

Appraisal Alamosa Ditch Carrying Capacity Easement

Prepared for Clients:
Katie M. Gray
Faegre Drinker Biddle & Rath, LLP
and
Erich Schwiesow, Esq.
City of Alamosa, Colorado

For Intended Users
Clients

Date of Value:
November 25, 2020

Date of Report:
June 2, 2021



Wright Water Engineers, Inc.
2490 West 26th Avenue, Suite 100A
Denver, CO 80211

201-074.000

Blank Page Intentional



Wright Water Engineers, Inc.

2490 West 26th Ave., Suite 100A
Denver, Colorado 80211
(303) 480-1700 TEL
(303) 480-1020 FAX

www.wrightwater.com
e-mail: wwe@wrightwater.com

June 2, 2021

Via Email

Katie M. Gray, Esq.
Faegre Drinker Biddle & Reath, LLP
1144 15th Street, Suite 3400
Denver, CO 80202

Erich Schwiesow, Esq.
City of Alamosa
300 Hunt Street
Alamosa, CO 81101

Re: Appraisal Alamosa Ditch Carrying Capacity Easement

Dear Ms. Gray and Mr. Schwiesow:

Attached is the Appraisal of the Alamosa Ditch Carrying Capacity Easement which the City of Alamosa seeks to acquire from the Hickory-Jackson Ditch Company. The permanent ditch carrying capacity easement includes six discharge locations between the approximately 3.23 miles reach length between CR 107S and the south line of the N1/2 Section 14, Township 37 North, - Range 10 East of the New Mexico Principal Meridian, for a combined total maximum discharge of 18 cubic feet per second (cfs).

As of the effective date of November 25, 2020, the reasonable market values of are as follows:

Value of the Larger Parcel	\$1,408,000
Value of the Property Being Taken	\$ 47,100
Value of the Remaining Property Before the Taking	\$1,360,900
Value of the Remaining Property After the Taking	\$1,360,900
Value of the Permanent Easement	\$ 47,100

Sincerely,
WRIGHT WATER ENGINEERS, INC.

By 

Patricia K. Flood, P.E., Senior Consultant
Certified General Appraiser No. CG01318801

Z:\Project Files\20\201-074\201-074.000\Engineering\7. Appraisal\Transmittal Letter.docx

Blank Page Intentional

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION.....	1
1.1 Appraiser's Certification	1
1.2 Assumptions and Limiting Conditions	3
1.3 Summary of Salient Facts and Conclusions	4
1.4 Scope of Work.....	6
2.0 IDENTIFICATION OF THE DITCH CARRYING CAPACITY EASEMENT.....	9
2.1 Alamosa Ditch Water Right.....	12
2.2 Legal Description	12
2.3 History of Use.....	15
2.4 Alamosa Ditch Carrying Capacity Easement.....	18
2.5 Stormwater Discharge.....	21
2.6 Larger Parcel.....	22
3.0 PURPOSE OF THE APPRAISAL	23
4.0 INTENDED USE AND INTENDED USERS	23
5.0 EXPOSURE TIME	23
6.0 DATE OF VALUATION	23
7.0 MARKET AREA DESCRIPTION.....	24
7.1 City of Alamosa and Alamosa County	24
7.2 Hydrology	25
7.3 Topography	28
7.4 Water Rights Administration	30
8.0 HIGHEST AND BEST USE BEFORE THE TAKING.....	30
8.1 Legally Permissible	30
8.2 Physically Possible.....	31
8.3 Financially Feasible.....	31
8.4 Maximally Productivity.....	31
9.0 VALUE OF THE LARGER PAREL BEFORE THE TAKING	32
9.1 Cost Approach	32
9.1.1 Land As Vacant.....	32
9.1.2 Replacement Cost New Less Depreciation	35
9.2 Sales Comparison Approach Before Ditch Carrying Capacity Easement Taking	37
9.3 Income Capitalization Approach Before Taking.....	44
9.4 Reconciliation Value Larger Parcel Before Taking	44
10.0 VALUE EASEMENT AS PART OF LARGER PARCEL BEFORE TAKING.....	44
11.0 IDENTIFICATION OF DITCH CARRYING CAPACITY EASEMENT TAKING	45
12.0 HIGHEST AND BEST USE AFTER TAKING.....	45
12.1 Financially Feasible.....	46
12.2 Maximally Productivity.....	46

13.0	VALUE AFTER THE TAKING.....	47
13.1	Cost Approach After Ditch Carrying Capacity Easement Taking	47
13.2	Sales Comparison Approach After Taking.....	48
13.3	Income Capitalization Approach After Acquisition	48
13.4	Reconciliation Remaining Value After Taking.....	48
14.0	ALLOCATION OF JUST COMPENSATION	49
15.0	QUALIFICATIONS OF APPRAISER.....	50

PHOTOGRAPHS

TABLES

Table 1	Alamosa Ditch Water Right	12
Table 2	Alamosa Ditch Diversion Records.....	16
Table 3	Existing Ditch Capacity by Cross Section Location	18
Table 4	Alamosa Ditch Carrying Capacity Easement Length by Reach	20
Table 5	Drainage Areas and Expected Annual Discharge.....	21
Table 6	Alamosa Population Forecast	24
Table 7	Precipitation Alamosa WSO, AP (Sta. 50130).....	27
Table 8	Highest One-Day Precipitation Amounts	28
Table 9	Sales of Vacant Dry Land	34
Table 10	Alamosa Ditch Cost Approach Before Taking	36
Table 11	Sales of Vacant Dry Land	38
Table 12	Summary Grid of Sales Comparisons	39
Table 13	Sales Comparison 1.....	41
Table 14	Sales Comparison 2.....	42
Table 15	Sales Comparison 3.....	43
Table 16	Value of Easement as Part of the Larger Parcel Before Taking.....	45
Table 17	Alamosa Ditch Cost Approach After Taking	47
Table 18	Allocation of Compensation	49

FIGURES

Figure 1	Vicinity Map Alamosa Ditch.....	7
Figure 2	Existing and Proposed Discharge Alamosa Ditch Locations	10
Figure 3	Alamosa Ditch Location along CR 8S	11
Figure 4	Alamosa Ditch Filing Map 12694.....	13
Figure 5	Extension of Alamosa Ditch Filing Map 17349	14
Figure 6	Alamosa Ditch Irrigated Lands 1998	17
Figure 7	Alamosa Ditch Lengths by Reach	19
Figure 8	Peak Annual Streamflow Rio Grande at Alamosa	25
Figure 9	Market Area	29
Figure 10	Location of Vacant Land Sales.....	33
Figure 11	Sales Comparison A	35
Figure 12	Location of Land & Water Sales Comparisons	40

ADDENDA

- A Ditch Carrying Capacity Easement City Seeks to Acquire
- B May 26, 1983 Agreement. City of Alamosa and Hickory-Jackson Ditch Company.
- C. Hickory Jackson Ditch Cross Sections
- D. June 1, 2020 Reynolds Engineering Company Memorandum to Harry Reynolds Re:
Drainage Calculations for Areas Tributary to The Hickory Jackson Ditch
- E January 19, 2019 Reynolds Engineering Company
- F. Resume Patricia Flood

Blank Page Intentional

Appraisal Alamosa Ditch Carrying Capacity Easement

1.0 INTRODUCTION

1.1 Appraiser's Certification

Patricia K. Flood, the undersigned, certifies that, to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.
4. I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment. Staff from Wright Water Engineers, Inc. Durango office prepared a Water Efficiency Plan for the City.
5. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
6. My engagement in this assignment was not contingent upon developing or reporting a predetermined result.
7. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
8. My analyses, opinions, and conclusions were developed, and the appraisal report was prepared in general conformance with the Appraisal Standards Board's *Uniform Standards of Professional Appraisal Practice* (USPAP).
9. I made a physical inspection of the subject Alamosa Ditch Carrying Capacity Easement (Easement) reach on October 13, 2020 and the Hickory Jackson Ditch Company was offered the opportunity to accompany me on the property inspection but did not do so.
10. I relied upon the findings of Martin Reynolds, Reynolds Engineering Company, regarding the stormwater runoff rates and volumes, the survey of Alamosa Ditch cross sections, and the calculations of Alamosa ditch capacities.
11. Kenneth R. Wright, P.E., provided professional engineering assistance with regard to water rights and Jonathan E. Jones, P.E. with regard to permitting and regulatory items.

Appraisal Alamosa Ditch Carrying Capacity Easement

Based upon the research and analyses outlined in the report, it is my opinion, as of the effective date of November 25, 2020 the reasonable market value of the Easement is:

Value of the Larger Parcel	\$1,408,000
Value of the Property Being Taken	\$ 47,100
Value of the Remaining Property Before the Taking	\$1,360,900
Value of the Remaining Property After the Taking	\$1,360,900
Value of the Permanent Easement	\$ 47,100

WRIGHT WATER ENGINEERS, INC.

By: 
Patricia K. Flood, P.E., Senior Consultant
Certified General Appraiser No. CG01318801

1.2 Assumptions and Limiting Conditions

This appraisal has been developed with the following general assumptions and limiting conditions:

1. The appraiser has reviewed the information provided by others and is believed to be reasonable and reliable.
2. The exact nature of the Alamosa Ditch rights-of-way have not been fully ascertained; however, it is judged that the Ditch rights-of-way provide adequate access to construct, operate, clean, maintain, repair, and replace the ditch and appurtenant structures, and to enter onto the property for such operations.
3. The subject Easement (Addendum B) is described in general terms. The appraiser has not reviewed all documents relating to the subject property interest. No responsibility is assumed for matters including legal or title considerations. Title to the properties is assumed to be good and marketable. The subject Easement is appraised free and clear of any and all liens or encumbrances.
4. With regard to competency, the appraiser, Patricia Flood, has been appraising water rights since 1985 on a regular basis in conjunction with my work as a professional engineer working in the area of water rights. I obtained my Certified General appraiser certification in 1996. I am familiar with the subject area having performed appraisals of water rights and water infrastructure in the area previously. I was a co-author of the chapter on Appraising Water Rights in the *Water Rights Handbook for Colorado Conservation Professionals* in year 2006 (Revised Edition). I have made numerous Continuing Legal Education presentations on the subject of Water Rights Appraisals. Kenneth Wright and our firm, Wright Water Engineers, Inc., has had long involvement in the Rio Grande Basin with work dating back to the early 1970s.
5. It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations.
6. The appraiser, by reason of this appraisal, is not required to give further consultation or testimony or to be in attendance in court with reference to the property in question, unless arrangements have been previously made.
7. Possession of this report, or a copy thereof, does not carry with it the right of publication.
8. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser, or the firm with which the appraiser is connected) shall be disseminated without the prior written consent and approval of the appraiser.

1.3 Summary of Salient Facts and Conclusions

Location	The Alamosa Ditch (aka Hickory Jackson Ditch) diverts from Rock Creek in Section 18, Township 37 North (T37N), Range 10 East (R10E) of the New Mexico Principal Meridian (NMPM), Alamosa County, Colorado. The Alamosa Ditch located along the south side of Alamosa County Road 8 South (CR 8S) parallels the road from its diversion from Rock Creek to U.S. Highway 285 (Highway 285), a distance of approximately 2.25 miles. From Highway 285, the Alamosa Ditch parallels 14 th Street a distance of approximately one mile before the ditch turns to the southeast a distance of approximately 4.2 miles (as the crow flies) with its confluence with Rock Creek.																													
Clients	Katie M. Gray, Esq. Faegre Drinker Biddle & Reath, LLP 1144 15 th Street, Suite 3400 Denver, CO 80202 Erich Schwiesow, Esq. City of Alamosa 300 Hunt Street Alamosa, CO 81101																													
Type of Report	Appraisal report, not a restricted report																													
Effective Date	November 25, 2020																													
Report Date	June 2, 2021																													
Subject Ditch Carrying Capacity Easement (Easement)	The permanent Easement in the Alamosa Ditch includes six discharge locations between the approximately 3.23 miles reach length between CR 107S and the south line of the N1/2 Section 14-T37N-R10E, NMPM, for a combined total discharge of 18 cubic feet per second (cfs). The City will restore the capacity of the Alamosa Ditch in the Easement reach upstream of Highway 285 to 34 cfs.																													
Intended User	Clients																													
Purpose	Determine reasonable current market value of the Ditch Carrying Capacity Easement the City Seeks to acquire from the Hickory-Jackson Ditch Company.																													
Intended Use	Our understanding is that the appraisal will be used by the City in connection with its negotiations with the Hickory-Jackson Ditch Company.																													
Larger Parcel Identification	The Larger Parcel includes the Alamosa Ditch water rights, Ditch infrastructure, and the Ditch right-of-way. The Alamosa Ditch water rights are summarized as follows: <table><tr><td>Adjudication Date</td><td>Appropriation Date</td><td>Priority Admin No</td><td>Priority No.</td><td>Associated Case Numbers</td><td>Amount, cfs</td></tr><tr><td>10/15/1934</td><td>9/24/1919</td><td>25468.00000</td><td>1934-11</td><td>10/15/1934</td><td>26.78</td></tr><tr><td>1/27/1960</td><td>6/15/1943</td><td>34133.00000</td><td>1959-28</td><td>1/27/1960</td><td>50.00</td></tr><tr><td colspan="5">Total</td><td>76.78</td></tr></table>						Adjudication Date	Appropriation Date	Priority Admin No	Priority No.	Associated Case Numbers	Amount, cfs	10/15/1934	9/24/1919	25468.00000	1934-11	10/15/1934	26.78	1/27/1960	6/15/1943	34133.00000	1959-28	1/27/1960	50.00	Total					76.78
Adjudication Date	Appropriation Date	Priority Admin No	Priority No.	Associated Case Numbers	Amount, cfs																									
10/15/1934	9/24/1919	25468.00000	1934-11	10/15/1934	26.78																									
1/27/1960	6/15/1943	34133.00000	1959-28	1/27/1960	50.00																									
Total					76.78																									

Physical Access	Access to the Easement reach is from street rights of way.										
Highest and Best Use	Before the Ditch Carrying Capacity Easement Taking: The highest and best use for the Alamosa Ditch Larger Parcel is irrigation use and the conveyance of stormwater at 3 locations between U.S. Highway 285 and Ross Avenue. After the Ditch Carrying Capacity Easement Taking: The highest and best use for the Alamosa Ditch is irrigation use and stormwater ditch carrying capacity between its intersection with County Road 107 South (CR 107S) and the south line of the N1/2 Section 14, T37N, R10E, NMPM..										
Reasonable Market Value	As of the effective date of November 25, 2020, the reasonable market values are as follows: <table> <tr> <td>Value of Alamosa Ditch Larger Parcel</td><td>\$1,408,000</td></tr> <tr> <td>Value of the Easement Taking as part of The entire property</td><td>\$ 47,100</td></tr> <tr> <td>Value of the Remaining Property before the Taking</td><td>\$1,360,900</td></tr> <tr> <td>Value of the Remaining Property after the Taking</td><td>\$1,360,900</td></tr> <tr> <td>Permanent Ditch Carrying Capacity Easement</td><td>\$ 47,100</td></tr> </table>	Value of Alamosa Ditch Larger Parcel	\$1,408,000	Value of the Easement Taking as part of The entire property	\$ 47,100	Value of the Remaining Property before the Taking	\$1,360,900	Value of the Remaining Property after the Taking	\$1,360,900	Permanent Ditch Carrying Capacity Easement	\$ 47,100
Value of Alamosa Ditch Larger Parcel	\$1,408,000										
Value of the Easement Taking as part of The entire property	\$ 47,100										
Value of the Remaining Property before the Taking	\$1,360,900										
Value of the Remaining Property after the Taking	\$1,360,900										
Permanent Ditch Carrying Capacity Easement	\$ 47,100										

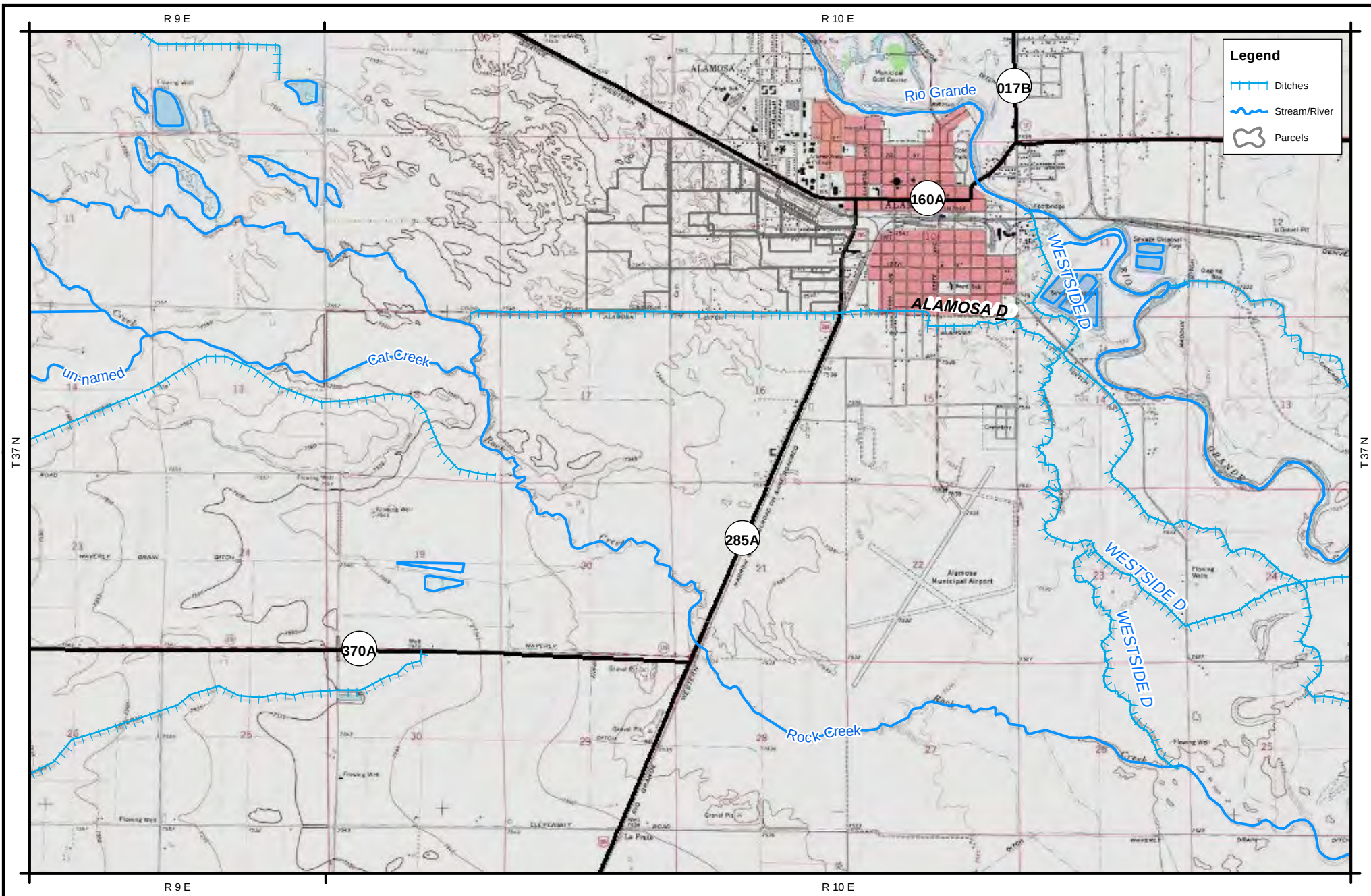
1.4 Scope of Work

Wright Water Engineers, Inc. (WWE) was engaged to perform a valuation of the perpetual Easement (Addendum A) of ditch carrying capacity easement to convey stormwater in the Alamosa Ditch. The valuation problem is to determine the reasonable market value of the Ditch Carrying Capacity Easement Taking. The value sought is the impact of the Easement on the Alamosa Ditch, not the value of the Easement to the City.

The Alamosa Ditch is owned by the Hickory-Jackson Ditch Company (Ditch Company) and diverts from Rock Creek, a tributary to the Rio Grande. The Ditch Company also owns the Westside Ditch which diverts from the Rio Grande. Both of the ditches irrigate lands located between the Rio Grande and Rock Creek. The location of the Alamosa Ditch is shown on the Vicinity Map Figure 1.

The Alamosa Ditch is also commonly referred to as the Hickory-Jackson Ditch. The ditch is located south of Alamosa County Road 8 South (CR 8S), also known as the Coop Road. The ditch generally parallels CR 8S for approximately 2.25 miles from its diversion from Rock Creek to U.S. Highway 285 (Highway 285). After culvert crossings under Highway 285 and the railroad, the Alamosa Ditch parallels 14th Street to the Old Airport Road (CR 110S) and then turns south and east with return flows from its irrigation to Rock Creek and to the Rio Grande. The City of Alamosa (City) and Ditch Company entered an Agreement dated May 26, 1983 (1983 Agreement, Addendum B) which outlined terms and conditions for the City's use of the Alamosa Ditch to remove stormwater. Two of the three contemplated discharge pipelines to the ditch have been installed, one at Railroad Avenue and one at 14th and Alamosa. Under terms of the 1983 Agreement, the City is to cut weeds on the tops and the outside slope of the ditch and to spray weeds (Ditch Company to provide the chemicals) at the sole expense of the City.

The City requires a stormwater outfall for public health, safety, and welfare. An additional stormwater carrying capacity discharge reach is required to manage stormwater runoff from existing and future development areas in the City and in potential future development areas.



Path: Z:\Project Files\201-074\201-074.000\CAD-GIS\GIS\01_mxd\Fig_1_Vicinity_Map_Alamosa_Ditch.mxd

The scope of work for this appraisal has included the following tasks:

1. Historical diversion records and acres of irrigation for the Alamosa Ditch (aka the Hickory-Jackson Ditch) from the Colorado Decision and Support System (CDSS) were tabulated. The consumptive use of the Alamosa Ditch was estimated.
2. Reviewed the Alamosa Ditch decrees and the Ditch Company Articles of Incorporation.
3. Patricia Flood and Jonathan Jones of WWE made a site visit on October 13, 2020 to observe the Alamosa Ditch.
4. Topographic mapping for Alamosa Ditch tributary area and the irrigated area were reviewed.
5. Interviewed members of the City of Alamosa public works department. Reviewed documents provided to WWE regarding stormwater planning. Reviewed documents prepared by Martin Reynolds, engineering consultant to the City, and interviewed Mr. Reynolds. Have relied upon the estimates of ditch carrying capacity of engineering consultant Martin Reynolds of Reynolds Engineering Company.
6. Have reviewed the Ditch Carrying Capacity Easement the City seeks to acquire (Addendum A).
7. Have reviewed the 1983 Agreement (Addendum B) between the City and the Hickory-Jackson Ditch Company to remove stormwater.
8. Defined the local area for market analysis.
9. Performed a larger parcel analysis with the conclusion that the larger parcel is the Alamosa Ditch water right, the Ditch infrastructure, and the Ditch rights-of-way. The larger parcel components have the same highest and best use.
10. The highest and best use of the Alamosa Ditch Before the Easement Taking and After the Easement Taking was analyzed for the Before and After conditions including four steps: 1) legally permissible, 2) physically possible, 3) financially feasible, and 4) maximally profitable use.
11. In the sales comparison approach to value, a search was made to identify property transactions with water rights and vacant land sales through review of publicly available records and review of WWE files. A cost approach was performed to develop an estimate of the Alamosa Ditch rights of way and infrastructure value, but the sales comparison approach includes the water rights value. The income approach to value was considered but was not used.
12. Performed reconciliation analyses to arrive at the opinion of value.
13. Prepared written appraisal report to present opinion of value and supporting data.

