COLORADO
Division of Water Resources
Department of Natural Resources

July 30, 2019

Jared Dains, P.E.
Applegate Group, Inc.
1490 W. 121st Avenue, Suite 100
Denver, CO 80234

Re: **Corrected Fredstrom Pit Substitute Water Supply Plan (WDID 0502539, Plan ID 6090)**
Fredstrom Pit, DRMS Permit No. M-2001-016 (WDID 0505629)
Section 36, T3N, R70W, Section 1, T2N, R70W, Section 31, T3N, R69W, and Section 6, T2N, R69W, 6th P.M.
Water Division 1, Water District 5, Boulder County

Approval Period: June 6, 2019 through December 31, 2019
Contact information for Mr. Dains: 303-452-6611; jareddains@applegategroup.com

Dear Mr. Dains:

We have reviewed your letter dated April 23, 2019, requesting approval of the above referenced substitute water supply plan ("SWSP") in accordance with § 37-90-137(11), C.R.S. to replace depletions associated with the Fredstrom Pit sand and gravel mining operation, operated by Aggregate Industries-WCR, Inc. ("Aggregate" or "Applicant"). The required filing fee of $1,593.00 has been submitted (receipt no. 3691556).

The subject SWSP was originally approved on June 6, 2019 with the requirement that the financial warranty for the site be increased to cover the cost of backfilling of the pit or the installation of a clay liner or slurry wall to prevent long term injurious stream depletions that result from mining related exposure of groundwater. According to the information you provided on June 14, 2019, the Applicant's intention was for the affidavit of water rights dedication to fully cover the requirements of the Colorado Division of Reclamation, Mining and Safety ("DRMS") April 30, 2010 letter under approach no.4. You provided further information on June 25, 2019, and July 18, 2019, to demonstrate the adequacy of the dedicated water rights. **This Corrected SWSP is issued to reflect this change in approach to satisfy DRMS requirements and supersedes the SWSP approval issued on June 6, 2019 in its entirety.**

SWSP Operation

The Fredstrom Pit is located just west of the City of Longmont generally situated in the SE¼ of Section 36, Township 3 North, Range 70 West, part of the W½ of Section 31, Township 3 North, Range 69 West, part of the NW¼ of Section 6 Township 2 North, Range 69 West, and part of the NE¼ of Section 1, Township 2 North, Range 70 West of the 6th P.M., as shown on the attached Figure 1. Mining of the site is anticipated to begin in June 2019, with Aggregate beginning dewatering

operations to allow the site to be dry mined. Consumptive use at the Fredstrom Pit during this plan period will consist of evaporation from exposed groundwater surface area, water removed in the mined product, and water used for dust control purposes. Replacement water will be provided by the City of Longmont pursuant to a temporary lease agreement. After December 31, 2019, this site is proposed to be incorporated into Aggregate Industries' South Platte Combined SWSP (WDID 0202565).

Depletions

Aggregate has estimated that a total of 1.0 acre of groundwater will be exposed at the site beginning in June, consisting of dewatering trenches and settling ponds. Net annual evaporative loss was estimated at 2.57 feet per exposed acre, as approved for the nearby Distel and Tull Pits in Aggregate Industries' South Platte Combined SWSP. This value is more conservative than the net evaporative loss estimated by DWR and therefore is acceptable for the purposes of this SWSP. Net evaporative losses are estimated to total 1.82 acre-feet at the site for the requested plan period.

The Applicant anticipates mining up to 1,370 tons of aggregate per day, for a total of up to 293,151 tons of aggregate mined during this plan period. The material will be mined below the groundwater table in a dewatered state. For the purposes of this SWSP you have assumed that all mined material will be washed; therefore the water retained in the mined product is considered to be 4.0% of the mined material by weight. This results in a groundwater loss of 8.63 acre-feet.

The Applicant anticipates using 2.93 acre-feet of water from the pit for dust control purposes per year. All water used for dust control purposes is assumed to be 100% consumed.

The total consumptive use of ground water at the Fredstrom Pit during this plan period, including evaporative and operational losses, is estimated to be 13.38 acre-feet.

Consumptive uses from the Fredstrom Pit will result in lagged depletions to the stream system. The IDS Alluvial Water Accounting System (AWAS) analytical stream depletion model, which uses the Glover method, was used to calculate the lagged depletions to St. Vrain Creek. The following parameters were used in the model: transmissivity (T) = 50,000 gallons per day per foot, specific yield (SY) = 0.2, the aquifer width (W) = 8,700 feet, and the distance from the centroid of the exposed surface water areas to the creek (X) = 1,400 feet. The total lagged depletions were determined to be 7.24 acre-feet for this plan period.

The attached Table 1 shows the monthly breakdown of evaporative, operational, and lagged depletions for the plan period of June 2019 through December 2019.

Dewatering

Once dewatering of the site commences, it will be continuously dewatered during this SWSP period, with all such water discharged to St. Vrain Creek. As long as the pit is continuously dewatered and all water is discharged to St. Vrain Creek without consumptive use, the accretions to the stream system from dewatering of the pit should be sufficient to replace the lagged dewatering depletions. All site dewatering must be accounted for in a method satisfactory to the division engineer and water commissioner. Adequate measuring devices may be required in order to adequately account for the dewatering. You have indicated that the dewatering pump will be equipped with a totalizing flow meter and monthly meter readings will be maintained and reported with the accounting for this SWSP.

Replacements

Aggregate has obtained a lease of 10.4 acre-feet of fully consumable water from the City of Longmont ("Longmont") for replacement purposes under this SWSP. A copy of the water supply agreement showing the monthly replacement schedule was provided in support of this SWSP request and is attached. Longmont will deliver the replacement water to St. Vrain Creek at either the outfall of Longmont's municipal wastewater treatment plant (WDID 0502300) located approximately 5 miles downstream of the Fredstrom Pit, or at the confluence of Spring Gulch and St. Vrain Creek in the SE¼ of Section 7, Township 2 North, Range 68 West of the 6th P.M., approximately 7 miles downstream of the Fredstrom Pit. In the event of a call by an intervening water right between Fredstrom Pit and the primary point of delivery, the Applicant must replace depletions at an upstream location of the intervening water right, either from one of Longmont's alternative water sources or by hauling water upstream. Any releases by Longmont at a location other than its municipal wastewater treatment plant must be coordinated with the water commissioner to insure the proper transit losses are applied and that no intervening water rights are injured.

Long Term Augmentation

All sand and gravel mining operators must comply with the requirements of the Colorado Reclamation Act and the Mineral Rules and Regulations for the protection of water resources. DRMS requires that you provide information to demonstrate you can replace long term injurious stream depletions that result from mining-related exposure of groundwater. Aggregate Industries-WCR, Inc. has submitted a dedication of water rights to the Fredstrom Pit SWSP, which is an agreement with the Golden Land Company regarding their 5/12ths interest in the Zweck & Turner Ditch, for a dedication of a pro-rata share of said water right for as long as there are depletions at the gravel pit or until such time as another replacement source is obtained.

Aggregate Industries-WCR submitted a Historical Consumptive Use Analysis for the Fredstrom Property Zweck & Turner Ditch Water Rights, which indicated that the dedicated water rights resulted in an average of 197.4 acre-feet of consumptive use per year. This office has reviewed the Historical Consumptive Use Analysis and found it to be acceptable. According to your email of July 18, 2019, Aggregate has estimated that potentially 4 acres of groundwater would be exposed if dewatering were to be discontinued during this plan period, resulting in potential evaporative losses of 10.28 acre-feet per year for mining activities planned for this plan period. The dedicated 197.4 acre-feet of consumptive use credits from the dry-up of 121.5 acres of the Fredstrom Property historically irrigated by Golden Land Company's 5/12th ownership in the Zweck & Turner Ditch are sufficient to cover the maximum expected depletions of 10.28 acre-feet should dewatering at the site be discontinued. For the purposes of this SWSP, this affidavit will be accepted for the dedication of the shares; however, if the State Engineer determines that a different affidavit or dedication process is necessary to assure proper dedication of the shares, additional information may be required prior to future SWSP approvals.

Conditions of Approval

I hereby approve this SWSP, in accordance with § 37-90-137(11), C.R.S., subject to the following conditions:

1. This SWSP shall be valid for the period of June 6, 2019 through December 31, 2019, unless otherwise revoked or superseded by decree. If this plan will not be made absolute by a

water court action by the plan's expiration date, a renewal request must be submitted to this office with the statutory fee (currently $257) prior to the expiration date but no later than **November 1, 2019**. If a renewal request is received after the expiration date of this plan, it may be considered a request for a new SWSP and the $1,593 filing fee will apply.

2. A new well permit must be obtained for the Fredstrom Pit in accordance with § 37-90-137(2), C.R.S., and this SWSP. A gravel pit well permit application was submitted to this office and is currently pending under receipt no. 3691674, subject to the resolution of a hearing scheduled to be held before the Hearing Officer in case no. 19SE01.
3. The total surface area of the groundwater exposed at the Fredstrom Pit must not exceed 1.0 acre, which results in a net evaporative loss of 1.82 acre-feet for this plan period.
4. The amount of water used for operational purposes at the Fredstrom Pit during this plan period must not exceed 13.38 acre-feet, estimated as 2.93 acre-feet for dust control purposes and 8.63 acre-feet lost with the production of 293,151 tons of mined aggregate.
5. Total consumption at the Fredstrom Pit must not exceed these aforementioned amounts unless an amendment is made to this plan.
6. Approval of this plan is for the purposes as stated herein. This office must first approve any additional uses for the water.
7. The replacement water that is the subject of this plan cannot be sold or leased to any other entity. As a condition of subsequent renewals of this SWSP, the replacement water must be appurtenant to this site until a plan for augmentation is obtained.
8. All pumping for dust control purposes shall be measured in a manner acceptable to the division engineer.
9. All releases of replacement water must be sufficient to cover all out-of-priority depletions in time, place, and amount and must be made under the direction and/or the approval of the water commissioner. Notice must be provided and approval made by the water commissioner at least 48 hours prior to the release of replacement water, or as required by the water commissioner.
10. If approved by the division engineer, the release of replacement water may be aggregated to maximize beneficial use. The water commissioner and/or the division engineer shall determine the rate and timing of any aggregated release.
11. Conveyance loss for delivery of augmentation water is subject to assessment and modification as determined by the water commissioner or division engineer.
12. Adequate accounting of depletions and replacements must be provided to the division engineer in Greeley (DNR_Div1Accounting@state.co.us) and the water commissioner (Shera Sumerford at Shera.Sumerford@state.co.us) on a monthly basis or other interval acceptable to both of them. Submitted accounting shall conform to the Administration Protocol *"Augmentation Plan Accounting, Division One – South Platte Basin"* (attached).

    In addition, it is the applicant's responsibility to verify that the entities making replacements are identifying this use on their accounting submitted to our office. For the period of this plan, that entity is the City of Longmont.
13. The name, mailing address, and phone number of the contact person who will be responsible for operation and accounting of this plan must be provided on the accounting forms to the division engineer and water commissioner.

14. The approval of this SWSP does not relieve the Applicant and/or landowner of the requirement to obtain a Water Court decree approving a permanent plan for augmentation or mitigation to ensure the permanent replacement of all depletions, including long-term evaporation losses and lagged depletions after gravel mining operations have ceased. If reclamation of the mine site will produce a permanent water surface exposing groundwater to evaporation, an application for a plan for augmentation must be filed with the Division 1 Water Court at least three (3) years prior to the completion of mining to include, but not be limited to, long-term evaporation losses and lagged depletions. If a lined pond results after reclamation, replacement of lagged depletions shall continue until there is no longer an effect on stream flow.

15. Dewatering at this site will produce delayed depletions to the stream system. As long as the pit is continuously dewatered, the water returned to the stream system should be adequate to offset the depletions attributable to the dewatering operation, thus dewatering is required to continue during the term of this plan. The operator shall equip the dewatering operations with a totalizing flow meter and report monthly meter readings which will be used to determine the post-pumping depletions when dewatering ceases. Once dewatering at the site ceases, the delayed depletions must be addressed, including depletions resulting from the gradual refilling of the pit. At least three years prior to completion of dewatering, a plan must be submitted that specifies how the post pumping dewatering depletions (including refilling of the pit) will be replaced, in time, place and amount.

16. In accordance with the letter dated April 30, 2010 (copy attached) from the Colorado Division of Reclamation, Mining, and Safety (“DRMS”), all sand and gravel mining operators must comply with the requirements of the Colorado Reclamation Act and the Mineral Rules and Regulations for the protection of water resources. The April 30, 2010 letter from DRMS requires that you provide information to DRMS to demonstrate you can replace long term injurious stream depletions that result from mining related exposure of groundwater. The DRMS letter identifies four approaches to satisfy this requirement. In accordance with approach no. 4, an agreement with Golden Land Company was submitted that dedicates a pro-rata share of their 5/12th interest in the Zweck & Turner Ditch to the Fredstrom Pit SWSP for as long as there are depletions at this gravel pit, or until such time as another replacement source is obtained. A copy of the affidavit dated April 23, 2019 is attached to this letter. For the purposes of this SWSP, this affidavit will be accepted for the dedication of the shares; however, if the State Engineer determines that a different affidavit or dedication process is necessary to assure proper dedication of the shares, additional information may be required prior to future SWSP approvals.

17. The state engineer may revoke this SWSP or add additional restrictions to its operation if at any time the state engineer determines that injury to other vested water rights has or will occur as a result of the operation of this SWSP. Should this SWSP expire without renewal or be revoked prior to adjudication of a permanent plan for augmentation, all excavation of product from below the water table, and all other use of water at the pit, must cease immediately.

18. In accordance with amendments to § 25-8-202-(7), C.R.S. and “Senate Bill 89-181 Rules and Regulations” adopted on February 4, 1992, the State Engineer shall determine if the substitute supply is of a quality to meet the requirements of use to which the senior appropriation receiving the substitute supply has normally been put. As such, water quality data or analyses may be requested at any time to determine if the requirement of use of the senior appropriator is met.

19. The decision of the state engineer shall have no precedential or evidentiary force, shall not create any presumptions, shift the burden of proof, or serve as a defense in any water court case or any other legal action that may be initiated concerning the SWSP. This decision shall not bind the state engineer to act in a similar manner in any other applications involving other SWSPs or in any proposed renewal of this SWSP, and shall not imply concurrence with any findings of fact or conclusions of law contained herein, or with the engineering methodologies used by the Applicant.

Should there be any further comments or questions, please contact Michael Hein in Greeley at 970-352-8712 or Javier Vargas-Johnson of this office.

