

**Del Puerto Water District  
January 2018  
Supporting Documentation for the SBX7-7 Agricultural Water  
Measurement Regulation (as applicable)**

**Section 1. AGRICULTURAL WATER MEASUREMENT  
REGULATION ATTACHMENTS**

**A. Legal Certification and Apportionment Required for Water Measurement**

Not Applicable

**B. Engineer Certification and Apportionment Required for Water  
Measurement**

Not Applicable

**C. Description of Water Measurement Best Professional Practices**

The District's Water Measurement Best Professional Practices include four components: irrigation scheduling, volumetric measurement, water meter accuracy, and monthly water use statements provided to customers/water users for each measurement point.

Irrigation Scheduling

Irrigation Scheduling is the procedure in which the customer places a water order with the District. The District's Rules & Regulations for Water Service require that orders be placed two days in advance in order to facilitate unlocking of the gate serving the primary delivery point, more commonly called "Turnout".

Customers requesting an "unlock" are required to provide:

1. The customer/water user name for billing purposes.
2. The numeric milepost of the delivery point/turnout location.
3. Pump number, if applicable.
4. An estimated rate of flow in cubic feet per second (cfs).
5. The desired start time.
6. A current meter reading, if applicable or requested.

Once a turnout is unlocked, the customer operates the gate at the delivery point to regulate the flow of irrigation water to his/her field, thus creating an "on-demand" delivery system. When finished, the customer closes the gate and notifies the District of completion, at which time the turnout is locked until the next irrigation order is received and scheduled.

Volumetric Measurement

All water meters used by the District measure flow in cubic feet per second (cfs) or gallons per minute (gpm). Each meter also totalizes in acre feet (af) of water used.

Water Meter Accuracy

The primary delivery points, or turnouts, where water leaves District facilities (i.e. the DMC) are measured by mechanical propeller (primary) meters that meet an accuracy standard of + or - 2%, as confirmed by San Luis & Delta-Mendota Water Authority personnel. During the irrigation season, these meters are read weekly, and during the non-irrigation season they are read semi-monthly.

At turnouts where the primary delivery points have multiple customers, secondary meters have been installed downstream of the primary meter to measure each customers' water use separately. The District routinely calibrates the secondary meters against the primary meter, thereby striving to meet accuracy standards at all times. In certain locations where secondary meters are used, there may be one customer who is without a measuring device. This customers' water use is calculated by subtracting the total measured use of the secondary meter(s) from total use measured by the primary meter. A numeric presentation of this calculation is provided with each month's billing statement and is also available upon request at any time during the billing cycle.

The District also has several turnout locations where multiple customers who share a pipeline irrigate one-at-a-time using a rotating delivery schedule. These customers are required to provide their meter reading with each on and off order, thereby facilitating accurate measurement for billing purposes.

#### Monthly Billing Statements

For purposes of the monthly billing, all water meters are read on the last day of the month and translated into customer water use statements. The District's database tracks irrigated acreage at each turnout location, and crop reports are submitted annually to determine total irrigated acres by crop type. The District strives at all times to utilize best professional practices, using water order information, weekly comparisons between water orders and measured flow readings, and a high level of communication with its customers to achieve quality control and meet quality assurance standards. Customers are reminded that they are welcome to contact the District at any time regarding a question about the accuracy of their water measurement/billing statement.

### **D. Documentation of Water Measurement Conversion to Volume**

Not Applicable

### **E. Device Corrective Action Plan Required for Water Measurement**

Primary delivery points/turnouts have propeller meters that are read, repaired and tested by the San Luis & Delta-Mendota Water Authority (SLDMWA). The SLDMWA is a joint powers agency responsible for maintenance and operation of the United States Bureau of Reclamation (USBR) Delta-Mendota Canal (DMC) which delivers water to the District. The DMC, and the turnouts along the DMC where water is delivered, effectively serve as the District's "Facilities". Beyond the turnouts, conveyance facilities are owned, operated and maintained by the District's customers.

