RECLAMATION

*Managing Water in the West*

**Predecisional**

**Technical Memorandum No. PUB-8140-APP-2013-01**
**Appraisal Design Report**
**Supplemental Data - Comanche North**

# Arkansas Valley Conduit

**Fryingpan-Arkansas Project, Colorado**
**Great Plains Region**

**U.S. Department of the Interior**
**Bureau of Reclamation**

**June 2013**

# 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

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**U.S. Department of the Interior**
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**Technical Service Center**
**Denver, Colorado**

**June 2013**

## Technical Memorandum No. PUB-8140-APP-2013-01

# Arkansas Valley Conduit Appraisal Design Report

## Supplemental Data - Comanche North
## Fryingpan-Arkansas Project, Colorado
## Great Plains Region

Attached is a set of engineering support data of the AVC Comanche North alignment prepared by the Bureau of Reclamation's Technical Service Center (TSC). The engineering data supplements and supports the 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 Final Environmental Impact Statement* (AVC Final 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 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 P.E. — 6/3/13

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

6/3/13

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

6/3/13

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

REVISED COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS

Brief Description

# Attachment A

## 1. Purpose and Background

The purpose of the proposed Arkansas Valley Conduit (AVC) is to deliver water for municipal and industrial water use within Southeastern Colorado Water Conservancy District's boundaries. This water supply is needed to supplement or replace existing poor quality water and to help meet AVC participants' projected water demands. There are two general needs for AVC: (1) needs associated with drinking water quality, and (2) the need to meet existing and future water demands.

The AVC would include construction of buried pipelines, a water treatment plant (WTP), regulating tank , water surge tanks, pumping plants, valve vaults, meter vaults, participant deliveries, and other related facilities.

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 pre-National Environmental Policy Act (NEPA) process, the *Arkansas Valley Conduit Appraisal Design Report* (Appraisal Design Report) (Bureau of Reclamation, 2012a) was prepared by the Bureau of Reclamation's (Reclamation) Technical Service Center (TSC) in Denver, Colorado. As a result of alignment refinements, the Appraisal Design Report was supplemented with the *Arkansas Valley Conduit Appraisal Design Report Supplemental Data – Revised Comanche South* report (Revised Comanche South report) (Bureau of Reclamation 2012b), and both reports were included as an appendix to the *Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract Draft Environmental Impact Statement* (AVC Draft EIS) (Bureau of Reclamation, 2012c). The Appraisal Design Report identified five technically feasible construction Action Alternatives along with cost estimates. The Appraisal Design Report is a stepping stone into the feasibility level planning process.

This supplemental engineering data packet only includes items required to describe Comanche North alternative and its associated costs. Therefore, refer to the Appraisal Design Report (Bureau of Reclamation, 2012a) for more descriptions of specific topics related to the AVC Draft EIS Action Alternatives (Bureau of Reclamation, 2012c).

The Comanche North alternative consists of a main pipeline and spurs to convey Pueblo Reservoir water to communities along the Arkansas River corridor east of Pueblo to Lamar, Colorado. This alternative was investigated in an attempt to



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lower project costs and includes southern and northern segments selected from various alternatives, which generally fall within established AVC flight and environmental corridors already being evaluated. In this alternative, the WTP site is co-located with the Board of Water Works of Pueblo (BWWP) existing Whitlock WTP; this option is being investigated in order to reduce capital and operation and maintenance (O&M) costs because it directly impacts the number of operators required in a new plant.

The pipeline loop located between Rocky Ford, La Junta, and north to near Cheraw was broken in this alternative. Breaking of the loop between La Junta and Bents Fort eliminated approximately 3 miles of pipeline that traversed a significant portion of La Junta. It also eliminated an Arkansas River crossing, railway crossings, and a major canal crossing. In addition, it enabled the diameter of the pipeline serving Bents Fort to be reduced.

Additionally, to reduce capital and operation, maintenance, and replacement (OM&R) costs, water storage tanks (i.e., two sites consisting of a total of nine tanks) were removed from the Comanche North alternative. Storage facilities at participant proposed delivery points will need to be investigated during the feasibility level planning phase. However, two water surge tanks were added to provide a free water surface to manage the required pipe head class by reducing transient static pressure within the pipe. The sites proposed for online surge tanks are located in the Fowler and La Junta community areas. It should be noted that the original five Action Alternatives and the Revised Comanche South alternative were based on analyses using a peak day flow rate of approximately 20 million gallons per day (mgd). In order to reduce total construction costs, the maximum monthly flow rate of approximately 14.5 mgd was used in the Comanche North alternative analysis. The approximate pipeline size for this alternative is expected to range between 36 inches and 8 inches in diameter, with several smaller diameter spurs. The combined main pipeline and spur length would be approximately 227 miles.

The following sections contain brief descriptions of facility components included in the Comanche North alternative. 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 estimate sheets) included in this brief writeup were prepared by Reclamation's TSC in Denver, Colorado. These data supplement the Appraisal Design Report (Bureau of Reclamation, 2012a).

The Comanche North alternative was derived from "mixed, matched, and modified" environmental impact considerations, along with direct and indirect construction and operational costs of the various project components of the Action Alternatives presented in the Appraisal Design Report.

The cost estimate presented in this data packet is at the appraisal level and is not suitable for requesting construction funding from Congress due to the early stages of project development and the availability of limited design data.

# 2. Facility Components and Options

Specific components and screening criteria were developed as part of the process by the 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, final participant delivery locations, individual versus combined spurs, and 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 depicts the Comanche North alternative alignment and the major engineering components and options.

**Table 1. AVC EIS Comanche North Alternative - 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** |
| 227 miles | Dam/JUP/ Whitlock/ Comanche Powerplant raw water line route, then northern route | Co-located with BWWP Whitlock WTP | Filtered | Whitlock WTP exit high lift (465 feet) | Filtered | Yes |

Note: JUP = Utilizes existing joint use pipeline.

## 2.1 Comanche North Description

The following supplemental engineering data are attached to support the AVC Final EIS and Comanche North alternative:

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 Descriptions
Attachment G – Cost Estimate Sheets

**Comanche North Alternative Engineering Support Data**

The Comanche North alternative would generally use a southern alignment, whereby Pueblo Reservoir water would be diverted from the existing joint use pipe (JUP) "wye" immediately west of Pueblo Boulevard and would be filtered at the existing BWWP Whitlock WTP. Then, the water would be delivered in a pipeline route that would generally follow 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, then follow South Road to Avondale, and then (for the most part) north of the Arkansas River to Lamar.

The alignment would mostly avoid U.S. Highway 50 from Avondale to Fowler, and from La Junta to Las Animas, east of Pueblo. The first water surge tank site would be located north of Fowler. From the surge tank site, the alignment would zigzag east along county roads (CRs) on the north side of the Arkansas River and eventually join up with U.S. Highway 50 at Manzanola. Then, the alignment would zigzag southeast along CRs until reaching the south side of Rocky Ford. From Rocky Ford, the alignment would be north and east along Highway 266 to near Cheraw. A second water surge tank site would be located north of La Junta, near Cheraw. From Cheraw, the alignment would parallel CRs north of the Arkansas River to Las Animas. From Las Animas, the alignment would parallel U.S. Highway 50 to near the intersection with U.S. Highway 287. From this intersection, the alignment would cross south over the Arkansas River and then 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 south spur from Rocky Ford southeast to La Junta.

A high lift pumping plant, located at the BWWP Whitlock WTP site, would be required to raise the water over high ground up to approximate elevation (El.) 5100, on the southwest edge of the Pueblo segment. A regulating tank would be required near the high ground along the route, southwest of the City of Pueblo. 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.

Extensive effort was made during the appraisal level planning phase to lock in delivery point locations; however, depending on whether the water being delivered was filtered or filtered and disinfected, some AVC participants identified two delivery locations. The delivery of filtered water will directly impact AVC participant delivery point locations and should be revisited during the feasibility level planning phase.

This alignment would include an Interconnect between the north outlet works and south outlet works at Pueblo Reservoir (attachment C, facility drawing CN-1). The drawing shown in this document has been modified to show the specific

arrangement where the AVC water is carried in the JUP, rather than a dedicated pipeline. This eliminates a couple of medium-sized valves and a small amount of piping.

There are two alternatives under consideration that would use the existing JUP to convey AVC water to the Whitlock WTP: (1) divert out of the JUP at the "wye" located west of Pueblo Boulevard, and parallel the JUP the remaining way to the WTP; and (2) coordinate use of the JUP excess capacity the entire way to the WTP. Both alternatives would require coordination to secure a lease or purchase of excess capacity in any portion (or all) of BWWP's raw water pipeline. Since the JUP reduces in size (i.e., 84 inches, 78 inches to 66 inches) along its length, it is advised that further hydraulic analysis be performed using maximum monthly flow of 15.22 mgd (includes maximum monthly flow rate and an estimated 5-percent WTP waste) to verify the capacity in this section of pipe at low reservoir water surface El. 4796 when considering BWWP build-out capacity of 140 mgd at the Whitlock WTP site.

## 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 online surge 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 for Comanche North Alternative**

| Type of Crossing | Number of Crossings[1] |
|---|---|
| Divided highway<br>(interstate highway) | 27<br>(1) |
| Major road | 26 |
| Paved road<br>(Pueblo streets) | 200<br>(9) |
| Gravel road | 10 |
| Railroad | 8 |
| Major river/stream | 7 |

**Table 2. Number of Crossings for Comanche North Alternative**

| Type of Crossing | Number of Crossings[1] |
|---|---|
| Minor creek/stream (costs are included in design contingencies) | 46 |
| Irrigation ditch or small drainage (costs are included in design contingencies) | 78 |

[1] The number of crossings, including drainage crossings, will be further evaluated and confirmed during the design data collection phase (Scour Study planned for fiscal year 2014) and during the feasibility level planning phase.

### 2.2.2 Pumping/Booster 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.

Whitlock Pumping Plant (attachment C, drawing CN-2) would be sited at the BWWP Whitlock WTP site to lift filtered water from the WTP over high grounds southwest of Pueblo. The ground surface at the Whitlock WTP site is at approximately El. 4688.

The Whitlock Pumping Plant would be of the open sump style, which means that the reservoir water pressure would be reduced to a constant water elevation at the Whitlock WTP by an inlet altitude pressure-reducing valve. The valve pressure drop would vary between approximately 73 feet and 200 feet with Pueblo Reservoir at low and high water surface elevations, respectively. The pumping plant would consist of four vertical turbine type pumps, each rated at 5.61 cubic feet per second ($ft^3/s$) (2,518 gallons per minute [gpm] and 465 feet [includes 5 feet of unit losses]) of total dynamic head operating at 1,800 revolutions per minute. The pumping units would be driven by 400-horsepower, weather-protected Type I, vertical induction electric motors operating at 4,160 volts, 3 phase, 60 hertz.

The Comanche North alternative routes around the southwestern edge of Pueblo, with a high point of approximately El. 5100. A regulating tank (attachment C, drawing CN-4) would be located downstream of the WTP near high ground the pipeline is crossing. Filtered water would be pumped from the clearwell, over high ground southwest of the City of Pueblo, to the Fowler North water surge tank (attachment C, drawing CN-5). The Fowler North water surge tank site would be located at approximate ground El. 4545. The valve pressure drop would vary between approximately 43 feet and 535 feet, with varying flow rates through the year at high and low flow rates, respectively. The La Junta North water surge tank site would be located near Cheraw (attachment C, drawing CN-6) at approximate ground El. 4155. The valve pressure drop would vary between

approximately 16 feet and 321 feet, with varying flow rates through the year at high and low flow rates, respectively.

The Eads/May Valley booster pumping plant (attachment C, drawing CN-3) would provide additional pressure necessary to deliver water to the Eads and May Valley communities. It 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 1.0 $ft^3/s$ (449 gpm) and 305 feet (includes 5 feet of unit losses) of total dynamic head operating at 1,800 revolutions per minute. 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 50-horsepower, totally enclosed, fan-cooled, vertical induction electric motor operating at 480 volts, 3 phase, 60 hertz.

The Whitlock Pumping Plant would include a shallow reinforced concrete clearwell substructure and a pre-engineered 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. Meter 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 to span the distance.

### 2.2.3 Surge Tanks

In a cost reduction effort, water storage tanks at Fowler North and La Junta North have been replaced with water surge tanks (attachment C, drawings CN-5 and CN-6). The surge tanks will perform the function of positively reducing the pipeline pressure and the function of surge protection during anticipated normal valve movements by participants.

A surge allowance of 30 percent above static pipeline pressure elevation at the most downstream end of the pipeline reach is provided. A set of pressure-reducing valves (cost is included in the design contingencies), operating in the altitude mode, will set the normal operating tank water elevation at 10 feet below the top of the tank. This freeboard is anticipated to be adequate for use during the upsurges.

### 2.2.4 Water Treatment Plant

The AVC Draft EIS (Bureau of Reclamation 2012c) evaluated five Action Alternatives that would supplement existing water supplies of the AVC participants and meet a portion of their existing and future municipal and industrial demands. The water treatment component of these Action Alternatives considered conventional treatment technologies that have been used to reliably and economically treat surface water supplies from Pueblo Reservoir and the Arkansas River upstream of its confluence with Fountain Creek.

The proposed Comanche North alternative is anticipated to deliver filtered water (nonpotable) to the AVC participants, which would be treated at a central facility (not fully confirmed by the Colorado Department of Public Health and Environment [CDPHE]). Filtered water meets all requirements of the *Colorado Primary Drinking Water Regulations* (CDPHE, 2010), with the exception that a disinfectant residual is not maintained. If residual disinfection with free-chlorine is maintained in a long pipeline such as the AVC, disinfection by-product (DBP) standards may be exceeded.

Integrating AVC water treatment (up to 14.5 mgd of filtered water) with the existing BWWP Whitlock WTP is evaluated in the Comanche North alternative. Integrating AVC water treatment with the Whitlock WTP has several treatment-related operational benefits and may be more cost effective than constructing, operating, and maintaining a new WTP. The treatment process scheme at the Whitlock WTP uses the same conventional technologies included in the WTP components evaluated in other Action Alternatives. Also, Whitlock WTP staff has decades of experience producing high-quality drinking water from the same surface water supply proposed for the AVC (Pueblo Reservoir). The Whitlock WTP is also favorably located next to potential pipeline alignments of the AVC Draft EIS Action Alternatives previously evaluated.

The current capacity of the Whitlock WTP is 84 mgd. BWWP has an ultimate planned build-out capacity of 180 mgd, with 40 mgd of that capacity located at the 50-acre reserved site at Pueblo Reservoir and the remaining 140 mgd located at the Whitlock WTP site (BWWP, 1998). Colorado Springs Utilities has a contractual right to 68 mgd in the portion of the JUP from the south outlet works and delivery manifold to the “wye” located west of Pueblo Boulevard, so they would need to be involved in discussions concerning use of excess capacity in the BWWP’s raw water pipeline. Recent maximum daily production at the Whitlock WTP has been 56 mgd; therefore, the BWWP could, at present, reliably supply 14.5 mgd of treated water to AVC. Based on relatively modest BWWP water demand growth, this excess capacity is likely to be available for some years into the future. However, it is anticipated that, at some point, growing AVC water demand would require constructing additional treatment facilities at the existing Whitlock WTP to meet BWWP and AVC demands. Appraisal level engineering

and capital and annual OM&R costs are developed here to describe the Comanche North alternative WTP component that would use the Whitlock WTP to produce up to 14.5 mgd of filtered water for AVC.

For this analysis, it was assumed that additional facilities that may be required in the future to meet AVC demands would be implemented within the context of the Whitlock WTP facility Master Plan. Expansion of the Whitlock WTP has been master planned in two phases: each phase includes an additional enhanced settling train and additional granular media filters similar to those constructed in the most recent capacity expansion (BWWP, 2003). There is little, if any, space available onsite that is not already reserved for additional future treatment facilities. Separate treatment facilities to supply AVC demands, operated in parallel with existing BWWP facilities, would require extremely compressed footprint designs and extensive relocation of existing large-diameter yard piping, would potentially infringe on existing treatment basins, and would require extraordinary measures and methods to maintain BWWP's production capacity during construction. These considerations would increase the capital cost of additional treatment facilities and impose unacceptable limitations on BWWP's use of the Whitlock WTP site to meet future demands.

For this analysis, it was assumed that one additional enhanced settling train and two new filters of the current design would expand treatment capacity to serve AVC demands. The enhanced settling train includes coagulation, flocculation, and plate-assisted sedimentation processes (pretreatment). The BWWP's existing water treatment practice includes chloramination before filtration for DBP control. Breakpoint chlorination capability would be added after AVC filters to remove chloramine residual and deliver filtered water to AVC. The ultimate BWWP build-out capacity of 140 mgd at the Whitlock WTP site would not be affected by this proposed AVC expansion and could be preserved by constructing a fourth enhanced-settling train and three additional filters of the current design or by using higher-rate treatment technologies, at BWWP's discretion.

The Supervisory Control and Data Acquisition (SCADA) control center for AVC pipeline operations would be co-located with the proposed Whitlock Pumping Plant. It is anticipated that the SCADA system would need to be interfaced with the BWWP SCADA system to ensure that the control system would be compatible. Metering facilities would be included at each participant delivery vault (attachment C, drawing CN-7). Layout of new facilities on the Whitlock WTP site is shown on attachment C, facility drawing CN-9.

The cost of constructing 14.5 mgd of additional treatment capacity at the Whitlock WTP would be substantially less than constructing a new WTP. The Whitlock WTP has facilities, such as a water quality laboratory and administrative

and staff accommodation spaces, that would not need to be expanded for AVC. Using other existing ancillary facilities that would only require modification or modest expansion, rather than complete new construction, would also substantially reduce construction costs. Ancillary facilities that would require only partial replacement include the electrical power substation, residual lagoons, low-service pumping, finished water operational storage, and certain chemical feed systems. Finally, existing pretreatment and filtration capacity would meet treatment redundancy requirements, further reducing the construction cost for a 14.5-mgd expansion. Construction cost for an AVC treatment component integrated with the Whitlock WTP could be 56 to 62 percent less compared with other Action Alternatives evaluated in the AVC Draft EIS.

The unit cost for treatment at an integrated Whitlock WTP could also be reduced. An economy of scale related to treatment labor costs would reduce unit OM&R costs for water produced at Whitlock WTP over the AVC Draft EIS timeframe. Unlike variable OM&R costs, such as power chemical usage and residuals disposal, that vary in a nearly linear manner with production, labor costs associated with treatment operations typically vary to a much lesser degree. For example, BWWP anticipates that no additional staff would be required to produce up to an additional 14.5 mgd of filtered water at the Whitlock WTP for use by AVC (BWWP, 2012). Based on this potential economy of scale for the labor component of OM&R costs, treating an additional 3,015 mgd per year (8.26 mgd) at the Whitlock WTP for use by AVC participants would lower the unit cost of treatment by 14.3 percent, as shown in attachment G, table G1.

This potential OM&R cost savings was calculated using the OM&R cost breakdown developed for other Action Alternatives and could vary throughout the timeframe evaluated in the AVC Draft EIS, based on the terms and conditions of the contract negotiated between Reclamation and BWWP. Economies of scale related to variable OM&R costs, such as power, chemical usage, and residuals disposal, were not evaluated here but would contribute to lower unit cost for treatment. Annual unit treatment costs for the Action Alternatives estimated here are similar to median cost values with those of utilities of comparable size, as shown in attachment G, table G2.

AVC participants would be responsible for adding a disinfectant residual (likely free-chlorine) at the entry point(s) to their distribution system(s). OM&R of AVC turnout disinfection stations would be the responsibility of AVC participants. Based on conversations thus far with the CDPHE Water Quality Control Division, 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 for reporting requirements for water received from the AVC. 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's *Colorado Primary Drinking Water Regulations* (CDPHE, 2010) and project-specific guidance from Mr. Ron Falco, CDPHE Safe Drinking Water Program Manager (CDPHE, 2011).

In addition to the AVC turnout disinfection stations, 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 SCADA central control center. For further in-depth discussion of a filtered WTP process, technologies, and components, see pertinent sections of the Appraisal Design Report (Bureau of Reclamation, 2012a).

# 3. Cost Summary

This section briefly summarizes the appraisal level construction costs and OM&R costs for the Comanche North alternative that will be provided to the EIS team with a level of information that is consistent with previous deliverables. The appraisal level cost estimate presented in this data packet is at the appraisal level and not suitable for requesting construction funding from Congress due to the early stages of project development and the availability of limited design data. For additional details regarding construction and OM&R cost estimating, see the Appraisal Design Report (Bureau of Reclamation, 2012a). Table 3 summarizes total construction costs and present worth OM&R costs for the Comanche North alternative.

**Table 3. Summary of Total Construction and Present Worth: OM&R Costs (January 2011 Dollars) for Comanche North Alternative**

| Cost Description | Cost |
|---|---|
| Total construction cost[1] | $400,000,000 |
| Present worth total OM&R costs (less WTP OM&R costs)[2] | $37,400,000 |
| Present worth total WTP OM&R costs | $36,000,000 |
| **Total costs (50-year period)** | **$473,400,000** |

[1] Includes Interconnect subtotal costs of $4,158,675. Applying the 5% mobilization, 12% design contingency, and 23% construction contingency to the Interconnect subtotal costs, this translates to approximately $6,000,000 in field costs for the Interconnect. The field costs for the Interconnect do not include noncontract costs. Noncontract costs for the Interconnect were not separated from the total project noncontract costs. Note that simply subtracting $6,000,000 of Interconnect field costs from the total construction cost above may not give an accurate representation of the total construction costs less the Interconnect costs due to the Reclamation rounding guide.

[2] Includes Interconnect present worth OM&R costs of $34,000.

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 support team.

## 3.1 Project Cost Summary

Costs prepared are those associated with the delivery of maximum monthly demands. Table 4 summarizes the Comanche North alternative contract cost, field cost, and total construction cost by reach.

**Table 4. Summary of Total Construction Costs for Comanche North Alternative**

| | Components | |
|---|---|---|
| | **AVC intake** | Pueblo Dam |
| | **Route through Pueblo** | JUP to Whitlock WTP, then south of Pueblo |
| | **Route east of Pueblo** | South and north of river |
| | **Water treatment** | Co-located with BWWP Whitlock WTP |
| | **Dam outlet works Interconnect** | Yes |
| Reach 1 and 2 pipeline, high-lift pumping plant, and regulating tank between Pueblo intake and Fowler | | $70,791,997 |
| Reach 3 pipeline and surge tanks between Fowler and La Junta (excludes south spur) | | $31,043,790 |
| Reach 4 pipeline between La Junta north surge tank (Cheraw) and Lamar | | $28,688,129 |
| Highway 96 spur pipeline | | $6,590,546 |
| Eads spur (includes May Valley) pipeline and booster plant | | $8,021,230 |
| South spur between Rocky Ford and La Junta | | $9,703,668 |
| Roadway, railroad, and stream/drainage crossings | | $22,720,000 |
| Dewatering of soil for construction | | $4,235,000 |
| Dust abatement during construction | | $4,000,000 |
| Dam outlet works Interconnect | | $4,158,675 |
| WTP[1] (Co-located with BWWP Whitlock WTP) | | $11,501,586 |
| Subtotal | | $201,454,621 |
| Mobilization (±5%) | | $10,000,000 |
| Design contingencies (±12%) | | $28,545,379 |
| **Contract Cost** | | $240,000,000 |
| Construction contingencies (±23%) | | $50,000,000 |
| **Field Cost[2]** | | $290,000,000 |
| Noncontract costs[3] | | $110,000,000 |
| **Total Construction Cost** | | $400,000,000 |

[1] Costs provided to TSC on April 8, 2013, from MWH America's, Inc. subconsultant Black & Veatch.

[2] Includes Interconnect subtotal costs of $4,158,675. Applying the 5% mobilization, 12% design contingency, and 23% construction contingency to the Interconnect subtotal costs, this translates to approximately $6,000,000 in field costs for the interconnect.

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

### 3.1.1 Design and Construction Contingencies

With the development of the Comanche North alternative, the design and construction contingency rates used in the cost estimate were evaluated based upon changes from the previous alternatives and the subsequent confidence level from additional exploration (i.e., design data collection) and design. The previous alternatives utilized a design contingency of +/- 12% and a construction contingency of +/- 25%.

Section 1, "Purpose and Background," of this attachment cites the previous work in the development of the five Action Alternatives as discussed in the Appraisal Design Report (Bureau of Reclamation, 2012a). Reference Chapter 8 of the Appraisal Design Report (section 8.1.1.6 on page 158 through section 8.1.1.9 on page 161) for details and descriptions of the design and construction contingencies utilized in the alternatives.

On page 158 of the Appraisal Design Report, it states: "Design contingencies are intended to account for three types of uncertainties inherent as a project advances from the planning stage through final design, which directly affects the estimated cost of the project. These include: (1) minor unlisted items, (2) minor design and scope changes, and (3) minor cost estimating refinements."

Furthermore, on page 159 of the Appraisal Design Report, it states: "…construction contingencies…cover minor differences in actual and estimated quantities, unforeseeable difficulties at the site, changed site conditions, possible minor changes in plans, and other uncertainties."

It is appropriate to note that, on page 160 and 161 of the Appraisal Design Report, it states: "In general, designs and cost estimates at the preliminary and appraisal levels are prepared based on local knowledge and existing project data." Furthermore, it is stated: "… the confidence level of the design and cost estimate increases based on the level of exploration and availability of design data available to the design staff. Simply stated, the confidence of the design and cost estimate is directly related to the amount and quality of the design data collected for the project."

The following is noted to have changed as a result of refining the alignment and availability of draft design data in developing the Comanche North alternative:

1. The Comanche North alternative has less "urban" type construction going through the City of Pueblo than most action alternatives, which would have had a higher construction risk (i.e., utility and road crossings, traffic control, etc.).

2. A third gradation of pipe installation costs was added to better define existing conditions. Previous estimates were based on an urban and rural pipe installation designation, whereas the current estimate has city, suburban, and rural installations.

3. The number of river crossings was reduced, which has a perceived high construction risk.

4. Appraisal designs and cost estimates have since gone through an independent appraisal level Design, Engineering, and Construction (DEC) review, and no significant comments were received that would indicate that the current estimate methodologies are not adequate.

5. Limited Phase I geologic exploration to date indicates that current assumptions regarding pipeline rock excavation are appropriate. Appraisal designs and estimates assume 80% soil and 20% partial rock (3 feet of cover on rock) excavation for the pipeline. Of 67 draft borings, only 4 borings indicated rock within 5 feet of the top of ground, and only 8 borings indicated rock within the assumed depth of the trench (about 9 feet).

Given these changes with the Comanche North alternative, the construction contingency is reduced from +/- 25% to +/-23%. The design contingency remains the same at +/-12%.

Reclamation prepares studies and designs at various levels during the evaluation and planning of a project. Similarly, various levels of cost estimates are prepared throughout the life of that project. Table 5, from page 160 of the Appraisal Design Report, provides a partial list of the recognized levels of cost estimates prepared by Reclamation and some common percentages used in preparation of those cost estimates over the design life of a project.

**Table 5. Common Contingency Percentages**

| Level | Design Contingency (%) | Construction Contingency (%) |
|---|---|---|
| Preliminary | 20-30 | 25-30 |
| Appraisal | 15-20 | 20-30 |
| Feasibility | 10-15 | 20-25 |
| 30% design | 5-15 | 20 |
| 90% design | 2-10 | 20 |
| PreVal[1] | 0-3[3] | 0[3] |
| IGCE[2] | 0[3] | 0[3] |

[1] PreVal denotes Prevalidation of Funds Cost Estimate.
[2] IGCE denotes Independent Government Cost Estimate.
[3] It should be noted that even though contingencies are not formally computed and included in Preval and IGCE cost estimates, it is widely recognized and understood that the budget established at the feasibility level, which is generally used for authorization and appropriation of a Reclamation project, should be maintained and carried in the budget by Eastern Colorado Area Office.

### 3.1.2 Noncontact Costs

Along with the contingency rates, the noncontract costs were re-evaluated due to the changes in the Comanche North alternative. Table 6 itemizes the noncontract costs used in this alternative.

**Table 6. Noncontract Cost Summary (Millions of Dollars)**

| Noncontract Cost Items | | | $ Million |
|---|---|---|---|
| Right-of-way/easement purchase (land costs) | | | $12.2 |
| Relocation of facilities | | | $0.825 |
| Distributive costs | | | $86.025 |
| Service facilities | | $0.825 | |
| Planning investigations (postauthorization) | | $26.45 | |
| Studies | $14.75 | | |
| Design data collection, surveys, and topography | $11.7 | | |
| Engineering and other costs | | | |
| Design and specification | | $28.7 | |
| Construction engineering and management | | $29.0 | |
| Management and office engineering | $9.40 | | |
| Offsite offices | $3.90 | | |
| Construction inspection and surveying | $8.30 | | |
| Laboratories | $4.10 | | |
| Program management | $0 | | |
| Construction safety | $0.36 | | |
| Construction office costs | $2.80 | | |
| Other costs | | $1.05 | |
| Procurement | | | $1.65 |
| Legislative | | | $0.00 |
| Reclamation grant administration | | | $0.00 |
| Reclamation postauthorization | | | $6.60 |
| Sponsor postauthorization oversight | | | $3.61 |
| | | Total | $110.91 [1] |

[1] Total noncontract costs were rounded from this value for use in the total construction cost per *Reclamation Manual*, Directives and Standards FAC 09-01 (see table 4).

## 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 7).

**Table 7. Summary of OM&R Present Worth Costs (January 2011 Dollars) for 50-Year Life Cycle (assuming a discount rate of 4.125%) for Comanche North Alternative**

| Cost Description | OM&R Present Worth Costs |
|---|---|
| Present worth of all future periodic (replacement) costs (less WTP)[1] | $7,400,000 |
| 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) | $30,000,000 |
| Present worth of all future WTP annual (O&M) costs | $36,000,000 |
| **Total OM&R present worth costs[2]** | **$73,400,000** |

[1] Includes Interconnect present worth OM&R costs of $34,000.
[2] 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 at the WTP facility.

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 8).

**Table 8. Summary of Annualized OM&R Costs[1] for Comanche North Alternative**

| Cost Description | Annualized OM&R Costs |
|---|---|
| Annual OM&R costs (less annual WTP OM&R costs)[2] | $1,750,000 |
| Annual WTP OM&R costs | $1,700,000 |
| **Total annual OM&R costs[1]** | **$3,450,000** |

[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 at the WTP facility.
[2] Includes Interconnect annualized OM&R costs of $1,600.

### 3.2.2 Energy Cost

Energy supply for pumping plants and the WTP, and other ancillary facilities 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.

Table 9 presents the annual energy costs for operation of the pumping plant and booster plant for the Comanche North alternative. These costs are based on the information provided by Black Hills Energy and Southeast Colorado Power Association. The energy costs are for operations of a typical WTP for the year 2010, as stated in Black & Veatch Comanche North email dated April 9, 2013.

**Table 9. Annual Plant Energy Costs**

| | Location | Energy Costs |
|---|---|---|
| Comanche North Alternative | Whitlock Pumping Plant | $700,000 |
| | Eads/May Valley Booster Plant | $3,500 |
| WTP | Whitlock | $99,300 |

# 4. References

Bureau of Reclamation, 2012a. *Arkansas Valley Conduit Appraisal Design Report,* Technical Memorandum No. PUB-8140-APP-2012-01, Bureau of Reclamation, Civil Engineering Support Division, Technical Service Center, Denver, Colorado, August 7, 2012.

Bureau of Reclamation, 2012b. *Arkansas Valley Conduit Appraisal Design Report Supplemental Data – Revised Comanche South,* Technical Memorandum No. PUB-8140-APP-2012-02, Bureau of Reclamation, Civil Engineering Support Division, Technical Service Center, Denver, Colorado, August 14, 2012.

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

BWWP, 1998. *Water Treatment Master Plan*, Board of Water Works of Pueblo, Colorado, Prepared by Black & Veatch, October 1998.

BWWP, 2003, *Whitlock WTP Expansion Specifications and As-Built Construction Drawings*, BWWP P.N. 4597-1, Board of Water Works of Pueblo, Colorado, Prepared by Black & Veatch, 2003.

BWWP, 2012. Letter from Mr. Terry Book to Ms. Signe Snortland, *Public Comment on the Arkansas Valley Conduit and Long Term Excess Capacity Master Contract Draft Environmental Impact Statement*, October 12, 2012.

CDPHE, 2010. *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, 2011. Letter from Mr. Ron Falco, CDPHE Safe Drinking Water Program Manager, to Mr. Michael P. Collins, Area Manager, U.S. Department of the Interior, Bureau of Reclamation, December 12, 2011.

ATTACHMENT B

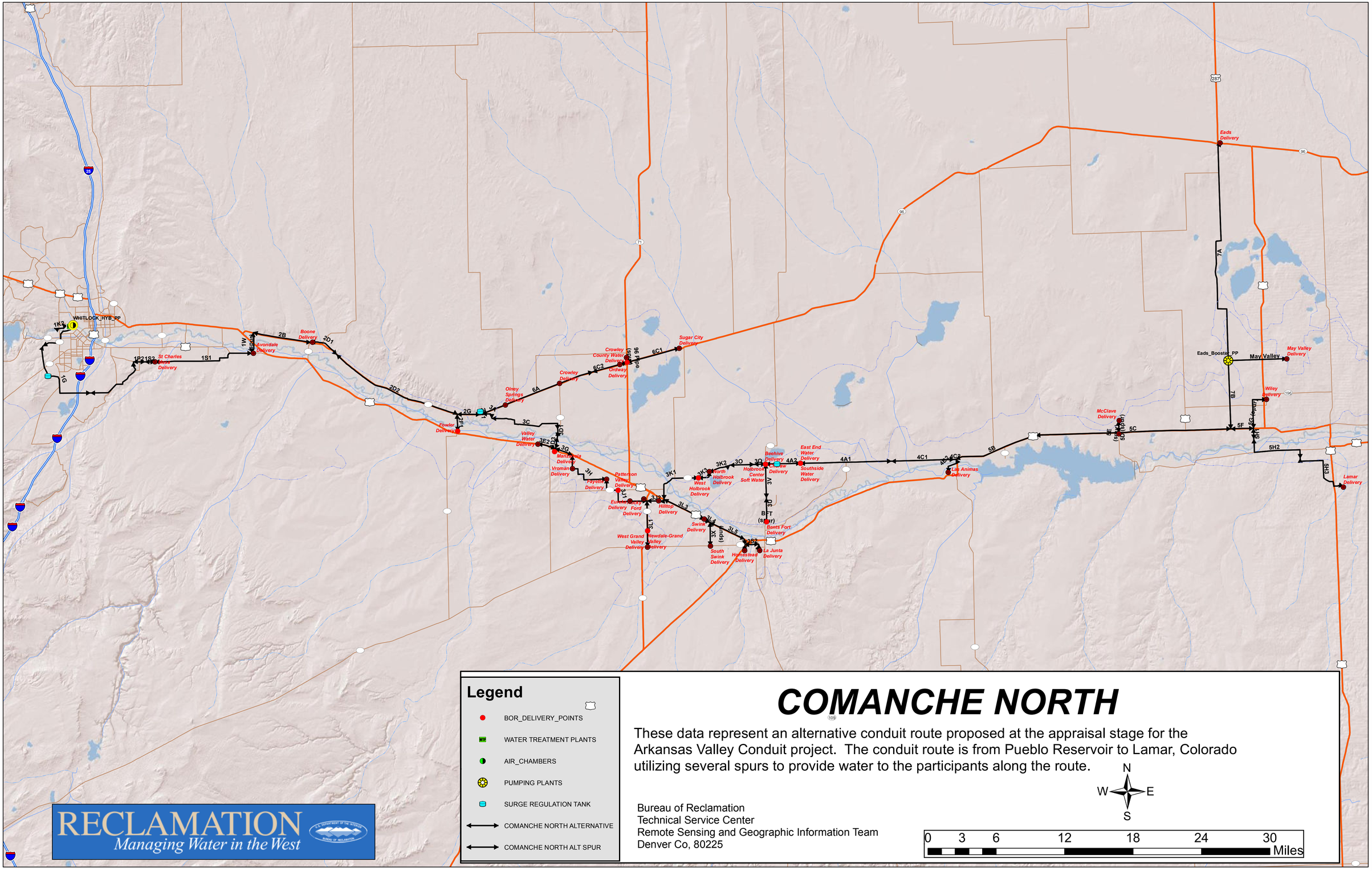
COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS –

Large Scale Map (1 Sheet)

Small Scale Maps (7 Sheet)

Large Scale Map Showing Pipe Sizes (1 Sheet)




# COMANCHE NORTH

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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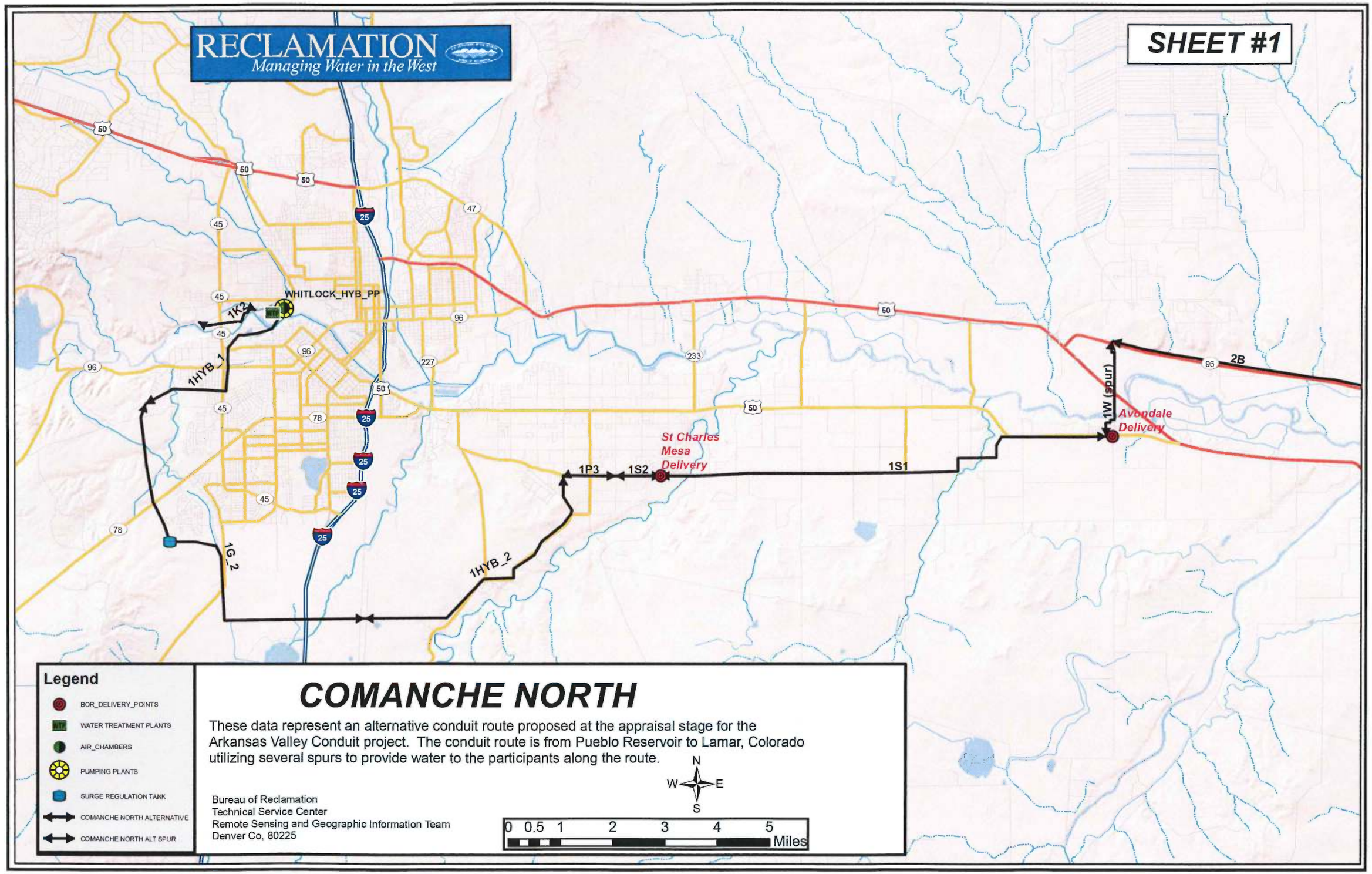