Sincerely,

Jeff Deatherage, P.E.
Chief of Water Supply

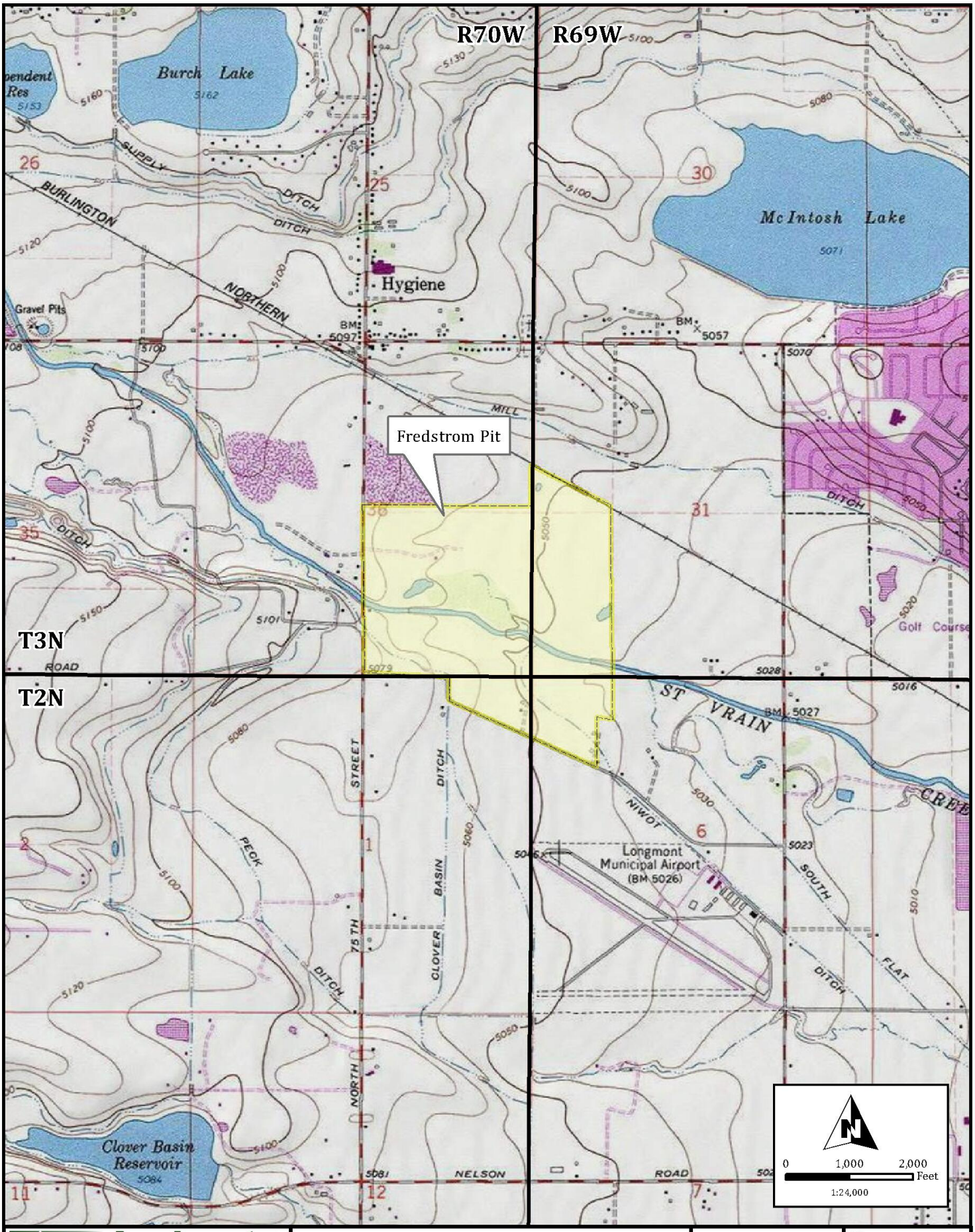
Attachments: Figure 1
Table 1
Water Supply Agreement
Administration Protocol *"Augmentation Plan Accounting, Division One – South Platte River"*

Cc: Michael Hein, Lead Assistant Division Engineer, Michael.Hein@state.co.us
810 9th Street, Ste. 200, Greeley, CO 80631, (970) 352-8712

Shera Sumerford, Water Commissioner, Water District 5, Shera.Sumerford@state.co.us

Louis Flink, Tabulation/Diversion Records Coordinator, Louis.Flink@state.co.us

Amy Eschberger, Division of Reclamation Mining and Safety,
Amy.Eschberger@state.co.us



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FREDSTROM PIT
M-2001-016
Overview Map

Date: 25 Oct 2018

Job #: 06-103

Drawn By: JMD

Figure: 1

Of: 1

Date Saved: 10/25/2018 1:20:02 PM
Path: N:\06103 Aggregate Industries WRPM\GIS\Fredstrom Pit.mxd

Table 1

2019 Water Balance

Fredstrom Pit Substitute Water Supply Plan

Date Revised: 5/17/2019

AG Job #: 06-103

All values in ac-ft unless noted

	Depletions								Replacements		
Month	Monthly Net Evap (ft) (A)	Exposed Water Surface Area (acres) (B)	Evaporative Losses (C)	On-site Aggregate Production (tons) (D)	Water Retained in Product (E)	Water used for Dust Control (F)	Total CU (G)	Lagged Depletions (H)	Longmont Lease Volume (I)	Longmont Lease Credit (J)	Water Balance (K)
Jan-19	0.08	0.0	0.00	0	0.00	0.00	0.00	0.00	0.0	0.00	0.00
Feb-19	0.09	0.0	0.00	0	0.00	0.00	0.00	0.00	0.0	0.00	0.00
Mar-19	0.13	0.0	0.00	0	0.00	0.00	0.00	0.00	0.0	0.00	0.00
Apr-19	0.20	0.0	0.00	0	0.00	0.00	0.00	0.00	0.3	0.30	0.30
May-19	0.25	0.0	0.00	0	0.00	0.00	0.00	0.00	0.8	0.80	0.80
Jun-19	0.38	1.0	0.38	41,096	1.21	0.41	2.00	0.32	1.1	1.10	0.78
Jul-19	0.44	1.0	0.44	42,466	1.25	0.42	2.11	0.84	1.2	1.20	0.36
Aug-19	0.38	1.0	0.38	42,466	1.25	0.42	2.05	1.10	1.4	1.40	0.30
Sep-19	0.26	1.0	0.26	41,096	1.21	0.41	1.88	1.20	1.4	1.40	0.20
Oct-19	0.18	1.0	0.18	42,466	1.25	0.42	1.85	1.25	1.4	1.40	0.15
Nov-19	0.10	1.0	0.10	41,096	1.21	0.41	1.72	1.26	1.4	1.40	0.14
Dec-19	0.08	1.0	0.08	42,466	1.25	0.42	1.75	1.27	1.4	1.40	0.13
Total	2.57		1.82	293,151	8.63	2.93	13.38	7.24	10.4	10.40	3.16

Unit Transit Loss =	0.00%	per mile
Lease Transit Distance =	0	miles
Lease Total Transit Loss =	0.00%	

Notes:

(A) Monthly Evaporation rates from previous AI CoSSP approvals
(B) Estimated exposed groundwater acreage
(C) Monthly Evap rate (Col A) multiplied by current monthly exposed surface area (Col B)
(D) Estimated aggregate production
(E) Assuming material is 4% water by weight; material is mined in a dewatered state but may be washed
(F) Estimated water needed for dust control on-site
(G) Total Consumptive Use (CU) is Col C + Col E + Col F
(H) CU amount is lagged back to river using Glover equation
(I) Lease from the City of Longmont
(J) Credit from the City of Longmont lease after transit loss is assessed
(K) Water Balance = (J) - (H)

WATER SUPPLY AGREEMENT

This WATER SUPPLY AGREEMENT ("Agreement") is made and entered into this 7th day of March, 2019, by and between the City of Longmont, a municipal corporation organized under the laws of the State of Colorado and acting by and through its Water Utility Enterprise ("Longmont"), whose address is 1100 South Sherman Street, Longmont, Colorado 80501, and Aggregate Industries, Inc., whose mailing address is 1687 Cole Blvd., Suite 300 Golden, CO 80401 ("Customer"). Longmont and Customer may sometimes be referred to herein individually as a "Party" or collectively as "Parties."

RECITALS

A. Longmont, a home rule municipality in Boulder County, Colorado, duly organized and existing under Article XX of the State Constitution, acting on behalf of its water utility enterprise, is authorized, pursuant to Sections 1.2, 1.3, and 11.1 of Longmont's Home Rule Charter and Section 31-15-101, et seq., C.R.S., as amended, to acquire, hold, lease, and dispose of real and personal property, including water and water rights.

B. Longmont owns water, water rights, or water credits in the St. Vrain Creek basin that are fully consumable.

C. Longmont and Customer desire to enter into this Agreement to provide water to be supplied by Longmont to Customer.

D. Pursuant to Section 14.09.030 of the Longmont Municipal Code, Longmont's General Manager of Public Works and Natural Resources, or the General Manager's designee, is authorized to enter into and execute water rights leases or raw water supply agreements, at the then-current rental market rates for agricultural and other uses, or exchange agreements by which Longmont obtains water of equal or greater value, of one year or less.

AGREEMENT

Now, therefore, in consideration of the foregoing recitals, and mutual covenants and agreements herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. Supply. Longmont hereby agrees to provide to Customer 10.4 acre-feet of fully consumable water (the "Subject Water"). The Subject Water may be selected and delivered by Longmont, in its discretion, from various sources including reusable effluent, water stored in Union Reservoir, other fully consumable water controlled by Longmont, or water from any other source, provided the Subject Water shall be usable by Customer for its stated purpose.

2. Deliveries.

2.1. Point of delivery. Longmont shall, at its sole discretion, deliver the Subject Water at either (hereinafter the "Delivery Point"): (1) the outfall of Longmont's

municipal wastewater treatment plant, presently located in the SE¼ NW¼ of Section 11, T2N, R69W of the 6th P.M., Boulder County, Colorado; or (2) the confluence of Spring Gulch and the Saint Vrain Creek, presently located in the SE1/4 of Section 7, T2N, R68W of the 6th P.M., Weld County, Colorado. Customer shall bear any losses associated with conveyance of the Subject Water from the Delivery Point to any location where Customer may use the Subject Water. Longmont shall be responsible for all losses and/or return obligations associated with delivery of the Subject Water to the Delivery Point.

2.2. Timing of deliveries. The Subject Water shall be delivered based upon the following schedule:

Month	Year	Ac-Ft
April	2019	0.30
May	2019	0.80
June	2019	1.10
July	2019	1.20
August	2019	1.40
September	2019	1.40
October	2019	1.40
November	2019	1.40
December	2019	1.40
Total		10.40

2.3. Accounting. Longmont shall maintain an accounting of all deliveries of the Subject Water to Customer, and shall provide monthly copies of such accounting to Customer upon request.

3. Use of Subject Water. Customer shall use the Subject Water for the Fredstrom Substitute Water Supply Plan at the Fredstrom Pit (the "Property"). No change of Longmont's water rights shall be applied for or reviewed as part of such use. Customer shall be responsible for obtaining all necessary authorizations, approvals, decrees, and/or permits from any and all private entities, and local, state, and federal agencies, as may be required to effectuate use of the Subject Water by Customer pursuant to this Agreement. If requested, Customer shall provide copies of any such authorizations, approvals, and permits to Longmont.

4. Rate. Customer agrees to pay Longmont $641.00 per acre-foot. The total price for the 10.40 acre-feet of Subject Water is $6,666.40. Payment to Longmont of $6,666.40 is due upon execution of this Agreement; such payment shall be nonrefundable and not contingent upon whether the Subject Water is actually diverted or used by Customer, so long as Longmont delivered the Subject Water based upon the schedule in paragraph 2 above.

5. Term. The term of this Agreement shall begin at time of execution of this Agreement and payment to Longmont of the Rate as outlined in Paragraph 4, and shall end on December 31, 2019.

6. Untreated water. The water delivered to Customer under this Agreement is untreated or non-potable water of whatever quality that is now or in the future available from the

sources specified herein. Delivery of non-potable water under this Agreement will be on an "as is" basis only, and Longmont does not warrant the quality of the Subject Water or the suitability of the Subject Water for any particular purpose. Customer shall not make any claim against Longmont arising from the quality of water delivered, and Longmont shall have no treatment responsibility for the Subject Water made available under this Agreement.

7. Indemnification. Customer shall bear all responsibility for its use of the Subject Water provided under this Agreement, together with the costs associated therewith. To the extent allowed by law, Customer shall defend, indemnify, and hold harmless Longmont from and against any and all damages, claims, losses, obligations, other costs, and other liabilities arising out of Customer's use of the Subject Water provided under this Agreement.

8. Transfer and assignment. This Agreement, and the right to use the Subject Water, may not be transferred, assigned, subleased, or otherwise conveyed by Customer for use at locations other than the Property without the prior written consent of Longmont.

9. Use Restrictions and Accounting. Customer shall not use any water provided by Longmont under this Agreement for any oil and gas operation, nor suffer such water to be put to such use by anyone to whom Customer conveys the water, or their ultimate successors or assigns. Customer shall not provide this water to any subject political entity or for any use within an urbanized area, as those terms are defined in Chapter 14.09 of the Longmont Municipal Code, as amended, nor suffer the water to be transferred to such entities or used in such areas by anyone to whom Customer conveys the water, or their ultimate successors or assigns. Water used solely at the Property to satisfy the Customer's substitute water supply plan obligations complies with these restrictions. Customer shall account for, and make record of, all uses, deliveries, and transfers of the water provided by Longmont under this Agreement; shall include such information in the monthly State accounting form required to be submitted to the State Engineer's Office, Division One Engineer; and shall provide Longmont a copy of such form when it is submitted thereto or required to be submitted thereto, whichever is sooner. Satisfaction of Customer's substitute water supply plan obligations shall qualify as a final use of the water.

10. Water conservation. Customer agrees to implement or continue reasonable Best Management Practices ("BMP") for water conservation during the term of this Agreement. This paragraph shall not be construed to require any specific BMP but shall broadly be held to encourage reasonable, cost effective efforts to conserve water used by Customer both under this Agreement and for base water supplies used by Customer. Procedures and application processes for this paragraph shall be as outlined in the City's annual Water Supply and Drought Management Plan.

11. Integration. This instrument embodies the whole agreement of the Parties with respect to the subject matter contained herein. This Agreement shall supersede all previous communications, representations, or agreements, whether verbal or written, between the Parties hereto. There shall be no modification of this Agreement nor waiver of any of its provisions, except upon mutual agreement of the Parties expressed in writing, executed with the same formalities as this instrument.

12. Default; Remedies. A default shall be deemed to have occurred if either Party breaches its obligations hereunder and fails to cure such breach within 30 days of written notice from the non-breaching Party specifying the breach. Waiver or failure to give notice of a particular default or defaults shall not be construed as condoning or acquiescing to any continuing or subsequent default. In addition to other legal remedies available to it, including specific performance and damages, the non-breaching Party shall also have the right to cancel this Agreement for noncompliance with any provision hereunder by giving written notice of cancellation; provided that such Party has previously given the other Party written notice of such noncompliance and the other Party has not cured such noncompliance.

13. Notices and payments. All notices, payments, and other communications under this Agreement shall be in writing, except as otherwise provided for in this Agreement. All such notices and communications and all payments shall be deemed to have been duly given on the date of service, if delivered and served personally, or served via facsimile (with respect to notices and communications only) on the person to whom notice is given; on the next business day after deposit for overnight delivery by a courier service such as Federal Express; or on the third day after mailing, if mailed to the Party to whom payment and notice is to be given by first class mail, postage prepaid, and properly addressed as follows:

Longmont:	City of Longmont P W & N R General Manager 1100 South Sherman Street Longmont, Colorado 80501 Facsimile (303) 651-8812
With a Copy to:	City of Longmont City Attorney 408 Third Avenue Longmont, Colorado 80501
Customer:	Aggregate Industries (US) Inc. 1687 Cole Blvd., Suite 300 Golden, CO 80401

Persons and addresses to which notices are to be sent may be changed by the same method.

14. No beneficiaries. This Agreement is for the sole benefit of and binds the Parties, their successors and assigns. This Agreement affords no claim, benefit, or right of action to any third party. Any person besides Longmont or Customer receiving services or benefits under this Agreement is only an incidental beneficiary.

15. Governmental immunity. Nothing in this Agreement shall be construed to waive Longmont's protection from liability or the limitations on its liability due to its sovereign immunity under the Colorado Governmental Immunity Act or otherwise.

16. Governing law. This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado. In the event of litigation over this Agreement, jurisdiction and venue shall be proper and exclusive in the District Court in and for Boulder County, State of Colorado.

17. Force majeure. Customer acknowledges that the availability of the Subject Water provided for hereunder is dependent upon natural water resources that are variable in quantity of supply, and which can be affected by causes beyond Longmont's control. Moreover, Longmont shall not be liable for any delay or failure to perform its obligations under this Agreement caused by an event or condition beyond the reasonable control of, and without the fault of Longmont, including, without limitation, failure of facilities, flood, earthquake, storm, lightning, fire, epidemic, contamination, war, terrorist act, riot, civil disturbance, labor disturbance, accidents, sabotage, or restraint by court or restrictions by other public authority which delays or prevents performance (including, but not limited to, the adoption or change in any rule, policy, or regulation or environmental constraints imposed by federal, state, or local governments), which Longmont could not reasonably have avoided by exercise of due diligence and foresight. Upon the occurrence of such an event or condition, the obligations of Longmont under this Agreement shall be excused and suspended without penalty or damages, provided that Longmont shall give Customer written notice describing the particulars of the occurrence or condition, the suspension of performance is of no greater scope and of no longer duration than is required by the event or condition, and Longmont proceeds with reasonable diligence to remedy its inability to perform and provides progress reports to Customer describing the actions taken to remedy the consequences of the event or condition.

18. Independent contractors. Both Parties shall perform all services under this Agreement as independent contractors and not as an agent or employee of the other Party. No official or employee of Longmont shall supervise Customer. No official or employee of Customer shall supervise Longmont. Neither Party shall represent that it is an employee or agent of the other Party in any capacity. Neither Party has any right to workers' compensation benefits from the other Party or its insurance carriers or funds. Customer shall pay any federal and state income tax on money earned under this Agreement.

19. No continuing duty to supply water. Longmont shall have no obligation to supply water to Customer after this Agreement expires or is otherwise terminated. By agreeing to deliver water to Customer under this Agreement, Longmont does not intend to represent itself as a public utility to Customer or others in such regard nor shall it be deemed to operate as a public utility. Customer shall not assert that Longmont is a public utility by reason of delivering water pursuant to this Agreement nor that it is subject to regulation as a public utility or subject to regulation by the Colorado Public Utilities Commission or to rate regulation by any other public entity.

20. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, and all of which shall constitute one and the same Agreement. Facsimile signatures shall be acceptable and binding upon all Parties.

21. Headings. All paragraph headings used herein are for the convenience of the Parties and shall have no meaning in the interpretation or effect of this Agreement.

22. Negotiated provisions. This Agreement shall not be construed more strictly against one Party than against the other merely by virtue of the fact that it may have been prepared by counsel for one of the Parties, it being recognized that both Longmont and Customer have contributed substantially and materially to the preparation of this Agreement.

23. Authority. The Parties warrant that they have taken all actions necessary or required by their own procedures, bylaws, or applicable law to authorize their respective signatories to sign this Agreement for them and bind them to its terms.

Executed as of the date first set forth above.

Signatures on following page

CITY OF LONGMONT, acting by and through its Water Utility Enterprise:

Ken S Huson
Water Resources Manager

APPROVED AS TO FORM

Assistant City Attorney

3/7/19
Date

CA File: 19-000222

State of Colorado)
) ss:
County of Boulder)

The foregoing instrument was acknowledged before me by Ken Huson of the City of Longmont, this 7th day of March, 2019.

Witness my hand and official Seal.

Notary Public

DENISSE PEREZ
NOTARY PUBLIC - STATE OF COLORADO
My Identification # 20154021013
Expires May 28, 2019

My Commission expires May 28, 2019.

CUSTOMER:
AGGREGATE INDUSTRIES (US) INC.

Joel Bolduc

By: Joel Bolduc

Title: Reg. Land & Envir. Mgr

State of Colorado)
) ss:
County of Jefferson)

The foregoing instrument was acknowledged before me by Joel Bolduc,
(Name of Party Signing)

as Reg. Land & Envir. Mgr of Aggregate Industries,
(Title of Party Signing) (Name of Corporation)

a Colorado corporation, on behalf of the corporation, this
(State of incorporation)

22 day of March, 2019.

Witness my hand and official Seal.

My Commission expires 2/21/21.

Sarah Grega
Notary Public

SARAH GREGA
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20174007757
MY COMMISSION EXPIRES FEBRUARY 21, 2021

Dedication of Water Rights to the

Fredstrom Pit Substitute Water Supply Plan

Golden Land Company, LLC, as the owner of 5/12ths interest in the Zweck & Turner Ditch, hereby affirm that a pro-rata share (as pro-rata is defined below) of said water rights will be dedicated solely to the Fredstrom Pit Substitute Water Supply Plan for as long as there are depletions at this gravel pit, until such time as another replacement source is obtained, or until the associated depletions are reduced requiring less water to be dedicated. This dedication is subject to the terms & conditions of Paragraph 10 of the Purchase and Sale Agreement between Aggregate Industries- WCR, Inc & Golden Land Company, LLC dated March 13, 2018, which makes available for mining operations a pro-rata share of the water rights appurtenant to the property based on the ratio of mined acres to total farmable acres; the remaining pro-rata share of the water rights not used for mining may continue to be used for irrigation of the property. Other than as allowed by the aforementioned Purchase and Sale Agreement, the water right will not be sold, leased, or traded to others during the term of this dedication.

Dated: 4/23/19

GOLDEN LAND COMPANY, LLC

By _____
Reginald V. Golden, Manager

STATE OF COLORADO)
) ss
COUNTY OF BOULDER)

The foregoing instrument was acknowledged before me this 23rd day of April, 2019, by Reginald V. Golden as Manager of Golden Land Company, LLC.

Witness my hand and official seal.

_____
Notary Public

ROBIN A. ENGEN
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 19964014478
MY COMMISSION EXPIRES AUGUST 20, 2020

Applegate Group, Inc.

Water Resource Advisors for the West

Memorandum

Date:	May 29, 2018	AG Job No.:	06-103
To:	Christine Felz, Aggregate Industries		
From:	Jared Dains, P.E.		
Subject:	**Historical Consumptive Use Analysis on Fredstrom Property Zweck & Turner Ditch Water Rights**		

The purpose of this memorandum is to summarize the historical consumptive use analysis conducted on the Zweck & Turner Ditch water rights historically associated with the Fredstrom Property. As part of this analysis, I reviewed the following:

- Decree for Case No. 87CW221 (prior change of 199/864ths or 23.03% of the Zweck & Turner Ditch)
- Decree for Case No. 08CW275 (prior change of 5.833% of the Zweck & Turner Ditch)
- Fredstrom and Neighbors Water Rights and Operations Summary Memorandum by Thomas Kennedy of RMC, dated July 18, 2002
- Interview with Bill Hazelbush (tenant farmer) on May 14, 2018
- Interview with John Zweck (Zweck & Turner ditchrider) on May 14, 2018

Historically, 5/12ths (or approximately 41.7%) of the Zweck & Turner Ditch was associated with the Fredstrom Property. A parcel-specific evaluation was conducted with a monthly timestep using the IDSCU tool; a summary of the analysis is contained in the attached Table 1. To the extent applicable, assumptions from prior decreed changes of the Zweck & Turner Ditch were adopted in the analysis. Per Table 1, the estimated average annual consumptive use for the 5/12ths ownership is 197.4 acre-feet.

Prior Analyses

Thomas Kennedy performed a preliminary historical consumptive use analysis of the Fredstrom property water rights, including its portion of the Zweck & Turner Ditch, and summarized those findings in a July 18, 2002 memorandum. The analysis, using a 10% ditch loss and a 60% irrigation efficiency, determined that 124 acres of alfalfa, silage corn, and spring grains (barley) were irrigated, resulting in approximately 174.6 acre-feet of consumptive use per year.

In Case No. 87CW221, 23.03% of the Zweck & Turner Ditch was analyzed assuming a 10% ditch loss and 60% irrigation efficiency, resulting in 129.4 acre-feet of consumptive use per year for 23.03% of the ditch.

In Case No. 08CW275, 5.833% of the Zweck & Turner Ditch was analyzed assuming a 10% ditch loss and 60% irrigation efficiency, resulting in 64.6 acre-feet of consumptive use per year for 5.833% of the ditch.

Study Period

Diversion records for the Zweck & Turner Ditch are reported on the Colorado Decision Support System (CDSS) starting in 1950. Although the Fredstrom Property continues to be irrigated to this day, the first change of the ditch (involving almost ¼ of the water rights) was decreed in August 1995. Therefore, it is likely that the diversion record for following years is impacted by this first change of use and may not completely reflect diversions to the originally decreed uses. Therefore, a study period starting in 1950 and ending in 1995 was

used for this analysis. This 45-year study period encompasses wet, dry, and average years and therefore provides a representative estimate of the historical consumptive use of the shares in accordance with the requirements of C.R.S. §37-92-305(3)(d).

Diversions and Ditch Loss

Zweck & Turner Ditch diversions coded as "natural streamflow" to "irrigation" uses were obtained from CDSS. Total River Diversions are shown in the attached Table 2. Diversions in 1982 were not reported, so they were filled with the average of diversions during the 1950 to 1995 study period. Based on discussions with the ditchrider, it was confirmed that the fields served by the Zweck & Turner generally had plenty of water for their needs and therefore it was decided that a demand-based analysis would not be appropriate. Therefore, diversions to the Fredstrom Property were pro-rated as 5/12ths of the total river diversions. Pro-rata river diversions are shown in the attached Table 3.

All prior decreed change cases involving the Zweck & Turner Ditch have adopted a ditch loss estimate of 10%. During an interview, the ditchrider provided a ditch loss estimate of 20%. In order to be conservative towards the stream, a ditch loss rate of 20% was adopted for this analysis.

Irrigation Efficiency

Maximum irrigation efficiency is based on a variety of factors including application method, farm management, and soil types. For the Fredstrom Parcel, aerial photographs indicate that wild flood and furrow irrigation was the primary means of irrigation application. A maximum irrigation efficiency of 60% was assumed, which is reasonable for this type of irrigation method and is consistent with efficiencies assumed in prior decreed Zweck & Turner Ditch change cases. Application of the maximum irrigation efficiency to farm headgate deliveries results in the water available for crop consumption. The combined water available for both parcels is shown in the attached Table 6.

Irrigated Acreage

During an interview, Bill Hazelbush identified a current irrigated area of approximately 121.5 acres on the Fredstrom Property; this area is shown in the attached Figure 1. Digitized crop areas from 1956, 1976, and 1987 were obtained from CDSS; review of these shapefiles revealed that the irrigated area of 121.5 acres was identical in past years. Therefore, a constant irrigated area of 121.5 acres was adopted for this analysis.

During the interview, Bill Hazelbush stated that two fields, totaling 63.4 acres, were always in alfalfa. The remaining fields, totaling 58.1 acres, rotated between corn and barley. Therefore, for the purposes of this analysis half of the area was assumed to be corn and the remaining half was assumed to be spring grain (barley) throughout the study period.

A review of soil survey information revealed that the Fredstrom Property is predominantly underlain by Niwot soils, which are described as being loamy over sandy and gravelly alluvium. Therefore, a loam soil with an average water holding capacity of 1.5 inches per foot was assumed.

Crop Irrigation Requirement

Weather data was acquired from the LONGMONT 2 ESE weather station. The modified Blaney-Criddle method was used to estimate the crop irrigation water requirement using TR-21 crop coefficients. The crop irrigation water requirement has already deducted for precipitation that meets some of the crop demand. The crop irrigation water requirement for the Fredstrom Property is shown in the attached Table 7.

Consumptive Use

The consumptive use associated with crop irrigated was limited to the lesser of the water available or the crop irrigation requirement. Additional consumptive use resulted from the delivery of excess available water to the soil moisture reservoir when space was available. The consumptive use for the Fredstrom Property is shown in

the attached Table 8. On average, the Zweck & Turner Ditch water rights on the Fredstrom Property resulted in 197.4 acre-feet of consumptive use per year.

Return Flows

Return flows are the difference between farm headgate deliveries and consumptive use. The total return flows for the Fredstrom Property are shown on the attached Table 9. These return flows consist of a surface component, which return to the stream system the same month of application, and a subsurface component which accrue to the stream system in a lagged manner over a period of time. Given the Fredstrom Property's close proximity to St. Vrain Creek and it's generally water long nature, tor this analysis we assumed return flows would be split 80%/20% between surface and subsurface components. The surface and subsurface return flows for the Fredstrom Property are shown in the attached Tables 10, and 11, respectively.

To determine the timing of when subsurface returns accrued back to the stream system, the subsurface return flows were lagged back to the stream using the bounded Glover method based on the location of the parcel relative to St. Vrain Creek. The parameters required by the bounded Glover technique are as follows:

Parameter	Fredstrom Property	Source
Distance from parcel to river (X)	1,400 ft	Aerial photography
Distance from river to aquifer boundary (W)	8,700 ft	Measured to benchland near Hygiene
Transmissivity (T)	50,000 gpd/ft	Assumed
Specific Yield (S)	0.2	Assumed

Subsurface return flows were lagged using the AWAS tool. The lagged subsurface return flows for the Fredstrom Property are shown in the attached Table 12.

Return Flow Factors

In order to ensure return flows continue as they have historically accrued, return flow factors were derived which specify what percentage of future deliveries are owed as return flow obligations. For this analysis, two sets of factors were developed. The surface return flow factor is derived by dividing the average surface returns in a given month by the average farm headgate delivery; this set is applied to monthly deliveries during the irrigation season to estimate surface return flow obligations. The subsurface return flow factor is derived by dividing the average subsurface returns in a given month by the average total farm headgate delivery during the entire year; this set is applied to the total delivery during the prior year to estimate subsurface return flow obligations. The return flow factors derived from the analysis are shown on the attached Table 1.

Dry-Year Yield

During the study period, 1954, 1963, 1977, and 1994 are recognized as dry years. The average river diversion over these three years was 865 acre-feet for the 5/12ths Fredstrom Property ownership. Assuming a ditch loss of 20%, the dry-year yield (delivery at the headgate) from April through October is estimated to be as follows:

Month	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Dry-Year Yield [ac-ft]	9	182	124	150	104	86	26	10	691

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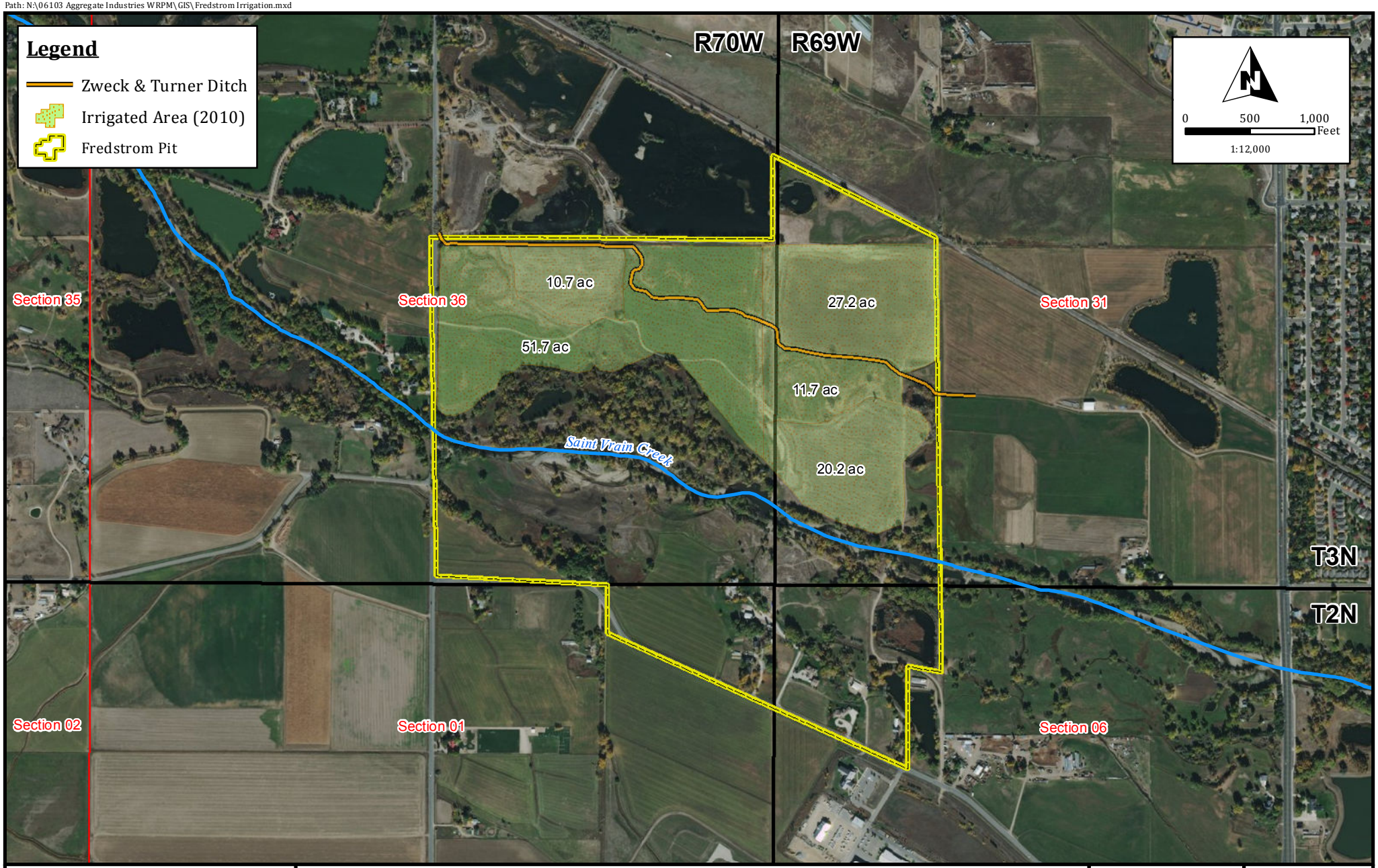

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Water Resource Advisors for the West
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FREDSTROM PROPERTY

Zweck and Turner Ditch Irrigated Area

Date: 29 May 2018

Job #: 06-103

Drawn By: JMD

Figure: 1

Of: 1

Table 1 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis 5/12ths of total ownership

