Decorative Water Feature Design Guide

In today's highly competitive markets, businesses and institutions have no choice but to make wise use of available resources. Increasingly the most forward-thinking companies are partnering with local utilities to reduce their demands for energy and water, both to save costs and improve the long-term sustainability of their business.

Using highly treated recycled water for non-potable purposes is an effective way to reduce the demand for increasingly precious fresh-water resources. It is also a recognized green building practice. Recycled water has been used throughout California and the arid west for nearly 100 years. The State of California currently allows Disinfected Tertiary Recycled Water under Title 22 for outdoor decorative water features. Indoor water features using recycled water are not recommended.

PURPOSE OF THIS GUIDE

Decorative water features, which don't require water treated to potable standards, are an approved use of recycled water. The San Diego County Water Authority (SDCWA) has published this document with the support of the San Diego County Department of Environmental Health (DEH) to assist customers who are considering converting their water features to recycled water or planning new construction using recycled water. This guide provides information tailored specifically for customers planning to use recycled water in decorative water features while still protecting public health.

DEFINITION OF DECORATIVE WATER FEATURE

For the purpose of these guidelines, a decorative water feature is a piece of architecture which pours water into a basin or jets it into the air for decorative or dramatic effect. It does not include other ponds used for the purposes of storing recycled water for irrigation. Fish ponds will be handled on a case by case basis and are not included in these guidelines.

MITIGATION OF PUBLIC HEALTH CONCERNS

The potential health concern being addressed through these guidelines is minimizing the risk of exposure to human pathogens, such as Legionella, Giardia and Cryptosporidium. Legionella is a concern for fountains using potable or recycled water. It is a greater concern in recycled water fountains due to the higher nutrient content and potential for regrowth. The primary health concern is the risk of exposure to Legionella which may colonize in the fountains and is transmitted through inhalation of aerosols. Good design practice and maintenance for all fountains is prudent to minimize overall risk. Mitigation should be commensurate with the risk. Common strategies to control exposure to pathogens include:

(1) Minimizing dispersion of aerosols through mist and spray. In particular, minimizing production of droplets in the < 10 μm (micrometer) size range.
(2) Reducing spray when wind conditions could transport spray mist and aerosols
(3) Use of filtration and a biocide (chlorine, bromine, chlorite, UV disinfection or others)
(4) Periodic cleaning, disinfection and maintenance at a frequency to avoid growth of microorganisms
(5) Proper training of maintenance personnel on the level of maintenance required.
(6) Maintaining adequate distance or separation. Factors to consider include:
    (a) Proximity to eating areas
    (b) Use of area by at risk populations such as the elderly, immune compromised and children
    (c) Level of treatment of the recycled water
    (d) Level of spray
    (e) Proximity to people's living area
    (f) Use of physical barriers to discourage access such as rocks, hedges and fencing

TABLE 1: DESIGN GUIDELINES FOR USE OF DISINFECTED TERTIARY RECYCLED WATER (TITLE 22) IN DECORATIVE WATER FEATURES

Location	Separation*	Level	Type of Use	Design Criteria (required)	Treatment Criteria
Inside Buildings	**N/A**	**Will not be approved**	**N/A**	**N/A**	**N/A**
Outdoor	**Direct Contact**	**Will not be approved**	**Body Contact Fountain**	**N/A**	**N/A**
Outdoor	**< 4 feet**	**Class A**	**High Potential for Public access (i.e. Open access where the public, particularly in areas where young children or at risks populations may congregate.)**	**Laminar Flow or minimal spray/misting with filtration and maintain disinfectant residual. Use of Physical Barriers to prevent access**	**Conventional treatment in accordance with Section 60301.170 or equivalent. Agency agrees to oversight and review of customer recommended maintenance practices during routine site visits**
Outdoor	**<4 feet**	**Class B**	**Moderate to High Potential for Public access (i.e. Open access to the general public)**	**Laminar flow or minimal spray/misting with filtration. Maintain disinfectant residual.**	**Title 22 Disinfected Tertiary Recycled Water. Water Agency agrees to oversight and review of customer recommended maintenance practices during routine site visits**
Outdoor	**≥ 4 ft and < 30 ft**	**Class C**	**Moderate to Low public exposure. Low contact potential.**	**Laminar flow with no overspray/misting with filtration. Maintain disinfectant residual.**	**Title 22 Disinfected Tertiary Recycled Water**

