



COLORADO

Colorado Water Conservation Board

Department of Natural Resources

House Bill 15-1178 Emergency Dewatering Grant Program

Report to the Water Resources Review Committee



INTRODUCTION

House Bill (HB) 15-1178, signed into law by the Governor on June 5, 2015, authorizes the Colorado Water Conservation Board (the “CWCB” or the “Board”), in collaboration with the State Engineer, to administer a grant program for emergency dewatering of areas in and around Gilcrest, Colorado and Sterling, Colorado. Emergency dewatering is intended for areas that the Board and the State Engineer determine are experiencing damaging high groundwater levels. The duration of this grant program is from July 1, 2015 until July 1, 2018.

FUNDING BREAKDOWN

HB15-1178 created the Emergency Dewatering Grant Account (the account) in the Construction Fund. The State Treasurer transferred \$455,000 from the General Fund to the account over two fiscal years. Another \$125,000 was transferred to the account from the Construction Fund, for a total of \$580,000.

DEPOSITS INTO THE ACCOUNT

State Treasurer:

FY 2015/2016: \$165,000

FY 2016/2017: \$290,000

Construction Fund: \$125,000

TOTAL: \$580,000

NOTE: The governor signed this measure on 6/5/2015.



HOUSE BILL 15-1178

BY REPRESENTATIVE(S) Saine and Humphrey, Arndt, Pettersen, Priola, Ryden, Vigil, Windholz, Young, Ginal;
also SENATOR(S) Marble and Sonnenberg, Crowder, Hodge, Lambert, Lundberg, Neville T., Woods.

CONCERNING THE STATE ENGINEER'S AUTHORITY TO ALLOW WELL USERS TO LOWER THE WATER TABLE IN AN AREA THAT THE STATE ENGINEER DETERMINES IS EXPERIENCING DAMAGING HIGH GROUNDWATER LEVELS, AND, IN CONNECTION THEREWITH, ESTABLISHING AN EMERGENCY DEWATERING GRANT PROGRAM FOR THE PURPOSE OF LOWERING THE WATER TABLE IN AREAS OF GILCREST, COLORADO, AND STERLING, COLORADO AND MAKING AN APPROPRIATION.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. In Colorado Revised Statutes, 37-60-121, **add** (10) as follows:

37-60-121. Colorado water conservation board construction fund - creation of - nature of fund - funds for investigations - contributions - use for augmenting the general fund - funds created - repeal. (10) **Emergency dewatering grant program and data collection - fund - creation - legislative declaration.** (a) (I) THE GENERAL

Capital letters indicate new material added to existing statutes; dashes through words indicate deletions from existing statutes and such material not part of act.

BACKGROUND

Due to a combination of natural geology and hydrology, average to above-average precipitation in the South Platte watershed, increased recharge for augmentation purposes, and decreased groundwater pumping, high groundwater within and near the Town of Gilcrest and the City of Sterling is causing damage to private and public property and agricultural land. The General Assembly has determined that the water table needs to be lowered immediately to a level that is no longer damaging.



Table 1: All Projects that Applied for Funding under HB15-1178

Project	Applicant	Board Approval	Funding Awarded	Total Spent	Status
Gilcrest School Well Dewatering System	Town of Gilcrest	July 2015	\$90,000	\$0	Withdrawn
Dewatering Improvements Study for the Town of Gilcrest	Town of Gilcrest	January 2016	\$139,800	\$139,800	Complete
Dewatering Pilot Project Near Gilcrest Year 1	West Greeley Conservancy District	May 2016	\$140,329.50	\$126,709.06	Complete
Pawnee Ridge Dewatering System	Pawnee Ridge HOA	September 2016	\$128,407.00	\$120,888.82	In Progress
Dewatering Pilot Project Near Gilcrest Year 2	West Greeley Conservancy District	May 2017	\$107,355.60		In Progress
Gilcrest Waste Water Treatment Plant Well	Town of Gilcrest	July 2017	\$57,986.30		In Progress
Total Spent on Completed Projects and Encumbered on In-Progress Projects:			\$560,257.96		
Total Unobligated Funds:			\$19,742.04		

PROJECTS

Six applications have been received by CWCB for funding through HB15-1178; all six have been approved by the CWCB Board . One was withdrawn due to permission issues encountered by the applicant after the Board approval. The others have been a mix of studies, construction, and pilot programs to help lower the water table in these areas. *(See detailed summaries beginning on the next page.)*

The average project cost was about \$110,000. Two projects have been completed at this time, and three of the projects are still in progress. All projects are anticipated to be completed by June 2018.

REMAINING FUNDS

Any remaining funds after HB15-1178 ends will still be in the CWCB Construction Fund and will be used in conjunction with funding from Section 10 of HB17-1248 in order to award grants for projects in response to damaging high groundwater levels in areas of the South Platte River Basin.

Gilcrest School Well Dewatering System



INTRODUCTION

The Gilcrest School Well Dewatering System was the first application to go before the CWCB Board for the HB15-1178 Emergency Dewatering Grant Program. The project was conditionally approved for \$90,000.