Analysis Summary

All values in ac-ft unless noted otherwise

Month	Total River Diversions (A)	Pro-Rata River Diversion (B)	Ditch Loss (C)	Farm Headgate Delivery (D)	Water Available (E)	Crop Irrigation Requirement (F)	Consumptive Use (G)	Total Return Flows (H)	Surface Returns (I)	Subsurface Returns (J)	Lagged Subsurface Returns (K)	Surface Return Flow Factor (L)	Subsurface Return Flow Factor (M)
January	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0%	0.7%
February	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.85	0%	0.5%
March	0	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	3.70	0%	0.5%
April	47	19.58	3.92	15.67	9.40	3.67	2.60	13.07	10.46	2.61	3.61	66.7%	0.5%
May	347	144.57	28.91	115.65	69.39	19.69	20.53	95.13	76.10	19.03	6.76	65.8%	0.9%
June	433	180.21	36.04	144.17	86.50	47.01	46.87	97.30	77.84	19.46	10.88	54.0%	1.5%
July	521	216.98	43.40	173.59	104.15	62.35	62.76	110.83	88.66	22.17	13.72	51.1%	1.9%
August	429	178.56	35.71	142.85	85.71	42.77	42.57	100.28	80.22	20.06	15.10	56.2%	2.1%
September	257	106.98	21.40	85.59	51.35	20.26	19.53	66.06	52.84	13.21	14.06	61.7%	2.0%
October	107	44.53	8.91	35.62	21.37	3.32	2.59	33.03	26.42	6.61	12.14	74.2%	1.7%
November	12	5.18	1.04	4.14	2.49	0.00	0.00	4.14	3.31	0.83	8.73	80.0%	1.2%
December	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.42	0%	0.9%
Total	2,152	896.59	179.32	717.28	430.36	199.11	197.44	519.83	415.86	103.97	103.96		

Notes:
(A) Total river diversions; see Table 2
(B) River diversions pro-rated by number of shares; see Table 3
(C) Ditch loss assumed to be 20%; see Table 4
(D) = (B) - (C); see Table 5
(E) Maximum irrigation efficiency assumed to be 60%; see Table 6
(F) Crop irrigation requirement per IDSCU; see Table 7
(G) Consumptive use includes crop consumption and delivery to soil moisture reservoir; see Table 8
(H) = (D) - (G); see Table 9
(I) Surface returns assumed to be 80% of total returns; see Table 10
(J) Subsurface returns assumed to be 20% of total returns; see Table 11
(K) Lagged subsurface return flows based on parcel locations; see Table 12
(L) = (I) / (D) during months when deliveries are being made
(M) = (K) / Total annual farm headgate delivery

Table 2 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Total Zweck & Turner Ditch River Diversions

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0.00	0.00	0.00	19.84	277.69	418.52	483.97	523.64	277.69	0.00	0.00	0.00	2,001.35
1951	0.00	0.00	0.00	0.00	0.00	456.21	462.16	39.67	160.66	0.00	0.00	0.00	1,118.69
1952	0.00	0.00	0.00	0.00	168.60	692.24	458.19	432.40	297.53	210.25	47.60	0.00	2,306.81
1953	0.00	0.00	0.00	0.00	291.58	593.07	422.49	460.17	202.32	142.81	83.31	0.00	2,195.74
1954	0.00	0.00	0.00	45.62	606.95	543.48	559.35	293.56	234.05	0.00	0.00	0.00	2,283.01
1955	0.00	0.00	0.00	0.00	460.17	361.00	472.07	303.48	218.19	0.00	0.00	0.00	1,814.90
1956	0.00	0.00	0.00	0.00	589.10	487.94	511.74	380.83	303.48	99.18	0.00	0.00	2,372.27
1957	0.00	0.00	0.00	0.00	0.00	337.20	339.18	422.49	297.53	0.00	0.00	0.00	1,396.38
1958	0.00	0.00	0.00	0.00	0.00	412.57	460.17	410.58	261.82	176.53	0.00	0.00	1,721.68
1959	0.00	0.00	0.00	0.00	89.26	791.42	606.95	561.33	220.17	0.00	0.00	0.00	2,269.13
1960	0.00	0.00	0.00	117.03	202.32	602.98	702.16	614.89	120.99	75.37	0.00	0.00	2,435.74
1961	0.00	0.00	0.00	0.00	128.93	480.01	547.45	460.17	122.98	0.00	0.00	0.00	1,739.53
1962	0.00	0.00	0.00	79.34	547.45	406.62	416.54	535.55	202.32	0.00	0.00	0.00	2,187.80
1963	0.00	0.00	0.00	25.79	638.69	182.48	406.62	382.82	277.69	0.00	0.00	0.00	1,914.08
1964	0.00	0.00	0.00	0.00	414.55	261.82	587.12	487.94	140.83	0.00	0.00	0.00	1,892.26
1965	0.00	0.00	0.00	19.84	402.65	182.48	527.61	261.82	172.57	0.00	89.26	0.00	1,656.22
1966	0.00	0.00	0.00	188.43	458.19	240.00	678.36	396.70	156.70	41.65	0.00	0.00	2,160.03
1967	0.00	0.00	0.00	71.41	345.13	63.47	160.66	434.39	47.60	0.00	0.00	0.00	1,122.66
1968	0.00	0.00	0.00	9.92	535.55	674.39	960.01	678.36	507.78	107.11	0.00	0.00	3,473.11
1969	0.00	0.00	0.00	103.14	95.21	95.21	694.23	698.19	468.11	0.00	0.00	0.00	2,154.08
1970	0.00	0.00	0.00	0.00	483.97	1,380.52	741.83	499.84	325.29	0.00	0.00	0.00	3,431.46
1971	0.00	0.00	0.00	0.00	253.89	842.99	662.49	595.05	714.06	737.86	0.00	0.00	3,806.34
1972	0.00	0.00	0.00	297.53	390.75	172.57	549.43	341.36	19.84	119.01	0.00	0.00	1,890.47
1973	0.00	0.00	0.00	0.00	261.82	487.94	626.79	585.13	353.06	0.00	0.00	0.00	2,314.75
1974	0.00	0.00	0.00	0.00	610.92	372.90	678.36	599.02	297.53	99.18	0.00	0.00	2,657.89
1975	0.00	0.00	0.00	0.00	529.60	281.66	664.47	557.36	408.60	368.93	47.60	0.00	2,858.22
1976	0.00	0.00	0.00	166.61	295.54	525.63	553.40	474.06	255.87	152.73	23.80	0.00	2,447.64
1977	0.00	0.00	0.00	0.00	497.86	388.77	426.45	293.56	337.20	238.02	117.03	0.00	2,298.88
1978	0.00	0.00	0.00	122.98	208.27	390.75	569.26	400.67	273.72	164.63	0.00	0.00	2,130.28
1979	0.00	0.00	0.00	154.71	372.90	481.00	636.70	251.91	355.05	138.85	0.00	0.00	2,391.11
1980	0.00	0.00	0.00	11.90	247.94	618.85	557.36	376.87	315.38	271.74	0.00	0.00	2,400.04
1981	0.00	0.00	0.00	202.32	301.49	402.65	483.97	305.46	226.12	192.40	39.67	0.00	2,154.08
1982	0.00	0.00	0.00	47.00	346.97	432.50	520.76	428.54	256.76	106.86	12.43	0.00	2,151.82
1983	0.00	0.00	0.00	0.00	333.23	430.42	535.55	503.81	412.57	368.93	111.08	0.00	2,695.58
1984	0.00	0.00	0.00	0.00	428.44	474.06	684.31	702.16	357.03	103.14	0.00	0.00	2,749.13
1985	0.00	0.00	0.00	103.14	446.29	454.22	452.24	388.77	178.52	31.74	0.00	0.00	2,054.91
1986	0.00	0.00	0.00	65.46	456.21	563.31	553.40	480.01	374.88	93.23	0.00	0.00	2,586.49
1987	0.00	0.00	0.00	0.00	452.24	438.35	434.39	337.20	285.62	150.75	0.00	0.00	2,098.54
1988	0.00	0.00	0.00	35.70	406.62	434.39	315.38	307.44	178.52	184.47	0.00	0.00	1,862.51
1989	0.00	0.00	0.00	83.31	428.44	345.13	474.06	425.46	124.47	81.32	0.00	0.00	1,962.18
1990	0.00	0.00	0.00	0.00	415.54	326.29	408.60	315.38	276.70	0.00	0.00	0.00	1,742.51
1991	0.00	0.00	0.00	100.17	239.11	119.01	361.99	307.44	243.97	103.14	0.00	0.00	1,474.83
1992	0.00	0.00	0.00	39.67	367.15	368.93	464.14	364.96	154.22	94.22	0.00	0.00	1,853.28
1993	0.00	0.00	0.00	15.87	388.77	293.56	357.03	202.32	0.00	128.93	0.00	0.00	1,386.47
1994	0.00	0.00	0.00	35.27	438.93	375.72	406.52	282.71	188.93	79.86	0.00	0.00	1,807.92
1995	0.00	0.00	0.00	0.00	105.54	209.95	379.15	607.43	206.17	52.94	0.00	0.00	1,561.17
Average	0.00	0.00	0.00	47.00	346.96	432.50	520.76	428.54	256.76	106.86	12.43	0.00	2,151.83

Table 3 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis 5/12ths ownership

Pro-Rata Zweck & Turner Ditch River Diversions

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	8.26	115.7	174.38	201.66	218.18	115.7	0	0	0	833.88
1951	0	0	0	0	0	190.09	192.57	16.53	66.94	0	0	0	466.13
1952	0	0	0	0	70.25	288.43	190.91	180.17	123.97	87.6	19.83	0	961.16
1953	0	0	0	0	121.49	247.11	176.04	191.74	84.3	59.51	34.71	0	914.9
1954	0	0	0	19.01	252.9	226.45	233.06	122.32	97.52	0	0	0	951.26
1955	0	0	0	0	191.74	150.42	196.7	126.45	90.91	0	0	0	756.22
1956	0	0	0	0	245.46	203.31	213.23	158.68	126.45	41.32	0	0	988.45
1957	0	0	0	0	0	140.5	141.32	176.04	123.97	0	0	0	581.83
1958	0	0	0	0	0	171.9	191.74	171.08	109.09	73.55	0	0	717.36
1959	0	0	0	0	37.19	329.76	252.9	233.89	91.74	0	0	0	945.48
1960	0	0	0	48.76	84.3	251.24	292.57	256.2	50.41	31.41	0	0	1014.89
1961	0	0	0	0	53.72	200	228.1	191.74	51.24	0	0	0	724.8
1962	0	0	0	33.06	228.1	169.42	173.56	223.14	84.3	0	0	0	911.58
1963	0	0	0	10.74	266.12	76.03	169.42	159.51	115.7	0	0	0	797.52
1964	0	0	0	0	172.73	109.09	244.63	203.31	58.68	0	0	0	788.44
1965	0	0	0	8.26	167.77	76.03	219.84	109.09	71.9	0	37.19	0	690.08
1966	0	0	0	78.51	190.91	100	282.65	165.29	65.29	17.36	0	0	900.01
1967	0	0	0	29.75	143.8	26.45	66.94	180.99	19.83	0	0	0	467.76
1968	0	0	0	4.13	223.14	281	400.01	282.65	211.57	44.63	0	0	1447.13
1969	0	0	0	42.98	39.67	39.67	289.26	290.91	195.04	0	0	0	897.53
1970	0	0	0	0	201.66	575.22	309.1	208.27	135.54	0	0	0	1429.79
1971	0	0	0	0	105.79	351.24	276.04	247.94	297.52	307.44	0	0	1585.97
1972	0	0	0	123.97	162.81	71.9	228.93	142.23	8.26	49.59	0	0	787.69
1973	0	0	0	0	109.09	203.31	261.16	243.81	147.11	0	0	0	964.48
1974	0	0	0	0	254.55	155.37	282.65	249.59	123.97	41.32	0	0	1107.45
1975	0	0	0	0	220.66	117.36	276.86	232.24	170.25	153.72	19.83	0	1190.92
1976	0	0	0	69.42	123.14	219.01	230.58	197.52	106.61	63.64	9.92	0	1019.84
1977	0	0	0	0	207.44	161.99	177.69	122.32	140.5	99.18	48.76	0	957.88
1978	0	0	0	51.24	86.78	162.81	237.19	166.94	114.05	68.6	0	0	887.61
1979	0	0	0	64.46	155.37	200.42	265.29	104.96	147.94	57.85	0	0	996.29
1980	0	0	0	4.96	103.31	257.86	232.24	157.03	131.41	113.22	0	0	1000.03
1981	0	0	0	84.3	125.62	167.77	201.66	127.27	94.22	80.17	16.53	0	897.54
1982	0	0	0	19.58	144.57	180.21	216.98	178.56	106.98	44.53	5.18	0	896.59
1983	0	0	0	0	138.85	179.34	223.14	209.92	171.9	153.72	46.28	0	1123.15
1984	0	0	0	0	178.51	197.52	285.13	292.57	148.76	42.98	0	0	1145.47
1985	0	0	0	42.98	185.95	189.26	188.43	161.99	74.38	13.22	0	0	856.21
1986	0	0	0	27.27	190.09	234.71	230.58	200	156.2	38.84	0	0	1077.69
1987	0	0	0	0	188.43	182.65	180.99	140.5	119.01	62.81	0	0	874.39
1988	0	0	0	14.88	169.42	180.99	131.41	128.1	74.38	76.86	0	0	776.04
1989	0	0	0	34.71	178.51	143.8	197.52	177.28	51.86	33.88	0	0	817.56
1990	0	0	0	0	173.14	135.95	170.25	131.41	115.29	0	0	0	726.04
1991	0	0	0	41.74	99.63	49.59	150.83	128.1	101.65	42.98	0	0	614.52
1992	0	0	0	16.53	152.98	153.72	193.39	152.07	64.26	39.26	0	0	772.21
1993	0	0	0	6.61	161.99	122.32	148.76	84.3	0	53.72	0	0	577.7
1994	0	0	0	14.69	182.89	156.55	169.38	117.79	78.72	33.27	0	0	753.29
1995	0	0	0	0	43.98	87.48	157.98	253.09	85.9	22.06	0	0	650.49
Average	0.00	0.00	0.00	19.58	144.57	180.21	216.98	178.56	106.98	44.53	5.18	0.00	896.59

Table 4 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis 20%

Ditch Loss

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	1.65	23.14	34.88	40.33	43.64	23.14	0	0	0	166.78
1951	0	0	0	0	0	38.02	38.51	3.31	13.39	0	0	0	93.23
1952	0	0	0	0	14.05	57.69	38.18	36.03	24.79	17.52	3.97	0	192.23
1953	0	0	0	0	24.3	49.42	35.21	38.35	16.86	11.9	6.94	0	182.98
1954	0	0	0	3.8	50.58	45.29	46.61	24.46	19.5	0	0	0	190.24
1955	0	0	0	0	38.35	30.08	39.34	25.29	18.18	0	0	0	151.24
1956	0	0	0	0	49.09	40.66	42.65	31.74	25.29	8.26	0	0	197.69
1957	0	0	0	0	0	28.1	28.26	35.21	24.79	0	0	0	116.36
1958	0	0	0	0	0	34.38	38.35	34.22	21.82	14.71	0	0	143.48
1959	0	0	0	0	7.44	65.95	50.58	46.78	18.35	0	0	0	189.1
1960	0	0	0	9.75	16.86	50.25	58.51	51.24	10.08	6.28	0	0	202.97
1961	0	0	0	0	10.74	40	45.62	38.35	10.25	0	0	0	144.96
1962	0	0	0	6.61	45.62	33.88	34.71	44.63	16.86	0	0	0	182.31
1963	0	0	0	2.15	53.22	15.21	33.88	31.9	23.14	0	0	0	159.5
1964	0	0	0	0	34.55	21.82	48.93	40.66	11.74	0	0	0	157.7
1965	0	0	0	1.65	33.55	15.21	43.97	21.82	14.38	0	7.44	0	138.02
1966	0	0	0	15.7	38.18	20	56.53	33.06	13.06	3.47	0	0	180
1967	0	0	0	5.95	28.76	5.29	13.39	36.2	3.97	0	0	0	93.56
1968	0	0	0	0.83	44.63	56.2	80	56.53	42.31	8.93	0	0	289.43
1969	0	0	0	8.6	7.93	7.93	57.85	58.18	39.01	0	0	0	179.5
1970	0	0	0	0	40.33	115.04	61.82	41.65	27.11	0	0	0	285.95
1971	0	0	0	0	21.16	70.25	55.21	49.59	59.51	61.49	0	0	317.21
1972	0	0	0	24.79	32.56	14.38	45.79	28.45	1.65	9.92	0	0	157.54
1973	0	0	0	0	21.82	40.66	52.23	48.76	29.42	0	0	0	192.89
1974	0	0	0	0	50.91	31.07	56.53	49.92	24.79	8.26	0	0	221.48
1975	0	0	0	0	44.13	23.47	55.37	46.45	34.05	30.74	3.97	0	238.18
1976	0	0	0	13.88	24.63	43.8	46.12	39.5	21.32	12.73	1.98	0	203.96
1977	0	0	0	0	41.49	32.4	35.54	24.46	28.1	19.83	9.75	0	191.57
1978	0	0	0	10.25	17.36	32.56	47.44	33.39	22.81	13.72	0	0	177.53
1979	0	0	0	12.89	31.07	40.08	53.06	20.99	29.59	11.57	0	0	199.25
1980	0	0	0	0.99	20.66	51.57	46.45	31.41	26.28	22.65	0	0	200.01
1981	0	0	0	16.86	25.12	33.55	40.33	25.45	18.84	16.03	3.31	0	179.49
1982	0	0	0	3.92	28.91	36.04	43.4	35.71	21.4	8.91	1.04	0	179.33
1983	0	0	0	0	27.77	35.87	44.63	41.98	34.38	30.74	9.26	0	224.63
1984	0	0	0	0	35.7	39.5	57.03	58.51	29.75	8.6	0	0	229.09
1985	0	0	0	8.6	37.19	37.85	37.69	32.4	14.88	2.64	0	0	171.25
1986	0	0	0	5.45	38.02	46.94	46.12	40	31.24	7.77	0	0	215.54
1987	0	0	0	0	37.69	36.53	36.2	28.1	23.8	12.56	0	0	174.88
1988	0	0	0	2.98	33.88	36.2	26.28	25.62	14.88	15.37	0	0	155.21
1989	0	0	0	6.94	35.7	28.76	39.5	35.46	10.37	6.78	0	0	163.51
1990	0	0	0	0	34.63	27.19	34.05	26.28	23.06	0	0	0	145.21
1991	0	0	0	8.35	19.93	9.92	30.17	25.62	20.33	8.6	0	0	122.92
1992	0	0	0	3.31	30.6	30.74	38.68	30.41	12.85	7.85	0	0	154.44
1993	0	0	0	1.32	32.4	24.46	29.75	16.86	0	10.74	0	0	115.53
1994	0	0	0	2.94	36.58	31.31	33.88	23.56	15.74	6.65	0	0	150.66
1995	0	0	0	0	8.8	17.5	31.6	50.62	17.18	4.41	0	0	130.11
Average	0.00	0.00	0.00	3.92	28.91	36.04	43.40	35.71	21.40	8.91	1.04	0.00	179.32