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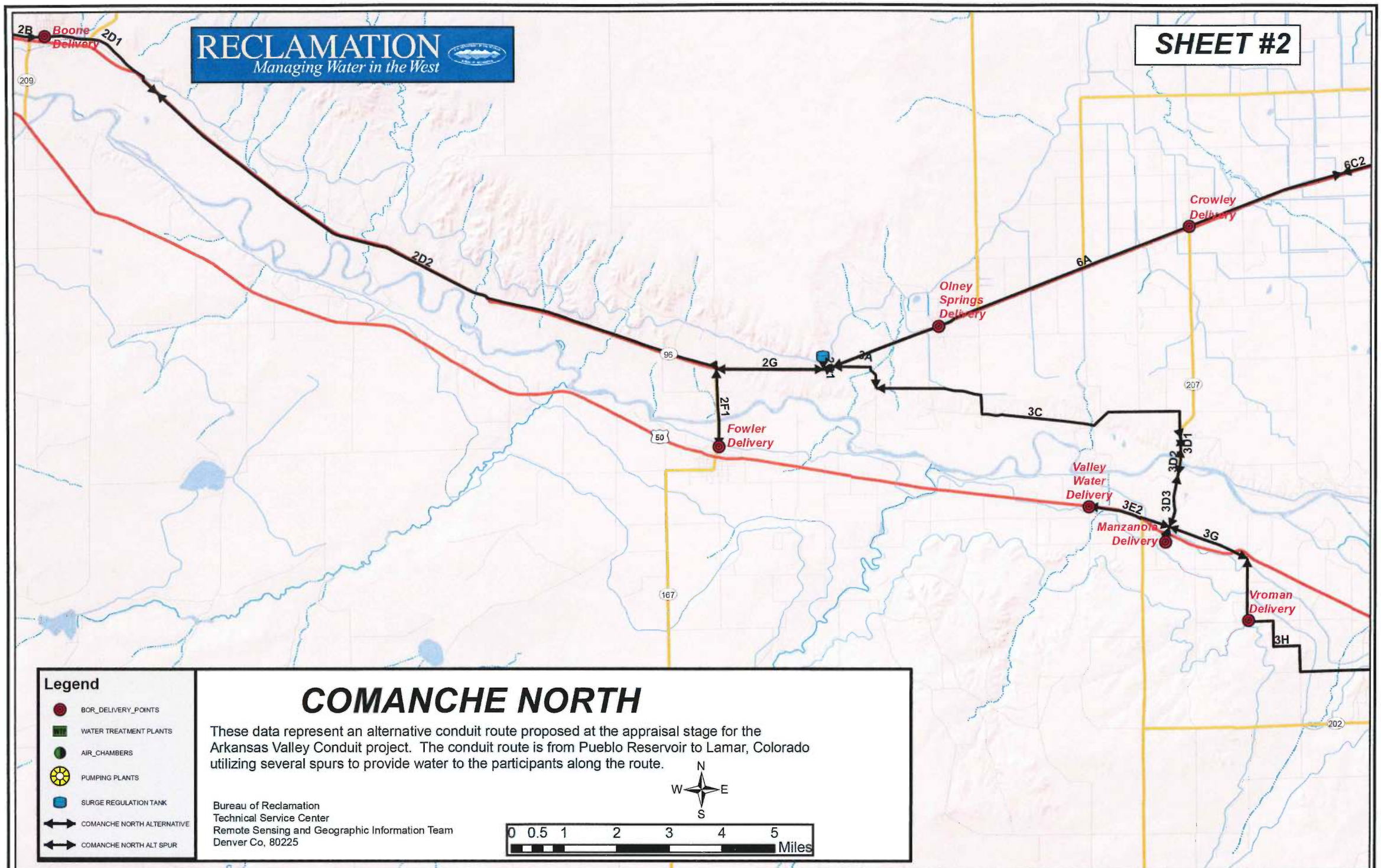
RECLAMATION
Managing Water in the West
SHEET #2
2B
Boone Delivery
2D1
2D2
2G
2F1
Fowler Delivery
3A
Olney Springs Delivery
6A
6C2
Crowley Delivery
3C
3D1
3D2
3D3
Valley Water Delivery
3E2
Manzanola Delivery
3G
Vroman Delivery
3H
209
96
50
167
207
202
Legend
BOR_DELIVERY_POINTS
WATER TREATMENT PLANTS
AIR_CHAMBERS
PUMPING PLANTS
SURGE REGULATION TANK
COMANCHE NORTH ALTERNATIVE
COMANCHE NORTH ALT SPUR
COMANCHE NORTH
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Technical Service Center
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Denver Co, 80225
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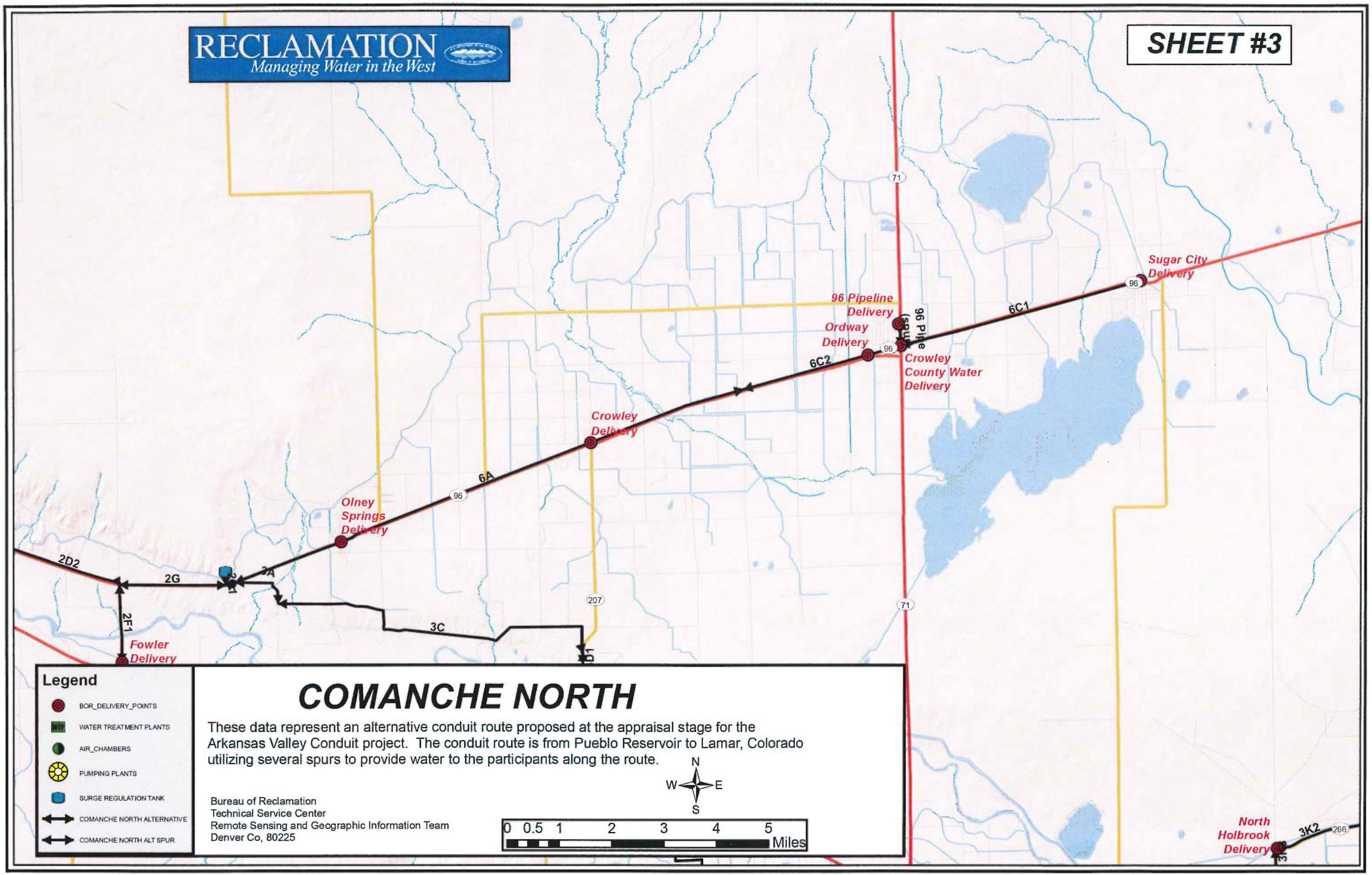
Miles


RECLAMATION
Managing Water in the West
SHEET #3
Sugar City Delivery
96 Pipeline Delivery
Ordway Delivery
96 Pipe
Crowley County Water Delivery
6C1
6C2
Crowley Delivery
6A
Olney Springs Delivery
2D2
2G
2A
2F1
Fowler Delivery
3C
D1
North Holbrook Delivery
3K2
71
96
207
266
Legend
BOR_DELIVERY_POINTS
WATER TREATMENT PLANTS
AIR_CHAMBERS
PUMPING PLANTS
SURGE REGULATION TANK
COMANCHE NORTH ALTERNATIVE
COMANCHE NORTH ALT SPUR
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Denver Co, 80225
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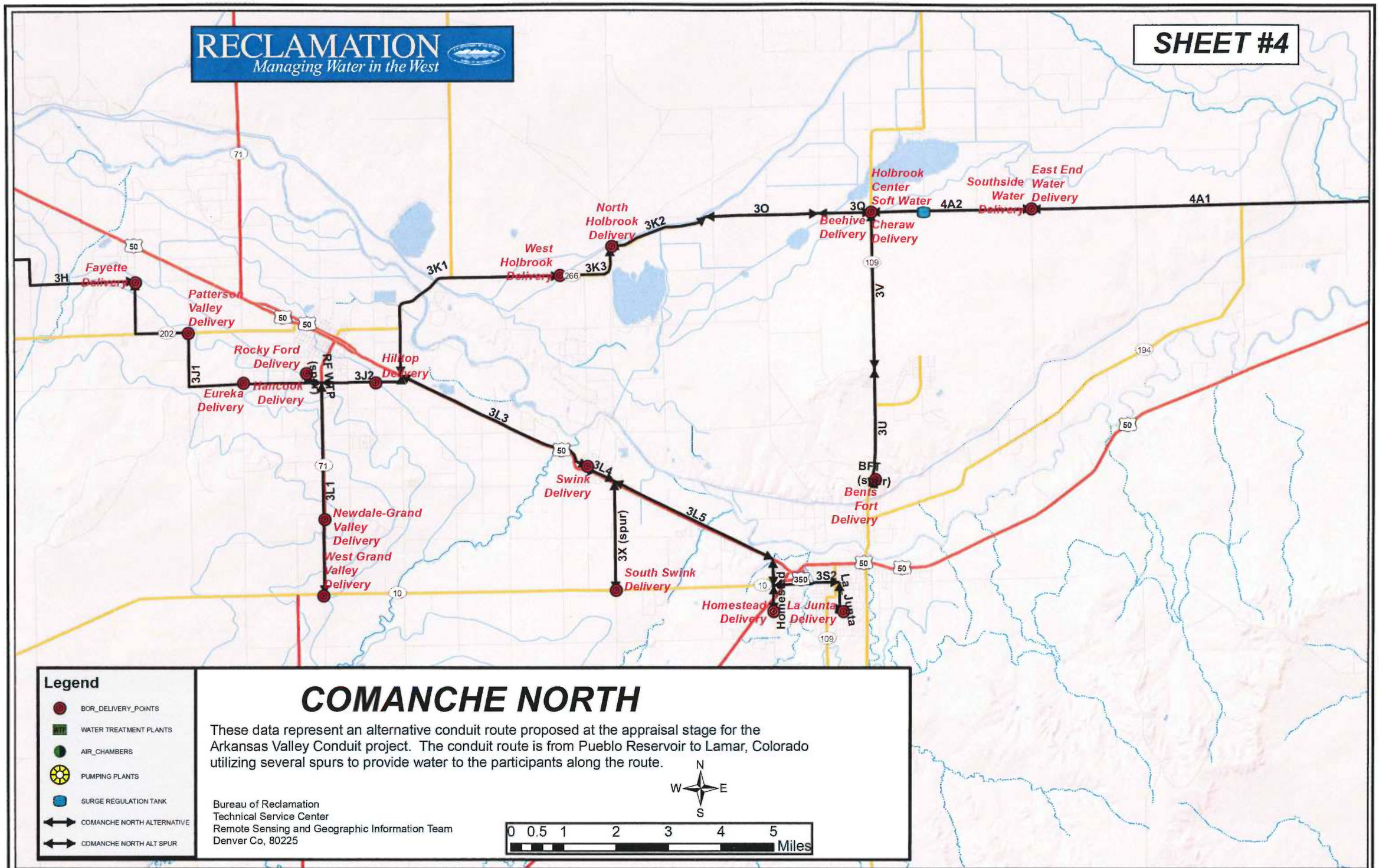
RECLAMATION
Managing Water in the West
SHEET #4
Fayette Delivery
Patterson Valley Delivery
Rocky Ford Delivery
Eureka Delivery
Hancock Delivery
Hilltop Delivery
West Holbrook Delivery
North Holbrook Delivery
Holbrook Center Soft Water
Beehive Delivery
Cheraw Delivery
Southside Water Delivery
East End Water Delivery
Newdale-Grand Valley Delivery
West Grand Valley Delivery
Swink Delivery
South Swink Delivery
Homestead Delivery
La Junta Delivery
Bents Fort Delivery
3H
3J1
3J2
3K1
3K2
3K3
3L1
3L3
3L4
3L5
3X (spur)
3O
3Q
4A2
4A1
3V
3U
BFT (spur)
3S2
Homestead
La Junta
Legend
BOR_DELIVERY_POINTS
WATER TREATMENT PLANTS
AIR_CHAMBERS
PUMPING PLANTS
SURGE REGULATION TANK
COMANCHE NORTH ALTERNATIVE
COMANCHE NORTH ALT SPUR
COMANCHE NORTH
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Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225
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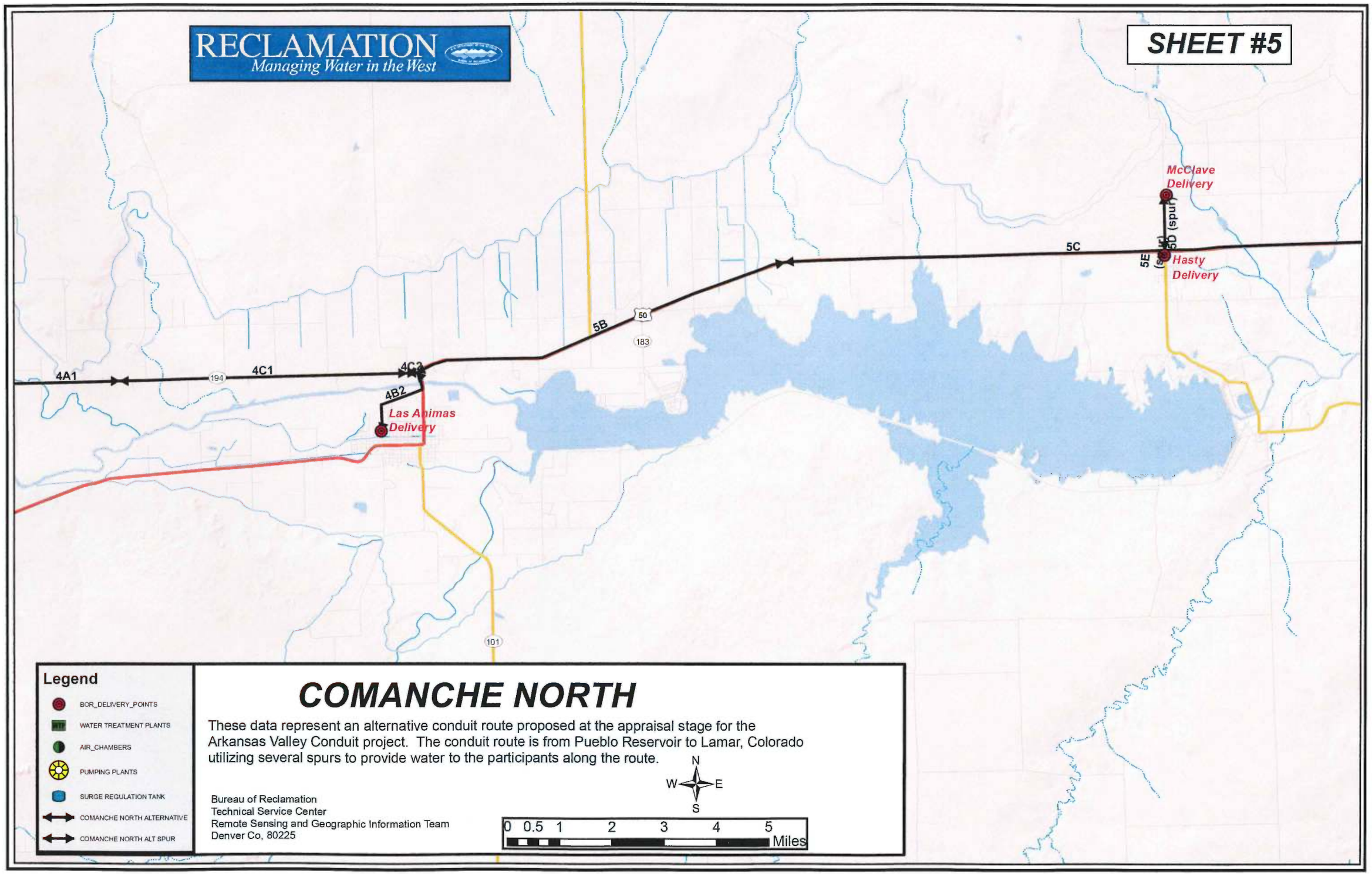
RECLAMATION
Managing Water in the West
SHEET #5
McClave Delivery
5D (spur)
5E (spur)
Hasty Delivery
5C
5B
50
183
4A1
194
4C1
4C2
4B2
Las Animas Delivery
101
Legend
BOR_DELIVERY_POINTS
WATER TREATMENT PLANTS
AIR_CHAMBERS
PUMPING PLANTS
SURGE REGULATION TANK
COMANCHE NORTH ALTERNATIVE
COMANCHE NORTH ALT SPUR
COMANCHE NORTH
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Technical Service Center
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Denver Co, 80225
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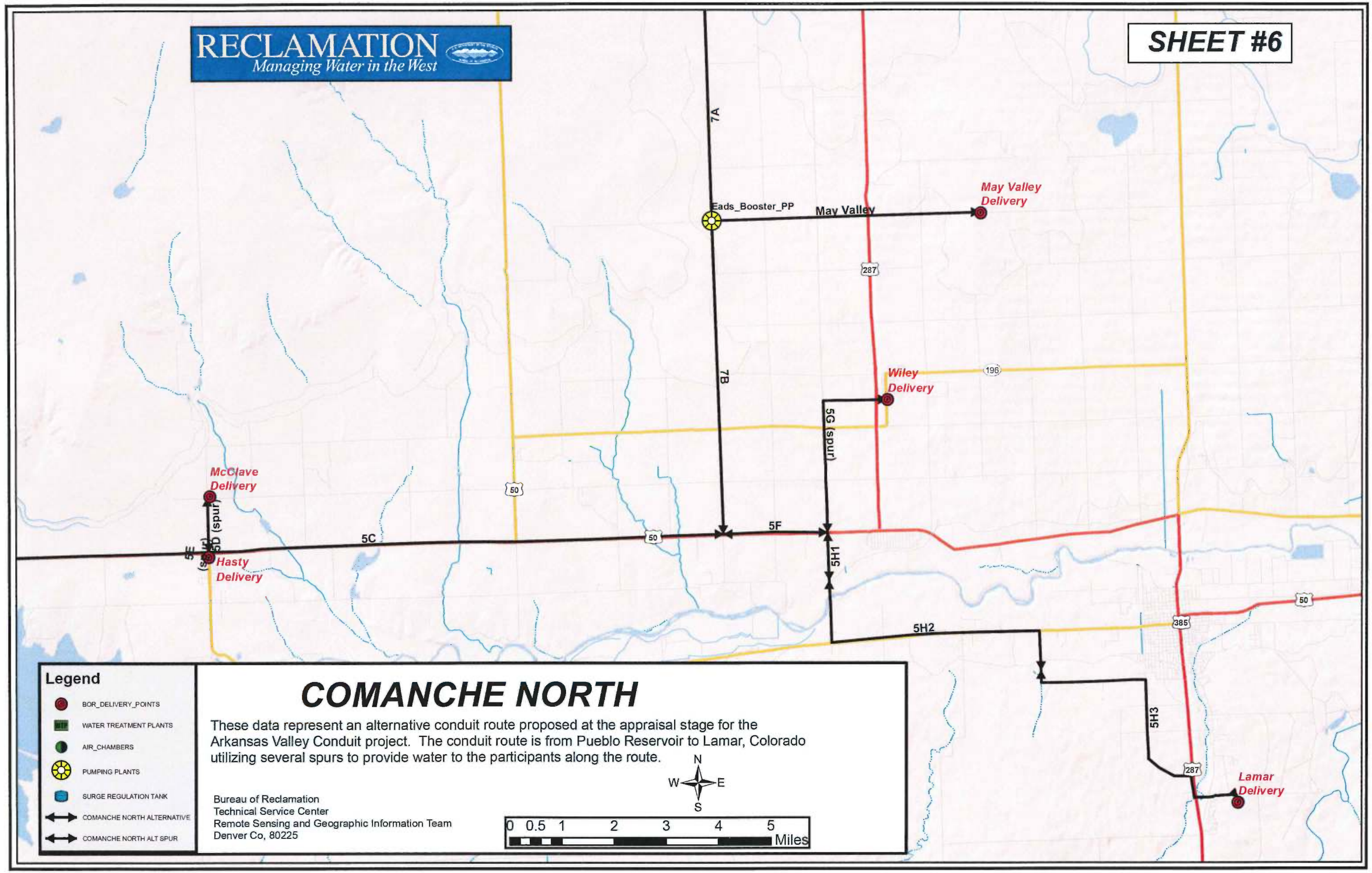
Miles


RECLAMATION
Managing Water in the West
SHEET #6
7A
Eads_Booster_PP
May Valley
May Valley Delivery
287
7B
Wiley Delivery
196
5G (spur)
McClave Delivery
50
5D (spur)
5E (spur)
5C
Hasty Delivery
5F
5H1
5H2
385
5H3
Lamar Delivery
Legend
BOR_DELIVERY_POINTS
WATER TREATMENT PLANTS
AIR_CHAMBERS
PUMPING PLANTS
SURGE REGULATION TANK
COMANCHE NORTH ALTERNATIVE
COMANCHE NORTH ALT SPUR
COMANCHE NORTH
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Denver Co, 80225
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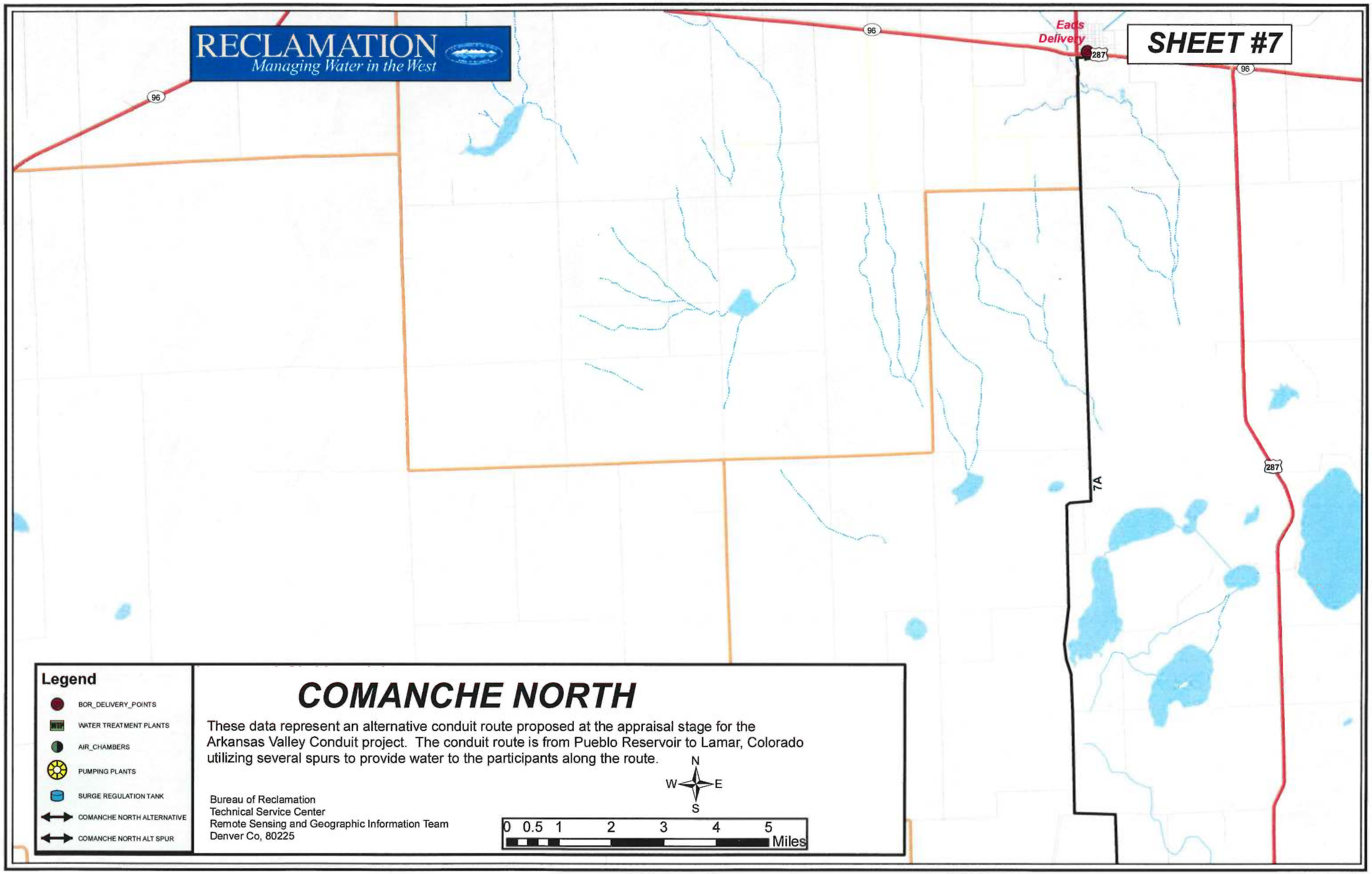


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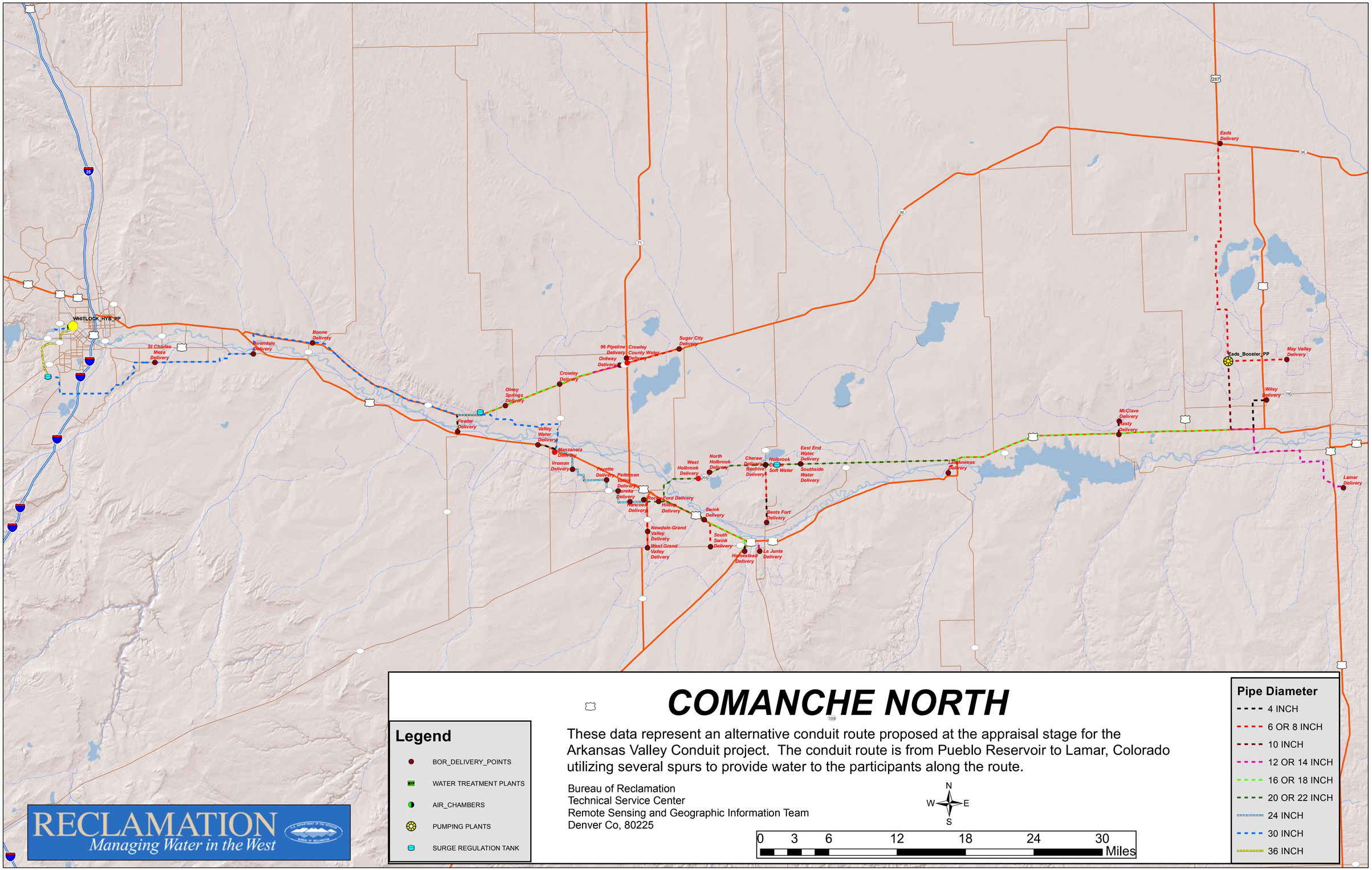


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Denver Co, 80225

ATTACHMENT C

COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS –

Facility Drawings:

CN-1 – Outlet Works – Interconnect – Site Plan

CN-2 – Whitlock Pumping Plant (after WTP) – Site Plan & Sections

CN-3 – Eads & May Valley – Booster Pumping Plant – Site Plan & Sections

CN-4 – Regulating Tank – Site Plan, Elevation & Section

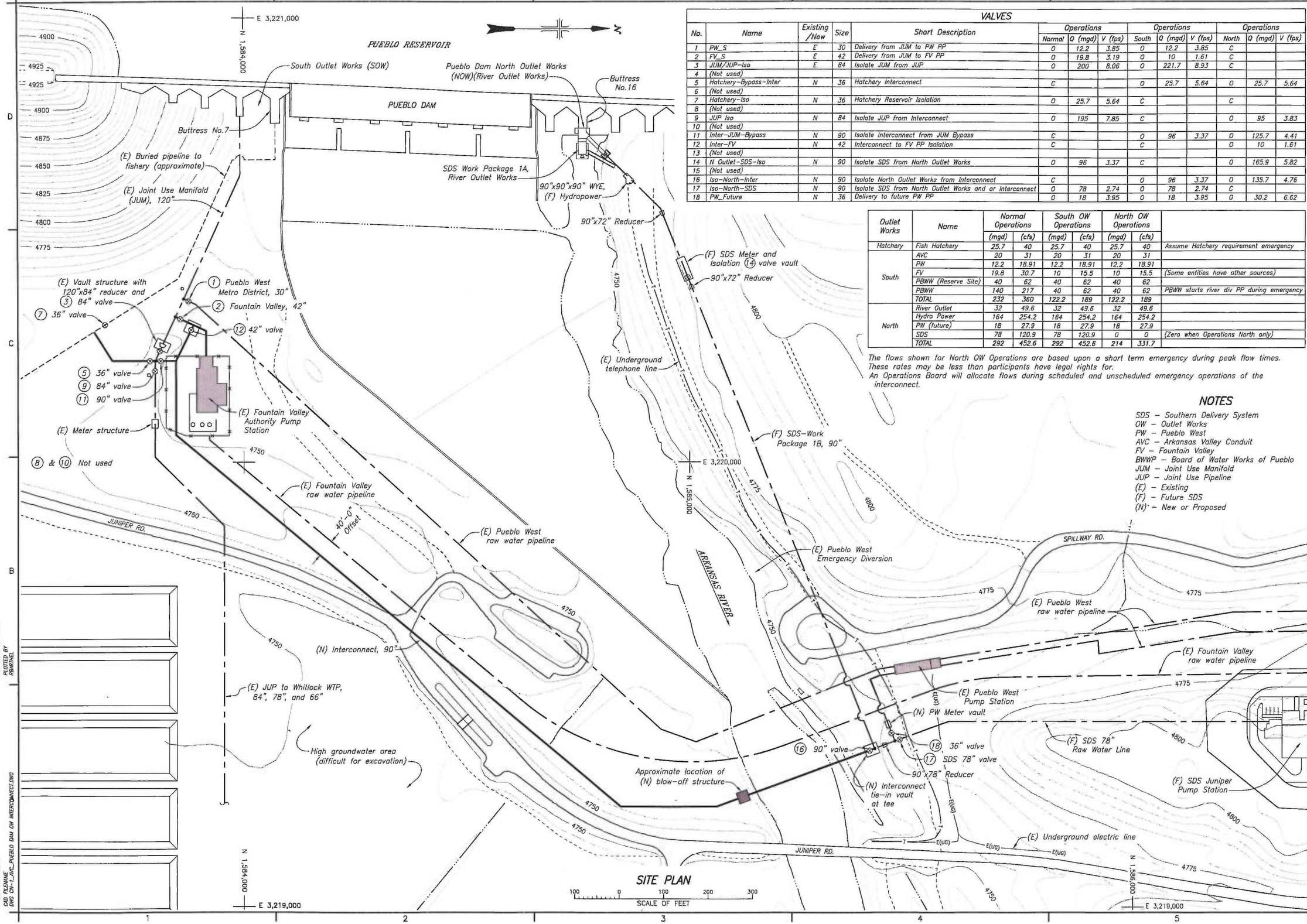
CN-5 – Fowler North Water Surge Tank – Site Plan, Elevation & Section

CN-6 – La Junta North Water Surge Tank – Site Plan, Elevation & Section

CN-7 – Participant Delivery Vault - Plans & Sections

CN-8 – Whitlock Valve Vault– Site Plan & Section

CN-9 – Treatment At Whitlock Water Treatment Plant – Site Plan




## VALVES

| No. | Name | Existing /New | Size | Short Description | Operations Normal | Operations Q (mgd) | Operations V (fps) | Operations South | Operations Q (mgd) | Operations V (fps) | Operations North | Operations Q (mgd) | Operations V (fps) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PW_S | E | 30 | Delivery from JUM to PW PP | O | 12.2 | 3.85 | O | 12.2 | 3.85 | C | | |
| 2 | FV_S | E | 42 | Delivery from JUM to FV PP | O | 19.8 | 3.19 | O | 10 | 1.61 | C | | |
| 3 | JUM/JUP-Iso | E | 84 | Isolate JUM from JUP | O | 200 | 8.06 | O | 221.7 | 8.93 | C | | |
| 4 | (Not used) | | | | | | | | | | | | |
| 5 | Hatchery-Bypass-Inter | N | 36 | Hatchery Interconnect | C | | | O | 25.7 | 5.64 | O | 25.7 | 5.64 |
| 6 | (Not used) | | | | | | | | | | | | |
| 7 | Hatchery-Iso | N | 36 | Hatchery Reservoir Isolation | O | 25.7 | 5.64 | C | | | C | | |
| 8 | (Not used) | | | | | | | | | | | | |
| 9 | JUP Iso | N | 84 | Isolate JUP from Interconnect | O | 195 | 7.85 | C | | | O | 95 | 3.83 |
| 10 | (Not used) | | | | | | | | | | | | |
| 11 | Inter-JUM-Bypass | N | 90 | Isolate Interconnect from JUM Bypass | C | | | O | 96 | 3.37 | O | 125.7 | 4.41 |
| 12 | Inter-FV | N | 42 | Interconnect to FV PP Isolation | C | | | C | | | O | 10 | 1.61 |
| 13 | (Not used) | | | | | | | | | | | | |
| 14 | N Outlet-SDS-Iso | N | 90 | Isolate SDS from North Outlet Works | O | 96 | 3.37 | C | | | O | 165.9 | 5.82 |
| 15 | (Not used) | | | | | | | | | | | | |
| 16 | Iso-North-Inter | N | 90 | Isolate North Outlet Works from Interconnect | C | | | O | 96 | 3.37 | O | 135.7 | 4.76 |
| 17 | Iso-North-SDS | N | 90 | Isolate SDS from North Outlet Works and or Interconnect | O | 78 | 2.74 | O | 78 | 2.74 | C | | |
| 18 | PW_Future | N | 36 | Delivery to future PW PP | O | 18 | 3.95 | O | 18 | 3.95 | O | 30.2 | 6.62 |

| Outlet Works | Name | Normal Operations (mgd) | Normal Operations (cfs) | South OW Operations (mgd) | South OW Operations (cfs) | North OW Operations (mgd) | North OW Operations (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

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 DESIGN REPORT
COMANCHE NORTH
OUTLET WORKS INTERCONNECT
SITE PLAN

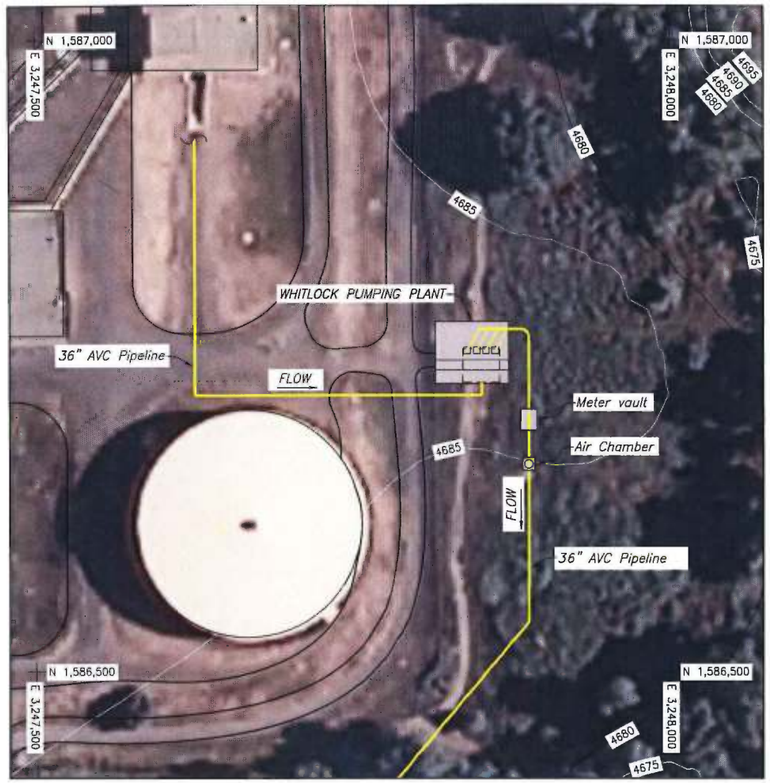
S/Robertson P.E.
DESIGNED
REVIEWED
DAVID EDWARDS, P.E. – WATER CONVEYANCE GROUP
DENVER, COLORADO 2013-05-29

COMANCHE NORTH
OUTLET WORKS INTERCONNECT
SITE PLAN

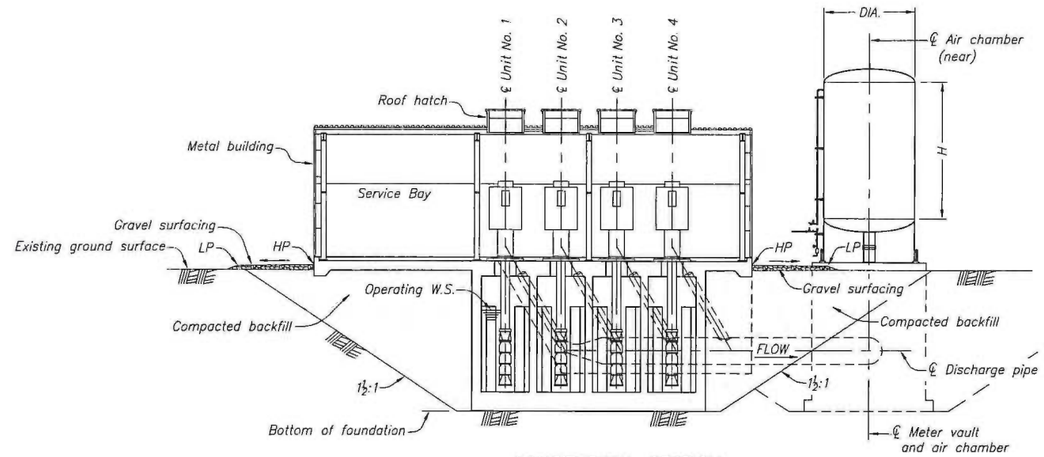
CN-1
SHEET 1 OF 1

DATE AND TIME PLOTTED MAY 29, 2013 10:19
PLOTTED BY REMATHEL

CAD SYSTEM AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-1_AVC_PUEBLO DAM OW INTERCONNECT.DWG



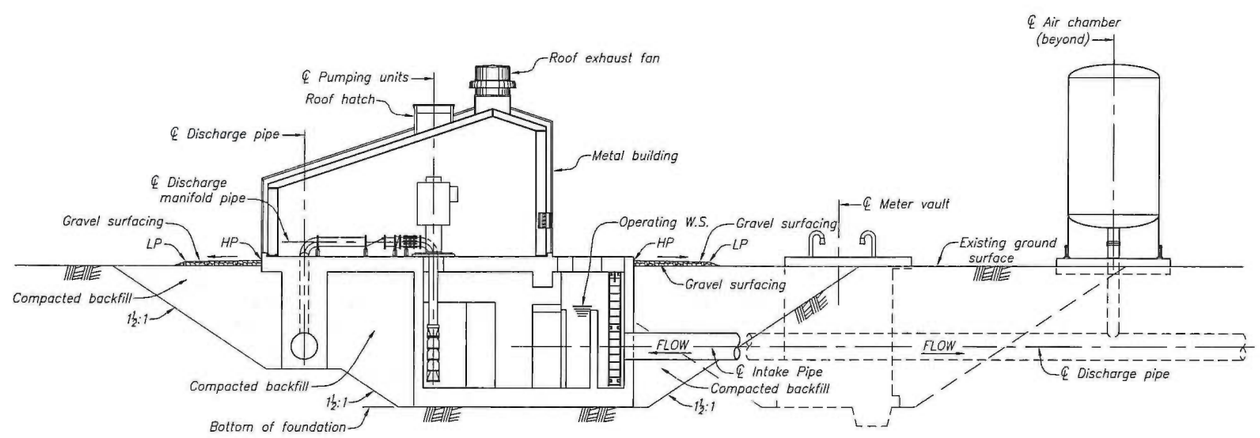

SITE PLAN



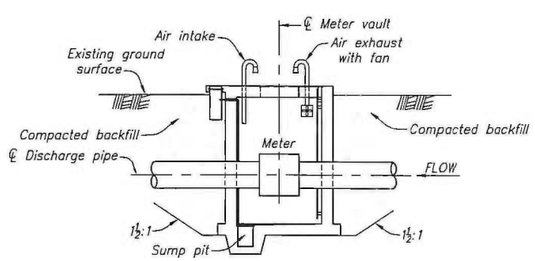

LONGITUDINAL SECTION

| 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 | 5.61 ea. | 4 | 465 | 12 | 18 | 2488 |
| Total | 22.43 | – | – | – | – | – |

* Does not include wear factor




TRANSVERSE SECTION




METER VAULT

SCALE OF FEET
SITE PLAN
60 0 60 120 180

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

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 DESIGN REPORT
COMANCHE NORTH
WHITLOCK PUMPING PLANT
SITE PLAN AND SECTIONS

DESIGNED

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

DENVER, COLORADO 2013-05-29

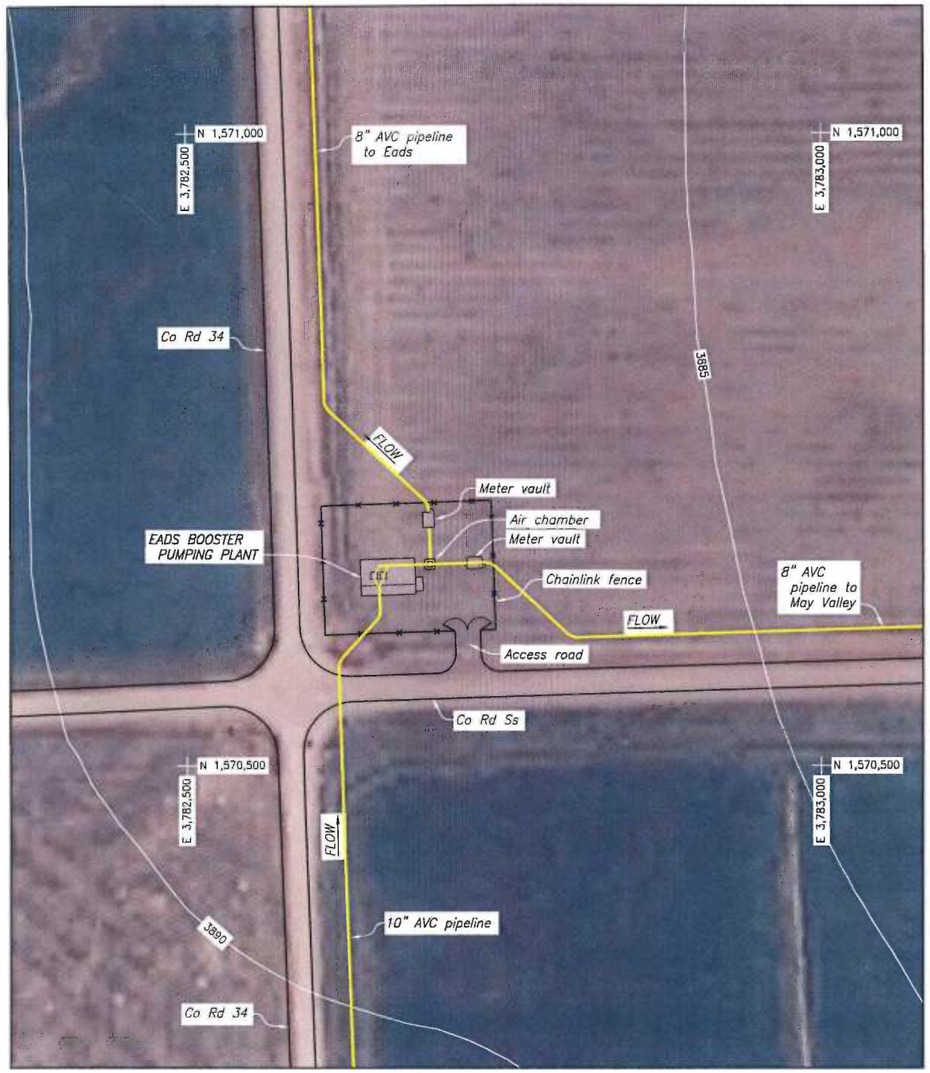
COMANCHE NORTH
WHITLOCK PUMPING PLANT

CN-2

SHEET 1 OF 1

DATE AND TIME PLOTTED
MAY 29, 2013 10:20
PLOTTED BY
RBAKHEL

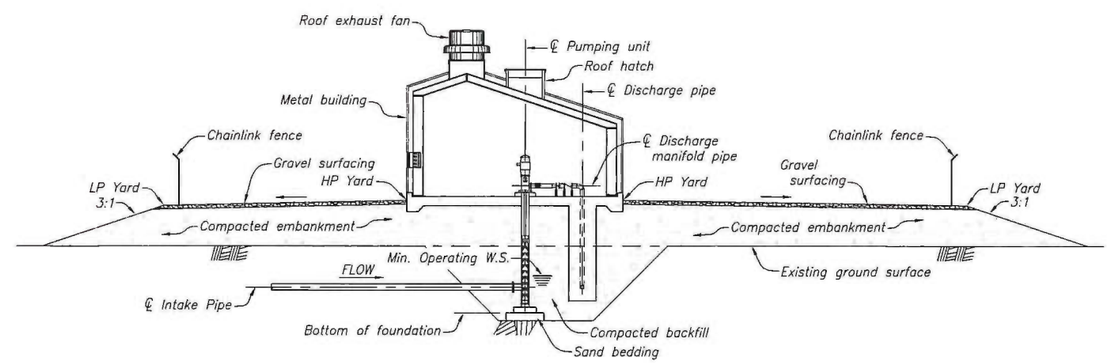
CAD SYSTEM
AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-2_ARC_WHITLOCK PP.DWG



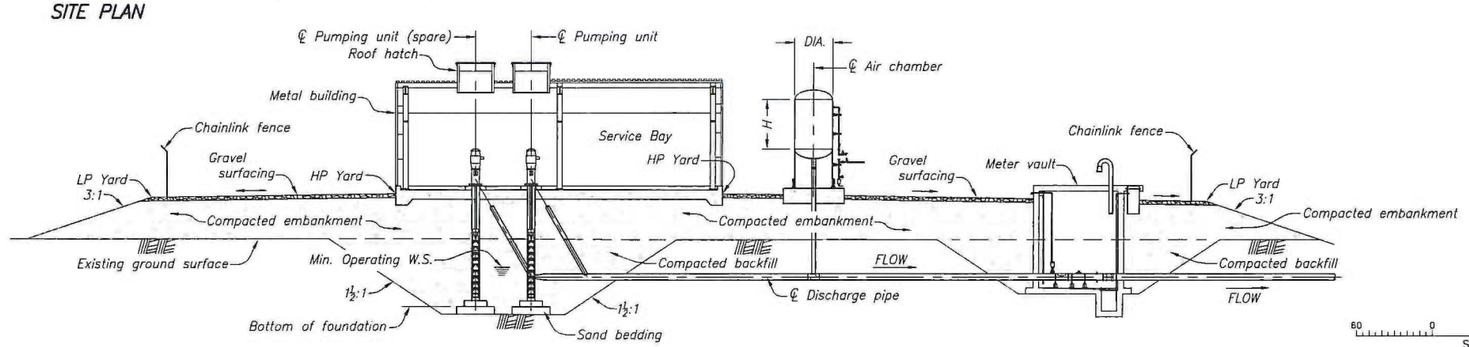

SITE PLAN

| PUMP DATA | | | | AIR CHAMBER | | |
|---|---|---|---|---|---|---|
| PUMP NUMBER * | RATED CAPACITY (CFS) | NO. STAGES | RATED HEAD (FT.) | CYLINDER DIA. (FT.) | CYLINDER H (FT.) | VOLUME (CU FT.) |
| 1 | 1.0 ea.** | 7 | 305 | 5 | 6.5 | 160 |

* 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.




