

## Exhibit A - Scope of Work

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### Project Summary & Scope of Work

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Contract       Grant

Does this project include Research (as defined in the UTC)?     Yes     No

PI Name:    Erik Porse

Project Title:    Environmental and Economic Effects of Water Conservation Regulations in California

### Project Summary/Abstract

*Briefly describe the long-term objectives for achieving the stated goals of the project.*

*University will assist the State Water Resources Control Board (Water Board) with the environmental and economic analysis of new water use efficiency standards to meet California Environmental Quality Act (CEQA) and other procedural requirements, as required for the regular rulemaking process.*

#### **If Third-Party Confidential Information is to be provided by the State:**

- Performance of the Scope of Work is anticipated to involve use of third-party Confidential Information and is subject to the terms of this Agreement; **OR**
- A separate CNDA between the University and third-party is required by the third-party and is incorporated in this Agreement as Exhibit A7, Third Party Confidential Information.
- Third-Party Confidential Information is not involved.

### Scope of Work

*Describe the goals and specific objectives of the proposed project and summarize the expected outcomes. If applicable, describe the overall strategy, methodology, and analyses to be used. Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the goals and objectives.*

#### **Background, Goal, and Primary Deliverables**

##### **1. Background**

AB 1668 and SB 606 (Stats. 2018) build on ongoing efforts to make water conservation a way of life in California. They create a new framework for long term improvements in water conservation and drought planning by, among other provisions, establishing standards for efficient water use and requiring urban retail water suppliers to calculate and adhere to an *urban water use objective* ("objective") based on those standards.

The standards include the following:

- A standard for indoor residential use, which the Legislature has provisionally set at 55 gallons per capita per day (GPCD). The indoor standard is set to decrease to 52.5 GPCD beginning January 2025, and to 50 GPCD beginning in 2030. Based on the results of a forthcoming report, the standard may be adjusted upwards.
- To-be-determined standards for 1) outdoor residential use, 2) outdoor irrigation of landscape areas with dedicated irrigation meters in connection with Commercial, Industrial, and Institutional (CII) properties and 3) water loss from water distribution systems.

In addition to these standards, the legislation allows *variances* for unique uses that can have a material effect on annual water deliveries (e.g., significant use of evaporative coolers) and, to incentivize the production and use of recycled water, a *bonus incentive*, which will be based on the amount of potable reuse water an Urban Retail Water Supplier (URWS) used the previous year.

Using these standards, granted variances, and the bonus incentive, every URWS in California will calculate an *objective*, which the legislation defines as "the aggregate amount of water that would have been delivered by an URWS if all that water had been used efficiently." Generally, an URWS's objective is a volume of water that would equal the sum of the following:

- Aggregate Residential Indoor Use
- Aggregate Residential Outdoor Use
- Aggregate CII Outdoor Use
- Aggregate Water Loss
- Aggregate Variances
- Bonus Incentive

AB 1668 and SB 606 direct the Water Board to adopt the long-term standards on or before June 30, 2022. As part of the regular rulemaking process, the Water Board must consider the potential environmental and economic impacts of the regulation prior to adoption.

## **2. Goal**

The contract will support the environmental and economic analysis of the proposed regulation to meet California Environmental Quality Act (CEQA) obligations, other procedural requirements required for the regular rulemaking process, and any unique requirements set by AB 1668 or SB 606.

## **3. Primary Deliverables**

There are seven (7) major deliverables University will complete to meet the goal.

