AGENDA

IRVINE RANCH WATER DISTRICT
SUPPLY RELIABILITY PROGRAMS COMMITTEE

THURSDAY, OCTOBER 20, 2016

CALL TO ORDER 3:00 p.m., Committee Room, Second Floor, District Office
15600 Sand Canyon Avenue, Irvine, California

ATTENDANCE Committee Chair: Peer Swan _____
Member: Douglas Reinhart _____

| ALSO PRESENT | | | | |
|---|---|---|---|---|
| | Paul Cook | _____ | Kellie Welch | _____ |
| | Rob Jacobson | _____ | Patrick Sheilds | _____ |
| | Ray Bennett | _____ | Paul Weghorst | _____ |
| | Jo Ann Corey | _____ | Dane Johnson | _____ |
| | Fiona Sanchez | _____ | Christine Compton | _____ |
| | _____ | _____ | _____ | _____ |

## COMMUNICATIONS

1. Notes: Weghorst
2. Public Comments
3. Determine the need to discuss and/or take action on item(s) introduced that came to the attention of the District subsequent to the agenda being posted.
4. Determine which items may be approved without discussion.

## INFORMATION

5. UPDATE ON COLORADO RIVER SHORTAGE PROBABILITIES – JOHNSON / WELCH / SANCHEZ / WEGHORST

   Recommendation: Receive and file.

6. WATER BANKING PROJECT FACILITIES, CAPACITIES AND PROGRAMS OVERVIEW – JOHNSON / WELCH / SANCHEZ / WEGHORST

   Recommendation: Receive and file.

## OTHER BUSINESS

7. A. Directors' Comments

B. CLOSED SESSION with real property negotiator (Government Code Section 54956.8).

Property: Parcels 875-240-008, 878-102-006, 878-102-011, 878-102-012, 866-021-004, 866-022-001, 866-022-03, 866-080-004, 866-090-012, 869-020-002, and 869-050-010, County of Riverside
Negotiating Parties: Hayday Farms, Inc.
Agency Negotiator: Paul Cook, General Manager
Purpose of Negotiations: Price and Term of Payment,

Property: Parcels 824-030-001 and 824-030-002, County of Riverside
Negotiating Parties: Calabrese
Agency Negotiator: Paul Cook, General Manager
Purpose of Negotiations: Price and Term of Payment,

Property: Parcels 827-030-004, 827-030-005, 827-110-005, 827-110-006, 827-110-010, 827-110-011, 827-110-014, and 827-110-016, County of Riverside
Negotiating Parties: Lourenco Farm
Agency Negotiator: Paul Cook, General Manager
Purpose of Negotiations: Price and Term of Payment,

Property: Parcels 827-090-004, 827-090-012, 827-090-013, 827-180-001, 827-180-001-002, County of Riverside
Negotiating Parties: Stroschein
Agency Negotiator: Paul Cook, General Manager
Purpose of Negotiations: Price and Term of Payment, and

Property: Parcels 878-151-003, 878-210-001, 878-270-001, 878-270-002, 878-260-001, 878-260-002, County of Riverside
Negotiating Parties: Barnes and Berger
Agency Negotiator: Paul Cook, General Manager
Purpose of Negotiations: Price and Term of Payment.

C. Adjourn

Availability of agenda materials: Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the above-named Committee in connection with a matter subject to discussion or consideration at an open meeting of the Committee are available for public inspection in the District's office, 15600 Sand Canyon Avenue, Irvine, California ("District Office"). If such writings are distributed to members of the Committee less than 72 hours prior to the meeting, they will be available from the District Secretary of the District Office at the same time as they are distributed to Committee Members, except that if such writings are distributed one hour prior to, or during, the meeting, they will be available at the entrance of the meeting room at the District Office. The Irvine Ranch Water District Committee Room is wheelchair accessible. If you require any special disability-related accommodations (e.g., access to an amplified sound system, etc.), please contact the District Secretary at (949) 453-5300 during business hours at least seventy-two (72) hours prior to the scheduled meeting. This agenda can be obtained in an alternative format upon written request to the District Secretary at least seventy-two (72) hours prior to the scheduled meeting.

October 20, 2016
Prepared by: D. Johnson/K. Welch
Submitted by: F. Sanchez/P. Weghorst
Approved by: Paul Cook

SUPPLY RELIABILITY PROGRAMS COMMITTEE

## UPDATE ON COLORADO RIVER SHORTAGE PROBABILITIES

### SUMMARY:

This report provides an update on future water supply conditions on the Colorado River. Recently, the U.S. Bureau of Reclamation (Reclamation) released information that indicates a 48 to 60 percent probability of a shortage condition occurring on the lower Colorado River over the next five years. Additionally, Reclamation predicts a decreasing likelihood of normal or Intentionally Created Surplus (ICS) conditions through 2021. These recent projections will likely influence the development of terms for an agreement between the Metropolitan Water District of Southern California (Metropolitan) and interstate and intrastate parties involved in the development of a Drought Contingency Plan (DCP) that would facilitate California sharing in shortages on the river.

### BACKGROUND:

The flow in the Colorado River is highly variable from year to year. The basic apportionment of water to both Upper and Lower Basin states was set forth in the 1922 Compact. The apportionments were made based on consideration of only 16 years of historical flow records that unknowingly represented high flow conditions. During that early 16-year period, the average annual flow was 16.5 million acre-feet (MAF). The long-term flow records that are available today, indicate that on average, the Colorado River has an annual natural flow of 16.1 MAF (14.8 MAF from the Upper Basin and 1.3 MAF from the Lower Basin). These statistics demonstrate that the Colorado River is consistently over-allocated by approximately 0.4 MAF per year. The use of water in pursuit of these apportionments has resulted in a high probability of shortage conditions developing in the Lower Basin in the near future.

### Colorado River Simulation Model Shortage Probabilities:

Comprehensive river modeling is important to the ongoing discussions related to potential future Colorado River shortage conditions. On a semi-annual basis, Reclamation simulates future Colorado River conditions using the Colorado River Simulation Model (CRSS) which is the primary planning tool for studying river operations. When the model is run, numerous simulations are performed to quantify the uncertainties in future Colorado River conditions with the results being expressed as probabilities. The results from the August 2016 CRSS model run indicate a 48 to 60 percent chance of some degree of shortage in the Lower Basin over the next five years. This information, along with the probabilities for other system conditions in both the Upper and Lower Basins, is presented as Exhibit "A". At the Committee meeting staff will describe the content of Exhibit "A".

Law of the River:

Colorado River operations and water deliveries are governed by the numerous compacts, treaties, contractual relationships, court decisions and regulations that are collectively referred to as the "Law of the River." Every year, the Secretary of the U.S. Department of the Interior (Secretary) is required to declare the availability of water supply in the Colorado River for the Lower Basin as a Normal, Surplus or Shortage year. The elevation of Lake Mead is used by the Secretary to determine whether there is a shortage along the Colorado River. As of October 3, 2016, the lake's surface is around 1,075.4 feet above sea level, or 37% of capacity. Consistent with the Interim Guidelines, the Secretary would declare a shortage should Lake Mead water surface elevations drop below 1,075 feet on January 1 of any year.

*Interim Guidelines:*

In 2007, Reclamation developed the *Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead* that defined the strategies for dealing with shortages on the river. The guidelines also created the ICS mechanism that allows agencies to store water in the Colorado River system through implementation of conservation measures. This stored water can be called upon during future drought conditions. The Interim Guidelines do not allow access to stored ICS water or allow interstate water transfers during shortage conditions. Under the Interim Guidelines, Metropolitan has the ability to store 0.4 MAF annually of ICS water. It also has the ability to call on 0.4 MAF per year of stored ICS water during drought conditions. The maximum amount of ICS water that Metropolitan can store in the Lake Mead is 1.5 MAF.

