BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

October 16, 2018

NOTICE

The Regular Meeting of the Board of Water Supply, will convene on Monday, October 22, 2018, at 2:00 p.m. in the Board Room, Public Service Building, 630 South Beretania Street, Honolulu, Hawaii.

SPEAKER REGISTRATION

The Board of Water Supply is committed to allowing public testimony at open meetings of the Board.

Please provide your name, phone number and subject matter of testimony when registering **prior to the day of the meeting** by one of the following options:

1. Emailing to board@hbws.org;
2. Faxing to 748-5079;
3. Calling 748-5172;
4. In person – 630 S. Beretania Street, Room 311

Persons wishing to testify may also register by filling out the registration form **on-site on the day of the meeting.**

Persons who have not registered to testify will be given an opportunity to speak on an item following the oral testimonies of the registered speakers.

Testimony is limited to three minutes and shall be presented by the registered speaker only.

WRITTEN TESTIMONY

Written testimony may be emailed to board@hbws.org or faxed to 748-5079, **prior to the day of the meeting**, for distribution at the meeting.

13 copies are requested if written testimony is submitted **on-site on the day of the meeting**.

If submitted, written testimonies, including the testifier's address, email address, and phone number may be posted on the Board of Water Supply website.

SPECIAL REQUESTS AND ACCOMMODATIONS

If you would require special assistance to review and/or inspect this Notice, the agenda, or the Board packet, please call 748-5172 or email your detailed request to board@hbws.org.

If you require special assistance, auxiliary aid and/or service to participate in this meeting (i.e. sign language interpreter; interpreter for language other than English, or wheelchair accessibility), please call 748-5172 or email your request to board@hbws.org **at least three business days prior to the meeting date**.

The agenda for the October 22, 2018 Regular Meeting of the Board of Water Supply is as follows:

ITEMS REQUIRING BOARD ACTION

1. Approval of the Minutes of the Regular Meeting Held on August 27, 2018 and September 24, 2018.

2. Adoption of Resolution No. 892, 2018 - David C. Hulihee, Resolution of Appreciation

INTRODUCTION OF NEW BOARD MEMBER

1. Appointment of New Board Member – Max J. Sword

ITEMS REQUIRING BOARD ACTION (CONTINUED)

3. Approval to Continue the Board of Water Supply Stakeholder Advisory Group

4. To Determine the Role of the Board in the Redevelopment of the Beretania Complex and Creation of a Permitted Interaction Group Pursuant to Section 92-2.5(b), Hawaii Revised Statutes

ITEMS FOR INFORMATION

1. Red Hill Bulk Fuel Facility Update

2. Update on 2018-2022 Board of Water Supply Strategic Plan and Water Master Plan Performance Metrics

3. Financial Update for the Quarter Ended September 30, 2018

4. Status Update of Groundwater Levels at All Index Stations

5. Water Main Repair Report for September 2018

MINUTES

REGULAR MEETING
OF THE
BOARD OF WATER SUPPLY

October 22, 2018

At 2:00 PM on October 22, 2018 in the Board Room of the Public Service Building at 630 South Beretania Street, Honolulu, Hawaii, Board Chair Andaya called to order the Regular Meeting.

Present:	Bryan P. Andaya, Chair Kapua Sproat, Vice Chair Kay C. Matsui Ross S. Sasamura Jade T. Butay Max J. Sword
Also Present:	Ernest Lau, Manager and Chief Engineer Ellen Kitamura, Deputy Manager Erwin Kawata Barry Usagawa Joe Cooper Robert Morita Kathleen Pahinui Jennifer Elflein Michele Thomas Mike Matsuo Mike Fuke Jason Takaki Kevin Ihu Henderson Nuuhiwa Kathy Mitchell
Others Present:	Moana Yost, Deputy Corporation Counsel Jeff Lau, Deputy Corporation Counsel Chris Harris, Harris & Company Reed Harris, Harris & Company Susan Uyesugi, SSFM International Steven Young, Intera Joseph Tracey, Intera David Brown, Morgan Lewis
Absent:	Ray C. Soon

APPROVAL OF MINUTES	Approval of the Minutes of the Public Hearing and Regular Meeting held on August 27, 2018, and the Regular Meeting held on September 24, 2018.
MOTION TO APPROVE	Ross Sasamura and Jade Butay motioned and seconded, respectively, to approve the Minutes of the Public Hearing and Regular Session Meeting of August 27, 2018 and the Regular Session Meeting of September 24, 2018. The motion was unanimously carried.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

RESOLUTION NO. 892, 2018

DAVID C. HULIHEE

IN APPRECIATION FOR SERVING AS A MEMBER OF THE BOARD OF WATER SUPPLY

WHEREAS, DAVID C. HULIHEE has ably served as a member of the Board of Water Supply (BWS), City and County of Honolulu, since September 2013; and

WHEREAS, MR. HULIHEE's experience and work as Chairman and President of Royal Contracting Company, Limited, and as President and Chief Executive Officer of Grace Pacific Corporation, and coupled with the esteem of his colleagues, has resulted in additional recognition and respect for the Board; and

WHEREAS, MR. HULIHEE's professional and community affiliations and familiarity with the construction industry, strategic plans and programs, overall operations, and long-range planning have made him an asset to the Board and a helpful resource in its deliberations, as he provided useful insights and counsel to its members; and

WHEREAS, as a Board member, DAVID C. HULIHEE has supported and encouraged initiatives that have improved the BWS's fiscal management and day-to-day operations, and has volunteered his time and expertise to help effect business and policy decisions for the Board that will benefit the Board of Water Supply and Oahu's water users for many years to come; and

WHEREAS, MR. HULIHEE's service is a testament to his commitment to maintaining a municipal water system worthy of trust from the public it serves; now, therefore

BE IT RESOLVED by the Members of the Board of Water Supply, City and County of Honolulu, that we do hereby express to DAVID C. HULIHEE our deep appreciation and gratitude for his committed service to this Board and Department; and

BE IT FURTHER RESOLVED that the Members of this Board extend to DAVID C. HULIHEE our sincere aloha and best wishes for continued success in all of his future endeavors; and

BE IT FINALLY RESOLVED that this Resolution be presented to DAVID C. HULIHEE.

Adopted this 22nd day of October 2018
Board of Water Supply, Honolulu, Hawaii

BRYAN P. ANDAYA
Chair of the Board

MOTION TO APPROVE

Jade Butay motioned to adopt Resolution No. 892, 2018, David C. Hulihee – In Appreciation for Serving as a member of the Board of Water Supply. The motion was seconded by Ross Sasamura and unanimously carried.

RESOLUTION NO. 892, 2018, DAVID C. HULIHEE – IN APPRECIATION FOR SERVING AS A MEMBER OF THE BOARD OF WATER SUPPLY, ADOPTED ON OCTOBER 22, 2018			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
KAY C. MATSUI	X		
RAY C. SOON			ABSENT
MAX J. SWORD	X		
ROSS S. SASAMURA	X		
JADE T. BUTAY	X		

INTRODUCTION OF NEW BOARD MEMBER

"October 22, 2018

APPOINTMENT OF NEW BOARD MEMBER - MAX J. SWORD

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Subject: Appointment of New Board Member – Max J. Sword

Mr. Max Sword has been appointed to the Board of Water Supply by Mayor Kirk Caldwell to succeed Mr. David Hulihee.

On October 3, 2018, the City Council confirmed Mr. Sword's appointment for a term expiring on June 30, 2023.

We extend congratulations to Max Sword on his appointment and welcome him as a Member of the Board.

Respectfully submitted,

/s/ ERNEST Y. W. LAU, P.E
Manager and Chief Engineer"

The foregoing was for information only.

DISCUSSION: Mr. Andaya introduced and welcomed Mr. Sword as the newest member of the Board. Mr. Sword thanked the Board for welcoming him and mentioned it's a little change of pace and looks forward to working with all of you. Chair Andaya thanked Mr. Sword and mentioned the BWS Board Members look forward to working with you as well.

"October 22, 2018

APPROVAL TO CONTINUE STAKEHOLDER ADVISORY GROUP

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Subject: Approval to Continue the Board of Water Supply Stakeholder Advisory Group

In April 2015, the Board of Water Supply (BWS) Board of Directors approved the formation of a Stakeholder Advisory Group to provide input to the Water Master Plan, proposed rate study and other important initiatives. Since then, the BWS and Stakeholder Advisory Group have accomplished those goals. Establishment of this Stakeholder Advisory Group successfully demonstrated our commitment to increase the consistency and transparency of our communications and public engagement. The Water Master Plan adopted in October 2016, Updated Financial Policies adopted in May 2017, Long Range Financial Plan adopted in March 2018, and new water rates adopted in August 2018 were developed with the benefit of significant advisement from the Stakeholder Advisory Group. Their inquiry and input also helped shape our communications and supported clear, transparent outreach to our customers.

The Stakeholder Advisory Group is a highly valued resource of diverse community leaders who have actively engaged with us in providing public input towards our mission of providing safe, dependable and affordable water now and into the future.

The BWS has an ongoing need for the assistance of the Stakeholder Advisory Group to help us better understand and address the needs of key segments of our customer base. Board approval to continue meeting and providing resources to sustain the Stakeholder Advisory Group is requested.

Objectives

BWS's objectives in continuing the Stakeholder Advisory Group are to continue to improve the public's understanding of our island's complex water issues and seek stakeholder input to the implementation of our Water Master Plan and other important initiatives.

The Stakeholder Advisory Group will enable BWS to further achieve:

- Accountability with our customers for implementation of the Water Master Plan.
- Ongoing credibility through transparency with and engagement of the public.

- Gaining regular feedback from people in the community who deeply understand BWS issues and challenges and are motivated to seek solutions.
- Strengthening the partnerships necessary to ensure success of our most important sustainability and resiliency initiatives including water conservation, watershed protection and climate change adaptation.

Composition

The Stakeholder Advisory Group will consist of approximately 26 highly respected local residents and community leaders with expertise in many disciplines and who have an active and ongoing interest in issues relevant to the Board of Water Supply. The group will represent diverse communities, interests and geographies across Oahu in the following expected categories:

Agriculture
Building Industry
Community Organizations
Environment
Every City Council District
Financial/Economic
Golf
Hawaiian Culture
Homeowners Associations
Large Water Users
Large Land Owner/Developer
Realtors
Seniors/Low Income
Travel/Tourism Industry
Small Businesses
Utilities

Roles and Responsibilities

The Stakeholder Advisory Group will continue to attend a series of BWS workshops, consider a broad range of topics and issues, and communicate openly and collaboratively to advise on what is most important to Oahu's diverse communities. Members will continue to serve as ambassadors, sharing information with others in their community, organization or area of interest.

The Stakeholder Advisory Group will be asked to provide feedback related to the implementation of the Water Master Plan, roll out of new water rates, and other BWS issues, including but not limited to water conservation and watershed protection, customer services, field services, outreach and education, and preparations for climate change.

The group functions in an advisory capacity and does not have decision making authority. It will make recommendations to staff and the Board of Directors of the Board of Water Supply.

Meetings Open to Public

The Office of the Corporation Counsel of the City and County of Honolulu has advised that the Stakeholder Advisory Group is not subject to the Hawaii Sunshine Law. That said, operating protocols will follow the intent of the Sunshine Law in that workshops will be open to the public and announced in advance on the BWS's website. Time for public comment will be made available at each meeting, and meeting notes will be prepared and made available to the public, along with meeting materials, following each meeting.

BWS Commitment

In continuing this Stakeholder Advisory Group, the BWS commits to 1) provide the staffing and resources to support the group's meetings, 2) provide accurate and transparent information, and 3) review and consider input and advisement provided by the group.

Respectfully submitted,

/s/ ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer"

DISCUSSION: Ernest Lau, Manager and Chief Engineer, gave the report. He gave a summary of the Stakeholder Advisory Group's history, objectives, goals, roles, and accomplishments, who the members are, and why the need to continue this group.

The Stakeholder Advisory Group (SAG) discusses many important initiatives, with different ideas, and solutions, but always focusing on BWS' mission of providing safe, dependable, and affordable water, now and into the future. With the input of SAG, the water master plan, financial policies and plans, water rates, were adopted.

BWS wants to continue the SAG to help better understand and address the needs of key segments of it's customer base and to assist in the implementation of the Water Master plan.

Ms. Sproat commented that the Stakeholder Advisory Group is an important best practice. It was helpful to have input from the Stakeholder Advisory Group on the Water Master plan and on the rates. She appreciated their service and thinks it's a great idea and hopes BWS does something to show their appreciation, especially since it is a significant time commitment for the members.

Mr. Sword asked if the members of the Stakeholder Advisory Group are on a rotating basis or not. Mr. Lau responded that some members stay and

there has been a natural turnover. Mr. Sword's concern was if a handful of people stay throughout the whole process, you might have same thinking, and not get any new thinking coming in as time progresses on. But, Mr. Sword will wait to see how it works out. Mr. Lau said members are not afraid to express their viewpoints and if necessary, BWS has multiple meetings to discuss problems. Mr. Lau doesn't believe the SAG operates on a consensus basis.

Mr. Lau welcomes any board members, up to two members, may attend these meetings.

Mr. Andaya asked how many people sit on the Stakeholder's meeting to which Ms. Sproat replied 26 people. Mr. Lau said not everyone shows up at all the meetings.

Mr. Andaya said he did attend several meetings and they were incredibly beneficial, especially to get a little bit more context and familiar with some of the things going on. He also wanted to express his appreciation to the Stakeholder Group and said he couldn't imagine what BWS would do without them.

Mr. Lau recognized in the audience, Ms. Chris Harris, a subconsultant with CDM Smith, who helps to keep in touch and communicates regularly with the SAG.

APPROVAL TO CONTINUE THE BOARD OF WATER SUPPLY STAKEHOLDER ADVISORY GROUP WERE APPROVED AT THE OCTOBER 22, 2018 BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
KAY C. MATSUI	X		
RAY C. SOON			ABSENT
MAX J. SWORD	X		
ROSS S. SASAMURA	X		
JADE T. BUTAY	X		

October 22, 2018

APPROVAL OF REDEVELOPMENT OF BERETANIA AND CREATION OF PIG

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Subject: To Determine the Role of the Board in the Redevelopment of the Beretania Complex and Creation of a Permitted Interaction Group Pursuant to Section 92-2.5(b), Hawaii Revised Statutes

The Board of Water Supply (BWS) is considering the redevelopment of its Beretania Complex. The primary purpose is to develop a revenue stream that can be used to offset a portion of BWS operating and capital improvement costs. A secondary purpose of the redevelopment is to maximize the use of the Beretania Complex.

BWS released a Request for Proposals (RFP) on March 15, 2013 for the redevelopment of the Beretania Complex. Although BWS received proposals from several interested parties, a developer was not selected. BWS will be issuing a new RFP for the redevelopment in 2019. Redevelopment will occur over the existing surface level parking lots above the Public Service Building used by BWS equipment and vehicles and employees. Redevelopment would be via a ground lease for a maximum term not to exceed 65 years and a development contract. At the completion of the lease, the property and all improvements would revert to BWS. The specific and approved redevelopment plan will be determined by the lessee. But, to identify the most likely redevelopment scenarios and advise BWS, RFP consultant Architects Hawaii, Ltd. (AHL) hired private development firm Avalon Development Company, LLC (Avalon).

Based on Avalon's market analysis study, the three (3) redevelopment scenarios for the Beretania Complex are:

- Assisted Care Living Facility
- Affordable Senior Rental Apartments
- Parking Structure

The first and third scenarios include the construction of a multi-level parking structure between Lisbon and Lauhala Streets to replace the lost existing surface level parking. Attached are maps showing these redevelopment scenarios.

The maps for the redevelopment scenarios show a new multi-story office surface level employee parking lot above the Engineering Building. It is needed to provide additional office facilities to support the accelerated

capital improvement program identified in the water master plan process. This new building could be constructed by BWS or a developer.

All three scenarios are allowed under the property's current A-2 Medium Density Apartments zoning and would not require new entitlements. The first two scenarios would increase the rental housing inventory in a centrally located area, provide a public benefit at reasonable cost for both assisted care patients and Oahu's aging population. Further, the proximity to the Queen's Medical Center (QMC) and Straub Medical Clinic and Hospital creates synergy between assisted care patients, seniors and medical support services. Other redevelopment scenarios considered included commercial office, government or other public use buildings and leasehold condominiums. These scenarios were rejected due to the need for a zone change (which can take considerable time and effort) and/or insufficient market demand. Expansion of the QMC campus was also considered. But that would require a lengthy plan review use process.

Because of the scale of the redevelopment and the fact that it would involve the use of public lands and funds, AHL will be preparing an Environmental Impact Statement (EIS), which will evaluate not only the 3 scenarios, but also the new BWS office building. The first step is to issue an EIS Preparation Notice (EISPN). AHL and their planning sub-consultant HHF Planners (HHF) are working on the EISPN, which is scheduled to be published in late November 2018. Attached for your information is a schedule for the EIS up through publication of the draft EIS.

Staff from AHL, HHF and Avalon are present today to answer any questions regarding the three redevelopment scenarios, the new BWS office building and the EIS process schedule.

Ultimately, the Board will recommend to the City Council approval of the selected developer and execution of the development contract (and consequently the redevelopment scenario).

If two or more Board members would like to participate in the Beretania Complex redevelopment, we recommend the creation of a Permitted Interaction Group. The pertinent section of Chapter 92, Hawaii Revised Statues regarding the permitted interaction of members is as follows:

§92-2.5 Permitted interactions of members. (a) Two members of a board may discuss between themselves matters relating to official board business to enable them to perform their duties faithfully, as long as no commitment to vote is made or sought and the two members do not constitute a quorum of their board.

(b) Two or more members of a board, but less than the number of members which would constitute a quorum for the board, may be assigned to:

(1) Investigate a matter relating to the official business of their board; provided that:

(A) The scope of the investigation and the scope of each member's authority are defined at a meeting of the board;

(B) All resulting findings and recommendations are presented to the board at a meeting of the board; and

(C) Deliberation and decision-making on the matter investigated, if any, occurs only at a duly noticed meeting of the board held subsequent to the meeting at which the findings and recommendations of the investigation were presented to the board; or

(2) Present, discuss, or negotiate any position which the board has adopted at a meeting of the board; provided that the assignment is made and the scope of each member's authority is defined at a meeting of the board prior to the presentation, discussion or negotiation.

The involvement of the Board in the Beretania Complex Redevelopment is an important opportunity to ensure that the long-term use of the property adequately serves the needs of the BWS and its customers.

Respectfully submitted,

/s/ ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Attachments"

DISCUSSION: Michael Matsuo, Civil Engineer, of the Land Division, addressed the Board Chair and Members with a powerpoint presentation on the creation of the Permitted Interaction Group (PIG) for the redevelopment of the Beretania complex.

Mr. Matsuo announced that Architects Hawaii, Limited, their planning consultant, HHF Planners, and Avalon Company were present to answer any questions.

If two or more Board members would like to participate in the redevelopment, the creation of a Permitted Interaction Group was recommended. Chapter 92 of the Hawaii Revised Statutes allows for the creation of a Permitted Interaction Group composed of Board members.

Mr. Matsuo said that the involvement of the Board in the redevelopment of the Beretania Complex is an important opportunity to ensure that the long-term use of the property adequately serves the needs of both the BWS and its customers.

Mr. Andaya thanked Mr. Matsuo and asked if there were any questions or comments.

Mr. Butay asked if there was a comparison study on the revenue streams each of the scenarios would produce. Mr. Matsuo indicated that they will be reviewing revenue projections for all three scenarios.

Discussion focused on the third scenario – parking structure. Mr. Sword agreed that a revenue projection based on the need for parking should be reviewed.