SLDMWA employees are trained to follow the standards and procedures for testing and calibrating the primary meters as provided in the USBR's "Water Measurement Manual". An accuracy range of +/- 2% is required and documented by SLDMWA's staff engineer. After a series of tests, meters not falling into that range are adjusted by making necessary gear changes. Testing involves using a pitot tube and manometers. All test results are recorded and documented in the SLDMWA's Asset Management Program. All meters are required to be tested at least once a year. Repeat tests are conducted during the year as time permits, with requests from the District for additional tests given priority should accuracy be questioned. The SLDMWA Primary Meter Testing Protocols are attached as Exhibit E1.

Secondary meters are read, repaired and tested by District personnel. Since 2007, meters purchased

by the District have included a certified test report. The calibration on these meters is performed at a primary or secondary volumetric test facility, traceable to the National Institute of Standards and Technology, USA. The estimated margin for error at these calibration facilities is +/- 0.5%. Once the secondary meter is installed in the field, volumetric accuracy is verified by instantaneous flow rates taken and compared against the instantaneous flow rate of the primary meter at a time when only one secondary meter is operating downstream of a primary meter. Meters not falling into an accuracy range of +/- 6% are adjusted by making necessary gear changes after a series of tests show a consistent discrepancy. All secondary meters are routinely tested for accuracy and the testing results are documented in the District's records. The District's Secondary Meter Testing Protocols are attached as Exhibit E2.

**Other Documents (as applicable)**

Exhibit E1 – San Luis & Delta-Mendota Water Authority (SLDMWA) Primary Meter Testing Protocols

Exhibit E2 – District Secondary Meter Testing Protocols

**SECTION 2: DOCUMENTATION REQUIRED FOR LOAN AND GRANT ELIGIBILITY**

Schedule to Implement EWMPs (Water Code;§10608.56 (d))				
EWMP	Implementation Schedule	Finance Plan	Budget Allotment	USBR BMPs
<b>Critical</b>				
1 - Water Measurement	Completed-upgrades to be installed as needed	Per-acre assessment	\$10,000	Critical 1
2 - Volume-Based Pricing	Completed	N/A	N/A	Critical 4
<b>Conditional</b>				
1 - Alternate Land Use	Ongoing	N/A	N/A	Exemptible 1
2 - Recycled Water Use	Ongoing	Per-acre assessment	\$1,176,000	Exemptible 2
3 - On-Farm Irrigation Capital Improvements	To Be Determined	SWRCB ADLP Loan Funding	TBD	Exemptible 3
4 - Incentive Pricing Structure	Not applicable-Occurs by default	N/A	N/A	Exemptible 4

5 - Infrastructure	Not applicable-The District has no pipelines, canals or regulatory reservoirs	N/A	N/A	Exemptible 5a Exemptible 5b
6 - Order/Delivery Flexibility	Ongoing	Per-acre assessment	N/A	Exemptible 6
7 - Supplier Spill and Tailwater Systems	Not applicable-The District has no operational spills	N/A	N/A	Exemptible 7
8 - Conjunctive Use	Ongoing	Per-acre assessment	\$300,000	Exemptible 9
9 - Automated Canal Controls	Not applicable-The District does not operate or maintain a delivery system	N/A	N/A	Exemptible 10
10 - Customer Pump Test/Eval.	Ongoing	Per-acre assessment	N/A	Exemptible 11
11 - Water Conservation Coordinator	Ongoing	Per-acre assessment	N/A	Critical 2
12 - Water Management Services to Customers	Ongoing	Per-acre assessment	N/A	Critical 3
13 - Identify Institutional Changes	Ongoing	Per-acre assessment	N/A	No equivalent - Used Critical 5 Policy Evaluation
14 - Supplier Pump Improved Efficiency	Not applicable-The District has no pumps	N/A	N/A	Critical 6
<b>Grand Total all EWMPs</b>	-	-	\$531,000	

