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Daniel B. Stephens & Associates, Inc.

Memorandum

To: Gregory Patterson, Musick, Peeler & Garrett LLP **Date:** July 14, 2021

From: Jennifer Hill. P.E. (NM, CO, AZ)
Tony Morgan, PG, CHG

Subject: Crestview Mutual Water Company, Camarillo, CA
Pipeline Construction Costs for Alternative Well Site

Executive Summary

This memorandum describes the comparative water pipeline construction costs for connecting a new groundwater extraction well to an existing water reservoir (Reservoir 3) in the Crestview Mutual Water Company (CMWC) service area. A location on Alviso Drive is under consideration by Crestview for Well 7. A Crestview stakeholder has suggested an alternative location on the Las Posas golf course.

The Alviso Drive location is adjacent to the existing water system distribution pipeline; therefore, the cost of connecting the well to the system was estimated as $47,500. The estimated cost for constructing a 6,000- to 7,130-foot pipeline to connect to a well at the Las Posas golf course alternative location is estimated between $1.34 million and $1.47 million, depending on the route selected, and will impact neighboring residents and golf course operations for 30 to 60 days during construction and installation.

Findings

- Construction of a pipeline from a proposed well site on the Las Posas golf course to the Crestview water system reservoir is anticipated to cost between $1.34 million (Alternative 2) and $1.47 million (Alternative 1).
- The less expensive option of the two golf course options (Alternative 2) may incur additional costs due to disruption of the golf course activities as the pipeline construction progresses across the greens and in front of the golf club building. It is not known if loss of income compensation will be required by the golf course to mitigate their operational disruption.
- The estimated costs to construct a pipeline from a new well constructed at the Alviso Drive site to the nearby existing pipeline is approximately $47,500.

Background

An alternative well site location has been proposed for a new well to serve the Crestview Mutual Water District (the District) by a Crestview stakeholder. That well site is located on the Las Posas golf course, as shown on Figure 1, and would connect to the existing water system at the intersection of Fairway Drive and Valley Vista Drive to an existing 8-inch pipe that fills Reservoir 3. Reservoir 3 is located at 602 Valley Vista Drive. The District provided the overflow elevation of 575 feet above mean sea level (feet msl) for the reservoir, which we used in our analysis as the high water level in the reservoir.

Analysis

The well is proposed to be located on the golf course at an approximate ground elevation of 253 feet msl. The pipeline will connect to the existing 8-inch-diameter water transmission main that fills Reservoir 3 at Fairway Drive and Valley Vista Drive at approximate elevation of 502 feet msl. The pressure in the pipeline at that location will reflect the water level elevation. At a water level of 575 feet msl, the pressure at the tie-in is estimated to be 32 pounds per square inch (psi).

Based on available mapping of the area, we evaluated two pipeline alignments from the well site to the point of connection. The alignment with the least impact to the golf course greens is to follow Fairway Drive (Alternative 1); however, that alignment is not the most direct. Therefore, we selected a second, shorter alignment that crosses the golf course to Deseo Avenue, passing in front of the Las Posas Country Club before following Fairway Drive to the connection point (Alternative 2). These two alternative alignments are shown on Figure 1.

The golf club is served irrigation water for use near the clubhouse by the Crestview water system. This irrigation water pipeline is not a viable delivery system for water from the proposed Las Posas golf course site to the reservoir. The pipeline is in the wrong pressure zone to convey water to the reservoir, and the connection is also undersized (4-inch pipe) for the proposed well discharge of 1,000 gallons per minute (gpm).

For both alignments, we prepared a profile showing the existing ground elevations, the required hydraulic grade line to convey water to Reservoir 3, and the corresponding operating pressures along the pipeline. From this analysis, it appears that a total dynamic head (TDH) of 400 feet is required to boost the water from the well site to the reservoir. This TDH does not include groundwater lift; it comprises the static lift based on the elevation difference between the

wellhead and the reservoir of 317 feet plus pipe losses of 82 feet for Alternative 1 and 75 feet for Alternative 2.

For this analysis, we assumed a pumping rate of 1,000 gpm. The corresponding horsepower (hp) required for both alternatives is about 135 hp. Based on an electrical cost of $0.32 per kwH (an average of actual costs paid by the District for Well 4 and 6 for FY20), and pumping 12 hours per day, that corresponds to an additional ongoing annual electric cost of approximately $141,000 to deliver water from the alternative well site to the reservoir.