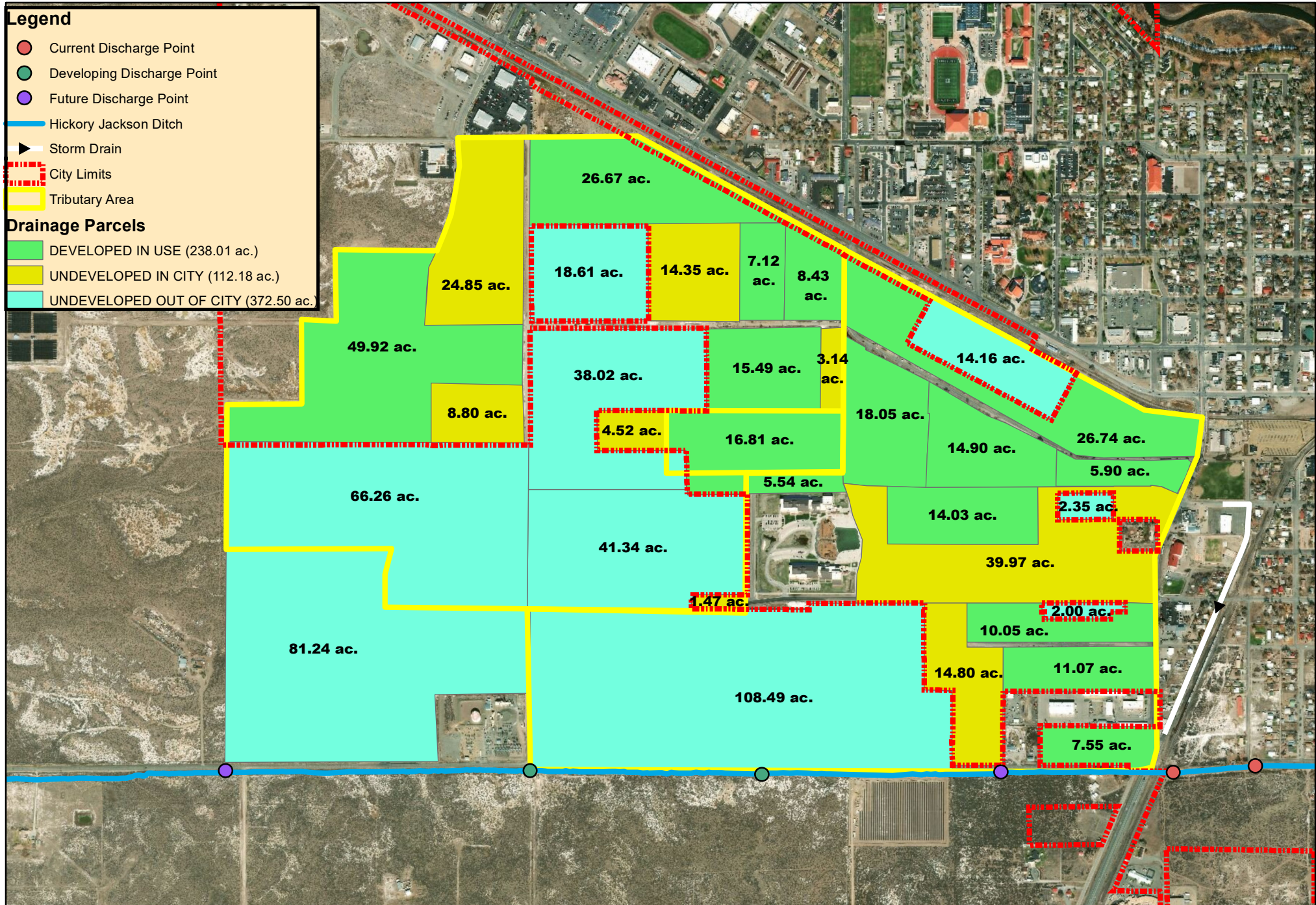
2.0 IDENTIFICATION OF THE DITCH CARRYING CAPACITY EASEMENT

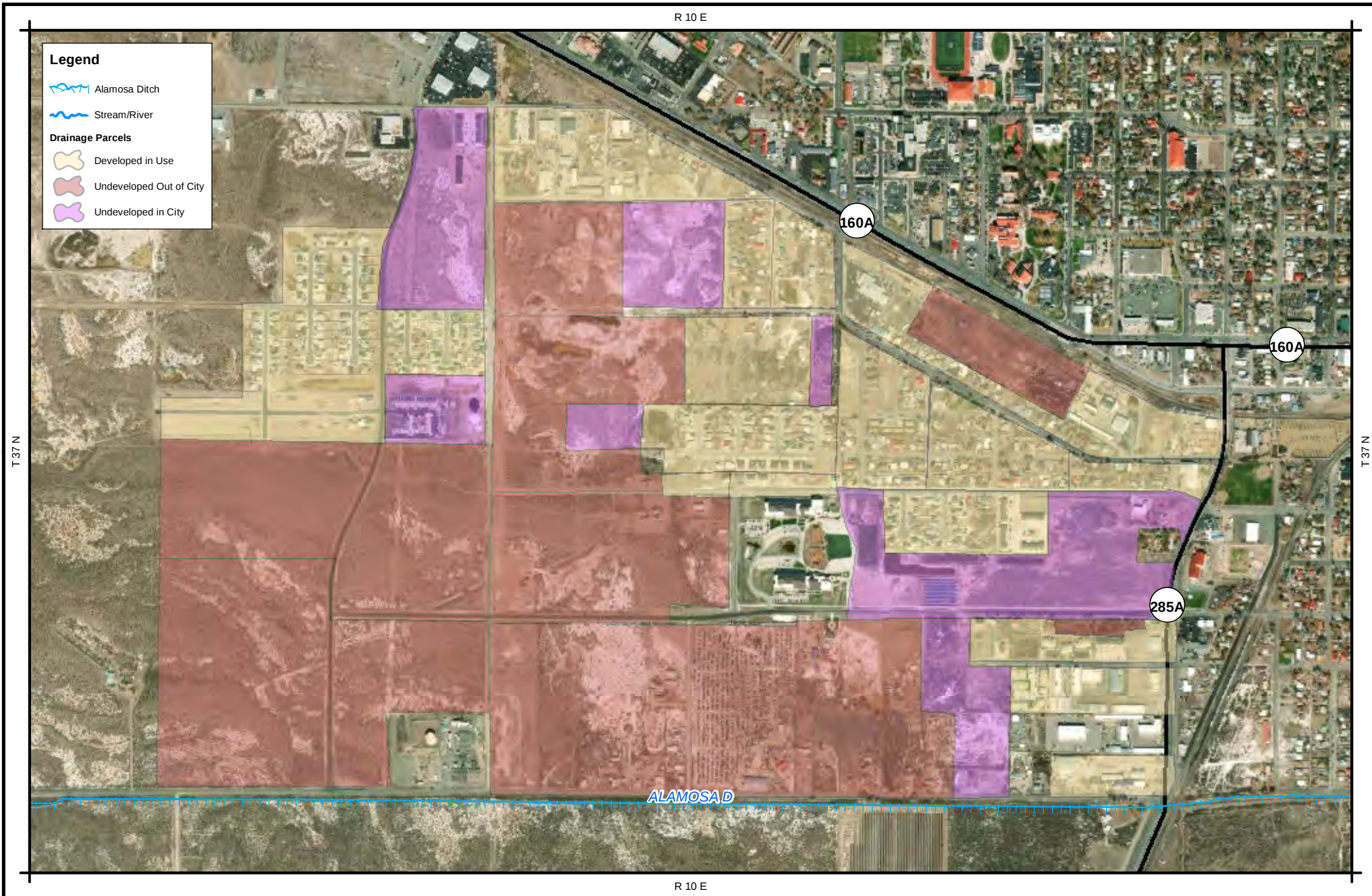
The City has identified future growth areas along with existing development areas west of Highway 285 and north of CR 8S as shown on Figure 2. An aerial image is shown on Figure 3. To better serve existing development and to serve future growth, the City needs a defined outfall for storm drainage. The storm drainage discharge from these areas will be upstream of the reach of the Alamosa Ditch addressed in the 1983 Agreement. The City is seeking an easement for a total of six discharge points (including existing discharge points) into the Alamosa Ditch as shown on Figure 2. Similar to the terms outlined in the 1983 Agreement, the City would be responsible for the maintenance of the ditch in the easement reach. The City would restore the ditch capacity west of Highway 285 in the easement reach. The Ditch Carrying Capacity Easement the City seeks to acquire is given in Addendum A.

The 2021 Agreement outlines water quality testing for certain parameters with the results of the testing to be compared to the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission (WQCC) Applicable Standards for Irrigation Water. If the storm water discharge would cause water in the ditch to exceed standards, the City would take steps to bring the discharge into compliance.

The 1983 Agreement lists a concern with excess stormwater causing winter freeze ups issues on pasture lands. The 2021 Agreement would allow the City to install water measurement devices and infrastructure to deliver water out of the ditch to the Rio Grande, if necessary, to satisfy the Division 3 Engineer or State Engineer or to eliminate winter freezing issues for pasture lands.

HICKORY JACKSON DITCH





Path: Z:\Project Files\20\201-074\201-074.000\CAD-GIS\GIS\01_mxd\Figure_1A_Overview_Map.mxd

2.1 Alamosa Ditch Water Right

The Alamosa Ditch has two water right priorities which together total 76.78 cubic feet per second (cfs) as summarized in Table 1. The water rights are decreed for irrigation use.

Table 1
Alamosa Ditch Water Right

Structure Name Alamosa Ditch

WDID 2000505

Water Source Rock Creek

Diversion Location NE1/4NE1/4 Section 18, T37N, R10E, NMPM

Adjudication Date	Appropriation Date	Priority Admin No	Priority No	Case Numbers	Amount, cfs
10/15/1934	9/24/1919	25468.00000	1934-11	10/15/1934	26.78
1/27/1960	6/15/1943	34133.00000	1959-28	1/27/1960	50.00
Total					76.78

2.2 Legal Description

The Alamosa Ditch “headgate is located at a point on the north bank of Rock Creek from which it derives its supply of water, whence the North East corner of Section No. 18 Township 37 North, Range 10 East of the New Mexico Principal Meridian bears N. 79° 28’ E. 1265.0 feet.” A copy of the Alamosa Ditch Filing Map 12694, accepted by the State Engineer November 6, 1919, is given in Figure 4. The map shows the Alamosa Ditch lying south of the north section line of Sections 18, 17, and 3/4ths of Section 16 with the ditch then turning north, east, and northeast to an arroyo. The current ditch alignment does not turn north from CR 8S and instead continues to the east to Highway 285. After culvert crossings under Highway 285 and the railroad, the Alamosa Ditch parallels 14th Street to the Old Airport Road (CR 110S) and then turns south and east with return flows from its irrigation to Rock Creek and to the Rio Grande.

The Extension of the Alamosa Ditch Filing Map 17349, accepted by the State Engineer on November 26, 1943 is shown on Figure 5. The diversion from the Bowen Drain to Rock Creek is shown. The water from the Bowen Drain is conveyed in Rock Creek a distance of nearly 7 miles to the Alamosa Ditch headgate described above.

DITCH STATEMENT

Know all men by these presents: That the undersigned the Hickory Jackson Ditch Co, a corporation, owner of the Alamosa ditch, a feeder to the Hickory Jackson Ditch, claimant, whose post office address is Alamosa, Colo, has caused to be located a diversion from the outlet ditch of the Bowen Drainage Dist. outside of the boundry lines of the said Bowen Drainage Dist. for the purpose of carrying water there from through the channel of Rock Creek to the present headgate of the said Alamosa Ditch and has made these several statements relative thereto, and filed the same in compliance with the laws of the State of Colo. The accompanying map, which shows the location of the headgate of said Alamosa Ditch forms a part of this filing.

First: The necessary structures for the purpose of effecting the diversion from the outlet ditch of the Bowen drain-age district and the headgate through which the water there from is diverted into the channel of Rock Creek and, thence to the present headgate of the Alamosa Ditch which is also, (at that place), the North bank of Rock Creek from which point the Southwest Corner of Sec. 6- in Township-37-North Range-9-East of the N.M.P.M. bears S-20°30'W 11180 feet. This point is approximately 3951 feet southeasterly, measured along the South bank of the Bowen Drain Ditch with the dividing line between the Counties of Rio Grande and Alamosa.

Second: The headgate of the Alamosa Ditch, above referred to is located in the County of Alamosa State of Colorado, at a point on the North bank of said Rock Creek from which it derives its supply of water whence the N.E. Corner of Section 18 in Township 37 North, Range 10-East of the N.M.P.M. bears N. 79°38'E 1265 ft.

Third: The depth of said ditch is 3.0 feet.
The width of said ditch is 24.0 feet on top.
The width of said ditch is 15.0 feet on bottom.
The grade of said ditch is .714 ft per 1000 ft.
The length of said ditch is 13,756 feet.

Fourth: That the carrying capacity of said ditch is 50 cu. ft. per sec. of time, for which claim is here made for irrigation purposes.

Fifth: The estimated cost is Five Hundred Dollars.

Sixth: Work was commenced by survey on the 15th day of June 1943.

Seventh: No legal diversion exists on Rock Creek between the headgate of this diversion described in the first paragraph here of and the headgate of the Alamosa Ditch which is described in the second paragraph here-of.

Eighth: This ditch is a part of the Alamosa Ditch which for many years has been owned and used by the claimant here in and consists of the necessary headgate and intake ditch at the point of diversion from the outlet ditch of the Bowen Drain-age District, the channel of Rock Creek between said point of diversion and the headgate of the Alamosa Ditch and all of the Alamosa Ditch, as shown on the accompanying map.

Ninth: This claim is hereby made by the Hickory Jackson Ditch Co. in addition to all claims heretofore made and to all adjudications of water, or the right to the use of water, heretofore decreed to the said Alamosa Ditch through its original headgate, and is made in accordance with the statutes in such cases made and provided for the purpose of appropriating claiming, utilizing and applying to a beneficial use the seepage and spring waters which are gathered into the outlet ditch of canal of the Bowen Drainage Dist. north and west of the point of diversion, which said waters consist of the seepage water on lands lying within the Bowen Drainage Dist. a Corporation organized and existing under and by virtue of the statutes of the State of Colorado, and which are drawn from said land into said outlet ditch and Canal and conducted there from to the Rio-Grande Del Norte, except where the same are intercepted, used and applied by the claimant herein, and which said waters cannot be used and are not capable of being used within the exterior boundry lines of the said Bowen Drainage District.

Attest.

Luna O. Tropp
Secretary.

The Hickory Jackson Ditch Company.

W.H. Adams
President.

State of Colorado } S.S.
County of Rio Grande }

David H. Mathias, being duly sworn on his oath, disposes and says that he is the engineer of the Hickory Jackson Ditch, that the survey of the same and the map thereof were made by him and that such Survey is accurately represented upon this map; that he has read the statements thereon, and that the same are true of his own knowledge.

D.H. Mathias
Civil Engineer

Subscribed and sworn to before me this 13th day of Nov. A.D. 1943.

My Commission expires

February 4 1945

Chas. M. Reed
Notary Public

Accepted for Filing in the office of the State Engineer of Colorado on the 26th day of Nov. 1943

M. G. Simons
State Engineer.

By *G. G. Agnew*
Deputy

EXTENSION of THE ALAMOSA DITCH	
ALAMOSA COUNTY	For The COLORADO
HICKORY JACKSON DITCH COMPANY	
IRRIGATION DIVISION 3.	WATER DISTRICT 20.
Drawn <u>BHM</u>	Approved <u> </u>
Traced <u>BHM</u>	
Checked <u> </u>	
Alamosa, Colorado. November 12-1943.	
17349	

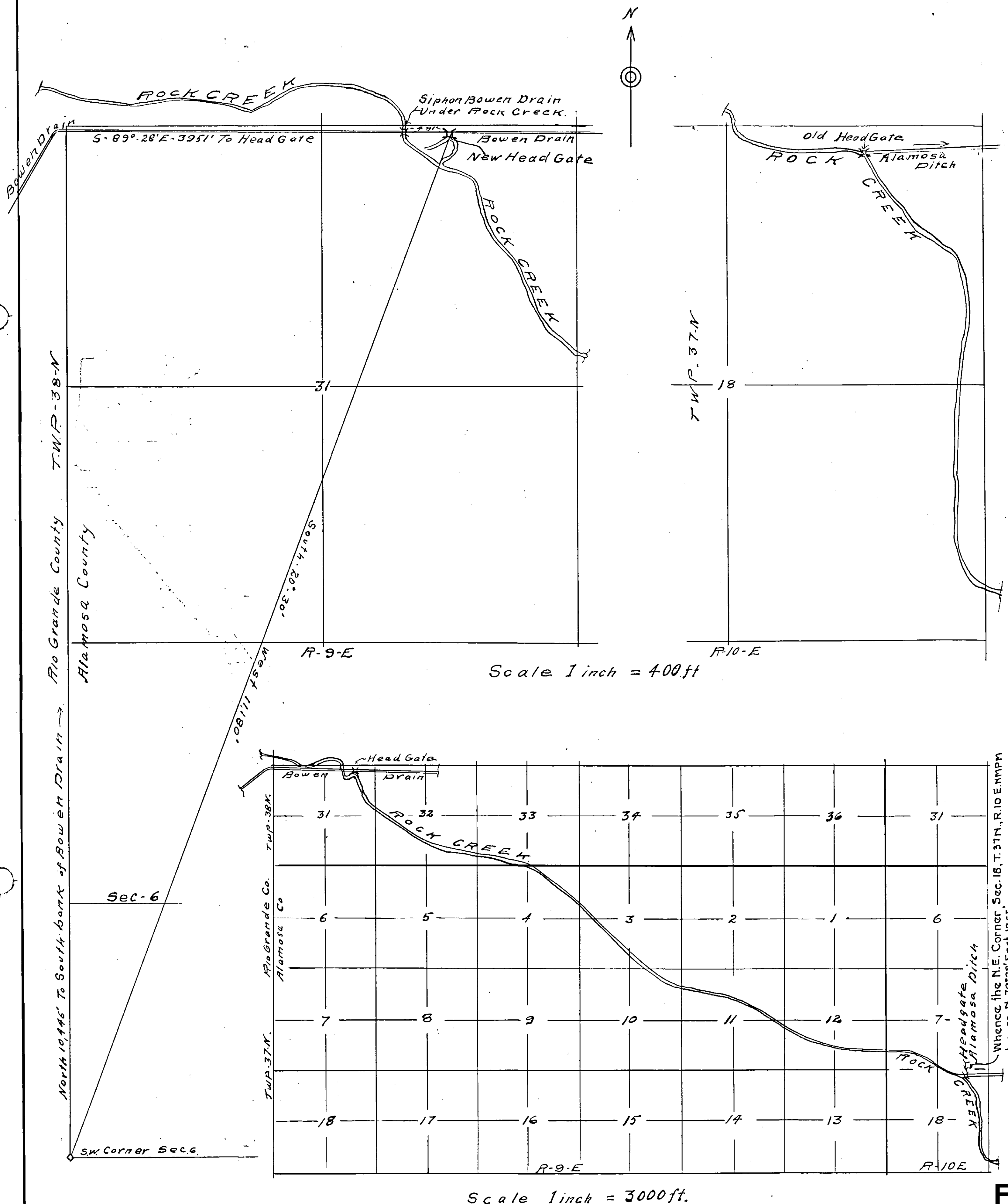


Figure 5
Extension Alamosa Ditch Filing Map 17349

The survey drawing recorded with the County, Reception No. 366868, recording date July 20, 2017, shows the location of a “30’ Easement for Hickory-Jackson Ditch” along with the owner statement by Catherine D. Wiescamp, noting the dedication of easements and listing “The 30 feet in width easement for the Hickory-Jackson ditch as shown on the accompanying plat,...” The appraiser did not do an exhaustive search of rights-of-way of other reaches of the ditch, but the Ditch Company would have a prescriptive right to a reasonable amount of ground on both sides of the ditch to inspect, operate, maintain, and repair the ditch.

2.3 History of Use

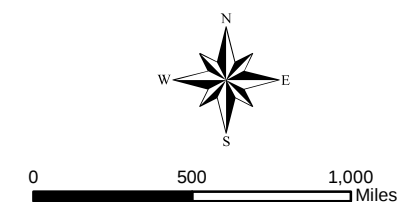
The diversion records for the Alamosa Ditch from the Colorado Decision Support System (CDSS) database for the period 1968 through 2019 are given in Table 2. The average annual diversion for the period is 1,632 acre-feet (AF) with over 40 percent of the water diverted in June. The dry year yield is low and in the dry year 2003 and in the following year 2004 there were no diversions. In the recent dry years of 2012 and 2013, the average annual yield was 350 AF, 21 percent of the average annual yield.

The average number of days water is carried in the ditch is 71 days for an average flow rate of 11.6 cfs ($1,632 \text{ AF} / [1.9835 \text{ AF/cfs day} * 71 \text{ days}] = 11.6 \text{ cfs}$). The maximum diversion month occurred in June 1985 with 1,849 AF, or 31 cfs average for the month which would include yield from the second priority of the Alamosa Ditch right. The maximum day flow rate occurred in 1982 with a rate of 46 cfs which would include about 19 cfs from the 1960 priority . The second priority of the Alamosa Ditch right does not appear in the Division 3 2020 Abandonment List.

The average number of acres irrigated by the Alamosa Ditch over the period of records as shown in Table 2 is 694 acres. The maximum reported irrigated acreage is 1,034 acres in 1998 with the area irrigated shown on Figure 6. Based upon an overall 50 percent efficiency (ditch loss and flood irrigation) the average annual consumptive use for irrigation of pasture grass is estimated to be approximately 800 AF ($1,632 \text{ AF} * 50\%$, rounded).

