ECONOMIC IMPACT ASSESSMENT
Onsite Treatment and Reuse of Nonpotable Water Regulations
SBDDW-22-001
July 2024

SUMMARY

The State Water Resources Control Board (State Board) proposes to amend California Code of Regulations, Title 22, Division 4 for the purpose of adding Article 3.5 to provide uniform statewide criteria for onsite treated nonpotable water systems (OTNWS). The adoption of the proposed regulations will establish risk-based water quality standards for the onsite treatment and reuse of nonpotable water (onsite wastewater, graywater, stormwater, and roof runoff) for indoor and outdoor nonpotable end uses (toilet flushing, urinal flushing, commercial laundry, decorative fountains, landscape irrigation, ornamental plant irrigation, dust suppression, and car washing) in multifamily residential, commercial, and mixed-use buildings.

State Board staff estimated total cost impact of the proposed regulations for the first seven years after the regulation is effective, whereas total cost impact includes direct cost impact and fiscal impact. Direct cost impact to privately owned businesses and fiscal impact to local government consist of capital and operations & maintenance costs related to replacement of and the subsequent operation and maintenance of existing OTNWS in operation before the effective date of the regulations. Existing OTNWS in operation before the effective date of regulations are statutorily mandated to comply with the regulations no later than five years after the effective date[1].

Total cost is expected to range between $6.4 million and $8.6 million per year in the first five years, where the maximum total cost is expected to occur on year 5. Costs for subsequent years beyond year 5 are limited to annually incurred operations and maintenance cost of $2.8 million. See **Table 1** below.

Table 1. Cost estimate for the first 7 years of regulatory implementation, for privately owned business and local governments

Year	Capital Cost	O&M Cost	Total Cost
1	$5,815,000	$567,100	$6,382,100
2	$5,815,000	$1,134,200	$6,949,200
3	$5,815,000	$1,701,300	$7,516,300
4	$5,815,000	$2,268,400	$8,083,400
5	$5,815,000	$2,835,500	$8,650,500
6	$0	$2,835,500	$2,835,500
7	$0	$2,835,500	$2,835,500

[1] California Water Code section 13558(f).

SECTION 1. BACKGROUND

The State Board proposes to amend California Code of Regulations, Title 22, Division 4 for the purpose of adding Article 3.5 to provide uniform statewide criteria for onsite treated nonpotable water systems (OTNWS). The adoption of the proposed regulations will establish risk-based water quality standards for the onsite treatment and reuse of nonpotable water (onsite wastewater, graywater, stormwater, and roof runoff) for indoor and outdoor nonpotable end uses (toilet flushing, urinal flushing, commercial laundry, decorative fountains, landscape irrigation, ornamental plant irrigation, dust suppression, and car washing) in multifamily residential, commercial, and mixed-use buildings.

In September 2018, Senate Bill 966 (SB 966) was enacted, adding sections 13558 and 13558.1 of the Water Code. SB 966 requires the State Board to consult with California Building Standards Commission (CBSC) and the Department of Housing and Community Development (HCD) in the regulation adoption process. SB 966 requires that HCD, in consultation with the State Board, develop and propose for adoption any necessary corresponding building standards on or before December 1, 2023.

If adopted as building standards by CBSC and HCD in their future rulemaking, the proposed regulations will replace and/or supplement the existing California Plumbing Code (Part 5 of Title 24 California Code of Regulations) requirements addressing treated alternate water sources (i.e. treated graywater and treated rainwater). Untreated graywater systems that are used exclusively for subsurface irrigation and untreated rainwater systems that are used exclusively for surface, sub-surface, or drip irrigations are already regulated by Chapter 15 and Chapter 16 of the California Plumbing Code and will not be addressed by the proposed regulations.

SECTION 2. BENEFITS

The anticipated benefit from this proposed regulatory action is the continued protection of the health and welfare of California residents and worker safety through the prevention of cross connection of onsite treated nonpotable water systems and potable water supply and the provision of a health-protective risk-based water quality standards for the use of onsite treated nonpotable water. The potential benefit of the proposed regulations cannot be quantified because the necessary data were not available at the time of writing.

SECTION 3. DISCUSSION OF REGULATORY IMPACT

To describe statewide regulatory impact, the discussion is separated into two parts: 1) the regulatory setting without the proposed regulations (baseline); and 2) the regulatory setting with the proposed regulations adopted.

3.1. Baseline Regulatory Setting

3.1.1. Statewide

California Plumbing Code Chapter 15 and Chapter 16 contain water quality standards for alternate (also known as nonpotable) water sources, including treated and untreated graywater and rainwater, for nonpotable uses. Local jurisdictions have the option to adopt an alternative water quality standard, including risk-based water quality standard. Based on State Board staff research and discussions with local jurisdictions, treatment and reuse of alternate water sources for nonpotable end uses generally consist of reuse of untreated graywater or untreated rainwater for surface, sub-surface, or drip irrigations, which, according to California Water Code section 13558, are not subject to the proposed regulations.

Statewide, only two local jurisdictions actively operate permitting programs for treatment and reuse of alternate water sources extending beyond the use of untreated graywater and untreated rainwater for nonpotable end uses, and thus would be subject to the proposed regulations: City and County of San Francisco and Los Angeles County.

3.1.2. Los Angeles County

Los Angeles County permits recycled water and alternate water source system projects, including for onsite treatment and reuse of graywater, rainwater, and stormwater. Los Angeles County implements the following water quality standards based on the Los Angeles County Department of Public Health (DPH) Guidelines for Alternate Water Sources[2] in the table below. While the use of recycled water (from centralized wastewater treatment and distribution system) is mandated for many parts of the county, the use of other alternate water sources, such as treated and untreated graywater, rainwater, and stormwater, is voluntary.

