Firebaugh Canal Water District

Water Management Plan

2023 Criteria

Index

Firebaugh Canal Water District Water Management Plan

Section I – Description of the District

	(Enter Information Below)
District Name	Firebaugh Canal Water District
Contact Name	Jeff Bryant
Title	General Manager
Email	Bryant_jeff@sbcglobal.net
Web Address	WWW.Firebaughcanal.com

A. History

1. Date District Formed: 1913

   Date of First Reclamation Contract: September 14, 1939

Original Size Acres: 23,675 Current Year (last complete calendar year): 21,750

2. Current irrigated acres 21,650

	(Enter Data Year)
Size (acres)	23,675
Population Served (For Urban, number of connections)	
Irrigated Acres	21,650

3. Water supplies received in current year:

Water Source	AF
Federal urban water (Table 1)	0
Federal agricultural water (Table 1)	40494
State water (Table 1)	0
Other Wholesaler (define) (Table 1)	0
Local surface water (Tbl 1)	1193
Upslope drain water (Tbl 1)	270
District groundwater (Tbl 2)	410
Banked water (Tbl 1)	0
Transferred water (Tbl 1)	16781
Recycled water (Tbl 3)	0

Water Source	AF
Other (define) (Tbl 1)	0
Total	17191

4. Annual entitlement under each right and/or contract:

	AF	Source	Contract #	Availability Period(s)
Reclamation Urban AF/Y				
Reclamation Agriculture AF/Y	85000	USBR	11r-1144	January - December
Other AF/Y				
Other AF/Y				

5. Anticipated land-use changes:

No anticipated land-use changes in the next 5 years. District will remain 100 percent agriculture use; 21,650. 58 acres of farm shops, pump facilities and roads.

6. Cropping patterns:

Original Plan (1993) Previous Plan (2016) Current Plan (2023)

Crop Name	Acres	Crop Name	Acres	Crop Name	Acres
Cotton	Unknown	Alfalfa	1305	Alfalfa	750
Alfalfa	Unknown	Almond	1706	Almond	2185
Tomato	Unknown	Cotton	4830	Cotton	3415
Sugar Beets	Unknown	Grains	1117	Grains	1210
		Melon	1178	Melon	1895
		Pistachio	1928	Pistachio	6580
		Tomato	4956	Tomato	3785
		Pomegranate	549		
Other (<5%)		Other (<5%)	4094	Other (<5%)	1175
Total	21650	**Total**	21663	**Total**	20995

7. Major irrigation methods:

Original Plan (1993) Previous Plan (2016) Current Plan (2023)

Irrigation Method	Acres	Irrigation Method	Acres	Irrigation Method	Acres
Level basin	unknown	Level basin	1305	Level basin	500
Furrow	unknown	Furrow	4071	Furrow	1474
Sprinkler	unknown	Sprinkler	1830	Sprinkler	
Low-volume	unknown	Low-volume	13746	Low-volume	19426
Multiple	unknown	Multiple		Multiple	
Other	unknown	Other	711	Other	250
Total		**Total**	21663	**Total**	21650

B. Location and Facilities

See Attachment A for maps containing the following: incoming flow locations, turnouts (internal flow), and outflow (spill) points, conveyance system, storage facilities, operational loss recovery system, district wells and lift pumps, water quality monitoring locations, and groundwater facilities.

1. Incoming flow locations and measurement methods:

Location Name	Physical Location	Type of Measurement Device	Accuracy
DMC 107	DMC MP 107.86L	Propeller Meter	+/- 5 %
DMC 109	DMC MP 109.65R	Electro – Magnetic	+/- 2%
Station #1	District Headquarters	Rated Pump / Hour Meter	+/- 5%
DMC Grower Turnouts	DMC Canal	Propeller Meter	+/-5%

2. Current year Agricultural Conveyance System

Miles of Unlined – Canal	Miles of Lined – Canals	Miles of Pipe	Miles - Other
13.5	25.5	5	0

3. Current year Urban Distribution System: Ag System

Miles of AC Pipe	Miles of Steel Pipe	Miles of Cast Iron Pipe	Miles - Other
Ag System			

4. Storage facilities: None

Name	Type	Capacity (AF)	Distribution or Spill
None	None	None	None

5. Description of the agricultural spill recovery system and outflow points:

A lift Pump with a variable speed drive is located near the end of Canal # 2 that is level control operated to pump water upslope to Canal # 3.

6. Agricultural delivery system operation:

Scheduled	Rotation	Other (Describe)
Water Users call office to order water	**24 -Hour Notice**	

7. Restrictions on water source(s):

Source	Restriction	Cause of Restriction	Effect on Operations
Delta – Mendota Canal	Crop water requirements	Canal Capacity	Crop growth / decline in production
San Joaquin River	River Obstructions	River Obstructions	Reduced Water Supply

8. Proposed changes or additions to facilities and operations for the next 5 years:

We continue to acquire grant funding to concrete line approximately 12.95 miles of the unlined portion of the Third Lift canal.

C. Topography and Soils

1. Topography of the district and its impact on water operations and management:

Topography of the District is generally flat terrain. Alluvial fan makes up the majority of the District's soil. Contours run northwest to southwest, with a two decline across the area. Subsidence has occurred from over draft pumping in the past 20 years. Soil clad shows a tendency for slow percolation. Saline soils prevail in the area and are high in sodium.

2. See Attachment B, District Soils Map

Agricultural limitations resulting from soil problems: None within service area

Soil Problem	Estimated Acres	Effect on Water Operations and Management
Salinity	6000	Saline soils affect health of crop growth
High-water table	6000	Tile drainage systems must be operated and maintained. High saline water must be transported out of District
High or low infiltration rates	10000	Slow percolation is an irrigation management problem
Other (define)		

D. Climate

1. General climate of the district service area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ave Precip	1.7	1.5	1.6	.95	.44	.08	0.0	0.0	.21	.57	.93	1.5	9.5
Ave Temp	47	53	57	61	69	77	81	77	73	64	56	46	63
Max Temp	55	62	71	74	83	92	98	95	90	78	68	56	76
Min Temp	39	45	44	47	53	60	64	61	55	50	45	38	50
ETo	.88	1.6	4.0	5.4	7.7	8.6	9.1	7.5	5.6	3.4	1.6	.73	56.1

Weather station ID: Telles # 7 Data period: Year 1971 to Year 2023
ET Station ID: CIMIS Zone # 15_Average annual frost-free days: 290

2. Impact of microclimates on water management within the service area:

No Impact of microclimates on water management within our service area.

E. Natural and Cultural Resources

1. Natural resource areas within the service area: None

Name	Estimated Acres	Description
NONE		

2. Description of district management of these resources in the past or present

None within service area

3. Recreational and/or cultural resources areas within the service area

None within the service area

Name	Estimated Acres	Description
NONE		

F. Operating Rules and Regulations

1. Operating rules and regulations - See Attachment C, District Rules and Regulations

See Attachment C, Rule # 4: Distribution of Water, Rule # 5 Application of Water, Rule # 9 Shortage of Water, Rule # 12 Enforcement of Rules and Regulations

2. Official and actual lead times necessary for water orders and shut-off: Rule # 4 States water orders and shut offs, must be placed 24 hours in advance.

3. Policies regarding return flows: Rule # 7 Drain Water – The District has a "No Tail Water "Policy.

4. Policies on water transfers by the district and its customers:
See Attachment D, The Firebaugh Canal Water District and San Joaquin River Exchange Contractors Water Authority Transfer Policies are enclosed.

G. Water Measurement, Pricing, and Billing:

See Attachment F For Water Measurement Verification.
Agricultural Rates: See Attachment G for Annual Pricing to Water Users. Current year rate structures and billing frequency: Water is invoiced on a monthly basis.

The District has a Tiered Water Pricing Program: Tier 1 $18 for the first acre foot, Tier 2 $20 for the second acre foot, Tier 3 $25 for the third acre foot, Tier 4 $30 per acre foot.

See Attachment G.

a. Annual charges:

Fixed Charges: The District has a $20 per acre Drainage Service Charge.

Charges ($ by unit)	Charge Units ($/AF, etc)	Units Billed During Year (AF, etc)	Total $ Collected ($ times Units)
$20	$20 per acre	21650	$433000

Volumetric Charges

Charges ($ by unit)	Charge Units ($/AF, etc)	Units Billed During Year	Total $ Collected
18.00	Acre-Feet	20995	377910
20.00	Acre-Feet	19475	389500
25.00	Acre-Feet		
30.00	Acre-feet		

b. Record management system:

The district documents all water use and water related data in a water accounting program named Storm. This program allows the district to store water use data and landowner records for each entity. That information is available to any landowner or water user who might request it.

H. Water Shortage Allocation Policies

1. Current year water shortage policies or shortage response plan:
See Attachment C, Rule # 9 page (5), Shortage of Water

2. Current year policies that address wasteful use of water and enforcement methods:
See Attachment C, Waste of Water: Rule # 8 page (5), Enforcement Methods Rule # 12 page (6) Enforcement of Rules and Regulations.

I. Evaluate Policies of Regulatory Agencies Affecting the Contractor and Identify Policies that Inhibit Good Water Management

FCWD is affected yearly by the hydrologic conditions that exist in the watershed that drives the Exchange Contract, primarily the Shasta Watershed Criteria, and to some lessor degree the San Joaquin River Watershed. Policies within Reclamation are based on water allocations associated with that Contract and the forecasted Full Natural Inflow into Shasta Reservoir. . These conditions can affect the amount of water the District receives each year and that can adversely affect grower choices he has to make on the farm.

Section II – Inventory of Water Resources

A. Surface Water Supply

1. Surface water supplies in acre feet, imported and originating within the service area, by month (Table 1)
   See Chapter 5, Water Inventory Tables, Table 1

2. Amount of water delivered to the district by each of the district sources for the last 10 years
   See Chapter 5, Water Inventory Tables, Table 8

B. Groundwater Supply

1. Groundwater extracted by the district and delivered, by month (Table 2) – See Chapter 5, Water Inventory Tables, Table 8

2. Groundwater basin(s) that underlies the service area

Name	Size (Square Miles)	Usable Capacity (AF)	Safe Yield (AF/Y)
Delta Mendota Subbasin	1,195	4,440,000	308,000-375,000

3. Map of district-operated wells.
   See Attachment A, for District Map of Groundwater Facilities:

   Description of conjunctive use of surface and groundwater:
   District has limited amount of groundwater extraction due to saline conditions.

4. Groundwater Management Plan
   See Attachment E, AB 3030 Groundwater Management Plan, SGMA Participation

5. Groundwater Banking Plan – Due to all of the District acreage overtopping a saline sink, no groundwater banking occurs.

C. Other Water Supplies

1. "Other" water used as part of the water supply: The District can utilize some subsurface Water if necessary.

See Chapter 5, Water Inventory Tables, Table 8

D. Source Water Quality Monitoring Practices

Agricultural water quality concerns: FCWD receives its daily water supply from the Mendota Pool. That facility also receives pumped groundwater from other sources. That pumped water can exceed the Exchange Contract standards and is of concern, at times, to the District. Delivered water is monitored and any problems are reported to the Delta-Mendota Water Authority and Reclamation.

Current water quality monitoring programs for surface water by source:

2. The district has a concern with importation of salts. 3. and 4. The district takes water samples monthly during the water season. Ag Suitability tests are performed quarterly and tests for salt, boron and Selenium are performed monthly. The districts SCADA (supervisory control and data acquisition) system has twelve sites that monitor the EC (Electrical Conductivity) on an instantaneous basis.

Analyses Performed	Frequency	Concentration Range	Average
Ag Suitability	Quarterly		
EC, Boron, Selenium	Quarterly		
EC	Daily		

6. Current water quality monitoring programs for groundwater by source: The District performs an Ag Suitability test of Groundwater Wells Annually.

Analyses Performed	Frequency	Concentration Range	Average
Ag Suitability	Annually		

E. Water Uses Within the District

1. Agricultural
   See Chapter 5, Water Inventory Tables, Table 5 - Crop Water Needs

2. Types of irrigation systems used for each crop in current year

Crop Name	Total Acres	Level Basin (Acres)	Furrow (Acres)	Sprinkler (Acres)	Low Volume (Acres)	Multiple Methods (Acres)	Other (Acres)
Alfalfa	750	500			250		
Almond	2185				2185		
Asparagus	115				115		
Cotton	3412	1855			1557		
Grain	1210	1210					
Melons	1895				1895		
Pistachios	6580				6580		
Tomato	3785				3785		
Pomegranates	635				635		
Other	425	25			400		

3. Urban Wastewater Collection/Treatment Systems serving the service area: None

Treatment Plant	Treatment Level (1,2,3)	AF	Disposal to/Uses
None			
	Total		
Total discharged to ocean and/or saline sink			

4. Groundwater recharge in current year (Table 6)

Recharge Area	Method of Recharge	AF	Method of Retrieval
No Groundwater Recharge in district			
	Total		

6. a. Transfers and exchanges **into** the service area in current year – (Table 1)

From Whom	To Whom	AF	Use
No Transfers into district			
	Total		

6. b. Transfers and exchanges **out** of the service area in current year – (Table 6)

From Whom	To Whom	AF	Use
Firebaugh Canal WD	Bureau of Reclamation	6932	Refuge Water Supply Program
Firebaugh Canal WD	San Luis Delta Mendota WA	7791	South Delta Ag Contractors

From Whom	To Whom	AF	Use
Firebaugh Canal WD	Rosedale Rio-Bravo	2058	Agricultural Water Supply
	Total	16781	

7. Wheeling, or other transactions in and out of the district boundaries – (Table 6)

From Whom	To Whom	AF	Use
No Other Transactions			
	Total		

8. Other uses of water: None

Other Uses	AF
None	

F. Outflow from the District (Agricultural only)

See Facilities Map, Attachment A, for the location of surface and subsurface outflow points, outflow measurement points, outflow water-quality testing locations

1. Surface and subsurface drain/outflow

Outflow Point	Location Description	AF	Type of Measurement	Accuracy (%)	% of Outflow	Acres Drained
1	FC-1		Flow Meter	+/-6%	66	4000
2	DT-2		Flow Meter	+/-6%	33	2000

Outflow Point	Where the Outflow Goes (Drain, River, or Other Location)	Type Reuse
San Joaquin River Improvement Project	**Reuse Area**	**Irrigation of salt tolerant crops**

2. Description of the Outflow (surface and subsurface) water quality testing program:

3. Outflow (surface drainage & spill) Quality Testing Program:

FCWD is within the Grassland Drainage Area and regulated through Waste Discharge Order R5-2019-0077 by the Central Valley Regional Water Quality Control Board. In compliance with this order, subsurface drainage outflows are conveyed to the San Joaquin River Improvement Project where they are used to irrigate salt tolerant crops. Extreme storm events may cause surface and subsurface outflows that are discharged to the San Joaquin River through the San Luis Drain, in compliance with the waste discharge order.

Analyses Performed	Frequency	Concentration Range	Average	Reuse Limitation
None				

Outflow (subsurface drainage) Quality Testing Program

Analyses Performed	Frequency	Concentration Range	Average	Reuse Limitation
Electrical Conductivity	Monthly	2500 – 15000 EC		All to high for Ag Use
Boron	Quarterly	4.0 – 21.0 mg/l		All to high for Ag Use
Selenium	Quarterly	0.11 – 0.39 mg/l		All to high for Ag Use

4. Provide a brief discussion of the District's involvement in Central Valley Regional Water Quality Control Board programs or requirements for remediating or monitoring any contaminants that would significantly degrade water quality in the receiving surface waters. See Addendum C.

FCWD is a participating agency in the Grassland Bypass Project, which is regulated through Waste Discharge Order R5-2019-0077 (Order) by the Central Valley Regional Water Quality Control Board. This order includes requirements for a complex flow and water quality monitoring program, primarily focused on the discharge of selenium and boron and compliance with water quality objectives in Mud Slough and the San Joaquin River.

Districts included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)," should also complete Water Inventory **Table 7 in Chapter 5** and use Addendum C for information. If a Drainage Problem Report is available, please provide a copy as Addendum C.

G. Water Accounting (Inventory)

See Chapter 5 Inventory Tables

Section III – Best Management Practices (BMPS) for Agricultural Contractors

A. Critical Agricultural BMPs

1. Measure the volume of water delivered by the district to each turnout with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6%

    a. Number of delivery points (turnouts and connections) 180

    b. Number of delivery points serving more than one farm 39

    c. Number of measured delivery points (meters and measurement devices) 141

    d. Percentage of water delivered to the contractor that was measured at a delivery point 100

    e. Total number of delivery points not billed by quantity 0

    f. Delivery point measurement device table

Measurement Type	Number	Accuracy* (+/- %)	Reading Frequency (Days)	Calibration Frequency (Months)	Maintenance Frequency (Months)
Orifices					
Propeller meters	130	+/-5%	Daily	Annual	Annual
Weirs					
Flumes					
Venturi					
Metered gates	9	+/-5%	Daily	Annual	Annual
Acoustic dopplers					
Other (define)	2 Electromagnetic	+/-2%	Daily	Annual	Annual
Total					

* Documentation verifying the accuracy of measurement devices must be submitted with Plan and included in Attachment H.

2. Designate a water conservation coordinator to develop and implement the Plan and develop Annual Updates.

Name Jeff Bryant, General Manager

Address P.O. Box 97, Mendota, CA 93640

Telephone (559) 655-4761 Email bryant_jeff@sbcglobal.net

3. The General Manager is currently the Water Conservation Coordinator, district staff is utilized for data collection and compilation of 5-year data. District Engineer will be tasked with review and quality control of 5-year Plan and annual updates. General

Manager has responsibility, with Board approval, for submitting grant proposals and funding requests for all funding requests.

4. **On farm irrigation and drainage system evaluations using a mobile lab type assessment:** The district supports on-farm evaluations by its water users. The growers are reminded of the availability and should be utilized on-farm whenever possible.

	Total in District	# Surveyed Last Year	# Surveyed in Current Year	#Projected for Next Year	# Projected 2nd Year in Future
Irrigated Acres	21,650	2	0	1 SCADA	Same
Number of Farms	45	2	0	1	1

a. Timely field and crop-specific water delivery information to the water user:

The district provides water use by turnout, through the monthly water invoice. Yearend summaries are also available for each turnout. During water years where the allocation to the users is less than 100 percent, the water users are more cognizant of water use / allocation and utilize district staff more often to inquire of water use and balances. This transparency has improved water management.

b. Real-time and normal irrigation scheduling and crop ET information

The district keeps CIMIS data available to all growers at the district office and encourages access to the CIMIS system website at www.cimis.water.ca.gov/cimis.The district supports professional irrigation scheduling available through www.lmlordinc.com

c. Surface, ground, and drainage water quantity and quality data provided to water users

The district provides monthly volumes of water use on each monthly invoice to its water users. Quality reports are generated for various regulatory agencies and are filed at the district office.

d. Agricultural water management educational programs and materials for farmers, staff, and the public:

See Attachment G, Notices of District Education Programs and Services Available to Water Users

Program	Co-Funders (If Any)	Yearly Targets
Newsletter	SJR Exchange Contractors	District Water users, land owners
FCWD quarterly updates		District Water users, land owners
Cal Poly-ITRC	Irrigation Training and Research Center	District Water users, land owners
Fresno State - CIT	Center for Irrigation Technology	District Water users, land owners

See Attachment G for samples of provided materials and notices

5. **Pricing structure – based at least in part on quantity delivered.** The district has a tiered water pricing structure that is based on the amount delivered through turnouts. The Board of Directors review this pricing structure annually.

6. **Evaluate and improve efficiencies of district pumps.** The district services and does a visual inspection of its pumps on a weekly basis. In addition, the well is serviced by wat of removal from the casing on a maximum basis of three years. As to lift pumps; removal and repair are on a four-to-six-year schedule based on use and output. The district strives for 70 percent efficiency for its low lift pumps.

	Total in District	# Surveyed Last Year	# Surveyed in Current Year	#Projected for Next Year
Wells	1	1	1	1
Lift Pumps	12	3	3	3

B. Exemptible BMPs for Agricultural Contractors

1. All district lands are productive and no alternative land use is planned.

Drainage Characteristic	Acreage	Potential Alternate Uses
High water table (<5 feet)	0	
Poor drainage	0	
Groundwater Selenium concentration > 50 ppb	0	
Poor productivity	0	

Describe how the contractor encourages customers to participate in these programs

2. Facilitate use of available recycled urban wastewater

Sources of Recycled Urban Waste Water	AF/Y Available	AF/Y Currently Used in District
N / A		

3. Facilitate the financing of capital improvements for on-farm irrigation systems

Program	Description
FCWD	**Loan and Grant Program**

4. Incentive pricing
   The District has Tiered Pricing to promote reductions for minimal irrigation use.

5. a. Line or pipe ditches and canals:

Canal/Lateral (Reach)	Types of Improvement	Number of Miles in Reach	Estimated Seepage (AF/Y)	Accomplished/Planned Date
#3 Canal	Lining	2.2	430	Spring of 2025

5. b. A 60 acre foot regulating reservoir is planned along with the 22.2 miles of lined canal.

Reservoir Name	Location	Describe Improved Operational Flexibility and AF Savings
NONE		

6. Increase flexibility in water ordering by, and delivery to, water users: The District has a 24-hour order / shut off policy. Due to the installation of efficient irrigation systems and the District operating on a level controlled or demand system, irrigation events can be accommodated for periods less than 24 hours.

7. Construct and operate district spill and tailwater recovery systems

Distribution System Lateral	Annual Spill (AF/Y)	Quantity Recovered and Reused (AF/Y)
NONE		
Total		

Drainage System Lateral	Annual Drainage Outflow (AF/Y)	Quantity Recovered and Reused (AF/Y)
NONE		
Total		

Describe facilities that resulted in reduced spill and tailwater

Variable speed drive on # 3 Pump at M.P. 109.46 L that is connected to level control of canal check structure.

8. Plan to measure outflow

   a. Total # of outflow (surface) locations/points 3

   b. Total # of measured outflow points 3

   c. Percentage of total outflow (volume) measured during report year 100 %

   d. Identify locations, prioritize, determine best measurement method/cost, submit funding proposal

      The district has a "No Tail Water Policy" therefore no new locations are planned, or the need for new locations, or funding proposal.

Estimated Cost (in $1,000s)

Location and Priority	Current Year	Year 2	Year 3	Year 4	Year 5
None					

9. Optimize conjunctive use of surface and groundwater:
   The district is in a saline sink. Therefore, no plans for conjunctive use.

10. Automate distribution and/or drainage system structures:
    Identify locations where automation would increase delivery flexibility and reduce spill and losses. The drainage systems are on level control and pump a minimal amount of tail water.

11. Facilitate or promote water customer pump testing and evaluation:
    See Attachment G, Notices of District Education Programs and Services Available to Customers.

12. Mapping

Estimated Cost (in $1,000s)

GIS Maps	Current Year	Year 2	Year 3	Year 4	Year 5
Layer 1 – Distribution system	500	500	550	550	600
Layer 2 – Drainage system	500	500	550	550	600
Suggested layers:					
Layer 3 – Groundwater information	0	0	0	0	0
Layer 4 – Soils map	0	0	0	0	0
Layer 5 – Natural & cultural resources	0	0	0	0	0
Layer 6 – Problem areas	0	0	0	0	0

C. Provide a 5-Year Budget for Implementing BMPs

1. Amount actually spent during current year

Current Year BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A1	Measurement	$50,000	225
A2	Conservation staff	$20,000	150
A3	On-farm evaluation/water delivery info irrigation Scheduling Water quality Agricultural Education Program	$0	0
A4	Quantity pricing	$0	0
A5	Contractor's pumps	$75,000	55
B1	Alternative land use	$0	0
B2	Urban recycled water use	$0	0
B3	Financing of on-farm improvements	$225,000	25
B4	Incentive pricing	$0	0
B5	Line or pipe canals/install reservoirs	$0	0
B6	Increase delivery flexibility	$0	0
B7	District spill/tailwater recovery systems	$0	0
B8	Measure outflow	$5,000	80

Current Year BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
B9	Optimize conjunctive use	$0	0
B10	Automate canal structures	$50,000	50
B11	Customer pump testing	$0	0
B12	Mapping	$2,500	15
	Total	**$357,500**	**225**

2. Projected budget summary for the next year

Year 2 BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A1	Measurement	$0	0
A2	Conservation staff	$0	0
A3	On-farm evaluation/water delivery info irrigation Scheduling Water quality Agricultural Education Program	$0	0
A4	Quantity pricing	$0	0
A5	Contractor's pumps	$0	0
B1	Alternative land use	$0	0
B2	Urban recycled water use	$0	0
B3	Financing of on-farm improvements	$0	0
B4	Incentive pricing	$0	0
B5	Line or pipe canals/install reservoirs	$0	0
B6	Increase delivery flexibility	$0	0
B7	District spill/tailwater recovery systems	$0	0
B8	Measure outflow	$0	0
B9	Optimize conjunctive use	$0	0
B10	Automate canal structures	$25,000	25
B11	Customer pump testing	$0	0
B12	Mapping	$1,000	5
	Total	**$26,000**	**30**

3. Projected budget summary for the 3rd year

Year 3 BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A1	Measurement	$5,000	20
A2	Conservation staff	$0	0
A3	On-farm evaluation/water delivery info irrigation Scheduling Water quality Agricultural Education Program	$0	0
A4	Quantity pricing	$0	0
A5	Contractor's pumps	$35,000	24
B1	Alternative land use	$0	0
B2	Urban recycled water use	$0	0
B3	Financing of on-farm improvements	$125,000	16
B4	Incentive pricing	$0	0
B5	Line or pipe canals/install reservoirs	$0	0
B6	Increase delivery flexibility	$0	0
B7	District spill/tailwater recovery systems	$0	0
B8	Measure outflow	$0	0
B9	Optimize conjunctive use	$0	0
B10	Automate canal structures	$30,000	30
B11	Customer pump testing	$0	0
B12	Mapping	$1,500	0
	Total	**$196,500**	**90**

4. Projected budget summary for the 4th year

Year 4 BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A1	Measurement	$25,000	40
A2	Conservation staff	$0	0
A3	On-farm evaluation/water delivery info irrigation Scheduling Water quality Agricultural Education Program	$0	0
A4	Quantity pricing	$0	0
A5	Contractor's pumps	$50,000	30
B1	Alternative land use	$0	0
B2	Urban recycled water use	$0	0
B3	Financing of on-farm improvements	$100,000	20
B4	Incentive pricing	$0	0
B5	Line or pipe canals/install reservoirs	$0	0
B6	Increase delivery flexibility	$0	0
B7	District spill/tailwater recovery systems	$0	0
B8	Measure outflow	$0	0

Year 4 BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
B9	Optimize conjunctive use	$0	0
B10	Automate canal structures	$50,000	36
B11	Customer pump testing	$0	0
B12	Mapping	$2000	8
	Total	**$227,000**	**126**

5. Projected budget summary for the 5th year

Year 5 BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A1	Measurement	$50,000	50
A2	Conservation staff	$0	0
A3	On-farm evaluation/water delivery info irrigation Scheduling Water quality Agricultural Education Program	$0	0
A4	Quantity pricing	$0	0
A5	Contractor's pumps	$75,000	35
B1	Alternative land use	$0	0
B2	Urban recycled water use	$0	0
B3	Financing of on-farm improvements	$100,000	20
B4	Incentive pricing	$0	0
B5	Line or pipe canals/install reservoirs	$0	0
B6	Increase delivery flexibility	$0	0
B7	District spill/tailwater recovery systems	$0	0
B8	Measure outflow	$0	0
B9	Optimize conjunctive use	$0	0
B10	Automate canal structures	$75,000	50
B11	Customer pump testing	$0	0
B12	Mapping	$2,500	10
	Total	**$302,500**	**165**

DISTRICT WATER INVENTORY TABLES

Table 1

Surface Water Supply

2023 Month	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (Return) (acre-feet)	Other Water (acre-feet)	Transfers into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
Method								
January	60	0	0	97	0	0	0	157
February	711	0	0	9	0	0	0	720
March	384	0	0	43	0	0	0	427
April	2,533	0	0	72	0	0	0	2,605
May	4,063	0	0	125	5,383	0	0	9,571
June	6,626	0	0	215	4,356	0	0	11,197
July	9,143	0	0	187	2,571	0	0	11,901
August	7,952	0	0	223	3,261	0	0	11,436
September	3,427	0	0	66	1,186	0	0	4,679
October	2,229	0	0	63	0	0	0	2,292
November	2,037	0	0	0	24	0	0	2,061
December	1,329	0	0	93	0	0	0	1,422
TOTAL	40,494	0	0	1,193	16,781	0	0	58,468

Table 2

Ground Water Supply

2023 Month	District Groundwate (acre-feet)	Private Ag Groundwater *(acre-feet)
Method		
January	0	0
February	0	0
March	0	0
April	0	0
May	85	0
June	82	0
July	85	0
August	82	0
September	76	0
October	0	0
November	0	0
December	0	0
TOTAL	410	0

*normally estimated

Table 3

Total Water Supply

2023 Month	Surface Water Total (acre-feet)	District Groundwater (acre-feet)	Recycled M&I (acre-feet)	Total District Water Supply (acre-feet)
Method				
January	157	0	0	157
February	720	0	0	720
March	427	0	0	427
April	2,605	0	0	2,605
May	9,571	85	0	9,656
June	11,197	82	0	11,279
July	11,901	85	0	11,986
August	11,436	82	0	11,518
September	4,679	76	0	4,755
October	2,292	0	0	2,292
November	2,061	0	0	2,061
December	1,422	0	0	1,422
TOTAL	58,468	410	0	58,878

*Recycled M&I Wastewater is treated urban wastewater that is used for agriculture.