Table 2
Alamosa Ditch Diversion Records

Irr Year	First Day Used	Last Day Used	Days water carried	Max Day, cfs	Values in Acre-Feet									Acres Irrigated
					Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	
1968	5/24	1/10	70	24.8	-	-	332	985	243	-	160	141	1,861	950
1969	5/4	9/28	86	19.4	-	-	855	485	430	-	363	-	2,134	950
1970	5/12	9/22	88	29.6	-	-	746	697	467	32	199	-	2,142	950
1971	5/1	8/31	82	24.0	-	-	901	838	360	55	-	-	2,153	950
1972	5/17	8/5	95	33.0	-	-	1,262	837	607	77	-	-	2,783	950
1973	5/19	9/12	72	14.5	-	-	330	510	264	186	212	-	1,503	950
1974	5/1	6/26	50	12.6	-	-	511	552	-	-	-	-	1,062	900
1975	5/16	7/29	75	28.5	-	-	747	1,320	904	-	-	-	2,972	900
1976	5/7	7/21	76	24.2	-	-	605	983	581	-	-	-	2,169	900
1977	5/4	6/15	43	15.3	-	-	720	350	-	-	-	-	1,070	450
1978	5/11	7/17	68	12.7	-	-	264	500	298	-	-	-	1,062	300
1979	6/1	7/15	45	24.0	-	-	-	980	409	-	-	-	1,388	1,000
1980	5/24	7/21	59	23.0	-	-	214	1,186	695	-	-	-	2,095	1,000
1981	4/10	6/24	74	13.0	-	290	559	507	-	-	-	-	1,356	100
1982	5/26	7/20	56	46.0	-	-	113	1,546	783	-	-	-	2,443	100
1983	6/1	7/19	49	26.6	-	-	-	1,121	490	-	-	-	1,611	1,000
1984	5/16	7/8	54	38.0	-	-	708	1,538	242	-	-	-	2,488	1,000
1985	5/29	8/14	78	40.0	-	-	129	1,849	1,443	304	-	-	3,726	1,000
1986	6/4	8/7	65	40.0	-	-	-	1,180	1,536	207	-	-	2,923	1,000
1987	6/3	7/5	33	36.4	-	-	-	1,553	330	-	-	-	1,884	1,000
1988	5/25	7/27	64	20.0	-	-	225	991	885	-	-	-	2,101	1,000
1989	5/10	7/1	61	20.0	-	-	574	739	141	-	-	-	1,454	500
1990	5/15	7/18	65	27.3	-	-	334	1,228	593	-	-	-	2,154	500
1991	5/29	7/23	56	16.3	-	-	79	765	510	-	-	-	1,354	500
1992	5/1	7/13	70	15.0	-	-	661	549	206	-	-	-	1,416	500
1993	5/21	7/28	69	28.0	-	-	585	1,198	1,097	-	-	-	2,880	500
1994	5/21	7/15	56	26.0	-	-	278	1,133	567	-	-	-	1,978	500
1995	5/22	10/18	150	32.2	-	-	181	1,615	858	211	180	86	3,131	500
1996	5/9	6/20	43	27.7	-	-	1,142	427	-	-	-	-	1,569	500
1997	5/5	10/1	136	30.0	-	-	853	575	528	268	244	6	2,473	500
1998	5/8	8/19	104	24.5	-	-	850	1,234	1,108	75	-	-	3,267	1,034
1999	4/19	10/13	178	14.7	-	221	690	728	775	753	640	235	4,041	500
2000	4/20	6/21	63	14.5	-	244	865	521	-	-	-	-	1,630	500
2001	5/11	9/12	125	27.3	-	-	1,034	1,007	281	276	114	-	2,711	500
2002	4/5	5/22	48	7.0	-	282	76	-	-	-	-	-	357	250
2003			-	-	-	-	-	-	-	-	-	-	0	0
2004			-	-	-	-	-	-	-	-	-	-	0	0
2005	5/10	7/27	79	5.0	-	-	55	145	171	-	-	-	370	656
2006	5/18	6/7	21	5.0	-	-	139	42	-	-	-	-	181	
2007	4/5	8/1	119	26.0	-	563	911	711	236	1	-	-	2,422	
2008	5/1	7/23	84	10.6	-	-	471	514	431	-	-	-	1,417	
2009	3/24	7/8	107	16.4	130	543	594	778	186	-	-	-	2,232	658
2010	4/9	6/30	83	10.5	-	436	625	420	-	-	-	-	1,480	967
2011	3/28	6/1	63	4	24	184	73	1	-	-	-	-	283	364
2012	3/29	5/20	53	5	30	155	33	-	-	-	-	-	218	281
2013	3/14	5/29	77	7	206	238	38	-	-	-	-	-	482	389
2014	4/24	8/6	42	3	-	3	-	119	3	1	-	-	126	573
2015	6/16	7/23	5	10	-	-	-	54	24	-	-	-	77	698
2016	4/13	8/23	100	18	-	107	394	762	230	-	-	-	1,493	955
2017	5/8	6/30	108	5	-	-	178	134	59	8	-	-	379	1003
2018	3/10	5/13	51	1.9	64	26	1	-	-	-	-	-	90	629
2019					31	8	4	28	180	-	-	-	251	806
Average			71	19.2	9	63	403	691	368	47	41	9	1,632	666
Maximum			178	46.0	206	563	1,262	1,849	1,536	753	640	235	4,041	1,034
Max Month average cfs					3.4	9.5	21	31	25	12	11	3.8		

FIGURE
6

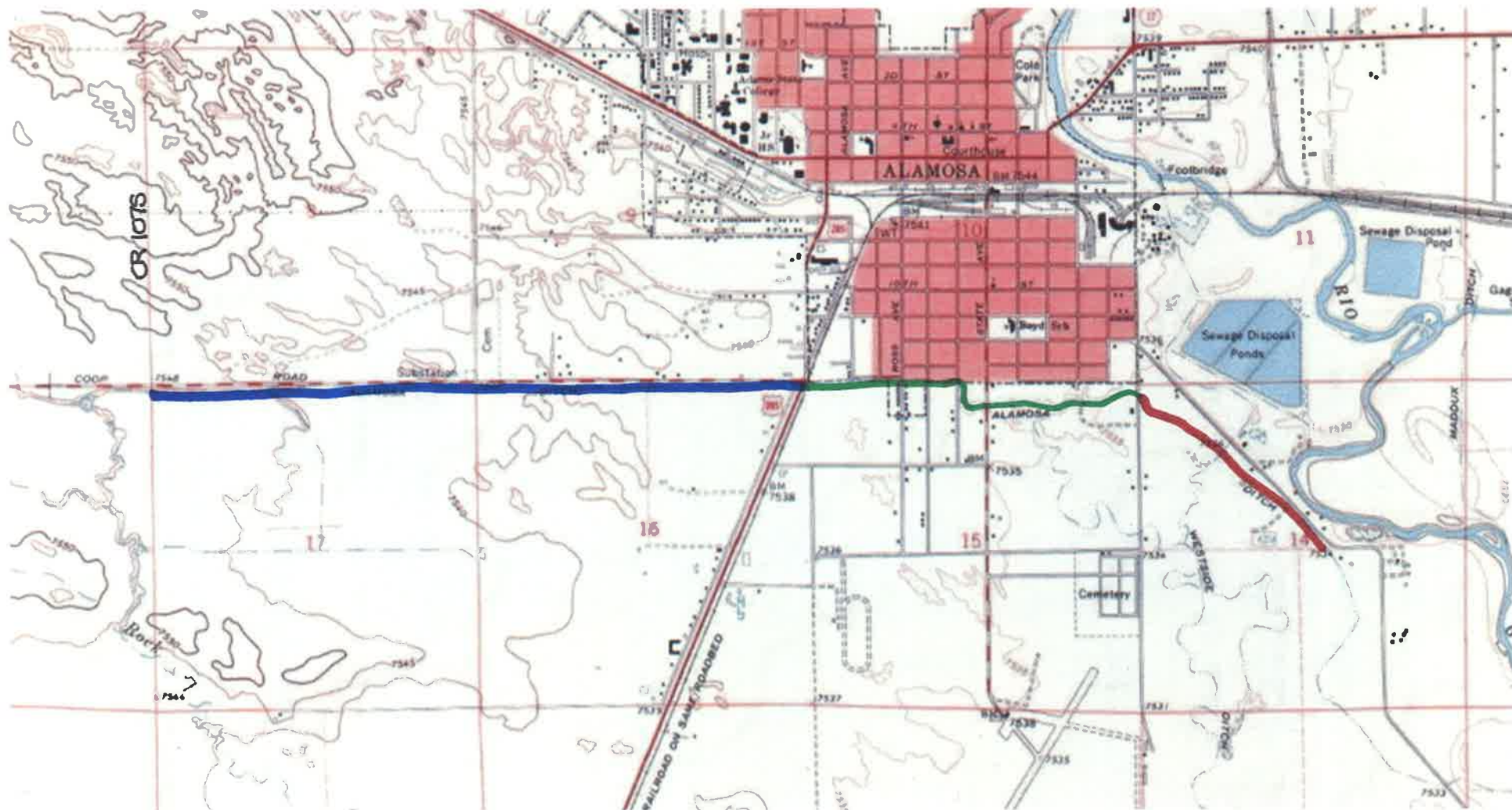
2.4 Alamosa Ditch Carrying Capacity Easement

The current ditch carrying capacity of the Alamosa Ditch has been analyzed by Martin Reynolds, Reynolds Engineering Company (Reynolds). Cross sections of the ditch were surveyed at nine locations extending from near Foster Avenue downstream to the west side of Airport Road (Addendum C). The ditch capacity with 1-foot of freeboard at each cross section as determined by Reynolds Engineering Company is given in Table 3. The Alamosa Ditch opposite of Foster Avenue (Cross section 1) has a capacity with 1-foot of freeboard of 21-cfs. Cross section 2, at the entrance of the culvert under Highway 285, has a capacity of 36-cfs with a 1-foot freeboard. In addition to the ditch capacity with 1-foot of freeboard, the Reynolds cross sections also give the water surface elevations at flows of 26-cfs and 50-cfs when such ditch capacity exists. The Reynolds survey cross sections are consistent with the appraiser's field observations and the calculations of ditch capacities appear reasonable and are relied upon.

Table 3
Existing Ditch Capacity by Cross Section Location

Cross Section No.	Cross Section Location	Discharge with 1 ft. of Freeboard, cfs
1	Foster Avenue	21
2	West of Hwy 285	34
3	East of Hwy 285	99
4	100' east of RR	154
5	West of Ross	87
6	West of Edison	101
7	West of San Juan	50
8	West of State Avenue	70
9	West of Airport Road	183

The Ditch Carrying Capacity Easement reach along the Alamosa Ditch extends from approximately the Old Airport Road and extending west to CR 107S as shown on Figure 7. Shown on Figure 7 is a length of 955 feet which is conceptual alignment of a return to the Rio Grande should the City need to construct such a return.



Reach	Length, LF	Length, mi.
CR 107S to Highway 285	10,147	1.92
Highway 285 to CR 110S	6,943	1.31
CR 110S to south line of N1/2 Section 14-T37N-R10E	4,200	0.80
Total	21,290	4.03

Figure 7
Alamosa Ditch Lengths By Reach

The top width of the ditch to the west of Highway 285 is generally about 15 feet. From the Alamosa County Parcel Viewer mapping and from field observations, the Ditch alignment between South Foster Avenue and Highway 285 appears to be nearly coincident with the south edge of the CR 8S right-of-way providing access to the north side of the Ditch. The Alamosa County Master Plan from year 2008 designates CR 8S as a major collector roadway. The width of the road right-of-way appears to vary from approximately 50 to 60 feet in width. Beyond South Foster Avenue, the Ditch is offset further from the road. The proposed Ditch Carrying Capacity Easement length through various reaches is given in Table 4.

Table 4
Alamosa Ditch Carrying Capacity Easement Length by Reach

Stormwater Discharge Extent	Ditch Length	
	Lineal Feet	Miles
S. line N1/2 Section 14-T37N-R10E to CR 110S	4,200	0.80
CR 110S (Airport Road) to Hwy 285	6,943	1.31
Hwy 285 to S. Foster Ave (CR 108S)	4,979	0.94
S. Foster Ave. (CR 108S) to S. Craft Dr.	1,215	0.23
S. Craft Dr. to CR 107S	3,953	0.75
Total	21,290	4.03

With an estimated Easement width of 30 feet, the total Easement area for the ditch upstream of Highway 285 would be approximately 7 acres (10,147 lineal feet*30 feet/43,560 ft²/acre). Downstream of Highway 285, the additional easement area for a 30-foot width easement would be approximately 7.7 acres. The total easement area is approximately 14.7 acres (21,290 lineal feet*30 feet/43,560 ft²/acre).

2.5 Stormwater Discharge

The annual estimated stormwater discharge volumes from existing current development areas within the City and potential future development areas located west of Highway 285 as outlined in the June 1, 2020 Reynolds Engineering Company Memorandum (Addendum D) are summarized in Table 5. The figure that accompanied the Memorandum is reproduced as Figure 2 (page 3) herein.

Table 5
Drainage Areas and Expected Annual Discharge

Areas west of Highway 285	Acres	Estimated Annual Discharge (AF)
Developed in City Limits	238	58
Undeveloped in City Limits	112	27
Undeveloped Outside City Limits	373	91
Total	723	176

Colorado Senate Bill 15-1212 establishes administrative requirements for storm water management of detention and infiltration ponds and to be excluded from water rights administration, the following criteria, among others, must be met:

- The facility must release or infiltrate 97 percent of all water from a rainfall event less than or equal to a 5-year storm event within 72 hours (3 days).
- The facility must release or infiltrate 99 percent of all water from a rainfall event greater than a 5-year storm event within 120 hours (5 days).

The drainage criteria and the facilities for the Montana Azul Park design prepared by Reynolds Engineering Company are provided in Addendum E. As described in the January 8, 2019 memorandum, stormwater is routed to the detention pond and the proposed lift station would pump water from the pond through a force main to the Alamosa Ditch. The calculated runoff volume from a 100-year, 24-hour design storm of 1.97 inches for 241 acres (238 acres in the later June 1, 2020 Memorandum) is 15.8 AF $[(241 \text{ acres} \times 1.97'' \times 0.4 \text{ runoff coefficient}) / 12''/\text{ft}]$. The storm runoff would be routed to retention ponds. The stormwater would be pumped at such times as there is sufficient capacity in the Alamosa Ditch. To pump out the 15.8 AF over a 120 hour period (5

days) would require a rate of 715 gpm (1.59 cfs). Two pumps with a combined capacity of up to 1,500 gpm (3.34 cfs) would handle the ultimate buildout for the 241 acres.

Prorating the 100-year runoff event volume of 15.8 AF for 241 acres to the 723 acres total area west of Highway 285 gives a total runoff volume of 47.4 AF. To release 47.4 AF within 120 hours would require a release rate of 4.7 cfs $[47.4 \text{ AF} \cdot 99\% / (5 \text{ days} \cdot 1.9835 \text{ cfs/AF-day})] = 4.7 \text{ cfs}$. Pumping capacity would need to be higher to allow for back to back storms and to make up for pumping time lost to due to potential lack of Alamosa Ditch capacity.

The City will monitor the capacity in the Ditch. The combined maximum pumping rate for all the discharge locations is 18 cfs.

The estimated annual stormwater discharge to the Alamosa Ditch is 176 AF and the average annual Alamosa Ditch diversion is 1,632 AF (Table 2) which would bring the average annual flow to 1,808 AF. The stormwater discharge would be 10 percent of the average flow in the Alamosa Ditch.

2.6 Larger Parcel

The Larger Parcel analysis includes tests of 1) unity of title, 2) contiguity, and 3) unity of highest and best use. The Hickory-Jackson Ditch Company is the owner of the Alamosa Ditch water right and infrastructure located in the ditch right-of-way, thus meeting the unity of title test. The Ditch delivers the water diverted under the water right through the ditch right-of-way for irrigation use and for conveyance of stormwater under the 1983 Agreement. Together they pass the contiguity test. The Alamosa Ditch water right, infrastructure and right-of way all have a highest and best use including irrigation and carriage of stormwater.

3.0 PURPOSE OF THE APPRAISAL

The purpose of the appraisal is to determine a “reasonable market value” as of the effective date of November 25, 2020 of the Ditch Carrying Capacity Easement the City seeks to acquire from the Ditch Company. Reasonable market value” is defined as follows:

“Reasonable market value” means the fair, actual, cash market value of the property. It is the price the property could have been sold for on the open market under the usual and ordinary circumstances, that is, under those circumstances where the owner was willing to sell and the purchaser was willing to buy, but neither was under an obligation to do so.

¹*Colorado Civil Jury Instruction No. 36:3.*

4.0 INTENDED USE AND INTENDED USERS

The intended use of the report is by the City in connection with its negotiations with the Ditch Company to acquire the Ditch Carrying Capacity Easement. It is not intended for any other use.

The intended users are the Clients. Use of this report by others is not intended.

5.0 EXPOSURE TIME

Exposure time is defined as:

the estimated length of time the property interest being appraised would have been offered on the market prior to the hypothetical consummation of a sale at market value on the effective date of the appraisal; a retrospective opinion based on an analysis of past events assuming a competitive and open market.

Based on review of water rights transaction and experience with water facilities and easements, it is our opinion that the estimated exposure time for the Ditch Carrying Capacity Easement in the vicinity is one to two years.

6.0 DATE OF VALUATION

The effective date of the valuation is November 25, 2020.

7.0 MARKET AREA DESCRIPTION

7.1 City of Alamosa and Alamosa County

The City is the county seat of Alamosa County. The junction of U.S. Highways 160/285 (US 160/285) with State Highway 17 is on the east side of the City near the Rio Grande. US 160/285 continues to the west through the City and Highway 285 continues south to Santa Fe, New Mexico. La Jara Creek has its confluence with the Rio Grande in the southeast corner of the County. The market area is Alamosa County south of US 160/285 and west of the Rio Grande. The lands irrigated by the Alamosa Ditch lie between Highway 285 and the Rio Grande.

Alamosa has a 2020 population of approximately 10,221 persons, which is 62 percent of the Alamosa County population. The State Demography Office population forecast for Alamosa County through year 2050 is given in Table 6 with an annual growth rate between year 2020 and year 2030 of 1.1 percent with lower growth rates in the two following decades. The City population is estimated based on the same growth rate as forecast for the County with a year 2050 projected population for the City of 13,531.

Table 6
Alamosa Population Forecast

Year	2020	2030	2040	2050
City of Alamosa	10,221	11,763	12,521	13,531
Alamosa County	16,240	18,690	19,895	21,500
Forecast County Annual Growth Rate	1.1%	0.9%	0.8%	

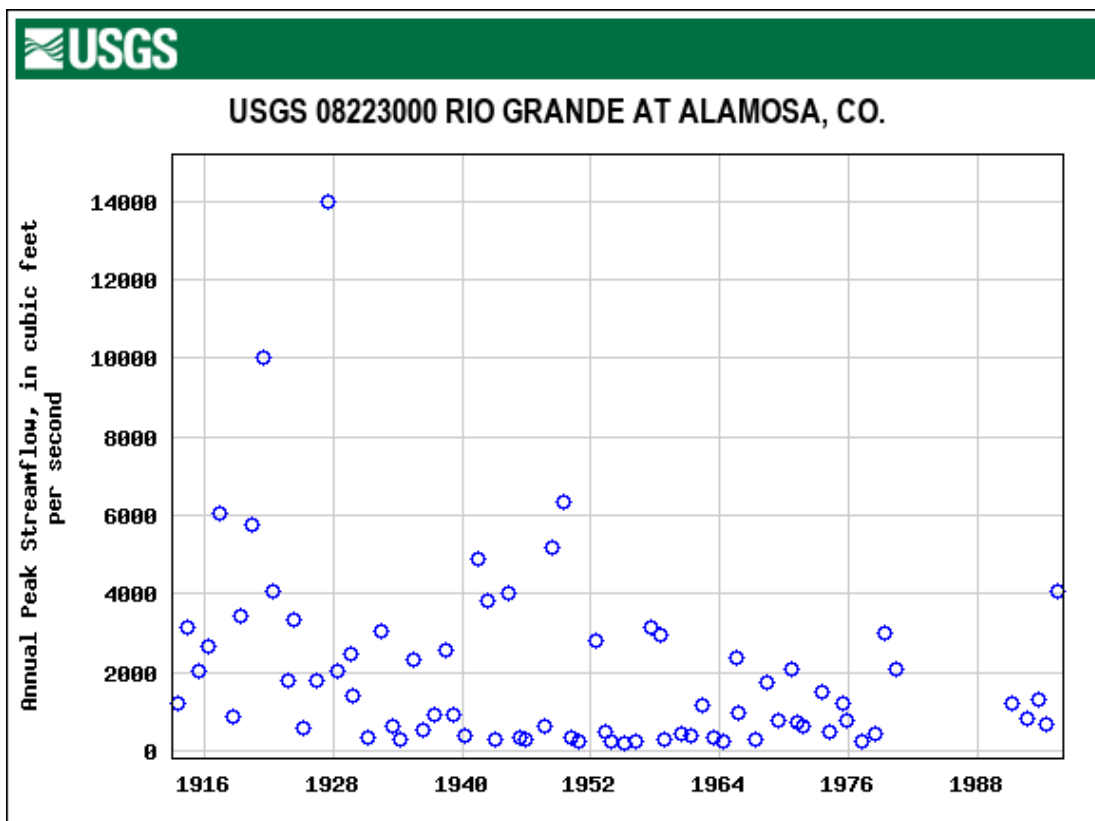
The median age of the population in Alamosa County is 30.4 years, 5.5 years younger than the state of Colorado median age. There are approximately 6,200 housing units with a projection of 8,100 housing units in year 2050. The median value of owner-occupied homes is \$157,500.

Five industries make up 70 percent of the jobs in Alamosa County and in order of job numbers the industries are: governmental, healthcare, and social services, retail trade, accommodation and food service, and agriculture.

7.2 Hydrology

The Rio Grande with its headwaters near the Continental Divide has a 1,710 square mile tributary area to the Rio Grande at Alamosa stream gage 0822300 which is located north of Adams State College and east of Stadium Drive. The Rio Grande 100-year streamflow is contained within levees through the City of Alamosa. Figure 8 shows the annual peak streamflow in cfs. The peak flow of approximately 14,000 cfs occurred in June 1927.

Figure 8
Peak Annual Streamflow Rio Grande at Alamosa



Rock Creek has a tributary area of 149 square miles at the location of the Alamosa Ditch headgate. The Rock Creek basin extends up to a maximum elevation of 13,000 feet. The USGS StreamStats (StreamStats) program predicts 2-year, 5-year, 10-year and 100-year storm events at 136, 286, 435 and 1,290-cfs, respectively.

The area tributary to the Alamosa Ditch below its headgate on Rock Creek is approximately 6 square miles. There is a drainage ditch along most of the north side of CR 8S. Three culverts with

outlets into the Alamosa Ditch within the proposed additional stormwater discharge reach were observed during the appraiser's November 25, 2020 site visit. Photograph 10 is a culvert outlet into the Ditch immediately above the culvert under Highway 285. Much of the paved CR 8S drains toward the Ditch.

The monthly and annual precipitation as measured at the Alamosa airport for years 1948 through September 2020 is given in Table 7 (next page). The average annual precipitation is 7.17 inches. The maximum annual precipitation for the 72 year period of record is 11.55 inches in 1969 and the second highest annual precipitation of 11.19 inches in 1990. The maximum month of precipitation of 5.4 inches occurred in August 1993 with the second highest monthly precipitation of 3.52 inches occurring in July 2017.

