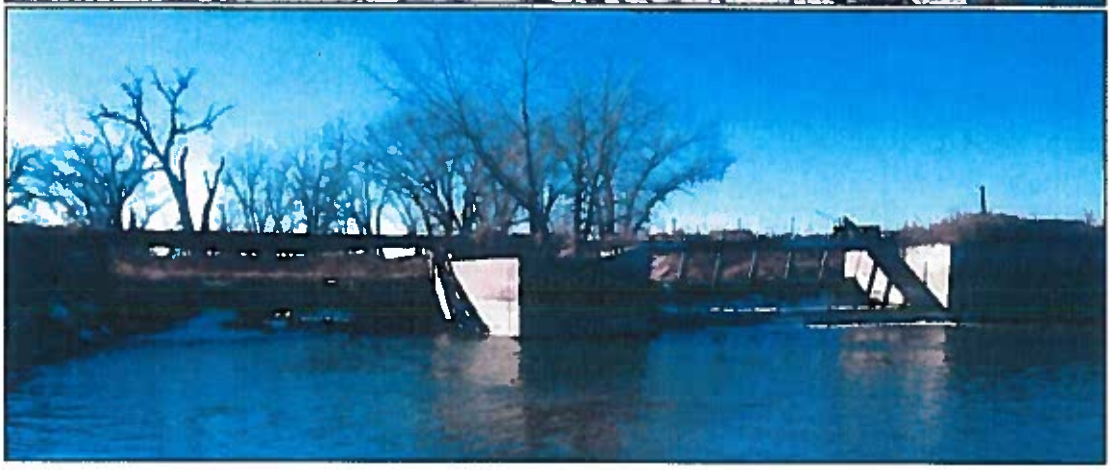
FEASIBILITY REPORT

SPRINGDALE DITCH COMPANY
DIVERSION STRUCTURE REPLACEMENT PROJECT

DIVISION 1, WATER DISTRICT 64
LOGAN COUNTY, COLORADO

September 27, 2019



Prepared for:

Springdale Ditch Company
P.O. Box 109
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In cooperation with the Colorado Water Conservation Board.

Prepared by:

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FEASIBILITY STUDY APPROVAL
Pursuant to Colorado Revised Statutes 37-60-121 &122, and in accordance with policies adopted by the Board, the CWCB staff has determined this Feasibility Study meets all applicable requirements for approval.

Signed 11/4/19 Date

COLORADO LICENSED
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09/27/19

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Signed Date

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EXHIBITS

Springdale Ditch Company

Ken Fritzler
President

Brad Anderson
Vice-President

Rick Zweygardt
Secretary/Treasurer

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HARRIS ENGINEERING CONSULTANTS, INC. would like to thank the Springdale Ditch Company for the valuable assistance provided during the preparation of this report. Special thanks are offered to the following individuals of the Company and other organizations:

Mr. Ken Fritzler
President, Springdale Ditch Company

Mr. Brad Anderson
Vice-President, Springdale Ditch Company

Ms. Katy Barkley
Office Manager, Springdale Ditch Company

Mr. Cole Bedford, P.E.
Colorado Water Conservation Board

Executive Summary

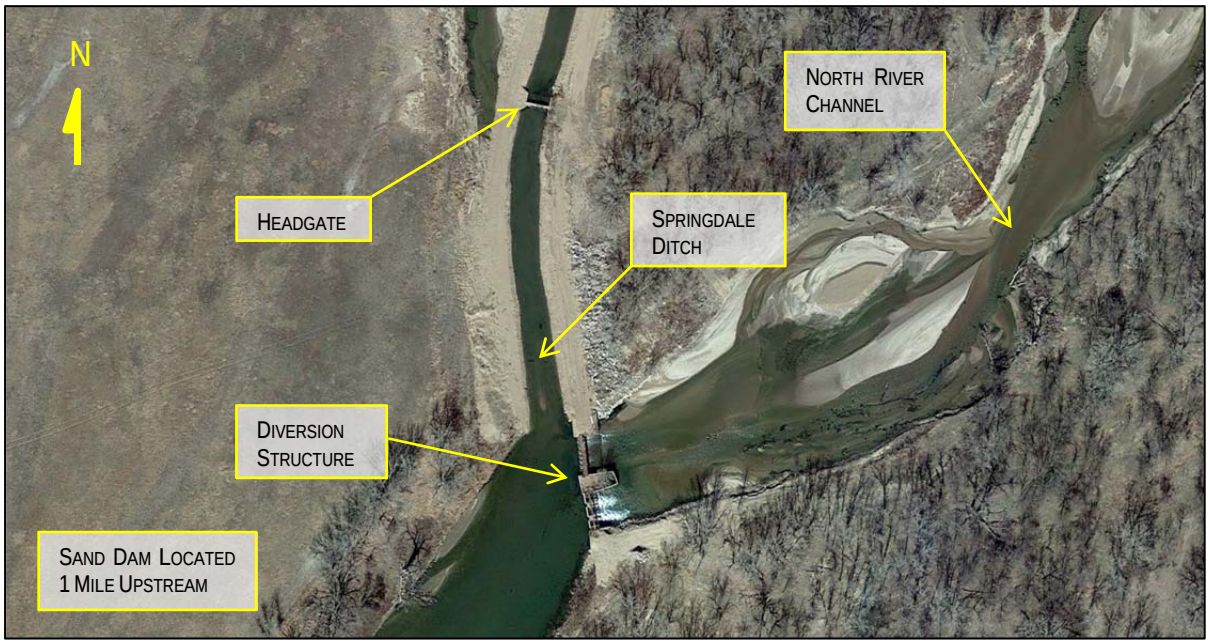
The Springdale Ditch Company (SDDC) operates and maintains an irrigation ditch system in Logan County for the distribution of direct flow irrigation and augmentation water. The system serves approximately 3,500 acres for 51 shareholders. Water is diverted from the South Platte River at a diversion structure located approximately one mile south of the Town of Atwood and upstream of the State Highway 63 bridge in Logan County, Colorado. The diversion structure is positioned on the north channel of a braided section of the South Platte River, where flow is spilt by a large island into two distinct channels. As the river is morphologically inclined to occupy the south channel, the SDDC is obliged to build and maintain a sand dam located approximately one mile upstream of the point of diversion in order to get water to the Springdale Ditch. An aerial image of the existing structure is provided on Figure 1, below.

Management of sediment at the headworks is a concern; this has something to do with the existing headgate being located a considerable distance down channel from the diversion barrage. The recessed nature of the headgate in the Springdale Ditch creates a stagnation point in the channel between the headgate and the diversion structure. As a result, low velocities allow sediment to fall out of suspension and accumulate on the channel bottom upstream of the headgate. Consequently, dredging is periodically required to restore the channel cross section and maintain adequate capacity in the ditch. Other concerns regarding the existing structure include structural degradation, erosion on the downstream side of the structure, and safety concerns with operating the existing flashboard arrangement. Pictures of the existing structure are included in Exhibit D.

The cost for a new diversion structure is estimated at $1,210,000 (rounded to the nearest thousand dollars). A detailed cost estimate is included in Exhibit F.

The SDDC is requesting a low-interest water project loan from the Colorado Water Conservation Board (CWCB) to fund the project.

Figure 1: Aerial View of Existing Structure



Project Sponsor

The Springdale Ditch Company (SDDC), located in Logan County, Colorado is a mutual ditch company and a non-profit corporation. Articles of Incorporation and Company Bylaws are included in Exhibit A; a list of current shareholders can be found in Exhibit J.

The SDDC, incorporated in July of 1886, was formed to construct and operate the Springdale Ditch for the benefit of shareholders by providing direct flow irrigation water. The Company currently has 51 shareholders with 831.5 total shares of stock and a decreed absolute water right of 62.275 cubic feet per second (cfs) from the South Platte River. Water is diverted at the Company's headworks located on the north bank of a braided section of the river. The diversion structure is located at stream mile 76.83, in the northwest quarter of Section 35 of Township 7 North, Range 53 West of the Sixth Principal Meridian. The average annual diversion for the SDDC is approximately 8,150 acre-feet, which equates to approximately 10 acre-feet per share.

Project Service Area

The service area is located in Logan County, positioned on the north side of the South Platte River between the Town of Atwood and the City of Sterling, Colorado. The service area is comprised of, on the average, approximately 3,500 acres of irrigated cropland. Water diverted from the river is typically used to irrigate corn, alfalfa, beans, and sugar beets. The elevation at the point of diversion is approximately 3990 feet. A location map of the service area can be found in Exhibit C.

Water Rights

A summary of the historic water rights held by the SDDC are included in Table 1, below. This information was obtained from the Structure Summary Report in the Colorado Water Resources Decision Support System (CDSS) attached in Exhibit B. The SDDC has a decreed absolute water right of 62.275 cfs.

Table 1: Historic Water Rights Data

APPRO. DATE	ADJ. DATE	CASE NO.	AMOUNT (CFS)
07/19/1886	11/15/1894	CA0304	62.275

Table 2: Water Rights and Diversion Summary

DESCRIPTION	AMOUNT
Decreed Water Right (cfs)	62.275
Maximum Day Diversion (cfs)	108
Date of Maximum	06/30/2005
Average Annual Diversion 1950 – 2018 (acre-ft)	8,150

Yearly diversions over the past fifteen years have generally exceeded the historic average shown in Table 2 due to the advent of augmentation plans and the proliferation of associated infiltration sites across the service area. In fact, annual diversions over the last fifteen years have averaged 11,660 acre-feet, with an average over the past five years of 12,780 acre-feet. The average and maximum monthly historic diversions into the Springdale Ditch are included in Table 3.

Table 3: Historic Diversions

MONTH	AVG. DIVERSION (CFS)	MAX. DIVERSION (CFS)
November	21	58
December	18	37
January	16	35
February	17	61
March	22	65
April	22	64
May	23	71
June	26	108
July	34	99
August	29	98
September	21	74
October	17	64

Streamflow

The South Platte River Basin is hydrologically diverse, receiving drainage from the eastern slope of the Rocky Mountains with headwaters near 14,000 feet culminating into large tributaries before emptying into the South Platte River. Conversely, the basin is comprised of many small ephemeral tributaries in the plains region that extend as far south as the Palmer Divide. The Basin also includes many heavily urbanized regions, including the Denver metropolitan area. Although streamflow in the South Platte is primarily the result of snowmelt, major flood events over the past century have been the product of inflows generated from large convective storms occurring between May and September. Namely, the major floods of 1894, 1921, 1935, 1965, 1973, 2013, and, most recently, 2015 were all the result of large precipitation events within the Basin.

As there are no historic records of streamflow at the Company's headworks, records from the nearest river gaging station located approximately 14 miles upstream near Balzac were used to represent conditions at the point of diversion. There are records available for two gaging stations near Balzac:

Station 06760000
Operating Entity: USGS
Location: N40° 24' 24" W103° 27' 58" (NAD27)
Date of Record: 01/1917 through 05/1980
Drainage Area: 16,623 square miles
Elevation: 4091.06 feet (NGVD29)

Station 06759910
Operating Entity: Colorado Department of Water Resources (DWR)
Location: N40° 21' 27" W103° 31' 41" (NAD83)
Date of Record: 10/1980 through present
Drainage Area: 16,609 square miles
Elevation: 4135.02 feet (NAVD88)

Tables 4 through 6 summarize the streamflow characteristics at the point of diversion. Peak discharges for the South Platte River at Balzac were adopted from a hydrologic evaluation conducted in 2015 [Ref. 2], as part of

the Colorado Hazard Mapping Program (CHAMP) study for the Lower South Platte River Basin. The flood frequency analysis documented in the study included peak flows from flooding events that occurred in September of 2013 and the Spring of 2015. Peak flood discharges are enumerated in Table 4, while Tables 5 and 6 illustrate the average monthly streamflow and flow duration exceedance values, respectively.

Table 4: Flood Discharges, South Platte River

FLOOD EVENT	PEAK DISCHARGE (cfs)
2 yr	3,652
5 yr	9,143
10 yr	15,088
25 yr	26,152
50 yr	37,643
Sept. 2013	51,000
100 yr	52,549
500 yr	105,067

Table 5: Mean Monthly Flows, South Platte River

MONTH	MEAN FLOW (cfs)
November	203
December	309
January	444
February	413
March	357
April	484
May	1,216
June	1,839
July	484
August	375
September	378
October	260

Table 6: Flow Duration Data, South Platte River

EXCEEDENCE (%)	FLOW (cfs)
5	1,830
10	1,080
20	590
30	348
40	236
50	177
60	132
70	80
80	30
90	16
95	12

Need for the Project

The SDDC is undertaking repairs to their headgate and diversion structure to ensure that it can continue to divert water from the South Platte River. The current facility is comprised of three major components: 1) ditch intake structure; 2) concrete diversion barrage; and, 3) sand dam.

The ditch intake is a concrete structure with five (5) 4-foot wide vertical slide gates fabricated of wood planking and steel strapping. The gates are used to adjust flows into the ditch. Each individual gate is actuated by a jack and locked into position by a steel pin attached to a lever; the pin engages into a series of slots machined into the steel centerpiece of each gate. Consequently, flow adjustment into the ditch can potentially be a timely and laborious task. The gates are well maintained but the structure itself is showing signs of age and deterioration; minor spalling and fatigue cracking are clearly visible throughout the structure. As previously alluded, the position of the headgate structure is problematic. The structure is located approximately 350 feet downstream of the river diversion, creating a stagnation point in the ditch. As a result, sediment falls out of suspension and accumulates in the ditch upstream of the headgates.

The diversion barrage is a reinforced concrete slab structure that consists of two 40-foot sections, a gated section on the north for sluicing sand from the ditch inlet and a rollover wall with two flash boarded sand chutes

on the south. The north and south sections are separated by an artificial island surrounded by concrete. The total length of the structure is approximately 100 feet from the north to south abutment. The height of the rollover wall is approximately 5.5 feet above the concrete floor slab. Although the exact age of the structure is unknown, it has likely been in place for at least 70 to 80 years. The concrete shows signs of age and deterioration with spalling, fatigue cracking, erosion from abrasion, and general decay evident throughout most of the structure.

The sand chutes allow for marginal sediment passage and cannot remove sediment upstream of the intake due to the current configuration of the headgate structure. Operation of the gated chutes and flashboards presents a safety concern for the SDDC. The chutes are accessed by traversing across the top of the structure on a make-shift bridge fabricated from part of a thin-walled steel tank and an old railcar chassis. Undermining of the floor on the back face of the structure as a result of scour is also evident. Because of the configuration of the structure, debris detainment has also been a problem over the years. Photos of the existing structure can be found in Exhibit D.

The existing structure is positioned in a braided section of the river where flow is bifurcated by a large island into two channels. It is clear from historic aerial photos (supported by years of operating the headworks) that the river is morphologically inclined to occupy the south channel, opposite the structure. Hence, at times of low river flow a sand dam is pushed into position about one-mile upstream of the structure to divert water into the north channel. During periodic surges in streamflow, the sand dam is often breached and scoured to such a degree as to render it ineffective. Accordingly, as the river stage subsequently recedes, water preferentially flows through the south channel and the SDDC is unable to maintain an adequate supply of water until the sand dam can be repaired.

Alternatives Evaluated

Three alternatives were considered: 1) Do not build the project; 2) Replace the existing structure at/near the present diversion location; and 3) Build a new structure upriver (upstream of the divergence of the north and south channels). A subjective evaluation of the alternatives is summarized below:

1. *Do not build the project:*

   If this project is not pursued, the headworks will continue to deteriorate and the Company will continue to invest a significant amount of capital each year on remedial activities required to maintain the channel upstream of their headgate and diversion structure. As a worst case scenario, if the diversion dam fails, the shareholders would be unable to divert irrigation water supporting approximately 3,500 acres of farmland. This could potentially lead to a substantial loss of crops reliant on the Springdale Ditch. The value of affected irrigated lands in the SDDC system could potentially drop from $4600 to $1250 per acre, based on average land values for irrigated and dryland farm ground in the State of Colorado. At a minimum, shareholders will continue to bear the capital burden associated with dredging the upstream channel as a result of the inadequate sediment transport and sand sluicing capability of the existing structure.

   For the reasons above, this alternative is not considered acceptable by the Company.

2. *Replace the existing structure at/near the present diversion location:*

   This alternative will consist of the complete removal and replacement of the existing structure. The new diversion structure will be constructed near the footprint of the existing structure, but would be preferentially oriented to the direction of flow in the river channel. The floor of the new structure will be lowered approximately 6 to 12 inches below the elevation of the existing structure. The new ditch intake will be integral to the structure, on the north abutment and aligned perpendicular to the diversion

barrage. Little to no modification to the Springdale ditch will be required to accommodate the new structure, outside of the demolition and removal of the existing intake structure.

The new structure will be constructed of reinforced concrete and arranged in a traditional slab and buttress configuration and will include the following major components:

- One 48-foot long, 6.5-foot tall inflatable crest gate spillway (bladder gate) as manufactured by Obermeyer Hydro, Inc. (Obermeyer) and placed in the river channel;
- A new intake structure for the Springdale Ditch;
- One 15-foot long, 3-foot tall Obermeyer headgate on the new Springdale Ditch intake structure;
- One 15-foot by 15-foot control building, constructed of reinforced concrete. The control house will contain the following:
  - Gate air-supply system, including air compressors, dryers, and air receiver tanks.
  - Gate control system, consisting of a pneumatic control panel and PLC for gate automation.

Lowering the bladder gate during times of high river flow will greatly reduce the stress on the entire intake system. This structure will also greatly improve sediment passage and eliminate the need to dredge the channel upstream of the headgate on a frequent basis. However, because of the tendency of the river to occupy the south channel, a sand dam will still be required during low flows to ensure that a sufficient quantity of water is delivered to the headworks.

The alternative will restore channel continuity and improve sediment transport along the river. The new Obermeyer crest gate spillway will facilitate sediment passage and provide additional flow conveyance during floods, reducing upstream backwater effect for smaller floods and improving overall channel stability. During intermediate flows, the gates will have the ability to operate in a partially deflated mode to allow fish passage over the dam while maintaining the benefits of a partial pool upstream of the barrage for aquatic habitat and waterfowl. The enhanced sediment control capability of the new structure will mitigate environmental impacts associated with periodic dredging activities on the upstream channel that are currently required to remove sediment retained by the existing structure.

The cost of this alternative is approximately $1,210,000.

3. *Build a new structure upriver:*

Similar to alternative #2, this alternative would involve the replacement of the existing diversion structure. The new structure would be placed approximately one mile up river near the location of the existing sand dam. The structure would be approximately 225 feet in length, which would include a 100-foot section of inflatable bladder gate, 5 feet in height, to act as a service spillway in the river channel. The balance of the channel would be spanned with a reinforced concrete rollover wall. The headgate would be of the same design described in alternative #2. The Springdale Ditch would be extended one mile southwest from the existing point of diversion, and would occupy the existing north channel of the river. The existing diversion structure would serve as a wasteway back to the river. Reinforced concrete pipe could be placed in lieu of a surface channel but would be cost prohibitive. This alternative would have the same benefits as alternative #2 but would eliminate the need for the sand dam.

Disadvantages and/or difficulties associated with this alternative involve the acquisition additional easements, construction of a new access road and potential impacts to the floodplain. Additional legal expenses would also be required to file what is known as a “Simple Change” with the water court. Colorado water law [C.R.S. 37-92-305(3.5)] has a provision for the change to a surface point of

diversion which does not include any amendments to the decreed water right(s) and for which there are no intervening surface diversions between the new and existing point of diversion.

The cost of this alternative is estimated at $1,853,000. Because of the high capital expense and other concerns described above, this alternative was not selected.

The Selected Project

The SDDC plans to construct alternative #2. Features of this alternative are as follows:

- The new concrete structure will be founded on friction piling driven into the riverbed in a grid pattern.
- Steel sheet piling will be driven around the perimeter of the foundation to preclude seepage, reduce uplift pressures and exit gradient, and confine the material under the foundation during all conditions of river flow and turbulence.
- The structure will be supported on a monolithic steel reinforced concrete base. The base slab will have a minimum thickness of 15 inches.
- The slab and buttress walls and abutment retaining walls will be constructed of steel reinforced concrete. Walls with potential exposure to debris impact in the river channel will have a minimum thickness of 15 inches; abutment retaining walls will have a minimum thickness of 12 inches.
- One 48-foot long Pneumatically Actuated Bladder Gate furnished by Obermeyer will be installed in the river channel. The gate will be 6.5 feet in height and will be fabricated out of ASTM A240 304L stainless steel.
- The Springdale Ditch intake structure will consist of 15 feet of Pneumatically Actuated Bladder Gate furnished by Obermeyer. This gate will be 3 feet in height and will be fabricated out of ASTM A240 304L stainless steel. Orientation of the ditch intake structure will be approximately perpendicular to the river structure.
- A 15-foot by 15-foot control building constructed of reinforced concrete will house the gate air-supply system and control system.

The features narratively described above are shown on the preliminary plan set found in Exhibit E.

