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Technical Memorandum

To: Mike Hall, Reclamation District 2035
From: Davids Engineering, Inc.
Date: 2/11/2020
Subject: Water Rate Analysis

Executive Summary

The purpose of this technical memorandum is to document the development of updated water rates for RD2035 and to summarize supporting analyses. Based on direction from RD2035 staff, the updated water rate structure has been modified (relative to the existing structure) so that all lands that could receive district water are charged administration costs and only lands that are receiving water are charged the water delivery costs. The administration rate is designed to recover district operating costs when temporary land idling (fallowing) occurs. This results in two rates as described below.

1. Administration Rate – Fixed costs that are shared equally among all lands that could be irrigated whether or not they are actually irrigated.
2. Water Delivery Rate – Variable costs associated with water delivery that are shared equally among the lands actually irrigated, prorated according to the amounts of water used by different crops and for decomp.

The updated water delivery rates by crop are compared to the current Master Water Delivery Rates in Table 1. An additional \$50,000 is added to the costs for potential future cost sharing projects. And an additional \$100,000 is added for sinking fund for intake repair. The additional \$50,000 revenue for cost sharing was split equally between the fixed Administration Rate and the variable Water Delivery Rate. The additional \$50,000 revenue for intake repair was built into the Administration Rate only. The updated rates averaged across all crops are \$5.43 per acre higher. A breakdown of the costs and delivered water volumes used in the analysis are provided in the next section followed by a description of the analyses for development of the Administration Rate and Water Delivery Rates.

Cost and Volume Summary

Historical monthly district line item costs for calendar years 2016 through 2018 were provided by Kevin Lee via email correspondence, and then assigned to a rate by Mike Hall. An annual summary of all the itemized costs is provided in Appendix A. The Pump Fuel and Utilities line item costs were assigned to the Water Delivery Rate, and the remaining items were assigned to the Administration Rate. The Water Delivery costs were further divided by season, so that those occurring in the winter months (November through February) were assigned to water delivery to decomp and those occurring during the irrigation season (March through October) were assigned to the water delivery to a crop. Table 2 summarizes the

total cost used in each of the analyses. Approximately 68% of the historical costs are assigned to the Administration Rate, 22% to the Water Delivery Rate and 10% to Water Delivery Rate for decomp.

Table 1. Updated Water Rates Compared to Current Master Water Delivery Rate Sheet

Crop	Administration Rate	Water Delivery Rate	Total New Water Rate	Current Master Water Delivery Rate	Estimated Rate Increase (Decrease)
RICE	\$57.60	\$24.62	\$82.23	\$77.75	\$4.48
SWEET RICE	\$57.60	\$23.22	\$80.83	\$76.35	\$4.48
WILD RICE	\$57.60	\$21.92	\$79.53	\$75.05	\$4.48
ALFALFA	\$57.60	\$24.86	\$82.47	\$75.05	\$7.42
CORN	\$57.60	\$14.27	\$71.87	\$73.70	\$(1.83)
SOD	\$57.60	\$26.90	\$84.50	\$73.70	\$10.80
TOMATOES	\$57.60	\$18.86	\$76.46	\$71.00	\$5.46
SUDAN	\$57.60	\$15.23	\$72.83	\$71.00	\$1.83
VINE SEED	\$57.60	\$18.56	\$76.16	\$69.65	\$6.51
BEANS	\$57.60	\$12.65	\$70.25	\$69.65	\$0.60
SQUASH/PUMPKINS	\$57.60	\$18.56	\$76.16	\$69.65	\$6.51
MELONS	\$57.60	\$18.56	\$76.16	\$68.30	\$7.86
SUNFLOWER	\$57.60	\$15.23	\$72.83	\$68.30	\$4.53
OATS/WHEAT	\$57.60	\$5.26	\$62.86	\$50.00	\$12.86
DECOMP*	\$ -	\$ -	\$25.00	\$25.00	\$ -

*Admin cost already paid.