Appraisal Alamosa Ditch Carrying Capacity Easement

Table 7 Precipitation Alamosa WSO, AP (Sta. 50130)

YEAR	Precipitation in inches												ANN
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1948	0.62	0.47	0.24	0.34	0.73	1.3	0.24	0.58	0.13	0.6	0.24	0.17	5.66
1949	0.33	0.31	0.12	0.34	1.02	0.49	1.08	1.35	0.98	0.31	0	0	6.33
1950	0.03	0.19	0.2	0.08	0.04	1.13	0.6	1	0.55	0.19	0	0.11	4.12
1951	0.03	0.15	0.37	0.45	0.03	0.03	0.74	1.29	0.05	0.35	0.22	0.38	4.09
1952	0.67	0.12	0.07	1.55	1.01	0.13	1.19	0.94	1.28	0.02	0.63	0.15	7.76
1953	0.08	0.2	0.26	0.35	1.2	0.43	1.24	0.62	0	1.21	0.51	0.39	6.49
1954	0.28	0	0.06	0.32	0.78	0.03	1.77	1.03	0.88	0.19	0.09	0.13	5.56
1955	0.06	0.15	0	0.22	1.24	0.11	0.67	1.44	0.15	0.03	0.05	0.04	4.16
1956	0.58	0.06	0.19	0.58	0.19	0.16	0.19	1.18	0	0.18	0.09	0	3.4
1957	0.52	0.08	0.26	1.38	1.64	0.21	2.45	0.63	0.01	0.26	1.21	0.01	8.66
1958	0.3	0.15	0.32	0.81	0.38	0.2	0.72	0.72	0.48	0.65	0.26	0.02	5.01
1959	0.24	0.31	0.42	0.58	1.15	0.18	1.09	1.53	1.94	1.78	0.07	0.26	9.55
1960	0.33	0.56	0.1	0.39	0.15	0.65	0.55	0.71	0.26	1.28	0.29	0.58	5.85
1961	0.09	0.23	0.62	1.02	0.7	0.51	0.89	2.03	1.38	1.55	0.6	0.57	10.19
1962	0.08	0.21	1.16	0.11	0.15	0.52	0.49	0.22	0.81	0.32	0.52	0.15	4.74
1963	0.42	1.42	0.25	0.13	0.13	0.69	1.1	1.87	0.15	0.27	0.08	0.04	6.55
1964	0.26	0.27	0.41	0.22	0.5	0.39	0.91	0.73	1.06	0	0.8	1.52	7.07
1965	0.28	0.37	0.52	0.36	0.59	1.77	1.52	0.95	1.59	1.08	0.05	0.76	9.84
1966	0.28	0.23	0.11	0.15	0.3	0.72	0.78	1.42	0.03	0.49	0.1	0.35	4.96
1967	0.07	0.78	0.15	0.58	1.22	0.84	1.78	3.28	0.53	0.42	0.01	1.2	10.86
1968	0.04	0.42	0.21	0.27	0.2	0.06	3.5	2.22	0.41	0.11	0.28	0.38	8.1
1969	0.16	0.12	0.47	0.32	0.49	2.58	1.92	1.31	1.29	2.37	0.11	0.41	11.55
1970	0.06	0.03	0.85	0.54	0.86	0.38	1.35	1.3	1.53	1.09	0.06	0.03	8.08
1971	0.15	0.26	0.03	0.33	1.07	0.08	2.59	1.21	1.45	0.71	0.44	0.45	8.77
1972	0.24	0.09	0.12	0	0.07	0.6	0.8	1.16	1	2.16	1	0.46	7.7
1973	0.16	0.12	1.42	0.41	1.85	0.69	1.09	0.65	1.06	0.64	0.11	0.19	8.39
1974	0.7	0.08	0.24	0.18	0.09	0.72	1.78	0.72	0.62	0.74	0.15	0.74	6.76
1975	0.38	0.22	0.5	0.33	0.01	0.65	0.51	0.9	1.47	0.78	0.43	0.04	6.22
1976	0.05	0.33	0.39	0.5	0.77	0.07	1.43	1.22	0.67	0.51	0.2	0.07	6.21
1977	0.25	0.27	0.14	0.82	0.35	1.17	2.2	0.63	1.15	0.08	0.63	0.17	7.86
1978	0.33	0.07	0.13	0.2	1.59	1.23	1.04	0.27	0.19	0.51	0.9	0.81	7.27
1979	0.75	0.09	0.29	0.42	0.94	0.72	0.19	1.61	0.22	0.19	0.5	0.55	6.47
1980	0.32	0.31	0.65	1.48	1.21	0	0.54	0.21	0.46	0.52	0.01	0	5.71
1981	0	0.13	0.62	0.01	0.99	0.95	1.43	1.94	1.4	0.34	0.78	0.33	8.92
1982	0.07	0.49	0.4	0.37	0.57	0.22	0.51	0.58	1.85	0.19	0.25	0.49	5.99
1983	0.21	0.25	0.85	0.32	0.87	1.23	0.5	0.87	0.38	0	0.78	0.99	7.25
1984	0.14	0.28	1.12	0.49	0.18	0.55	0.74	1.07	0.36	1.48	0.1	0.59	7.1
1985	0.28	0.28	0.44	0.97	0.37	0.47	1.68	0.91	1.33	2.02	0.68	0.37	9.8
1986	0.05	0.1	0.37	1.08	0.74	0.67	0.54	0.66	1.2	1.18	1.02	0.12	7.73
1987	0.65	0.48	0.29	0.85	1	0.14	0.03	1.06	0.22	0.31	0.95	0.51	6.49
1988	0.26	0.25	0.18	0.35	0.51	0.83	0.66	1.08	0.64	0.2	0.35	0.11	5.42
1989	0.31	0.28	0.1	0.09	0.12	0.14	1.46	0.35	1.28	0.09	0	0.15	4.37
1990	0.62	0.2	0.43	1.72	0.78	0.45	1.86	1.28	1.48	0.72	0.9	0.75	11.19
1991	0.14	0.36	0.32	0.16	0.66	0.3	0.59	0.88	0.7	0.95	1.23	0.98	7.27
1992	0.08	0.08	1.62	0.04	1.13	1.23	1.21	1.97	0.5	0.01	0.48	0.79	9.14
1993	-----	0.39	0.68	0.42	0.93	0.14	0.33	5.4	0.58	0.32	0.35	0.1	9.64 a
1994	0.22	0.04	0.45	0.39	1.78	0.15	0.02	1.22	1.01	0.88	0.84	0.07	7.07
1995	0.1	0.09	0.36	0.87	0.63	1.26	0.95	0.85	1.6	0	0.2	0.13	7.04
1996	0.06	0.01	0.34	0.66	0.03	1.16	0.57	0.94	0.57	0.86	0.22	0	5.42
1997	0.33	0.77	0.04	0.17	0.51	0.79	0.92	0.92	1.69	0.43	0.54	0.19	7.3
1998	0	0.03	0.53	0.67	0.01	0.27	1.45	1.03	0.86	1.66	0.35	0.01	6.87
1999	0.07	0	0.22	1.15	1.07	0.32	0.31	3.08	1.09	0.24	0	0.03	7.58
2000	0.23	0.02	0.52	0.6	0.1	0.54	0.37	1.01	0.23	1.24	0.05	0.11	5.02
2001	0.36	0.56	1.02	0.27	1.09	0.07	2.75	3.22	0.11	0.03	0.26	0.13	9.87
2002	0.5	0.23	0.07	0.15	0.04	0.02	0.84	0.32	1.38	0.57	0.06	0.24	4.42
2003	0.01	0.28	0.51	0.24	0.11	0.6	0.94	1.26	1.29	0.38	0.58	0.3	6.5
2004	0.14	1.02	0.19	1.05	0.01	0.42	0.72	0.6	0.74	0.6	0.28	0.26	6.03
2005	1.09	0.38	0.79	0.78	0.38	0.36	0.17	1.59	1.12	1.18	0.08	0.04	7.96
2006	0.17	0.02	0.57	0.36	0.18	0.15	2.94	1.08	0.6	1.59	0.15	0.62	8.43
2007	0.48	0.07	1.05	1.49	0.53	0.25	2.62	0.49	1.06	0.07	0.42	1.21	9.74
2008	0.29	0.57	0.13	0.18	0.43	0.15	0.36	1.23	0.21	0.85	0.6	0.48	5.48
2009	0.1	0.02	0.53	1.12	1.17	0.59	0.45	0.7	1.04	1.33	0.11	0.1	7.26
2010	0.65	0.19	1.01	0.62	0.09	0.11	1.03	0.47	0.73	0.69	0.02	0.38	5.99
2011	0.06	0.39	0.02	0.13	0.18	0	0.14	1.27	1.15	0.48	0.51	0.27	4.6
2012	0.06	0.28	0.1	0.2	0.88	0.2	1	0.5	1.1	0.37	0.08	0.81	5.58
2013	0.07	0.15	0.34	0.32	0.18	0.54	0.8	2.47	2.98	0.53	1.63	0.17	10.18
2014	0.07	0.05	0.4	1.06	0.23	0.02	1.52	0.53	0.41	0.7	0.32	-----	4.99 b
2015	0.33	1.01	0.4	0.43	1.77	1.19	1.34	0.5	0.78	0.98	0.44	0.25	9.42
2016	0.58	0.4	0.52	1.75	1.12	0.51	0.31	2.16	0.28	0.02	0.44	1.08	9.17
2017	1.36	0.29	0.73	0.63	1.24	0.19	3.52	0.73	1.75	0.06	0.05	0.14	10.69
2018	0.08	0.23	0.15	0.2	0.14	0.62	1.05	0.64	1.02	1.16	0.16	0.32	5.77
2019	1.17	0.37	1.42	0.8	0.93	0.43	0.08	0.85	0.73	0.07	0.45	0.51	7.81
2020	0.14	0.12	0.22	0.09	0.23	0.17	1.58	0.33	1.53	0	-----	-----	4.41 c
Period of Record Statistics													
MEAN	0.29	0.27	0.43	0.53	0.64	0.52	1.09	1.16	0.86	0.64	0.38	0.36	7.17
MAX	1.36	1.42	1.62	1.75	1.85	2.58	3.52	5.4	2.98	2.37	1.63	1.52	11.55

a = 1 day missing, b = 2 days missing, c = 3 days, .etc., MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS:5

Individual Months not used for annual or monthly statistics if more than 5 days are missing.

Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

The maximum one-day recorded precipitation occurred on September 30, 1959 with 1.77 inches. Table 8 shows the ten highest one-day precipitation amounts. The Reynolds calculations used a 100-year, 24-hour design storm of 1.97 inches.

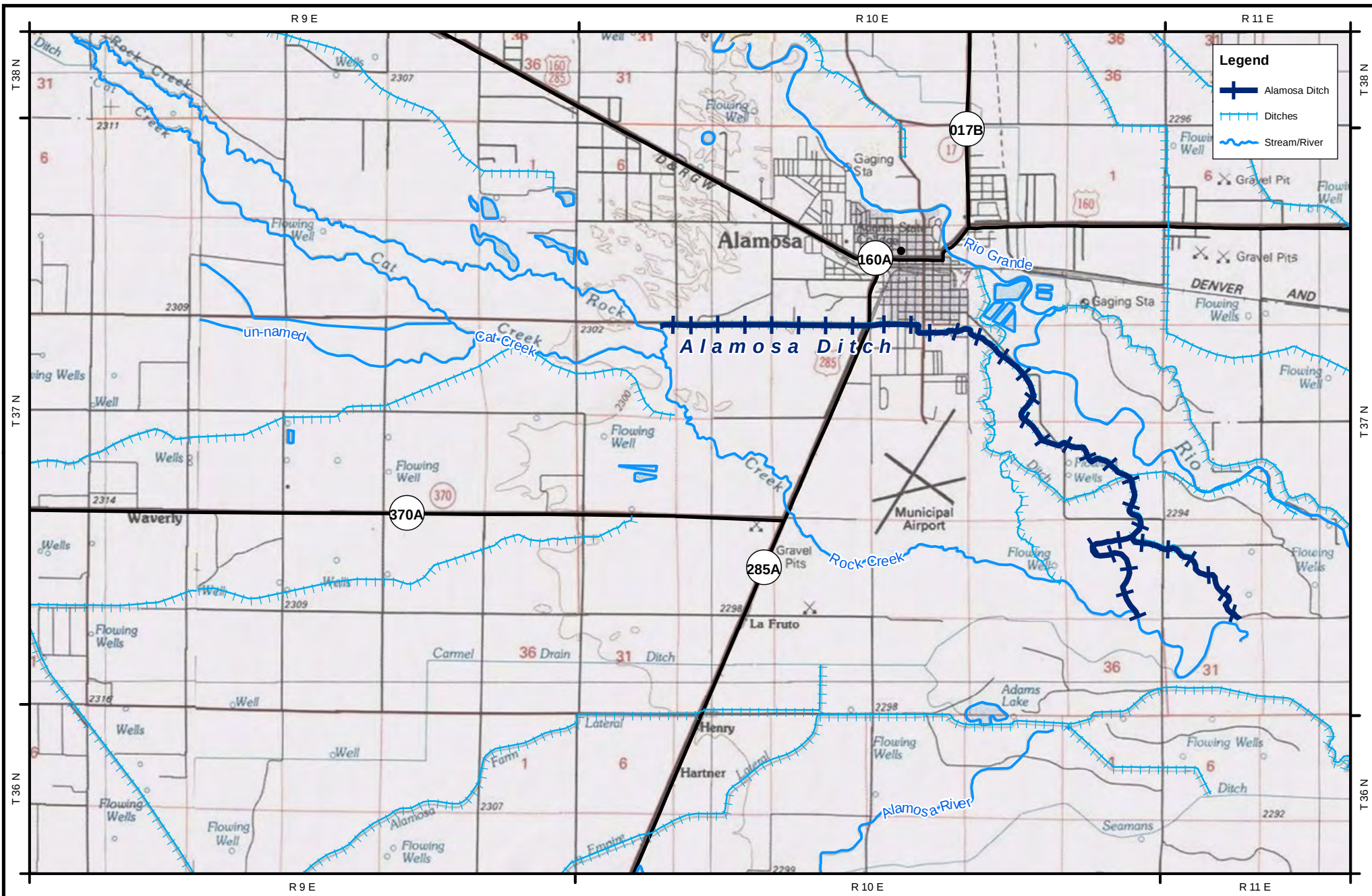
Table 8
Highest One-Day Precipitation Amounts

Rank	inches	Date
1	1.77	30-Sep-1959
2	1.56	18-Jul-1971
3	1.55	28-Jul-1939
4	1.49	19-Jul-2007
5	1.45	15-Apr-1938
6	1.40	9-Jun-1943
7	1.38	5-Aug-1937
8	1.31	27-Aug-1993
9	1.24	3-Sep-1938
10	1.22	20-Apr-1952

7.3 Topography

The Alamosa County western boundary of the market area has an average elevation of approximately 7600 feet. The elevation of the Rio Grande at the southeast corner of the market area is 7500 feet. The drainage direction is to the east toward the Rio Grande. The roughly 100 foot elevation change occurs over 14 miles for an overall land slope of 0.0014 (0.14 percent). The area is traversed by numerous irrigation canals and drains.

The location of the Alamosa River and La Jara Creek in the southeast area of the market are shown on Figure 9.



Path: Z:\Project Files\20\201-074\201-074.000\CAD-GIS\GIS\01_mxd\Figure_9_Market_Area.mxd



WRIGHT WATER ENGINEERS, INC.
 2490 W 26TH AVE 100A
 DENVER, CO. 80211
 (303) 480-1700

MARKET AREA



0 7,000 14,000 Feet

PROJECT NO.
 201-074.000

FIGURE
 9

7.4 Water Rights Administration

The market area is within Water Division 3 and the majority of the market area is in Water District 20. A portion of the area is in the Alamosa - La Jara Water District 21.

In response to the decline in groundwater levels and the groundwater overdraft, rules and regulations governing use of groundwater in Water Division 3 were developed. The State Engineer was given discretion to permit the continued use of groundwater with use to be regulated to maintain a “sustainable” water supply. Subdistricts have been formed to address the groundwater overdraft with the goal of the Subdistricts to 1) maintain a sustainable irrigation water supply in the unconfined and confined aquifers, 2) replace injurious stream depletions and eliminate expanded use of groundwater, and 3) avoid Compact delivery obligation interference. Irrigators pumping groundwater must have an augmentation plan or must participate in a subdistrict. Many of the groundwater irrigators in market area are participants in Subdistrict No. 6.

A review of the DWR well permits does not show any irrigation well permits on the Alamosa Ditch irrigated lands shown on Figure 4.

8.0 HIGHEST AND BEST USE BEFORE THE TAKING

Highest and best use is defined as follows:

The reasonably probable and legal use of property that results in the highest value. The four criteria that the highest and best use must meet are legally permissibility, physically possibility, financially feasibility, and maximum productivity.
Appraisal Institute. 2015. The Dictionary of Real Estate Appraisal, 6th Edition.

8.1 Legally Permissible

A legally permissible use of the Alamosa Ditch water right, infrastructure and rights-of-way is the current use of irrigation. The Ditch rights-of-way provide for the right to construct, operate, clean, maintain, repair, and replace the ditch and appurtenant structures, and to access the property for these purposes. The Alamosa Ditch water right could be changed to allow other uses in addition to the decreed irrigation use through a water court change case. By the 1983 Agreement, the conveyance of stormwater in a portion of the Ditch is legally permissible. The use of the ditch for

carriage of stormwater would not preclude a change of use of the Alamosa Ditch to allow other uses in addition to irrigation.

8.2 Physically Possible

The use of the Alamosa Ditch for irrigation is physically possible as evidenced by its continued use. Currently the ditch capacity is reduced along CR 8S due to overgrowth of vegetation in the ditch and in some locations, trees. Currently there are two stormwater discharges into the Alamosa Ditch downstream of Highway 285. A requirement of the stormwater discharges into the Ditch is the obligation of the City to provide maintenance in the ditch reach defined in the 1983 Agreement. Use of the Alamosa Ditch for storm water conveyance in addition to irrigation use or other uses is physically possible.

8.3 Financially Feasible

The continued use of the Alamosa Ditch for irrigation is financially feasible based upon its current use though ditch cleaning is needed to improve water delivery. The Alamosa Ditch with its 1934 water right priority is junior as is evidenced by its low or no diversions in dry years which makes the use of the water right for augmentation unlikely. Because the City under the 1983 Agreement conducts maintenance on a defined reach of the ditch, the Ditch Company has lower costs for maintenance. The use of the Alamosa Ditch for irrigation and the use of capacity for the conveyance of stormwater is financially feasible. The financially feasible uses include irrigation use and stormwater carriage in the ditch.

8.4 Maximally Productivity

The maximally productive use of the Alamosa Ditch is the combined irrigation use and stormwater carriage use in the ditch. After considering the above, and data review and analysis, the highest and best use of the Alamosa Ditch larger parcel Before the Easement Taking is combined irrigation and stormwater carriage use.

9.0 VALUE OF THE LARGER PAREL BEFORE THE TAKING

Three approaches to value are considered. They are described as follows:

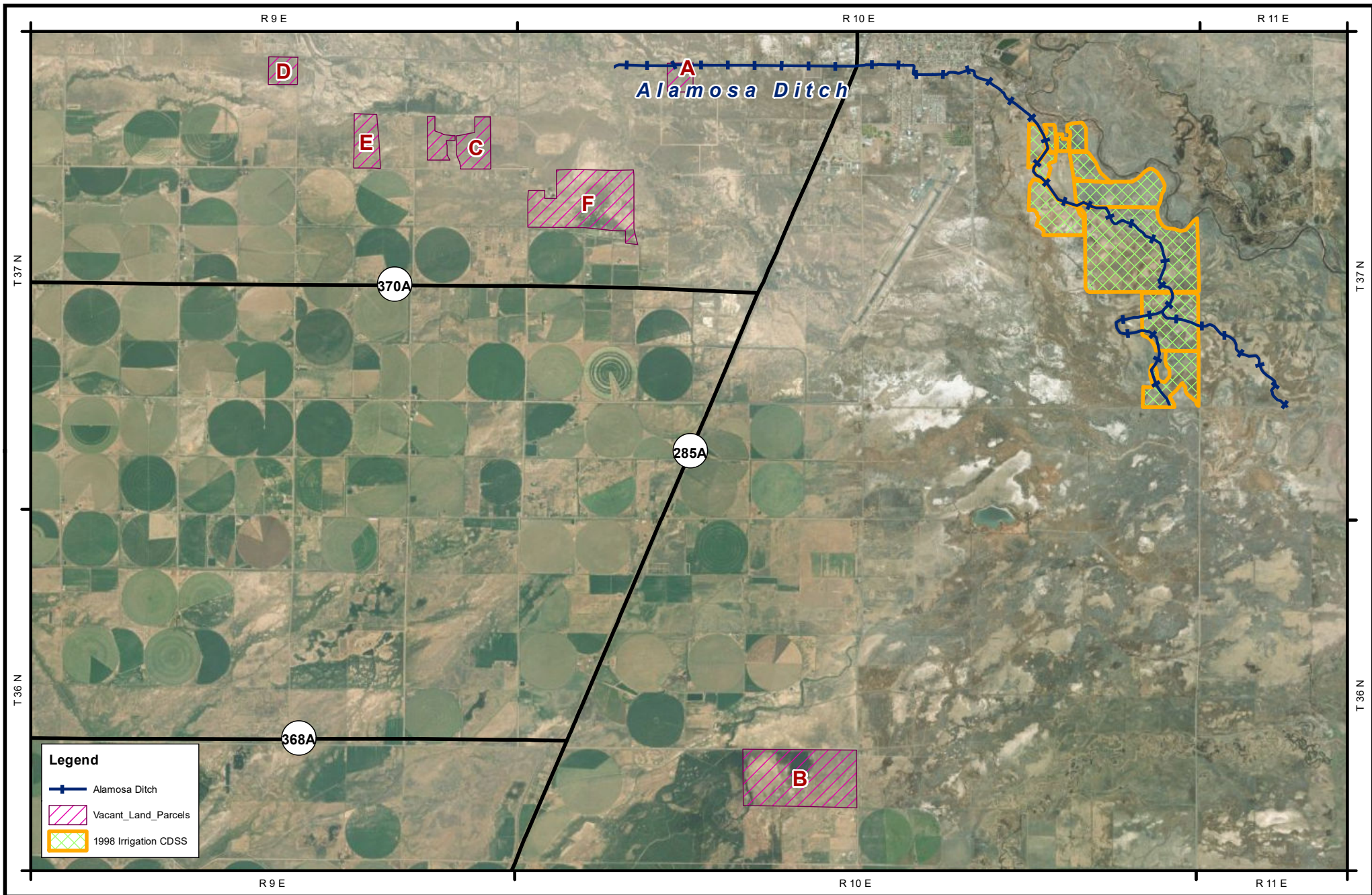
- In the **cost approach**, an estimated replacement cost of the subject as of the date of the appraisal is developed. Where applicable, depreciation from all sources is deducted from the replacement cost to which the land as vacant value is added. The total represents the subject value indicated by the cost approach.
- In the **sales comparison approach**, the subject is compared to other applicable recent sales. This method is most commonly used for appraisals when adequate data is available. Data for generally comparable sales are used, and comparisons are made to demonstrate a probable price at which the subject would be priced on the market.
- In the **income capitalization approach**, the current potential income value for the property interest is shown. The prospective net operating income is estimated. An applicable capitalization method and appropriate capitalization rate are developed and used in computations that lead to an indication of value.

9.1 Cost Approach

The cost approach gives the value of the ditch infrastructure and ditch rights-of-way which are a portion of the water rights value.

9.1.1 Land As Vacant

The Alamosa Ditch has a total length of approximately 24,590 lineal feet (approximately 4.65 miles) and with an estimated width requirement of 30 feet, the easement area is 16.94 acres. The existing Alamosa Ditch easement is encumbered by the ditch channel which diminishes the opportunity to use the land for many other uses. The identified sales of vacant land are shown on Figure 10 and are summarized in Table 9 in order of the recording date. To adjust sales for the time of sale, an escalation of 2.16 percent annually is used based on the average change in the Colorado non-irrigated cropland prices 2016-2020. The adjusted purchase price per acre (PPA) range from \$400 to \$1,830 per acre.



Path: Z:\Project Files\20\201-074\201-074.000\CAD-GIS\GIS\01_mxd\Figure_11_Vacant.mxd

Table 9
Sales of Vacant Dry Land

Adjustment	A	B	C	D	E	F
Grantor	HICKS SHEILA & SHAWN R	THS ENTERPRISES LLC	RUSSELL DANIEL M	LACY CAROL L	WOODMAN STANLEY DOUGLAS & CECIL ANNABELLE	MORGAN GARY H & ROBERTA L
Grantee	MONDRAGON LAWRENCE	BECHAVER JOSHUA a & BRUCE A	ROCKY MOUNTAIN HOME	ALICEA ROGER CARL	TAYLOR HUBERT GLEN JR & MARY ANN	SUTTON MARK S & CHRISTINA M
Reception No	377925	374965	374881	374394	372164	370478
Recording Date	9/10/2020	11/1/2019	10/25/2019	9/4/2019	1/22/2019	7/18/2018
Parcel	541317101002	555716100047	541113300019	541115100210	541114400309	541320200216
PLSS	17-37-10	16-36-10	13-37-9	15-37-9	14-37-9	19-37-10
Purchase Price	\$56,000	\$150,000	\$231,000	\$15,500	\$40,000	\$155,000
Time Adjusted Price to Nov '20	\$56,100	\$153,240	\$236,393	\$15,891	\$41,598	\$162,913
Acres	36.12	320	129.35	40	72.99	303.8
Price Per Acre	\$1,550	\$480	\$1,830	\$400	\$570	\$540

Sales Comparison A which abuts CR 8S sold in September 2020 and is the most recent sale. The Alamosa Ditch traverses west to east across the property as shown on Figure 11. This property is the most applicable to the Alamosa Ditch right-of-way as there is access to the ditch from adjacent roads as exists for much of the Alamosa Ditch. Sole reliance is placed upon this transaction. The purchase price for the 36.12-acre fee ownership of property was \$56,000 for a purchase price per acre of \$1,550. The Alamosa Ditch right-of-way gives the Ditch Company the right to convey its water rights and the right of access for ditch operation, maintenance, and repair. The value of the Alamosa Ditch right-of-way before the taking is estimated to be 50 percent of the fee simple land value of \$1,550 or \$775 per acre. For the 16.8-acre ditch right-of-way, the total value is \$13,000.

In the Ditch Carrying Capacity Easement the City seeks to acquire, the rights sought include the right to convey stormwater in the easement reach and to access the easement for restoration of capacity and for the operation, maintenance, and repair of the ditch in the easement reach. The operations the City seeks to conduct will not diminish the value of the Alamosa Ditch right-of-way. The Ditch Carrying Capacity Easement area to be encumbered by the City includes 14.52 acres. The volume of storm water the City seeks to convey is 176 AF while the average annual Hickory Jackson water right diversion is 1,632 AF. The stormwater volume represents approximately 10 percent of the total water volume ($176/(1,632+176) = 0.097$). The land as vacant value of the Ditch Carrying Capacity Easement the City seeks to acquire is \$1,100 (14.7 acres * \$775 per acre * 10 percent, rounded to nearest \$100).