*** Distances are approximate and should be considered within the context of other site conditions. This is a general guide and use of physical barriers will be based on site-specific conditions.**

REGULATORY CONSIDERATIONS

California Department of Public Health & San Diego County Department of Environmental Health

Using recycled water requires compliance with regulations set forth by the California Department of Public Health (CDPH), as well as conformance with guidance established in the Uniform Plumbing Code. Counties do not set recycled water requirements, but may assist in implementing and enforcing state regulations. For each recycled water use, CDPH must review and approve an Engineering Report and the project design documents. Engineering Report submittals include a set of plans with the relevant information included. San Diego County Department of Environmental Health (DEH) staff review recycled water use plans and conduct site inspections on behalf of CDPH to ensure that potable water supplies are not contaminated with recycled water and that recycled water use does not present a risk to the public. Sites

using recycled water must also pass an initial cross-connection control shut down test and additional retesting every four years or at a frequency required by CDPH, DEH, or the recycled water purveyor, all of which must be coordinated with the agency supplying the recycled water.

Local Building Officials and Water Districts
Whether you are constructing a new decorative water feature or re-plumbing your existing decorative water feature to change the source water, contact your local building officials, recycled water agency and water agency for permits and requirements.

Engineering Report
The Engineering Report/Set of Plans should provide enough detail and explanation to allow regulatory agencies to understand the project and the strategy for complying with regulatory requirements. The Engineering Report/Set of Plans should be retained on the premises by the designated Recycled Water Site Supervisor. Typical information provided in the Engineering Report/Set of Plans includes, but is not limited to:

- Location/description of the recycled water use areas including proximity to walkways and public access, outdoor eating areas and drinking fountains, and living areas.
- Drawings of the water feature
- Site piping diagrams illustrating compliance with all separation requirements
- Outline method to avoid cross-connection
- Location/description of any backflow prevention devices
- Location/description of signage
- Location of filtration and chlorination equipment
- Location of connection(s) to the sanitary sewer system
- Outline maintenance schedule and other triggers that could be used to initiate maintenance and cleaning.
- Description of controls used to minimize drift and overspray
- Description of barriers provide to discourage access.

DESIGN GUIDELINES AND RECOMMENDED PRACTICES

The following guidelines and practices are recommended. Specific design criteria for projects are shown in Table 1.

- Water features should be designed to minimize misting (minimize droplets < 10 μm), overspray and splash. Pulsating fountains should be avoided to prevent misting. Fountains in high wind areas should be designed to reduce spray levels during periods of high winds.
    - For laminar flow fountains: the point at which the water flows over the top edge of the fountain cannot have an extended lip. The water must smoothly sheet down the fountain wall. The splash at the bottom of the fountain must be minimal and non-turbulent and if the fountain features water flow over rocks, the flow must be smooth without excessive splash.
- All submerged lighting is discouraged because it contributes to regrowth.
- Fountains should be designed with the ability to be fully drained to onsite irrigation or sewer
- The location of the water features on site should minimize the potential for direct physical contact with the public.
- Landscaped buffers and/or physical barriers should be included in the design whenever possible to protect the public and minimize the opportunity for direct physical contact.
- Properly sized filtration and disinfection units (i.e. use of chlorine, ultraviolet (UV) light, etc.) are recommended to reduce the growth of algae and other micro-organisms due to the nutrient content of the recycled water.
- Maintenance personnel servicing water features using recycled water should have equipment that is reserved exclusively for operations involving recycled water or other non-potable supplies.

- There should be provision for periodic cleaning, disinfection and maintenance. In addition to routine maintenance, fountains should be drained and disinfected (minimum 5 ppm of chlorine) when left non-operational for three or more days and whenever the water appears cloudy or has an odor.
- Operational records should be maintained of temperature, chlorine residual, pH, filter media maintenance and visual inspections.
- Users must designate one person on maintenance staff to attend the Recycled Water Site Supervisor Training Workshop.

CONTACT INFORMATION

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