In addition, Mr. Matsuo stated that Queen's Medical Center has approached the BWS for additional parking on several occasions, they are having their employees park off campus and the currently have a waiting list for parking.

Another suggestion made was an elevator type parking system, which are available on Sheridan Street and Rycroft Street. This type of parking system would be at a lower cost to build with more space to park cars.

Mr. Lau thanked the Board members for their contributions to the discussions and that the suggestions made were excellent points.

Mr. Andaya stated that because of the Sunshine Law sometimes it is difficult to share information among Board members. With the Permitted Interaction Group, they would be able to meet with staff, consultants and members of the public to freely discuss issues and exchange information and ideas without violating the Sunshine Law. It was pointed out that a Permitted Interaction Group was used very effectively with the new water rates.

Mr. Andaya recommended establishing a Permitted Interaction Group to have more interaction and to be used as an avenue for the exchange of information. The group would be able to flush out issues and vet the different proposals more fully and then come to the full Board with recommendations and updates on the process.

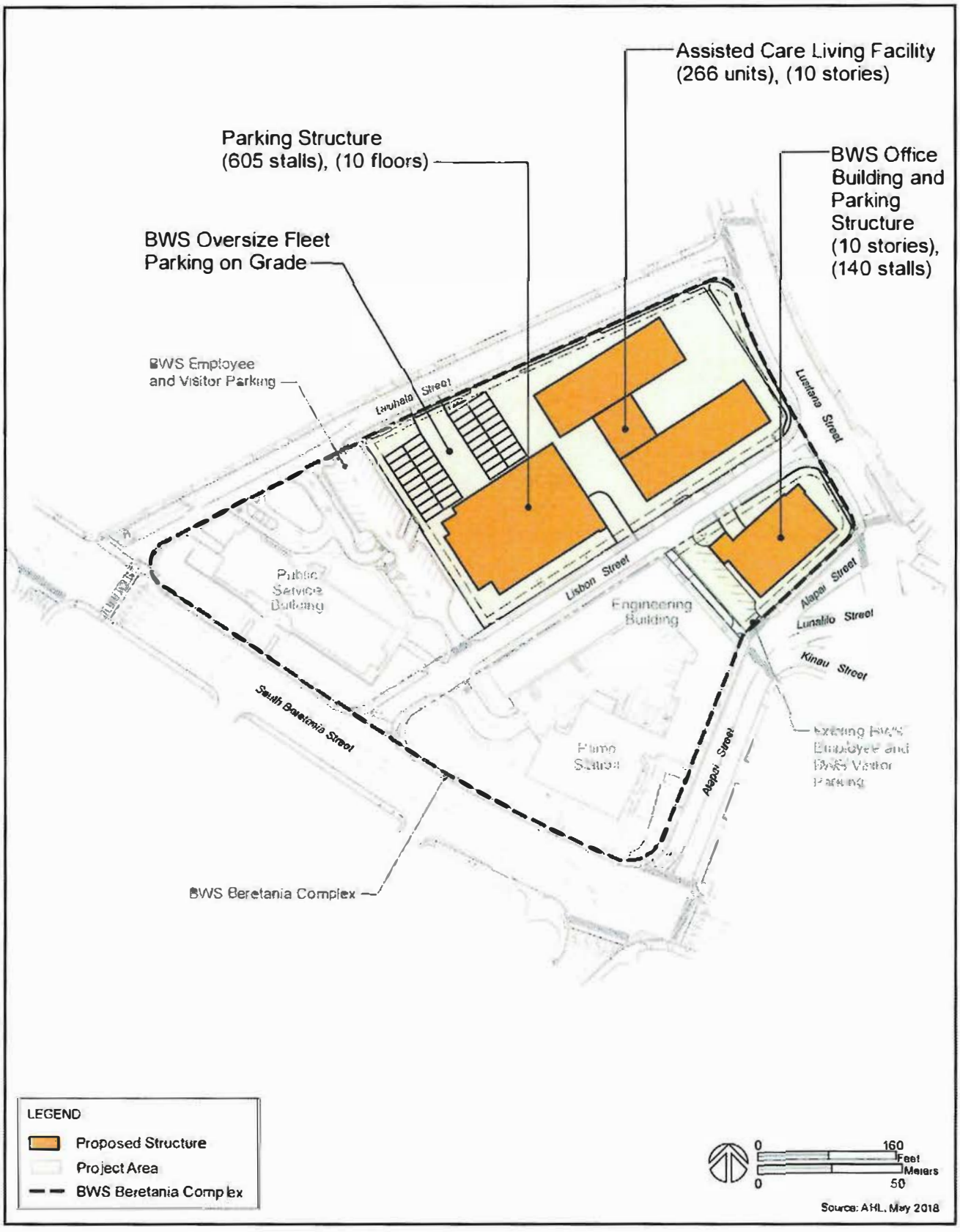
Mr. Andaya asked for a motion to create a Permitted Interaction Group for the Beretania Redevelopment. It was moved and seconded by Board member Sword and Board member Butay, respectively, to create a Permitted Interaction Group for the purposes of determining the redevelopment of the Beretania Complex.

Ms. Yost, Legal Counsel, pointed out that she would have started by listing of names of the people who are going to be in the Permitted Interaction Group to be sure that there were enough Board members to be part of the Permitted Interaction Group and then proceed with the motion.

The question was put forward on who would be interested in being on the Permitted Interaction Group. Up to three Board Members may be in the Permitted Interaction Group since the number of Board members can't be the same as quorum, which is four. The Board members on the Permitted Interaction Group will be Board members Ray Soon, Max Sword, and Kay Matsui.

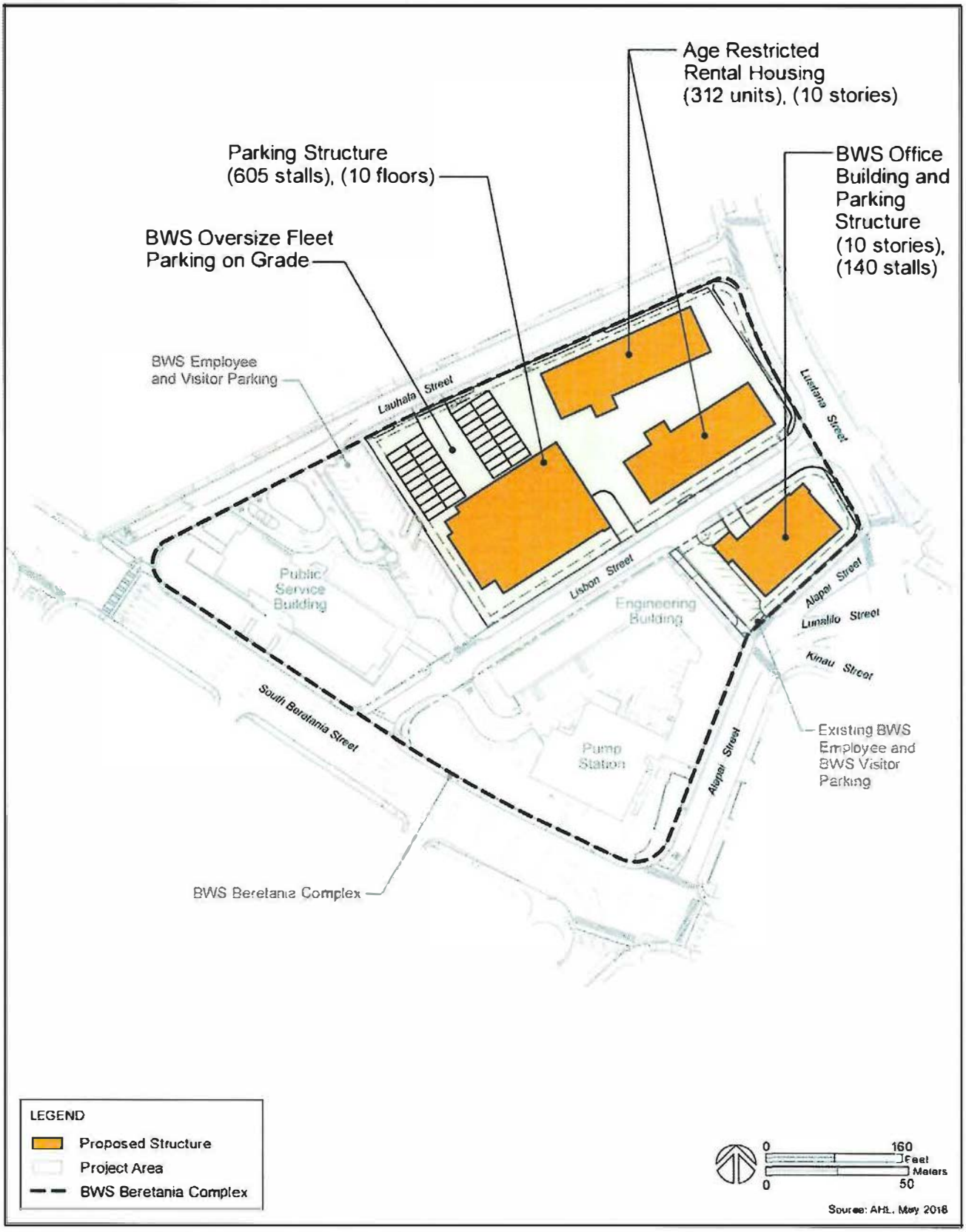
Once again, Mr. Andaya asked for a motion and second and asked if there were further questions.

Ms. Sproat asked how often should the Permitted Interaction Group report to the Board any updates regarding the redevelopment. Mr. Lau reminded the Board members that the Permitted Interaction Group only submits one report to the Board before it's dissolved. Since this is a very important project with high visibility, Mr. Lau agreed that periodic briefings is appropriate to keep all Board members updated.



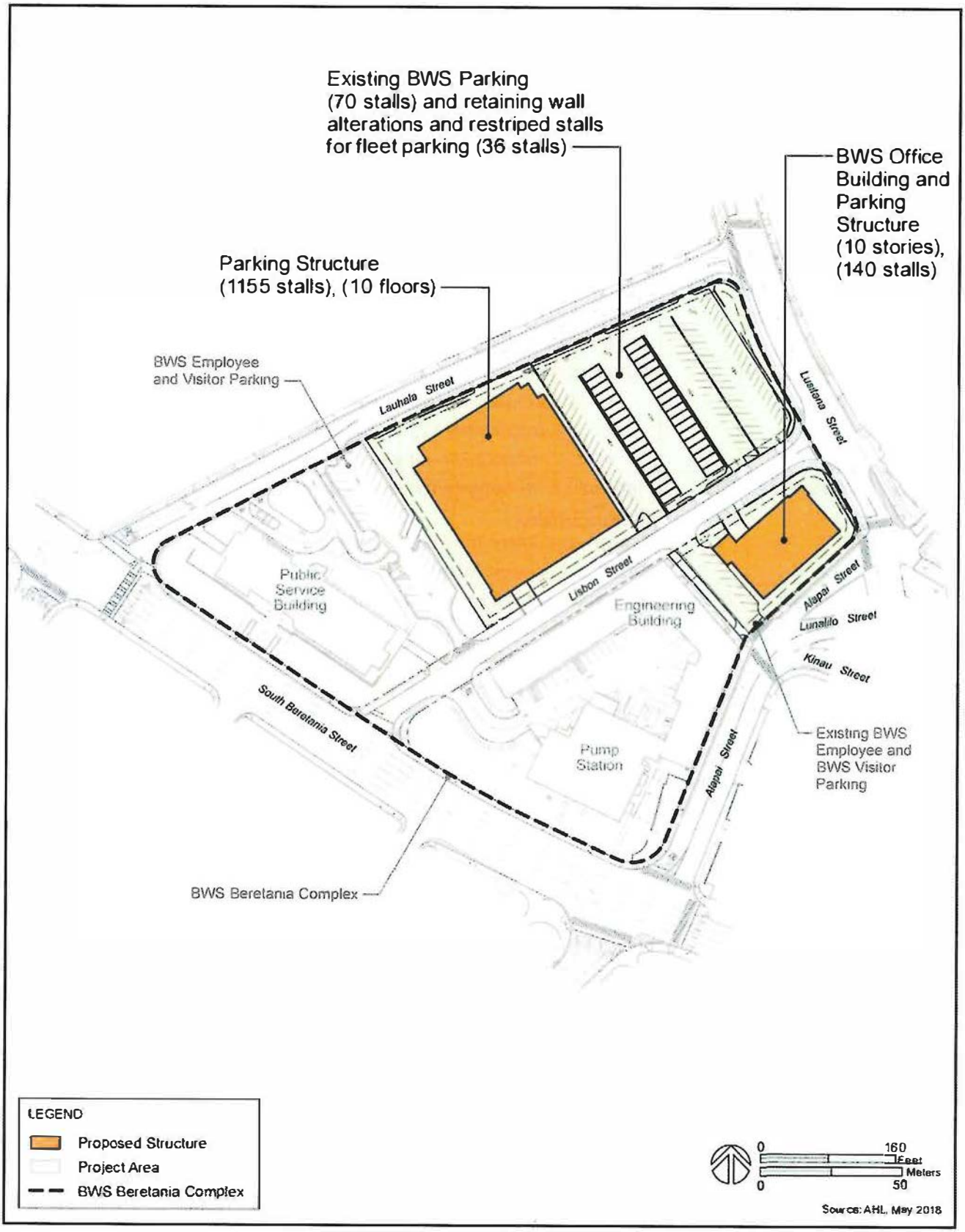
Scenario 1: Assisted Care Living Facility and Office Building

Board of Water Supply Beretania Complex Redevelopment



Scenario 2: Affordable Senior Rental Apartments and Office Building

Board of Water Supply Beretania Complex Redevelopment



Scenario 3: Parking Structure and Office Building

Board of Water Supply Beretania Complex Redevelopment

Board of Water Supply Redevelopment

EIS Preparation Notice (EISPN) Schedule

Revised 5 October 2018

	Date	Task
1	Aug. 17, 2018	Draft EISPN to AHL for Review
2	Aug. 24, 2018	Review comments back from AHL
3	Aug. 30, 2018	Submit to BWS: Draft EISPN to BWS for Review
	Oct/Nov 2018	Public Outreach • BWS Outreach to City Council, State Legislators • Downtown NB #13 mtg (Thurs., November 1) • Community Meeting (week of Nov. 5)
4	October 31, 2018	Receive EISPN Comments back from BWS Submit to BWS: Transmittal letter for BWS signature OEQC publication forms for review
5	November 8, 2018	BWS have signed transmittal letter ready
6	**November 9, 2018**	**Submit EISPN and publication forms to OEQC**
7	**November 23 2018**	**Publication in The Environmental Notice**
8	December 24, 2018	30-day EISPN public review period ends
9	Jan. 2019-Feb. 2019	Respond to Comments and Prepare Draft EIS
	May 2019	Submit Draft EIS to AHL for Review
	May 2019	Submit Draft EIS to BWS for Review
	June 2019	Publish Draft EIS

ITEM FOR INFORMATION NO. 1

"October 22, 2018

RED HILL BULK FUEL FACILITY UPDATE

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Subject: Red Hill Bulk Fuel Facility Update

Erwin Kawata, Water Quality Division Program Administrator, will be presenting our review of the Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018.

The report was recently made available on the United States Environmental Protection Agency's (EPA) website and is titled "interim groundwater flow model". It also has been referred by the Navy as the "tank upgrade alternative (TUA) technical memo".

Respectfully submitted,

/s/ for ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Attachment"

The foregoing was for information only.

DISCUSSION: Erwin Kawata, Program Administrator for the Water Quality Division, gave the presentation.

Mr. Kawata provided a review of the Navy's Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility report. This report is also referred to as the Interim Groundwater Flow Model report or the Tank Upgrade Alternatives Technical memo.

Mr. Kawata started the discussion with a basic description of Oahu's groundwater aquifer, and discussed how groundwater models are used to describe where groundwater is flowing, it's rate, and what happens to fuel that's released into the environment. He also provided a basic explanation of the hydrological terms that will be used in the presentation.

Mr. Kawata introduced Dr. Steve Young and Mr. Joe Tracy, from INTERA and Mr. David Brown from Morgan Lewis, members of BWS' technical team.

Mr. Kawata reviewed the major conclusions in the Navy's interim groundwater flow model report, as well as the department's comments and

concerns. First, the report concludes that all of the groundwater flows only towards the Navy's Red Hill Shaft water supply, irrespective of how much water is pumping from other neighboring water sources like the BWS Halawa Shaft or Moanalua Wells. The report states that fuel releases, called Light Non-Aqueous Phase Liquids (LNAPL) don't impact any of the Navy's monitoring wells becoming weathered and decomposing as it stays within the unsaturated or vadose zone, between the bottom of the tanks and the groundwater table. In addition, the report states that the 27,000-gallon release in January 2014 did not impact the groundwater or any of the Navy's monitoring wells. Finally, the report states that an undetected chronic release of 2,300 gallons per year per tank would be biodegraded; a sudden release of approximately 120,000 gallons of fuel would likely be retained in the vadose zone and/or at the water table without impacting the safety of the water at Red Hill Shaft and that a release as large as 700,000 gallons would also not impact water quality at Red Hill Shaft. Mr. Kawata pointed out that aquifer pumping tests conducted in 2017-2018 show changes in groundwater levels across Halawa Valley as water pumping rate was changed. For example, when the BWS Halawa Shaft was pumped at high rates, groundwater levels were observed to decrease in the Navy's monitoring wells and as far away as monitoring well DH-43 in Moanalua Valley. This data shows that groundwater can also flow across the valley towards the BWS Halawa Shaft as well as toward the Navy's Red Hill Shaft water source. A significant concern is the Navy model's inability to predict groundwater levels measured in the field. A model's ability to reproduce real world field measurements is a fundamental requirement of any good calibrated model. The Navy model's inability to reproduce field measurements means the model is not calibrated and therefore cannot reliably predict the rate and direction of groundwater flow and what happens to fuel releases in the subsurface. U.S. Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) subject matter experts reviewed the Navy's model report and listed 10 areas of concern with the model and its conclusions. The concerns raised by the regulatory agencies are consistent with BWS comments submitted to date. BWS does not agree with the conclusions in the Navy's model report and have urged the regulatory agencies to not approve this report nor use the Navy's model conclusions to make the tank upgrade alternative (TUA) selection decision.

Ms. Sproat asked if the water levels mentioned in the presentation are the same as head levels. Mr. Kawata responded "yes".

Ms. Sproat asked if the military did any additional geophysics testing as far as the direction of the flow. Mr. Kawata explained that the Navy did seismic studies to collect geophysical data. However, BWS disagrees with the Navy's interpretation that the data showed the presence of a deep valley fill.

Ms. Sproat also asked if BWS has information of when United States Geological Service (USGS) model is going to be made available. Mr. Lau stated it will be a while before BWS gets that information.

Ms. Sproat asked if the Navy's study was peer reviewed. Mr. Kawata said the report was reviewed by the regulatory agencies and BWS has submitted comments.

Ms. Sproat asked if USGS commented on the model report. Mr. Kawata said USGS has reviewed it, but not sure whether they will be submitting any comments.

Ms. Sproat said that the model report appears to contradict a lot of the data, even the Navy's own data and information.

Mr. Kawata agreed and added that an aquifer test performed in 2017-2018 also showed water level changes across the valley.

Ms. Sproat stated that her concern is fuel detected, up-gradient of the spill.

Mr. Kawata said the Navy has a monitoring well up-gradient of the tanks called Monitoring Well No. 4 and that small amounts of contaminants have been recorded in the past but none in recent times.

Mr. Lau said there are also fuel detections at the Water Commission's deep monitor well on the mauka side of the Halawa Correctional facility.

Ms. Sproat said it appears to contradict much of the information that BWS has.

Mr. Kawata said one of the assumptions that the Navy made in their model is that the underlying basalt is homogeneous. This is not true given well known documentation that Hawaiian geology and lava flows is not homogenous and not uniform.

