Safe, dependable, and affordable water now and into the future

### Honolulu Board of Water Supply Stakeholder Advisory Group Meeting #6 March 16, 2016 4:00 – 6:30 PM Neal S. Blaisdell Center, Hawai'i Suites 777 Ward Avenue, Honolulu, HI 96814

### **Meeting Notes**

### PURPOSE AND ORGANIZATION OF MEETING NOTES

WATER FOR LIFE

The purpose of these notes is to provide an overview of the Board of Water Supply (BWS) Stakeholder Advisory Group meeting. They are not intended as a transcript or as minutes. Major points of the presentations are summarized herein, primarily for context. Copies of presentation materials were provided to all participants and are available on the BWS website. Participants made many comments and asked many questions during the meeting. These are paraphrased to be more concise.

#### ATTENDEES

There were 19 stakeholders, two guests, and BWS and CDM Smith staff present. The stakeholders represent diverse interests and communities island-wide.

The following Stakeholders Advisory Group members attended:

Pono Chong	Chamber of Commerce Hawai'i
Bill Clark	Resident of City Council District 6
Rick Hobson	Building Industry Association of Hawai'i
Shari Ishikawa	Hawaiian Electric Co.
Micah A. Kāne	Hawai'i Community Foundation
Will Kane	Mililani Town Association
Ralph Mesick	First Hawaiian Bank
Helen Nakano	Resident of City Council District 5
Robbie Nicholas	Resident of City Council District 3
Dean Okimoto	Nalo Farms
Alison Omura	Coca-Cola Bottling Co.
Kathleen Pahinui	Resident of City Council District 2
Dick Poirier	Resident of City Council District 9
Francois Rogers	Blue Planet Foundation
Josh Stanbro	Hawai'i Community Foundation
Cruz Vina Jr.	Resident of Council District 8
Christopher Wong	Resident of Council District 7
Lee Yamamoto	Marine Corps Base Hawai'i
Suzanne Young	Honolulu Board of Realtors

### **MEETING AGENDA**

- Welcome
- Public Comment on Agenda Items
- Accept Notes from Meeting 5 (For possible action)
- Update on Activities of the BWS (For possible action)
- Objectives of the Water Master Plan (For possible action)
- Water System Analysis (For possible action)
- Summary and Next Steps (Information only)

### WELCOME

Dave Ebersold, Facilitator and Vice President of CDM Smith, welcomed the group. He asked stakeholders who attended the tour of the BWS's Hālawa Shaft on Saturday, February 20, 2016, if they would share reflections on their experiences. The following were highlights of that discussion (comments are not verbatim):

- I was able to show my family what I've been working on.
- I received two rainbarrels. When our community has a disaster preparedness event, we will offer them as door prizes.
- I brought pictures of the tour to my students and we did a whole interactive lesson on the water system. We're going to try to setup a field trip; they were blown away that something like Hālawa Shaft is so close to their homes.
- It's impressive how well maintained the facility is, considering it was built in the 1940s. It reinforces confidence in the Board of Water Supply. Also impressive is how the BWS is able to monitor, test and control everything from the Beretania headquarters.
- What impressed me most, at every aspect of the tours, was the Board of Water Supply staff. Whether we were seeing the Xeriscape garden or going down the 900-foot shaft, the passion and knowledge demonstrated by Barry, Ernie, and the team were clear. I came away feeling confident in the protection of our water supply.
- The Hālawa Shaft was amazing and the staff was fantastic. It was just an overall great experience and the Xeriscape garden was awesome. Thank you so much. That was fantastic.

### PUBLIC COMMENTS ON AGENDA

None.

### UPDATES ON BOARD OF WATER SUPPLY ACTIVITIES

Ellen Kitamura, Deputy Manager and Chief Engineer, welcomed everyone. She said that Ernest Lau could not attend this meeting but sends his greetings.

Ellen introduced Duane Miyashiro, Chairman of the BWS Board. He greeted the Stakeholder Advisory Group and explained that the BWS Board consists of seven voluntary members appointed by the Mayor and confirmed by the City Council. His purpose for attending this meeting was to thank everyone for taking time from busy schedules, work, families, etc., to assist the BWS with its planning. The BWS mission is to provide safe, dependable, affordable water to its customers. The input of the Stakeholder Advisory Group is very important. He asked stakeholders for help in telling people the importance of keeping water clean, safe and pure for customers. The BWS is concerned about proposed Charter amendments that would affect the semiautonomous nature of managing water resources. He said he appreciates the leadership of Ellen, Ernest, and others in communicating the importance of retaining semiautonomy for the BWS.