Exhibit "B" presents Colorado River annual apportionments of water consistent with the 1922 Compact. The Lower Basin states are apportioned 7.5 MAF plus 1 MAF draining below Lees Ferry downstream of Lake Powell. During a shortage condition, deliveries to the Lower Basin water users would be reduced. The Interim Guidelines include a shortage strategy that could call for Arizona and Nevada to absorb any reductions due to shortage conditions in any year when Lake Mead levels are projected to be at or below elevation 1,075 feet on January 1.

Whenever Lake Mead is below the elevation of 1,025 feet, the Secretary is required to consult with the Basin States to consider whether Colorado River hydrologic conditions, together with the anticipated delivery of water to the Lower Basin states and Mexico, is likely to cause the elevation of Lake Mead to fall below 1,000 feet. Upon such a consideration, the Secretary is required to consult with the Basin States to discuss further measures that may be undertaken to deal with shortages. The Secretary has the power to implement any additional measures consistent with applicable federal law to deal with the shortages.

Structural Deficit:

Evaporation losses and other unaccounted for factors are compounding the risk of shortages occurring on the Colorado River. These losses are known as "structural deficits" in the accounting of water from Lake Mead. Some estimates indicate that the structural deficit is as high as 1.2 MAF

per year. Even if deliveries out of Lake Mead were balanced with inflows, the structural deficit would result in declining lake levels. As a result, the risk of shortage conditions being declared by the Secretary may increase through time.

Drought Contingency Plan:

It has been speculated that should Lake Mead levels continue to decline, the Secretary may intervene and require action that could include California being required to absorb a reduction in deliveries during shortage conditions. In light of this possibility, the Lower Basin states and Reclamation have entered into discussions to determine how to handle a shortage condition on the Colorado River to avoid Secretary intervention. The discussions have included concepts where each state, including California, would volunteer to accept reductions. As part of these discussions, the Lower Basin states have been developing a Drought Contingency Plan (DCP) that aims to avoid future conflict from critically low levels in Lake Mead. It is envisioned that the DCP would be supplemental to 2007 the Interim Guidelines and existing Law of the River. The plan would allow for:

- Continued access to stored ICS water;
- Interstate exchanges;
- Increased flexibility to meet water needs;
- Protection of California's senior priority for water on the river; and;
- Protection of the capability to produce power from Hoover Dam.

Under the terms of the 1931 California Seven Party Agreement, Metropolitan maintains a fourth priority on California's apportionment of Colorado River water behind Palo Verde Irrigation District, the Yuma Project, and Imperial Irrigation District as depicted in Exhibit "C". Although the negotiations are still underway, as a lower priority right holder in California, Metropolitan could potentially have to contribute up to 25% of California's DCP contribution. Metropolitan anticipates that draft terms for the DCP would be available by the end of October 2016. Metropolitan staff expects to review the draft terms with its Board in December 2016. At the meeting, staff will update the Committee on any further information that has come available related to the draft terms for the DCP.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Colorado River Shortage Probability Table
Exhibit "B" – Colorado River Interstate Apportionments
Exhibit "C" – California Priorities for Use of Colorado River Water

# Colorado River Shortage Probability Table

## Results from August 2016 CRSS[1,2,3] (values in percent)

| | Event or System Condition | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Upper Basin – Lake Powell | **Equalization Tier** | **7** | **21** | **21** | **28** | **31** |
| | *Equalization – annual release > 8.23 maf* | *7* | *21* | *21* | *27* | *30* |
| | *Equalization – annual release = 8.23 maf* | *0* | *0* | *0* | *1* | *1* |
| | **Upper Elevation Balancing Tier** | **93** | **57** | **57** | **53** | **45** |
| | *Upper Elevation Balancing – annual release > 8.23 maf* | *89* | *48* | *43* | *41* | *35* |
| | *Upper Elevation Balancing – annual release = 8.23 maf* | *4* | *8* | *13* | *10* | *10* |
| | *Upper Elevation Balancing – annual release < 8.23 maf* | *0* | *1* | *1* | *2* | *0* |
| | **Mid-Elevation Release Tier** | **0** | **21** | **20** | **10** | **16** |
| | *Mid-Elevation Release – annual release = 8.23 maf* | *0* | *0* | *0* | *1* | *1* |
| | *Mid-Elevation Release – annual release = 7.48 maf* | *0* | *21* | *20* | *9* | *15* |
| | **Lower Elevation Balancing Tier** | **0** | **0** | **2** | **9** | **8** |
| Lower Basin – Lake Mead | **Shortage Condition – any amount (Mead ≤ 1,075 ft)** | **0** | **48** | **60** | **60** | **56** |
| | *Shortage – 1st level (Mead ≤ 1,075 and ≥ 1,050)* | *0* | *48* | *50* | *41* | *33* |
| | *Shortage – 2nd level (Mead < 1,050 and ≥ 1,025)* | *0* | *0* | *10* | *16* | *16* |
| | *Shortage – 3rd level (Mead < 1,025)* | *0* | *0* | *0* | *3* | *7* |
| | **Surplus Condition – any amount (Mead ≥ 1,145 ft)** | **0** | **0** | **5** | **8** | **14** |
| | *Surplus – Flood Control* | *0* | *0* | *0* | *1* | *2* |
| | **Normal or ICS Surplus Condition** | **100** | **52** | **35** | **32** | **30** |

[1] Reservoir initial conditions based on December 31, 2016 conditions from the August 2016 24-Month Study.

[2] Percentages computed from 107 hydrologic inflow sequences based on resampling of the observed natural flow record from 1906-2012 for a total of 107 traces analyzed.

[3] Percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions.

RECLAMATION

7

# Exhibit "B"

**Annual Apportionment of Use of Colorado River Water Interstate/ International**

| Description | Amount |
|---|---|
| Upper Basin. Required to deliver 75 maf over a 10-year period measured at Lee Ferry. (small portion of Arizona, Colorado, New Mexico, Utah, and Wyoming) | 7.5 maf |
| Lower Basin. (portions of Arizona, Nevada, California, and Utah draining below Lee Ferry) | 7.5 maf plus 1 maf |
| Republic of Mexico[a] | 1.5 maf |
| Total | 17.5 maf[b] |

Notes:

Amounts represent consumptive use; maf = million acre-feet, taf = thousand acre-feet

[a] Plus 200 taf of surplus water, when available as determined by the United States. Water delivered to Mexico must meet specified salinity requirements. During an extraordinary drought or other cause resulting in reduced uses in the United States, deliveries to Mexico would be reduced proportionally with uses in the United States.

[b] The total volume of 17.5 maf/yr refers to all waters of the Colorado River System, which is defined as that portion of the Colorado River and its tributaries in the United States.