- a) University shall report projected urban water use for each URWS using the following four approaches:

- 1) The water use target of each URWS is adjusted such that the resulting statewide GPCD is equal to twenty (20) percent less than the SBX7-7 baseline<sup>1</sup>.
  - 2) Water use continues at current rates (near-term (1-3 year) post-drought water use rates).
  - 3) Water use rebounds after reductions in water use due to the drought (medium-term projection of post-drought water use rates).
  - 4) Water use decreases to rates experienced during the recent drought (2014-2016)
- b) University shall develop and report hypothetical urban water use objectives under different scenarios of climatic and socioeconomic conditions over a multi-year time horizon. University shall compare the objectives and other demands excluded from the standards to projected water use (i.e., deliverable 1).
  - c) University shall evaluate other demands not included in the urban water use objectives and report total water use.
  - d) The University shall compare the total water demands developed through the objective-based approach with the projected water uses.
  - e) Using the scenarios and additional available data, University shall analyze the potential environmental impacts of the proposed regulation pursuant to CEQA (Pub. Resources Code, § 21000 et seq.), the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.)<sup>2</sup> and Water Code section 10609.2, subdivision (c) requirements.

Section 10609.2, subdivision (c) states:

*When adopting the standards under this section, the board shall consider the policies of this chapter and the proposed efficiency standards effects on local wastewater management, developed and natural parklands, and urban tree health. The standards and potential effects shall be identified by May 30, 2022. The board shall allow for public comment on potential effects identified by the board under this subdivision.*

- f) Using the scenarios and additional available data, University shall analyze the potential economic impacts of the proposed regulation.
- g) University shall support the development of the environmental and economic documentation needed to meet rulemaking requirements as described in this agreement.

University shall communicate the results of all analyses numerically, graphically, and in-writing. Upon request by the Water Board Contract Manager, University shall ensure that any data, plans, drawings, specifications, reports, and other written or graphic work submitted to the Water Board or uploaded directly to any State internet website in the performance of this Agreement complies with the accessible content requirements set forth in Government Code sections 7405 and 11135; section 508 of the federal Rehabilitation Act (29 USC 794d) and the regulations promulgated thereunder (36 CFR part 1194); and the most current Web Content Accessibility Guidelines published by the Web Accessibility Initiative of the World Wide Web Consortium at a minimum Level AA success criteria.

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<sup>1</sup> See page 25: [https://www.waterboards.ca.gov/water\\_issues/hot\\_topics/20x2020/docs/comment043009/202020\\_final\\_report\\_draft.pdf](https://www.waterboards.ca.gov/water_issues/hot_topics/20x2020/docs/comment043009/202020_final_report_draft.pdf)

<sup>2</sup> The Water Board will use analyses conducted by University to comply with the requirements of CEQA or determine whether Water Code Section 1060934 applies to the proposed regulation, or both. Section 10609.34 states:

*Notwithstanding Section 15300.2 of Title 14 of the California Code of Regulations, an action of the board taken under this chapter shall be deemed to be a Class 8 action, within the meaning of Section 15308 of Title 14 of the California Code of Regulations, provided that the action does not involve relaxation of existing water conservation or water use standards.*

After accepting final deliverables provided by University, the Water Board Contract Manager may make changes, as needed, to finalize regulatory documents.

**B. Tasks and Deliverables**

1. **Task 1: Projected Urban Water Use.** University shall develop projected urban water use over a multi-year time horizon:
  - a. University shall work with the Water Board Contract Manager to determine the time horizon.
  - b. University shall work with the Water Board Contract Manager to determine and account for background conservation, *i.e.* conservation that is expected or otherwise required to occur as a result of plumbing, appliance and building codes and standards.
  - c. For each URWS, University shall project urban water use (as GPCD and volumetrically) using the following approaches:
    - i. **Water use increases to rates indicated by 20% by 2020 goals.** Using the 2020 targets indicated by URWS in their 2015 Urban Water Management Plans (UWMP)<sup>1</sup> and adjusting those targets such that statewide GPCD is equal to 20 percent less than the SBX7-7 baseline<sup>2</sup>, estimate projected urban water use for the multi-year time horizon, accounting for background conservation.
    - ii. **Water use continues at current rates.** Using the average annual near-term post-drought water use rates provided by URWS in the Electronic Annual Report (EAR) and monthly conservation and reporting database, project urban water use for the multi-year time horizon, accounting for background conservation.
    - iii. **Water use rebounds to post-drought rates.** Using available post-drought water use rates provided by URWS in the EAR and monthly conservation and reporting database, project plausible medium-term post-drought use rates for each URWS for the multi-year time horizon, accounting for background conservation.
    - iv. **Water use declines to drought rates.** Using the 2014-2016 water use rates provided by URWS in the EAR and monthly conservation and reporting database, project urban water use for the multi-year time horizon, accounting for background conservation.