Precipitation Worksheet					Evaporation Worksheet				
2023	inches precip	ft precip	acres	AF/Year	2023	inches evap	ft evap	acres	AF/YEAR
Jan	3.52	0.29	25.87	24.85	Jan	1.46	0.12	25.87	122.93
Feb	1.55	0.13	43.79	42.07	Feb	2.08	0.17	43.79	208.10
Mar	3.86	0.32	47.10	45.25	Mar	2.96	0.25	47.10	223.83
Apr	0.09	0.01	2.35	2.25	Apr	5.90	0.49	2.35	11.15
May	0.07	0.01	2.10	2.02	May	6.61	0.55	2.10	10.00
Jun	0.00	0.00	0.32	0.31	Jun	7.87	0.66	0.32	1.52
Jul	0.00	0.00	5.64	5.42	Jul	9.25	0.77	5.64	26.79
Aug	0.11	0.01	5.14	4.94	Aug	7.53	0.63	5.14	24.44
Sept	0.01	0.00	0.00	0.00	Sept	5.53	0.46	0.00	0.00
Oct	0.00	0.00	0.00	0.00	Oct	4.15	0.35	0.00	0.00
Nov	0.44	0.04	0.00	0.00	Nov	2.35	0.20	0.00	0.00
Dec	1.88	0.16	0.00	0.00	Dec	1.34	0.11	0.00	0.00
TOTAL	11.53	0.96	132.30	127.12	TOTAL	57.03	4.75	132.30	628.76

Table 4

Agricultural Distribution System

2023 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitation (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
#1 Canal	43,336	26	1,126,736	8.0	0.0	0	0	8
#2 Canal	73,362	26	1,907,412	35.0	0.0	0	0	35
#3 Canal	68,385	30	2,051,550	37.0	0.0	0	0	37
1-2 A Lateral	12,778	8	102,224	2.3	0.0	0	0	2
Fourchy Lateral	11,458	8	91,664	2.1	0.0	0	0	2
Shaw Pipeline	4,650	3	13,950	0.0	0.0	0	0	0
Other Laterals	40,920	6	245,520	4.7	0.0	0	0	5
Intake Canal	5,600	40	224,000	4.5	0.0	0	0	5
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
TOTAL				93.6	0.0	0	0	94

Table 5

Crop Water Needs

2023 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Leaching Requiremen (AF/Ac)	Cultural Practices (AF/Ac)	Effective Precipitatio (AF/Ac)	Appl. Crop Water Use (acre-feet)
Alfalfa	750	3.23	0.1	0.1	0.0	2,573
Almonds	2,185	3.02	0.1	0.1	0.0	7,036
Asparagus	115	1.51	0.1	0.1	0.0	197
Cotton	3,415	2.38	0.1	0.1	0.0	8,811
Grain	1,210	1.03	0.1	0.1	0.0	1,488
Melons	1,895	1.41	0.1	0.1	0.0	3,045
Onions	400	1.51	0.1	0.1	0.0	684
Pasture	25	3.18	0.1	0.1	0.0	85
Pistachios ; 4th Lea	6,580	1.92	0.1	0.1	0.0	13,950
Pomegrantes	635	1.72	0.1	0.1	0.0	1,219
Tomatos	3,785	1.89	0.1	0.1	0.0	7,911
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
Crop Acres	20,995					46,997

Total Irrig. Acres 20,995 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2023 District Water Inventory

Type of Water	Location of Information		
Water Supply	Table 3		58,878
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	(intentional - ponds, injection)	minus	0
Seepage	Table 4	minus	0
Evaporation - Precipitation	Table 4	minus	(94)
Spillage	Table 4	minus	0
Transfers out of District		minus	16,781
Water Available for sale to customers			42,191
Actual Agricultural Water Sales 2023	From District Sales Records		40,470
Private Groundwater	Table 2	plus	0
Crop Water Needs	Table 5	minus	46,997
Drainwater outflow	(tail and tile, not recycled)	minus	2,394
Percolation from Agricultural Land	(calculated)		(8,921)
Unaccounted for Water	(calculated)		1,721

Table 7

Influence on Groundwater and Saline Sink

2023	
Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence on	1,984
Estimated actual change in ground water storage, including natural recharge)	0
Irrigated Acres (from Table 5)	20,995
Irrigated acres over a perched water table	10,000
Irrigated acres draining to a saline sink	4,000
Portion of percolation from agri seeping to a perched water table	(4,249)
Portion of percolation from agri seeping to a saline sink	(1,700)
Portion of On-Farm Drain water flowing to a perched water table/saline sink	3,500
Portion of Dist. Sys. seep/leaks/spills to perched water table/saline sink	100
Total (AF) flowing to a perched water table and saline sink	(2,349)

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (Return) (acre-feet)	Other Water (acre-feet)	Transfers into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
2014	53,102	0	0	1,296	0	0	0	54,398
2015	53,047	0	0	2,579	0	0	0	55,626
2016	59,326	0	0	1,481	9,193	0	0	70,000
2017	48,039	0	0	2,030	12,751	0	0	62,820
2018	46,861	0	0	1,981	10,000	0	0	58,842
2019	44,461	0	0	2,152	12,226	0	0	58,839
2020	44,713	0	0	2,161	11,518	0	0	58,392
2021	39,909	0	0	1,386	0	0	0	41,295
2022	42,931	0	0	1,244	0	0	0	44,175
2023	40,494	0	0	1,193	16,781	0	0	58,468
Total	472,883	0	0	17,503	72,469	0	0	562,855
Average	47,288	0	0	1,750	7,247	0	0	56,286

Addendum C

INFORMATION REQUIRED FOR DISTRICTS LOCATED IN DRAINAGE PROBLEM AREA

A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside of the San Joaquin Valley

Recommendations for Implementation
Firebaugh Canal Water District

Source Control

FCWD initiated a program in ***2001*** to line all surface water delivery canals to assist in reducing seepage losses that contributed to subsurface drainage problems. Farm units in FCWD have continually been urged to switch to sprinkler and drip systems, by both District and Industry Representatives, to improve source water application rates.

- FCWD has spent approximately ***$12, 650,000 in the last 10 years*** in an effort to substantially reduce seepage to deep percolation on all District irrigated lands.
- FCWD loan program to farm units has averaged ***$567,000/year since 2014.***

Land Retirement

FCWD has not implemented any land retirement program to date. Source control efforts, including District canal lining projects and grower irrigation improvements, have dramatically reduced drainage production within FCWD, making land retirement unnecessary.

Drainage Water Treatment

FCWD is an active member of the San Joaquin River Drainage Improvement Project (SJRIP). Firebaugh Canal moves approximately 800 a.f./year into the SJRIP lands where drainage waters are used to irrigate salt tolerant crops, such as JOSE TALL Wheatgrass and Pistachio Trees. FCWD will continue as an active member of this project.

- FCWD contributes ***$500,550 per year*** to the SJRIP Program.

Drainage Water Reuse

FCWD has a small amount of subsurface drain water that leaves the district and is captured by the San Joaquin River Improvement Project. This water, along with drainage flows from other entities, is reused as an irrigation source for salt tolerant crops, such as Jose Tall Wheatgrass. On average, FCWD discharges about 800 a.f. annually, although canal lining projects and improved irrigation systems may reduce this volume in the future.

- FCWD estimates it spends up to $***35,000 per year*** to assist growers in the co-mingle process and canal management of the reuse water.

Groundwater Pumping

Due to the Saline Sink that underlies the District, FCWD does not have a large groundwater pumping program, but shares a program with the Central California Irrigation District. (CCID)this program consists of seven wells drilled above the clay layer and perforated high in the pumping zone pump poor quality water into a neighboring districts canal system. Groundwater is used in co-mingling where quality allows such practice. In 2023, one irrigation well is on-line to augment water supplies to growers in need of extra water as crop needs arise. Widespread canal lining has reduced seepage to the extent that groundwater pumping, to alleviate high water tables, has seen some reduction since 2012.

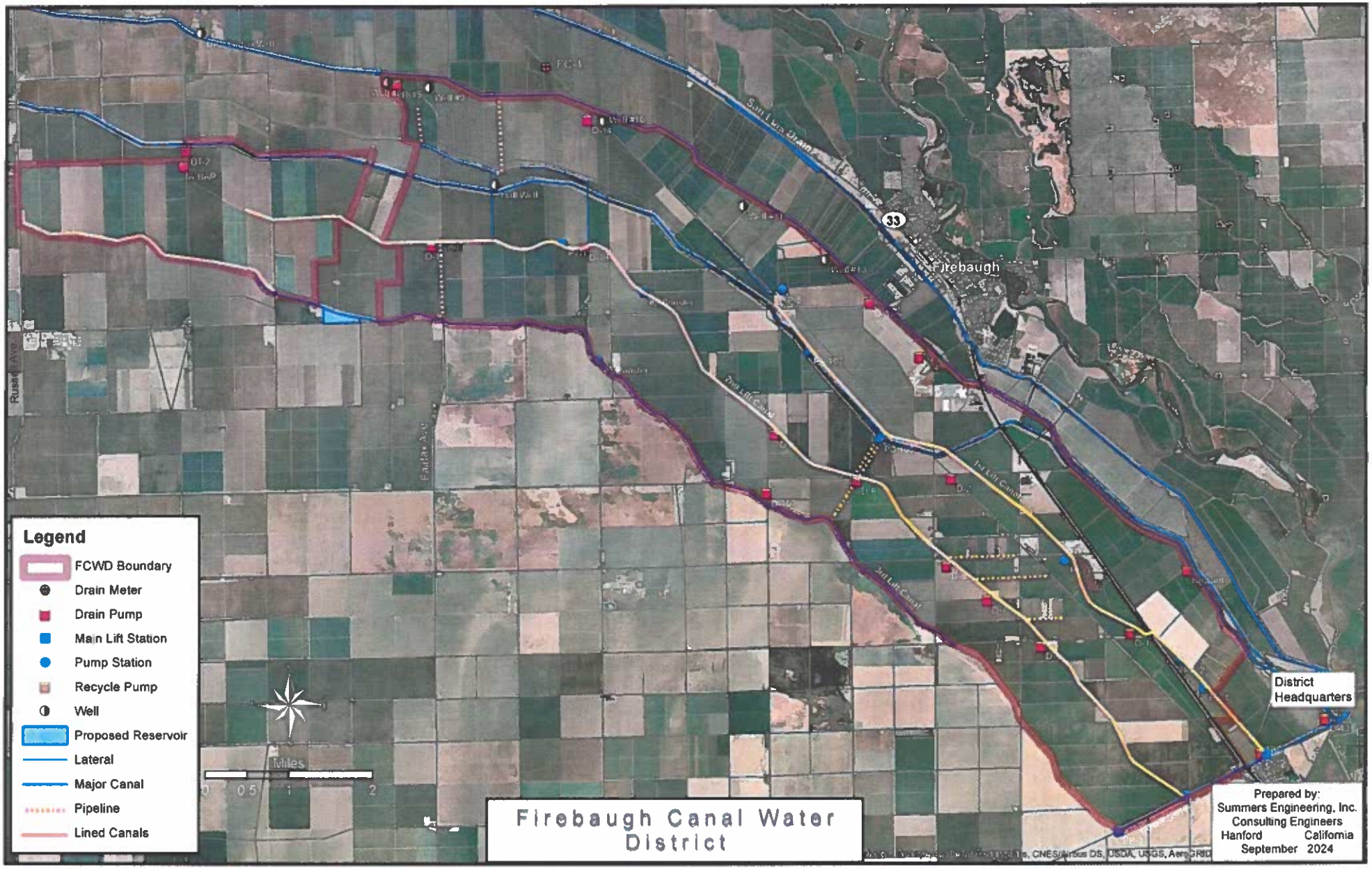
- FCWD budgets $***50,000 each year*** for pump monitoring, flow model studies on groundwater and reuse facility upgrades.

Evaporation Ponds

Due to the presence of naturally occurring selenium in the subsurface drain water, use of evaporation ponds is not a viable option for drainage management.

ATTACHMENT A

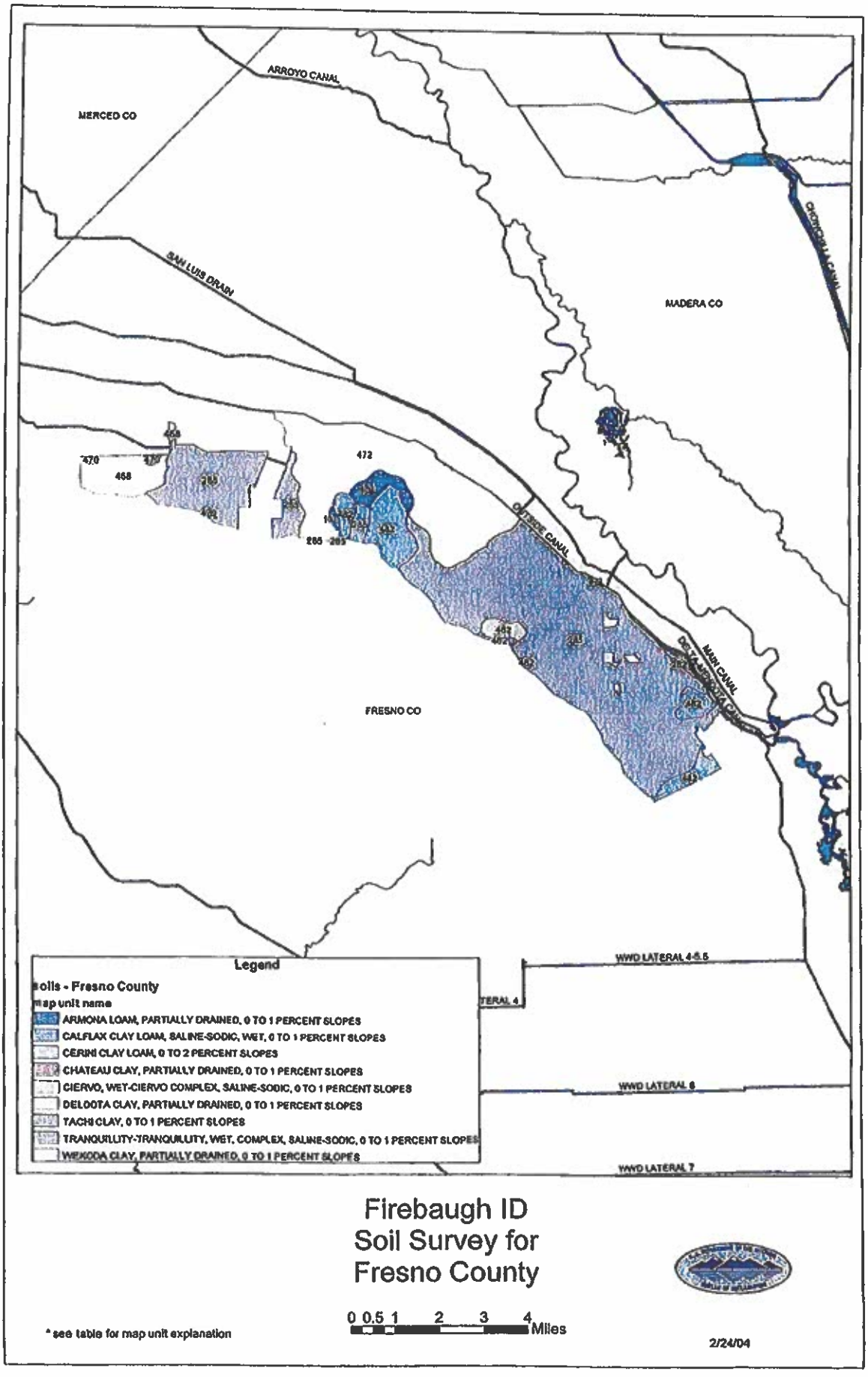
DISTRICT MAP



Document Path: G:\data\ARCVIEW\MAPS\FCWD\FCWD Basemap.mxd

ATTACHMENT B

DISTRICT SOILS MAP



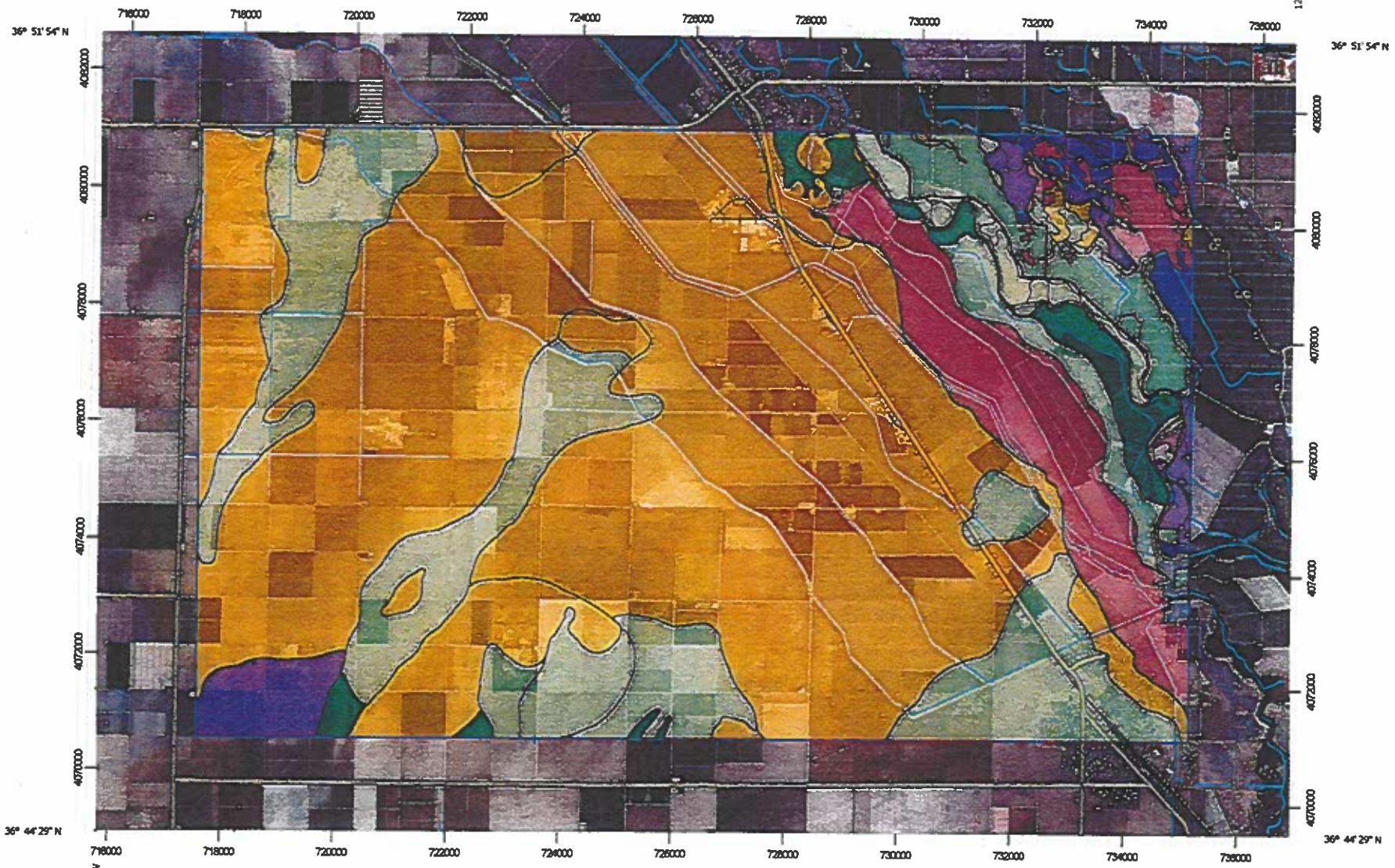
Firebaugh ID
Soil Survey for
Fresno County

* see table for map unit explanation

2/24/04

Firebaugh Irrigation District - Soil Map unit Explanation, Fresno County			
MUSYM	Sum_Acres	Sum_Hectar	Mls_muname
101	498.58	201.77	ARMONA LOAM, PARTIALLY DRAINED, 0 TO 1 PERCENT SLOPES
282	75.16	30.43	TACHI CLAY, 0 TO 1 PERCENT SLOPES
285	14102.15	5706.93	TRANQUILLITY-TRANQUILLITY, WET, COMPLEX, SALINE-SODIC, 0 TO 1 PERCENT SLOPES
452	235.73	95.40	CERVO, WET-CERVO COMPLEX, SALINE-SODIC, 0 TO 1 PERCENT SLOPES
468	1037.95	420.04	DELOOTA CLAY, PARTIALLY DRAINED, 0 TO 1 PERCENT SLOPES
470	70.09	28.37	CHATEAU CLAY, PARTIALLY DRAINED, 0 TO 1 PERCENT SLOPES
472	5535.60	2240.18	WEKODA CLAY, PARTIALLY DRAINED, 0 TO 1 PERCENT SLOPES
479	10.49	4.25	CERINI CLAY LOAM, 0 TO 2 PERCENT SLOPES
482	1942.53	786.11	CALFLAX CLAY LOAM, SALINE-SODIC, WET, 0 TO 1 PERCENT SLOPES

California Revised Storie Index (CA)—Eastern Fresno Area, California; Fresno County, California, Western Part; and Madera Area, California
(Firebaugh Canal WD southern portion)



Map Scale: 1:96,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 1000 2000 4000 6000

Feet
0 4500 9000 18000 27000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Grade 1 - Excellent
- Grade 2 - Good
- Grade 3 - Fair
- Grade 4 - Poor
- Grade 5 - Very Poor
- Grade 6 - Nonagricultural
- Not rated
- Not rated or not available

Soil Rating Lines
- Grade 1 - Excellent
- Grade 2 - Good
- Grade 3 - Fair
- Grade 4 - Poor
- Grade 5 - Very Poor
- Grade 6 - Nonagricultural
- Not rated
- Not rated or not available

Soil Rating Points
- Grade 1 - Excellent
- Grade 2 - Good
- Grade 3 - Fair
- Grade 4 - Poor
- Grade 5 - Very Poor
- Grade 6 - Nonagricultural
- Not rated
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eastern Fresno Area, California
Survey Area Data: Version 9, Sep 22, 2016

Soil Survey Area: Fresno County, California, Western Part
Survey Area Data: Version 11, Sep 12, 2016

Soil Survey Area: Madera Area, California
Survey Area Data: Version 10, Sep 12, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 23, 2016—Mar 11, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

California Revised Storie Index (CA)

California Revised Storie Index (CA)— Summary by Map Unit — Eastern Fresno Area, California (CA654)					
Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
Cr	Chino loam	Grade 2 - Good	Chino (85%)	20.6	0.0%
W	Water	Not Applicable for Storie Index	Water (100%)	70.8	0.2%
Subtotals for Soil Survey Area				**91.4**	**0.2%**
Totals for Area of Interest				**45,680.6**	**100.0%**

California Revised Storie Index (CA)— Summary by Map Unit — Fresno County, California, Western Part (CA653)					
Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
282	Tachi clay, 0 to 1 percent slopes	Grade 5 - Very Poor	Tachi, clay (91%)	3,091.2	6.8%
285	Tranquillity-Tranquillity, wet, complex, saline-sodic, 0 to 1 percent slopes	Grade 4 - Poor	Tranquillity, clay, saline-sodic (60%)	24,393.4	53.4%
			Tranquillity, clay, saline-sodic, wet (25%)		
286	Tranquillity clay, saline-sodic, wet, 0 to 1 percent slopes	Grade 4 - Poor	Tranquillity, clay, saline-sodic, wet (85%)	345.9	0.8%
320	Elnido sandy loam, drained, 0 to 1 percent slopes	Grade 1 - Excellent	Elnido, sandy loam, drained (85%)	916.7	2.0%
325	Palazzo sandy loam, drained, 0 to 1 percent slopes	Grade 2 - Good	Palazzo, sandy loam, drained (85%)	728.8	1.6%
445	Excelsior sandy loam, 0 to 2 percent slopes, MLRA 17	Grade 1 - Excellent	Excelsior (85%)	79.8	0.2%
459	Ciervo clay, 0 to 2 percent slopes	Grade 3 - Fair	Ciervo, clay (80%)	745.3	1.6%
462	Ciervo, wet-Ciervo complex, saline-sodic, 0 to 1 percent slopes	Grade 4 - Poor	Ciervo, clay, saline-sodic, wet (50%)	1,744.3	3.8%
472	Wekoda clay, partially drained, 0 to 1 percent slopes	Grade 4 - Poor	Wekoda, clay, partially drained (85%)	765.1	1.7%

California Revised Storie Index (CA)—Summary by Map Unit — Fresno County, California, Western Part (CA663)					
Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
475	Posochanet clay loam, saline-sodic, wet, 0 to 1 percent slopes	Grade 2 - Good	Posochanet, clay loam, saline-sodic, wet (88%)	660.5	1.4%
479	Cerini clay loam, 0 to 2 percent slopes	Grade 1 - Excellent	Cerini, clay loam (85%)	135.4	0.3%
482	Calflax clay loam, saline-sodic, wet, 0 to 1 percent slopes, MLRA 17	Grade 2 - Good	Calflax, clay loam, saline-sodic, wet (85%)	7,561.4	16.6%
941	Bisgani-Elnido association, 0 to 1 percent slopes	Grade 4 - Poor	Bisgani, loamy sand (45%)	110.3	0.2%
981	Sewage disposal pond	Not Applicable for Storie Index	Sewage disposal pond (100%)	46.9	0.1%
Subtotals for Soil Survey Area				41,324.8	90.5%
Totals for Area of Interest				45,680.6	100.0%

California Revised Storie Index (CA)—Summary by Map Unit — Madera Area, California (CA661)					
Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
CaA	Cajon loamy sand, 0 to 1 percent slopes	Grade 2 - Good	Cajon (85%)	5.3	0.0%
CeaA	Chino clay loam, slightly saline-alkali, 0 to 1 percent slopes	Grade 3 - Fair	Chino (85%)	13.9	0.0%
CfaA	Chino fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes	Grade 3 - Fair	Chino (85%)	52.4	0.1%
CgA	Chino loam, 0 to 1 percent slopes	Grade 2 - Good	Chino (85%)	73.7	0.2%
CgaA	Chino loam, slightly saline-alkali, 0 to 1 percent slopes	Grade 3 - Fair	Chino (85%)	193.7	0.4%
CgbA	Chino loam, moderately saline-alkali, 0 to 1 percent slopes	Grade 4 - Poor	Chino (85%)	15.0	0.0%
CgcA	Chino loam, strongly saline-alkali, 0 to 1 percent slopes	Grade 5 - Very Poor	Chino (85%)	47.9	0.1%
CmA	Columbia fine sandy loam, 0 to 1 percent slopes	Grade 2 - Good	Columbia (85%)	449.0	1.0%

California Revised Storie Index (CA)—Summary by Map Unit—Madera Area, California (CA651)

Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
CoA	Columbia loamy sand, 0 to 1 percent slopes	Grade 3 - Fair	Columbia (85%)	97.7	0.2%
CrB	Columbia soils, channeled, 0 to 8 percent slopes	Grade 2 - Good	Columbia, soils (75%)	50.7	0.1%
FaaA	Foster clay loam, slightly saline-alkali, 0 to 1 percent slopes	Grade 3 - Fair	Foster (85%)	179.5	0.4%
FacA	Foster clay loam, strongly saline-alkali, 0 to 1 percent slopes	Grade 5 - Very Poor	Foster (85%)	70.1	0.2%
FbA	Foster loams, 0 to 1 percent slopes	Grade 2 - Good	Foster, loam (45%) Foster, FSL (45%)	1,287.7	2.8%
FbaA	Foster loams, slightly saline-Alkali, 0 to 1 percent slopes	Grade 3 - Fair	Foster, loam (45%) Foster, FSL (45%)	93.9	0.2%
FbbA	Foster loams, moderately saline-Alkali, 0 to 1 percent slopes	Grade 4 - Poor	Foster, loam (45%) Foster, FSL (45%)	111.8	0.2%
FbcA	Foster loams, strongly saline-Alkali, 0 to 1 percent slopes	Grade 5 - Very Poor	Foster, loam (45%) Foster, FSL (45%)	26.6	0.1%
FdcA	Foster-Chino loams, strongly saline alkali, 0 to 1 percent slopes	Grade 5 - Very Poor	Foster (40%) Chino (40%)	365.2	0.8%
GbA	Grangeville fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes	Grade 3 - Fair	Grangeville (85%)	151.4	0.3%
GdA	Grangeville fine sandy loam, over traver soils, slightly saline alkali, 0 to 1 percent slopes	Grade 3 - Fair	Grangeville (85%)	42.4	0.1%
Rh	Riverwash	Not rated	Riverwash (100%)	94.6	0.2%
TbA	Temple clay loam, 0 to 1 percent slopes	Grade 4 - Poor	Temple (85%)	8.2	0.0%
TnA	Traver loam, moderately saline alkali, 0 to 1 percent slopes	Grade 3 - Fair	Traver (85%)	0.1	0.0%

California Revised Storie Index (CA)—Summary by Map Unit — Madera Area, California (CA651)					
Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
ToA	Traver loam, strongly saline-alkali, 0 to 1 percent slopes	Grade 5 - Very Poor	Traver (85%)	89.5	0.2%
TrA	Traver-Chino complex, moderately saline alkali, 0 to 1 percent slopes	Grade 3 - Fair	Traver (40%)	295.7	0.6%
TwA	Tujunga loamy sand, 0 to 3 percent slopes	Grade 2 - Good	Tujunga (85%)	227.3	0.5%
VdA	Visalia sandy loam, 0 to 3 percent slopes	Grade 2 - Good	Visalia (85%)	11.3	0.0%
W	Water	Not Applicable for Storie Index	Water (100%)	199.7	0.4%
WvA	Wunjey very fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes	Grade 3 - Fair	Wunjey (85%)	8.7	0.0%
WxA	Wunjey very fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes	Grade 5 - Very Poor	Wunjey (85%)	1.4	0.0%
Subtotals for Soil Survey Area				**4,264.3**	**9.3%**
Totals for Area of Interest				**45,680.6**	**100.0%**

Description

The Revised Storie Index is a rating system based on soil properties that govern the potential for soil map unit components to be used for irrigated agriculture in California.

The Revised Storie Index assesses the productivity of a soil from the following four characteristics:

- Factor A: degree of soil profile development
- Factor B: texture of the surface layer
- Factor C: steepness of slope
- Factor X: drainage class, landform, erosion class, flooding and ponding frequency and duration, soil pH, soluble salt content as measured by electrical conductivity, and sodium adsorption ratio

Revised Storie Index numerical ratings have been combined into six classes as follows:

- Grade 1: Excellent (81 to 100)
- Grade 2: Good (61 to 80)
- Grade 3: Fair (41 to 60)
- Grade 4: Poor (21 to 40)
- Grade 5: Very poor (11 to 20)
- Grade 6: Nonagricultural (10 or less)

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

ATTACHMENT C

DISTRICT RULES AND REGULATIONS

FIREBAUGH CANAL WATER DISTRICT
RULES AND REGULATIONS
GOVERNING OPERATIONS OF DISTRICT
FACILITIES AND SALE OF WATER

Rule 1: Control of System. The maintenance and operation of the canals, outlets, head-works, pumping facilities and other physical properties and works of the District shall be under exclusive management and control of the manager appointed by the Board of Directors and no other persons except the manager, his employees and assistants shall have any right to interfere with the maintenance and operation of said canals, head-works, pumping facilities and other physical properties and works in any manner except in case of an order from the Board of Directors.