# Exhibit "C"

**Annual Intrastate Apportionment of Water from the Colorado River Mainstream within California under the Seven Party Agreement[a]**

| Priority Number[d, e] | Apportionment |
|---|---|
| Priority 1 | Palo Verde Irrigation District (PVID) (based on 104,500 acres). |
| Priority 2 | Lands in California within USBR's Yuma Project (not to exceed 25,000 acres). |
| Priority 3 | Imperial Irrigation District and lands served from the All American Canal in Imperial and Coachella valleys (Priority 3a), and PVID for use on 16,000 acres in the Lower Palo Verde Mesa (Priority 3b). Priority 3a and 3b are equal in priority. |
| Priority 4 | MWDSC for coastal plain of Southern California - 550,000 af/yr. |
| Priority 5 | An additional 550,000 af/yr to MWDSC (Priority 5a), and 112,000 af/yr for the City and County of San Diego (Priority 5b).[b, c] |
| Priority 6 | Imperial Irrigation District and lands served from the All American Canal in Imperial and Coachella Valleys (Priority 6a), and PVID for use on 16,000 acres in the Lower Palo Verde Mesa (Priority 6b), for a total not to exceed 300 taf/yr. |
| Priority 7 | All remaining water available for use in California, for agricultural use in California's Colorado River Basin. |

Notes: (amounts represent consumptive use)

af = acre-feet; taf = thousand acre-feet; maf = million acre-feet; af/yr. = acre-feet per year

USBR = U.S. Bureau of Reclamation; MWDSC = Metropolitan Water District of Southern California; SDCWA = San Diego County Water Authority

[a] Indian tribes and miscellaneous present perfected right holders that are not encompassed in California's Seven Party Agreement have the right to divert up to approximately 90 taf /yr. (equating to about 50 taf/yr. of consumptive use) within California's 4.4 maf basic apportionment. Present consumptive use under these miscellaneous and tribal present perfected rights is approximately 15 taf/yr.

[b] Subsequent to execution of the Seven Party Agreement, MWDSC, SDCWA, and the City of San Diego executed a separate agreement transferring its apportionment to MWDSC.

[c] Under the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement of 2003, MWDSC (and SDCWA) gained access to water that may be available under Priority 6 and 7.

[d] Priorities 1 through 3 collectively are not to exceed 3.85 maf/yr. The Seven Party Agreement did not quantify the division of this volume among the three parties. Priorities 1-3 were further defined in the 2003 Quantification Settlement Agreement.

[e] Total of Priorities 1 through 6 is 5.362 maf/yr.

October 20, 2016
Prepared by: D. Johnson/K. Welch
Submitted by: F. Sanchez/P. Weghorst
Approved by: Paul Cook

SUPPLY RELIABILITY PROGRAMS COMMITTEE

# WATER BANKING PROJECT
# FACILITIES, CAPACITIES AND PROGRAMS OVERVIEW

## SUMMARY:

Staff has prepared information related to IRWD's water banking facilities, capacities, exchange programs and operations that can be used for reference purposes during Committee meetings. The information is provided in tabular, map and schematic formats that can be updated as necessary to reflect changes in IRWD's projects, programs and operations. Since the last Committee meeting, an additional map has been developed that depicts the location of recharge basins within IRWD's Strand and Stockdale West Integrated Water Banking Projects.

## BACKGROUND:

To assist in the facilitation of Committee meeting discussions, staff has prepared reference materials in tabular, map and schematic formats that describe IRWD's water banking facilities, capacities, exchange programs and operations. The reference materials will be updated as needed to reflect changes to the projects, programs and operations. Following is an overview of the reference materials provided.

### Capacity and Operations Tables:

A table has been prepared that presents storage, recharge and recovery capacities of existing and planned IRWD water banking projects including capacities available to IRWD in the Kern Water Bank. Another table has been prepared that provides an update on Strand Ranch recovery and recharge operations and the balance of the stored water in the Kern Water Bank. These tables are provided as Exhibits "A" and "B", respectively.

### Project Maps:

To support the tables provided as Exhibits "A" and "B", staff has prepared maps that depict project wells, pipelines and Cross Valley Canal turn-out locations. These maps are provided as Exhibits "C" and "D", respectively. The facilities shown on these maps are associated with the Strand Ranch, Stockdale West, Stockdale East and Rosedale Drought Relief Projects. An additional map has been developed that shows the location of recharge basins at the Strand and Stockdale West Ranch projects. This map is provided as Exhibit "E".

Program Agreement Diagrams:

Schematic diagrams have been prepared that depict IRWD's water banking and exchange programs with Rosedale-Rio Bravo Storage District, Buena Vista Water Storage District, Dudley Ridge Water District and Metropolitan Water District of Southern California. These diagrams are provided as Exhibits "F", "G", "H", "I" and "J" as described in the List of Exhibits shown below.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Recharge, Storage and Recovery Capacities of Current and Anticipated Water Banking Projects
Exhibit "B" – Strand Ranch Storage, Recharge and Recovery Operations
Exhibit "C" – Map of Water Banking Project Wells and Pipelines
Exhibit "D" – Map of Cross Valley Canal Turnout Facilities
Exhibit "E" – Map of Water Banking Recharge Basins
Exhibit "F" – Diagram of IRWD-Rosedale Water Banking and Exchange Program Agreements
Exhibit "G" – Diagram of Long-Term Water Exchange Program with Buena Vista Water Storage District
Exhibit "H" – Diagram of Unbalanced Exchange Program Diagram with Dudley Ridge Water District
Exhibit "I" – Diagram of Coordinated Operating, Water Storage, Exchange and Delivery Agreement with Metropolitan Water District of Southern California
Exhibit "J" – Diagram of Template Wheeling Agreement with Metropolitan Water District of Southern California

# Exhibit "A"

**TABLE 1**
**Current and Anticipated Water Banking Projects**
**Recharge, Storage and Recovery Capacities**
**October 20, 2016**

| WATER BANKING PROJECT | OWNERSHIP AND WELL INFO | | | ALLOCATED CAPACITY (AF) | | | | | 1st PRIORITY RECOVERY CONDITIONS (CFS) | | 2nd PRIORITY RECOVERY CONDITIONS (CFS) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IRWD OWNED | WELLS EXISTING | WELLS PROPOSED | TOTAL STORAGE CAPACITY | ANNUAL RECHARGE 1ST PRIORITY | ANNUAL RECHARGE 2ND PRIORITY | ANNUAL RECOVERY 1ST PRIORITY | ANNUAL RECOVERY 2ND PRIORITY | RECOVERY CAPACITY AS PLANNED[1] | RECOVERY CAPACITY CURRENT CONDITIONS[2] | RECOVERY CAPACITY AS PLANNED | RECOVERY CAPACITY CURRENT CONDITIONS |
| Strand Ranch | Yes | 7 | - | 50,000 | 17,500 | - | 17,500 | - | 40.0 | 18.6 | - | - |
| Stockdale West | Yes | - | 3 | 26,000 | 27,100 | - | 11,250 | - | 15.0 | - | - | - |
| Stockdale East | No | - | 2 | - | - | 19,000 | - | 7,500 | - | - | 10.0 | - |
| IRWD Acquired Storage Account[3] | No | - | - | 50,000 | - | - | - | - | - | - | - | - |
| Drought Relief Project Wells | No | - | 3 | - | - | - | - | - | 15.0 | - | - | - |
| Kern Water Bank Storage Account[5] | No | - | - | 9,495 | 3,200 | - | 6,330 | - | - | - | - | - |
| **TOTALS** | | **7** | **8** | 126,000 | 44,600 | 19,000 | 28,750 | 7,500 | 70.0 | 18.6 | 10.0 | 0.0 |
| Partner Capacities[4] | | | | 36,000 | 22,300 | 9,500 | 12,000 | 0 | 35.5 | 35.5 | - | - |
| IRWD Capacities | | | | 90,000 | 22,300 | 9,500 | 16,750 | 7,500 | 34.5 | 0.0 | - | - |
| IRWD's recovery ***during*** 6 month partner recovery period (AF) | | | | | | | | | 12,420 | 0.0 | - | - |
| IRWD's recovery ***after*** 6 month partner recovery period (AF) | | | | | | | | | 4,330 | 6,733 | - | - |
| **TOTALS (AF)** | | | | | | | | | 16,750 | 6,733 | - | - |
| Number of months needed to recover IRWD's total AF after partners' recovery (Assumes IRWD has use of total recovery capacity after partners' recovery) | | | | | | | | | 8.1 | 14.0 | - | - |

[1] Based on designed Strand recovery capacity assuming 370' bgs. Assumes 5 cfs for each of the Stockdale West and Drought Relief wells in order to meet IRWD's Water Banking, Transfers, and Wheeling policy position. Assumes partners' water is recovered over 6 months.