BACKGROUND

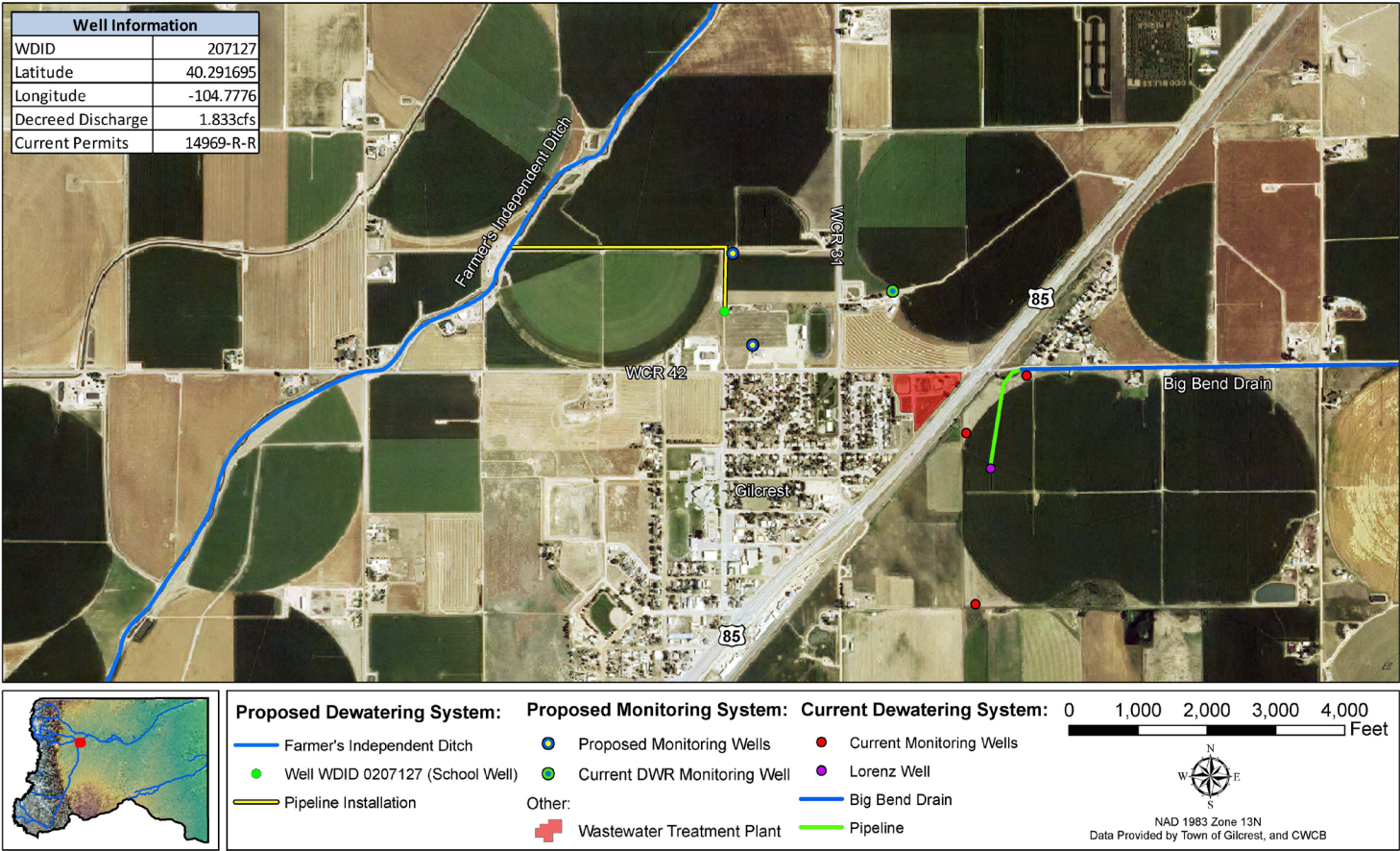
Through previous efforts of the South Platte Basin Round-table Groundwater Technical Committee (Committee), dewatering had begun near the Town of Gilcrest utilizing an irrigation well on the east side of Highway 85. Though this well showed an immediate response in lowering the water table around it, it was determined by the Committee that another well should be utilized by the Town of Gilcrest in order to provide more relief from high groundwater. The School Well (WDID 0207127) was selected as the most feasible option at the time. The application was submitted to the Board for approval in July of 2015, immediately after the approval of the

HB15-1178 Guidelines. The application was for \$90,000 and proposed pumping the water from the School Well west to the Farmer’s Independent Ditch (FIDCo). At the time of the application, discussions had taken place between the Town of Gilcrest and FIDCo, with preliminary indications that FIDCo would allow the use of their ditch. The CWCB Board approved the project contingent on getting all permissions solidified.

RESULT

After a several-month delay, FIDCo shareholders voted to deny permission for Gilcrest to convey the water to the South Platte River through the ditch. Due to this decision, the project did not move forward and was withdrawn.

Figure 1: School Well Dewatering Project Proposal



Water from the School Well was to be piped west to the Farmer’s Independent Ditch, where it would be conveyed north to the South Platte River.

Dewatering Improvements Study for the Town of Gilcrest



INTRODUCTION

The Dewatering Improvements Study for the Town of Gilcrest was approved for \$139,800 at the January 2016 Board Meeting.