Rule 2: Installation of Gates, Pumps and Structures. No pumps, gates, platforms, take-out siphons or other structures or devices shall be placed in any canal, ditch or conduit of the District except pursuant to plans adopted by the Board of Directors or pursuant to an order issued by the Board. No person shall divert or take water from any canal, ditch or conduit belonging to the District or under its control or make any opening therein or tamper with, change, molest, disturb, or in any manner interfere with any gates, take-out or other structure or facility or device in any such canal, ditch or conduit except under the direction and authority of the manager or the Board of Directors of the District.

Rule 3: Private Ditches.

a. All private ditches or community ditches shall be cleaned and Maintained by the user without expense to the District and shall be of sufficient size to carry the maximum quantity of water that is ordered. No privately owned ditches shall be constructed upon or be permitted to impinge upon any right-of-way belonging to the

District without the District's consent in writing. The user or users of private ditches shall be responsible for any damage to District property that results from the cleaning and maintenance of private ditches or community ditches.

b. Where ditches must be constructed or enlarged in order to carry Water from existing District laterals to the land to be served, the landowner or user requesting water for such land must provide the right-of-way and construct or enlarge such connecting ditch from the land to a District lateral designated by the District.

c. Delivery of water by the District will be made at such turn-out on The system as the water user may designate provided there is sufficient facilities and sufficient water available for the delivery at the point designated.

Rule 4: Distribution of Water. Orders for water and shutoffs must be placed at the District office or with the Canal System Operator; twenty-four hours (24) in advance. Except as otherwise provided herein, all water distributed for irrigation purposed shall be apportioned ratably to each holder of title to land upon the landowner making proper application for water and making payment of the water tolls, charges and land assessments as may be fixed by the Board. Upon failure of any landowner to make application for water or pay tolls, charges or land assessments, the water belonging to such landowner may be allotted by the District to other landowners offering to make the required payment.

Rule 5: Applications for Water.

a. On or before January 1st of each year, each landowner or water user desiring water for the ensuing year shall file at the District's office an application for water on a crop map provided by the landowner or water user for this purpose.

Payment for water shall be made in accordance with the terms of the application. The base water charge per acre as established by the Board of Directors shall be paid monthly for water used.

b. All obligations incurred hereunder for irrigation water or which is incidental thereto or to the delivery thereof or any other debt or loan shall constitute a debt owned by the landowner to the District and shall be secured by a lien against the land upon which the water is used or debt occurred. In the event any owner of land within the District shall lease all or a portion of the land, such lessee shall be jointly and severally liable with the landowner for all obligations incurred in connection with water used upon the premises or a debt of any type.The District will, upon request by the landowner, mail copies of all billings for water and incidental charges to the lessee but such action shall not in any manner release the landowner from the obligation to pay for water used in the event that the lessee fails to do so.

c. Monthly billings shall be mailed to water users in the District for water, overhead, electricity and other incidental expenses as shall be involved in the acquisition and delivery of irrigation water in the District. Such billings shall become delinquent thirty (30) days after the date of mailing and if not paid within such time, a notice of delinquency shall be mailed to the landowner. Delinquent bills shall incur a penalty of ten percent (10%) and said penalty shall be added to the billing. Delinquent bill shall bear interest at the rate of 1-1/2% per month. If payment is not received on or before the 60th day after the mailing of such delinquent notice, the District may withhold deliveries of water from the landowner until such obligations have been paid in full.

Further, in case of such default, all payments for irrigation water deliveries may be required in advance for the remainder of the crop year and for the next water year.

Rule 6: Time for Fixing Rate of Tolls and Charges. The rates of tolls and charge for use of water shall be fixed and determined annually by the Board of Directors between November 1 and December 31 for the next year.

Rule 7: Drain Water. No landowner or landowner/lessee within the District shall, at any time, discharge drainage water into any of the District's canals or conduits without permission of the Board of Directors or the manager. The District provides drainage service to district landowners. Historically, drainage service was provided by discharge of irrigation return flow and tile water to Grasslands where such discharge would enter the San Joaquin River. The Central Valley Regional Water Quality Control Board has adopted a 2 parts per billion standard governing the discharge of selenium to the Grasslands channels and some sloughs, and 5 parts per billion standard for discharge to the San Joaquin River. In an effort to meet these stringent standards, the District has joined with other Grassland drainers in a project which allows the use of a portion of the San Luis Drain to shunt drainage water around the Grasslands for discharge to Salt Slough and the San Joaquin River. Agreements with regulatory agencies which permit this project severely limit selenium loads that can be discharged. These limitations require extraordinary steps be taken; one such step is an urgent need to reduce the quantity of irrigation return flow and tile discharges from all of the draining entities. To meet this objective, the District adopted a "no tail water" policy. Any consumer who fails to adhere to this policy will be deemed to be in violation of Rule 9, Waste of Water,

and the District reserved the right to limit or terminate water deliveries to the offending lands.

Rule 8: Waste of Water. All reasonable steps shall be taken to eliminate waste of water in the District. Any consumer wasting water on roads or vacant land or land previously irrigated either willfully, carelessly or on account of defective ditches or laterals, or who shall irrigate certain portions of land to an unreasonable depth or use an unreasonable amount of water in order to properly irrigate other portions or whose land has been improperly prepared for the economical use of water may be refused the use of water until such conditions are remedied. The District and its Board of Directors reserve the right to refuse delivery of water to any lands when it appears to the satisfaction of the Board of Directors that its proposed use or method of use will require such extensive quantities of water as will constitute waste.

Rule 9: Shortage of Water. In the event it shall, at any time, be impossible for the District to deliver the full supply of water required by the water users; because of shortage of water or lack of ditch or pumping capacity or any other reason such supply shall be available and subject to delivery shall be prorated on an acreage basis to such acreage as is eligible to receive the water until such time as delivery of a full supply can be made.

Rule 10: Access to Land and Ditches. The Manager, Maintenance Superintendent, Canal Workers and other agents of the District shall have free access at all times to all lands irrigated from the canal system and to all canals, laterals, and ditches for the purpose of inspection, examination, measurements, surveys or other necessary purposes of the District with the right of installation, maintenance, control and regulation

of all meters or other measuring devices, gates, turnouts or other structures necessary or proper for the measurement and distribution of water.

Rule 11: District Not Liable for Damages. Neither the District, the Board of Directors, its officers, agents, consultants or employees shall be liable for any loss or damage which may occur as a result of terminating or shutting off service in accordance with the provisions of the bylaws or these rules and regulations, nor for taking any other action provided for by the bylaws or by these rules and regulations. The District assumes no liability for damages to persons or property occasioned through defective ditches, laterals, meters or measuring devices.

Rule 12: Enforcement of Rules and Regulations.

a. Refusal or failure to comply with these rules and regulations or any interference with the proper discharge of the duties of any person employed by the District shall be considered sufficient cause for shutting off the water of the offending person; and water will not again be furnished until, and in the opinion of the Board of Directors, full compliance has been made with all requirements of these rules and regulations and assurance has been given of future compliance with these rules and regulations.

b. The foregoing rules and regulations are established and Adopted pursuant to Water Code Sections 35423 and 35424 and the bylaws of the District. Any violation of these rules and regulations is a misdemeanor and the violator shall be subject to penalty as provided by the law and bylaws of the District.

Rule 13: Wheeling of Water in District Facilities. Anyone who wishes to use the District ditches and/or facilities to wheel or transfer District or non-District water must first obtain authorization from the Manager or Board of Directors.

Rule 14: Water Transfers. Water transfers for use of water outside the District boundaries may only be accomplished with the written agreement and compliance with the agreement terms established by the Board of Directors and only in compliance with the Districts Transfer Policy, Federal and State law. Transfers to lands outside the District boundaries are not a matter of right. If any terms of a written agreement specifying the means and conditions of a transfer shall be violated or failed to be performed, the landowner shall be subject to the penalties provided under the terms of the agreement but shall further be barred from receiving water upon any lands within the boundaries of the District until such time as the District Board of Directors shall determine that the transfer agreement terms have been fully complied with. A breach of the terms of a water transfer agreement which cannot be remedied by physical performance may result in a suspension of the right to receive water for up to one calendar year after a hearing is conducted by the Board of Directors in addition to the remedies, fines or penalties established under the written agreement and under these rules and regulations.

ATTACHMENT D

TRANSFER POLICIES

FIREBAUGH CANAL WATER DISTRICT
WATER TRANSFER POLICY

Firebaugh Canal Water District (FCWD) has the right to appropriate water from the San Joaquin River. Under the terms of the Exchange Contract with the Bureau of Reclamation, the District receives substitute water generally delivered through the Delta-Mendota Canal to Mendota Pool. The District will permit the transfer of substitute water pursuant to this policy.

Eligible Transferors. Only District landowners may transfer their water allocation. The District will only permit transfer of water from a landowner within the District to his or her land in a recipient District. Fallowing transfers may occur only from the Landowner who owns the fallowed land within FCWD to land owned by that same Landowner within a Recipient District. As used herein, the word "Landowner" shall mean the owner of the right through deeds or contracts of sale to possession of property for farming purposes, which contract or deed must provide the right to control and utilize on the land the surface water provided by FCWD upon that land. A lessee, regardless of the term of the lease, is not a Landowner for purposes of this policy, nor is a lessee who holds an option to purchase considered a Landowner for the purposes of this policy. The holder of a life estate entitling the person to possession and use of the land and the surface water provided by FCWD upon that land shall be deemed a Landowner.

If the land is owned by a corporation, trust, partnership, or other form of business entity, provided all other owners of that business entity or beneficiaries consent in writing, a person holding an undivided interest may to the extent of that proportional interest be considered a Landowner of that percentage of the acreage, provided that the proposed land to receive the transfer is the same person or an entity holding title in which that individual holds a similar percentage interest. The District will not approve a transfer between entities of the Landowner's proportion of the surface water otherwise transferable unless all of the other holders of proportional interest of both the transferring land and the recipient land agree to be parties to the contract indemnifying, defending and holding the District harmless from any claim.

The parents, spouse or natural or adopted children or grandchildren of a Landowner will be treated as identical with the Landowner for the purposes of transfers because these ownership differences often arise from estate planning, governmental entitlement or similar requirements.

A person who does not own that interest in land within FCWD, and in addition, the interest in land to which the water is to be transferred, for at least one (1) calendar year prior to January 1 of the year in which the transfer is proposed to occur, shall not be permitted to transfer water under the District programs until that ownership qualification period has been complied with.

1. **District Approval**. The District strives to manage water transfers so that the water supply, operations, and financial condition of the District and the Exchange Contractors, and water users within the Exchange Contract service area are not unreasonably impacted. In order to obtain District approval of a water transfer proposal, the transferor must demonstrate that the transfer does not unreasonably impact:

    a. The quantity and quality of the water supply available to the District and its water users;

    b. The ability of the District to blend irrigation return flow and drainage water in its canals to meet water quality standards imposed by the Regional Water Quality

Control Board;

c. The Districts operations including, but not limited to the ability of the District to meet its delivery obligations, obtain additional water supplies, and undertake conservation measures, exchanges, and transfers;

d. The Districts financial condition and its cost of providing water service to its water users;

e. The ability of the District or its water users to provide drainage to lands, including the ability to meet regulatory requirements relating to the discharge of agricultural drainage; and

f. Other relevant factors that may create an adverse financial, operations, or water supply impact on the District or its water users.

g. The ability of neighboring lands to continue to farm and cultivate crops without the fallowed land creating noxious weeds, dust, insect or disease conditions which may impact those neighboring lands.

3. **Water Transfer Proposal.** All transfers which an individual landowner wishes to make must be presented to the District for processing. In any water year, the total water to be transferred shall not exceed that quantity of water that the District determines can be safely transferred without adversely impacting the quantity and quality of the water supply available to the District and its water users. The District will also determine the quantity of water for the water year that the District needs in order to provide for blending of irrigation return flow and drainage water in its canal systems to meet regulatory requirements. The total water allowed to be transferred shall be computed first after considering these factors and, then, after subtracting the quantity of water needed to offset transportation, evaporation, seepage, metering or measurement error, and any amounts necessary to satisfy agreements with the other Exchange Contractors.

4. **Consumptive Use Limitation.** Only water that would have been consumptively used or irretrievably lost to beneficial use during the term of the transfer may be transferred, and the transfer quantity may not exceed the transferors' allocation of water. The District reserves the right to limit transfers during specific months to the quantity of water that would have been consumptively used or irretrievably lost to beneficial use by the transferor during those months.

5. **Correlative Share Limitation**. The amount of District water that can be transferred without unreasonable impacts on the District and its water users is limited. The District considers the rights of individual landowners to transfer their water supplies to be limited to a correlative share of the total transferable supply. The District will not approve any transfer proposal that would prevent other landowners from transferring their correlative share of the transferable supply of District water.

6. **Groundwater Limitations:**

a. **General Limitation.** The District will not approve any water transfer involving a substitution of groundwater that the District believes (i) is likely to result in significant long-term adverse impacts on groundwater conditions within the District's service area, (ii) unreasonably interferes with pumping rates or capacities of wells within the Districts service area, or, (iii) interferes with the Districts ability to meet water quality objectives imposed by the Central Valley Regional Water Quality Control Board or other agency having jurisdiction and regulatory authority of the quality of waters used within or discharged from the Districts service area. This limitation shall also apply to water transfer proposals whereby groundwater extracted from lands within the District service area is wheeled in District facilities for use within the Districts service area.

b. **Critical Year Limitation.** The District has determined that groundwater pumping within its boundaries during critical water years as defined by the Exchange Contract results in significant long-term adverse impacts on groundwater conditions within the Districts service area that in turn causes unreasonable impacts on the water supply of the District and its water users; therefore, the District will not approve any water transfer proposal that involves pumping of groundwater in critical water years unless the impacts to water quality can be shown not to effect overall water quality.

7. **Transfer Limitations.** A transfer will not be approved if the District determines that the water transfer is likely to increase drainage requirements or otherwise cause a deleterious effect on District lands downslope of the lands irrigated as a result of the transfer. The transfer will not be approved unless the Transferor's plan for the lands from which the water will be removed includes a full, detailed and feasible plan to maintain any fallowed lands in a condition in which the lands will not create a risk of insect infestation, disease, dust, noxious weeds or other detrimental condition that may affect neighboring lands and assurances that the plan will be implemented.

8. **Compliance with Law and Regulations.** Transfer proposals must comply with all provisions of law including but not limited to the provisions of the California Environmental Quality Act (CEQA).

9. **Submission of Proposals:**

a. **Preliminary Proposals.** A transferor may submit a preliminary water transfer proposal to the District prior to the submission of a formal water transfer proposal. The purpose of a preliminary water transfer proposal is to provide the opportunity for informal review by District staff in order to advise the transferor of possible requirements, conditions or objections if a formal proposal is made. The response of the District to a preliminary proposal shall be deemed tentative and subject to change if a formal transfer proposal is made.

b. **Formal Proposals.** No later than the date the formal water transfer proposal is submitted to the USBR, the transferor shall submit two (2) complete copies to the District. A proposal shall be deemed complete for purposes of District review only

when it has been deemed complete by the USBR and contains sufficient information for the District to determine the impact of the proposed transfer on operations of the District, and that it has been analyzed for compliance with CEQA. The transferor must supply any additional information requested by the District in order to enable the District to effectively review the proposal.

10. **Hearings.** The District may conduct one or more public hearings in order to determine whether the proposed transfer is likely to have am impact on the water supply, operations and financial condition of the District and its water users, and to ensure compliance with CEQA. The transferor and the transferee, or their representative, shall attend any such hearing if requested to do so by the District in order to respond to questions and comments regarding the impact of the proposed water transfer.

11. **Future Modifications.** District-approved transfers shall be subject to modification from time to time in order to respond to:

a. Changes in applicable laws, regulations, contracts and court decisions;

b. Changed circumstances that cause a transfer to result in unreasonable impacts on the water supply, operations or financial condition of the District or its water users;

c. Proposals by the water users within the District to transfer their correlative share of the Districts transferable water supply.

12. **Costs.**

a. The transferor must demonstrate that the transferor has paid or has made acceptable arrangements to pay all costs associated with developing a complete water transfer proposal, including the costs associated with necessary environmental review and District staff and attorney review necessary to process the transfer proposal.

b. The transferor shall be responsible to pay all costs incurred by the District in processing the water transfer proposal and administering the water transfer itself. Such costs shall be charged to the transferor on a time-and-materials/acre-foot basis in accordance with generally accepted accounting practices. A deposit, in an amount to be fixed by the Board of Directors, shall accompany the proposal. If it appears to the District that the deposit will be inadequate to cover the Districts costs, the District may issue a written cost estimate, or estimates, to the transferor. The transferor shall deposit with the District the funds necessary to meet such supplemental cost estimates. The District shall charge its costs against the transferors' deposits and shall render an accounting to the transferor upon request, but not more often than monthly. Any unexpended portion of the transferors' deposits shall be refunded upon completion of the transfer. If the transferor fails to deposit sufficient funds to cover the Districts costs, the deficiency shall be due upon submission of an invoice from the

District to the transferor. If the transferor fails to pay the invoice, the amount due may, at the Districts election, be added to the transferors' property taxes or secured by recordation of a lien certificate pursuant to Water Code '37212.

13. **Charges.** Before any water is transferred in a given water year, the transferor shall pay to the District in full:

a. All additional water rates and charges due to the Bureau of Reclamation or other agency that the District is obligated to collect on account of the approved water transfer.

b. The Districts water charges for that years water supply to the land from which the water is being transferred

c. Any standby charges or assessments attributable to the subject land for the year of the transfer, and any delinquencies on account of past water charges, standby charges or assessments.

14. **Indemnification.** The transferor and transferee are required to defend, indemnify, and hold harmless the District against any claims of third parties that the transfer:

a. Violates the terms of the Second Amended Contract for Exchange of Waters, Contract No. Ilr-1144, dated February 14, 1968;

b. Is not a beneficial or reasonable use of water;

c. Violates any law or regulation including, but not limited to the National Environmental Policy Act (NEPA), CEQA, State and Federal Endangered Species acts, water quality statutes, and Area of Origin laws; or

d. Has caused or will cause injury or damage to any person or property, including violations of any contracts, leases, trust deeds or water rights.

The transferor and transferee are also required to defend, indemnify and hold harmless the District from any claims that the transferor or transferees have breached any contractual or statutory duties pertaining to the transfer.
In addition, the transferor shall relinquish for the duration of the approved transfer all entitlement to receive the water supply that is the subject of the approved transfer. The transferor and transferee shall abide by the termination date of the transfer unless extended in the manner provided by law and shall not contest the return of the transferred water supply to the Districts service area upon such termination.

The transferor shall provide the necessary assurances to the District that the transferee has agreed

to abide by the termination date as set forth above and that the transferee has agreed to waive any claim of dependency, detrimental reliance, or intervening public use as a basis for extending the water transfer beyond its approved term.

Prior to approval of the proposed transfer, the transferor shall deliver to the District an agreement, in a form acceptable to the District, signed by the transferor and the transferee, by which they agree to conform to this policy, and in particular to the requirements of this Section.

The agreement shall provide among other terms for the compliance with the plan for maintenance of the land and facilities upon the land from which the water is transferred in such a condition that the land will not create a risk of detrimental impacts to surrounding lands. The District shall be granted the right to perform those measures at the cost of the transferor if the measures are not fully and timely complied with.

15. **Water Transfers.** Water Transfers for use of water outside of the District boundaries may only be accomplished with the written agreement and compliance with the agreement terms established by the Board of Directors and only in compliance with Federal and State law. Transfers to lands outside of the District boundaries are not a matter of right. If any terms of a written agreement specifying the means and conditions of a transfer shall be violated or fail to be performed, the landowner shall be subject to the penalties provided under the terms of the agreement but shall further be barred from receiving water upon any lands within the boundaries of the District until such time as the District Board of Directors shall determine that the transfer agreement terms have been fully complied with. A breach of the terms of a water transfer agreement which cannot be remedied by physical performance may result in a suspension of the right to receive water for up to one calendar year after a hearing is conducted by the Board of Directors, in addition to the remedies, fines or penalties established under the written agreement and under these rules and regulations.

16. Maximum Quantity of Water Transferable from the Exchange Contractors Service Area due to fallowing:

Land Fallowing, Technical Standards and Guidelines

1. The requirements of this section will be the responsibility of the Entity from which the fallowing transfer is proposed to provide or implement.
2. **Maximum Quantity of Transferable Water**
    a. The maximum quantity of water (Max Transferable) that can be transferred by a landowner fallowing land is the *lesser of the monthly* ***Consumptive Use*** *of the crop being fallowed or the* ***Exchange Contractor Entity Deliverable Monthly Entitlement.*** (Subject to **Adjustments** within paragraph d, and the limits or reductions within Part 2 of 2 paragraphs 3c., 3d., and 3e. of this Appendix.)
    b. **Consumptive Use**

i. The consumptive use will be calculated using the average of the crops grown on the land for the past three normal water years.
ii. Consumptive Use (CU) = Evapotranspiration Crop + Required Leaching Fraction (LF) – Effective Precipitation.
    1. CU = Etc + LF – EP
iii. Etc is calculated on a monthly time step for the calendar year. Data on the baseline three year average ETo and rainfall is collected from the nearest CIMIS station(s). The crop coefficients (Kc) are taken from the SWRCB report # 84-1.
iv. LF is calculated based on the methodology outlined in the Western Fertilizer Handbook. The ECe and ECw are shown on the attached example. However these may be updated by the Exchange Contractors.
v. EP is 50% of the three year average rainfall measured at the nearest CIMIS station(s).

c. **Exchange Contractor Entity Deliverable Monthly Entitlement**
    i. The deliverable monthly entitlement is that quantity of Exchange Contract Water, on average, (not other water such as well water) that can be delivered to farmed fields within the entity.
    ii. The deliverable monthly entitlement is calculated on a per acre basis.
        1. The deliverable monthly quantities are the Division of Waters Agreement quantities less system losses and other commitments divided by total entity acreage.

d. **Adjustments**
    i. The deliverable monthly entitlement may be accumulated (bath tubbed) for the 7-month period so long as the bath tub is being provided by Reclamation in accordance with the Refuge Water Transportation Agreement.

3. **Determination of Acreage of Fallowed Land**
    a. Acreage of Fallowed land will be based on farmed acres not assessed acreage.
        i. The following are acceptable methods for determining farmed acreage:
            1. FSA data base;
            2. Measurements based on aerial photography;
            3. Field measurements, and;
            4. Equivalent methods approved by the transfer committee.
    b. To the extent possible whole fields will be fallowed.
    c. If only a portion of a field is to be fallowed then the fallowed portion must be physically separated from the farmed field by levee or drain. (It is important that surface water not be applied to the fallowed land.

TECHNICAL STANDARDS AND CHECKLIST FOR A COMPLETE WRITTEN PROPOSAL FOR A TRANSFER FROM AN ENTITY ON BEHALF OF LANDOWNERS

1. Name and address of Transferring Entity
2. Names, addresses and locations of the landowners for whom the Transferring Entity is Transferring water on behalf of.
3. If all or a portion of the transfer proposal by the Entity is on behalf of a Landowner for his own use in another District, then:
    a. Provide name, address and location of the Receiving District
    b. Provide detailed location maps of the area(s) proposed to receive the transferred water.
    c. Provide documentation (deed or other equivalent proof) showing the same ownership of area(s) proposed both to develop water within the Entity and to receive water consistent with the transferring Entities Transfer Policy. The ownerships must be identical unless the Entities Transfer Policy proposing the transfer requires the reduction in the quantity of the transfer based on the percentage of ownership difference between the in-District land developing the transfer water AND the receiving land in another District, then the District shall provide the calculations for the reduced transfer quantities, and such a transfer will be allowed and the reduction shall be applied.
    d. Provide a signed statement by the landowner that they are also the 100% farming entity of the receiving lands, or, if the landowner is not the 100% farming entity, then the landowner shall provide documentation (Reclamation Reform Act form or other equivalent proof) showing the percentage of interest the landowner has in the farming interest on the receiving land. The Entity proposing the transfer on behalf of the landowner shall provide the calculations to show that the transfer has been reduced based on the percentage. (Example: Landowner has a 50% interest in the farming operation then the transfer will be reduced by 50%).
    e. The quantity of the transfer to the Receiving District shall also be limited to the deficit below a 100% allocation for the Receiving District as of April 1 in the year in which the transfer is to occur. (Example: The receiving District has an allocation of 3.0 acre-feet per acre at a 100% CVP allocation. If the declared CVP allocation as of April 1 is 50%, then the transfer will be limited to 1.5 acre-feet per acre on the receiving land.)
4. For Fallowing transfers:
    a. Provide crop maps showing the locations of fields being fallowed.
    b. Provide a tabulation of the acreage of fields being fallowed and the crops grown during the last three normal water years.
    c. State the quantity of water involved within the transfer and identify the proposed use for the transferred water.
    d. For transfers based on fallowing, provide the calculations of the **Maximum Quantity of Transferable Water** based on the Land Fallowing Technical Standards and Guidelines.

e. State that the entity will be responsible to field verify that fallowing is accomplished as proposed and that an end of the year report on the fallowed lands will be provided.
f. State that the entity will guarantee that the fallowed lands will be maintained so as to not create a nuisance to neighboring lands.

5. For transfers based on groundwater exchanges or substitution, provide basis for calculation of quantity of groundwater to be exchanged or substituted and transferred.
6. Provide a complete written description of the transfer proposal, including any special water transfer scheduling.
7. Attach statement by the Entity from where the water is being transferred that the transfer will have no unreasonable impact on water supply, operations, or financial condition of the Entity or its water users.

The foregoing policy was adopted by the Firebaugh Canal Water District at a regular meeting of its Board of Directors on March 11, 1993 and revised in the same manner on October 16, 2001, July 20, 2004, May 15, 2012 and March 16, 2021.

SAN JOAQUIN RIVER EXCHANGE CONTRACTORS WATER AUTHORITY WATER TRANSFER POLICY & DRAINAGE TRANSFER POLICY

Adopted April 7, 2000
Proposed Revised Policy – October 7, 2020

1. Background.

1.1 The San Joaquin River Exchange Contractors Water Authority (**SJRECWA**) is a joint exercise of powers authority formed and existing under California law. Its member agencies are Central California Irrigation District, San Luis Canal Company, Firebaugh Canal Water District, and Columbia Canal Company. These four entities are traditionally referred to collectively as the **Exchange Contractors**.

1.2 The **Exchange Contractors** hold pre-1914 water rights on the San Joaquin River. In order to facilitate the construction of the Central Valley Project, the **Exchange Contractors** and their predecessors entered into two contracts with the United States Bureau of Reclamation (Reclamation) in 1939. The Purchase Contract conveyed excess San Joaquin River flows—the so called "high flows" -- and reserved the first San Joaquin River flows—sometimes referred to as the "low flows" -- to the **Exchange Contractors**. The Exchange Contract established the terms pursuant to which a substitute supply of water was to be delivered by the Reclamation to the **Exchange Contractors** in lieu of their "low flow" diversions from the San Joaquin River. These agreements established the underpinnings for the Reclamation to construct Friant Dam on the upper San Joaquin River and divert the river's natural flow north to Madera and Chowchilla through the Madera Canal and south into Kern County through the Friant-Kern Canal. The Exchange Contract specifies that so long as the **Exchange Contractors** are provided a quantified substitute supply of water, the **Exchange Contractors** will not exercise their pre-1914 right to divert water from the San Joaquin River. The Exchange Contract at Article 5a contemplates that most, if not all, of this substitute water will be delivered to the **Exchange Contractors** from the Sacramento River watershed, pumped from the South Delta, and conveyed by means of the Delta-Mendota Canal. The current Exchange Contract is the Second Amended Contract for Exchange of Waters, Contract No. Ilr-1144, executed February 14, 1968.

1.3 The **SJRECWA** was formed in 1993 to represent its four member entities in many water matters including issues related to water transfers.

1.4 In California, the concept of water transfers, also referred to as water marketing or water brokering, is considered by some to be a partial solution to the shortage of water. The underlying assumption is that market forces in a free market will reallocate water. In some circumstances, agricultural water users who manage a conjunctive use water resource area can, to some extent, provide flexibility which may, at times, facilitate transfers of water. The **Exchange Contractors** proactively manage their surface water, groundwater, and conserved water conjunctively to maximize its beneficial use.

2. Objective. The objective of this water transfer policy is to manage water transfers to provide a framework by which the **Exchange Contractors** manage water transfers on a sound scientific basis, and to provide a clear set of standards and guidelines that each transfer proposal must comply with, and to only allow **SJRECWA**, or its member entities, to market and/or transfer water, and not individual landowner(s). The approach is designed to (i) ensure that the quantity of water proposed for transfer is made available through technically sound methods and projects which are scientifically based and verifiable; (ii) provide sound analysis of potential water transfer impacts; (iii) properly develop and implement necessary mitigations; (iv) monitor on-going water transfers and water development projects to ensure that beneficial and conjunctive use objectives are met; (v) provide flexible and efficient use of available water resources; (vi) ensure that the water supply, operations, and financial condition of the **Exchange Contractors** and their water users are not unreasonably impacted, and third party impacts from the transfer are mitigated; and, (vii) establish, maintain and utilize a data bank that will be used to manage the San Joaquin River Exchange Contractors Groundwater Sustainability Agency's Groundwater Sustainability Plan. The Transfer Policy will be reviewed by the Water Transfer Committee and Board of Directors every five (5) years, or as needed.

3. Authority

3.1 A transfer of water is considered a beneficial use under state and federal law. (Water Code Section 1011; CVPIA Section 3405.)

3.2 The **Exchange Contractors** hold pre-1914 rights to appropriate water from the San Joaquin River. The California Legislature has declared that it is established policy of the State to facilitate the voluntary transfer of water and water rights. (Water Code Section 109.) The Costa-Isenberg Water Transfer Act adopted by the legislature in 1986 as Water Code Sections 470 and 475-484 provides that voluntary water transfers between water users can result in a more efficient use of water, alleviate water shortages and finds and declares that it is in the public interest to conserve all available water resources. Water transfers do not undermine the rights that are the basis of the transfer. Water Code Sections 1010,

1011, 1011.5, 1244, 1440, 1731, 1737 and 1745.07 were specifically added to provide protection to water right holders who transfer water.

3.3 Reclamation utilizes the water transfer authority provided for in CVPIA to facilitate Exchange Contract water transfers. Water transfers implemented in accordance with CVPIA Section 3405(a) are deemed by federal law to be a beneficial use of water.