TRANSVERSE SECTION




LONGITUDINAL SECTION

SCALE OF FEET SITE PLAN: 60 0 60 120 180

SCALE OF FEET SECTIONS: 10 0 10 20 30

RECLAMATION
Managing Water in the West

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BUREAU OF RECLAMATION

FRYINGPAN–ARKANSAS PROJECT – COLORADO
ARKANSAS VALLEY CONDUIT
APPRAISAL DESIGN REPORT
COMANCHE NORTH
EADS & MAY VALLEY BOOSTER PUMPING PLANT
SITE PLAN AND SECTIONS

DESIGNED

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

DENVER, COLORADO 2013-05-29

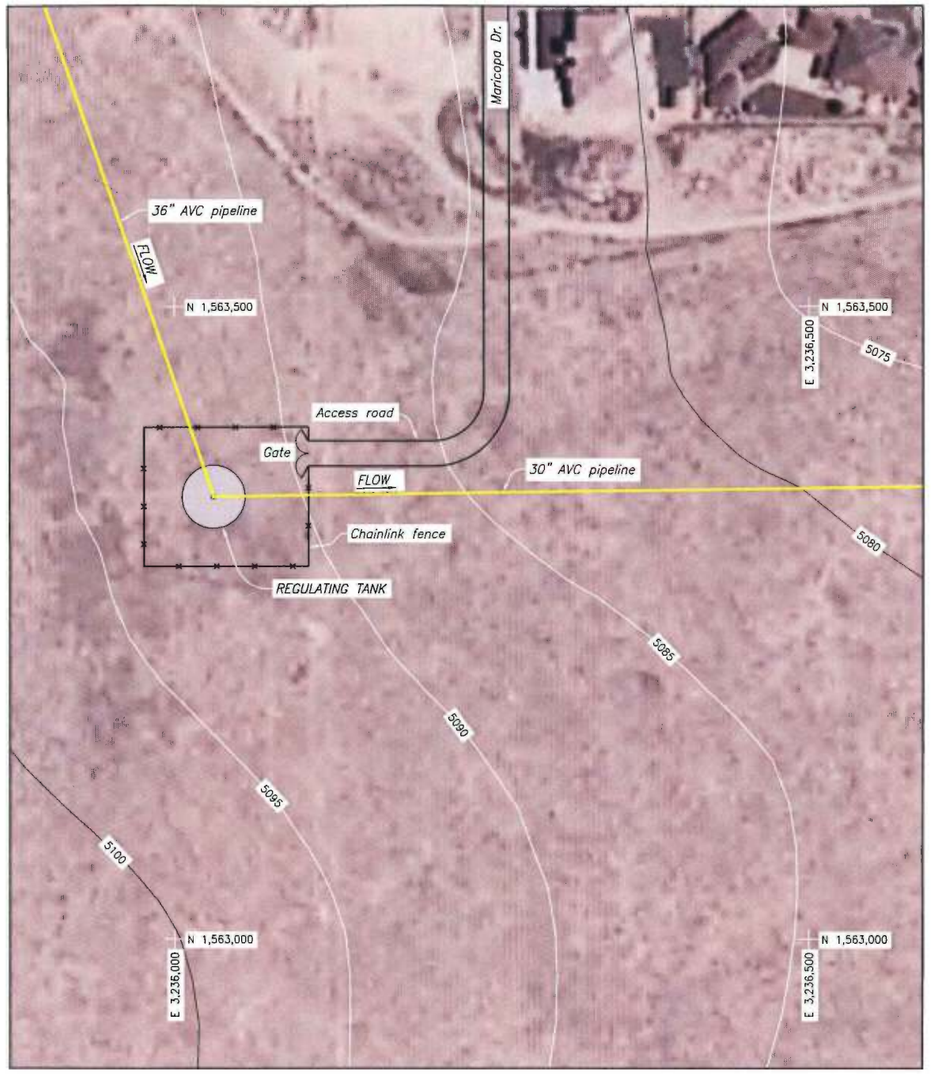
COMANCHE NORTH
EADS & MAY VALLEY
BOOSTER PUMPING PLANT

CN-3

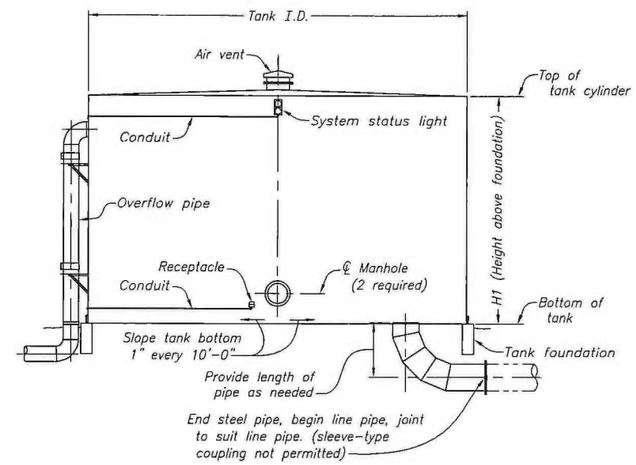
SHEET 1 OF 1

DATE AND TIME PLOTTED MAY 29, 2013 10:21
PLOTTED BY RBARNEL

CAD SYSTEM AutoCAD Rel. 19.0s
CAD FILENAME DWG CN_3_ARC_EADS BOOSTER PP.DWG



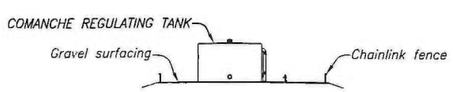

SITE PLAN




ELEVATION
WATER REGULATING TANK

| REGULATING TANK | | | | | |
|---|---|---|---|---|---|
| NUMBER OF TANKS | TANK CAPACITY (GAL.) * | TANK I.D. (FT.) | HEIGHT ABOVE FOUNDATION– H1 (FT.) | NORTHING | EASTING |
| 1 | 294,000 | 50 | 30 | 1,563,349 | 3,236,031 |

* Volume calculation assumed 10'–0" freeboard within tank.




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

RECLAMATION
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BUREAU OF RECLAMATION

FRYINGPAN–ARKANSAS PROJECT – COLORADO
ARKANSAS VALLEY CONDUIT
APPRAISAL DESIGN REPORT
COMANCHE NORTH
REGULATING TANK
SITE PLAN, ELEVATION, AND SECTION

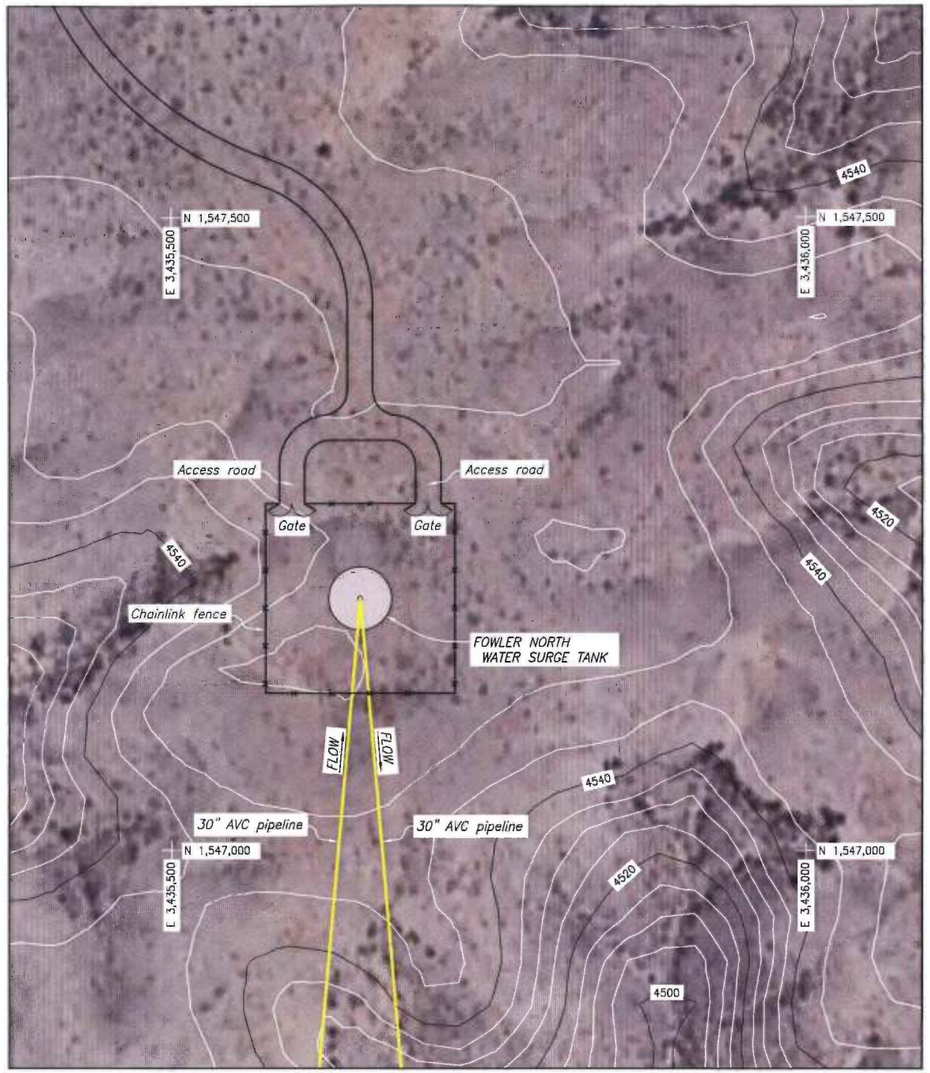
DESIGNED
K.R. Smith P.E.
REVIEWED
K.R. SMITH, P.E. – HYDRAULIC EQUIPMENT GROUP
DENVER, COLORADO 2013-05-29

COMANCHE NORTH
REGULATING TANK

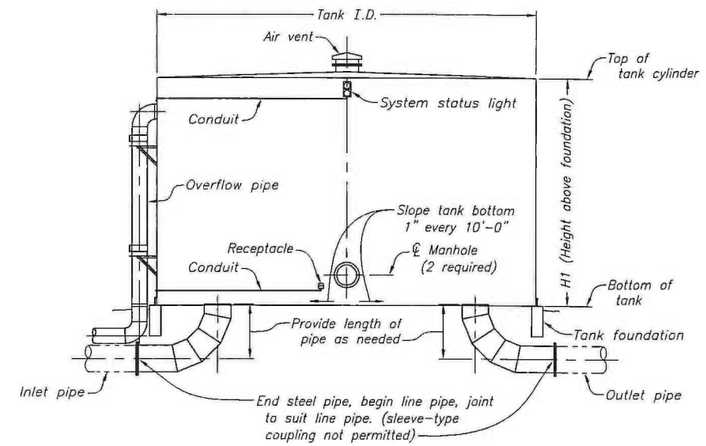
CN–4
SHEET 1 OF 1

DATE AND TIME PLOTTED
MAY 29, 2013 10:22
PLOTTED BY
RBARTHEL

CAD SYSTEM
AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-1_ARC_REGULATING TANK.DWG



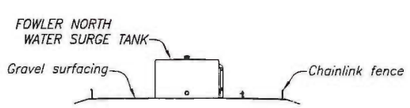

SITE PLAN




**ELEVATION**
WATER SURGE TANK

| WATER SURGE TANK | | | | | |
|---|---|---|---|---|---|
| NUMBER OF TANKS | EACH TANK CAPACITY (GAL.) * | TANK I.D. (FT.) | HEIGHT ABOVE FOUNDATION – H1 (FT.) | NORTHING | EASTING |
| 1 | 294,000 | 50 | 30 | 1,547,198 | 3,435,649 |

* Volume calculation assumed 10'-0" freeboard within tank.




LONGITUDINAL SECTION THRU SERVICE YARD

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

SCALE OF FEET
ELEVATION
10 0 10 20 30

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BUREAU OF RECLAMATION
FRYINGPAN–ARKANSAS PROJECT – COLORADO
ARKANSAS VALLEY CONDUIT
APPRAISAL DESIGN REPORT
COMANCHE NORTH
FOWLER NORTH WATER SURGE TANK
SITE PLAN, ELEVATION, AND SECTION

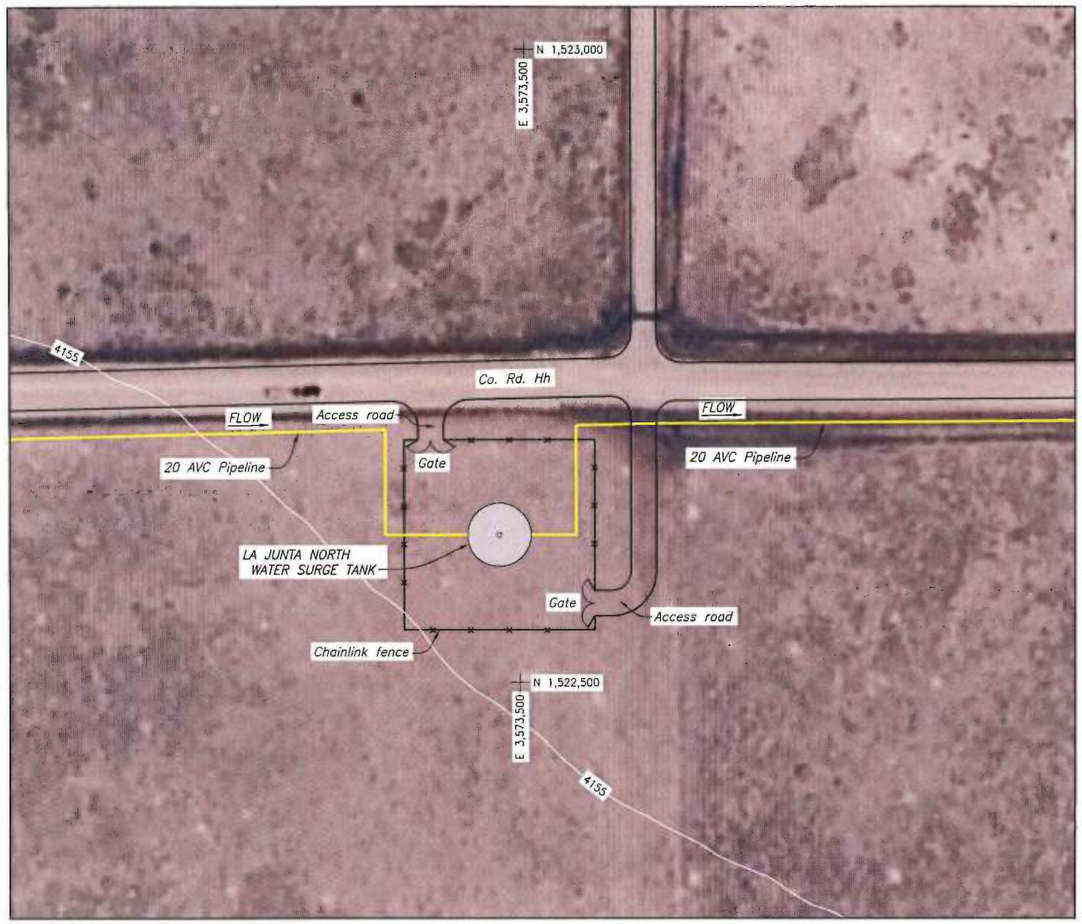
DESIGNED
K.R. Smith P.E.
REVIEWED
K.R. SMITH, P.E. – HYDRAULIC EQUIPMENT GROUP
DENVER, COLORADO 2013-05-29

COMANCHE NORTH
FOWLER NORTH
WATER SURGE TANK

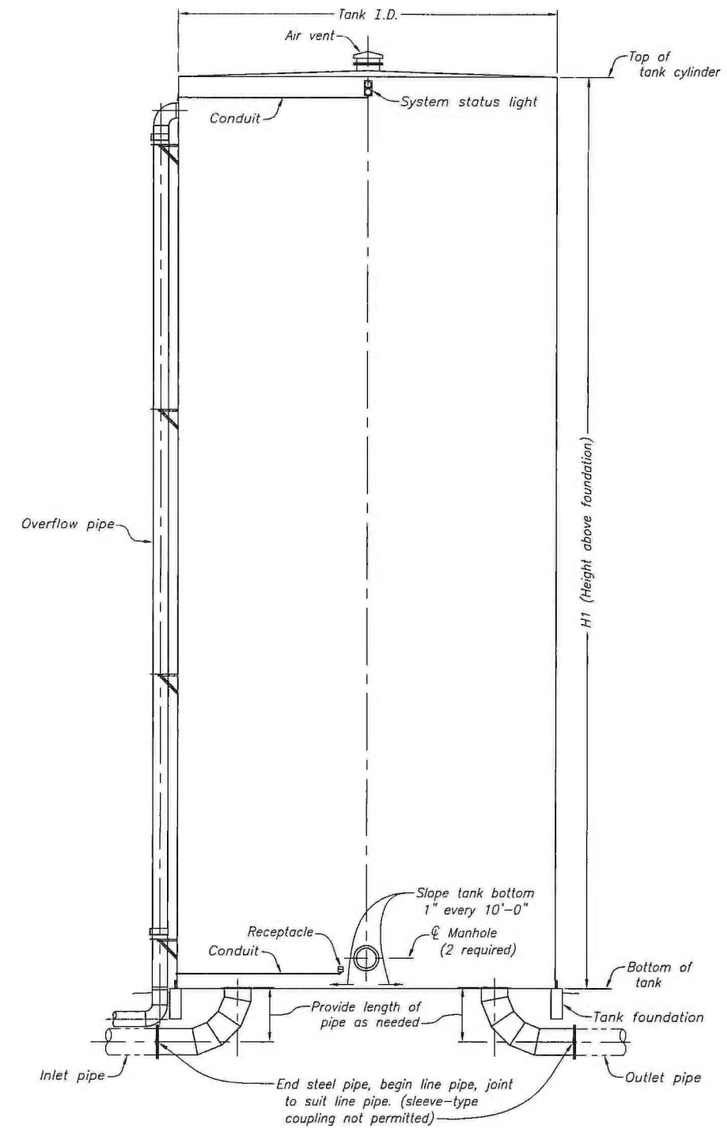
CN-5
SHEET 1 OF 1

DATE AND TIME PLOTTED
MAY 29, 2013 10:22
PLOTTED BY
RBARTHEL

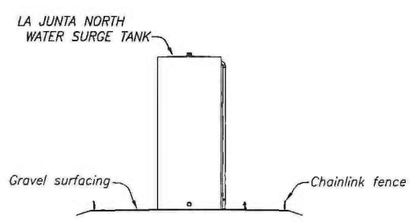
CAD SYSTEM
AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-5_ARC_FOWLER NORTH SURGE TANK.DWG




SITE PLAN




ELEVATION
WATER SURGE TANK




LONGITUDINAL SECTION THRU SERVICE YARD

| WATER SURGE TANK | | | | | |
|---|---|---|---|---|---|
| NUMBER OF TANKS | TANK CAPACITY (GAL.) * | TANK I.D. (FT.) | MAX. WS HEIGHT ABOVE FOUNDATION – H1 (FT.) | NORTHING | EASTING |
| 1 | 1,615,000 | 50 | 120 | 1,522,616 | 3,573,480 |

* Volume calculation assumed 10'-0" freeboard within tank.

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 DESIGN REPORT
COMANCHE NORTH
LA JUNTA NORTH WATER SURGE TANK
SITE PLAN, ELEVATION, AND SECTION

DESIGNED
K.R. Smith P.E
REVIEWED
K.R. SMITH, P.E. - HYDRAULIC EQUIPMENT GROUP
DENVER, COLORADO 2013-05-29

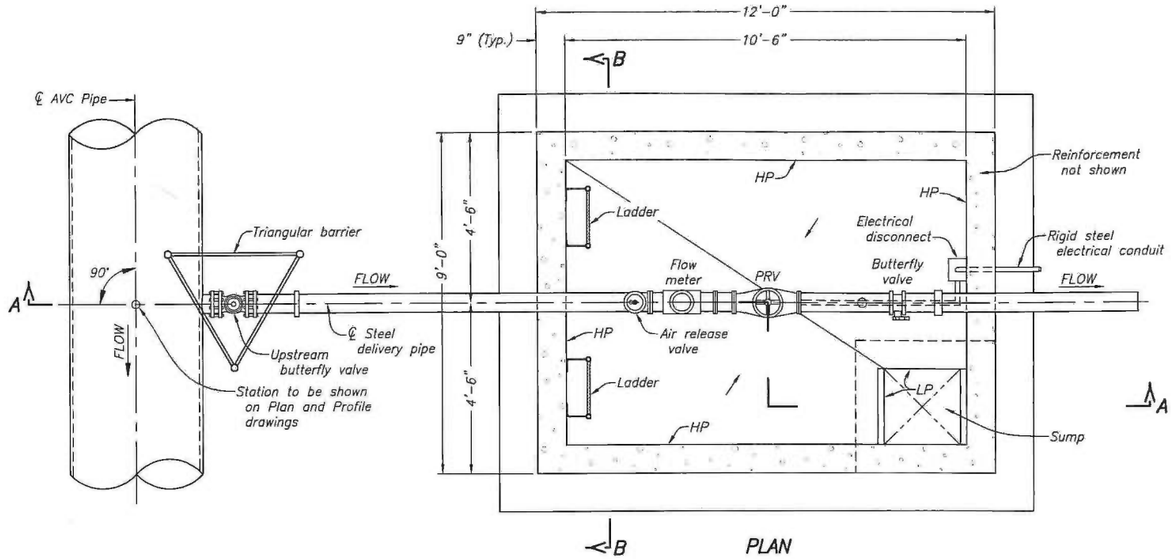
COMANCHE NORTH
LA JUNTA NORTH
WATER SURGE TANK

CN-6

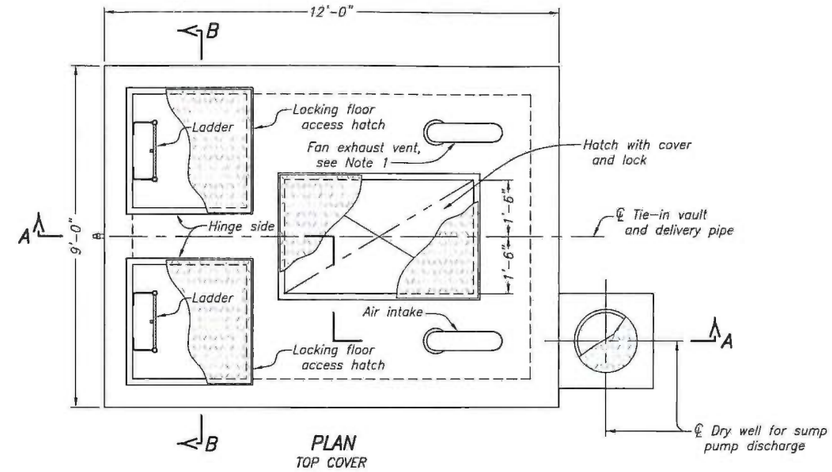
SHEET 1 OF 1

DATE AND TIME PLOTTED
MAY 29, 2013 10:23
PLOTTED BY
RBARTHEL

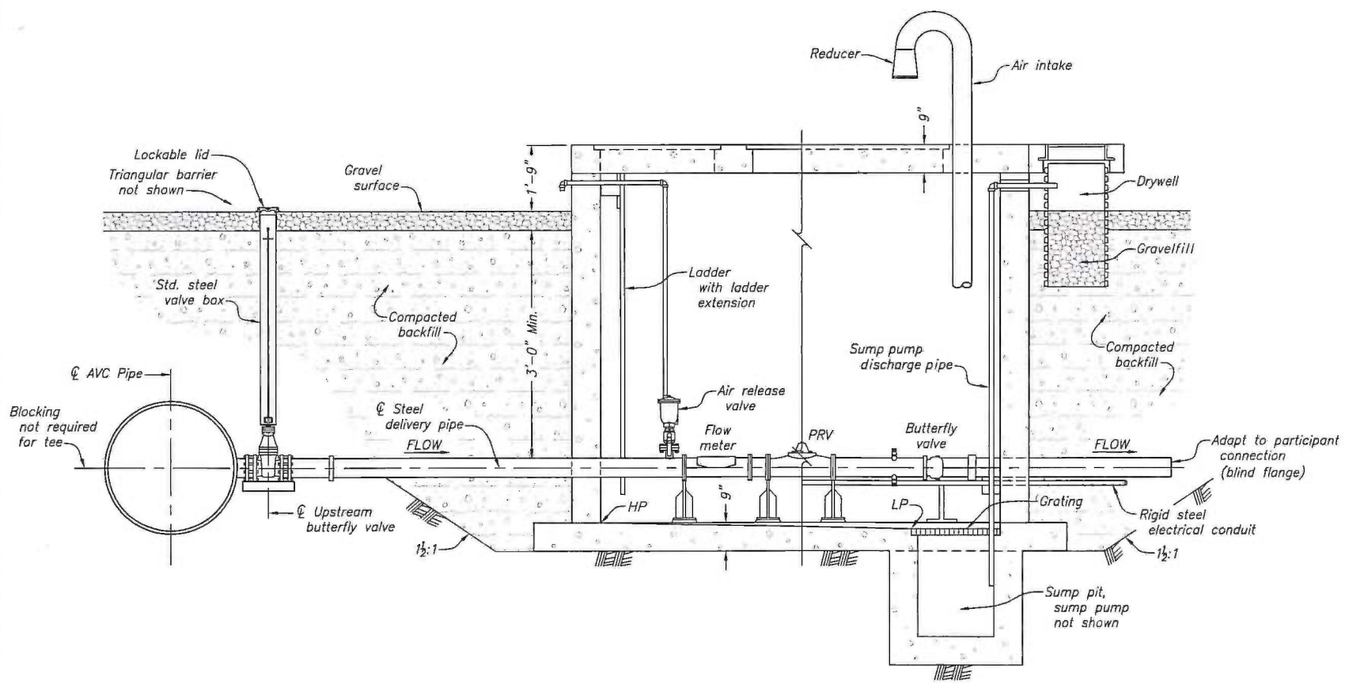
CAD SYSTEM
AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-6_AVC_LAJUNTA NORTH SURGE TANK.DWG



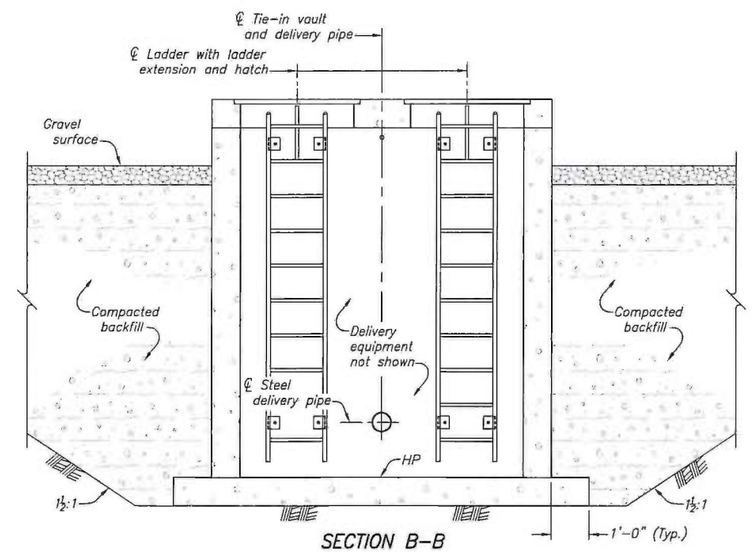

PLAN




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

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BUREAU OF RECLAMATION

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ARKANSAS VALLEY CONDUIT

APPRAISAL DESIGN REPORT

COMANCHE NORTH
PARTICIPANT DELIVERY VAULT
PLANS AND SECTIONS

DESIGNED

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

DENVER, COLORADO 2013-05-29

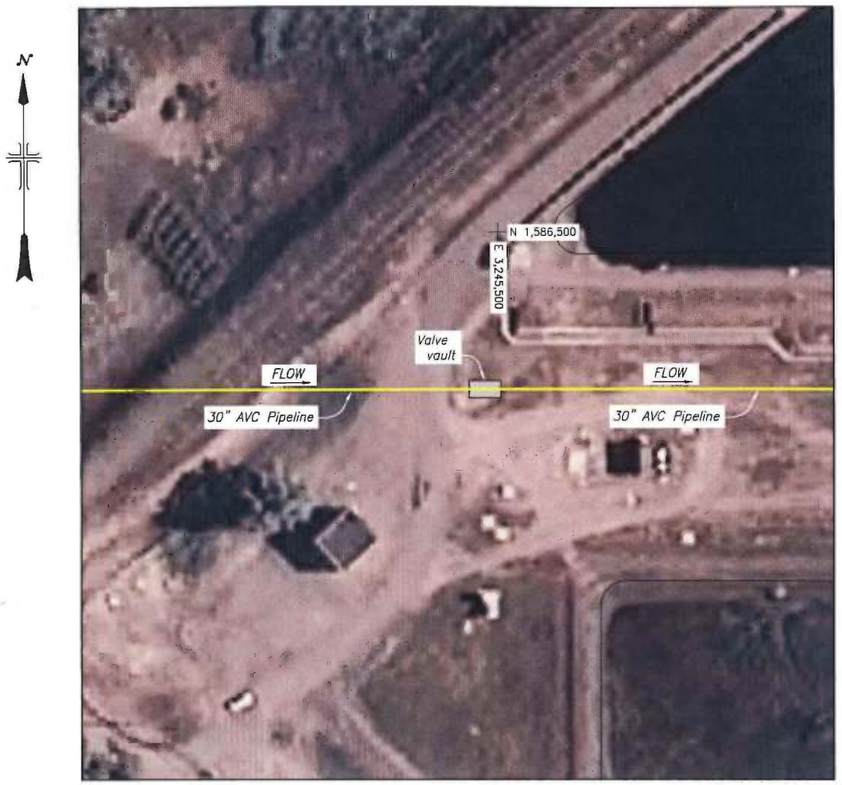
COMANCHE NORTH
PARTICIPANT DELIVERY VAULT

CN–7

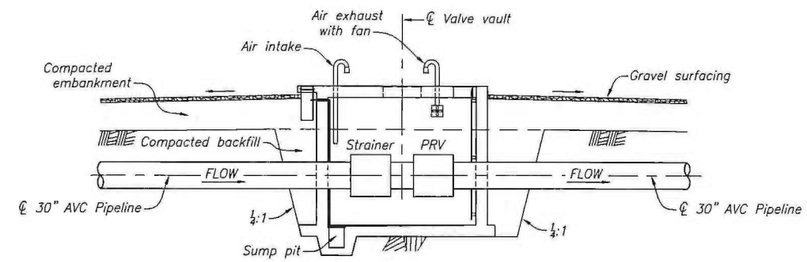
SHEET 1 OF 1

DATE AND TIME PLOTTED
MAY 29, 2013 10:24
PLOTTED BY
RSMITHEL

CAD SYSTEM
AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-7_ARC_PARTICIPANT DELIVERY VAULT.DWG




SITE PLAN




TRANSVERSE SECTION

60 0 60 120 180
SCALE OF FEET
SITE PLAN

10 0 10 20 30
SCALE OF FEET
SECTION

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BUREAU OF RECLAMATION

FRYINGPAN–ARKANSAS PROJECT – COLORADO
ARKANSAS VALLEY CONDUIT
APPRAISAL DESIGN REPORT
COMANCHE NORTH
WHITLOCK VALVE VAULT
SITE PLAN AND SECTION

DESIGNED

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

DENVER, COLORADO 2013-05-29

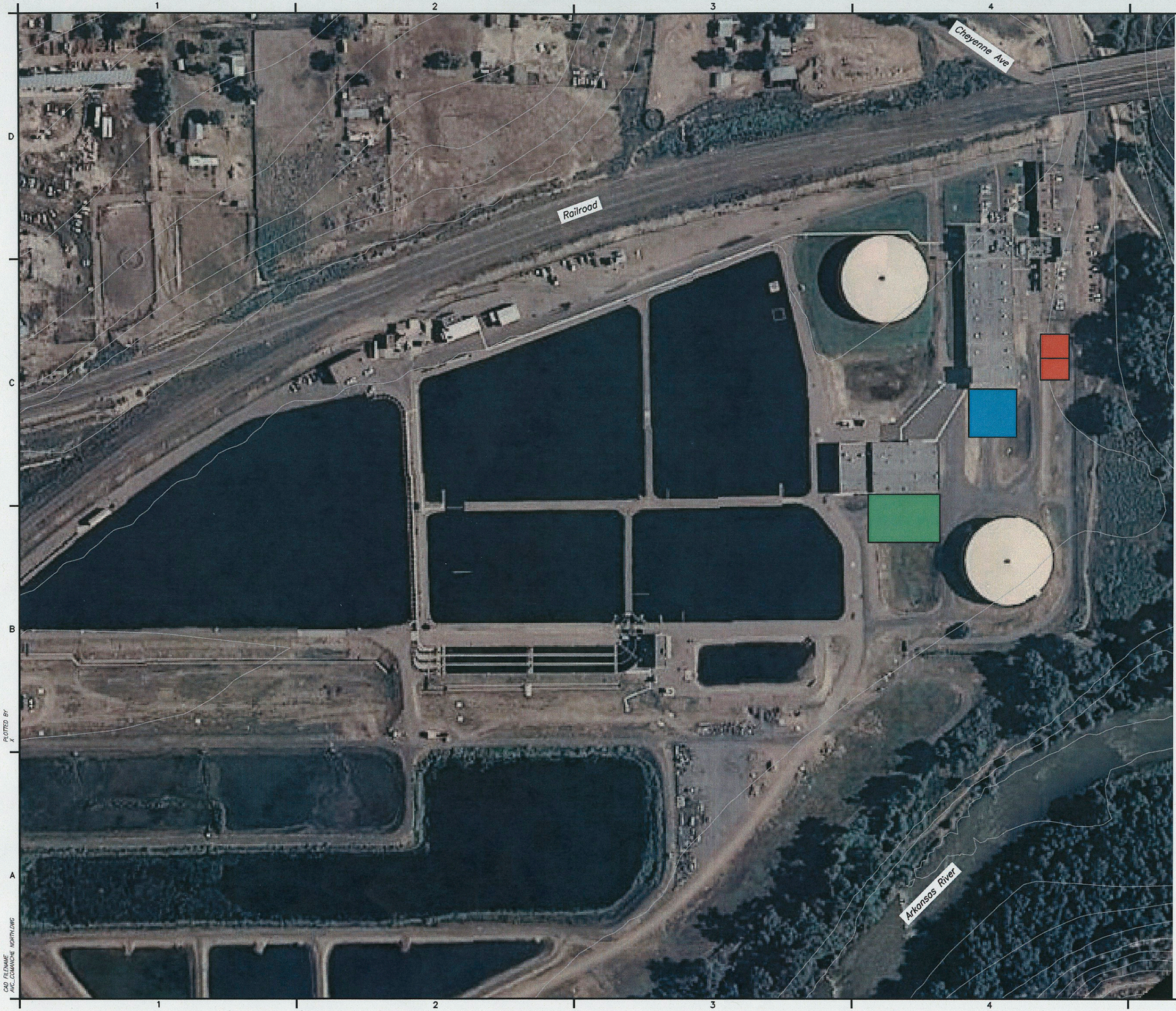
COMANCHE NORTH
WHITLOCK VALVE VAULT

CN-8

SHEET 1 OF 1

DATE AND TIME PLOTTED
MAY 29, 2013 10:24
PLOTTED BY
RGMITPEL

CAD SYSTEM
AutoCAD Rel. 19.0s
CAD FILENAME
DWG CN-SL_NC_WHITLOCK VALVE VAULT.DWG




N

## SITE PLAN

100 0 100 200 300
SCALE OF FEET

## LEGEND

- Pre-treatment
- Filtration
- High Service Pump Station/ Contact Basin TBD

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION

03-07-2013

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Managing Water in the West

B&V Project No. 174625

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Colorado Springs, Colorado

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FRYINGPAN-ARKANSAS PROJECT - COLORADO

**ARKANSAS VALLEY CONDUIT**

APPRAISAL LEVEL DESIGN

**COMANCHE NORTH - TREATMENT AT WHITLOCK WATER TREATMENT PLANT - SITE PLAN**

DRAWN B&V

ACCEPTED PLANT STRUCTURES GROUP

DENVER, COLORADO 2013-03-07

**COMANCHE NORTH - TREATMENT AT WHITLOCK WATER TREATMENT PLANT**

CN-9

SHEET 1 OF 1

DATE AND TIME PLOTTED
X
PLOTTED BY
X

CAD SYSTEM
AutoCAD Rel. 17.1s
CAD FILENAME
AVC_COMANCHE NORTH.DWG

ATTACHMENT D

COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS –

Hydraulic Calculation Sheet

Hydraulic Profile Sheets

**Arkansas Valley Conduit**
Environmental Impact Statement / Apprasial Level Study

| | | |
|---|---|---|
| | | Intake, Existing PBWW Whitlock JUP |
| | | Dam N/S Interconnect |
| Hydraulic Analysis | | WTP (Filtered) @ Whitlock |
| **Comanche North** | 227.22 | mgd |
| (broken loop) | | Revised Northern Route |

Existing JUP Peak Flow Rate

| | |
|---|---|
| | = Input Cell color |
| 4796 | Pueblo Reservoir Min Water Surface (Top of Inactive Pool) |
| 4880 | Pueblo Reservoir Max Water Surface (Top of Active Conservation Pool) |
| 46.20 | Loss in existing raw water feed pipeline |
| 4675 | Whitlock WTP Clearwell Elev. |
| 460 | Pump Head |

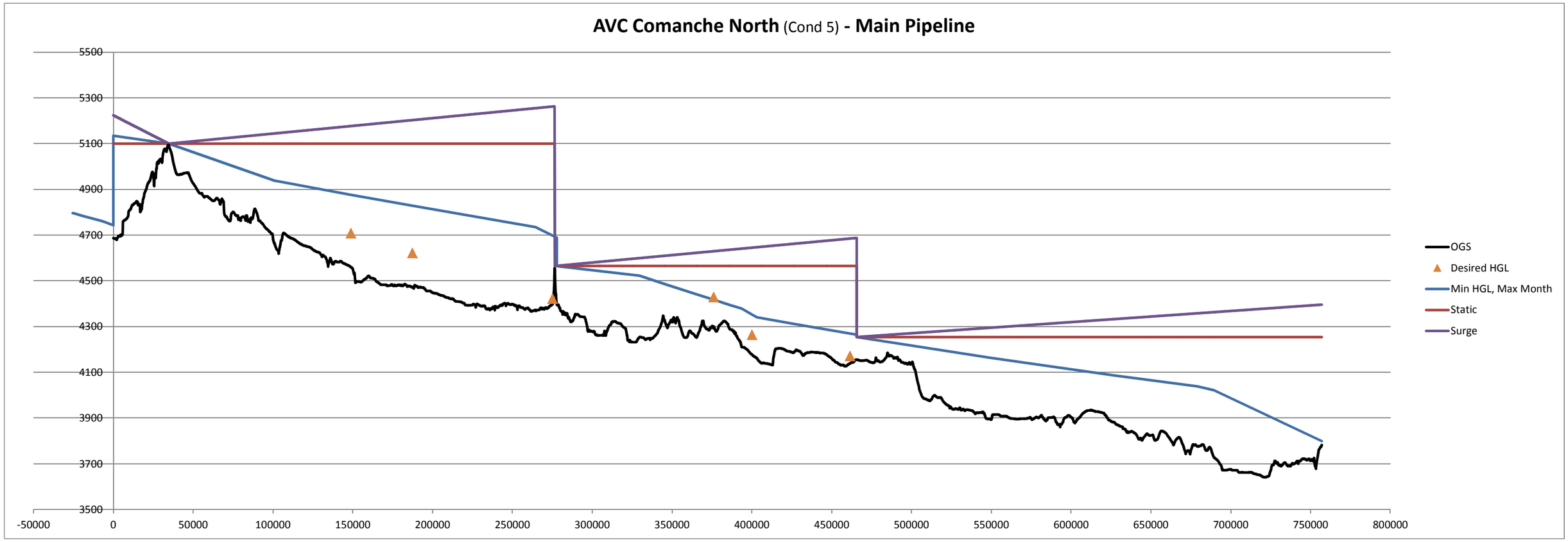
Condition 1 - Minimum Pueblo Reservoir, Max Month Demands
Condition 2 - (Not Used)
Condition 3 - Maximum Pueblo Reservoir, Min Day Demands
Condition 4 - Minimum Pueblo Reservoir, Max Day Demands
Condition 5 - Minimum Pueblo Reservoir, Max Month Demands (Except Radionuclides Participants Being Provided Max Day)
Condition 5 - Selected Condition