## **San Luis & Delta Mendota Water Authority Primary Meter Testing Protocols**

Meters are read once a week during the peak season and twice a month in the off season. Meters are also read on the last working day of the month or as close as possible. All Canal Operations employees may be called upon to read meters. DMC meters are divided into the upper, middle, and lower sections and are read by Operations personnel as scheduled. The Mendota Pool meters are read by the Mendota Pool Hydrotech. Rotation of personnel reading meters are made as much as possible. Meter readings are recorded and transmitted to the Watermaster by radio or fax upon completion where they are entered into the upper and lower end books for accounting purposes. During the readings, turnouts found to be off and unlocked are called in to the Watermaster. If the water order is old, usually over 3 days, the turnout will be locked up as directed by the Watermaster. This is done in an attempt to account for daily use on the canal. Several turnouts remain unlocked due to operational reasons and are indicated as such on the meter sheet. Meters found not to be working properly are reported to the Hydrotech. Once the meter is repaired, a meter timing and reading is given to the Watermaster, to allow use adjustments to be made.

Meters are periodically removed; cleaned, greased and worn parts are replaced as needed. Once all meters on the system have been serviced, the repairman starts a new cycle. Repairmen jointly work large meters, requiring the use of a boom truck for removal, once a year. All meters are serviced at least once a year. Gear changes are made to meters when tests show a constant discrepancy of over + or - 2% of accuracy. Each winter, all meters are removed, overhauled and given a fresh coat of paint. The Assistant Watermaster orders all needed parts for this winter work based on input from the Hydrotechs. All meter work performed and parts used are documented in the Authorities Asset Management Program.

Employees are trained and follow the standards and procedures for testing as provided in the USBR's "Water Measurement Manual". An accuracy range of + or - 2% is required. Meters not falling into that range are adjusted by making necessary gear changes after a series of tests show a constant discrepancy. Meters at DMC turnouts and wells are tested using a pitot tube and manometers. Current meter measurements are performed using standard current meter or Marsh McBirney type. Monthly current meter measurements are conducted at Milepost 4.98. Biweekly current meter measurements are conducted at Milepost 116.44 (when flows exceed 1000 cfs). Tests at the DMC closed drain pumps are conducted twice a year. Pitot tube test results are recorded on a form and are documented in the Authority's Asset Management Program.

All meters at each turnout on the DMC and Mendota Pool are required to be tested at least once a year. Ground water measurements are currently conducted quarterly. The DMC drain pumps are tested twice a year. Users requesting individual tests are given priority should they feel meters are inaccurate. Some turnouts seldom operate causing difficulties in obtaining tests. Repeat tests should be conducted during the year as time permits on an on-going basis.

## **Del Puerto Water District Secondary Meter Testing Protocols**

For District-owned secondary meters, volumetric accuracy is verified by District personnel through a process that compares the instantaneous flow rates at the secondary meter against the instantaneous flow rate of the primary meter at a time when only one secondary meter is operating downstream of a primary meter. Meters not falling into an accuracy range of  $\pm 6\%$  are adjusted by making necessary gear changes to the secondary meter after a series of tests show a consistent discrepancy. All secondary meters are routinely tested for accuracy and the testing results are documented in the District's records. The protocol is as follows:

### **Conditions Required:**

- A full pipeline of water between the primary and secondary meter.
- No change in flow while checking calibration.
- Only one secondary meter may be operating at the time of calibration.
- Both the primary meter and the secondary meter must be tested at the same site visit. The order of the testing does not matter.

### **Test Procedures:**

Step 1: Operate the delivery system until a stabilized flow in the pipe is obtained.

Step 2: Record time for (1) revolution of the sweep hand on the totalizer (in seconds).

Step 3: Divide 43,560 cu. ft. by the result from Step 2.

Step 4: Multiply the result from Step 3 by .001 for a meter that measures in thousandths (4-place meter) and .01 for a meter that measures in hundredths (3-place meter). This calculates the instantaneous flow rate in cubic feet per second (cfs). Record calculated flow on the Flow Monitoring, Testing and Maintenance Sheet for the location being tested (Sample Attached).

Step 5: Repeat steps 1 through 4 a minimum of three times for both the primary meter and the secondary meter. Average each set of results separately.

Step 6: If the results from Step 5 indicate a difference of  $\pm 6\%$  between the two meters, a gear change is made to the secondary meter. Once the gear change is made, the testing procedure is repeated to validate the gear change.