

Exhibit 1
Future Amendments

CWC 5/18 Directions:

Add language for future amendment to provide a check on new technologies and how the regulation is being implemented.

Regulation Notes 3 (page 2)

May 18 Version	N/A
June 3 Version	The Department shall consider the availability of new water measurement technologies and impediments to implementation of this Article when reporting to the Legislature the status of adopted Agricultural Water Management Plans in plan submittal years 2012, 2015 and every five years thereafter as required by California Water Code §10845; and based on its findings, the Department may propose amendments to the article.
6/7 R&RC Recommendation	The Department shall consider report on the availability of new <u>commercially available</u> water measurement technologies and impediments to implementation of this Article when reporting to the Legislature and California Water Commission the status of adopted Agricultural Water Management Plans in plan submittal years 2012, 2015 and every five years thereafter as required by California Water Code §10845; and based on its findings, the Department may propose amendments to the article.

Notes:

This revision also addresses CWC's recommendation for assessing the extent of implementation and associated costs to suppliers.

Exhibit 2a
Accuracy Standard Definition

CWC 5/18 Directions:

related to Exhibits 2b and 2c

Regulation §597.2. Definitions (page 3)

May 18 Version	“Accuracy” means the measured flow rate, velocity, or volume relative to the actual flow rate, velocity, or volume, expressed as a percent. The percent shall be calculated as $100 \times (\text{measured value} - \text{actual value}) / \text{actual value}$, where “measured value” is the value indicated by the device and “actual value” is the value as determined through laboratory, design or field testing protocols using best professional practices.
June 3 Version	“Accuracy” means the measured volume relative to the actual volume, expressed as a percent. The percent shall be calculated as $100 \times (\text{measured value} - \text{actual value}) / \text{actual value}$, where “measured value” is the volume indicated by the device or determined through calculations using a measured value by the device, such as flow rate, combined with a duration of flow, and “actual value” is the value as determined through laboratory, design or field testing protocols using best professional practices.
6/7 R&RC Recommendation	“Accuracy” means the measured volume relative to the actual volume, expressed as a percent. The percent shall be calculated as $100 \times (\text{measured value} - \text{actual value}) / \text{actual value}$, where “measured value” is the volume <u>value</u> indicated by the device or determined through calculations using a measured value by the device, such as flow rate, combined with a duration of flow, and “actual value” is the value as determined through laboratory, design or field testing protocols using best professional practices.

Notes:

The definition of ‘Accuracy’ is revised following the revision to the accuracy standards to be based on volume only.

Exhibit 2b

Volume versus flow and velocity

CWC 5/18 Directions:

Address accuracy of measuring volume, flow and velocity. Add/modify section on converting flow and velocity to volume to refer to related accuracy of time (duration and frequency) and cross-sectional area.

Regulation §597.4(e)(3) Reporting in Agricultural Water Management Plans (page 9)

May 18 Version	N/A
June 3 Version	If a water measurement device measures flow rate, velocity or water elevation, and does not report the total volume of water delivered, the agricultural water supplier must document in its Agricultural Water Management Plan how it converted the measured quantity value to volume, and it must record the duration of each water delivery event, the frequency of flow rate or velocity measurements, and the cross-sectional area of flow, as needed to determine volume.
6/7 R&RC Recommendation	If a water measurement device measures flow rate, velocity or water elevation, and does not report the total volume of water delivered, the agricultural water supplier must document in its Agricultural Water Management Plan how it converted the measured <u>quantity value</u> to volume, and it must record the duration of each water delivery event, the frequency of flow rate or velocity measurements, and the cross-sectional area of flow, as needed to determine volume.

Notes:

The accuracy standards have also been modified to be volume based as shown in Exhibit 2c

Exhibit 2c
Simplify the Accuracy Standards

CWC 5/18 Directions:

Simplify the accuracy standards requirements. Consider same standards for both Options (a) and (b).
Regulation §597.3(a) Measurement Options at the Delivery Point or Farm-gate (pages 4-5)