For a flow of 1,000 gpm, a 10-inch pipe is recommended based on anticipated flow velocities and head losses. The total length of new 10-inch pipe for Alternative 1 is approximately 7,130 linear feet and for Alternative 2 is approximately 6,000 linear feet. For Alternative 1, the total head loss in the 10-inch pipe is 44 feet. For Alternative 2, the total head loss in the 10-inch pipe is 37 feet. The total head loss in the 8-inch pipe (approximately 2,100 feet in length) from the proposed point of connection to the reservoir is 38 feet.

Preliminary Opinion of Probable Cost

We prepared a cost estimate for each alignment. These costs are based on 10-inch PVC pipe and assume a 5-foot pavement replacement width over the new pipeline wherever the pipe follows the roadway alignment. The unit price of 10-inch PVC pipe, and therefore the overall construction cost, is heavily impacted by current plastic pipe prices.

The estimated costs include contractor mobilization, demobilization, pipe installation cost, pavement replacement, and restoration of the golf course, plus 25 percent contingency, and 10 percent for engineering survey and design (Tables 1 and 2). The cost estimates have been adjusted for California prevailing wages. The total cost for Alternative 1 is $1.47 million and the total estimated cost for Alternative 2 is $1.34 million.

Assuming between 200 and 300 feet per day for pipeline installation, the construction duration is estimated between 30 and 60 days, including traffic control, staging and general disruption. The construction is expected to disrupt business to the golf club for a portion of that duration due to the need to cross the golf course and will impact access to the golf course as well.

For comparison purposes, the estimated costs to connect a new well constructed at the Alviso Drive site to the existing nearby water pipeline is approximately $47,500 (Travis, 2021).

Reference

Travis Agricultural Construction (Travis). 2021. Letter from Jack McCormick to Crestview Water regarding 191 Alviso Drive. May 24, 2021.

Source: Aerial photo, ESRI, 11/14/2018

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4/16/2021 DB20.1430

CRESTVIEW MUTUAL WATER COMPANY
Proposed Pipeline

Figure 1

K:\PROJECTS\LITIGATION SERVICES\DB20.1430.00 CRESTVIEW MUTUAL WC PATHOGEN TRAVEL TIME\GIS\MXDS\FIGURE1_PROPOSED_PIPELINES.MXD

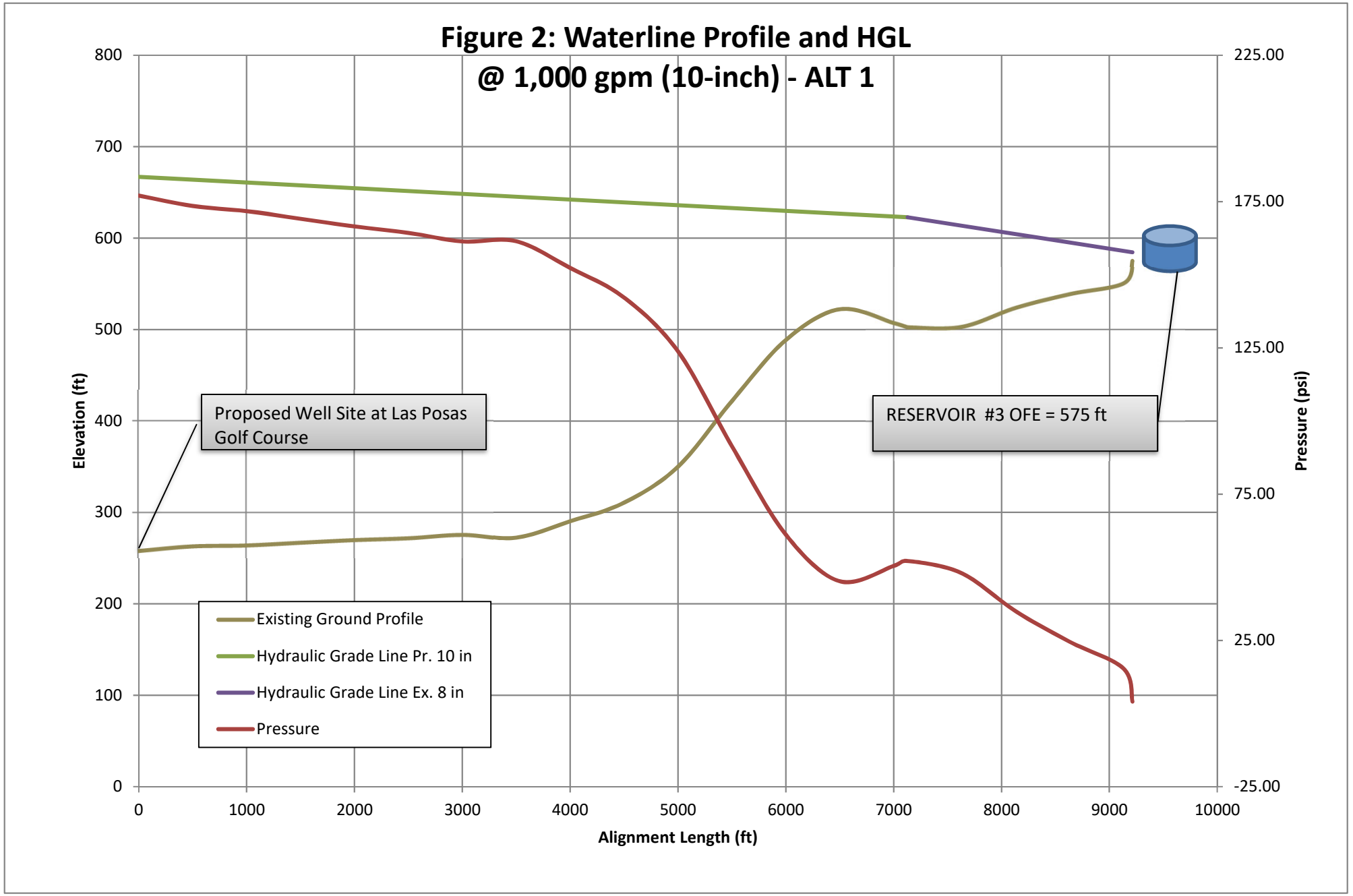
Figure 2: Waterline Profile and HGL
@ 1,000 gpm (10-inch) - ALT 1
Elevation (ft)
Pressure (psi)
Alignment Length (ft)
800
700
600
500
400
300
200
100
0
225.00
175.00
125.00
75.00
25.00
-25.00
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Proposed Well Site at Las Posas Golf Course
RESERVOIR #3 OFE = 575 ft
Existing Ground Profile
Hydraulic Grade Line Pr. 10 in
Hydraulic Grade Line Ex. 8 in
Pressure