Ellen reviewed the basic contents of three proposed Charter amendments and described the process that the Charter Commission is following to ultimately determine which few of more than 150 proposed amendments will be placed on the General Election ballot in November 2016. The Charter Commission will meet on March 17, 2016, and stakeholders are welcome to attend.

### **QUESTIONS, COMMENTS, AND ANSWERS**

Q: If we sent testimony previously for the Charter Commission's March 8<sup>th</sup> meeting that was cancelled, will that testimony be carried over to the March 17<sup>th</sup> meeting? A: We will check and send an email with the answer.

*Note:* The answer was yes, the testimony would be carried over and stakeholders were notified.

Q: Is the testimony sent in by the public posted on the Charter Commission website?A: Yes, but that related to the Board of Water Supply has not been posted yet.

Comment: When I talked to the BWS about why proposed Charter amendment #20 (re: semi-autonomy) was introduced in the first place, I was satisfied with the answers. But trying to talk with the Charter Commissioner who introduced the proposal has been unsuccessful. It would be very powerful if all members of the Stakeholder Advisory Group submitted testimony related to these proposed amendments. With the Commission meeting being the following day, members would have to act quickly. Testimony could be given at the Commission meeting or submitted in writing by noon.

### Q: What was the intent behind proposed amendments 6 and 20? Is it anything besides what is included in the amendment application?

A: The BWS does not know of anything else driving the intent of these proposals.

### **REVIEW AND ACCEPT NOTES FROM MEETING 5**

The notes from Meeting 5 were accepted without changes.

### WATER MASTER PLAN OBJECTIVES

The Stakeholder Advisory Group previously discussed and reached consensus on the first four of five objectives for the Water Master Plan:

- Water Quality, Health and Safety
- Cost and Affordability
- System Reliability and Adequacy
- Water Conservation

The discussion continued with the fifth draft objective: water resource sustainability.

Water Resource Sustainability		
<ul> <li>Water Resource</li> <li>Draft text incorporating Stakeholder</li> <li>Advisory Group edits from meeting 2</li> <li>Water sources are protected and available now and into the future by: <ul> <li>Coordinated management and improvement of the watershed and groundwater supply</li> <li>Conducting long-range planning (including risks due to climate change)</li> <li>Collaborating with Department of Land and Natural Resources and other relevant land owners</li> <li>Considering alternative sources of water (e.g., stormwater, recycled water, brackish water and seawater)</li> </ul> </li> </ul>	<ul> <li>e Sustainability</li> <li>Draft text incorporating Stakeholder</li> <li>Advisory Group edits from Meeting 6</li> <li>(discussion to be continued)</li> <li>Water sources are protected and available</li> <li>now and into the future by:</li> <li>Proactive management and improvement of the watershed and groundwater supply</li> <li>Conducting long-range planning (including risks due to climate change)</li> <li>Collaborating with Department of Land and Natural Resources and other relevant land owners and land users</li> </ul>	
	<ul> <li>land owners and land users</li> <li>Promoting alternative sources of water (e.g., stormwater, recycled water, brackish water and seawater)</li> <li>Ensuring sufficient financial and staff resources for implementing long-term water sustainability</li> </ul>	

Stakeholders contributed the following observations, ideas, and edits, to arrive at the second draft version above:

- To tighten up this objective, identify the main partners that we're coordinating with (re: coordinated management).
- The 4 C's of water resource sustainability -- coordinating, conducting, collaborating, and considering -- are action words that are very powerful.
- Saying "proactive management and improvement" would give more authority to the BWS related to taking care of the water supply.
- One of the things that we have become aware of in working with BWS is that they are understaffed for some of their major responsibilities. The objective should elude to making sure the resources are there for management to fully execute these responsibilities. When the BWS starts requesting resources [to implement the Water Master Plan (WMP)], the language of the objective should help make sure that the strategies are complimented by budget.
- A bullet that says something like: 'Ensuring sufficient financial and staff resources to ensure long-term water sustainability' would give the BWS the ability to speak up when they don't have the needed resources or the technical capacity.
- Is that necessary?
- Yes, it is necessary. Perhaps it's not necessary under this particular objective, but it (the concept of ensuring sufficient financial and staff resources) needs to be included in one of the objectives.