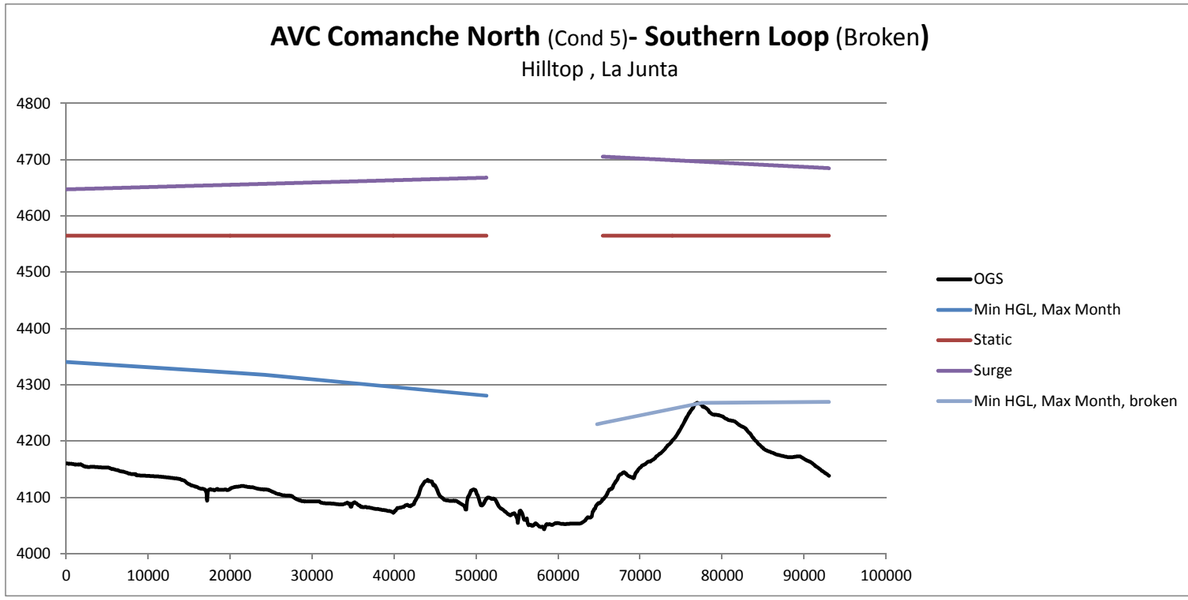
Participants Being Provided Max Day Demands Due to Radionuclides (Condition 5)

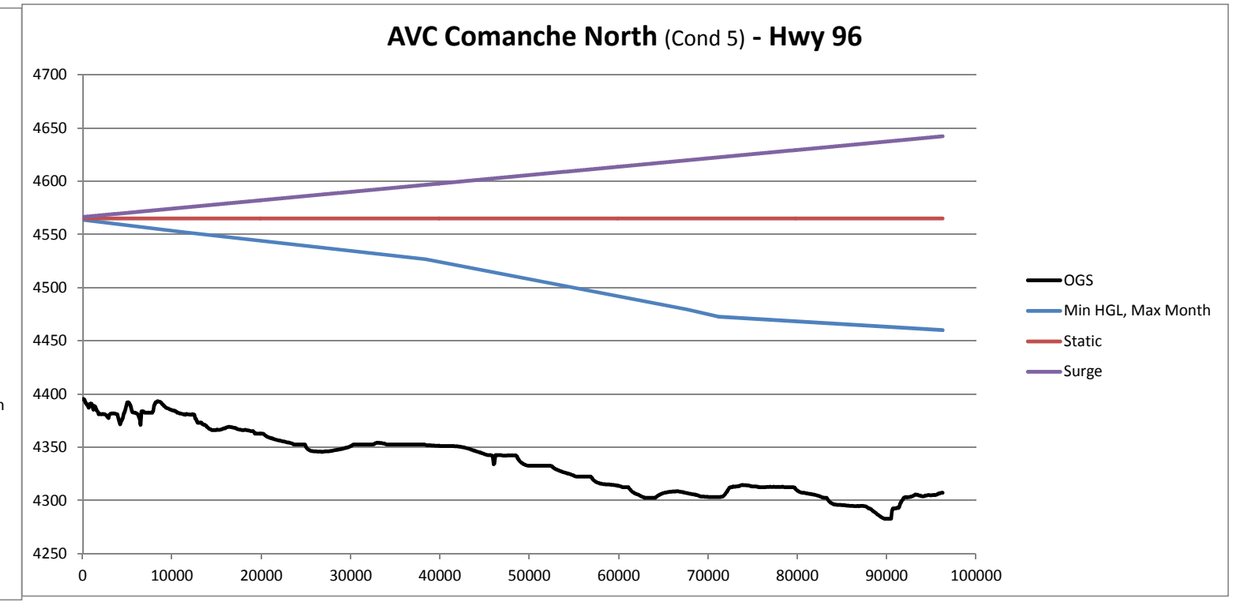
| | | |
|---|---|---|
| East End Water | Manzanola | Valley Water |
| Eureka Water Co | May Valley | Vroman |
| Fayette Water | Patterson Valley | Wiley |
| Hancock | South Swink | |
| Holbrook Center Soft Water | | |
| Homestead Improvement | | |

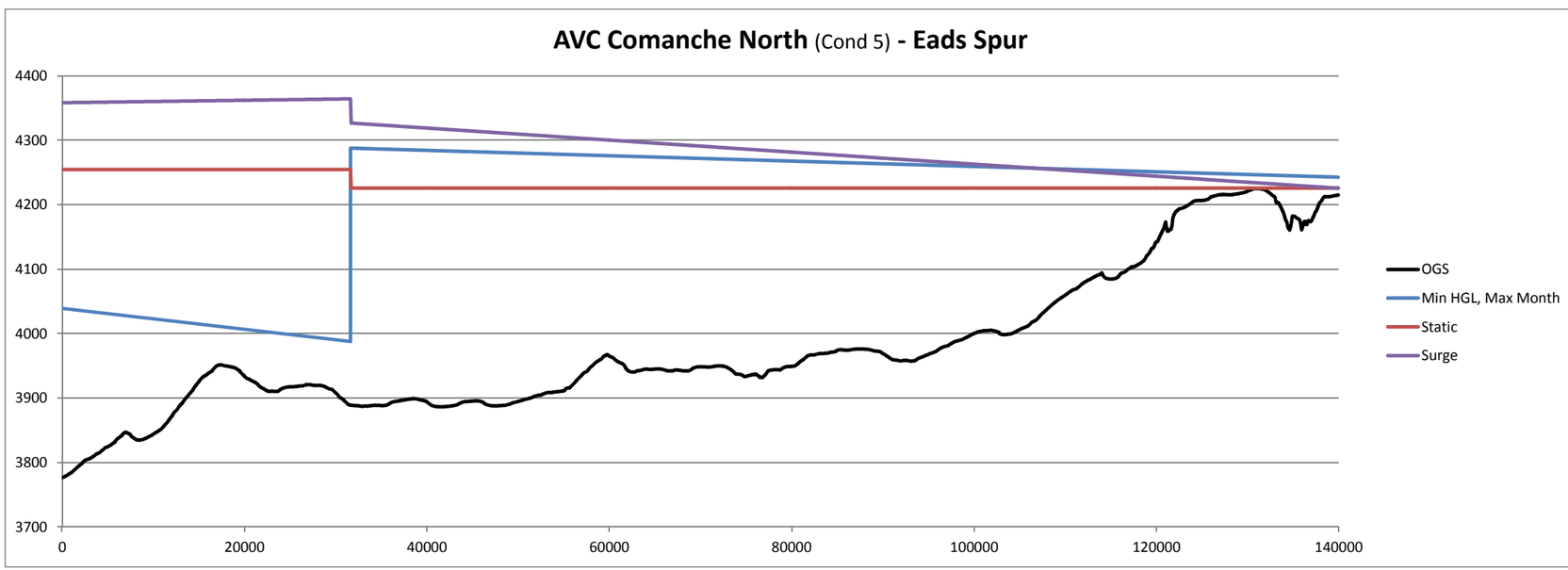
Date: February 7, 2013

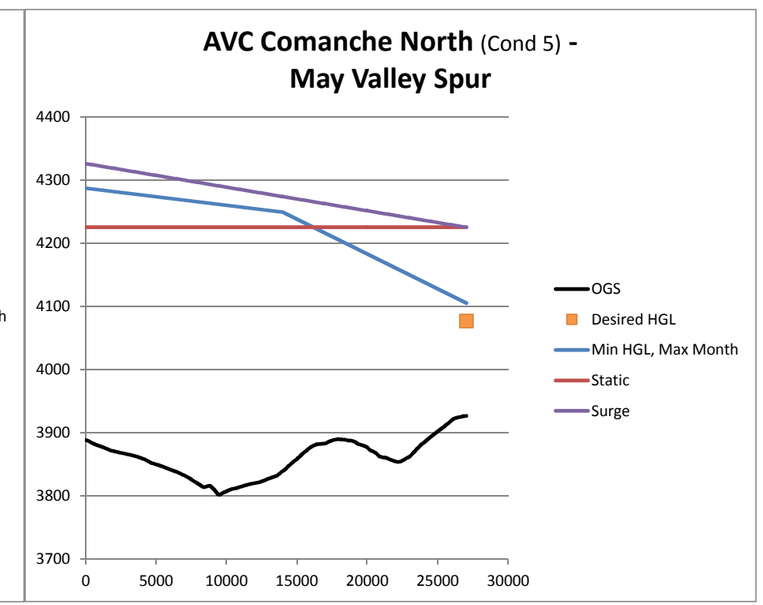
| Overall Pipe Segment | Individual Pipe Segment | Description: Starting Point | Description: Ending Point | Station: Starting | Station: Ending | Length ft | Total Flow, Q mgd | Total Flow, Q cfs | Total Flow, Q gpm | Inside Pipe Diameter in | Inside Pipe Area ft^2 | Velocity ft/s | C Value | Friction Headloss ft | Minor Headloss Loss/ft | Minor Headloss $H_L$, ft | Total Headloss ft | Begin HGL | End HGL | Participant Tap | Participant Flow mgd | Maximum Ground Elev | Actual Tap Pressure, psi | Desired System Pressure, psi | Pressure Met? | Desired System Gradient | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JUM | | Pueblo Reservoir | End of JUM (end of 120" segment) | -255+18 | -250+03 | 515 | 227.221 | 351.51 | 157,792 | 120 | 78.54 | 4.48 | 120 | 0.24 | 9.13E-06 | 0.00 | 0.24 | 4796.00 | 4795.76 | Pueblo W. & Fountain Valley | 32.000 | | | | | | Existing JUM |
| JUP84 | | End of JUM (end of 120" segment) | JUP - end of 84" segment | -250+03 | -196+03 | 5,400 | 195.221 | 302.01 | 135,570 | 84 | 38.48 | 7.85 | 120 | 10.79 | 9.13E-06 | 0.05 | 10.84 | 4795.76 | 4784.92 | Future PBWW | 40.000 | | | | | | Existing JUP |
| JUP78 | | JUP - end of 84" segment | JUP - WYE (in 78" segment) | -196+03 | -67+54 | 12,849 | 155.221 | 240.13 | 107,792 | 78 | 33.18 | 7.24 | 120 | 24.09 | 9.13E-06 | 0.12 | 24.21 | 4784.92 | 4760.71 | Current PBWW | 140.000 | | | | | | Wye in JUP, split of AVC & PBWW flows |
| 1K2 | | JUP - WYE (in 78" segment) | New WTP Inlet @ Whitlock | -67+54 | 0+00 | 6,754 | 15.221 | 23.55 | 10,570 | 30 | 4.91 | 4.80 | 120 | 18.02 | 9.13E-06 | 0.06 | 18.08 | 4760.71 | 4742.63 | New WTP @ Whitlock | 0.725 | 4687.57 | 23.83 | 0 | | 0.00 | Whitlock desired HGL = 4705 ft per PBWW |
| Main | 1 | New WTP PP Outlet @ Whitlock | Whitlock PP Regulating Tank | 0+00 | 347+25 | 34,725 | 14.496 | 22.43 | 10,067 | 36 | 7.07 | 3.17 | 120 | 34.83 | 9.13E-06 | 0.32 | 35.14 | 5135.00 | 5099.86 | Reg. Tank | 0.000 | 5092.03 | 3.39 | 0 | | 0.00 | Reg. Tank on highspot |
| Main | 2 | Whitlock PP Regulating Tank | St. Charles Mesa delivery | 347+25 | 1008+36 | 66,112 | 14.496 | 22.43 | 10,067 | 30 | 4.91 | 4.57 | 120 | 161.13 | 9.13E-06 | 0.60 | 161.73 | 5099.86 | 4938.12 | St. Charles Mesa | 4.254 | 4664.05 | 118.65 | 0 | | 0.00 | Tie in at WTP |
| Main | 3 | St. Charles Mesa delivery | Avondale delivery | 1008+36 | 1488+20 | 47,984 | 10.242 | 15.84 | 7,113 | 30 | 4.91 | 3.23 | 120 | 61.46 | 9.13E-06 | 0.44 | 61.90 | 4938.12 | 4876.23 | Avondale | 0.203 | 4557.72 | 137.88 | 65 | | 4707.87 | Avondale |
| Main | 4 | Avondale delivery | Boone Delivery | 1488+20 | 1873+35 | 38,515 | 10.039 | 15.53 | 6,971 | 30 | 4.91 | 3.16 | 120 | 47.54 | 9.13E-06 | 0.35 | 47.89 | 4876.23 | 4828.34 | Boone | 0.138 | 4471.45 | 154.50 | 65 | | 4621.60 | Boone |
| Main | 5 | Boone Delivery | Fowler Tap | 1873+35 | 2643+87 | 77,052 | 9.901 | 15.32 | 6,875 | 30 | 4.91 | 3.12 | 120 | 92.69 | 9.13E-06 | 0.70 | 93.39 | 4828.34 | 4734.95 | Fowler | 0.209 | 4330.37 | 175.14 | 0 | | 0.00 | Lower tank spill elev ? |
| Main | 6 | Fowler Tap | Fowler Surge Tank Tap (North) | 2643+87 | 2751+18 | 10,731 | 9.692 | 14.99 | 6,730 | 24 | 3.14 | 4.77 | 120 | 36.78 | 9.13E-06 | 0.10 | 36.88 | 4734.95 | 4698.07 | Fowler Surge Tank Tap | 0.000 | 4396.26 | 130.65 | 11 | | 4421.67 | Fowler Surge Tank Tap |
| Main | 7 | Fowler Surge Tank Tap (North) | Fowler Surge Tank (North) | 2751+18 | 2777+86 | 2,668 | 9.692 | 14.99 | 6,730 | 24 | 3.14 | 4.77 | 120 | 9.15 | 9.13E-06 | 0.02 | 9.17 | 4698.07 | 4688.90 | Fowler Surge Tank | 0.000 | 4555.68 | 57.67 | 0 | | 0.00 | |
| Main | 8 | Fowler Surge Tank (North) | Hwy 96 Spur Tap (East of Surge Tank) | 2777+86 | 2787+91 | 1,005 | 9.692 | 14.99 | 6,730 | 30 | 4.91 | 3.05 | 120 | 1.16 | 9.13E-06 | 0.01 | 1.17 | 4565.00 | 4563.83 | Hwy 96 Spur | 1.733 | 4395.19 | 73.00 | 0 | | 0.00 | |
| Main | 8 | Hwy 96 Spur Tap (East of Surge Tank) | Valley Water & Manzanola Taps | 2787+91 | 3297+10 | 50,918 | 7.959 | 12.31 | 5,527 | 30 | 4.91 | 2.51 | 120 | 40.88 | 9.13E-06 | 0.46 | 41.34 | 4563.83 | 4522.48 | Valley Water & Manzanola | 0.163 | 4254.95 | 115.82 | 0 | | 0.00 | Manzanola max ground elev is 4285. Tank Spill El |
| Main | 9 | Valley Water & Manzanola Taps | Vroman Delivery | 3297+10 | 3443+69 | 14,659 | 7.796 | 12.06 | 5,414 | 24 | 3.14 | 3.84 | 120 | 33.58 | 9.13E-06 | 0.13 | 33.71 | 4522.48 | 4488.77 | Vromann | 0.079 | 4342.42 | 63.36 | 0 | | 0.00 | |
| Main | 10 | Vroman Delivery | Fayette Delivery | 3443+69 | 3653+84 | 21,015 | 7.717 | 11.94 | 5,359 | 24 | 3.14 | 3.80 | 120 | 47.24 | 9.13E-06 | 0.19 | 47.43 | 4488.77 | 4441.34 | Fayette | 0.030 | 4253.36 | 81.38 | 0 | | 0.00 | |
| Main | 11 | Fayette Delivery | Patterson Valley Delivery | 3653+84 | 3760+47 | 10,663 | 7.687 | 11.89 | 5,338 | 24 | 3.14 | 3.79 | 120 | 23.80 | 9.13E-06 | 0.10 | 23.89 | 4441.34 | 4417.45 | Patterson Valley | 0.036 | 4294.47 | 53.24 | 58.4 | -5.2 | 4429.37 | Tank spill El 4435 |
| Main | 12 | Patterson Valley Delivery | Eureka Delivery | 3760+47 | 3869+46 | 10,898 | 7.650 | 11.83 | 5,313 | 24 | 3.14 | 3.77 | 120 | 24.11 | 9.13E-06 | 0.10 | 24.21 | 4417.45 | 4393.25 | Eureka | 0.184 | 4288.56 | 45.32 | 0 | | 0.00 | |
| Main | 13 | Eureka Delivery | Rocky Ford & Hancock Taps | 3869+46 | 3933+93 | 6,447 | 7.466 | 11.55 | 5,185 | 24 | 3.14 | 3.68 | 120 | 13.63 | 9.13E-06 | 0.06 | 13.69 | 4393.25 | 4379.55 | Rocky Ford & Hancock | 0.886 | 4219.59 | 69.25 | 0 | | 0.00 | At WTP |
| Main | 14 | Rocky Ford & Hancock Taps | Newdale-Grand Valley & West Grand Valley Tap | 3933+93 | 3946+95 | 1,302 | 6.580 | 10.18 | 4,569 | 20 | 2.18 | 4.67 | 120 | 5.29 | 9.13E-06 | 0.01 | 5.30 | 4379.55 | 4374.25 | Newdale-Grand Valley & West Grand Valley | 0.110 | 4210.06 | 71.08 | 0 | | 0.00 | |
| Main | 15 | Newdale-Grand Valley & West Grand Valley Tap | Hilltop Delivery | 3946+95 | 4001+08 | 5,413 | 6.469 | 10.01 | 4,493 | 20 | 2.18 | 4.59 | 120 | 21.33 | 9.13E-06 | 0.05 | 21.38 | 4374.25 | 4352.87 | Hilltop | 0.049 | 4177.9 | 75.75 | 37.3 | | 4264.06 | Tank El 4266. 72 psi high pressure. |
| Main | 16 | Hilltop Delivery | South Spur Tap | 4001+08 | 4032+87 | 3,179 | 6.421 | 9.93 | 4,459 | 20 | 2.18 | 4.55 | 120 | 12.35 | 9.13E-06 | 0.03 | 12.38 | 4352.87 | 4340.49 | South Spur Tap | 2.983 | 4160.17 | 78.06 | 0 | | 0.00 | |
| Main | 17 | South Spur Tap | West Holbrook Delivery | 4032+87 | 4272+20 | 23,933 | 3.438 | 5.32 | 2,387 | 20 | 2.18 | 2.44 | 120 | 29.24 | 9.13E-06 | 0.22 | 29.46 | 4340.49 | 4311.03 | West Holbrook | 0.013 | 4192.45 | 51.33 | 0 | | 0.00 | |
| Main | 18 | West Holbrook Delivery | North Holbrook Delivery | 4272+20 | 4347+85 | 7,565 | 3.424 | 5.30 | 2,378 | 20 | 2.18 | 2.43 | 120 | 9.18 | 9.13E-06 | 0.07 | 9.25 | 4311.03 | 4301.79 | North Holbrook | 0.010 | 4186.64 | 49.85 | 0 | | 0.00 | |
| Main | 19 | North Holbrook Delivery | Holbrook Center Soft Water, Cheraw, Beehive, Bent's Fort Spur Tap | 4347+85 | 4614+32 | 26,647 | 3.414 | 5.28 | 2,371 | 20 | 2.18 | 2.42 | 120 | 32.14 | 9.13E-06 | 0.24 | 32.39 | 4301.79 | 4269.40 | HCSW, Cheraw, Beehive, Bent's Fort Spur Tap | 0.174 | 4138.5 | 56.67 | 14 | | 4170.84 | 4162 is max tank WSEL. |
| Main | 20 | Holbrook Center Soft Water, Cheraw, Beehive, Bent's Fort Spur Tap | La Junta North Surge Tank | 4614+32 | 4657+15 | 4,283 | 3.240 | 5.01 | 2,250 | 20 | 2.18 | 2.30 | 120 | 4.69 | 9.13E-06 | 0.04 | 4.73 | 4269.40 | 4264.67 | La Junta Surge Tank | 0.000 | 4154.4 | 47.74 | 0 | | 0.00 | |
| Main | 21 | La Junta North Surge Tank | East End and South Side Deliveries | 4657+15 | 4775+70 | 11,855 | 3.240 | 5.01 | 2,250 | 20 | 2.18 | 2.30 | 120 | 12.98 | 9.13E-06 | 0.11 | 13.09 | 4254.40 | 4241.31 | East End & Southside | 0.035 | 4158.44 | 35.87 | 0 | | 0.00 | |
| Main | 22 | East End and South Side Deliveries | Las Animas Tap | 4775+70 | 5495+41 | 71,971 | 3.205 | 4.96 | 2,226 | 20 | 2.18 | 2.27 | 120 | 77.24 | 9.13E-06 | 0.66 | 77.89 | 4241.31 | 4163.42 | Las Animas | 0.889 | 3895.14 | 116.14 | 0 | | 0.00 | 4020 is tank spill elevation |
| Main | 23 | Las Animas Tap | McClave & Hasty Taps | 5495+41 | 6272+29 | 77,688 | 2.316 | 3.58 | 1,609 | 18 | 1.77 | 2.03 | 120 | 76.32 | 9.13E-06 | 0.71 | 77.03 | 4163.42 | 4086.39 | McClave & Hasty | 0.104 | 3880.54 | 89.11 | 0 | | 0.00 | |
| Main | 24 | McClave & Hasty Taps | Eads & May Valley Tap | 6272+29 | 6790+39 | 51,809 | 2.213 | 3.42 | 1,536 | 18 | 1.77 | 1.94 | 120 | 46.75 | 9.13E-06 | 0.47 | 47.23 | 4086.39 | 4039.16 | Eads & May Valley | 0.646 | 3776.81 | 113.57 | 0 | | 0.00 | 4215 is Eads tie-in at ground storage tank. |
| Main | 25 | Eads & May Valley Tap | Wiley Tap | 6790+39 | 6895+55 | 10,516 | 1.566 | 2.42 | 1,088 | 14 | 1.07 | 2.27 | 120 | 17.02 | 9.13E-06 | 0.10 | 17.11 | 4039.16 | 4022.05 | Wiley | 0.034 | 3727.78 | 127.39 | 0 | | 0.00 | 3750 is max ground in Wiley |
| Main | 26 | Wiley Tap | Lamar Delivery | 6895+55 | 7570+50 | 67,495 | 1.532 | 2.37 | 1,064 | 12 | 0.79 | 3.02 | 120 | 222.10 | 9.13E-06 | 0.62 | 222.72 | 4022.05 | 3799.33 | Lamar | 1.532 | 3783.86 | 6.70 | 0 | | 0.00 | Spill elevation of tanks. |
| | | **Totals** | | | | | | | | | | | | | | | | | | | **14.496** | | | | | | |
| Hwy 96 | 27 | Hwy 96 Spur (East of Fowler Surge Tank) | Olney Springs Delivery | 0+00 | 113+68 | 11,368 | 1.733 | 2.68 | 1,203 | 16 | 1.40 | 1.92 | 120 | 11.58 | 9.13E-06 | 0.10 | 11.68 | 4563.83 | 4552.15 | Olney Springs | 0.088 | 4381.14 | 74.03 | 0 | | 0.00 | Tank spill elev of 4486 |
| Hwy 96 | 28 | Olney Springs Delivery | Crowley | 113+68 | 384+09 | 27,041 | 1.645 | 2.54 | 1,142 | 16 | 1.40 | 1.82 | 120 | 25.00 | 9.13E-06 | 0.25 | 25.25 | 4552.15 | 4526.90 | Crowley | 0.084 | 4352.4 | 75.54 | 0 | | 0.00 | |
| Hwy 96 | 29 | Crowley | Ordway Delivery | 384+09 | 676+90 | 29,281 | 1.561 | 2.41 | 1,084 | 14 | 1.07 | 2.26 | 120 | 47.08 | 9.13E-06 | 0.27 | 47.34 | 4526.90 | 4479.56 | Ordway | 0.415 | 4306.99 | 74.70 | 0 | | 0.00 | |
| Hwy 96 | 30 | Ordway Delivery | 96 Pipeline Co. Spur | 676+90 | 711+31 | 3,441 | 1.146 | 1.77 | 796 | 12 | 0.79 | 2.26 | 120 | 6.61 | 9.13E-06 | 0.03 | 6.64 | 4479.56 | 4472.91 | 96 Pipeline Co. Spur | 0.049 | 4303.46 | 73.36 | 0 | | 0.00 | |
| Hwy 96 | 31 | 96 Pipeline Co. Spur | Crowley County Water Assoc. Delivery | 711+31 | 711+97 | 66 | 1.096 | 1.70 | 761 | 10 | 0.55 | 3.11 | 120 | 0.28 | 9.13E-06 | 0.00 | 0.28 | 4472.91 | 4472.63 | Crowley County Water Assoc. | 0.908 | 4303.36 | 73.28 | 65 | | 4453.51 | |
| Hwy 96 | 32 | Crowley County Water Assoc. Delivery | Sugar City Delivery | 711+97 | 962+88 | 25,091 | 0.188 | 0.29 | 131 | 8 | 0.35 | 0.83 | 120 | 12.27 | 9.13E-06 | 0.23 | 12.50 | 4472.63 | 4460.13 | Sugar City | 0.188 | 4307.15 | 66.23 | 65 | | 4457.30 | |
| | | **Totals** | | | | | | | | | | | | | | | | | | | **1.733** | | | | | | |
| South Spur | 33 | South Spur Tap | Swink Delivery | 0+00 | 210+70 | 21,070 | 2.983 | 4.62 | 2,072 | 20 | 2.18 | 2.12 | 120 | 19.80 | 9.13E-06 | 0.19 | 19.99 | 4340.49 | 4320.50 | Swink | 0.044 | 4118.8 | 87.32 | 0 | | 0.00 | |
| South Spur | 34 | Swink Delivery | South Swink Tap | 210+70 | 242+60 | 3,190 | 2.939 | 4.55 | 2,041 | 20 | 2.18 | 2.08 | 120 | 2.92 | 9.13E-06 | 0.03 | 2.94 | 4320.50 | 4317.55 | South Swink | 0.189 | 4113.91 | 88.16 | 0 | | 0.00 | |
| South Spur | 35 | South Swink Tap | Homestead Tap | 242+60 | 446+35 | 20,375 | 2.751 | 4.26 | 1,910 | 18 | 1.77 | 2.41 | 120 | 27.52 | 9.13E-06 | 0.19 | 27.70 | 4317.55 | 4289.85 | Homestead | 0.015 | 4128.27 | 69.95 | 0 | | 0.00 | |
| South Spur | 36 | Homestead Tap | La Junta Tap | 446+35 | 512+62 | 6,627 | 2.736 | 4.23 | 1,900 | 18 | 1.77 | 2.39 | 120 | 8.86 | 9.13E-06 | 0.06 | 8.92 | 4289.85 | 4280.93 | La Junta | 2.736 | 4097.55 | 79.39 | 0 | | 0.00 | At La Junta WTP. 4374 is max system water elevation. |
| | | **Totals** | | | | | | | | | | | | | | | | | | | **2.983** | | | | | | |
| Spur | 39 | Main Line Tap | Fowler | 0+00 | 77+63 | 7,763 | 0.209 | 0.32 | 145 | 4 | 0.09 | 3.71 | 120 | 134.51 | 9.13E-06 | 0.07 | 134.59 | 4734.95 | 4600.36 | Fowler | 0.209 | 4330.37 | 116.88 | 0 | | 0.00 | |
| Spur | 40 | Main Line Tap | 96 Pipeline Co. | 0+00 | 23+94 | 2,394 | 0.034 | 0.05 | 23 | 4 | 0.09 | 0.60 | 120 | 1.42 | 9.13E-06 | 0.02 | 1.44 | 4472.91 | 4471.47 | 96 Pipeline Co. | 0.034 | 4317.13 | 66.81 | 65 | | 4467.28 | |
| Spur | 41 | Main Line Tap | Valley Water | 0+00 | 85+06 | 8,506 | 0.084 | 0.13 | 58 | 4 | 0.09 | 1.48 | 120 | 26.98 | 9.13E-06 | 0.08 | 27.06 | 4522.48 | 4495.42 | Valley Water | 0.084 | 4287.51 | 90.01 | 65 | | 4437.66 | Valley Water ground elev 4288 at conduit tap plus 65 |
| Spur | 42 | Main Line Tap | Manzanola | 0+00 | 16+36 | 1,636 | 0.079 | 0.12 | 55 | 4 | 0.09 | 1.41 | 120 | 4.71 | 9.13E-06 | 0.01 | 4.72 | 4522.48 | 4517.76 | Manzanola | 0.079 | 4276.5 | 104.44 | 65 | | 4426.65 | Manzanola max ground elev is 4285. Tank Spill El |
| Spur | 43 | Main Line Tap | Rocky Ford & Hancock | 0+00 | 9+60 | 960 | 0.886 | 1.37 | 615 | 8 | 0.35 | 3.93 | 120 | 8.26 | 9.13E-06 | 0.01 | 8.26 | 4379.55 | 4371.29 | Rocky Ford & Hancock | 0.886 | 4221.17 | 64.99 | 0 | | 0.00 | |
| Spur | 44 | Main Line Tap | Newdale-Grand Valley | 0+00 | 137+10 | 13,710 | 0.110 | 0.17 | 77 | 8 | 0.35 | 0.49 | 120 | 2.49 | 9.13E-06 | 0.13 | 2.62 | 4374.25 | 4371.63 | Newdale-Grand Valley | 0.110 | 4353.29 | 7.94 | 0 | | 0.00 | |
| Spur | 45 | Newdale-Grand Valley | West Grand Valley | 137+10 | 211+76 | 7,466 | 0.022 | 0.03 | 15 | 4 | 0.09 | 0.39 | 120 | 2.02 | 9.13E-06 | 0.07 | 2.09 | 4371.63 | 4369.55 | West Grand Valley | 0.022 | 4226.05 | 62.12 | 0 | | 0.00 | |
| Spur | 46 | South Spur Tap | South Swink | 0+00 | 109+16 | 10,916 | 0.111 | 0.17 | 77 | 6 | 0.20 | 0.87 | 120 | 8.13 | 9.13E-06 | 0.10 | 8.23 | 4317.55 | 4309.32 | South Swink | 0.111 | 4186.54 | 53.15 | 65 | -11.8 | 4336.69 | |
| Spur | 47 | South Spur Tap | Homestead | 0+00 | 26+25 | 2,625 | 0.015 | 0.02 | 10 | 4 | 0.09 | 0.27 | 120 | 0.35 | 9.13E-06 | 0.02 | 0.37 | 4289.85 | 4289.48 | Homestead | 0.015 | 4134.17 | 67.23 | 0 | | 0.00 | |
| Spur | 48 | South Spur Tap | La Junta | 0+00 | 31+53 | 3,153 | 2.736 | 4.23 | 1,900 | 12 | 0.79 | 5.39 | 120 | 30.37 | 9.13E-06 | 0.03 | 30.40 | 4280.93 | 4250.54 | La Junta | 2.736 | 4151.43 | 42.90 | 0 | | 0.00 | |
| Spur | 49 | Northern line tap (Bents Fort Spur) | La Junta Hill @ Airport | 0+00 | 156+72 | 15,672 | 0.081 | 0.13 | 56 | 8 | 0.35 | 0.36 | 120 | 1.60 | 9.13E-06 | 0.14 | 1.74 | 4269.40 | 4267.66 | | | | | | | | Check for elevation at La Junta airport |
| Spur | 49 | La Junta Hill @ Airport | Bents Fort elbow | 156+72 | 275+51 | 11,879 | 0.081 | 0.13 | 56 | 4 | 0.09 | 1.43 | 120 | 35.49 | 9.13E-06 | 0.11 | 35.60 | 4267.66 | 4232.06 | | | | | | | | |
| Spur | 49 | Bents Fort elbow | Bent's Fort | 275+51 | 282+65 | 714 | 0.081 | 0.13 | 56 | 4 | 0.09 | 1.43 | 120 | 2.13 | 9.13E-06 | 0.01 | 2.14 | 4232.06 | 4229.92 | Bent's Fort | 0.081 | 4132.44 | 42.20 | 0 | | 0.00 | |
| Spur | 50 | Main Line Tap | Las Animas | 0+00 | 90+02 | 9,002 | 0.889 | 1.37 | 617 | 8 | 0.35 | 3.94 | 120 | 77.86 | 9.13E-06 | 0.08 | 77.94 | 4163.42 | 4085.48 | Las Animas | 0.889 | 3903.16 | 78.93 | 50 | | 4018.66 | 4020 is tank spill elevation |
| Spur | 51 | Main Line Tap | McClave | 0+00 | 54+82 | 5,482 | 0.057 | 0.09 | 39 | 4 | 0.09 | 1.01 | 120 | 8.48 | 9.13E-06 | 0.05 | 8.53 | 4086.39 | 4077.86 | McClave | 0.057 | 3918.93 | 68.80 | 65 | | 4069.08 | |
| Spur | 52 | Main Line Tap | Hasty | 0+00 | 6+26 | 626 | 0.047 | 0.07 | 33 | 4 | 0.09 | 0.83 | 120 | 0.69 | 9.13E-06 | 0.01 | 0.69 | 4086.39 | 4085.70 | Hasty | 0.047 | 3876.88 | 90.40 | 65 | | 4027.03 | |
| Spur | 53 | Main Line Tap | Eads & May Valley | 0+00 | 316+26 | 31,626 | 0.646 | 1.00 | 449 | 10 | 0.55 | 1.83 | 120 | 51.15 | 9.13E-06 | 0.29 | 51.44 | 4039.16 | 3987.72 | Eads & May Valley | 0.646 | 3888.88 | 42.79 | 0 | | 0.00 | |
| Spur | 54 | Eads & May Valley | May Valley 1 | 0+00 | 140+00 | 14,000 | 0.476 | 0.74 | 330 | 8 | 0.35 | 2.11 | 120 | 38.04 | 9.13E-06 | 0.13 | 38.17 | 4287.72 | 4249.55 | May Valley reducer | 0.476 | 3926.76 | 139.74 | 0 | | 0.00 | |
| Spur | 54 | May Valley 1 | May Valley 2 | 140+00 | 270+50 | 13,050 | 0.476 | 0.74 | 330 | 6 | 0.20 | 3.75 | 120 | 143.94 | 9.13E-06 | 0.12 | 144.06 | 4249.55 | 4105.49 | May Valley | 0.476 | 3926.76 | 77.37 | 65 | | 4076.91 | |
| Spur | 55 | Eads & May Valley | Eads | 316+26 | 1399+39 | 108,313 | 0.171 | 0.26 | 119 | 8 | 0.35 | 0.76 | 120 | 44.11 | 9.13E-06 | 0.99 | 45.10 | 4287.72 | 4242.62 | Eads | 0.171 | 4225 | 7.63 | 0 | | 0.00 | 4215 is Eads tie-in at ground storage tank. |
| Spur | 56 | Main Line Tap | Wiley | 0+00 | 197+45 | 19,745 | 0.034 | 0.05 | 24 | 4 | 0.09 | 0.61 | 120 | 12.03 | 9.13E-06 | 0.18 | 12.21 | 4022.05 | 4009.84 | Wiley | 0.034 | 3733.56 | 119.60 | 65 | | 3883.71 | 3750 is max ground in Wiley, 3733 @ delivery |

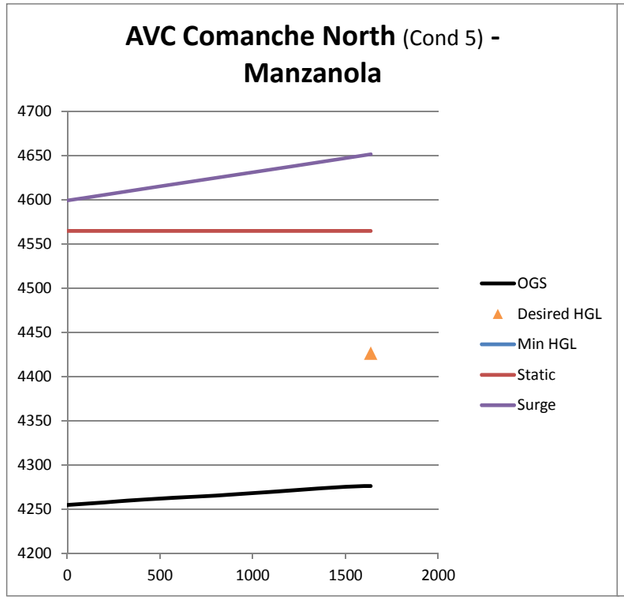

AVC Comanche North (Cond 5) - Main Pipeline
5500
5300
5100
4900
4700
4500
4300
4100
3900
3700
3500
-50000
0
50000
100000
150000
200000
250000
300000
350000
400000
450000
500000
550000
600000
650000
700000
750000
800000
OGS
Desired HGL
Min HGL, Max Month
Static
Surge

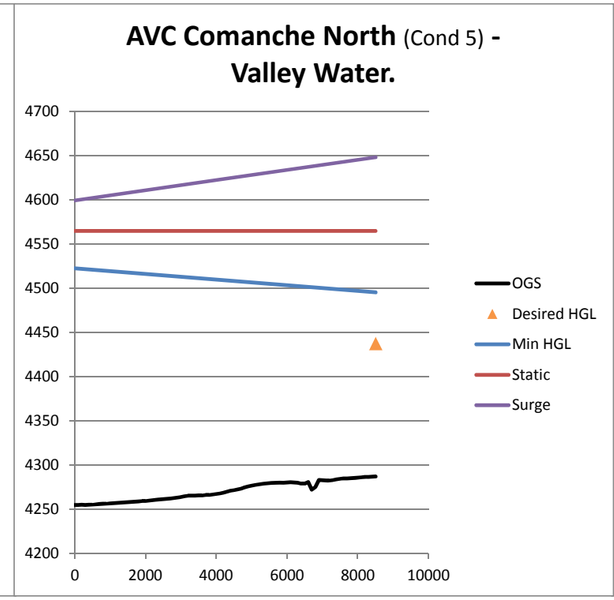

AVC Comanche North (Cond 5)- Southern Loop (Broken)
Hilltop , La Junta
4800
4700
4600
4500
4400
4300
4200
4100
4000
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000
OGS
Min HGL, Max Month
Static
Surge
Min HGL, Max Month, broken


AVC Comanche North (Cond 5) - Hwy 96
4700
4650
4600
4550
4500
4450
4400
4350
4300
4250
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000
OGS
Min HGL, Max Month
Static
Surge


AVC Comanche North (Cond 5) - Eads Spur
4400
4300
4200
4100
4000
3900
3800
3700
0
20000
40000
60000
80000
100000
120000
140000
OGS
Min HGL, Max Month
Static
Surge


AVC Comanche North (Cond 5) -
May Valley Spur
4400
4300
4200
4100
4000
3900
3800
3700
0
5000
10000
15000
20000
25000
30000
OGS
Desired HGL
Min HGL, Max Month
Static
Surge


AVC Comanche North (Cond 5) - Manzanola
4700
4650
4600
4550
4500
4450
4400
4350
4300
4250
4200
0
500
1000
1500
2000
OGS
Desired HGL
Min HGL
Static
Surge


AVC Comanche North (Cond 5) - Valley Water.
4700
4650
4600
4550
4500
4450
4400
4350
4300
4250
4200
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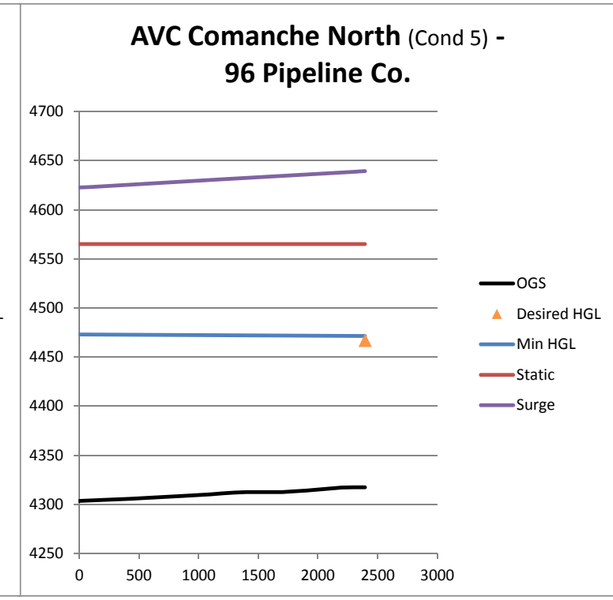
2000
4000
6000
8000
10000
OGS
Desired HGL
Min HGL
Static
Surge


AVC Comanche North (Cond 5) - 96 Pipeline Co.
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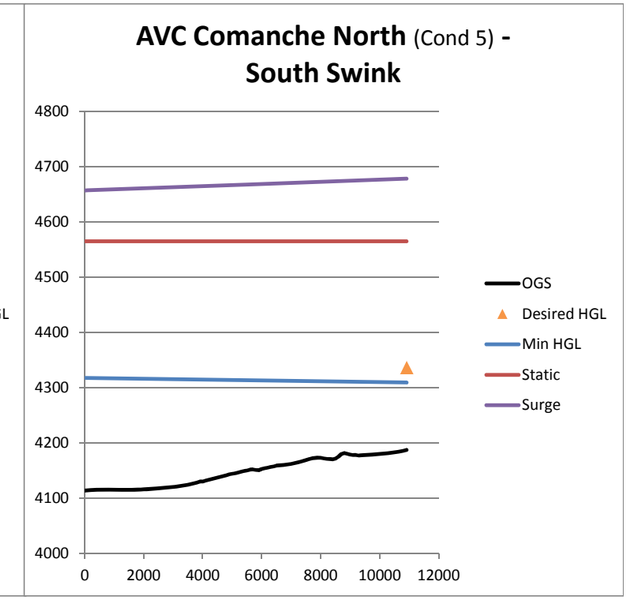
4650
4600
4550
4500
4450
4400
4350
4300
4250
0
500
1000
1500
2000
2500
3000
OGS
Desired HGL
Min HGL
Static
Surge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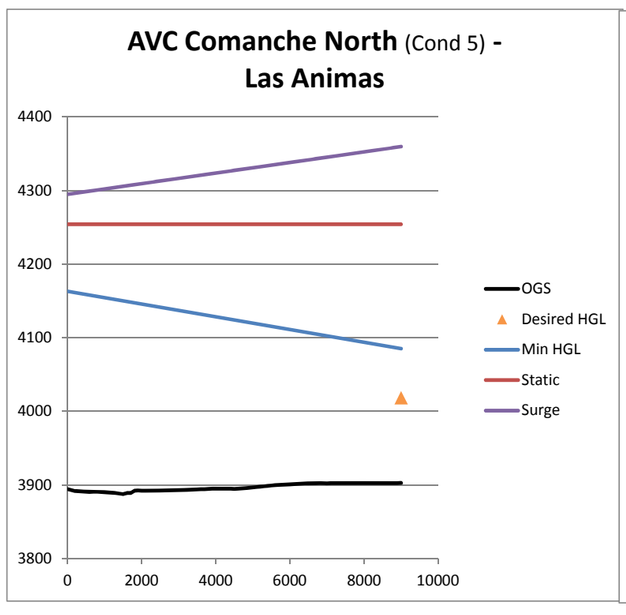
Static
Surge