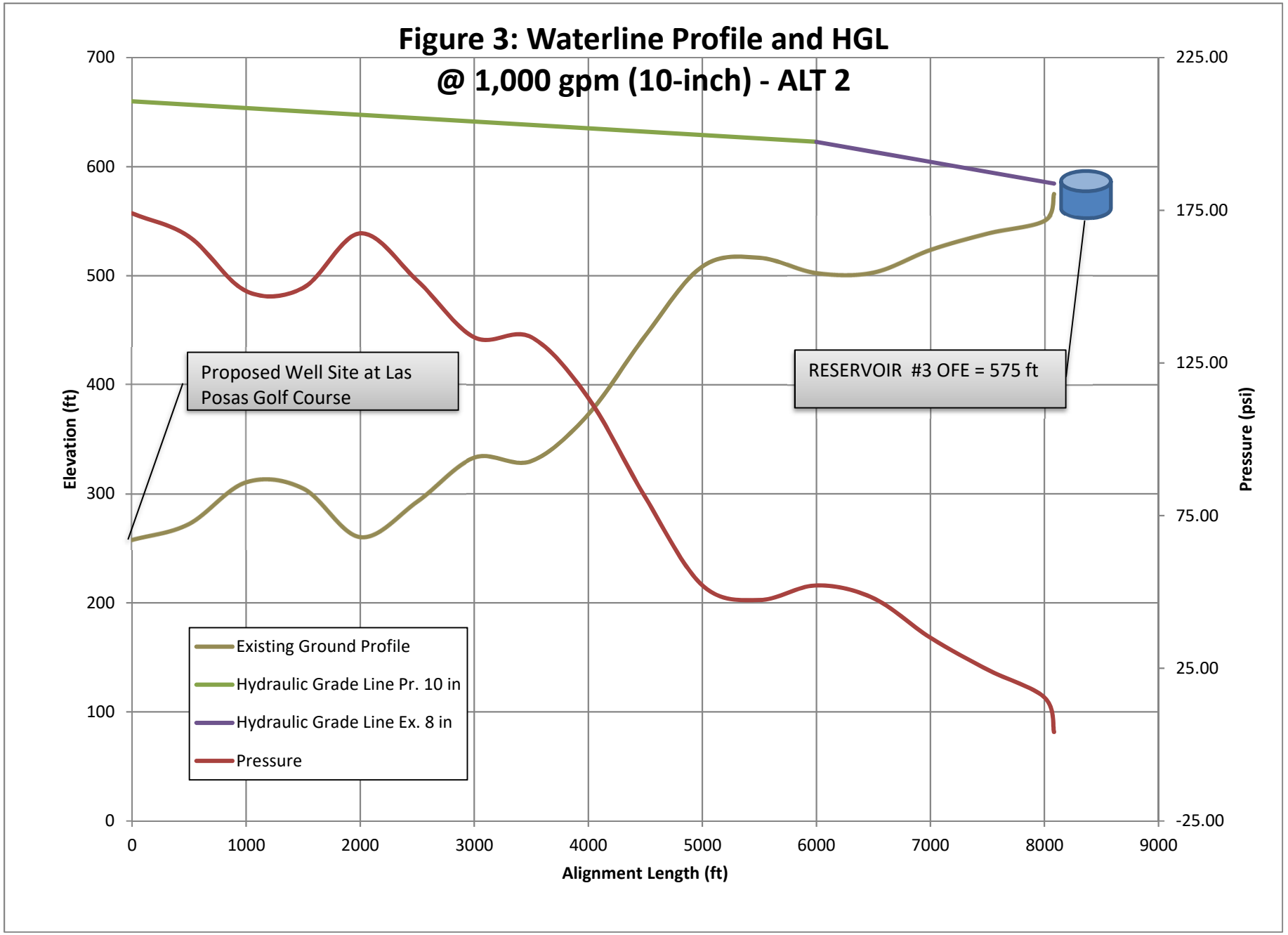
Figure 3: Waterline Profile and HGL
@ 1,000 gpm (10-inch) - ALT 2
Elevation (ft)
Pressure (psi)
Alignment Length (ft)
700
600
500
400
300
200
100
0
225.00
175.00
125.00
75.00
25.00
-25.00
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Proposed Well Site at Las Posas Golf Course
RESERVOIR #3 OFE = 575 ft
Existing Ground Profile
Hydraulic Grade Line Pr. 10 in
Hydraulic Grade Line Ex. 8 in
Pressure