Dave said that at the previous Stakeholder Advisory Group meeting, the concept of a preamble to the Water Master Plan objectives could be valuable. He asked the group to consider and edit the following:

Draft Preamble to the Water Master Plan Objectives		
Initial draft text	Draft text incorporating Stakeholder	
	Advisory Group edits from Meeting 6	
	(discussion to be continued)	
The Honolulu Board of Water Supply (BWS) Stakeholder Advisory Group has developed the following objectives for the BWS Water Master Plan using a consensus-based process. These objectives cover five major areas that support the BWS's water resource planning efforts and the ahupua'a model of sustainable resource management. In establishing these objectives, the Stakeholder Advisory Group recognizes that, in a world of limited resources, not all objectives will be fully attainable and some	The Honolulu Board of Water Supply (BWS) Stakeholder Advisory Group has developed the following objectives for the BWS Water Master Plan using a consensus-based process. These objectives cover five major areas that support the BWS's water resource planning efforts and the ahupua'a model of sustainable resource management. In establishing these objectives, the Stakeholder Advisory Group recognizes that in a world of limited resources, some objectives may take precedence over others.	
objectives may directly compete with others. For this reason, the Stakeholder Advisory Group emphasizes the guiding principle that meeting these objectives will require balance,	For this reason, the Stakeholder Advisory Group emphasizes the guiding principle that meeting these objectives will require balance, sensitivity and shared kuleana.	
a sensitivity and shared kuleana.		

Stakeholders discussed concepts as well as word selection included in the initial draft text. Edits were made as the group discussed the associated meanings, pros, and cons. The group tested incorporating the fifth bullet from the Water Resource Sustainability objective (Ensuring sufficient financial and staff resources for implementing long-term water sustainability) into the preamble. That idea was abandoned in favor of addressing it in the Cost and Affordability objective (see edits to Cost and Affordability objective below).

The concept of "competing" objectives was discussed extensively. The group decided on "... some objectives may take precedence over others". Some of that discussion addressed whether or not the BWS would have sufficient financial and staff resources to fulfill the WMP. One point of discussion was how the BWS will prioritize projects and programs when they work in a "world of limited resources". The group recognized that staff has a tough job, but they will figure out which projects and programs must take priority at different times. The Stakeholder Advisory Group sees all of the objectives as necessary to make sure that the WMP is sustainable and will be around for the long run.

Dave asked the group to take another look at the Cost and Affordability objective to see if it would be appropriate to include the bullet about "Ensuring sufficient financial and staff resources for implementing long-term water sustainability".

Stakeholders discussed the options of incorporating the concept of "sufficient financial and staff resources" within the "price of water" bullet, or stating the group's intent in a stand-alone bullet. Discussion included:

- The BWS has a fabulous plan; make sure there are resources to implement it.
- The BWS should not risk criticism for appearing as not accountable to customers.
- Government is always short on resources for sufficient staffing.
- It is hard to follow any long-range plan without stable resources to implement it.
- Staff and resources are part of the total price of water.

After considering everything, the group agreed to the language shown above.

While the meeting began with a quorum, some stakeholders had to leave early. At this point in the meeting, the Stakeholder Advisory Group no longer had a quorum, so Dave asked that these objectives and the preamble be completed at the May 2016 meeting. The two draft objectives above and draft preamble will be distributed in advance so that stakeholders will come prepared to discuss, edit, and come to a consensus.

#### WATER SYSTEM ANALYSIS

Barry Usagawa, Water Resources Program Administrator greeted stakeholders and introduced the next part of the presentation: an analysis of the BWS water system. He reminded everyone of previous presentations about water supply and demand, and explained that he and James Kim, lead hydraulic modeler, would show how that information was used in analyses of the water system to identify improvements needed to meet future demands.