4. Applicability. Proposals to transfer any water from the **Exchange Contractors'** service area are subject to the requirements of this policy.

5. Definitions. For purposes of this policy, "water district" shall mean any water district, irrigation district, municipality, federal water agency, state water agency, or similar entity that exists pursuant to federal or state law.

6. Criteria for Water Transfers

6.1 Basis for all water transfers.

6.1.1 The state water rights, that are the underpinning of the Exchange Contract, are owned by the individual **Exchange Contractors'** members. The federal contract rights pursuant to the Exchange Contract are similarly owned by the individual **Exchange Contractors'** members. Consequently, any transfer of water from the **Exchange Contractors'** service area must first be approved by the **Exchange Contractors'** member entity from which the water will be transferred and then by the **SJRECWA**.

6.1.2 The **Exchange Contractors'** member entities share a water right in common, have a single watermaster who schedules water deliveries to the member entities, and are in the process of completing a Groundwater Sustainability Plan (GSP) as required by the Sustainable Groundwater Management Act (SGMA) of 2014. The **Exchange Contractors** actively manage their surface water, groundwater and conserved water resources conjunctively, and manage water application within their service area to minimize drainage discharges from their service area and to cope with regulatory requirements imposed by law. Thus, all proposals to transfer water must be submitted by an **Exchange Contractors'** member entity and by the **SJRECWA** on behalf of its member entities, and water transfer proposals shall not be accepted from individual landowners. An individual landowner who proposes a water transfer must submit the

proposal to the landowner's member entity, and, if approved by the member entity, shall be submitted by the member entity on behalf of the individual landowner.

6.1.3 It is imperative to protect the member entity's water rights and to assure that no water right is assigned; therefore, only annually severable water transfers will be considered.

6.2 Water transfer types.

6.2.1 All water transfers shall be proposed by an **Exchange Contractors'** member entity. Additionally, the individual entities may propose a transfer jointly with any or all of the member entities. A transfer of water proposed jointly by all of the member entities shall be handled as a **SJRECWA** water transfer.

6.2.2 Therefore, transfer proposals are limited to three types:

6.2.2.1 A transfer of water by the **SJRECWA** on behalf of its four member entities.

6.2.2.2 A transfer of water by an **Exchange Contractors'** member entity to another water district.

6.2.2.3 A transfer of water by an **Exchange Contractors'** member entity to a water district that is made on behalf of an **Exchange Contractors'** landowner who is entitled to receive Exchange Contract water.

6.3 Water to be transferred. Water that is subject to transfer may be from an **Exchange Contractors'** member entity's water entitlement allocated pursuant to the Exchange Contract Division of Water Agreement, or from a member entity's non-allocated water supplies.

6.4 Generation of transferable water. Transferable water can be generated by using standard methods of conservation, groundwater substitution, or fallowing depending on the special hydrologic conditions that exist within the service area where the water is being generated as determined in paragraph 6.6.

6.5 Transferees. Water shall only be transferred to a water district.

6.6 Technical standards. All water transfers are subject to the technical standards and criteria adopted by the individual entity that proposes the transfer, and the **SJRECWA.** The technical standards are attached hereto as Appendices.

6.7 Priority of Transfers. All transfers are subject to the following priorities:

6.7.1 First priority shall be given to transfers initiated by the **SJRECWA** on behalf of its four member entities, and/or a transfer by an **Exchange Contractors'** member entity that enables an individual landowner within the member entity's service area to transfer water to a CVP ag service contracting water district for their own use in that water district.

6.7.2 Second priority shall be given to transfers initiated by an **Exchange Contractors'** member entity.

6.7.3 Third priority shall be given to transfers proposed by an **Exchange Contractors'** member entity on behalf of one of its landowners.

6.7.4 For illustrative purposes, the attached Appendix "A" provides an example of how the priority system would be implemented under the following three scenarios: 1) the transfer demands are less than the transfer supply during a normal water year; 2) the transfer demands are greater than the transfer supply during a normal water year; and, 3) a critical water year.

6.8 Limitation on Quantity of Water Transferred. For the years 2019 through 2023, the maximum quantity of transfers in each category is as follows:

Table 6.8

PROGRAM	***ACRE FEET (AF) MAXIMUM***	***NOTES***
Current Conservation	80,000 AF	Divided on Four Entity split *
Additional Conservation	20,000 AF	Divided on Four Entity split*
Drainage	20,000 AF	Under the Drainage Transfer Policy
Fallowing	50,000 AF	Divided on Four Entity split*
Groundwater Exchange.	28,000 AF	Divided on Four Entity split *

* Subject to Section 6.8.1.

The annual amount of transfer water to be offered to M&I purchasers is capped at 10,000 AF. The 10,000 AF is from within the quantities in Table 6.8 and not in

addition to those amounts.

Each year, each entity shall declare the quantity of water that will be transferred out of the **Exchange Contractors'** service area. The aggregated amount of the water to be transferred shall not exceed the amounts in Table 6.8 above.

Each year, as soon as practicable, and not later than the **Exchange Contractors'** March board meeting, the transfer quantity for the upcoming water year shall be announced. The announced maximum shall not be changed upward or downward from the announced maximum unless clear and convincing scientific evidence supports the change. Transfers initiated by **SJRECWA** will not be permitted in a critical water year designated under the Exchange Contract.

6.8.1 Internal Allocation of Transferable Water: On an annual basis, any Exchange Contractors' member entity may assign any portion of their maximum percent allocation in any of the transfer classifications to one or more of the Exchange Contractors' member entities and this assignment will increase the recipient Member Entity's share of transfers in the classifications stated below. The baseline for determining the Exchange Contractors' member's maximum percent allocation is the 1978 Division of Water Agreement subject to modifications pursuant to Sections 6.8.2.1 and 6.8.2.2.

6.8.2 Transfers will be classified as: (i) conservation or (ii) groundwater exchange or substitution or (iii) fallowing transfers or (iv) drainage transfers. The income from each classification of transfer will be blended and distributed to the member entities in proportion to the amount of water contributed by each entity.

6.9 Annual Establishment of Transferees and Maximum Quantities of Water to be Transferred to Each Transferee. Each year by no later than March 1st, the **SJRECWA** shall establish the transferees and maximum quantities of water to be transferred to each transferee. The water needed to meet these obligations will be in accordance with the transfer priorities established by Section 6.7.

6.10 Water Transfer Committee.

6.10.1 A **SJRECWA** Water Transfer Committee is established to review all transfer proposals that are submitted consistent with this policy. It will review and analyze the technical data upon which each transfer is based

and make a recommendation on each water transfer proposed. The membership of the committee will include the manager of each of the **Exchange Contractors'** member entities, and one board member from each member entity, or a member's alternate, appointed by the President of the board. The committee may retain technical consultants.

6.10.2 The committee shall review each transfer proposal, and each approved transfer annually, to ensure that it meets the stated objectives, technical standards, and criteria of this policy.

6.10.3 Due to the fact that the **Exchange Contractors** and their landowners conjunctively use surface and groundwater resources, where a water transfer is proposed from lands that the committee believes will not participate fully in the conjunctive use program, the committee may limit a water transfer to the amount of groundwater used by the lands initiating the transfer so that those lands do not exceed annually their fair share of the safe yield.

6.10.4 The committee shall review each transfer proposal, and each approved transfer annually, to consider whether it is likely to cause unreasonable impacts to the overall water supply, water management operations, or financial condition of the transferor entity or its water users, and whether member entity impacts that result from the transfer will likely be mitigated.

6.10.5 The committee shall make a recommendation to the **SJRECWA** Board of Directors on each proposed transfer, and an annual recommendation for the continuation or termination of each approved transfer, based upon analysis of technical criteria developed pursuant to paragraph 6.6.

6.11 Water Transfer Fees, Mitigation Costs, and Water Transfer Proceeds.

6.11.1 Where a transfer is made by a **SJRECWA** member entity, the entity will allocate a portion of the income from the water transfer to conservation projects and/or water distribution and drainage facilities, or other similar projects and actions that benefit its water users.

6.11.2 Any Bureau of Reclamation, or state agency water transfer application and environmental assessment fee shall be the responsibility of the transferring entity.

6.11.3 The processing by **SJRECWA** of a water transfer will require the payment by the transferring entity of all costs associated with the transfer. Such cost shall include but not be limited to management and study costs associated with administration of the Transfer Policy. For example, where a transfer involves groundwater, the transferring entity will be responsible for the cost (i) to determine safe annual yield of groundwater, (ii) for monitoring required to analyze groundwater conditions both in terms of quantity and quality, (iii) the amount of applied water that recharges the groundwater or enters drainage systems, and (iv) to study and monitor for subsidence impacts.

6.11.4 The **SJRECWA** shall be the fiscal agent for all water transfers.

6.12 Environmental Requirements. The environmental review requirements of NEPA and CEQA must be complied with before the **Exchange Contractors** will process a transfer application and all such costs shall be born by the transferring member entity.

6.13 Public Hearing. The **Exchange Contractors** may conduct a public hearing to determine the impact of the proposed transfer. The transferor and transferee must attend the hearing if requested to do so by the **Exchange Contractors** or by the entity from which the transferor is entitled to receive water.

6.14 Action by **SJRECWA** Board of Directors. All water transfers must be approved by unanimous vote of the **SJRECWA** Board of Directors. A water transfer proposal along with the recommendation by the Water Transfer Committee will be considered by the **SJRECWA** Board of Directors, and the transfer approved, disapproved, or returned to the Water Transfer Committee for further action as directed by the Board.

APPENDIX "A"

Illustration of Transfer Policy Priority System

Annually the SJRECWA shall establish:

1. Annual Maximum – The maximum annual amount of water to be transferred from the SJRECWA developed on a sub-basin by sub-basin level. (Section 6.8)

2. Demand – The maximum quantities of water to be transferred to each transferee shall be established by no later than March 1st of each year. (Section 6.9)

3. SJRECWA Supply – The amount of water available under a SJRECWA transfer and/or a transfer by an **Exchange Contractors'** member entity that enables an individual landowner within the member entity's service area to transfer water to a CVP ag service contracting water district for their own use in that water district. First priority. (Section 6.7.1)

4. Individual Entity Supply – The amount of water available under an individual entity transfer. Second priority. (Section 6.7.2)

5. Individual Entity on behalf of landowner supply – The amount of water available for an entity on behalf of a landowner, limited by the maximum demand. Third priority. (Section 6.7.3)

The application of the priority system described in section 6.7 is limited to determining quantities of transfer demand to be met by each of water transfer types. It will be calculated as follows (Section 6.9):

	TOTAL DEMAND
Less	***Amount available through SJRECWA initiated and/or Exchange Contractors' member entity that enables an individual within the member entity's service area to transfer water to a CVP ag service contracting water district for their own use in that water district (priority 1)***
Equals	***Amount available for priority 2 and priority 3***
Then	***Amount available through priority 2 and priority 3***
Less	***The amount of water available under an individual entity transfer (priority 2)***
Equals	***Amount available through priority 3***

Individual landowners will be notified of the amount of transfer demand available to be met by the third priority. They will be required to determine their level of participation (through fallowing as an example) as soon as possible.

To further illustrate the priorities, below are three types of water year scenarios:

NORMAL YEAR

100 % allocation to EC; demand is 95,000 af which exceeds Supply

Priority		Supply	Demand	Amount Transferred
1	SJRECWA/ dist. to dist. initiated	75,000	85,000	75,000
2	Exchange Contractor Entity Initiated	5,000	5,000	5,000
3	Exchange Contractor Entity Initiated on behalf of Individual	5,000	5,000	5,000
		85,000	95,000	85,000

Total amount transferred **85,000**

NORMAL YEAR

100 % allocation to EC; demand is 65,000 af and is less than Supply

Priority		Supply	Demand	Amount Transferred
1	SJRECWA/ dist. to dist. initiated	75,000	65,000	65,000
2	Exchange Contractor Entity Initiated	5,000	0	0
3	Exchange Contractor Entity Initiated on behalf of Individual	5,000	0	0
		85,000	65,000	65,000

Total amount transferred **65,000 af**

CRITICAL YEAR

75 % allocation to EC; demand is 25,000 af and is greater than Supply

Priority		Supply	Demand	Amount Transferred
1	SJRECWA/ dist. to dist. initiated	0	0	0
2	Exchange Contractor Entity Initiated	0	0	0
3	Exchange Contractor Entity Initiated on behalf of Individual	5,000	25,000	5,000
		5,000	25,000	5,000

Total amount transferred **5,000 af**

(Appendix to Subparagraph "6.6", Part 1 of 2)

Maximum Quantity of Water Transferable from the
Exchange Contractors Service Area due to fallowing

Adopted August 5, 2005

Land Fallowing
Technical Standards and Guidelines

1. The requirements of this section will be the responsibility of the Entity from which the fallowing transfer is proposed to provide or implement.
2. **Maximum Quantity of Transferable Water**
    a. The maximum quantity of water (Max Transferable) that can be transferred by a landowner fallowing land is the *lesser of the monthly* ***Consumptive Use*** *of the crop being fallowed or the* ***Exchange Contractor Entity Deliverable Monthly Entitlement.*** (Subject to **Adjustments** within paragraph d, and the limits or reductions within Part 2 of 2 paragraphs 3c., 3d., and 3e. of this Appendix.)
    b. **Consumptive Use**
        i. The consumptive use will be calculated using the average of the crops grown on the land for the past three normal water years.
        ii. Consumptive Use (CU) = Evapotranspiration Crop + Required Leaching Fraction (LF) – Effective Precipitation.
            1. CU = Etc + LF – EP
        iii. Etc is calculated on a monthly time step for the calendar year. Data on the baseline three year average ETo and rainfall is collected from the nearest CIMIS station(s). The crop coefficients (Kc) are taken from the SWRCB report # 84-1.
        iv. LF is calculated based on the methodology outlined in the Western Fertilizer Handbook. The ECe and ECw are shown on the attached example. However these may be updated by the Exchange Contractors.

v. EP is 50% of the three year average rainfall measured at the nearest CIMIS station(s).

c. **Exchange Contractor Entity Deliverable Monthly Entitlement**

i. The deliverable monthly entitlement is that quantity of Exchange Contract Water, on average, (not other water such as well water) that can be delivered to farmed fields within the entity.

ii. The deliverable monthly entitlement is calculated on a per acre basis.

1. The deliverable monthly quantities are the Division of Waters Agreement quantities less system losses and other commitments divided by total entity acreage.

d. **Adjustments**

i. The deliverable monthly entitlement may be accumulated (bath tubbed) for the 7-month period so long as the bath tub is being provided by Reclamation in accordance with the Refuge Water Transportation Agreement.

3. Determination of Acreage of Fallowed Land

a. Acreage of Fallowed land will be based on farmed acres not assessed acreage.

i. The following are acceptable methods for determining farmed acreage:

1. FSA data base;
2. Measurements based on aerial photography;
3. Field measurements, and;
4. Equivalent methods approved by the transfer committee.

b. To the extent possible whole fields will be fallowed.

c. If only a portion of a field is to be fallowed then the fallowed portion must be physically separated from the farmed field by levee or drain. (It is important that surface water not be applied to the fallowed land.)

(Appendix to Subparagraph "6.6", Part 2 of 2)

TECHNICAL STANDARDS AND CHECKLIST FOR A COMPLETE WRITTEN PROPOSAL FOR A TRANSFER FROM AN ENTITY ON BEHALF OF LANDOWNERS

Revised October 7, 2020

1. Name and address of Transferring Entity
2. Names, addresses and locations of the landowners for whom the Transferring Entity is Transferring water on behalf of.
3. If all or a portion of the transfer proposal by the Entity is on behalf of a Landowner for his own use in another District, then:
    a. Provide name, address and location of the Receiving District
    b. Provide detailed location maps of the area(s) proposed to receive the transferred water.
    c. Provide documentation (deed or other equivalent proof) showing the same ownership of area(s) proposed both to develop water within the Entity and to receive water consistent with the transferring Entities Transfer Policy. The ownerships must be identical unless the Entities Transfer Policy proposing the transfer requires the reduction in the quantity of the transfer based on the percentage of ownership difference between the in-District land developing the transfer water AND the receiving land in another District, then the District shall provide the calculations for the reduced transfer quantities, and such a transfer will be allowed and the reduction shall be applied.
    d. Provide a signed statement by the landowner that they are also the 100% farming entity of the receiving lands, or, if the landowner is not the 100% farming entity, then the landowner shall provide documentation (Reclamation Reform Act form or other equivalent proof) showing the percentage of interest the landowner has in the farming interest on the receiving land. The Entity proposing the transfer on behalf of the landowner shall provide the calculations to show that the transfer has

been reduced based on the percentage. (Example: Landowner has a 50% interest in the farming operation then the transfer will be reduced by 50%).

e. The quantity of the transfer to the Receiving District shall also be limited to the deficit below a 100% allocation for the Receiving District as of April 1 in the year in which the transfer is to occur. (Example: The receiving District has an allocation of 3.0 acre-feet per acre at a 100% CVP allocation. If the declared CVP allocation as of April 1 is 50%, then the transfer will be limited to 1.5 acre-feet per acre on the receiving land.)

4. For Fallowing transfers:
   a. Provide crop maps showing the locations of fields being fallowed.
   b. Provide a tabulation of the acreage of fields being fallowed and the crops grown during the last three normal water years.
   c. State the quantity of water involved within the transfer and identify the proposed use for the transferred water.
   d. For transfers based on fallowing, provide the calculations of the **Maximum Quantity of Transferable Water** based on the Land Fallowing Technical Standards and Guidelines.
   e. State that the entity will be responsible to field verify that fallowing is accomplished as proposed and that an end of the year report on the fallowed lands will be provided.
   f. State that the entity will guarantee that the fallowed lands will be maintained so as to not create a nuisance to neighboring lands.

5. For transfers based on groundwater exchanges or substitution, provide basis for calculation of quantity of groundwater to be exchanged or substituted and transferred.
6. Provide a complete written description of the transfer proposal, including any special water transfer scheduling.

7. Attach statement by the Entity from where the water is being transferred that the transfer will have no unreasonable impact on water supply, operations, or financial condition of the Entity or its water users.

WATER TRANSFER POLICY RELATING TO DRAINAGE PROJECTS

Adopted: September 3, 2004
Adopted Revised Policy: November 5, 2010
Adopted Revised Policy: April 12, 2019

1. Background.

1.1 The San Joaquin River Exchange Contractors Water Authority (**SJRECWA**) is a joint exercise of powers authority formed and existing under California law. Its member agencies are Central California Irrigation District, San Luis Canal Company, Firebaugh Canal Water District, and Columbia Canal Company. These four entities are traditionally referred to collectively as the **Exchange Contractors**.

1.2 The **Exchange Contractors** hold pre-1914 water rights on the San Joaquin River. In order to facilitate the construction of the Central Valley Project, the **Exchange Contractors** and their predecessors entered into two contracts with the United States Bureau of Reclamation in 1939. The Purchase Contract conveyed excess San Joaquin River flows—the so called "high flows" -- and reserved the first San Joaquin River flows—sometimes referred to as the "low flows" – to the **Exchange Contractors**. The Exchange Contract established the terms pursuant to which a substitute supply of water was to be delivered by the Reclamation to the **Exchange Contractors** in lieu of their "low flow" diversions from the San Joaquin River. These agreements established the underpinnings for Reclamation to construct Friant Dam on the upper San Joaquin River and divert the river's natural flow north to Madera and Chowchilla through the Madera Canal and south into Kern County through the Friant-Kern Canal. The Exchange Contract specifies that so long as the **Exchange Contractors** are provided a quantified substitute supply of water, the **Exchange Contractors** will not exercise their pre-1914 right to divert water from the San Joaquin River. Reclamation will be entitled during those periods to exercise the pre-1914 rights of the **Exchange Contractors** for the benefit of the Friant Users. The Exchange Contract at Article 5a contemplates that most, if not all, of this substitute water will be delivered to the **Exchange Contractors** from the Sacramento River watershed, pumped from the South Delta, and conveyed by means of the Delta-Mendota Canal. The current Exchange Contract is the Second Amended Contract for Exchange of Waters, Contract No. Ilr-1144, executed February 14, 1968.

1.3 The **SJRECWA** was formed in 1993 to represent its four member entities in many water matters including issues related to water transfers.

1.4 In California, the concept of water transfers, also referred to as water marketing or water brokering, is considered by some in California to be a partial solution to the shortage of water. The underlying assumption is that market forces in a free market will reallocate water. In some circumstances, agricultural water users who manage a conjunctive use water resource area can, to some extent, provide flexibility which may, at times, facilitate transfers of water. The **Exchange Contractors** proactively manage their surface water, groundwater, and conserved water conjunctively to maximize its beneficial use.

1.5 Two areas within the **Exchange Contractors**, the Firebaugh Canal Water District and the Camp 13 area of Central California Irrigation District (as shown on the map included in Appendix A), are currently directly impacted by the inaction of the Bureau of Reclamation (Reclamation) to provide drainage to the San Luis Unit adjacent areas. San Luis Canal Company and Columbia Canal Company are impacted more indirectly at this time from the lack of drainage of poor-quality water originating from irrigation of the San Luis Unit and the Bureau's inaction. Poor-quality drainage waters from the San Luis Unit join in the drains and channels of Central California Irrigation District which lead to the service area of SLCC and add salinity and other constituents to those waters which SLCC utilizes for irrigation. In addition, poor-quality drainage enters underground aquifers which CCID and its landowners use for well water. The return flow from that well water has also been historically utilized by SLCC and is degraded by the drainage water escaping the San Luis Unit. Columbia Canal Company and its landowners depend upon substantial amounts of well water to supplement surface water supplies. A front of poor-quality water generated by irrigation of the San Luis Unit without the provision of drainage has been moving eastward toward the Columbia Canal wells, and degradation of the quality of well water from these drainage waters is believed to be occurring and will increase in the future. Per federal law, Reclamation was required to install and operate a drainage system to provide drainage for irrigation waters applied to lands within the San Luis Unit, and the Bureau has not provided for those works. For more than 35 years, irrigation water has been applied to the upslope San Luis Unit lands causing poor-quality groundwater to migrate through groundwater aquifers into these areas of the **Exchange Contractors'** service area. The application of irrigation water upslope has also resulted in increased pressures transmitted downslope into the Exchange Contractors' service area. The pressure causes poor-quality water to rise into crop root zones and drainage systems within the **Exchange Contractors'** service area. At the same time, new regulatory requirements are being placed upon the quality of drainage discharged from the **Exchange Contractors'** service area. Unless the quality of drainage water discharges are improved, drainage will

be prohibited or curtailed. It would not be possible to continue irrigated farming under the proposed regulatory conditions. Because the activities upon upslope lands are not within the control of the **Exchange Contractors,** and Reclamation has never complied with its legal duties relating to drainage, the districts, on behalf of the areas where drainage impacts are occurring, are forced to undertake expensive mitigation measures to provide for reduction in drainage quantities and treatment of drainage water to improve the quality of drainage discharges (pursuant to the attached Appendix A -- Technical Criteria for Drainage Plan Transfers). Other adjacent areas of the **Exchange Contractors** may be threatened with impacts from upslope activity and may be required to take similar measures in the future.

1.6 A Drainage Plan Transfer will not compete with annually severable transfers.

2. Objective. The objective of this water transfer policy is to provide a framework to manage water transfers that relate to drainage by which the **Exchange Contractors** manage such water transfers. The framework will provide a sound scientific basis, and provide a clear set of standards and guidelines that each such transfer proposal must comply with. The approach is designed to (i) ensure that the quantity of water proposed for transfer is made available through technically sound methods and projects which are scientifically based and verifiable; (ii) provide sound analysis of potential water transfer impacts; (iii) properly develop and implement necessary mitigations; (iv) monitor on-going water transfers and water development projects to ensure that beneficial and conjunctive use objectives are met; (v) provide flexible and efficient use of available water resources; (vi) ensure that the water supply, operations, and financial condition of the **Exchange Contractors** and their water users are not unreasonably impacted, and third party impacts from the transfer are mitigated; and, (vii) establish, maintain and utilize a data bank that will be used to manage the San Joaquin River Exchange Contractors Groundwater Sustainability Agency's Groundwater Sustainability Plan.

3. Authority.

3.4 A transfer of water is considered a beneficial use under state and federal law. (California Water Code Section 1011; CVPIA Section 3405.)

3.5 The **Exchange Contractors** hold pre-1914 rights to appropriate water from the San Joaquin River. The California Legislature has declared that it is established policy of the State to facilitate the voluntary transfer of water and water rights. (Water Code Section 109.) The Costa-Isenberg Water Transfer Act adopted by the legislature in 1986 as Water Code Sections 470 and 475-484 provides that voluntary water transfers between water users can result in a more efficient use of water, alleviate water shortages and finds and declares that it is in the public

interest to conserve all available water resources. Water transfers do not undermine the rights that are the basis of the transfer. Water Code Sections 1010, 1011, 1011.5, 1244, 1440, 1731, 1737 and 1745.07 were specifically added to provide protection to water right holders who transfer water.

3.6 Reclamation utilizes the water transfer authority provided for in CVPIA to facilitate Exchange Contract water transfers. Water transfers implemented in accordance with CVPIA Section 3405(a) are deemed by federal law to be a beneficial use of water.

4. Applicability. Proposals to transfer any water from the **Exchange Contractors**' service for the purpose of solving drainage problems caused in whole or in part by the failure of Reclamation to provide drainage to the San Luis Unit are subject to the requirements of this policy. Proposals to receive high quality surface water from outside of the **Exchange Contractors'** service area and to provide on a cooperative basis for the exchange of water with those third parties, and to provide for the transfer of an equal amount of **Exchange Contractor** water pursuant to the exchange in the same calendar year in order to remedy drainage and water quality problems within an **Exchange Contractors** service area, shall be subject to the requirements of this policy.

5. Definitions. For purposes of this policy, "water district" shall mean any water district, irrigation district, municipality, federal water agency, state water agency, mutual water company, or similar entity that exists pursuant to federal or state law.

6. Criteria for Water Transfers

6.1 Basis for all water transfers.

6.1.1 The state water rights, that are the underpinning of the Exchange Contract, are owned by the individual **Exchange Contractors'** members. The federal contract rights pursuant to the Exchange Contract are similarly owned by the individual **Exchange Contractors'** members. Consequently, any transfer of water from the **Exchange Contractors'** service area must first be approved by the **Exchange Contractors'** member entity from which the water will be transferred and then by the **SJRECWA**.

6.1.2 The **Exchange Contractors'** member entities share a water right in common, have a single water master who schedules water deliveries to the member entities, and have adopted a single groundwater management plan. The **Exchange Contractors** actively manage their surface water,

groundwater and conserved water resources conjunctively, and manage water application within their service area to minimize drainage discharges from their service area and to cope with regulatory requirements imposed by law. Thus, all proposals to transfer water must be submitted by an **Exchange Contractors'** member entity and by the **SJRECWA** on behalf of its member entities, and water transfer proposals shall not be accepted from individual landowners. An individual landowner who proposes a water transfer must submit the proposal to the landowner's member entity, and, if approved by the member entity, shall be submitted by the member entity on behalf of the individual landowner.

6.1.3 Under no condition will a long-term transfer under this policy be an assignment of a water right.

6.2 Drainage Plan Transfers. Water transfer proposals which provide for funding for drainage projects from: (1) the Firebaugh Canal Water District service area and from the Camp 13 service area portion of the Central California Irrigation District or (2) Exchanges of surface water with third parties for the purposes of remedying significant drainage water quality conditions by any of the **Exchange Contractors** which involve transfers of **Exchange Contractors'** water in the same quantity received from the third party in the same calendar year, are hereinafter referred to as "Drainage Plan Transfers."

6.2.1 A Drainage Plan Transfer is one in which all of the following requirements are met:

A. The transfer is of water conserved, developed or exchanged within the service areas described as an integral part of a plan to reduce drainage, manage drainage and improve drainage water quality, which transfer is based upon findings made and adopted by the respective member entity that the transfer will reduce drainage discharges and contribute to compliance with water quality regulatory requirements; and,

B. The transfer is found by the respective member entity to be required because of a failure of the United States Department of Interior, Bureau of Reclamation to provide for the construction and operation of a drainage system as required by Section lA of the San Luis Act irrigated lands and as provided under Section 5 of the San Luis Act and for adjoining lands impacted by irrigation of San Luis Unit lands; and,

C. The net proceeds of the transfer or exchange will be utilized for the purposes of implementing the Drainage Plan of the Member Entity and reducing the physical and monetary impacts to landowners and water users within the described areas of the Member Units service area from drainage and water quality impacts; and,

D. The amounts of water made subject to transfer will not reduce the amounts of water or the schedule of water deliveries available to other member units under the Exchange Contract;

E. Except when an exchange of water in the same calendar year and in the same amount is the basis for the transfer, the amounts of water to be transferred shall be shown by a water budget first prepared and approved by the member unit and then approved by the **Exchange Contractors** to be not in excess of the amounts of water made available as a means of reducing drainage impacts within the **Exchange Contractors'** service areas. The water budget shall be prepared utilizing established scientific methods and shall demonstrate that the transfer will allow continued agricultural use of water within the Firebaugh Canal Water District and/or the Camp 13 area of Central California Irrigation District on a long-term basis in accordance with the Drainage Plan; and,

F. The transfer shall be conditioned upon the maintenance and implementation of long-term monitoring and adjustment factors which will further the Drainage Plan; and,

G. The initial consideration of the transfer pursuant to the Drainage Plan shall occur prior to conduct of CEQA/NEPA processes and final approval shall occur only after completion of all regulatory and environmental processes. Final approval shall be granted only if, in the judgment of the **SJRECWA**, the approval of the transfer and its term will further the goals of the **SJRECWA** in preserving the rights to water of the **Exchange Contractors** and providing a long term means of reducing damages from drainage impacts and the regulatory conditions placed upon drainage flows.

6.2.2 A Drainage Plan Transfer shall be proposed only by an **Exchange Contractors** Member Entity.

6.3 Water to be transferred. Water that is subject to transfer may be from an **Exchange Contractors'** Member Entity's water entitlement allocated pursuant to the Exchange Contract Division of Water Agreement, or from a member entity's non-allocated water supplies. Water exchanged with a Member Entity to permit a Drainage Transfer by a Member Entity in the same calendar year must be received only from the surface water rights of a water district.

6.4 Generation of transferable water. Transferable water can be generated by using standard methods of conservation, groundwater substitution, or fallowing depending on the special hydrologic conditions that exist within the service area where the water is being generated as determined in paragraph 6.6. Transferred water pursuant to an exchange with third parties and receipt of an equal amount of water in the same calendar year will not require evidence of the generation mechanism except as set forth in Paragraph 6.3 above.