Ms. Sproat is hoping that much of this information should be resolved by the 3D modeling that USGS is doing.

Mr. Lau stated that the Navy is on a timeline to select the tank upgrade options by early next year and that the BWS shouldn't wait for the USGS model to be completed because it will take time.

Ms. Sproat asked what would your recommendation be, as far as how we should proceed. Mr. Kawata replied BWS will continue to state our concerns to the regulatory agencies and Navy, monitor the situation closely, and work with the regulatory agencies to ask the Navy to reconsider the approach they are taking with the model.

Ms. Sproat expressed concerns of the way that this is proceeding and as a board member noted that BWS has a fiduciary public trust duty to protect the groundwater resource.

Mr. Andaya asked if we communicated to the Navy our concerns, and if a public meeting was held on this. Mr. Kawata replied yes, we have communicated our concerns with the Navy and USGS and the meeting to consider the TUA selection report will not happen until later this year or next year. Mr. Andaya and Mr. Sword wanted to know if we had any responses. Mr. Kawata said we have submitted 115 comment letters to date, but received only 3 or 4 responses. All of BWS' comments are addressed to the regulatory agencies and the Navy is copied on each one.

Dr. Young, hydrologist and groundwater modeler with INTERA, shared his 30 years of experiences working at facilities with groundwater contamination where he worked at different times for both EPA and the Department of Defense. He said that compare to his previous sites, the Red Hill site is the most complex because the water levels are very flat and the hydraulic properties of the basalt aquifer are very difficult to measure and are very permeable. Dr. Young stated that compared to the sites he has worked, the amount of available data at Red Hill is very poor. This concern was also raised by a DOH hydrologist. Also, the limited data was not collected in a timely manner because the Navy waited too long to start its investigation. As a result, the Navy did not have sufficient data available to build a site conceptual model on which to create its groundwater flow model. The lack of site characterization data makes developing models difficult to properly build and promotes the opportunity for different interpretations of the data because there is insufficient data to prove or disprove most conclusions. More data and well testing is needed. For instance, the seismic testing performed by the Navy only had one data point to ground truth the results. One data point is unacceptable and provides unreliable results that cannot be checked. The important results the Navy has presented to BWS are not validated by site data. Rather, the conclusions are based on results from their model. A major problem with the Navy model(s) is that it does not predict results that are in agreement with the field data.

Mr. Lau asked how do you correct poor data? Dr. Young said that the site needs to have more hydraulic tests performed in the wells. The hydraulic test involves pumping water out and looking at the well water level response to water levels changes around the pumped well. And a key part of determining where the tests are needed is looking at maps of data and determining where more data is needed.

Mr. Andaya asked what happens next? Mr. Lau said under the Administrative Order on Consent, BWS is a subject matter expert, along with USGS and Water Commission. Therefore, BWS can submit comments, but BWS is not signatory to the agreement, and has no regulatory authority to force a decision. The decision lies solely with the EPA and the Department of Health.

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Board of Water Supply
City and County of Honolulu

Red Hill Bulk Fuel Storage Facility Update

Board Meeting

October 22, 2018

Today's Discussion

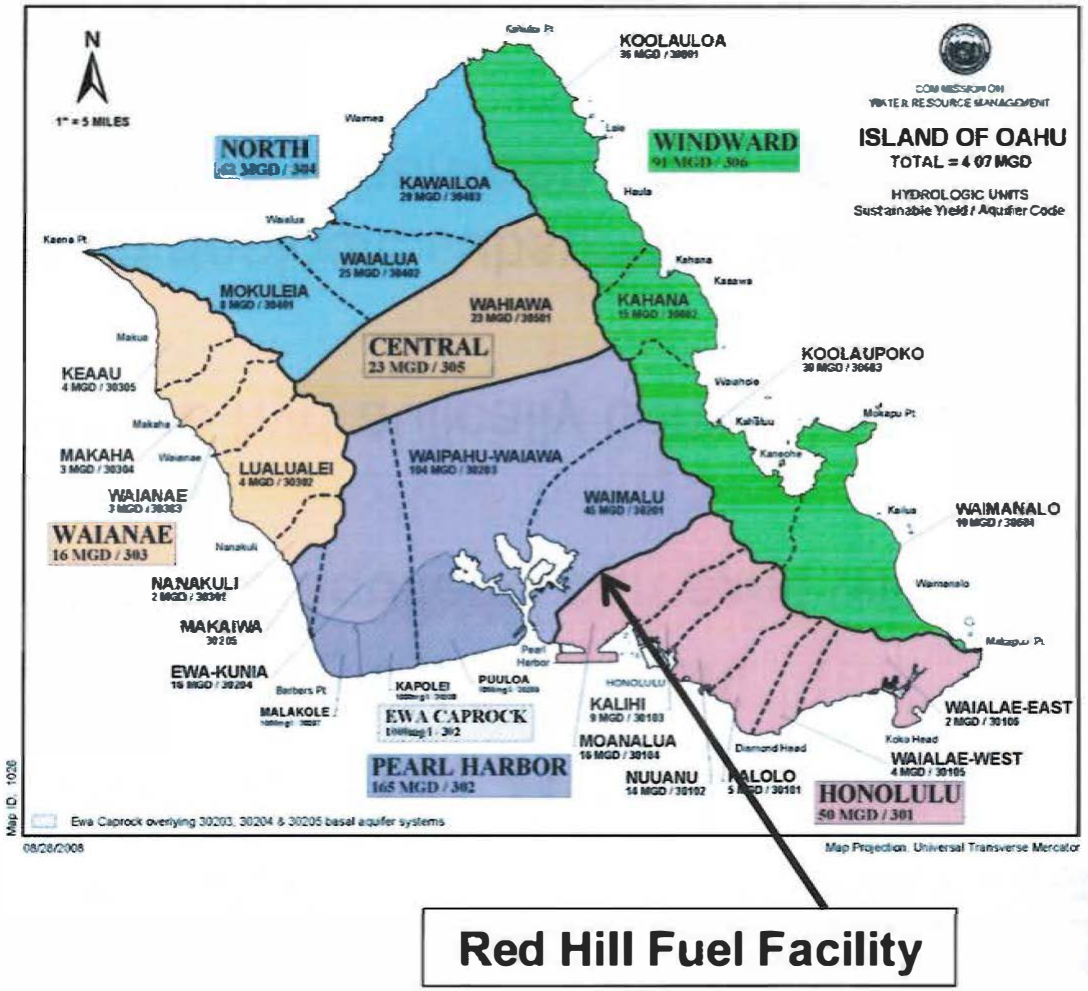
- BWS review of the Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018
  - "Red Hill Interim Groundwater Flow Model"
  - "Tank upgrade alternatives (TUA) technical memo"
- Summary

Oahu's Groundwater Aquifer

- Is one large continuous geological formation.
- Smaller aquifers (called sub-aquifers) can exist within the larger formation.
- All parts of the aquifer are hydraulically connected with each other.
- The aquifer can contain geologic subsurface features called valley fills that can exist between one part of the aquifer and another.
- Not much is known about valley fills except water can travel through them at different speeds. More data is needed to better understand them.

Groundwater Model

- A reliable groundwater model which is calibrated using data collected in the field should help us understand where groundwater is flowing in the Red Hill area and what happens to petroleum releases in it.
- The lines on the map are drawn for managing water use and not aquifer boundaries.



Interim Groundwater Flow Model Report

- Technical Memorandum Report to present the Navy's interim environmental analysis of current data and an initial framework and analysis of potential environmental risks at Red Hill. This document was prepared as a precursor to:
  - Navy's "Investigation and Remediation of Releases Report", and
  - Navy's "Final Groundwater Flow Model Report"
  - Both are due to EPA and DOH in December 2018
- For input into the tank upgrade alternative (TUA) decision process.

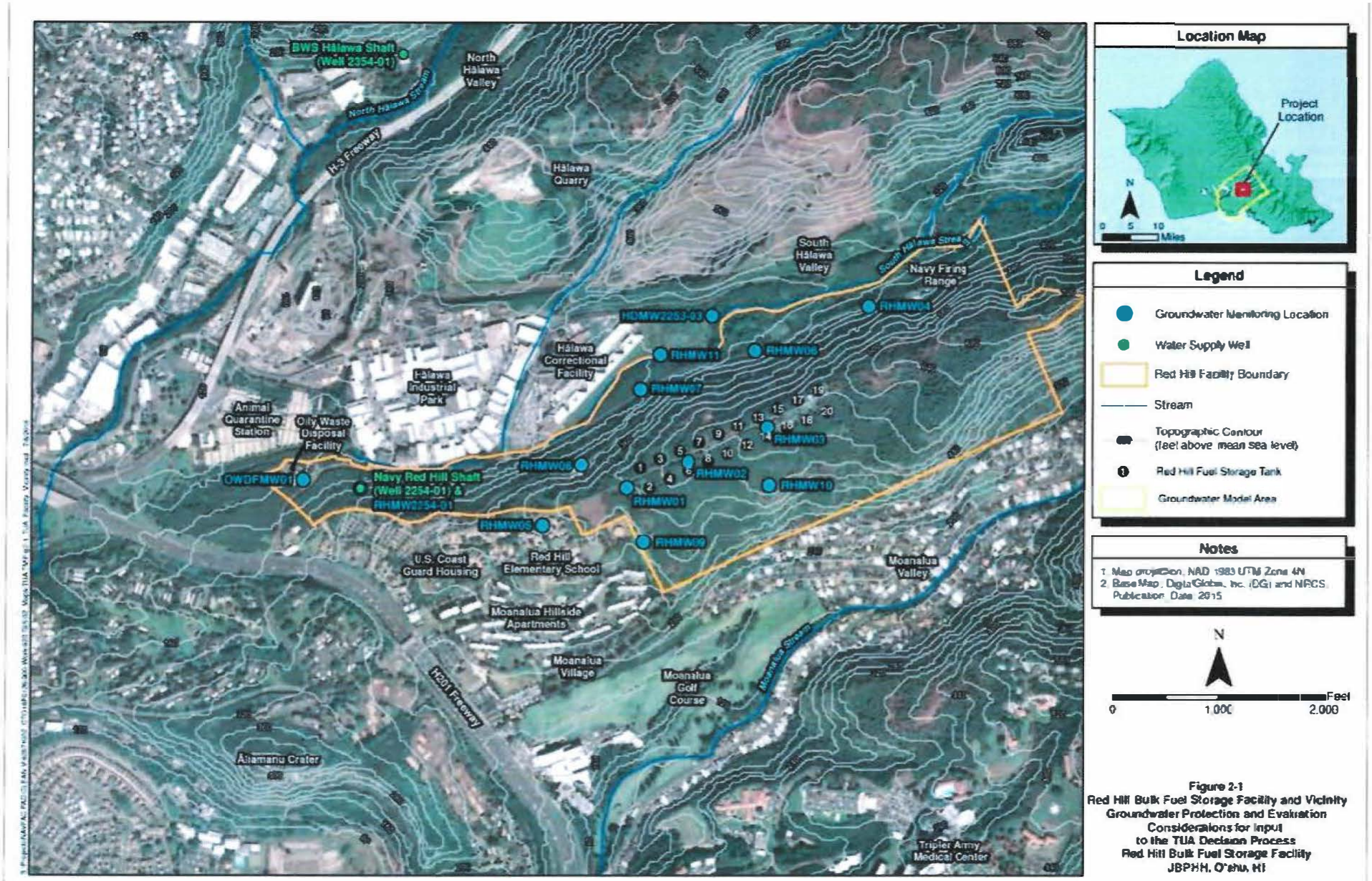
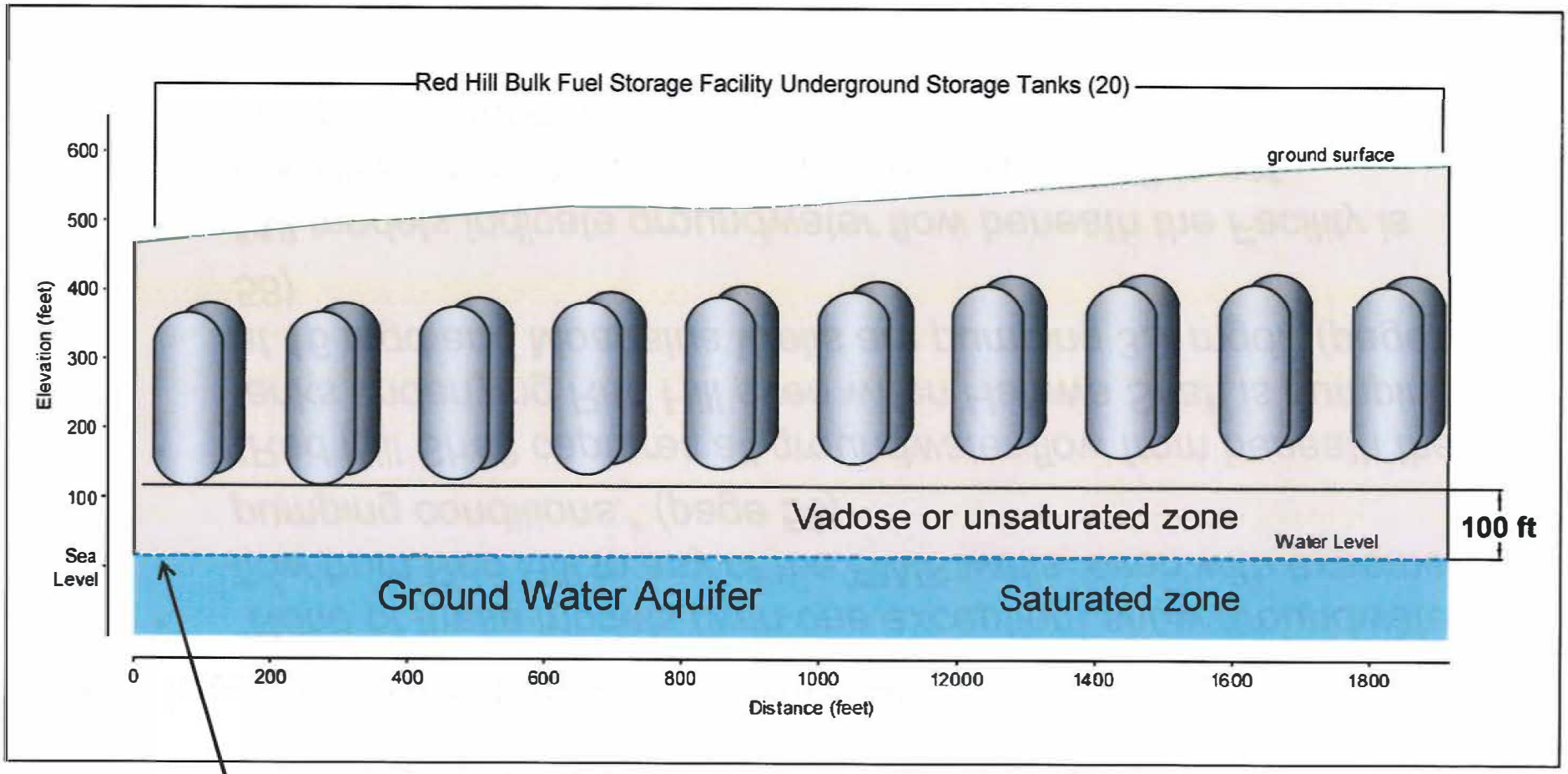


Figure 2-1: Red Hill Bulk Fuel Storage Facility and Vicinity

Figure 2-1
Red Hill Bulk Fuel Storage Facility and Vicinity
Groundwater Protection and Evaluation Considerations for Input to the TUA Decision Process
Red Hill Bulk Fuel Storage Facility
JBPHH, O'ahu, HI

Ref: Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018


Red Hill Bulk Fuel Storage Facility Underground Storage Tanks (20)
ground surface
600
500
400
300
200
100
Sea Level
Elevation (feet)
Vadose or unsaturated zone
Water Level
100 ft
Ground Water Aquifer
Saturated zone
0
200
400
600
800
1000
12000
1400
1600
1800
Distance (feet)
Top of groundwater table (approx. + 20 ft. MSL)

Major Navy Conclusions

- Interim groundwater flow model
  - *"None of these models (with one exception) show groundwater flow from Red Hill to any of the BWS wells, even with extreme pumping conditions." (page 58)*
  - *"Red Hill Shaft captures all groundwater flow from beneath the tanks underlying Red Hill even when Halawa Shaft is pumping at 16 mgd and Moanalua Wells are pumping 3.7 mgd." (page 58)*
  - *"All models indicate groundwater flow beneath the Facility is toward Red Hill Shaft even when Red Hill Shaft is not pumping." (page 58)*

Ref: Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018

Major Navy Conclusions – cont.

- Fuel (LNAPL-light non-aqueous phase liquids) distribution and properties in the subsurface
  - *"A 27,000-gallon release of jet fuel from Tank 5 in January 2014 did not appear to impact any of the Facility's monitoring wells or Red Hill Shaft." (page 57)*
  - *"LNAPL is indicated in the vadose zone, it is located primarily within the upper one-third of the vadose zone between the lower tunnel and the water table." (page 57)*

Ref: Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018

Major Navy Conclusions – cont.

- Fuel (LNAPL-light non-aqueous phase liquids) distribution and properties in the subsurface
  - *"No LNAPL has been measured on any of the Red Hill monitoring wells." (page 57)*

    Ref: Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018
  - LNAPL (fuel) is a mixture of many different chemicals. When LNAPL contacts water, the dissolved phase constituents can enter groundwater and be measured. "No LNAPL" measured in monitoring well groundwater discounts the ability for LNAPL constituents to dissolve and enter groundwater.

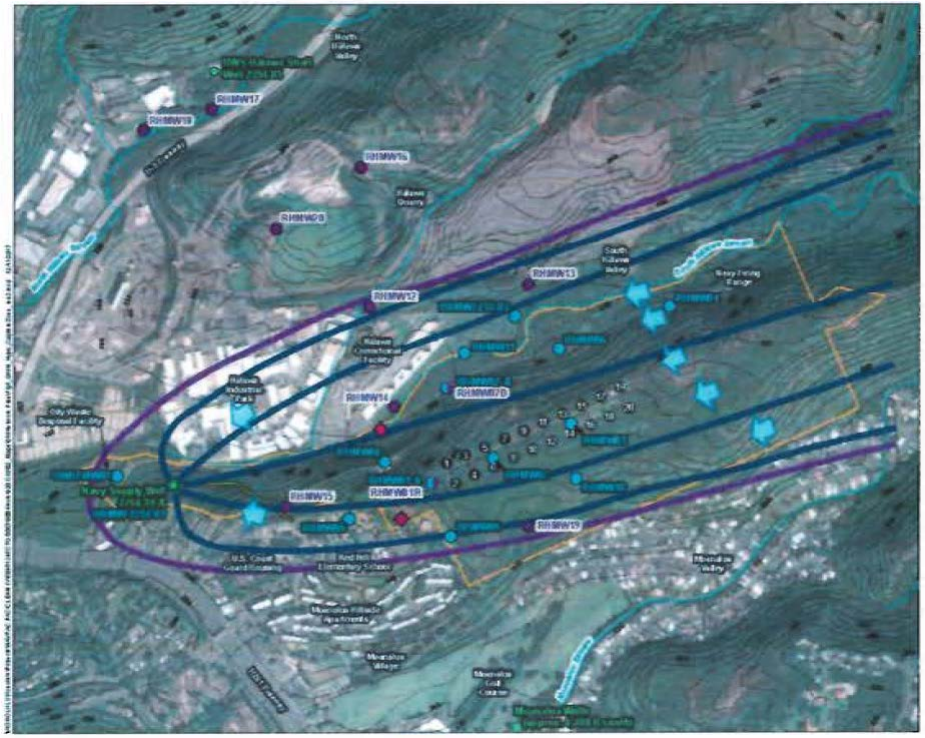
Major Navy Conclusions – cont.