Figure 11
Sales Comparison A



9.1.2 Replacement Cost New Less Depreciation

The estimated replacement cost for the Alamosa Ditch infrastructure and the physical depreciation is outlined in Table 10. The ditch cross sectional area of 30 square feet (sf) is based upon the Reynolds Engineering cross section 2 at the upstream side of Highway 285 that has a capacity of 36-cfs with 1-foot of freeboard at a flow area of approximately 30 sf. Downstream of the Highway and railroad crossings the ditch area is approximately 42 sf. The ditch estimated excavation volume in cubic yards (cy) is shown at the top of Table 10 with a total of 31,710 cy.

Table 10
Alamosa Ditch Cost Approach Before Taking

Ditch Reach	Length	Ditch Area, sf	Excavation Volume, cy
Diversion Structure to CR107S	3,100	30	3,440
CR107S to Highway 285	10,147	30	11,270
Hwy 285 Crossing	172		
RR Crossing	40		
RR Crossing to end of Ditch Carrying Capacity Easement	10,931	42	17,000
Total Length	24,390	Total Volume	31,710

Replacement Cost New				
	Amount	Unit	Unit Cost	Subtotal
Diversion Structure 30-inch culvert	1	L.S.	\$ 20,000	\$ 20,000
Headgate & Measuring Flume 6-ft width	1	L.S.	30,000	30,000
Culvert, 5 ft CMP	20	lf	160	3,200
Culvert 6 ft CMP	20	lf	200	4,000
Boring Hwy & RR Boring - 36" equiv., 250 lf	1	LS	600,000	600,000
Ditch excavation	31,710	cy	5.00	158,600
Subtotal				\$ 815,800
30% Engineering, Legal & Contingency				244,700
Total Costs				\$ 1,060,500
Ditch Right of Way	16.8	acre	\$ 775	13,000
Total Replacement Cost New (rounded)				\$ 1,073,500
Infrastructure (Depreciation Type)			Depreciation	
Diversion Structure 30-inch culvert (Physical)		50%	\$10,000	
Headgate & Measuring Flume 6-ft width (Physical)		50%	15,000	
Culvert, 5 ft CMP (Physical)		50%	1,600	
Culvert, 6 ft CMP (Physical)		50%	2,000	
Hwy & RR crossing (Physical)		50%	300,000	
Ditch (Functional) (34 cfs-21cfs)/34 cfs = 0.38		38%	60,300	
Total Estimated Depreciation (rounded)				(388,900)
Ditch Infrastructure & Easement				
Replacement Cost New Less Depreciation				\$ 684,600

RSMeans Cost
Data Ref. (Other)

334211402160
-
334211402220
334211402240
(Boring Contractor)
312316131360

Unit costs for the replacement cost new are based on data from the RS Means Heavy Construction on-line data for year 2020, Alamosa. A 30 percent allowance for engineering, legal and construction contingency along with the value of the Alamosa Ditch easement area of \$13,000 is included giving a total replacement cost new of \$1,073,500.

The physical culvert and flume structures are estimated to be at 50 percent of their design life. The ditch functional depreciation is based upon the percentage of ditch capacity in the reach above the highway. The total depreciation is estimated to be \$388,900. The replacement cost new less depreciation is \$684,600.

The indicated value of the Alamosa Ditch infrastructure and ditch right-of-way before the taking from the cost approach as of the effective date of November 25, 2020 is \$684,600.

9.2 Sales Comparison Approach Before Ditch Carrying Capacity Easement Taking

The Alamosa Ditch larger parcel includes the water rights, and the value of a water right includes the infrastructure and right-of-way components necessary to deliver the water. The search for transactions with water rights in the vicinity of the Alamosa Ditch included review of Alamosa County Assessor Office sales and Clerk and Recorder Office records for years 2018 through October 2020. Verified or confirmed sales of vacant land of 35 acres area or greater were identified. To arrive at the value of water rights which includes their delivery system and ditch rights-of-way, the value of improvements, such as wells or center pivots, and the value of dry land are deducted from the purchase price to arrive at the value of the water right.

To adjust sales for the time of sale, an adjustment of 2.19 percent annually is used based on the average change in Colorado irrigated land values between 2016 and 2020.

The vacant land sales used to adjust the water right are summarized in Table 11 with the locations as shown on Figure 10 (page 33). The time adjusted prices per acre range from \$400 to \$1,830. Transactions A and C are not relied upon, as Sale A is along the paved CR 8S and close to Alamosa. Sale C is land slated for residential subdivision. The remaining four vacant land sales are more similar to the land in the vicinity of the Alamosa Ditch irrigated land areas and are weighted equally giving a vacant land adjustment of \$500 per acre.

Table 11
Sales of Vacant Dry Land

Adjustment	A	B	C	D	E	F
Grantor	HICKS SHEILA & SHAWN R	THS ENTERPRISES LLC	RUSSELL DANIEL M	LACY CAROL L	WOODMAN STANLEY DOUGLAS & CECIL	MORGAN GARY H & ROBERTA L
Grantee	MONDRAGON LAWRENCE	BECHAVER JOSHUA a & BRUCE A	ROCKY MOUNTAIN HOME	ALICEA ROGER CARL	TAYLOR HUBERT GLEN JR & MARY ANN	SUTTON MARK S & CHRISTINA M
Reception No	377925	374965	374881	374394	372164	370478
Recording Date	9/10/2020	11/1/2019	10/25/2019	9/4/2019	1/22/2019	7/18/2018
Parcel	541317101002	555716100047	541113300019	541115100210	541114400309	541320200216
PLSS	17-37-10	16-36-10	13-37-9	15-37-9	14-37-9	19-37-10
Purchase Price	\$56,000	\$150,000	\$231,000	\$15,500	\$40,000	\$155,000
Time Adjusted Price to Nov '20	\$56,100	\$153,240	\$236,393	\$15,891	\$41,598	\$162,913
Acres	36.12	320	129.35	40	72.99	303.8
Price Per Acre	\$1,550	\$480	\$1,830	\$400	\$570	\$540
Indicated Value Dry Land per acre	\$500					

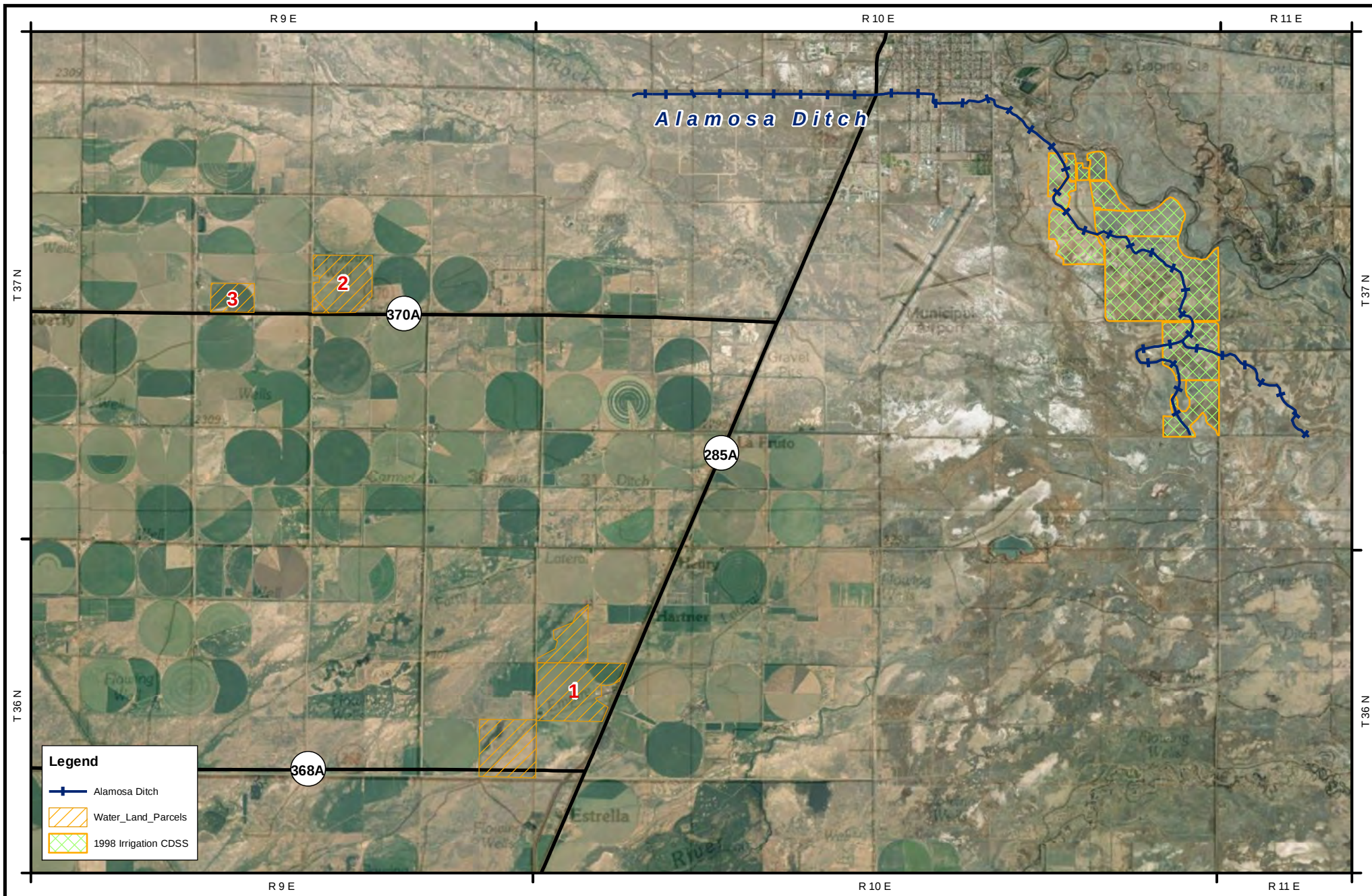
Table 12 is a summary grid outlining the three sales comparisons with the locations shown on Figure 12. The three transactions all include shares of The Commonwealth Irrigation Company (Commonwealth) which has an average annual river diversion per share of approximately 76 AF and after a 35 percent ditch loss, a farm headgate yield of approximately 49 AF per share. The dry year yield of Commonwealth is about 75 percent of the average yield, substantially higher than the dry year yield of the Alamosa Ditch which is approximately 21 percent of the average yield. A negative adjustment of 10 percent is made for the superior surface water rights yield.

The purchase price per acre ranges from \$3,121 to \$3,340. The amount of irrigated land is from CDSS and review of aerial imagery. In addition to surface water rights, the three Grantees properties all have an irrigation well and are participants in the Alamosa-La Jara Subdistrict 6 for replacement of groundwater depletions. A groundwater pumping adjustment is not made for Sales Comparison 2 as the groundwater can be used on an adjacent property owned by the Grantee and was the motivation for the purchase. The estimate of consumptive use is based upon the minimum of 1) the irrigated area x 2.14 AF/acre and 2) the total water diversion x irrigations efficiency (83% for sprinkler and 60 percent for flood). A time adjustment was made to the sales price at an annual rate of 2.19 percent based on the average annual change in the USDA reported change in Colorado irrigated cropland between 2016 and 2020. A negative adjustment is made for the total land area at the vacant land price of \$500 per acre. Adjustments are also made for the well/s and center pivot

irrigation systems. The adjusted total reflects the water value which is also expressed in terms of value per AF of HCU. The details of the three transactions are summarized in Tables 13-15.

Table 12
Summary Grid of Sales Comparisons

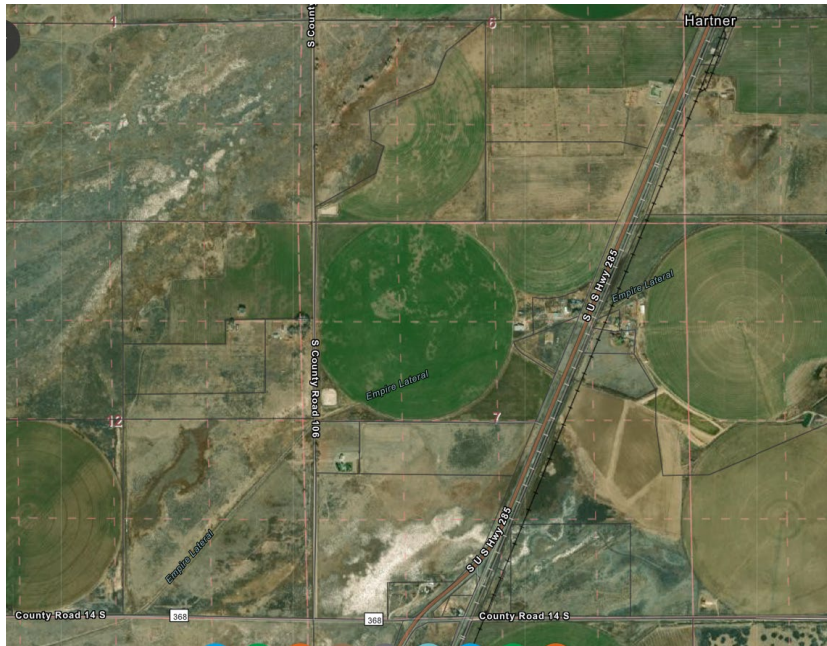
	Subject	1	2	3
Table No.		13	14	15
Grantor	The Hickory-Jackson Company	Gallegos, Timothy J	Heersink, Theodore J and Barbara N	Sandoval, Daniel L and Henderson, H Marie
Grantee		Mt. Valley Farm, LLC	Schneider, Curtis J and Candace G	Fransen, Dale R and Keri D
Reception		374053-55	365870-72	366522-24
Recording Date		7/31/2019	4/5/2017	6/14/2017
Document		WD, BSD,DT	WD, QCD,DT	WD, QCD, DT
PLSS		portions 6&7-36-10; 12-36-9	SW4 23-37-9	S2 SW4 22-37-9
Parcel No.		555707100140, 555912400046, 555706400137	540023403004, 540023403002	541122300006
Area, acres		448.52	154.3	61.38
Purchase Price		\$1,400,000	\$510,000	\$205,000
PPA		\$3,121	\$3,305	\$3,340
Irrigated Land, area	1034	260	130	61
Water rights	Alamosa Ditch	4 sh. Commonwealth Irrigation Co.	4 sh. Commonwealth Irrigation Co., 0.000445 units SLVWO, Waverly Drain, 1 pumping permit	2 sh. Commonwealth Irrigation Co.
Groundwater rights	N.A.	1 active & 1 nonactive irrigation wells, 5 stockwater wells	1 active irrigation well, 2 additional wells	1 irrigation well
Estimated HCU, AF	800	314	278	106
Adjustments				
Time of Sale		\$1,438,429	\$550,173	\$220,335
Land		(\$224,260)	(\$77,150)	(\$30,500)
Wells		(\$65,000)	(\$40,000)	(\$10,000)
Center Pivots		(65,000)	(\$30,000)	-
Groundwater Fee		(119,333)	\$0	(\$37,089)
Dry Year/Average Yr	0.21	0.75	0.75	0.75
Dry year yield		(\$96,484)	(\$40,302)	(\$14,275)
Total Water Value		\$868,353	\$362,722	\$128,472
Indicated Water Value per AF HCU		\$2,766	\$1,304	\$1,215
Sales Weighed Equally		\$1,760		
Indicated Value		\$1,408,000		



Path: Z:\Project Files\20\201-074\201-074.000\CAD-GIS\GIS\01_mxd\Figure_12_Water.mxd

Table 13 Sales Comparison 1

Grantor	Gallegos, Timothy J			
Grantee	Mt. Valley Farm, LLC			
Reception	374053-55			
Recording Date	7/31/2019			
Document	WD, BSD,DT			
PLSS	portions 6&7-36-10; 12-36-9			
	Parcel 1 (SD #6)	Parcel 2	Parcel 3 (SD #6)	Total
Parcel No.	555707100140	555912400046	555706400137	
Area, acres	209.42	160	79.1	448.52
Purchase Price	\$1,400,000			
PPA	\$3,121			
	FHG, AF			
The Commonwealth Irrigation Company	4 sh @ 49 AF FHG Delivery/sh	196		
Well No. 1 (WDID 2105134)		182	378 AF/293 ac = 1.29	AF/acre
		378		
Irrigated Land	260			
Historical Consumptive Use (83% irr. efficiency)		314		
Wells adjudicated W-0581	Permit No.	gpm	Use	
Well No. 1 (WDID 2105134)	3910-F	2,000	irrigation	1800' depth, 1963
Well No. 2 (WDID 2009327)	4596	1,000	irrigation	850' depth, 1957 No div record
Well No. 3 (WDID 2009328)	51731	50	stockwater	600' depth, 1935 Active but no
Well No. 4 (WDID 2009329)	51724	50	stockwater	600' depth, 1936 div record
Well No. 6	51726	5	stockwater	300' depth, 1933
Well No. 7	51721	5	stockwater	
Well No. 8	51727	5	stockwater	
Confirmation	Cleave Simpson			
	Property is adjacent to other property owned. Previously had leased from Gallegos who wanted to sale to concentrate on his business. Lease 1 additional sh of Commonwealth			



\$1,400,000

Adjustments:	
Time Adjustment	\$1,438,429 1.25 yrs @ 2.19%
Dry Land	(224,260) 458.52 ac @ \$500
7 wells	(65,000) 1 active & 1 inactive irrigation wells, 5 stock wells
Center pivots	(65,000) Full, 20+ yrs 30K, half 20+ yrs \$15K, half 10 yr \$20 K
Groundwater fee	(119,333) 182*0.83*\$25 = \$3,7982/yr, P/A 3%, 100 yrs = 31.5989
Dry year yield	(96,484) Superior (Dry/Average = 0.75), 10% negative
Total water value	\$868,352
Water Value per AF HCU	\$2,766

Table 14
Sales Comparison 2

Grantor	Heersink, Theodore J and Barbara N			
Grantee	Schneider, Curtis J and Candace G			
Reception	365870-72			
Recording Date	4/5/2017			
Document	WD, QCD,DT			
PLSS	SW4 23-37-9			
Parcel No.	1	2	Total 1 & 2	
Parcel No.	540023403004	541123403002		
Area, acres	147.84	6.46	154.3	
Purchase Price	\$510,000			
PPA	\$3,305			
Irrigated Land, acres	130			
Potential CU, AF	283	Irr. Water Req't = FHG	472	
1. The Commonwealth Irrigation Company	4 sh @ 49 AF FHG Delivery/sh	196	1.5	ft/acre
2. Waverly Drain District (Waverly Seepage Ditch, Priority 1959-14)	1 pumping permit, no div records			
3. Well No. 1, Case W-149, Permit No. 20916-R (WDID 2008569)		195	1,787 ft, 2,480 gpm, 16-inch, 1956	
The San Luis Valley Irrigation Well Owners, Inc. (SLVIWO)	0.000445 units* 1,405,914 gpm/unit = 626 gpm			
Well No. 2, Case W830, Permit No.12868-R (WDID 2009728)	Active no div records		500 ft, 50 gpm, 4-inch 1937	
Well No. 1, Case W830, Permit No.12866-R (WDID 2009727)	Inactive		600 ft., 200 gpm, 6-inch 1937	
		391		
	HCU	278		
Confirmation	Curtis Schneider			
	Owns adjacent property to north which had a right to a portion of Well No 2			



Time Adjustment	\$550,173	3.5 yrs @	2.19%
Dry Land	(77,150)	154.3 ac. @	\$500
Ctr Pivot	(40,000)		
Wells	(30,000)		
Groundwater Pumping Fee	-	Groundwater used on adjacent property, No adjustment made	
Dry year yield	(40,302)	Superior (Dry/Average = 0.75), 10% negative	
Water Value	\$362,721		
Water Value per AF HCU	\$1,304		

Table 15
Sales Comparison 3

Grantor	Sandoval, Daniel L and Henderson, H Marie			
Grantee	Fransen, Dale R and Keri D			
Reception	366522-24			
Recording Date	6/14/2017			
Document	WD, QCD, DT			
PLSS	S2 SW4 22-37-9			
Parcel No.	541122300006			
Area, acres	61.38			
Irrigated area	61			
Purchase Price	\$205,000	\$175,000	\$30,000 well improvements	
PPA	\$3,340			
The Commonwealth	2 shares @ 49 AF	98 AF	1.6	ft/acre
Irrigation Company	FHG Delivery/sh			
W-650, Well No. 1, Well				
Permit No. 15486-R,		78 AF	560 ft, 500 gpm, 8-inch, 1957	
WDID 2005194				
		176 AF		
Min(HCU 60% efficiency or 61.38 ac * 2.14 ft)		106 AF HCU		
Confirmation	Dale Fransen			
	Had farmed property for years & wanted to increase land. He contributed \$30,000 for well.			
	Was flood irrigated at time of purchase. He installed a center pivot system after purchase.			



\$205,000

Adjustments:

Time Adjustment	\$220,335.17 3.33 yrs @ 2.19%
Dry Land	(\$30,500) 61.38 ac @ \$500
1 well	(\$10,000)
Groundwater Fee	(\$37,089) 78*0.60*\$25 \$1,174, P/A 3%, 100 yrs = 31.5989
Dry year yield	(\$14,275) Superior (Dry/Average = 0.75), 10% negative
Total water value	\$128,471
Water Value per AF HCU	\$1,215

The indicated values per AF HCU range between \$1,215 and \$2,766. The three sales are weighed equally for an indicated unit value of \$1,760 per AF HCU. The indicated value of the Alamosa Ditch Before Easement Taking from the sales comparison approach for the estimated HCU of approximately 800 AF and a unit value of \$1,760 per AF gives a value of:

\$1,408,000

9.3 Income Capitalization Approach Before Taking

The income capitalization approach before the easement taking was considered but was not used as there is inadequate data for market rent.

9.4 Reconciliation Value Larger Parcel Before Taking

The cost approach is the most appropriate approach to arrive at the value of the Ditch Carrying Capacity Easement; however, the cost approach does not include the value of the Alamosa Ditch water right which is a part of the larger parcel. The sales comparison approach does include the value of the water right along with its delivery infrastructure and ditch right-of-way. The indicated value from the cost approach is \$686,200 and the value from the sales comparison approach is \$1,408,000.

The indicated value of the Alamosa Ditch larger parcel before taking from the sales comparison approach as of the effective date of November 25, 2020 is:

\$1,408,000

10.0 VALUE EASEMENT AS PART OF LARGER PARCEL BEFORE TAKING

The City is not acquiring Hickory-Jackson water rights and therefore, the water rights are not included in the easement value as part of the larger parcel before taking. The ditch carrying capacity easement being taken includes 14.7 acres of the total 16.8 acres total Alamosa Ditch easement land and a portion of the ditch carrying capacity. The ditch carrying capacity easement does not include the diversion structure, headgate, flume, or the 6-foot and 5-foot culverts but does include a portion of the highway/railroad crossing and the earthen ditch channel. The estimated average annual stormwater discharge to the Alamosa Ditch is 176 AF (Table 5) and the average

annual diversion by the Alamosa Ditch is 1,632 AF (Table 2) for a total average annual flow in the ditch of 1,808 AF. The stormwater discharge is approximately 10 percent (rounded from 9.7 %). The value of the ditch carrying capacity easement as part of the larger parcel is outlined in Table 16 and totals \$47,100.

Table 16
Value of Easement as Part of the Larger Parcel Before Taking

Item	Total Qty.	Unit	Total Value	Part Taken	Replacement Cost New	Depreciation	Replacement Cost New Less Depreciation
Highway/Railroad Crossing	1,808	AF/yr	\$600,000	10%	\$ 60,000	50%	\$ 30,000
Total Ditch Channel	31,710	cy	158,600				
Easement Reach	28,270	cy	141,350	10%	14,100	38%	5,400
Subtotal					\$ 74,100		\$35,400
30% Eng, Legal & Contingency					22,200		10,600
Total					\$ 96,300		\$46,000

Replacement Cost New Less Depreciation	\$46,000
14.7 acres of easement @ \$775 * 10%	\$1,100
Total	\$47,100

11.0 IDENTIFICATION OF DITCH CARRYING CAPACITY EASEMENT TAKING

The Alamosa Ditch Carrying Capacity Easement is described in Section 2.0.