BACKGROUND

After the initial \$90,000 School Well Project (originally conditionally approved in July 2015) was withdrawn, it was determined by the South Platte Basin Roundtable Groundwater Technical Committee that a new means to convey water to the South Platte was necessary in order to provide Gilcrest with a reliable dewatering solution. This Study, conducted by JVA and Bishop-Brogden Associates, Inc., had three main objectives:

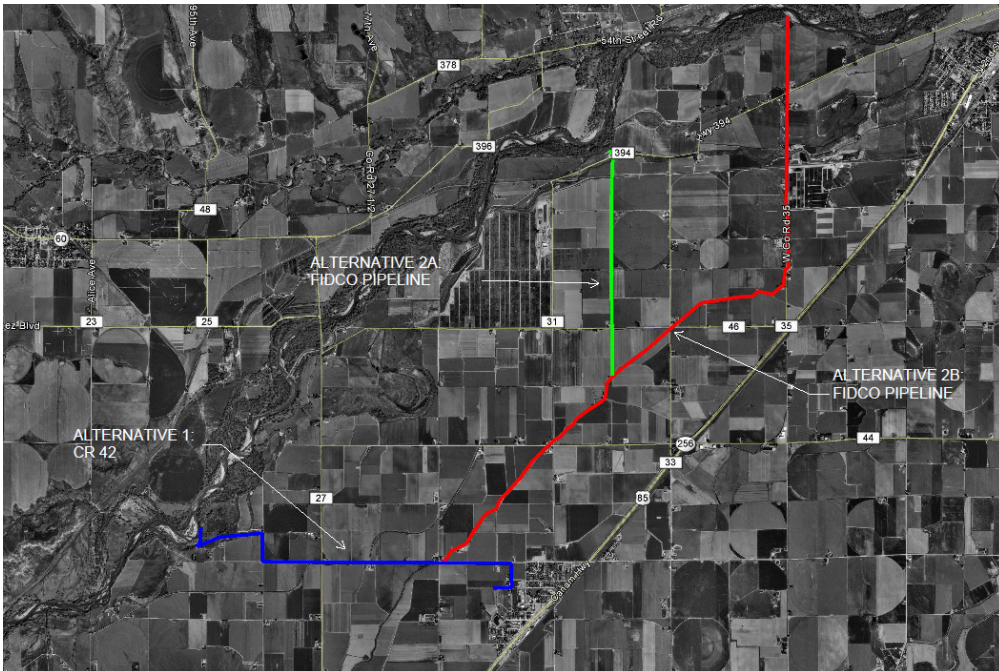


Figure 1: Three alternatives were identified as permanent dewatering conveyances for the Town of Gilcrest. The first alternative uses the existing alignment of the wastewater discharge pipeline to the west. The other two alternatives turn north at the Farmer's Independent Ditch.

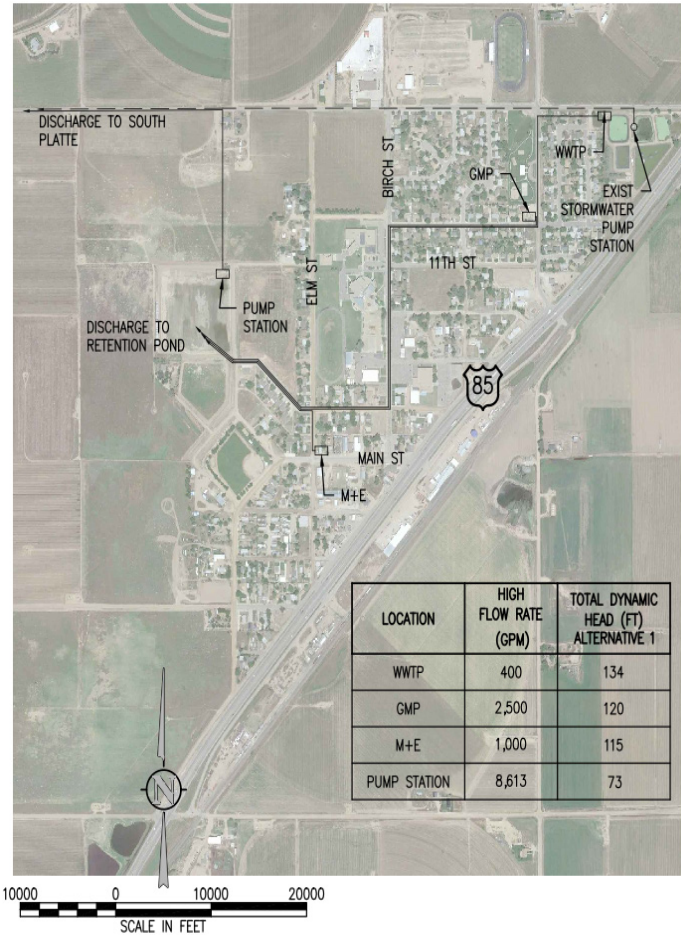


Figure 2: Proposed dewatering wells for the Town of Gilcrest

- 1) Review previous studies, quantify current groundwater levels beneath the town, document existing and proposed areas of groundwater recharge near the town, and establish the initial target dewatering rates and groundwater levels.
- 2) Develop three conceptual dewatering and conveyance systems, and evaluate these systems against economic and non-economic criteria.
- 3) Recommend a preferred dewatering conveyance alternative.

RESULTS

One interim option and three long-term options were identified for dewatering in the Town of Gilcrest. The interim solution consists of constructing a dewatering well near the wastewater treatment plant on the northeast end of town. This well would tie into the existing effluent line that runs west out to the South Platte River. It is estimated that one well near the plant pumping at a rate of 336 gpm could potentially lower the water table 1-2 ft near the treatment plant.

The three permanent alternatives utilize two existing wells in Gilcrest and the above-mentioned new well to be installed near the waste water treatment plant (Figure 2, Table 1). These three wells would all pump into the storm water retention pond on the west edge of Gilcrest, then conveyed to the South Platte River via one of the three pipeline alignments (Figure 1).