Hydraulic Design Criteria

To evaluate the ability of the proposed structures to safely pass floods and meet irrigation demands, the following hydraulic design criteria was applied:

- Flood condition: Safely pass the 100-year flood (52,550 cfs) with minimal overtopping of non-overflow sections of the dam (i.e. abutments and intake structure). Scour protection designed for the 2- and 5-year flood events as tailwater depths associated with larger floods inhibit the potential for bed scour.
- High flow condition: River discharge at mean monthly flow for June (1,839 cfs); diversion requirement commensurate with historic maximum flow for the Springdale Ditch (108 cfs).
- Average flow condition: River discharge equal to the mean monthly flow for August (375 cfs); diversion requirement at maximum decreed right for the Springdale Ditch (~62.3 cfs).
- Low flow condition: River discharge at the 70-percent exceedance flow (80 cfs); diversion requirement for the Springdale Ditch equal to the historic average diversion for the month of August (29 cfs).

Hydraulic Modeling

A hydraulic model of the South Platte River was developed using the existing FEMA HEC-RAS model of the Lower South Platte dated November 2017. The model was used to evaluate the hydraulics of the existing and proposed structures during normal flows and flood events. An additional model of the irrigation ditch and intake structure was developed to assess the performance of the proposed headworks to deliver water for irrigation.

While the FEMA model was complete with elevations at established cross-sections along the river corridor, additional site-specific elevation data was gathered from a field survey conducted in December, 2018 and from 0.7-meter resolution LiDAR mapping of the South Platte River acquired by the USACE Omaha District in October, 2014. Elevations of existing and proposed structures are included in Table 7 and were used in the hydraulic modeling.

Table 7: Critical Elevations

POINT NO.	POINT DESCRIPTION	EXIST. ELEVATION (feet)	PROP. ELEVATION (feet)
1	Top of (T.O.) Wall, North Abutment	3992.05	3994.5
2	T.O. Wall, South Abutment	3992.19	3994.5
3	T.O. Floor, River Structure	3983.23	3982.5
4	T.O. Wall, Rollover Wall	3988.69	3989.0
5	± Channel Floor, Downstream of Structure	3982.36	
6	T.O. Wall, Ditch Check Structure	3990.64	
7	T.O. Floor, Ditch Check Structure	3985.64	
8	T.O. Wall, Wasteway Gate Structure	3990.29	
9	T.O. Floor, Wasteway Gate Structure	3984.77	
10	Gate Crest	--	3989.0
11	Intake Floor	--	3985.0

Water surface elevations under various flood events at the structure for existing and proposed conditions are tabulated below. The results of the modeling indicate that the proposed improvements will not raise flood elevations. It can also be inferred from the data presented in the table that the impact of the proposed improvements become increasingly negligible at higher flows. This is due to a greater proportion of conveyance occurring in the overbank region (floodplain) at larger flood discharges, diminishing the impact of changes to the channel. Cross-sectional profiles and other output data from the hydraulic model are included in Exhibit K.

Table 8: Flood Simulation Results

FLOOD EVENT	DISCHARGE (cfs)	FLOOD ELEVATIONS (feet)	
		EXIST. STRUCTURE	PROP. STRUCTURE
~1.3 yr (HF)	1,839	3990.7	3989.6
2 yr	3,652	3991.1	3990.7
5 yr	9,143	3990.6	3990.6
10 yr	15,088	3991.3	3991.3
25 yr	26,152	3992.5	3992.6
50 yr	37,643	3993.6	3993.6
100 yr	52,549	3994.6	3994.6
500 yr	105,067	3996.8	3996.8

Note: the sand dam was assumed to breach somewhere between the 2 and 5 year flood events, opening up the south channel and substantially increasing the area available for flood conveyance. This accounts for the disruption in the upward trend of water surface elevations.

The hydraulic performance of several different headgate configurations was evaluated, the results of which are summarized in Table 9. The results shown are based on an orifice flow condition through the gate opening with the flood gate closed sufficiently to maintain the indicated upstream pool elevation.

Table 9: Headgate Performance Summary

DESCRIPTION	HIGH FLOW CONDITION	AVG. FLOW CONDITION	LOW FLOW CONDITION
River Discharge (cfs)	1,839	375	80
Upstream Pool Elevation (ft)	3989.0	3989.0	3989.0
Flood Gate Position (% open)	100	26	9
Diversion Requirement (cfs)	108	62.3	29
Ditch W.S.E. at Headgate (ft)	3988.7	3988.1	3987.4
Gate Position – *15' width* (% open)	67	22	11
Gate Position – *10' width* (% open)	100	31	16
Min. Upstream Pool Elevation to Meet Diversion Requirement with Gate Fully Open (*15' Wide Gate*)	3988.8	3988.1	3987.5

Note: headgate sizing was performed based on the target upstream pool depth at crest elevation (3989.0 feet); however, the minimum pool elevation at the high flow condition for the 40 foot gate option is 3989.7 feet. Performance listed based on pool elevation at 3989.0 feet.

Cost Estimate

The estimated total project cost is $1,210,000. A detailed cost estimate is attached to this report in Exhibit D.

Item	Estimated Cost
1. Planning, Design, and Legal Costs	$ 61,500
2. Construction Cost	$ 1,038,500
3. Miscellaneous and Contingency @ 10%	$ 110,000
Total Cost	$ 1,210,000

Implementation Schedule

The proposed implementation schedule anticipates a completed project by February of 2021. This is based on construction commencing in early fall of 2020, after irrigation season and when conditions in the river are optimal. A detailed project construction schedule is included in Exhibit G. Project milestone dates are as follows:

Task	Date of Completion
1. Feasibility Study Submitted to CWCB	10/01/19
2. Preliminary Design	10/30/19
3. Feasibility Study Review and Approval by CWCB	11/20/19
4. Complete Final Design	07/20/20
5. Order Long Lead Time Items (Obermeyer gates)	08/10/20
6. Bidding and Contract Award	08/24/20
7. Notice to Proceed with Construction	09/21/20
8. Begin Construction	09/28/20
9. Complete Construction	01/29/21

Social, Economic, and Physical Impacts

The project will have no significant social impacts.

The construction activity itself will result in short term, localized economic benefits. The primary economic impact, however, will be borne by the shareholders who will assume a considerable increase in annual assessments to subsidize the acquired debt service. This may be offset somewhat by obviated maintenance expenditures associated with the existing structure. From a reliability perspective, the project will have a long term positive economic impact by assuring continued diversions into the Springdale Ditch. As indicated before, the 'no action' alternative is not acceptable.

The project will have no significant negative physical impacts once construction is complete. Positive environmental impacts include: improved sediment passage; river continuity for habitat migration at intermediate flows when the bladder gate in the river is sufficiently lowered; and enhanced conveyance of low to moderate flood flows.

Permitting

The project is located on State-owned land with a long standing easement that includes both the headworks at the point of diversion and the Springdale Ditch. A copy of the easement may be found in Exhibit A. No additional easements or rights of way for the selected alternative are anticipated as the new structure will be located at or near the existing point of diversion; the new electrical service line will be kept within SDDC property and/or within existing right of way limits.

The Company expects to be exempt from 404 permitting by Statutory Exemption, 33 CFR Section 323.4 (a) 3 (repair of an existing diversion structure). As the project is unlikely to have any federal nexus, the Company believes no Environmental Assessment (EA) or Environmental Impact Statement (EIS) will be required.

Financial Plan

The total cost of the project is $1,210,000. The SDDC is requesting a 30-year low interest loan from the Colorado Water Conservation Board (CWCB) for the full amount of the project.

Lending rates for CWCB loans are set based on the designation of the entity applying for a loan. Ownership of shares in the Springdale ditch are approximately 97% agricultural, 2% low-income municipal (City of Sterling), and 1% commercial. It is therefore anticipated that the Company will qualify for a blended interest rate of 1.5% at current lending rates. Accordingly, a rate of 1.5% was used to estimate the debt service associated with the project. The financial analysis summarized in Table 10 is based on a 100% loan from the CWCB.

Table 10: Project Loan Summary

Total Project Cost (rounded)	$	1,210,000
1% CWCB Service Fee	$	12,100
CWCB Loan (including 1% service fee)	$	1,222,100
Annual Payment (30 year term @ 1.50%)	$	50,887
Number of Shares		831.5
Annual Cost per Share for Loan	$	61.20
Current Assessment per Share	$	25.00
New Assessment per Share	$	86.20
Annual Project Cost per acre-foot (Based on an average annual diversion of 8,150 acre-feet)	$	6.24

A $1,222,100 loan from the CWCB (including a 1% origination fee) at 1.5% interest over a 30-year repayment period yields an annual payment of approximately $50,887, for a total principal plus interest payment of $1,526,618 over the 30-year term. As there are 831.5 shares in the SDDC, this results in a project cost per share of $61.20 per year. Based on a combined average annual diversion of 8,150 acre-feet of water, the project will entail an incremental commodity rate increase of $6.24 per acre-foot diverted. Considering the existing assessment of $25 per share, the total cost of water diverted after the project is complete will be $8.79 per acre-foot. This financial analysis should stay consistent over the period of the CWCB debt retirement.

Collateral

The SDDC has the following collateral it can offer for the CWCB loan, in this order of preference:

1. The project itself. The project will be owned by the SDDC and can be offered by vote of the stockholders.
2. A pledge of assessment revenue of the SDDC stockholders, if approved by vote.
3. One annual payment in the form of a Certificate of Deposit (CD), to be held by the State Treasurer.

Institutional Considerations

The SDDC would need authorization to borrow $1,222,100 from the CWCB Construction Fund. The loan, if approved, from the CWCB will be contingent upon the successful negotiation of a contract between CWCB and the SDDC. Agreements with contractors will be finalized upon authorization of the CWCB loan.

Opinion of Feasibility

The selected alternative is technically and financially feasible. There are no significant roadblocks, which would keep the SDDC from successfully completing this project.

References

1) Flood Insurance Study for Logan County, Colorado and Incorporated Areas, Federal Emergency Management Agency, Flood Insurance Study No. 08075CV000B, April, 2019.

2) Colorado Hazard Mapping Program Hydrologic Analysis Technical Support Data Notebook for the South Platte River, AECOM, CWCB Contract CT 2016-1452, August 2017.

3) South Platte River Watershed Phase 2 Hydrologic Evaluation, URS, December 2015.

4) Colorado Hazard Mapping Program Hydraulic Analysis Technical Support Data Notebook for the South Platte River, AECOM, CWCB Contract CT 2016-1452, March, 2018.

5) 7.5-Minute Series Topographic Maps, U.S. Department of the Interior, Geological Survey, Scale 1:24,000, Contour Interval 10 Feet: Atwood, Colorado (1951); Sterling South, Colorado (1951).

6) Digital Elevation Models, Colorado GeoData Cache, Colorado Governor's Office of Information Technology, https://geodata.co.gov/, August, 2019.

7) Open-Channel Hydraulics, Chow, Ven Te, McGraw-Hill, Inc., 1959.

8) HEC-RAS River Analysis System, Version 4.1.0, U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, January 2010.

9) Land Values 2018 Summary, U.S. Department of Agriculture, National Agricultural Statistics Service, August 2018.

APPENDIX A

Articles of Incorporation, Bylaws and Historic Easement Records

NO. 844

CERTIFICATE OF INCORPORATION

Spring Dale Ditch
Company

[No. 167.] CERTIFICATE OF INCORPORATION.—Printed and for sale by the Rocky Mountain News Printing Company, Denver.

Know all Men by these Presents, That we Pennumbra Keeney, W. H. Schenck, H. L. Spencer, J. H. Barnett, M. C. King and J. J. Chears

residents of the State of Colorado, have associated ourselves together as a Corporation under the name and style of the ~~Farmers Independent Ditch Company~~ Spring Dale Ditch Company for the purpose of becoming a body corporate and politic under and by virtue of the Laws of the State of Colorado; and in accordance with the provisions of the Laws of said State, we do hereby make, execute and acknowledge in Jerson this certificate in writing of our intention so to become a body corporate, under and by virtue of said Laws.

FIRST—The corporate name and style of our said Company shall be The ~~Farmers Independent Ditch Company~~ Spring Dale Ditch Company

SECOND—The object for which our said Company is formed and incorporated is for the purpose of Constructing an Irigation Ditch for Irigating the land under said Ditch And domestic purposes. said ditch beginning at a point on the north bank of the South Platte River In the N.W. 1/4 of the N.W. 1/4 of Section 26, Township 7 Range 53 West South 20 degrees East 600 ft from N.W. Corner of said Section. Thence on a North Easterly direction to a point near the N.W. Corner of Section 28, T. 9, R. 53 West where it will empty in to Cedar Creek, In Weld County in the State of Colorado.

THIRD—The Capital stock of our said Company is Fifty-Thousand Dollars, to be divided into one thousand shares of Fifty Dollars for each share.

FOURTH—Our said Company is to exist for the term of Twenty years.

FIFTH—The affairs and management of our said Company is to be under the control of Five Directors and Pennumbra Keeny, M. C. King, H. L. Spencer, J. H. Barnett, and J. J. Chears are hereby selected to act as said Directors, and to manage the affairs and concerns of said Company until the first Saturday in February 1887.

SIXTH—The operations of our said Company will be carried on in the County of Weld and State of Colorado

and the principal place and business office of said Company be located in the Town of Sterling and County & State aforesaid.

SEVENTH—The Directors shall have power to make such prudential by-laws as they may deem proper, for the management of the affairs of this Company according to the statute in such case made and provided.

IN TESTIMONY WHEREOF, we have hereunto set our hands and seals, on this Tenth day of July 1886.

In presence of

M H Samuels

(Signed.)

Pennumbra Keeney
W H Schenck
H L Spencer
J H Barnett
M. C. King
J. J. Chears

1-19-'80-1500.

STATE OF COLORADO, }
COUNTY OF Weld } ss

I M. H. Smith a Notary Public

in and for said County, in the State aforesaid, do hereby certify that Penumbra Keeney W. H. Schenck N. L. Spencer. J. H. Barnett M. C. King & J. J. Chearis who are

personally known to me as the persons whose names are subscribed to the annexed and foregoing certificate of incorporation, appeared before me this day in person, and acklowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and Notarial seal, on this Tenth day of July A. D. 1886

M. H. Smith
Notary Public

M. H. SMITH NOTARY PUBLIC STERLING, WELD COUNTY, COLO.

Certificate of Incorporation.

OF THE

Spring Dale Ditch Co

State of Colorado, County of Weld

STATE OF COLORADO, }
COUNTY OF Weld } ss.

Filed ~~for record~~ at 9 o'clock A M.,
July 19th 1886
in my office, and duly recorded in Book
page No

J B Phillips
Recorder.

No. FEES, $5.75

No. 195. CERTIFICATE OF RENEWAL OF THE CERTIFICATE OF INCORPORATION

To Whom It May Concern:

This is to certify that a special meeting of the stockholders of The Spring Dale Ditch Company a Colorado corporation, was held at Sterling, Colorado on the 10th. day of July, A. D. 19 46, such meeting having been called by the stockholders representing at least 10 per cent (10%) of the entire capital stock of the company outstanding. Notice of such meeting as provided by law, was published at least once not more than thirty days and at least ten days prior to the date fixed for said meeting in a newspaper printed at Sterling, Colorado, State of Colorado, and notice of said meeting was delivered personally or mailed to each stockholder at least thirty (30) days prior to the date of such meeting, there being represented at such meeting 550 shares of the capital stock of said company out of a total of 900 shares outstanding. At said meeting a resolution was passed to extend the corporate existence of the said corporation to In perpetuity, from and after the date of the expiration of its corporate life, the resolution received a MAJORITY vote of all the outstanding stock of the corporation. The president and secretary were authorized and directed to file under the corporate seal of the company, a certificate of renewal with the Secretary of State of the State of Colorado, and to file a duplicate certificate in the office of the Recorder of Deeds in each county wherein the company may do business in the State of Colorado.

Owen L. Walker
President.

THE SPRINGDALE DITCH COMPANY
STATE OF COLORADO
1886

John C. Reed
Secretary.

Corporate existence may be renewed perpetually or for any specified number of years.
This certificate or renewal shall be filed before or within one year after the expiration of the charter.
Fee for filing certificate of renewal is $25.00 for $50,000 or less and twenty cents for each additional or fractional part of one hundred dollars of authorized capital stock, plus $5.00 for certificate of renewal. 3 5.

111072

CERTIFICATE OF RENEWAL

OF THE

CERTIFICATE OF INCORPORATION

OF

The Spring Dale Ditch Company

DOMESTIC

RECORDED

BOOK 495 PAGE 363

FILED in the office of the Secretary of State, of the State of Colorado, on the 13 day of Sept A.D. 1968 at 11:45 o'clock A.M.

WALTER S. MORRISON

Secretary of State

By Clerk

Fees 3.50

Old Age Pension Fund

Indexed by

This document has been inspected and properly Entered on the Records of The Flat Tax Department.

OK

Date Sept. 26, 1968

Clerk

BY-LAWS OF THE SPRING DALE DITCH COMPANY

1/8/77

ARTICLE I - NAME

The Corporate name shall be The Spring Dale Ditch Company.

ARTICLE II - OBJECTS

The objects of the Company shall be the constructing and maintenance of an irrigation ditch, as is described in the Certificate of Incorporation.

ARTICLE III - STOCKHOLDERS

Section 1: Annual Meeting

The annual meeting of the stockholders for the election of directors and for other purposes shall be held in the City of Sterling, County of Logan, Colorado, on the first Saturday in January of each year of its existence. The Secretary shall mail notices of the Annual Meeting to each stockholder or to the legal representative of each stockholder not more than 20 days and not less than 10 days before the meeting. Said notice to state the date and place of said meeting. Public notice of the time and place of the Annual Meeting of the stockholders shall be published at least once, not more than 30 days and at least 10 days prior to the date fixed for said meeting, in a newspaper printed in Sterling, Colorado.

Section 2: Delayed Annual Meeting

If for any reason the annual meeting should not be held on the day fixed in Section 1 of this article, then, it may be held at any time fixed upon by the President after giving legal notice as stated in Section 1 of this Article.

Section 3: Quorum

A Quorum for the transaction of business at any meeting of the stockholders shall consist of 20% of the stock issued and outstanding represented by the stockholders in person or by their duly authorized proxies, and a majority of the Quorum present shall govern.

Section 4: Voting

Each stockholder will be entitled to as many votes as he owns shares of stock. Cumulative voting shall not be allowed.

Section 5: Special Meetings.

Special meetings of the stockholders of the Company may be called at any time by resolution of the Board of Directors, or by the President and Secretary, and the President or Secretary shall call a special meeting upon receipt of a written request of the holders of one-half of the issued and outstanding stock of the Company. The notice of a special meeting shall state the business thereof in addition to the time and place, and no business shall be transacted at any special meeting except such as shall be mentioned in such notice. The time required for stockholder notice and publication shall be the same as required for an annual meeting as outlined in Section 1 of this Article.

ARTICLE IV - DIRECTORS

Section 1: Number and election

The affairs and management of the company shall be under the control of a board of six directors who shall be elected at the annual meeting of the stockholders of the Company and they shall serve for a term of 3 years or until their successors shall be duly chosen and shall qualify, and no person shall be qualified as a director who is not a stockholder of the Company. Officers of corporations holding stock in the Company shall be eligible to serve as a director, but only one director may come from any one corporation. The terms of office shall be alternated so that two Directors are elected each year.

Section 2: Vacancies

When any vacancy shall occur among the directors by death, resignation, or otherwise, it shall be filled by a vote of the remaining directors, or if only three or less remain, then a special meeting of the stockholders shall be called to fill such vacancies.

Section 3: Meetings

The regular meeting of the Board of Directors for the election of officers and for the transaction of any business of the Company shall be held each year immediately following the annual meeting of the stockholders. Special meetings of the Board of Directors may be called at any time by the President or by a majority of the members of the board. Notice of the time, and place of special meetings shall be given to each director orally or in writing not less than twenty-four hours previous to the time fixed for the meeting. If four members of the Board of Directors are present at the meeting or waive notice of the meeting.

Section 4: Quorum

Four members of the Board of Directors shall constitute a quorum and a majority of those in attendance shall govern.

ARTICLE V - OFFICERS

Section 1: Officers

The officers of the company shall be a president, vice president, and secretary, who shall be elected by the Board of Directors. The secretary need not be a stockholder of the company. At any meeting the Board of Directors may elect one or more additional officers as it may deem necessary. Directors and officers may be either male or female.

Section 2: President

The President shall preside at all meetings of both stockholders and directors and shall sign, with the Secretary, all certificates of stock, debentures, bonds, deeds and other instruments in writing made or entered into by or on behalf of the Company. As President of the Board of Directors he shall have no vote, only in case of a tie, at which time he may cast his vote, which shall decide the question.

Section 3: Vice President

The Vice President shall perform all the functions belonging to the office of the President in the absence of the President from the county or from a meeting, and he shall perform all other duties that may be required of him by the Board of Directors.