[2] Strand Ranch wells currently idle.

[3] IRWD has use of Acquired Storage and Drought Relief Project wells until January 12, 2039, unless the term of the agreement is extended.

[4] One half of storage capacity at Stockdale West and Strand Ranch will be allocated for partners.

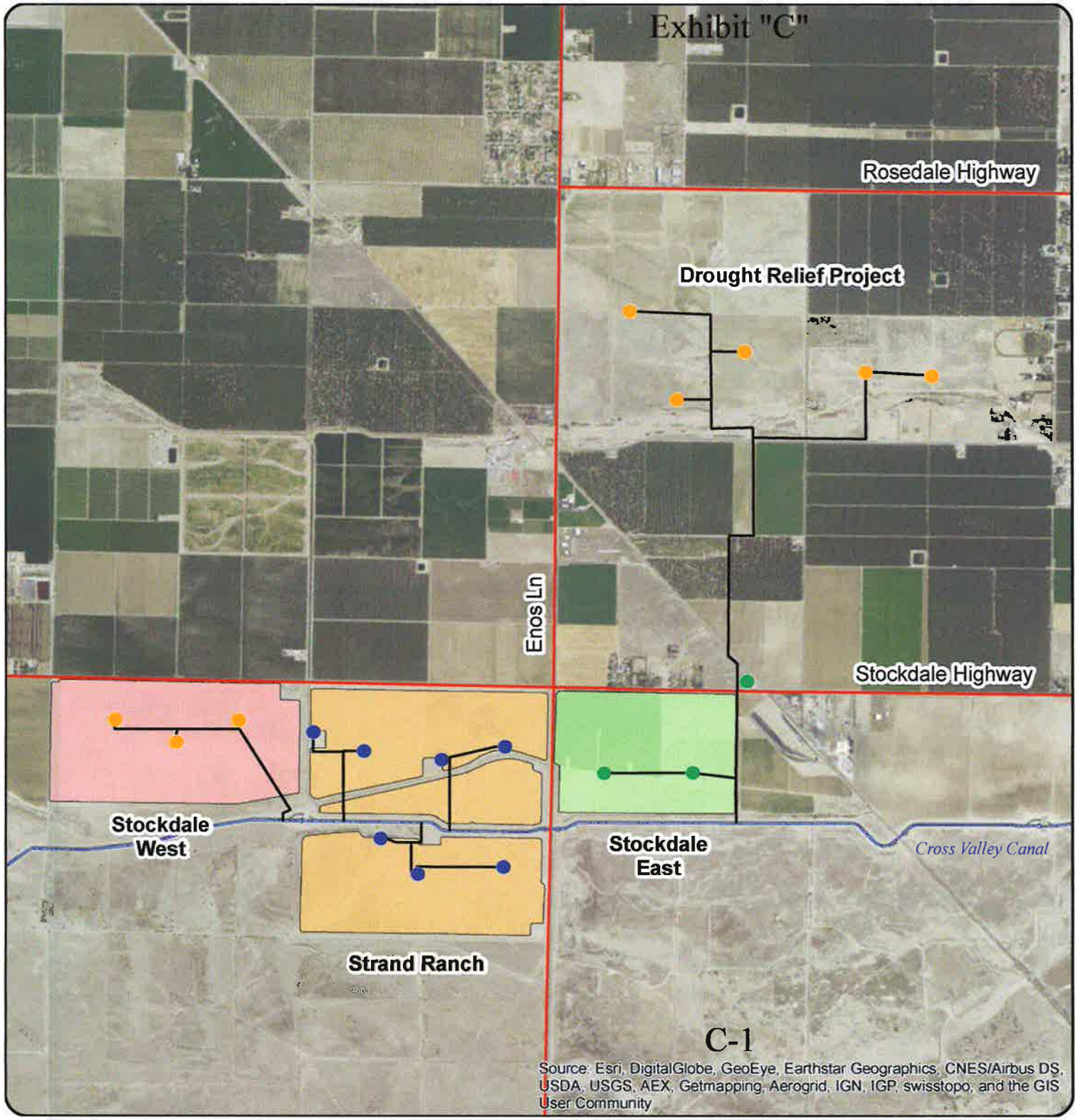
[5] Kern Water Bank capacities based on 6.58% of Dudley Ridge Water District's 9.62% share of the Kern Water Bank. Annual recharge amount is based on an average of recharge rates for high and low groundwater level conditions. Not included in storage capacity, recharge, and recovery totals to match IRWD's Water Banking Policy Position Paper (10/26/2015).

# Exhibit "B"

**TABLE 2**
**Strand Ranch Storage, Recharge and Recovery Operations**
October 20, 2016

| TRANSACTIONS | WATER BANKING ENTITY | | | | |
|---|---|---|---|---|---|
| | IRWD | | BUENA VISTA (BVWSD) | CARPINTERIA VALLEY (CVWD) | DUDLEY RIDGE WATER DISTRICT (DRWD)[3] |
| | SWP[1] | NON-SWP[2] | NON-SWP | SWP | SWP |
| **BEGINNING WATER IN STORAGE 2015 (AF)** | | | | | |
| Total Kern Water Bank | - | 4,016 | - | - | - |
| Total MWD System[5] | 7,327 | - | - | - | - |
| Total Strand Ranch | 249 | 9,675 | 4,341 | 413 | 474 |
| **TOTAL STORED WATER (1/1/2015)** | 7,576 | 13,691 | 4,341 | 413 | 474 |
| **(RECOVERY) AND RECHARGE IN 2015 (AF)** | | | | | |
| CVWD | - | - | - | (413) | - |
| BVWSD | - | - | (4,341) | - | - |
| Kern Water Bank | - | 251 | - | - | - |
| 2015 SWP Allocation[5] | 175 | - | - | - | 175 |
| Reserve Water Available in 2015[6] | 140 | - | - | - | - |
| **TOTAL 2015 TRANSACTIONS** | 315 | 251 | (4,341) | (413) | 175 |
| Total Kern Water Bank | - | 4,267 | - | - | - |
| Total MWD System | 7,502 | - | - | - | - |
| Total Kern County | 389 | 9,675 | - | - | 649 |
| **TOTAL STORED WATER (1/1/2016)** | 7,891 | 13,942 | - | - | 649 |
| **(RECOVERY) AND RECHARGE IN 2016 (AF)** | | | | | |
| Recharge | TBD | TBD | - | - | - |
| Kern Water Bank | TBD | TBD | - | - | - |
| 2016 SWP Allocation[5] | 524 | - | - | - | 525 |
| **TOTAL ESTIMATED 2016 TRANSACTIONS** | 524 | - | - | - | 525 |
| Total Kern Water Bank | - | 4,267 | - | - | - |
| Total MWD System | 8,026 | - | - | - | - |
| Total Kern County | 389 | 9,675 | - | - | 1,174 |
| **TOTAL ESTIMATED STORED WATER (1/1/2017)** | 8,415 | 13,942 | - | - | 1,174 |

**NOTES:**
-Water in storage has been adjusted to account for losses.
-MWD = Metropolitan Water District of Southern California.
[1] IRWD's SWP includes 229 AF from CVWD that stays in Kern County.
[2] IRWD's Non-SWP total includes 2,842 AF of Kern County Water Agency Article 21 Water.
[3] DRWD water supply will be returned by MWD to IRWD's Jackson Ranch.
[5] MWD is storing IRWD's share of 2013-2016 SWP allocation.
[6] 4% of banked water is placed into a reserve to account for actual or potential losses. The reserve water may be purchased within 3 years following the end of the calendar year in which the water was banked. If the water is not purchased at the end of 3 years, it is made available for recovery.




