

Innovation & Technology Working Group Recommendations

On Site Wastewater Treatment and Reuse

The workgroup recommends that the City develop a set of guidelines for on-site waste water treatment and reuse (including proposals for sewer mining operations) which detail the issues and criteria (including the financial viability of a proposed project) that proposals must meet or address in order for the City to participate in or cooperate with such projects.

Further, the workgroup recommends that the City consider the value of both wastewater (when providing water for potential sewer mining operations) and reclaimed water (when projects provide water to City owned properties) and increased costs or avoided costs that the City would incur or realize, and how the proposed project could impact the City's plans for potable reuse when setting a charge for wastewater supply and/or purchase price of recycled product water provided by the project.

Finally, the workgroup recommends that the City establish standby fees and reserved capacity charges for such projects, so that developers can take such fees into account in determining whether a proposed project makes economic sense.

Advanced Metering Infrastructure (AMI) Technology to read water meters

The working group recommends that the City:

- Pursue grant funding to offset some of the costs for an entire system AMI retrofit; and
- Continue to work with SDG&E to determine whether synergies exist between the City's efforts and the already in-place system that SDG&E uses; and
- Accelerate its program to retrofit all of the remaining 265,000 water meters within 7 to 10 years; and
- Consider cost sharing with single family customers who would like to retrofit their water meters with AMI technology on a more expeditious basis.

Leak Detection and Technology

The working group recommends that a presentation report on the IBM/Brady pilot study be presented to the Task Force on completion.

The working group recommends the City first ensure that steps have been taken to improve the quality of the data used to establish water loss performance indicators, such as:

- Evaluation of the accuracy in the determination of the number of service connections and length of water mains.
- Evaluation of the potential for errors associated with determination of water input volumes.
- A program to address unauthorized consumption.
- A methodology to determine the magnitude for meter under-registration.
- Separate statistics maintained for leaks and for water used for fire suppression.
- Benchmarking of real versus apparent losses
- Calibration of City's current model
- Evaluation of pressure reduction through rezoning

Further, the working group recommends the City also conduct its own assessment of potential pressure reduction throughout each pressure zone, if the City has not already done so, by such means as:

- Desktop assessment of existing topographic and water supply conditions, including customer base requirements
- Evaluation and validation of network performance through hydraulic modeling
- Identification and investigation of potential rezoning opportunities to reduce energy requirements.

Facilitating Technology Development in the San Diego Region

The working group recommends that the City look into the possibility of using the repurification demonstration test site or providing services, as appropriate, for local water treatment technology manufacturers and/or Blue Tech industries that need (or desire) to do field testing of new products.

Energy and water

The working group recommends that any planned optimization study not only include pumped storage but also look at developing solar energy at City owned sites and the use of in-line hydroelectric (microturbines) in places of pressure reducing valves at appropriate locations in the distribution system to reduce imported energy consumption by the City and overall long term energy savings.

San Diego Water Policy Implementation Task Force
Innovation and Technology Working Group
Recommendations
February 19, 2013

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On Site Wastewater Treatment and Reuse. On site wastewater treatment using Membrane Bioreactor (MBR) technology is used various areas of the country including southern California (Irvine CA.). In 2005 a study was completed for the San Diego County Water Authority which evaluated potential satellite MBR sites within the SDCWA service area, including three sites within the City of San Diego. There appears to be some renewed interest in the application of this technology and the working group heard a presentation regarding a proposal to construct and operate a combined sewer mining and on-site recycled water project near the Bahia Hotel. The project, according to the proponent, would treat wastewater produced by the hotel and from the City of San Diego collection system to irrigate the hotel property and an adjacent City park with the product water. The additional water from the City's wastewater system would be required at times to meet irrigation demands, and at other times (such as during rainy periods), it is likely that there would be little or no demand for the treated wastewater. In these cases the system may need to be shut down, or product water would need to be stored, or discharged elsewhere. The working group asked for and is receiving additional information from the project proponent regarding the specific role, obligations, and estimated cost impacts to the City, and further information regarding production, use, permitting and environmental impacts.

The working group also heard from City of San Diego representatives regarding their concerns and issues with this specific project. These include financial risk to rate payers, permitting, economic feasibility and technical challenges as detailed in a January 2012 letter to the project proponent. Additionally, City staff told the workgroup that it wishes to focus efforts on its indirect potable reuse program and projects as the means to increase the use of recycled water within the City.