Section 4: Secretary

The Secretary shall give due notice of all meetings of the stockholders and of special meetings of the Board of Directors, he shall prepare and keep proper books of record for the business of the company and other books as the Board of Directors may prescribe, all of which shall be kept at the office of the Secretary; he shall hold all records, securities and papers belonging to and in the custody of the Company, subject to the order and direction of the Board of Directors. He shall countersign and register all certificates of stock and other documents requiring the signature of the Secretary, attaching the corporate seal of the Company to all instruments requiring the seal and perform all such other duties as are incidental to the office. He shall be the custodian of the corporate seal. With the President, he shall make out such reports as the law and Board of Directors may require. He shall receive all monies paid to the company and same shall be deposited with such bank as may be designated by the Board of Directors. He shall collect all monies due the company from assessments on capital stock. In general, he shall perform all duties that are incidental to his office and also such duties as are usually performed by the treasurer of a company.

Section 5: Tenure of office

Officers of the company shall be elected for a term of one year immediately following the annual meeting of the stockholders and shall serve until their successors have been elected and shall have entered upon the duties of their respective offices, providing, that any officer of the company may be removed at any time for sufficient cause by a vote of the majority of the Board of Directors represented at any regularly called meeting.

Section 6: Salaries

The amount of salary paid the Secretary of the company shall be determined by the Board of Directors.

Section 7: Board Member expense

Any officer of member of the Board of Directors shall be entitled to per diem and mileage expense while conducting the affairs of the Company.

Section 8: Bonds

The Board of Directors, if they so desire, may require the Secretary to make and file a good and sufficient surety bond with the President of the company for such amount as the Board of Directors deem sufficient to secure the company from any loss of money coming into his hands or from any wrongful act or acts of said officer and the company shall pay the premium for said surety bond.

Section 9: Auditing Committee

The Board of Directors may appoint an auditing committee or may engage the services of an auditor, whose duty it shall be, with such assistance as may be necessary, to audit the accounts, books and records of the company and make a report thereon in writing to the Board of Directors and to the next succeeding meeting of the stockholders.

Section 10: Employees

The Board of Directors may hire a ditchrider and other employees deemed necessary and determine the length of employment and the wages they receive and may discharge any employee at any time.

ARTICLE VI - STOCK CERTIFICATES

Section 1: Stock Certificates

All the owners of capital stock shall be entitled to have issued to their names and to have delivered to them certificates thereof duly signed by the President and Secretary and the seal of the corporation affixed thereto.

Section 2: Transfers

Transfers of stock certificates shall be made only upon the books of the company by the stockholder in person or by his attorney appointed under a power duly executed and filed with the Secretary of the company, and no transfer shall be allowed until the old certificate has been surrendered to the Secretary and by him cancelled and a new certificate issued thereof, and all assessments levied on the stock must be paid in full.

Section 3: Lost Certificates

The Board of Directors may direct that a new certificate of stock be issued in place of any certificate theretofore issued by the company and alleged to have been lost or destroyed; and when authorizing the issuance of such new certificate the Board may, in its discretion, require the owner or holder of such lost or destroyed certificate, or his legal representative, to give the company a bond in such sum as the Board of Directors may require, as indemnity against any claim that may be made against the company on account of such lost or destroyed certificate.

Section 4: Miscellaneous

Any person acquiring stock by purchase and transfer either at public or private sale shall be subject to all liabilities incurred and assumed by the other stockholders and to all the provisions of these by-laws.

Section 5: Sale of delinquent stock

At the option of the Board of Directors the stock of any stockholder who has failed to pay any assessment or assessments or any part thereof, may be sold after thirty days written notice and demand that the same be paid, said notice may be served upon the stockholder either personally or by mail and the certificate of the Secretary of the fact of such service shall be sufficient evidence thereof. After the expiration of the 30 days, the

Secretary shall publish a notice of the sale of said stock in a newspaper published in Sterling, Logan County, Colorado, once a week for four successive weeks, said notice to state the time, place and purpose of sale, and a copy of this notice shall be mailed in the post office at Sterling, Colorado, properly addressed to the delinquent stockholder and to persons in interest as shown by the books of the company at least 10 days prior to the date of sale. All sales of such stock shall be at public auction, conducted by the President and the proceeds of such sale over and above the amount due upon the stock and interest thereon, and all expenses of sale, shall be paid to the delinquent stockholder.

ARTICLE VII - ASSESSMENTS

Section 1: Assessments

All assessments on the capital stock of the company for the maintenance, operation and protection of the property of the company shall be made at the stockholders meeting, either annual or special. All assessments shall be payable within thirty days of billing. A 10% interest charge shall be made on all delinquent accounts.

ARTICLE VIII - LOANS AND CONTRACTS

Section 1: Loans

The Board of Directors may negotiate and make a loan to pay any legal outstanding indebtedness of said company.

Section 2: Contracts

No contract or contracts made by any officer of this company shall be valid without the previous authorization or subsequent ratification of the Board of Directors.

ARTICLE IX - ALTERNATE POINT OF DIVERSION

Section 1: Alternate Point of Diversion

No shareholder shall obtain an alternate point of diversion for all or a portion of the share owned by him, or utilize all or a portion of said share in any plan of augmentation, as either proceeding is denominated in Sec. 37-92-302, C.R.S. 1973, unless, at least 30 days prior to filing any application in the Water Court of Water Division No. 1 of the State of Colorado, he supplies the Secretary of the company with a detailed written plan for such application, and shall also, at such time, deposit with the Secretary the sum of $500.00 to cover the engineering and legal expense of investigation of such plan. No such plan shall be approved by the company unless such plan provides for leaving not less than 40% of the shares in the ditch to compensate for carrying losses and further provides for the continued payment of assessments on all shares held by the person desiring the change. (Any portion of said deposit not expended for costs attributable to the analysis of said plan shall be returned to the person making the deposit.)

ARTICLE X

That all water shall be drawn from the main ditch through regular headgates not less than 16 feet in length nor less than 3½ feet deep in the clear through the bank of the ditch. Said gates shall be put in by or under the directions of the ditch rider. No checks shall be placed in the ditch except permission be first obtained from the Board of Directors, and same must then be constructed of cement and under the direction of the ditch rider.

All water shall be measured by a uniform measuring device and delivered by the ditch rider, prorata according to the stock held or owned by the parties using water. The ditch rider may whenever it becomes necessary in order to secure an equal distribution of water provide locks for any or all headgates, and in such case he shall retain possession of the keys to the same.

All expenses connected with the putting in and repairs of headgages and locks for same shall be paid by the owners of said gates.

Any stockholders in violation of any of the provisions of this article shall subject the offender to be deprived of the use of water from ditch for such a time as the Board of Directors may order.

ARTICLE XI - CERTIFICATE OF INCORPORATION

Section 1: Certificate of Incorporation

The certificate of incorporation shall he here inserted and become a part of these by-laws.

ARTICLE XII - AMENDMENT OF BY-LAWS

Section 1: Amendment of By-laws

The stockholders may alter or amend or revoke any or all of the by-laws of the company or enact such new by-laws as shall be deemed proper at any regular meeting of the stockholders or at a special meeting called for that purpose, provided that notice of the proposed change or additions shall have been given at least ten days prior to the meeting or that such notice be waived by all stockholders not present at the meeting.

ARTICLE XIII - EFFECTIVE DATE

These by-laws shall become effective immediately upon their adoption.

24371
Sworn Statement
and Map.
of the
Spring Dale Ditch
Company.
Filed for record at
10 45 o'clock A. M.
March 7th 1887.
J B Phillips
Recorder.
By D. P. Brout. Depy.

M. C. King, President of the Spring Dale Ditch Company, W. H. Schenck and J. J. Cheairs stockholders in the The Spring Dale Ditch Company being duly sworn, say:

That said Spring Dale Ditch Company is an incorporation incorporated under the laws of the State of Colorado.

That the name of the ditch owned and controlled by said Spring Dale Ditch Company is the Spring Dale Ditch.

That the head gate of said ditch is situated in the South East corner of the S. E. 1/4 of N. W 1/4 of section 26, Tp 7 North, in Range 53 West, 4500 feet below where said ditch is taken out of the South Platte River

That said ditch is taken out of the South Platte River on the North side of said stream at a point 600 feet from the N. W. Corner of Section 35. Tp 7 North, in Range 53 West by a magnetic bearing South 20 degrees East.

That the size of said ditch is as follows: to wit:
In width the said ditch is twenty feet on the bottom; slopes of bank are one to one; its depth is three and one half feet;

That the carrying capacity of said ditch is one hundred and twenty five and sixty five one hundreths cubic feet per second.

The line of said ditch as shown by map or plat hereto attached runs from the point where it is taken out of the South Platte River in a North Easterly course through the sub-divisions of lands shown by plat hereto annexed.

Work was commenced on said ditch on about July 15th 1886.

That the names of the owners of said ditch are W. H. Schenck. J. J. Cheairs, M. C. King. Penumbra Keeney. H. L. Spencer, R. G. Smith, J. H. Barnett, H. P. Sutherland, B. Knudson, Josiah South, J. A. Tyler, J. C. Kendal, J. H. Simpson, Robert Smith, H. C. Hatch and George H. West, who are stock holders in the Spring Dale Ditch Company.

That the map hereto attached is a true and correct one and correctly shows the route of said ditch, the legal sub-divisions of the land through which said ditch passes with its proper corners and distances

M. C. King President Spring Dale Ditch Co.
W. H. Schenck
J. J. Cheairs

State of Colorado, } ss.
County of Weld.

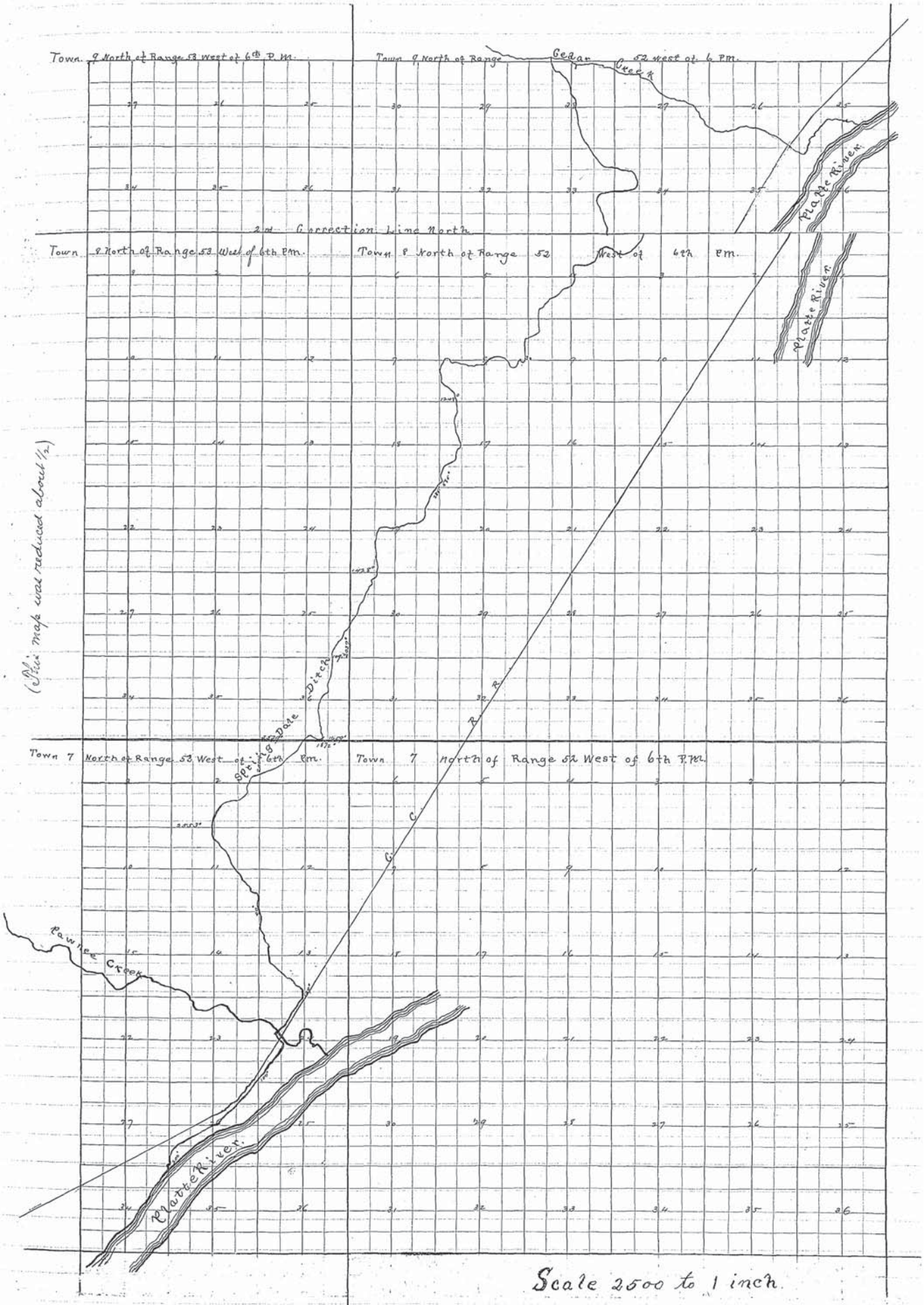
On this day personally appeared before me W. H. Schenck and J. J. Cheais stock holders in the Spring Vale Company and M. C. King, President of said Company who being duly sworn by me stated that they read the above and foregoing statement and that the same is true of their own knowledge and belief.

Witness my hand and official seal. this Feby 28th 1887.

A. L. Rowden.
Notary Public

NOTARIAL SEAL.

See opposite page for Map


Town 9 North of Range 53 West of 6th P.M.
Town 9 North of Range 52 West of 6 P.M.
Cedar Creek
Platte River
2nd Correction Line North
Town 8 North of Range 53 West of 6th P.M.
Town 8 North of Range 52 West of 6th P.M.
Platte River
(This map was reduced about 1/2)
Spring Dale Ditch
Town 7 North of Range 53 West of 6th P.M.
Town 7 North of Range 52 West of 6th P.M.
Rawlee Creek
Platte River
Scale 2500 to 1 inch.

APPENDIX B

State Engineer Diversion Reports 1950-2018
(Colorado Decision Support System, HydroBase)

COLORADO
Division of Water Resources
Department of Natural Resources

Structure Summary Report

Structure Name: SPRINGDALE DITCH (6400530)

Structure Type: DITCH

CIU Code: Active Structure with contemporary diversion records (A)

Associated Permits:

Water Source Type: Tributary

Water Source: SOUTH PLATTE RIVER [00201759] @ Stream Mile: 76.83

Physical Location

Feature Type	Dist N/S	Dist E/W	Q10	Q40	Q160	Sec	Township	Range	PM	UTMx	UTMy	Latitude	Longitude	Location Accuracy
Point of Diversion			SW	NW	NW	35	7.0 N	53.0 W	S	646070.0	4488520.0	40.534560	-103.275287	Digitized

Division: 1 District: 64

County: LOGAN

Designated Basin:

Management District:

Water Rights - Net Amounts

Adj Date	Appro Date	Priority Admin No	Order No	Priority No	Associated Case Numbers	Net Absolute	Net Conditional	Net APEX Absolute	Net APEX Conditional	Decreed Units	Seasonal Limits	Comments
11/15/1894	7/19/1886	13349.00000	0		03CW0195, W8104, CA0304, 00CW0253	62.2750	0.0000	0.0000	0.0000	C	No	47, TFR TO SO PLATTE R 02/17/1977 FOR STERLING REALTY AUG, STERLING CHNG USE 12/30/03, STERLING CHNG USE 12/30/03, LOGAN WELL USERS CHNG USE, LOGAN WELL USERS CHNG USE
12/31/1978	4/10/1958	46751.39546	0		W9206	0.0000	0.0000	0.0000	0.0000	C	No	STORGAGE IN SCHUMANS LK
12/31/1986	3/1/1986	49733.00000	0		86CW0368	0.0000	0.0000	0.0000	0.0000	C	No	STORGAGE IN SCHUMANS SOUTH LK
12/31/1995	4/24/1995	53074.00000	0		02CW0073, 95CW0101	26.6000	0.0000	0.0000	0.0000	C	No	STORAGE AND RECHAGE IN FRITZLER LAKE 1 2, STORAGE AND RECHAGE IN FRITZLER LAKE 1 2, STORAGE AND RECHAGE IN FRITZLER LAKE 1 2
12/31/2003	1/6/2003	55888.00000	0		12CW0017, 03CW0195	62.5000	0.0000	0.0000	0.0000	C	No	MADE ABSOLUTE
12/31/2005	4/23/2003	56613.55995	0		03CW0195	0.0000	0.0000	0.0000	104.0000	C	No	EXCH FM ILIFF & PLATTE VLY REACH, EXCH FM STERLING NO 1 REACH

Diversion Record - Totals

Water Class	Irr Year	FDU	LDU	MaxQ	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual Amount	Units	Data Status
Total (Diversions)	2018	11/9/17	10/31/18	52.15	1816.51	1104.67				1452.87	2137.10	1755.26	1588.33	1637.48	1625.76	415.19	13533.16	AF	Approved
Total (Diversions)	2017	11/9/16	9/22/17	72.94	1495.64	288.52			426.25	2258.49	862.39	591.88	3029.72	2919.41	2516.07		14388.37	AF	Approved
Total (Diversions)	2016	11/4/15	10/28/16	60.60	1390.29	456.56	245.14	825.71	1464.97	1537.25	425.42	783.72	2801.67	2591.44	1691.69	704.36	14918.24	AF	Approved
Total (Diversions)	2015	11/20/14	10/26/15	68.91	388.51	1491.59	90.84			1247.19	590.17	673.26	1981.40	1471.04	1674.75	1085.01	10693.76	AF	Approved
Total (Diversions)	2014	11/19/13	10/30/14	51.51	507.50	413.46	933.49	383.97	1097.99	1628.08	920.92	747.01	1415.74	1230.27	718.76	381.15	10378.33	AF	Approved
Total (Diversions)	2013	11/1/12	9/30/13	48.67	17.20	758.43	573.09	1190.99	792.65	86.44	600.46	1673.48	1093.94	944.68	267.14	0.00	7998.50	AF	Approved
Total (Diversions)	2012	11/1/11	10/31/12	47.34	1450.73	22.69		135.04	1332.32	1035.19	1871.45	1302.66	982.49	284.20	573.49	799.61	9789.86	AF	Approved