IRVINE RANCH WATER DISTRICT

# Location Map: IRWD Water Banking Projects Wells and Turnin Pipelines

**MAP FEATURES**

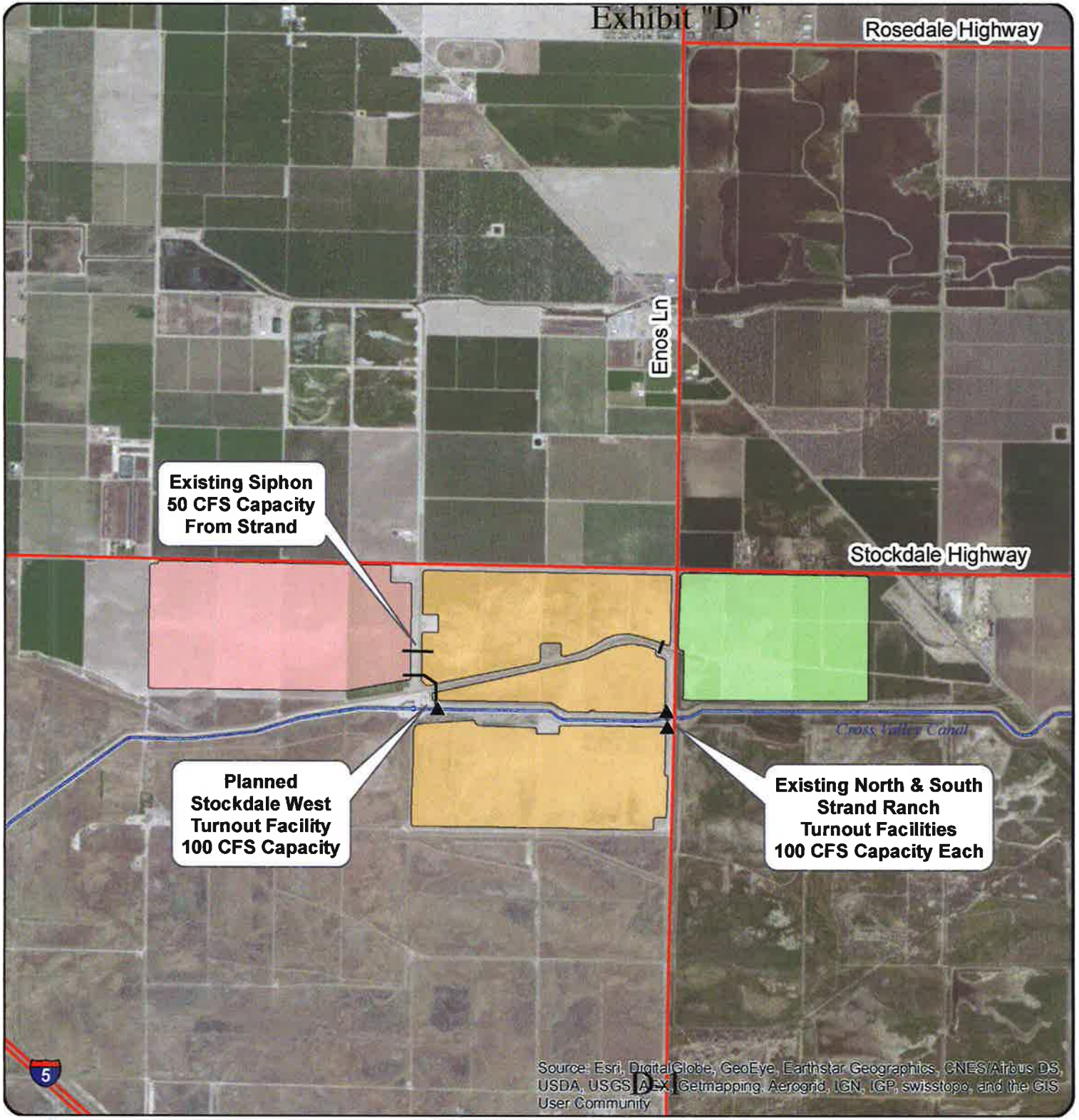
- Existing Extraction Well
- Planned Extraction Well
- Well Under Construction
- Well Discharge Pipelines
- Stockdale East
- Stockdale West
- Strand Ranch

This figure shows the location of IRWD's water banking project sites as well as existing and proposed extraction wells.

N

0 0.25 0.5 1 Miles

NAD 83 State Plane Zone 5 (feet)
Central Meridian: -118




IRVINE RANCH WATER DISTRICT

# Location Map:
# IRWD Water Banking Projects
# Turnout Facilities

**MAP FEATURES**

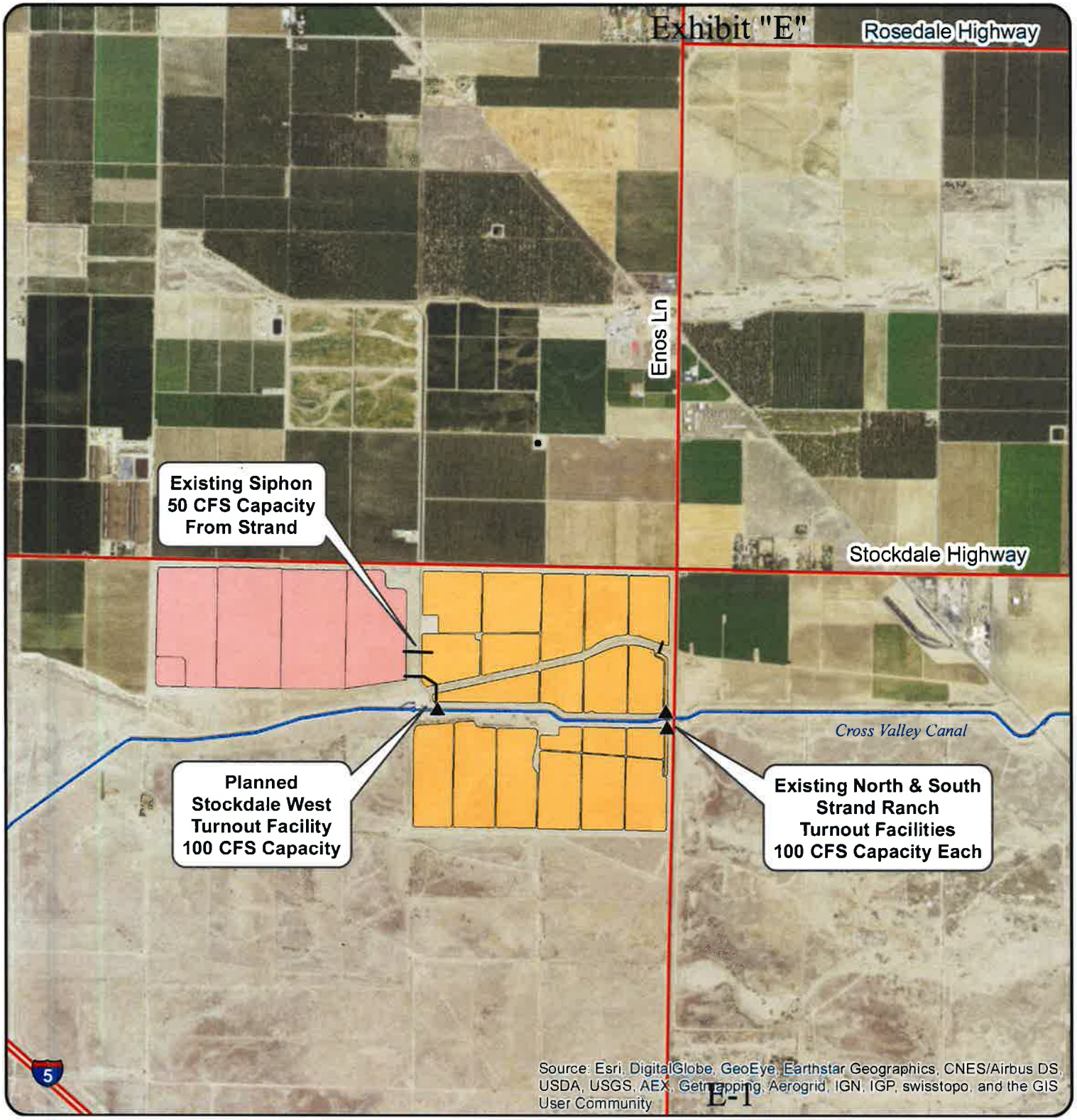
- Turnouts
- Stockdale East
- Stockdale West
- Strand Ranch