May 18 Version	<p>a) Measurement Options at the Delivery Point or Farm-gate of a Single Customer: An agricultural water supplier shall measure water delivered at the delivery point or farm-gate of a single customer using one of the following measurement options:</p> <ol style="list-style-type: none"> 1) An existing measurement device shall be certified to be accurate to within $\pm 12\%$ by flow rate, velocity or volume. After replacement of an existing measurement device, the new or replacement measurement device must meet the requirements of paragraph (a)(2) of this section. <p>Or,</p> <ol style="list-style-type: none"> 2) A new or replacement measurement device shall be certified to be accurate by flow rate, velocity or volume to within: <ol style="list-style-type: none"> A. $\pm 5\%$ in the laboratory when using a laboratory certification; B. $\pm 10\%$ when installed in the field when using a non-laboratory certification.
	<p><u>Notes:</u> <i>More stringent standards are used for option b) Measurement Options at a Location Upstream of the Delivery Points or Farm-gates of Multiple Customers (3%, 6%, and 10%).</i></p>
June 3 Version	<p>a) Measurement Options at the Delivery Point or Farm-gate of a Single Customer An agricultural water supplier shall measure water delivered at the delivery point or farm-gate of a single customer using one of the following measurement options. The stated numerical accuracy for each measurement option is for the volume delivered. If a device measures a quantity other than volume, for example flow rate, velocity or water elevation, the accuracy certification must incorporate the measurements or calculations required to convert the measured quantity to volume as described in §597.4(e).</p> <ol style="list-style-type: none"> 1) An existing measurement device shall be certified to be accurate to within $\pm 12\%$ by volume. After replacement of an existing measurement device, the new or replacement measurement device must meet the requirements of paragraph (a)(2) of this section. <p>Or,</p> <ol style="list-style-type: none"> 2) A new or replacement measurement device shall be certified to be accurate to within: <ol style="list-style-type: none"> A. $\pm 5\%$ by volume in the laboratory if using a laboratory certification; B. $\pm 10\%$ by volume in the field if using a non-laboratory certification.
	<p><u>Notes:</u> <i>The same accuracy standards are used for option b) Measurement Options at a Location Upstream of the Delivery Points or Farm-gates of Multiple Customers.</i></p>

6/7 R&RC Recommendation	<p>a) Measurement Options at the Delivery Point or Farm-gate of a Single Customer</p> <p>An agricultural water supplier shall measure water delivered at the delivery point or farm-gate of a single customer using one of the following measurement options. The stated numerical accuracy for each measurement option is for the volume delivered. If a device measures a quantity other than volume, for example flow rate, velocity or water elevation, the accuracy certification must incorporate the measurements or calculations required to convert the measured quantity to volume as described in §597.4(e).</p> <p>1) An existing measurement device shall be certified to be accurate to within $\pm 12\%$ by volume. After replacement of an existing measurement device, the new or replacement measurement device must meet the requirements of paragraph (a)(2) of this section.</p> <p>Or <u>And</u>,</p> <p>2) A new or replacement measurement device shall be certified to be accurate to within:</p> <ul style="list-style-type: none"> A. $\pm 5\%$ by volume in the laboratory if using a laboratory certification; B. $\pm 10\%$ by volume in the field if using a non-laboratory certification. <p>Notes: <i>The same accuracy standards are used for option b) Measurement Options at a Location Upstream of the Delivery Points or Farm-gates of Multiple Customers.</i></p>
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Notes:

Suppliers subject to the Article shall measure all water deliveries to their customers. Exclusion of measuring recycled water has been removed. The Law excludes recycled water only when calculating the acreage threshold.

Exhibit 3a
Option (b)(1)(A) - Legal Access

CWC 5/18 Directions:

Add/modify text regarding “legal access” – Water suppliers document that they don’t have legal access now – and indicate that they considered getting access.

Regulation §597.3 (b)(1)(A) and (b)(2)(A) (pages 5-6)

May 18 Version	The agricultural water supplier does not have legal access to the customer delivery points or farm-gates downstream of the point of measurement to install, measure, maintain, operate, and monitor the measurement device.
June 3 Version	<p>The agricultural water supplier does not have, and has made a good faith effort to obtain, legal access to the customer delivery points or farm-gates downstream of the point of measurement needed to install, measure, maintain, operate, and monitor a measurement device. To demonstrate lack of legal access at the customer delivery point, the agricultural water supplier shall self-certify to the Department that either:</p> <p>(i) It has sought and been denied access from its customer to measure water at the farm-gate,</p> <p>Or;</p> <p>(ii) It can provide documentation, as requested by the Department, that it is not economical to pursue legal or other remedies to access the farm-gate.</p>
Staff Recommendation	<p>The agricultural water supplier does not have, and has made a good faith effort to obtain, legal access to the customer delivery points or farm-gates downstream of the point of measurement needed to install, measure, maintain, operate, and monitor a measurement device. To demonstrate lack of legal access at the customer delivery point, the agricultural water supplier shall self-certify to the Department that either:</p> <p>(i) It has sought and been denied access from its customer to measure water at the farm-gate,</p> <p>Or;</p> <p>(ii) It can provide documentation, as requested by the Department, that it is not economical to pursue legal or other remedies to access the farm-gate.</p> <p>And add to (b)(2) a new subsection (A):</p> <p>(A) To demonstrate lack of legal access at customer delivery points or farm-gates downstream of the point of measurement, the agricultural water supplier shall self-certify to the Department that it has sought and been denied access from its customers to measure water at those customer delivery points or farm-gates.</p>

Notes:

Staff recommendation changes (b)(1)(A) back to May 30 version and adds a new subsection (b)(2)(A) to require self-certification.