Alternative 1: Pressurized Pipeline that runs west to the South Platte River

Alternative 2: Pressurized/Gravity Flow Combination west to the South Platte River

Alternative 3: Multi-Use Multi Benefit Pipeline north to the South Platte River.

It was determined that the most economically feasible alternatives were 1 and 3, with Alternative 3 allowing for more partnership opportunities along the pipeline (Table 2). Though Alternative 3 has significantly larger costs it does allow for more partnerships making it cost competitive to Alternative 1.

The final study can be found [here](#).

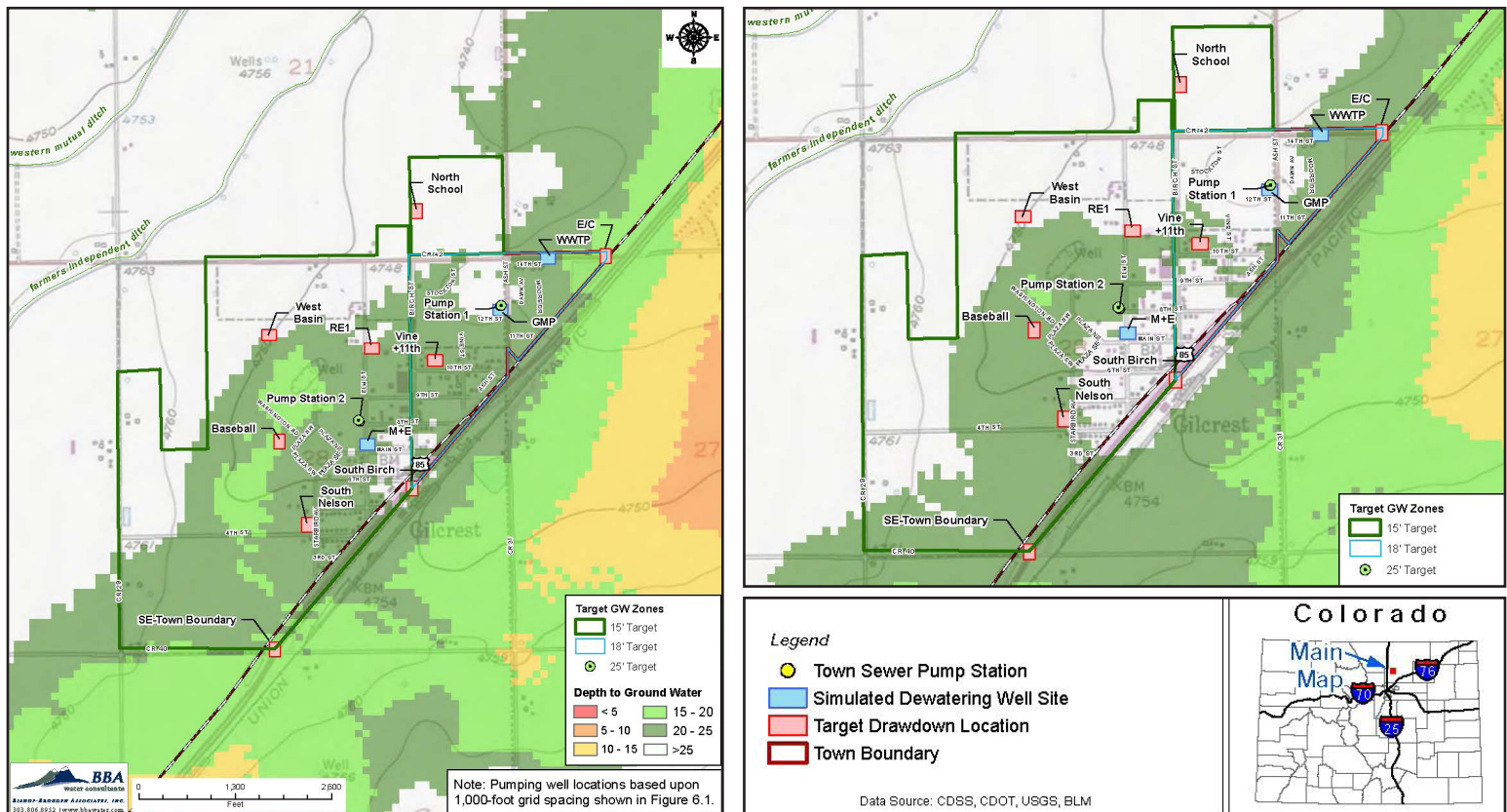
Table 1: Dewatering infrastructure specifications

Dewatering Infrastructure	Flow Rate (gpm)	Total Dynamic Head (ft)
WWTP	450	191
GMP	2,500	148
M+E	1,400	124
Stormwater Retention Pump Station	4,350	168.28

Table 2: Summary of costs for the dewatering alternatives

Costs	Alternative 1	Alternative 3
Project Cost	\$7,161,000	\$11,233,000
20 Year O&M (2016PW)	\$4,841,700	\$7,051,000
Total Cost	\$12,002,700	\$18,284,000

Figure 3: Modeled groundwater levels in Gilcrest after 1 year (left) and 5 years (right) of pumping under the specifications in Table 1.