This figure shows the location of existing and anticipated pipelines and turnout facilities.

N

0 0.25 0.5 1 Miles

NAD 83 State Plane Zone 5 (feet)
Central Meridian: -118




IRVINE RANCH WATER DISTRICT

# Location Map: IRWD Water Banking Projects Recharge Basins &Turnout Facilities

**MAP FEATURES**

- Turnouts
- Stockdale West
- Strand Ranch

This figure shows the location of recharge basins as well as existing and anticipated pipelines and turnout facilities.

N

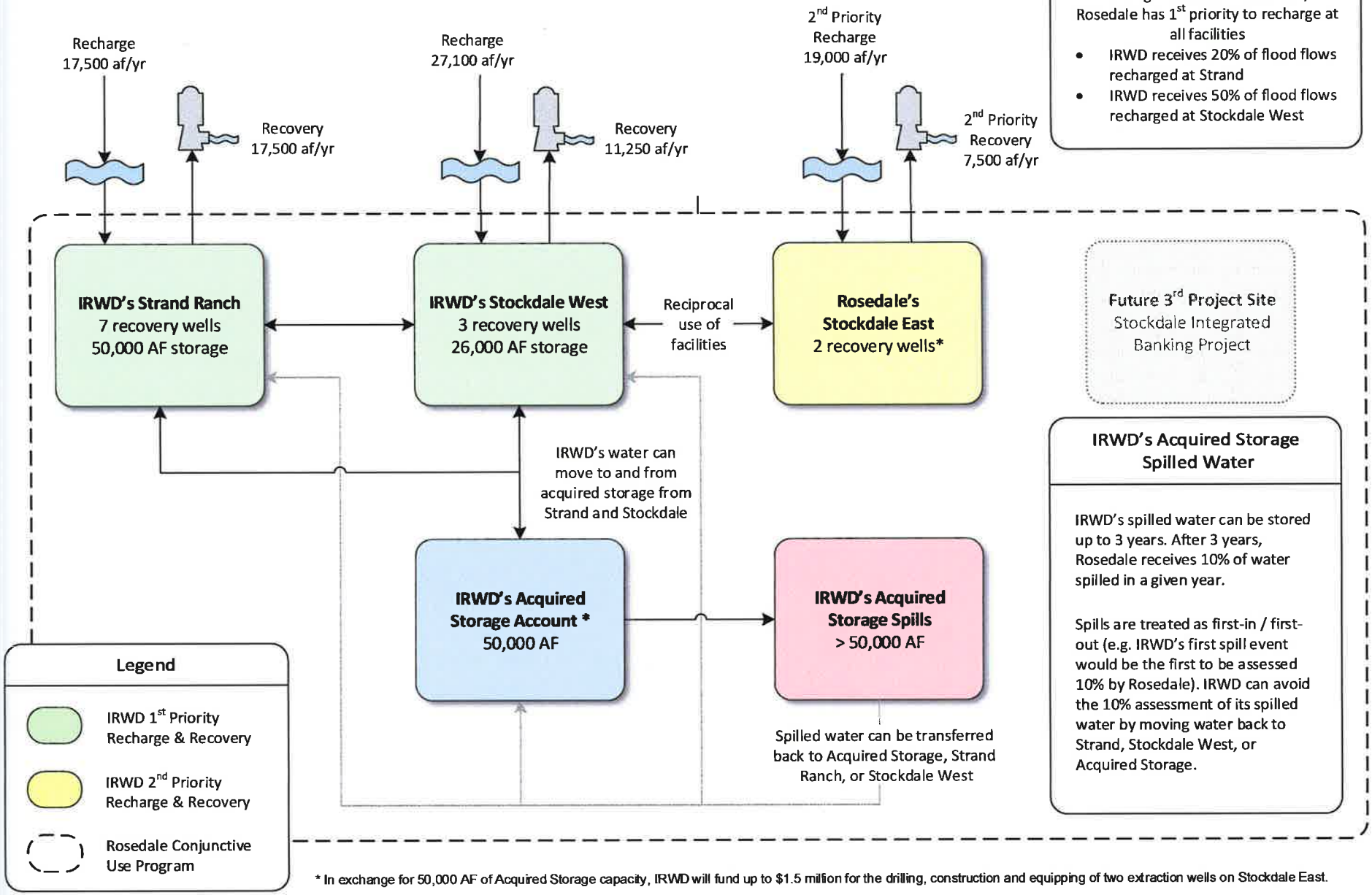
0 0.25 0.5 1 Miles

NAD 83 State Plane Zone 5 (feet)
Central Meridian: -118

# EXHIBIT "F"

## IRWD-Rosedale Water Banking and Exchange Program Agreements

Effective 1/12/2009 through 1/12/2039 (Strand Ranch)
2/4/2016 through 1/12/2039 (Stockdale West)




### Recharge of Flood Flows

During Kern River flood flows, Rosedale has 1st priority to recharge at all facilities

- IRWD receives 20% of flood flows recharged at Strand
- IRWD receives 50% of flood flows recharged at Stockdale West

### IRWD's Acquired Storage Spilled Water

IRWD's spilled water can be stored up to 3 years. After 3 years, Rosedale receives 10% of water spilled in a given year.