Table 5 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Farm Headgate Delivery

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	6.61	92.56	139.51	161.32	174.55	92.56	0	0	0	667.11
1951	0	0	0	0	0	152.07	154.05	13.22	53.55	0	0	0	372.89
1952	0	0	0	0	56.2	230.75	152.73	144.13	99.18	70.08	15.87	0	768.94
1953	0	0	0	0	97.19	197.69	140.83	153.39	67.44	47.6	27.77	0	731.91
1954	0	0	0	15.21	202.32	181.16	186.45	97.85	78.02	0	0	0	761.01
1955	0	0	0	0	153.39	120.33	157.36	101.16	72.73	0	0	0	604.97
1956	0	0	0	0	196.37	162.65	170.58	126.94	101.16	33.06	0	0	790.76
1957	0	0	0	0	0	112.4	113.06	140.83	99.18	0	0	0	465.47
1958	0	0	0	0	0	137.52	153.39	136.86	87.27	58.84	0	0	573.88
1959	0	0	0	0	29.75	263.81	202.32	187.11	73.39	0	0	0	756.38
1960	0	0	0	39.01	67.44	200.99	234.05	204.96	40.33	25.12	0	0	811.9
1961	0	0	0	0	42.98	160	182.48	153.39	40.99	0	0	0	579.84
1962	0	0	0	26.45	182.48	135.54	138.85	178.51	67.44	0	0	0	729.27
1963	0	0	0	8.6	212.9	60.83	135.54	127.61	92.56	0	0	0	638.04
1964	0	0	0	0	138.18	87.27	195.71	162.65	46.94	0	0	0	630.75
1965	0	0	0	6.61	134.22	60.83	175.87	87.27	57.52	0	29.75	0	552.07
1966	0	0	0	62.81	152.73	80	226.12	132.23	52.23	13.88	0	0	720
1967	0	0	0	23.8	115.04	21.16	53.55	144.8	15.87	0	0	0	374.22
1968	0	0	0	3.31	178.51	224.8	320	226.12	169.26	35.7	0	0	1157.7
1969	0	0	0	34.38	31.74	31.74	231.41	232.73	156.04	0	0	0	718.04
1970	0	0	0	0	161.32	460.17	247.28	166.61	108.43	0	0	0	1143.81
1971	0	0	0	0	84.63	281	220.83	198.35	238.02	245.95	0	0	1268.78
1972	0	0	0	99.18	130.25	57.52	183.14	113.79	6.61	39.67	0	0	630.16
1973	0	0	0	0	87.27	162.65	208.93	195.04	117.69	0	0	0	771.58
1974	0	0	0	0	203.64	124.3	226.12	199.67	99.18	33.06	0	0	885.97
1975	0	0	0	0	176.53	93.89	221.49	185.79	136.2	122.98	15.87	0	952.75
1976	0	0	0	55.54	98.51	175.21	184.47	158.02	85.29	50.91	7.93	0	815.88
1977	0	0	0	0	165.95	129.59	142.15	97.85	112.4	79.34	39.01	0	766.29
1978	0	0	0	40.99	69.42	130.25	189.75	133.56	91.24	54.88	0	0	710.09
1979	0	0	0	51.57	124.3	160.33	212.23	83.97	118.35	46.28	0	0	797.03
1980	0	0	0	3.97	82.65	206.28	185.79	125.62	105.13	90.58	0	0	800.02
1981	0	0	0	67.44	100.5	134.22	161.32	101.82	75.37	64.13	13.22	0	718.02
1982	0	0	0	15.67	115.65	144.17	173.59	142.85	85.59	35.62	4.14	0	717.28
1983	0	0	0	0	111.08	143.47	178.51	167.94	137.52	122.98	37.03	0	898.53
1984	0	0	0	0	142.81	158.02	228.1	234.05	119.01	34.38	0	0	916.37
1985	0	0	0	34.38	148.76	151.41	150.75	129.59	59.51	10.58	0	0	684.98
1986	0	0	0	21.82	152.07	187.77	184.47	160	124.96	31.08	0	0	862.17
1987	0	0	0	0	150.75	146.12	144.8	112.4	95.21	50.25	0	0	699.53
1988	0	0	0	11.9	135.54	144.8	105.13	102.48	59.51	61.49	0	0	620.85
1989	0	0	0	27.77	142.81	115.04	158.02	141.82	41.49	27.11	0	0	654.06
1990	0	0	0	0	138.51	108.76	136.2	105.13	92.23	0	0	0	580.83
1991	0	0	0	33.39	79.7	39.67	120.66	102.48	81.32	34.38	0	0	491.6
1992	0	0	0	13.22	122.38	122.98	154.71	121.65	51.41	31.41	0	0	617.76
1993	0	0	0	5.29	129.59	97.85	119.01	67.44	0	42.98	0	0	462.16
1994	0	0	0	11.76	146.31	125.24	135.51	94.24	62.98	26.62	0	0	602.66
1995	0	0	0	0	35.18	69.98	126.38	202.48	68.72	17.65	0	0	520.39
Average	0.00	0.00	0.00	15.67	115.65	144.17	173.59	142.85	85.59	35.62	4.14	0.00	717.28

Table 6 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Water Available for Consumptive Use 60%

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	3.97	55.54	83.7	96.79	104.73	55.54	0	0	0	400.27
1951	0	0	0	0	0	91.24	92.43	7.93	32.13	0	0	0	223.73
1952	0	0	0	0	33.72	138.45	91.64	86.48	59.51	42.05	9.52	0	461.37
1953	0	0	0	0	58.31	118.61	84.5	92.03	40.46	28.56	16.66	0	439.13
1954	0	0	0	9.12	121.39	108.7	111.87	58.71	46.81	0	0	0	456.6
1955	0	0	0	0	92.03	72.2	94.41	60.7	43.64	0	0	0	362.98
1956	0	0	0	0	117.82	97.59	102.35	76.17	60.7	19.83	0	0	474.46
1957	0	0	0	0	0	67.44	67.84	84.5	59.51	0	0	0	279.29
1958	0	0	0	0	0	82.51	92.03	82.12	52.36	35.31	0	0	344.33
1959	0	0	0	0	17.85	158.28	121.39	112.27	44.03	0	0	0	453.82
1960	0	0	0	23.41	40.46	120.6	140.43	122.98	24.2	15.07	0	0	487.15
1961	0	0	0	0	25.79	96	109.49	92.03	24.6	0	0	0	347.91
1962	0	0	0	15.87	109.49	81.32	83.31	107.11	40.46	0	0	0	437.56
1963	0	0	0	5.16	127.74	36.5	81.32	76.56	55.54	0	0	0	382.82
1964	0	0	0	0	82.91	52.36	117.42	97.59	28.17	0	0	0	378.45
1965	0	0	0	3.97	80.53	36.5	105.52	52.36	34.51	0	17.85	0	331.24
1966	0	0	0	37.69	91.64	48	135.67	79.34	31.34	8.33	0	0	432.01
1967	0	0	0	14.28	69.03	12.69	32.13	86.88	9.52	0	0	0	224.53
1968	0	0	0	1.98	107.11	134.88	192	135.67	101.56	21.42	0	0	694.62
1969	0	0	0	20.63	19.04	19.04	138.85	139.64	93.62	0	0	0	430.82
1970	0	0	0	0	96.79	276.1	148.37	99.97	65.06	0	0	0	686.29
1971	0	0	0	0	50.78	168.6	132.5	119.01	142.81	147.57	0	0	761.27
1972	0	0	0	59.51	78.15	34.51	109.89	68.27	3.97	23.8	0	0	378.1
1973	0	0	0	0	52.36	97.59	125.36	117.03	70.61	0	0	0	462.95
1974	0	0	0	0	122.18	74.58	135.67	119.8	59.51	19.83	0	0	531.57
1975	0	0	0	0	105.92	56.33	132.89	111.47	81.72	73.79	9.52	0	571.64
1976	0	0	0	33.32	59.11	105.13	110.68	94.81	51.17	30.55	4.76	0	489.53
1977	0	0	0	0	99.57	77.75	85.29	58.71	67.44	47.6	23.41	0	459.77
1978	0	0	0	24.6	41.65	78.15	113.85	80.13	54.74	32.93	0	0	426.05
1979	0	0	0	30.94	74.58	96.2	127.34	50.38	71.01	27.77	0	0	478.22
1980	0	0	0	2.38	49.59	123.77	111.47	75.37	63.08	54.35	0	0	480.01
1981	0	0	0	40.46	60.3	80.53	96.79	61.09	45.22	38.48	7.93	0	430.8
1982	0	0	0	9.4	69.39	86.5	104.15	85.71	51.35	21.37	2.49	0	430.36
1983	0	0	0	0	66.65	86.08	107.11	100.76	82.51	73.79	22.22	0	539.12
1984	0	0	0	0	85.69	94.81	136.86	140.43	71.41	20.63	0	0	549.83
1985	0	0	0	20.63	89.26	90.84	90.45	77.75	35.7	6.35	0	0	410.98
1986	0	0	0	13.09	91.24	112.66	110.68	96	74.98	18.65	0	0	517.3
1987	0	0	0	0	90.45	87.67	86.88	67.44	57.12	30.15	0	0	419.71
1988	0	0	0	7.14	81.32	86.88	63.08	61.49	35.7	36.89	0	0	372.5
1989	0	0	0	16.66	85.69	69.03	94.81	85.09	24.89	16.26	0	0	392.43
1990	0	0	0	0	83.11	65.26	81.72	63.08	55.34	0	0	0	348.51
1991	0	0	0	20.03	47.82	23.8	72.4	61.49	48.79	20.63	0	0	294.96
1992	0	0	0	7.93	73.43	73.79	92.83	72.99	30.84	18.84	0	0	370.65
1993	0	0	0	3.17	77.75	58.71	71.41	40.46	0	25.79	0	0	277.29
1994	0	0	0	7.05	87.79	75.14	81.3	56.54	37.79	15.97	0	0	361.58
1995	0	0	0	0	21.11	41.99	75.83	121.49	41.23	10.59	0	0	312.24
Average	0.00	0.00	0.00	9.40	69.39	86.50	104.15	85.71	51.35	21.37	2.49	0.00	430.36

Table 7 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Crop Irrigation Requirement

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	0	12.79	48.03	59.97	44.11	21.76	2.47	0	0	189.13
1951	0	0	0	0.05	17.36	33.33	67.5	31.82	20.49	1.3	0	0	171.85
1952	0	0	0	4.41	15.55	63.31	70.11	42.13	27.3	2.18	0	0	224.99
1953	0	0	0	0.04	8.86	57.33	57.08	49.41	32.12	2.79	0	0	207.63
1954	0	0	0	12.16	31.1	63.19	63.32	48.75	21.47	5.7	0	0	245.69
1955	0	0	0	8.22	26.95	46.41	63.45	42.75	20.57	2.94	0	0	211.29
1956	0	0	0	3.13	26.19	66.77	52.94	34.72	27.75	6.06	0	0	217.56
1957	0	0	0	0	0	43.33	73.79	43.56	20.55	5.15	0	0	186.38
1958	0	0	0	2.19	7.88	48.92	56.34	49.25	24.81	0.43	0	0	189.82
1959	0	0	0	0	11.91	59.86	66.13	52.41	14.86	0.38	0	0	205.55
1960	0	0	0	5.51	9.5	55.89	64.66	49.32	28.08	4.4	0	0	217.36
1961	0	0	0	1.71	5.57	45.36	63.18	42.41	4.25	0	0	0	162.48
1962	0	0	0	8.87	28.06	41.72	53.63	43.36	20.8	7.07	0	0	203.51
1963	0	0	0	11.33	40.84	31.03	69.56	34.34	22.56	13.35	0.22	0	223.23
1964	0	0	0	2.66	23.91	44.07	78.67	45.15	23.89	0	0	0	218.35
1965	0	0	0	5.16	17.26	37.47	48.98	41.34	6.38	0	0	0	156.59
1966	0	0	0	3	32.39	43.02	75.33	45.96	19.44	0.46	0	0	219.6
1967	0	0	0.14	0.64	16.03	13.95	35.07	38.61	25.56	5.91	0	0	135.91
1968	0	0	0	0	17.34	52.66	68.98	36.16	24.04	3.38	0	0	202.56
1969	0	0	0	9.76	10.54	22.77	68.84	46.47	26.15	0	0	0	184.53
1970	0	0	0	1.49	33.96	30.14	64.65	54.71	8.61	2.24	0	0	195.8
1971	0	0	0	0.07	25.72	65.43	58.61	53.74	4.85	0	0	0	208.42
1972	0	0	0.31	3.41	32.94	42.43	51.96	35.81	21.62	7.14	0	0	195.62
1973	0	0	0	0	6.74	59.42	67	57.86	11.98	4.34	0	0	207.34
1974	0	0	0	1.87	41.81	39.54	60.71	42.42	16.51	4.98	0	0	207.84
1975	0	0	0	0	8.21	45.35	68.57	43.92	21.36	6.14	0	0	193.55
1976	0	0	0	3.95	22.44	48.78	59.94	39.78	10.01	4.15	0	0	189.05
1977	0	0	0	3.03	36.32	59.68	65.06	40.95	28.41	5.04	0	0	238.49
1978	0	0	0.04	6.23	0	50.86	66.8	39.48	29.68	3.79	0	0	196.88
1979	0	0	0	2.3	6.97	38.44	68.71	23.57	29.32	7.71	0	0	177.02
1980	0	0	0	0.51	6.56	68.19	74.33	47.87	28.95	6.7	0	0	233.11
1981	0	0	0	13.85	14.78	69.48	59.4	45.19	23.69	6.65	0	0	233.04
1982	0	0	0	7.61	11.94	34.8	55.11	46.22	13.34	3.28	0	0	172.3
1983	0	0	0	0	2.14	30.56	57.92	53.69	23.44	0	0	0	167.75
1984	0	0	0	0.57	31.93	47.17	61.93	41.96	20.35	0	0	0	203.91
1985	0	0	0	5.47	35.89	49.55	52.56	50.77	14.56	0	0	0	208.8
1986	0	0	0.65	1.18	23.81	46.22	54.05	43.27	22.23	2.52	0	0	193.93
1987	0	0	0	7.18	24.92	46.93	68.01	40.51	22.07	3.16	0	0	212.78
1988	0	0	0	5.81	21.19	62.29	65.25	37.57	16.65	0	0	0	208.76
1989	0	0	0	3.13	22.46	34.63	77.86	38.44	13.24	5.18	0	0	194.94
1990	0	0	0	1.77	16.58	64.43	55.93	36.3	23.74	3.71	0	0	202.46
1991	0	0	0	5.14	28.74	44.11	55.31	32.07	18.34	1.57	0	0	185.28
1992	0	0	0	11.06	30.29	43.11	46.47	16.94	26.34	3.77	0	0	177.98
1993	0	0	0	1.82	25.18	39.69	60.32	38	7.4	0	0	0	172.41
1994	0	0	0	2.34	34.38	61.45	62.67	45.15	26.61	6.82	0	0	239.42
1995	0	0	0	0	0	21.42	71.62	59.38	15.61	0	0	0	168.03
Average	0.00	0.00	0.02	3.67	19.69	47.01	62.35	42.77	20.26	3.32	0.00	0.00	199.11