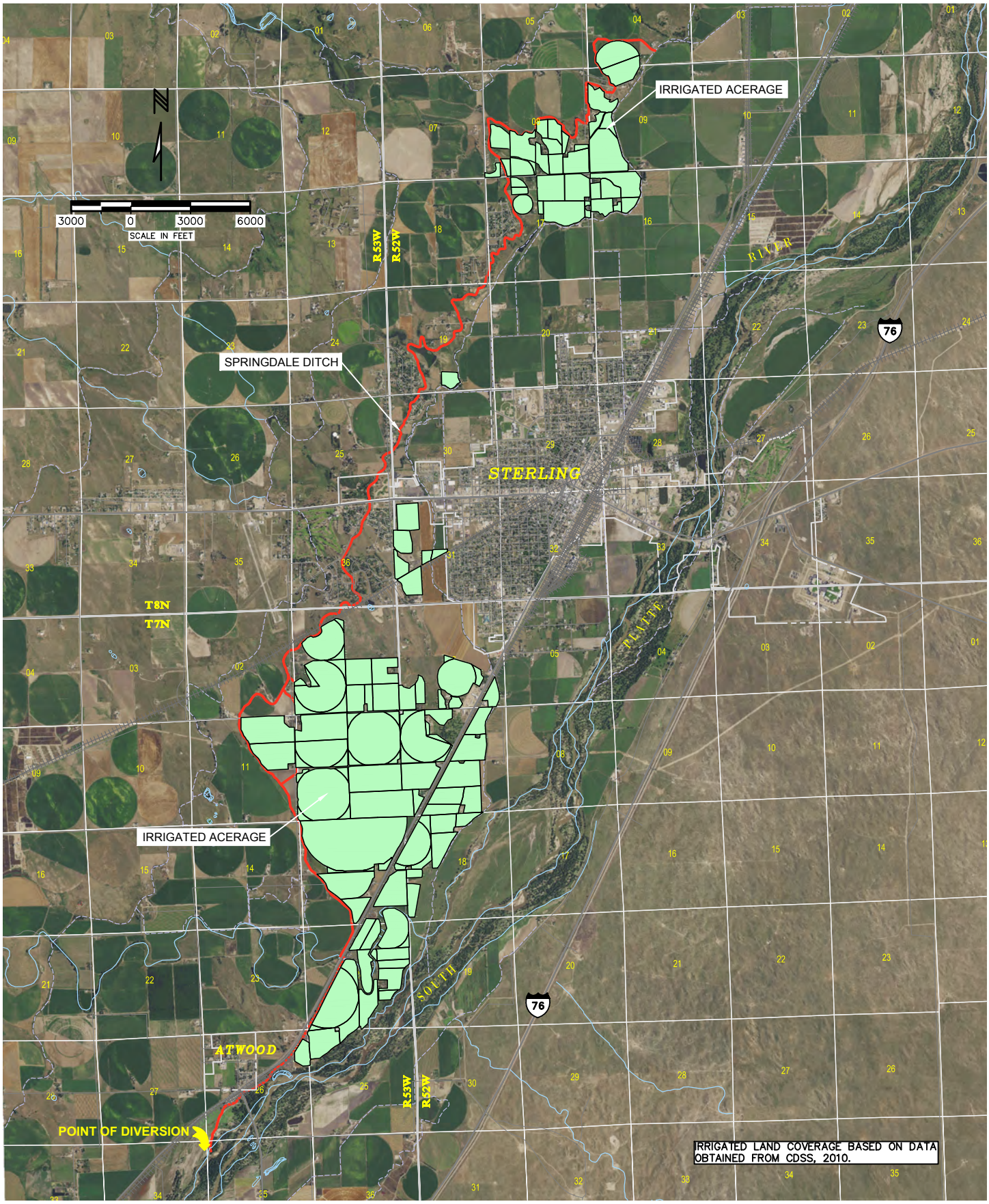
Water Class	Irr Year	FDU	LDU	MaxQ	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual Amount	Units	Data Status
Total (Diversions)	2011	12/1/10	10/31/11	55.56		1397.30	0.00	97.15	630.08	1410.33	1033.48	1080.55	1445.93	2599.56	1034.55	1577.99	12306.92	AF	Approved
Total (Diversions)	2010	11/1/09	10/31/10	64.05	72.83			790.13	1645.31	625.26	568.07	813.93	2661.48	2036.68	1186.07	1595.15	11994.92	AF	Approved
Total (Diversions)	2009	12/1/08	10/29/09	64.05		426.91	423.66	645.07	595.45	852.75	1674.75	834.06	1922.92	2853.72	978.78	653.68	11861.75	AF	Approved
Total (Diversions)	2008	12/3/07	10/31/08	53.68		392.02	363.34	110.46	471.97	1000.89	1566.33	1373.89	1587.93	1937.54	1018.75	1207.48	11030.60	AF	Approved
Total (Diversions)	2007	12/19/06	10/31/07	51.53		25.96	774.76	656.97	718.19	967.37	1123.26	1326.23	1804.91	1738.56	1331.38	790.19	11257.77	AF	Approved
Total (Diversions)	2006	11/26/05	10/22/06	59.97	111.41	430.50	1166.75	748.63	1098.54	1354.00	1170.66	447.64	400.87	917.29	2061.37	692.28	10599.94	AF	Approved
Total (Diversions)	2005	12/14/04	10/31/05	58.58		407.97	939.98	1088.15	369.11	175.04	1025.41	1769.50	2676.40	1531.56	968.74	1352.95	12304.80	AF	Approved
Total (Diversions)	2004	12/23/03	10/29/04	59.00		396.70	1372.78	972.51	671.41	1973.58	942.76	777.93	1606.04	1428.52	743.02	964.18	11849.43	AF	Approved
Total (Diversions)	2003	1/6/03	10/31/03	55.30			901.90	616.08	431.81	1116.12	283.18	1966.24	962.00	374.88	1025.87	2011.33	9689.40	AF	Approved
Total (Diversions)	2002	11/1/01	10/31/02	66.00	34.51					999.01	61.49	1132.34	795.38	67.44	661.30	2649.52	6400.99	AF	Approved
Total (Diversions)	2001	4/27/01	10/31/01	60.00						142.61	1504.68	1989.25	2536.90	2931.61	1069.50	933.44	11108.00	AF	Approved
Total (Diversions)	2000	4/21/00	10/31/00	60.00						515.71	1957.12	2094.58	2257.22	1610.60	1293.24	670.42	10398.90	AF	Approved
Total (Diversions)	1999	4/13/99	10/29/99	61.00						51.17	646.22	1141.11	1979.14	712.08	1229.77	80.33	5839.82	AF	Approved
Total (Diversions)	1998	4/20/98	10/26/98	66.00						370.12	1426.73	1121.07	2235.40	1529.28	1349.57	260.43	8292.62	AF	Approved
Total (Diversions)	1997	4/21/97	10/4/97	83.00						648.60	2836.41	285.43	2322.68			4.36	6097.48	AF	Approved
Total (Diversions)	1996	4/10/96	9/15/96	56.00						643.53	1319.94	744.59	2361.20	2193.75	190.30		7453.30	AF	Approved
Total (Diversions)	1995	3/14/95	9/17/95	46.80					14.44	119.78	441.03		241.87	1693.91	998.10		3509.13	AF	Approved
Total (Diversions)	1994	4/22/94	10/18/94	43.10						566.55	1856.99	1665.54	1648.69	1644.12	1488.22	348.16	9218.28	AF	Approved
Total (Diversions)	1993	4/18/93	10/7/93	55.00						63.99	1306.13	960.61	2409.16	2297.69	1091.92	184.27	8313.76	AF	Approved
Total (Diversions)	1992	4/14/92	10/6/92	53.00						729.93	1154.40	1277.37	1443.99	1816.89	716.04	146.78	7285.40	AF	Approved
Total (Diversions)	1991	4/17/91	10/8/91	60.00						835.05	1963.67	1160.09	2651.94	2191.77	1374.57	99.18	10276.26	AF	Approved
Total (Diversions)	1990	5/3/90	10/16/90	61.00							1777.22	2149.14	2007.30	2062.84	1499.53	317.36	9813.39	AF	Approved
Total (Diversions)	1989	5/1/89	10/20/89	62.00							1402.33	1464.58	1848.62	1745.48	610.92	476.04	7547.97	AF	Approved
Total (Diversions)	1988	4/15/88	10/31/88	76.00						284.99	811.25	1180.18	2336.56	2396.07	1321.01	418.99	8749.06	AF	Approved
Total (Diversions)	1987	4/30/87	10/7/87	66.00						4.86	669.71	301.49	2939.55	2283.01	1176.69	218.19	7593.49	AF	Approved
Total (Diversions)	1986	5/12/86	9/26/86	84.00							1081.01	866.79	3719.06	2122.35	1067.12		8856.33	AF	Approved
Total (Diversions)	1985	4/19/85	10/28/85	89.00						662.49	954.06	1255.56	2060.86	2572.60	1287.29	583.15	9376.00	AF	Approved
Total (Diversions)	1984	5/4/84	9/25/84	64.00							941.17	1186.13	2715.41	2796.74	942.16		8581.61	AF	Approved
Total (Diversions)	1983	5/1/83	10/4/83	99.00							525.63	103.14	2560.70	2477.39	1317.04	87.27	7071.18	AF	Approved
Total (Diversions)	1982	4/16/82	10/24/82	78.00						571.25	1277.37	949.10	2187.80	2310.78	1346.80	509.76	9152.86	AF	Approved
Total (Diversions)	1981	4/14/81	10/14/81	60.00						759.28	1086.96	953.07	785.47	795.38	1176.22	341.16	5897.54	AF	Approved
Total (Diversions)	1980	4/30/80	10/12/80	77.00						0.46	369.84	2104.77	2396.07	1656.22	1922.01	192.40	8641.77	AF	Approved
Total (Diversions)	1979	4/20/79	10/12/79	94.00						446.29	1438.04	583.15	2341.52	1937.88	880.67	138.85	7766.39	AF	Approved
Total (Diversions)	1978	11/1/77	10/26/78	62.00	208.27				277.69	1515.39	926.29	882.66	1168.28	1144.48	1820.85	422.49	8366.40	AF	Approved
Total (Diversions)	1977	4/23/77	10/31/77	51.00						238.02	952.08	1305.14	962.00	775.55	539.51	642.65	5414.96	AF	Approved
Total (Diversions)	1976	4/18/76	9/23/76	66.00						644.64	1572.92	1775.23	1299.19	595.05	948.11		6835.14	AF	Approved
Total (Diversions)	1975	11/1/74	10/19/75	67.00	267.77					337.20	1122.66	1194.07	2834.42	1699.86	872.74	509.76	8838.48	AF	Approved
Total (Diversions)	1974	5/4/74	9/30/74	70.00							1118.69	1067.12	466.12	1059.19	846.95	0.00	4558.08	AF	Approved

Water Class	Irr Year	FDU	LDU	MaxQ	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual Amount	Units	Data Status
Total (Diversions)	1973	5/15/73	9/11/73	65.00							525.63	714.06	2150.11	1759.36	291.57		5440.74	AF	Approved
Total (Diversions)	1972	4/2/72	10/20/72	48.00						495.88	1719.69	283.64	932.25	884.64	317.36	595.05	5228.51	AF	Approved
Total (Diversions)	1971	5/3/71	9/24/71	70.00							357.03	1184.15	1918.04	1122.66	1096.88		5678.76	AF	Approved
Total (Diversions)	1970	5/2/70	10/23/70	67.00							765.63	1745.48	2082.68	2066.81	1239.69	466.12	8366.40	AF	Approved
Total (Diversions)	1969	4/13/69	10/3/69	70.00						366.95	674.39	533.56	1430.10	1180.18	714.06	59.51	4958.75	AF	Approved
Total (Diversions)	1968	4/8/68	10/5/68	62.00						323.31	591.08	1005.63	1249.61	676.37	670.42	99.18	4615.60	AF	Approved
Total (Diversions)	1967	11/1/66	10/19/67	65.00	148.76				950.10	450.25	396.70		827.12	1997.38	565.30	406.62	5742.23	AF	Approved
Total (Diversions)	1966	4/3/66	10/6/66	50.00						555.38	755.71	327.28	1330.93	979.85	307.44	178.52	4435.11	AF	Approved
Total (Diversions)	1965	11/1/64	9/15/65	62.00	803.32					850.92	551.41	49.59		870.76	569.26		3695.26	AF	Approved
Total (Diversions)	1964	4/19/64	10/31/64	80.00						400.67	781.50	1713.74	723.98			2046.97	5666.86	AF	Approved
Total (Diversions)	1963	4/3/63	10/17/63	65.00						587.12	1674.07	962.00	1190.10	487.94	357.03	126.94	5385.20	AF	Approved
Total (Diversions)	1962	4/20/62	10/13/62	90.00						634.72	694.23		1410.27	2068.79	1096.88	158.68	6063.56	AF	Approved
Total (Diversions)	1961	4/26/61	9/18/61	75.00						299.51	400.67	662.49	1662.17	1884.33	809.27		5718.43	AF	Approved
Total (Diversions)	1960	4/19/60	10/9/60	70.00						519.68	1943.83	1395.39	1997.38	950.10	652.57	241.99	7700.94	AF	Approved
Total (Diversions)	1959	4/30/59	9/30/59	65.00						19.84	39.67	1235.72	2003.34	575.22	723.98	0.00	4597.75	AF	Approved
Total (Diversions)	1958	5/25/58	9/24/58	80.00							140.83	1745.48	2175.90	2088.63	874.72		7025.56	AF	Approved
Total (Diversions)	1957	11/1/56	10/9/57	88.00	99.18			702.16	1160.35	269.76	811.25	785.47	2413.92	2118.38	1106.79	382.82	9850.06	AF	Approved
Total (Diversions)	1956	11/1/55	10/31/56	66.00	251.90					1096.88	156.70	967.95	27.77	273.72		1015.55	3790.47	AF	Approved
Total (Diversions)	1955	11/1/54	10/31/55	58.00	1886.31					1293.24	537.53	595.05		79.34	333.23	2308.79	7033.49	AF	Approved
Total (Diversions)	1954	4/5/54	10/31/54	64.00						587.12	1077.04	708.11	241.99	51.57		2340.53	5006.35	AF	Approved
Total (Diversions)	1953	4/27/53	10/21/53	74.00						214.22	1112.74	1812.92	1317.04	1025.47	1499.53	624.80	7606.72	AF	Approved
Total (Diversions)	1952	5/2/52	10/16/52	101.00							755.71	3169.63	1519.36	1007.62	1808.95	644.64	8905.92	AF	Approved
Total (Diversions)	1951	11/1/50	10/13/51	72.00	124.96					89.26	595.05	2314.74	1717.71	2106.48	1392.42	1081.01	9421.63	AF	Approved
Total (Diversions)	1950	4/14/50	10/31/50	68.00						676.37	1820.85	1886.31	1114.73	1374.57	932.25	761.66	8566.74	AF	Approved
Total (Releases)	2006	11/27/05	10/22/06	8.28	21.98	6.90	13.63	17.10		61.03	12.52		1.19		30.17	59.70	224.21	AF	Approved
Total (Releases)	2005	6/8/05	10/24/05	9.82								77.08	78.51	1.31	0.00	167.19	324.08	AF	Approved
Total (Releases)	2004	1/12/04	10/24/04	1.80			3.37	8.33	3.17	0.00						13.29	28.17	AF	Approved
Total (Releases)	2003	4/1/03	10/31/03	5.00						37.49	38.74	37.49	0.00		37.49	118.08	269.28	AF	Approved
Total (Releases)	2002	4/12/02	10/31/02	42.00						229.41		17.61			14.68	39.63	301.33	AF	Approved
Total (Releases)	2001	4/27/01	10/31/01	25.00						124.88	95.09	44.03	32.29	45.50	44.03	255.75	641.58	AF	Approved
Total (Releases)	2000	4/21/00	10/31/00	50.00						236.83	45.50	35.23	20.55	17.61	44.03	134.76	534.51	AF	Approved
Total (Releases)	1999	4/19/99	9/25/99	61.00						4.40	402.65		2.94		366.95		776.94	AF	Approved
Total (Releases)	1998	4/18/98	10/15/98	60.00						892.58	0.00	220.17	30.82	19.08	16.15	188.43	1367.23	AF	Approved
Total (Releases)	1997	4/20/97	9/5/97	40.00						178.52	29.36		24.95		2.94		235.76	AF	Approved
Total (Releases)	1996	4/8/96	9/15/96	38.00						996.15	16.15		39.63	33.76	178.52		1264.20	AF	Approved
Total (Releases)	1995	4/28/95	9/17/95	0.74						4.40	27.89		3.85	35.58	24.95		96.68	AF	Approved
Total (Releases)	1974	5/24/74	8/29/74	60.00							126.94	198.35	844.97	505.79			1676.06	AF	Approved

Note:
FDU - First day used
LDU - Last day used
MaxQ - Maximum flow rate (cfs)

APPENDIX C

Service Area Map



REV	BY	DATE
A	MCH	4/12/19
B	MCH	9/20/19

HARRIS ENGINEERING CONSULTANTS, INC.

DRAWN:	M. C. HARRIS	3/25/19
CHECKED:	M. C. HARRIS	4/12/19
CAD FILE:	18017 SPRINGDALE DITCH MAP VX.DWG	

SPRINGDALE DITCH COMPANY

REVIEW:	SPRINGDALE DITCH CO.	
APPROVED:	SPRINGDALE DITCH CO.	

PROJECT NUMBER	CLIENT REFERENCE
18017	

HEC
HARRIS ENGINEERING CONSULTANTS, INC.
21482 County Road T.5
Fort Morgan, CO 80701
(970) 867-4971

SPRINGDALE DITCH COMPANY

SOUTH PLATTE RIVER DIVERSION STRUCTURE REPLACEMENT
PROJECT SERVICE AREA
LOGAN COUNTY, COLORADO

SCALE:	DRWG. NO.:	SHEET	REV.
1"=3000' (D)	FIGURE C1	1 of 1	B

APPENDIX D

Site Photos

Fig. 1: Diversion structure, looking upstream.

Fig. 2: South sand chutes, looking upstream.

Fig. 3: South flash boarded sand chutes, looking north.

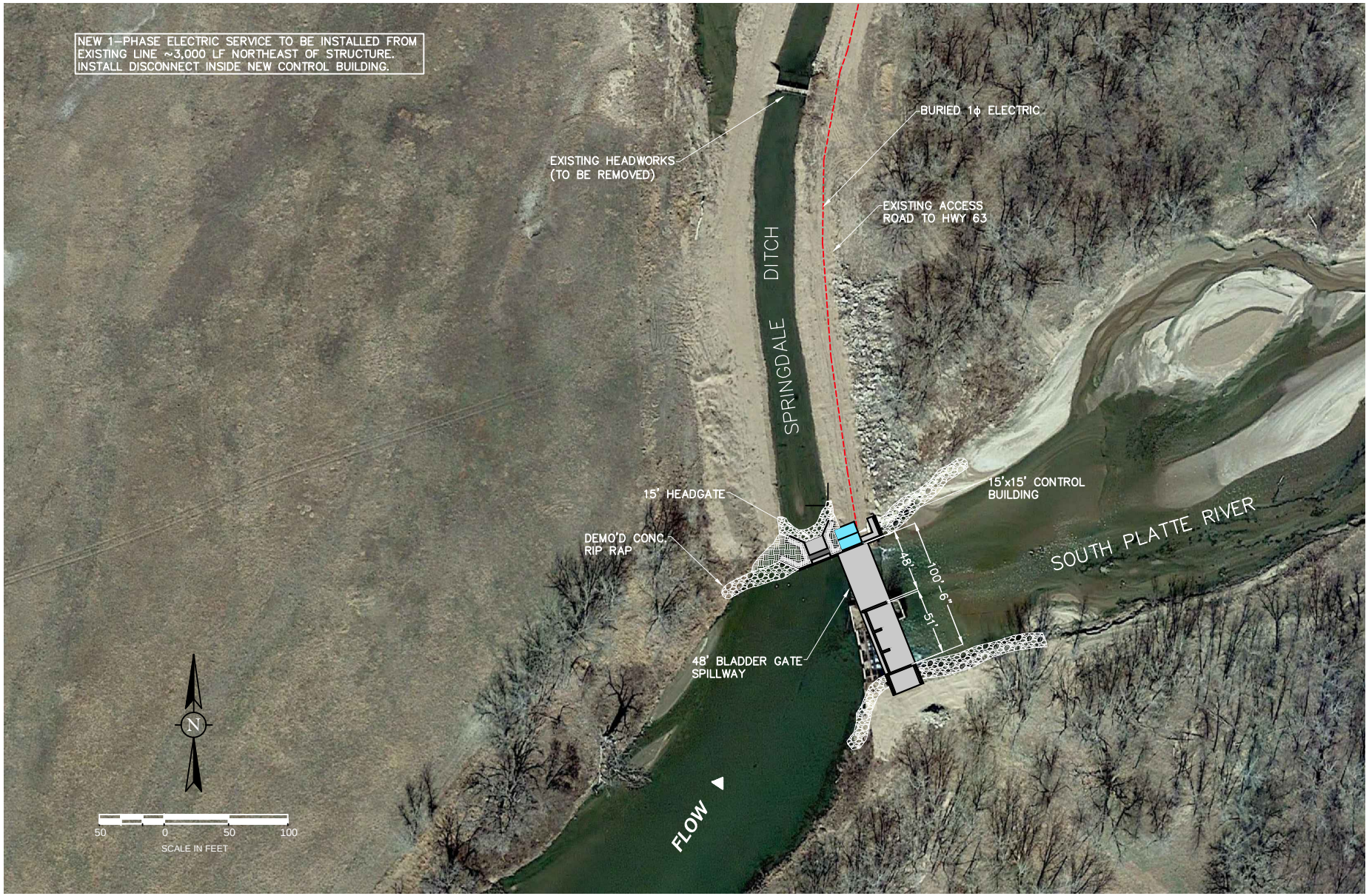
Fig. 4: North gated sand chutes, looking south.

Fig. 5: Head gate structure, looking west.