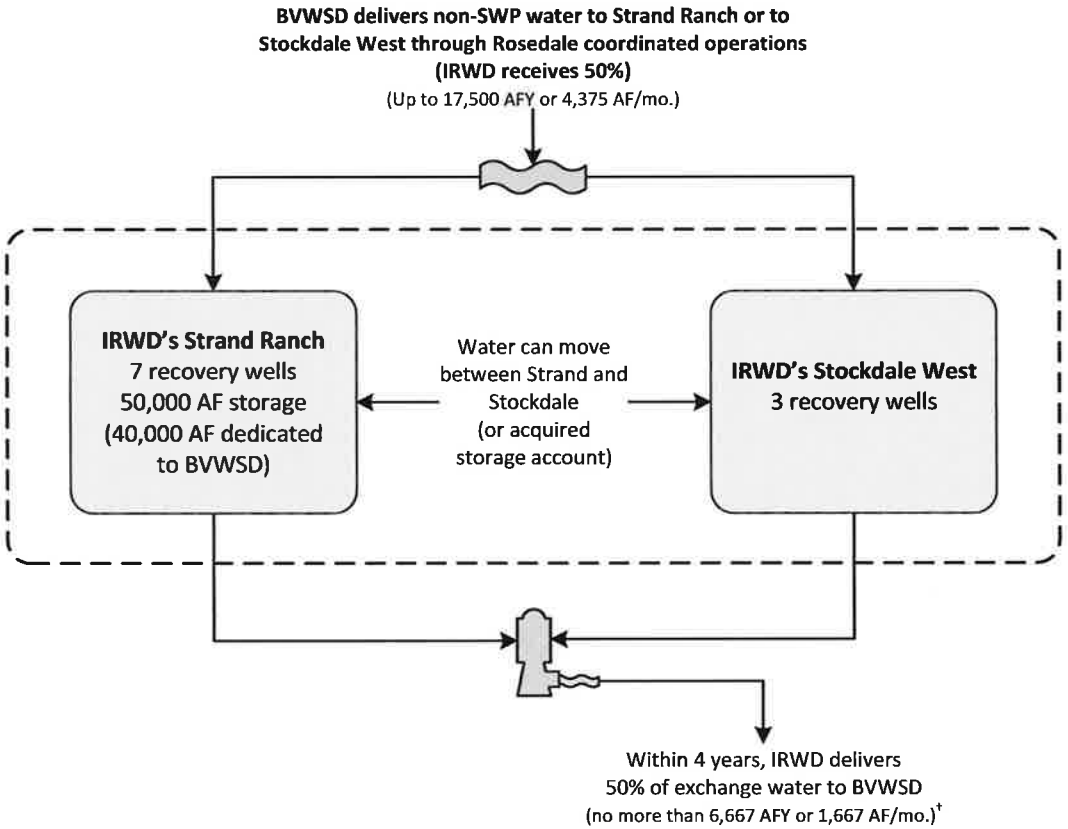
Spills are treated as first-in / first-out (e.g. IRWD's first spill event would be the first to be assessed 10% by Rosedale). IRWD can avoid the 10% assessment of its spilled water by moving water back to Strand, Stockdale West, or Acquired Storage.

* In exchange for 50,000 AF of Acquired Storage capacity, IRWD will fund up to $1.5 million for the drilling, construction and equipping of two extraction wells on Stockdale East.

# Exhibit "G"

## Buena Vista Water Storage District Long Term Water Exchange Program

Effective 1/1/2011 through 1/12/2039




**Legend**

- IRWD 1st Priority Recharge & Recovery
- Rosedale Conjunctive Use Program & Coordinated Operations

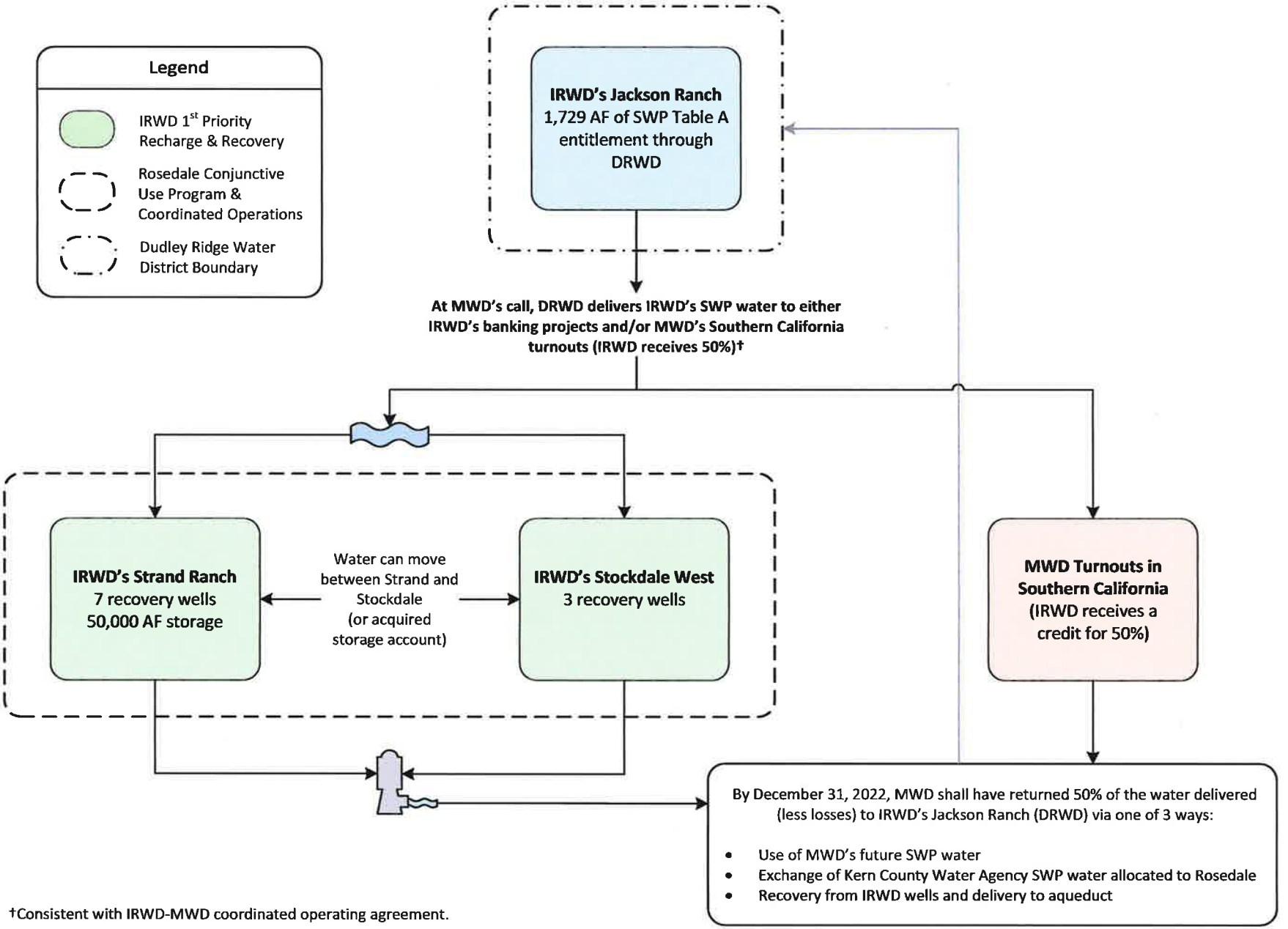
†IRWD shall remit one-half of the exchanged supply less one-half of reasonable losses back to BV no later than December 31st of the 4th year following the associated recharge event. IRWD pays for recovery of water returned to BV. Water to be remitted back to BV may remain in storage at Strand Ranch beyond the 4th year, in exchange for a greater percent being transferred to IRWD as compensation per the table shown to the right:

| Year Following Recharge Event | Percent Transferred to IRWD | Percent Returned to BV During or Before Indicated Year |
|---|---|---|
| 1 | 50% | 50% |
| 2 | 50% | 50% |
| 3 | 50% | 50% |
| 4 | 50% | 50% |
| 5 | 60% | 40% |
| 6 | 70% | 30% |
| 7 | 80% | 20% |
| 8 | 90% | 10% |
| 9 | 100% | 0% |