Table 2. Cost Summary for 2016 through 2018

Cost Item	2016	2017	2018	Notes
Admin Costs	\$670,648	\$712,328	\$724,604	All Costs except Pump Fuel and Utilities (Jan – Dec)
Water Delivery Cost (Summer Crops)	\$232,267	\$41,091	\$213,396	Pump Fuel and Utilities (Mar - Oct)
Water Delivery Costs (Winter Decomp)	\$116,463	\$82,131	\$96,690	Pump Fuel and Utilities (Nov - Feb)
Total Cost	\$1,019,378	\$1,035,550	\$1,034,690	

Historical monthly water supply volumes were provided by Mike Hall and Kevin Lee and divided into two groups: water volumes associated with pump and fuel financed by RD2035 and water volumes associated with pump and fuel financed by Conaway Ranch. Volumes and costs financed by Conaway Ranch were excluded from the rate development analysis. The total water supply was multiplied by the 95% distribution system efficiency to estimate the volume of water delivered to customers. The distribution system efficiency was based on a comparison of the estimated delivery volume, discussed above, and the crop consumptive use. Table 3 provides a summary of water supply volumes and estimated water delivery volumes that were used in the analyses. The Delivery Volume Summary

(financed by RD2035) was used to develop the crop water delivery rates as described in a following section.

Administration Rate Development

The administration rate was calculated by dividing the total water delivery cost excluding pump fuel and utilities by the total land area that could be irrigated in the district (13,498 acres). The total land area was provided by district staff. The average administration rate for the 2016-2018 period is \$52.05 per acre (highlighted blue in Table 4). The total cost per acre to provide additional revenue of \$75,000 (half of the \$50,000 cost sharing projects and \$50,000 for intake repairs) is \$57.60 per acre (highlighted yellow in Table 4).

Table 3. Water Volume Summary for 2016 through 2018 (all values in acre-feet)

Water Types	2016	2017	2018
Surface Water	38,766	37,120	37,190
Ground Water	21,758	3,211	19,449
Total Water Supply	60,524	40,331	56,639
Total Water Supply (Financed by RD2035)	40,500	37,120	37,739
Total Water Supply Summer (Financed by RD2035)	29,015	25,874	27,576
Total Water Supply Winter (Financed by RD2035)	11,485	11,246	10,163
Delivery Volume Summer (Financed by RD2035)*	27,564	24,580	26,198
Delivery Volume Winter (Financed by RD2035)*	10,911	10,684	9,655

*Conveyance Efficiency of 90% not applied to recycled water

Table 4. Administration Rate Analysis*

Item	2016	2017	2018	Average
Administration Cost	\$670,648	\$712,328	\$724,604	\$702,527
Administration Cost Per Acre	\$49.68	\$52.77	\$53.68	\$52.05
Administration Cost Per Acre with 25K Additional Revenue	\$55.24	\$58.33	\$59.24	\$57.60

*Assumes total area of 13,498 acres

Water Delivery Rate Analysis

The Water Delivery Rates for each crop were developed based on historical cropping, and average ET of applied water and on-farm irrigation efficiency by crop (Table 5). Historical cropping was provided by the district. ET of applied water estimates were based on values reported by the California Department of Water Resources (DWR) Simetaw application that are used in various modeling efforts¹. Average irrigation season (March through October) ET of applied water was calculated by Simetaw based on a 2000-2014 period of record. Estimated efficiencies of 65% for rice crops and 75% for non-rice crops result in total delivered water volumes approximately matching the reported water supplies multiplied by 95% to account for distribution system losses. The Sweet Rice and Wild Rice rates were decreased

¹ <https://data.cnra.ca.gov/dataset/cal-simetaw-unit-values>

from the rice rate proportionately based on current master rate sheet values to account for their relatively short irrigation season compared to other rice varieties. This was done since there was only one rice variety reported in DWR Simetaw ET of applied water data. The water delivery rate in \$/acre is calculated so that approximate cost of water in \$/AF is the same for all the crops. Thus, the crops paying the most \$/Acre are receiving the most water.