Table 2 presents Los Angeles County DPH water quality standards and acceptable treatment system for alternate water sources that may be impacted by the proposed regulations. The Los Angeles County DPH pathogen water quality standards are not risk-based water quality standards.

[2] Los Angeles County DPH. Guidelines for Alternate Water Sources: Indoor and Outdoor Non-Potable Uses. February 2016. http://www.publichealth.lacounty.gov/eh/docs/permit/guidelines-alternate-water-sources.pdf

Table 2. Los Angeles County guidelines for alternate water sources treatment

Alternate water source	Use	Pathogen water quality standards	Typical treatment system
Stormwater	Outdoor	• NSF 350, if sprayed or • CCR Title 22 Recycled Water Quality Equivalence at the point of use and meets all bacterial limits at point of use when distributed offsite	• Packaged units and/or design-build units shall be NSF 350 certified as a complete system • Evaluated on a case-by case basis per project
Stormwater	Indoor	• NSF 350 or • CCR Title 22 Recycled Water Quality Equivalence at the point of use or • Other standard matching or exceeding presently accepted standards and meets all bacterial limits at point of use when distributed offsite	• Packaged units and/or design build units – evaluated and complying with NSF 350 certification standard as a complete system • Specific treatment components shall be based on classification of chemical components during the first two years of operation • Evaluated on a case-by case basis per project
Rainwater	Indoor	• Ch. 17 CPC E. coli < 100 CFU/100 ml, turbidity < 10 NTU or • NSF 350 or • CCR Title 22 Recycled Water Quality Equivalence at the point of use	• Ch. 17 CPC Table 1702.9.4 Prescreening & 100 µm filtration w/ disinfection • Evaluated on a case-by case basis per project
Graywater	Indoor	• NSF 350 with disinfection or • CCR Title 22 Recycled Water Quality Equivalence at the point of use or • Other standard matching or exceeding presently accepted standards	• Packaged Units and/or Design Build Units – evaluated and complying with NSF 350 certification standard as a complete system • Evaluated on a case-by case basis per project

3.1.3. City and County of San Francisco:

The City and County of San Francisco adopted the Onsite Water Reuse for Commercial, Multi-Family, and Mixed-Use Development Ordinance, commonly known

as the Non-potable Water Ordinance (NPO) in September 2012, which allows for the collection, treatment, and use of alternate water sources for non-potable uses in buildings. In 2015, the ordinance became mandatory for new development projects of 250,000 square feet or more of gross floor area to install and operate an OTNWS. In 2021, the ordinance required new development projects that apply for a site permit after January 1, 2022, of 100,000 gross square feet or more to install and operate an OTNWS.

City and County of San Francisco has adopted and implemented pathogen risk-based water quality standards for alternate water source systems, which has been published in The San Francisco Department of Public Health Director's Rules and Regulations Regarding the Operation of Alternate Water Source Systems[3] (San Francisco DPH Rules and Regulations) since 2015. **Table 3** presents the pathogen log reduction targets for alternate water sources. The pathogen log reduction targets are equal or more conservative than the proposed regulations' pathogen log reduction targets for graywater and blackwater. The pathogen log reduction targets for stormwater and rainwater are lower than the proposed regulations' pathogen log reduction targets.

Table 3. City and County of San Francisco pathogen log reduction targets for alternate water sources treatment

Alternate water source	Enteric Virus	Parasitic Protozoa	Bacteria
Rainwater	--	--	3.5
Stormwater	3.5	3.5	3.0
Stormwater outdoor use only	3.0	2.5	2.0
Foundation water	3.5	3.5	3.0
Foundation water outdoor use only	3.0	2.5	2.0
Graywater	6.0	4.5	3.5
Graywater outdoor use only	5.5	4.5	3.5
Blackwater	8.5	7.0	6.0
Blackwater outdoor use only	8.0	7.0	6.0

3.2. Post Rulemaking Regulatory Setting

Consistent with other Title 22 regulations related to water recycling (reuse), the proposed regulations are the minimum standards to ensure that water reuse is carried out in a manner that is protective of public health. The statutes do not mandate treatment of all alternate water sources, installations of OTNWS, nor do they require the local jurisdictions statewide to permit OTNWS. The statutes, however, require local

[3] San Francisco DPH. Director's Rules and Regulations Regarding the Operation of Alternate Water Source Systems. November 2022. https://www.sfdph.org/dph/files/EHSdocs/ehsWaterdocs/NonPotable/SFHC_12C_Rules.pdf

jurisdictions choosing to permit OTNWS to adopt a local jurisdiction program. An OTNWS cannot be operated without a permit from the local jurisdiction.

Water Code section 13558(f) requires that an OTNWS in operation before the effective date of the regulations comply with the regulations within two years of the effective date (or up to five years after the effective date of the regulations if there are extenuating circumstances related to the engineering, repair, or replacement of the system).

The risk-based water quality standards proposed in the regulations consist of the following pathogen log reduction targets in **Table 4**. Each OTNWS treating an alternate water source for a particular use type is required to provide a treatment system that is capable to continuously removing or inactivating the corresponding pathogens (enteric virus, giardia, cryptosporidium) to the specified log reduction. A 1-log reduction equates to 90% removal, 2-log reduction to 99% removal, 3-log reduction to 99.9% removal, and so on.

Table 4. Proposed pathogen log reduction targets for OTNWS regulations

Alternate Water Source	Use Type	Enteric Virus	Giardia	Cryptosporidium
Onsite wastewater	Indoor use	8.0	6.5	5.5
Onsite wastewater	Outdoor use	7.5	5.5	5.0
Stormwater	Indoor use	7.0	5.5	4.5
Stormwater	Outdoor use	6.5	4.5	4.0
Graywater	Indoor use	6.0	4.5	3.5
Graywater	Outdoor use	5.5	3.5	3.0
Roof runoff	Indoor use	-	1.5	-
Roof runoff	Outdoor use	-	1.0	-

3.2.1. Los Angeles County

Based on discussion with Los Angeles County staff in 2023, there are approximately 54 existing projects that may be impacted by the proposed regulations. Los Angeles County staff provided DDW staff with a summary count of alternate water source systems, including those that may fall under the scope of the proposed regulations presented in **Table 5** below.