6.5 Transferees. Water shall only be transferred to a water district, although a Drainage Plan Transfer may provide that the recipient agency will use the water transferred only for a specific development.

6.6 Technical standards. All water transfers are subject to the technical standards and criteria adopted by the individual entity that proposes the transfer, and the **Exchange Contractors.** The technical standards are attached hereto as Appendices.

6.7 Water Transfer Committee.

6.7.1 An **Exchange Contractors'** Water Transfer Committee is established to review all transfer proposals that are submitted consistent with this policy. It will review and analyze the technical data upon which each transfer is based, and make a recommendation on each water transfer proposed. The membership of the committee will include the manager of each of the **Exchange Contractors'** member entities, and one board member from each member entity, or a member's alternate, appointed by the President of the board. The committee may retain technical consultants.

6.7.2 The committee shall review each transfer proposal, and receive annual reports to ensure that it continues to comply with the stated objectives, technical standards, and criteria of this policy.

6.7.3 The committee shall make a recommendation to the **Exchange Contractors'** Board of Directors on each proposed Drainage Plan

Transfer, and an annual report to the Board based upon analysis of technical criteria developed pursuant to paragraph 6.6.

6.8 Water Transfer Fees, Mitigation Costs, and Water Transfer Proceeds.

6.8.1 Where a Drainage Plan Transfer is made by an **Exchange Contractors'** member entity, the entity will allocate the net income from the water transfer to conservation projects and/or water distribution and drainage facilities, or other similar projects and actions that are part of the implementation of the Drainage Plan.

6.8.2 Any Bureau of Reclamation, or state agency water transfer application and environmental assessment fee shall be the responsibility of the transferring entity.

6.8.3 The processing by the **Exchange Contractors** of a Drainage Plan Transfer will require the payment by the transferring entity of all costs associated with the transfer. Such cost shall include but not be limited to management and study costs associated with administration of the Transfer Policy.

6.8.4 The **Exchange Contractors** shall be the fiscal agent for all water transfers, (1) except that the **Exchange Contractors** may decline that role in favor of the Member Entity, and (2) if bonds are to be issued by the Member Unit, the transfer proceeds may be pledged as security for bond repayment by the Member Entity.

6.9 Environmental Requirements. Any environmental review requirements of NEPA and CEQA must be complied with before the **Exchange Contractors** will process a transfer application and all such costs shall be borne by the transferring member entity.

6.10 Public Hearing. The **Exchange Contractors** may conduct a public hearing to determine the impact of the proposed transfer. The transferor and transferee and/or the third party providing the water to the Member Entity for the exchange must attend the hearing if requested to do so by the **Exchange Contractors** or by the entity from which the transferor is entitled to receive water.

6.11 Action by the **Exchange Contractors'** Board of Directors. All water transfers must be approved by unanimous vote of the **Exchange Contractors'** Board of Directors. A water transfer proposal along with the recommendation by the

Water Transfer Committee will be considered by the **Exchange Contractors'** Board of Directors, and the transfer approved, disapproved, or returned to the Water Transfer Committee for further action as directed by the Board.

Appendix A

Insert technical criteria for Drainage Plan transfers not involving exchange of water.

ATTACHMENT E

AB 3030 PLAN AND SUSTAINABLE MANAGEMENT CRITERIA FOR SGMA

KENNETH D. SCHMIDT AND ASSOCIATES
GROUNDWATER QUALITY CONSULTANTS
600 WEST SHAW, SUITE 250
FRESNO, CALIFORNIA 93704
TELEPHONE (559) 224-4412

February 12, 2008

Mr. Steve Chedester
Executive Director
San Joaquin River Exchange
Contractors Water Authority
541 H Street
Los Banos, CA 93635

Re: Groundwater Management Plan

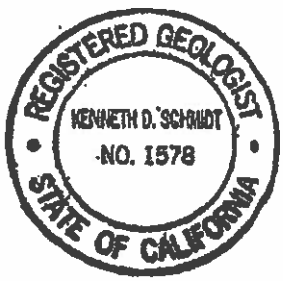
Dear Steve:

Submitted herewith is our report on Updated 3030 Groundwater Management Plan within the Exchange Contractors services area.

Sincerely yours,

Kenneth D. Schmidt
Geologist 1578
Certified Hydrogeologist 176

KDS/pe



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INTRODUCTION

General

The San Joaquin River Exchange Contractors Water Authority ("Exchange Contractors" or "Authority") is a Joint Powers Authority organized under the Joint Exercise of Power Act. The member agencies are Central California Irrigation District ("CCID"), Firebaugh Canal Water District ("FCWD"), Columbia Canal Company ("CCC") and San Luis Canal Company ("SLCC"). Each of the entities is a holder in common of certain priority water rights, which are the subject matter of an agreement executed on February 14, 1968, between the United Sates of America ("Bureau of Reclamation, Department of Interior" or "USBR") and the Exchange Contractors. The title of the agreement is the "Second Amended Contract for Exchange of Waters" (Contract No. Ilr-1144), commonly known and referred to as the "Exchange Contract". The Exchange Contract confers upon the USBR the right to utilize the subject water so long as USBR delivers specified quantities of substitute water at specified locations via the Delta-Mendota Canal.

The Authority

The Authority is empowered to administer and protect the jointly held water rights under the Exchange Contract and power

incidental, necessary and convenient thereto, administer operation under the Division of Water Agreement and represent the Exchange Contractors in many water matters, including, but not limited to, operation of the Central Valley Project, conjunctive use of groundwater and surface supplies, water conservation, reclamation, transfers, drainage, management of the San Francisco Bay-Delta Estuary, environmental considerations and related legislation, litigation, and administrative proceedings. The Exchange Contractors Water Authority is committed to managing its ground and surface water resources to replenish and preserve its groundwater.

AB 3030

The State Legislature enacted AB 3030 (Costa), the Groundwater Management Act, in 1992. The act was codified as Part 2.75, commencing with Section 10750 of Division 6 of the Water Code and became effective January 1, 1993.

1. The act applies to all groundwater basins in the state, except any portion of a groundwater basin that is subject to groundwater management by a local agency or a water master pursuant to other provisions of law, court order, judgement, or decree, unless the local or water master agrees.

2. It provides that any local agency, whose service area includes an applicable groundwater basin, may by ordinance or resolution,

adopt and implement a groundwater management plan within a part or all of its service area in accordance with certain procedures.

The Role of Groundwater in the Exchange Contractors Water Operations

The conjunctive use of groundwater within the Exchange Contractors service area is required due to surface water delivery restrictions contained within the Exchange Contract. In addition, peak irrigation demands within certain areas exceed surface water distribution channel capacities. Groundwater is pumped and delivered into the system to make up capacity shortfalls.

1. The Exchange Contract provides both non-critical and critical surface water entitlement maximums on a per month basis, on a five-month basis (January, February, March, November, and December), and on a seven-month basis (April through October). In addition, monthly maximum instantaneous delivery flow rates are defined. Provisions are made to allow deliveries in excess of these rates if it can be done without detriment to the United States or its other obligations.

2. The Exchange Contract entitlement maximums and the instantaneous flow limits require conjunctive use of surface and groundwater to meet peak crop water demands during June, July, and August. While USBR has historically allowed instantaneous flow deliv-

eries (except in 1992) in excess of the limits, the five-month and seven-month entitlement maximums remain in effect. When USBR provides this flexibility, the Contractors must pump groundwater from District owned wells during April, May, and early June to "bank" sufficient Exchange Contract water for use during peak demands in June, July, and August. Groundwater pumpage from District owned wells must continue through June, July, and August, due to the seven-month Exchange Contract maximum for surface water. During the rest of the water year, there are sufficient quantities of surface water to meet crop water demands and provide necessary quantities for storage in the aquifer for use during the critical months.

3. During critical water years the necessity for conjunctive use of water increases. The seven-month surface water entitlement maximums decrease during critical water years. The five month maximums are not reduced.

4. Private well pumpage within the Exchange Contractors service area also fluctuates in response to the non-critical or critical surface supply. As shown in Table 1, the total groundwater pumpage within the Exchange Contractors service area averaged about 160,000 acre-feet per year from 1996 to 2006. The pumping ranged from about 80,400 acre-feet in 1998 to 212,000 acre-feet in 2004. Tiered water prices are analyzed yearly based on the annual "deep

TABLE 1-WELL PUMPAGE INSIDE AND OUTSIDE OF THE CCID

CCID's WELLS (NO.)	TOTAL NO. OF WELLS (included in AREAS summary)	AB3030 SUB-AREA	1996 REV.2002	1997 REV.2002	1998 REV.2002	1999 REV.2002	2000 REV.02302	2001	2002	2003	2004	2005	2006	95-05 AVERAGE (ALL WELLS) col. (h)	2006 DATA AS A PERCENT OF AVG. (% of col. h)	2006 PUMPAGE WELL LOCATION BREAKDOWN: ALL WELLS IN (CCID) (a)	WELLS OUT of (CCID) (b)	CCID's WELLS already included in col. a	DWC PUMP-ER'S (AREA already incl'd)
USING SAME METHODOLOGY FOR CALC'D																			
12	88	A	9,868	12,887	4,869	11,810	11,817	14,337	11,809	13,015	17,868	6,835	3,768	11,363	33%	3,768			
7	105	B	9,832	10,691	5,825	12,880	16,886	17,829	12,104	10,767	17,091	2,872	7,424	12,880	58%	7,424		64	
4	69	C	12,887	13,882	4,003	10,216	13,289	14,288	9,800	14,343	21,382	11,887	12,814	12,489	101%	12,814		21	812
1	21	D	2,872	4,310	3,834	3,402	2,050	2,868	1,413	2,051	2,831	1,882	187	2,682	7%	187			
28	123	E	30,773	29,883	8,885	27,043	32,335	38,728	34,388	28,728	39,838	21,818	11,880	29,977	40%	11,880		1,761	
	4	F		373				2,707	804	804			343	499	84%	343			
9	76	G	5,838	6,803	838	5,173	6,888	6,829	7,845	7,849	10,887	3,884	1,888	6,308	17%	1,888		120	
	86	H	4,843	10,880	2,882	8,491	30,248	24,482	23,108	15,888	32,888	6,881	11,887	15,878	73%		11,887		
	10	I			727	8	22		19	19			1,198	78	1809%		1,198		
	80	J	288			48	13,833	16,817	11,880	11,128	17,887	4,818	20,881	7,815	278%		20,881		
	84	O/S A	12,710	18,186	16,337	16,187	16,881	18,888	3,787	21,888	14,834	15,845	11,887	15,373	78%		11,887		
	63	O/S B	11,477	12,488	6,741	11,877	7,818	8,488	7,877	9,838	13,184	8,128	7,801	9,388	82%		7,801		
	194	O/S C	27,181	41,302	16,821	32,348	33,418	33,485	14,488	34,817	28,448	24,887	30,907	28,833	108%		30,907		1,388
	2	O/S D																	
	18	O/S E	3,284	3,274	2,224	4,882	1,883	918	2,888	8,128	3,882	2,810	3,438	3,044	113%		3,438		
	26	O/S G	1,818	4,382	2,788	387	824	1,438	821	3,481	3,537	3,284	878	2,328	38%		878		
	2	O/S H																	
	6	O/S I	84	1,328	10	988				88				242					
	6	O/S J					1,887	2,837	3,888	3,887	3,888	1,183	3,438	1,872	208%		3,438		
		USBR EXCHANGE CONTRACT WATER YEAR STATUS :	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	AVERAGE		(percent of 2006 pumpage) 29%	71%		
81	294	TOTALS->	139,278	168,739	80,404	144,381	191,899	204,445	144,094	198,332	212,913	121,881	128,919	159,788		37,283	91,636	1,965	2,200

1828 = TOTAL NO. OF WELLS IN STUDY

1996 -> 2005 AVE. = 159,788 | 128,919 | REPRESENTS A | -19% | (INCREASE OR DECREASE OVER THE PREVIOUS 10 YR. RUNNING AVG.)

NOTES:

1. PUMPAGE BY C.C.I.D. CONSUMERS IN THE CENTRAL CALIFORNIA IRRIGATION DISTRICT: 37,283 | 1,958 | (CCID) | 35,325 AF for | 0.25 | AF/AC
2. PUMPAGE OUTSIDE C.C.I.D. INCLUDES ALL DEEP WELLS WITHIN CITY LIMITS IN ADDITION TO DEEP WELLS USED FOR INDUSTRY ASE
3. THIS ORIGINAL STUDY INCLUDED ALL KNOWN DEEP WELLS W RIVER FROM MARSHALL ROAD (KNOWS LANDING) TO THE CAMP 13 AREA, EXCA CONFIRMATION , AND BY USING PAST OR AVERAGE PUMP TEST KINNAP DATA, OR FROM REQUESTED DATA. THOSE IN THE SAN LUIS CANAL COMPANY AREA; THEN SOUTH FOR THE AREA BETWEEN THE SJR AND DELTA MENDOTA CANAL OR THE WEI DAM AREA. A JULY 1999 REVISION MAKES THE SAN LUIS C.C. AND THE COLUM ADDITION THERE ARE SOME 100 WELLS +- IN THE POOL PUMPER AREA AS OF 1/1/1999. C.C. AREA NOW INCLUDED.
4. C.C.I.D.'s (OWNED) WELL PUMPAGE IS INCLUDED IN THE "ALL WELLS IN CCID" TO THE 2001 STUDY, PREVIOUS YEARS OF 1996,1997, 1998, 1999 AND 2000 WERE REVISED THE SAME WAY.
5. ADDITIONAL PUMPAGE (NOT INCLUDED ABOVE) FROM THE MENDOTA POOL PUMPERS IS AS FOLLOWS:

1996 --	@NA	@NA	1997 --	23,431 AF	1998 --	34,888 AF	2001 --	40,130 AF	2003 --	18,820 AF	2005 --	10892 AF
1996 --	2,872 AF	2,872 AF	1998 --	3,834 AF	2000 --	37,833 AF	2002 --	34,138 AF	2004 --	17,288 AF	2006 --	8641 AF
1996 --	0 AF	0 AF	1997 --	18,882 AF	1998 --	5,487 AF	2001 --	6,378 AF	2003 --	4,818 AF	2005 --	838 AF
1996 --	4,788 AF	4,788 AF	1998 --	12,712 AF	2000 --	9,881 AF	2002 --	3,807 AF	2004 --	3,088 AF	2006 --	2,088 AF

6.
7. DATA IS INCOMPLETE IN THE COLUMBIA CANAL COMPANY AREA.
8. PUMPAGE IS CALCULATED FROM THE ANNUAL READING OF POGE, HOUR, PROPELLER AF METERS AND OR PAST OR AVERAGE PUMP TEST KINNAP DATA, OR FROM REQUESTED DATA.
9. UP TO 1/1/1999 THERE WERE 410 WELLS IN INVENTORY; AS OF 1/1/1999, THE INVENTORY IS AT 386 WELLS; AS OF 1/1/1999.
10. DATA WAS CALCULATED USING A NEW METHODOLOGY IN REGARDS TO POGE METER DATA, FOR THE PRESENT

PAST C.C.I.D. CONSUMER PUMPAGE

for 1985 =	0.19	AF / AC
for 1984 =	0.24	AF / AC
for 1983 =	0.01	AF / AC
for 1982 =	0.07	AF / AC
for 1981 =	0.33	AF / AC
for 1980 =	0.28	AF / AC
for 1979 =	0.27	AF / AC
for 1978 =	0.16	AF / AC
for 1977 =	0.20	AF / AC
for 1976 =	0.32	AF / AC
for 1975 =	0.89	AF / AC
for 1974 =	1.05	AF / AC
for 1973 =	0.83	AF / AC

well" study. This mechanism has been effectively utilized to implement conjunctive use of ground-water from both private and District owned wells.

5. In the FCWD, the groundwater has become unusable for agricultural purposes because of high levels of total dissolved solids (TDS), boron, and selenium. FCWD is able to provide surface water capacity to the other Exchange Contractors in return for their cooperation in utilizing groundwater during periods in which FCWD needs amounts of water in excess of that available from its share of the Exchange Contract supply. As a result, groundwater within CCID, SLCC, and CCC is conjunctively used, not simply with the surface deliveries within the service areas for those specific entities, but also within service areas of the other entities, as the availability of surface water under the Exchange Contract is not sufficient to meet crop water demands.

Entrix, Inc. (2007) reported on the Environmental Assessment/ Initial Study for the Groundwater Pumping/Water Transfer Project for 25 consecutive years. The primary source of of the water to be transferred is pumpage of poor quality shallow groundwater in the area west and northwest of Firebaugh. The easterly and northeasterly migration of the poor quality groundwater above the Corcoran Clay has been identified as a major groundwater management concern in Madera County.

GENERAL CONDITIONS OF THE EXCHANGE CONTRACTORS GROUNDWATER BASIN

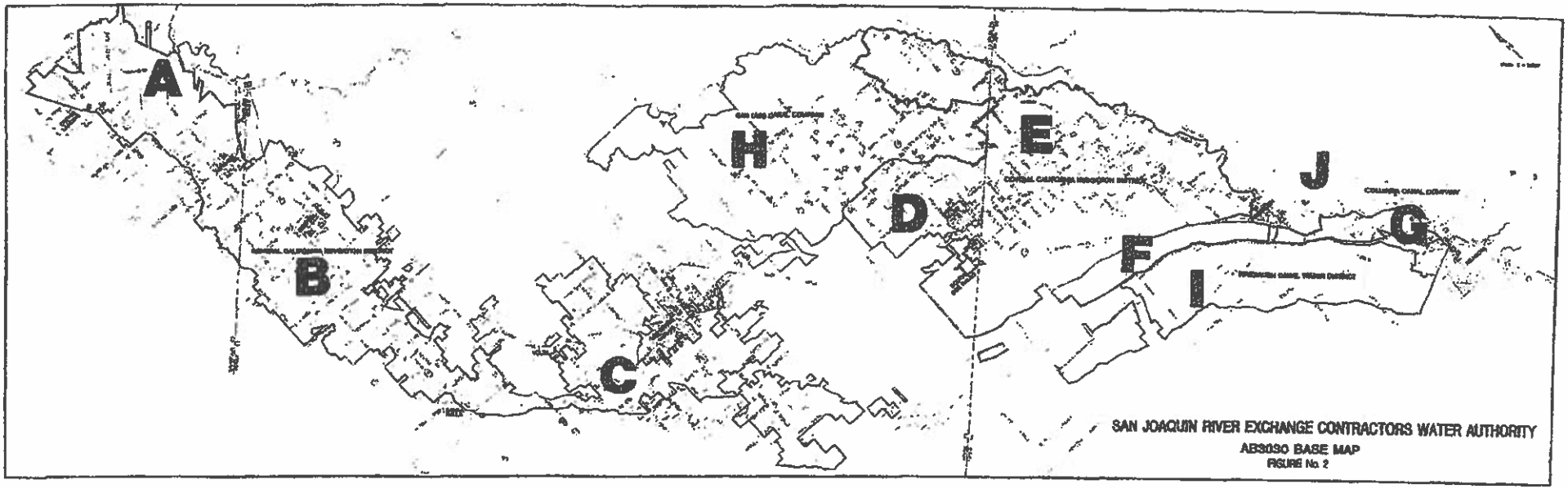
Figure 1 is the AB 3030 basemap of the Exchange Contractors service area. The service area is divided into sub-areas of generally similar aquifer, water supply, and drainage characteristics. Detailed evaluations of the groundwater conditions within the boundaries was performed by Kenneth D. Schmidt and Associates in 1997 ("Groundwater Conditions in and near Central California Irrigation District") and in 2007 "Update on Groundwater Conditions in the San Joaquin River Exchange Contractors Service Area". The evaluations included: 1) subsurface geologic conditions, 2) depth to water, water-levels elevations, the direction of groundwater flow, and water-level trends, 3) aquifer characteristics, based on numerous pump tests and aquifer tests on about two dozen wells, 4) land surface subsidence, and 5) groundwater quality in both the upper and lower aquifers.

DEMANDS ON THE GROUNDWATER BASIN

In addition to the yearly demands placed upon groundwater to meet the conjunctive use requirements to supplement the Exchange Contract surface water, other demands are placed upon the basin.

Surface Water Transfers

Each of the four entities comprising the Exchange Contractors have developed and adopted transfer policies as shown in Attachment


A
B
C
D
E
F
G
H
I
J
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS WATER AUTHORITY
AB3030 BASE MAP
FIGURE No. 2

A. All water transfers have potential impacts on the aquifer. Three types of transfers are possible based on: 1) groundwater substitution, 2) fallowing of crops, and 3) conservation. Of these, groundwater substitution has the highest potential impact to groundwater. CCID, FCWD, and SLCC allow groundwater substitution type transfers, but the CCC does not allow groundwater substitution. Its policy states that "no transfer of groundwater to areas outside the Company service area will be approved and no transfer of surface water without fallowing the land to which such surface supply would have been delivered will be approved."

Groundwater Pumping into the Delta-Mendota Canal

The San Luis and Delta-Mendota Water Authority (SL&DMWA) has administered a program to allow groundwater pumping into the Delta-Mendota Canal for drought contingency. Figure 1, (the AB 3030 basemap), shows the groundwater pumping management areas developed by the SL&DMWA groundwater management committee. The potential impacts to the Exchange Contractors are 1) degradation of the surface water quality delivered through the Delta-Mendota Canal, and 2) land surface subsidence along the CCID outside canal and the Delta-Mendota Canal. High salinity and boron concentrations have been problems in many wells. For the most part, the pumped water is generally not suitable for use on crops without blending with the better quality surface water. Land surface subsidence along the

Outside Canal was discussed by KDSA (1997). The CCID is presently undertaking a five million dollar improvement project on the Outside Canal, to raise banks and replace structures due to subsidence. Subsidence along the Delta-Mendota Canal is shown in Figure 2.

Groundwater Pumping into the Mendota Pool

The Mendota Pool, on the San Joaquin River, is the location were the Exchange Contractors receive most of the substitute water under the Exchange Contract. For almost two decades, there has been concentrated groundwater pumping in the Mendota Pool area. The magnitude of the pumping depends in large part on the yearly allocations by the USBR to Central Valley Project agricultural contractors. In response to reduced allocations, groundwater pumped near the Mendota Pool is introduced into the Pool and either delivered to adjacent Central Valley Project agricultural contractors directly through pumping facilities or given credit for the groundwater pumped into the Pool and, in exchange, the USBR provides deliveries to Westlands Water District. The potential impacts of the pumping program are water quality degradation, well interference, and land surface subsidence affecting the Exchange Contractors gravity canal system headworks facilities and the Mendota Dam.

The Mendota Pool Group (MPG) transfer pumping began in 1989 to

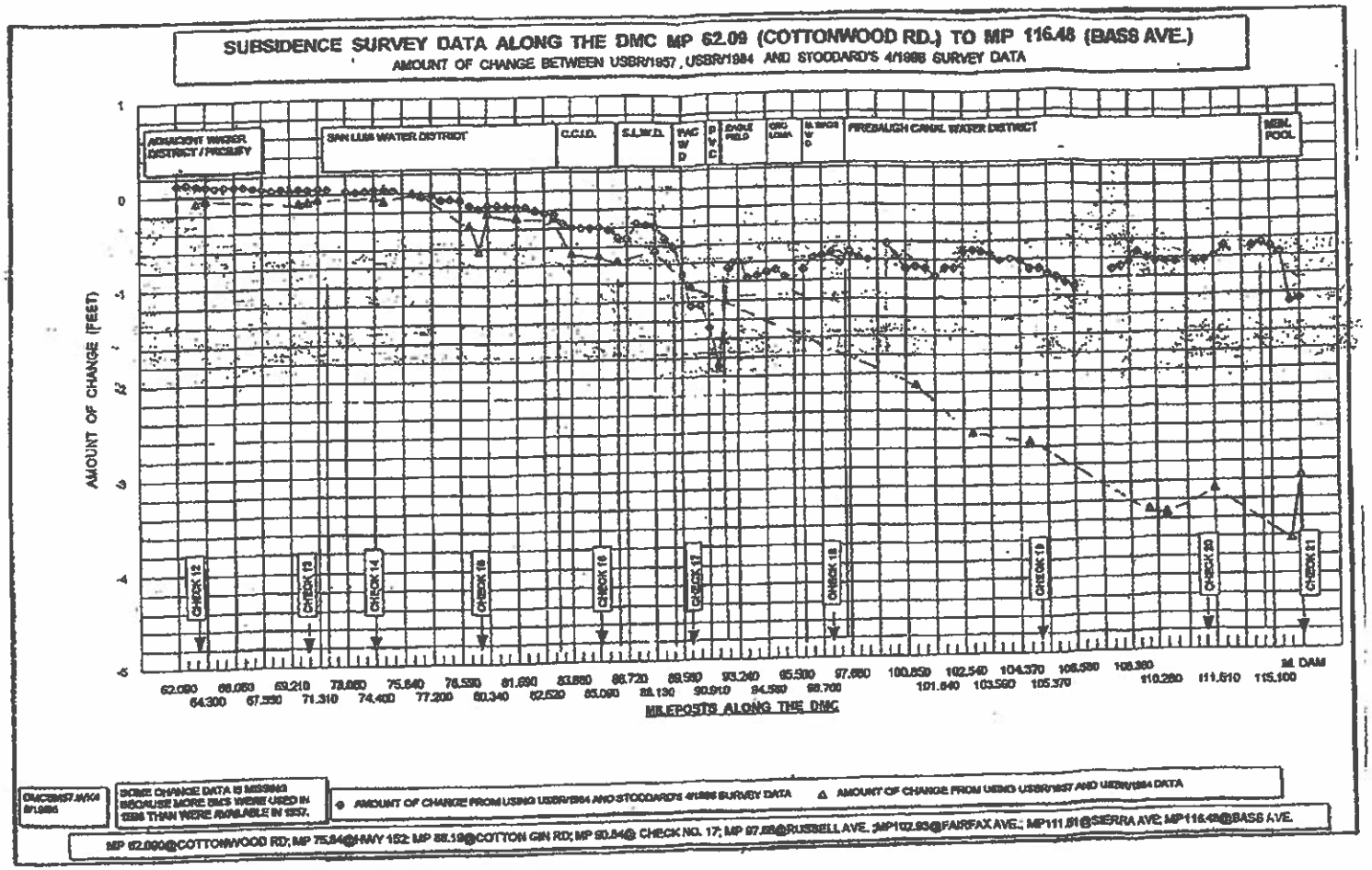


FIGURE 2-SUBSIDENCE ALONG THE DELTA-MENDOTA LAND

make up for some of the cutbacks in deliveries of Central Valley Project and State Water Project surface water during the drought. The greatest MPG transfer pumping was during 1991-1992 and 1994. There was little MPG transfer pumping between 1995 and 1999, except for a four-month period in 1997.

A pilot pumping and monitoring program was undertaken in 1999 to determine the impacts of MPG transfer pumping on water users within the San Joaquin River Exchange Contractors Water Authority (SJREC) and Newhall Land and Farming Company (NLF) service areas. Extensive monitoring of pumpage, water levels, water quality, and compaction was initiated in 1999 and continues to the present. This led to a settlement agreement, that provided for continued MPG pumping, constrained by the results of monitoring and other factors.

Annual reports are prepared on the results of the monitoring. The results of monitoring have been used to revise the pumping program to mitigate adverse impacts. For example, pumpage from the lower aquifer has been limited, primarily due to drawdowns and land surface subsidence.

Migration of Poor Quality Groundwater

Water-level elevation contours for the upper aquifer (above the Corcoran Clay) were provided by KDSA (1997 and 2007). These maps indicate that groundwater enters the upper aquifer from up-

slope areas along virtually all the west and southwest boundaries of the Exchange Contractors service area. Certain areas west and southwest of the Exchange Contractors boundaries contain poor quality groundwater. The areas include 1) areas recharged by creeks south of Los Banos Creek and north of Panoche Creek, 2) the area southwest of Firebaugh-Mendota, and 3) the area south of Orestimba Creek.

Urban Groundwater Pumpage

Urban groundwater issues facing the Cities within the Exchange Contractors service area were summarized in KDSA (1997). In addition, cooperative groundwater studies have been done during the past two decades by the CCID and the Cities of Mendota, Los Banos, Gustine, and Newman. The Mendota study was completed in February 1999. Studies in Los Banos were completed in 1991 and updated in 1998. Studies in Gustine and Newman were completed in 1992 and updated in 2001. High manganese concentrations in well water have been a problem in Firebaugh and Mendota. High salinity water was also a problem in Mendota, prior to several years ago. As a result of the Mendota study (KDSA, 1999), the City developed a new well field in the mid-2000's, to mitigate water quality degradation coming from the area west of Mendota. The City of Dos Palos developed a surface water supply because of the poor chemical quality of the groundwater. In and near Los Banos, Newman, and Gustine,

groundwater of suitable quality for public supply has been developed through test hole exploration programs. However, a number of potential well sites have been found to be unsuitable. Plans are to update the Los Banos study within the next year.

ELEMENTS OF THE PLAN

The elements of the original plan were divided into two categories. Implementation of each of the elements proceeded concurrently.

Monitoring, Data Acquisition, and Evaluation

This element is subdivided into 1) regional activities, and 2) site specific (being done to address specific groundwater issues).

Regional Activities

Overall or regional activities to be conducted by the Exchange Contractors include the following.

Coordination with Other AB 3030 Groundwater Management Plan and Cooperation. The Central Valley Project agricultural contractors located upslope of the Exchange Contractors service area have developed two regional groundwater management plans through the San Luis and Delta-Mendota Water Authority (Stoddard & Associates, 1996 a and b). As part of these plans, Stoddard & Associates (1999 a and b) prepared associated groundwater monitoring plans. Both of

the management plans are being updated in 2007. In order to monitor the larger connected groundwater basin, future regional monitoring would include a coordinated data gathering effort with the upslope areas. In addition, Madera County is developing an Integrated Water Management Plan for the area downgradient of the Exchange Contractors service area. This plan focuses on overdraft in non-Districted areas. A program will be pursued such that the necessary study is accomplished and water-level measurements and water sampling results will be coordinated and gathered by each respective agency and shared.

Water Levels. Water-level elevation maps will be prepared approximately every five years. Data gaps in the existing monitoring plan were filled in accordance to the recommendations contained in the KDSA 1997 report. As part of the 2007 update by KDSA, a water-level elevation and direction of groundwater flow map was prepared for the upper aquifer for Spring 2006. Significant changes from previous maps were discussed in the text. Sufficient data were not available to prepare an updated map for the lower aquifer for the entire service area for 2006.