Barry said that water in Hawai'i is a public trust and essential to everything that the BWS does. In the way the BWS sustains, captures and delivers water to its customers, staff keeps this trust in mind. The BWS is a steward of this precious resource and has a duty to manage O'ahu's water resources for present and future generations. He said that the BWS uses the ahupua'a concept as a model for a water sustainable future and apply its economic, environmental, and cultural values in a modern context. The Water Master Plan centers around this model.

One of the BWS's principles is moving water to where it's needed, taking only what is needed without causing harm, and not wasting it. This principle addresses transfers of water and ties into the Land Use Plan. The Land Use Plan directs the urban growth towards southern O'ahu.

In Honolulu, current pumping is approaching the limit of sustainable yields of the aquifer. Conservation measures are expressly trying to use less of that resource.

The BWS maintains high water quality without degrading the resource. For example, very little water is transferred from Windward to East Honolulu because Windward's smaller dike aquifers diminish when we have long-term drought, and much of Windward's water resources is needed to feed streams. There are no water transfers from North Shore because that's where much of the island's agriculture is.

The WMP discusses supply and demand as part of the preparation for life on O'ahu 30 years from now.

Barry reminded stakeholders that demand for water varies throughout the day and throughout the year. Key components of "demand" are Average Day demand, Maximum Day demand, and Peak Hour demand. Maximum Day is calculated at 1.5 times the Average Day demand (this ratio is a State standard). Peak Hour demand is 2 times the Maximum Day demand. Peak Hour demands occur in the morning and afternoon. The WMP team analyzed the BWS water system in terms of Maximum Day demand plus the amount of water in reserve for fire flow.

Barry told stakeholders that the WMP team developed a hydraulic model to analyze the entire BWS water system for present and future conditions. Analyzing the system identifies where it needs to be improved and by how much. He introduced James Kim, who described the process of developing and verifying the model, and presented some of the most significant findings of the analysis.

James said his team built and verified the computer models, estimated future water demands, and evaluated the performance of the water system under both existing and future conditions. Lastly, using the evaluation results, the WMP team recommended

water system improvement projects. The models were verified for accuracy using actual field data. Existing demands are based on actual usage: historical billing records.

For background, James explained that the BWS water system is divided into 110 individual subsystems (or pressure zones) that serve O'ahu. Overall, it has 171 reservoirs, 90 pumping stations, 2,100 miles of pipeline, 21,000 fire hydrants, and 170,000 customer connections.

The 110 subsystems were grouped into 10 different models for the analysis. The hydraulic model developed for the WMP can estimate flows and water pressures throughout the system, and how water cycles through the reservoirs.

James said forecasting future demand is based on several variables, including population served, and where growth is expected to occur. Land use plans and planned Transit Oriented Development (TOD) tell where most of O'ahu's growth will occur; that information is inputted to the hydraulic model. Other variables inputted to the hydraulic model include Average Day, Maximum Day, and Peak Hour demands; Most Probable Future and High-Range Future demands; and others.

Hydraulic modeling analyzes three key parameters related to capacity: reservoir, pumps, and pipeline capacities. These are important because if any one of these is too small or otherwise inadequate to serve safe, dependable and affordable water in the future, it needs to be addressed in the WMP. The hydraulic model indicates where the system will be inadequate, and by how much.

'Ewa and the lower altitudes of the Primary Urban Center (called Metro Low) are where the majority of the population will increase between now and 2040. The hydraulic model analyzed the entire BWS system, but findings related to these areas were highly informative for the WMP. Looking at 'Ewa first, the model shows that there is a current need for new storage and new pipelines. It also confirms that there is enough water available to transfer 11 million gallons per day (mgd) to the leeward side. No water from Waipāhu or 'Ewa is being exported the other direction, to Metro Low.

James told the Stakeholder Advisory Group that, currently, there is sufficient water to serve Metro Low. Looking ahead to 2040, the Metro Low population is going to increase significantly from the building out of TOD. That larger population will require significant additional supplies (27 mgd) and additional reservoir storage (60 mgd). State standards will impact the size of future facilities. That becomes particularly significant in densely populated areas like Metro Low where actual use (Average Day, Maximum Day, Peak Hour) is much lower than the State standards.