Los Angeles County has a total of 870 alternate water source systems. Of these, 54 are systems that may be impacted by the proposed regulations, including stormwater and graywater systems. 39 of the 54 systems are graywater and stormwater systems that are owned by private entities. 15 of the 54 systems are graywater and stormwater systems that are owned by government entities (city and county). Recycled water

systems and untreated graywater systems used for irrigation are not subject to the proposed regulations. Onsite water reuse is not mandatory in Los Angeles County. Existing alternate water source system owners can choose to replace or update their systems to comply with the proposed regulations or choose to decommission and switch back to potable water as a source.

Table 5. Los Angeles County existing systems count

Alternate water source	Use	No of systems
Recycled Water	Indoor and Outdoor	750
Stormwater	Outdoor	24
Stormwater	Indoor	4
Graywater	Outdoor (irrigation)	66
Graywater	Indoor	26
Total number of systems		870
Total number of systems that may be impacted by the proposed regulations		54
Total number of **privately owned** systems that may be impacted by the proposed regulations		39
Total number of **local government owned** systems that may be impacted by the proposed regulations		15

3.2.2. City and County of San Francisco

Based on discussion with City and County of San Francisco staff in 2023, there are approximately 29 existing OTNWS that may be impacted by the proposed regulations. City and County of San Francisco staff provided DDW staff with a summary count of alternate water source systems that may be impacted by the proposed regulations, presented in **Table 6**. All 29 rainwater and stormwater systems are privately owned.

The total number of alternate water source systems that may be impacted by the proposed regulations are alternate water source systems that treat stormwater and rainwater for outdoor (non-irrigation) only. The City and County of San Francisco current rules and regulations include pathogen log reduction targets for graywater and blackwater that are at least equal to the proposed regulations' pathogen log reduction targets.

Table 6. City and County of San Francisco existing systems count

Alternate water source	Use	No of systems
Rainwater	Outdoor (non-irrigation)	27
Stormwater	Indoor	2
Foundation water	Outdoor	1
Graywater	Indoor	17
Blackwater	Indoor	1
Total number of systems		48
Total number of systems that may be impacted by the proposed regulations		29
Total number of **privately owned** systems that may be impacted by the proposed regulations		29
Total number of **local government owned** systems that may be impacted by the proposed regulations		0

SECTION 4. BASIS OF COST ESTIMATE

Cost estimates for each OTNWS treatment train by source water type are provided in **Table 7**. Estimates are based on *Table 22. Cost and layout estimates for each model treatment train* published in Olivieri et al. (2021), which summarizes the capital cost and operation and maintenance (O&M) budgetary estimate for OTNWS that could be implemented in California to meet the water quality standards in the proposed regulations. The range of estimates are based on a range of design flows (5,000 gpd to 15,000 gpd for graywater systems and 43,200 gpd to 86,400 gpd for roof runoff and stormwater systems). For simplicity of estimates, State Board staff uses average values for capital cost and O&M annual cost.

Capital costs include a complete and fully functional treatment train (all necessary treatment processes complete with auxiliary equipment needed for the proper functioning of each unit process, including plumbing, electrical, and signal wiring within the treatment train), instrumentation and controls integration (including capability for automatic shut-down or diversion), design fees, manufacturing, shipping, and installation. Annual O&M costs include expenses associated with system maintenance, parts replacement, repair, chemicals, electricity, and operations labor. For basis of estimate, only graywater, stormwater, and roof runoff capital costs and O&M costs are presented in this document as only existing alternate water source systems treating the graywater, stormwater, and roof runoff will be impacted by the proposed regulations.

Table 7. Cost estimate for treatment trains by water source type

Water Source Type	Capital Cost Estimate Range	O&M Annual Cost Estimate Range	Capital Cost Average	O&M Annual Cost Average
Graywater	$300,000 to $500,000	$20,000 to $66,000	$400,000	$43,000
Stormwater	$300,000 to $450,000	$15,000 to $50,000	$375,000	$32,500
Roof runoff	$200,000 to $350,000	$15,000 to $40,000	$275,000	$27,500

4.1. Assumptions and Calculations

The cost estimate presented in this document is based on the best available data to State Board staff at the time the analysis was performed with the following assumptions:

- Existing rainwater treatment systems will be replaced based on the requirements for roof runoff treatment standards.
- The cost impacts of the proposed regulations are limited to existing OTNWS in operation before the effective date of the proposed regulations. Onsite treatment and reuse of alternate water sources is not mandatory statewide. The state has no ability to reasonably predict where and how many new alternate water source systems will be constructed statewide. The proposed regulations will provide a statewide minimum standard for treatment, distribution, and use of alternate water sources. The proposed regulations will have no effect on the decisions to have new alternate water source systems or OTNWS constructed. In local jurisdictions where onsite treatment and reuse of nonpotable water is mandated through a local jurisdiction ordinance, such as City and County of San Francisco, any costs related to installation and operation of new OTNWS will be incurred regardless of the adoption of the proposed regulations.
- Capital cost and O&M of treatment train for each type of alternate water source are assumed equal for indoor and outdoor uses. The pathogen log reduction target difference between indoor and outdoor uses is generally between 0.5 to 1.0 log, which can easily be addressed by minimal increase in UV dose (electricity cost) or free chlorine dose (chemical cost).
- Existing OTNWS will incur a 100% capital cost (replacement) and ongoing 100% annual O&M cost. To simplify the cost estimates and to account for the many variations between each installed system conditions and operations that can result in lower cost or higher cost for upgrading, State Board staff conservatively assumes the full replacement (capital) cost and full O&M cost for each existing OTNWS. In reality, existing OTNWS may already have some or most of the