Table 8 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Consumptive Use

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	0	12.79	48.03	59.97	44.11	21.76	0	0	0	186.66
1951	0	0	0	0	0	50.74	67.5	7.93	32.13	0	0	0	158.3
1952	0	0	0	0	22.87	63.31	70.11	42.13	27.3	2.18	0	0	227.9
1953	0	0	0	0	8.91	57.33	57.08	49.41	32.12	2.79	0	0	207.64
1954	0	0	0	9.12	34.14	63.19	63.32	48.75	21.47	0	0	0	239.99
1955	0	0	0	0	35.17	46.41	63.45	42.75	20.57	0	0	0	208.35
1956	0	0	0	0	29.32	66.77	52.94	34.72	27.75	6.06	0	0	217.56
1957	0	0	0	0	0	43.33	67.84	49.52	20.55	0	0	0	181.24
1958	0	0	0	0	0	58.99	56.34	49.25	24.81	0.43	0	0	189.82
1959	0	0	0	0	11.91	59.86	66.13	52.41	14.86	0	0	0	205.17
1960	0	0	0	5.51	9.5	55.89	64.66	49.32	24.2	7.38	0	0	216.46
1961	0	0	0	0	7.27	45.36	63.18	42.41	4.25	0	0	0	162.47
1962	0	0	0	8.87	28.06	41.72	53.63	43.36	20.8	0	0	0	196.44
1963	0	0	0	5.16	47.01	31.03	69.56	34.34	22.56	0	0	0	209.66
1964	0	0	0	0	35.78	44.07	78.67	45.15	23.89	0	0	0	227.56
1965	0	0	0	3.97	18.46	36.5	49.95	41.34	6.38	0	0	0	156.6
1966	0	0	0	3	32.39	43.02	75.33	45.96	19.44	0.46	0	0	219.6
1967	0	0	0	0.64	16.03	12.69	32.13	42.79	9.52	0	0	0	113.8
1968	0	0	0	1.98	19.2	52.66	68.98	36.16	24.04	3.38	0	0	206.4
1969	0	0	0	9.76	10.54	19.04	72.57	46.47	26.15	0	0	0	184.53
1970	0	0	0	0	35.45	30.14	64.65	54.71	8.61	0	0	0	193.56
1971	0	0	0	0	25.79	65.43	58.61	53.74	4.85	0	0	0	208.42
1972	0	0	0	3.72	32.94	34.51	59.87	35.81	3.97	23.8	0	0	194.62
1973	0	0	0	0	6.74	59.42	67.01	57.86	11.98	0	0	0	203.01
1974	0	0	0	0	43.68	39.54	60.71	42.42	16.51	4.98	0	0	207.84
1975	0	0	0	0	8.21	45.35	68.57	43.92	21.36	6.14	0	0	193.55
1976	0	0	0	3.95	22.44	48.78	59.94	39.78	10.01	4.15	0	0	189.05
1977	0	0	0	0	39.35	59.68	65.06	40.95	28.41	5.04	0	0	238.49
1978	0	0	0	6.26	0	50.86	66.8	39.48	29.68	3.79	0	0	196.87
1979	0	0	0	2.3	6.97	38.44	68.71	23.57	29.32	7.71	0	0	177.02
1980	0	0	0	0.51	6.56	68.19	74.33	47.87	28.95	6.7	0	0	233.11
1981	0	0	0	13.85	14.78	69.48	59.4	45.19	23.69	6.65	0	0	233.04
1982	0	0	0	7.61	11.94	34.8	55.11	46.22	13.34	3.28	0	0	172.3
1983	0	0	0	0	2.14	30.56	57.92	53.69	23.44	0	0	0	167.75
1984	0	0	0	0	32.5	47.17	61.93	41.96	20.35	0	0	0	203.91
1985	0	0	0	5.47	35.89	49.55	52.56	50.77	14.56	0	0	0	208.8
1986	0	0	0	1.58	23.81	46.22	54.05	43.27	22.23	2.52	0	0	193.68
1987	0	0	0	0	32.1	46.93	68.01	40.51	22.07	3.16	0	0	212.78
1988	0	0	0	5.81	21.19	62.29	63.08	39.74	16.65	0	0	0	208.76
1989	0	0	0	3.13	22.46	34.63	77.86	38.44	13.24	5.18	0	0	194.94
1990	0	0	0	0	18.35	64.43	55.93	36.3	23.74	0	0	0	198.75
1991	0	0	0	5.14	28.74	23.8	72.4	34.16	18.34	1.57	0	0	184.15
1992	0	0	0	7.93	33.42	43.11	46.47	16.94	26.34	3.77	0	0	177.98
1993	0	0	0	1.82	25.18	39.69	60.32	38	0	1.39	0	0	166.4
1994	0	0	0	2.34	34.38	61.45	62.67	45.15	26.61	6.82	0	0	239.42
1995	0	0	0	0	0	21.42	71.62	59.38	15.61	0	0	0	168.03
Average	0.00	0.00	0.00	2.60	20.53	46.87	62.76	42.57	19.53	2.59	0.00	0.00	197.44

Table 9 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Total Return Flows

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0	0	0	6.61	79.77	91.47	101.36	130.43	70.8	0	0	0	480.44
1951	0	0	0	0	0	101.33	86.55	5.29	21.42	0	0	0	214.59
1952	0	0	0	0	33.33	167.44	82.62	102	71.87	67.9	15.87	0	541.03
1953	0	0	0	0	88.29	140.36	83.75	103.98	35.32	44.82	27.77	0	524.29
1954	0	0	0	6.08	168.18	117.97	123.13	49.1	56.55	0	0	0	521.01
1955	0	0	0	0	118.22	73.92	93.91	58.41	52.15	0	0	0	396.61
1956	0	0	0	0	167.05	95.87	117.64	92.22	73.41	27	0	0	573.19
1957	0	0	0	0	0	69.07	45.22	91.31	78.63	0	0	0	284.23
1958	0	0	0	0	0	78.53	97.05	87.61	62.47	58.41	0	0	384.07
1959	0	0	0	0	17.84	203.95	136.19	134.7	58.53	0	0	0	551.21
1960	0	0	0	33.5	57.94	145.11	169.39	155.64	16.13	17.75	0	0	595.46
1961	0	0	0	0	35.7	114.64	119.3	110.98	36.75	0	0	0	417.37
1962	0	0	0	17.57	154.42	93.82	85.21	135.16	46.64	0	0	0	532.82
1963	0	0	0	3.44	165.89	29.8	65.98	93.26	70.01	0	0	0	428.38
1964	0	0	0	0	102.4	43.2	117.04	117.5	23.05	0	0	0	403.19
1965	0	0	0	2.64	115.76	24.33	125.92	45.93	51.14	0	29.75	0	395.47
1966	0	0	0	59.81	120.34	36.98	150.79	86.27	32.79	13.42	0	0	500.4
1967	0	0	0	23.16	99.01	8.46	21.42	102	6.35	0	0	0	260.4
1968	0	0	0	1.32	159.32	172.13	251.03	189.96	145.22	32.32	0	0	951.3
1969	0	0	0	24.62	21.2	12.69	158.83	186.26	129.88	0	0	0	533.48
1970	0	0	0	0	125.88	430.04	182.63	111.9	99.82	0	0	0	950.27
1971	0	0	0	0	58.84	215.57	162.22	144.61	233.17	245.95	0	0	1060.36
1972	0	0	0	95.46	97.31	23.01	123.27	77.97	2.64	15.87	0	0	435.53
1973	0	0	0	0	80.53	103.23	141.92	137.18	105.71	0	0	0	568.57
1974	0	0	0	0	159.96	84.75	165.41	157.25	82.67	28.08	0	0	678.12
1975	0	0	0	0	168.33	48.54	152.92	141.86	114.84	116.83	15.87	0	759.19
1976	0	0	0	51.59	76.07	126.43	124.53	118.24	75.28	46.76	7.93	0	626.83
1977	0	0	0	0	126.6	69.91	77.09	56.91	83.99	74.3	39.01	0	527.81
1978	0	0	0	34.73	69.42	79.39	122.96	94.07	61.56	51.09	0	0	513.22
1979	0	0	0	49.27	117.33	121.89	143.52	60.4	89.03	38.58	0	0	620.02
1980	0	0	0	3.45	76.09	138.09	111.45	77.76	76.18	83.88	0	0	566.9
1981	0	0	0	53.59	85.72	64.74	101.92	56.63	51.68	57.49	13.22	0	484.99
1982	0	0	0	8.06	103.71	109.36	118.47	96.63	72.25	32.34	4.14	0	544.96
1983	0	0	0	0	108.94	112.91	120.59	114.25	114.08	122.98	37.03	0	730.78
1984	0	0	0	0	110.31	110.84	166.18	192.09	98.66	34.38	0	0	712.46
1985	0	0	0	28.91	112.87	101.86	98.19	78.82	44.95	10.58	0	0	476.18
1986	0	0	0	20.24	128.26	141.56	130.41	116.73	102.73	28.56	0	0	668.49
1987	0	0	0	0	118.65	99.19	76.78	71.89	73.13	47.09	0	0	486.73
1988	0	0	0	6.09	114.35	82.51	42.05	62.74	42.85	61.49	0	0	412.08
1989	0	0	0	24.64	120.35	80.41	80.16	103.38	28.25	21.92	0	0	459.11
1990	0	0	0	0	120.16	44.33	80.27	68.82	68.49	0	0	0	382.07
1991	0	0	0	28.25	50.96	15.87	48.27	68.32	62.98	32.81	0	0	307.46
1992	0	0	0	5.29	88.97	79.87	108.24	104.72	25.06	27.63	0	0	439.78
1993	0	0	0	3.47	104.41	58.16	58.69	29.44	0	41.59	0	0	295.76
1994	0	0	0	9.42	111.93	63.79	72.84	49.08	36.36	19.8	0	0	363.22
1995	0	0	0	0	35.18	48.57	54.76	143.09	53.11	17.65	0	0	352.36
Average	0.00	0.00	0.00	13.07	95.13	97.30	110.83	100.28	66.06	33.03	4.14	0.00	519.83

Table 10 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Surface Return Flows 80% of total

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0.00	0.00	0.00	5.29	63.82	73.18	81.09	104.34	56.64	0.00	0.00	0.00	384.35
1951	0.00	0.00	0.00	0.00	0.00	81.06	69.24	4.23	17.14	0.00	0.00	0.00	171.67
1952	0.00	0.00	0.00	0.00	26.66	133.95	66.10	81.60	57.50	54.32	12.70	0.00	432.82
1953	0.00	0.00	0.00	0.00	70.63	112.29	67.00	83.18	28.26	35.86	22.22	0.00	419.43
1954	0.00	0.00	0.00	4.86	134.54	94.38	98.50	39.28	45.24	0.00	0.00	0.00	416.81
1955	0.00	0.00	0.00	0.00	94.58	59.14	75.13	46.73	41.72	0.00	0.00	0.00	317.29
1956	0.00	0.00	0.00	0.00	133.64	76.70	94.11	73.78	58.73	21.60	0.00	0.00	458.55
1957	0.00	0.00	0.00	0.00	0.00	55.26	36.18	73.05	62.90	0.00	0.00	0.00	227.38
1958	0.00	0.00	0.00	0.00	0.00	62.82	77.64	70.09	49.98	46.73	0.00	0.00	307.26
1959	0.00	0.00	0.00	0.00	14.27	163.16	108.95	107.76	46.82	0.00	0.00	0.00	440.97
1960	0.00	0.00	0.00	26.80	46.35	116.09	135.51	124.51	12.90	14.20	0.00	0.00	476.37
1961	0.00	0.00	0.00	0.00	28.56	91.71	95.44	88.78	29.40	0.00	0.00	0.00	333.90
1962	0.00	0.00	0.00	14.06	123.54	75.06	68.17	108.13	37.31	0.00	0.00	0.00	426.26
1963	0.00	0.00	0.00	2.75	132.71	23.84	52.78	74.61	56.01	0.00	0.00	0.00	342.70
1964	0.00	0.00	0.00	0.00	81.92	34.56	93.63	94.00	18.44	0.00	0.00	0.00	322.55
1965	0.00	0.00	0.00	2.11	92.61	19.46	100.74	36.74	40.91	0.00	23.80	0.00	316.38
1966	0.00	0.00	0.00	47.85	96.27	29.58	120.63	69.02	26.23	10.74	0.00	0.00	400.32
1967	0.00	0.00	0.00	18.53	79.21	6.77	17.14	81.60	5.08	0.00	0.00	0.00	208.32
1968	0.00	0.00	0.00	1.06	127.46	137.70	200.82	151.97	116.18	25.86	0.00	0.00	761.04
1969	0.00	0.00	0.00	19.70	16.96	10.15	127.06	149.01	103.90	0.00	0.00	0.00	426.78
1970	0.00	0.00	0.00	0.00	100.70	344.03	146.10	89.52	79.86	0.00	0.00	0.00	760.22
1971	0.00	0.00	0.00	0.00	47.07	172.46	129.78	115.69	186.54	196.76	0.00	0.00	848.29
1972	0.00	0.00	0.00	76.37	77.85	18.41	98.62	62.38	2.11	12.70	0.00	0.00	348.42
1973	0.00	0.00	0.00	0.00	64.42	82.58	113.54	109.74	84.57	0.00	0.00	0.00	454.86
1974	0.00	0.00	0.00	0.00	127.97	67.80	132.33	125.80	66.14	22.46	0.00	0.00	542.50
1975	0.00	0.00	0.00	0.00	134.66	38.83	122.34	113.49	91.87	93.46	12.70	0.00	607.35
1976	0.00	0.00	0.00	41.27	60.86	101.14	99.62	94.59	60.22	37.41	6.34	0.00	501.46
1977	0.00	0.00	0.00	0.00	101.28	55.93	61.67	45.53	67.19	59.44	31.21	0.00	422.25
1978	0.00	0.00	0.00	27.78	55.54	63.51	98.37	75.26	49.25	40.87	0.00	0.00	410.58
1979	0.00	0.00	0.00	39.42	93.86	97.51	114.82	48.32	71.22	30.86	0.00	0.00	496.02
1980	0.00	0.00	0.00	2.76	60.87	110.47	89.16	62.21	60.94	67.10	0.00	0.00	453.52
1981	0.00	0.00	0.00	42.87	68.58	51.79	81.54	45.30	41.34	45.99	10.58	0.00	387.99
1982	0.00	0.00	0.00	6.45	82.97	87.49	94.78	77.30	57.80	25.87	3.31	0.00	435.97
1983	0.00	0.00	0.00	0.00	87.15	90.33	96.47	91.40	91.26	98.38	29.62	0.00	584.62
1984	0.00	0.00	0.00	0.00	88.25	88.67	132.94	153.67	78.93	27.50	0.00	0.00	569.97
1985	0.00	0.00	0.00	23.13	90.30	81.49	78.55	63.06	35.96	8.46	0.00	0.00	380.94
1986	0.00	0.00	0.00	16.19	102.61	113.25	104.33	93.38	82.18	22.85	0.00	0.00	534.79
1987	0.00	0.00	0.00	0.00	94.92	79.35	61.42	57.51	58.50	37.67	0.00	0.00	389.38
1988	0.00	0.00	0.00	4.87	91.48	66.01	33.64	50.19	34.28	49.19	0.00	0.00	329.66
1989	0.00	0.00	0.00	19.71	96.28	64.33	64.13	82.70	22.60	17.54	0.00	0.00	367.29
1990	0.00	0.00	0.00	0.00	96.13	35.46	64.22	55.06	54.79	0.00	0.00	0.00	305.66
1991	0.00	0.00	0.00	22.60	40.77	12.70	38.62	54.66	50.38	26.25	0.00	0.00	245.97
1992	0.00	0.00	0.00	4.23	71.18	63.90	86.59	83.78	20.05	22.10	0.00	0.00	351.82
1993	0.00	0.00	0.00	2.78	83.53	46.53	46.95	23.55	0.00	33.27	0.00	0.00	236.61
1994	0.00	0.00	0.00	7.54	89.54	51.03	58.27	39.26	29.09	15.84	0.00	0.00	290.58
1995	0.00	0.00	0.00	0.00	28.14	38.86	43.81	114.47	42.49	14.12	0.00	0.00	281.89
Average	0.00	0.00	0.00	10.46	76.10	77.84	88.66	80.22	52.84	26.42	3.31	0.00	415.86

Table 11 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Unlagged Subsurface Return Flows 20% of total