Table 5. Crop Water Delivery Rates

Crop	Simetaw ETaw, inches	On-Farm Efficiency	Water Duty, Inches	Water Delivery Rate (\$/Acre)				Final Rates
				2016	2017	2018	Average	
Rice	30.54	65%	47.0	\$ 21.85	\$32.84	\$21.11	\$24.62	\$ 24.62
Sweet Rice	30.54	65%	47.0	\$ -	\$ -	\$ -	\$ -	\$23.22
Wild Rice	30.54	65%	47.0	\$21.85	\$32.84	\$21.11	\$24.62	\$21.92
Alfalfa	35.58	75%	47.4	\$22.07		\$21.32	\$24.86	\$24.86
Corn	20.42	75%	27.2	\$12.66	\$19.03	\$12.23	\$14.27	\$14.27
Sod	38.50	75%	51.3	\$ -	\$ -	\$ -	\$ -	\$ 26.90
Tomatoes	26.99	75%	36.0	\$16.74	\$25.15	\$16.17	\$18.86	\$18.86
Sudan	21.79	75%	29.1	\$13.51	\$20.31	\$13.05	\$15.23	\$15.23
Vine Seed	26.56	75%	35.4	\$16.47	\$24.75		\$18.56	\$18.56
Beans	18.10	75%	24.1	\$11.23			\$ 12.65	\$12.65
Squash/Pumpkins	26.56	75%	35.4			\$15.91	\$18.56	\$18.56
Melons	26.56	75%	35.4	\$ -	\$ -	\$ -	\$ -	\$18.56
Sunflower	21.79	75%	29.1	\$ -	\$20.31	\$13.05	\$15.23	\$15.23
Oats/Wheat	7.52	75%	10.0	\$ -	\$ -	\$ -	\$ -	\$5.26

Decomp Water Delivery Rate Analysis

The Water Delivery Rate for decomp was estimated based on total water volumes delivered in the winter months (November through February) and a District estimated land area of 5,000 acres applying decomp water (Table 6). This results in an average decomp rate of \$19.69 per acre. Because the actual decomp area was unknown at the time of this analysis it is recommended that the existing rate of \$25.00 per acre be continued.

Table 6. Decomp Rate Analysis (based on an assumed area of 5,000 acres applying decomp water each year)

Item	2016	2017	2018	Average
Water Delivery Costs	\$116,463	\$82,131	\$96,690	\$98,428
Water Delivery Cost Per Acre	\$23.29	\$16.43	\$19.34	\$19.69

Appendix A. Annual Itemized Cost Summary (\$)

Item	2016	2017	2018
Utilities - Water Delivery*	306,967	308,721	252,998
River Pump Intake - WD	10,228	198,884	155,024
Depr. Expense - WD	181,961	186,262	153,688
Regular Employees - Water Delivery	129,427	93,035	100,562
Pump Maintenance-Water Delivery	71,452	28,203	34,308
Pump Fuel – WD*	41,763	14,501	57,089
Ditch Maintenance - Water Delivery	35,312	9,673	60,058
Memberships - Water Delivery	39,950	41,012	17,336
Professional & Specialized - WD	66,433	20,622	1,355
Insurance - Water Delivery	18,319	17,335	30,840
Legal Services - Water Delivery	44,919	261	16,975
Arch, Eng. & Planning Services - WD	14,020	14,462	14,532
Rents & Leases - Equipment - WD	18,473	4,176	9,708
Lobbying - Fish Screen - WD	16,000	16,000	0
Auditing & Fiscal Services - WD	11,300	8,100	8,950
Group Insurance - Water Delivery	2,403	13,719	11,384
Maintenance - Equipment - Water Delivery	-4,976	13,042	17,854
Bad Debt Expense - WD	0	0	24,576
Loss on disposal of Assets - WD	0	22,253	0
Communications - Water Delivery	5,489	4,225	4,249
General Maintenance - WD	12,344	0	1,073
Levee Maintenance - WD	5,626	3,467	3,467
Workers Compensation - Water delivery	0	0	11,317
Payroll Taxes - FICA/Med - WD	0	0	10,809
Maintenance Supplies - Water Delivery	2,145	3,191	5,396
401K Contribution - WD	0	0	9,272
SCADA Project - WD	0	780	4,612
Information Technology Service - WD	2,628	1,575	1,012
Miscellaneous - Water Delivery	1,291	3,039	541
Vehicle Fuel - Water Delivery	-4,333	2,167	6,136
Payroll Processing Exp - WD		00	2,241
Unemployment Insurance - Water Delivery	0	0	2,024
Small Tools & Minor Equip. - WD	0	1,841	118
Road maint. & Construction Servs - WD	0	1,950	0
Interest Expense - Short Term - WD	398	917	586
Other Employee Benefits - WD	0	0	1,544
Transportation & Travel - Water Delivery	649	180	74
Overhead - Water Delivery	0	0	394
Maintenance Bldgs & Grounds - WD	341	0	0
Publications & Legal Notice - WD	0	336	0
Training - Water Delivery	0	45	0

Fish Screen Expense - WD	0	0	0
Office Expense - Water Delivery	-5,032	1,576	1,972
Maintenance - Bldg & Improvements - WD	-6,119	0	616
Grand Total	1,019,378	1,035,550	1,034,690

*Water Delivery Rate (Variable) costs.