Gilcrest Area Pilot Project



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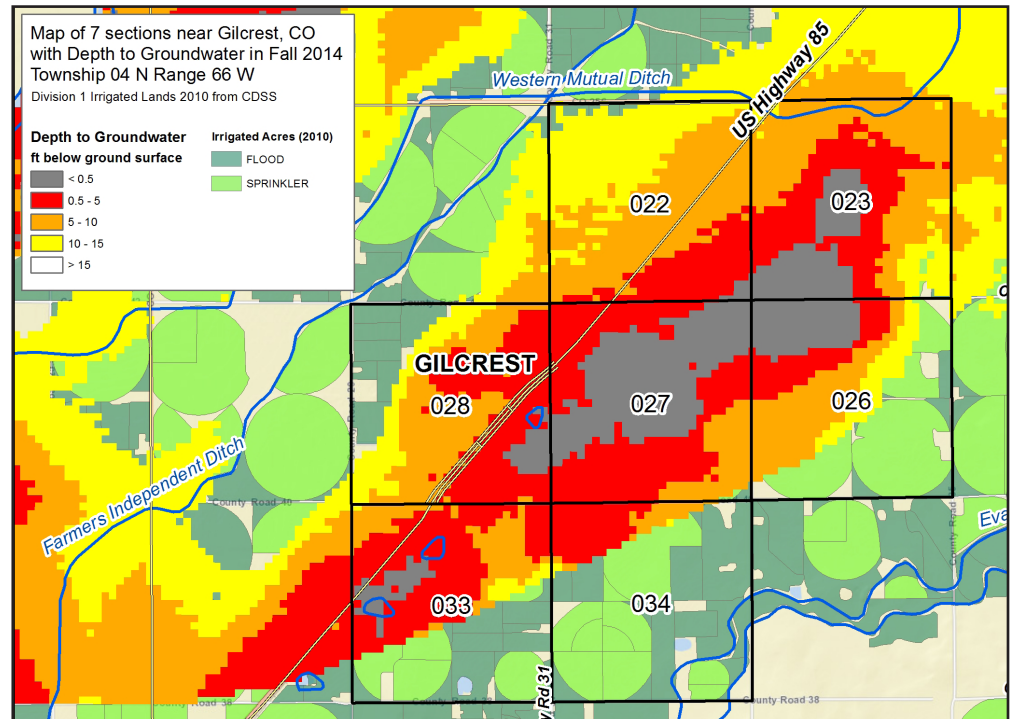
Department of Natural Resources

INTRODUCTION

The Gilcrest Area Pilot Project has recently completed its first irrigation season. There were six participants for this first year in the seven section area who were incentivized to pump more groundwater and divert less surface water in an effort to lower the groundwater table.

BACKGROUND

The South Platte Basin Roundtable Groundwater Technical Committee, in collaboration with Central Colorado Water Conservancy District (Central), West Greeley Conservation District (WGCD), the Town of Gilcrest, Colorado State University (CSU), the Governor's Office, the State Engineer's



The 7 Section Area for the Pilot Project was determined based on the depth to groundwater in the area; these seven sections envelope the areas with the highest groundwater.



Office, and the Colorado Water Conservation Board (CWCB), developed the Pilot Project with the intent of lowering the groundwater table via alternative management strategies, while operating within the existing legal boundaries of prior appropriation. The pilot includes elements of the HB12-1278 study and HB15-1013, and was funded for \$140,329.50 for the first year through the HB15-1178 Emergency Dewatering Program.

YEAR ONE

Two options were provided for participation in the Pilot Project for the first year. The first option A incentivized farmers to pump beyond their historical average up to their 2016 quota from Central by paying them \$60/AF pumped above their 2013-2015 average. The second option B allowed participants to pump their full contractual amount with Central by providing additional augmentation water specifically for the project. There were six participants in total (note that some participants had multiple contracts with Central), and there was just under 670 AF (see table on back) of water that participants were incentivized to pump. CSU worked with some of the participants to install monitoring wells on their properties, and one of the participants was also willing to install soil moisture probes in order to better monitor their field.

By the end of the irrigation season, participants had pumped an additional 534 AF beyond the 2013-2015 average. Colorado State University, in conjunction with Principia Mathematica, has analyzed some of the data from this first year to help determine what impact this additional pumping may



have had on the water table within the seven section area.

The preliminary modeling results showed that there is not a full understanding of what influences the system. Some of the modeling results tracked well with the measured outcome (see WWTP East and Lorenz North below), while others showed that there is still more data that needs to be collected (see Lorenz South and Lorenz West below).

Pilot Project Option	Subdistrict	Contract No.	Field Efficiency	2016 Allotment (Metered Pumping)	2013-15 Historical Pumping	2016 Pilot Increased Pumping	2016 Pilot Increased CU	2016 Total Pumping by Contract
				AF	AF	AF	AF	AF
B	GMS	423	0.6	157.94	110.95	204.92	122.952	315.87
A	GMS	388	0.78	54.20	3.32	50.56	39.4368	53.88
A	GMS	1150	0.75	64.46	13.76	50.71	38.0325	64.47
B	WAS	863	0.6	79.67	15.12	93.52	56.11	108.64
B	GMS	415	0.6	78.97	8.05	110.40	66.24	118.45
B	GMS	748	0.6	41.87	36.68	47.05	28.23	83.73
B	WAS	94	0.6	92.11	0.00	30	18	30.00
B	GMS	968	0.73	56.83	58.08	0	0	56.83
B	GMS	421	0.6	83.26	85.32	10	6	93.26
B	WAS	921	0.75	50.70	8.39	72.15	54.1125	80.54
Totals				759.99	339.67	669.31	429.11	1005.67

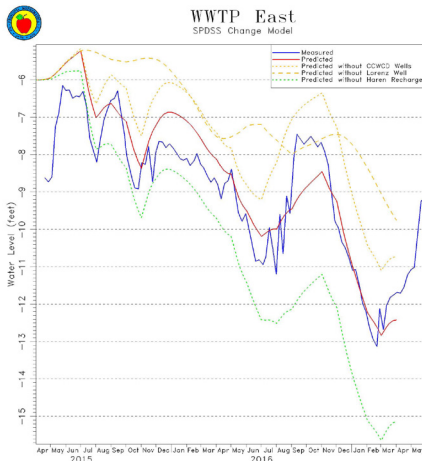
Year 1 of the Pilot Project set out to incentivize farmers to pump an additional 670 AF beyond their 2013-2015 average; any increased consumptive use from groundwater was replaced through a lease with Aurora Water.