- Release Scenarios
  - *"An undetected chronic release of 2,300 gallons per year per tank would be biodegraded in the vadose zone, prior to reaching groundwater." (page 59)*
  - *"A sudden release of approximately 120,000 gallons of LNAPL would likely be retained in the vadose zone and/or at the water table without causing an exceedance of RBDC at Red Hill Shaft." (page 59) "RBDC (risk-based decision criteria) are risk-based screening values for drinking/domestic use water that are protective of human health, safety, and the environment." (page 48)* *RBDC = DOH Environmental Action Level (EAL). For TPH-d, DOH EAL (2017) = 400 parts per billion (ppb) Table 7-1 (page 50).* Prior to 2017, DOH EAL for TPH-d was 160 ppb.
  - *"It is possible that a release as large as 700,000 gallons would not cause an exceedance of the RBDC at Red Hill Shaft." (page 59)*

Ref: Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018

Red Hill Sentinel Well Network Plan

1. *"A key of objective of the Sentinel Well Network Program is to monitor the effectiveness of a capture zone that extends outward from the Facility capable of adequately containing potential contamination from inadvertent fuel releases of varying magnitudes and rates." (page 14)*
2. *"Sentinel groundwater monitoring wells will be used to monitor and evaluate degree of capture (i.e., groundwater flow gradients), and assess if potential contamination from inadvertent fuel releases from the Facility is adequately contained." (page 14)*
3. *"Figure 5 presents a hypothetical capture zone based on a network of sentinel monitoring wells and the groundwater flow model." (page 15)*



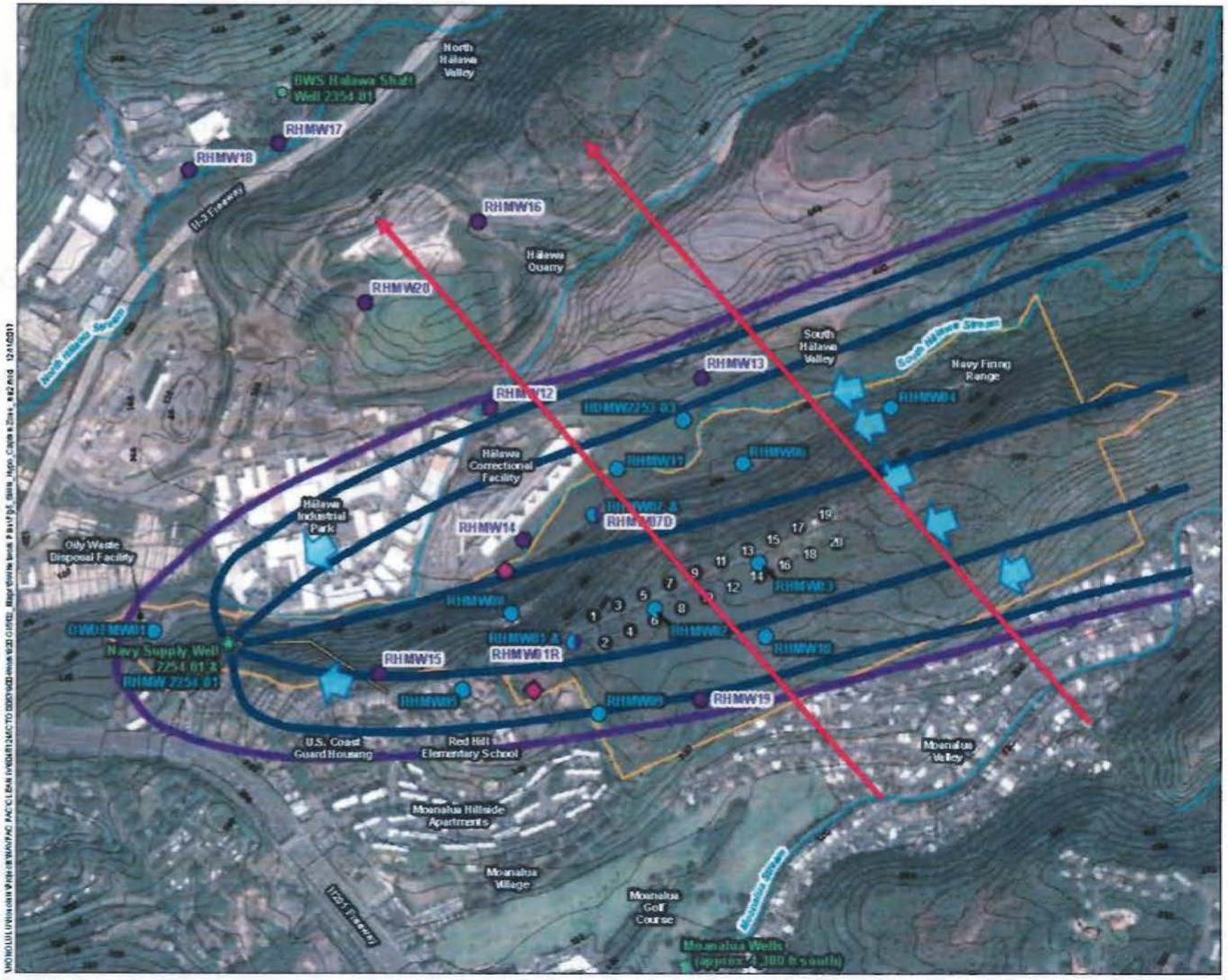
Ref. Figure 5, Sentinel Well Network Development Plan, page 17

Ref. Sentinel Well Network Development Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, December 11, 2017

BWS Review – GW Flow

Navy presents that there is no GW flow from Red Hill to any BWS wells and that Red Hill Shaft captures all groundwater flow from beneath the tanks.

BWS: Pumping test data from 2017-18 show water level changes across the valleys. EPA and DOH have asked the Navy to look at this stating some of the field data contradict Navy interim groundwater model flow paths.



Ref. Sentinel Well Network Development Plan, Red Hill Bulk Fuel Storage Facility, Dec. 11, 2017

BWS Review – GW Flow – cont.

Navy Interim GW model calculation of groundwater levels at Navy monitoring wells (blue line) does not match with measurements collected in the field (yellow line)

BWS: Lack of correlation between observed and model simulation means the model is not calibrated. This is a fundamental requirement of a good model and it's ability to produce reliable results. DOH and EPA share this same concern.

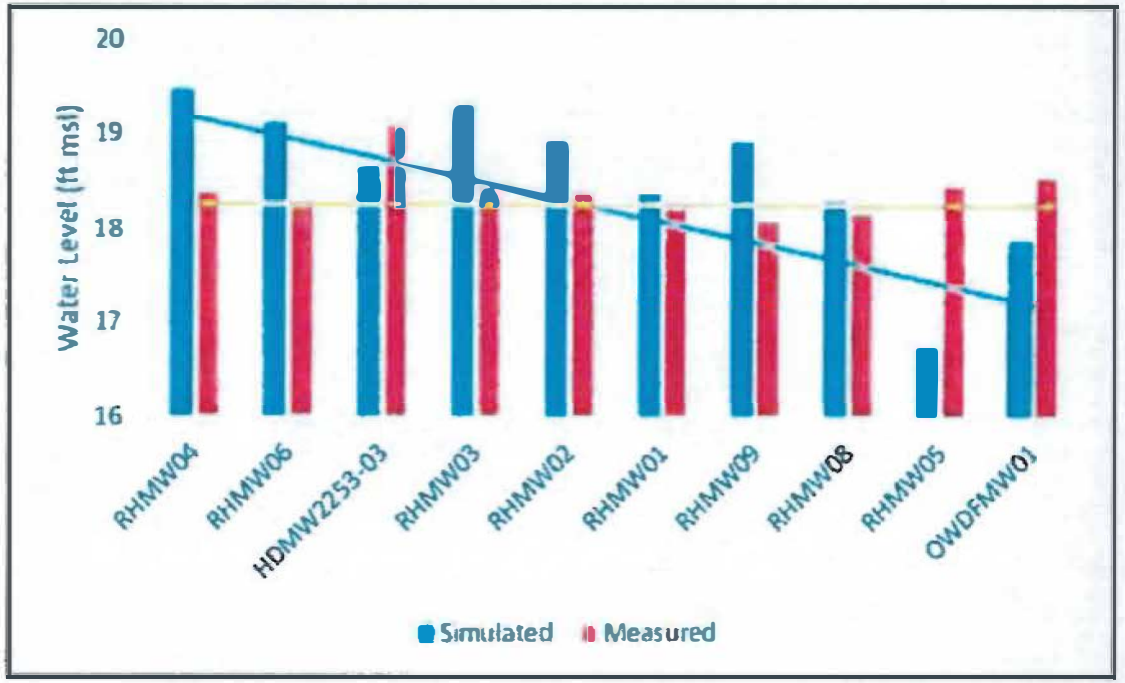


Figure 1. A comparison of the simulated and measured groundwater elevations in the RHMNW. RHMW07 is excluded from this graph since the water level in this well is very anomalous. The Red Hill Shaft (2254-01) is also excluded due to questions about the top of casing reference. Ref. Hawaii Department of Health memorandum to G. Fenix Grange from Robert Whittier re: Comments on the Progress of the Red Hill Groundwater Flow Model, February 20, 2018.

∴ Model not calibrated.

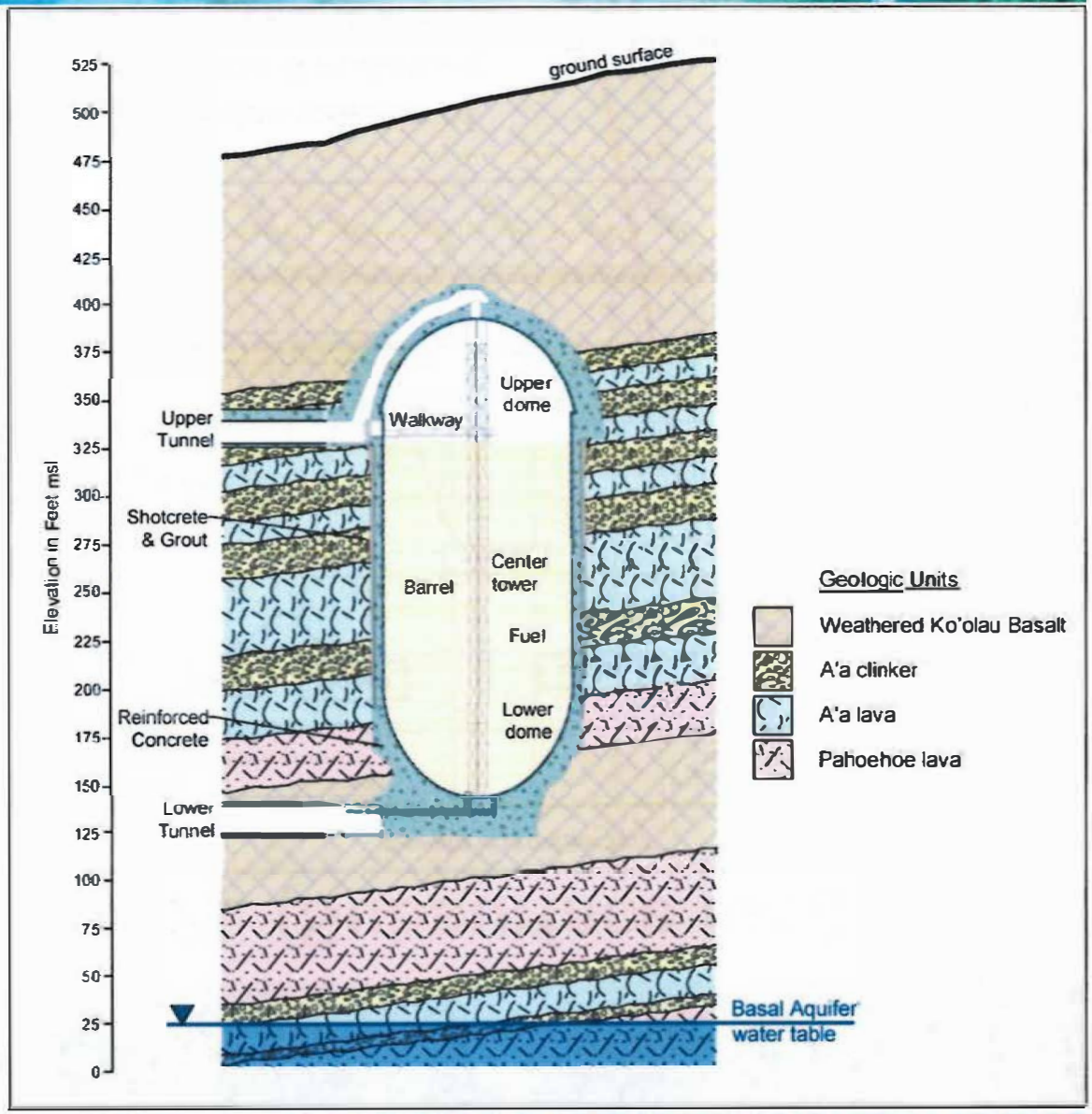
BWS Review –LNAPL (Subsurface fuel)

Navy: Fuel located in the upper one-third of the vadose zone between the lower tunnel and the water table based on elevated temperatures recorded in the vadose zone.

BWS: Fuel can also be found at lower depths with elevated temperatures. EPA and DOH stated elevated temperatures are not a good indicator of fuel depth.

Navy: No fuel has been measured in any of the Red Hill monitoring wells.

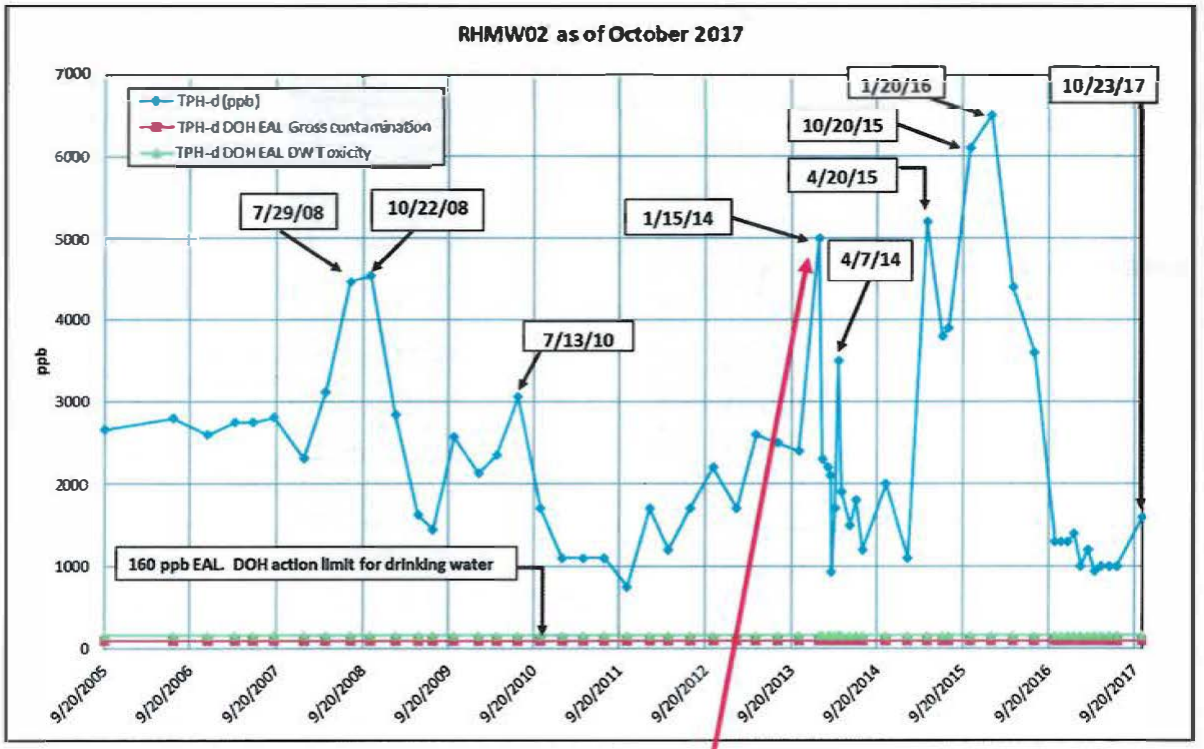
BWS: This assumes released fuel travel directly to Navy monitoring wells. The wells could be in the wrong location to detect fuel releases.



BWS Review – LNAPL (Subsurface fuel)

Navy: Weathered fuel from a release prior to 2005 may be present in the immediate vicinity of RHMW02 or within the saturated zone upgradient from this well. Mixture of dissolved constituents in groundwater are consistent with weathered / biodegraded fuel.

BWS: Weathered fuel from prior releases is still a release. BWS agrees biodegradation can occur. This natural process can be overwhelmed by fuel release amounts that are larger than nature's ability and pace to degrade.



The 27,000-gallon release of jet fuel from Tank 5 in January 2014 did not appear to impact any of the Facility's monitoring wells or Red Hill Shaft.

Response observed shortly after Jan. 13, 2014 release was reported.

BWS Review – Fuel Releases

- *"An undetected chronic release of 2,300 gallons per year per tank would be biodegraded in the vadose zone, prior to reaching groundwater." (page 59)*
- *"A sudden release of approximately 120,000 gallons of LNAPL would likely be retained in the vadose zone and/or at the water table without causing an exceedance of RBDC at Red Hill Shaft." (page 59)*
- *"It is possible that a release as large as 700,000 gallons would not cause an exceedance of RBDC at Red Hill Shaft." (page 59)*

Ref: Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility Report, dated July 27, 2018

- **BWS: The Navy's calculations of the aquifer's capacity to retain and degrade contaminants are based on assumptions that the EPA, DOH, and the BWS feel are overly optimistic and significantly over predict the aquifer's ability to retain and degrade Red Hill contamination.**

EPA and DOH Comments Presented at GW Model Working Group Meeting No. 13

EPA and DOH comments to Navy's Interim Groundwater Model and Conceptual Site Model.

1. *Basalt strike-and-dip – direction and magnitude in question*
2. *Saprolite extents – modeled vs. measured depths*
3. *Cap rocks, tuffs, sediments – not in interim model*
4. *Preferential pathways – not incorporated fully in interim model*
5. *Tunnel inflows – inflows do vary but modeled as consistent*
6. *Calibration – heads, gradients – directions/magnitude do not match field data*
7. *LNAPL Fate and Transport – vapor data – more rapid transport than modeled*
8. *LNAPL Fate and Transport – temperature – extent deeper than modeled*
9. *Groundwater data – concentration data contradict modeled flow path*
10. *Coastal marine discharge – boundary conditions modeled reduces model sensitivity*

Ref: Comments on tank upgrade alternative (TUA) Deliverables, Red Hill Bulk Fuel Storage Area, Oahu, Hawaii, prepared for GWMG Meeting by: Gary Beckett, Donald Thomas, Matthew Tonkin, & Robert Whittier, dated August 14, 2018 presented at the Red Hill Groundwater Model Working Group Meeting No. 13 held August 16, 2018.

The EPA and DOH comments are consistent with many letters BWS wrote to the Navy, EPA, and DOH for the past several months. Unclear if/how Navy will address EPA and DOH comments.

BWS Concerns with Interim GW Model

- Model simulation water levels does not match water levels observed in the field.
- Model unable to replicate pumping test data from 2017-18 showing water level changes across the valleys.
- Does not adequately account for what is known about sub-surface geology and all of its features.

"The Proposed TUA Way Forward. At this time, the Navy and DLA will:

- Continue with sustainment / maintenance of the existing tanks in accordance with current procedures as the Navy's initial best available practicable technology (BAPT) decision submittal."