Scenarios for 2040 include new ground water sources for Metro Low, increases in water transfers from other areas, more aggressive conservation, and diversification of supplies. State standards will require an additional 60 million gallons of storage. One serious challenge is the lack of places in Metro Low for additional reservoirs of this magnitude, and at the right elevation (for water pressure). James said one alternative

solution to address the need for 60 million gallons of storage includes pumping to meet peak-hour demands, having wells with stand-by power, and a tank that is not at the correct elevation but designed with the ability to pump. Another alternative is to locate storage elsewhere, e.g., in Central O'ahu. The hydraulic model also indicated that new pipelines will be needed in the future to serve Metro Low.

### **QUESTIONS, COMMENTS, AND ANSWERS**

## Q: Did the hydraulic model take into account studies that show land receding in 'Ewa in the future as a result of climate change?

**A:** No. **Response:** I will send you a report on this topic.

### Q: Will infrastructure for 2040 be phased in or built all at once?

**A:** The model indicates when future facilities would be needed. Barry will address this question further in his presentation.

# Q: Assuming that new infrastructure is sized to meet the demands of a projected future population, what happens if that population doesn't actually materialize? Would the system be over-sized and thus have operational problems?

**A:** Whether or not the system would be over-sized depends in part upon the how conservative we make our projections. However, even after 2040, the population of O'ahu and related demand will continue to grow. Even if the infrastructure built in the near future is oversized a little bit, it will still serve O'ahu into the future. A key planning consideration is what we can do to delay installing these new improvements.

James turned the presentation over to Barry.

Barry told stakeholders that pursuing the Fresh Water Blueprint strategies of conservation, recharge, and reuse is an important pathway to reducing and deferring the impacts and costs of construction of some of the bigger infrastructure projects until later in the future. The BWS will not defer all projects, but by implementing conservation, recharge and reuse projects and programs, the BWS may have the options to make some infrastructure smaller (and therefore less expensive), and/or phase in some projects rather than build them all at the same time. Spreading infrastructure investments out over the future is balancing the needs with costs. That's what the WMP is all about.

Barry told the group that the BWS is focusing advanced conservation efforts on new TODs. Opportunities include:

- High-efficiency toilets in the new high-rises being built along transit routes instead of low-flow toilets (1.28 gallons vs. 1.6 gallons per flush).
- Installing sub-meters in multi-family complexes.
- Using alternative sources of water for cooling towers and irrigation, e.g., graywater, air conditioning condensate, and rainwater catchment.

He said the BWS is discussing whether or not focused advanced conservation should be voluntary or mandated. The BWS reviews building permits and, at present, conservation is consistently recommended but still voluntary. Barry said that pilot projects could demonstrate economic benefits of advanced conservation measures. He added that conservation has already achieved major savings in town: In 1990, demand in Metro Low was 85 mgd and now it's 70 mgd – saving 15 million gallons per day.

Barry said that the BWS is also pursuing more recharge to sustain O'ahu's freshwater lens. This is being accomplished through watershed partnerships. Examples of partnerships that the BWS has formed are:

- Koʻolau & Waiʻanae Mountains
- Waihe'e Ahupua'a Initiative
- Mohala I Ka Wai in Waianae
- Waihe'e-Waiehu Power Initiative with the KEY Project
- Department of Land and Natural Resources and O'ahu Invasive Species Committee

The BWS is also looking into capturing stormwater behind an existing dam in Nu'uanu. In the future, with climate change, storms will be more intense, and that water could be captured to recharge the aquifer. By injecting more water into the aquifer, and pulling more water out through existing wells, it's possible that the need for new wells in this area could be delayed or even eliminated.

Barry said, to diversify its sources of water, the BWS is looking at the possibility of raising the level of the Nu'uanu Dam, which would force tunnels right below the dam to produce more water. That water would be treated by microfiltration and injected into the aquifer.

Barry showed the group an aerial photo of two Nu'uanu reservoirs (#1 and #4) that have a 600-foot elevation drop between them. The elevation drop opens the door to an opportunity to generate hydroelectric power. The BWS is studying a pump-storagehydroelectric concept, where stored stormwater would be dropped from reservoir #4 to reservoir #1 to generate power to meet peak energy needs, then the water would be pumped back up to reservoir #4 during off-peak hours. An alternative is to inject the water into the aquifer at the lower reservoir and skip pumping altogether.