YEAR TWO

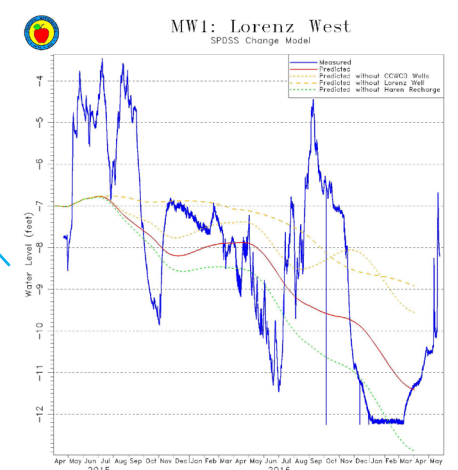
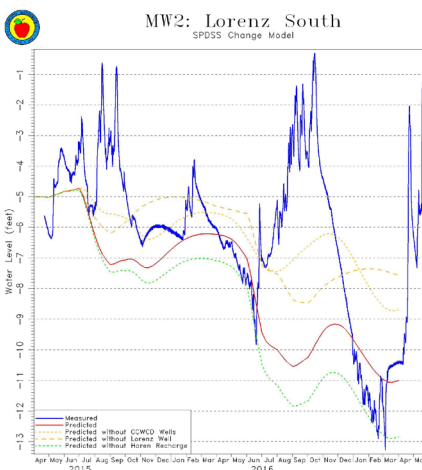
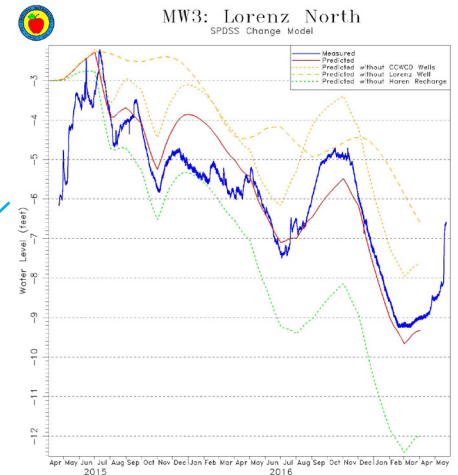
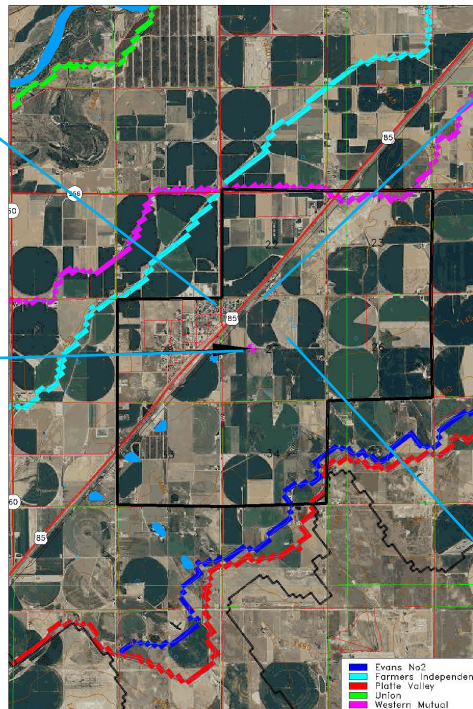
Project proponents realized that one year of data does not allow for proper recommendations and conclusions, and so a second year of the Pilot Project

is currently underway. The second year was approved by the CWCB in May of 2017 for \$107,355.60.

There is significantly more emphasis on ensuring that participants do not lose value for their surface rights. Data collection is also a major focus for year two, including better surface diversion data collection.



— Measured
— Predicted
— Predicted without CCWCD Wells
— Predicted without Lorenz Well
— Predicted without Haren Recharge



Pawnee Ridge Dewatering System


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INTRODUCTION

The Pawnee Ridge Dewatering System was approved by the CWCB Board for \$128,407 at the September 2016 Board Meeting.

BACKGROUND

Damaging high groundwater conditions have existed in the Pawnee Ridge subdivision since April of 2010, primarily along Dakota Road on the northwest side of the subdivision. Pawnee Ridge residents Gene Thim and Sandy and Bonnie St. John permitted and installed dewatering wells on their property in early 2011 to lower the water table in their area. These wells were initially connected to a borrowed aboveground 4-in aluminum pipeline