Table 1

Crestview Mutual Water District

4/16/2021

Engineer's Opinion of Probable Cost - Alternatives Analysis

prepared by : CLK

ALTERNATIVE 1 - Fairways Drive alignment

checked by: JEH

Item No	Description	Quantity	Unit	Unit Price	Extended Price
Capital Costs					
1	Contractor mobilization/demobilization	6%	%	$ 875,160	$ 52,510
2	Construction surveying and staking	2%	%	$ 875,160	$ 17,503
3	Traffic control	1%	%	$ 875,160	$ 8,752
4	10-inch PVC C-900 SDR 18, Class 150 water line, CIP	7130	LF	$ 72	$ 513,360
5	Pavement Replacement	3,400	SY	$ 77	$ 261,800
6	Remove and restore golf course	1000	LF	$ 100	$ 100,000
				Subtotal	**$ 953,924**
		25%		Contingency	$ 238,481
				Subtotal Capital Costs	**$ 1,192,406**
		10%		Design	$ 119,241
		2%		Permitting	$ 23,848
				Subtotal	**$ 1,335,494**
		10%		Construction Oversight	$ 133,549
				PROJECT TOTAL	**$ 1,469,044**

Table 2

Crestview Mutual Water District

4/16/2021

Engineer's Opinion of Probable Cost - Alternatives Analysis

prepared by : CLK

ALTERNATIVE 2 - Deseo Avenue alignment

checked by: JEH

Item No	Description	Quantity	Unit	Unit Price	Extended Price
Capital Costs					
1	Contractor mobilization/demobilization	6%	%	$ 801,400	$ 48,084
2	Construction surveying and staking	2%	%	$ 801,400	$ 16,028
3	Traffic control	1%	%	$ 801,400	$ 8,014
4	10-inch PVC C-900 SDR 18, Class 150 water line, CIP	6000	LF	$ 72	$ 432,000
5	Pavement Replacement	2200	SY	$ 77	$ 169,400
6	Remove and restore golf course	2000	LF	$ 100	$ 200,000
				Subtotal	**$ 873,526**
		25%		Contingency	$ 218,382
				Subtotal Capital Costs	**$ 1,091,908**
		10%		Design	$ 109,191
		2%		Permitting	$ 21,838
				Subtotal	**$ 1,222,936**
		10%		Construction Oversight	$ 122,294
				PROJECT TOTAL	**$ 1,345,230**