AVC Comanche North (Cond 5) - Las Animas
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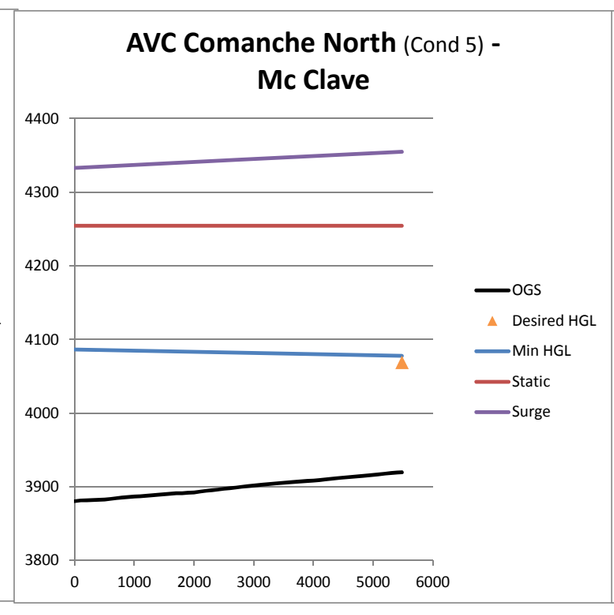
Min HGL
Static
Surge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3900
3800
0
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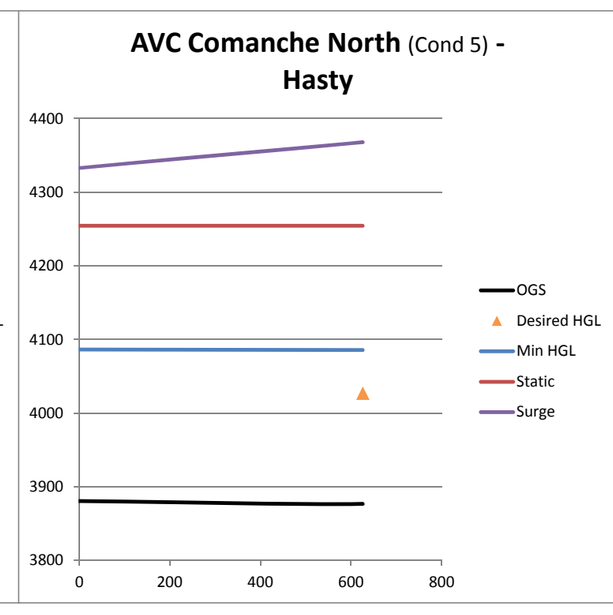
4000
5000
6000
OGS
Desired HGL
Min HGL
Static
Surge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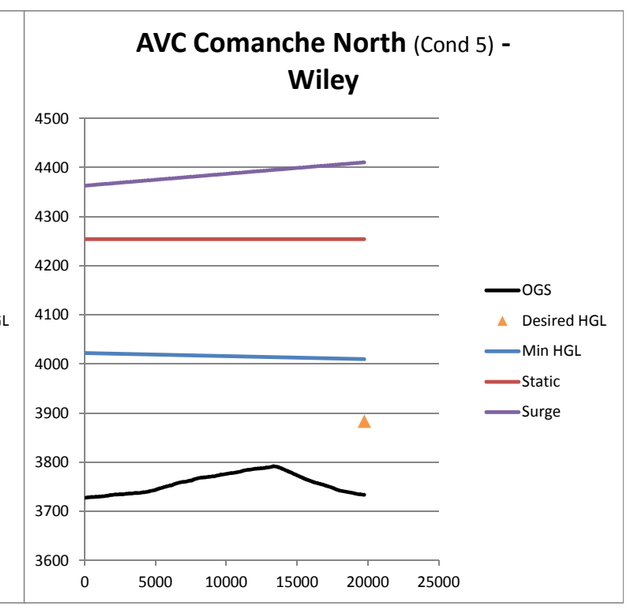
OGS
Desired HGL
Min HGL
Static
Surge


AVC Comanche North (Cond 5) - Wiley
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5000
10000
15000
20000
25000
OGS
Desired HGL
Min HGL
Static
Surge

ATTACHMENT E

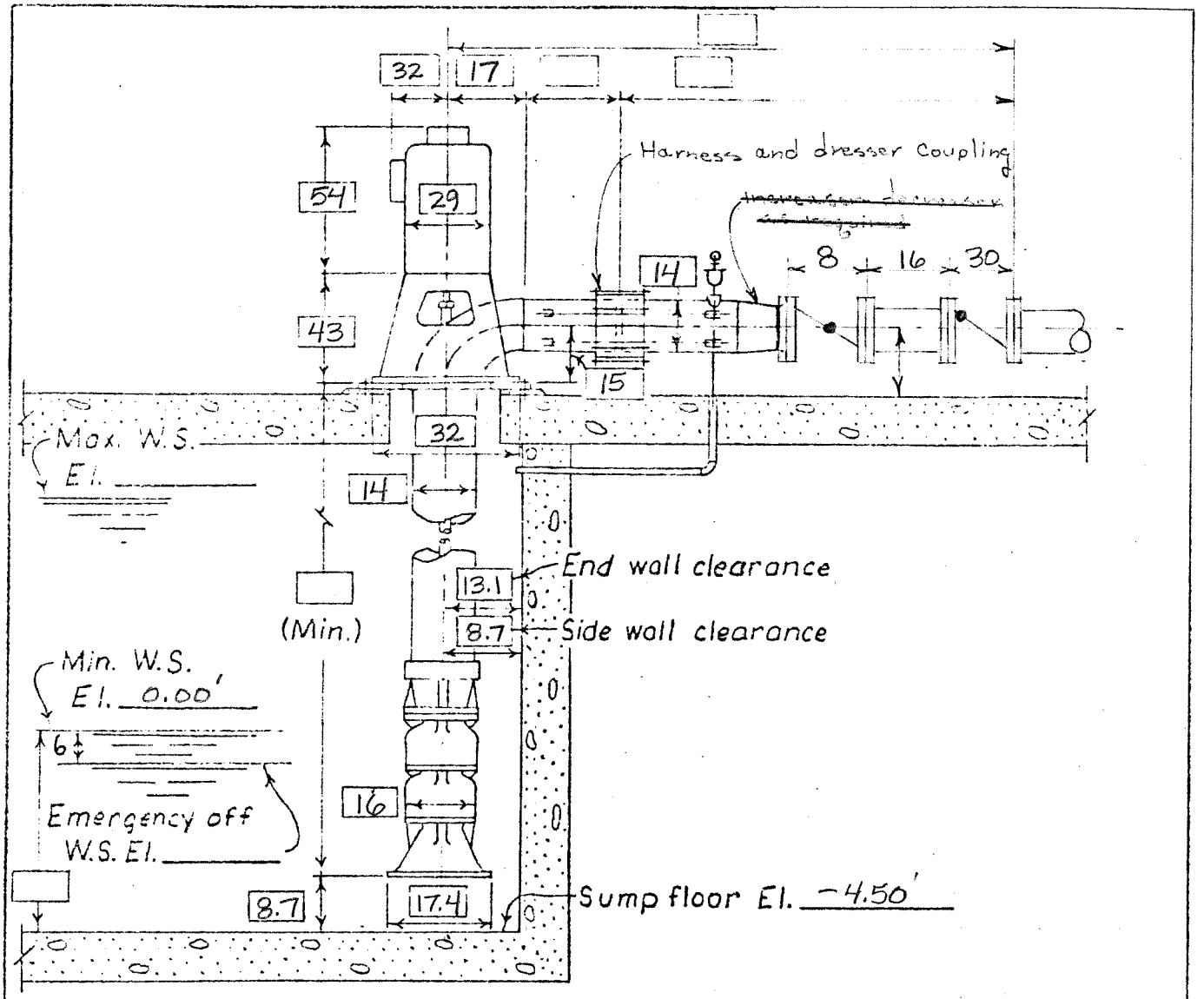
COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS –

Pump Data Sheets

Whitlock Pumping Plant (after WTP)

Eads and May Valley Booster Pumping Plant




VALVE DATA:
Weir-Floway Model 16JKH, 1770 rpm

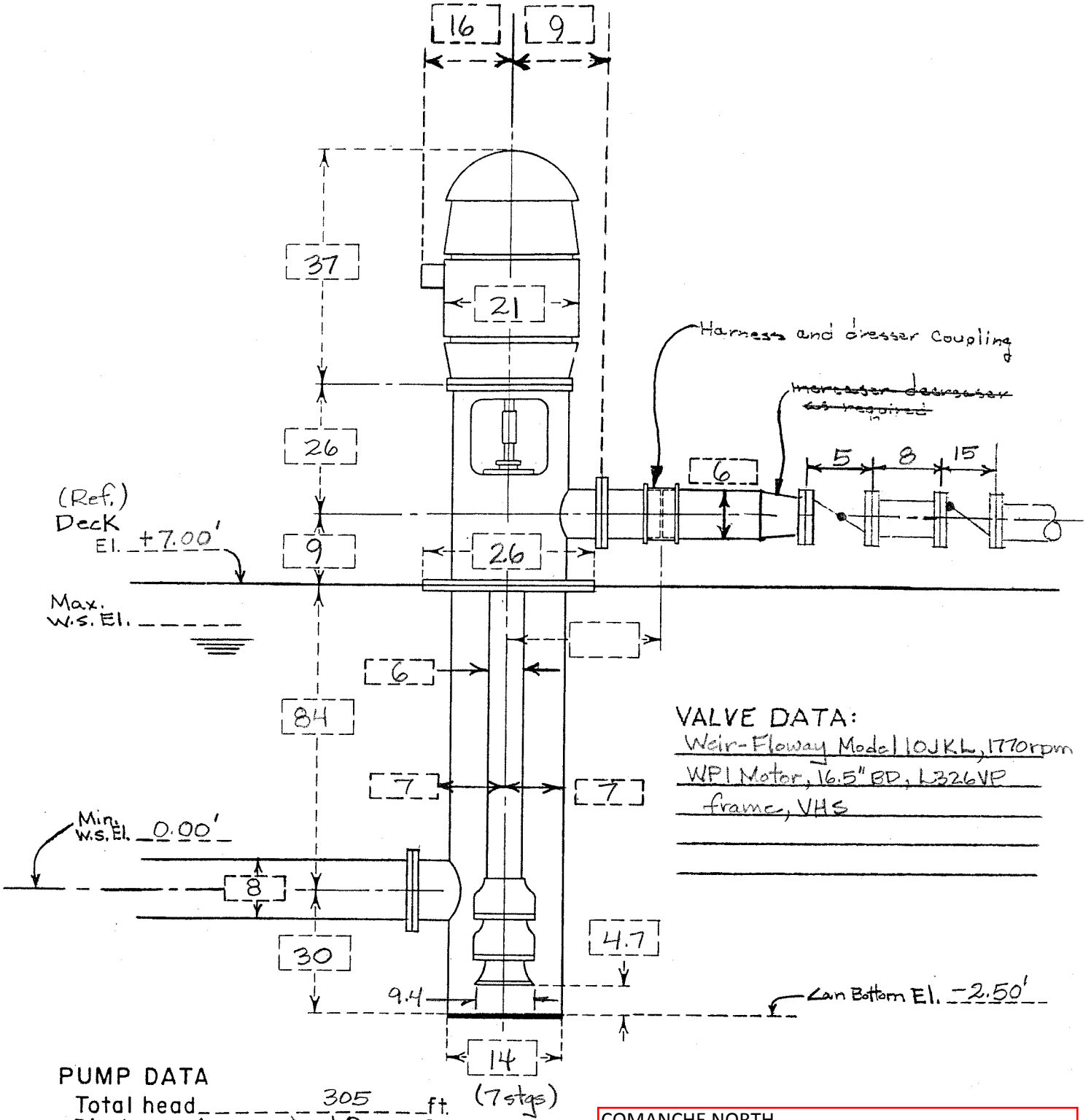
PUMP DATA:
Unit No. 1-4
Discharge (2518 gpm) 5.61 c.f.s.
Total head 465 ft.
No. of stages 4
Shut off head 540 ft.
R.P.M. 1800 (Max.)
B.H.P. 352.3
Weight 3,100 lbs.

MOTOR DATA @ 4160 volts
Rated H.P. 400
Weight 3,500 lbs.

UNIT DATA:
Weight 6,600 lbs.

COMANCHE NORTH
WHITLOCK PUMPING PLANT

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




VALVE DATA:
Weir-Floway Model 10JKL, 1770rpm
WPI Motor, 16.5" BD, L326VP
frame, VHS

PUMP DATA
Total head 305 ft.
Discharge (449 gpm) 1.0 c.f.s.
S.O.H. (max.) 400 ft.
RPM 1800 (Max.)
BHP 43.1
Weight 1,800 lbs.

MOTOR DATA
Rated HP 50 @ 480 volts
Weight 700 lbs.

UNIT DATA
Weight 2,500 lbs.

COMANCHE NORTH
EADS/MAY VALLEY BOOSTER PLANT

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

Denver, Colorado
Drawn R. Zelenka Chkd.

ATTACHMENT F

COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS –

Conduit Segment Descriptions

**Arkansas Valley Conduit - Comanche North (broken loop)**
**Reach Summary Descriptions and**
**Corridor Widths for EIS / Apprasial Level Design**

**March 12, 2013**

| 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 |
| 20,252 | 1 HYB_1 | Eastern Whitlock WTP yard | Junction with Pueblo South Route (Approx. 6,600 feet southeast of Bessemer Ditch and Hwy 96 Intersection) | Grass/Gravel and Asphalt/Concrete | 400 | From Whitlock WTP, to the southwest through park and golf course, west on Saint Clair Ave |
| 40,956 | 1G_2 | Junction with Pueblo South Route (Approx. 6,600 feet southeast of Bessemer Ditch and Hwy 96 Intersection) | Intersection of I25 south of CF&I slag piles. | Grass/Gravel | 400 | Pueblo South Route and adjacent to Comanche pipeline. |
| 29,646 | 1 HYB_2 | Intersection of I25 south of CF&I slag piles. | South Rd, near St. Charlse Mesa WTP | Grass/Gravel | 400 | Pueblo South Route and adjacent to Comanche roadway |
| 6,755 | 1K.2 | Colorado Springs Utilities Wye in the Whitlock Raw Water Line | Whitlock WTP Inlet ponds | Gravel Road | 400 | Parallel to Existing Whitlock Raw Water Line. |
| 5,407 | 1P.3 | 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 |
| 10,689 | 1W Spur | Intersection of Avondale Blvd and Hwy 96 | Intersection of Avondale St and Hwy 50 (Business) in Avondale | Grass/Gravel and Asphalt/Concrete | 400 | Spur to Avondale from North Alignment. Alignment follows Avondale Blvd and crosses Arkansas River and Hwy 50. |
| | **2** | **Avondale** | **Fowler** | | | |
| 27,055 | 2B | Intersection of Avondale Blvd and Hwy 96 | Baker Ave and Railroad Street in Boone | Grass/Gravel | 600 | Alignment is north of railroad on north side of Hwy 96. |
| 14,322 | 2D.1 | Baker Ave and Railroad Street in Boone | 2 Miles southeast of Boone where RR departs farther north. | Grass/Gravel | 600 | Alignment is adjacent to RR allong Hwy 96. |
| 63,528 | 2D.2 | 2 Miles souteast of Boone where RR departs farther north. | Intersection of Hwy 96 and Hwy 167 north of Fowler. | Grass/Gravel | 600 | Alignment is adjacent to Hwy 96. |
| 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. |
| 2,669 | 2G1 | High pressure pipeline from Mainline to north Fowler storage tank | Low pressure pipeline from north Fowler storage tank to Mainline. | Grass/Gravel | 600 | Spurs to/from north Fowler storage tank. |
| 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. |

**Arkansas Valley Conduit - Comanche North (broken loop)**
**Reach Summary Descriptions and**
**Corridor Widths for EIS / Apprasial Level Design**

| Length | Reach | Beginning Point | Ending Point | Corridor Basic Description | Corridor Width, ft | Summary |
|---|---|---|---|---|---|---|
| | **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. |
| 35,711 | 3C | Approx 3,800 feet south of Hwy 96 on CR Ln | Intersection of CR 4 and Hwy 207 (North of Manzanola) | Prairie | 600 | Alignment is adjacent to CR 65, CR B 5/10, cross-country, CR 6, CR 2175, and Hwy 207. |
| 1,116 | 3D.1 | Intersection of CR 4 and Hwy 207 (North of Manzanola) | Arkansas River Crossing north bank | Grass/Gravel | 600 | Alignment is adjacent to Hwy 207. |
| 2,666 | 3D.2 | Arkansas River Crossing north bank | Arkansas River Crossing south bank | Grass/Gravel | 600 | Alignment is adjacent to Hwy 207. |
| 5,349 | 3D.3 | Arkansas River Crossing south bank | Center of Manzanola | Grass/Gravel | 600 | Alignment is adjacent to Hwy 207. |
| 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. |
| 21,075 | 3L.3 | Intersection of Hwy 50 and CR 21 (east of Rocky Ford). | Swink Delivery | Grass/Gravel | 600 | 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 |
| 17,742 | 3L.5 | Intersection of Hwy 50 and CR 25 | West Side of La Junta near Intersection of Hwy 10 and Hwy 50 | 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. |
| 2,637 | 3S.1 | West Side of La Junta near Intersection of Hwy 10 and Hwy 50 | Intersection of CR 28 and 6th St | Asphalt and/or Concrete | 100 | Alignment goes south on Hwy 10, south on Dalton Ave. |

**Arkansas Valley Conduit - Comanche North (broken loop)**
**Reach Summary Descriptions and**
**Corridor Widths for EIS / Apprasial Level Design**

| Length | Reach | Beginning Point | Ending Point | Corridor Basic Description | Corridor Width, ft | Summary |
|---|---|---|---|---|---|---|
| 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. |
| 13,753 | 3U | Intersection of Hwy 109 and Bents Fort spur north of 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** | | | |
| 42,119 | 4A.1 | Intersection of CR Hh and Cr 33 | Approx 4300 feet west of Intersection of Adobe Crk and Hwy 194 | Grass/Gravel | 600 | Alignment is east on CR Hh, and east on Hwy 194. |
| 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 |
| 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. |
| 28,981 | 4C.1 | Approx 4300 feet west of Intersection of Adobe Crk and Hwy 194 | 900 ft west of Intersection of Hwy 194 and Hwy 50 North of Las Animas | Grass/Gravel | 600 | Alignment is adjacent to Hwy 194. |
| 888 | 4C.2 | 900 ft west of Intersection of Hwy 194 and Hwy 50 North of Las Animas | Intersection of Hwy 194 and Hwy 50 North of Las Animas | Grass/Gravel | 600 | Alignment is adjacent to Hwy 194. |
| | **5** | **Las Animas** | **Lamar** | | | |
| 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 - Comanche North (broken loop)**
**Reach Summary Descriptions and**
**Corridor Widths for EIS / Apprasial Level Design**

| 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

COMANCHE NORTH ENGINEERING SUPPORT DATA

CONTENTS – (w/o Escalation)

Total Construction Cost Summary Estimate Sheets (3 total sheets)

Total Construction Cost Estimate Sheets (125 total sheets)

Interconnect OM&R Cost Estimate Sheet (1 total sheet)

OM&R Cost Summary Sheet (1 total sheets)

OM&R Cost Estimate Sheets (58 total sheets)

Water Treatment Plant OM&R Costs Summary Sheet (1 total sheet)

Table G1 – WTP – Annual OM&R Costs for Action Alternatives by B&V

Table G2 – WTP – Typical Unit Costs for Drinking Water Treatment by B&V

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Comanche North Alternative Summary Sheet
Max Month Condition 5

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]SUM

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | **Reach 1** | | | | | **$5,261,325** |
| | | Reach 1 Pipeline | | | | | $1,584,880 |
| | | Whitlock Pumping Plant (D/S of WTP) | | | | | $2,400,000 |
| | | Air Chamber Pumping Plant after WTP (Sum of Civil Sheet + Hydraulic Sheet) | | | | | $460,500 |
| | | Valve Vault Whitlock "Y" JUP (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $383,850 |
| | | Meter Vault Pumping Plant after WTP (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $432,095 |
| | | **Reach 2** | | | | | **$65,530,672** |
| | | Reach 2 Pipeline | | | | | $63,864,490 |
| | | Fowler Spur Pipeline | | | | | $564,620 |
| | | Regulating Tank WTP to N Fowler WaterSurge Tank (Sum of Civil Sheet + Hydraulic Sheet) | | | | | $836,362 |
| | | Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $265,200 |
| | | **Reach 3** | | | | | **$31,043,790** |
| | | Reach 3 Pipeline | | | | | $24,414,170 |
| | | Manzanola Spur Pipeline | | | | | $202,857 |
| | | Valley Water Spur Pipeline | | | | | $453,785 |
| | | Rocky Ford & Hancock Spur Pipeline | | | | | $139,793 |
| | | Newdale-Grand Valley Spur Pipeline | | | | | $704,750 |
| | | West Grand Valley Spur | | | | | $323,435 |
| | | LaJunta North Water Surge Tank (Sum of Civil Sheet + Hydraulic Sheet) | | | | | $2,288,575 |
| | | Fowler North Water Surge Tank (Sum of Civil Sheet + Hydraulic Sheet) | | | | | $854,625 |
| | | Fowler North Water Surge Tank - Roadway | | | | | $597,000 |
| | | Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $1,064,800 |
| | | **Reach 4** | | | | | **$28,688,129** |
| | | Reach 4 Pipeline | | | | | $25,825,700 |
| | | Las Animas Spur Pipeline | | | | | $592,925 |
| | | Hasty Spur Pipeline | | | | | $56,114 |
| | | McClave Spur Pipeline | | | | | $282,490 |
| | | Wiley Spur | | | | | $1,462,800 |
| | | Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $468,100 |
| | | **Highway 96 Spur** | | | | | **$6,590,546** |
| | | Hwy 96 Spur Pipeline | | | | | $6,044,446 |
| | | 96 Pipeline Co. Spur Pipeline | | | | | $135,300 |
| | | Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $410,800 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Design Team | CHECKED<br>TSC Design Team | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/3/13 |
| DATE PREPARED<br>Jan-13 | PEER REVIEW / DATE<br>TSC Design Team | DATE PREPARED<br>02/18/13 | PEER REVIEW / DATE<br>NCL 3/5/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

**Arkansas Valley Conduit**
**Comanche North Alternative Summary Sheet**
**Max Month Condition 5**

**PROJECT:**
**Fryingpan-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 05-30-2013.xls]Interconnect

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | **Eads Spur (Includes May Valley)** | | | | | **$8,021,230** |
| | | Eads and May Valley Spur Pipeline | | | | | $1,546,994 |
| | | Eads Spur Pipeline | | | | | $4,434,896 |
| | | May Valley Spur Pipeline | | | | | $1,414,100 |
| | | Eads Booster Plant | | | | | $190,000 |
| | | Eads and May Valley Air Chamber (Sum of Civil Sheet and Hydraulic Sheet) | | | | | $90,700 |
| | | Eads and May Valley Meter Vault (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $205,940 |
| | | Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet) | | | | | $138,600 |
| | | **Loop** | | | | | **$9,703,668** |
| | | South Loop Pipeline (Broken Loop) | | | | | $6,871,110 |
| | | South Swink Spur Pipeline | | | | | $542,700 |
| | | Homestead Spur Pipeline | | | | | $151,780 |
| | | La Junta Spur Pipeline | | | | | $480,408 |
| | | Bent's Fort Spur Pipeline (Broken Loop) | | | | | $1,320,170 |
| | | Participant Tie-In Vaults | | | | | $337,500 |
| | | **Crossings (Broken Loop)** | | | | | **$22,720,000** |
| | | **Dewatering** | | | | | **$4,235,000** |
| | | **Dust Abatement** | | | | | **$4,000,000** |
| | | **Interconnect (Sum of Pipe & Valve Sheets + Civil Sheets + Cofferdam Sheet)** | | | | | **$4,158,675** |
| | | **Water Treatment Plant*** | | | | | **$11,501,586** |
| | | * Costs developed by Black & Veatch (Estimate Sheets Peer Review/Date 03-20-2013). | | | | | |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| **BY** TSC Design Team | **CHECKED** TSC Design Team | **BY** Jim Jetton, P.E., C.C.E. | **CHECKED** |
| **DATE PREPARED** January-13 | **PEER REVIEW / DATE** TSC Design Team | **DATE PREPARED** 05/30/13 | **PEER REVIEW / DATE** DCD 6/5/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

**Arkansas Valley Conduit**
**Comanche North Alternative Summary Sheet**
**Max Month Condition 5**

**PROJECT:**
**Fryingpan-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 05-30-2013.xls]Interconnect

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Subtotal 1 | | | | | $201,454,620.50 |
| | | Mobilization | 5% | +/- | | | $10,000,000.00 |
| | | **Subtotal 1 with Mobilization** | | | | | **$211,454,620.50** |
| | | Design Contingencies | 12% | +/- | | | $28,545,379.50 |
| | | Allowance for Procurement Strategies (APS) | 0.0% | +/- | | | $0.00 |
| | | Type of solicitation assumed is: Full and open sealed bid competition | | | | | |
| | | **CONTRACT COST** | | | | | **$240,000,000.00** |
| | | Construction Contingencies | 23% | +/- | | | $50,000,000.00 |
| | | **FIELD COST** | | | | | **$290,000,000.00** |
| | | Non-Contract Costs* | | | | | $110,000,000.00 |
| | | **CONSTRUCTION COST** | | | | | **$400,000,000.00** |

* 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. Non-Contract Costs are subject to the rounding noted in the references below.

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** Jim Jetton, P.E., C.C.E. | **CHECKED** |
| **DATE PREPARED** January-13 | **PEER REVIEW / DATE** TSC Design Team | **DATE PREPARED** 05/30/13 | **PEER REVIEW / DATE** DCD 6/4/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 9.2 | acre | $1,000.00 | $9,200.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.92 | acre | $2,500.00 | $2,300.00 |
| | | Stripping (6" thick) | 8140 | 7,400 | cy | $4.00 | $29,600.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 9.2 | acre | $1,500.00 | $13,800.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 17,500 | cy | $6.00 | $105,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 1,100 | cy | $35.00 | $38,500.00 |
| | | (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 | 17,500 | cy | $5.00 | $87,500.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 1,900 | cy | $14.00 | $26,600.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 3,200 | cy | $11.00 | $35,200.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 145 | cy | $50.00 | $7,250.00 |
| | | Embedment & Cover Backfill | 8140 | 2,700 | cy | $7.00 | $18,900.00 |
| | | Compacting Embedment Backfill | 8140 | 480 | cy | $14.00 | $6,720.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (urban trench length of 2169 ft of 30" pipe) | | | | | |
| | | | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 0.50 | mo | $15,000.00 | $7,500.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 2,169 | lin ft | $60.00 | $130,140.00 |
| | | Utility Relocation & Repair Urban Excavation | | 2,169 | lin ft | $30.00 | $65,070.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $599,780.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Reach 1: Pueblo Reservoir to WTP<br>Civil | Fryingpan-Arkansas Project, Colorado |
| WOID: AF523 | ESTIMATE LEVEL: Appraisal |
| REGION: GP | UNIT PRICE LEVEL: Jan-11 |
| FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1 | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 30" dia. steel, 0.1345" thick (45 #/ft)-mortar lined | 8140 | 6,300 | lin ft | $125.00 | $787,500.00 |
| | | epoxy tape coated, rubber gaskets, HC=250 | | | | | |
| | | 281,430 lbs total steel | | | | | |
| | | 30" dia. steel, 0.1428" thick (48 #/ft)-mortar lined | 8140 | 500 | lin ft | $125.00 | $62,500.00 |
| | | epoxy tape coated, rubber gaskets, HC=375 | | | | | |
| | | 24,000 lbs total steel | | | | | |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 30" AWWA class 150(psig) b-fly valve w/ operato | 8140 | 1 | ea | $14,500.00 | $14,500.00 |
| | | 30" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 1 | ea | $23,000.00 | $23,000.00 |
| | | 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 | | | | | $901,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Reach 1: Pueblo Reservoir to WTP<br>Civil | Fryingpan-Arkansas Project, Colorado |
| WOID: AF523 | ESTIMATE LEVEL: Appraisal |
| REGION: GP | UNIT PRICE LEVEL: Jan-11 |
| FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1 | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Air Valve Structures (to include): | | 2 | ea | $12,000.00 | $24,000.00 |
| | | - 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 | | |
| | | - 6" Combination Air Valve (1ea) | 8140 | 2 | ea | | |
| | | - 6" Butterfly 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 | 8 | 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 | $43,000.00 | $43,000.00 |
| | | *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 | | | | | $83,600.00 |
| | | SUBTOTAL Reach 1 Pipeline | | | | | $1,584,880.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Whitlock Pumping Plant (after WTP)
Comanche North (Max Month Condition 5)

**PROJECT:** Frylington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural/Electrical/Mechanical: | | | | | |
| | | **Whitlock P.P. (D/S of WTP)** | | | | | |
| | 1 | Pumping Plant (Total Q = 22.44 cfs w/ 0% wf) | 86-68420 | 1 | LS | $2,400,000.00 | $2,400,000.00 |
| | | Using pumping plant program | | | | | |
| | | P.P. - 5.61 cfs each; 465 feet TDH; | | | | | |
| | | Unit Brake HP: 352.3 hp; Motors: 400 hp each | | | | | |
| | | @ 4160 volts | | | | | |
| | | 4 pumps; vertical; supply voltage (69 kV) | | | | | |
| | | Structures And Improvements | | | | | |
| | | Waterways | | | | | |
| | | Pumps and Motors | | | | | |
| | | Accessory Electrical | | | | | |
| | | Miscellaneous Equipment | | | | | |
| | | Switchyards | | | | | |
| | | Subtotal Whitlock Pumping Plant | | | | | $2,400,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY R. Zelenka | REVIEWED Toby Turnage 1.25.13 | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 1/18/13 | PEER REVIEW / DATE Toby Turnage 1.25.13 | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCA 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Air Chamber (Pumping Plant after WTP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:**
Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural: | | | | | |
| | | **Reinforced Concrete for Foundation** | 86-68120 | 1 | ls | $10,500.00 | $10,500.00 |
| | | (slab-on-grade foundation type) | | | | | |
| | | (Assume: $f'_c$=4,500 psi) | | | | | |
| | | Source: Pueblo, CO 20 miles | | | | | |
| | | Concrete: 9 yd3 | | | | | |
| | | Reinforcement (Assume 135 lb/yd3): 1225 lbs | | | | | |
| | | Cement (Assume: 0.282 ton/yd3): 2.6 tons | | | | | |
| | | **Subtotal This Sheet** | | | | | **$10,500.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>R. J. Barthel | REVIEWED<br>Paul Ruchti | BY | CHECKED 3/8/13 |
| DATE PREPARED<br>01/15/13 | PEER REVIEW / DATE<br>Paul Ruchti, P.E. | DATE PREPARED | PEER REVIEW / DATE<br>DGL 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Air Chamber (Pumping Plant after WTP)<br>Comanche North (Max Month Condition 5)<br>Reach 1: Pueblo Reservoir to WTP | Fryington-Arkansas Project, Colorado<br>WOID: AF523 — ESTIMATE LEVEL: Appraisal<br>REGION: GP — UNIT PRICE LEVEL: Jan-11<br>FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1 |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic equipment/Mechanical | | | | | |
| | | Air Chamber | 86-68420 | 1 | ls | $450,000.00 | $450,000.00 |
| | | 18612-gallon (2488 cubic feet) | | | | | |
| | | steel air chamber | | | | | |
| | | cylinder height 18 feet | | | | | |
| | | cylinder diameter 12 feet | | | | | |
| | | air chamber weight 45,000 pounds | | | | | |
| | | mounted air compressor 165 horsepower | | | | | |
| | | Subtotal This Sheet | | | | | $450,000.00 |
| | | Subtotal Reach 1 Air Chamber | | | | | $460,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Valve Vault (Whitlock "Y" JUP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| 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: Jim Jetton, P.E., C.C.E | CHECKED: 3/8/13 |
| DATE PREPARED: 01/15/13 | PEER REVIEW / DATE: Paul Ruchti, P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Valve Vault (Whitlock "Y" JUP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:**
Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Mechanical Equipment: | | | | | |
| | | assume valve vault size=14'x23'x20'd | | | | | |
| | | assume 1 vault @ site | | | | | |
| | 1 | Valve vault ventilation equipment | 86-68410 | 1 | ls | $8,700.00 | $8,700.00 |
| | | list of equipment per vault: | | | | | |
| | | (1)-steel reversible centrifugal fan, 1100 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 30" pipe | | | | | |
| | | Subtotal This Sheet | | | | | $75,300.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>AM Ritt | REVIEWED<br>Patrick Dawson | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Patrick Dawson | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCW 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Valve Vault (Whitlock "Y" JUP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | Valve Vault | 86-68420 | | | | |
| | | 30-inch pressure reducing valve | | 1 | ea | $130,000.00 | $130,000.00 |
| | | 1 valve, 6,500 lbs each, 6,500 lbs total | | | | | |
| | | Cla-Val 150-pound | | | | | |
| | | 30-inch manually-operated butterfly valve | | 2 | ea | $14,500.00 | $29,000.00 |
| | | 2 valves, 2,435 lbs each, 4,870 lbs total | | | | | |
| | | AWWA Class 150-B | | | | | |
| | | 24-inch manually-operated butterfly valve | | 1 | ea | $9,000.00 | $9,000.00 |
| | | 1 valve, 1,085 lbs each, 1,085 lbs total | | | | | |
| | | AWWA Class 150-B | | | | | |
| | | Subtotal This Sheet | | | | | $168,000.00 |
| | | Subtotal Reach 1 Valve Vault | | | | | $383,850.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Ken Smith | REVIEWED: Nathan Nakamoto P.E. | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 1/18/2013 | PEER REVIEW / DATE: Nathan Nakamoto P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Pumping Plant after WTP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| 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, P.E. | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 01/15/13 | PEER REVIEW / DATE Paul Ruchti, P.E. | DATE PREPARED 02/15/13 | PEER REVIEW / DATE 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Pumping Plant after WTP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D6170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Mechanical Equipment: | | | | | |
| | | assume meter vault size=11.25'x11.25'x16.7'd | | | | | |
| | | assume 1 vault @ Comanche High Lift PP | | | | | |
| | 1 | Meter vault ventilation equipment | 86-68410 | 1 | ls | $7,700.00 | $7,700.00 |
| | | list of equipment per vault: | | | | | |
| | | (1)-steel reversible centrifugal fan, 600 cfm @ 0.25" w.g.s.p., 1/4 Hp | | | | | |
| | | (16 ft)-10" diam, 16 ga., galv. steel duct | | | | | |
| | | (2)-10" diam, sch 20, galv., L.R. 180 deg. steel pipe returns | | | | | |
| | | (2)-10"x12" reducer, sch 20, galv. steel pipe | | | | | |
| | | (4)-12" diam, stainless steel bird screens | | | | | |
| | | (2)-10"x12" reducer, 16 ga, galv. steel duct | | | | | |
| | | (2)-10" 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 | | | | | $73,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: AM Ritt | REVIEWED: Patrick Dawson | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 1/18/2013 | PEER REVIEW / DATE: Patrick Dawson 01/18/2013 | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: Ned 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Pumping Plant after WTP)
Comanche North (Max Month Condition 5)
Reach 1: Pueblo Reservoir to WTP

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 1

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | **Meter Vault** | 86-68420 | | | | |
| | | 36-inch pressure reducing valve | | 1 | ea | $200,000.00 | $200,000.00 |
| | | 1 valve, 11,720 lbs each, 11,720 lbs total | | | | | |
| | | Cla-Val 150-pound | | | | | |
| | | 36-inch manually-operated butterfly valve | | 2 | ea | $17,000.00 | $34,000.00 |
| | | 2 valves, 3,425 lbs each, 6,850 lbs total | | | | | |
| | | AWWA Class 150-B | | | | | |
| | | 30-inch manually-operated butterfly valve | | 1 | ea | $14,500.00 | $14,500.00 |
| | | 1 valve, 2,435 lbs each, 2,435 lbs total | | | | | |
| | | AWWA Class 150-B | | | | | |
| | | **Subtotal This Sheet** | | | | | **$248,500.00** |
| | | **Subtotal Reach 1 Meter Vault** | | | | | **$432,095.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>2/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>NCN 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _4_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 2: WTP to Fowler North Water Surge Tank
Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 430 | acre | $800.00 | $344,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 43 | acre | $2,000.00 | $86,000.00 |
| | | Stripping (6" thick) | 8140 | 350,000 | cy | $2.00 | $700,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 430 | acre | $800.00 | $344,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 850,000 | cy | $4.00 | $3,400,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 53,000 | cy | $25.00 | $1,325,000.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 16,000 | cy | $30.00 | $480,000.00 |
| | | Embedment & Cover Backfill | 8140 | 760,000 | cy | $3.00 | $2,280,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 92,000 | cy | $8.00 | $736,000.00 |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Suburban areas have limited access & space with | | | | | |
| | | sparse utilities (> 1000' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 85,000 | cy | $11.00 | $935,000.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 3,800 | cy | $50.00 | $190,000.00 |
| | | Embedment & Cover Backfill | 8140 | 70,000 | cy | $7.00 | $490,000.00 |
| | | Compacting Embedment Backfill | 8140 | 3,800 | cy | $14.00 | $53,200.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (urban trench length of 23,118 ft of 36" pipe) | | | | | |
| | | (Suburban trench length of 30,183 ft of 30" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 12.00 | mo | $15,000.00 | $180,000.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 53,301 | lin ft | $60.00 | $3,198,060.00 |
| | | Utility Relocation & Repair Urban Excavation | | 53,301 | lin ft | $30.00 | $1,599,030.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $16,340,290.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _4_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 2: WTP to Fowler North Water Surge Tank
Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

**WOID:** AF523 | **ESTIMATE LEVEL:** Appraisal
**REGION:** GP | **UNIT PRICE LEVEL:** Jan-11
**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 36" dia. steel, 0.1501" thick (60 #/ft)-mortar lined | 8140 | 7,500 | lin ft | $140.00 | $1,050,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=125 | | | | | |
| | | 451,500 lbs total steel | | | | | |
| | | 36" dia. steel, 0.1501" thick (60 #/ft)-mortar lined | 8140 | 6,700 | lin ft | $140.00 | $938,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=250 | | | | | |
| | | 402,000 lbs total steel | | | | | |
| | | 36" dia. steel, 0.1707" thick (68 #/ft)-mortar lined | 8140 | 10,000 | lin ft | $145.00 | $1,450,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=375 | | | | | |
| | | 686,800 lbs total steel | | | | | |
| | | 36" dia. steel, 0.25" thick (100 #/ft)-mortar lined | 8140 | 4,700 | lin ft | $155.00 | $728,500.00 |
| | | epoxy tape coated, rubber gaskets, HC=500 | | | | | |
| | | 470,000 lbs total steel | | | | | |
| | | 36" dia. steel, 0.3125" thick (125 #/ft)-mortar lined | 8140 | 5,700 | lin ft | $175.00 | $997,500.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 712,500 lbs total steel | | | | | |
| | | 30" dia. steel, 0.1345" thick (45 #/ft)-mortar lined | 8140 | 4,300 | lin ft | $125.00 | $537,500.00 |
| | | epoxy tape coated, rubber gaskets, HC=125 | | | | | |
| | | 192,375 lbs total steel | | | | | |
| | | 30" dia. steel, 0.1345" thick (45 #/ft)-mortar lined | 8140 | 20,000 | lin ft | $125.00 | $2,500,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=250 | | | | | |
| | | 918,000 lbs total steel | | | | | |
| | | 30" dia. steel, 0.1428" thick (48 #/ft)-mortar lined | 8140 | 32,000 | lin ft | $125.00 | $4,000,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=375 | | | | | |
| | | 1,521,600 lbs total steel | | | | | |
| | | 30" dia. steel, 0.25" thick (84 #/ft)-mortar lined | 8140 | 25,000 | lin ft | $145.00 | $3,625,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=500 | | | | | |
| | | 2,091,600 lbs total steel | | | | | |
| | | 30" dia. steel, 0.25" thick (84 #/ft)-mortar lined | 8140 | 34,000 | lin ft | $145.00 | $4,930,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 2,847,600 lbs total steel | | | | | |
| | | 30" dia. steel, 0.3125" thick (106 #/ft)-mortar lined | 8140 | 46,000 | lin ft | $165.00 | $7,590,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=750 | | | | | |
| | | 4,865,400 lbs total steel | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $28,346,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/5/13 |
| DATE PREPARED: 02/05/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCN 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _4_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 2: WTP to Fowler North Water Surge Tank

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items (cont'd): | | | | | |
| | | 30" dia. steel, 0.375" thick (127 #/ft)-mortar lined | 8140 | 64,000 | lin ft | $195.00 | $12,480,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=875 | | | | | |
| | | 8,128,000 lbs total steel | | | | | |
| | | 30" dia. steel, 0.4375" thick (148 #/ft)-mortar lined | 8140 | 4,600 | lin ft | $225.00 | $1,035,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=1000 | | | | | |
| | | 678,876 lbs total steel | | | | | |
| | | 24" dia. steel, 0.25" thick (68 #/ft)-mortar lined | 8140 | 270 | lin ft | $140.00 | $37,800.00 |
| | | epoxy tape coated, rubber gaskets, HC=750 | | | | | |
| | | 18,088 lbs total steel | | | | | |
| | | 24" dia. steel, 0.3125" thick (86 #/ft)-mortar lined | 8140 | 3,600 | lin ft | $160.00 | $576,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=875 | | | | | |
| | | 306,848 lbs total steel | | | | | |
| | | 24" dia. steel, 0.3125" thick (86 #/ft)-mortar lined | 8140 | 8,200 | lin ft | $160.00 | $1,312,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=1000 | | | | | |
| | | 706,318 lbs total steel | | | | | |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 36" AWWA class 150(psig) b-fly valve w/ operato | 8140 | 1 | ea | $17,000.00 | $17,000.00 |
| | | 36" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 1 | ea | $29,000.00 | $29,000.00 |
| | | 36" ANSI class 150 (psig) butterfly valve | 8140 | 1 | ea | $43,000.00 | $43,000.00 |
| | | 30" AWWA class 150(psig) b-fly valve w/ operato | 8140 | 1 | ea | $14,500.00 | $14,500.00 |
| | | 30" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 3 | ea | $23,000.00 | $69,000.00 |
| | | 30" ANSI class 150 (psig) butterfly valve | 8140 | 2 | ea | $35,000.00 | $70,000.00 |
| | | 30" ANSI class 300 (psig) butterfly valve | 8140 | 5 | ea | $65,000.00 | $325,000.00 |
| | | 24" ANSI class 300 (psig) butterfly valve | 8140 | 1 | ea | $37,000.00 | $37,000.00 |
| | | 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 | | | | | $16,150,300.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>ACD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _4_ OF _4_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 2: WTP to Fowler North Water Surge Tank

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Air Valve Structures (to include): | | 53 | ea | $7,500.00 | $397,500.00 |
| | | - 48" dia. Concrete Pipe, vertical (10 ft ea) | 8140 | 530 | lin ft | | |
| | | - 3/4 inch gravel filter (4cy) | 8140 | 210 | cy | | |
| | | - 48" diam Alum. Hatch cover (95 lbs ea) | 8140 | 5,000 | lbs | | |
| | | - 3" Combination Air Valve (1ea) | 8140 | 53 | ea | | |
| | | - 3" Ball Valves (1 ea) | 8140 | 53 | ea | | |
| | | | | | | | |
| | | Blowoff Structures (to include): | | 53 | ea | $8,300.00 | $439,900.00 |
| | | - 6" dia. Steel pipe, vertical (8 ft ea) | 8140 | 420 | lin ft | | |
| | | - 8' x 8' x 6" Concrete Pad (1.18 cy ea) | 8140 | 63 | cy | | |
| | | - Cementitious Materials for Pad (0.33 tons ea) | 8140 | 17.5 | tons | | |
| | | - Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea) | 8140 | 7,600 | lbs | | |
| | | - 6" dia. Discharge stem pipe (2 ft ea) | 8140 | 105 | lin ft | | |
| | | - 6" Butterfly Valve (1 ea) | 8140 | 53 | ea | | |
| | | - 48" Diam Concrete Pipe, vertical (10 ft ea) | 8140 | 530 | lin ft | | |
| | | - 6" Tee (1 ea) | 8140 | 53 | ea | | |
| | | - 6" Blind Flange (1 ea) | 8140 | 53 | ea | | |
| | | - 48" diam Alum hatch cover (95 lbs ea) | 8140 | 5,000 | lbs | | |
| | | | | | | | |
| | | Manholes-Buried: (to include) | | | | | |
| | | -36" pipe outlet (1 ea) | 8140 | 14 | ea | | |
| | | -36" blind flange (1 ea) | 8140 | 14 | ea | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | Cathodic Protection | 8140 | 1 | ls | $2,190,000.00 | $2,190,000.00 |
| | | *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 | | | | | $3,027,400.00 |
| | | SUBTOTAL Reach 2 Pipeline | | | | | $63,864,490.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/4/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Fowler Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 9.6 | acre | $1,000.00 | $9,600.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.96 | acre | $2,500.00 | $2,400.00 |
| | | Stripping (6" thick) | 8140 | 7,800 | cy | $4.00 | $31,200.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 9.6 | acre | $1,500.00 | $14,400.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 13,000 | cy | $6.00 | $78,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 460.00 | cy | $45.00 | $20,700.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 260 | cy | $50.00 | $13,000.00 |
| | | Embedment & Cover Backfill | 8140 | 13,000 | cy | $5.00 | $65,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 980 | cy | $14.00 | $13,720.00 |
| | | SUBTOTAL THIS SHEET | | | | | $248,020.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Fowler Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" dia. steel, 0.1345" thick (8 #/ft)-mortar lined | 8140 | 6,600 | lin ft | $34.00 | $224,400.00 |
| | | epoxy tape coated, rubber gaskets, HC=1000 | | | | | |
| | | 52,800 lbs total steel | | | | | |
| | | 4" dia. steel, 0.1345" thick (8 #/ft)-mortar lined | 8140 | 1,150 | lin ft | $34.00 | $39,100.00 |
| | | epoxy tape coated, rubber gaskets, HC=1225 | | | | | |
| | | 9,304 lbs total steel | | | | | |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" ANSI class 300 (psig) butterfly valve | 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 | | | | | $273,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/31/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>NCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Fowler Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| 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 | 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 | $13,000.00 | $13,000.00 |
| | | *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 | | | | | $43,200.00 |
| | | SUBTOTAL Fowler Spur Pipeline | | | | | $564,620.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Regulating Tank
Comanche North (Max Month Condition 5)
Reach 2: WTP to North Fowler Water Surge Tank