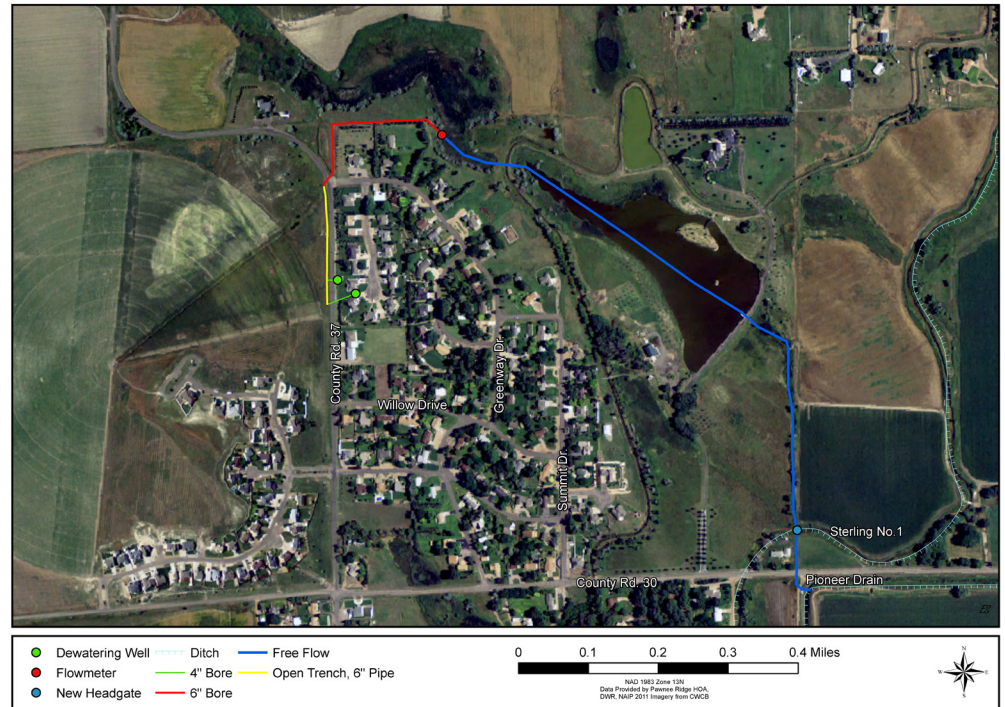
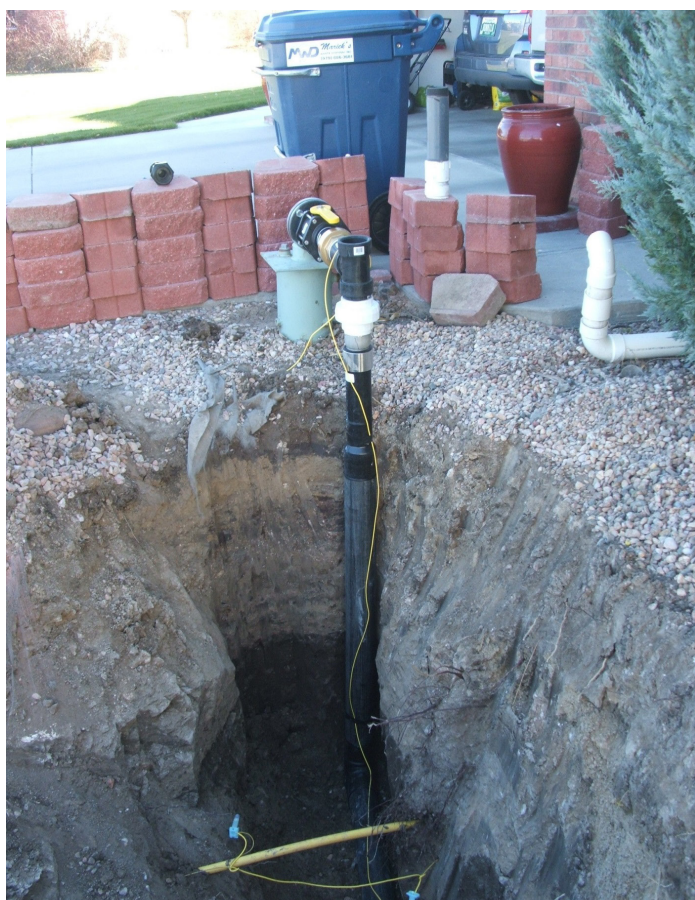


Figure 1: Pawnee Ridge permanent dewatering system



The St. John dewatering well as it is being tied into the permanent pipeline.

that delivered the pumped water north. Pumping continued until late fall of 2011, when it was discontinued due to a couple of factors, including the owner of the pipeline requesting the pipe back, and one property owner no longer wanting an aboveground pipeline running through their property.

DESCRIPTION

The project is for installation of a permanent dewatering system for the Pawnee Ridge subdivision. The Pawnee Ridge HOA worked with Division 1 staff, Logan County and affected private property owners to ensure the water makes it back to the South Platte River in such a way that it can be measured and not cause any injury.

The dewatering system utilizes existing dewatering wells permitted in 2010 and 1670 feet of 6-in HDPE pipeline to convey the water north to the Gentz property. This new system utilizes pre-existing infrastructure and a rehabilitated headgate from where it daylights on Alan Gentz's property to the Pioneer Drain, which conveys the water to the South Platte River.

CURRENT PROGRESS

To date, the Pawnee Ridge Homeowner's Association has finished installation of the dewatering pipeline, and has begun

rehabilitating the headgate to the Sterling No. 1 Ditch. Pumping began immediately after installation of the pipeline was complete. Residents have stated that sump pumps in homes in the surrounding area have begun to pump less water.

REMAINING WORK

All that remains for the project to be complete is final installation of the rehabilitated headgate at the Sterling No. 1, and installation of the telemetry system for data collection. This work is on track to be completed within the next few months, weather permitting.



Open trench installation of 6" pipeline running north along the west side of County Road 37.