treatment processes and associated auxiliary equipment, which would not necessitate a full replacement (i.e. partial treatment train replacement or addition to an existing treatment train would be sufficient) to comply with the proposed regulations. For example, an existing OTNWS treatment train may already have existing filtration process and need only new disinfection system. A full replacement (capital) cost is a conservative assumption as it likely overestimates the cost of the proposed regulation. Existing OTNWS have existing and recurring associated O&M cost; therefore, the assumption of full O&M cost is conservative. Depending on the extent of upgrade or replacement, an existing OTNWS may incur incremental O&M cost as a result of complying with the proposed regulations.

- No additional costs are associated with reporting requirements for the proposed regulations. The existing OTNWS are already required to submit water quality monitoring reports to their local jurisdictions. These existing water quality reporting are comparable to water quality reporting required by the proposed regulations.
- The statutes allow up to five years for the owners of existing alternate water source systems to come into compliance with the state regulations. For the estimation of direct cost impact and fiscal impact of the proposed regulations, staff assumed that the installation of replacement systems would occur in equal increments during the first five years after the proposed regulations are effective. The assumption that system replacement would be evenly distributed over time is based on the following. First, data on existing alternate water source system sizes, system owner's budgets, and other individual/site-specific information are not available at the time of writing, which makes it infeasible for State Board staff to make system-specific replacement projections. Second, in the absence of system-specific data, the assumption that system replacement would be evenly distributed over the five-year period is most consistent with the following evidence and observed factors:
    - Decentralized implementation: The replacement process will be carried out by multiple independent entities (building owners or private companies), each making their own decisions about timing and resources.
    - Local jurisdiction resource availability to implement regulations: It is anticipated that local jurisdiction will be absorbing the additional permitting workload with their existing available staffing, which would result in paced review and permit issuance.
    - Lack of historical precedence of compliance rate for similar regulations: The proposed regulations will likely be implemented similarly to building

standards. Government (state or local) mandated retroactive compliance with construction or installation standards at a building scale, particularly for private owned buildings, is uncommon. Generally, building standards are applicable at the time of permit issuance, and new building standards are not retroactively enforced.

- Risk mitigation and financial planning: Government owned facilities will likely be replaced over multiple budget years to spread the cost. Phasing replacements over multiple years will reduce the risk of supply chain issues, overallocated workload (if self-performed by local agency employees), or contractor unavailability.

SECTION 5. DIRECT COST IMPACTS

State Board staff estimated direct cost impact of the proposed regulations on privately owned systems that may be impacted by the proposed regulations for the first seven years after the regulation is effective. Direct costs, which include capital and operations and maintenance, incurred by privately owned businesses are expected to range between $5.1 million and $7.0 million per year in the first five years. Costs for subsequent years beyond year 5 are limited to annually incurred operations and maintenance cost of $2.3 million.

The proposed regulation is developed for uses of onsite treated nonpotable water in the multifamily residential, commercial, and mixed-use buildings. The direct cost impacts will be on existing alternate water source systems installed at multifamily residential, commercial, and mixed-use buildings that may be impacted by the proposed regulations. Building ownership of these properties consist of privately owned large and small businesses and nonprofit entities.

Existing alternate water source systems regulated by local jurisdictions are currently required to submit water quality monitoring reports to their respective local jurisdiction programs. The proposed regulations will have a requirement to submit monitoring reports, which will supersede the existing local jurisdiction reporting requirements. The cost of reporting for portions required by the proposed regulations are anticipated to be the same as the existing reporting requirements.

Table 8 summarizes the number of existing, privately owned, alternate water source systems in City and County of San Francisco and Los Angeles County that may be impacted by the proposed regulations. **Table 9** estimates the total capital cost for full replacement of all existing privately owned alternate water source systems (OTNWS). The total capital cost amount reflects cost at full replacement. It is assumed to be a one-time cost that will be incurred over the years analyzed. **Table 10** estimates the total

annual O&M cost for privately owned OTNWS at full replacement. The total O&M cost amount reflects cost at full replacement.

Table 8. Existing privately owned alternate water source systems that may be impacted by the proposed regulations

Jurisdiction	Alternate Water Source	Count
City and County of San Francisco	Rainwater	27
City and County of San Francisco	Stormwater	2
Los Angeles County	Stormwater	15
Los Angeles County	Graywater	24
Total number of privately owned systems that may be impacted by the proposed regulations		68

Table 9. Capital cost for existing privately owned alternate water source systems

Jurisdiction	Alternate Water Source	Number of systems	Capital Cost per system	Total Capital Cost
City and County of San Francisco	Rainwater	27	$275,000	$7,425,000
City and County of San Francisco	Stormwater	2	$375,000	$750,000
Los Angeles County	Stormwater	15	$375,000	$5,625,000
Los Angeles County	Graywater	24	$400,000	$9,600,000
			Total	$23,400,000

Table 10. Annual O&M cost for existing privately owned alternate water source systems

Jurisdiction	Alternate Water Source	Number of systems	Annual O&M Cost per system	Total Annual O&M Cost
City and County of San Francisco	Rainwater	27	$27,500	$742,500
City and County of San Francisco	Stormwater	2	$32,500	$65,000
Los Angeles County	Stormwater	15	$32,500	$487,500
Los Angeles County	Graywater	24	$43,000	$1,032,000
			Total	$2,327,000