**Deliverables:** University shall: 1) provide the data informing and the results of these calculations in an excel file formatted according to Table 1; 2) summarize the findings narratively and graphically; and 3) document all assumptions in writing.

20%by 2020		Current		Rebound		Drought	
GPCD	Volume	GPCD	Volume	GPCD	Volume	GPCD	Volume
URWS'A'							

Table 1: Conceptual framework for providing projected urban water use rates for an URWS for a single year.

2. **Task 2: Hypothetical Urban Water Use Objectives.** University shall develop different scenarios based on varying climactic and economic characteristics over the multi-year time horizon and develop hypothetical urban water use objectives based on those scenarios.

<sup>1</sup> [https://wuedata.water.ca.gov/uwmp\\_export.asp](https://wuedata.water.ca.gov/uwmp_export.asp)

<sup>2</sup> [https://www.waterboards.ca.gov/water\\_issues/hot\\_topics/20x2020/docs/commentD43009/202020\\_final\\_report\\_draft\\_\(pg25\)](https://www.waterboards.ca.gov/water_issues/hot_topics/20x2020/docs/commentD43009/202020_final_report_draft_(pg25))

- a. University shall work with the Water Board Contract Manager to determine what scenarios to evaluate.
- b. University shall calculate hypothetical objectives (in GPCD and volumetrically) for URWS's per the legislated formula described in SB 606 and AB 1668 (Section 10609.20). Using the format conceptually presented in Table 2, University shall develop objectives for varying scenarios over a multiyear time horizon. The scenarios shall consider the following:
  - i. Irrigable areas and, if the data are available, irrigated areas;
  - ii. Varying statewide reference evapotranspiration (ET<sub>o</sub>) efficiency factors
  - iii. Reducing ET<sub>o</sub> to account for effective precipitation;
  - iv. Varying drought factors;
  - v. Varying indoor water use rates;
  - vi. Varying and reasonably foreseeable climatic conditions; and
  - vii. Varying and reasonably foreseeable economic conditions.
- c. University shall work with the Water Board Contract Manager to determine the most appropriate approach with available data to perform calculations in the method outlined above. In the event of unavailable or incomplete data, University will work with the Water Board Contract Manager to evaluate alternative methods of scope the results accordingly.

**Deliverables:** University shall: 1) provide the data informing and the results of these calculations in an Excel file; 2) summarize the findings narratively and graphically; and 3) document all assumptions in writing.

Indoor GPCD	55								
Irrigation	Irrigable								
Efficiency Factor	0.55								
Weather	Wet & Cool			Average			Hot & Dry		
Economic activity	Low	Med	High	Low	Med.	High	Low	Med	High
Objective (GPCD)									
Objective (volume)									

Table 2: Conceptual framework for developing hypothetical objectives. This example for a single URWS for one year shows nine scenarios under varying climatic and economic circumstances; each of these scenarios assumes an indoor GPCD of 55, that the outdoor standards would be based on "irrigable" rather than "irrigated" areas, and that the ET<sub>o</sub> would be set at 0.55. Evaluating additional factors increases the number of hypothetical objectives. For example, considering three different efficiency factors would triple the number of hypothetical objectives (27). From there, also considering a scenario in which the outdoor standards were based on "irrigated" area would double the number of hypothetical objectives (54).