While taking no position on the Bahia project or any other specific project, the workgroup feels that in certain cases on-site wastewater treatment using MBR technology may provide opportunities to increase the use of recycled water within the City without competing with IPR plans. These projects can be divided into two types of projects, or a combination of both:

1. On-site wastewater treatment including the collection, treatment and reuse of wastewater at the location in which the waste is generated. The supply for the wastewater treatment system could also include rainwater and storm water.
2. Sewer mining wastewater treatment, meaning the withdrawal of wastewater from City of San Diego's wastewater collection system for treatment and reuse at or near the location of the wastewater treatment system.

There are opportunities and constraints, benefits, challenges, and potential risks associated with both types of projects. Further coordination with regulatory and permitting agencies such as Department of

Public Health (DPH) and Regional Water Quality Control Board (RWQCB), along with other water utilities is needed.

Primary issues and concerns of the City include:

1. City's liability – what responsibility will the City have if the treatment system fails to perform?
2. Public health and safety – who is responsible for monitoring and reporting?
3. System redundancy – how much redundancy should be required to minimize the risk of failure?
4. Responsibility for long-term operation and maintenance – how to ensure long term operation and maintenance by the property owner?
5. Compliance with existing and future regulations – who is responsible for monitoring and reporting to ensure compliance, and how to ensure adequate funding for improvements that may be required?
6. Impacts to future City infrastructure development – how does this impact the City's current and future ability and/or need to fund existing and future infrastructure?
7. Benefits versus costs to the City – do the benefits outweigh the potential risks and liabilities?

As more policies are developed that link water supply to future land use and development, there may be an increased level of interest by local developers to include on-site or sewer mining wastewater projects as part of a new and/or expansion of existing development.

The concept of on-site recycling based on treatment of waste produced on-site and use of the recycled water on site only is the simplest scenario to manage potential impacts to the City but in some cases and in order to make on-site wastewater treatment and reuse more cost-effective, additional wastewater flows beyond what is expected to be produced by a project may be needed or there may be a need to find other customers for the recycled water produced. Still other projects may be able to provide irrigation water to public parks, open spaces, golf courses or other City-owned properties. This creates a scenario that combines on-site recycling with sewer mining and potential impacts become more complex.

Other issues will also need to be addressed. At times, if there is no on-site storage, discharge back into the City's wastewater system is likely when seasonal demand for recycled water is reduced. The concentrated waste stream (sludge) may also need to be discharge to the City's wastewater collection system with potential impacts to the collection system and downstream wastewater treatment plant.

Currently, developers of such projects do not have sufficient guidelines as to whether on-site wastewater treatment (and potential sewer mining operations) would be consistent with the City's operations or plans for increasing reclaimed water usage. Similarly, proposals to construct such facilities do not always contain sufficient details necessary for the City to evaluate projects on a case-by-case basis and within the context of the City's regional recycled water plans, wastewater operations, or irrigation needs.

The workgroup recommends that the City develop a set of guidelines for on-site waste water treatment and reuse (including proposals for sewer mining operations) which detail the issues and criteria (including the financial viability of a proposed project) that proposals must meet or address in order for the City to participate in or cooperate with such projects.

Further, the workgroup recommends that the City consider the value of both wastewater (when providing water for potential sewer mining operations) and reclaimed water (when projects provide water to City owned properties) and increased costs or avoided costs that the City would incur or realize, and how the proposed project could impact the City's plans for potable reuse when setting a charge for wastewater supply and/or purchase price of recycled product water provided by the project. Finally, the workgroup recommends that the City establish standby fees and reserved capacity charges for such projects, so that developers can take such fees into account in determining whether a proposed project makes economic sense.

Advanced Metering Infrastructure (AMI) Technology to read water meters . SDG&E has converted nearly every one of its electricity meters to smart meters that can be read remotely and in real time, and the technology exists to do the same with water meters. The City of San Diego has adopted, and is in the process of implementing, a program to replace or convert 10,000 to 11,000 water meters City-wide with AMI technology. These water meters are larger meters that are currently read monthly, and such conversion or replacement would be accomplished over the next few years.