Water-level hydrographs were provided for a number of wells in the KDSA 1997 report. These were evaluated for the period 1962-89, which was considered a representative long-term period. As part of this plan update, the CCID updated many of these hydrographs. The

KDSA 2007 hydrogeologic report update contains a detailed discussion by subarea of the water-level trends for 1962-2005.

Aquifer Characteristics. The Exchange Contractors have continued to obtain specific capacity values from pump tests for wells within the Districts. As part of the updated plan, a specific capacity map was prepared by CCID for the mid-2000's, and this was presented in the 2007 hydrogeologic report update. Updated maps for specific capacities will be prepared about every five years.

Pumpage. Annual measurements and estimates of pumpage have been continued. Pumpage has been determined for each subarea, and divided into the upper aquifer, the lower aquifer, and composite (from both aquifers). Table 1 provided a pumpage update through 2006.

Subsidence. Three compaction recorders now being operated in the area. One is at Yearout Ranch, southeast of Mendota, which is operated by CCID, as part of the MPG monitoring program. A second is the Fordel recorder, adjacent to the Mendota Airport, which is operated by the MPG. The third is along the DMC near Russell Avenue, which is operated by the SL&DMWA. Information on the first two recorders is provided in the annual monitoring reports for the MPG program.

In addition, the Scripts Institute has established a con-

tinuous land surface elevation monitoring station (CORS) at a site about one mile southeast of Mendota. This monitoring will provide additional information on subsidence near Mendota.

Groundwater Quality. At least every five years, water samples are obtained from numerous selected wells for analysis of key constituents. Maps will be periodically prepared to show the geographic distribution of selected constituents in the upper and lower aquifers. As part of the 2007 update, an updated map of electrical conductivity was prepared. This map was generally similar to the previous map, and evidence was presented that indicated the northeasterly flow of poor quality groundwater has continued in the Mendota-Firebaugh area. As part of the 2007 update, water quality hydrographs were prepared for electrical conductivity of water from district supply wells and other selected wells. These hydrographs will be updated every several years in the future.

Site Specific Activities

These activities are to be accomplished in response to specific groundwater issues. Many of the activities will be accomplished cooperatively with other entities or made a requirement of pumping program.

Surface Water Transfers. For well water substitution transfer request the following hydrogeologic items will be required:

1. Locations and types of wells in vicinity, including domestic and stock wells.

2. Subsurface geologic conditions, extent of confinement, and possibly impacted aquifers. Existing sections could be used if they are near the proposed project and representative of conditions at the project site.

3. Depth to water, direction of groundwater flow, and any changes that would occur. Existing water-level maps and hydrographs are expected to be suitable in most cases. However in areas where data gaps are present water-level measurements and preparation of local maps are expected to be necessary.

4. Long-term water-level trends and the status of groundwater overdraft.

5. Aquifer characteristics.

6. Potential for land surface subsidence, particularly where groundwater is confined.

7. Overall water budgets (consumptive use versus recharge) for the pre-existing situation for the proposes project.

8. Groundwater quality, identification of problem constituents, and the potential migration of poor quality groundwater.

9. Subsurface drainage problems and the possible beneficial impacts of the proposed project.

10. Drawdown projections due to the proposed project.

11. A technical report by a certified hydrogeologist including supporting tables, illustrations, and appendices. The report will document pre-existing conditions and evaluate possible hydrogeologic impacts of the proposed transfer.

Pool Pumpers. A process is now in place to monitor the effects of MPG pumping in order to monitor potential impacts from future pumping and in cooperation and participation with other entities. As discussed previously, annual reports on the results of monitoring are prepared.

Delta-Mendota Canal Pumpers. In order to monitor potential impacts from future pumping the following monitoring is needed.

1. Annual water-level maps for each zone being pumped.

2. Continuous water-level recorders.

3. Annual pumpage.

4. Annual reports of the compaction recorder located at Russell Avenue.

5. Water quality maps prepared every five years.

6. Water-level and quality hydrographs.

Cities. Focused groundwater quality studies will be periodically performed. In the case of Mendota, Newman, Gustine, and Los Banos, this will require periodic updates of the joint studies previously accomplished. Firebaugh will require a new study. Attachment B contains a copy of the sample MOU to be utilized outlining the scope of work and subdivision of costs.

Migration of Poor Quality Groundwater. As compilation and analyses of regional monitoring activities identify areas or pockets of migration of poor quality groundwater, more focused monitoring in these areas may be needed. Case by case evaluation of risk to the groundwater will be made, and site specific monitoring will be developed as necessary.

Water Banking. There is potential for water banking in the Exchange Contractors service area, exclusive of FCWD and the Camp 13 Drainage District. Water banking could involve direct recharge in basins or stream channels, or in-lieu recharge. In-lieu recharge generally involves delivering water to users who would otherwise have pumped groundwater. When pumping is decreased, water levels tend to recover. Later, groundwater is pumped and delivered to the

banking partner(s). The in-lieu type of recharge has been practiced for years in the Semitropic WSD, and is particularly applicable in areas where subsurface geologic conditions aren't favorable for intentional recharge.

Areas considered to have potential for direct recharge include parts of the Columbia Canal Water Co., where depth to the shallow groundwater is generally more than about 30 feet. There are several areas along the west side of the CCID where direct recharge by basins or stream channels may be possible. Included are the fans of Los Banos Creek and Orestimba Creek, where permeable deposits are present, groundwater salinity is relatively low, and depth to water is adequate to allow recharge.

Hydrogeologic studies are necessary to better delineate the storage space available and to develop well recovery programs in target areas. Other potentially competing activities, such as gravel mining, need to be carefully addressed. In some areas, such as parts of the Columbia Canal Co. service area, depth to the shallowest groundwater is not well known. In such areas, exploratory borings can be used to evaluate potential restricting layers above the water level and the depth to groundwater. Pilot percolation tests are normally done, using relatively small basins, to determine probable long-term percolation rates for larger basins. Mounding calculations can be done, once the transmissivity of the

shallowest saturated deposits is known, to determine the water-level rise expected due to various amounts of recharge.

In-lieu recharge normally involves expanding District surface water delivery facilities to areas previously served by groundwater pumpage. The banking partners normally pay for these facilities and in wet years their excess water is delivered to farmers who then decrease their groundwater pumpage. When the banking partners need water returned, it is pumped from wells and delivered to the banking partners, or exchanges of surface water supplies can also be used.

Development of Drought Contingency Strategies

Drought contingency strategies are necessary during times when multiple critical water years occur, or when the USBR cannot provide delivery capacity flexibility during the seven moth period. An itemized list of drought period procedures will be developed and adopted. Such a list might include:

1. Reducing irrigation demand peaks through water ordering strategies.

2. Purchase of private well water and an associated emergency notification and purchase procedure.

3. Maximum pumping from drainage wells and tailwater return pumps.

4. Borrowing space and or water from other Exchange contractors.

5. Provide economic incentives for growers to pump wells not plumbed into the canal system.

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July 2024

Groundwater Sustainability Plan

for the Delta-Mendota Subbasin

DELTA-MENDOTA SGMA

eki environment & water

SUSTAINABLE MANAGEMENT CRITERIA

11 INTRODUCTION TO SUSTAINABLE MANAGEMENT CRITERIA

§ 354.22. Introduction to Sustainable Management Criteria
This Subarticle describes criteria by which an Agency defines conditions in its Plan that constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.

☑ 23 CCR § 354.22

The Sustainable Groundwater Management Act (SGMA) legislation defines "Sustainability Goal" as "the existence and implementation of one or more groundwater sustainability plans that achieve sustainable groundwater management by identifying and causing the implementation of measures targeted to ensure that the applicable basin is operated within its sustainable yield" (California Water Code [CWC] § 10721(u)). SGMA legislation further defines "Sustainable Groundwater Management" as "the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results" (CWC § 10721(v)). Consistent with these regulations, the Basin Groundwater Sustainability Agencies (GSAs) have defined "groundwater management" as GSA actions related to groundwater recharge or extraction within the Basin.

SGMA requires each Groundwater Sustainability Plan (GSP) to develop and implement plans to meet the defined Sustainability Goal (CWC § 10727(a)) and to include Measurable Objectives (MOs) and Interim Milestones (IMs) in increments of five years to achieve the Sustainability Goal within 20 years of the implementation of the 2020 GSPs (CWC § 10727.2(b)(1)).

The SGMA legislation and California Code of Regulations Title 23 (23 CCR) Division 2 Chapter 1.5 Subchapter 2 define terms related to achievement of the Sustainability Goal, including:

- Undesirable Result – "one or more of the following effects caused by groundwater conditions occurring throughout the basin:
  - (2) Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.
  - (3) Significant and unreasonable reduction of groundwater storage.
  - (4) Significant and unreasonable seawater intrusion.
  - (5) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.
  - (6) Significant and unreasonable land subsidence that substantially interferes with surface land uses.

(7) Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water." (CWC § 10721(x));

- Minimum Threshold (MT) – "a numeric value for each sustainability indicator used to define undesirable results" (23 CCR § 351(t));
- Measurable Objective – "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin" (23 CCR § 351(s)); and,
- Interim Milestone – "a target value representing measurable groundwater conditions, in increments of five years, set by an Agency as part of a Plan" (23 CCR § 351(q)).

Collectively, the Sustainability Goal, Undesirable Results, MTs, MOs, and IMs are referred to herein as Sustainable Management Criteria (SMCs).

The GSP Emergency Regulations specify how GSAs must establish SMCs for each applicable Sustainability Indicator. **Sections 12** and **13** describe the Sustainability Goal, Undesirable Results, MTs, and MOs and IMs developed as part of this GSP.

11.1 Summary of Sustainable Management Criteria

Table SMC-1 summarizes the SMCs for each Sustainability Indicator established for the Delta-Mendota Subbasin (Basin). The SMCs development process and justification are detailed in **Section 13**. Groundwater conditions relative to the established SMCs will be evaluated in the Basin's Annual Reports and monitored within the Basin's Representative Monitoring Network (**Section 14**).

Table SMC-1. Summary of Sustainable Management Criteria

Sustainability Indicator	Undesirable Results Criteria	Minimum Threshold	Measurable Objective
Chronic Lowering of Groundwater Levels	At least one of the following occurs as a result of groundwater management within the Basin: 1. Groundwater levels decline below the established MTs in 25 percent or more of the RMW-WLs for two consecutive years, or 2. More than 10 drinking water wells are reported as dry in any given year, or 3. More than 170 drinking water wells are cumulatively reported dry by 2040 (10 wells per year over 17 years).	2015 Low Groundwater Elevation (Measured or Approximated Based on Available Data and Allowing for a Minimum of 20 Feet of Operational Flexibility Between the MO and MT)	2015 High Groundwater Elevation (Measured or Approximated)
Reduction in Groundwater Storage	Chronic Lowering of Groundwater Levels Used as a Proxy	Chronic Lowering of Groundwater Levels Used as a Proxy	Chronic Lowering of Groundwater Levels Used as a Proxy

Sustainability Indicator	Undesirable Results Criteria	Minimum Threshold	Measurable Objective
Seawater Intrusion	Not Applicable	Not Applicable	Not Applicable
Degraded Water Quality	MTs for a groundwater quality COC are exceeded in 15 percent of the RMW-WQs in three consecutive semiannual monitoring events and are caused by groundwater management within the Basin.	The greater concentration of either: 1. The applicable health-based screening standard (i.e., the MCL). 2. The baseline condition at each RMW-WQ, defined as the average measured concentrations in either: (1) the last calendar year with data in the period of 2010-2014; or if no data are available from 2010-2014, (2) the first calendar year with data after 2014 plus the maximum annual fluctuation range.	MT concentration for each RMW-WQ and COC.
Land Subsidence	The extent or rate of subsidence exceeds the applicable MT at any RMS-LS as a result of groundwater management within the Basin, based on a 5-year moving average.	Extent: 2.0 ft of cumulative subsidence between 2020 and 2040; Rate: Maximum five year moving average rate of 0.2 ft/year of subsidence	Extent: 0.0 ft of cumulative subsidence after 2040 Rate: 0.0 ft/yr of subsidence after 2040
Interconnected Surface Water	MT is exceeded for two consecutive years caused by groundwater extraction within the Basin.	Model-estimated Basin-wide depletion rate of 12,000 AFY.	Model-estimated Basin-wide depletion rate of 6,700 AFY.

Abbreviations:
AFY = Acre-Feet per Year
COC = Constituent of Concern
ft/year = Feet per Year
MO = Measurable Objective
MT = Minimum Thresholds
RMS = Representative Monitoring Site
RMS-LS = Representative Monitoring Site for Land Subsidence
RMW-WL = Representative Monitoring Well for Chronic Lowering of Groundwater Levels
RMW-WQ = Representative Monitoring Well for Degraded Water Quality

San Joaquin Valley Groundwater Basin
Delta-Mendota Subbasin

- Groundwater Subbasin Number: 5-22.07
- County: Stanislaus, Merced, Madera, Fresno
- Surface Area: 747,000 acres (1,170 square miles)

Basin Boundaries and Hydrology

The San Joaquin Valley is surrounded on the west by the Coast Ranges, on the south by the San Emigdio and Tehachapi Mountains, on the east by the Sierra Nevada and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The northern portion of the San Joaquin Valley drains toward the Delta by the San Joaquin River and its tributaries, the Fresno, Merced, Tuolumne, and Stanislaus Rivers. The southern portion of the valley is internally drained by the Kings, Kaweah, Tule, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes.

The Delta-Mendota subbasin is bounded on the west by the Tertiary and older marine sediments of the Coast Ranges, and on the north by the Stanislaus/San Joaquin county line. The eastern boundary follows the San Joaquin River to Township 11 S, where it jogs eastward and follows the eastern boundary of Columbia Canal company to the San Joaquin River, then follows the Chowchilla Bypass and the eastern border of Farmer's Water District. It then trends southerly through Township 14S Range 15E on the eastern side of Fresno Slough, then follows the Tranquility ID boundary to its southern extremity. Heading northward, it follows the eastern, northern, and northwestern boundary of San Joaquin Valley – Westside Groundwater Subbasin (corresponding with Westlands Water District boundaries). Average annual precipitation is nine to 11 inches, increasing northwards.

Hydrogeologic Information

The San Joaquin Valley represents the southern portion of the Great Central Valley of California. The San Joaquin Valley is a structural trough up to 200 miles long and 70 miles wide filled with up to 32,000 feet of marine and continental sediments deposited during periodic inundation by the Pacific Ocean and by erosion of the surrounding mountains, respectively. Continental deposits shed from the surrounding mountains form an alluvial wedge that thickens from the valley margins toward the axis of the structural trough. This depositional axis is below to slightly west of the series of rivers, lakes, sloughs, and marshes, which mark the current and historic axis of surface drainage in the San Joaquin Valley.

Water Bearing Formations

The geologic units that comprise the ground water reservoir in the Delta-Mendota subbasin consist of the Tulare Formation, terrace deposits, alluvium, and flood-basin deposits. The Tulare Formation is composed of beds, lenses, and tongues of clay, sand, and gravel that have been alternately deposited in oxidizing and reducing environments (Hotchkiss 1971). The Corcoran Clay Member of the formation underlies the basin at depths ranging about 100 to 500 feet and acts as a confining bed (DWR 1981).

Terrace deposits of Pleistocene age lie up to several feet higher than present streambeds. They are composed of yellow, tan, and light-to-dark brown silt, sand, and gravel with a matrix that varies from sand to clay (Hotchkiss 1971). The water table generally lies below the bottom of the terrace deposits. However, the relatively large grain size of the terrace deposits suggests their value as possible recharge sites.

Alluvium is composed of interbedded, poorly to well-sorted clay, silt, sand, and gravel and is divided based on its degree of dissection and soil formation. The flood-basin deposits are generally composed of light-to-dark brown and gray clay, silt, sand, and organic materials with locally high concentrations of salts and alkali. Stream channel deposits of coarse sand and gravel are also included.

Groundwater in the Delta-Mendota subbasin occurs in three water-bearing zones. These include the lower zone, which contains confined fresh water in the lower section of the Tulare Formation, an upper zone which contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits, and a shallow zone which contains unconfined water within about 25 feet of the land surface (Davis 1959).

The estimated specific yield of this subbasin is 11.8 percent (based on DWR San Joaquin District internal data and Davis 1959). Land subsidence up to about 16 feet has occurred in the southern portion of the basin due to artesian head decline (Ireland 1964).

Restrictive Structures

Groundwater flow was historically northwestward parallel to the San Joaquin River (Hotchkiss 1971). Recent data (DWR 2000) show flow to the north and eastward, toward the San Joaquin River. Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the subbasin.

Groundwater Level Trends

Changes in groundwater levels are based on annual water level measurements by DWR and cooperators. Water level changes were evaluated by quarter township and computed through a custom DWR computer program using geostatistics (kriging). On average, the subbasin water level has increased by 2.2 feet from 1970 through 2000. The period from 1970 through 1985 showed a general increase, topping out in 1985 at 7.5 feet above the 1970 water level. The nine-year period from 1985 to 1994 saw general declines in groundwater levels, reaching back down to the 1970 groundwater level in 1994. Groundwater levels rose in 1995 to about 2.2 feet above the 1970 groundwater level. Water levels fluctuated around this value until 2000.

Groundwater Storage

Estimations of the total storage capacity of the subbasin and the amount of water in storage as of 1995 were calculated using an estimated specific yield of 11.8 percent and water levels collected by DWR and cooperators.

According to these calculations, the total storage capacity of this subbasin is estimated to be 30,400,000 af to a depth of 300 feet and 81,800,000 af to the base of fresh groundwater. These same calculations give an estimate of 26,600,000 af of groundwater to a depth of 300 feet stored in this subbasin as of 1995 (DWR 1995). According to published literature, the amount of stored groundwater in this subbasin as of 1961 is 51,000,000 af to a depth of ≤ 1,000 feet (Williamson 1989).

Groundwater Budget (Type B)

Although a detailed budget was not available for this subbasin, an estimate of groundwater demand was calculated based on the 1990 normalized year and data on land and water use. A subsequent analysis was done by a DWR water budget spreadsheet to estimate overall applied water demands, agricultural groundwater pumpage, urban pumping demand and other extraction data.

Natural recharge is estimated to be 8,000 af. Artificial recharge and subsurface inflow are not determined. Applied water recharge is approximately 74,000 af. Annual urban and agricultural extractions estimated to be 17,000 af and 491,000 af, respectively. Other extractions are approximately 3,000 af, and subsurface outflow is not determined.

Groundwater Quality

Characterization. The groundwater in this subbasin is characterized by mixed sulfate to bicarbonate types in the northern and central portion with areas of sodium chloride and sodium sulfate waters in the central and southern portion. TDS values range from 400 to 1,600 mg/L in the northern portion of the subbasin and from 730 to 6,000 mg/L in the southern portion of the subbasin (Hotchkiss 1971). The Department of Health Services (DHS), which monitors Title 22 water quality standards, reports TDS values in 44 public supply wells to range from 210 to 1,750 mg/L, with an average value of 770 mg/L. A typical range of water quality in wells is 700-1,000 mg/L.

Impairments. Shallow, saline groundwater occurs within about 10 feet of the ground surface over a large portion of the subbasin. There are also localized areas of high iron, fluoride, nitrate, and boron in the subbasin (Hotchkiss 1971).

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	47	2
Radiological	47	1
Nitrates	51	4
Pesticides	47	1
VOCs and SVOCs	45	0
Inorganics – Secondary	47	18

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 20 – 5,000	Average: 800-2,000
	Total depths (ft)	
Domestic		
Municipal/Irrigation	Range: 50 - 800	Average: 400-600

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR (incl. Cooperators)	Groundwater levels	816 Semi-annually
DWR (incl. Cooperators)	Mineral, nutrient, & minor element	
Department of Health Services (incl. Cooperators)	Title 22 water quality	120 Varies

Basin Management

Groundwater management:	Panoche Water District is approximately 11 months into the AB3030 process and will be doing a joint plan with other districts and the county. San Luis and Delta-Mendota Water Authority North adopted an AB 3030 plan on December 5, 1997.
Water agencies	
Public	Merced County, Fresno County, Broadview WD, Centinella WD, Central California ID, Davis WD, Del Puerto WD, Eagle Field WD, El Solyo WD, Farmers WD, Firebaugh Canal WD, Foothill WD, Fresno Slough WD, Grasslands WD, Hospital WD, Kern Canon WD, Laguna WD, Mercy Springs WD, Mustang WD, Oak Flat WD, Orestimba WD, Oro Loma WD, Pacheco WD, Panoche WD, Patterson WD, Romero WD, Salado WD, San Luis Canal Company, San Luis WD, Santa Nella C.WD, Sunflower WD, Tranquility ID, West Stanislaus ID, Widren WD, Quinto WD
Private	None.

San Joaquin Valley Groundwater Basin
Westside Subbasin

- Groundwater Subbasin Number: 5-22.09
- County: Fresno, Kings
- Surface Area: 640,000 acres (1,000 square miles)

Basin Boundaries and Hydrology

The San Joaquin Valley is surrounded on the west by the Coast Ranges, on the south by the San Emigdio and Tehachapi Mountains, on the east by the Sierra Nevada and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The northern portion of the San Joaquin Valley drains toward the Delta by the San Joaquin River and its tributaries, the Fresno, Merced, Tuolumne, and Stanislaus Rivers. The southern portion of the valley is internally drained by the Kings, Kaweah, Tule, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes.

The Westside Subbasin consists mainly of the lands in Westlands Water District. It is located between the Coast Range foothills on the west and the San Joaquin River drainage and Fresno Slough on the east. The subbasin is bordered on the southwest by the Pleasant Valley Groundwater Subbasin and on the west by Tertiary marine sediments of the Coast Ranges, on the north and northeast by the Delta-Mendota Groundwater Subbasin, and on the east and southeast by the Kings and Tulare Lake Groundwater Subbasins. Average annual precipitation varies across the subbasin from 7 inches in the south to 9 inches in the north.

Hydrogeologic Information

Water Bearing Formations

The aquifer system comprising the Westside Subbasin consists of unconsolidated continental deposits of Tertiary and Quaternary age. These deposits form an unconfined to semi-confined upper aquifer and a confined lower aquifer. These aquifers are separated by an aquitard named the Corcoran Clay (E-Clay) member of the Tulare Formation.

The unconfined to semi-confined aquifer (upper zone) above the Corcoran Clay includes younger alluvium, older alluvium, and part of the Tulare Formation. These deposits consist of highly lenticular, poorly sorted clay, silt, and sand intercalated with occasional beds of well-sorted fine to medium grained sand. The depth to the top of the Corcoran Clay varies from approximately 500 feet to 850 feet (DWR 1981).

The confined aquifer (lower zone) consists of the lower part of the Tulare Formation and possibly the uppermost part of the San Joaquin Formation. This unit is composed of lenticular beds of silty clay, clay, silt, and sand interbedded with occasional strata of well-sorted sand. Brackish or saline water underlies the usable groundwater in the lower zone.

Unpublished DWR (San Joaquin District) information indicates specific yield ranges from 5.1 to 17.8 percent to a depth of 300 feet. The highest

specific yields are associated with coarser sediments distributed along the eastern portion of the subbasin from the Sierra Nevada Mountains. The USGS (Williamson and others 1989) used a subbasin average specific yield of 10.3 percent for groundwater modeling purposes. Earlier USGS work estimated an average specific yield of 9 percent from a depth of 10 to 200 feet (Davis and others 1959).

Restrictive Structures

Flood basin deposits along the eastern subbasin have caused near surface soils to drain poorly thus restricting the downward movement of percolating water. This causes agriculturally applied water to buildup as shallow water in the near surface zone. Areas prone to this buildup are often referred to as drainage problem areas.

The Corcoran Clay is a lacustrine diatomaceous clay unit that underlies much of the subbasin. Within the subbasin it varies in thickness from 20 to 120 feet (Belitz and Heimes 1990). Prior to groundwater development, the Corcoran Clay effectively separated the upper and lower zones. Numerous wells penetrate the clay and have allowed partial interaction between the zones.

Recharge Areas

Primary recharge to the aquifer system is from the seepage of Coast Range streams along the west side of the subbasin and the deep percolation of surface irrigation. Davis and Poland (1957) indicated that secondary recharge to the upper and lower aquifers occurred from areas to the east and northeast as subsurface flows.

Groundwater Level Trends

Groundwater levels were generally at their lowest levels in the late 1960s, prior to importation of surface water. The Central Valley Project began delivering surface water to the San Luis Unit in 1967-68. Water levels gradually increased to a maximum in about 1987-88, falling briefly during the 1976-77 drought. Water levels began dropping again during the 1987-92 drought with water levels showing the effects until 1994. Through a series of wet years, after the drought, 1998 water levels recovered nearly to 1987-88 levels.

Groundwater Storage

Groundwater Storage Capacity. Davis and others (1959) estimated the groundwater storage capacity at 10,940,000 af in the depth zone from 10 to 200 feet of the Mendota-Huron storage unit. This was over an area of 639,000 acres and a specific yield varying from 8.0 to 9.6 percent. This occupies a portion of the upper aquifer.

Using an average thickness of 675 feet (ground surface to top of Corcoran Clay), specific yield of 9 percent, over an area of 600,000 acres; the storage capacity of the upper aquifer is approximately 36,500,000 af.

Using a thickness of 1,200 feet from the average base of the Corcoran Clay to the average base of fresh groundwater, a specific yield of 9 percent, over

600,000 acres; the storage capacity of the lower aquifer is approximately 65,000,000 af.

Groundwater in Storage. The USGS estimated the water in storage in 1961 was 52,000,000 af (Williamson 1989). This estimate was to a depth of less than or equal to 1,000 feet.
Using an average depth to water in October 1984 of 111 feet, a specific yield of 9 percent, over an area of 600,000 acres; the available storage is estimated to be 6,000,000 af.

Groundwater Budget (Type C)

Davis and Poland (1957) estimated seepage from west side streams amounted to 30,000-40,000 af per year. For 1951, secondary recharge from the east into the upper aquifer was 20,000-30,000 af and was 150,000-200,000 af into the lower aquifer (Davis and Poland 1957).

Westlands Water District (1999) estimated the average deep percolation between 1978 and 1996 was 244,000 af per year. The District (1998) also estimated the average applied groundwater between 1978 and 1997 was 193,000 af per year.

Groundwater Quality

Characterization. Groundwaters of the west side of the San Joaquin Valley are generally of the sulfate or bicarbonate type (Davis and others 1959).

The waters of the upper aquifer, generally, are high in calcium and magnesium sulfate (Davis and Poland 1957). Groundwater below 300 feet and above the Corcoran Clay shows a tendency of decreased dissolved solids with increased depth. Most of the groundwater of the lower aquifer is of the sodium sulfate type (Davis and Poland 1957). The difference in quality between the upper and lower aquifers is that the confined zone contains less dissolved solids (Davis and others 1959). Groundwater in western Fresno County can have an upper range between 2,000 and 3,000 mg/L (Davis and others 1959).

DHS data indicates an average TDS of 520 mg/L in the subbasin with a range from 220 mg/L to 1,300 mg/L based on the analyses of six Title 22 monitoring wells.

Dubrovsky and others (1993) indicated dissolved solids in shallow groundwater can be greater than 10,000 mg/L at some locations in the lower fan areas. One sample had a TDS of 35,000 mg/L.