Table 11 summarizes a conservative cost estimate for year 1 through year 7 after the regulation is effective. State Board staff make the following assumptions:

- All existing alternate water source systems that may be impacted by the proposed regulations (see **Table 8**) in City and County of San Francisco and Los Angeles County are replaced and subsequently operated;
- Installation of replacement systems occurs in equal increments during the first five years after the proposed regulations are effective (as described in the previous section, owners of existing alternate water source systems would need to come into compliance with the state regulations by the end of year 5). Thus, approximately 20% of the estimated total capital cost of $23,400,000 (see total in **Table 9**) is incurred each year for the first five years until full replacement (100%) is achieved. See **Section 4.1** for an explanation of the distribution of replacement rate. After the first five years, no capital cost is incurred in subsequent years;
- O&M cost is annually recurring and is assumed to begin at the year of installation (i.e. when capital cost is incurred). Consistent with the assumption for installation of replacement systems above, 20% of the estimated total annual O&M costs of $2,327,000 (see total in **Table 10**) are incurred corresponding with the total systems installed each year for the first five years until full replacement (100%) is achieved. For example, at year 1, O&M cost is at 20% of total O&M cost because 20% of replacement systems were installed; at year 2, O&M cost is at 40% of total O&M cost because, in addition to the O&M cost of the replacement systems installed in year 1, there is also the O&M cost of the new replacement systems, etc. After the first five years, full replacement O&M cost is incurred each year as all replaced systems continue to be operated; and
- Total cost after year 5 equals to full O&M cost for total replacement of all existing systems.

Table 11. Cost estimate for the first 7 years of regulatory implementation for all privately owned systems

Year	Capital Cost	O&M Cost	Total Cost
1	$ 4,680,000	$ 465,400	$ 5,145,400
2	$ 4,680,000	$ 930,980	$ 5,610,800
3	$ 4,680,000	$ 1,396,200	$ 6,076,200
4	$ 4,680,000	$ 1,861,600	$ 6,541,600
5	$ 4,680,000	$ 2,327,000	$ 7,007,000
6	$ 0	$ 2,327,000	$ 2,327,000
7	$ 0	$ 2,327,000	$ 2,327,000

5.1. Direct Cost for Typical Business, Small Businesses, and Individuals

5.1.1. Typical Business

Existing alternate water source systems installed at multifamily residential, commercial, and mixed use buildings in the City and County of San Francisco and Los Angeles County may be impacted by the proposed regulations. To assess the direct cost impact on the typical regulated business, all 68 privately-owned alternate water source systems were considered. For this analysis, a typical business is defined as a hypothetical business entity that privately owns and occupies an entire building and operates an alternate water source system with the average attributes. Based on the numbers shown in **Table 7**, direct costs for a typical business are as following:

- A typical business operating a rainwater (roof runoff) system thus defined would incur a direct cost of approximately $275,000 in Year 1 assuming a replacement system installation in Year 1. A typical business would incur a direct cost of $27,500 in Year 2 and in subsequent years for operations and maintenance.
- A typical business operating a stormwater system thus defined would incur a direct cost of approximately $375,000 in Year 1 assuming a replacement system installation in Year 1. A typical business would incur a direct cost of $32,500 in Year 2 and in subsequent years for operations and maintenance.
- A typical business operating a graywater system thus defined would incur a direct cost of approximately $400,000 in Year 1 assuming a replacement system installation in Year 1. A typical business would incur a direct cost of $43,000 in Year 2 and in subsequent years for operations and maintenance.

5.1.1.1 Reporting Cost to Businesses

As discussed above, Water Code section 13558 requires the State Water Board to adopt the proposed regulations. The proposed regulations represent the minimum criteria and requirements necessary for the protection of human health and the environment. The proposed regulations contain reporting requirements for owners of alternate water source systems to demonstrate compliance with the regulations. These reporting requirements will ensure that the treatment, distribution, and use of onsite treated non-potable water is protective of public health, safety, and welfare. To the extent that some alternate water source systems are privately owned businesses, the State Water Board finds that it is necessary for the proposed regulations to apply to these businesses to ensure the delivery of safe onsite treated non-potable water for non-potable end uses in these facilities.

As explained before, no additional costs are associated with reporting requirements for the proposed regulations. The existing OTNWS are already required to submit water

quality monitoring reports to their local jurisdictions, which could be adjusted at a negligible cost.

5.1.2. Small Businesses

For the purpose of this Economic Impact Assessment, State Board staff assumes the definition of “Small Business” to be as defined in Government Code section 11346.3 (b)(4)(B), where a “small business” means a business that is all of the following:

- Independently owned and operated,
- Not dominant in its field of operation.
- Has fewer than 100 employees.

Data to determine if an impacted alternate water system is located within a building owned by a business meeting the criteria above are not available. Therefore, it is not possible to determine the number of small businesses, if any, that would be affected by the proposed regulations. If a small business is affected, State Water Board staff assumes that the cost incurred by that small business will be the same as the cost incurred by a typical business if it owns and occupies an entire building and operates an alternate water source system. Small businesses that rent and occupy spaces in privately owned buildings with operational alternate water source systems that are impacted by the proposed regulations might incur indirect cost impacts through increase in rent cost or facilities fee.

5.1.3. Individuals

Single family residences are not subject to the requirements of the proposed regulations; therefore, individuals are not expected to incur any direct costs to comply with the proposed regulations. The proposed regulations are only applicable to multifamily residential, commercial, and mixed-use occupancies. Costs related to compliance with the proposed regulations will be incurred directly by businesses or private entities owning the multifamily residential or mixed-use occupancy buildings. The costs related to compliance with the proposed regulations may be passed on to individuals in the form of increased cost of goods or services provided by the business, or in the form of increased facilities fee or condominium fee . At the time of this assessment, data to analyze potential pass-through to individuals are not available.