AMI technology has the potential to save the City costs for meter reading and provide both the City and customers opportunities to know real-time water use. For the City's current program, it is estimated that the pay-back period is only 5 years to recover the cost of the program. This favorable payback period applies to the large meter program; it is anticipated that a longer period may be required for a more expanded smaller meter program. According to City staff, the cost to retrofit all City meters to AMI technology is \$84 million, or about \$300 per meter for the remaining 265,000 water meters. The sub-committee was pleased that the City is beginning to utilize AMI technology, but felt that there was an opportunity to expand and accelerate the program to further promote water conservation among water users and labor and other cost savings for the City. Recognizing that this is a sizable investment which would impact water rates, but provide substantial benefits to customers and the City, **the working group recommends that the City:**

- **Pursue grant funding to offset some of the costs for an entire system AMI retrofit; and**
- **Continue to work with SDG&E to determine whether synergies exist between the City's efforts and the already in-place system that SDG&E uses; and**
- **Accelerate its program to retrofit all of the remaining 265,000 water meters within 7 to 10 years; and**
- **Consider cost sharing with single family customers who would like to retrofit their water meters with AMI technology on a more expeditious basis.**

Leak Detection and Technology

The working group was informed by City staff that the City has initiated a pilot leak detection study. The study, being performed by IBM and Richard Brady & Associates, has set up a test "zone" within the Paradise Mesa North pressure zone. The study employs a complex system of sensors, data management, analysis, and computer algorithms in an attempt to pin-point leaks within the water distribution system. Pressure zone data collection has been ongoing since May 2012, and leak identification and verification is continuing. While a number of false leads have occurred to date, the program continues to be updated and refined through iterations of the testing process.

A successful pilot program could lead to a more widespread program that could be implemented in order to promote water conservation, pressure management, improved maintenance, and reduction of revenue loss and wear on the system. A final report from IBM /Brady on the pilot study is expected in early spring

2013. **The working group recommends that a presentation report on the pilot study be presented to the Task Force at that time.**

Several members of the Task Force have an interest in quantifying and reducing water loss and optimizing the energy used within the City distribution system. While the current IBM Study offers a number of potential benefits in both water loss reduction and energy reduction, it requires additional instrumentation and sophisticated modeling that may be costly. Most importantly though is the quality of the data and an accurate baseline from which to evaluate the IBM Study. **The working group recommends the City first ensure that steps have been taken to improve the quality of the data used to establish water loss performance indicators, such as:**

- **Evaluation of the accuracy in the determination of the number of service connections and length of water mains.**
- **Evaluation of the potential for errors associated with determination of water input volumes.**
- **A program to address unauthorized consumption.**
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Further, the working group recommends the City also conduct its own assessment of potential pressure reduction throughout each pressure zone, if the City has not already done so, by such means as:

- **Desktop assessment of existing topographic and water supply conditions, including customer base requirements**
- **Evaluation and validation of network performance through hydraulic modeling**
- **Identification and investigation of potential rezoning opportunities to reduce energy requirements.**

Facilitating Technology Development in the San Diego Region. The working group discussed the fact that the San Diego region is a major hub for membrane technology with several manufacturers of membranes and pressure vessels located in the area. San Diego is also the home of high tech maritime products and services (known as Blue Tech) with one objective of this industry being the development of a local technology center. The working group also noted that the Water Recycling Sources Working Group recommended to the Task Force that the site of the repurification demonstration project be considered as a test site for investigation by the City and others of real time monitoring capabilities and development of failsafe technologies that might be used to promote direct potable reuse (DPR). In addition to supporting this recommendation, the working group recognized that the San Diego region is home to a number of water treatment technology companies, including two of the world's largest membrane manufacturers. **The working group recommends that the City look into the possibility of using the repurification demonstration test site or providing services, as appropriate, for local water treatment technology manufacturers and/or Blue Tech industries that need (or desire) to do field testing of new products.** Obviously, any site constraints would need to be considered, but the working group noted that if found to be feasible and interest existed within the local Blue Tech and water technology industry, this would not only promote the use of these local technologies but also support economic growth of the region.

Energy and water. The working group discussed potential opportunities to use City facilities, i.e. reservoir sites, water treatment plants, and pipelines for developing energy resources. It was further noted that there was a proposal made several years ago for pumped storage using San Vicente Reservoir and that the City and County Water Authority are currently in discussions to reexamine this possibility through an energy optimization study. The working group supports this effort. **The working group recommends that the optimization study not only include pumped storage but also look at developing solar energy at City owned sites and the use of in-line hydroelectric (microturbines) in places of pressure reducing valves at appropriate locations in the distribution system to reduce imported energy consumption by the City and overall long term energy savings.**