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2

| 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 foundat | 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 Foundati | 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: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/15/13 | PEER REVIEW / DATE: Paul Ruchti, P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCQ 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Regulating Tank<br>Comanche North (Max Month Condition 5)<br>Reach 2: WTP to North Fowler Water Surge Tank | Fryingpan-Arkansas Project, Colorado |

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | **Steel regulating tank** | | | | | |
| | | 1 - 441,000-gallon steel regulating tank | 86-68420 | 1 | ls | $775,000.00 | $775,000.00 |
| | | (58,900 cubic feet) | | | | | |
| | | AWWA D100 compliance | | | | | |
| | | tank height 30 feet | | | | | |
| | | inside diameter 50 feet | | | | | |
| | | Subtotal This Sheet | | | | | $775,000.00 |
| | | Subtotal Reach 2 Regulating Tank | | | | | $836,362.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Participant Tie-In Vaults<br>Comanche North (Max Month Condition 5)<br>Reach 2: WTP to North Fowler Water Surge Tank | Fryingpan-Arkansas Project, Colorado |

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Civil/Structural: | | | | | |
| | | | | | | | |
| | | **Participant Tie-In Vaults** | 86-68120 | 4 | ea | $35,000.00 | $140,000.00 |
| | | 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** | | | | | **$140,000.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>R. J. Barthel | REVIEWED<br>Paul Ruchti | BY<br>Jim Jetton, P.E., C.C.E | CHECKED 3/3/10 |
| DATE PREPARED<br>01/15/13 | PEER REVIEW / DATE<br>Paul Ruchti, P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Participant Tie-In Vaults<br>Comanche North (Max Month Condition 5)<br>Reach 2: WTP to North Fowler Water Surge Tank | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2 |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Mechanical Equipment: | | | | | |
| | | assume participant tie-in vault size=12' W x 9' L x 10'-8" D | | | | | |
| | 1 | Meter vault ventilation equipment | 86-68410 | 4 | ls | $5,600.00 | $22,400.00 |
| | | 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 | 4 | ea | $800.00 | $3,200.00 |
| | | 3 kW unit heater | | | | | |
| | | thermostatically controlled | | | | | |
| | 3 | Flowmeter system | 86-68410 | 4 | ea | $13,000.00 | $52,000.00 |
| | | 6" diameter, microprocessor-based, | | | | | |
| | | flanged electro-magnetic flowmeter with | | | | | |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs | | | | | |
| | | 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | | | $77,600.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>AM Ritt | REVIEWED<br>James Weems | BY<br>Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED<br>1/15/2013 | PEER REVIEW / DATE<br>James Weems | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Participant Tie-In Vaults<br>Comanche North (Max Month Condition 5)<br>Reach 2: WTP to North Fowler Water Surge Tank | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 2 |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | **Participant Tie-In Vaults (4 vaults)** | 86-68420 | | | | |
| | | 6-inch pressure reducing valve | | 4 | ea | $7,800.00 | $31,200.00 |
| | | 4 valves, 195 lbs each, 780 lbs total | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | | 6-inch manually-operated butterfly valve | | 4 | ea | $1,300.00 | $5,200.00 |
| | | 4 valves, 90 lbs each, 360 lbs total | | | | | |
| | | AWWA Class 150-B | | | | | |
| | | 6-inch buried square-nut operated butterfly | | 4 | ea | $1,800.00 | $7,200.00 |
| | | valve with valve box | | | | | |
| | | 4 valves, 245 lbs each, 980 lbs total | | | | | |
| | | AWWA Class 150-B | | | | | |
| | | 1-inch air valve | | 4 | ea | $1,000.00 | $4,000.00 |
| | | combination air valve | | | | | |
| | | 4 air valves, 35 lbs each, 140 lbs total | | | | | |
| | | **Subtotal This Sheet** | | | | | **$47,600.00** |
| | | **Subtotal Participant Tie-In Vaults** | | | | | **$265,200.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED 3/5/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>Dcd 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 3: Fowler North Surge Tank to La Junta

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 300 | acre | $800.00 | $240,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 30 | acre | $2,500.00 | $75,000.00 |
| | | Stripping (6" thick) | 8140 | 240,000 | cy | $2.00 | $480,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 300 | acre | $800.00 | $240,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 580,000 | cy | $4.00 | $2,320,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 32,000 | cy | $25.00 | $800,000.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 10,500 | cy | $30.00 | $315,000.00 |
| | | Embedment & Cover Backfill | 8140 | 580,000 | cy | $3.00 | $1,740,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 51,000 | cy | $8.00 | $408,000.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Suburban areas have limited access & space with | | | | | |
| | | sparse utilities (> 1000' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 3,400 | cy | $11.00 | $37,400.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 160 | cy | $50.00 | $8,000.00 |
| | | Embedment & Cover Backfill | 8140 | 2,900 | cy | $7.00 | $20,300.00 |
| | | Compacting Embedment Backfill | 8140 | 450 | cy | $14.00 | $6,300.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Suburban trench length of 1,128 ft of 30" pipe) | | | | | |
| | | (Suburban trench length of 1,710 ft of 24" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 0.50 | mo | $15,000.00 | $7,500.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 2,838 | lin ft | $60.00 | $170,280.00 |
| | | Utility Relocation & Repair Urban Excavation | | 2,838 | lin ft | $30.00 | $85,140.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $6,952,920.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/2/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 3: Fowler North Surge Tank to La Junta

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Pipe Items: | | | | | |
| | | 30" dia. steel, 0.1345" thick (45 #/ft)-mortar lined | 8140 | 750 | lin ft | $125.00 | $93,750.00 |
| | | epoxy tape coated, rubber gaskets, HC=125 | | | | | |
| | | 33,660 lbs total steel | | | | | |
| | | 30" dia. steel, 0.1345" thick (45 #/ft)-mortar lined | 8140 | 18,500 | lin ft | $125.00 | $2,312,500.00 |
| | | epoxy tape coated, rubber gaskets, HC=250 | | | | | |
| | | 831,060 lbs total steel | | | | | |
| | | 30" dia. steel, 0.1428" thick (48 #/ft)-mortar lined | 8140 | 34,000 | lin ft | $127.00 | $4,318,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=375 | | | | | |
| | | 1,634,880 lbs total steel | | | | | |
| | | 20" dia. steel, 0.1596" thick (36 #/ft)-mortar lined | 8140 | 27,000 | lin ft | $90.00 | $2,430,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 985,140 lbs total steel | | | | | |
| | | 24" DR25 (CIOD) C905 PVC pipe | 8140 | 60,000 | lin ft | $68.00 | $4,080,000.00 |
| | | 24" DR18 (CIOD) C905 PVC pipe | 8140 | 3,400 | lin ft | $90.00 | $306,000.00 |
| | | 20" DR18 (CIOD) C905 PVC pipe | 8140 | 45,000 | lin ft | $60.00 | $2,700,000.00 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 30" AWWA class 150(psig) b-fly valve w/ operato | 8140 | 1 | ea | $14,500.00 | $14,500.00 |
| | | 30" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 2 | ea | $23,000.00 | $46,000.00 |
| | | 24" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 3 | ea | $15,000.00 | $45,000.00 |
| | | 20" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 2 | ea | $10,500.00 | $21,000.00 |
| | | 20" ANSI class 150 (psig) butterfly valve | 8140 | 2 | ea | $18,000.00 | $36,000.00 |
| | | | | | | | |
| | | | | | | | |
| | | Isolation Valve Manholes (to include): | 8140 | 10 | ea | $7,000.00 | $70,000.00 |
| | | 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 | | | | | $16,472,750.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 3: Fowler North Surge Tank to La Junta

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Air Valve Structures (to include): | | 35 | ea | $6,800.00 | $238,000.00 |
| | | - 48" dia. Concrete Pipe, vertical (10 ft ea) | 8140 | 350 | lin ft | | |
| | | - 3/4 inch gravel filter (4cy) | 8140 | 140 | cy | | |
| | | - 48" diam Alum. Hatch cover (95 lbs ea) | 8140 | 3,300 | lbs | | |
| | | - 6" Combination Air Valve (1ea) | 8140 | 35 | ea | | |
| | | - 6" Butterfly Valves (1 ea) | 8140 | 35 | ea | | |
| | | Blowoff Structures (to include): | | 35 | ea | $8,300.00 | $290,500.00 |
| | | - 6" dia. Steel pipe, vertical (8 ft ea) | 8140 | 280 | lin ft | | |
| | | - 8' x 8' x 6" Concrete Pad (1.18 cy ea) | 8140 | 41 | cy | | |
| | | - Cementitious Materials for Pad (0.33 tons ea) | 8140 | 11.5 | tons | | |
| | | - Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea) | 8140 | 5,000 | lbs | | |
| | | - 6" dia. Discharge stem pipe (2 ft ea) | 8140 | 70 | lin ft | | |
| | | - 6" Butterfly Valve (1 ea) | 8140 | 35 | ea | | |
| | | - 48" Diam Concrete Pipe, vertical (10 ft ea) | 8140 | 350 | lin ft | | |
| | | - 6" Tee (1 ea) | 8140 | 35 | ea | | |
| | | - 6" Blind Flange (1 ea) | 8140 | 35 | ea | | |
| | | - 48" diam Alum hatch cover (95 lbs ea) | 8140 | 3,300 | lbs | | |
| | | Cathodic Protection | 8140 | 1 | ls | $460,000.00 | $460,000.00 |
| | | *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 | | | | | $988,500.00 |
| | | SUBTOTAL Reach 3 Pipeline | | | | | $24,414,170.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Manzanola Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 0.26 | acre | $1,000.00 | $260.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.026 | acre | $2,500.00 | $65.00 |
| | | Stripping (6" thick) | 8140 | 210 | cy | $6.00 | $1,260.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 0.26 | acre | $1,500.00 | $390.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 730 | cy | $9.00 | $6,570.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 47 | cy | $50.00 | $2,350.00 |
| | | Embedment & Cover Backfill | 8140 | 680 | cy | $7.00 | $4,760.00 |
| | | Compacting Embedment Backfill | 8140 | 115 | cy | $16.00 | $1,840.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Urban trench length of 1,636 ft of 4" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 0.25 | mo | $15,000.00 | $3,750.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 1,636 | lin ft | $60.00 | $98,160.00 |
| | | Utility Relocation & Repair Urban Excavation | | 1,636 | lin ft | $30.00 | $49,080.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $168,485.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>5/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Manzanola Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR25 (CIOD) C900 PVC pipe | 8140 | 1,600 | lin ft | $6.20 | $9,920.00 |
| | | 4" DR18 (CIOD) C900 PVC pipe | 8140 | 36 | lin ft | $7.00 | $252.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" AWWA class 250(psig) b-fly valve w/ 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 | | | | | $19,272.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>HCA 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Manzanola Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3 | | |

| 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 | 1.20 | 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 Pipeline | | | | | $202,857.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Valley Water Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 8.90 | acre | $1,000.00 | $8,900.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.89 | acre | $2,500.00 | $2,225.00 |
| | | Stripping (6" thick) | 8140 | 7,200 | cy | $2.00 | $14,400.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 8.90 | acre | $1,500.00 | $13,350.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 11,500 | cy | $6.00 | $69,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 410 | cy | $35.00 | $14,350.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 240 | cy | $50.00 | $12,000.00 |
| | | Embedment & Cover Backfill | 8140 | 12,000 | cy | $5.00 | $60,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 880 | cy | $14.00 | $12,320.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Suburban areas have limited access & space with | | | | | |
| | | sparse utilities (> 1000' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 680 | cy | $9.00 | $6,120.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 44 | cy | $50.00 | $2,200.00 |
| | | Embedment & Cover Backfill | 8140 | 530 | cy | $7.00 | $3,710.00 |
| | | Compacting Embedment Backfill | 8140 | 110 | cy | $16.00 | $1,760.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Suburban trench length of 1,530 ft of 4" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 0.25 | mo | $15,000.00 | $3,750.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 1,530 | lin ft | $60.00 | $91,800.00 |
| | | Utility Relocation & Repair Urban Excavation | | 1,530 | lin ft | $30.00 | $45,900.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $361,785.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DGR 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Valley Water Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR25 (CIOD) C900 PVC pipe | 8140 | 8,500 | lin ft | $6.20 | $52,700.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" AWWA class 250(psig) b-fly valve w/ 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 | | | | | $61,800.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Valley Water Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 Water Valley Spur | | | | | $453,785.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>ACD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Rocky Ford & Hancock Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\DB170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 0.180 | acre | $1,000.00 | $180.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.0180 | acre | $2,500.00 | $45.00 |
| | | Stripping (6" thick) | 8140 | 140 | cy | $4.00 | $560.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 0.180 | acre | $1,500.00 | $270.00 |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 520 | cy | $9.00 | $4,680.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 32 | cy | $50.00 | $1,600.00 |
| | | Embedment & Cover Backfill | 8140 | 480 | cy | $5.00 | $2,400.00 |
| | | Compacting Embedment Backfill | 8140 | 98 | cy | $16.00 | $1,568.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Urban trench length of 960 ft of 8" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 0.25 | mo | $15,000.00 | $3,750.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 960 | lin ft | $60.00 | $57,600.00 |
| | | Utility Relocation & Repair Urban Excavation | | 960 | lin ft | $30.00 | $28,800.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $101,453.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 02/05/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Rocky Ford & Hancock Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 8" DR18 (CIOD) C900 PVC pipe | 8140 | 960 | lin ft | $14.00 | $13,440.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 8" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,800.00 | $2,800.00 |
| | | 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 | | | | | $23,240.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/6/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Rocky Ford & Hancock Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 | 1.20 | 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 & Hancock Spur | | | | | $139,793.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCW 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Newdale-Grand Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 18 | acre | $1,000.00 | $18,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 1.80 | acre | $2,500.00 | $4,500.00 |
| | | Stripping (6" thick) | 8140 | 14,500 | cy | $2.00 | $29,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 18 | acre | $1,500.00 | $27,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 26,000 | cy | $6.00 | $156,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 1,050 | cy | $35.00 | $36,750.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 520 | cy | $50.00 | $26,000.00 |
| | | Embedment & Cover Backfill | 8140 | 27,000 | cy | $5.00 | $135,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 2,800 | cy | $14.00 | $39,200.00 |
| | | SUBTOTAL THIS SHEET | | | | | $471,450.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>ACQ 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Newdale-Grand Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 8" DR25 (CIOD) C900 PVC pipe | 8140 | 6,800 | lin ft | $12.00 | $81,600.00 |
| | | 8" DR18 (CIOD) C900 PVC pipe | 8140 | 6,900 | lin ft | $14.00 | $96,600.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 8" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,800.00 | $2,800.00 |
| | | 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 | | | | | $188,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Newdale-Grand Valley Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 Newdale-Grand Valley Spur | | | | | $704,750.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>NCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
West Grand Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 9.3 | acre | $1,000.00 | $9,300.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.93 | acre | $2,500.00 | $2,325.00 |
| | | Stripping (6" thick) | 8140 | 7,500 | cy | $4.00 | $30,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 9.3 | acre | $1,500.00 | $13,950.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 12,500 | cy | $6.00 | $75,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 440 | cy | $35.00 | $15,400.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 250 | cy | $50.00 | $12,500.00 |
| | | Embedment & Cover Backfill | 8140 | 12,500 | cy | $5.00 | $62,500.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 950 | cy | $14.00 | $13,300.00 |
| | | SUBTOTAL THIS SHEET | | | | | $234,275.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION — ESTIMATE WORKSHEET — SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
West Grand Valley Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR25 (CIOD) C900 PVC pipe | 8140 | 3,300 | lin ft | $6.20 | $20,460.00 |
| | | 4" DR18 (CIOD) C900 PVC pipe | 8140 | 4,200 | lin ft | $7.00 | $29,400.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" AWWA class 250(psig) b-fly valve w/ 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 | | | | | $58,960.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 02/05/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
West Grand Valley Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 West Grand Valley Spur | | | | | $323,435.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 02/05/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
La Junta North Water Surge Tank
Comanche North (Max Month Condition 5)
Reach 3: Fowler N. Surge Tank to La Junta N. Sur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 | 225 | $yd^3$ | $6.00 | $1,350.00 |
| | | Access Roads | 86-68120 | 25 | $yd^3$ | $6.00 | $150.00 |
| | | Excavation (tank foundation) | 86-68120 | 490 | $yd^3$ | $25.00 | $12,250.00 |
| | | (Assume: Common, 1-1/2:1 slope) | | | | | |
| | | Compacted engineered backfill (tank foundat | 86-68120 | 345 | $yd^3$ | $25.00 | $8,625.00 |
| | | Gravel Surfacing (6 inches thick) | | | | | |
| | | Service Yard | 86-68120 | 190 | $yd^3$ | $40.00 | $7,600.00 |
| | | Access Roads | 86-68120 | 25 | $yd^3$ | $40.00 | $1,000.00 |
| | | Chain Link Fence | 86-68120 | 440 | lin ft | $40.00 | $17,600.00 |
| | | 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 Foundati | 86-68120 | 1 | ls | $140,000.00 | $140,000.00 |
| | | (Assume: $f'_c$=4,500 psi) | | | | | |
| | | Source: Pueblo, CO 70 miles | | | | | |
| | | Concrete: 150 yd3 | | | | | |
| | | Reinforcement (Assume 135 lb/yd3): 20420 lbs | | | | | |
| | | Cement (Assume: 0.282 ton/yd3): 42.7 tons | | | | | |
| | | Subtotal This Sheet | | | | | $188,575.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: R. J. Barthel | REVIEWED: Paul Ruchti | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/15/13 | PEER REVIEW / DATE: Paul Ruchti, P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
La Junta North Water Surge Tank
Comanche North (Max Month Condition 5)
Reach 3: Fowler N. Surge Tank to La Junta N. Sur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | Steel water surge tanks | | | | | |
| | | 1 - 1,763,000-gallon steel water storage tanks | 86-68420 | 1 | ls | $2,100,000.00 | $2,100,000.00 |
| | | (1,763,000 gallons combined capacity) | | | | | |
| | | 326,000 cubic feet | | | | | |
| | | AWWA D100 compliance | | | | | |
| | | minimum water surface 0 feet | | | | | |
| | | (above foundation) | | | | | |
| | | maximum water surface 120 feet | | | | | |
| | | (above foundation) | | | | | |
| | | diameter 50 feet | | | | | |
| | | Subtotal This Sheet | | | | | $2,100,000.00 |
| | | Subtotal LaJunta North Water Surge Tank | | | | | $2,288,575.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCO 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Fowler North Water Surge Tank
Comanche North (Max Month Condition 5)
Reach 3: Fowler N. Surge Tank to La Junta N. Sur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 | 225 | $yd^3$ | $6.00 | $1,350.00 |
| | | Access Roads | 86-68120 | 75 | $yd^3$ | $6.00 | $450.00 |
| | | Excavation (tank foundation) | 86-68120 | 153 | $yd^3$ | $25.00 | $3,825.00 |
| | | (Assume: Common, 1-1/2:1 slope) | | | | | |
| | | Compacted engineered backfill (tank foundat | 86-68120 | 112 | $yd^3$ | $25.00 | $2,800.00 |
| | | Gravel Surfacing (6 inches thick) | | | | | |
| | | Service Yard | 86-68120 | 190 | $yd^3$ | $40.00 | $7,600.00 |
| | | Access Roads | 86-68120 | 75 | $yd^3$ | $40.00 | $3,000.00 |
| | | Chain Link Fence | 86-68120 | 440 | lin ft | $40.00 | $17,600.00 |
| | | 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 Foundati | 86-68120 | 1 | ls | $43,000.00 | $43,000.00 |
| | | (Assume: $f'_c$=4,500 psi) | | | | | |
| | | Source: Pueblo, CO 40 miles | | | | | |
| | | Concrete: 46.5 yd3 | | | | | |
| | | Reinforcement (Assume 135 lb/yd3): 6,285 lbs | | | | | |
| | | Cement (Assume: 0.282 ton/yd3): 13.1 tons | | | | | |
| | | Subtotal This Sheet | | | | | $79,625.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>R. J. Barthel | REVIEWED<br>Paul Ruchti | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>01/15/13 | PEER REVIEW / DATE<br>Paul Ruchti, P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Fowler North Water Surge Tank<br>Comanche North (Max Month Condition 5)<br>Reach 3: Fowler N. Surge Tank to La Junta N. Sur | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3 |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | Steel water surge tank | | | | | |
| | | 1 - 441,000-gallon steel surge tank | 86-68420 | 1 | ls | $775,000.00 | $775,000.00 |
| | | (441,000 gallons combined capacity) | | | | | |
| | | 58,900 cubic feet | | | | | |
| | | AWWA D100 compliance | | | | | |
| | | minimum water surface 0 feet | | | | | |
| | | (above foundation) | | | | | |
| | | maximum water surface 30 feet | | | | | |
| | | (above foundation) | | | | | |
| | | diameter 50 feet | | | | | |
| | | Subtotal This Sheet | | | | | $775,000.00 |
| | | Subtotal Fowler North Water Surge Tank | | | | | $854,625.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Fowler North Water Surge Tank - Roadway
Comanche North (Max Month Condition 5)
Reach 3: Fowler South Surge Tank to La Junta

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| 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 | $4.00 | $12,400.00 |
| | | (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 (2 month duration) | 86-68140 | 1 | ls | $10,000.00 | $10,000.00 |
| | | SUBTOTAL Fowler North Water Surge Tank - Roadway | | | | | $597,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: W. Chris Duke, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/30/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 3: North Fowler Surge Tank to La Junta

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural: | | | | | |
| | | **Participant Tie-In Vaults** | 86-68120 | 16 | ea | $35,000.00 | $560,000.00 |
| | | 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 | | | | | $560,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: R. J. Barthel | REVIEWED: Paul M. Ruchti, P.E. | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/15/13 | PEER REVIEW / DATE: Paul M. Ruchti, P.E. 1/17/2013 | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 3: North Fowler Surge Tank to La Junta

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Mechanical Equipment: | | | | | |
| | | assume participant tie-in vault size=12' W x 9' L x 10'-8" D | | | | | |
| | 1 | Meter vault ventilation equipment | 86-68410 | 16 | ls | $5,600.00 | $89,600.00 |
| | | 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 | 16 | ea | $800.00 | $12,800.00 |
| | | 3 kW unit heater | | | | | |
| | | thermostatically controlled | | | | | |
| | 3 | Flowmeter system | 86-68410 | 16 | ea | $13,000.00 | $208,000.00 |
| | | 6" diameter, microprocessor-based, | | | | | |
| | | flanged electro-magnetic flowmeter with | | | | | |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs | | | | | |
| | | 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | | | $310,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>AM Ritt | REVIEWED<br>James Weems | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/15/2013 | PEER REVIEW / DATE<br>James Weems 1/15/2013 | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 3: North Fowler Surge Tank to La Junta

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Reach 3

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | Participant Tie-In Vaults (16 vaults) | 86-68420 | | | | |
| | | 6-inch pressure reducing valve | | 16 | ea | $7,800.00 | $124,800.00 |
| | | 16 valves, 195 lbs each, 3,120 lbs total | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | | 6-inch manually-operated butterfly valve | | | | | |
| | | 14 valves, 90 lbs each, 1,260 lbs total | | 14 | ea | $1,300.00 | $18,200.00 |
| | | AWWA Class 150-B | | | | | |
| | | 2 valves, 130 lbs each, 260 lbs total | | 2 | ea | $2,300.00 | $4,600.00 |
| | | AWWA Class 250-B | | | | | |
| | | 1,520 lbs total | | | | | |
| | | 6-inch buried square-nut operated butterfly | | | | | |
| | | valve with valve box | | | | | |
| | | 14 valves, 245 lbs each, 3,430 lbs total | | 14 | ea | $1,800.00 | $25,200.00 |
| | | AWWA Class 150-B | | | | | |
| | | 2 valves, 285 lbs each | | 2 | ea | $2,800.00 | $5,600.00 |
| | | 4,000 lbs total | | | | | |
| | | 1-inch air valve | | 16 | ea | $1,000.00 | $16,000.00 |
| | | combination air valve | | | | | |
| | | 16 air valves, 35 lbs each | | | | | |
| | | 560 lbs total | | | | | |
| | | Subtotal This Sheet | | | | | $194,400.00 |
| | | Subtotal This Sheet | | | | | $1,064,800.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Ken Smith | REVIEWED Nathan Nakamoto P.E. | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 1/18/2013 | PEER REVIEW / DATE Nathan Nakamoto P.E. | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCO 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 4: La Junta to Lamar

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 440 | acre | $800.00 | $352,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 44 | acre | $2,500.00 | $110,000.00 |
| | | Stripping (6" thick) | 8140 | 360,000 | cy | $2.00 | $720,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 440 | acre | $800.00 | $352,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 750,000 | cy | $4.00 | $3,000,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 36,000 | cy | $25.00 | $900,000.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 14,000 | cy | $30.00 | $420,000.00 |
| | | Embedment & Cover Backfill | 8140 | 760,000 | cy | $3.00 | $2,280,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 48,000 | cy | $8.00 | $384,000.00 |
| | | SUBTOTAL THIS SHEET | | | | | $8,518,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/31/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Reach 4: La Junta to Lamar<br>Civil | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4 |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 18" dia. steel, 0.1442" thick (30 #/ft)-mortar lined | 8140 | 40,000 | lin ft | $75.00 | $3,000,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 1,214,670 lbs total steel | | | | | |
| | | 14" dia. steel, 0.1345" thick (22 #/ft)-mortar lined | 8140 | 9,800 | lin ft | $60.00 | $588,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 215,842 lbs total steel | | | | | |
| | | 14" dia. steel, 0.1359" thick (22 #/ft)-mortar lined | 8140 | 710 | lin ft | $60.00 | $42,600.00 |
| | | epoxy tape coated, rubber gaskets, HC=750 | | | | | |
| | | 15,510 lbs total steel | | | | | |
| | | 12" dia. steel, 0.1345" thick (19 #/ft)-mortar lined | 8140 | 66,000 | lin ft | $55.00 | $3,630,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=750 | | | | | |
| | | 1,263,405 lbs total steel | | | | | |
| | | 20" DR18 (CIOD) C905 PVC pipe | 8140 | 3,800 | lin ft | $60.00 | $228,000.00 |
| | | 20" DR25 (CIOD) C905 PVC pipe | 8140 | 80,000 | lin ft | $48.00 | $3,840,000.00 |
| | | 18" DR18 (CIOD) C905 PVC pipe | 8140 | 89,000 | lin ft | $50.00 | $4,450,000.00 |
| | | 12" DR14 (CIOD) C900 PVC pipe | 8140 | 1,000 | lin ft | $31.00 | $31,000.00 |
| | | | | | | | |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 20" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 4 | ea | $10,500.00 | $42,000.00 |
| | | 18" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 4 | ea | $8,600.00 | $34,400.00 |
| | | 18" ANSI class 150 (psig) butterfly valve | 8140 | 2 | ea | $12,500.00 | $25,000.00 |
| | | 14" ANSI class 150 (psig) butterfly valve | 8140 | 1 | ea | $7,600.00 | $7,600.00 |
| | | 14" ANSI class 300 (psig) butterfly valve | 8140 | 2 | ea | $17,000.00 | $34,000.00 |
| | | 12" ANSI class 300 (psig) butterfly valve | 8140 | 3 | ea | $12,500.00 | $37,500.00 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | Isolation Valve Manholes (to include): | 8140 | 16 | ea | $7,000.00 | $112,000.00 |
| | | 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 | | | | | $16,102,100.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 4: La Junta to Lamar

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Air Valve Structures (to include): | | 56 | ea | $6,800.00 | $380,800.00 |
| | | - 48" dia. Concrete Pipe, vertical (10 ft ea) | 8140 | 560 | lin ft | | |
| | | - 3/4 inch gravel filter (4cy) | 8140 | 220 | cy | | |
| | | - 48" diam Alum. Hatch cover (95 lbs ea) | 8140 | 5,300 | lbs | | |
| | | - 2" Combination Air Valve (1ea) | 8140 | 56 | ea | | |
| | | - 2" Ball Valves (1 ea) | 8140 | 56 | ea | | |
| | | Blowoff Structures (to include): | | 56 | ea | $8,300.00 | $464,800.00 |
| | | - 6" dia. Steel pipe, vertical (8 ft ea) | 8140 | 450 | lin ft | | |
| | | - 8' x 8' x 6" Concrete Pad (1.18 cy ea) | 8140 | 66 | cy | | |
| | | - Cementitious Materials for Pad (0.33 tons ea) | 8140 | 18.5 | tons | | |
| | | - Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea) | 8140 | 8,000 | lbs | | |
| | | - 6" dia. Discharge stem pipe (2 ft ea) | 8140 | 110 | lin ft | | |
| | | - 6" Butterfly Valve (1 ea) | 8140 | 56 | ea | | |
| | | - 48" Diam Concrete Pipe, vertical (10 ft ea) | 8140 | 560 | lin ft | | |
| | | - 6" Tee (1 ea) | 8140 | 56 | ea | | |
| | | - 6" Blind Flange (1 ea) | 8140 | 56 | ea | | |
| | | - 48" diam Alum hatch cover (95 lbs ea) | 8140 | 5,300 | lbs | | |
| | | Cathodic Protection | 8140 | 1 | ls | $360,000.00 | $360,000.00 |
| | | *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 | | | | | $1,205,600.00 |
| | | SUBTOTAL Reach 4 Pipeline | | | | | $25,825,700.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Las Animas Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| 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 (10% of cleared area) | 8140 | 1.25 | acre | $2,500.00 | $3,125.00 |
| | | Stripping (6" thick) | 8140 | 9,600 | cy | $2.00 | $19,200.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 12 | acre | $1,500.00 | $18,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 17,500 | cy | $6.00 | $105,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 680 | cy | $45.00 | $30,600.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 340 | cy | $50.00 | $17,000.00 |
| | | Embedment & Cover Backfill | 8140 | 17,500 | cy | $5.00 | $87,500.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 1,800 | cy | $16.00 | $28,800.00 |
| | | SUBTOTAL THIS SHEET | | | | | $321,225.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCR 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Las Animas Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe items: | | | | | |
| | | 8" DR18 (CIOD) C900 PVC pipe | 8140 | 9,000 | lin ft | $14.00 | $126,000.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 8" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,800.00 | $2,800.00 |
| | | 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 | | | | | $135,800.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Las Animas Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Air Valve Structures (to include): | | 9 | ea | $6,800.00 | $61,200.00 |
| | | - 48" dia. Concrete Pipe, vertical (10 ft ea) | 8140 | 90 | lin ft | | |
| | | - 3/4 inch gravel filter (4cy) | 8140 | 36 | cy | | |
| | | - 48" diam Alum. Hatch cover (95 lbs ea) | 8140 | 860 | lbs | | |
| | | - 2" Combination Air Valve (1ea) | 8140 | 9 | ea | | |
| | | - 2" Ball Valves (1 ea) | 8140 | 9 | ea | | |
| | | Blowoff Structures (to include): | | 9 | ea | $8,300.00 | $74,700.00 |
| | | - 6" dia. Steel pipe, vertical (8 ft ea) | 8140 | 72 | lin ft | | |
| | | - 8' x 8' x 6" Concrete Pad (1.18 cy ea) | 8140 | 10.5 | cy | | |
| | | - Cementitious Materials for Pad (0.33 tons ea) | 8140 | 3 | tons | | |
| | | - Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea) | 8140 | 1300 | lbs | | |
| | | - 6" dia. Discharge stem pipe (2 ft ea) | 8140 | 18 | lin ft | | |
| | | - 6" Butterfly Valve (1 ea) | 8140 | 9 | ea | | |
| | | - 48" Diam Concrete Pipe, vertical (10 ft ea) | 8140 | 90 | lin ft | | |
| | | - 6" Tee (1 ea) | 8140 | 9 | ea | | |
| | | - 6" Blind Flange (1 ea) | 8140 | 9 | ea | | |
| | | - 48" diam Alum hatch cover (95 lbs ea) | 8140 | 860 | lbs | | |
| | | Cathodic Protection | 8140 | 1 | ls | Not appllicable, 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 | | | | | $135,900.00 |
| | | SUBTOTAL Las Animas Spur | | | | | $592,925.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/8/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Hasty Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 0.78 | acre | $1,000.00 | $780.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.078 | acre | $2,500.00 | $195.00 |
| | | Stripping (6" thick) | 8140 | 630 | cy | $6.00 | $3,780.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 0.78 | acre | $1,500.00 | $1,170.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 1,100 | cy | $9.00 | $9,900.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 37 | 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 | 1,100 | cy | $7.00 | $7,700.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 79 | cy | $16.00 | $1,264.00 |
| | | SUBTOTAL THIS SHEET | | | | | $27,504.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/31/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Hasty Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR18 (CIOD) C900 PVC pipe | 8140 | 630 | lin ft | $7.00 | $4,410.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" AWWA class 250(psig) b-fly valve w/ 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 | | | | | $13,510.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Hasty Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| 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 | 1.20 | 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 | | | | | $56,114.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
McClave Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 6.8 | acre | $1,000.00 | $6,800.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.68 | acre | $2,500.00 | $1,700.00 |
| | | Stripping (6" thick) | 8140 | 5,500 | cy | $4.00 | $22,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 6.8 | acre | $1,500.00 | $10,200.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 9,200 | cy | $9.00 | $82,800.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 320 | cy | $45.00 | $14,400.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 185 | cy | $50.00 | $9,250.00 |
| | | Embedment & Cover Backfill | 8140 | 9,300 | cy | $5.00 | $46,500.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 690 | cy | $16.00 | $11,040.00 |
| | | SUBTOTAL THIS SHEET | | | | | $204,690.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
McClave Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4 | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR18 (CIOD) C900 PVC pipe | 8140 | 5,500 | lin ft | $7.00 | $38,500.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" AWWA class 250(psig) b-fly valve w/ 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 | | | | | $47,600.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
McClave Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| 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 | | | | | $282,490.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/13/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>ACD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Wiley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| 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 (10% of cleared area) | 8140 | 2.4 | acre | $2,500.00 | $6,000.00 |
| | | Stripping (6" thick) | 8140 | 19,500 | cy | $2.00 | $39,000.00 |
| | | Seeding (re-seed entire stripped area) | 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 | 670.00 | 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 | | | | | $581,750.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Wiley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" dia. steel, 0.1345" thick (8 #/ft)-mortar lined | 8140 | 11,000 | lin ft | $34.00 | $374,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=750 | | | | | |
| | | 86,760 lbs total steel | | | | | |
| | | 4" DR14 (CIOD) C900 PVC pipe | 8140 | 8,900 | lin ft | $7.50 | $66,750.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" ANSI class 300 (psig) butterfly valve | 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 | | | | | $450,650.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Wiley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| 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 | 1.35 | 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 | $370,000.00 | $370,000.00 |
| | | *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 | | | | | $430,400.00 |
| | | SUBTOTAL Wiley Spur | | | | | $1,462,800.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 4: La Junta to Lamar

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| 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: R. J. Barthel | REVIEWED: Paul M. Ruchti, P.E. | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/15/13 | PEER REVIEW / DATE: Paul M. Ruchti, P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 4: La Junta to Lamar

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Mechanical Equipment: | | | | | |
| | | 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: James Weems | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 1/15/2013 | PEER REVIEW / DATE: James Weems | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: ACA 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 4: La Junta to Lamar

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-2 2013.xls]Reach 4

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | 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, 195 lbs each, 1,365 lbs total | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | | 6-inch manually-operated butterfly valve | | | | | |
| | | 5 valves, 90 lbs each, 450 lbs total | | 5 | ea | $1,300.00 | $6,500.00 |
| | | AWWA Class 150-B | | | | | |
| | | 2 valves, 130 lbs each, 260 lbs total | | 2 | ea | $2,300.00 | $4,600.00 |
| | | AWWA Class 250-B | | | | | |
| | | 1,365 lbs total | | | | | |
| | | 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 | | | | | |
| | | 1,795 lbs total | | | | | |
| | | 1-inch air valve | | 7 | ea | $1,000.00 | $7,000.00 |
| | | combination air valve | | | | | |
| | | 7 air valves, 35 lbs each | | | | | |
| | | 245 lbs total | | | | | |
| | | **Subtotal This Sheet** | | | | | **$87,300.00** |
| | | **Subtotal Reach 4 Participant Tie-In Vaults** | | | | | **$468,100.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Ken Smith | REVIEWED: Nathan Nakamoto P.E. | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 1/18/2013 | PEER REVIEW / DATE: Nathan Nakamoto P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: ACD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Highway 96 Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 105 | acre | $800.00 | $84,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 10.5 | acre | $2,500.00 | $26,250.00 |
| | | Stripping (6" thick) | 8140 | 86,000 | cy | $2.00 | $172,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 105 | acre | $800.00 | $84,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 160,000 | cy | $4.00 | $640,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 7,200 | cy | $25.00 | $180,000.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 3,100 | cy | $40.00 | $124,000.00 |
| | | Embedment & Cover Backfill | 8140 | 170,000 | cy | $3.00 | $510,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 11,500 | cy | $10.00 | $115,000.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Suburban areas have limited access & space with | | | | | |
| | | sparse utilities (> 1000' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 9,000 | cy | $11.00 | $99,000.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 490 | cy | $50.00 | $24,500.00 |
| | | Embedment & Cover Backfill | 8140 | 7,900 | cy | $7.00 | $55,300.00 |
| | | Compacting Embedment Backfill | 8140 | 890 | cy | $14.00 | $12,460.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Urban trench length of 2,500 ft of 16" pipe) | | | | | |
| | | (Suburban trench length of 5,936 ft of 16" pipe) | | | | | |
| | | (Suburban trench length of 3,676 ft of 14" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 7.50 | mo | $15,000.00 | $112,500.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 12,112 | lin ft | $60.00 | $726,720.00 |
| | | Utility Relocation & Repair Urban Excavation | | 12,112 | lin ft | $30.00 | $363,360.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $3,329,090.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>5/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Highway 96 Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 16" DR25 (CIOD) C905 PVC pipe | 8140 | 38,000 | lin ft | $32.00 | $1,216,000.00 |
| | | 14" DR25 (CIOD) C905 PVC pipe | 8140 | 29,000 | lin ft | $26.00 | $754,000.00 |
| | | 12" DR25 (CIOD) C905 PVC pipe | 8140 | 3,400 | lin ft | $22.00 | $74,800.00 |
| | | 10" DR25 (CIOD) C905 PVC pipe | 8140 | 66 | lin ft | $16.00 | $1,056.00 |
| | | 8" DR25 (CIOD) C905 PVC pipe | 8140 | 25,000 | lin ft | $12.00 | $300,000.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 16" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 2 | ea | $6,200.00 | $12,400.00 |
| | | 14" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 2 | ea | $5,500.00 | $11,000.00 |
| | | 12" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 1 | ea | $4,400.00 | $4,400.00 |
| | | 10" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 1 | ea | $3,000.00 | $3,000.00 |
| | | 8" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,800.00 | $2,800.00 |
| | | Isolation Valve Manholes (to include): | 8140 | 7 | ea | $7,000.00 | $49,000.00 |
| | | 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 | | | | | $2,428,456.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>2/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCO 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Highway 96 Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| 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 Highway 96 Spur | | | | | $6,044,446.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
96 Pipeline Co. Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| 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 (10% of cleared area) | 8140 | 0.30 | acre | $2,500.00 | $750.00 |
| | | Stripping (6" thick) | 8140 | 2,400 | cy | $4.00 | $9,600.00 |
| | | Seeding (re-seed entire stripped area) | 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 | | | | | $97,700.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
96 Pipeline Co. Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR25 (CIOD) C900 PVC pipe | 8140 | 2,400 | lin ft | $6.00 | $14,400.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" AWWA class 150(psig) b-fly valve w/ 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 | | | | | $22,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
96 Pipeline Co. Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| 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 | 1.20 | 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, not 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 Co. Spur | | | | | $135,300.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCW 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
HWY 96 Spur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: Q:\FRYINGPAN - ARKANSAS PROJECT (382)\Arkansas Valley Conduit\Appraisal Level 2010-2012\Comanche North (Hybrid) Data\Attachment G - Cost Estimates\Quant Estimates\Participant Vaults\[AVC - 96 Spur Part Tie-In Vaults Comanche N Quant Est 8120.xlsx]Civil/Structural