SECTION 6. FISCAL IMPACTS

State Board staff estimated fiscal impact of the proposed regulations for the first seven years after the regulation is effective. Fiscal impact is expected to be incurred by local governments that own existing alternate water systems that will be impacted by the

proposed regulations. State Board staff does not anticipate any fiscal impact on state government and federal funding of state programs.

6.1. Cost to conform existing local government owned buildings with the proposed regulations

There are a total of 15 existing installed alternate water systems owned by local government in Los Angeles County that will be impacted by the proposed regulations. There is no existing local government owned alternate water system in City and County of San Francisco that will be impacted by the proposed regulations.

The facilities served by the alternate water systems in Los Angeles County consist of irrigation of local parks, office buildings, and a detention facility. Based on the numbers shown in **Table 7**, cost to the local government are as following:

- Local government operating a stormwater system thus defined would incur a direct cost of approximately $375,000 in Year 1 assuming a replacement system installation in Year 1. The local government would incur a direct cost of $32,500 in Year 2 and in subsequent years for operations and maintenance.
- Local government operating a graywater system thus defined would incur a direct cost of approximately $400,000 in Year 1 assuming a replacement system installation in Year 1. The local government would incur a direct cost of $43,000 in Year 2 and in subsequent years for operations and maintenance.

The estimated fiscal impact, which include capital and operations & maintenance costs, are expected to range between $1.2 million and $1.6 million per year in the first five years. Costs for subsequent years beyond year 5 are limited to annually incurred operations and maintenance cost of $0.5 million.

Table 12 summarizes the number of existing, local government owned, alternate water source systems. **Table 13** estimates the total capital cost for full replacement of all existing local government owned alternate water source systems (OTNWS). The total capital cost amount reflects cost at full replacement. **Table 14** estimates the total annual O&M cost for local government owned OTNWS at full replacement.

Table 12. Existing alternate water source systems that may be impacted by the proposed regulations – local government owned

Jurisdiction	Alternate Water Source	Count
Los Angeles County	Stormwater	13
Los Angeles County	Graywater	2
Total number of local government owned systems that may be impacted by the proposed regulations		15

Table 13. Estimate of capital cost for existing OTNWS – local government owned

Jurisdiction	Alternate Water Source	Number of systems	Capital Cost per system	Total Capital Cost
Los Angeles County	Stormwater	13	$375,000	$4,875,000
Los Angeles County	Graywater	2	$400,000	$800,000
			Total	$5,675,000

Table 14. Estimate of O&M cost per year for existing OTNWS – local government owned

Jurisdiction	Alternate Water Source	Number of systems	O&M Cost per system per year	Total O&M Cost per year
Los Angeles County	Stormwater	13	$32,500	$422,500
Los Angeles County	Graywater	2	$43,000	$86,000
			Total	$508,500

The statutes allow up to five years for the owners of existing alternate water source systems, including those owned by local governments, to come into compliance with the state regulations. **Table 15** summarizes a conservative cost estimate for year 1 through year 7 after the regulation is effective. As described in the Direct Cost Impacts section, State Board staff make the following assumptions:

- All existing alternate water source systems that may be impacted by the proposed regulations (see **Table 12**) in Los Angeles County are replaced and subsequently operated;
- Installation of replacement systems occurs in equal increments during the first five years. Thus, approximately 20%of the estimated total capital cost of $5,675,000 (see total in **Table 13**) is incurred each year for the first five years until full replacement (100%) is achieved. See **Section 4.1** for an explanation of the distribution of replacement rate. After the first five years, no capital cost is incurred in subsequent years;
- O&M cost is annually recurring and is assumed to begin at the year of installation (i.e. when capital cost is incurred). Consistent with the assumption for installation of replacement systems above, 20% of the estimated total annual O&M costs of $508,500 (see total in **Table 14**) are incurred corresponding with the total systems installed each year for the first five years until full replacement (100%) is

achieved. For example, at year 1, O&M cost is at 20% of total O&M cost; at year 2, O&M cost is at 40% of total O&M cost, etc. After the first five years, full replacement O&M cost is incurred each year as all replaced systems continue to be operated; and

- Total cost after year 5 equals to full O&M cost for total replacement of all existing systems.

Table 15. Cost estimate for the first 7 years of regulatory implementation for all local government owned systems

Year	Capital Cost	O&M Cost	Total Cost
1	$ 1,135,000	$ 101,700	$ 1,236,700
2	$ 1,135,000	$ 203,400	$ 1,338,400
3	$ 1,135,000	$ 305,100	$ 1,440,100
4	$ 1,135,000	$ 406,800	$ 1,541,800
5	$ 1,135,000	$ 508,500	$ 1,643,500
6	$ 0	$ 508,500	$ 508,500
7	$ 0	$ 508,500	$ 508,500

6.2. Cost to implement local jurisdiction programs

The proposed regulations provide uniform, statewide technical standards for onsite water reuse treatment systems for nonpotable uses. The proposed regulations do not affect any State agency or program, nor they would affect any federally funded State agency or program.

The statutes specify the implementation of the proposed regulations through local jurisdiction programs; however, these standards are optional. The onsite reuse nonpotable programs are not state-mandated local programs.

Local jurisdictions with existing programs have already incurred the cost for administering their programs, and these costs occur regardless of promulgation of the proposed regulations. For the two local jurisdictions with existing alternate water source systems program, which includes permitting of OTNWS. The existing local jurisdictions will incur additional permitting workload to address bringing the existing systems to compliance within the first 5 years after the proposed regulations become effective. City and County of San Francisco will have approximately 29 existing systems to bring into compliance within 5 years or 6 systems per year. County of Los Angeles will have approximately 54 existing systems to bring into compliance within 5 years or 11 systems per year. County of Los Angeles alternate water source system program may not see the full permitting workload as onsite non-potable water reuse is not mandated locally.