DEPARTMENT OF THE NAVY

August 15, 2018

Aloha, Stakeholder,

The Proposed TUA Way Forward. At this time, the Navy and DLA will:

- Continue with sustainment/maintenance of the existing tanks in accordance with current procedures as the Navy's initial best available practicable technology (BAPT) decision submittal.

Very Respectfully,

B.P. FORT
Rear Admiral, U.S. Navy

Ref: https://www.cnic.navy.mil/regions/cnrh/om/environmental/red-hill-tank.html

BWS Review – Interim GW Report

- **Question:** Is this report meant to justify fuel releases up to 700,000 gallons from Red Hill into the aquifer as the basis for selecting and maintaining the status quo single wall tanks?
- Regulatory agencies should not approve report.
- No more leaks – The interim model results are unreliable and do not form the foundation for selecting a single wall TUA option.
- BWS continues to call for the most protective option of secondary containment be selected as the TUA option or relocate tanks away from the aquifer.

Questions/ Discussion

ITEM FOR INFORMATION NO. 2

"October 22, 2018

UPDATE ON 2018-2022 STRATEGIC PLAN AND PERFORMANCE METRICS

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Ellen Kitamura, Deputy Manager, will present an update on the Board of Water Supply's 5-Year Strategic Plan for Fiscal Years 2018-2022 and Water Master Plan performance metrics for Fiscal Year 2018.

Respectfully submitted,

ERNEST Y.W. LAU, P.E.
Manager and Chief Engineer

Attachment"

The foregoing was for information only.

DISCUSSION:

Ellen Kitamura, Deputy Manager and Chief Engineer, gave the presentation.

Ms. Kitamura provided updates to the Board of Water Supply (BWS) Strategic Plan and Water Master Plan Performance Metrics for Fiscal Year 2017-2018. Ms. Kitamura indicated that the Strategic Plan had nine performance metrics, seven of which were either met or were on track, one metric missed the goal by 10% or less and one metric missed the goal by 10% or more.

Ms. Kitamura discussed the "Main Breaks per 100 Miles of Pipe" which missed the goal by 10% or less. The goal for this performance metric was 15 or less main breaks per 100 miles of pipe. In FY 2017-2018, there were 16 main breaks for 100 miles of pipe. Ms. Kitamura explained that although the goal for this fiscal year was missed, this was expected based on the model results used to determine predicted main breaks. The model takes into consideration the increase in pipeline installation to 21 miles within the next 10 years. The model predicts that main breaks will increase until the year 2030, then start to go down in the subsequent years as BWS meets the target of replacing 21 miles of pipeline per year. It is important to note that even though BWS is not meeting this metric now, it has a long-term plan to address and improve this metric.

The next metric, "Employee Departure Rate" missed the goal by 10% or more. The goal was 7% and the FY 2017-2018 rate was 10%. The Employee Departure Rate measures the number of employees that leave the Board through voluntary, involuntary, or retirement. Ms. Kitamura

indicated that this a very challenging goal to meet as BWS has an aging workforce. In addition, with unemployment very low in Hawaii, the Department is in constant competition with other agencies. To improve this metric, BWS has utilized many programs to attract and retain employees such as continuing apprenticeship and internship programs; participating in number job fairs; offering internal promotional opportunities; offering competitive salaries when appropriate and creating training curriculums to encourage succession planning.

Ms. Kitamura provided updates to the performance metrics for the Water Master Plan (WMP) which has 33 performance metrics, 21 were met or were on track to be met, 5 metrics missed by the goal by 10% or less, and 7 missed the goal by 10%.

Ms. Kitamura discussed the 5 metrics that missed the goal by 10% or less.

The metric, "Pumps Available for Use", measures the percent of pumps that are available to be put into service. The goal is >90% and the FY 2018-2017 metric was 82%. During fiscal year 2017-2018, there were about 63 out of 364 pumps out of service. Of the 63, 38 pumps are currently in repair and are expected to be placed on line by the end of FY 2018-2019.

The metric, Storage Deficient Pressure Zones, measures pressure zones that do not meet storage required by the water system standards. To help meet the goal, three new reservoirs are scheduled for either design or construction within the next two years.

The two metrics, Pipeline Breaks and Leaks repaired per 100 miles of Pipe and Pipeline Breaks and Leaks per Year will improve with the implementation of the long-range pipeline replacement program.

The metric, Fire Hydrant Supply, measures the percentage of fire hydrants that met the Department's fire protection standards. Hydraulic model analysis was used to determine this metric in 2015 and will be updated every 5 years. This metric should improve as the long-range pipeline replacement program is implemented since fire protection will be upgraded to meet BWS standards with each pipe replacement project.

Ms. Kitamura discussed the last set of performance metrics for the WMP which did not meet the goal by 10% or more. Ms. Kitamura discussed 7 metrics in this area.

The first three metrics relating to Watershed Management and Conservation are programs that are still under development. BWS continues to fund appropriate programs to protect the watersheds and encourage conservation and anticipate progress in these areas to meet the targeted goals.

The metric, Emergency Power, measures the percentage of the population that can be served in the event of an island-wide power outage. This

metric is tied to the installation of permanent emergency generators and deployment of mobile emergency generators at critical pump stations. Currently, BWS has seven mobile emergency generators that can be deployed throughout the island as needed. BWS will complete construction of one permanent emergency generator at the Beretania Complex by the end of December, 2018, and five more at other critical facilities within the next 2 years. Once the permanent emergency generators are place on-line, BWS will have the flexibility to move the mobile emergency generators to other locations to increase island-wide coverage.

The metric, Pipeline Repair and Replacement, measures the 3-year moving average of miles of pipeline installed. BWS has a long-term pipe replacement program that anticipates ramping up pipeline installation to 21 miles per year within the next 10 years. As this goal is met, this metric will improve and eventually meet the target goal.

The last two metrics, High Risk Pipeline: Pipelines with high risk scores and Pipe Wall Assessment: Miles of pipeline recommended for pipe wall assessments by the analysis software, are undergoing re-analysis due to a change in the software that was used to develop these metrics. However, these metrics are directly related to the Pipeline Repair and Replacement metric. Pipelines with high risk scores identified by the original software were programmed for replacement in the 30-Year Capital Improvement Program. It is anticipated as the long-range pipe line replacement program is implemented, these metrics will improve.

Chair Andaya inquired about the last three metrics that were related to the pipeline replacement program and wanted to know the anticipated pipeline replacement for FY 2018-2019. Mr. Jason Takaki, Program Administrator for the Capital Project Division, responded that they were on target. Ms. Kitamura indicated that BWS will be reporting to the Board annually on the metrics to show progress on meeting the goals.

BWS Strategic Plan
Water Master Plan
Performance Metrics Update

Board of Directors Meeting
October 22, 2018

Overall Summary for FY 2018

PLAN	Total Number of Metrics	Met/on track to meet 🟢	Miss by <10% of goal 🟡	Miss by > 10% of Goal 🔴
Strategic Plan	**9**	**7**	**1**	**1**
Water Master Plan	33	21	5	7

Strategic Plan – Goals Met

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Water Levels at Index Wells	% Wells with stable water levels	100%	100%	100%	100%	WR
Water Quality Regulatory Compliance	Number of water quality regulatory violations	0	0	0	0	WQ
Water Conservation	Gallons per capita consumption (gpcd)	<145 by 2040	155	155	155	WR
Watershed Management	Acres of watershed surveyed	5,200	1,691	5,262	43,739	WR
Resident Overall Satisfaction	% Strong overall satisfaction with BWS	>59%	59%	NA	63%	CO
Pipeline Leak Detection	% Pipes check for leaks per year	25%	14%	12%	26%	FO
Fiscal Stability	Bond rating	AA+ - Fitch Aa2 – Moody's	Met	Met	Met	FN

Strategic Plan
Missed by 10% or Less of Goal

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Main Breaks	Main breaks per 100 miles of pipe	<15 (3-yr avg)	14	15	16	FO

Missed by more than 10% of Goal

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Employee Departures	Employee turn over rate	7%	11%	9%	10%	HR

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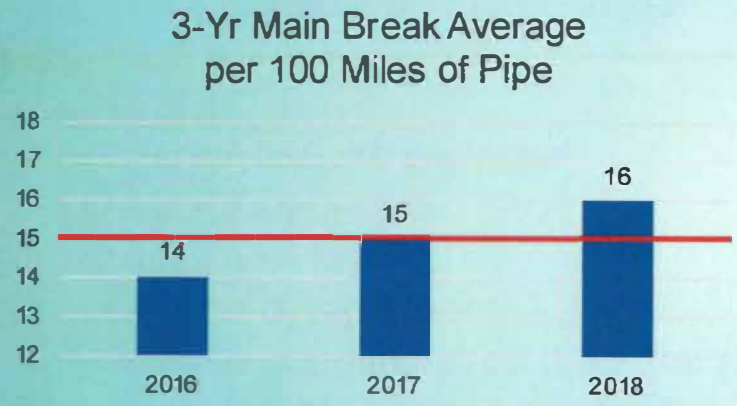
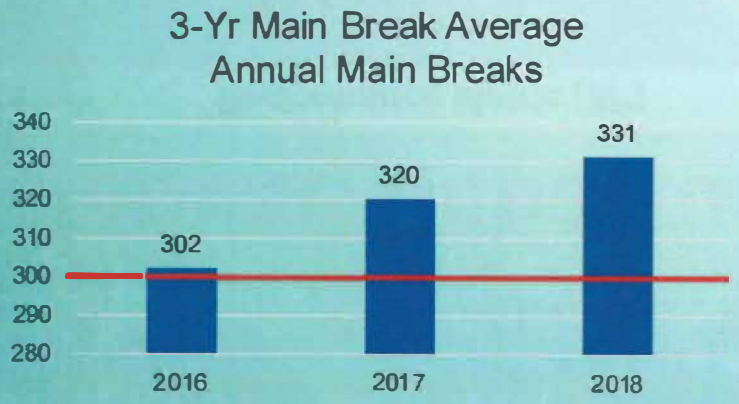
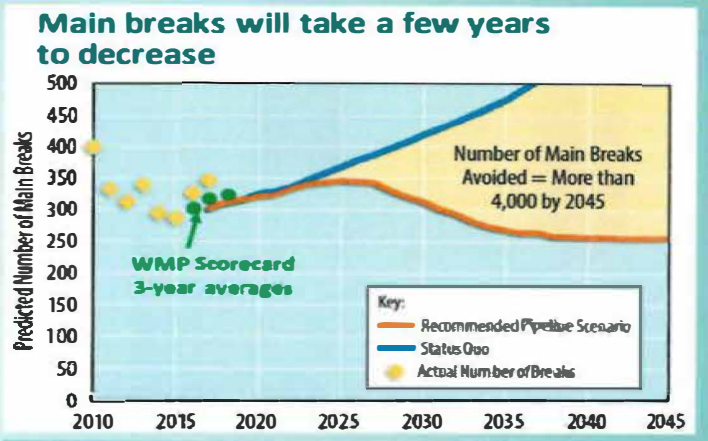
Board of Water Supply
City and County of Honolulu

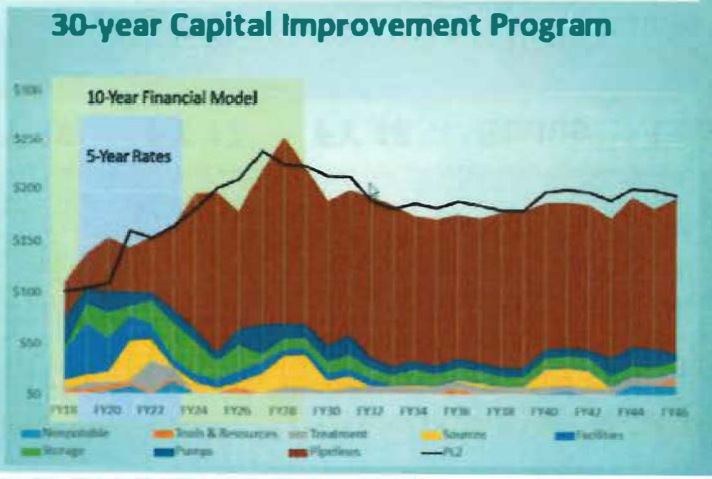
Main Breaks per 100 Miles of Pipe

Indicator	Performance Metric (SP)	Goal	FY 16	FY 17	FY 18	Status	Lead
Main Breaks	Main breaks per 100 miles of pipe	< 15 (3-yr avg)	14	15	16	🟡	FO









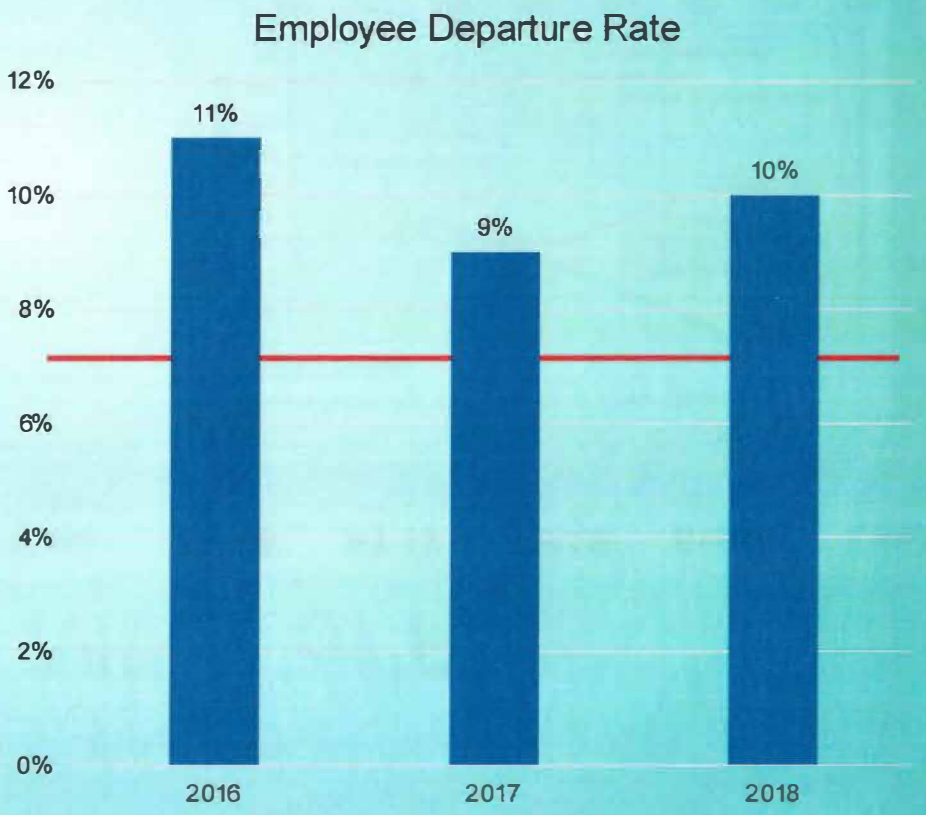
🟢 met/on track to meet 🟡 Miss by <10% of goal 🔴 Miss by >10% of goal

Employee Departure Rate

Indicator	Performance Metric (SP)	Goal	FY 16	FY 17	FY 18	Status	Lead
Employee Departures	Employee turn over rate	7%	11%	9%	10%	🔴	HR

- Turnover rates continue to be high due to high incidence of retirements – 20% eligible as of July 2018
- Low unemployment rate
- Opportunities to move between organizations

- Apprentice Programs and Internships
- Job Fairs, College and High Schools visits
- Internship and participation in Pookela Program
- Internal promotional opportunities
- Offering competitive salaries based on market comparison
- Training curriculums to encourage succession planning



🟢 met/on track to meet 🟡 Miss by <10% of goal 🔴 Miss by >10% of goal

Overall Summary for FY 2018

PLAN	Total Number of Metrics	Met/on track to meet	Miss by <10% of goal	Miss by > 10% of Goal
Strategic Plan	9	7	1	1
Water Master Plan	**33**	**21**	**5**	**7**

Water Master Plan – Goals Met

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Supply from Nonpotable Sources	% of total supply served from nonpotable water system	>12%	6%	7.15%	7.10%	WR
Annual Water Resource Yield	% of available water resource yield used	<90%	80%	70%	72%	WR
Watershed Management	Acres of watershed surveyed for invasive plant species removal	5,200	1,691	5,262	43,739	WR
Conservation	Gallons per capita consumption (gpcd)	<145 (by2040)	155	155	155	WR
Standby Source Capacity	% of Source Capacity used at Maximum Day Demand (MDD)	<50%	44%	40%	41%	WR
Water Level at Index Wells	% of wells with stable water levels	100%	100%	100%	100%	WR
Permitted or Assessed Sustainable Yield	Number of sources exceeding source permitted use or assessed sustainable yield (12 mo avg)	0	0	0	0	WR
Water Quality Regulatory Compliance	Number of water quality regulatory violations	0	0	0	0	WQ
Treatment on-line	% of chlorination systems on-line	100%	100%	100%	199%	WSO
Comprehensive treatment system condition assessment	Perform comprehensive condition assessment of all potable and non-potable treatment system	Update every 5 years	Done 2014	Target 2019	Target 2019	WSO

Water Master Plan – Goals Met (cont'd)

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Sufficient Pump Capacity	% of pressure zones where firm capacity is less Maximum Day Demand	<5%	2.6%	2.8%	2.8%	WR
Pump Station Condition Assessment	Perform regularly scheduled condition assessment	Update every 5 years	Done 2015	Target 2020	Target 2020	WSO
Reservoir Restrictions	Number of reservoirs with use restrictions	<2%	1%	0.58%	0.58%	CP
Reservoir Condition Assessment	Perform regularly scheduled condition assessment	Update every 10 years	Done 2015	Target 2025	Target 2025	CP
Transmission pipeline breaks	Number of pipeline breaks for ≥ 16 inches in diameter	<14 (3-yr avg)	10	12	13	FO
Non-Revenue Water	% of water produced but not sold	<8.1%	7.8%	7.4%	TBD	WR
Pipeline Leak Detection	% of pipes checked for leaks per year	25%	14%	12%	26%	WR
Water Master Plan Update	Update Water Master Plan	Update every 10 years	Done 2016	Target 2026	Target 2026	WR
Hydraulic Models and CapPlan Update	Update hydraulic models and CapPlan	Update every 5 years	Done 2016	Target 2021	Target 2021	IT
GIS Update	Update GIS	Annually	Done	Done	Done	IT
SCADA Reliability	% of sources, pump stations, water treatment plants and reservoirs utilizing microwave backbone for control data	100% (by 2023)	13%	15%	23%	WSO

Water Master Plan
Miss by 10% or Less of Goal

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Pumps Available for Use	% of pumps that are available to be put in-service	>90%	82%	81%	82%	WSO/ CP
Storage Deficient Pressure Zones	Pressure zones with less than Standard storage and without pumping or transmission equivalency to meet operating, emergency, and fire needs	0%	6%	5%	5%	WR
Pipeline Breaks	Pipeline breaks and leaks repaired per 100 miles per year	<15	14	15	16	FO
Pipeline Breaks	Pipeline breaks and leaks repaired per year	<300 (3-yr avg)	302	320	331	FO
Fire Hydrant Supply	Hydrants that meet fire flow standards	>99%	98%	98%	98%	WR