Barry talked about some interesting water reuse projects being considered by the BWS. Using graywater – from sinks, showers, and laundry – for lawn irrigation is one way that individuals can give water a second use instead of sending it to sewers for treatment. State of Hawai'i guidelines explain controls and restrictions for graywater reuse.

The BWS has a feasibility study underway about a reuse opportunity at the Ala Wai Golf Course. The conceptual project – which would be in partnership with the Ala Wai Golf Course and the Department of Environmental Services – is to divert some of the wastewater flow from a sewer pipeline that runs through the golf course to a satellite treatment plant on-site, treat and filter the recycled water, and store it in an existing golf course pond (reservoir) for irrigation. The next step for this conceptual project is to complete and publish an environmental assessment. Barry said that no single conservation, recharge or reuse project or approach does everything to meet future water needs. But a combination of strategies in the Fresh Water Blueprint will go a long way to helping the BWS reduce the amount of hard infrastructure to install over time.

Barry circled back to a question asked earlier about phasing-in infrastructure. He said the BWS uses adaptive management to time investments in infrastructure with needs. Infrastructure has to be developed concurrent with growth, so the BWS monitors trends, population, water use, climate change, fluctuating max and peak-hour demands, quality, and sustainable yields to stay in front of when new pipes, pumps and other facilities would be needed.

The BWS will provide adequate infrastructure so that no building moratoriums are triggered by water supply limitations. At the same time, the BWS doesn't want to put new infrastructure in so early that the users who benefit from that new pipeline or reservoir also share in paying for them. Stakeholders will see that adaptive management planning and prioritization in the WMP as well as the 30-year Capital Improvement Plan.

Barry then went back to a question asked earlier about rising sea levels. He said the BWS is funding a study by the University of Hawai'i's Dr. Chip Fletcher and others to identify areas that may be significantly impacted by rising sea level. In 2100, sea level will rise 3-4 feet. At high tide, the low-lying areas Waikīkī, Kaka'ako, Iwilei, Kapālama and Māpunapuna are going to be underwater. Barry said water will come from the ocean going in and the ground water rising up. At high tide with a storm, the concern becomes coastal soil erosion and inundation. Should we start to retreat from the coast? That question involves very important and challenging land use and political decisions.

The BWS also has a research project with the Water Research Foundation to look at the vulnerability of its water systems along the coast and the above-mentioned low-lying areas. When these areas are flooded with seawater, pipes will corrode and break faster. Another concern is that, in some coastal areas, the BWS has pipelines on some bridges, including on Kamehemeha Highway, Farrington Highway and others. If coastal erosion, inundation, and storms damage those bridges, then the pipelines on them will break too. The BWS wants to know where the vulnerable areas are and where it needs to strengthen the infrastructure. That's going to be costly but necessary.

Cooperative planning for higher sea levels is needed, but it's not happening enough yet. For example:

- The ground floors of many new high-rises in Kaka'ako are being built 5-6 feet above the pavement to accommodate for climate change. In the future, when the sea level rises 3-4 feet, the ground floors will be dry, but unfortunately the existing roadways in front of the high-rises will be underwater.
- In Iwilei they're going to put in new roadways, so a planning question is: Do they build the new roadways high? If they do, those new roads will dam water from draining, which will create flooding.

It's going to take a multiple agency effort to adjust to the projected sea level rise.

Barry said that we can at least plan for and try to anticipate the impacts of climate change. That's why the BWS is diversifying its system, and pushing for more conservation, recycled water, and recharge. The BWS is not waiting for the impacts of climate change to hit before taking action. The BWS is doing a little bit every year, leading research to understand what's happening, and using the WMP to help stay ahead of impacts over the long-run.

### SUMMARY AND NEXT STEPS

Dave said the next Stakeholder Advisory Group meeting – the 1<sup>st</sup> anniversary of the group -- will be held May 17th from 4:00 to 6:30 p.m. He said the meeting will be at the Board of Water Supply, but advised the group that since it's an old building, no elevator reaches the meeting room. He asked if that's going to be a problem for anyone dealing with steep stairs to let the team know. Stakeholders will be invited to tour the Beretania Pump Station and control room immediately preceding the meeting. He encouraged everyone to look for upcoming email invitations.