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	0.00	0.00	0.00	1.32	15.95	18.29	20.27	26.09	14.16	0.00	0.00	0.00	96.09
1951	0.00	0.00	0.00	0.00	0.00	20.27	17.31	1.06	4.28	0.00	0.00	0.00	42.92
1952	0.00	0.00	0.00	0.00	6.67	33.49	16.52	20.40	14.37	13.58	3.17	0.00	108.21
1953	0.00	0.00	0.00	0.00	17.66	28.07	16.75	20.80	7.06	8.96	5.55	0.00	104.86
1954	0.00	0.00	0.00	1.22	33.64	23.59	24.63	9.82	11.31	0.00	0.00	0.00	104.20
1955	0.00	0.00	0.00	0.00	23.64	14.78	18.78	11.68	10.43	0.00	0.00	0.00	79.32
1956	0.00	0.00	0.00	0.00	33.41	19.17	23.53	18.44	14.68	5.40	0.00	0.00	114.64
1957	0.00	0.00	0.00	0.00	0.00	13.81	9.04	18.26	15.73	0.00	0.00	0.00	56.85
1958	0.00	0.00	0.00	0.00	0.00	15.71	19.41	17.52	12.49	11.68	0.00	0.00	76.81
1959	0.00	0.00	0.00	0.00	3.57	40.79	27.24	26.94	11.71	0.00	0.00	0.00	110.24
1960	0.00	0.00	0.00	6.70	11.59	29.02	33.88	31.13	3.23	3.55	0.00	0.00	119.09
1961	0.00	0.00	0.00	0.00	7.14	22.93	23.86	22.20	7.35	0.00	0.00	0.00	83.47
1962	0.00	0.00	0.00	3.51	30.88	18.76	17.04	27.03	9.33	0.00	0.00	0.00	106.56
1963	0.00	0.00	0.00	0.69	33.18	5.96	13.20	18.65	14.00	0.00	0.00	0.00	85.68
1964	0.00	0.00	0.00	0.00	20.48	8.64	23.41	23.50	4.61	0.00	0.00	0.00	80.64
1965	0.00	0.00	0.00	0.53	23.15	4.87	25.18	9.19	10.23	0.00	5.95	0.00	79.09
1966	0.00	0.00	0.00	11.96	24.07	7.40	30.16	17.25	6.56	2.68	0.00	0.00	100.08
1967	0.00	0.00	0.00	4.63	19.80	1.69	4.28	20.40	1.27	0.00	0.00	0.00	52.08
1968	0.00	0.00	0.00	0.26	31.86	34.43	50.21	37.99	29.04	6.46	0.00	0.00	190.26
1969	0.00	0.00	0.00	4.92	4.24	2.54	31.77	37.25	25.98	0.00	0.00	0.00	106.70
1970	0.00	0.00	0.00	0.00	25.18	86.01	36.53	22.38	19.96	0.00	0.00	0.00	190.05
1971	0.00	0.00	0.00	0.00	11.77	43.11	32.44	28.92	46.63	49.19	0.00	0.00	212.07
1972	0.00	0.00	0.00	19.09	19.46	4.60	24.65	15.59	0.53	3.17	0.00	0.00	87.11
1973	0.00	0.00	0.00	0.00	16.11	20.65	28.38	27.44	21.14	0.00	0.00	0.00	113.71
1974	0.00	0.00	0.00	0.00	31.99	16.95	33.08	31.45	16.53	5.62	0.00	0.00	135.62
1975	0.00	0.00	0.00	0.00	33.67	9.71	30.58	28.37	22.97	23.37	3.17	0.00	151.84
1976	0.00	0.00	0.00	10.32	15.21	25.29	24.91	23.65	15.06	9.35	1.59	0.00	125.37
1977	0.00	0.00	0.00	0.00	25.32	13.98	15.42	11.38	16.80	14.86	7.80	0.00	105.56
1978	0.00	0.00	0.00	6.95	13.88	15.88	24.59	18.81	12.31	10.22	0.00	0.00	102.64
1979	0.00	0.00	0.00	9.85	23.47	24.38	28.70	12.08	17.81	7.72	0.00	0.00	124.00
1980	0.00	0.00	0.00	0.69	15.22	27.62	22.29	15.55	15.24	16.78	0.00	0.00	113.38
1981	0.00	0.00	0.00	10.72	17.14	12.95	20.38	11.33	10.34	11.50	2.64	0.00	97.00
1982	0.00	0.00	0.00	1.61	20.74	21.87	23.69	19.33	14.45	6.47	0.83	0.00	108.99
1983	0.00	0.00	0.00	0.00	21.79	22.58	24.12	22.85	22.82	24.60	7.41	0.00	146.16
1984	0.00	0.00	0.00	0.00	22.06	22.17	33.24	38.42	19.73	6.88	0.00	0.00	142.49
1985	0.00	0.00	0.00	5.78	22.57	20.37	19.64	15.76	8.99	2.12	0.00	0.00	95.24
1986	0.00	0.00	0.00	4.05	25.65	28.31	26.08	23.35	20.55	5.71	0.00	0.00	133.70
1987	0.00	0.00	0.00	0.00	23.73	19.84	15.36	14.38	14.63	9.42	0.00	0.00	97.35
1988	0.00	0.00	0.00	1.22	22.87	16.50	8.41	12.55	8.57	12.30	0.00	0.00	82.42
1989	0.00	0.00	0.00	4.93	24.07	16.08	16.03	20.68	5.65	4.38	0.00	0.00	91.82
1990	0.00	0.00	0.00	0.00	24.03	8.87	16.05	13.76	13.70	0.00	0.00	0.00	76.41
1991	0.00	0.00	0.00	5.65	10.19	3.17	9.65	13.66	12.60	6.56	0.00	0.00	61.49
1992	0.00	0.00	0.00	1.06	17.79	15.97	21.65	20.94	5.01	5.53	0.00	0.00	87.96
1993	0.00	0.00	0.00	0.69	20.88	11.63	11.74	5.89	0.00	8.32	0.00	0.00	59.15
1994	0.00	0.00	0.00	1.88	22.39	12.76	14.57	9.82	7.27	3.96	0.00	0.00	72.64
1995	0.00	0.00	0.00	0.00	7.04	9.71	10.95	28.62	10.62	3.53	0.00	0.00	70.47
Average	0.00	0.00	0.00	2.61	19.03	19.46	22.17	20.06	13.21	6.61	0.83	0.00	103.97

Table 12 5/29/2018

Fredstrom Property Zweck & Turner Ditch Consumptive Use Analysis

Lagged Subsurface Return Flows 20% of total

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	3.60	2.74	2.65	2.50	5.06	8.99	11.90	14.46	14.65	11.09	6.59	5.00	89.23
1951	4.00	3.06	2.97	2.56	2.40	5.27	10.20	8.97	5.93	5.04	3.52	2.97	56.89
1952	2.57	2.15	2.10	1.88	2.88	8.54	13.92	13.45	13.17	12.59	10.16	7.12	90.53
1953	5.02	3.62	3.38	2.84	5.44	11.16	14.37	14.16	12.70	10.47	8.97	7.14	99.27
1954	5.04	3.67	3.47	3.14	8.45	14.84	16.54	15.21	12.00	9.89	6.33	5.04	103.62
1955	4.16	3.26	3.21	2.81	6.45	10.74	12.01	12.26	10.69	8.79	5.61	4.49	84.48
1956	3.74	3.05	2.92	2.57	7.80	13.75	14.92	15.60	14.19	12.28	8.38	6.06	105.26
1957	4.77	3.64	3.53	3.04	2.86	4.68	7.56	9.18	11.12	9.59	5.69	4.39	70.05
1958	3.60	2.82	2.79	2.45	2.34	4.54	9.32	11.64	11.39	10.99	8.50	5.63	76.01
1959	4.25	3.19	3.05	2.62	3.02	9.40	17.69	18.37	16.34	11.77	7.24	5.57	102.51
1960	4.49	3.56	3.34	3.92	6.34	10.63	17.24	20.46	16.85	11.12	7.88	5.98	111.81
1961	4.81	3.70	3.61	3.12	4.08	8.00	13.26	15.30	13.46	9.52	6.16	4.92	89.94
1962	4.08	3.21	3.18	3.34	8.53	13.61	13.88	15.36	14.95	10.69	6.79	5.36	102.98
1963	4.41	3.44	3.39	3.06	8.29	12.02	10.06	11.66	12.36	10.21	6.28	4.92	90.10
1964	4.05	3.29	3.13	2.75	5.90	8.95	10.73	14.42	12.79	8.55	5.64	4.55	84.75
1965	3.79	2.99	2.97	2.69	6.33	9.00	10.25	12.25	9.98	8.32	6.21	5.80	80.58
1966	4.21	3.14	3.03	4.47	9.49	10.88	12.55	15.66	12.55	9.42	6.57	5.03	97.00
1967	4.09	3.18	3.12	3.44	6.97	8.17	6.00	8.21	8.94	5.75	4.03	3.39	65.29
1968	2.92	2.44	2.38	2.17	7.22	15.39	22.75	27.09	25.07	20.70	12.91	9.02	150.06
1969	6.85	5.07	4.77	4.78	5.68	5.27	9.65	17.91	20.20	16.25	9.30	6.93	112.66
1970	5.51	4.21	4.08	3.53	7.34	22.70	34.45	27.45	21.98	17.39	10.81	8.37	167.82
1971	6.76	5.20	5.05	4.36	5.97	13.31	21.49	22.17	24.52	31.02	25.51	15.23	180.59
1972	10.72	7.90	7.04	8.82	13.54	12.54	13.15	15.71	12.27	9.03	7.23	5.97	123.92
1973	5.13	4.15	4.21	3.77	6.22	10.65	15.16	18.39	18.38	15.00	9.07	7.03	117.16
1974	5.75	4.49	4.42	3.87	8.79	14.13	16.74	20.81	19.57	15.70	10.61	7.83	132.71
1975	6.23	4.79	4.67	4.05	9.21	13.56	14.72	19.01	19.17	19.51	15.94	10.86	141.72
1976	7.83	5.92	5.39	6.18	9.42	12.74	16.76	18.06	16.85	14.79	11.07	8.23	133.24
1977	6.37	4.86	4.73	4.11	7.93	12.13	12.49	12.32	12.12	13.48	12.00	9.41	111.95
1978	6.59	4.82	4.59	5.01	7.75	10.09	13.40	15.49	14.04	12.74	9.73	6.89	111.14
1979	5.44	4.18	4.09	5.08	9.74	13.92	17.39	17.03	14.48	13.87	9.85	7.10	122.17
1980	5.62	4.46	4.20	3.75	6.06	11.33	15.70	15.37	13.87	14.30	11.58	7.73	113.97
1981	5.89	4.44	4.28	5.35	9.05	10.70	12.40	13.06	11.25	11.18	9.49	7.05	104.14
1982	5.30	4.00	3.88	3.62	6.93	11.73	14.88	15.87	14.58	12.74	9.08	6.72	109.33
1983	5.25	4.02	3.91	3.39	6.68	11.94	15.16	16.63	16.86	18.32	15.96	11.33	129.45
1984	7.72	5.66	5.07	4.25	7.44	12.51	17.04	21.91	21.75	17.44	11.61	8.35	140.75
1985	6.54	4.97	4.80	5.02	9.01	13.03	14.88	14.88	12.92	10.43	7.28	5.78	109.54
1986	4.83	3.83	3.82	4.00	8.41	14.34	17.81	18.43	17.63	15.49	10.30	7.50	126.39
1987	5.93	4.54	4.41	3.82	7.39	12.36	13.59	13.10	12.63	12.36	9.27	6.59	105.99
1988	5.21	4.15	3.91	3.61	7.22	11.47	11.30	10.36	10.01	10.19	8.62	5.95	92.00
1989	4.66	3.59	3.52	3.84	8.08	11.85	12.53	13.60	12.41	9.49	7.00	5.31	95.88
1990	4.33	3.38	3.34	2.93	6.64	10.05	10.18	11.33	11.17	9.58	5.93	4.68	83.54
1991	3.87	3.05	3.03	3.54	5.67	6.04	6.19	8.12	9.30	9.17	6.64	4.68	69.30
1992	3.69	2.94	2.77	2.59	5.43	9.22	11.87	14.00	12.14	9.15	6.82	4.98	85.60
1993	3.96	3.04	2.97	2.68	5.95	9.40	9.55	8.75	6.30	5.79	5.55	3.97	67.91
1994	3.18	2.49	2.47	2.46	6.16	9.80	10.29	10.17	8.71	7.60	5.54	4.11	72.98
1995	3.31	2.58	2.53	2.21	3.23	5.19	6.98	10.76	12.72	9.69	6.36	4.58	70.14
Average	5.00	3.85	3.70	3.61	6.76	10.88	13.72	15.10	14.06	12.14	8.73	6.42	103.96

STATE OF COLORADO

Vargas-Johnson - DNR, Javier <javier.vargasjohnson@state.co.us>

Fredstrom Pit SWSP Follow up

Jared Dains <JaredDains@applegategroup.com> Thu, Jul 18, 2019 at 4:23 PM
To: "Vargas-Johnson - DNR, Javier" <javier.vargasjohnson@state.co.us>

Sorry for the delay Javier; I needed to get confirmation from the client. Anyways, it looks like during this SWSP approval period Aggregate Industries will only be potentially exposing up to about 4 acres (assuming dewatering stopped). I think the Zweck & Turner Ditch water rights being dedicated have more than sufficient HCU credit to offset that amount of evaporation.

Regards,

Jared Dains

From: Vargas-Johnson - DNR, Javier <javier.vargasjohnson@state.co.us>
Sent: Tuesday, July 16, 2019 4:54 PM
To: Jared Dains <JaredDains@applegategroup.com>
Subject: Re: Fredstrom Pit SWSP Follow up

Hello Jared,

I am back in the office and wanted to follow up and see if you had received estimated acreages of exposed surface water (assuming no dewatering) from the operator.

Thank you,

Javier

On Wed, Jun 26, 2019 at 3:20 PM Vargas-Johnson - DNR, Javier <javier.vargasjohnson@state.co.us> wrote:

> Hello Jared,
>
> Following up on our phone conversation this morning. I will be leaving on vacation tomorrow, so please copy Sarah Brucker (sarah.brucker@state.co.us)when you submit the Phase 1 acreages.
>
> Thank you,
>
> **Javier Vargas-Johnson, E.I.**
> **Water Resources Engineer**

ADMINISTRATION PROTOCOL
Augmentation Plan Accounting
Division One – South Platte River

This protocol establishes the accounting and reporting process required to enable the division engineer's office to confirm that depletions from all out-of-priority diversions are being replaced so as to prevent injury to vested water rights. The accounting must comport with established "cradle to grave" accounting standards, which allow an audit of the information to track exactly how the data is manipulated as it is translated from raw input data to the resultant impact on the river. While this protocol is subordinate to any decreed language addressing specific accounting requirements, it generally addresses the minimum requirements of such accounting.

The accounting must use the standard convention where a depletion is "negative" and an accretion or other replacement source is "positive". The sum of the impacts will then result in either a "negative" or "positive" impact on the stream.

Wells in plans that have a negative stream impact must provide additional replacement water, curtail pumping or both until the impact is no longer negative. Plans with a negative stream impact that fail to curtail pumping will be ordered to stop pumping until such time as the projected impact of the wells is no longer negative.

1. Accounting must be submitted electronically to the water commissioner (call 970-352-8712 to obtain email address) and division engineer at Div1Accounting@state.co.us within 30 days of the end of the month for which the accounting is being submitted.
2. The accounting must provide the **contact information** including name and address for:
    a. the owner(s) of each well
    b. the person responsible for submitting the accounting
    c. the plan administrator and/or the plan attorney.
3. All **input data** must be in one location, such as an "Input" worksheet, etc. The accounting must show all pumping. Input data includes the information listed below.
    a. The required input data for each **well** is:
        i. the monthly meter reading for wells that use a **presumptive depletion factor** (PDF) to determine the associated consumptive use (CU); or
        ii. the monthly CU in acre-feet (AF) for wells that have a decree or approved SWSP that allows the wells to use a **water balance methodology** to determine the CU of the well. The analysis used to determine the CU must be included with the accounting.
        iii. Wells that are decreed as an **alternate point of diversion** (APOD) to a surface water right must report pumping on a daily basis if any of the diversion during the month is claimed as being "in priority". (See *Administration Protocol – APOD Wells* for more details.)

iv. The well meter serial readings for each meter shall be included if there is more than one meter on a well.

b. Each **recharge site** must comply with the *Administration Protocol - Recharge* and must report the:

i. daily volume in AF diverted into the site;

ii. monthly volume in AF released from the site;

iii. monthly net evaporative loss in AF;

iv. volume of water in AF remaining at the end of the month.

c. The accounting must identify each source of **fully consumable replacement water** actually delivered to the location impacted by the depletions. To demonstrate the water was actually delivered to the required location will require the following information:

i. the originating source of the water, date released and volume of water released;

ii. transportation losses to point of diversion or use, if any, using stream loss factors approved by the water commissioner;

iii. the volume of water actually delivered on a daily basis past any surface water diversion that was sweeping the river as corroborated by the water commissioner.