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural: | | | | | |
| | | **Participant Tie-In Vaults** | 86-68120 | 6 | ea | $35,000.00 | $210,000.00 |
| | | 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** | | | | | **$210,000.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>R. J. Barthel | REVIEWED<br>Paul Ruchti | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>01/15/13 | PEER REVIEW / DATE<br>Paul Ruchti, P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>ACA 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Participant Tie-In Vaults<br>Comanche North (Max Month Condition 5)<br>HWY 96 Spur | Fryingpan-Arkansas Project, Colorado |
| | 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 Equipment | | | | | |
| | | assume participant tie-in vault size=12' W x 9' L x 10'-8" D | | | | | |
| | 1 | Meter vault ventilation equipment | 86-68410 | 6 | ls | $5,600.00 | $33,600.00 |
| | | 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 | 6 | ea | $800.00 | $4,800.00 |
| | | 3 kW unit heater | | | | | |
| | | thermostatically controlled | | | | | |
| | 3 | Flowmeter system | 86-68410 | 6 | ea | $13,000.00 | $78,000.00 |
| | | 6" diameter, microprocessor-based, | | | | | |
| | | flanged electro-magnetic flowmeter with | | | | | |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs | | | | | |
| | | 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | | | $116,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>AM Ritt | REVIEWED<br>James Weems | BY<br>Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED<br>1/15/2013 | PEER REVIEW / DATE<br>James Weems | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
HWY 96 Spur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Hwy 96 Spur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment | | | | | |
| | | **Participant Tie-In Vaults (6 vaults)** | 86-68420 | | | | |
| | | 6-inch pressure reducing valve | | 6 | ea | $7,800.00 | $46,800.00 |
| | | 6 valves, 195 lbs each, 1,170 lbs total | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | | 6-inch manually-operated butterfly valve | | | | | |
| | | 5 valves, 130 lbs each | | 5 | ea | $2,300.00 | $11,500.00 |
| | | AWWA Class 250-B | | | | | |
| | | 1 valve, 170 lbs each | | 1 | ea | $2,800.00 | $2,800.00 |
| | | Henry Pratt Class 350 | | | | | |
| | | 820 lbs total | | | | | |
| | | 6-inch buried square-nut operated butterfly | | | | | |
| | | valve with valve box | | | | | |
| | | 5 valves, 285 lbs each. | | 5 | ea | $2,800.00 | $14,000.00 |
| | | AWWA Class 250-B | | | | | |
| | | 1 valve, 325 lbs each | | 1 | ea | $3,300.00 | $3,300.00 |
| | | Henry Pratt Class 350 | | | | | |
| | | 1,750 lbs total | | | | | |
| | | 1-inch air valve | | 6 | ea | $1,000.00 | $6,000.00 |
| | | combination air valve | | | | | |
| | | 6 air valves, 35 lbs each | | | | | |
| | | 210 lbs total | | | | | |
| | | **Subtotal This Sheet** | | | | | **$84,400.00** |
| | | **Subtotal Hwy 96 Participant Tie-In Vault** | | | | | **$410,800.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>NCN 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads and May Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 43 | acre | $800.00 | $34,400.00 |
| | | Grubbing (10% of cleared area) | 8140 | 4.3 | acre | $2,500.00 | $10,750.00 |
| | | Stripping (6" thick) | 8140 | 35,000 | cy | $2.00 | $70,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 43 | acre | $8.00 | $344.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 65,000 | cy | $4.00 | $260,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 2,700 | cy | $35.00 | $94,500.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 1,300 | cy | $40.00 | $52,000.00 |
| | | Embedment & Cover Backfill | 8140 | 66,000 | cy | $3.00 | $198,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 7,700 | cy | $10.00 | $77,000.00 |
| | | SUBTOTAL THIS SHEET | | | | | $796,994.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DGD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads and May Valley Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 10" DR18 (CIOD) C900 PVC pipe | 8140 | 20,000 | lin ft | $19.00 | $380,000.00 |
| | | 10" DR14 (CIOD) C900 PVC pipe | 8140 | 11,500 | lin ft | $22.00 | $253,000.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 10" AWWA class 250(psig) b-fly valve w/ operato | 8140 | 1 | ea | $3,000.00 | $3,000.00 |
| | | 10" ANSI class 300 (psig) butterfly valve | 8140 | 1 | ea | $9,400.00 | $9,400.00 |
| | | 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 | | | | | $659,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCQ 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads and May Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| 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 Eads & May Valley Spur Pipeline | | | | | $1,546,994.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 142 | acre | $800.00 | $113,600.00 |
| | | Grubbing (10% of cleared area) | 8140 | 14.0 | acre | $2,500.00 | $35,000.00 |
| | | Stripping (6" thick) | 8140 | 115,000 | cy | $2.00 | $230,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 142 | acre | $800.00 | $113,600.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 210,000 | cy | $4.00 | $840,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 8,200 | cy | $35.00 | $287,000.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 4,100 | cy | $40.00 | $164,000.00 |
| | | Embedment & Cover Backfill | 8140 | 210,000 | cy | $3.00 | $630,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 22,000 | cy | $10.00 | $220,000.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 390 | cy | $11.00 | $4,290.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 24 | cy | $50.00 | $1,200.00 |
| | | Embedment & Cover Backfill | 8140 | 360 | cy | $7.00 | $2,520.00 |
| | | Compacting Embedment Backfill | 8140 | 74 | cy | $14.00 | $1,036.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Urban trench length of 720 ft of 8" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 0.25 | mo | $15,000.00 | $3,750.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 720 | lin ft | $60.00 | $43,200.00 |
| | | Utility Relocation & Repair Urban Excavation | | 720 | lin ft | $30.00 | $21,600.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $2,710,796.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 8" DR18 (CIOD) C900 PVC pipe | 8140 | 25,000 | lin ft | $14.00 | $350,000.00 |
| | | 8" DR25 (CIOD) C900 PVC pipe | 8140 | 84,000 | lin ft | $12.00 | $1,008,000.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 8" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 5 | ea | $2,800.00 | $14,000.00 |
| | | 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 | | | | | $1,407,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Jeremy Lorberau | CHECKED Steven J. Robertson, PE | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 02/05/13 | PEER REVIEW / DATE Steven J. Robertson, PE | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| 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 | 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 Pipeline | | | | | $4,434,896.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION — ESTIMATE WORKSHEET — SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
May Valley Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 35 | acre | $1,000.00 | $35,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 3.5 | acre | $2,500.00 | $8,750.00 |
| | | Stripping (6" thick) | 8140 | 28,000 | cy | $2.00 | $56,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 35 | acre | $1,500.00 | $52,500.00 |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 50,000 | cy | $8.00 | $400,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 1,950 | cy | $35.00 | $68,250.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 1,000 | cy | $40.00 | $40,000.00 |
| | | Embedment & Cover Backfill | 8140 | 51,000 | cy | $5.00 | $255,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 4,900 | cy | $14.00 | $68,600.00 |
| | | SUBTOTAL THIS SHEET | | | | | $984,100.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 02/05/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
May Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 8" DR18 (CIOD) C900 PVC pipe | 8140 | 14,000 | lin ft | $14.00 | $196,000.00 |
| | | 6" DR25 (CIOD) C900 PVC pipe | 8140 | 6,700 | lin ft | $9.00 | $60,300.00 |
| | | 6" DR18 (CIOD) C900 PVC pipe | 8140 | 6,400 | lin ft | $10.00 | $64,000.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 8" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,800.00 | $2,800.00 |
| | | 6" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,300.00 | $2,300.00 |
| | | 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 | | | | | $339,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Jeremy Lorberau | CHECKED Steven J. Robertson, PE | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 02/05/13 | PEER REVIEW / DATE Steven J. Robertson, PE | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
May Valley Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| 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 May Valley Spur Pipeline | | | | | $1,414,100.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION — ESTIMATE WORKSHEET — SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Eads & May Valley Booster P.P.
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural/Electrical/Mechanical: | | | | | |
| | | 10- & 12-Inch spur | | | | | |
| | | **Booster Pumping Plant** | 86-68420 | 1 | LS | $190,000.00 | $190,000.00 |
| | | **Using pumping plant program** | | | | | |
| | | Booster Plant - 1.00 cfs each, 305 feet TDH; | | | | | |
| | | Unit Brake HP: 43.1 hp; Motors: 50 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 Eads & May Valley Booster P.P.** | | | | | $190,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY R. Zelenka | REVIEWED Toby Turnage 1.25.13 | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 1/18/13 | PEER REVIEW / DATE Toby Turnage 1.25.13 | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DQ 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Air Chamber (Eads & May Valley)
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural: | | | | | |
| | | **Reinforced Concrete for Foundation** | 86-68120 | 1 | ls | $2,700.00 | $2,700.00 |
| | | (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** | | | | | $2,700.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>R. J. Barthel | REVIEWED<br>Paul Ruchti | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>01/15/13 | PEER REVIEW / DATE<br>Paul Ruchti, P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Air Chamber (Eads & May Valley)
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| 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 |
| | | 1,200-gallon (160 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 |
| | | Subtotal Eads & May Valley Spur Air Chamber | | | | | $90,700.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Ken Smith | REVIEWED: Nathan Nakamoto P.E. | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/5/13 |
| DATE PREPARED: 1/18/2013 | PEER REVIEW / DATE: Nathan Nakamoto P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DGB 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Eads & May Valley)
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Civil/Structural: | | | | | |
| | | **Reinforced Concrete for Vaults (Two)** | 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 Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 01/15/13 | PEER REVIEW / DATE Paul Ruchti, P.E. | DATE PREPARED 02/15/13 | PEER REVIEW / DATE 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Eads & May Valley)
Comanche North (Max Month Condition 5)
Eads and May Valley Spur

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Mechanical Equipment: | | | | | |
| | | assume meter vault size=11.25'x11.25'x16.7'd | | | | | |
| | | assume 2 vaults @ Eads | | | | | |
| | 1 | Meter vault ventilation equipment | 86-68410 | 2 | ls | $7,700.00 | $15,400.00 |
| | | list of equipment per vault: | | | | | |
| | | (1)-steel reversible centrifugal fan, 600 cfm @ 0.25" w.g.s.p., 1/4 Hp | | | | | |
| | | (16 ft)-10" diam, 16 ga., galv. steel duct | | | | | |
| | | (2)-10" diam, sch 20, galv., L.R. 180 deg. steel pipe returns | | | | | |
| | | (2)-10"x12" reducer, sch 20, galv. steel pipe | | | | | |
| | | (4)-12" diam, stainless steel bird screens | | | | | |
| | | (2)-10"x12" reducer, 16 ga, galv. steel duct | | | | | |
| | | (2)-10" 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 (Eads) | 86-68410 | 1 | ea | $21,000.00 | $21,000.00 |
| | | Single-path ultrasonic, 10" diam | | | | | |
| | | 2 transducers with cables and 1 transmitter console | | | | | |
| | 4 | Flowmeter (May Valley) | 86-68410 | 1 | ea | $17,500.00 | $17,500.00 |
| | | Single-path ultrasonic, 8" diam | | | | | |
| | | 2 transducers with cables and 1 transmitter console | | | | | |
| | | Subtotal This Sheet | | | | | $55,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: AM Ritt | REVIEWED: Patrick Dawson | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/8/13 |
| DATE PREPARED: 1/18/2013 | PEER REVIEW / DATE: Patrick Dawson | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Eads & May Valley)
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment/Mechanical | | | | | |
| | | **Meter Vaults (2 Vaults)** | 86-68420 | | | | |
| | | Eads | | | | | |
| | 1 | 10-inch manually-operated butterfly valves | | 1 | ea | $3,000.00 | $3,000.00 |
| | | 1 valve, 225 lbs each, 225 lbs total | | | | | |
| | | AWWA Class 250-B | | | | | |
| | | May Valley | | | | | |
| | 2 | 8-inch manually-operated butterfly valves | | 1 | ea | $2,800.00 | $2,800.00 |
| | | 1 valves, 145 lbs each, 145 lbs total | | | | | |
| | | AWWA Class 250-B | | | | | |
| | | **Subtotal This Sheet** | | | | | $5,800.00 |
| | | **Subtotal Eads & May Valley Meter Vault** | | | | | $205,940.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DGD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| 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, | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/15/13 | PEER REVIEW / DATE: Paul Ruchti, P.E. | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION — ESTIMATE WORKSHEET — SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:** Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| 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 Equipment: | | | | | |
| | | 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: James Weems | BY: Jim Jetton, P.E., C.C.E | CHECKED: 2/21/13 |
| DATE PREPARED: 1/15/2013 | PEER REVIEW / DATE: James Weems | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: ACD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Eads & May Valley Spur

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Eads & MaySpur

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment: | | | | | |
| | | **Participant Tie-In Vaults (2 vault)** | 86-68420 | | | | |
| | | 6-inch pressure reducing valve | | 2 | ea | $7,800.00 | $15,600.00 |
| | | 2 valves, 195 lbs each, 390 lbs total | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | | 6-inch manually-operated butterfly valve | | 2 | ea | $2,800.00 | $5,600.00 |
| | | 2 valve, 170 lbs each, 340 lbs total | | | | | |
| | | Henry Pratt Class 350 | | | | | |
| | | 6-inch buried square-nut operated butterfly valve with valve box | | 2 | ea | $3,300.00 | $6,600.00 |
| | | 2 valve, 325 lbs each, 650 lbs | | | | | |
| | | Henry Pratt Class 350 | | | | | |
| | | 1-inch air valve | | 2 | ea | $1,000.00 | $2,000.00 |
| | | combination air valve | | | | | |
| | | 2 air valve, 35 lbs each, 70 lbs total | | | | | |
| | | **Subtotal This Sheet** | | | | | $29,800.00 |
| | | **Subtotal Eads & May Valley Spur Participant Tie-In Vaults** | | | | | $138,600.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Ken Smith | REVIEWED Nathan Nakamoto P.E. | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 1/18/2013 | PEER REVIEW / DATE Nathan Nakamoto P.E. | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCR 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
South Loop (Broken)

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 67 | acre | $800.00 | $53,600.00 |
| | | Grubbing (10% of cleared area) | 8140 | 6.7 | acre | $2,500.00 | $16,750.00 |
| | | Stripping (6" thick) | 8140 | 54,000 | cy | $2.00 | $108,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 67 | acre | $800.00 | $53,600.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 110,000 | cy | $4.00 | $440,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 5,500 | cy | $35.00 | $192,500.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 2,100 | cy | $40.00 | $84,000.00 |
| | | Embedment & Cover Backfill | 8140 | 115,000 | cy | $3.00 | $345,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 7,700 | cy | $10.00 | $77,000.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Urban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | Suburban areas have limited access & space with | | | | | |
| | | sparse utilities (> 1000' apart, approximately) | | | | | |
| | | Soil Excavation (box w/supports,~10'deep) | 8140 | 7,900 | cy | $11.00 | $86,900.00 |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 420 | cy | $50.00 | $21,000.00 |
| | | Embedment & Cover Backfill | 8140 | 6,900 | cy | $7.00 | $48,300.00 |
| | | Compacting Embedment Backfill | 8140 | 850 | cy | $14.00 | $11,900.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Urban trench length of 5,486 ft of 18" pipe) | | | | | |
| | | (Suburban trench length of 1,712 ft of 20" pipe) | | | | | |
| | | (Suburban trench length of 2,336 ft of 18" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 2.00 | mo | $15,000.00 | $30,000.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 9,534 | lin ft | $60.00 | $572,040.00 |
| | | Utility Relocation & Repair Urban Excavation | | 9,534 | lin ft | $30.00 | $286,020.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $2,426,610.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/25/13 |
| DATE PREPARED<br>03/14/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>3/25/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>South Loop (Broken)<br>Civil | Fryingpan-Arkansas Project, Colorado |

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Loop | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 20" dia. steel, 0.1596" thick (36 #/ft)-mortar lined | 8140 | 20,000 | lin ft | $85.00 | $1,700,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 772,160 lbs total steel | | | | | |
| | | 18" dia. steel, 0.1442" thick (30 #/ft)-mortar lined | 8140 | 25,000 | lin ft | $75.00 | $1,875,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=625 | | | | | |
| | | 741,060 lbs total steel | | | | | |
| | | 18" dia. steel, 0.1730" thick (36 #/ft)-mortar lined | 8140 | 2,300 | lin ft | $80.00 | $184,000.00 |
| | | epoxy tape coated, rubber gaskets, HC=750 | | | | | |
| | | 82,800 lbs total steel | | | | | |
| | | 20" DR18 (CIOD) C905 PVC pipe | 8140 | 4,200 | lin ft | $60.00 | $252,000.00 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 20" ANSI class 150 (psig) butterfly valve | 8140 | 1 | ea | $16,500.00 | $16,500.00 |
| | | 20" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $10,500.00 | $10,500.00 |
| | | 18" ANSI class 150 (psig) butterfly valve | 8140 | 1 | ea | $12,500.00 | $12,500.00 |
| | | 18" ANSI class 300 (psig) butterfly valve | 8140 | 1 | ea | $25,000.00 | $25,000.00 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | 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 | | | | | $4,103,500.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED |
| DATE PREPARED<br>03/14/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>NCD 3/25/13 |

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _3_ OF _3_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>South Loop (Broken)<br>Civil | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Loop |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Air Valve Structures (to include): | | 10 | ea | $6,800.00 | $68,000.00 |
| | | - 48" dia. Concrete Pipe, vertical (10 ft ea) | 8140 | 100 | lin ft | | |
| | | - 3/4 inch gravel filter (4cy) | 8140 | 40 | cy | | |
| | | - 48" diam Alum. Hatch cover (95 lbs ea) | 8140 | 950 | lbs | | |
| | | - 2" Combination Air Valve (1ea) | 8140 | 10 | ea | | |
| | | - 2" Ball Valves (1 ea) | 8140 | 10 | ea | | |
| | | Blowoff Structures (to include): | | 10 | ea | $8,300.00 | $83,000.00 |
| | | - 6" dia. Steel pipe, vertical (8 ft ea) | 8140 | 80 | lin ft | | |
| | | - 8' x 8' x 6" Concrete Pad (1.18 cy ea) | 8140 | 12 | cy | | |
| | | - Cementitious Materials for Pad (0.33 tons ea) | 8140 | 3 | tons | | |
| | | - Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea) | 8140 | 1,400 | lbs | | |
| | | - 6" dia. Discharge stem pipe (2 ft ea) | 8140 | 20 | lin ft | | |
| | | - 6" Butterfly Valve (1 ea) | 8140 | 10 | ea | | |
| | | - 48" Diam Concrete Pipe, vertical (10 ft ea) | 8140 | 100 | lin ft | | |
| | | - 6" Tee (1 ea) | 8140 | 10 | ea | | |
| | | - 6" Blind Flange (1 ea) | 8140 | 10 | ea | | |
| | | - 48" diam Alum hatch cover (95 lbs ea) | 8140 | 950 | lbs | | |
| | | Cathodic Protection | 8140 | 1 | ls | $190,000.00 | $190,000.00 |
| | | *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 | | | | | $341,000.00 |
| | | SUBTOTAL South Loop Pipeline | | | | | $6,871,110.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/20/13 |
| DATE PREPARED<br>03/14/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>NCA 3/25/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
South Swink Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 14.0 | acre | $1,000.00 | $14,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 1.40 | acre | $2,500.00 | $3,500.00 |
| | | Stripping (6" thick) | 8140 | 11,500 | cy | $2.00 | $23,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 14.0 | acre | $1,500.00 | $21,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 20,000 | cy | $6.00 | $120,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 740 | cy | $45.00 | $33,300.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 400 | cy | $50.00 | $20,000.00 |
| | | Embedment & Cover Backfill | 8140 | 20,000 | cy | $5.00 | $100,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 1,800 | cy | $14.00 | $25,200.00 |
| | | SUBTOTAL THIS SHEET | | | | | $360,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
South Swink Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 6" DR18 (CIOD) C900 PVC pipe | 8140 | 2,800 | lin ft | $10.00 | $28,000.00 |
| | | 6" DR14 (CIOD) C900 PVC pipe | 8140 | 8,100 | lin ft | $11.00 | $89,100.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 6" AWWA class 250(psig) b-fly valve w/ operator | 8140 | 1 | ea | $2,300.00 | $2,300.00 |
| | | 6" ANSI class 300 (psig) butterfly valve | 8140 | 1 | ea | $4,000.00 | $4,000.00 |
| | | 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 | | | | | $137,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>ACD 3/5/13 |

BUREAU OF RECLAMATION — ESTIMATE WORKSHEET — SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
South Swink Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| 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 | 1.00 | 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 Swink Spur Pipeline | | | | | $542,700.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 02/05/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Homestead Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| 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 (10% of cleared area) | 8140 | 0.33 | acre | $2,500.00 | $825.00 |
| | | Stripping (6" thick) | 8140 | 2,600 | cy | $4.00 | $10,400.00 |
| | | Seeding (re-seed entire stripped area) | 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<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Homestead Spur

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR14 (CIOD) C900 PVC pipe | 8140 | 2,600 | lin ft | $7.50 | $19,500.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" ANSI class 300 (psig) butterfly valve | 8140 | 1 | ea | $2,900.00 | $2,900.00 |
| | | 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 | | | | | $29,400.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/1/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Homestead Spur<br>Civil | Fryingpan-Arkansas Project, Colorado<br>WOID: AF523 — ESTIMATE LEVEL: Appraisal<br>REGION: GP — UNIT PRICE LEVEL: Jan-11<br>FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop |

| 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 | 1.20 | 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 Pipeline | | | | | $151,780.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/4/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
La Junta Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 0.65 | acre | $1,000.00 | $650.00 |
| | | Grubbing (10% of cleared area) | 8140 | 0.065 | acre | $2,500.00 | $162.50 |
| | | Stripping (6" thick) | 8140 | 530 | cy | $6.00 | $3,180.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 0.65 | acre | $1,500.00 | $975.00 |
| | | | | | | | |
| | | Urban Earthwork Items: (Vertical Trench) | | | | | |
| | | Suburban areas have limited access & space with | | | | | |
| | | dense utilities (< 500' apart, approximately) | | | | | |
| | | 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 | 1,800 | cy | $7.00 | $12,600.00 |
| | | Compacting Embedment Backfill | 8140 | 180 | cy | $14.00 | $2,520.00 |
| | | (Urban trench will require traffic control, signage, | | | | | |
| | | and detours for duration of work) | | | | | |
| | | (Suburban trench length of 3,153 ft of 12" pipe) | | | | | |
| | | Traffic Control/Detours Urban Excavation | | 1.00 | mo | $15,000.00 | $15,000.00 |
| | | Pavement & Base/Remove & Replace Urban Excavation | | 3,153 | lin ft | $60.00 | $189,180.00 |
| | | Utility Relocation & Repair Urban Excavation | | 3,153 | lin ft | $30.00 | $94,590.00 |
| | | All urban earthwork quantities above are for a straight wall "vertical trench" | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $346,607.50 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
La Junta Spur

Civil

**PROJECT:**

Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 12" DR14 (CIOD) C900 PVC pipe | 8140 | 3,200 | lin ft | $31.00 | $99,200.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 12" ANSI class 300 (psig) butterfly valve | 8140 | 1 | ea | $12,500.00 | $12,500.00 |
| | | 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 | | | | | $118,700.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
La Junta Spur

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop | | |

| 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 | 1.20 | 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 LaJunta Spur Pipeline | | | | | $480,407.50 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/1/13 |
| DATE PREPARED<br>02/05/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Bents Fort Spur (Broken Loop)

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Clearing (3 times trench width) | 8140 | 36 | acre | $1,000.00 | $36,000.00 |
| | | Grubbing (10% of cleared area) | 8140 | 3.6 | acre | $2,500.00 | $9,000.00 |
| | | Stripping (6" thick) | 8140 | 29,000 | cy | $2.00 | $58,000.00 |
| | | Seeding (re-seed entire stripped area) | 8140 | 36.00 | acre | $1,500.00 | $54,000.00 |
| | | | | | | | |
| | | Earthwork Items: | | | | | |
| | | Soil Excavation (1.5:1) outside urban area | 8140 | 51,000 | cy | $6.00 | $306,000.00 |
| | | Rock Excavation (0.25:1) outside urban area | 8140 | 1,950 | cy | $35.00 | $68,250.00 |
| | | (20% of length is assumed partial rock exc.) | | | | | |
| | | assume rippable material | | | | | |
| | | Pipe Bedding (Select material, 4" thick) | 8140 | 1,000 | cy | $40.00 | $40,000.00 |
| | | Embedment & Cover Backfill | 8140 | 52,000 | cy | $5.00 | $260,000.00 |
| | | (does not include shrink/swell) | | | | | |
| | | Compacting Embedment Backfill | 8140 | 4,800 | cy | $14.00 | $67,200.00 |
| | | SUBTOTAL THIS SHEET | | | | | $898,450.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/25/13 |
| DATE PREPARED: 03/14/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 03/19/13 | PEER REVIEW / DATE: 3/25/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Bents Fort Spur (Broken Loop)

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Pipe Items: | | | | | |
| | | 4" DR14 (CIOD) C900 PVC pipe | 8140 | 9,200 | lin ft | $6.00 | $55,200.00 |
| | | 4" DR18 (CIOD) C900 PVC pipe | 8140 | 3,400 | lin ft | $6.80 | $23,120.00 |
| | | 8" DR14 (CIOD) C900 PVC pipe | 8140 | 8,300 | lin ft | $17.00 | $141,100.00 |
| | | 8" DR18 (CIOD) C900 PVC pipe | 8140 | 7,400 | lin ft | $14.00 | $103,600.00 |
| | | Isolation Valves (Manual operation): | | | | | |
| | | 4" ANSI class 150 (psig) butterfly valve | 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 | | | | | $331,120.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: Steven J. Robertson, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/25/13 |
| DATE PREPARED: 03/14/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 03/19/13 | PEER REVIEW / DATE: DCD 3/25/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Bents Fort Spur (Broken Loop)<br>Civil | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Loop |

| 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 | 860 | 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 Bents Spur Pipeline | | | | | $1,320,170.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>Steven J. Robertson, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/25/13 |
| DATE PREPARED<br>03/14/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>DCD 3/25/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Participant Tie-In Vaults<br>Comanche North (Max Month Condition 5)<br>Loop | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Civil/Structural: | | | | | |
| | | | | | | | |
| | | **Participant Tie-In Vaults** | 86-68120 | 5 | ea | $35,000.00 | $175,000.00 |
| | | 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** | | | | | $175,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>R. J. Barthel | REVIEWED<br>Paul Ruchti | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/31/13 |
| DATE PREPARED<br>01/15/13 | PEER REVIEW / DATE<br>Paul Ruchti, P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Loop

**PROJECT:** Fryingpan-Arkansas Project, Colorado

| | | | |
|---|---|---|---|
| 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 Equipment | | | | | |
| | | assume participant tie-in vault size=12' W x 9' L x 10'-8" D | | | | | |
| | 1 | Meter vault ventilation equipment | 86-68410 | 5 | ls | $5,600.00 | $28,000.00 |
| | | 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 | 5 | ea | $800.00 | $4,000.00 |
| | | 3 kW unit heater | | | | | |
| | | thermostatically controlled | | | | | |
| | 3 | Flowmeter system | 86-68410 | 5 | ea | $13,000.00 | $65,000.00 |
| | | 6" diameter, microprocessor-based, | | | | | |
| | | flanged electro-magnetic flowmeter with | | | | | |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs | | | | | |
| | | 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | | | $97,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: AM Ritt | REVIEWED: James Weems | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 1/15/2013 | PEER REVIEW / DATE: James Weems | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Loop

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

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| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Hydraulic Equipment | | | | | |
| | | **Participant Tie-In Vaults (5 vaults)** | 86-68420 | | | | |
| | | 6-inch pressure reducing valve | | 5 | ea | $7,800.00 | $39,000.00 |
| | | 5 valves, 195 lbs each, 975 lbs total | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | | 6-inch manually-operated butterfly valve | | | | | |
| | | 2 valves, 90 lbs each | | 2 | ea | $1,300.00 | $2,600.00 |
| | | AWWA Class 150-B | | | | | |
| | | 3 valves, 130 lbs each | | 3 | ea | $2,300.00 | $6,900.00 |
| | | AWWA Class 250-B | | | | | |
| | | 570 lbs total | | | | | |
| | | 6-inch buried square-nut operated butterfly | | | | | |
| | | valve with valve box | | | | | |
| | | 2 valves, 245 lbs each | | 2 | ea | $1,800.00 | $3,600.00 |
| | | AWWA Class 150-B | | | | | |
| | | 3 valves, 285 lbs each | | 3 | ea | $2,800.00 | $8,400.00 |
| | | AWWA Class 250-B | | | | | |
| | | 1,345 lbs total | | | | | |
| | | 1-inch air valve | | 5 | ea | $1,000.00 | $5,000.00 |
| | | combination air valve | | | | | |
| | | 5 air valves, 35 lbs each | | | | | |
| | | 175 lbs total | | | | | |
| | | **Subtotal This Sheet** | | | | | **$65,500.00** |
| | | **Subtotal Loop Participant Tie-In Vaults** | | | | | **$337,500.00** |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | REVIEWED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>1/18/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>DCN 3/5/13 |

BUREAU OF RECLAMATION — ESTIMATE WORKSHEET — SHEET 1 OF 2

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Roadway, Rail, and River Crossings<br>Civil (Broken Loop) | Fryingpan-Arkansas Project, Colorado |
| WOID: AF523 | ESTIMATE LEVEL: Appraisal |
| REGION: GP | UNIT PRICE LEVEL: Jan-11 |
| FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Crossings | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Gravel Road Crossings (to include): | | 10 | ea | $10,000.00 | $100,000.00 |
| | | Compacting backfill for road base (192 cy each) | 8140 | 1,900 | cy | | |
| | | Aggregate Base Course (6" thick) (22 cy each) | 8140 | 220 | cy | | |
| | | Gravel surfacing (6" thick) (23 cy each) | 8140 | 230 | cy | | |
| | | Temporary barricades & signage (1 each) | 8140 | 10 | ls | | |
| | | (assume req'd for 2 days per crossing) | | | | | |
| | | | | | | | |
| | | Paved Road Crossings, 2 lane (to include): | | 200 | ea | $25,000.00 | $5,000,000.00 |
| | | Compacting backfill for road base (194 cy each) | 8140 | 38,000 | cy | | |
| | | Asphalt base course (6" thick) (23 cy each) | 8140 | 4,500 | cy | | |
| | | Asphalt surfacing (6" thick) (23 cy each) | 8140 | 4,500 | cy | | |
| | | Temporary barricades & signage ( 1 each) | 8140 | 200 | ls | | |
| | | (assume paved and req'd for 5 days ea) | | | | | |
| | | | | | | | |
| | | Major Road Crossings, 4 lanes (to include): | | 26 | ea | $60,000.00 | $1,560,000.00 |
| | | Compacting backfill for road base (341 cy each) | 8140 | 8,900 | cy | | |
| | | Asphalt base course (6" thick) (39 cy each) | 8140 | 1,000 | cy | | |
| | | Asphalt surfacing (6" thick) (40 cy each) | 8140 | 1,050 | cy | | |
| | | Temp. detour, barricades, & signage (1000') | 8140 | 26 | ls | | |
| | | (assume paved and req'd for 10 days ea) | | | | | |
| | | | | | | | |
| | | Interstate and Highway Crossings (to include): | | 27 | ea | $300,000.00 | $8,100,000.00 |
| | | Horizontal Directional Drilling, 36" dia carrier pipe, min. cover depth is 20 ft, 500 lin. ft. each | 8140 | 13,500 | lin. ft. | | |
| | | 48" dia casing pipe, welded steel 1/4" thick | 8140 | 13,500 | lin. ft. | | |
| | | Grout between borehole & casing pipe (290 cy) | 8140 | 7,800 | cy | | |
| | | | | | | | |
| | | Railroad Crossing (to include): | | 8 | ea | $120,000.00 | $960,000.00 |
| | | Horizontal Directional Drilling, 36" dia carrier | 8140 | 1,200 | lin. ft. | | |
| | | pipe, min. cover depth is 20 ft, 150 lin. ft. each | | | | | |
| | | 48" dia casing pipe, welded steel 1/4" thick | 8140 | 1,200 | lin. ft. | | |
| | | Grout between borehole and casing pipe | 8140 | 700 | cy | | |
| | | | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $15,720,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>W. Chris Duke, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/25 |
| DATE PREPARED<br>03/14/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>DCD 3/25/13 |

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET 2 OF 2

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Roadway, Rail, and River Crossings
Civil (Broken Loop)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 03-19-2013.xls]Crossings

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Major River Crossing (to include): | | 7 | ea | $1,000,000.00 | $7,000,000.00 |
| | | Horizontal Directional Drilling, 36" dia. Pipe, 48" | 8140 | 7,000 | lin ft | | |
| | | (1000 lin. ft ea) | | | | | |
| | | 48" dia. Casing pipe, 1/4" thick (1000 lin. ft ea) | 8140 | 7,000 | lin ft | | |
| | | average cover depth is 20 ft | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $7,000,000.00 |
| | | SUBTOTAL Roadway, Rail and River Crossings | | | | | $22,720,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Jeremy Lorberau | CHECKED W. Chris Duke, PE | BY Jim Jetton, P.E., C.C.E | CHECKED |
| DATE PREPARED 03/14/13 | PEER REVIEW / DATE Steven J. Robertson, PE | DATE PREPARED 03/19/13 | PEER REVIEW / DATE 3/25/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET

SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Dewatering

Civil

**PROJECT:**

Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Dewatering

| 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 | 1,100 | ea | $3,500.00 | $3,850,000.00 |
| | | 20.52 miles in saturated areas requiring 1 well | | | | | |
| | | per 100' of pipe trench | | | | | |
| | | Spurs | 8140 | 110 | ea | $3,500.00 | $385,000.00 |
| | | 2.07 miles in saturated areas requiring 1 well | | | | | |
| | | per 100' of pipe trench | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $4,235,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>W. Chris Duke, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>01/30/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Dust Abatement

Civil

**PROJECT:**

Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Dust Abatement

| 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 per driver, 0.0625" application per pass, 5-75 ft width (Duration estimated 6 years using 4 crews) | 8140 | 400,000 | Mgal | $10.00 | $4,000,000.00 |
| | | SUBTOTAL Dust Abatement | | | | | $4,000,000.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Jeremy Lorberau | CHECKED W. Chris Duke, PE | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 01/30/13 | PEER REVIEW / DATE Steven J. Robertson, PE | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _2_

**FEATURE:**

Arkansas Valley Conduit
Piping
Comanche North (Max Month Condition 5)
Dam N/S Interconnect (Option B)

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Interconnect

| 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' | 8140 | 5200 | cy | $35.00 | $182,000.00 |
| | | to 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 (2% 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<br>Jeremy Lorberau | CHECKED<br>W. Chris Duke, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>01/30/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _2_

**FEATURE:**

Arkansas Valley Conduit
Pipe Appurtenances
Comanche North (Max Month Condition 5)
Dam N/S Interconnect (Option B)

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Interconnect

| 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 ring, 36" access | 8140 | 11 | ea | $4,500.00 | $49,500.00 |
| | | 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 (2% of steel cost) | 8140 | 1 | ls | $14,325.00 | $14,325.00 |
| | | SUBTOTAL THIS SHEET | | | | | $350,325.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>W. Chris Duke, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>01/30/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>NCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Valve 2
Comanche North (Max Month Condition 5)
Dam N/S Interconnect (Option B)

Civil

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Stripping (6" deep) | 8140 | 162 | cy | $6.00 | $972.00 |
| | | Seeding (entire disturbed area) | 8140 | 0.20 | ac | $1,500.00 | $300.00 |
| | | 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 | 0.33 | tons | | |
| | | - Pad reinforcement (1 layer, #5 @ 1' o.c., ew, | 8140 | 140 | 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 | | | | | $130,122.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jeremy Lorberau | CHECKED<br>W. Chris Duke, PE | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/3/13 |
| DATE PREPARED<br>01/30/13 | PEER REVIEW / DATE<br>Steven J. Robertson, PE | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Valves 11 and 12
Comanche North (Max Month Condition 5)
Dam N/S Interconnect (Option B)

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\DB170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Interconnect

| 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 | 0.21 | ac | $1,500.00 | $315.00 |
| | | 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 | 0.33 | tons | | |
| | | - Pad reinforcement (1 layer, #5 @ 1' o.c., ew, 141 lbs/each) | 8140 | 140 | 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 | | | | | $138,035.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: W. Chris Duke, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/30/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _3_ OF _3_

**FEATURE:**

Arkansas Valley Conduit
Valves 13 and 14
Comanche North (Max Month Condition 5)
Dam N/S Interconnect (Option B)

Civil

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Interconnect

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | Sitework Items: | | | | | |
| | | Stripping (6" deep) | 8140 | 186.00 | ac | $6.00 | $1,116.00 |
| | | Seeding (entire disturbed area) | 8140 | 0.23 | ac | $1,500.00 | $345.00 |
| | | 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 | 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 | 145 | 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 | 0.33 | tons | | |
| | | - Pad reinforcement (1 layer, #5 @ 1' o.c., ew, | 8140 | 140 | 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 | | | | | $184,061.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY: Jeremy Lorberau | CHECKED: W. Chris Duke, PE | BY: Jim Jetton, P.E., C.C.E | CHECKED: 3/3/13 |
| DATE PREPARED: 01/30/13 | PEER REVIEW / DATE: Steven J. Robertson, PE | DATE PREPARED: 02/15/13 | PEER REVIEW / DATE: DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _2_

**FEATURE:**

Arkansas Valley Conduit
Dam N/S Interconnect - Pipes and Valves
Comanche North (Max Month Condition 5)
Dam N/S Interconnect (Option B)
Mechanical

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Interconnect

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Ken Smith | CHECKED Nathan Nakamoto P.E. | BY Jim Jetton, P.E., C.C.E | CHECKED 3/3/13 |
| DATE PREPARED 1/30/2013 | PEER REVIEW / DATE Nathan Nakamoto P.E. | DATE PREPARED 02/15/13 | PEER REVIEW / DATE DCD 3/5/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _2_ OF _2_

**FEATURE:**

Arkansas Valley Conduit
Dam N/S Interconnect - Pipes and Valves
Comanche North (Max Day Condition 5)
Interconnect
Mechanical

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 01-28-2013.xls]Interconnect

| 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 | | | | | |
| | | 33,000 lbs each, 132,000 lbs total | | | | | |
| | | 84" Dia: AWWA class 150B | 8420 | 1 | ea | $130,000.00 | $130,000.00 |
| | | 1 butterfly valves manually-operated | | | | | |
| | | 27,060 lbs each, 27,060 lbs total | | | | | |
| | | 48" Dia. AWWA class 150B | 8420 | 1 | ea | $36,000.00 | $36,000.00 |
| | | 1 butterfly valves manually-operated | | | | | |
| | | 6,925 lbs each, 6,925 lbs total | | | | | |
| | | 42" Dia. AWWA class 150B | 8420 | 2 | ea | $26,000.00 | $52,000.00 |
| | | 2 butterfly valves manually-operated | | | | | |
| | | 4,544 lbs each, 9,088 lbs total | | | | | |
| | | 36" Dia. AWWA class 150B | 8420 | 3 | ea | $17,000.00 | $51,000.00 |
| | | 3 butterfly valve manually-operated | | | | | |
| | | 3,425 lbs each, 10,275 lbs total | | | | | |
| | | 30" Dia. AWWA class 150B | 8420 | 2 | ea | $14,500.00 | $29,000.00 |
| | | 2 butterfly valves manually-operated | | | | | |
| | | 2,435 lbs each, 4,870 lbs total | | | | | |
| | | 8" Dia. AWWA class 150B | 8420 | 5 | ea | $1,900.00 | $9,500.00 |
| | | 5 butterfly valves manually-operated | | | | | |
| | | 125 lbs each, 625 lbs total | | | | | |
| | | 4" Dia. AWWA class 150B | 8420 | 8 | ea | $1,100.00 | $8,800.00 |
| | | 8 butterfly valves manually-operated | | | | | |
| | | 71 lbs each, 568 lbs total | | | | | |
| | | SUBTOTAL THIS SHEET | | | | | $916,300.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Ken Smith | CHECKED<br>Nathan Nakamoto P.E. | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>1/30/2013 | PEER REVIEW / DATE<br>Nathan Nakamoto P.E. | DATE PREPARED<br>02/15/13 | PEER REVIEW / DATE<br>NCO 3/5/13 |

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

**FEATURE:**
Arkansas Valley Conduit
Sandbag Cofferdam
Comanche North (Max Month Condition 5)
Interconnect (Option B)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Estimates\[Commanche North Max Month Cond 5 Estimate Worksheets 05-30-2013.xls]Interconnect

| 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. | | 1,450 | $yd^3$ | 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 furnish and install | |
| | | 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 |
| | | SUBTOTAL INTERCONNECT | | | | | $4,158,675.00 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY Paul Craig | CHECKED Ryan Davidson | BY Jim Jetton, P.E., C.C.E | CHECKED |
| DATE PREPARED 01/15/13 | PEER REVIEW Allen Kiene | DATE PREPARED 05/30/13 | PEER REVIEW / DATE 6/4/13 |

| FEATURE: | PROJECT: | Fryingpan-Arkansas Project | | |
|---|---|---|---|---|
| Arkansas Valley Conduit | WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| Comanche North Alternative (Max Mth Condition 5) | REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| OM&R Costs Summary Sheet - Interconnect (Present Worth Without Escalation to NTP) | FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\[OM&R Calcs-Preferred Alt Interconnect Only-without escalation.xlsx]Periodic Costs | | |

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>TSC Design Team | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/21/13 |
| DATE PREPARED<br>02/18/13 | PEER REVIEW / DATE<br>TSC Design Team 4/12 | DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>DCD 3/21/13 |

| FEATURE: | PROJECT: | Fryingpan-Arkansas Project, Colorado | | |
|---|---|---|---|---|
| Arkansas Valley Conduit | WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| Comanche North Alternative (Max Month Condition 5) | REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| OM&R Costs Summary Sheet | FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\[OM&R Calcs-Comanche North-without escalation 11-Feb-2013.xlsx]Periodic Costs | | |
| (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 | $74,000 | $60,459 |
| Year 10 | | | PW Factor | 0.66750 | $74,000 | $49,395 |
| Year 15 | | | PW Factor | 0.54535 | $720,000 | $392,652 |
| Year 20 | | | PW Factor | 0.44555 | $2,600,000 | $1,158,430 |
| Year 25 | | | PW Factor | 0.36402 | $1,950,000 | $709,839 |
| Year 30 | | | PW Factor | 0.29741 | $1,850,000 | $550,209 |
| Year 35 | | | PW Factor | 0.24298 | $74,000 | $17,981 |
| Year 40 | | | PW Factor | 0.19852 | $2,600,000 | $516,152 |
| Year 45 | | | PW Factor | 0.16219 | $720,000 | $116,777 |
| Year 50 | | | PW Factor | 0.13251 | $2,300,000 | $304,773 |
| **Subtotal Periodic (Replacement) Costs** | | | | | | **$3,876,666** |
| Mobilization (+/- 5%) | | | | | | $195,000 |
| Subtotal 1 with Mobilization | | | | | | $4,071,666 |
| Escalation to NTP | | | | | | $0 |
| Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP | | | | | | $4,071,666 |
| Design Contingencies (+/- 15%) | | | | | | $628,334 |
| **Contract Cost** | | | | | | $4,700,000 |
| Construction Contingencies (+/- 25%) | | | | | | $1,200,000 |
| **Field Cost** | | | | | | $5,900,000 |
| Non-Contract Costs (+/- 25%) | | | | | | $1,500,000 |
| **Total Periodic (Replacement) Present Worth Costs Rounded (Jan-2011)** | | | | | | **$7,400,000** |
| **Annual Periodic (Replacement) Costs Rounded (Jan-2011)** | | | | | | **$350,000** |

| Annual (Operations and Maintenance) Costs | | | | P/A Factor | Estimated Annual Costs | Present Worth Costs (Jan 2011) |
|---|---|---|---|---|---|---|
| Maintenance Costs | | | PWA Factor | 21.03006 | $140,000 | $2,944,208 |
| Operations Costs | | | PWA Factor | 21.03006 | $340,000 | $7,150,220 |
| Energy Costs for Pumping | | | PWA Factor | 21.03006 | $700,000 | $14,721,042 |
| | | | | | | |
| **Subtotal Annual (Operation and Maintenance) Costs** | | | | | | **$24,815,471** |
| Escalation to NTP | | | | | | $0 |
| Subtotal 1 with Escalation to NTP | | | | | | $24,815,471 |
| Design Contingencies (+/- 10%) | | | | | | $2,184,529 |
| Subtotal 3 = Subtotal 2 + Design Contingencies | | | | | | $27,000,000 |
| Non-Contract Costs (+/- 10%) | | | | | | $3,000,000 |
| **Total (Annual Operation and Maintenance) Present Worth Costs Rounded (Jan-2011)** | | | | | | **$30,000,000** |
| **Annual (Operation and Maintenance) Costs Rounded (Jan-2011)** | | | | | | **$1,400,000** |

- 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>TSC Design Team | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>TSC Design Team 6/12 | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

**Arkansas Valley Conduit**
**Pipeline (ALL)**
**Comanche North (Max Month Condition 5)**

**Civil OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryingpan-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | PVC Pipe Repair | 86-68140 | 1 | Year 50 | $10,000.00 | $10,000.00 |
| | | Replace one joint (2 sticks of pipe) Every 50 Years | | | | | |
| | | Repair Equivalent to 18" dia. Pipe | | | | | |
| | | Comanche North Alt has ~121 miles of PVC Pipe | | | | | |
| | 2 | Steel Pipe Repair | 86-68140 | 1 | Year 50 | $20,000.00 | $20,000.00 |
| | | Replace one joint (2 sticks of pipe) Every 50 Years | | | | | |
| | | Repair Equivalent to 36" dia. Pipe | | | | | |
| | | Comanche North Alt has ~108 miles of Steel Pipe | | | | | |
| | 3A | Cathodic Protection | 86-68140 | 1 | Annual | $76,000.00 | $76,000.00 |
| | | Annual Costs of Maintenance | | | | | |
| | 3B | Cathodic Protection | 86-68140 | 1 | Annual | $27,000.00 | $27,000.00 |
| | | Annual Costs of Operations | | | | | |
| | 3C | Cathodic Protection | 86-68140 | 1 | Annual | $610.00 | $610.00 |
| | | Annual Costs of Energy | | | | | |
| | 4 | Cathodic Protection | 86-68140 | 1 | Year 20 | $905,000.00 | $905,000.00 |
| | | Replace Vertical Anodes and Rectifiers | | 1 | Year 40 | $905,000.00 | $905,000.00 |
| | | Once Every 20 years | | | | | |
| | 5 | Butterfly Valve (Manually Operated) | 86-68140 | 1 | Year 50 | $351,480.00 | $351,480.00 |
| | | 15% of all butterfly valve costs for repair and replacement | | | | | |
| | | **Subtotal This Sheet** | | | Year 20 | | $905,000.00 |
| | | | | | Year 40 | | $905,000.00 |
| | | | | | Year 50 | | $381,480.00 |
| | | | | | 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, P.E., C.C.E. | **CHECKED** Tim Brown | **BY** Jim Jetton, P.E., C.C.E | **CHECKED** 3/5/13 |
| **DATE PREPARED** 2/20/2013 | **PEER REVIEW / DATE** Tim Brown | **DATE PREPARED** 02/20/13 | **PEER REVIEW / DATE** 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Entire System
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