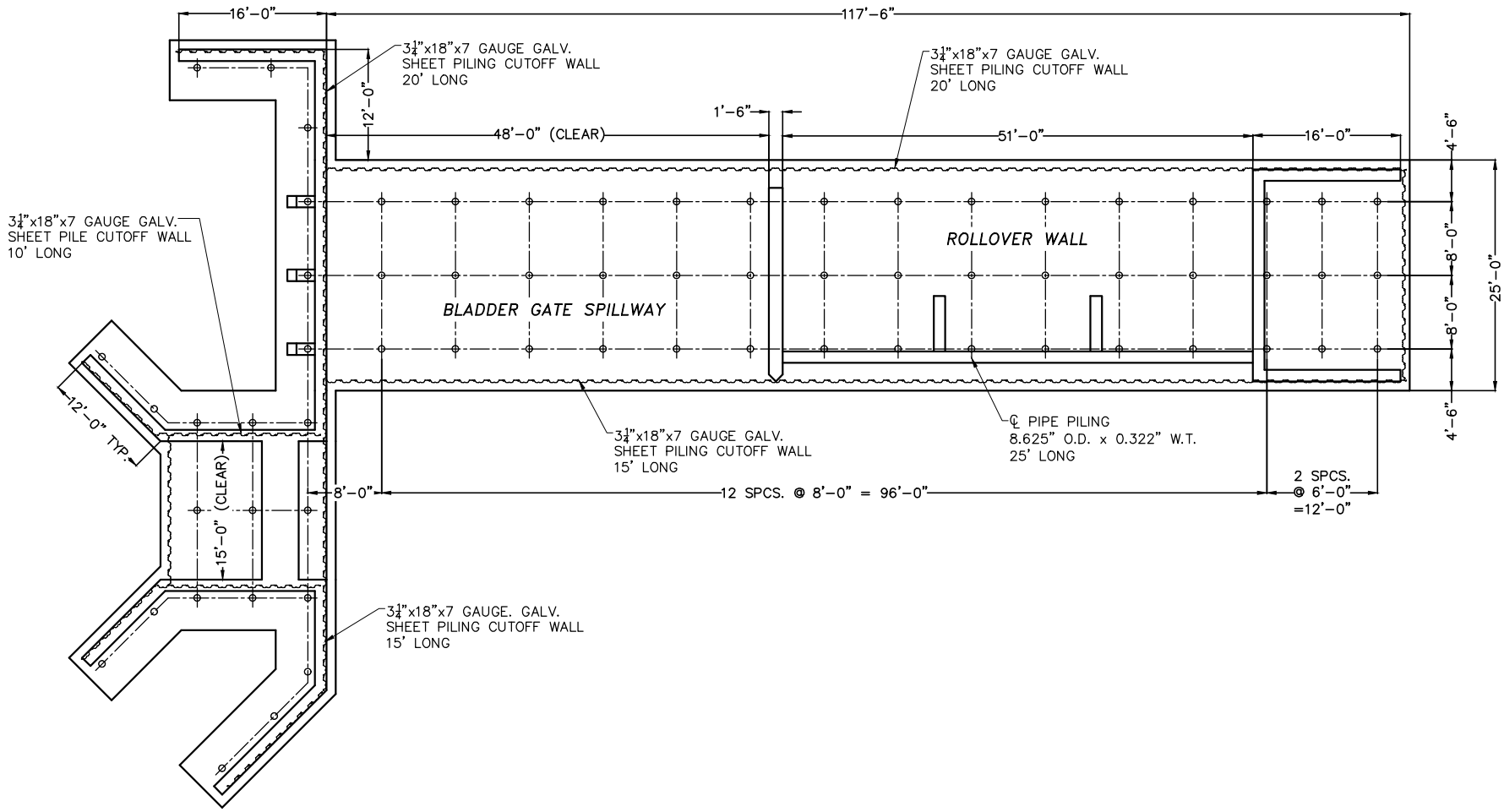
Fig. 6: Head gate structure, looking north.

APPENDIX E

Preliminary Design Drawings of the Preferred Alternative



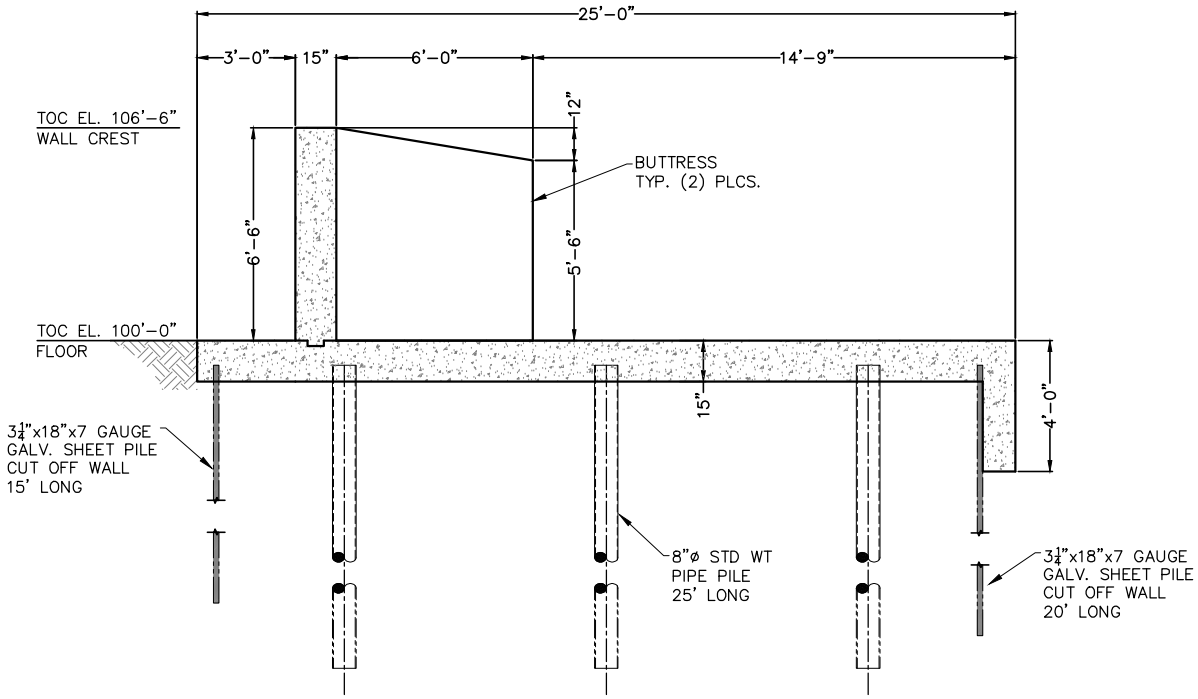
HEC	HARRIS ENGINEERING CONSULTANTS, INC. 21482 County Road T.5 Fort Morgan, CO 80701 (970) 867-4971	SCALE:	1" = 50'	SPRINGDALE DITCH DIVERSION STRUCTURE REPLACEMENT PROJECT PROPOSED SITE PLAN			
		DRAWN:	M. C. HARRIS				
		CAD FILE:	18017 SPRINGDALE STRUCTURE VX.DWG	DATE: 4/12/19	REV DATE: 9/16/19	FIGURE E1	REV. B



FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

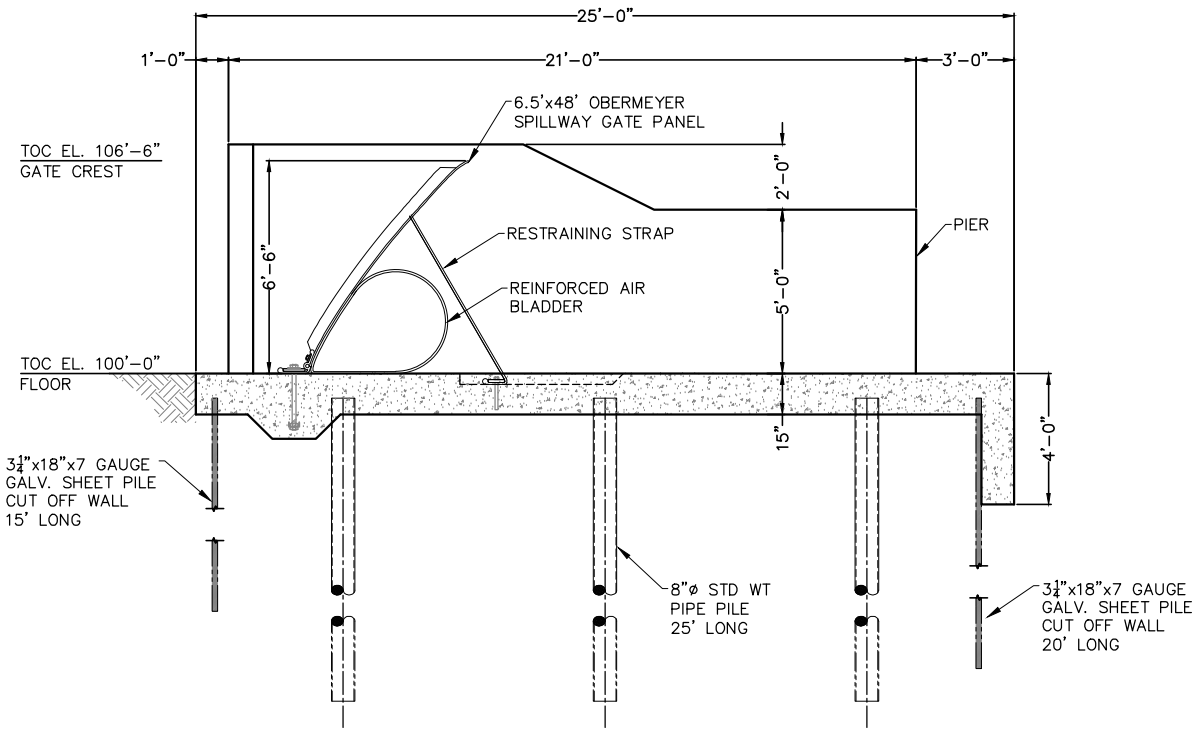
HARRIS ENGINEERING CONSULTANTS, INC. 21482 County Road T.5 Fort Morgan, CO 80701 (970) 867-4971	*SCALE:* AS NOTED	**SPRINGDALE DITCH DIVERSION STRUCTURE REPLACEMENT PROJECT** **FOUNDATION PLAN**			
	DRAWN: M. C. HARRIS				
	CAD FILE: 18017 SPRINGDALE STRUCTURE VX.DWG	*DATE:* 4/12/19	*REV DATE:* 9/16/19	FIGURE E2	*REV.* B



ROLLOVER WALL

SCALE: 3/8" = 1'-0"

HEC HARRIS ENGINEERING CONSULTANTS, INC. 21482 County Road T.5 Fort Morgan, CO 80701 (970) 867-4971	*SCALE:*	AS NOTED	**SPRINGDALE DITCH DIVERSION STRUCTURE REPLACEMENT PROJECT** **TYPICAL SECTIONS**			
	DRAWN:	M. C. HARRIS				
	CAD FILE:	18017 SPRINGDALE STRUCTURE VX.DWG	*DATE:* 4/12/19	*REV DATE:* 9/16/19	FIGURE E3	*REV.* B



SPILLWAY

SCALE: 3/8" = 1'-0"

HEC	HARRIS ENGINEERING CONSULTANTS, INC. 21482 County Road T.5 Fort Morgan, CO 80701 (970) 867-4971	*SCALE:*	AS NOTED	SPRINGDALE DITCH DIVERSION STRUCTURE REPLACEMENT PROJECT TYPICAL SECTIONS			
		DRAWN:	M. C. HARRIS				
		CAD FILE:	18017 SPRINGDALE STRUCTURE VX.DWG	*DATE:* 4/12/19	*REV DATE:* 9/16/19	FIGURE E4	*REV.* B

APPENDIX F

Detailed Construction Cost Estimate and Loan Amortization

SPRINGDALE DITCH COMPANY

PO Box 109 Sterling, CO 80751

SOUTH PLATTE RIVER DIVERSION STRUCTURE

PROJECT COST ESTIMATE

$1,210,000

FEASIBILITY COST ESTIMATE

NEW DIVERSION STRUCTURE

Demolish and Remove Existing Structure. New Structure at Present Location to Include: 6.5'x48' Spillway, 3'x15' Headgate, 15'x15' Control Building, Controls & Automation.

HARRIS ENGINEERING CONSULTANTS, INC.

PROCUREMENT AND INSTALLATION

	Description	Quantity	Unit	Unit Cost	Base Cost	Contg.	Total Cost	Basis
1	Mobilization and Demobilization	1	LS	$30,000	$30,000		$30,000	Estimate
2	Demolition of Concrete Structure & Processing of Concrete for Use as Riprap	400	CY	$50	$20,000		$20,000	Estimate
3	Control of Water & Dewatering	1	LS	$115,000	$115,000		$115,000	Estimate
4	Unclassified Excavation	2,000	CY	$10	$20,000		$20,000	Estimate
5	Structure Backfill	1,000	CY	$12	$12,000		$12,000	Estimate
6	Place Demolished Concrete Riprap Stockpiled Onsite	500	SF	$25	$12,500		$12,500	Estimate
7	Provide and Install 3-1/4" x 18" x 7 Gauge Galvanized Sheet Piling	7,350	LF	$18	$132,300		$132,300	Estimate
8	Provide and Install 8.625" O.D. Std. Wall Pipe Piling	1,550	LS	$30	$46,500		$46,500	Estimate
9	Furnish Obermeyer Bladder Gate 48' by 6.5', 304/304L Stainless Steel c/w all Equipment, Embeds, and Hardware	1	LS	$220,000	$220,000		$220,000	OHI Quote
10	Installation of Item #9, Including Air Supply Piping	1	LS	$16,000	$16,000		$16,000	Estimate
11	Furnish Obermeyer Bladder Gate 15' by 3', 304/304L Stainless Steel c/w all Equipment, Embeds and Hardware	1	LS	$30,000	$30,000		$30,000	OHI Quote
12	Installation of Item #11, Including Air Supply Piping	1	LS	$4,000	$4,000		$4,000	Estimate
13	New Electric Service, 120/240 VAC Single Phase (includes xformer and approx. 650 feet ovhd line to property bndry)	1	LS	$9,000	$9,000		$9,000	Estimate
14	Provide and Install New Electric Meter Post c/w Secondary Meter	1	LS	$5,000	$5,000		$5,000	Estimate
15	Provide and Install Buried (3 Feet Deep) Single Phase Electric Wire from New Service Drop at Property Bndry to Control Building	2,950	LF	$12	$35,400		$35,400	Estimate
16	Site Electrical Work	1	LS	$25,000	$25,000		$25,000	Estimate
17	Cast-In-Place Concrete	345	CY	$500	$172,500		$172,500	Estimate
18	Provide and Install Reinforcing Steel	75,000	LBS	$1.00	$75,000		$75,000	Estimate
19	Construct New 15' x 15' Cast-In-Place Concrete Control Building Including Foundation, Hardware, and Equipment Not Included in Items #9 and #11	225	SF	$120	$27,000		$27,000	Estimate
20	Furnish and Install Handrails	150	LF	$70	$10,500		$10,500	Estimate
21	Final Cleanup and Site Restoration	1	LS	$5,000	$5,000		$5,000	Estimate
22	Provide, Grade, and Compact 3/4" Roadbase Along Access Road		Ton	$35				By Company
23	Telemetry	1	LS	$15,800	$15,800		$15,800	Estimate
24								
25								
26								
				SUBTOTAL:	$1,038,500		$1,038,500	

ENGINEERING, ADMINISTRATION AND CONTINGENCY

	Description	Quantity	Unit	Unit Cost	Base Cost	Contg.	Total Cost	Basis
27	Engineering, Planning & Design	1	LS	$21,000	$21,000		$21,000	Estimate
28	Construction Management & Administration	1	LS	$31,000	$31,000		$31,000	Estimate
29								
30	Legal Services (review of company by-laws, contracts, etc.)	1	LS	$2,500	$2,500		$2,500	Estimate
31	Materials Testing	10	Days	$500	$5,000		$5,000	Estimate
32	Surveying, 2-Man Crew	1	Days	$2,000	$2,000		$2,000	Estimate
				SUBTOTAL:	$61,500		$61,500	
				SUBTOTAL ALL ITEMS:	$1,100,000		$1,100,000	
33	Miscellaneous and Contingency @ 10%						$110,000	
				TOTAL CONSTRUCTION COST:	$1,100,000	10.0%	$1,210,000	

REV B

TOTAL PROJECT COST $1,210,000

	SOURCE 1	SOURCE 2	TOTAL
FINANCING SOURCE	CWCB Loan	-	
COST SHARE	100%		
BASE LOAN AMOUNT	$1,210,000	$0	
SERVICE FEE @ 1%	$12,100	$0	
PRINCIPAL	$1,222,100	$0	
INTEREST RATE	1.50%		
TERM (YEARS)	30		
ANNUAL PAYMENT	$50,887	$0	$50,887
STARTING YEAR	2021		

District Shares	831.5
Annual Diversions (ac-ft)*	8,150
Cost per Share	$61.20
Cost per ac-ft	$6.24

YEAR	PAYMENT	INTEREST	PRINCIPAL	BALANCE
2021	$50,887	$18,332	$32,556	$1,222,100
2022	$50,887	$17,843	$33,044	$1,189,544
2023	$50,887	$17,348	$33,540	$1,156,500
2024	$50,887	$16,844	$34,043	$1,122,960
2025	$50,887	$16,334	$34,553	$1,088,918
2026	$50,887	$15,815	$35,072	$1,054,364
2027	$50,887	$15,289	$35,598	$1,019,292
2028	$50,887	$14,755	$36,132	$983,694
2029	$50,887	$14,213	$36,674	$947,563
2030	$50,887	$13,663	$37,224	$910,889
2031	$50,887	$13,105	$37,782	$873,665
2032	$50,887	$12,538	$38,349	$835,883
2033	$50,887	$11,963	$38,924	$797,534
2034	$50,887	$11,379	$39,508	$758,609
2035	$50,887	$10,787	$40,101	$719,101
2036	$50,887	$10,185	$40,702	$679,000
2037	$50,887	$9,574	$41,313	$638,298
2038	$50,887	$8,955	$41,932	$596,985
2039	$50,887	$8,326	$42,561	$555,053
2040	$50,887	$7,687	$43,200	$512,492
2041	$50,887	$7,039	$43,848	$469,292
2042	$50,887	$6,382	$44,506	$425,444
2043	$50,887	$5,714	$45,173	$380,938
2044	$50,887	$5,036	$45,851	$335,765
2045	$50,887	$4,349	$46,539	$289,914
2046	$50,887	$3,651	$47,237	$243,376
2047	$50,887	$2,942	$47,945	$196,139
2048	$50,887	$2,223	$48,664	$148,194
2049	$50,887	$1,493	$49,394	$99,530
2050	$50,887	$752	$50,135	$50,135
2051	$0	($0)	$0	($0)
TOTAL	*$1,526,618*	*$304,518*	*$1,222,100*	

**Average annual diversion per State of Colorado's records for the years 1950 through 2018 (Colorado Decision Support System).*

APPENDIX G

Estimated Construction Schedule

SPRINGDALE DITCH COMPANY

SOUTH PLATTE
DIVERSION STRUCTURE REPLACEMENT
CONSTRUCTION SCHEDULE

REV. A Thu 9/19/19

ID	Task Name	Aug	Sep	Oct	Nov	Dec	Jan	Feb
1	TASK 1 - CONSTRUCTION		9/28				1/29	
2	Mobilization		9/28 10/2					
3	De-watering			10/5		12/25		
4	Demolish Existing Concrete Structure			10/7 10/16				
5	Earthwork			10/12		12/4		
6	Rip-Rap Placement					12/28	1/1	
7	Sheet Piling Cutoff Wall			10/19	10/30			
8	Friction Piling (Pipe Piles)			10/12 10/23				
9	Bladder Gate, 40 ft. x 6.5 ft.					12/7	1/1	
10	Bladder Gate, 10 ft. x 4 ft.					12/21	1/1	
11	Bladder Gate Air Supply Equipment & Controls					12/21	1/8	
12	Concrete Control Building					12/7	12/25	
13	Electrical Service, Electrical Contractor					12/14	1/8	
14	Reinforced Concrete				11/2	12/25		
15	Hand Rails						1/11 1/15	
16	Telemetry						1/20	1/29
17								
18	TASK 2 - ENGINEERING, INSPECTION	8/10						2/2
19	Field Survey (As-Built)						2/1	2/2
20	Engineering, Project Management	8/10					1/22	
21	Construction Inspection			10/5				1/29
22	Materials Testing				11/2	12/18		
23	Controls Programming					12/28	1/15	
24								
25								
26	Bladder Gate Delivery	8/10				11/30		
27	Sheet Piling, 3-1/4" x 18", 7 ga.		9/14	10/5				
28								
29								
30								
31								
32								
33								
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APPENDIX H

CWCB Loan Application

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Water Project Loan Program

Projects financed by the Water Project Loan Program must align with the goals identified in Colorado's Water Plan and its measurable objectives.

Application Type

☐ Prequalification *(Attach 3 years of financial statements)* ☑ Loan Approval *(Attach Loan Feasibility Study)*

Agency/Company Information

Company / Borrower Name: Springdale Ditch Company

Authorized Agent &Title: Ken Fritzler, President

Address: PO Box 109 Sterling, CO 80751

Phone: ( ) | Email: fritz@kci.net

Organization Type: ☑ Ditch Co, ☐ District, ☐ Municipality ☐ other:_____ | Incorporated? ☑ YES ☐ NO

County: Logan | Number of Shares/Taps: 831.5 shares

Water District: 64 | Avg. Water Diverted/Yr 8,150 acre-feet

Number of Shareholders/Customers Served: 51 | Current Assessment per Share $ 25.00 (Ditch Co)

Federal ID Number: 84-0414052 | Average monthly water bill $ _____ (Municipality)

Contact Information

Project Representative: Ken Fritzler

Phone: (970) 580-9450 | Email: fritz@kci.net

Engineer: Matt Harris

Phone: (970) 867-4971 | Email: matt@harrisec.com

Attorney: Ryan Donovan

Phone: (970) 622-8181 | Email: ryan@ljcglaw.com

Project Information

Project Name: Springdale Ditch Diversion Structure Replacement

Brief Description of Project: (Attach separate sheets if needed)

See attached summary sheet.