Exhibit 3b

Option b(1)(B) - Field and Flow Conditions

CWC 5/18 Directions: N/A

Regulation §597.3 (b)(1)(B) and (b)(2)(B) (pages 5-6)

<p align="center">May 18 Version</p>	<p>The agricultural water supplier has determined, and approved by an engineer, that the applicable accuracy standard of §597.3(a) cannot be met with a single measurement device at the individual downstream customer delivery points or farm-gates due to large fluctuations in flow rate or velocity during the irrigation season; for example during rice cultivation, and provided the large fluctuations condition is applicable to all customers' irrigated areas downstream of the identified measurement location to multiple customers.</p>
<p align="center">June 3 Version</p>	<p>The measurement options in §597.3(a) cannot be met, as approved by an engineer, by installing a single measurement device at each of the downstream customer delivery points or farm-gates because of large fluctuations in flow rate or velocity during the irrigation season for rice cultivation, where rice cultivation represents a majority of irrigated acres, as defined in this article, of the lands served by the multiple downstream customer delivery points or farm-gates. At such time that a water measurement device becomes commercially available that can meet the measurement options in §597.3(a)(2) at the customer delivery points or farm-gates, an agricultural water supplier shall include in its Agricultural Water Management Plan a schedule, budget and finance plan to measure water at the individual customer delivery points in compliance with §597.3(a) of this Article.</p>
<p align="center">Staff Recommendation</p>	<p><i>The measurement options in §597.3(a) cannot be met, as approved by an engineer, by installing a single commercially available measurement device at each of the downstream customer delivery points or farm-gates because small differentials in water level or large fluctuations in flow rate or velocity occur during the irrigation-delivery season for rice cultivation, where rice cultivation represents a majority of irrigated acres, as defined in this article, of the lands served by the multiple downstream customer at those delivery points or farm-gates. At such time that When a water measurement device becomes commercially available that can meet the measurement options in §597.3(a)(2) at the customer delivery points or farm-gates, an agricultural water supplier shall include in its Agricultural Water Management Plan a schedule, budget and finance plan to measure water at the individual customer delivery points in compliance with §597.3(a) of this Article.</i></p> <p><i>And Section (b)(2)(B) was modified as follows:</i></p> <p><i>B) The agricultural water supplier shall document engineer approval that the field or flow condition(s)described in §597.3(b)(1)(B) exists-at the customer delivery points or farm-gates downstream of the point of measurement as approved by and engineer.</i></p>

Note:

Language modified to account for field and flow conditions (rather than crops grown) that preclude accurate measurement with existing commercially available measurement devices. These field and flow conditions include small head differentials due to flat topography and/or large flow fluctuations because of required irrigation practices.

Exhibit 4
CVP Water Suppliers

CWC 5/18 Directions:

Consider to include clarifying language in the Regulation if it can be done consistent with the statute. Consider if/how to include CVP Suppliers in the regulation (consistent with the statute) either as “option c” or in the “applicability” section.

Regulation §597.1 Applicability (page 2) OR §597.3 (c) Range of Measurement Options (page 6)

<p>May 18 and June 3 Versions</p>	<p>Two alternatives have been proposed to include a third measurement Option (c) for federal water suppliers in §597.3 Range of Measurement Options:</p> <p style="text-align: center;">c) Measurement Option for Agricultural Water Suppliers Subject to either the Central Valley Project Improvement Act (CVPIA) (Public Law 102-575) or the Reclamation Reform Act (RRA) of 1982, or both:</p> <p style="text-align: center;">Alternative 1 -- DWR Staff Recommendation</p> <p>An agricultural water supplier subject to CVPIA or RRA shall be deemed in compliance with this article if all irrigation water delivered by that water supplier to each customer is delivered through measurement devices that meet the United States Bureau of Reclamation accuracy standards defined in Reclamation’s Conservation and Efficiency Criteria Standards of 2008 or future amendments that meet the criteria of options 597.3(a) or 597.3(b) of this article.</p> <p style="text-align: center;">Alternative 2 -- Proposed by CVP Water Suppliers</p> <p>An agricultural water supplier subject to CVPIA or RRA shall be deemed in compliance with this article if all irrigation water delivered by that water supplier to each customer is delivered through measurement devices that meet the United States Bureau of Reclamation accuracy standards defined in Reclamation’s Conservation and Efficiency Criteria Standards of 2008 or future amendments. that meet the criteria of options 597.3(a) or 597.3(b) of this article.</p>
<p>6/7 R&RC Recommendation</p>	<p>Include the version proposed by CVP Water Suppliers in §597.1 Applicability:</p> <p>i) An agricultural water supplier subject to CVPIA or RRA shall be deemed in compliance with this article if all irrigation water delivered by that water supplier to each customer is delivered through measurement devices that meet the United States Bureau of Reclamation accuracy standards defined in Reclamation’s Conservation and Efficiency Criteria Standards of 2008 or future amendments.</p>