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

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 1
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6" Combination Air Valve | 86-68140 | 2 | Year 25 | $7,500.00 | $15,000.00 |
| | | Replace Every 25 Years | | 2 | Year 50 | $7,500.00 | $15,000.00 |
| | | **Subtotal This Sheet** | | | Year 25 | | $15,000.00 |
| | | | | | Year 50 | | $15,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 2
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 3" Combination Air Valve | 86-68140 | 53 | Year 25 | $3,500.00 | $185,500.00 |
| | | Replace Every 25 Years | | 53 | Year 50 | $3,500.00 | $185,500.00 |
| | 2 | 3" Ball Valve | 86-68140 | 53 | Year 25 | $500.00 | $26,500.00 |
| | | Replace Every 25 Years | | 53 | Year 50 | $500.00 | $26,500.00 |
| | | **Subtotal This Sheet** | | | Year 25 | | $212,000.00 |
| | | | | | Year 50 | | $212,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 2: Fowler Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]R2 - Fowler Spur

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 3
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6" Combination Air Valve | 86-68140 | 35 | Year 25 | $7,500.00 | $262,500.00 |
| | | Replace Every 25 Years | | 35 | Year 50 | $7,500.00 | $262,500.00 |
| | | **Subtotal This Sheet** | | | Year 25 | | $262,500.00 |
| | | | | | Year 50 | | $262,500.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DAQ 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R3: Manzanola Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R3:Valley Water Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R3: Rocky Ford & Hancock Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R3: Newdale-Grand Valley Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R3: West Grand Valley Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Reach 4
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 2" Combination Air Valve | 86-68140 | 56 | Year 25 | $2,875.00 | $161,000.00 |
| | | Replace Every 25 Years | | 56 | Year 50 | $2,875.00 | $161,000.00 |
| | 2 | 2" Ball Valve | 86-68140 | 56 | Year 25 | $375.00 | $21,000.00 |
| | | Replace Every 25 Years | | 56 | Year 50 | $375.00 | $21,000.00 |
| | | **Subtotal This Sheet** | | | Year 25 | | $182,000.00 |
| | | | | | Year 50 | | $182,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R4: Las Animas Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 2" Combination Air Valve | 86-68140 | 9 | Year 25 | $2,875.00 | $25,875.00 |
| | | Replace Every 25 Years | | 9 | Year 50 | $2,875.00 | $25,875.00 |
| | 2 | 2" Ball Valve | 86-68140 | 9 | Year 25 | $375.00 | $3,375.00 |
| | | Replace Every 25 Years | | 9 | Year 50 | $375.00 | $3,375.00 |
| | | Subtotal This Sheet | | | Year 25 | | $29,250.00 |
| | | | | | Year 50 | | $29,250.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R4: Hasty Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R4: McClave Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
R4: Wiley Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
HWY 96 Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
96 Pipline Co. Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comahche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads & May Valley Spur Pipeline
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/11/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Eads Spur Pipeline
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Condult\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>ACA 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
May Valley Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
South Loop
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]South Loop

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 2" Combination Air Valve | 86-68140 | 18 | Year 25 | $2,875.00 | $51,750.00 |
| | | Replace Every 25 Years | | 18 | Year 50 | $2,875.00 | $51,750.00 |
| | 2 | 2" Ball Valve | 86-68140 | 18 | Year 25 | $375.00 | $6,750.00 |
| | | Replace Every 25 Years | | 18 | Year 50 | $375.00 | $6,750.00 |
| | | **Subtotal This Sheet** | | | Year 25 | | $58,500.00 |
| | | | | | Year 50 | | $58,500.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/8/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
South Swink Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/11/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DWD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Homestead Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/7/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
La Junta Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCB 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Pipeline
Comanche North (Max Month Condition 5)
Bent's Fort Spur
Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8140 - Costs 02-20-2013.xlsx]Pipeline (ALL)

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Tim Brown | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/11/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Tim Brown | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Comanche North (Max Month Condition 5)<br>86-68140 | Fryingpan-Arkansas Project, Colorado |
| WOID: AF523 | ESTIMATE LEVEL: Appraisal |
| REGION: GP | UNIT PRICE LEVEL: Jan-11 |
| FILE: H:\D8170\Common\JMorris\Arkansas Valley Conduit Appraisal Estimate\Preferred Alternative\OM&R Cost Estimate\Cost Estimate Worksheets for Designers\[Preferred Alternative Life Cycle Costs Summary Worksheet.xls]EW SUM_Construction Cost | |

| 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 | | | | $1,009,500 | |
| | | 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 | | | | $1,390,980 | |
| | | Annual Costs | | | | $412,610 | |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Team | CHECKED<br>TSC Team | BY<br>Jim Jetton, P.E., C.C.E | CHECKED<br>3/5/13 |
| DATE PREPARED<br>Jan-13 | PEER REVIEW / DATE<br>TSC Team | DATE PREPARED<br>02/20/13 | PEER REVIEW / DATE<br>DCQ 3/11/13 |

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _28_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Meter Vault (Pumping Plant after WTP)
Comanche North (Max Month Condition 5)
Reach 1
OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCH 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _29_ OF _58_

**FEATURE:**

**Arkansas Valley Conduit**
**Eads & May Valley Meter & Valve Vaults**
**Comanche North (Max Month Condition 5)**
**Eads Spur**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryingpan-Arkansas Project, Colorado**

**WOID:** AF523 | **ESTIMATE LEVEL:** Appraisal
**REGION:** GP | **UNIT PRICE LEVEL:** Jan-11
**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Eads Single-Path Ultrasonic Flowmeter System | 86-68410 | 1 | Year 20 | $24,250.00 | $24,250.00 |
| | | Single-path utlrasonic, 10" diam | | 1 | Year 40 | $24,250.00 | $24,250.00 |
| | | 2 transducers with cables and 1 transmitter console | | | | | |
| | | Replace System Every 20 Years | | | | | |
| | 2 | May Valley Single-Path Ultrasonic Flowmeter Sys | 86-68410 | 1 | Year 20 | $21,875.00 | $21,875.00 |
| | | Single-path utlrasonic, 8" diam | | 1 | Year 40 | $21,875.00 | $21,875.00 |
| | | 2 transducers with cables and 1 transmitter console | | | | | |
| | | Replace System Every 20 Years | | | | | |
| | | **Subtotal This Sheet** | | | Year 20 | | $46,125.00 |
| | | | | | Year 40 | | $46,125.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _30_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 2
OM&R Costs (Estimated Costs)

**PROJECT:** Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6" Electro-Magnetic Flowmeter System | 86-68410 | 4 | Year 15 | $16,250.00 | $65,000.00 |
| | | Replace Entire System Every 15 Years | | 4 | Year 30 | $16,250.00 | $65,000.00 |
| | | flanged electro-magnetic flowmeter with | | 4 | Year 45 | $16,250.00 | $65,000.00 |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | Year 15 | | $65,000.00 |
| | | | | | Year 30 | | $65,000.00 |
| | | | | | Year 45 | | $65,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Reach 3
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche Nort 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6" Electro-Magnetic Flowmeter System | 86-68410 | 16 | Year 15 | $16,250.00 | $260,000.00 |
| | | Replace Entire System Every 15 Years | | 16 | Year 30 | $16,250.00 | $260,000.00 |
| | | flanged electro-magnetic flowmeter with | | 16 | Year 45 | $16,250.00 | $260,000.00 |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs, 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | Year 15 | | $260,000.00 |
| | | | | | Year 30 | | $260,000.00 |
| | | | | | Year 45 | | $260,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/1/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DOH 3/1/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _32_ OF _58_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Participant Tie-In Vaults<br>Comanche North (Max Month Condition 5)<br>Reach 4<br>OM&R Costs (Estimated Costs) | Fryingpan-Arkansas Project, Colorado<br>WOID: AF523 — ESTIMATE LEVEL: Appraisal<br>REGION: GP — UNIT PRICE LEVEL: Jan-11<br>FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche Nort 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT |

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DOH 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _33_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
HWY 96 Spur
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North- 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6" Electro-Magnetic Flowmeter System | 86-68410 | 6 | Year 15 | $16,250.00 | $97,500.00 |
| | | Replace Entire System Every 15 Years | | 6 | Year 30 | $16,250.00 | $97,500.00 |
| | | flanged electro-magnetic flowmeter with | | 6 | Year 45 | $16,250.00 | $97,500.00 |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs, 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | Year 15 | | $97,500.00 |
| | | | | | Year 30 | | $97,500.00 |
| | | | | | Year 45 | | $97,500.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DOH 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _34_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Eads & May Valley Spur
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche Nort 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/9/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DOH 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _35_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Loop
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche Nort 8410 - Costs 02-20-2013.xlsx]R1 - Meter Vault PP1 Before WT

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6" Electro-Magnetic Flowmeter System | 86-68410 | 5 | Year 15 | $16,250.00 | $81,250.00 |
| | | Replace Entire System Every 15 Years | | 5 | Year 30 | $16,250.00 | $81,250.00 |
| | | flanged electro-magnetic flowmeter with | | 5 | Year 45 | $16,250.00 | $81,250.00 |
| | | remote wall-mounted transmitter | | | | | |
| | | weight= approx 85 lbs, 120 Volt AC | | | | | |
| | | Subtotal This Sheet | | | Year 15 | | $81,250.00 |
| | | | | | Year 30 | | $81,250.00 |
| | | | | | Year 45 | | $81,250.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>David O. Hulse | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>David O. Hulse | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DOH 3/11/13 |

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Comanche North (Max Month Condition 5)<br>86-68410 | Fryingpan-Arkansas Project, Colorado |
| | WOID: AF523 — ESTIMATE LEVEL: Appraisal |
| | REGION: GP — UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JMorris\Arkansas Valley Conduit Appraisal Estimate\Preferred Alternative\OM&R Cost Estimate\Cost Estimate Worksheets for Designers\[Preferred Alternative Life Cycle Costs Summary Worksheet.xls]EW SUM_Construction Cost |

| 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 | | | | $127,375 | |
| | | Periodic Costs - Year 25 | | | | $0 | |
| | | Periodic Costs - Year 30 | | | | $650,000 | |
| | | Periodic Costs - Year 35 | | | | $0 | |
| | | Periodic Costs - Year 40 | | | | $127,375 | |
| | | Periodic Costs - Year 45 | | | | $650,000 | |
| | | Periodic Costs - Year 50 | | | | $0 | |
| | | Annual Costs | | | | $0 | |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Team | CHECKED<br>TSC Team | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/8/13 |
| DATE PREPARED<br>Feb-June 2011 | PEER REVIEW / DATE<br>TSC Team | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>3/11/13 |

| FEATURE: | PROJECT: Fryington-Arkansas Project, Colorado | |
|---|---|---|
| Arkansas Valley Conduit<br>Whitlock Pumping Plant (D/S of WTP)<br>Comanche North (Max Month Condition 5)<br>Reach 1<br>OM&R Costs (Estimated Costs) | WOID: AF523 | ESTIMATE LEVEL: Appraisal |
| | REGION: GP | UNIT PRICE LEVEL: Jan-11 |
| | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Pumping Plant PP1 Maintenance & Replacement | 86-68420 | 1 | Annual | $51,000.00 | $51,000.00 |
| | | 22.44 cfs capacity; 465 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 | $7,700.00 | $7,700.00 |
| | | Use PMPOM. OUT Program tp develop OM&R. | | | | | |
| | 3 | Pumping Plant PP1 Energy Costs | 86-68420 | 1 | Annual | $700,000.00 | $700,000.00 |
| | | Use Black Hills Energy Rate Analysis | | | | | |
| | | Subtotal This Sheet | | | Annual | | $758,700.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _38_ OF _58_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Eads Booster Plant<br>Comanche North (Max Month Condition 5)<br>Eads Spur<br>OM&R Costs (Estimated Costs) | Frylington-Arkansas Project, Colorado<br>WOID: AF523 — ESTIMATE LEVEL: Appraisal<br>REGION: GP — UNIT PRICE LEVEL: Jan-11<br>FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Eads Booster Maintenance & Replacement | 86-68420 | 1 | Annual | $1,200.00 | $1,200.00 |
| | | 1.0 cfs capacity; 305 feet TDH; 21 week operation period; | | | | | |
| | | Unattended plant | | | | | |
| | | Use PMPOM. OUT Program to develop OM&R. | | | | | |
| | 2 | Eads Booster Plant Operations | 86-68420 | 1 | Annual | $1,620.00 | $1,620.00 |
| | | 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 | | $6,320.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _39_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Air Chamber Pumping Plant after WTP
Comanche North (Max Month Condition 5)
Reach 1
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Air Chamber Interior Cleaning | 86-68420 | 1 | Year 5 | $1,810.00 | $1,810.00 |
| | | Clean once every 5 years (1-Tank) except | | 1 | Year 10 | $1,810.00 | $1,810.00 |
| | | when interior re-coating is performed | | 1 | Year 15 | $1,810.00 | $1,810.00 |
| | | 18,612 gallons; height = 18 feet; | | 1 | Year 25 | $1,810.00 | $1,810.00 |
| | | inside diameter = 12 feet | | 1 | Year 30 | $1,810.00 | $1,810.00 |
| | | | | 1 | Year 35 | $1,810.00 | $1,810.00 |
| | | | | 1 | Year 45 | $1,810.00 | $1,810.00 |
| | | | | 1 | Year 50 | $1,810.00 | $1,810.00 |
| | 2 | Air Chamber Exterior Re-Coating | 86-68420 | 1 | Year 30 | $39,600.00 | $39,600.00 |
| | | Apply Exterior Coating once every 30 years | | | | | |
| | 3 | Air Chamber Interior Re-Coating | 86-68420 | 1 | Year 20 | $54,300.00 | $54,300.00 |
| | | Apply Interior Coating once every 20 years | | 1 | Year 40 | $54,300.00 | $54,300.00 |
| | | Subtotal This Sheet | | | Year 5 | | $1,810.00 |
| | | | | | Year 10 | | $1,810.00 |
| | | | | | Year 15 | | $1,810.00 |
| | | | | | Year 20 | | $54,300.00 |
| | | | | | Year 25 | | $1,810.00 |
| | | | | | Year 30 | | $41,410.00 |
| | | | | | Year 35 | | $1,810.00 |
| | | | | | Year 40 | | $54,300.00 |
| | | | | | Year 45 | | $1,810.00 |
| | | | | | Year 50 | | $1,810.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/13/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _40_ OF _58_

**FEATURE:**

**Arkansas Valley Conduit**
**Regulating Tank**
**Comanche North (Max Month Condition 5)**
**Reach 2**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

**WOID:** AF523 | **ESTIMATE LEVEL:** Appraisal
**REGION:** GP | **UNIT PRICE LEVEL:** 11-Jan
**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Regulating Tank Interior Cleaning | 86-68420 | 1 | Year 5 | $17,280.00 | $17,280.00 |
| | | Clean once every 5 years (1-Tank) except | | 1 | Year 10 | $17,280.00 | $17,280.00 |
| | | when interior re-coating is performed | | 1 | Year 15 | $17,280.00 | $17,280.00 |
| | | 441,000 gallons; height = 30feet; | | 1 | Year 25 | $17,280.00 | $17,280.00 |
| | | Inside diameter = 50 feet | | 1 | Year 30 | $17,280.00 | $17,280.00 |
| | | | | 1 | Year 35 | $17,280.00 | $17,280.00 |
| | | | | 1 | Year 45 | $17,280.00 | $17,280.00 |
| | | | | 1 | Year 50 | $17,280.00 | $17,280.00 |
| | 2 | Regulating Tank Exterior Re-Coating | 86-68420 | 1 | Year 30 | $200,280.00 | $200,280.00 |
| | | Apply Exterior Coating once every 30 years | | | | | |
| | 3 | Regulating Tank Interior Re-Coating | 86-68420 | 1 | Year 20 | $311,000.00 | $311,000.00 |
| | | Apply Interior Coating once every 20 years | | 1 | Year 40 | $311,000.00 | $311,000.00 |
| | | **Subtotal This Sheet** | | | Year 5 | | $17,280.00 |
| | | | | | Year 10 | | $17,280.00 |
| | | | | | Year 15 | | $17,280.00 |
| | | | | | Year 20 | | $311,000.00 |
| | | | | | Year 25 | | $17,280.00 |
| | | | | | Year 30 | | $217,560.00 |
| | | | | | Year 35 | | $17,280.00 |
| | | | | | Year 40 | | $311,000.00 |
| | | | | | Year 45 | | $17,280.00 |
| | | | | | Year 50 | | $17,280.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/07/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _41_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
LaJunta North Water Surge Tank
Comanche North (Max Month Condition 5)
Reach 3
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]R3 - LaJunta Water Surge Tank

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | LaJunta Water Surge Tank Interior Cleaning | 86-68420 | 1 | Year 5 | $44,000.00 | $44,000.00 |
| | | Clean once every 5 years except | | 1 | Year 10 | $44,000.00 | $44,000.00 |
| | | when interior re-coating is performed | | 1 | Year 15 | $44,000.00 | $44,000.00 |
| | | (1) - 1,763,000 gallons; | | 1 | Year 25 | $44,000.00 | $44,000.00 |
| | | min water surface elev = 0feet; | | 1 | Year 30 | $44,000.00 | $44,000.00 |
| | | max water surface elev = 120 feet; Diameter = 50 feet | | 1 | Year 35 | $44,000.00 | $44,000.00 |
| | | | | 1 | Year 45 | $44,000.00 | $44,000.00 |
| | | | | 1 | Year 50 | $44,000.00 | $44,000.00 |
| | 2 | LaJunta Water Surge Tank Exterior Re-Coating | 86-68420 | 1 | Year 30 | $686,830.00 | $686,830.00 |
| | | Apply Exterior Coating once every 30 years | | | | | |
| | 3 | LaJunta Water Surge Tank Interior Re-Coating | 86-68420 | 1 | Year 20 | $911,040.00 | $911,040.00 |
| | | Apply Interior Coating once every 20 years | | 1 | Year 40 | $911,040.00 | $911,040.00 |
| | | **Subtotal This Sheet** | | | Year 5 | | $44,000.00 |
| | | | | | Year 10 | | $44,000.00 |
| | | | | | Year 15 | | $44,000.00 |
| | | | | | Year 20 | | $911,040.00 |
| | | | | | Year 25 | | $44,000.00 |
| | | | | | Year 30 | | $730,830.00 |
| | | | | | Year 35 | | $44,000.00 |
| | | | | | Year 40 | | $911,040.00 |
| | | | | | Year 45 | | $44,000.00 |
| | | | | | Year 50 | | $44,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/8 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

**FEATURE:**

**Arkansas Valley Conduit**
**Fowler North Water Surge Tank**
**Comanche North (Max Month Condition 5)**
**Reach 3**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]R3 - Fowler Water Surge Tank

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Fowler Water Surge Tank Interior Cleaning | 86-68420 | 1 | Year 5 | $11,000.00 | $11,000.00 |
| | | Clean once every 5 years except | | 1 | Year 10 | $11,000.00 | $11,000.00 |
| | | when interior re-coating is performed | | 1 | Year 15 | $11,000.00 | $11,000.00 |
| | | (1) - 441,000 gallons; | | 1 | Year 25 | $11,000.00 | $11,000.00 |
| | | min water surface elev = 0 feet; | | 1 | Year 30 | $11,000.00 | $11,000.00 |
| | | max water surface elev = 30 feet; Diameter = 50 feet | | 1 | Year 35 | $11,000.00 | $11,000.00 |
| | | | | 1 | Year 45 | $11,000.00 | $11,000.00 |
| | | | | 1 | Year 50 | $11,000.00 | $11,000.00 |
| | 2 | Fowler Water Surge Tank Exterior Re-Coating | 86-68420 | 1 | Year 30 | $180,250.00 | $180,250.00 |
| | | Apply Exterior Coating once every 30 years | | | | | |
| | 3 | Fowler Water Surge Tank Interior Re-Coating | 86-68420 | 1 | Year 20 | $276,450.00 | $276,450.00 |
| | | Apply Interior Coating once every 20 years | | 1 | Year 40 | $276,450.00 | $276,450.00 |
| | | **Subtotal This Sheet** | | | Year 5 | | $11,000.00 |
| | | | | | Year 10 | | $11,000.00 |
| | | | | | Year 15 | | $11,000.00 |
| | | | | | Year 20 | | $276,450.00 |
| | | | | | Year 25 | | $11,000.00 |
| | | | | | Year 30 | | $191,250.00 |
| | | | | | Year 35 | | $11,000.00 |
| | | | | | Year 40 | | $276,450.00 |
| | | | | | Year 45 | | $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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _43_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Eads & May Valley Air Chamber
Comanche North (Max Month Condition 5)
Eads & May Valley Spur
OM&R Costs (Estimated Costs)

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads & May Valley Air Chamber

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Eads & May Valley Air Chamber Interior Cleaning | 86-68420 | 1 | Year 5 | $280.00 | $280.00 |
| | | Clean once every 5 years except | | 1 | Year 10 | $280.00 | $280.00 |
| | | when interior re-coating is performed | | 1 | Year 15 | $280.00 | $280.00 |
| | | 1,200 gallons; Height = 6.5 feet; Diameter = 5 feet | | 1 | Year 25 | $280.00 | $280.00 |
| | | | | 1 | Year 30 | $280.00 | $280.00 |
| | | | | 1 | Year 35 | $280.00 | $280.00 |
| | | | | 1 | Year 45 | $280.00 | $280.00 |
| | | | | 1 | Year 50 | $280.00 | $280.00 |
| | 2 | Eads & May Valley Air Chamber Exterior Re-Coat | 86-68420 | 1 | Year 30 | $6,100.00 | $6,100.00 |
| | | Apply Exterior Coating once every 30 years | | | | | |
| | 3 | Eads & May Valley Air Chamber Interior Re-Coati | 86-68420 | 1 | Year 20 | $8,520.00 | $8,520.00 |
| | | Apply Interior Coating once every 20 years | | 1 | Year 40 | $8,520.00 | $8,520.00 |
| | | **Subtotal This Sheet** | | | Year 5 | | $280.00 |
| | | | | | Year 10 | | $280.00 |
| | | | | | Year 15 | | $280.00 |
| | | | | | Year 20 | | $8,520.00 |
| | | | | | Year 25 | | $280.00 |
| | | | | | Year 30 | | $6,380.00 |
| | | | | | Year 35 | | $280.00 |
| | | | | | Year 40 | | $8,520.00 |
| | | | | | 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, P.E., C.C.E. | CHECKED: Dan Drake | BY: Jim Jetton, P.E., C.C.E. | CHECKED: 3/5/13 |
| DATE PREPARED: 2/20/2013 | PEER REVIEW / DATE: Dan Drake | DATE PREPARED: 02/25/13 | PEER REVIEW / DATE: DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _44_ OF _58_

| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Meter & Valve Vaults<br>Comanche North (Max Month Condition 5)<br>Reach 1<br>OM&R Costs (Estimated Costs) | Frying ton-Arkansas Project, Colorado<br>WOID: AF523 — ESTIMATE LEVEL: Appraisal<br>REGION: GP — UNIT PRICE LEVEL: Jan-11<br>FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Meter 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 | | | | | |
| | | Valve Vault | | | | | |
| | | | | | | | |
| | 1 | 30" Pressure Reducing Valve | 86-68420 | 1 | Year 25 | $193,750.00 | $193,750.00 |
| | | Replace Every 25 Years | | 1 | Year 50 | $193,750.00 | $193,750.00 |
| | | Cla-Val class 150 | | | | | |
| | | Cla-Val distributor estimates 20-30 year life expectancy | | | | | |
| | | Subtotal This Sheet | | | Year 25 | | $443,750.00 |
| | | | | | Year 50 | | $443,750.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>ACD 3/11/13 |

**FEATURE:**

**Arkansas Valley Conduit**
**Meter Vault**
**Comanche North (Max Month Condition 5)**
**Eads and May Valley**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche Nor 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | Meter Vault | | | | | |
| | 1 | No PRV | 86-68420 | | | | |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _46_ OF _58_

**FEATURE:**

**Arkansas Valley Conduit**
**Participant Tie-In Vaults**
**Comanche North (Max Month Condition 5)**
**Reach 2**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6-inch pressure reducing valve | 86-68420 | 4 | Year 25 | $9,750.00 | $39,000.00 |
| | | Replace Every 25 Years | | 4 | Year 50 | $9,750.00 | $39,000.00 |
| | | 4 valves, 195 lbs each | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | 2 | 1-inch air valve | 86-68420 | 4 | Year 25 | $1,250.00 | $5,000.00 |
| | | Replace Every 25 Years | | 4 | Year 50 | $1,250.00 | $5,000.00 |
| | | 4 air valves, 35lbs each | | | | | |
| | | **Subtotal This Sheet** | | | Year 25 | | $44,000.00 |
| | | | | | Year 50 | | $44,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| **BY** Jim Jetton, P.E., C.C.E. | **CHECKED** Dan Drake | **BY** Jim Jetton, P.E., C.C.E. | **CHECKED** |
| **DATE PREPARED** 2/20/2013 | **PEER REVIEW / DATE** Dan Drake | **DATE PREPARED** 02/25/13 | **PEER REVIEW / DATE** 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _47_ OF _58_

**FEATURE:**

**Arkansas Valley Conduit**
**Participant Tie-In Vaults**
**Comanche North (Max Month Condition 5)**
**Reach 3**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

**WOID:** AF523 | **ESTIMATE LEVEL:** Appraisal
**REGION:** GP | **UNIT PRICE LEVEL:** Jan-11
**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6-inch pressure reducing valve | 86-68420 | 16 | Year 25 | $9,750.00 | $156,000.00 |
| | | Replace Every 25 Years | | 16 | Year 50 | $9,750.00 | $156,000.00 |
| | | 16 valves, 195 lbs each | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | 2 | 1-inch air valve | 86-68420 | 16 | Year 25 | $1,250.00 | $20,000.00 |
| | | Replace Every 25 Years | | 16 | Year 50 | $1,250.00 | $20,000.00 |
| | | 16 air valves, 35lbs each | | | | | |
| | | **Subtotal This Sheet** | | | Year 25 | | $176,000.00 |
| | | | | | Year 50 | | $176,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _48_ OF _58_

**FEATURE:**

**Arkansas Valley Conduit**
**Participant Tie-In Vaults**
**Comanche North (Max Month Condition 5)**
**Reach 4**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

**WOID:** AF523 | **ESTIMATE LEVEL:** Appraisal
**REGION:** GP | **UNIT PRICE LEVEL:** Jan-11
**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| 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, 195 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

**FEATURE:**

**Arkansas Valley Conduit**
**Participant Tie-In Vaults**
**Comanche North (Max Month Condition 5)**
**HWY 96 Spur**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

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

**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Condult\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6-inch pressure reducing valve | 86-68420 | 6 | Year 25 | $9,750.00 | $58,500.00 |
| | | Replace Every 25 Years | | 6 | Year 50 | $9,750.00 | $58,500.00 |
| | | 6 valves, 195 lbs each | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | 2 | 1-inch air valve | 86-68420 | 6 | Year 25 | $1,250.00 | $7,500.00 |
| | | Replace Every 25 Years | | 6 | Year 50 | $1,250.00 | $7,500.00 |
| | | 6 air valves, 35lbs each | | | | | |
| | | **Subtotal This Sheet** | | | Year 25 | | $66,000.00 |
| | | | | | Year 50 | | $66,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _50_ OF _58_

**FEATURE:**

**Arkansas Valley Conduit**
**Participant Tie-In Vaults**
**Comanche North (Max Month Condition 5)**
**Eads Spur**
**OM&R Costs (Estimated Costs)**

**PROJECT:**
**Fryington-Arkansas Project, Colorado**

**WOID:** AF523 | **ESTIMATE LEVEL:** Appraisal
**REGION:** GP | **UNIT PRICE LEVEL:** Jan-11
**FILE:** H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| 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, 195 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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/7/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _51_ OF _58_

**FEATURE:**

Arkansas Valley Conduit
Participant Tie-In Vaults
Comanche North (Max Month Condition 5)
Loop
OM&R Costs (Estimated Costs)

**PROJECT:**
Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | 6-inch pressure reducing valve | 86-68420 | 5 | Year 25 | $9,750.00 | $48,750.00 |
| | | Replace Every 25 Years | | 5 | Year 50 | $9,750.00 | $48,750.00 |
| | | 5 valves, 195 lbs each | | | | | |
| | | Cla-Val ANSI class 150 steel | | | | | |
| | | (285 psi rated) | | | | | |
| | 2 | 1-inch air valve | 86-68420 | 5 | Year 25 | $1,250.00 | $6,250.00 |
| | | Replace Every 25 Years | | 5 | Year 50 | $1,250.00 | $6,250.00 |
| | | 5 air valves, 35lbs each | | | | | |
| | | **Subtotal This Sheet** | | | Year 25 | | $55,000.00 |
| | | | | | Year 50 | | $55,000.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Meter & Valve Vaults (ALL)
Comanche North (Max Month Condition 5)

Civil OM&R Costs (Estimated Costs)

**PROJECT:**
Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Butterfly Valves (Manually Operated) | 86-68420 | 1 | Year 50 | $13,845.00 | $13,845.00 |
| | | 15% of all butterfly valve costs on Meter & Valve Vaults | | | | | |
| | | for repair and replacement | | | | | |
| | | Subtotal This Sheet | | | Year 50 | | $13,845.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Participant Tie-Ins (ALL)
Comanche North (Max Month Condition 5)

Civil OM&R Costs (Estimated Costs)

**PROJECT:** Fryington-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Eads - Meter Vault

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Butterfly Valves (Manually Operated) | 86-68420 | 1 | Year 50 | $23,550.00 | $23,550.00 |
| | | 15% of all butterfly valve costs on Participant Tie-Ins | | | | | |
| | | for repair and replacement | | | | | |
| | | Subtotal This Sheet | | | Year 50 | | $23,550.00 |

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

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/8/13 |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/14/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Pipeline<br>Comanche North (Max Month Condition 5)<br>Interconnect<br>Civil OM&R Costs (Estimated Costs) | Fryington-Arkansas Project, Colorado |
| WOID: AF523 | ESTIMATE LEVEL: Appraisal |
| REGION: GP | UNIT PRICE LEVEL: Jan-11 |
| FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[AVC Life cycle Cost Estimate Worksheets Comanche North - 8420 - Costs 02-20-2013.xlsx]Summary | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | 1 | Butterfly Valves (Manually Operated)<br>15% of all butterfly valve costs on Interconnect for repair and replacement | 86-68420 | 1 | Year 50 | $137,445.00 | $137,445.00 |
| | | **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<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>Dan Drake | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED |
| DATE PREPARED<br>2/20/2013 | PEER REVIEW / DATE<br>Dan Drake | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: | | | |
|---|---|---|---|---|
| Arkansas Valley Conduit<br>Preferred Alternative OM&R Costs Summary She<br>86-68420 | Fryington-Arkansas Project, Colorado | | | |
| | WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| | REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| | FILE: | H:\D8170\Common\JMorris\Arkansas Valley Conduit Appraisal Estimate\Preferred Alternative\OM&R Cost Estimate\Cost Estimate Worksheets for Designers\[Preferred Alternative Life Cycle Costs Summary Worksheet.xls]EW SUM_Construction Cost | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | Estimated Costs | |
| | | Periodic Costs - Year 5 | | | | $74,370 | |
| | | Periodic Costs - Year 10 | | | | $74,370 | |
| | | Periodic Costs - Year 15 | | | | $74,370 | |
| | | Periodic Costs - Year 20 | | | | $1,561,310 | |
| | | Periodic Costs - Year 25 | | | | $958,120 | |
| | | Periodic Costs - Year 30 | | | | $1,187,430 | |
| | | Periodic Costs - Year 35 | | | | $74,370 | |
| | | Periodic Costs - Year 40 | | | | $1,561,310 | |
| | | Periodic Costs - Year 45 | | | | $74,370 | |
| | | Periodic Costs - Year 50 * | | | | $958,120 | |
| | | Annual Costs | | | | $765,020 | |

* These estimated costs do not include Sheet 52, 53, & 54. Sheet 1, Pay Item 5 includes these costs.

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Team | CHECKED<br>TSC Team | BY<br>Jim Jetton, P.E., C.C.E. | CHECKED<br>3/5/13 |
| DATE PREPARED<br>Feb-13 | PEER REVIEW / DATE<br>TSC Team | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Comanche North (Max Month Condition 5)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[Comanche North Life Cycle Costs Summary Worksheet.xls]O&M Summary Cost

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | Estimated Costs | Estimated Costs (Rounded) |
| | | Sheet 27 Summary (86-68140) | | | | | |
| | | Periodic Costs - Year 5 | | | | $0 | $0 |
| | | Periodic Costs - Year 10 | | | | $0 | $0 |
| | | Periodic Costs - Year 15 | | | | $0 | $0 |
| | | Periodic Costs - Year 20 | | | | $905,000 | $910,000 |
| | | Periodic Costs - Year 25 | | | | $1,009,500 | $1,000,000 |
| | | Periodic Costs - Year 30 | | | | $0 | $0 |
| | | Periodic Costs - Year 35 | | | | $0 | $0 |
| | | Periodic Costs - Year 40 | | | | $905,000 | $910,000 |
| | | Periodic Costs - Year 45 | | | | $0 | $0 |
| | | Periodic Costs - Year 50 | | | | $1,390,980 | $1,400,000 |
| | | | | | | | |
| | | Annual Costs | | | | $412,610 | $410,000 |
| | | | | | | | |
| | | | | | | | |
| | | Sheet 36 Summary (86-68410) | | | | | |
| | | Periodic Costs - Year 5 | | | | $0 | $0 |
| | | Periodic Costs - Year 10 | | | | $0 | $0 |
| | | Periodic Costs - Year 15 | | | | $650,000 | $650,000 |
| | | Periodic Costs - Year 20 | | | | $127,375 | $130,000 |
| | | Periodic Costs - Year 25 | | | | $0 | $0 |
| | | Periodic Costs - Year 30 | | | | $650,000 | $650,000 |
| | | Periodic Costs - Year 35 | | | | $0 | $0 |
| | | Periodic Costs - Year 40 | | | | $127,375 | $130,000 |
| | | Periodic Costs - Year 45 | | | | $650,000 | $650,000 |
| | | Periodic Costs - Year 50 | | | | $0 | $0 |
| | | | | | | | |
| | | Annual Costs | | | | $0 | $0 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Team | CHECKED<br>TSC Team | BY<br>Jim Jetton, PE, CCE | CHECKED<br>3/5/13 |
| DATE PREPARED<br>Jan-13 | PEER REVIEW / DATE<br>TSC Team | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>3/11/13 |

# ESTIMATE WORKSHEET



**FEATURE:**

Arkansas Valley Conduit
Comanche North (Max Month Condition 5)

(Present Worth)

**PROJECT:**
Fryingpan-Arkansas Project, Colorado

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

FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[Comanche North Life Cycle Costs Summary Worksheet.xls]O&M Summary Cost

| 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 | | | | $74,370.00 | $74,000 |
| | | Periodic Costs - Year 10 | | | | $74,370.00 | $74,000 |
| | | Periodic Costs - Year 15 | | | | $74,370.00 | $74,000 |
| | | Periodic Costs - Year 20 | | | | $1,561,310.00 | $1,550,000 |
| | | Periodic Costs - Year 25 | | | | $958,120.00 | $960,000 |
| | | Periodic Costs - Year 30 | | | | $1,187,430.00 | $1,200,000 |
| | | Periodic Costs - Year 35 | | | | $74,370.00 | $74,000 |
| | | Periodic Costs - Year 40 | | | | $1,561,310.00 | $1,550,000 |
| | | Periodic Costs - Year 45 | | | | $74,370.00 | $74,000 |
| | | Periodic Costs - Year 50 | | | | $958,120.00 | $960,000 |
| | | Annual Costs | | | | $765,020.00 | $770,000 |
| | | | | P/F Factor | | Estimated Costs (Rounded) | Periodic Costs |
| | | Sheet 27, 36 & 55 Total Summary | | | | | |
| | | Periodic Costs - Year 5 | | 0.81701 | | $74,000.00 | $60,459 |
| | | Periodic Costs - Year 10 | | 0.66750 | | $74,000.00 | $49,395 |
| | | Periodic Costs - Year 15 | | 0.54535 | | $720,000.00 | $392,652 |
| | | Periodic Costs - Year 20 | | 0.44555 | | $2,600,000.00 | $1,158,430 |
| | | Periodic Costs - Year 25 | | 0.36402 | | $1,950,000.00 | $709,839 |
| | | Periodic Costs - Year 30 | | 0.29741 | | $1,850,000.00 | $550,209 |
| | | Periodic Costs - Year 35 | | 0.24298 | | $74,000.00 | $17,981 |
| | | Periodic Costs - Year 40 | | 0.19852 | | $2,600,000.00 | $516,152 |
| | | Periodic Costs - Year 45 | | 0.16219 | | $720,000.00 | $116,777 |
| | | Periodic Costs - Year 50 | | 0.13251 | | $2,300,000.00 | $304,773 |
| | | Annual Costs | | 21.03006 | | $1,180,000.00 | $24,815,471 |
| | | | Subtotal Periodic | | | | $3,876,666 |
| | | | Subtotal Annual | | | | $24,815,471 |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Team | CHECKED<br>TSC Team | BY<br>Jim Jetton, PE, CCE | CHECKED<br>3/7/13 |
| DATE PREPARED<br>Jan-13 | PEER REVIEW / DATE<br>TSC Team | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

BUREAU OF RECLAMATION

# ESTIMATE WORKSHEET



| FEATURE: | PROJECT: |
|---|---|
| Arkansas Valley Conduit<br>Comanche North (Max Month Condition 5)<br><br>(Present Worth) | Fryingpan-Arkansas Project, Colorado |

| | | | |
|---|---|---|---|
| WOID: | AF523 | ESTIMATE LEVEL: | Appraisal |
| REGION: | GP | UNIT PRICE LEVEL: | Jan-11 |
| FILE: | H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\OM&R\Estimate Worksheets\Comanche North\[Comanche North Life Cycle Costs Summary Worksheet.xls]O&M Summary Cost | | |

| PLANT ACCOUNT | PAY ITEM | DESCRIPTION | CODE | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | **Periodic Costs** | | | | | |
| | | Subtotal 1 | | | | | $3,876,666.00 |
| | | Mobilization | 5% | +/- | | | $195,000.00 |
| | | Subtotal 1 with Mobilization | | | | | $4,071,666.00 |
| | | Escalation to Notice to Proceed (NTP) | | | | | $0.00 |
| | | Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP | | | | | $4,071,666.00 |
| | | Design Contingencies | 15% | +/- | | | $628,334.00 |
| | | **CONTRACT COST** | | | | | **$4,700,000.00** |
| | | Construction Contingencies | 25% | +/- | | | $1,200,000.00 |
| | | **FIELD COST** | | | | | **$5,900,000.00** |
| | | Non-Contract Costs | 25% | +/- | | | $1,500,000.00 |
| | | **CONSTRUCTION COST** | | | | | **$7,400,000.00** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | **Annual Costs** | | | | | |
| | | Subtotal 1 | | | | | $24,815,471.00 |
| | | Mobilization | 0% | +/- | | | $0.00 |
| | | Subtotal 1 with Mobilization | | | | | $24,815,471.00 |
| | | Escalation to Notice to Proceed (NTP) | | | | | $0.00 |
| | | Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP | | | | | $24,815,471.00 |
| | | Design Contingencies | 10% | +/- | | | $2,184,529.00 |
| | | **CONTRACT COST** | | | | | **$27,000,000.00** |
| | | Construction Contingencies | 0% | +/- | | | $0.00 |
| | | **FIELD COST** | | | | | **$27,000,000.00** |
| | | Non-Contract Costs | 10% | +/- | | | $3,000,000.00 |
| | | **CONSTRUCTION COST** | | | | | **$30,000,000.00** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03. | | | | | |

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>TSC Team | CHECKED<br>TSC Team | BY<br>Jim Jetton, PE, CCE | CHECKED<br>3/5/13 |
| DATE PREPARED<br>Jan-13 | PEER REVIEW / DATE<br>TSC Team | DATE PREPARED<br>02/25/13 | PEER REVIEW / DATE<br>DCD 3/11/13 |

| 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 |
| Comanche North Alternative (Max Month Condition 5) (Present Worth) Costs Provided by Black & Veatch | FILE: H:\D8170\Common\JJetton\Arkansas Valley Conduit\Comanche North\Water Treatment Plant\April 2013 Information\[OM&R Calcs-WTP Comanche North 04-10-2013.xlsx]Periodic Costs | |

| 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 | $49,600 | $1,043,091 |
| Operations Costs | PWA Factor | 21.03006 | $616,300 | $12,960,826 |
| Chemical Costs | PWA Factor | 21.03006 | $534,500 | $11,240,567 |
| Residuals Costs | PWA Factor | 21.03006 | $127,500 | $2,681,333 |
| Energy Costs for Pumping | PWA Factor | 21.03006 | $99,300 | $2,088,285 |
| **Subtotal Annual (Operation and Maintenance) Costs** | | | | **$30,014,102** |
| Escalation to NTP | | | | $0 |
| Subtotal 1 with Escalation to NTP | | | | $30,014,102 |
| Design Contingencies (+/- 10%) | | | | $2,985,898 |
| Subtotal 3 = Subtotal 2 + Design Contingencies | | | | $33,000,000 |
| Non-Contract Costs (+/- 10%) | | | | $3,000,000 |
| **Total Annual (Operation and Maintenance) Present Worth Costs Rounded (Jan-2011)** | | | | **$36,000,000** |
| **Annual (Operation and Maintenance) Costs Rounded (Jan-2011)** | | | | **$1,700,000** |

- 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:**

1. TSC rounded Black & Veatch's PW costs per Reclamation's rounding guide by Jim Jetton. Rounding check by Shanna Yepez.
2. Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.

| QUANTITIES | | PRICES | |
|---|---|---|---|
| BY<br>Black & Veatch | CHECKED<br>DRK | BY<br>Black & Veatch | CHECKED<br>DRK by Black & Veatch |
| DATE PREPARED<br>03/19/13 | PEER REVIEW / DATE<br>WSS/3-20-2013 | DATE PREPARED<br>03/20/13 | PEER REVIEW / DATE<br>WSS/3-20-2013 by Black & Veatch |

# Attachment G

Information provided by Black & Veatch

### Table G1. Annual OM&R Costs for Action Alternatives[1]

| Alternative | Annual Water Treatment OM&R Costs | | | | | Present Value Water Treatment Plant Subtotal Costs [5] |
|---|---|---|---|---|---|---|
| | Variable Costs[2] | Labor | Maintenance[3] | Total | Unit Cost ($/MG) | |
| **Alternative 1: Comanche North[4]** | $760,900 | $616,300 | $49,600 | $1,426,800 | $473 | $11,501,586 |
| **Alternative 2: Pueblo Dam South** | $760,900 | $840,000 | $63,500 | $1,664,400 | $552 | $25,924,061 |
| **Alternative 3: Joint Use Pipeline North** | $760,900 | $840,000 | $63,500 | $1,664,400 | $552 | $30,076,061 |
| **Alternative 4: Pueblo Dam North** | $760,900 | $840,000 | $63,500 | $1,664,400 | $552 | $25,924,061 |
| **Alternative 5: River South / North** | $760,900 | $840,000 | $63,500 | $1,664,400 | $552 | $25,924,061 |

[1]Annual OM&R costs based on treatment of 3,015 MG (9,253 Af) of water per year for use by AVC participants and Board of Water Works Pueblo production in 2010 of 25,487 Af.
[2]Power, chemicals, and residuals disposal.
[3]Maintenance costs at 1.5 percent of installed equipment cost exclusive of maintenance related labor.
[4]The Whitlock WTP serves approximately 107,000 customers.
[5] Subtotal costs are in January 2011 dollars and do not include mobilization, contingencies, non-contract costs, or interest during construction.

### Table G2. Typical Unit Costs for Drinking Water Treatment[1]

| Population Served | 25th Percentile ($/MG) | Median ($/MG) | 75th Percentile ($/MG) |
|---|---|---|---|
| 50,001 to 100,000 | $383 | $635 | $1,075 |
| 100,001 to 500,000 | $362 | $592 | $873 |

[1]From AWWA, 2007 adjusted to January 2011 using the Engineering News Record 20-Cities Construction Cost Index (ENR CCI).