12.0 HIGHEST AND BEST USE AFTER TAKING

The use of the ditch rights-of-way for conveying stormwater is legally permissible when 1) in terms of water law, the stormwater from a detention facility meets the Senate Bill 15-212 release timing criteria (72-hours and 120-hours) as described in Section 7.4; or alternately, depletion due to evaporation from the ponds is augmented; and 2) discharge and permitting standards are met.

The use of the Alamosa Ditch for irrigation is physically possible as evidenced by its continued use. Currently the ditch capacity is reduced along CR 8S due to overgrowth of vegetation in the ditch and in some locations, trees. The ditch capacity with removal of sediment and vegetation and a 1-foot freeboard could be restored to 36 cfs (Table 3), the calculated Highway 285 culvert capacity. Removal of vegetation and sediment to restore the capacity is physically possible.

Stormwater policies of governmental agencies are typically to discourage or prohibit discharge of stormwater into irrigation ditches due to concerns of overtopping of ditches, especially if there is not a controlled spillway for excess water. Irrigation ditch owners have the same concerns and also have water quality concerns. The City will monitor Alamosa Ditch flow to determine sufficient ditch capacity exists before pumping and discharging stormwater to the ditch and the stormwater ponds will have adequate capacity to store stormwater runoff in excess of the historic runoff at times when there is not sufficient excess ditch capacity.

The Alamosa Ditch average diversion over the period of record is 11.6 cfs (1,632 AF/(71 days*1.98 cfs per AF-d)). The pumping of storm water to the ditch can be limited to times when there is excess ditch capacity. Use of the Alamosa Ditch for storm water carriage in addition to irrigation use or other uses is physically possible.

12.1 Financially Feasible

The continued use of the Alamosa Ditch for irrigation use is financially feasible based upon its current use though ditch cleaning is needed to improve water delivery. The Alamosa Ditch with its 1934 Priority is junior as is evidenced by its low or no diversions in dry years which makes the use of the water right for augmentation unlikely. The use of the Alamosa Ditch for irrigation and the use of excess capacity for carrying stormwater is financially feasible. The financially feasible uses include irrigation use and stormwater carriage in the ditch.

12.2 Maximally Productivity

The maximally productive use of the Alamosa Ditch is the combined irrigation use and stormwater conveyance use in the ditch. After considering the above, and data review and analysis, the highest and best use of the Alamosa Ditch easement is combined irrigation and stormwater conveyance use.

The legally permissible, physically possible, and financially feasible uses of the Alamosa Ditch after the Ditch Carrying Capacity Easement taking are similar to the before taking but with a lengthened easement and an additional stormwater volume. With regard to maximally productivity, the City, as part of easement taking, will restore ditch capacity in the easement reach

above Highway 285 and will perform maintenance along the easement discharge reach. Due to the reduced operation costs with the stormwater discharge easement, irrigation use and ditch carrying capacity use are the maximally productive uses.

13.0 VALUE AFTER THE TAKING

13.1 Cost Approach After Ditch Carrying Capacity Easement Taking

In the after taking condition, the cost approach is the same as in the before condition except that the ditch physical depreciation in the ditch carrying capacity easement reach estimated at \$60,800 is cured by the City upstream of Highway 285 to CR 107S as per the easement agreement sought. The cost approach indicated value after taking is outlined in Table 17. The Replacement Cost New is unchanged from the before condition. The City restores ditch capacity in curing the ditch functional depreciation at an estimated cost of \$60,300. The cost approach indicated value in the after taking of the Ditch Carrying Capacity Easement is \$744,900, a portion of the total water rights value.

Table 17
Alamosa Ditch Cost Approach After Taking

Replacement Cost New					RSMean Cost Data Ref. (Other)
	Amount	Unit	Unit Cost	Subtotal	
Diversion Structure 30-inch culvert	1	L.S.	\$ 20,000	\$ 20,000	334211402160
Headgate & Measuring Flume 6-ft width	1	L.S.	30,000	30,000	-
Culvert, 5 ft CMP	20	lf	160	3,200	334211402220
Culvert 6 ft CMP	20	lf	200	4,000	334211402240
Boring Hwy & RR Boring - 36" equiv., 250 lf	1	LS	600,000	600,000	(Boring Contractor)
Ditch excavation	31,710	cy	5.00	158,600	312316131360
Subtotal				\$ 815,800	
30% Eng, Legal & Contingency				244,700	
Total Construction Costs				\$ 1,060,500	
Easement Area	16.8	acre	\$ 775	13,000	
Total Replacement Cost New (rounded)				\$ 1,073,500	
Infrastructure (Depreciation Type)			Depreciation		
Diversion Structure 30-inch culvert (Physical)		50%	\$10,000		
Headgate & Measuring Flume 6-ft width (Physical)		50%	15,000		
Culvert, 5 ft CMP (Physical)		50%	1,600		
Culvert, 6 ft CMP (Physical)		50%	2,000		
Hwy & RR crossing (Physical)		50%	300,000		
Ditch - Depreciation Cured		0%	0		
Total Estimated Depreciation (rounded)				(328,600)	
Ditch Infrastructure & Easement Replacement Cost New Less Depreciation				\$ 744,900	

13.2 Sales Comparison Approach After Taking

The Alamosa Ditch value from the sales comparison approach in the after taking is the before taking value of \$1,408,000 (Table 12) less the easement part taken value of \$47,100 (Table 16) or \$1,360,900. The sales comparison approach after taking as of the effective date of November 25, 2020 is:

\$1,360,900.

13.3 Income Capitalization Approach After Acquisition

The income capitalization approach before acquisition was considered but was not used as there is inadequate data for market rent.

13.4 Reconciliation Remaining Value After Taking

Reliance is placed upon the sales comparison approach to determine the value of the Alamosa Ditch after the taking. The value of water from the sales comparison approach reflects the value of the water right along with its delivery infrastructure less the easement part taken value. The indicated value of the Alamosa Ditch after taking as of the effective date of November 25, 2020 is:

\$1,360,900.

14.0 ALLOCATION OF JUST COMPENSATION

Table 18 provides a summary of the allocation of just compensation. There are no damages to the Alamosa Ditch due to the ditch carrying easement. The City, under terms of the ditch carrying capacity easement, restores the capacity of the ditch which is a positive influence. The just compensation value is \$47,100.

Table 18
Allocation of Compensation

1)	Value of the Larger Parcel (Table 12) 800 AF @ \$1,760/AF		\$1,408,000
2)	Value of the property being taken, as part of the entire property (Table 16)	\$46,000	
	14.7 acres of easement @ \$775 * 10%	\$1,100	
	Permanent Easement		\$47,100
3)	Value of the remaining property before the taking (1 -2)		\$1,360,900
4)	Value of the remaining property after the taking		\$1,360,900
5)	Damages to the Remainder	0	
	Special Benefits	0	
	Permanent Easement	\$47,100	
			\$ 47,100

15.0 QUALIFICATIONS OF APPRAISER

Patricia K. Flood, P.E. has a B.S. Degree in civil engineering from the University of Kansas, is a registered professional engineer, and is a certified general appraiser in Colorado, New Mexico, Texas, and California. She has prepared numerous appraisals of water rights and water and wastewater facilities throughout Colorado and other states. She has performed water rights analyses and appraisals in the San Luis Valley. Patricia has provided expert testimony in water court and in civil court. She was a co-author of the book, *Water Rights Handbook for Colorado Conservation Easements, Colorado Water Trust for Conservation Organizations*. She has been a speaker at several Continuing Legal Education seminars on water rights valuation. Patricia is author of the chapters “Water Rights of the 50 States and Territories” and “Water Rights of the Eastern United States” in the American Water Works Association manuals on water rights.

The curriculum vitae of Patricia K. Flood, P.E. is given in Addendum F.

Z:\Project Files\20\201-074\201-074.000\Engineering\7. Appraisal\Report_06022021.docx

Site Visit October 13, 2020



1. Alamosa Ditch diversion from Rock Creek



2. Alamosa Ditch 6-foot throat width measuring flume



3. 6-foot diameter culvert on Alamosa Ditch near CR107



4. From Photo 3 culvert looking down gradient on the Alamosa Ditch.

Site Visit October 13, 2020



5. Along CR8S looking west along Alamosa Ditch



6. Alamosa Ditch approximately near CR108/Foster Avenue



7. Near CR108/Foster Avenue looking east along Alamosa Ditch



8. Looking west along Alamosa Ditch

Site Visit October 13, 2020



9. West of Highway Frontage Road trees and vegetation along Alamosa Ditch



11. Current City maintained reach of Alamosa Ditch in vicinity of 4" diameter force main discharge to ditch



10. Entrance to 5' W x 3' H corrugated metal pipe (CMP) culvert crossing of Hwy 285. 18" CMP discharge to ditch.



12. From 13th & Edison looking west at Alamosa Ditch along City maintained reach.

Addendum A
Ditch Carrying Capacity Easement
City Seeks to Acquire

DITCH CARRYING CAPACITY EASEMENT DEED AND AGREEMENT

The Hickory-Jackson Ditch Company ("Grantor"), for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, hereby sells, conveys, and quitclaims to the City of Alamosa, Colorado ("Grantee"), a perpetual, non-exclusive, easement for use of the carrying capacity of a defined segment of the Alamosa Ditch, otherwise known as the Hickory-Jackson (the "Ditch") to convey storm water (the "Easement") arising within the City of Alamosa.

1. *Location.* The Easement encompasses carrying capacity in the Ditch from its intersection with County Road 107 South (western end of segment) to the intersection with the south line of the North ½ Section 14, Township 37 North, Range 10 East of the New Mexico Principal Meridian. See map attached as EXHIBIT A.
2. *Use.* Grantee shall have the right to use the Easement to carry storm water from the City of Alamosa to the eastern terminus of the Easement, from which point Grantee may further convey the storm water to the Rio Grande through other structures not the subject of this Easement, or Grantor may, at its option and if not prohibited by the division engineer or other authority having jurisdiction, further use the storm water in its system. Grantee and its agents, employees and contractors shall have full right and authority to enter the Easement at all times for the purposes set forth in this Easement Deed and Agreement, including to make the modifications listed in paragraph 3, to repair and maintain the Ditch, to restore the capacity of the Ditch, and to use the Easement for reasonable access for personnel and equipment. Non-use or a limited use of the Easement by Grantee shall not prevent Grantee from thereafter making use of the Easement to the full extent authorized. This is a non-exclusive easement, and Grantor retains the right to use the Ditch in any manner that does not unreasonably interfere with Grantee's use of the Easement as described herein.
3. *Modifications by Grantee to Facilitate Use of Easement.* Grantee shall have the right to make the following modifications to the Ditch in the Easement segment to facilitate its use to convey storm water:
 - a. Provide a rip-rap lining of the Ditch at points of discharge of storm water;
 - b. Install a total of six (including existing discharge points) discharge points on the Ditch at locations to be determined by the Grantee, between Old Airport Road and County Road 107 S;
 - c. Remove trees and willows along the Ditch banks.
 - d. Install measuring devices, and metered discharges from the Ditch, so as to be able to monitor capacity in the Ditch, measure storm water introduced to the Ditch and to deliver such storm water out of the Ditch to the Rio Grande, with appropriate deductions for seepage and evaporation, if necessary to satisfy requirements by the state or division engineer. If Grantee undertakes any such measurement and delivery of storm water into and out of the Ditch, Grantee shall pay the cost of any engineering

work reasonably deemed necessary by the Grantor to ensure that no injury accrues to Grantor by virtue of such measurement and delivery.

All of such permitted modifications in the Ditch shall be done with good quality materials and in a workmanlike manner.

4. *Repair and Maintenance.* Grantee shall cut weeds on the tops and outside slopes of the Ditch, and shall spray the weeds on the Ditch, throughout the course of the Easement, all such maintenance shall be at the sole expense of Grantee, except if the Grantor requires certain chemicals to be sprayed other than those Grantee typically uses for weed control, in which case such particular chemicals shall be provided at the expense of Grantee. In addition, Grantee shall keep the Ditch reasonably free from all sediment and debris accumulating in the Ditch throughout the course of the Easement.
5. *Ditch Capacity.* Within six months after full execution of this Easement Deed and Agreement, Grantee shall restore the capacity of the Ditch to at least 34 cfs between County Road 107 S and U.S. Highway 285 by removing vegetation and sediment. Throughout the course of the Easement, Grantee shall monitor capacity in the Ditch, and the combined stormwater pumping rate from all of Grantee's discharge locations shall not exceed 18 cfs.
6. *Assurance of Water Quality.* Grantee will perform a water quality analysis of the water in the Ditch at a point downstream of Grantee's last introduction of storm water and upstream of any of Grantor's subsequent diversions out of the Ditch once every three years after a storm water event to test the storm water introduced into the Ditch for the list of water quality parameters as described in the Colorado State University Extension Colorado Water Institute Water Quality Interpretation Tool – Colorado – Irrigation Water (found online at <https://erams.com/wqtool/>) and four additional parameters: total ammonia, total nitrogen, chlorine and sulfide. Those results will be compared to CDPHE Water Quality Control Commission Applicable Standards for Irrigation Water. In the event Grantee's storm water discharge causes the water in the ditch to exceed applicable CDPHE standards, Grantee shall propose a method to bring the storm water discharge into compliance within four months of the test showing the exceeded parameter. Grantee shall provide engineering reasonably acceptable to Grantor assessing the proposed solution, and will implement the solution within one month of Grantor's approval of the solution, or diligently pursue such implementation until complete. In the event the storm water discharge cannot be brought within the CDPHE standards, the Easement will terminate one year from the date the determination is made that the discharge cannot be brought into compliance.
7. *Grantor's Modification to Ditch Location.* The location of the Ditch may be changed by Grantor in its discretion and at its expense. If any change in location of the Ditch requires Grantee to incur costs to modify its discharge points, Grantor shall pay all such costs unless the change to location of the Ditch is occasioned by requirement of any authority having

jurisdiction, in which case Grantee shall bear all costs relating to relocation of its discharge points, and shall share proportionately in the cost of relocating the segment of the Ditch encompassed by the Easement in the same proportion as the amount of storm water discharged to the Ditch over the preceding five full calendar years bears to the total amount of water (including storm water and irrigation water) carried by the ditch over that five year period.

8. *Successors and Assigns Bound.* The provisions of this Easement shall run with the land, and shall be binding on and burden the Ditch and shall be binding upon and shall inure to the benefit of all persons claiming an interest in the Ditch, or any portion thereof, through the parties hereto, including the heirs, executors, personal representatives, successors, and assigns of the parties.
9. *No Waiver.* No amendment, modification or supplement of this Easement shall be binding on Grantee unless made in writing and executed by an authorized representative of Grantee. No waiver by Grantee of any provision hereof shall be deemed to have been made unless made in writing and signed by an authorized representative of Grantee. No delay or omission in the exercise of any right or remedy accruing to Grantee upon any breach shall impair such right or remedy or be construed as a waiver of any such breach or of a subsequent breach of the same or any other term, covenant or condition herein contained.
10. *Entire Agreement.* This Easement incorporates all agreements between the parties as to the subject matter of this Easement and no prior representations or statements, verbal or written, shall modify or supplement the terms of this Easement. This Easement consists of the document entitled "Ditch Carrying Capacity Easement Deed and Agreement" and an Exhibit A containing a map and description of the Easement. No other exhibit, addendum, schedule or other attachment (collectively "Addendum") is authorized by Grantee, and no Addendum shall be effective and binding upon Grantee unless executed by an authorized representative of Grantee.

The remainder of this page is intentionally left blank.

IN WITNESS WHEREOF, Grantor and Grantee have executed this Easement Deed and Agreement this ____ day of _____, 2021.

CITY OF ALAMOSA

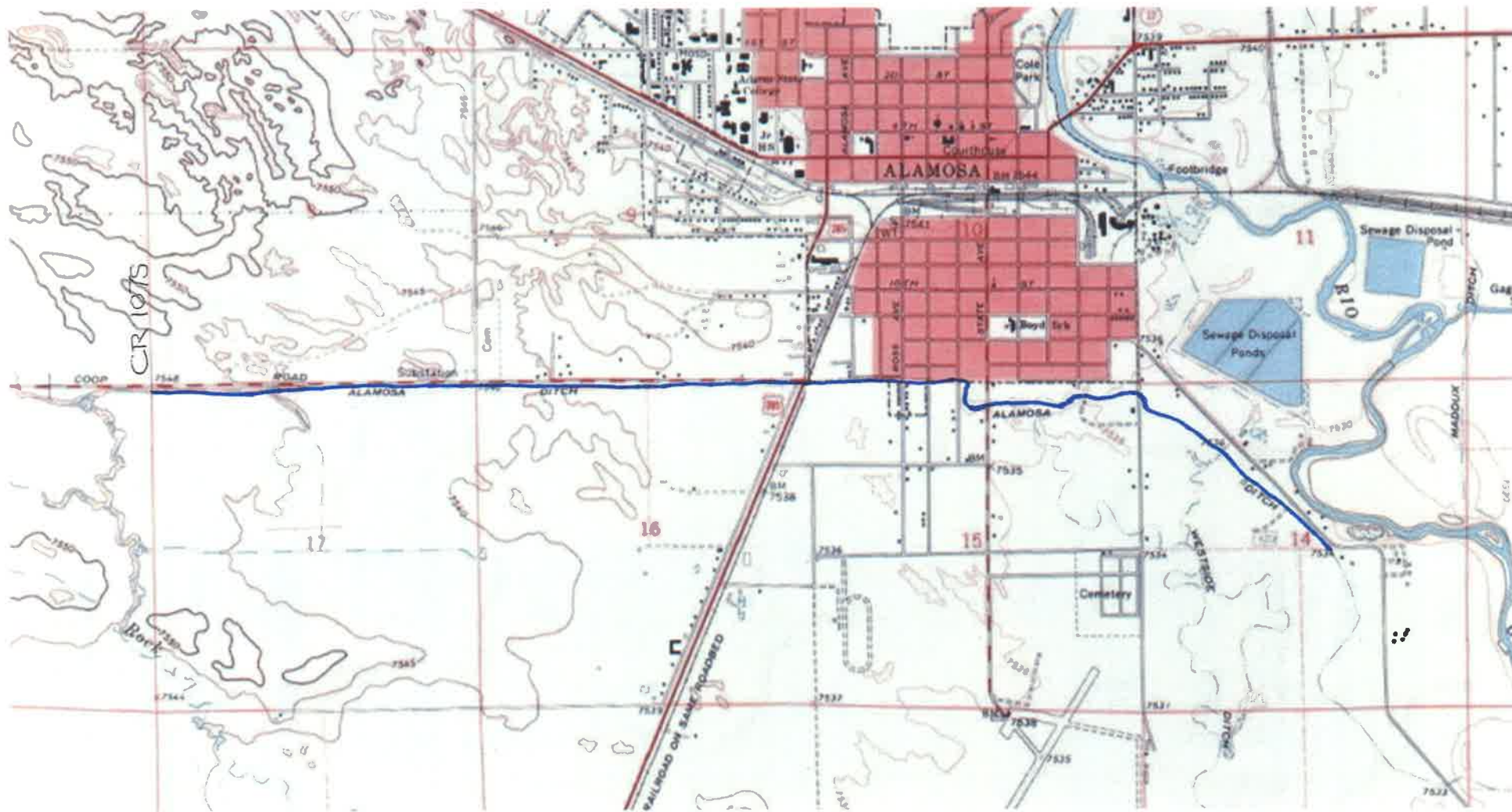
BY _____ (date) _____
Heather Brooks, City Manager

ATTEST _____
Holly C. Martinez, City Clerk

HICKORY-JACKSON DITCH COMPANY

By _____ (date) _____
Jeff Martinez, President

ATTEST _____
_____, Secretary



— Alamosa Ditch Carrying Capacity Easement Reach

EXHIBIT A

Addendum B
May 26, 1983 Agreement. City of Alamosa and
Hickory-Jackson Ditch Company

AGREEMENT

THIS AGREEMENT, Entered into this 26th day of May, 1983, between the City of Alamosa, hereinafter sometimes called, "City;" and

The Hickory-Jackson Ditch Company, hereinafter sometimes called, "Company;"

WITNESSETH:

THAT WHEREAS, City needs to improve its facilities for the removal of dangerous storm water which may arise, from time to time;

WHEREAS, Company is willing to make certain of its facilities available for the City's said purpose, upon certain terms and conditions;

NOW, THEREFORE, in consideration of the premises, the adequacy and sufficiency of which is hereby acknowledged, the parties agree as follows:

1. The City may use the Alamosa Ditch, property of the Hickory-Jackson Ditch Company, which runs through Alamosa, Colorado, as a facility to remove storm water from the City. In preparation of the same, the City may make the following changes in the Alamosa Ditch:

- a. May provide a rip-rap lining of the ditch at points of discharge of storm water;
- b. May install a total of three discharge lines on the ditch at locations to be determined by the City, between Ross Avenue and U.S. Route 285;

All of such permitted modifications in the ditch shall be done with good quality materials and in a workmanlike manner.

2. The City shall cut weeds on the tops and outside slopes of the ditch and shall spray the weeds on the ditch, between State Avenue west to the railroad tracks; all such maintenance shall be at the sole expense of the City, except for the chemicals to be sprayed, which shall be provided at the expense of the Company;

In addition, the City shall clean out regularly all sediment and debris resulting from the changes in the ditch permitted in paragraphs 1.a. and b. above.

3. This Agreement shall be in full force and effect for a period of 50 years from the date hereof, except:

- a. Company may terminate this Agreement prior to its automatic termination date, upon 30 days written notice, delivered to the City, should their ditch overflow because of excessive stormwater runoff which is caused by the City, or if their performance of this Agreement creates problems in pasture land downstream because of winter freezeups.
- b. In addition, the City may terminate this Agreement upon 30 days written notice to the Company.

4. All notices permitted or required to be given hereunder may be delivered personally or may be mailed by certified mail, return receipt requested, to an officer, board member, manager, or office manager at the principal office of the intended recipient. In the event of personal delivery, notice shall be considered complete upon receipt; in the event of notification by mailing, notice shall be deemed complete at the conclusion of the fifth business day following the date of posting.

IN WITNESS WHEREOF, The parties have hereinafter set their hands on the dates specified.

