San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission





San Francisco's Onsite Water Reuse System Projects

San Francisco Public Utilities Commission
September 2021

Single Building District Scale

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San Francisco's Onsite Water Reuse System Program creates a regulatory framework and streamlined permitting process for commercial, multi-family, and mixed-use developments in San Francisco to collect, treat, and reuse alternate water sources for toilet flushing, irrigation, and other non-potable uses. The program was established in September 2012 through Ordinance 195-12, commonly known as the Non-potable Water Ordinance, to allow the collection, treatment, and use of alternate water sources for non-potable applications. In October 2013, the Ordinance was amended to allow district-scale water systems consisting of two or more buildings sharing non-potable water.

The Ordinance was further amended in July 2015 to mandate the installation of onsite water systems in new developments meeting specified criteria. Beginning November 1, 2016 all new development projects of 250,000 square feet or more of gross floor area must install onsite non-potable water systems to treat and reuse available alternate water sources for toilet and urinal flushing and irrigation. The Ordinance also requires new development projects between 40,000 and 250,000 square feet of gross floor area to submit a water budget application and Water Use Calculator to the San Francisco Public Utilities Commision (SFPUC).

In dense, urban centers like San Francisco, the use of on-site alternate water sources is a key strategy for expanding potable water savings. Alternate sources of water that can be used in a non-potable water system are:

- **Rainwater** – precipitation collected from roofs or other manmade above grade surfaces
- **Stormwater** – precipitation collected from at or below grade surfaces
- **Graywater** – wastewater from bathroom sinks, showers, and washing machines
- **Blackwater** – graywater and wastewater from kitchen sinks and toilets
- **Foundation Drainage** – nuisance groundwater that floods basements
- **Condensate** – water vapor collected from air conditioning systems
- Other sources as approved by the San Francisco Department of Public Health (SFDPH)

San Francisco's Onsite Water Reuse System Program is a collaborative program involving four San Francisco agencies: San Francisco Public Utilities Commission (SFPUC), San Francisco Department of Public Health (SFDPH), San Francisco Public Works (SFPW), and San Francisco Department of Building Inspection (SFDBI). The SFPUC provides technical and financial assistance to assist developers through the processes for permitting, installing, and operating non-potable water systems. SFDPH regulates the water quality and monitoring requirements. SFDPH also issues operating permits and establishes reporting requirements for on-site treatment systems. SFPW reviews projects installing infrastructure in the public right-of-way (such as a sidewalk or street) for potential utility conflicts, and issues an encroachment permit. SFDBI oversees the design and construction of non-potable water systems, and issues final approvals for building occupancy. Each project proponent must ensure that the project is designed and installed safely, complies with applicable laws and regulations, and is operated in a manner that causes no harm or damage to building occupants or others.

This report details developments in San Francisco that are currently operating or are in the process of installing a non-potable water system. As more of these systems are installed in San Francisco, they will be added to this report. More information about San Francisco's Onsite Water Reuse System Program, including a developers guidebook, is available at: **https://sfpuc.org/construction-contracts/design-guidelines-standards/onsite-water-reuse**. If you have questions or need additional assistance, please email **nonpotable@sfwater.org**.

Uber Mission Bay at 1455 and 1515 Third Street – San Francisco, CA

Uber Headquarters (image courtesy of HTEC)

Project Status: Completed

Project Size:
1455 Third St: 182,530 Square Feet
1515 Third St: 223,680 Square Feet

Alternate Water Sources:
- Rainwater
- Graywater

End Uses:
- Toilet Flushing
- Irrigation

Treatment System Size:
1,200 Gallons/Day (Graywater)

Potable Water Use Reduction: 22%;
Graywater - 219,000 Gallons/Year,
Rainwater - 474,500 Gallons/Year

Drivers: Non-Potable Water Ordinance (Article 12C Compliance)

System Cost: $500,000 (Estimated)

Annual O&M Cost:
$23,000 Est. – Operation/Maintenance
$35,000 Est. – Article 12C Testing
$23,000 Est. – Treatment System Manager

Owner: Uber Technologies

Project Description:

The new San Francisco headquarters for Uber Technologies is comprised of two buildings: an 11-story building at 1455 Third St, and a 6-story building at 1515 Third St. Rainwater and graywater are collected from both buildings and treated at a facility within 1515 Third St before distribution to end use. This is the first district scale system to be permitted under Article 12C.