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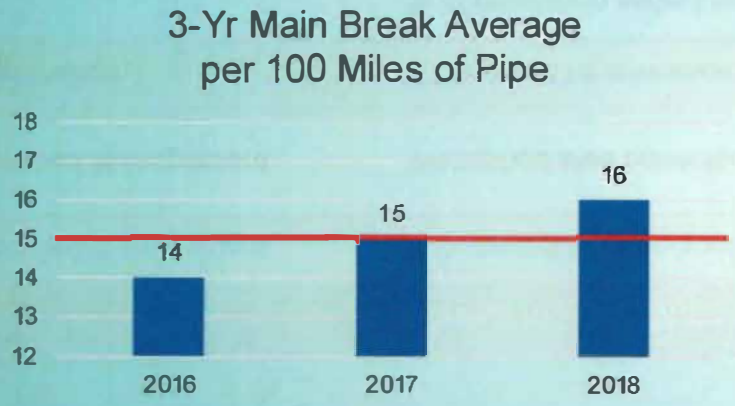
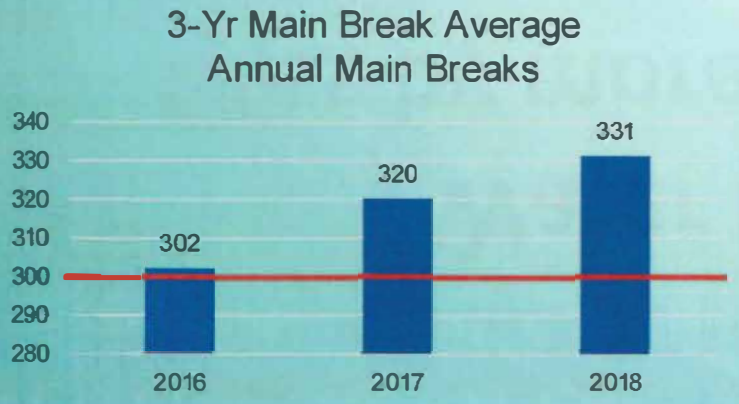
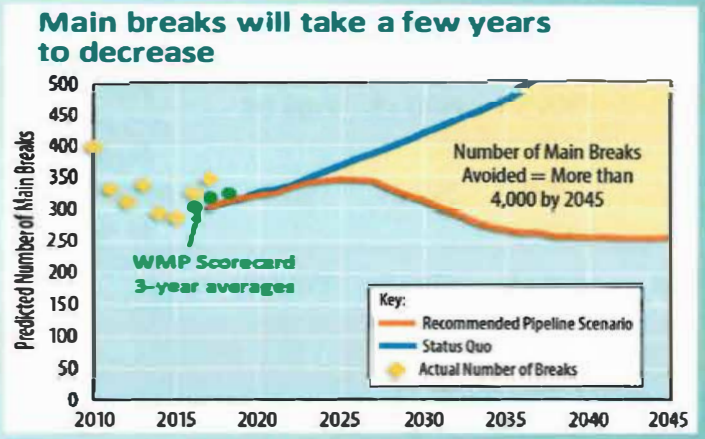
Board of Water Supply
City and County of Honolulu

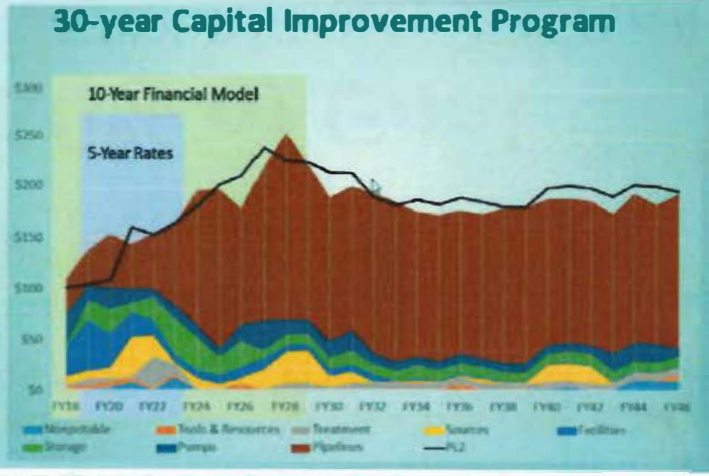
Main Breaks per 100 Miles of Pipe

Indicator	Performance Metric (SP)	Goal	FY 16	FY 17	FY 18	Status	Lead
Main Breaks	Main breaks per 100 miles of pipe	< 15 (3-yr avg)	14	15	16	🟡	FO









🟢 met/on track to meet 🟡 Miss by <10% of goal 🔴 Miss by >10% of goal

Water Master Plan
Miss by more than 10% of Goal

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Lead
Watershed Management	$ Budgeted for watershed management	4% of CIP $3.35M	$1.4M	$1.4M	$1.8M	WR
Watershed Management	Watershed area protected by fencing	20% of watershed funding	14%	19.8%	0%	WR
Conservation	$ Budgeted for conservation	4% of CIP $3.35M	$0.89M	$1.08M	$1.50M	WR
Emergency Power	% of population served indoor demand (85 gpcd) in event of loss of power	>85% distributed geographically	71%	71%	71%	WSO
High Risk Pipelines	Portion of pipelines with risk score	<5%	12%	14%	14%	WR/CP
Pipeline R&R	Miles of system pipeline renewed	21 mi (3-yr avg)	4.7	3.5	3.0	CP
Pipe Wall Assessment (PWA) pipeline condition assessment	Of pipelines recommended for PWA by CapPlan framework (currently 63 miles), miles assessed per year	6.3 mi (10%)	12 mi	0	0	WR/CP

Emergency Power

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Status	Lead
Emergency Power	% of population served indoor demand (85 gpcd) in event of loss of power	>85% distributed geographically	71%	71%	71%	●	WSO

- 71% coverage based on survey done in 2015
- 7 mobile generators on hand to be pre-deployed
- 5 permanent generators to be installed:
  - Within 2 years
    - Kunia Wells I
    - Halawa Shaft
    - Kalihi Yard
    - Kahuku Wells
  - December 2018
    - Beretania Station

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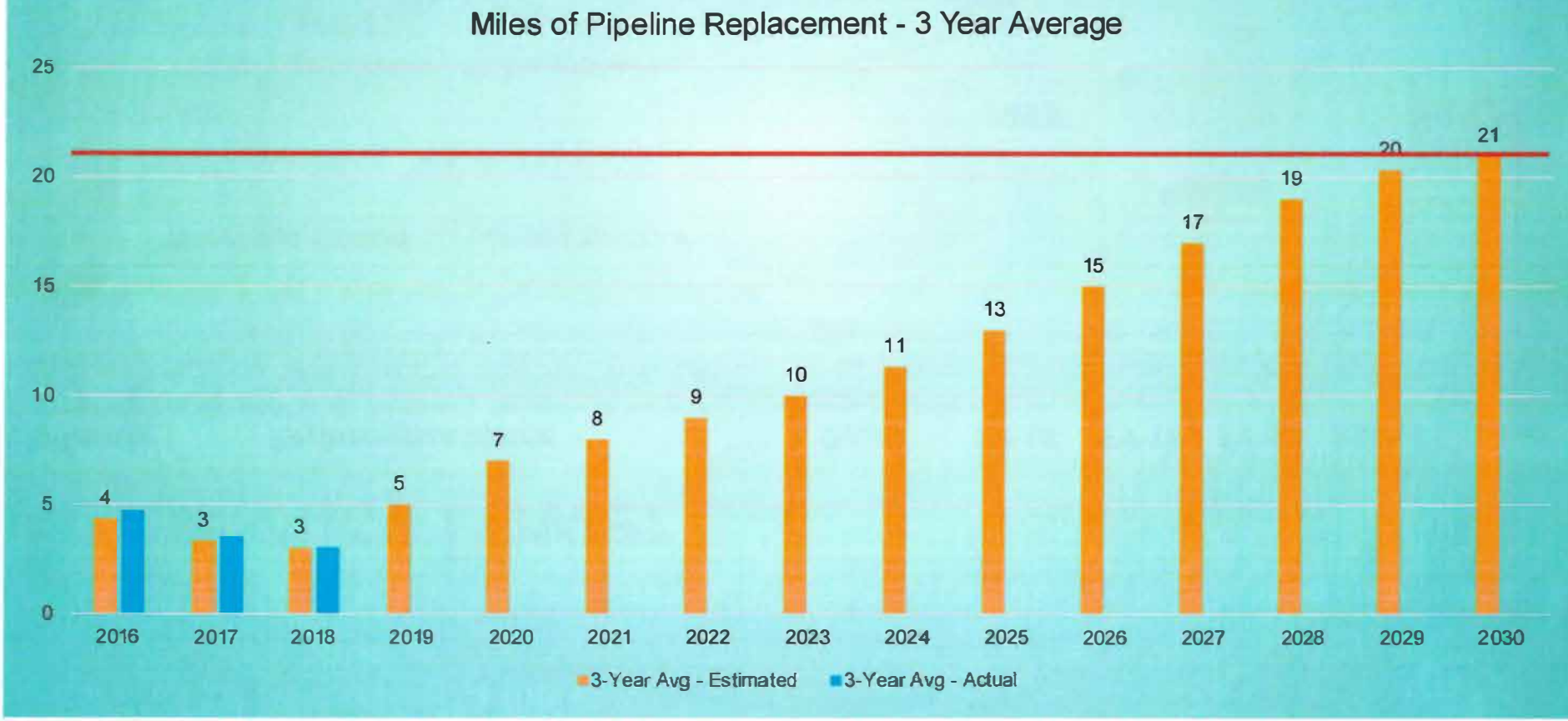
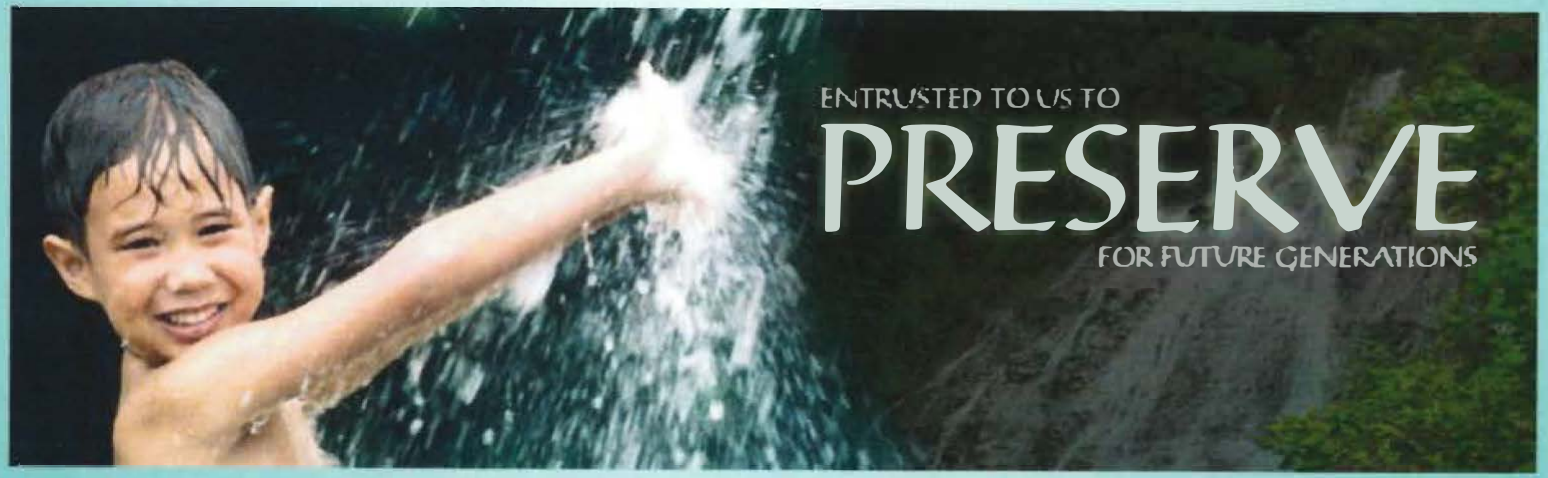
Miles of Pipeline Replacement – 3 Yr Avg

Indicator	Performance Metric	Goal	FY 16	FY 17	FY 18	Status	Lead
Pipeline R & R	Miles of System Pipeline Renewed	21 mi (3-yr avg)	4.7 mi	3.5 mi	3.0 mi	●	CP



met/on track to meet Miss by <10% of goal Miss by >10% of goal

Questions?



ITEMS FOR INFORMATION NO. 3

"October 22, 2018

FINANCIAL UPDATE FOR THE QUARTER ENDED SEPTEMBER 30, 2018

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Subject: Financial Update for the Quarter Ended September 30, 2018

The following Board of Water Supply's financial reports and graphs are attached:

- Budget vs Actual Revenue and Expense Totals
- Statement of Revenues, Expenses and Change in Net Assets
- Current Quarter Statement of Revenues, Expenses and Change in. Net Assets
- Balance Sheet
- Budget vs Actual Appropriation Budget – Total BWS Summary
- Graph Representing Operating Expenditures by Category
- Graphs of Total Budgeted Operating Expenditures and Total Budgeted Operating Revenues

Respectfully submitted,

/s/ for ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Attachments"

The foregoing was for information only.

DISCUSSION: Joseph Cooper, Waterworks Controller, gave the report. There were no comments or discussion.

Budget vs. Actual
Revenue and Expense Totals
As of September 30, 2018

	YTD Actuals	YTD Budget	Favorable/ (Unfavorable) Variance
Revenues	65,495,000	64,041,000	1,454,000
Operating Expenses	(41,424,000)	(42,506,000)	1,082,000
Net Revenues (expenditures)	24,071,000	21,535,000	2,536,000

Board Of Water Supply
Statement of Revenues, Expenses And Change In Net Assets
As of September 30, 2018

Current Month Actual	% Revenue	Last Year Actual	% Revenue	Description	Year to Date Actual	% Revenue	Last Year to Date Actual	% Revenue	% Change
				REVENUE					
19,631,453.08	100.00	22,219,072.43	100.00	OPERATING REVENUE	64,095,447.07	100.00	66,554,976.89	100.00	3.70-
19,631,453.08	100.00	22,219,072.43	100.00	REVENUE	64,095,447.07	100.00	66,554,976.89	100.00	3.70-
				OPERATING EXPENSES					
2,992,393.56-	15.24	3,057,015.25-	13.76	LABOR COSTS	8,943,332.11-	13.95	8,991,095.34-	13.51	.53-
2,103,911.55-	10.72	1,663,257.19-	7.49	SERVICES	3,880,488.91-	6.05	4,311,548.99-	6.48	10.00-
342,628.65-	1.75	481,037.97-	2.16	SUPPLIES	556,496.61-	.87	935,287.96-	1.41	40.50-
5,662.72-	.03	20,401.09-	.09	EDUCATION & TRAINING	30,243.17-	.05	44,308.61-	.07	31.74-
2,548,841.57-	12.98	2,084,408.83-	9.38	UTILITIES	5,377,608.97-	8.39	4,202,589.84-	6.31	27.96
133,961.18-	.68	96,280.78-	.43	REPAIR AND MAINTENANCE	257,784.71-	.40	422,412.91-	.63	38.97-
1,561,395.29-	7.95	7,490,562.61-	33.71	MISC	4,711,158.41-	7.35	10,568,009.62-	15.88	55.42-
1,973,953.14-	10.06	1,578,466.12-	7.10	RETIREMENT SYSTEM CONTRIBUTIO	4,826,708.42-	7.53	4,034,183.34-	6.06	19.65
1,556,676.13-	7.93	76,480.18	.34	MISC EMPLOYEES' BENEFITS	1,789,350.55-	2.79	104,890.39-	.16	1,605.92
13,219,423.79-	67.34	16,394,949.66-	73.79	OPERATING EXPENSES	30,373,171.86-	47.39	33,614,327.00-	50.51	9.64-
2,140,699.63	10.90	543,649.58	2.45	NON OPERATING REVENUE AND EXPE	641,048.45-	1.00	463,243.89	.70	238.38-
1,164,937.55	5.93	426,932.07	1.92	CONTRIBUTION IN AID	2,697,827.09	4.21	2,280,656.45	3.43	18.29
4,071,694.15-	20.74	4,934,873.42-	22.21	OTHER EXPENSES	11,863,926.63-	18.51	12,511,508.28-	18.80	5.18-
5,645,972.32	28.76	1,859,831.00	8.37	Change In Net Assets	23,915,127.22	37.31	23,173,041.95	34.82	3.20

Board Of Water Supply
Statement of Revenues, Expenses And Change In Net Assets
Quarter Ending September 30, 2018

Current Quarter Actual	% Revenue	Last Year Quarter Actual	% Revenue	Description	Year to Date Actual	% Revenue	Last Year to Date Actual	% Revenue	% Change
				REVENUE					
64,095,447	100.00	66,554,977	100.00	OPERATING REVENUE	64,095,447	100.00	66,554,977	100.00	-3.70
64,095,447	100.00	66,554,977	100.00	REVENUE	64,095,447	100.00	66,554,977	100.00	-3.70
				OPERATING EXPENSES					
-8,943,332	13.95	-8,991,095	13.51	LABOR COSTS	-8,943,332	13.95	-8,991,095	13.51	-0.53
-3,880,489	6.05	-4,311,549	6.48	SERVICES	-3,880,489	6.05	-4,311,549	6.48	-10.00
-556,497	0.87	-935,288	1.41	SUPPLIES	-556,497	0.87	-935,288	1.41	-40.50
-30,243	0.05	-44,309	0.07	EDUCATION & TRAINING	-30,243	0.05	-44,309	0.07	-31.74
-5,377,609	8.39	-4,202,590	6.31	UTILITIES	-5,377,609	8.39	-4,202,590	6.31	27.96
-257,785	0.40	-422,413	0.63	REPAIR AND MAINTENANCE	-257,785	0.40	-422,413	0.63	-38.97
-4,711,158	7.35	-10,568,010	15.88	MISC	-4,711,158	7.35	-10,568,010	15.88	-55.42
-4,826,708	7.53	-4,034,183	6.06	RETIREMENT SYSTEM CONTRIBUTIO	-4,826,708	7.53	-4,034,183	6.06	19.65
-1,789,351	2.79	-104,890	0.16	MISC EMPLOYEES' BENEFITS	-1,789,351	2.79	-104,890	0.16	1605.92
-30,373,172	47.39	-33,614,327	50.51	OPERATING EXPENSES	-30,373,172	47.39	-33,614,327	50.51	-9.64
-641,048	1.00	463,244	-0.70	NON OPERATING REVENUE AND EXPE	-641,048	1.00	463,244	-0.70	-238.38
2,697,827	-4.21	2,280,656	-3.43	CONTRIBUTION IN AID	2,697,827	4.21	2,280,656	3.43	18.29
-11,863,927	18.51	-12,511,508	18.80	OTHER EXPENSES	-11,863,927	18.51	-12,511,508	18.80	-5.18
23,915,127	37.31	23,173,042	-34.82	Change In Net Assets	23,915,127	37.31	23,173,042	34.82	3.20