- 3. **Task 3: Objective-based total water use.** Using the hypothetical objectives, University shall calculate total water use, accounting for the additional water demands excluded from the objective.
  - a. University shall work with the Water Board Contract Manager to determine what "other demands" are excluded from the urban water use objective. Per Water Code section 10609.2(d), those demands include uses "such as CII indoor and CII outdoor water use not connected to a dedicated landscape meter;"
  - b. Using data in the EAR and monthly conservation and reporting database, University shall, for each URWS, quantify the "other demands" excluded from the long-term standards and project



Table 4: Conceptual framework for comparing the objective-based total water use to projected water use. This example for a single URWS for one year shows one scenario. This scenario assumes an indoor GPCD of 55, outdoor standards based on "irrigable" area, an ETo at 0.55, that the weather will be "wet and cool," and that economic activity will be "low." For each scenario developed for every URWS in each year within the multi-year time-horizon, University shall compare objective-based total water use to the projected water uses described in Task 1.

5. **Task 5: Analyze Environmental Impacts.** University shall analyze the potential environmental impacts of the proposed regulation.

- a. University shall work with the Water Board Contract Manager to determine the most useful way to analyze potential environmental impacts;
  - i. For example, University shall work with the Water Board Contract Manager to develop and define categories for the objective-based total water uses. Categories may be grouped according to how significantly they deviate from projected use.
  - ii. For each of the potential environmental impacts noted below, University shall work with the Water Board Contract Manager to identify the most appropriate method for extrapolating statewide effects considering potential limitations in detailed data availability.

**Deliverables:** University shall: 1) provide the data informing and the results of these calculations in an Excel file; 2) summarize the findings in writing and graphically; 3) document all assumptions in writing.

- b. Per Water Code section 10609.Z(c) and based on the approach developed in 6a, University shall work closely with the Water Board Contract Manager to determine analytical scope and scale and then analyze the impact of the proposed regulation on local wastewater management, developed and natural parklands, and urban tree health.
  - i. University shall consider how changing water use rates in response to the set objective could impact wastewater management practices within the service areas of the potentially affected URWS. University shall work with the Water Board Contract Manager to develop an approach for extrapolating knowledge from one or more case studies to broader regional or statewide assessments. University shall analyze the following potential effects:
    1. Prospective impacts on wastewater conveyance, such as increased odor, increased corrosion, exacerbated settling and blockages, and associated increased O&M costs;
    2. Prospective impacts on wastewater treatment, such as changing influent water quality (e.g., increased ammonia, salinity, BOD);
    3. Prospective impacts on recycled water production, such as changing influent volume, and influent water quality.
  - ii. University shall consider how changing water use rates in response to the set objective could impact developed and natural parklands within the service areas of the potentially affected URWS.
    1. University shall analyze the prospective changes to irrigation regimes and how those changes could directly (e.g., less water for turf) and indirectly (e.g., reduced runoff) impact the form and function of developed and natural parklands.

2. University shall work with the Water Board Contract Manager to identify territories or retailers with sufficient and appropriate data (for example, but not limited to, inventories of state and local parklands, land cover, and knowledge of irrigation techniques) to carry out an analysis of potential effects on parklands.
- iii. University shall consider how changing water use rates in response to the set objective could impact urban trees within the service areas of the potentially affected URWS.
  1. University shall analyze prospective changes to irrigation regimes and how those changes could impact the number and health of urban trees.
  2. University shall work with the Water Board Contract Manager to identify territories or retailers with sufficient and appropriate data (for example, but not limited to, tree canopy cover, tree species surveys, estimates of water use by tree species) to carry out an analysis of potential effects on trees.

**Deliverables:** University shall: 1) provide the data informing and the results of these analyses in Excel and ArcGIS files; 2) summarize the findings in writing and graphically in a report; 3) prepare or provide Power Point presentations; and 4) document all assumptions in writing.