Project Start Date(s) Design: March 2020 Construction: October 2020

General Location: (Attach Map of Area)

NW/4 Sec. 35 T7N R53W, Logan County, Colorado

Project Costs - Round to the nearest thousand

Estimated Engineering Costs: $61,000 | Estimated Construction Costs: $1,039,000

Other Costs (Describe Above): $110,000 (10% contg.) | Estimated Total Project Costs: $1,210,000

Requested Loan Amount: $1,210,000 | Requested Loan Term(10, 20, or 30 years): 30 Years

Signature

Kenneth L. Fritzler President 9-25-19

Signature / Title Date

Return to: Finance Section Attn: Matt Stearns
1313 Sherman St #718
Denver, CO 80203
Ph. 303/866.3441
e-mail: matthew.stearns@state.co.us

APPENDIX K

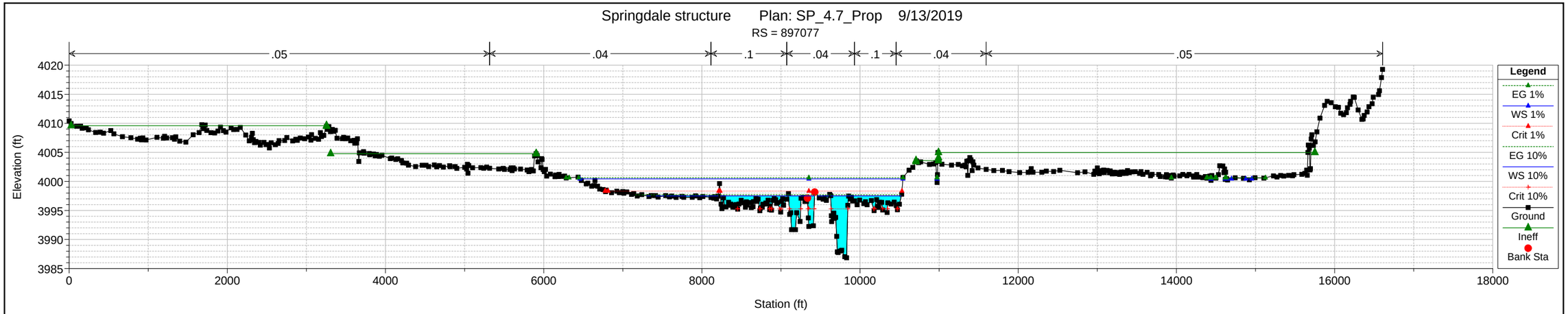
Hydraulic Model Printouts from HEC-RAS

HEC-RAS Plan: Prop River: SouthPlatteRiver Reach: SP_4.7

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SP_4.7	897077	10%	15088.00	3992.24	3997.50	3995.28	3997.69	0.001444	3.71	4950.03	3007.67	0.31
SP_4.7	897077	4%	26152.00	3992.24	3998.89	3997.21	3999.09	0.001424	4.38	8953.42	3215.78	0.33
SP_4.7	897077	2%	37643.00	3992.24	3999.59	3997.77	3999.77	0.001485	4.84	12615.99	3946.44	0.34
SP_4.7	897077	1%	52549.00	3992.24	4000.43	3998.33	4000.64	0.001551	5.38	16008.08	4234.70	0.35
SP_4.7	897077	1%+	67186.00	3992.24	4001.12	3998.76	4001.35	0.001604	5.81	18936.34	6063.65	0.37
SP_4.7	897077	0.2%	105067.00	3992.24	4002.55	3999.60	4002.84	0.001694	6.68	25527.41	9978.08	0.39
SP_4.7	896260	10%	15088.00	3989.31	3996.33	3994.62	3996.61	0.002250	5.19	4373.44	2095.05	0.40
SP_4.7	896260	4%	26152.00	3989.31	3997.64	3996.06	3997.98	0.002358	6.13	7447.97	3125.79	0.43
SP_4.7	896260	2%	37643.00	3989.31	3998.39	3996.90	3998.67	0.002205	6.36	11440.32	4043.47	0.42
SP_4.7	896260	1%	52549.00	3989.31	3999.22	3997.61	3999.52	0.002178	6.78	14900.68	4269.32	0.42
SP_4.7	896260	1%+	67186.00	3989.31	3999.89	3998.09	4000.21	0.002167	7.12	17876.87	4920.36	0.43
SP_4.7	896260	0.2%	105067.00	3989.31	4001.29	3999.00	4001.67	0.002169	7.85	24334.76	9189.70	0.44
SP_4.7	895206	10%	15088.00	3987.79	3994.96	3990.77	3995.10	0.000697	2.98	5122.50	2149.77	0.23
SP_4.7	895206	4%	26152.00	3987.79	3996.10	3992.45	3996.29	0.000957	3.88	8347.43	3127.11	0.27
SP_4.7	895206	2%	37643.00	3987.79	3996.80	3993.80	3997.01	0.001119	4.46	11723.31	4430.82	0.30
SP_4.7	895206	1%	52549.00	3987.79	3997.59	3995.40	3997.83	0.001210	4.93	15355.77	4736.44	0.31
SP_4.7	895206	1%+	67186.00	3987.79	3998.24	3995.98	3998.51	0.001257	5.27	18543.05	5430.59	0.32
SP_4.7	895206	0.2%	105067.00	3987.79	3999.62	3997.05	3999.94	0.001320	5.92	25660.30	8763.44	0.33
SP_4.7	894619	10%	15088.00	3987.77	3994.21	3992.30	3994.39	0.001973	4.13	5009.20	3512.73	0.37
SP_4.7	894619	4%	26152.00	3987.77	3995.21	3993.97	3995.40	0.001929	4.47	8372.63	3598.20	0.36
SP_4.7	894619	2%	37643.00	3987.77	3995.85	3994.43	3996.04	0.001841	4.69	11940.57	4698.64	0.36
SP_4.7	894619	1%	52549.00	3987.77	3996.63	3994.90	3996.83	0.001727	4.91	15672.40	5282.68	0.35
SP_4.7	894619	1%+	67186.00	3987.77	3997.28	3995.29	3997.51	0.001648	5.09	19000.02	6287.05	0.34
SP_4.7	894619	0.2%	105067.00	3987.77	3998.67	3996.04	3998.94	0.001529	5.48	26953.45	9902.03	0.34
SP_4.7	893852	10%	15088.00	3986.14	3993.12	3990.96	3993.25	0.001367	3.59	5694.34	3692.06	0.27
SP_4.7	893852	4%	26152.00	3986.14	3994.13	3992.62	3994.28	0.001368	3.88	9102.28	3699.15	0.27
SP_4.7	893852	2%	37643.00	3986.14	3994.84	3993.17	3994.98	0.001231	3.92	13205.57	4694.40	0.26
SP_4.7	893852	1%	52549.00	3986.14	3995.69	3993.62	3995.84	0.001135	4.06	17273.94	4968.79	0.26
SP_4.7	893852	1%+	67186.00	3986.14	3996.39	3993.95	3996.56	0.001089	4.21	20855.09	6442.82	0.26
SP_4.7	893852	0.2%	105067.00	3986.14	3997.84	3994.70	3998.04	0.001032	4.56	29441.51	9302.11	0.26
SP_4.7	892878	10%	15088.00	3985.42	3992.19	3990.80	3992.31	0.001214	3.51	6023.40	4023.44	0.29
SP_4.7	892878	4%	26152.00	3985.42	3993.25	3991.62	3993.38	0.001119	3.83	9811.22	3829.31	0.29
SP_4.7	892878	2%	37643.00	3985.42	3994.10	3992.14	3994.21	0.000905	3.79	14612.16	4813.41	0.27
SP_4.7	892878	1%	52549.00	3985.42	3995.01	3992.57	3995.14	0.000824	3.95	19082.72	5041.75	0.26
SP_4.7	892878	1%+	67186.00	3985.42	3995.74	3992.92	3995.88	0.000802	4.16	22889.00	7115.61	0.26

HEC-RAS Plan: Prop River: SouthPlatteRiver Reach: SP_4.7 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SP_4.7	892878	0.2%	105067.00	3985.42	3997.22	3993.63	3997.39	0.000790	4.62	31745.60	9607.91	0.26
SP_4.7	892493	10%	15088.00	3986.90	3991.55	3990.43	3991.69	0.001821	4.18	5439.47	3714.78	0.35
SP_4.7	892493	4%	26152.00	3986.90	3992.79	3991.20	3992.90	0.001213	3.93	10235.22	4080.25	0.30
SP_4.7	892493	2%	37643.00	3986.90	3993.75	3991.66	3993.85	0.000883	3.74	15376.02	4872.19	0.26
SP_4.7	892493	1%	52549.00	3986.90	3994.71	3992.11	3994.82	0.000781	3.86	20131.80	5699.84	0.25
SP_4.7	892493	1%+	67186.00	3986.90	3995.44	3992.46	3995.57	0.000762	4.07	23979.17	7158.60	0.25
SP_4.7	892493	0.2%	105067.00	3986.90	3996.93	3993.17	3997.09	0.000764	4.56	32668.65	9404.33	0.26
SP_4.7	892233	10%	15088.00	3985.04	3991.31	3989.50	3991.45	0.001523	4.18	5734.50	3963.49	0.35
SP_4.7	892233	4%	26152.00	3985.04	3992.61	3990.98	3992.72	0.000978	3.78	10998.14	4175.07	0.28
SP_4.7	892233	2%	37643.00	3985.04	3993.62	3991.45	3993.71	0.000744	3.58	16139.91	4778.39	0.25
SP_4.7	892233	1%	52549.00	3985.04	3994.58	3991.87	3994.69	0.000685	3.70	20884.10	5700.25	0.24
SP_4.7	892233	1%+	67186.00	3985.04	3995.32	3992.19	3995.44	0.000683	3.89	24815.08	7130.54	0.24
SP_4.7	892233	0.2%	105067.00	3985.04	3996.79	3992.90	3996.95	0.000713	4.36	33302.00	9216.12	0.25
SP_4.7	892186		Inl Struct									
SP_4.7	892133	10%	15088.00	3983.44	3991.27	3989.47	3991.41	0.001312	4.45	6040.45	3981.24	0.32
SP_4.7	892133	4%	26152.00	3983.44	3992.58	3990.89	3992.68	0.000896	4.15	11150.45	4152.43	0.27
SP_4.7	892133	2%	37643.00	3983.44	3993.59	3991.38	3993.68	0.000671	3.91	16777.78	4862.42	0.24
SP_4.7	892133	1%	52549.00	3983.44	3994.56	3991.82	3994.66	0.000629	4.08	21586.63	5957.76	0.23
SP_4.7	892133	1%+	67186.00	3983.44	3995.27	3992.16	3995.39	0.000642	4.32	25458.02	7324.19	0.24
SP_4.7	892133	0.2%	105067.00	3983.44	3996.75	3992.85	3996.90	0.000679	4.87	34071.00	9185.18	0.25
SP_4.7	891382	10%	15088.00	3984.65	3990.26	3988.24	3990.36	0.001125	3.81	6527.21	4320.30	0.29
SP_4.7	891382	4%	26152.00	3984.65	3991.99	3989.68	3992.05	0.000556	3.23	13830.23	4350.90	0.21
SP_4.7	891382	2%	37643.00	3984.65	3993.16	3990.14	3993.21	0.000407	3.06	20720.83	5094.51	0.19
SP_4.7	891382	1%	52549.00	3984.65	3994.14	3990.59	3994.21	0.000413	3.32	25976.81	5958.40	0.19
SP_4.7	891382	1%+	67186.00	3984.65	3994.84	3990.92	3994.92	0.000447	3.62	29986.22	6996.64	0.20
SP_4.7	891382	0.2%	105067.00	3984.65	3996.27	3991.64	3996.39	0.000522	4.28	38623.70	9241.22	0.22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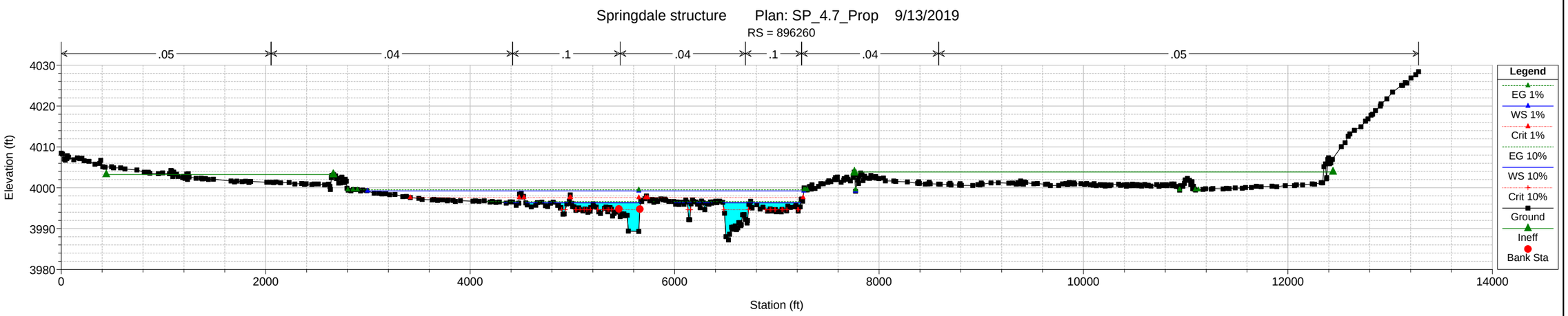
.04
.1
.04
.1
.04
.05
Elevation (ft)
Station (ft)
Legend
EG 1%
WS 1%
Crit 1%
EG 10%
WS 10%
Crit 10%
Ground
Ineff
Bank Sta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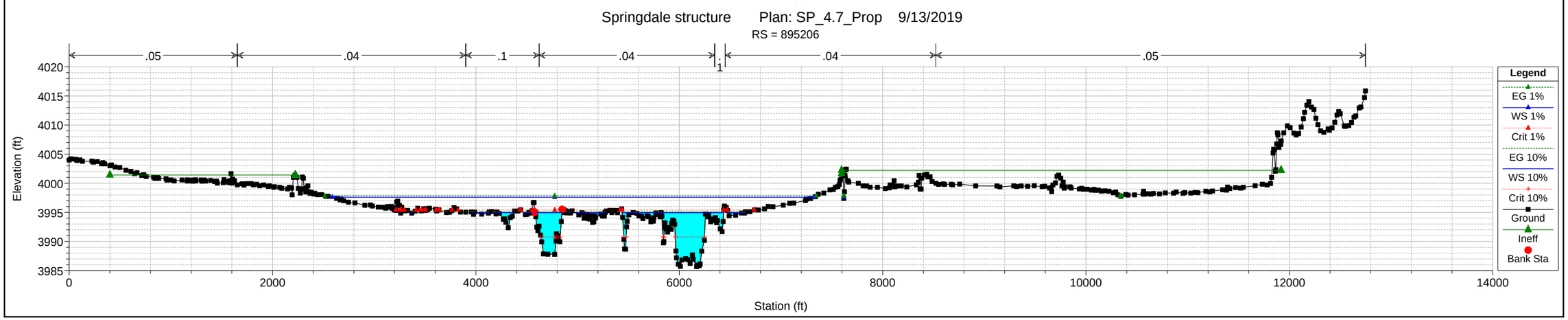
.04
.1
.04
.1
.04
.05
Elevation (ft)
Station (ft)
Legend
EG 1%
WS 1%
Crit 1%
EG 10%
WS 10%
Crit 10%
Ground
Ineff
Bank Sta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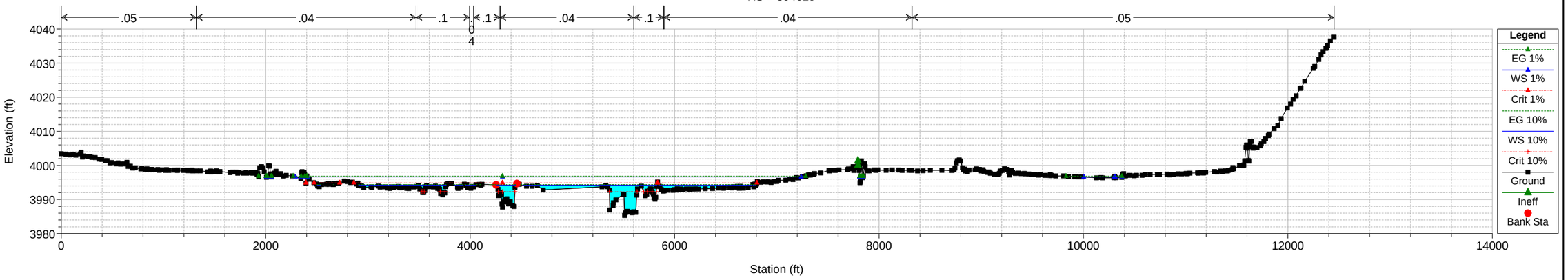
.04
.1
.04
.04
.05
Elevation (ft)
Station (ft)
Legend
EG 1%
WS 1%
Crit 1%
EG 10%
WS 10%
Crit 10%
Ground
Ineff
Bank Sta

Springdale structure Plan: SP_4.7_Prop 9/13/2019

RS = 894619



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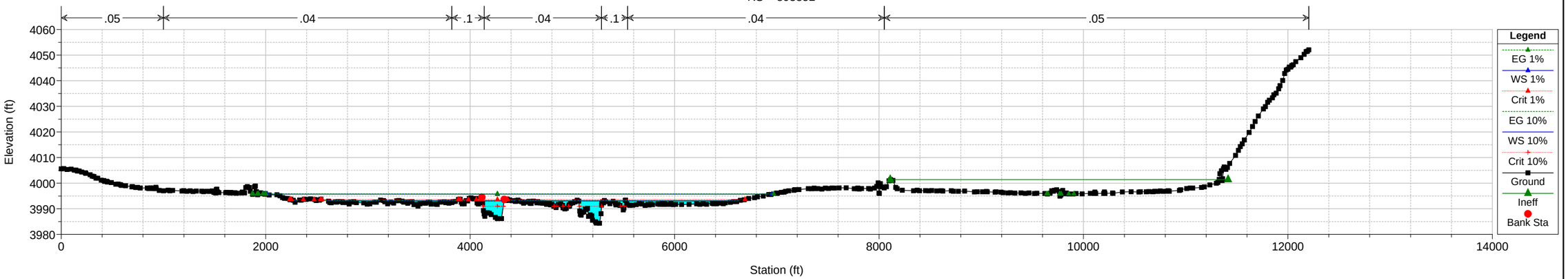

Springdale structure Plan: SP_4.7_Prop 9/13/2019

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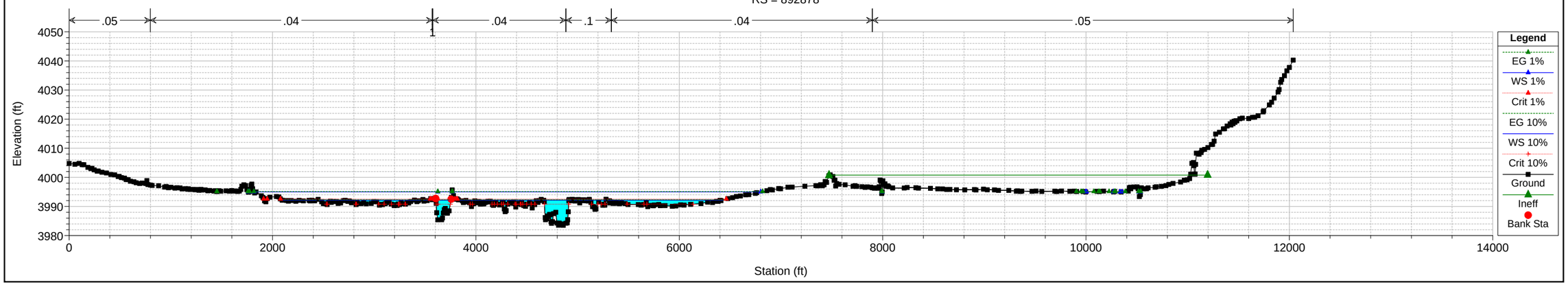

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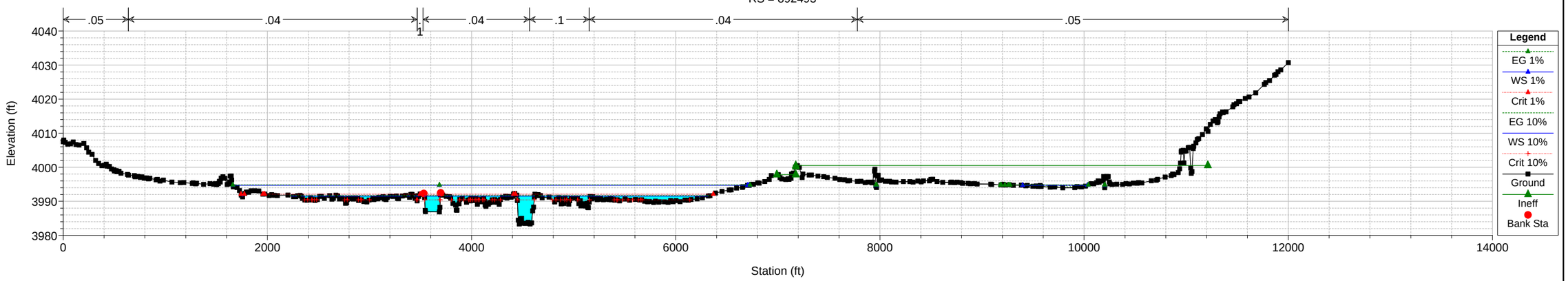