Storage tanks at 1455 Third St collect the building's rainwater and graywater in separate tanks. The collected rainwater and graywater are transferred to the storage tanks at 1515 Third St, where they undergo separate treatment processes before being combined in a treated water storage tank. The treated water is then used to meet the irrigation and toilet flushing demands of both buildings.

Rainwater is treated using an 800-micro prefilter, 30-micron sediment filter, and an 186mJ/cm2 UV disinfection tower with a combined collection volume of 24,000 gallons for both buildings. Graywater is treated using an 800-micron prefilter, NSF-350 certified membrane bioreactor, and an 186mJ/cm2 UV disinfection tower with a combined average treatment capacity of 1,200 gallons per day. Keeping the sources of influent in separate

treatment trains reduces the size and cost of the overall system while still meeting or exceeding Article 12C log reduction targets.

Treated water residual disinfection per the Article 12C requirement is accomplished by an on-site sodium hypochlorite generator. The generator uses table salt to create an environmentally benign concentration of sodium hypochlorite and peroxide. This allows the facility to reduce the environmental and health hazards associated with the transportation, storage, and handling of highly concentrated sodium hypochlorite. A side stream recirculation loop is continuously monitored to maintain the required level of residual disinfection.

Drivers for Onsite Water Reuse:

This project falls under SFPUC's Article 12C requirement for an onsite non-potable water system to treat and reuse available graywater and rainwater for toilet flushing and irrigation.

Ownership Model:

Uber Technologies owns the building and the water reuse system. System designer Heat Transfer Equipment Company (HTEC) is contracted for operations and maintenance, and third-party affiliates will provide lab analysis and the treatment system manager role.

Lessons Learned:

As with the launch of any new regulatory policy, uncertainty around implementation and compliance led to several project-specific challenges along the way. The manufacturer had to seek clarification from the SFPUC and its third-party consultants on multiple occasions regarding Article 12C and its supporting documents to fully understand how to comply with the regulation. This iterative process allowed both the manufacturer and the SFPUC to more fully understand how projects can move forward under this new regulatory framework. The manufacturer was able to submit an approved treatment train that became the basis of design for future Article 12C projects.

It was important for HTEC to be able to pivot with changing site conditions during the COVID shutdown, and to be able to support the installation contractors understand the system, a type of system they had no prior experience with. HTEC spent many more hours on site than originally anticipated to assist with installation hurdles. This helped HTEC develop more comprehensive installation guides for plumbing and electrical that have benefited more recent system installations since. It is not yet clear how to navigate a conditional startup of the system during the buildings' limited initial occupancy, requiring further coordination with the Department of Public Health.

Reference: Bill McCabe, Heat Transfer Equipment Company (bill@htecompany.com)

Onsite reuse system at Uber HQ (image courtesy of HTEC)

Future Non-potable Projects in San Francisco

Future Projects:

SFPUC staff continues to receive applications from developments proposing to implement non-potable water systems. Staff also regularly meets with project teams interested in integrating systems into future developments. The following is a list of projects in San Francisco that are proposing to implement non-potable water systems in the future:

Project Name	Alternate Water Source(s)	End Use(s)
India Basin	Blackwater	Irrigation, Toilet Flushing, Cooling Tower Make-up
1629 Market	Rainwater, Graywater	Irrigation, Toilet Flushing
88 Bluxome	Rainwater, Graywater	Irrigation, Toilet Flushing
598 Brannan	Rainwater, Graywater	Irrigation, Toilet Flushing
75 Howard	Rainwater, Graywater	Irrigation, Toilet Flushing
120 Stockton	Rainwater	Irrigation, Toilet Flushing, Cooling Tower Make-up
5M	Rainwater, Graywater	Irrigation, Toilet Flushing
725 Harrison	Rainwater, Graywater	Irrigation, Toilet Flushing
450 O'Farrell	Rainwater, Blackwater	Irrigation, Toilet Flushing
30 Van Ness Avenue	Rainwater, Stormwater, Graywater	Irrigation, Toilet Flushing, Cooling Tower Make-up
UC Hastings School of Law Campus Housing	Rainwater, Stormwater	Irrigation, Toilet Flushing
681 Florida Street Housing	Rainwater	Irrigation
1111 Pennsylvania	Rainwater	Irrigation
2465 Van Ness	Rainwater	Irrigation
921 Howard Street	Rainwater	Irrigation
Lofton at Nopo	Rainwater	Irrigation
531 Bryant Street	Rainwater	Irrigation