# Exhibit "H"

## Dudley Ridge Water District (DRWD) Unbalanced Exchange Program

Up to 8,700 AF delivered from 12/16/2013 through 12/31/2017

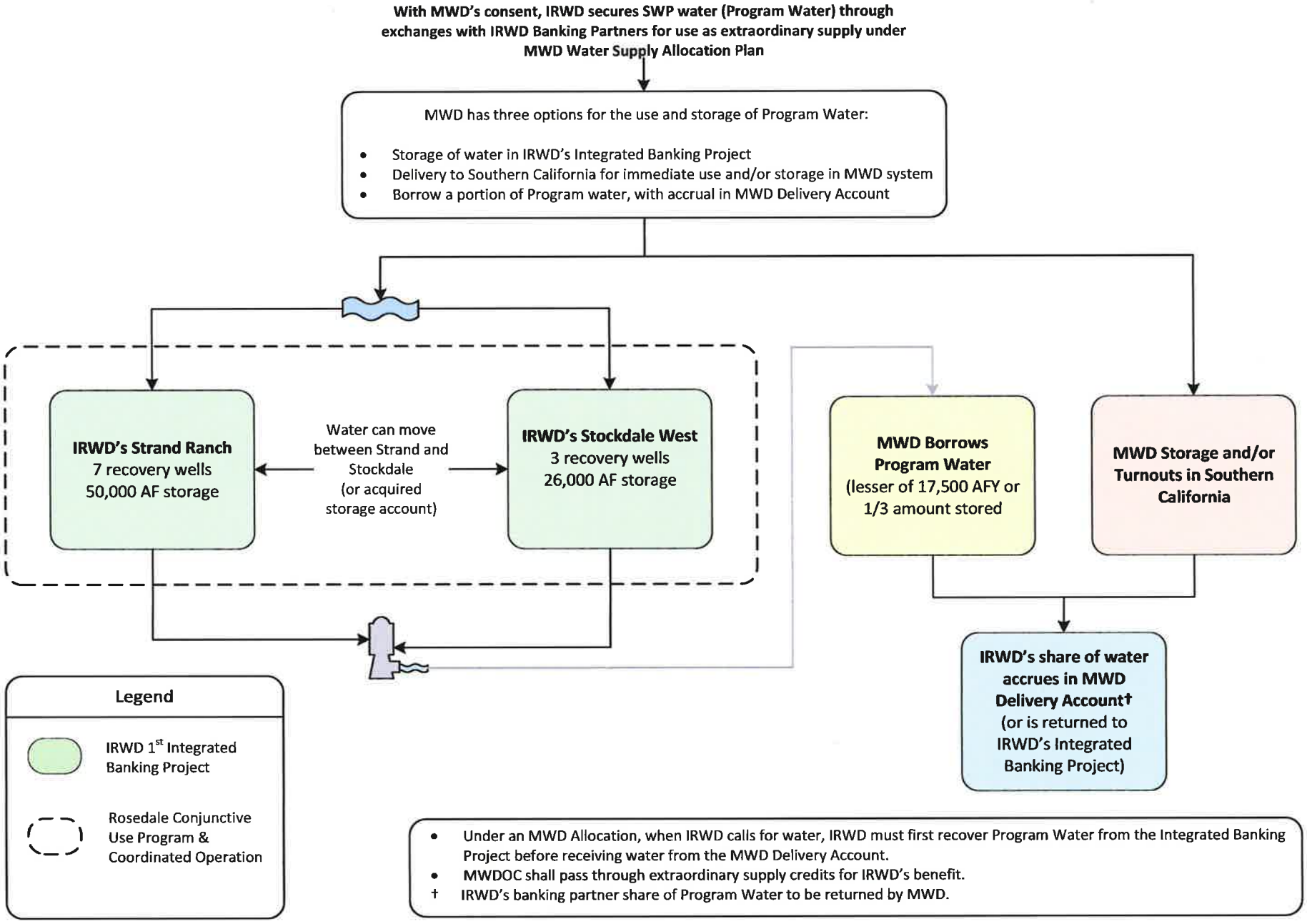



†Consistent with IRWD-MWD coordinated operating agreement.

# Exhibit "I"

## Coordinated Operating, Water Storage, Exchange and Delivery Agreement Between MWD, MWDOC and IRWD

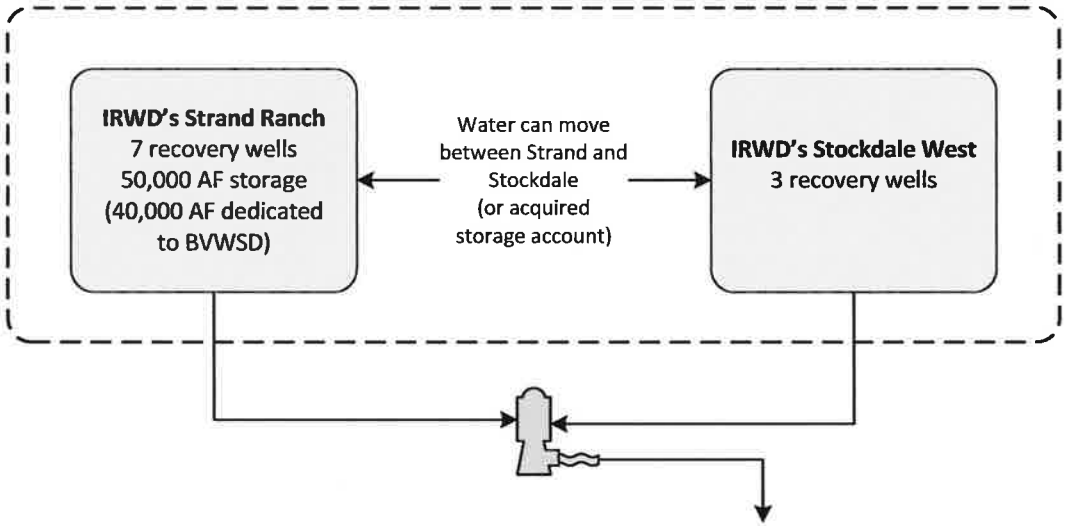
Effective 5/1/2011 through 11/4/2035



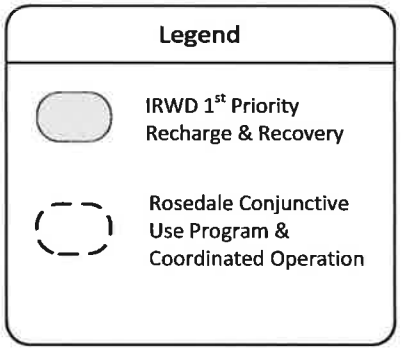
# Exhibit "J"

**Agreement for Conveyance of Water Between MWD, MWDOC, and IRWD (Wheeling Agreement)**

Template for future agreements




IRWD recovers its share of non-SWP water from its Integrated Banking Projects for use as extraordinary supply under a declared MWD Water Supply Allocation. MWD will coordinate the conveyance and delivery of recovered water to be used within IRWD's Service Area. Delivery can also occur through an operational exchange.*




*The recovered water must be used within IRWD's service area. IRWD to pay MWD wheeling charges, including system access rate, water stewardship rate, and treatment surcharge (if applicable), for each acre foot of recovered water wheeled by MWD. IRWD will pay the actual costs of power incurred by MWD to convey recovered water in the California Aqueduct to IRWD delivery points.