Notes:

Language about the CVP suppliers is now included in the ‘Applicability’ section instead of having it as ‘Measurement Option c’

Exhibit 5 Economic Impact Assessment

CWC 5/18 Directions:

Reconsider assumptions used for cost estimation. How much would the cost change if the same accuracy standards were used at laterals? How much would cost change if field-test requirements were eliminated? What is the fiscal impact on smaller growers?

1. How much would costs change if the same accuracy standards were used at laterals as apply to turnout measurement?

In general, we do not have sufficient engineering cost estimate information to distinguish costs between fairly small differences in device accuracy. The costs for lateral-level measurement were based on a recent study in RD108. That study included both a high-cost and low-cost estimate for lateral-level measurement. The high-cost estimate was used in the Cost Analysis for Proposed Agricultural Measurement Regulation. If we assume that setting the lateral-level accuracy standard to the same value as the turnout-level would allow the lower-cost installation to be used (note that this is only an assumption – we do not know that to be the case), the costs for lateral-level device installation and operation would fall by half.

Based on the other assumptions in the cost analysis, this would have a relatively small effect on total statewide costs, **reducing them by about \$6 million in present value**. The cost analysis assumed that all of the lateral-level measurement would occur in the Sacramento Valley, so all of this cost reduction would occur there. If more of the affected acreage in the state were to be measured at the lateral level, the potential total cost savings would be correspondingly greater.

2. How much would costs change if field-testing were not required?

The proposed regulation requires field testing only for lateral-level devices – it does not require field testing for turnout-level devices. Suppliers have two options for existing turnout-level devices (see Section 597.4 (a)(2)); they can choose to field-test a random sample of devices or they can use field inspections and analysis, with results certified by a professional engineer. Similarly, new turnout-level devices may be certified on the basis of laboratory tests, field tests, or certification of the design and installation by a professional engineer.

For purposes of cost estimation in the Cost Analysis for Proposed Agricultural Measurement Regulation, we assumed that 10% of existing turnout-level devices and 100% of lateral-level devices would be tested initially, at a cost of \$1,000 per device tested. If this assumption were removed, **the total costs would decline by about \$5 million in present value**. This decline would be offset by some additional cost to provide field inspections and analysis, but that cost has not been estimated.

3. What would be the cost impact to small farms?

Costs to an example small farm were included in the Cost Analysis for Proposed Agricultural Measurement Regulation. Table 6 showed the costs to both an average-sized farm of 313 acres and an example small farm of 20 acres (which is the median farm size in the State). Costs for the example 20-acre farm assumed it would be assessed the cost of initial assessment, replacement, and O&M for one turnout measurement device. Using these assumptions, **the example farm would face an initial cost of \$6,500 dollars and an ongoing, annual cost of \$1,165 per year**. The Cost Analysis also emphasized that costs to individual small farms could vary significantly, with some facing no cost. The example cost represents the high end of the costs potentially facing a single small farm.

Notes:

No Action was required by R&RC - DWR staff provided information on costs to implement various requirements of the regulations dealing with accuracy standards, field testing and small growers

Exhibit 6
Field Inspection

CWC 5/18 Directions: N/A

Regulation §597.4(b)(3) Protocols for Field-Testing and Field-Inspection and Analysis (page 8)

May 18 Version	For existing measurement devices covered by §597.3(b)(1)(A) (measurement at a location upstream of the delivery points or farm-gates of multiple customers), field-testing shall be completed on a random and statistically representative sample of the existing devices as described in §597.4(b)(1) and (2).
June 3 Version	Field-inspections and analysis protocols shall be performed and the results shall be approved by an engineer for every existing measurement device to demonstrate that the design and installation standards used for the installation of existing measurement devices meet the accuracy standards of §597.3(a) and operation and maintenance protocols meet best professional practices.
6/7 R&RC Recommendation	No changes needed – Adopted as shown in June 3 rd Version above.

Notes:

Field-inspection and analysis is added instead of requiring field testing. The definition of 'Best Professional Practices' has also been clarified in the definitions section.