St. John and Thim family celebrating a successful well hookup and turning on the wells for the first time. 11/12/2016



Gilcrest Waste Water Treatment Plant Well

INTRODUCTION

The Gilcrest Waste Water Treatment Plant Well was approved for \$57,986.30 at the July 2017 Board Meeting.

BACKGROUND

The Town of Gilcrest was previously dewatering using well WDID 0207026 (the Lorenz Well) under Permit No. 78949-F. This well was previously selected by the committee to provide Gilcrest some relief from the damaging high groundwater. However, a recent change in land ownership and the inability to consistently pump the well have created an immediate need for a more reliable system.

Through the recommendations of the Dewatering Improvements Study (JVA-Bishop Brogden Associates), a dewatering well will be drilled and installed near the waste water treatment plant in the Town of Gilcrest. This application is for the engineering work, well drilling, and purchase of a pump for a new dewatering well. The remaining costs to complete the well will be requested through funding from another grant source.

DESIGN

This well will be drilled near the westernmost pond of the waste water treatment plant as recommended by the Dewatering Improvements Study that was completed using HB15-1178 funding. Pumped water will be conveyed to the

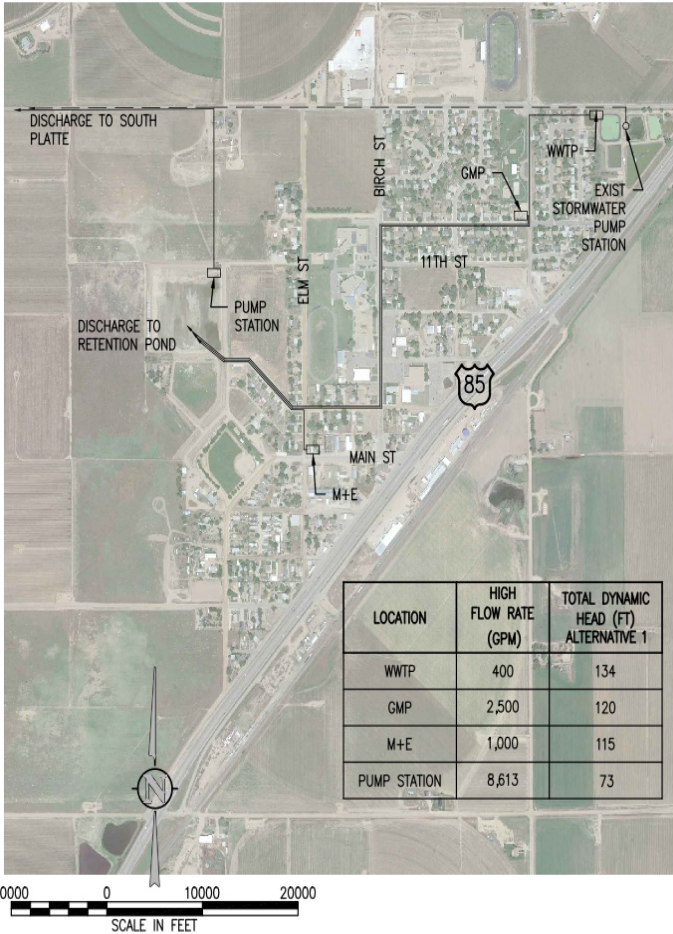


Figure 1: Dewatering Improvements Study proposed dewatering wells for the Town of Gilcrest

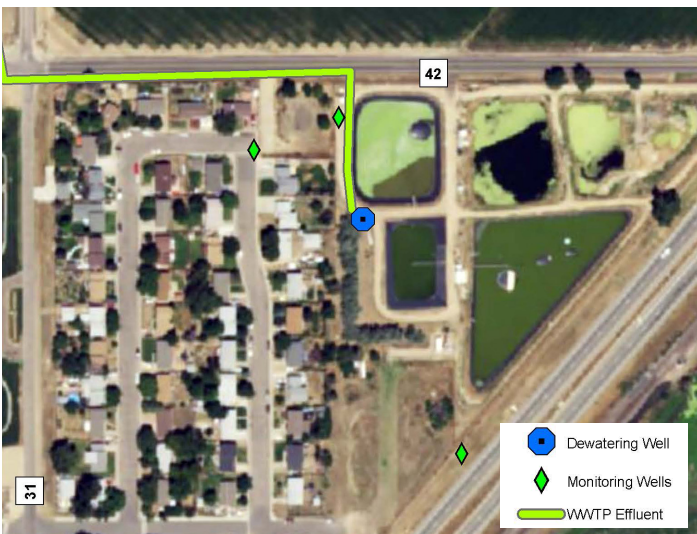


Figure 2: Proposed location for the waste water treatment plant dewatering well.

South Platte River via the existing effluent line that runs west from Gilcrest.

This well will also be equipped with a variable frequency drive (VFD) to provide the town with flexibility in how much or how little is pumped out of the well. This VFD will have a higher maximum pumping capacity than the current effluent line to account for future enlargement of the line.

The funds approved in this application will cover the engineering costs, well drilling, and purchase of the pump itself. The remaining tasks (installation of the pump, pipeline to tie the well to the effluent line, and the VFD purchase and installation) will be funded through a separate grant source. The total project cost was anticipated to be \$112,250.06 at the time of approval.

CURRENT PROGRESS

The Town of Gilcrest was awarded an additional \$54,263.76 from the Department of Local Affairs, and is currently in the process of collecting bids to construct the well.



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Department of Natural Resources

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