Springdale structure Plan: SP_4.7_Prop 9/13/2019

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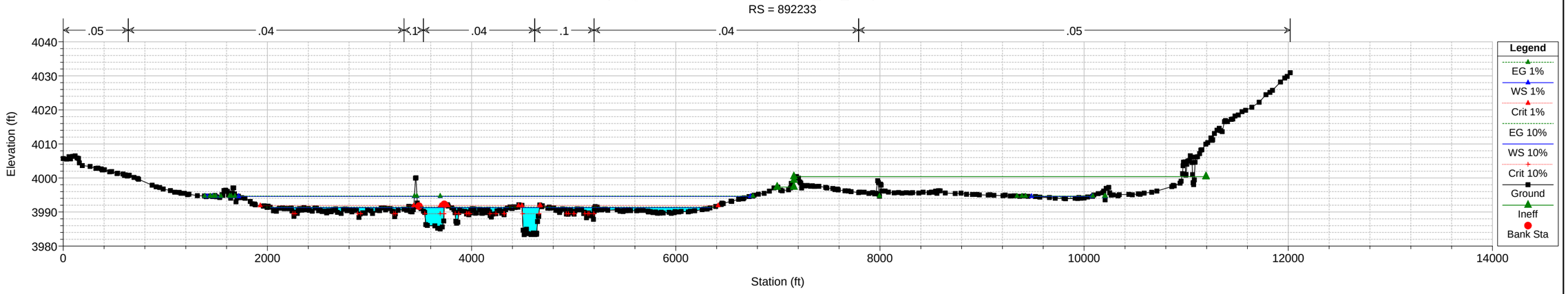

Springdale structure Plan: SP_4.7_Prop 9/13/2019

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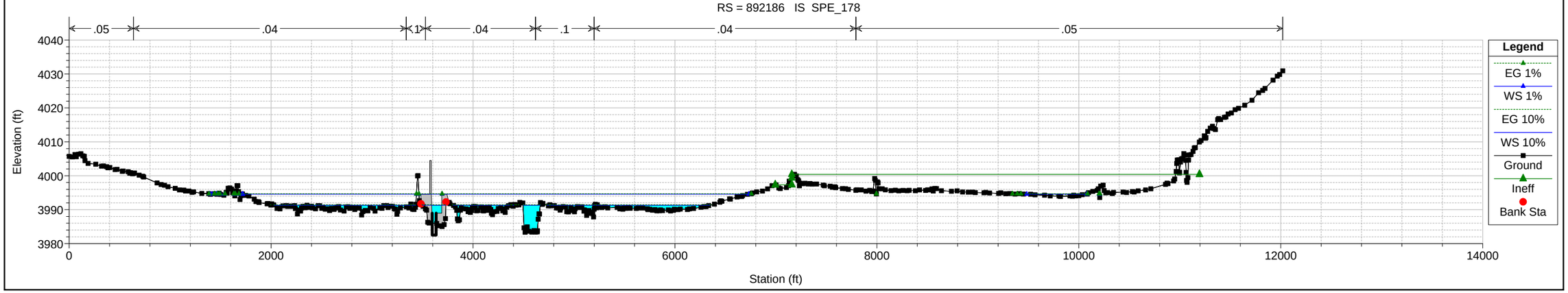

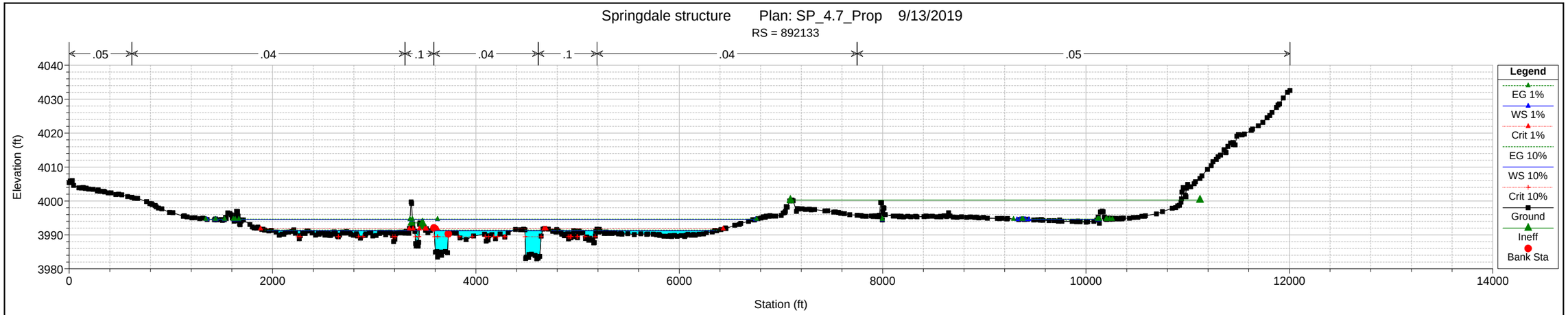
Springdale structure Plan: SP_4.7_Prop 9/13/2019
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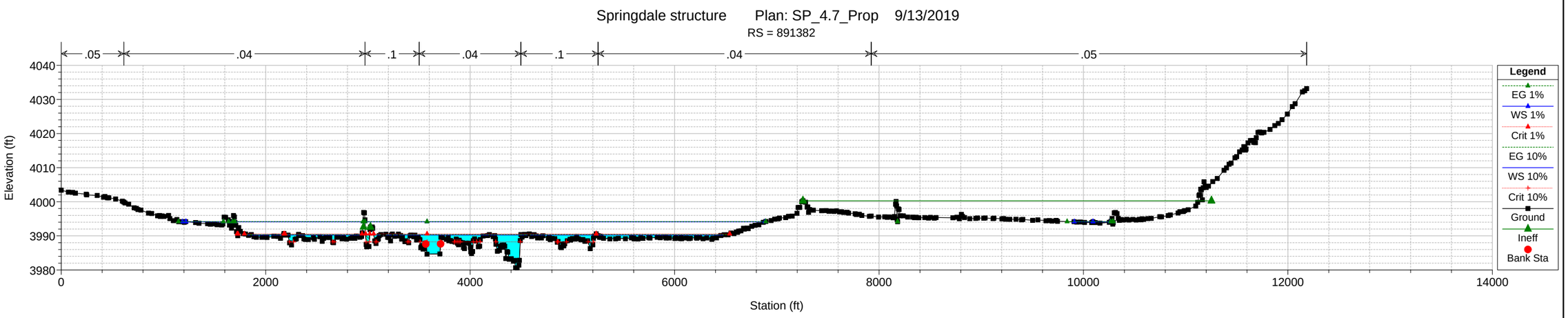
.05
.04
.1
.04
.1
.04
.05
Elevation (ft)
4040
4030
4020
4010
4000
3990
3980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
EG 1%
WS 1%
Crit 1%
EG 10%
WS 10%
Crit 10%
Ground
Ineff
Bank Sta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RS = 891382
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.04
.1
.04
.1
.04
.05
Elevation (ft)
4040
4030
4020
4010
4000
3990
3980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
EG 1%
WS 1%
Crit 1%
EG 10%
WS 10%
Crit 10%
Ground
Ineff
Bank Sta

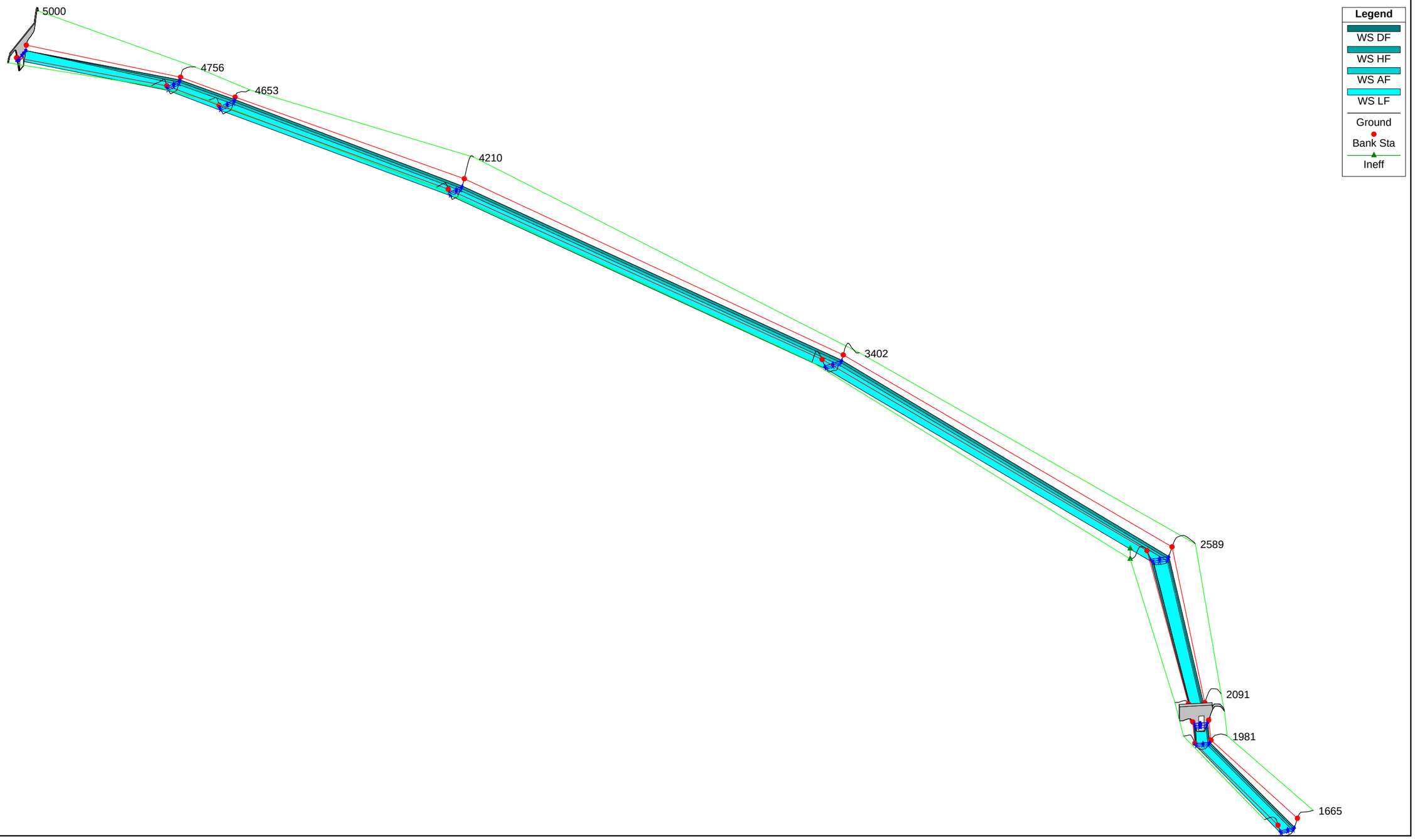
HEC-RAS Plan: PCM River: Springdale Ditch Reach: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	5000	DF	110.00	3984.74	3989.05	3985.78	3989.06	0.000066	1.00	110.14	34.72	0.10
1	5000	HF	108.00	3984.74	3989.01	3985.77	3989.03	0.000066	0.99	108.85	34.60	0.10
1	5000	AF	62.30	3984.74	3989.04	3985.47	3989.05	0.000021	0.57	109.91	34.70	0.06
1	5000	LF	29.00	3984.74	3989.05	3985.19	3989.05	0.000005	0.26	110.12	34.72	0.03
1	4999		Inl Struct									
1	4756	DF	110.00	3985.79	3988.73		3988.77	0.000253	1.59	69.39	30.77	0.19
1	4756	HF	108.00	3985.79	3988.71		3988.75	0.000252	1.57	68.61	30.68	0.19
1	4756	AF	62.30	3985.79	3988.06		3988.08	0.000225	1.26	49.34	28.46	0.17
1	4756	LF	29.00	3985.79	3987.40		3987.41	0.000184	0.92	31.49	25.33	0.15
1	4653	DF	110.00	3985.77	3988.72		3988.75	0.000192	1.41	78.08	33.72	0.16
1	4653	HF	108.00	3985.77	3988.69		3988.72	0.000191	1.40	77.22	33.64	0.16
1	4653	AF	62.30	3985.77	3988.04		3988.06	0.000168	1.11	56.02	31.50	0.15
1	4653	LF	29.00	3985.77	3987.39		3987.40	0.000135	0.80	36.16	28.44	0.13
1	4210	DF	110.00	3985.71	3988.57		3988.63	0.000395	1.85	59.46	29.30	0.23
1	4210	HF	108.00	3985.71	3988.55		3988.60	0.000394	1.84	58.73	29.19	0.23
1	4210	AF	62.30	3985.71	3987.92		3987.95	0.000369	1.51	41.15	26.23	0.21
1	4210	LF	29.00	3985.71	3987.29		3987.31	0.000310	1.13	25.77	22.61	0.19
1	3402	DF	110.00	3985.58	3988.24		3988.29	0.000430	1.85	59.59	31.59	0.24
1	3402	HF	108.00	3985.58	3988.22		3988.27	0.000432	1.84	58.79	31.50	0.24
1	3402	AF	62.30	3985.58	3987.58		3987.62	0.000465	1.57	39.57	28.46	0.24
1	3402	LF	29.00	3985.58	3987.00		3987.02	0.000387	1.19	24.42	23.39	0.20
1	2589	DF	110.00	3985.53	3987.78	3986.62	3987.85	0.000706	2.23	49.35	28.52	0.30
1	2589	HF	108.00	3985.53	3987.75	3986.62	3987.82	0.000718	2.23	48.49	28.42	0.30
1	2589	AF	62.30	3985.53	3986.99	3986.32	3987.06	0.001075	2.18	28.61	23.67	0.35
1	2589	LF	29.00	3985.53	3986.35	3986.04	3986.41	0.001961	2.03	14.29	20.81	0.43
1	2091	DF	110.00	3984.49	3987.44	3985.84	3987.53	0.000596	2.34	47.05	21.34	0.28
1	2091	HF	108.00	3984.49	3987.41	3985.83	3987.50	0.000599	2.33	46.34	21.19	0.28
1	2091	AF	62.30	3984.49	3986.59	3985.44	3986.66	0.000630	2.04	30.49	17.74	0.27
1	2091	LF	29.00	3984.49	3985.87	3985.09	3985.91	0.000616	1.58	18.32	15.67	0.26
1	2040		Inl Struct									
1	1981	DF	110.00	3983.43	3985.55		3985.72	0.001774	3.27	33.68	21.93	0.46
1	1981	HF	108.00	3983.43	3985.53		3985.69	0.001775	3.25	33.25	21.84	0.46
1	1981	AF	62.30	3983.43	3985.03		3985.14	0.001775	2.73	22.79	19.54	0.45
1	1981	LF	29.00	3983.43	3984.52		3984.59	0.001754	2.13	13.63	16.99	0.42
1	1665	DF	110.00	3983.04	3985.12	3984.25	3985.24	0.001200	2.78	39.59	24.55	0.39
1	1665	HF	108.00	3983.04	3985.10	3984.24	3985.22	0.001200	2.76	39.11	24.47	0.38
1	1665	AF	62.30	3983.04	3984.59	3983.93	3984.67	0.001200	2.30	27.07	22.45	0.37
1	1665	LF	29.00	3983.04	3984.08	3983.62	3984.13	0.001202	1.78	16.29	20.03	0.35

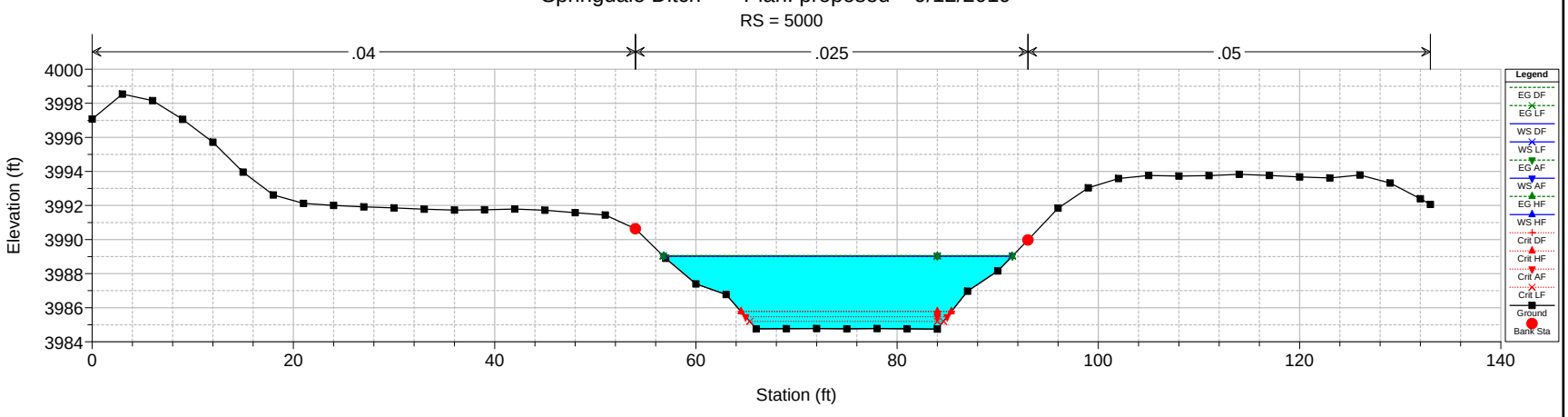
HEC-RAS Plan: PCM River: Springdale Ditch Reach: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Q Total	Q Weir	Q Gates	Gate Open Ht
			(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	4999	DF	3989.06	3989.05	110.00		110.00	2.00
1	4999	HF	3989.03	3989.01	108.00		108.00	2.00
1	4999	AF	3989.05	3989.04	62.30		62.30	0.66
1	4999	LF	3989.05	3989.05	29.00		29.00	0.34
1	2040	DF	3987.53	3987.44	110.00		110.00	3.00
1	2040	HF	3987.50	3987.41	108.00		108.00	3.00
1	2040	AF	3986.66	3986.59	62.30		62.30	3.00
1	2040	LF	3985.91	3985.87	29.00		29.00	3.00

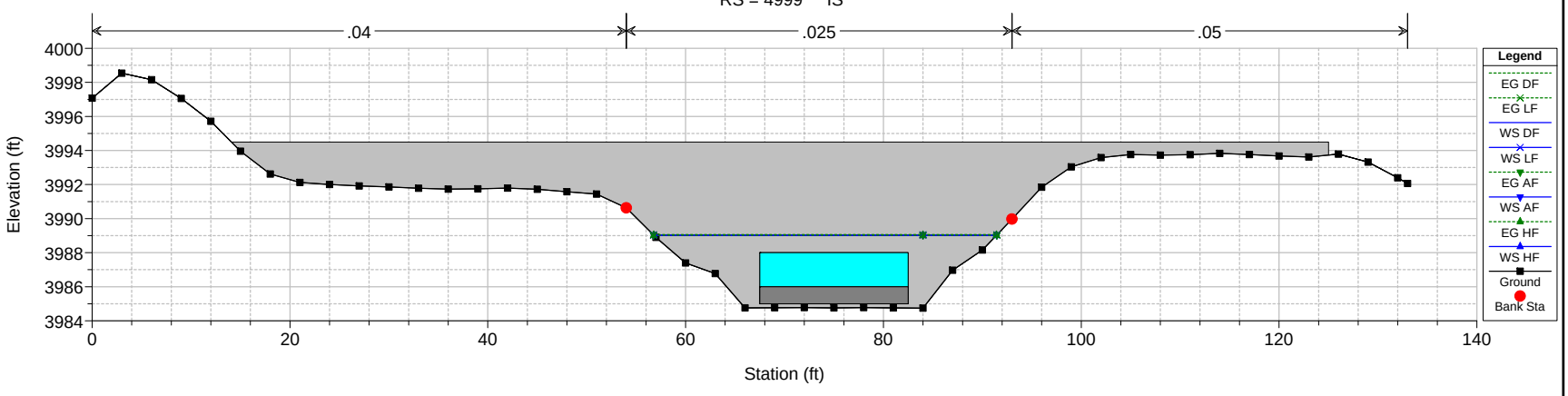
Springdale Ditch Plan: proposed 9/12/2019