CITY OF ALAMOSA

By Cliff Hartman
Cliff Hartman, Mayor

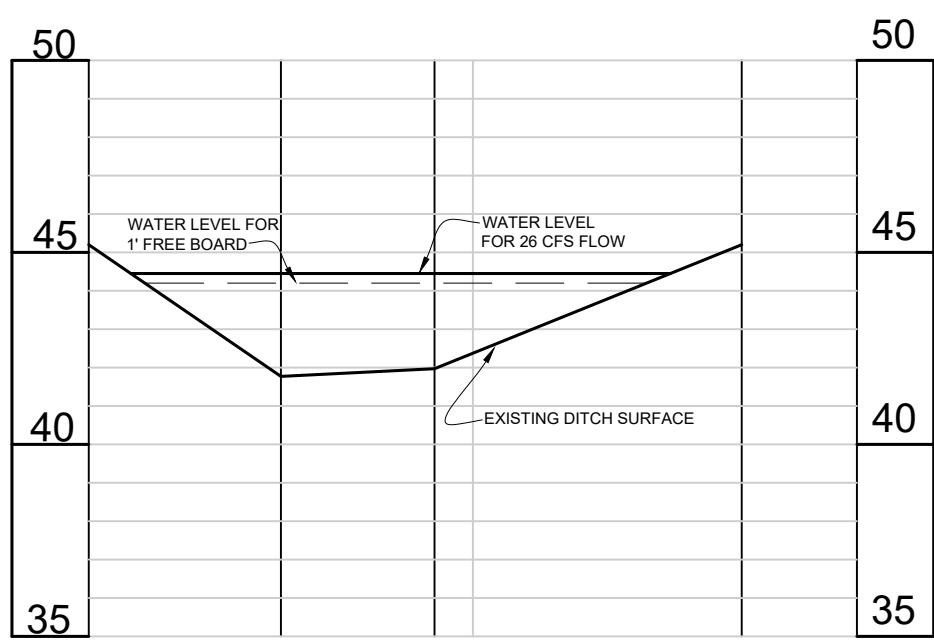
HICKORY-JACKSON DITCH COMPANY

By Jimmy Lacy
President

Addendum C
Hickory Jackson Ditch Cross Sections

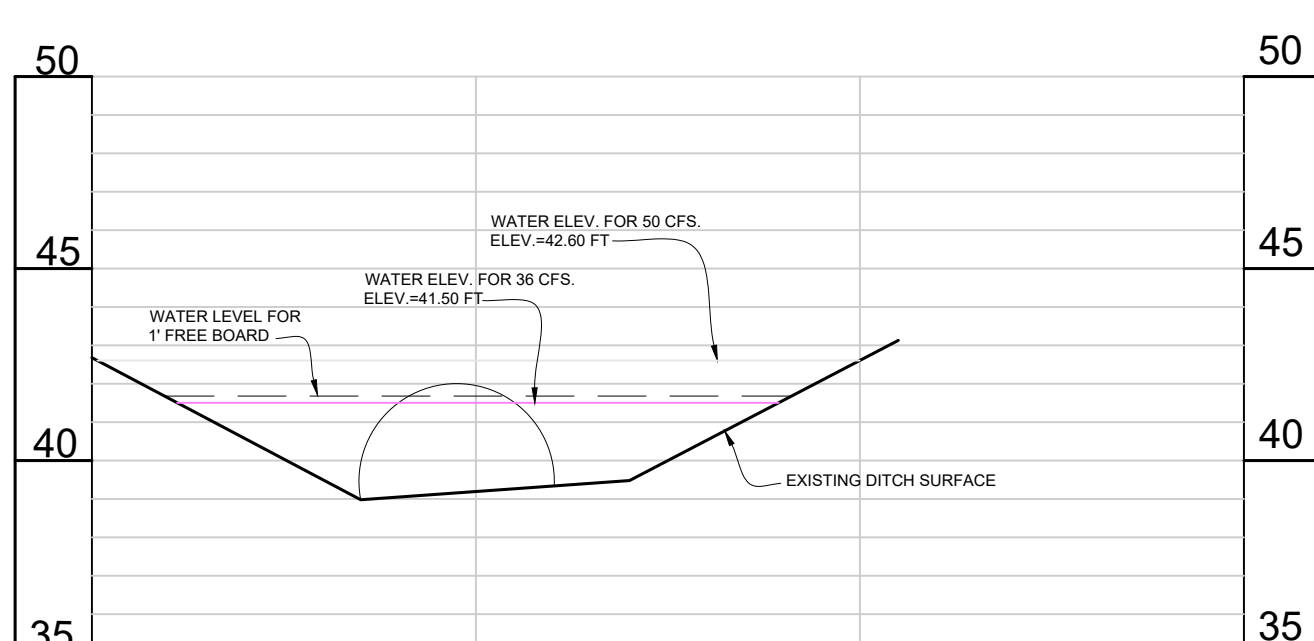


SECTION 1 FOSTER AVENUE



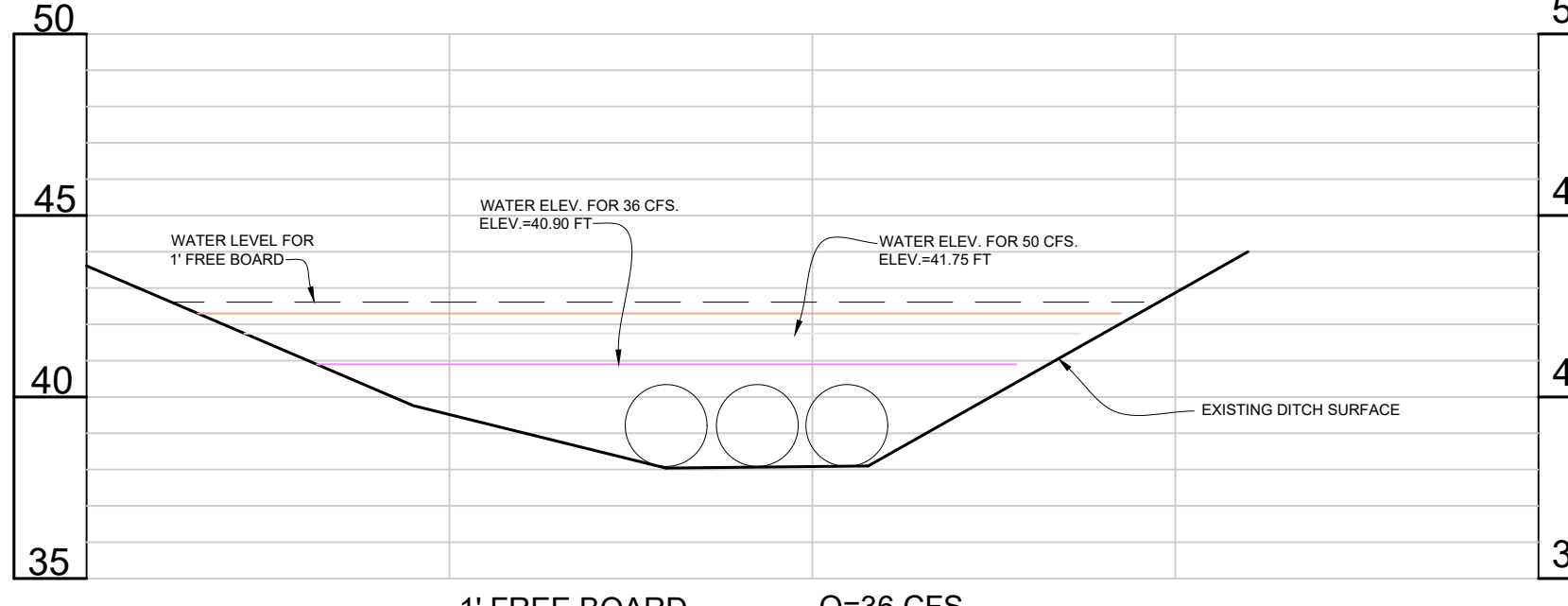
1' FREE BOARD	Q=26 CFS	Q=76 CFS
A=19.78 S.F. P=14.25 FT R=1.388 FT Q=20.91 CFS	A=23.18 S.F. P=15.36 FT R=1.509 FT Q=25.91 CFS FB = 0.75 FT	NOT POSSIBLE

SECTION 2 WEST OF 285



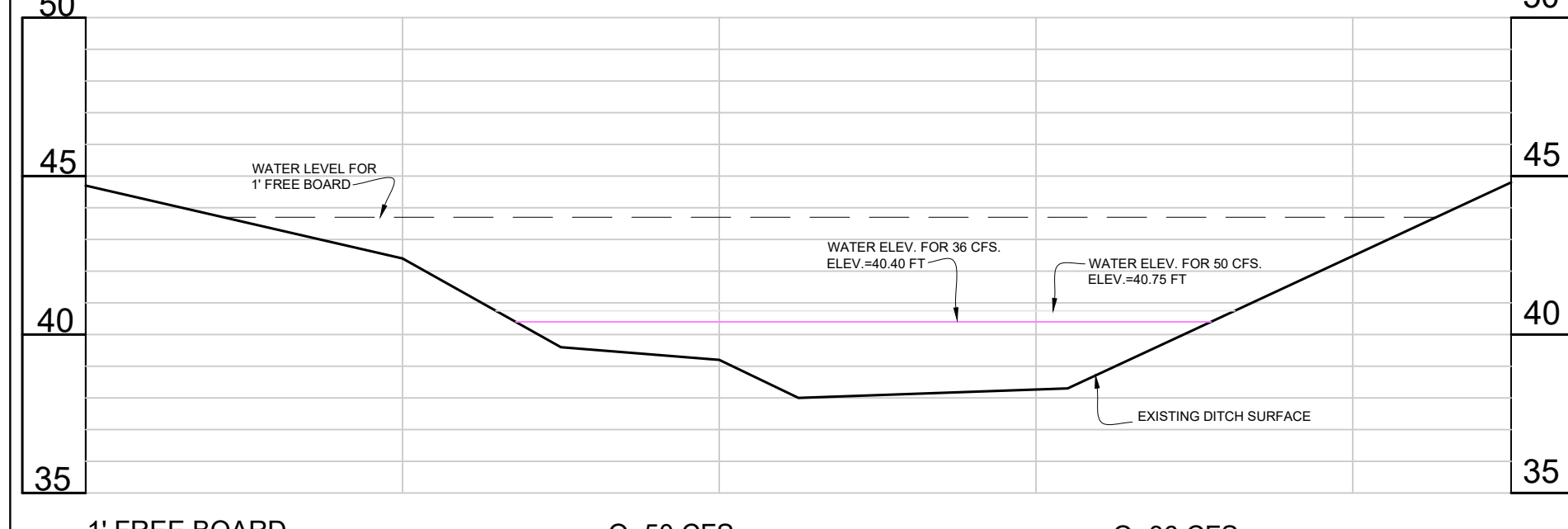
1' FREE BOARD	Q=36 CFS
A=28.68 S.F. P=17.55 FT R=1.634 FT Q=33.80 CFS	NECESSARY HEAD = 0.3' WATER SURFACE ELEV.=41.50 FT Q=50 CFS NECESSARY HEAD = 0.55 FT WATER SURFACE ELEV.=42.60 FT

SECTION 3 -EAST OF 285 BETWEEN CULVERTS



Q=50 CFS	1' FREE BOARD	Q=36 CFS
NECESSARY HEAD = 1.0' WATER SURFACE ELEV.=41.75 FT	A=66.36 S.F. P=28.34 FT. R=2.342 FT. Q=99.40 FS	NECESSARY HEAD = 0.5' WATER SURFACE ELEV.=40.90 FT

SECTION 4 100' EAST OF R.R.



1' FREE BOARD	Q=50 CFS	Q=36 CFS
A=90.75 S.F. P=32.03 FT. R=2.833 FT. Q=154.35 CFS WATER SURFACE ELEV.=43.77 FT	A= 41.87 S.F. P= 22.34 FT. R= 1.831 FT. Q= 50.88 CFS WATER SURFACE ELEV.=40.75 FT	A= 33.95 S.F. P= 22.91 FT. R= 1.482 FT. Q= 37.48 FS WATER SURFACE ELEV.=40.40 FT

REYNOLDS ENGINEERING COMPANY

21626 COUNTY ROAD AA.5
ALAMOSA, COLORADO 81101
(719) 274-3218

DATE: NOVEMBER 2020
SCALE: 1"=300'
DRAWN: MR
CHECKED:
APPROVED:

CITY OF ALAMOSA

HICKORY JACKSON DITCH CROSS SECTIONS

JOB NO. 2013 CIVIL 30
ALAMOSA
DRAWING HICKORY JACKSON

SHEET 1 OF 2



REVISIONS	
Description	By Date

REYNOLDS ENGINEERING COMPANY
21626 COUNTY ROAD AA.5
ALAMOSA, COLORADO 81101
(719) 274-3218

DATE: NOVEMBER 2020
SCALE: 1"=300'
DRAWN: MR
CHECKED:
APPROVED:

CLIENT:
CITY OF ALAMOSA

TITLE:
HICKORY JACKSON DITCH CROSS SECTIONS

JOB NO. 2013 CIVIL 30
ALAMOSA

DRAWING HICKORY JACKSON

SHEET 2

OF 2

This drawing is the property of Reynolds Engineering Company and is not to be reproduced, modified or used for any other project or extension of this project without the express written consent of the Engineer. The Engineer shall not be liable or held responsible for any claims, liability or costs arising out of any reuse or modification of this drawing by others.

Addendum D
June 1, 2020 Reynolds Engineering Company
Memorandum to Harry Reynolds Re: Drainage
Calculations for Areas Tributary to The
Hickory Jackson Ditch

REYNOLDS ENGINEERING COMPANY

21626 RD. AA.5 ~ ALAMOSA, CO 81101

Phone 719-274-3218 ~ Fax 719-274-3218

MEMORANDUM

June 1, 2020

To: Harry Reynolds
City of Alamosa
Public Works Director

From: Martin Reynolds

Re: Drainage Quantity Calculations for Areas Tributary to The Hickory Jackson Ditch.

This memorandum summarizes calculated drainage flow quantities for areas that may ultimately be tributary to the Hickory Jackson Ditch. This information is provided for use as a reference in the process of developing an agreement between the City of Alamosa and the owners of the Hickory Jackson Ditch, to allow stormwater discharge into the Hickory Jackson Ditch. The calculations are based on the areas and uses shown on the attached exhibit dated May 29, 2020. The exhibit defines tributary areas based on current uses as follows:

1. Areas that are currently developed and are within the City Limits (238.01 Acres).
2. Areas that are currently undeveloped and are within the City Limits (112.18 Acres).
3. Areas that are currently undeveloped and are outside the City Limits. (372.50 Acres)

The exhibit also identifies potential discharge points into the Hickory Jackson Ditch.

The drainage quantity calculations are based on the following.

1. Average annual precipitation in Alamosa is 7.31 inches
2. Runoff Coefficient for developed residential areas is 0.40

For one acre of developed land the calculated yearly runoff quantity is:

$$1 \text{ ac} \times \frac{43560 \text{ sf}}{1 \text{ ac}} \times 7.31 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}} \times 0.40 = 10,614 \text{ cubic feet}$$

$$\text{Or } 10,614 \text{ cubic feet} \times \frac{1 \text{ ac}}{43560 \text{ sf}} = 0.2437 \text{ acre-ft}$$

For the areas that are currently developed and are in the City Limits, the expected total yearly discharge to the Hickory Jackson Ditch would be $0.2437 \times 238.01 = 58.0$ acre feet.

For the areas that are currently undeveloped and are in the City Limits, the expected additional total yearly discharge to the Hickory Jackson Ditch would be $0.2437 \times 112.18 = 27.34$ acre-ft. for fully developed conditions.

For the areas that are currently undeveloped and are outside of the City Limits, the expected additional total yearly discharge to the Hickory Jackson Ditch would be $0.2437 \times 372.50 = 90.78$ acre-ft for fully developed conditions.

The expected total yearly discharge into the Hickory Jackson Ditch for ultimate developed conditions would be 176.12 acre-ft.

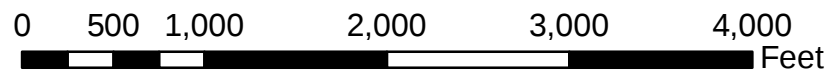
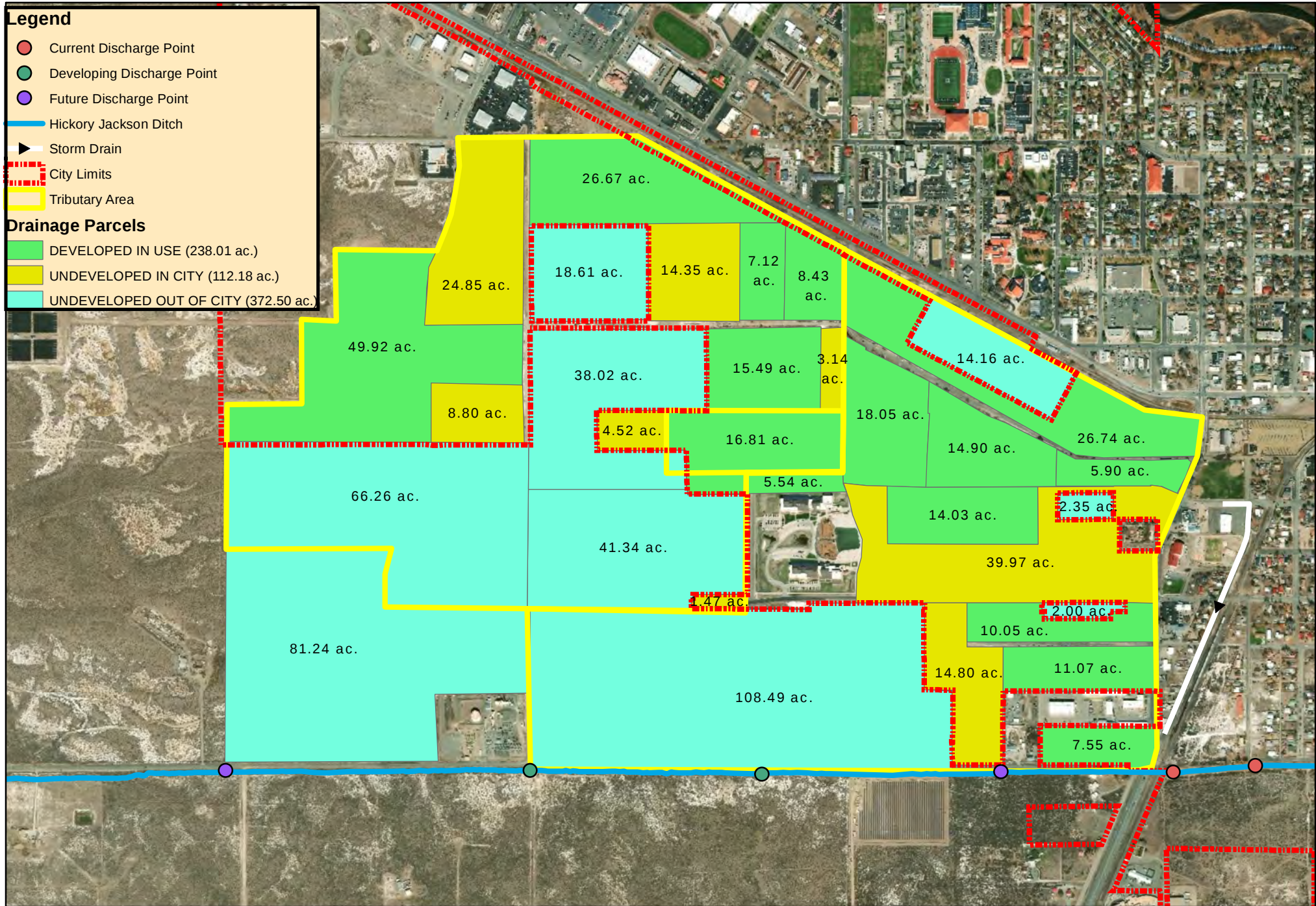
HICKORY JACKSON DITCH

Legend

- Current Discharge Point
- Developing Discharge Point
- Future Discharge Point
- Hickory Jackson Ditch
- Storm Drain
- City Limits
- Tributary Area

Drainage Parcels

- DEVELOPED IN USE (238.01 ac.)
- UNDEVELOPED IN CITY (112.18 ac.)
- UNDEVELOPED OUT OF CITY (372.50 ac.)



Addendum E
January 19, 2019 Reynolds Engineering Company

REYNOLDS ENGINEERING COMPANY

21626 RD. AA.5 ~ ALAMOSA, CO 81101

Phone 719-274-3218 ~ Fax 719-274-3218

MEMORANDUM

January 8, 2019

TO: Mark Wright,
Public Works director
City of Alamosa, CO

FROM: Martin Reynolds

RE: Design Criteria - Montana Azul Park and Drainage Facilities

This memorandum summarizes our evaluation relative to the drainage facilities which will be necessary within the proposed Montana Azul Park in Alamosa.

The proposed park is to be constructed within the existing storm water retention ponds which collect storm runoff from approximately 67 acres of the Montana Azul Estates Development and the adjacent farm workers residential development. Currently there are two retention ponds serving the Montana Azul Estates Development, one on each side of Craft Drive, and there is no outlet for these existing retention ponds. Storm water evaporates and/or infiltrates into the ground at the bottom of the ponds. It has been proposed to fill portions of these ponds to create a city park which would include a soccer field, basketball courts, parking areas, open space areas and surface water features.

The purpose of this drainage evaluation is to determine the site drainage requirements and develop a plan to incorporate the required drainage facilities within the proposed park features. It is anticipated that open pond areas and underground storm water storage facilities can be used to provide the required storm water holding capacity. We have evaluated the costs for manufactured underground storm water storage structures and modules and we believe the only viable option for underground storage is the use of potato rock as part of the fill material and utilizing the void spaces inherent within the potato rock. As part of our evaluation, we have conducted soil tests in the bottom of the existing ponds to determine an estimate of the infiltration capacity of the existing soil and we have completed field surveys to define the existing topography of the ponds and surrounding areas. We have also worked closely with Dan Vaughn, planning and development specialist with the City of Alamosa for creating the layout of the proposed park and determining what areas are available for storm water facilities.

Based on our evaluation of all available information, we believe that a functional park/ storm water facility will require an outlet to recover storm water capacity after each major storm event, and to return the function of the park to its fullest extent. The proposed park requires filling the existing ponds and reduces the storm water storage capacity by approximately

70%. While the remaining capacity is sufficient for the design storm event, with no outlet or release, the storm water will remain in the wetlands and underground storage areas. Based on our calculations, it will take approximately 39 days for the design storm to fully evaporate and/or infiltrate into the groundwater. This creates a situation with no further storm water capacity for the tributary 67 acres of residential properties. The available capacity will be dependent on the amount of infiltration/evaporation that has occurred since the last rainfall event.

Based on average monthly rainfall and infiltration rates, the ponds will reach their full capacity sometime in July. At this point any additional storms will result in flooding of the park, adjacent streets and residential areas. There will be ponding in the street at Tremont and Foster Avenue. This flooding will not dissipate any faster than the rate of infiltration in the ponds, due to the lack of outlets for the retention ponds. For any year with above average rainfall, the ponding may occur for 3-4 weeks at a time.

We believe there are two options available for creating parks within the existing retention ponds, as follows:

1. Create an outlet to discharge storm water from the ponds and recover the storm water storage capacity for the next the storm in a timelier manner. Based on the surrounding topography, there does not appear to be any possibility of surface discharge from the retention ponds. It might be possible to construct a lift station to discharge accumulated storm water and thereby recover storm water storage capacity for the next storm event. This will require an outlet and discharge area for the pumped water.
2. Eliminate some of the amenities in the park and increase the size of the wetland areas to increase the storm water retention capacity to a level that will accommodate a series of storms which may occur within the infiltration period. To feel confident that we have created a storm water facility that will function as we all intend, we should consider designing for capacity that would have accommodated the rainfall events that occurred in 2017. In 2017 the total rainfall between July 1 – September 30, was approximately 6 inches. This would require approximately 8 acre-feet of storage capacity or about twice what is available with the current design.

Our analysis has been based on the following design criteria.

1. Design storm – 100 year- 24 hour event, determined from NOAA ATLAS = 1.97 inches
2. On-site soil test pits were used to determine infiltration capacity of existing soil. The soil type was determined to be a silt clay with a long-term acceptance rate of 0.2 gallons /day-sf.
3. Available storm water retention capacity of potato rock was determined by testing potato rock sample. Water retention capacity was determined to be 40% by volume.
4. Storm water runoff coefficient for the tributary area to the ponds is residential development in the area with a corresponding storm water runoff coefficient of 0.40.
5. Average rainfall in Alamosa, based on latest available Climate Data for Alamosa at Bergman Field, (1981-2010). Wettest month (with highest rainfall) is August (1.2"). During 2017, rainfall from the first of July to the first of October, was approximately 6".
6. Evaporation rates are based on an evaporation study we recently completed for the Town of La Jara. We are assuming the evaporation rate in Alamosa is not significantly different than in La Jara. This rate was approximately 0.25 inches/day.
7. The onsite tributary area for the existing retention ponds is approximately 67 acres.
8. The retention ponds must be capable of storing the entire volume of water in the nearby 1.25-million-gallon water tower (3.84 acre-feet).

Based on the above criteria and existing conditions we have determined the following:

The total required runoff volume of the retention ponds for a 100 year 24-hour storm is 4.40 acre-feet.