Impairments. High total dissolved solids is one impairment of groundwater in the subbasin. Groundwaters at certain locations contain selenium and boron that may affect usability.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	2	0
Radiological	1	0
Nitrates	2	0
Pesticides	2	0
VOCs and SVOCs	2	0
Inorganics – Secondary	2	2

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: – 560-2,000	Average: 1,100 (Davis and Poland 1957)
	Total depths (ft)	
Domestic	Range: - Not determined	Average: Not determined
Municipal/Irrigation	Range: - 120-3,000	Average: 600-1,800 varies by type and location

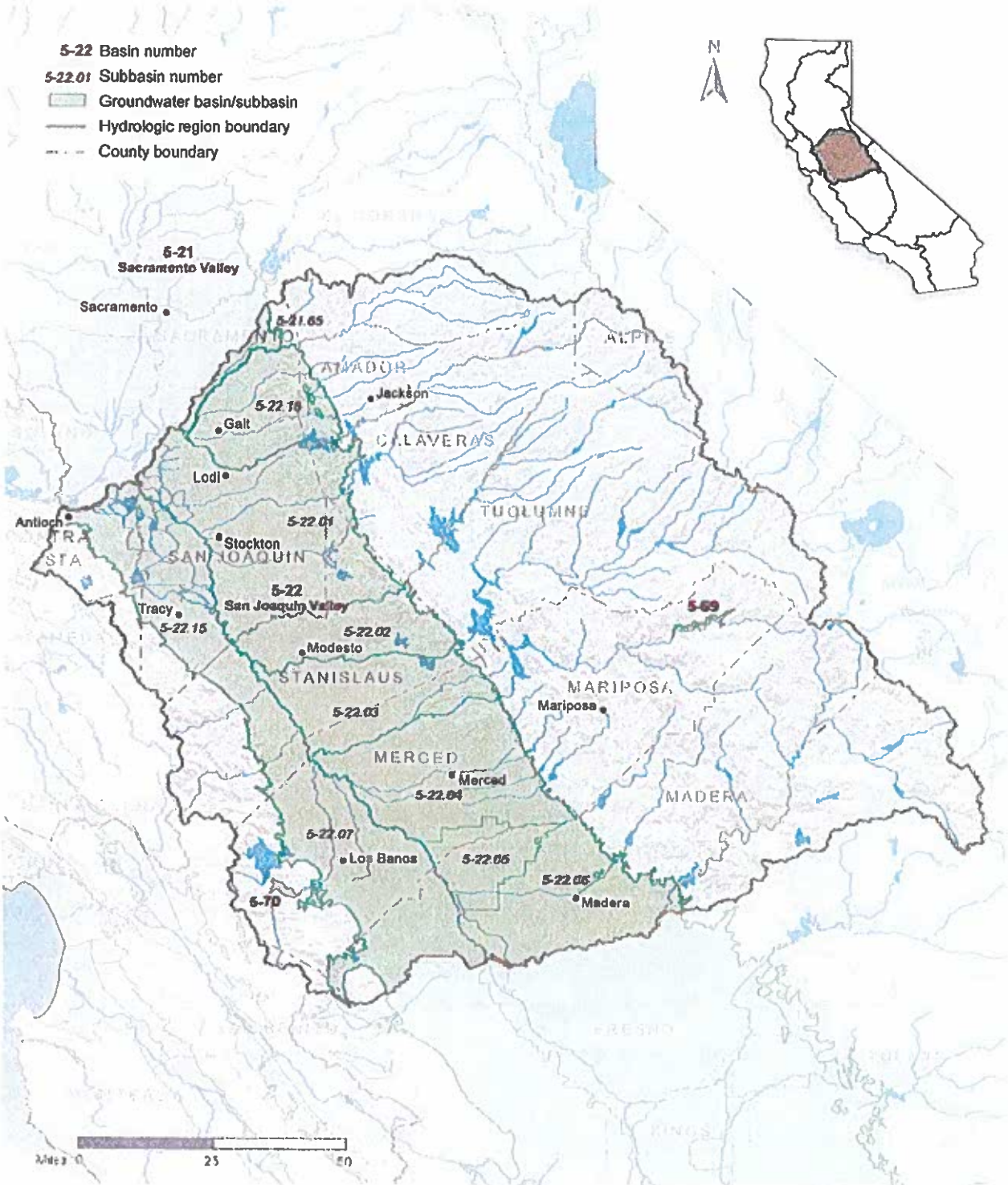
Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Westlands Water District	Groundwater levels	960 Annually and may vary
Westlands Water District	Miscellaneous water quality	Varies
Department of Health Services and cooperators	Title 22 water quality	50 Varies

Basin Management

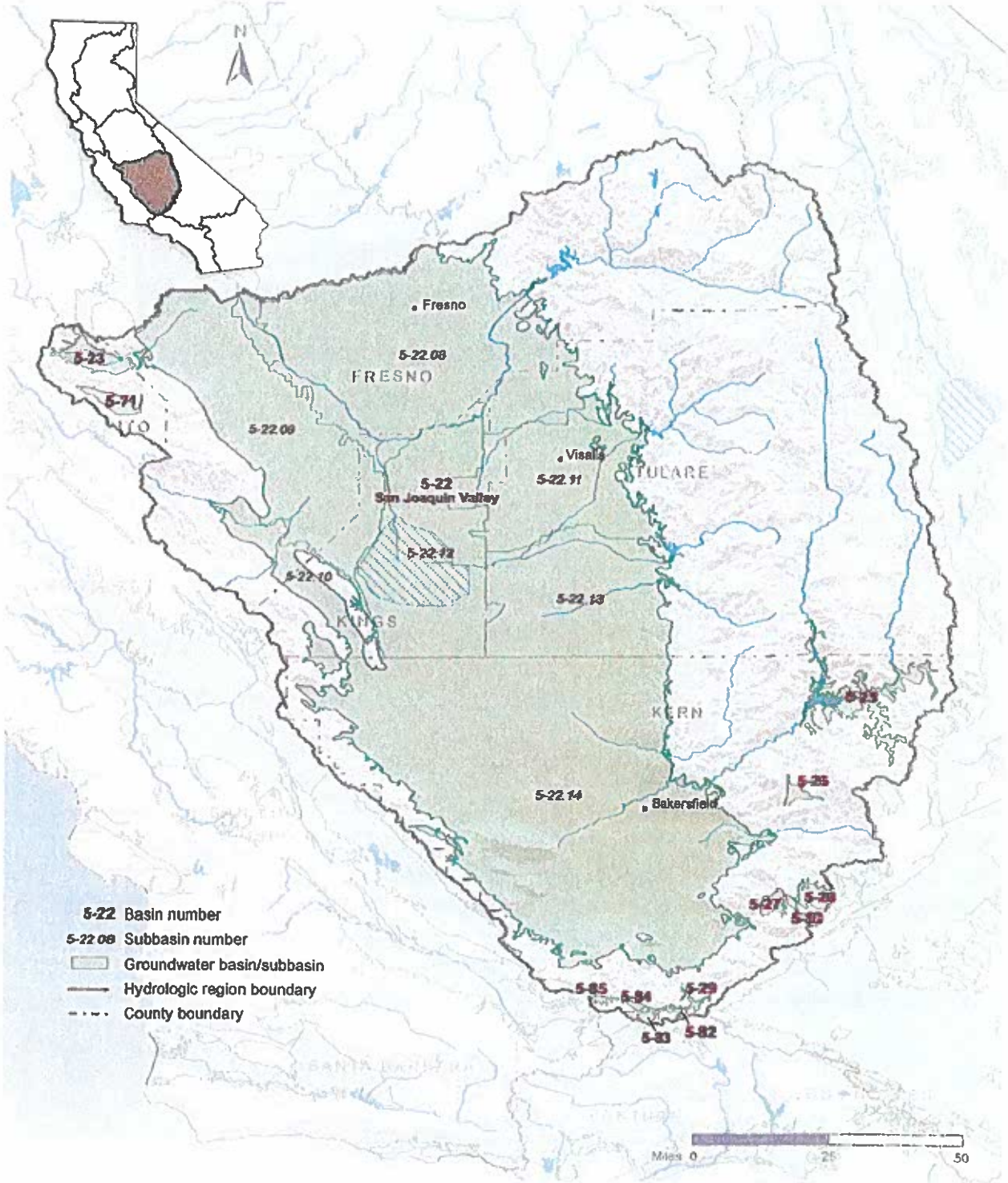
Groundwater management:	AB 3030 Plan adopted by Westlands Water District
Water agencies	
Public	Westlands Water District
Private	

Alluvial Groundwater Basins and Subbasins within the San Joaquin River Hydrologic Region



Source: Department of Water Resources, CWP 2013

Alluvial Groundwater Basins and Subbasins within the Tulare Lake Hydrologic Region



Source: Department of Water Resources, CWP 2013

ATTACHMENT F

MEASUREMENT DEVICE DOCUMENTATION

Pump and Flow Meter Certification

Firebaugh Canal Water District manages its flow data by adhering to manufactures guidelines and production curves. All pumps are maintained on a yearly basis and checked for damage and wear to support design specifications of the pumping unit.

Hour meters are read daily and calibrated on a daily basis rate of use at each turnout.

Flow meters are read daily and visually inspected for damage or wear. Flow meters are removed from service and calibrated / repaired to manufactures specifications on an annual basis at the district's shop facility.

The district consults with Cal Poly ITRC staff to gather information on the latest-most up to date water measurement information. The Mobile Lab will make periodic visits to the district to perform calibration tests.

Majority of the district's turnouts are measured by propeller meter. The meters are installed as per manufactures instructions. (Attached)

A few district turnouts are measured by way of meter gates. They have been installed and maintained per the guidelines for meter gates, produced by the Cal Poly ITRC. (Attached) District staff follows these guidelines and all meter gates are installed and maintained as instructed in the guidebook.

3.0 INSTALLATION INSTRUCTIONS

Proper meter installation is the first step to ensure excellent meter performance. Follow these instructions closely. Consult an authorized service representative or the factory for any circumstances encountered which are not covered in this manual.

All McCrometer products are tested and inspected during manufacture and prior to shipping. An inspection should be performed at the time of unpacking to detect any damage that might have occurred during shipment.

3.1 Safety

WARNING!
NEVER ATTEMPT TO REMOVE A METER WHILE THE LINE IS UNDER PRESSURE!

- Any person installing, inspecting, or maintaining a McCrometer flow meter should have a working understanding of piping configurations and systems under pressure.
- Before adjusting or removing any meter, be certain the system has depressurized completely.
- Be careful when lifting meters. Meters can cause serious injury if lifted incorrectly or dropped.
- Only necessary and appropriate tools should be used when working on a meter. For tools list see page 13.
- Before starting a system, make sure all connections are properly secured. Keep a safe and prudent distance away from the meter during system start-up.

3.2 Basic Installation Steps

NOTE
When cutting a hole in the pipe is required, be sure to use the provided template. It is recommended that four holes be drilled at the corners of the square for guiding the cut. It is also recommended that the cut be made on the inside of the lines that are drawn from the template.

1. Apply MolyKote lubricant or equivalent to the saddle gasket and the ID of the U-bolts.
2. Place saddle with gasket in place over the cut out.
3. Place U-bolts underneath the pipe and through the saddle clips.
4. Place the provided washers and nuts on the U-bolts that have been installed through the saddle clips.
5. Start tightening down the nuts ***evenly in a diagonal or figure 8 pattern***.
   5a. Tighten the nuts to **40 ft. lbs.**
   5b. Tighten the nuts to **60 ft. lbs.**
   5c. Tighten the nuts to **80 fts. lbs.**
6. Go back around and loosen all of the nuts. Do not back the nuts completely off of the U-bolts. The goal is to release force and tension off of the saddle and the gasket.
7. Repeat steps 5a through 5c exactly as described. Any step that is skipped may result in an improper seal.
8. Apply pressure/turn on pump.
9. Verify the saddle is not leaking water. If it is, repeat steps 6 through 8 until the saddle has sealed.

3.3 Straightening Vanes

Special attention should be given to systems using two elbows "out of plane" or devices such as a centrifugal sand separator. (See Figure 7.) These cause swirling flow in the line that affect propeller meters. Well developed swirls can travel up to 100 diameters downstream if unobstructed. Since most installations have less than 100 diameters to work with, straightening vanes become necessary to alleviate the problem. (See Figure 8.) Straightening vanes will break up most swirls and ensure more accurate measurement.

McCrometer's mainline meters like the MW500 series have vanes included as a standard feature. If your model does not have straightening vanes (e.g., M0300 Bolt-On Saddle series), McCrometer actively encourages installing vanes just ahead of the meter. Straightening vanes are available in weld-in, bolt-in, and the FS100 and FS200 Flow Straightener. (See Figure 9) For more information on vane installation, please visit www.mccrometer.com and download the following McCrometer documents:

- 24510-72 Installation Instructions For Bolt-In Vanes
- 24517-03 Flow Straightener Installation Instructions

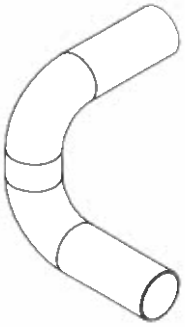


Figure 7. Elbows out of plane

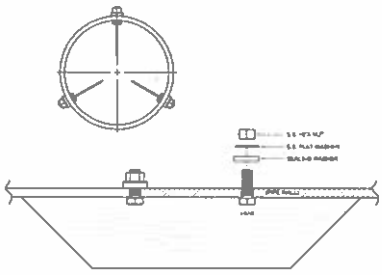


Figure 8. Bolt-in straightening vanes

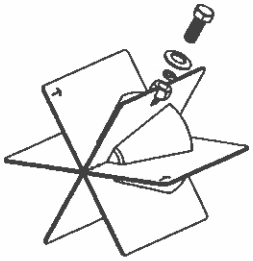


Figure 9. Flow Straightener

3.4 Other Installation Considerations

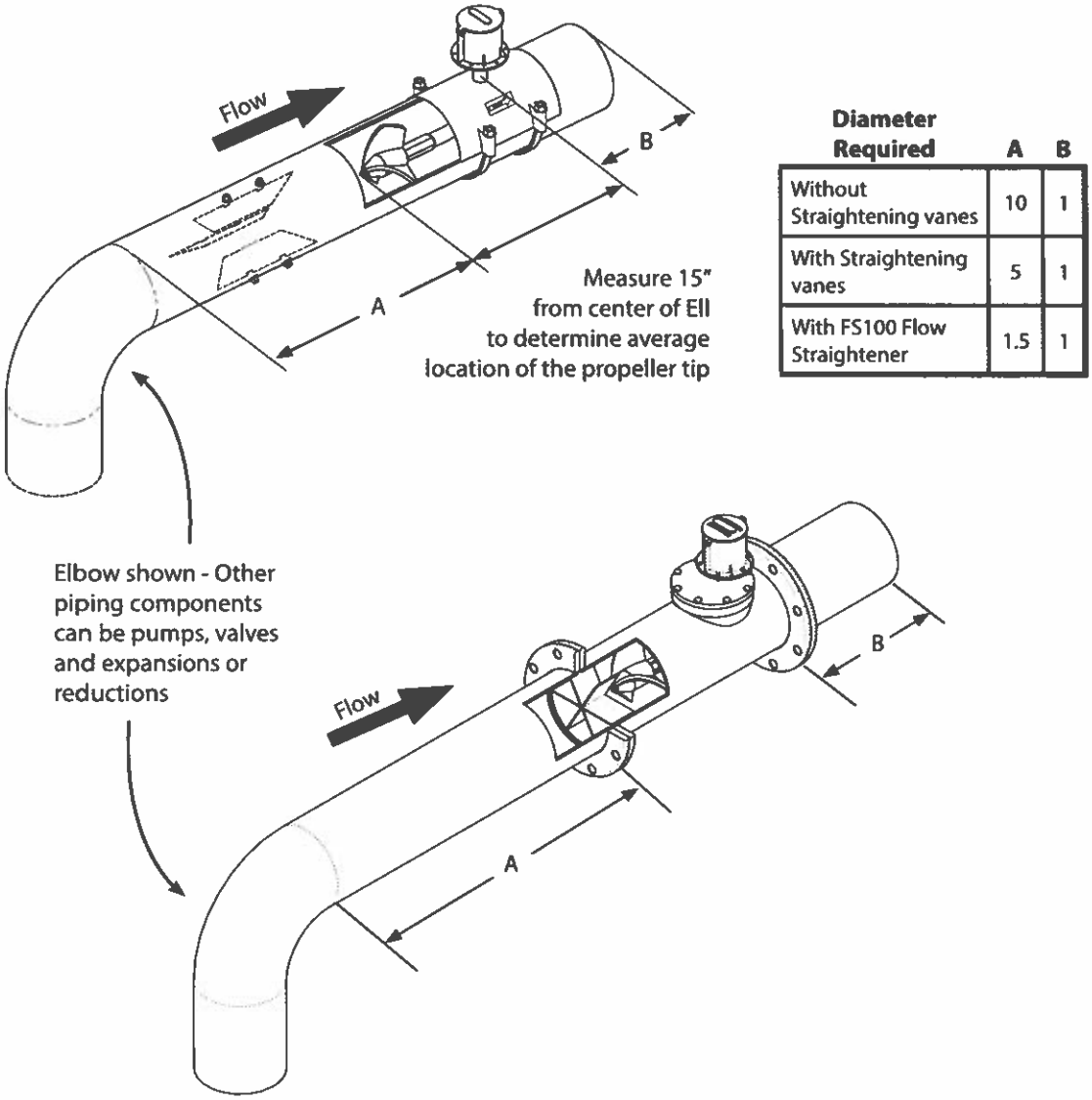
- All propeller flow meters are calibrated for a full pipeline only; if less, the flow meter will over register the flow. Although a minimum line pressure is not necessary for an accurate measurement, a full pipe is necessary.
- Mc Propeller flow meters can be mounted either horizontally or vertically. Mc Propeller flow meters are calibrated for horizontal installation. Vertical mounting can offer some slight advantages due to gravity having a more pronounced flow conditioning effect in vertical lines. If the meter is to be mounted vertically, please notify the factory at time of order as the mechanical indicator needs to be calibrated for vertical installations.
- With the meter installed, check the rate-of-flow indicator. It should be stable to the point that it can be easily read. Some indicator movement is normal due to variations in flow. Erratic movement of the indicator is normally caused by flow variations and the system should be checked. Drastic variations in flow can decrease meter accuracy. If you suspect a problem with the meter, please contact your local McCrometer representative.

3.5 Pipe Run Requirements

Flow meters are velocity sensing devices and are vulnerable to certain upstream disturbances. Because of this, meters need certain lengths of straight pipe runs before and after the meter. These distances usually relate to the diameter (D) of the pipe used. Obstructions can include elbows, valves, pumps, and changes in pipe diameter. The uneven flow created by these obstructions can vary with each system. If your application provides for more than the minimum distance required of upstream run, use the available distance.

- Upstream Requirement: McPropeller meters should be installed a minimum of 5D (with vanes) or 10D (without vanes). When the meter is installed with less than 10D upstream, the meter should be installed with vanes. See the table below. In the case of backflow, chemigation valves, or check valves, which are significant disturbers, we recommend installation of the meter at a greater distance if possible. 5D (with vanes) or 10D (without vanes) is the **minimum** requirement.
- Downstream Requirement: The downstream run should be one to two diameters of straight pipe length after the meter.

For upstream and downstream piping requirements relating to your specific meter, contact your local McCrometer representative. (Please be prepared to provide the serial number of your meter.)



Diameter Required	A	B
Without Straightening vanes	10	1
With Straightening vanes	5	1
With FS100 Flow Straightener	1.5	1

Figure 10. Pipe Run Requirements For Saddle And Tube Style Flow Meters

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Practical Guide for Metergates

by
Dr. Charles Burt and Dr. Daniel Howes
Rev November 14, 2016

Background

This document contains brief instructions on the use of special round canal gates called "metergates" for flow measurement. A metergate differs from a traditional canal gate turnout because it has a hole in the top of the pipe attached to a stilling well downstream of the gate so that the downstream water level can be measured.

Metergates have been used since the early 1900's for flow measurement in addition to on/off control. Recent research conducted by the authors at the Irrigation Training and Research Center has shown that the existing tables for "Armco"-type metergates, published after the 1950's, provide good accuracy for flow measurement (if measurements are made correctly).

Armco-type metergates include round gates from Fresno Valve and Castings (101), Waterman (C-10), and X-CAD (model unknown) gates. In order to properly use these gates, a hole (5/8 to 3/4 inch in diameter) must be drilled in the pipe 12 inches downstream of the back face of the gate (or at the top of a corrugation as close to 12 inches as possible). This hole must be attached to a stilling well at least 6 inches in diameter that protrudes up to the elevation of the top of the gate frame.

Figure 1 shows a common metergate design drawing.

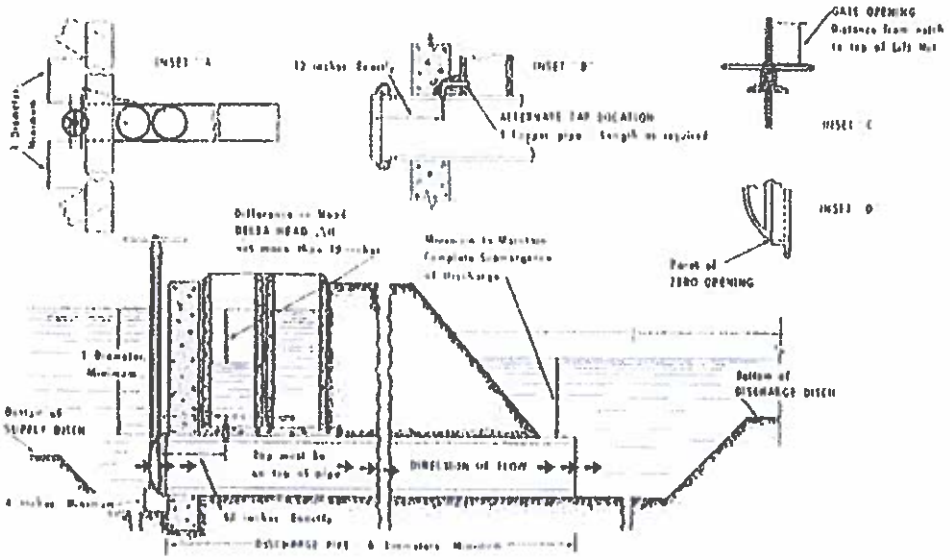

Figure 1. Metergate drawing used by various manufacturers, USBR, etc.

ITRC Research

ITRC evaluated the calibration of a variety of Armco-type round and square gates to determine if published "metergate" calibration tables are accurate. These gates were installed at the ITRC gate calibration facility (**Figure 2**). The gate calibration facility is set up so that the turnout gate is perpendicular to the main supply channel flow, which is typical in field installations.

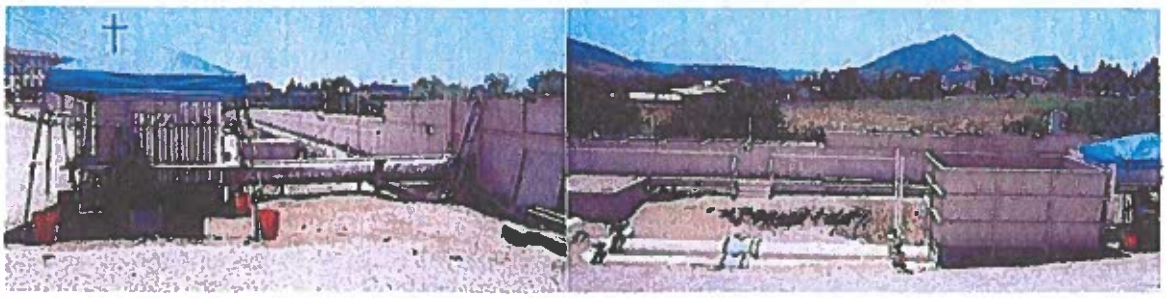

Figure 2. ITRC gate calibration facility

Summary of ITRC Research Results

1. A high level of accuracy (+/-5%) was found if all of the following conditions are met:
    a. Gate opening range: 20% < Gate opening < 75%
    b. Upstream submergence > 0.5D (where D is the gate diameter)
    c. Stilling well location was 4" to 12" downstream of the face of the gate
2. The distance downstream of the gate at which the stilling well is located (as long as it is within the 4" to 12" range) does not have a significant effect on the flow rate obtained using the tables **unless** the gate is **open** more than 70-75% (percent of fully open).

3. The preliminary evaluation of tangential supply channel flow velocity did not seem to have a significant impact on the flow through the turnout gates. Supply channel velocities up to 1.9 feet per second (fps) were examined in this evaluation.
4. Higher uncertainty (error) occurred at smaller gate openings.
5. Optimum range of operation for the highest accuracy was an opening between 20% and 75% under most conditions. Smaller gate openings seemed to be more problematic than larger gate openings.
6. One issue that is not discussed here but was apparent was the submergence (water level) in the supply canal above the turnout pipeline. Care should be taken to ensure that the water level upstream of the top of the turnout pipe remains above (0.5 × gate diameter). The USBR standard is (1 × gate diameter).

Correction for Stilling Well 4" from Gate

Standard flow tables are based on a stilling well located 12" downstream of the back of the gate. Stilling well measurements were made at multiple locations downstream of the gate to analyze the effects of stilling well location. It was found that, at gate openings less than 70% open, there was **minimal** impact on the change in head from any stilling well closer than 12" to the gate. Once the gate reached an opening of 70% or greater, the ΔH measurement measured at the closer stilling wells (e.g., at 4") began to vary depending on gate size resulting in more significant error.

On average, at gate openings above 75%, the flow rate for a 4" stilling well was 8%-10% greater than the value shown on a 12" stilling well-based table. This adjustment could be applied in the case where gates must be opened more than 75%.

Practical Details

Figure 3 shows one recommended configuration for a metergate. There are some significant differences between **Figures 1** and **3**. With metergates, "the devil is in the details". These are discussed on the next few pages.

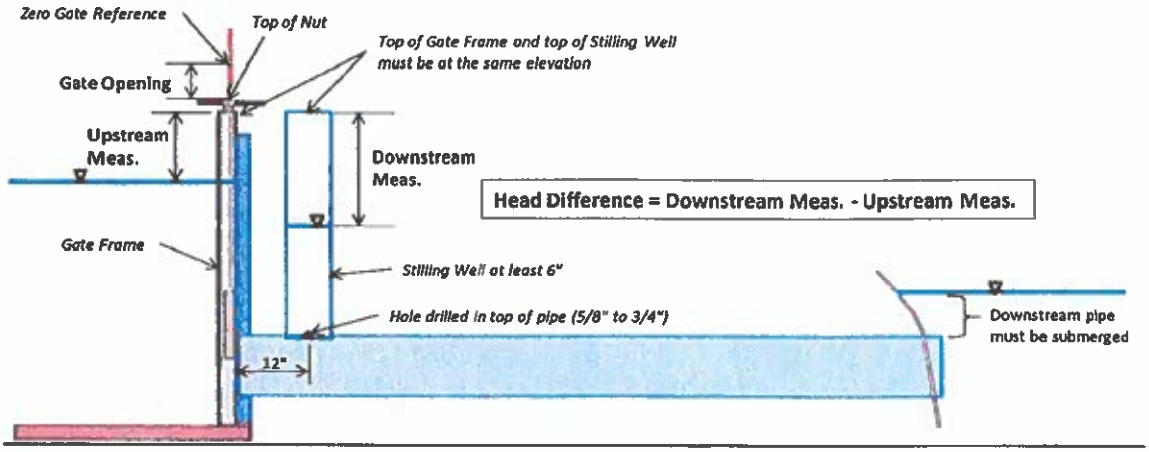

Figure 3. ITRC recommendation for proper metergate installation. These have been improved by Glenn Colusa ID with pre-cast concrete structures.

Practical Detail #1 – The pipe downstream of the metergate needs to be full. The water level needs to rise to some measurable level in the downstream stilling well.

Practical Detail #2 – Sufficient upstream submergence is needed. The required water level in the canal, above the top of the pipe, must be at least ½ of the gate (or pipe) diameter. In other words, if there is a 12" pipe, the water level in the supply canal needs to be at least 6" above the top of the pipe.

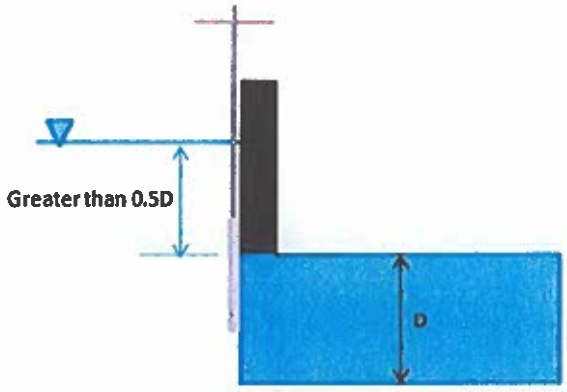

Figure 4. Recommended upstream submergence above the gate to ensure accurate flow measurement

Practical Detail #3 – All of the calibration charts require knowledge of the gate opening, as measured by the shaft opening. The "zero" gate opening must be properly determined and marked on the gate shaft. This is not a trivial detail. Specific points are:

1. All measurements of gate opening, as well as the initial marking, must be made after the gate stem has been lifted (opened). This is because there is some "slop" or movement between the shaft and the gate itself.
2. The gate stem will move up some distance before the gate plate itself reaches the bottom of the pipe. The charts depend on knowing the gate opening, not the movement from the gate seating position. The gate must be closed beyond the bottom of the pipe to seal off completely. That sealed position is not the "zero" position.
3. There must be some specific way to measure the shaft position when the bottom of the gate just barely clears the bottom of the pipe – in other words, when there is a "zero opening". This is fairly easy to set and measure if the canal is full. The gate is opened until a narrow strip of paper can be inserted into the crack. **Figure 5** shows photos taken at San Luis Canal Company of a customized tool that is used to detect the actual gate opening, but a similar device can be used to detect the initial "cracking (zero) open" position..

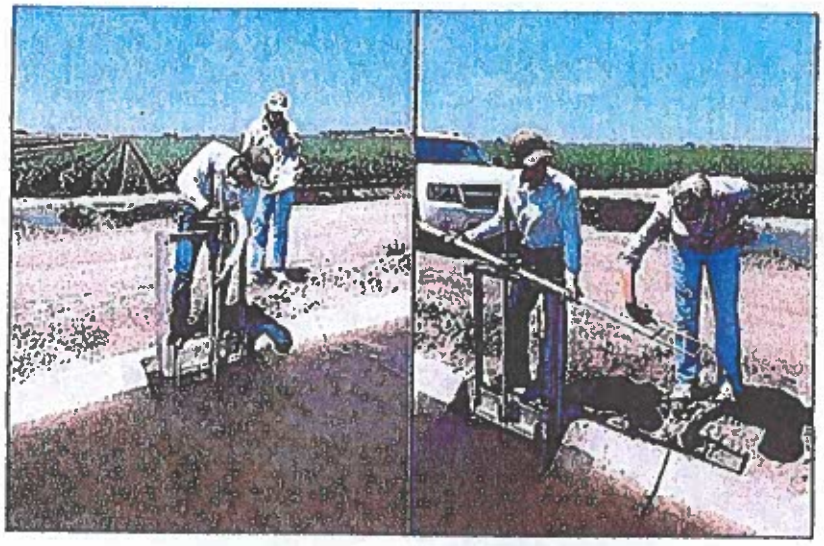

Figure 5. Special tool to detect actual gate opening

4. The shaft needs to be marked in a clear manner so that operators know where the "zero" opening is for the gate when they open the gate. **Figure 6** shows a properly cut notch. It has a sharp bottom edge that was cut with a grinding wheel so that the bottom of the cut is at the same elevation as the top of the bushing. Notice from the color on the shaft that the shaft can be lowered from this position to properly seat the gate.

   The operator will measure from the bottom of cut to the top of the bushing, when the gate is open, to determine the gate opening. This is always measured after an "uplift" action.

Practical Detail #4 – The stilling well needs to have sufficient diameter to dampen the turbulence, and so that operators can see into it. ITRC recommends a stilling well of 6" – 8" diameter, with an access hole of about 5/8" or 3/4" diameter.