Board Of Water Supply
Balance Sheet
As of September 30, 2018

	**********	Amounts	**********	**********	Change **********
Description	Current	Last Month End	Last Year End	This Month	This Year
ASSETS					
CURRENT ASSETS	68,095,171.93	66,637,936.86	56,821,489.13	1,457,235.07	11,273,682.80
RESTRICTED ASSETS	5,873,517.79	8,394,971.96	20,362,808.47	-2,521,454.17	-14,489,290.68
INVESTMENTS	419,424,081.09	414,037,548.00	414,037,548.00	5,386,533.09	5,386,533.09
OTHER ASSETS	15,880,321.48	16,171,500.86	17,087,015.81	-291,179.38	-1,206,694.33
PROPERTY / PLANT	1,150,793,085.25	1,148,417,127.30	1,150,029,284.68	2,375,957.95	763,800.57
DEFERRED OUTFLOWS OF RESOURCES	49,501,795.00	49,501,795.00	49,501,795.00	0.00	0.00
TOTAL ASSETS	1,709,567,972.54	1,703,160,879.98	1,707,839,941.09	6,407,092.56	1,728,031.45
LIABILITIES					
CURRENT LIABILITIES	12,795,624.56	11,148,947.42	33,834,409.77	1,646,677.14	-21,038,785.21
OTHER LIABILITIES	37,570,042.40	37,720,599.30	36,513,352.96	-150,556.90	1,056,689.44
BONDS PAYABLE, NONCURRENT	270,401,993.68	271,136,993.68	272,606,993.68	-735,000.00	-2,205,000.00
NET PENSION LIABILITY	116,342,916.00	116,342,916.00	116,342,916.00	0.00	0.00
DEFERRED INFLOWS OF RESOURCES	9,442,416.00	9,442,416.00	9,442,416.00	0.00	0.00
LIABILITIES	446,552,992.64	445,791,872.40	468,740,088.41	761,120.24	-22,187,095.77
NET ASSETS					
RETAINED EARNINGS	363,730,579.65	356,214,258.52	353,669,632.44	7,516,321.13	10,060,947.21
FUND BALANCE	594,633,831.66	594,633,831.66	594,633,831.66	0.00	0.00
RESERVE FOR ENCUMBRANCES	280,735,441.37	288,251,762.50	290,796,388.58	-7,516,321.13	-10,060,947.21
CURRENT YEAR CHANGES TO FU	23,915,127.22	18,269,154.90		5,645,972.32	23,915,127.22
NET ASSETS	1,263,014,979.90	1,257,369,007.58	1,239,099,852.68	5,645,972.32	23,915,127.22
TOTAL LIABILITIES AND NET ASSETS	1,709,567,972.54	1,703,160,879.98	1,707,839,941.09	6,407,092.56	1,728,031.45

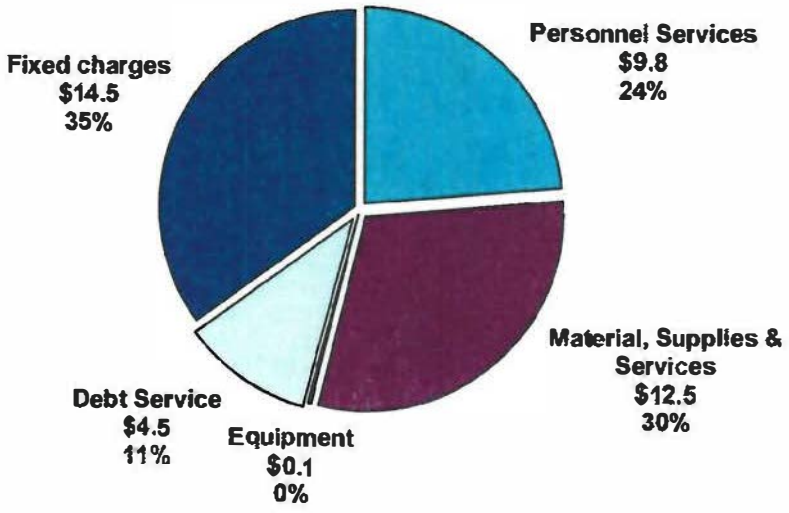
($000's)

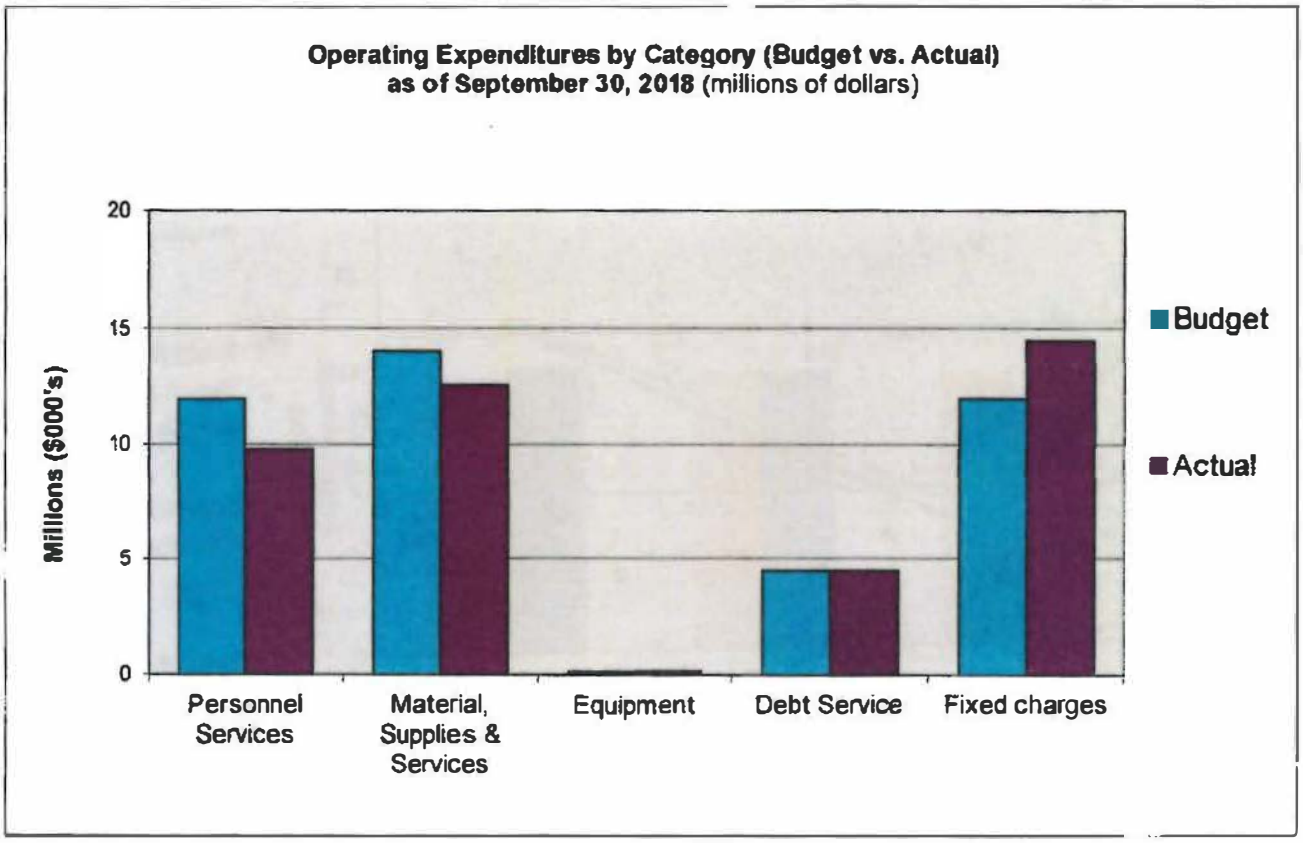
OPER UNIT ALL CIFIS 19820-3021

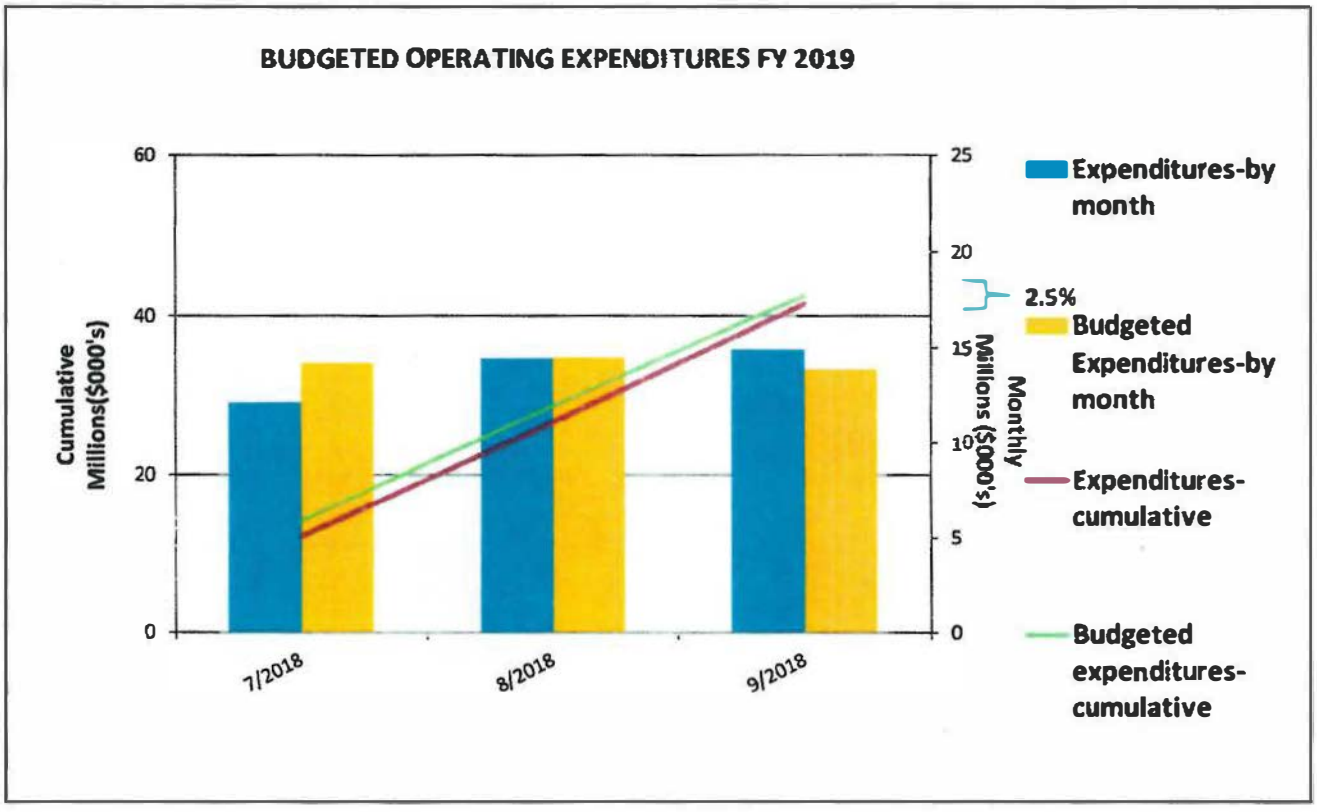
BUSINESS UNIT ALL AS OF 9/30/2018

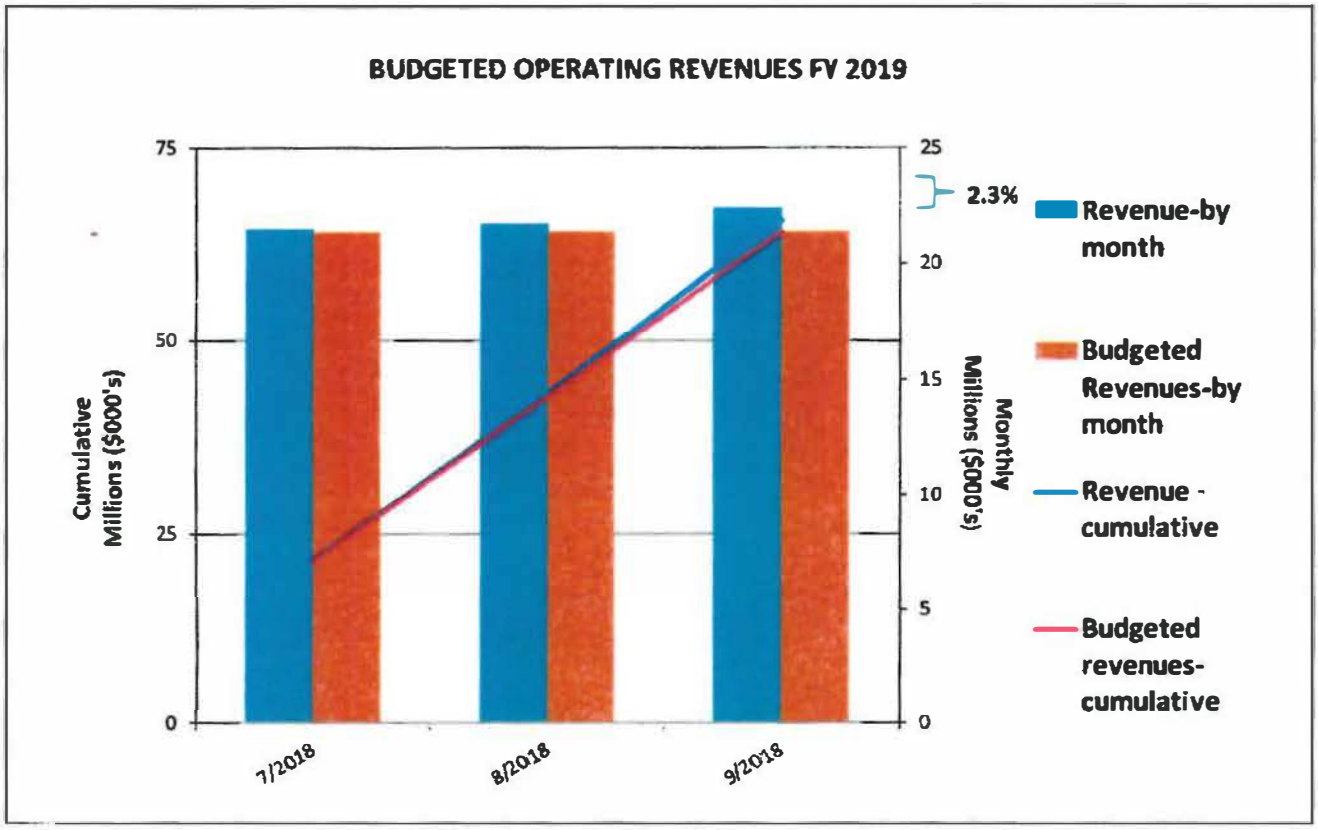
YTD-TO-DATE					FOR THE FISCAL YEAR				
YTD Actuals	YTD Budget	Avail/ (Over)	%	Object Description	Revenues/ Expend	Open Encumb	Annual Budget	Avail/ (Over)	%
65,495	64,041	(1,454)	2.27-	REVENUE	65,495		239,236	173,741	72.62
				OPERATING EXPENSES:					
9,797	11,958	2,161	18.07	Personnel Services	9,797		48,939	39,142	79.98
				MATERIALS AND SUPPLIES					
4,495	6,603	2,108	31.92	Services	2,749	1,746	32,571	28,076	86.20
2,208	3,180	972	30.57	Supplies	1,050	1,158	14,224	12,016	84.48
38	143	105	73.43	Education & Training	33	5	785	747	95.16
				Utilities					
398	600	202	33.67	Repairs & Maint	321	77	2,905	2,507	86.30
5,403	3,487	(1,916)	54.95-	Misc	4,203	1,200	11,996	6,593	54.96
143	118	(25)	21.19-	Equipment		143	5,365	5,222	97.33
4,470	4,469	(1)	.02-	Debt Service	4,470		17,877	13,407	75.00
				FIXED CHARGES:					
6,194	5,803	(391)	6.74-	Utilities	6,194		23,210	17,016	73.31
825	825			Case Fees	825		3,300	2,475	75.00
3,416	2,525	(891)	35.29-	Retirement System Contribution	3,416		10,100	6,684	66.18
4,037	2,795	(1,242)	44.44-	Misc Employees' Benefits	1,998	2,039	11,237	7,200	64.07
41,424	42,506	1,082	2.55	TOTAL OPERATING EXPENDITURES	35,056	6,368	182,509	141,085	77.30
24,071	21,535	(2,536)		NET REVENUES (EXPENDITURES)	30,439	(6,368)	56,727	32,656	

Total Operating Expenditures - $41.4
As of September 30, 2018
(millions of dollars)




Operating Expenditures by Category (Budget vs. Actual)
as of September 30, 2018 (millions of dollars)
Millions ($000's)
20
15
10
5
0
Personnel Services
Material, Supplies & Services
Equipment
Debt Service
Fixed charges
Budget
Actual


BUDGETED OPERATING EXPENDITURES FY 2019
Cumulative Millions($000's)
Monthly Millions ($000's)
60
40
20
0
25
20
15
10
5
0
7/2018
8/2018
9/2018
Expenditures-by month
2.5%
Budgeted Expenditures-by month
Expenditures-cumulative
Budgeted expenditures-cumulative


BUDGETED OPERATING REVENUES FY 2019
Cumulative Millions ($000's)
Monthly Millions ($000's)
75
50
25
0
25
20
15
10
5
0
2.3%
7/2018
8/2018
9/2018
Revenue-by month
Budgeted Revenues-by month
Revenue - cumulative
Budgeted revenues-cumulative

WATER FOR LIFE

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

Board of Water Supply
City and County of Honolulu

Financial Performance

July 2018 – September 2018

Budget to Actual
July 2018 – September 2018

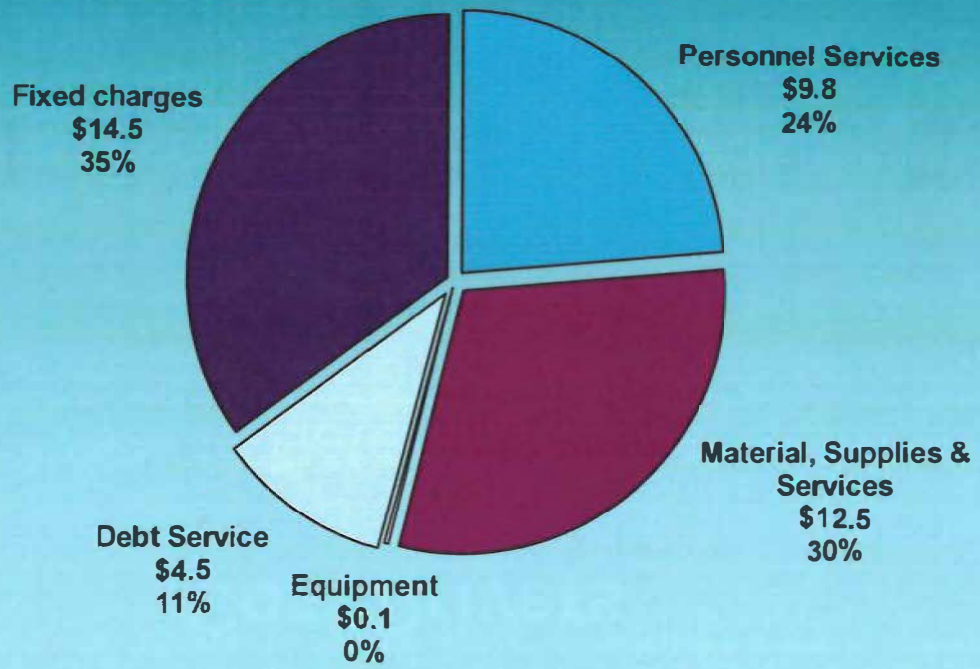
- Actual Revenue $65 million vs. Budgeted Revenue $64 million
- Operating costs are $41 million vs. Budgeted costs of $43 million
- Actual Net Revenue $24 million vs. Budgeted Net Revenue $22 million