Utilizing all available underground storage (potato rock) and limited wetland areas as shown on the current park configuration, the available storage capacity for the park located east of Craft Drive is 3.06 acre-feet. The available storage capacity for the park located west of Craft Drive is 1.34 acre- feet. These results in a total storm water storage capacity of 4.4 acre-feet.

While this capacity is sufficient to accommodate a 100-year, 24-hour storm, a problem arises when consideration is given to the infiltration and evaporation rates for the existing conditions. Because there is no existing outlet for these ponds, all runoff must currently either evaporate or infiltrate into the ground to recover storage capacity for the next storm runoff event. Based on the infiltration capacity of the existing soil type in this area, we have determined it would take approximately 39 days for the runoff from a 100-year, 24-hour storm to infiltrate/evaporate.

DRAINAGE CALCULATIONS FOR MONTANA AZUL PARK

Average rainfall Alamosa, CO [Resources]

- Average rainfall in January: 0.3"
- Average rainfall in February: 0.2"
- Average rainfall in March: 0.5"
- Average rainfall in April: 0.5"
- Average rainfall in May: 0.7"
- Average rainfall in June: 0.6"

- Average rainfall in July: 0.9"
- Average rainfall in August: 1.2"
- Average rainfall in September: 0.9"
- Average rainfall in October: 0.7"
- Average rainfall in November: 0.5"
- Average rainfall in December: 0.3"

Current Design Conditions:

Tributary Area = 67 acres
24-hour 100-year storm = 1.97 inches
Runoff Coefficient for Residential Area = 0.40
Total Runoff Volume for ponds =
 $(0.40)(67) \times (43,560) (1.97/12) = 191,650 \text{ ft}^3$
or
4.40 acre-feet

Water Tower Volume = 1.25 mg

$$\frac{1.25 \times 10^6}{7.48} = 167,112 \text{ ft}^3 \text{ or } 3.84 \text{ acre-feet}$$

For Current Conditions, provide a minimum of 4.40 acre-feet of storage.

With 72 hour time to discharge, needs lift station pumping an average rate of

$$\frac{4.40 \times 43,560 \times 7.48}{72 \times 60} = 331 \text{ GPM}$$

Ultimate Buildout Conditions:

Tributary Area = 241 acres

Total Runoff volume =

$$0.40)(241) \times (43,560) (1.97/12) = 689366 \text{ ft}^3$$

or

$$15.8 \text{ acre-ft.}$$

With a 5 day time to pump (120 hours)

$$\frac{15.8 \times 43,560 \times 7.48}{5 \times 24 \times 60} = 715 \text{ GPM}$$

For initial evaluation:

Set initial flow rate @ 700 GPM (Time to pump out 100 yr storm = 34 hours)

With capacity to upgrade to 1500 GPM (Time to pump out 100 yr storm = 57 hours)

Preliminary Design for Force Main:

Capacity of 1500 GPM –

Length from lift station to CR 8S (Coop Rd) – 3,000 ft.

Vertical lift from wet well to discharge $\approx$ 10 feet

At 1,500 GPM

Velocity = 4.4 ft./sec.

12" pipe - Head Loss = .45 ft. /100 ft. of pipe

$$\frac{3000 \times .45}{100} = 13.5 \text{ ft.}$$

Total Head Loss = $13.5 + \approx 10' = 23.5 \pm$

With 12" pipe - Flow @ 700 GPM

Velocity = 2.0 ft./sec.

Head Loss = 0.1 ft. / 100' or $30 \times 0.1 = 3'$

TOTAL HEAD LOSS = $10+3 \approx 13'$

Could Use 12" Force Main Pipe- and we need to size the pump to pump 700 gpm at TDH= 13 ft
With capacity to up grade to 1500 gpm at TDH = 24 feet.

$$\frac{4.40 \text{ acre-ft} \times 43,560 \text{ ft}^2/\text{acre} \times 7.48 \text{ gal/ft}^3}{700 \text{ gal/min.}} = 2,048 \text{ minutes, or 34 hours}$$

12" Force Main Pipe @ 700 GPM could pump out 4.40 acre ft. in about 34 hours.

As property develops within the area, tributary to the regional storm water lift station, each property should be required to limit discharge to:

$$\frac{(1500 - 700) \text{ GPM}}{241-67 \text{ acres}} \quad \text{or} \quad 4.6 \text{ GPM/acre from their individual detention ponds}$$

EXAMPLE: A 5 acre development would release at a rate of 23 GPM
The storage requirement for a 5 acre development would be:

$$\frac{5}{241} \times 15.8 = 0.33 \text{ ac-ft}$$

Time to drain this pond would be:

$$0.33 \times 43,560 \times 7.48 = 107,523 \text{ Gallons @ 23 GPM} =$$

$$107,523/23 = 4674 \text{ minutes}$$

$$\frac{4,674 \text{ minutes}}{60 \text{ minutes} \times 24 \text{ hours/day}} = 3.24 \text{ days to drain}$$

DESIGN FOR PUMPS IN THE FOSTER AVENUE STORM WATER LIFT STATION

Highwater elevation in Hickory Jackson Ditch = 40.5

Water level at mid-point in lift station storage area = 30.5

Static lift = 10 feet.

Pipe Friction Loss for 3000 lf of 12" pipe flowing 1500 gpm = 13.5 feet

Approximate maximum design condition = 1500 gpm at TDH=23.5 feet

Design points for system curve

700 gpm - TDH=13 ft

1000 gpm - TDH=16 ft

1500 gpm - TDH=24 ft

From Falcon Environmental Corporation:

Could use Sulzer/ABS Model XFP15E-CB1.4-PE75/4 6" submersible pump with 10 HP Motor having a 2 pumps operating design point of 1500 gpm at 24 ft TDH. See attached pump curves.

This system would install 2 pumps in the lift station capable of handling the ultimate build out conditions. The city could initially set the pumps to operate alternating the lead pump and would only operate the second pump when the water in the lift station reached a level above the

incoming pipes for the lift station. The single pump would deliver about 750 gpm to the Hickory Jackson Ditch. The lag pump would be operated on a float switch and would start when the water reached a to be determined level above the incoming pipes at the lift station. This would occur during larger storm events when the inflow to the lift station exceeds 750 gpm or (1.67 cfs) For current conditions, and with the effective pump capacity of the lift station of 1500 gpm, the system would drain all tributary detention ponds in about 17 hours. When the area is completely built out, the pumps would drain all retention ponds in about 57 hours. The city may want to purchase a third standby pump to have in hand in case of pump failure.

Addendum F
Resume Patricia K. Flood



Wright Water Engineers, Inc.

PATRICIA K. FLOOD, P.E.
SENIOR PRINCIPAL CONSULTANT

CURRENT	Appraisal of water rights and water facilities, evaluation of water rights, feasibility studies, and design of water supply and storm drainage facilities.
EDUCATION	B.S., Civil Engineering, 1974 University of Kansas Graduate Work, Water Resources, 1976-78 University of Colorado
REGISTRATION	Registered Professional Engineer—Colorado #20307 Certified General Appraiser—Colorado, New Mexico, Texas, and California

REPRESENTATIVE PROJECTS

Appraisals

Appraisal of Livestock water rights. Appraisal for U.S. Department of Justice regarding value of livestock watering water rights on a National Forest, New Mexico.

Denver Basin Groundwater Rights. Appraisal of Denver Basin groundwater with a decreed average annual withdrawal of 5,425 acre-feet. The valuation was performed for a Metropolitan District that would provide water service to a development in the Denver Metropolitan area.

Valuation of Reservoir System Water Rights. Appraisal of a partial ownership interest in a water rights system including direct flow and storage water rights in the Huerfano basin, Colorado.

Valuation of Transmountain Diversion Water Right. Appraisal of a transmountain diversion of a water right into the Rio Grande Basin, Colorado. The work was performed for a federal agency considering acquisition of the water right.

Appraisal of Water Rights Portfolios. Valuation of two industrial water rights portfolios including storage rights and direct flow water rights in the Las Animas basin and in the San Miguel basin, Colorado.

Appraisal of Irrigation Ditch Carriage Easement. Valuation of irrigation ditch carriage capacity for Tribe in Southwest Colorado.

Appraisal of Non-Tributary Artesian Well. Appraisal of 270 acre-feet non-tributary groundwater in the Arkansas River Basin performed for a federal government entity.

Appraisal of Catahoula Formation Groundwater. Valuation of artesian groundwater for commercial and public water supply use located within the Bluebonnet Groundwater Conservation District, Texas.

Rio Grande Basin Irrigation Water Rights. Prepared a valuation of water rights for consideration to be included in a conservation easement in Colorado.

Designated Groundwater Basin Appraisal. Valuation of approximately 1,000 acre-feet per year yield of Denver Basin groundwater.

Appraisal of Ditch Water Rights, St. Vrain Basin, Colorado. Prepared appraisal of irrigation ditch water rights for bank for its collateral decision making.

Arkansas Basin Irrigation Company. Appraisal of Irrigation Company water rights and infrastructure including river diversion structures, storage reservoirs, and irrigation canals.

South Platte River Lease Rates. Compiled summary of water lease rates located on the South Platte River downstream of Denver for clients use in establishing a renewal lease rate.

Conservation Easement Appraisal Manual. Prepared a chapter on the appraisal of water rights associated with conservation easements for a Conservation Easement Handbook.

Appraisal of Denver Basin Groundwater and Tributary Water Rights. Prepared an appraisal for a bank of a portfolio of deep groundwater and tributary groundwater rights.

Appraisal of Irrigation Company Water Rights, Lower Arkansas River, Colorado. Performed an appraisal of direct flow and storage water rights of an irrigation company's shares for decision-making purposes related to conservation easements

Appraisal of Water Rights Portfolio for Denver Metro Area Homebuilder. Prepared an appraisal of a package of water rights, including storage capacity, on the South Platte River and South Boulder Creek and contract water for consumable effluent.

Appraisal of Colorado-Big Thompson Water and Seepage Water Right. Prepared a valuation for an industrial client of their water right assets to be included in their financial statement.

Appraisal of a Reservoir Right-of-Way. Performed a valuation of a reservoir right-of-way located in a Wilderness Area. Analysis included feasibility analyses of reservoir construction.

Appraisal of Water Rights, Summit County, Colorado. Performed appraisal of water rights to be donated as part of a conservation easement.

Valuation of Reservoir, Weld County, Colorado. Preparation of appraisal for a 1,750-acre-foot reservoir rehabilitation project for use by the Colorado Water Conservation Board as collateral.

Valuation Consultation for San Juan County Water Conservancy District. Performed audit and replacement cost new-less-depreciation analysis of the water system facilities and a reservoir of a private water company for potential acquisition.

Appraisal of Water Rights Associated with Oil Shale Project. Analysis of yield and market for absolute and conditional water rights in the Colorado River basin. Appraisal also included the valuation of an existing roller-compacted concrete dam.

Patricia K. Flood, P.E.

Appraisal of Irrigation Water Rights in South Park, Colorado for Park County and Colorado Open Lands. Prepared appraisal of water rights, including reservoir yield, “with” and “without” a conservation easement.

Appraisal of Groundwater Rights in Southern Nevada. Review of yield of a portfolio of groundwater certificates in the Pahrump, Nevada area with an annual duty of 11,000 acre-feet. Provided follow-up testimony.

Yield of Analyses and Appraisal of Denver Basin Groundwater Rights. Analyze and prepare appraisal of 7,300 acre-feet of water rights south of the Denver metropolitan area.

Appraisal of Surface Water Rights, Lead, South Dakota. Analyze and appraise a Whitewood Creek surface right that was used for power generation, gold mining, and other uses.

Appraisal of Irrigation Water Right. Analyze yield and prepare an appraisal of a South Platte water right to be transferred to the Denver Botanical Gardens.

Appraisal of Transmountain Ditch in Rocky Mountain National Park. Analysis and appraisal of a transmountain ditch which was to be exchanged for Colorado Big Thompson Article 24 water. Appraisal prepared for National Park Service.

Appraisal of Reservoir Storage Right and Reservoir Right-of-Way. Appraisal for National Park Service of reservoir interests located within Rocky Mountain National Park. The subject failed due to hydraulic piping with extensive property damage and loss of life.

Valuation of Denver Basin Groundwater. Provide opinion of value of 30,000 acre-feet of adjudicated but undeveloped groundwater underlying lands of State Land Board. Work included analysis of distribution and transmission pipeline costs.

Appraisal of Surface and Groundwater Water Rights for FDIC. Analyze and prepare appraisal of South Platte surface water rights and Denver basin groundwater for Federal Deposit and Insurance Corporation.

Firm Yield Analysis and Appraisal of Municipal Water Supply. Water supply and reservoir operations study to determine firm yield of City of Broomfield, Colorado system. Preparation of market value appraisal of water systems associated with reservoir.

Appraisal of Water Rights. Evaluation and appraisal of direct flow and reservoir storage rights in North Platte River basin.

Yield Analysis and Appraisal of Yampa River Water Rights. River operation study of Yampa River in northwest Colorado to determine average and dry year yield. Preparation of appraisal of water rights.

Appraisal of Groundwater Rights in Eastern Colorado. Review of rights in a designated groundwater basin and preparation of an appraisal.

Appraisal of Water Farm Project. Preparation of appraisal of water farm project in western Arizona adjacent to the Central Arizona Project Canal.

Water Rights Acquisition Study. An analysis of current water rights and recommendations for purchase of additional water rights to meet future industrial demands on Clear Creek.

Appraisal of Water Rights. Evaluation and economic analysis of water rights transaction for industrial client in Denver, Colorado metropolitan area.

Water Rights

High Plains Aquifer, Eastern New Mexico. Compile existing data on Ogallala Aquifer including depth to groundwater, saturated thickness, and hydraulic conductivity. Search for comparable sales of groundwater and provide consulting services regarding potential offering price for purchase of groundwater.

Reservoir Feasibility Evaluation, Tulare County, California. Review a gravel pit property and feasibility of converting the excavation to water storage and availability of conveyance to the facility.

Town of Buena Vista, Colorado. Water Rights engineer for town since 1985 with work including water transfer plan, substitute water supply plans, well permits, and proposed augmentation plan and exchange.

Western Water Rights Seminar. Prepared and was a co-presenter of a two-day seminar on Western Water Rights for attorneys with the U.S. Department of Energy.

Due Diligence, Rio Grande Basin. Performed due diligence on the water supply associated with approximately 22 quarters of center pivot irrigated land. Work included a summary of the Groundwater Subdistrict #1 regulations and the allowable pumping volumes for the existing wells.

Irrigation Pond, Boulder County. Water rights change and augmentation plan for small pond.

Manhattan Creek, Tributary to Cache la Poudre River. Water rights change and augmentation plans for a retreat center. Well permit for center.

Substitute Water Supply Plans, South Platte River, Colorado. Preparation of substitute supply plans for a gravel mine operator with numerous plants along the South Platte River.

Coors Brewing Company, Colorado. Ditch-wide analyses for water rights change and augmentation plan.

Quantification and Water Rights Application. Quantify groundwater for a 320-acre parcel near Parker, Colorado for water rights application.

Cache la Poudre Transfer. Analysis and evaluation of proposed City of Thornton application to transfer and exchange irrigation rights on Cache la Poudre to Thornton.

Evaluation of South Park, Colorado Ranch. Field inspection and analysis of a South Park ranch transferable consumptive use.

Kansas v. Colorado. Analysis and preparation of exhibits regarding the Arkansas River Winter Storage Program for Southeastern Colorado Water Conservancy District.

Water Transfer Plan. Assist in negotiations with protesters in water transfer and provide testimony (Buena Vista, Colorado).

Augmentation Plan and Water Source Planning. Water augmentation plan and water source evaluation for the city of Woodland Park, Colorado.

Drainage

Frank Residence, Colorado Springs, Colorado. Represented home builder in evaluation of drainage and development of a drainage cure for a single-family residence located in Hillside Overlay District of Colorado Springs.

Integrated Subsurface Building Drainage System for University of Southern Colorado, Pueblo, Colorado. Planning and design of subsurface drainage system, surface drainage, and landscape modifications to provide protection to campus housing and university buildings to avoid damaging of foundations, to avoid wet basements, and to minimize wetting of highly expansive soils. Materials analysis for subsurface drains at depths of 20 to 25 feet and surface drainage materials selection with consideration of alkaline soils.

Master Planning for Highline Canal. Performed stormwater master planning for future conversion of the Highline Canal in the Denver metropolitan area from irrigation use to recreation corridor.

Water and Wastewater Systems

Town of Buena Vista, Colorado. Planning, design, and construction services for wells, water treatment plant, pump station, water storage, water transmission lines, and distribution system. Review submittals for proposed subdivision.

Water Transmission and Distribution Pipelines for Industrial Plant, Commerce City, Colorado. Planning, design, and construction services for a water line to provide fire flow for a large industrial facility.

Water Resource Planning for Boy Scouts. Prepared water resource master plan for the two Denver Area Council Boy Scout camps. Planning and design of water system to serve new Family Camp and design of individual wastewater disposal systems.

Reservoirs

Expert Testimony on Reservoir Facility. Researched records and historic use and performed hydraulic analysis of reservoir in Denver metropolitan area. Provided expert testimony in District Court.

Capacity Analysis of Reservoir. Research and feasibility study of enlarging reservoir storage capacity and spillway improvements necessary to provide safe operating conditions (Arvada, Colorado).

Dam Outlet Modifications at Rocky Flats Environmental Technology Site. Design of dam outlet modifications for three reservoirs. Work included analysis of piping materials and control gates.

EXPERT WITNESS TESTIMONY

Deposition testimony for the Defendant in 135 Federal Claim 168, U.S. Court of Federal Claims, Sacramento Grazing Association, Inc., et al., Plaintiffs v. the United States, Defendant, No. 04-786 L, December 2018.

Deposition testimony for Plaintiff in Case No. 2017CV30694, District Court, Jefferson County, Colorado for Plaintiff in Greg and Celeste Spiers vs. Kim Hopfenspirger, et al, April 2018.

Deposition testimony in Case No. 2014CV30849, District Court, Douglas County, Colorado, for Defendant in Hydro Resources – Rocky Mountain, Inc. v. The Denver Southeast Suburban Water and Sanitation District, et al, March 2016.

Testimony regarding Case No. 2015CV30037, District Court, Rio Grande County, Colorado, for Plaintiff in River Valley Group, LLC v. Prairie Ditch Company, October 2015.

Patricia K. Flood, P.E.

Deposition testimony regarding Case No. 2014CV32453 District Court, Denver County, Colorado, for defendant in KB Home Colorado, Inc. v. Vision Land Consultants, Inc. et al, October 2015.

Trial testimony regarding Case No. 2010CV1021, District Court, Jefferson County, Colorado, for respondent in Regional Transportation District (petitioner) v. Bronk, et. al. September 2011.

Deposition and trial testimony regarding Case No. 2008CV56, Gilpin County, for plaintiff in Dory Lake Property Owners Association v. Board of County Commissioners. August and September 2009.

Deposition regarding Case No. 2007CV8, Weld County District Court, for defendant in James Busby v. Lifestyle Homes, Inc., et al. September 2008.

Trial testimony, Case 00CV35, Conejos County, Colorado. Archuletta and Martinez vs. Los Sauces Ditch Company. January 2007.

Trial testimony on behalf of Lincoln County in Case 98CV6, Lincoln County, Colorado. Rodney J. Preisser v. Board of County Commissioners of Lincoln County, et al. October 2005.

Deposition regarding Case No. A455945, Dept. No. 20, District Court, Clark County, Nevada. Commercial Federal Bank, FSB, v. Lee Kapaloski; Parsons Behle & Latimer et al. 2005.

Deposition regarding Case No. 96CW313, Water Division 4, for Objectors Telluride Ski Company and Mountain Village Metropolitan District to the Application of the Town of Telluride and Idarado Mining Company. October 2002.

Eagle River Water & Sanitation District, Upper Eagle Regional Water Authority, and Vail Associates v. Town of Minturn: Deposition taken regarding Town of Minturn water rights. 1998.

PROFESSIONAL & HONORARY SOCIETIES

American Society of Civil Engineers
Tau Beta Pi
Chi Epsilon

HONORS

Outstanding Woman Engineer in Colorado, Colorado Consulting Engineers Council, 2006.

PUBLICATIONS/PRESENTATIONS

Flood, P.K. 2019. "Colorado Water Rights for Appraisers & Brokers" Presentation to the Northern Colorado Association of Real Estate Appraisers. February 11, 2019.

Flood, P.K. 2016. "Colorado Water 2016" Presentation to the Appraisal Institute Seminar on January 15, 2016.

Flood, P.K. 2015. "What is Your Ditch Company Worth?" Presentation to 13th Annual Ditch and Reservoir Company Alliance (DARCA) Convention in Grand Junction on February 12.

Flood, P.K. 2013. "Appraising Water Rights – Factors Affecting Value." Paper and Presentation 4th Annual Conference Water Law Institute, CLE International, Beaver Creek, Colorado. July 25.

Flood, P.K. 2011. "Appraising Water Rights-Factors Affecting Value." Paper and Presentation CLE Water Marketing-The Essentials of Buying and Selling Water Rights. Denver, Colorado, December 8.

Flood, P.K. 2011. "Valuing Water Rights." Paper and Presentation to Continental Divide Land Trust and Colorado Water Trust. Silverthorne, Colorado. March 29.

Flood, P.K. 2011. "Water Rights Valuation." Paper and Presentation CLE Water Marketing, Beaver Creek, Colorado. December 9.

Flood, P.K. 2009. "Valuation of Water Rights." Presentation Colorado Bar Association CLE, Denver, Colorado. April 3.

Flood, P.K. 2006. "Appraisal Issues with Conservation Easements." Presentation CLE on Conservation Easements, Pueblo, Colorado. June 23.

Flood, P.K., K.R. Wright. 2006. "Appraisal of Water Rights in Conservation Easements," Presentation Colorado Water Trust, Glenwood Springs, Colorado. February 27.

Nichols, P.D., M.F. Browning, K.R. Wright, P.K. Flood, and M.S. Weston. 2005. "Water Rights Handbook for Colorado Conservation Easements." Colorado Water Trust for Conservation Organizations, Funded by Great Outdoors Colorado.

Flood, P.K. 2003. Valuation of Water Interests in a Takings Context–CLE International Regulatory Takings, Denver, Colorado. June 9.

Flood, P.K. and K.R. Wright. 2003. Valuation of Water Rights CLE International Colorado Water Law, Denver, Colorado. March 29.

Patricia K. Flood, P.E.

Flood, P.K. and K.R. Wright. 1998. *Water Rights of the Eastern United States*. American Water Works Association.

Flood, P.K., K.R. Wright, and D. Freeman. 1998. The Eastern Water Manager's Guide to Water Rights. *Proc., American Water Works Association, Annual Conference, Dallas, TX*. June 21-25.

Flood, P.K. and K.R. Wright. 1998. Eastern Water Rights Engineering: The Role of the Hydrologist. *Proc. American Water Works Association, Annual Conference, Dallas, TX*. June 21-25.

Flood, P.K. 1996. Water Allocation Using the Efficient Marketplace. *Proc. from the USCID Water Management Conference*, Las Vegas, Nevada. December 5-7.

Flood, P.K. 1990. Water Rights of the 50 United States and Possessions. *Water Rights Handbook*. American Water Works Association.

Flood, P.K. 1987. Water Management Decision Support Using CADD. Paper presented at 3rd Water Resources Operation and Management Workshop, Colorado State University, sponsored by ASCE.

R:\Resources\Marketing\RESUMES\Flood\Flood Appraisal Short.doc

DENVER

2490 W. 26th Avenue Suite 100A
Denver, Colorado 80211
Phone: 303.480.1700
Fax: 303.480.1020

GLENWOOD SPRINGS

818 Colorado Avenue
P.O.Box 219
Glenwood Springs, Colorado 81602
Phone: 970.945.7755
Fax: 970.945.9210

DURANGO

1666 N. Main Avenue Suite C
Durango, Colorado 81301
Phone: 970.259.7411
Fax: 970.259.8758

www.wrightwater.com



Wright Water Engineers, Inc.