Existing system owners within County of Los Angeles can choose to decommission their systems instead of carrying out replacement. The state currently has no statutes or regulations that mandate a timeframe for permitting an OTNWS. Assuming that the workload to address the additional permitting is absorbed by the existing staff, there would be no additional fiscal impact resulting from the regulations.

SECTION 7. ECONOMY-WIDE IMPACTS

State Board staff has determined that the impacts of the proposed regulations on the state economy are negligible, specifically as following (the Appendix provides a more detailed discussion based on the RIMS II model):

- **Increase of investment in the state:** As explained in previous sections, the proposed regulations are assumed to increase the investment (capital costs) in existing OTNWS at multifamily residential, commercial, and mixed use buildings in City and County of San Francisco and County of Los Angeles. This increased investment should be met through increased production by in-state companies, mostly manufacturers of equipment and material for treatment trains. However, the magnitude of such investments are negligible when compared to the state economy, and thus no significant increase of investment is expected statewide.
- **Creation of new businesses or elimination of existing businesses:** Existing manufacturers of equipment and material for treatment trains, including manufacturers of electrical and plumbing fixtures and chemical manufacturers, will potentially expand production in the short term, as a result of the proposed regulations. Similarly, businesses that provide support, maintenance, and repair of treatment trains might experience some expansion. However, this expansion is not expected to be significant statewide, nor are new businesses expected to be created.
- **Creation or elimination of jobs within the state:** With existing manufacturers of equipment and material for treatment trains potentially expanding production in the short term, these businesses might slightly increase hiring of jobs in this sector because of the proposed regulations. However, the overall impact of the proposed regulations on jobs is negligible compared to California's labor force: as explained in the Appendix, the total number of jobs within the state is estimated to increase by 50 per year, on average, in the seven years after the proposed regulations are effective.
- **Competitive advantages or disadvantages for businesses:** The proposed regulations would not put in-state firms at a disadvantage.

- **Incentives for innovation in products, materials, or processes:** The proposed regulations rely on available and well-established treatment technologies (e.g. UV disinfection, chlorination, filtration) for demonstration of log reduction of pathogens. Innovation in the water treatment industry addresses all types of water sources. The scale of volumetric treatment of onsite nonpotable water is very minor compared to other industries, such as treatment of sources of drinking water or wastewater; therefore, the overall impact of the proposed regulations on innovation in products, materials, or processes is negligible compared to the overall water treatment industry.

SECTION 8. ALTERNATIVES

No alternatives were considered for the proposed regulations. The State Board has determined that no reasonable alternative considered or otherwise identified and brought to its attention would be more effective in carrying out the purpose for which this action is proposed, would be as effective and less burdensome to the regulated entities, or would be more cost-effective to the regulated entities, yet equally effective in implementing statutory requirements or other provisions of law, than adopting the proposed regulations. The statutory mandate is explicit in requiring the State Board to adopt risk-based water quality standards and does not provide the State Board with the discretion to consider any alternatives.

The proposed pathogen log reduction targets presented in the proposed regulations is a discrete result of quantitative microbial risk assessment (QMRA) to achieve a tolerable risk goal of 1 in 10,000 infections per person per year (10^{-4}). Inputs to the QMRA are based on scientifically gathered and published datasets, the analysis, results, and the recommendation are relied upon by the State Water Board for rulemaking, which is subject to Health and Safety Code 57004 requirement for an external scientific peer review.

A more stringent or less stringent set of log reduction targets warrants a lower tolerable risk goal, which is not appropriate for the proposed regulations. The risk goal of 1 in 10,000 infections per person per year is consistent with the State of California existing potable reuse regulations and the federal and California surface water treatment regulations. The proposed regulation is developed for uses on onsite treated nonpotable water in the multifamily residential, commercial, and mixed-use buildings, where the decision for treatment system installation and use of onsite treated nonpotable water is pre-determined and pre-plumbed for entire building(s), which does not afford the occupants/visitors the choice on source water or use (i.e. occupants have no choice of their pre-plumbed source for washing clothes or flushing toilets).

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APPENDIX. RIMS II MODEL AND ASSUMPTIONS

Economy-wide impacts of the proposed regulation, particularly the impact on jobs within the state, were estimated using the regional economic model developed by the U.S. Bureau of Economic Analysis, the Regional Input-Output Modeling System (RIMS II). RIMS II is a widely accepted economic input-output model. RIMS II multipliers from the 2012 U.S. Benchmark I-O data and 2019 Regional Data for California's economy were used. More specifically, Type II RIMS II final-demand multipliers for the state of California were used to account for "direct" and "indirect," and "induced" effects.

As explained in previous sections, the proposed regulations are assumed to increase the capital and O&M cost for existing OTNWS at multifamily residential, commercial, and mixed use buildings in City and County of San Francisco and County of Los Angeles. Capital costs include a complete and fully functional treatment train (treatment processes with auxiliary equipment needed for the proper functioning of each unit process, including plumbing, electrical, and signal wiring within the treatment train), instrumentation and controls integration (including capability for automatic shut-down or diversion), design fees, manufacturing, shipping, and installation. Annual O&M costs

include expenses associated with system maintenance, parts replacement, repair, chemicals, electricity, and operations labor.

State Board staff assumed that these costs represent new, additional spending or investment purchases that would impact the demand for services, equipment, and materials in "final-demand" industries. State Board staff assigned each type of spending to the most appropriate RIMS II industry code and multipliers, based on North American Industry Classification System (NAICS) descriptions (NAICS categories are more specific than RIMS II categories; RIMS II categories at a higher level of aggregation are used when needed). NAICS is the standard used by Federal statistical agencies to classify business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. State Board staff assume that all the purchases are from local (within California) manufacturers or service providers. The table below lists the five main industries that would be affected by investment purchases made for the existing OTNWS at multifamily residential, commercial, and mixed use buildings.