- c. Per Water Code section 10609.34, University shall analyze the statewide impacts of the regulation on the environmental factor identified in Appendix G of the CEQA guidelines.
  - i. University shall limit this analysis to those scenarios identified by the Water Board Contract Manager.
  - ii. In completing this analysis, University shall answer each of the questions posed in Appendix G of the CEQA guidelines;
  - iii. Upon answering the questions posed in Appendix G, University shall work closely with the Water Board contract manager to determine the type of CEQA documentation needed, and shall develop said documentation (e.g., negative declaration, mitigated negative declaration or environmental impact report) based on that determination.

**Deliverables:** University shall: 1) provide the data informing and the results of these analyses in Excel and, (if spatial analyses conducted) ArcGIS files; 2) summarize the findings in writing and graphically in a report; 3) document all assumptions in writing; and 4) develop appropriate CEQA documentation, as determined by the Water Board Contract Manager.

6. **Task 6: Economic Impacts.** University shall analyze the potential economic impacts of the proposed regulation.
  - a. University shall work with the Water Board Contract Manager to determine the most useful way to analyze potential economic impacts.
    - i. For example, University may work with the Water Board Contract Manager to develop and define categories for the objective based total water uses. They may be grouped according to how significantly they deviate from projected water uses;
    - ii. University shall work with the Water Board Contract Manager to identify the most appropriate methods for estimating statewide economic impacts from available statewide datasets, regional studies, and case studies;



**Deliverables:** University shall: 1) provide the data informing and the results of these calculations in an Excel file; 2) summarize the findings in writing and graphically; 3) prepare or provide Power Point presentations; and 4) document all assumptions in writing.

- b. University shall work closely with the Water Board Contract Manager to determine the scope and scale of the economic analysis based on the approach developed in 6a, and to complete the subsequent documentation needed.
  - i. If the Water Board Contract Manager determines that the impact of the regulation would be less than \$50 million, then University shall analyze the economic impacts of the proposed regulation per the California State Administrative Manual sections 6601 through 6616<sup>1</sup> and complete the required documentation.
  - ii. If the Water Board Contract Manager determines that the impact of the regulation would be \$50 million or greater, then University shall analyze the economic impacts of the proposed regulation per the California State Administrative Manual section 6600 et seq,<sup>2</sup> and complete the required documentation.
  - iii. University shall specifically consider how the cost of the regulation could impact lower-income water users.

**Deliverables:** University shall: 1) provide the data informing and the results of these analyses in Excel and (if spatial analyses are conducted) ArcGIS files; 2) summarize the findings in writing and graphically; 3) document all assumptions in writing; and 4) develop appropriate economic impact assessment documentation, as determined by the Water Board Contract Manager.

7. **Task 7: Communicating Results.** Upon completion of Tasks 1-6, University shall work with Water Board staff to communicate results and findings. The University shall create a webpage that would allow the public, URWS and other stakeholders to explore conservation scenarios.
  - a. University shall work with the Water Board Contract Manager to determine the most useful way to present the conservation scenarios in a publicly accessible location;
  - b. Upon completing Task 7a, University shall develop the online and publicly-available tool:
    - i. University shall ensure the tool can automatically integrate updated data as available and is compatible with the State Water Board's data systems and web requirements as outlined in section A.3.g above.
    - ii. University shall make appropriate data pertaining to the conservation scenarios available to the public according to the principles and requirements of the Open and Transparent Water Data Act<sup>3</sup>.
  - c. University shall work with Water Board staff to develop and provide presentations of results and findings as appropriate.

**Deliverables:** University shall create an online, publicly available tool that displays various conservation scenarios and can be automatically updated as new data become available. University shall coordinate with Water Board staff to provide presentations of findings as appropriate.

<sup>1</sup> <https://www.dgs.ca.gov/Resources/SAM/SAMTOC/6000>

<sup>2</sup> [http://www.dof.ca.gov/Forecasting/Economics/Major\\_Regulations/documents/Order\\_of\\_Adoption-12012013.pdf](http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/documents/Order_of_Adoption-12012013.pdf)

<sup>3</sup> <https://cdt.ca.gov/wp-content/uploads/2019/03/TL-19-01.pdf>