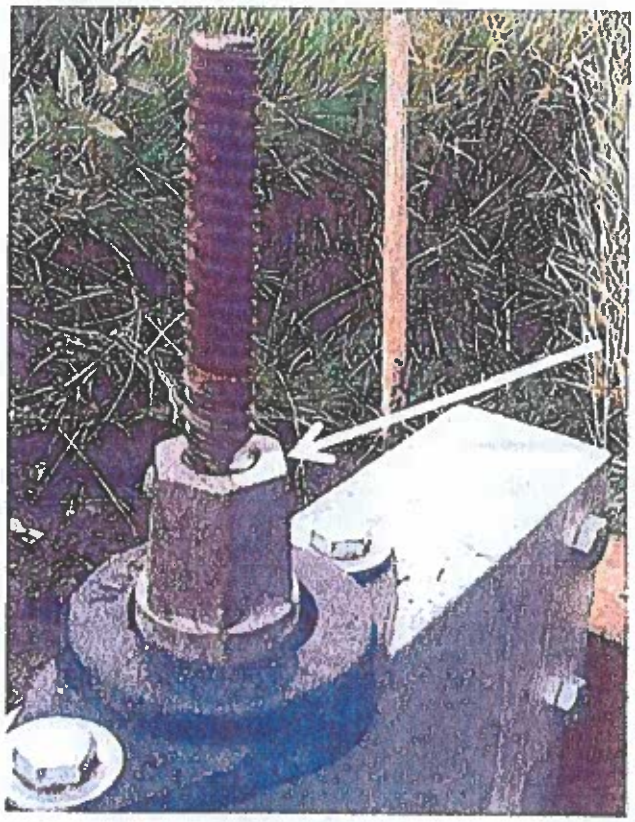

Figure 6. Proper cut in shaft to mark the "zero" opening

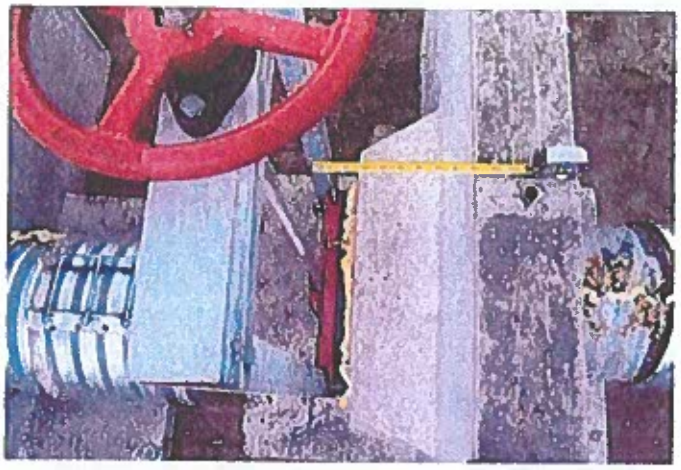

Figure 7. Stilling well is located the correct distance downstream of the gate, but is so small that there will be tremendous surging (up/down movement), and operators cannot see the water surface

Practical Detail #5 – The stilling well does not need to be centered over the access hole in the top of the discharge pipe. In general, it is good to have the stilling well close to the gate frame/bulkhead, so that it can be supported.

Practical Detail #6 – Make it easy to measure the difference in head (between the water level in the canal, and the water level in the stilling well). In other words, use the same datum (elevation) for both measurements. **Figure 8** shows a stilling well with the top correctly placed at the same elevation as the gate frame, and with a proper diameter. **The top of the stilling well should be at the same elevation as the top of the gate frame (where the bottom of the nut rests), or have the same elevation as another reference point.** Then the upstream measurement should be taken from the top of the gate frame to the water level. The downstream measurement should be taken from the top of the stilling well to the water level. The head difference is the difference between the upstream and downstream water levels.

Figure 8. Stilling well installed on an existing discharge pipe. It is constructed of PVC pipe that is too thin for long life, but it serves as an example of the correct diameter, position, and height.

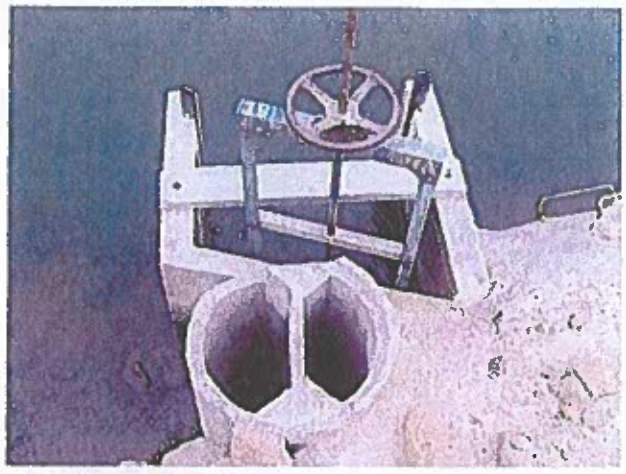

Figure 9. An old type of dual-stilling well commonly found in Central California irrigation districts. One stilling well was connected to the canal, and the second was directly over the discharge pipe. The idea of measuring down into both stilling wells from the same center point was good, but the top of the stilling well was so close to the ground surface that road maintenance quickly filled these stilling wells with dirt. Also, the side connection between the canal stilling well and the canal itself was too difficult to clean.

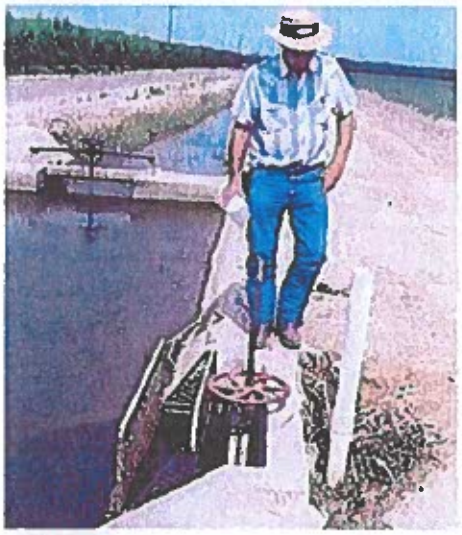

Figure 10. This stilling well is properly located, but it has too small a diameter. The operator also needs to know the elevation difference between the top of the stilling well and the gate frame, which requires an extra computation to determine the difference in head across the gate.

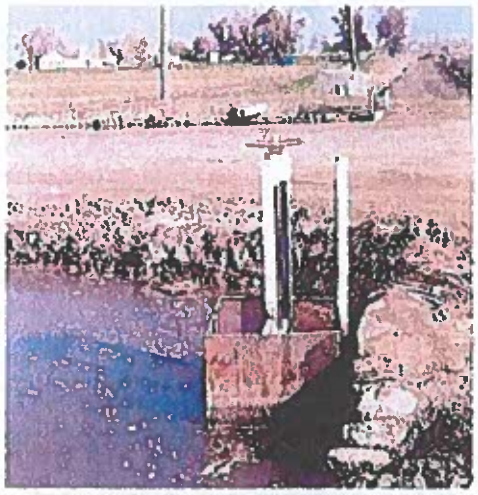

Figure 11. Correct height of stilling well to match top of gate frame. However, the diameter is too small. Steel pipe material is good

Figure 12. Large diameter stilling well, with cover to minimize having it fill with dirt from the road. Strong concrete, with the rim of the stilling well at the same elevation as the bulkhead top.

The tables at the end of this report show the key measurements needed to properly use a metergate. The gate opening should be measured from the top of the gate opening nut to a zero gate opening reference. **As mentioned previously, the zero gate opening reference should be marked with a grinder at the gate opening nut on the shaft when the gate is just open enough to breach the bottom of the pipe.**

The Glenn-Colusa ID Configuration

Glenn-Colusa ID (GCID) worked with Briggs (a local pre-cast concrete structure company near Willows, CA) to incorporate the ITRC recommendations into a pre-cast structure. The following photos illustrate their solution, which appears to be excellent. **Table 1** after the photos includes the approximate cost breakdown of the installation.

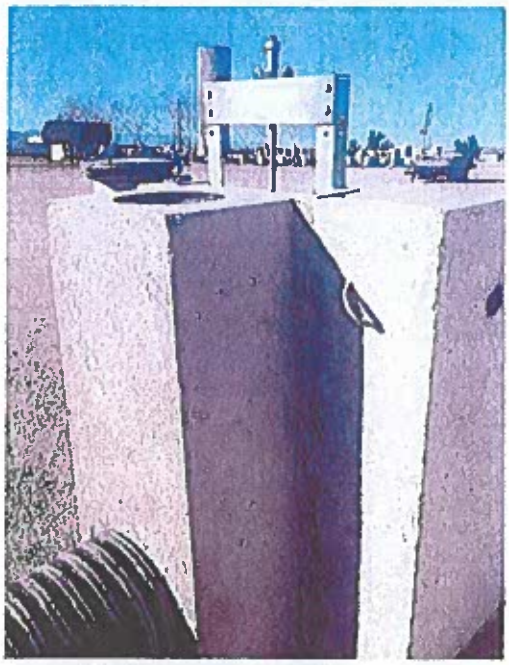

Figure 13. GCID metergate at Briggs

Figure 14. Pre-cast metergate ready for transport

Figure 15. Installation of GCID metergate

Figure 16. Final concrete for GCID metergate, showing downstream pre-cast outlet box

ATTACHMENT G

NOTICES OF DISTRICT EDUCATION PROGRAMS AND SERVICES AVAILABLE TO WATER USERS

P.O. Box 97 • 2412 Dos Palos Rd. (Hwy 33)
Mendota, California 93640
(559) 655-4761 • (559) 659-1245
Fax (559) 655-3658
mail: firebaughcanal@sbcglobal.net

FIREBAUGH CANAL WATER DISTRICT

JEFF BRYANT
General Manager

January 4, 2023

To: Firebaugh Canal Water District Landowners and Water Users

From: Jeff Bryant

Subjects: 2023Tiered Water Rates, Drainage Service Charge, Water Supply and Land Fallowing

2023 WATER RATES

The tiered water rates for 2023 are as follows:

- Tier 1 $18 an acre foot
- Tier 2 $20 an acre foot
- Tier 3 $25 an acre foot
- Tier 4 $30 an acre foot

These rates remain unchanged, however depending on Water Supply conditions; the Board of Directors has reserved the right to revisit tiered water pricing at any time this year.

DRAINAGE SERVICE CHARGE

The district has a $20 per acre Drainage Service Charge in place for 2023. We will be sending the first installment of $10 on February 1, 2023. The second will be invoiced on July 1, 2023.

WATER SUPPLY

Although December was wet with above average precipitation, it is early in the water year. The first official water year classification will come from the Bureau of Reclamation on or around the 15th of February 2023.

LAND FALLOWING REQUESTS

If you plan to fallow your land for a transfer to yourself in a neighboring federal water district, please send your request in letter form with: field number, ownership / deed information on district and receiving lands and name of receiving district as soon as possible; but no later than by February 28, 2023.

Please feel free to contact me with questions.

P.O. Box 97 • 2412 Dos Palos Rd. (Hwy 33)
Mendota, California 93640
(559) 655-4761 • (559) 659-1245
Fax (559) 655-3658
mail: firebaughcanal@sbcglobal.net

JEFF BRYANT
General Manager

To: All FCWD Landowners and Water Users

From: Jeff Bryant, General Manager

Date: August 8, 2023

Subject: Request for Low Interest Loan / Water Conservation Projects

The Firebaugh Canal Water District continues its low interest loan program for all types of water conservation and efficient irrigation projects if funding is available. In order to better facilitate fall construction of these projects, the district requests a project description, map of project lands identifying the field the project would benefit, together with a price quote from your contractor and any NRCS Funding estimates to be submitted to the district office no later than Friday September 8, 2023.

If the amounts of requests for projects exceed the available funding, some projects could be delayed until the fall of 2024 or longer if the funding is not available. The district's Board of Directors will review each of these projects at its September 19, 2023 meeting. The district has increased the funding of projects to $1,500 per acre benefited.

The District currently grants twenty-five percent of the project at no cost to the grower with the balance being carried at simple three-percent interest over a five year period.

Repairs or Upgrades on existing systems will need approval from the district's Board of Directors. If approved a grant of twenty-Five Percent of the project will be paid once project is complete and all documents have been submitted to District.

All sub-surface flows leaving the district must be reused at the San Joaquin River Water Quality Improvement Project.

Source control is the first line of defense in the battle to control subsurface drainage. These practices include conversion to ¼ mile furrows, sprinkler systems and drip irrigation systems. Experimentation has also proceeded with the timing of pre-irrigation and shallow drainage management to reduce deep percolation. These practices and new irrigation improvements will continue to be implemented to further reduce the production of subsurface drainage water.

Please contact me with any questions at (559) 655-4761 or 659-1245.

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Fax (559) 655-3658
nail: firebaughcanal@sbcglobal.net

FIREBAUGH CANAL WATER DISTRICT

JEFF BRYANT
General Manager

September 21, 2023

To: Landowners and Water Users

From: Jeff Bryant, General Manager

Subject: Fall Water Supply

September – October Water Supply

ıe water supply for the period September – October 2023 is unlimited; but still counts against your tiered water use. If at all possible, start your fall water application as soon as your schedule allows.

November Water / Mendota Dam De-Watering

The district has reduced amount of water for use in November, this water is on a first come first serve basis. Due to the de-watering of the Mendota Pool for dam repairs, we are planning to conclude the irrigation season by Thanksgiving.

Please contact me with any questions or concerns. I can be reached at the office; (559) 655-4761 or by cell at (559) 696-5180.

EXCHANGE perspective

JULY 2024

2024
Q2 Newsletter

541 H St. - Los Banos, CA 93635

An informational newsletter for water users and landowners in the San Joaquin River Exchange Contractors' service area.

Working Together on Drought Year Planning

The severe droughts we have seen in recent years were yet another reminder of just how critical it is that we continue to invest in new infrastructure to capture and store water to prepare for future dry years. At the same time, we also need to work collaboratively today to make the most of the resources we currently have.

Last month, we took a major step to do just that. The Exchange Contractors are proud to announce a new partnership along with the Bureau of Reclamation, Friant Water Authority, and San Luis & Delta-Mendota Water Authority to implement a South of Delta Drought Resiliency Framework.

In short, this agreement marks a new level of collaboration between the three agencies involved that will see us voluntarily agree to set aside and store a portion of our annual water deliveries for later use in dry years. It includes new investments and financial commitments for infrastructure projects to implement the agreement, including the Delta-Mendota Canal Subsidence Correction Project, and the Los Banos Creek Detention Dam Increased Storage Project. Importantly, this voluntary agreement achieves these goals while maintaining long-standing and historic water rights.

There are significant environmental benefits to the agreement, which include financial commitments from the Bureau and the Exchange Contractors to advance the goals of the San Joaquin River Restoration Program to ensure the San Joaquin River flows past Sack Dam to Mendota Pool.

Additionally, the three agencies have agreed to resolve previous disputes relating to the Del Puerto Canyon Reservoir Project. As I've written before in this column, the Del Puerto Canyon Reservoir Project is a critically important water conservation and storage project that is proposed to be built west of Patterson and south of the Sacramento-San Joaquin Delta. It will help promote water reliability and environmental sustainability by creating the capacity to store 82,000 acre-feet of water, while solving the issue of reoccurring flooding in surrounding areas.

I would like to thank our partner agencies for their hard work over many months to make this agreement a reality, as well as the Bureau of Reclamation for their commitment and resources, Reclamation Commissioner Camille Calimlim Touton and Regional Director Ernest Conant for their leadership, Senator Alex Padilla and Representative Jim Costa for their support, and our Board of Directors for their engagement.

For years, the Exchange Contractors have worked to help find solutions that benefit all water users in the Central Valley. The South of Delta Drought Resiliency Framework, and

Continued Page 2

the work that we continue to do today, will mean that we are more prepared with a more resilient water system when dry times come again.

This agreement shows what we can accomplish when we come together and work collaboratively to set aside our disagreements and focus on the areas where we can all benefit from working in partnership. I have said before that disputes relating to water are too often framed as a zero-sum game in which someone wins and someone loses. But there is so much more opportunity for us to work together in a way where everyone can benefit, and I hope that this agreement is just one example of many more such collaborations to come.

Giving Back – The Community Infrastructure Fund

The Exchange Contractors have been deeply intertwined with our local communities going back generations to the early days working alongside towns and organizations on water resource management to more recent efforts in regional infrastructure development. Our collaborative projects with local towns have helped build a resilient and thriving Central Valley, addressing various issues from water management to public health.

In continuance of this longstanding history, I am proud to announce the launch of our new Community Infrastructure Fund. This initiative is designed to support and empower local communities through financial investments to foster sustainable growth and resilience in our region.

Starting this year, our organization will allocate up to two percent of our annual Net Transfer Revenue to the Community Infrastructure Fund. These resources will be used to provide grants for a range of regional projects and initiatives, focusing on projects important to the well-being and development of our communities.

We invite proposals from community organizations, non-profits, and local government bodies. Eligible projects should aim to make a significant impact in the following areas:

- **Water Resource Development, Management, and Conservation**
- **Renewable Energy and Electric Power Infrastructure**
- **Recreational Facility Development**
- **Sewage Treatment Infrastructure**
- **Flood Protection Works**

Priority for funding will be given to projects within the service areas of our four Member Entities: Central California Irrigation District, San Luis Canal Company, Firebaugh Canal Water District, and Columbia Canal Company, including but not limited to: Mendota, Firebaugh, Dos Palos, Los Banos, Gustine and Newman. However, we will also consider proposals that benefit the broader community beyond these boundaries but have a direct impact on our service regions.

Interested applicants are encouraged to submit their proposals by August 9, 2024. Proposals should detail how the project aligns with the authorized uses of funds and the expected benefits for the community. Detailed submission guidelines and application forms will be available at www.sjrecwa.net/community.

All applications will be reviewed thoroughly by our Community Infrastructure Committee, with final decisions made by our Board of Directors. Applicants can expect to receive notification by September 27, 2024.

This new fund represents our continued commitment to investing in the future of our communities. We believe that collaboration makes our region stronger, and we are dedicated to supporting those who are doing good work in our community. While we continue to make significant investments in infrastructure and sustainability, we also want to recognize and support others who are also working to advance these priorities. We look forward to receiving innovative and impactful proposals that will help us build a brighter and more sustainable future for the Central Valley.

For more information, please visit our website or contact our office directly at (209) 827-8616.

An Update on the San Joaquin River Restoration Program

Debates over water in California have too often been framed as "either/or" questions, where one group wins at the expense of another. This approach not only leads to hard feelings and unnecessary combativeness, but also limits our ability to find true compromises—ones that provide positive, workable solutions for everyone involved and not just sacrifices.

Take the San Joaquin River Restoration Program (SJRRP) as an example.

As a quick history, portions of the San Joaquin River would remain dry for part of the year following the completion of Friant Dam. This negatively impacted Spring-run Chinook Salmon, which depend on moving throughout the river for spawning. The government, agricultural organizations, and environmental groups were involved in an almost two-decade long legal dispute relating to these issues.

In 2006, the parties involved agreed on a settlement, the SJRRP, with the dual goals of restoring river flows to maintain the salmon population below the Friant Dam while maintaining reliable water management for users dependent on Friant Dam. While our organization, the San Joaquin River Exchange Contractors,

Continued Page 3

were not involved in the lawsuit, we came on board following the settlement to provide technical and engineering support.

The agreement involved commitments from the federal government for project funding, commitments from water users to allocate a portion of their flows for restoration, and a commitment from environmental interests to drop legal action and work in concert with the program.

Today, we remain committed to meeting the goals of the SJRRP despite significant ongoing challenges. Our member agency, Central California Irrigation District, is involved in the design process for a control structure in the Mendota Pool. When complete, it will allow water to flow into the Mendota Pool for deliveries by utilizing a fish screen so that migrating salmon will stay in the main river and not enter the Pool. This connection for the river is vital for the salmon but will also allow the water deliveries needed to continue, without significant interruptions for either use. CCID is currently working toward 90% completion on the design process and hoping to have it complete and ready to go to bid for construction later this year.

Down at Sack Dam, another one of our member agencies, San Luis Canal Company, is working closely with Reclamation to install a diversion facility with another fish screen to Arroyo Canal. This will allow for canal operations to continue while maintaining spawning fish passage uninterrupted through the River. This project is also advancing toward 90% completion on design, and SLCC is working closely with the Bureau of Reclamation to see it through.

These are just a couple of many more projects that are underway, which when complete will replicate a more natural flow pattern along the San Joaquin River that both protects the habitat of fish populations while still allowing for the needed water deliveries through the region.

However, the progress that has been made has been slower than anyone involved would like, and the reality is that delays resulting from design changes have consequences, namely increased costs. During this time of inflation, further delays will only result in additional expenses in the future. We're hopeful that we will see a renewed sense of urgency shared by all parties involved to finally get designs approved, projects fully funded, and construction underway.

This is not an easy process but progress has been made and importantly there is general agreement as to the necessity and benefit of the project. What is needed now is a collective commitment to secure the necessary funding to fully complete these projects, make decisive decisions that allow everyone to move forward past design phases and into construction, and avoid future delays that will only exacerbate the challenges we face now into the future.

The San Joaquin River Restoration Program is a testament to what we can accomplish when we work to find common ground despite our differences to solve the issues we collectively face. After years of talk, it is time for us to show that we can not only find agreement, but also implement solutions.

Support for Disadvantaged Communities

One could spend a lifetime learning the intricacies of California's water systems and the countless claims and agreements that have coalesced into the structure we have today. It is complicated, yes, but it also exemplifies how interconnected and interdependent we are throughout the region and the state. Despite the disagreements we often see among neighbors that play out in the media, we are at our best when we are fostering cooperation between different water users.

Take for example the city of Dos Palos. Through the 1980s, Dos Palos received its water supply through the Central California Irrigation District's canal system, a member agency of the Exchange Contractors, to a turnout within the Dos Palos city limits. That water was treated and then delivered to the city. Dos Palos eventually secured a grant to build a pipeline and a treatment plant to receive water from the California Aqueduct, at which point they abandoned the connection to the Exchange Contractors canal and plugged it off.

This system worked well until 2015, when the growth of moss and contaminants clogged the treatment plant. Though they were able to fix the issue, it reemerged in 2022, causing the city to be without water for an extended period. Luckily, there was enough institutional knowledge to remember the old canal connection still existed and could be reestablished to provide a water source for the city until the issue was addressed. Though the water was not suitable for drinking, it sufficed for essential needs during the crisis. Today, Dos Palos is in the process of improving the treatment plant to avoid this issue in the future, but the spirit of collaboration and support remains.

Two of our other neighbors, the cities of Mendota and Firebaugh, are classified as severely disadvantaged communities by the State of California. Both are entirely dependent on groundwater but have faced challenges with their groundwater quality. Mendota's wells have faced increasingly poor water quality resulting from migration of poor quality groundwater and the water quality within the city and upstream of Firebaugh is highly degraded.

We worked closely with both cities on a solution. A dozen years ago, another of our member agencies, Columbia Canal Company (CCC), made an arrangement with Mendota to establish wells on the east side of the river in a location where significantly higher groundwater quality exists sustainably into the future. This location is outside of the city's boundary but within CCC's area. Years earlier a similar arrangement was implemented between the City of Firebaugh and CCC. Both arrangements have been significantly beneficial to water users in these disadvantaged communities.

It is true that we are increasingly facing decreased water availability in the Central Valley because of climate and regulatory changes. While many may instinctively react by trying to protect what is theirs at the expense of others, the reality is that we are collectively better off when we seek solutions that benefit all of us.

This will require collaboration to increase the capture, recharge, and storage of water for later use during dry periods. It means working together on drought year plans like one we are developing for south of the Delta with multiple groups agreeing to set aside water to prepare for drought years. And it means finding common ground as neighbors and partners to find solutions rather than opportunities for division.

EXCHANGE perspective

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San Joaquin River Exchange
Contractors Water Authority

PO Box 2115
Los Banos, CA 93635

Tel: 209.827.8616
Email: contactus@sjrecwa.net
Website: www.sjrecwa.net

A big thank you to everyone who joined up for the San Luis Canal Company Shareholder Lunch!

CAL POLY
Irrigation Training
& Research Center

Irrigation Training & Research Center

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The Irrigation Training & Research Center (ITRC) was established in 1989 at **California Polytechnic State University**, San Luis Obispo, within the **BioResource and Agricultural Engineering Department** as a center of excellence, building on a history of contributions to the irrigation industry.

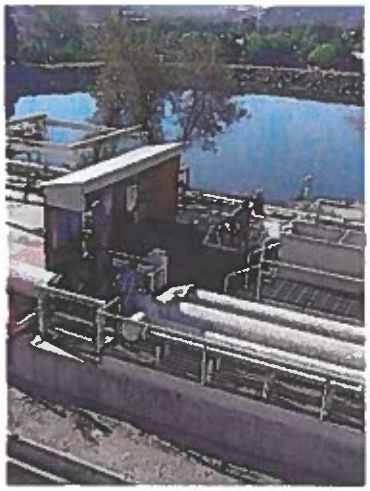
ITRC has a long history of providing pragmatic irrigation training and technical expertise to industry, farmers, irrigation districts, and state/federal agencies. Our work is approximately 65% direct technical assistance, 15% training, and 20% research (both applied government-funded, and industry). Explore our site to learn more **about us**. As our motto says, we are "moving water in new directions."

About ITRC

Faculty & Staff > | Facilities >

ITRC is a center of excellence housed within the **BioResource and Agricultural Engineering** (BRAE) Department of California Polytechnic State University (Cal Poly) in San Luis Obispo. The linkage to the BRAE Department is unique among irrigation centers - ITRC's organization was specifically developed as such to ensure long-term positive benefits to Cal Poly's academic irrigation teaching program - which provides long-term benefits to California and the nation. Cal Poly and ITRC are proud of their ability to combine sophisticated theory with a "hands-on" approach to provide a usable product. Many of the educational services that ITRC provides are made possible by our supporters and their generous donations of services, equipment, and funds.

ITRC was officially formed in 1989, and continues to be self-supporting through contracts. The first commitment of ITRC is to enhance Cal Poly's strong irrigation teaching program through outside activities in training, research, and technical support. Focus areas include:



- Irrigation projects (irrigation district modernization, water balances, river basin return flow issues, SCADA, canal automation, pump automation, flow measurement, energy consumption, and efficiency);
- Farm irrigation (drip, surface, and sprinkler irrigation; drainage; salinity; energy consumption; irrigation evaluations; evapotranspiration; pumps);
- Landscape (primarily development of urban water conservation programs).

ITRC's modern engineering offices, in addition to providing professional resources for ITRC staff, also house two training rooms and office space for both graduate and undergraduate **students**. Outdoors is the unique **Water Resources Facility** to demonstrate pumps, pump testing, flow measurement, SCADA, and canal automation. Additionally, the outdoor **Irrigation Practices Field** contains a complete assortment of on-farm and landscape irrigation systems and equipment.

The center is run by **Dr. Charles Burt** (Chairman and Founder) and **Dr. Stuart Styles** (Director) - both recognized internationally as irrigation experts - with an excellent **professional staff** of 13 persons. Additionally, 15-25 **students** are hired at any one time to provide support. ITRC utilizes specialists from within and outside the university to provide additional expertise. As an example, ITRC has worked for several years with an international team to develop sophisticated canal automation algorithms.

ITRC is active throughout the western U.S. and the world in irrigation research, technical assistance, and environmental/energy assessments. For example:

- ITRC has numerous active irrigation district modernization projects throughout California, as well as in Washington, northern Oregon, Colorado, Arizona, Idaho, and Oklahoma. Most involve some aspect of energy conservation or environmental improvement while simultaneously modernizing irrigation districts.
- The World Bank, FAO/UN, UNDP, and others fund ITRC to provide expertise on irrigation modernization in China, Philippines, Vietnam, Kyrgyzstan, Azerbaijan, India, Pakistan, Mexico, and many other countries.
- Manufacturers hire ITRC for a wide variety of projects ranging from testing of polymers in irrigation on field trials, to determining friction on large diameter pipes, to examining the performance of new sprinklers and drip tape under both field and laboratory conditions.
- ITRC has been a major innovator in water-related peak load reduction and electrical energy conservation for the California Energy Commission, utilities, and others.
- ITRC actively participates in various water-related technical sessions and workshops of professional organizations such as the US Committee on Irrigation and Drainage, and the American Society of Civil Engineers.

California Polytechnic State University
San Luis Obispo, CA 93407-0730
Phone: 805.756.2434 Fax: 805.756.2433 Email: itrc@calpoly.edu

Join Our Mailing List!

Center For Irrigation Technology

Irrigation Tech Seminars and Events

Since 2008, the Center for Irrigation Technology (CIT) at Fresno State has conducted the Irrigation Tech Seminar Series. These events match leading experts with current topics of importance to California farmers. The seminars typically last three hours and combine presentations and discussions with demonstrations on the University Agricultural Laboratory (UAL) - the Fresno State Farm.

Click here for more information about upcoming events.

Partners for the seminars have included the California Department of Food and Agriculture, the Department of Water Resources, and Pacific Gas and Electric Company. Topics have included:

Water Sources: Wells and Surface Water
Pumps and Irrigation Scheduling
Irrigation Performance: Tips and Tools
Irrigation Monitoring Systems for Pistachio
Soil Moisture Sensors in Olives
Winterizing Irrigation Systems
Irrigating with Center Pivots
Irrigation Water: Monitoring Tools to Make the Most of Every Drop
Irrigation System Spring Cleaning and Maintenance
Design and Operation of Microirrigation Systems for Permanent Crops
SAP Flow Sensors in Almonds
WATERIGHT: Web-based Irrigation Scheduling
Water Use Efficiency on Drip-irrigated Crops
Fertigation

For more informatio on the Advanced Pumping Efficiency Program (APEP) or other areas, or to propose a seminar topic, contact Bill Green (wgreen@csufresno.edu) or Kaomine Vang (kaomine@csufresno.edu) or call 559.278.2066.

Past Featured Events

CENTER FOR IRRIGATION TECHNOLOGY (CIT)

5370 N. Chestnut M/S OF 18
Fresno, CA 93740

P 559.278.2066

Irrigation Leader

VOLUME 15 ISSUE 9

OCTOBER 2024

McCrometer: Maximizing Water Conservation in Compliance With the Build America, Buy America Act

FIREBAUGH CANAL WATER DISTRICT
RESOLUTION NUMBER - 2024-08

RESOLUTION OF THE BOARD OF DIRECTORS APPROVING FIVE-YEAR WATER MANAGEMENT PLAN

WHEREAS, THE FIREBAUGH CANAL WATER DISTRICT has previously developed and submitted a Water Management Plan Five-Year update pursuant to the guidelines of the Bureau of Reclamation; and

WHEREAS, the Bureau requires that the Water Management Plan Five-Year update be periodically reviewed and updated; and

WHEREAS, THE FIREBAUGH CANAL WATER DISTRICT has prepared a "Water Management Plan Five-Year Update" in accordance with the Bureau's current criteria.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors approves the Water Management Plan Five-Year Update and directs that a copy of the Plan, along with a certified copy of this Resolution, be forwarded to the Bureau of Reclamation; and

BE IT FURTHER RESOLVED THAT the Manager is hereby authorized to sign and execute on behalf of the Firebaugh Canal Water District any documents related to the Water Management Plan.

All the foregoing being on motion of Director Villere and seconded by Director Hurd and authorized by the following vote, to wit:

AYES: Stearns, McCurdy, Villere, Hurd

NOES: None

ABSENT: Smith

ABSTAINED: None

I Hereby Certify that the foregoing resolution is the resolution of said District as duly passed and adopted by said Board of Directors on the 22nd day of October 2024.

WITNESS my hand and seal of said Board of Directors this 22nd day of October 2024.

ATTEST:

MIKE STEARNS, President
Firebaugh Canal Water District

JEFF BRYANT, Secretary
Firebaugh Canal Water District