Table 16. Affected final-demand industries

Code	RIMS II Industry
5419A0	All other miscellaneous professional, scientific, and technical services
811200	Electronic and precision equipment repair and maintenance
332996	Fabricated pipe and pipe fitting manufacturing
33391A	Pump and pumping equipment manufacturing
325180	Other basic inorganic chemical manufacturing

The RIMS II model and its application here depend on further assumptions and are subject to certain limitations:

- Potentially significant benefits to California residents were not modeled. To the extent that these benefits have a positive impact on public health, they could have been modeled as a lower demand for healthcare and related services, but as explained, these benefits are hard to quantify. If these benefits were accounted for, all the results would change (because the monetary benefits would change the model output).
- Affected building owners may find more cost-effective ways to comply with the proposed regulations other than the ones described in this assessment. These other compliance activities would thus cost less than estimated here. Therefore, the costs and economic impacts in this analysis represent the upper limits of costs and economic impacts for the proposed regulation.

- RIMS II multipliers only estimate the impact from changes in final demand on one or more regional industries (in this assessment, industries that are listed in the table above).
- RIMS II results describe what the state of the economy may be like once all sectors make all assumed economic adjustments. As there is no timeline in the RIMS II model, results listed for any year should be interpreted as the outcomes in the new economic equilibrium due to the costs of the proposed regulation in that year.
- Businesses in the affected industries have no permanent supply constraints. Supply constraints will not be a problem in the long run, as markets will adjust to provide the goods and services needed for compliance.
- Businesses in the affected industries can satisfy additional demand with an increase in inputs and labor from within the State. This assumption might not be fully realistic: some portion of goods and services needed for compliance might come from out of state. However, the majority share of the changes in final demand due to the proposed regulation are for products and services that are generally provided to suppliers by California firms. Thus, to the degree this assumption is violated, the economic impacts of the proposed regulations in California are likely to be smaller in magnitude than the modeling suggests because they will impact economies inside and outside of California.
- Businesses have fixed patterns of purchases, and there will be no technological changes that shift what inputs are needed to create outputs, and the RIMS II data used, for 2019, is appropriate. These might not be fully realistic, but these are common assumptions when using models such as RIMS II. While the economy has changed since 2019, that is the most recent set of RIMS II multipliers available. Note that affected building owners are likely to find more cost-effective solutions to satisfy the requirements of the proposed regulations over time. Thus, to the degree these assumptions are violated, the economic impacts of the regulation may be different from what the modeling suggests.

Economy-wide impacts estimated with RIMS II were estimated for gross output, value added, earnings, and jobs. As explained above, the modelling approach reflects the expected changes to the demand for the goods and services needed for compliance with the proposed regulations. The table below shows the macroeconomic effects obtained with the RIMS II multipliers.

Table 17. Projected impacts on California economy

Year	Gross Output ($ million)	Value Added ($ million)	Earnings ($ million)	Employment (Part- and full-time jobs)
1	11.66	6.13	3.14	52
2	12.72	6.70	3.45	57
3	13.77	7.26	3.75	61
4	14.82	7.83	4.06	66
5	15.88	8.40	4.36	71
6	5.27	2.84	1.53	24
7	5.27	2.84	1.53	24

- **Gross output**: Gross output is the value of the goods and services produced by an economy. It is principally measured using industry sales or receipts, including sales to final users and sales to other industries (intermediate inputs) during a given period. For that reason, gross output is commonly used as an aggregate measure for business impacts. The table contains the main results. The estimated increase in state gross output is negligible. It occurs mainly in the first five years after the regulations are effective, when capital investments are assumed to occur, reaching approximately $16 million in year 5. The estimated increase in state gross output is of approximately $5 million per year afterwards, mostly due to the assumed O&M of existing OTNWS.
- **Value added**: Value added, or gross state product, is a measurement of a state's output; it is the sum of value added from all industries in the state. Thus, it excludes the values of direct inputs and intermediate inputs, either domestically produced or imported. Value added is the state counterpart to the Nation's gross domestic product. As shown in the table, the state's value added is estimated to increase mostly during the first five years, peaking at $8 million in year 5. The state's value added is estimated to increase by less than $3 million per year afterwards. However, as noted before, these economy-wide impacts are negligible compared to California's economy: California's Gross State Product (GSP) in 2021 was almost $3.4 trillion.[4]
- **Earnings**: Earnings consist of wages and salaries and of proprietors' income, which is the net earnings of sole-proprietors and partnerships. Employer contributions for health insurance are also included. The table above shows that

[4] Department of Finance, State of California. 2022. Gross State Product. Retrieved from: https://dof.ca.gov/forecasting/Economics/economic-indicators/gross-state-product/.

earnings within the state will typically increase in the seven-year period analyzed, and the annual increase will range from $1 million to $4 million, approximately. Again, these economy-wide impacts are negligible compared to California's economy. California's personal income was approximately $3.0 trillion in 2021.[5]

- **Employment**: Employment consists of full-time and part-time jobs. As shown in the table above, the total number of jobs within the state is estimated to increase by 50 per year, on average, in the seven-year period analyzed, mostly in the first five years due to capital investments in existing OTNWS. As with the estimated impact on GSP and earnings, the overall impact of the proposed regulation on jobs is negligible compared to California's labor force. The state's civilian labor force consisted of almost 19 million individuals in 2021.[6]

[5] Department of Finance, State of California. 2022. Economic Forecasts, U.S. and California. Retrieved from https://dof.ca.gov/forecasting/Economics/economic-forecasts-u-s-and-california/.
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