(See *Administration Protocol – Delivery of Water* for more details on delivering water.)

d. For each source of **replacement water that has been "changed"** for use as a source of augmentation, such as changed reservoir shares, ditch bypass credits or credits from dry-up, etc., the following input information must be reported:

i. the basis and volume of the return flow obligation;

ii. the location the changed water was historically used; this will be the location used to determine the timing of the return flow impact on the river.

4. The accounting must include a monthly **projection** of the plan's operation at least through March 31 of the next calendar year.

5. The accounting must include all input and output files associated with **modeling the delayed impact** of diversions. The output from the modeling must report to a summary table that shows, by month, the ongoing depletions associated with pumping, return flow obligations, etc. and accretions from recharge operations.

6. A **net impact** summary must show the out-of-priority depletions, accretions from each recharge site, volume of replacement water actually delivered to the location of the depletions and the resultant net impact on **a daily basis**. If necessary, the net impact must be done by river reach.

   While **modeling** may use a **monthly step function** to determine the depletions from pumping and accretions from recharge, the monthly result must then be **divided by the number of days in the month** in order to **simulate a daily impact**, as water rights are administered on a daily and not monthly basis.

Replacement water must be provided such that the **daily net impact** (using the simulated daily numbers from the modeling) **is not negative**. If a well is out-of-priority for 15 days during a month, replacement must be made only for the 15 days the well is out-of-priority. The replacement must be made, however, on a daily basis as opposed to, for instance, making an aggregated release equal to the volume of the out-of-priority depletions. Likewise, the simulated daily accretion will only count toward replacing the depletion on the days the well is out-of-priority. The accretions that report to the river when the well is in priority cannot be used to replace the out-of-priority depletions.

The **accretions that impact the river when the well is in priority** are not considered "excess" unless the cumulative net impact of the well is not negative for the entire irrigation year to date. (The irrigation year for this purpose is April 1 thru the following March 31.) Until such time as the cumulative net impact is not negative, the accretions must simply be released to the river and cannot be leased to other plans or recaptured. Plans that show a positive cumulative net impact are still required to make replacements on a daily basis; the cumulative analysis only effects whether or not accretions reporting to the river when the well is in priority are considered "excess" and are, therefore, able to be recaptured.

7. The basis for determining that the depletions are **out-of-priority** must be clearly established and all steps in the calculation included in the accounting. The analysis may be done, unless otherwise limited by decree, for each well or groups of wells, provided the most junior water right associated with the group of wells is used as the reference water right for the group's out-of-priority status.

8. Accounting must include **actual information** for the irrigation year through the month for which the accounting is being submitted **AND projections** of the plan operation through March 31 of the next calendar year.

9. The following **naming convention** must be used for all files submitted pursuant to item 1:

   "Plan**WDID**_YYMMDD"

   where: PlanWDID is the WDID assigned by the division engineer's office
   YYMMDD corresponds to the date the accounting is submitted.

   As an example, the assigned WDID for the former GASP plan was 0103333. If accounting using Excel® was submitted for that plan on May 15, 2004, the file name would be:

   "0103333_040515.xls"

   The name of the file must be in the subject line of the email.

10. All accounting must be reported using the **WDID** for the structure, at a minimum. Other information such as well name, permit number, etc. may also be included as desired. <u>All wells must be decreed by the water court, permitted by the state engineer or included in a decreed plan for augmentation</u>. Unregistered and undecreed wells cannot, in the opinion of the division engineer, be effectively administered because of the need to know the location, allowable diversion rate and use of the well - information that is only available from the decree or permitting process.

11. If a well is covered in multiple SWSP's or augmentation plans, the monthly meter readings must be the same in the accounting for each plan covering the subject well. The accounting for every plan covering the well shall state the proportionate pumping amount covered by each plan to assure all out-of-priority depletions are replaced.

12. The following additional accounting is required for sources of replacement water used for more than one plan. The water right owner of the replacement water is responsible for accounting for the total replacement amount and how much each plan is using of that total amount. The accounting for portions of the replacement water by other users must match the accounting of the water right owner. The amount of replacement water used by the water right owner and other users together shall not exceed the total replacement amount available.

    (See *Administration Protocol – Use Of Unnamed Sources For Replacement* for additional requirements concerning required notice and approval of sources of replacement not specifically described in a SWSP or augmentation plan*)*

ADMINISTRATION PROTOCOL
Recharge
Division One – South Platte River

The purpose of a "recharge structure" as referenced in this document is to introduce water to the river alluvium that will result in accretions to a live stream. For the purposes of this document, a recharge structure does not include a well that is used to artificially recharge a Denver Basin bedrock aquifer. With that qualification, a recharge structure is defined as:

- A section of ditch, the losses from which can be reasonably modeled as a single source of water.
- A pond or group of ponds that receive water from the same delivery location and can be reasonably modeled as a single source of water.

1. A written notification for each recharge structure must be provided to the water commissioner and division engineer. **The Division of Water Resources will not acknowledge any recharge activity conducted without the knowledge of the water commissioner.** The notification must include:
    a. a map showing the location of the structure and the court case number of the plan for augmentation authorized to use the structure;
    b. a map showing the location of the diversion point and the court case number for the decree authorizing the diversion, if any;
    c. a map showing the location of and all information for the metering location;
    d. the maximum water surface area of the structure;
    e. for ditch structures, if the ditch is divided into more than one recharge reach, an explanation of how the volume diverted will be allocated to the various sections.
2. Upon receiving written notification or decree by the water court, the division engineer will assign the structure a WDID number. The WDID number is the identification number that will be used for the administration of the structure and must be included in all correspondence and accounting reports. **(For structures that were included in a decreed plan for augmentation but were not physically constructed at the time of the decree, a written notification of the intent to construct the structure must be provided.)**
3. Any structure that intercepts groundwater must be permitted as a well and included in a plan for augmentation or substitute water supply plan approved by the state engineer. The division engineer strongly recommends avoiding recharge structures that intercept groundwater, in order to simplify the accounting process.
4. The flow into **EVERY** recharge structure **MUST** be metered and equipped with a continuous flow recorder unless the water commissioner in conjunction with the division engineer determines adequate records may be kept without such equipment. If the recharge structure is designed to discharge water via a surface outlet, such discharge must also be metered and equipped with a continuous flow recorder. The water commissioner **MUST** approve the use of the recharge structure **BEFORE** any credit will be given for water placed into recharge.

5. All recharge ponds must have a staff gauge installed such that the gauge registers the lowest water level in the pond. The staff gauge must be readable from a readily accessible location adjacent to the pond.
6. All recharge areas must be maintained in such a way as to minimize consumptive use of the water by vegetation. **No recharge area may be used for the planting of crops during the same irrigation year that it is used as a recharge site without prior approval from the water commissioner or division engineer.**
7. The amount of water recharged to the alluvial aquifer is determined by measuring the amount of water delivered to the recharge structure and subtracting:
    a. the amount of water discharged from the recharge structure,
    b. the amount of water lost to evaporation (see item 8, below),
    c. the amount of water lost to consumptive use due to vegetation located within the recharge structure, and
    d. the amount of water retained in the recharge structure that has not yet percolated into the ground.
8. Net evaporative losses from the recharge structure must be subtracted from the volume of water delivered to the pond. Evaporative losses must be taken every day the pond has a visible water level. If the pond does not have a stage-surface area curve approved by the water commissioner, the maximum surface area of the pond must be used to determine the evaporative losses. Monthly loss factors prorated for the number of days the pond had a visible water level may be used as may real time evaporation data from NOAA or a local weather station. If the pond is not inspected on a routine basis through the month, no prorating of monthly factors will be allowed.
9. The amount of accretions from the recharge structure will be credited only in accordance with a decreed plan of augmentation or substitute water supply plan approved by the State Engineer.
10. All water delivered for recharge must be fully consumable:
    a. changed reservoir rights or the CU portion of changed senior ditch rights;
    b. transbasin water that has been imported into the South Platte River basin;
    c. nontributary water;
    d. excess (unused) accretions from the previous recharge of fully consumable water;
    e. water diverted in priority after "notice" of intent to fully consume the water;
    f. water diverted under free river.
11. Water may be delivered to recharge only if the net impact of the associated plan for augmentation is not negative. Water must first be delivered or exchanged to offset negative impacts of the plan for augmentation before it may be diverted for recharge.
12. Accounting must be performed on a daily basis with reports submitted at least monthly and within 30 days of the end of the month for which the accounting is being made. The volume of water diverted into recharge must be provided to the water commissioner weekly when requested by the water commissioner.

ADMINISTRATION PROTOCOL
Dry-Up of Irrigated Land
Division One – South Platte River

As required by either a decreed change of water rights or a substitute water supply plan, a source of irrigation water may be either permanently or temporarily removed from a parcel of land in order to make the historical consumptive use portion of that water supply available for other uses, typically augmentation. This protocol addresses the documentation required to administer the effective "dry-up". To the extent that one or more of the following directives are in direct contradiction with a decree of the court, the terms of the decree must be followed.

Permanent Dry-up Covenant

1. Must be decreed by the court.
2. Must be filed with clerk and recorder's office for the county wherein the land is located.
3. Must email a GIS shapefile to Div1Accounting@state.co.us that includes case number, WDID, and total acreage permanently dried-up, along with any accompanying metadata. The shapefile must be in NAD83 datum, UTM projection, Zone 13North.
4. Must address the issue of noxious weeds as required by §37-92-305(4.5)(a), C.R.S. and/or other county or local ordinances. (DWR is not authorized to administer the issue of noxious weeds; this statement is, therefore, simply informational).

Temporary Dry-up Agreement

1. May be made for a term that is not less than one irrigation season.
2. Unless otherwise stated in the approved SWSP, a written notification, reporting land of intended dry-up, must be submitted prior to April 1 of each irrigation season to the division engineer, water commissioner and Div1Accounting@state.co.us. Along with the written notification, a GIS shapefile reflecting the land of intended dry-up must be submitted. The shapefile must be emailed to Div1Accounting@state.co.us. The shapefile shall include case number, WDID, and acreage of dry-up, along with any accompanying metadata. The shapefile must be in NAD83 datum, UTM projection, Zone 13North.
3. Unless otherwise stated in the approved SWSP, a written affidavit, affirming land actually dried up, must be submitted prior to October 31 of each irrigation season to the division engineer, water commissioner and Div1Accounting@state.co.us. Along with the written affidavit, a GIS shapefile, reflecting the dried up acreage proclaimed in the affidavit, must be submitted. If the submitted affidavit indicates that the intended and actual dry-up acreages are identical, then no GIS shapefile is required. The shapefile must be emailed to Div1Accounting@state.co.us. The shapefile shall include case number, WDID, and acreage of dry-up, along with any accompanying metadata. The shapefile must be in NAD83 datum, UTM projection, Zone 13North.
4. Once written notice has been made to the division engineer and/or water commissioner, the dry-up requirement is irrevocable during the current irrigation season regardless of whether or not the water associated with the historical consumptive use is actually used.

STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY
Department of Natural Resources

1313 Sherman St., Room 215
Denver, Colorado 80203
Phone: (303) 866-3567
FAX: (303) 832-8106

COLORADO DIVISION OF RECLAMATION MINING & SAFETY

April 30, 2010

Lafarge West, Inc.
10170 Church Ranch Way, Ste. 200
Westminister, CO 800210000

RE: Mining Operations with Exposed Ground water

To Whom It May Concern:

The Division of Reclamation Mining and Safety is responsible for ensuring that Sand and Gravel mining operators comply with the requirements of the Colorado Land Reclamation Act for the Extraction of Construction Materials (Act) and the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for the Extraction of Construction Materials (Rules). Among these requirements are provisions for the protection of water resources. The Act requires that reclamation plans must ensure minimization of disturbances to the prevailing hydrologic balance, including disturbances to the quantity of water in the area affected by mining and in the surrounding areas. § 34-32.5-116(4)(h). Rule 3.1.6(1)(a) requires compliance with Colorado water laws and regulations governing injury to existing water rights both during and after mining. Permits must specify how the permittee will comply with applicable Colorado water laws and regulations governing injury to existing water right rights. Rule 6.3.3(j); Rule 6.4.5(2)(c). After an extensive review, the Division determined that several operators may not have appropriate permit conditions to address certain reclamation liabilities arising from impacts to water resources.

In September 2009 the Division of Water Resources (DWR) updated its Guidelines for Sand and Gravel Pits. These guidelines provide guidance on achieving compliance with state law regarding replacement of depletions from sand and gravel mining, thus the guidelines provide a benchmark for the protection of hydrologic balance required under the Act and Rules. As noted in the Guidelines, sand and gravel operations which expose groundwater without complying with state law create a reclamation liability by impacting available groundwater.

State law requires that any person exposing ground water must obtain a well permit from the SEO pursuant to § 37-90-137(11). Because exposed groundwater results in out-of-priority water depletions, operations which expose ground water must also eventually obtain a water-court approved augmentation plan. Currently, several operators do not have either an augmentation plan or bonding to provide an alternative method to mitigate injurious stream depletions that result from mining-related exposure of ground water. The Division has a statutory duty to ensure that lands affected by mining are reclaimed in a manner that complies with state law and to ensure that operators have sufficient bonding to achieve reclamation. In order to assist operators in achieving compliance with these requirements, the Division proposes that, by April 30, 2011, operators should contact the Division and agree upon a plan for achieving compliance.

The Division has identified four approaches for operators:

1. File a financial warranty that will ensure backfilling of the pit to cover the exposed ground water to a depth of two feet above the static ground water level or,

2. Obtain a court approved augmentation plan prior to exposing ground water or,

3. File a financial warranty to cover the cost of installing a clay liner or slurry wall that meets the Division of Water Resources requirements for preventing ground water exposure or,

4. Obtain approval from the Division of Water Resources that acknowledges compliance with the SEO's requirements pursuant to § 37-90-137(11).

The Division will work with operators on an individual basis as they move to implement one of these plans. It is likely that options 1 and 3 will require the submittal of a technical revision or an amendment to the existing permit depending on the nature of the current mining and reclamation plan and the proposed changes. Increased financial warranties, as a result of these modifications, may be posted in a phased manner not to exceed three years. Amendments or revisions currently under review will be required to be approved by April 30, 2011 and may use the phased financial warranty approach described above. New applications going forward or presently under review by the Division will be required to meet the requirements of one of the options 1-4 at the time of application approval. Failure of affected operators to initiate contact with the Division and gain compliance as described above could result in an enforcement action being issued by the Division.

If you have any questions, please contact Tony Waldron at 303-866-3567, extension 8150.

cc:

M2006064	Shields at Fossil Creek Mine			M1983031	Stromquist Pit
M1994002	Andrews S & G #5 (Burlington Pit)			M1974072	Chantala Pit
M2006018	North Bank Resources			M1985218	Rich Pit
M2006073	Sundance Sand and Gravel Resource			M1985206	Boone-Martin Pit
M2009082	Parsons Mine			M1995022	Andrews #2
M1977081	Greeley West Pit			M1990144	Boone-Fillmore Pit
M2003091	Duckworth Pit			M1997087	Hartman Pit
M2000113	Mamm Creek Sand & Gravel			M2001094	Shaw Pit
M2001090	River Valley Resource			M2002009	Beeman Pit #1
M2000016	Riverbend Operation			M1981307	Fountain Pit
M1979134	Powers Pit			M1977439	Home Office Mine
M1977036	Greeley 35th Ave Pit			M1979191	Three Bells Pit
M2000034	Reichert Pit			M1982182	Port of Entry Pit
M2001051	North Taft Hill Expansion Site			M2002081	Overland Ponds
M1974015	Lyons Pit			M1981088	McCoy Pit
M1974004	Specification Aggregates Quarry			M1982034	Miller Pit
M1987176	Hamm Pit			M1996082	Blair Mesa Pit
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M1990112	State Pit			M1977098	Sievers Pit
M1979002	North Delta Pit	M1983013	Latham - Burkett Pit	M1974070	Nelson Pit
M1979159	Brose Pit	M1979097	East Rigden Pit	M2000002	Tanabe Pit
M1998014	Gypsum Ranch Pit	M1991035	Bluestone Pit	M1994045	Bluestone Pit
M1999088	Kyger Pit	M1986159	Courtner Pit	M1986079	M & G Pit
M1998075	Andrews #3 (Mock Pit)				

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