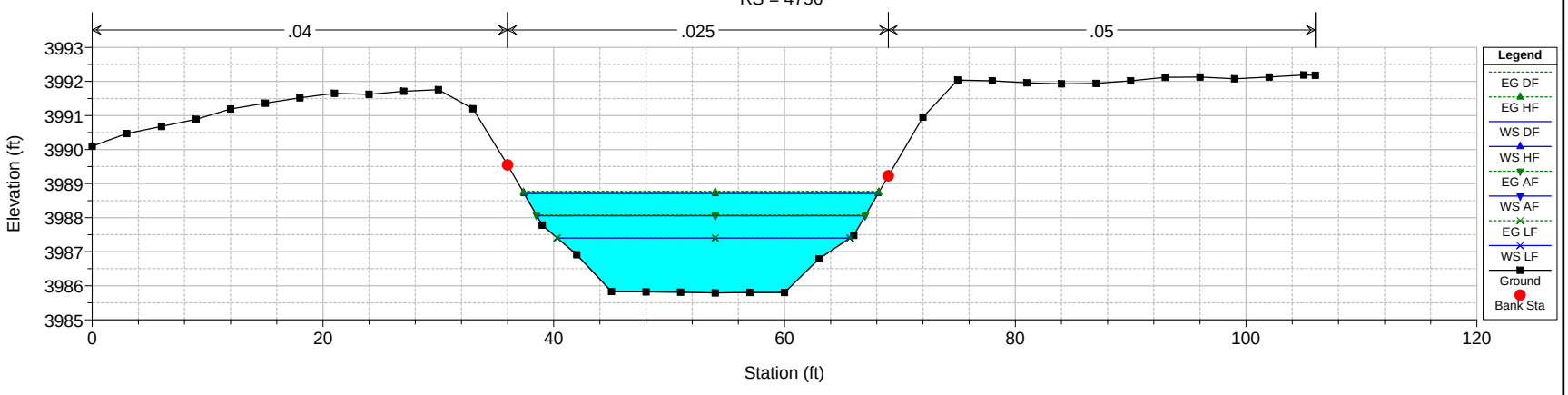
Springdale Ditch Plan: proposed 9/12/2019
RS = 5000



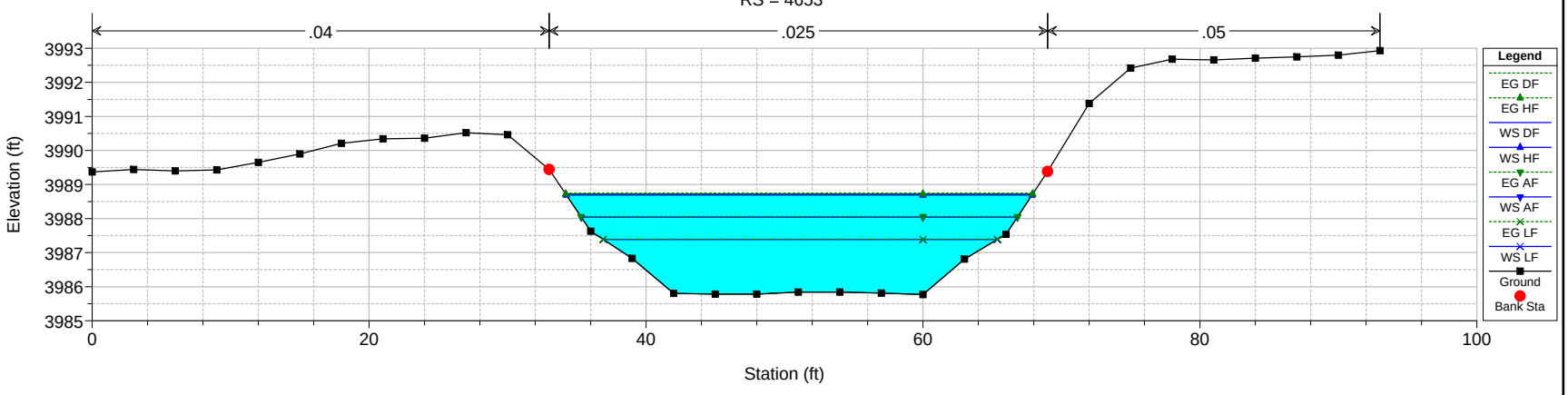
Springdale Ditch Plan: proposed 9/12/2019
RS = 4999 IS



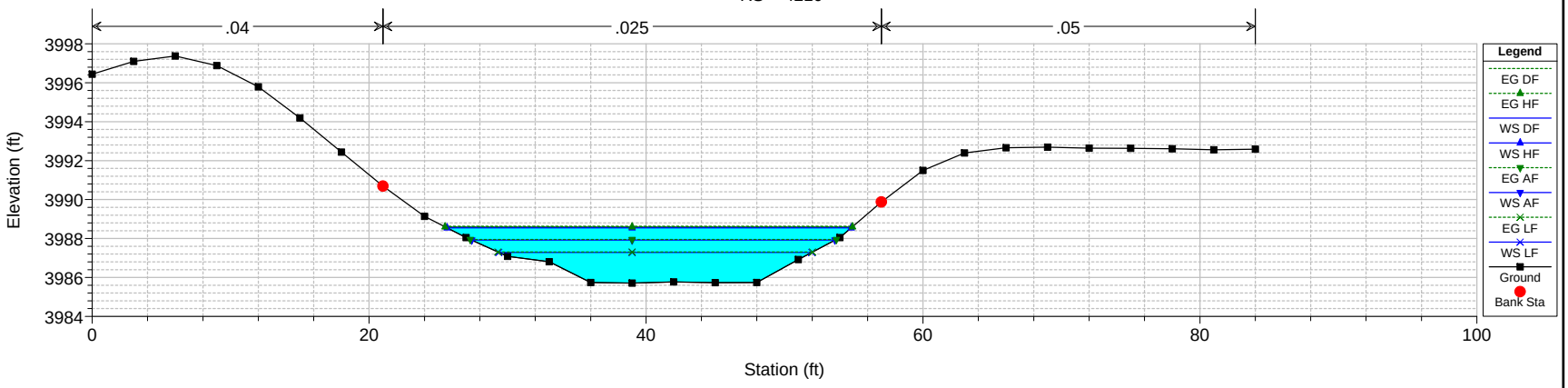
Springdale Ditch Plan: proposed 9/12/2019
RS = 4756



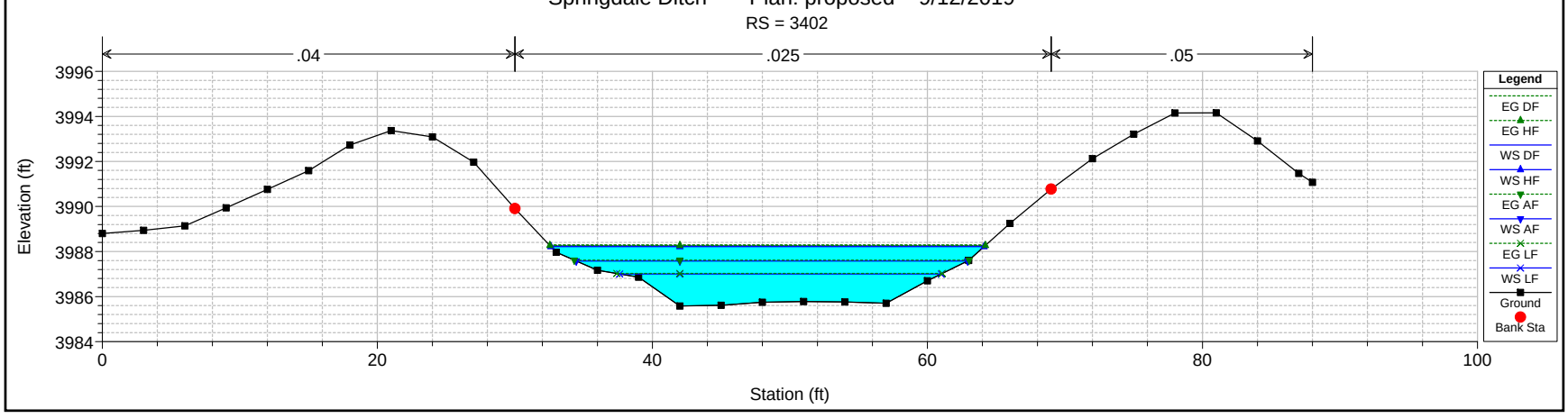
Springdale Ditch Plan: proposed 9/12/2019
RS = 4653

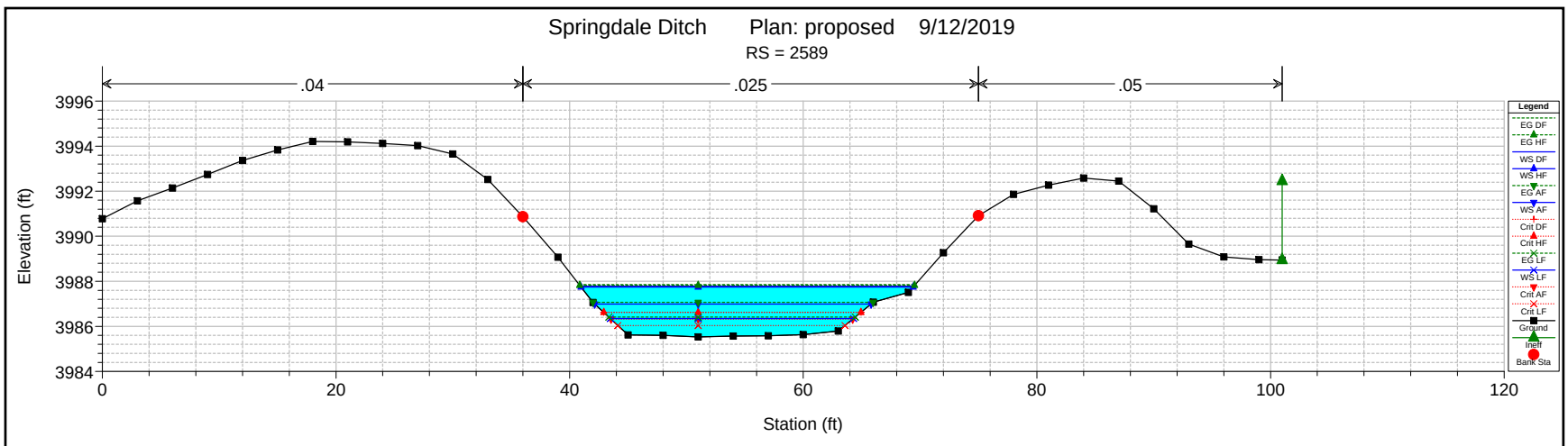


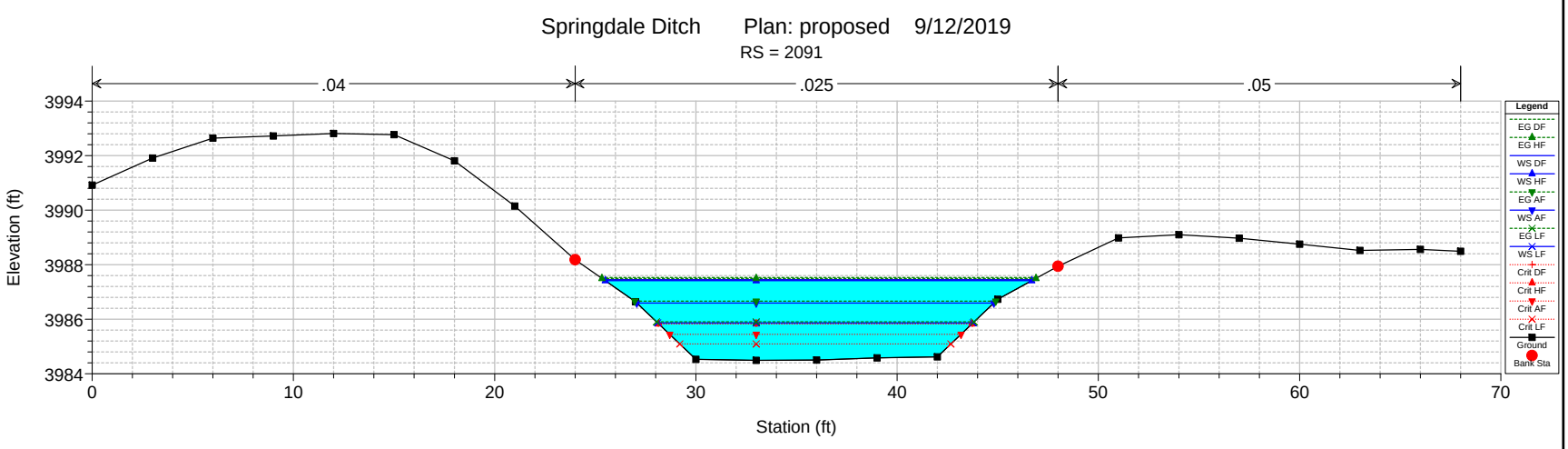
Springdale Ditch Plan: proposed 9/12/2019
RS = 4210

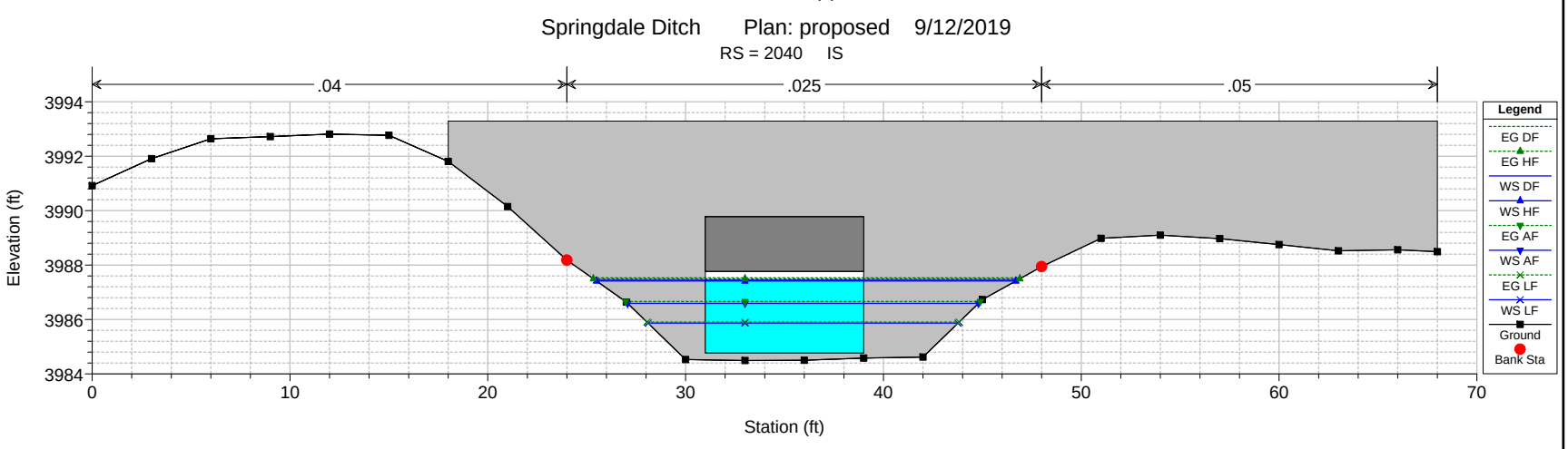


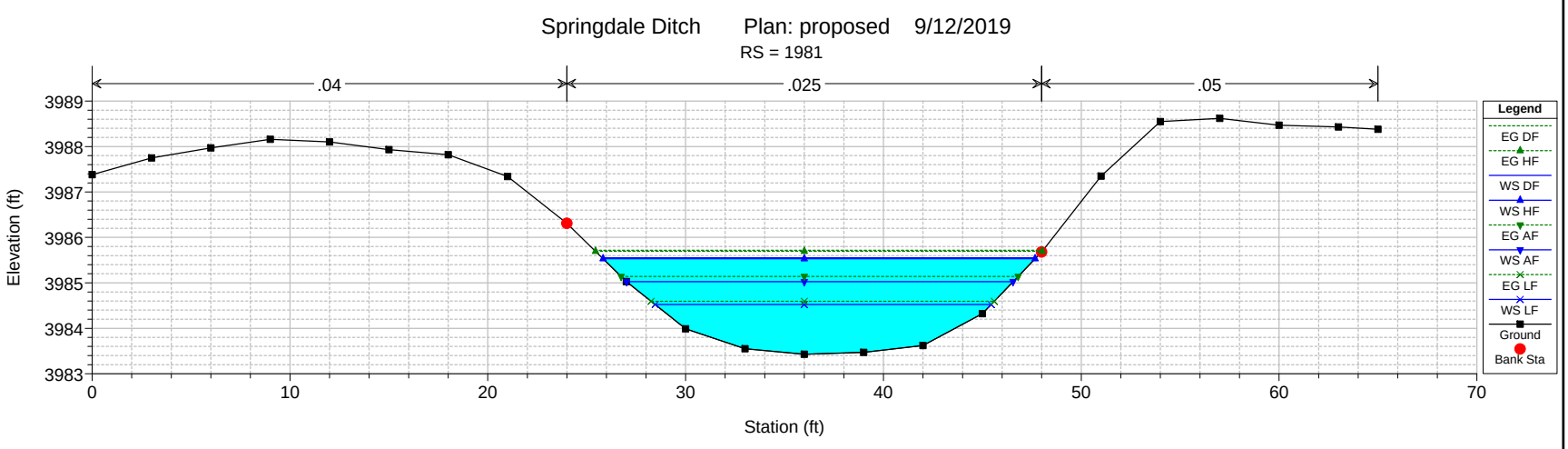
Springdale Ditch Plan: proposed 9/12/2019
RS = 3402

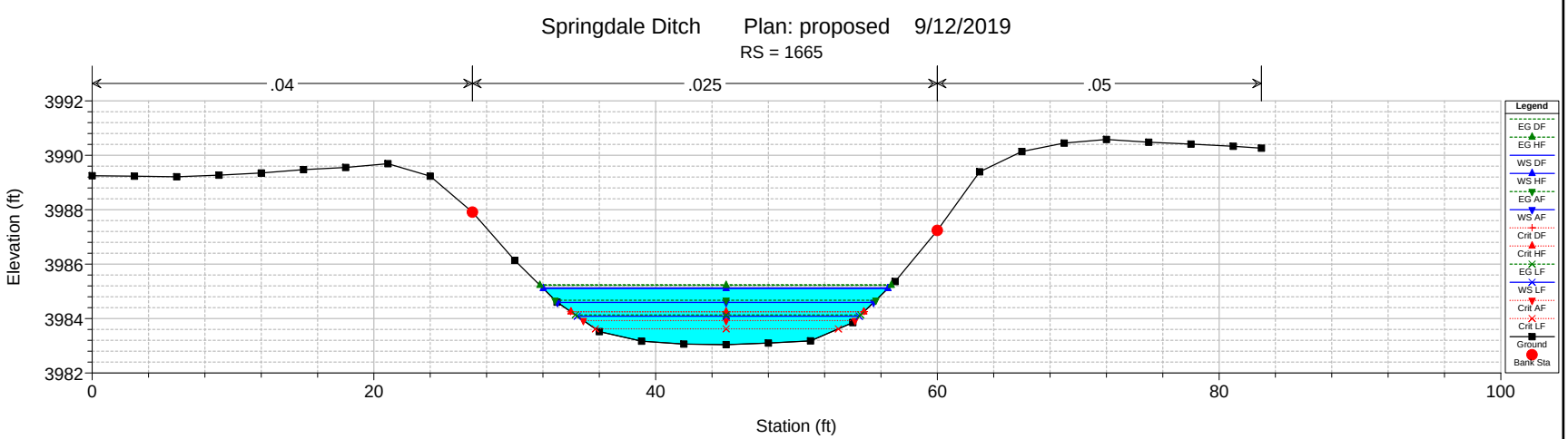



Springdale Ditch Plan: proposed 9/12/2019
RS = 2589
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG DF
EG HF
WS DF
WS HF
EG AF
WS AF
Crit DF
Crit HF
EG LF
WS LF
Crit AF
Crit LF
Ground
Ineff
Bank Sta


Springdale Ditch Plan: proposed 9/12/2019
RS = 2091
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG DF
EG HF
WS DF
WS HF
EG AF
WS AF
EG LF
WS LF
Crit DF
Crit HF
Crit AF
Crit LF
Ground
Bank Sta


Springdale Ditch Plan: proposed 9/12/2019
RS = 2040 IS
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG DF
EG HF
WS DF
WS HF
EG AF
WS AF
EG LF
WS LF
Ground
Bank Sta


Springdale Ditch Plan: proposed 9/12/2019
RS = 1981
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG DF
EG HF
WS DF
WS HF
EG AF
WS AF
EG LF
WS LF
Ground
Bank Sta


Springdale Ditch Plan: proposed 9/12/2019
RS = 1665
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG DF
EG HF
WS DF
WS HF
EG AF
WS AF
Crit DF
Crit HF
EG LF
WS LF
Crit AF
Crit LF
Ground
Bank Sta