Cost Drivers

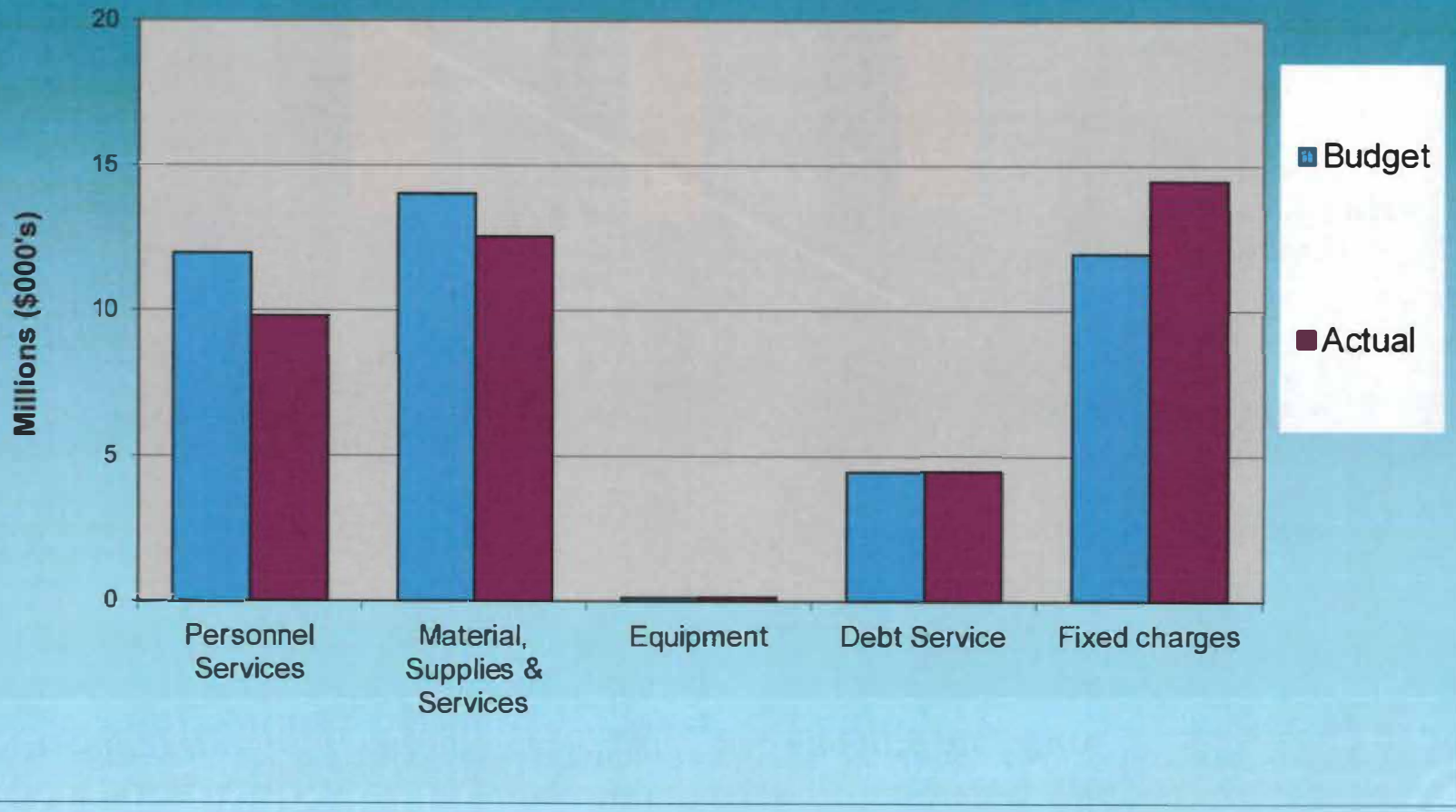
Year to Date September 2018

	Actual (millions)	Budget (millions)
• Personnel	$ 10	$12
• Services/Supplies	$ 7	$10
• Repairs & Misc.	$ 6	$ 4
• Equipment	$ 0.1	$ 0.1
• Utilities	$ 6	$ 6

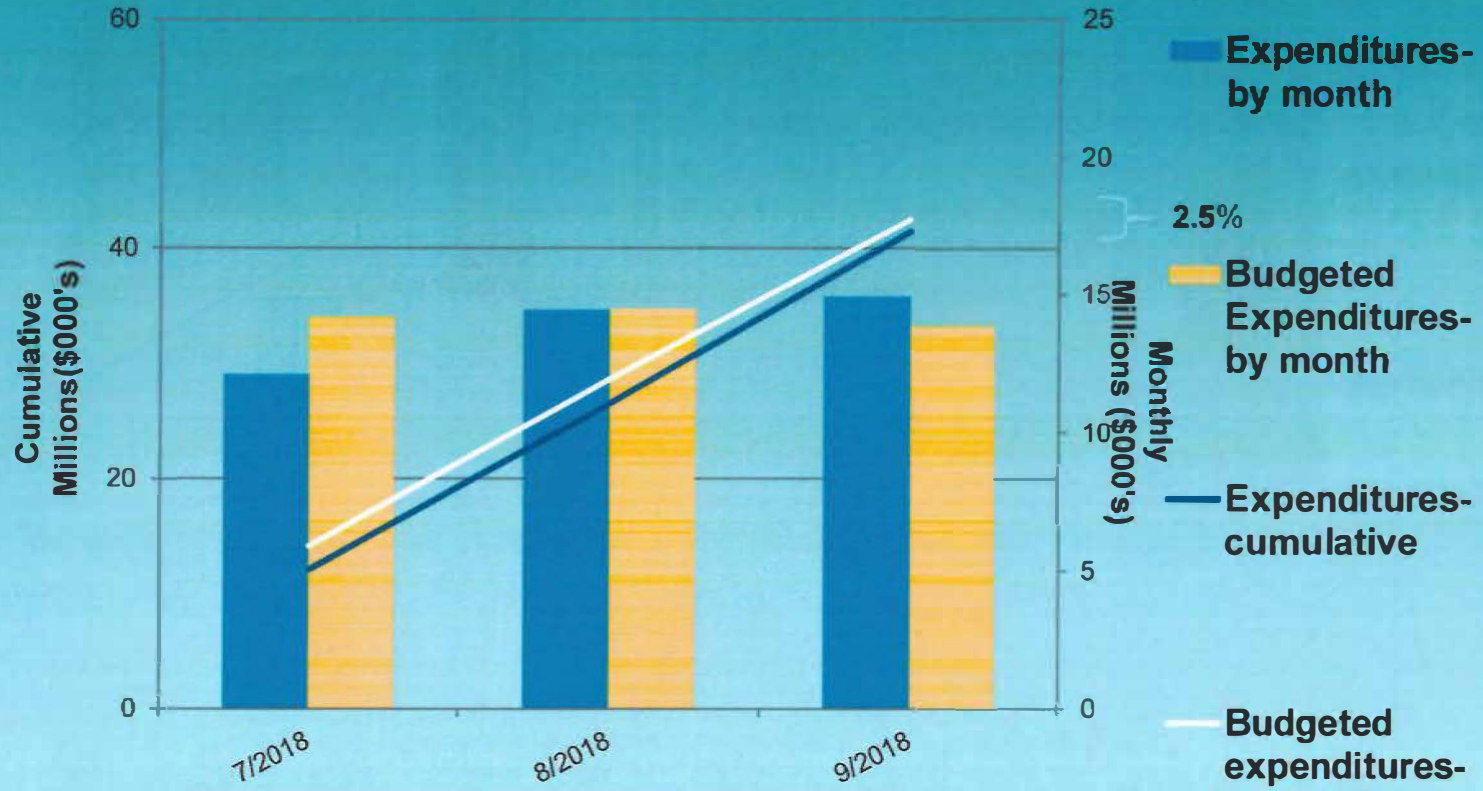
Total Operating Expenditures - $41.4
As of September 30, 2018
(millions of dollars)



Operating Expenditures by Category (Budget vs. Actual)
as of September 30, 2018 (millions of dollars)



BUDGETED OPERATING EXPENDITURES FY 2019

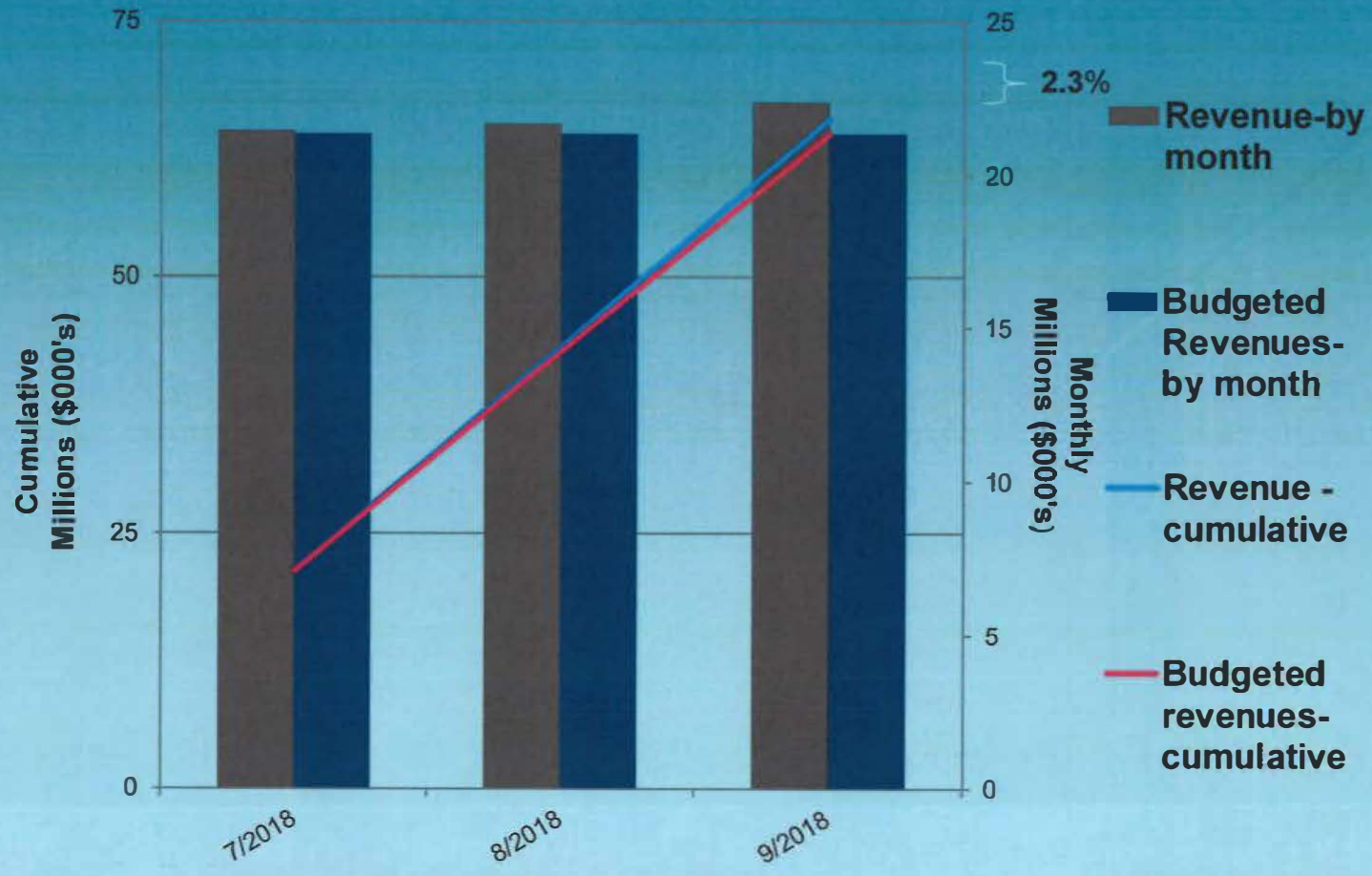


WATER FOR LIFE

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

Board of Water Supply
City and County of Honolulu

BUDGETED OPERATING REVENUES FY 2019



Questions
or
Comments

ITEMS FOR INFORMATION NO. 4

"October 22, 2018

GROUNDWATER LEVELS

Chair and Members
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Chair and Members:

Subject: Status Update of Groundwater Levels at All Index Stations

There were no aquifer index wells within low groundwater status for the production month of September 2018. The monthly production average for September 2018 was 136.11 million gallons per day.

The Board of Water Supply rainfall index for the month of September 2018 was 154 percent of normal; with a 5-month moving average of 141 percent. As of October 9, 2018, the Hawaii Drought Monitor shows no drought conditions for the Island of Oahu.

Like the previous month, most monitoring wells are exhibiting static or increasing trends, likely resulting from decreased pumping due to recent storm events.

Respectfully submitted,

/s/ for ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Attachment"

The foregoing was for information only.

DISCUSSION: Barry Usagawa, Water Resources Division Program Administrator, gave the report. There were no comments or discussion.

PRODUCTION, HEAD AND RAINFALL REPORT
MONTH OF SEPTEMBER 2018

POTABLE

STATION	MGD
HONOLULU (1)	
KULIOUOU	0.06
WAILUPE	0.11
AINA KOA	0.18
AINA KOA II	0.74
MANOA II	0.96
PALOLO	1.15
KAIMUKI HIGH	1.29
KAIMUKI LOW	1.99
WILDER	6.67
BERETANIA HIGH	4.31
BERETANIA LOW	2.11
KALIHI HIGH	1.88
KALIHI LOW	2.13
KAPALAMA	0.67
KALIHI SHAFT	8.40
MOANALUA	1.17
HALAWA SHAFT	9.09
KAAMILO	0.68
KALAUAO	6.40
PUNANANI	9.75
KAAHUMANU	0.28
HECO WAIAU	2.69
MANANA	0.42
WELLS SUBTOTAL:	63.14
MANOA TUNNEL	0.17
PALOLO TUNNEL	0.23
GRAVITY SUBTOTAL:	0.40
HONO. SUBTOTAL:	63.54

STATION	MGD
WINDWARD (2)	
WAIMANALO II	0.40
WAIMANALO III	0.00
KUOU I	0.38
KUOU II	0.05
KUOU III	0.15
LULUKU	0.96
HAIKU	0.00
IOLEKAA	0.00
KAHALUU	0.83
KAHANA	0.77
PUNALUU I	0.00
PUNALUU II	1.47
PUNALUU III	1.26
KALUANUI	1.12
MAAKUA	0.24
HAUULA	0.19
WELLS SUBTOTAL:	7.81
WAIM. TUNNELS I & II	0.00
WAIM. TUNNELS III&IV	0.19
WAIHEE INCL. WELLS	0.60
WAIHEE TUNNEL	4.85
LULUKU TUNNEL	0.12
HAIKU TUNNEL	0.90
KAHALUU TUNNEL	1.85
GRAVITY SUBTOTAL:	8.51
WIND. SUBTOTAL:	16.31

STATION	MGD
NORTH SHORE (3)	
KAHUKU	0.37
OPANA	0.09
WAIALEE I	0.46
WAIALEE II	0.46
HALEIWA	0.00
WAIALUA	1.82
N.SHORE SUBTOTAL:	3.20

MILILANI (4)	
MILILANI I	1.88
MILILANI II	0.00
MILILANI III	0.71
MILILANI IV	1.46
MILILANI SUBTOTAL:	4.05

WAHIAWA (5)	
WAHIAWA	1.33
WAHIAWA II	1.73
WAHIAWA SUBTOTAL:	3.06

PEARL CITY-HALAWA (6)	
HALAWA 277	0.84
HALAWA 550	0.00
AIEA	1.01
AIEA GULCH 497	0.43
AIEA GULCH 550	0.20
KAONOHI I	0.96
WAIMALU I	0.00
NEWTOWN	0.87
WAIAU	0.72
PEARL CITY I	0.50
PEARL CITY II	0.95
PEARL CITY III	0.40
PEARL CITY SHAFT	0.89
PEARL CITY-HALAWA SUBTOTAL:	7.77

STATION	MGD
WAIPAHU-EWA (7)	
WAIPIO HTS.	0.54
WAIPIO HTS. I	0.54
WAIPIO HTS. II	0.26
WAIPIO HTS. III	0.87
WAIPAHU	5.75
WAIPAHU II	1.96
WAIPAHU III	1.61
WAIPAHU IV	1.84
KUNIA I	4.27
KUNIA II	1.68
KUNIA III	1.45
HOAEAE	4.31
HONOULIULI I	1.30
HONOULIULI II	7.10
MAKAKILO	0.35
WAIPAHU-EWA SUBTOTAL:	33.83

WAIANAE (8)	
MAKAHA I	0.49
MAKAHA II	0.19
MAKAHA III	0.48
MAKAHA V	0.08
MAKAHA VI	0.00
MAKAHA SHAFT	0.00
KAMAILE	0.13
WAIANAE I	0.01
WAIANAE II	0.82
WAIANAE III	0.58
WELLS SUBTOTAL:	2.79
WAIA. C&C TUNNEL	1.40
WAIA. PLANT. TUNNELS	0.16
GRAVITY SUBTOTAL:	1.56
WAIANAE SUBTOTAL:	4.35

NONPOTABLE

NONPOTABLE	MGD
KALAUAO SPRINGS	0.64
BARBERS POINT WELL	1.32
GLOVER TUNNEL NP	0.41
NONPOTABLE TOTAL:	2.38

RECYCLED WATER (AUGUST 2018)

RECYCLED WATER	MGD
HONOULIULI WRF R-1	7.00
HONOULIULI WRF RO	1.70
RECYCLED WATER TOTAL:	8.70

PRODUCTION, HEAD AND RAINFALL REPORT
MONTH OF SEPTEMBER 2018

PRODUCTION SUMMARIES

TOTAL WATER	MGD
PUMPAGE	125.64
GRAVITY	10.47
POTABLE TOTAL:	136.11
NONPOTABLE	2.38
RECYCLED WATER	8.70
TOTAL WATER:	147.19

CWRM PERMITTED USE AND BWS ASSESSED YIELDS FOR BWS POTABLE SOURCES

	WATER USE DISTRICTS	A PERMITTED USE/ BWS YLDS	B SEP 2018	C DIFF. A-B
1	HONOLULU	82.93	63.14	19.79
2	WINDWARD	25.02	10.87	14.15
3	NORTH SHORE	4.74	3.20	1.54
4	MILILANI	7.53	4.05	3.48
5	WAHIAWA	4.27	3.06	1.21
6	PEARL CITY-HALAWA	12.25	7.77	4.48
7	WAIPAHU-EWA	50.63	33.83	16.80
8	WAIANAE	4.34	2.79	1.55
	TOTAL:	191.71	128.70	63.01

CWRM PERMITTED USE FOR BWS NONPOTABLE SOURCES

	WATER USE DISTRICTS	A PERMITTED USE	B SEP 2018	C DIFF. A-B
7	WAIPAHU-EWA (BARBERS POINT WELL)	1.00	1.32	-0.32
	TOTAL:	1.00	1.32	-0.32

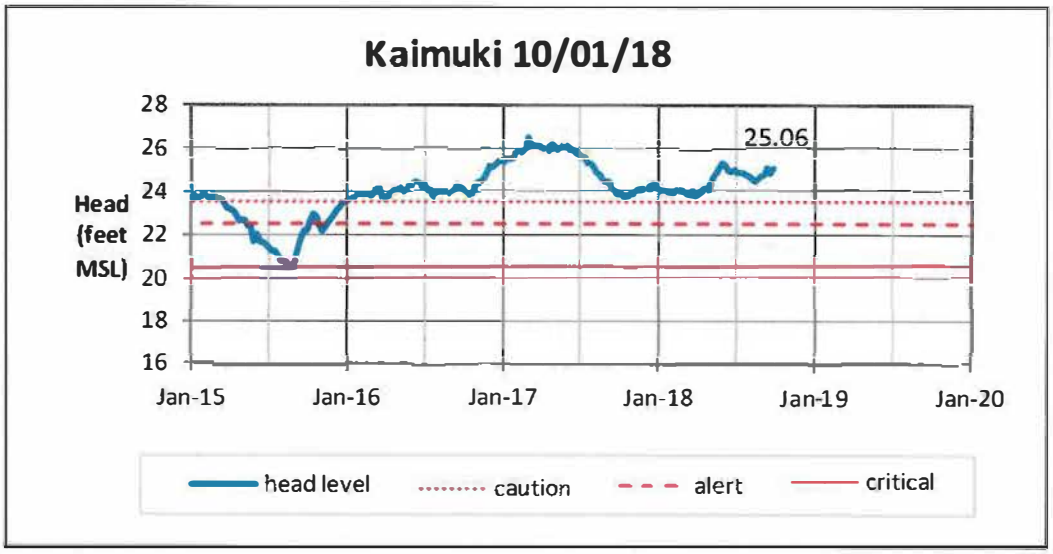
EFFECTIVE WATER DEMAND PER DISTRICT

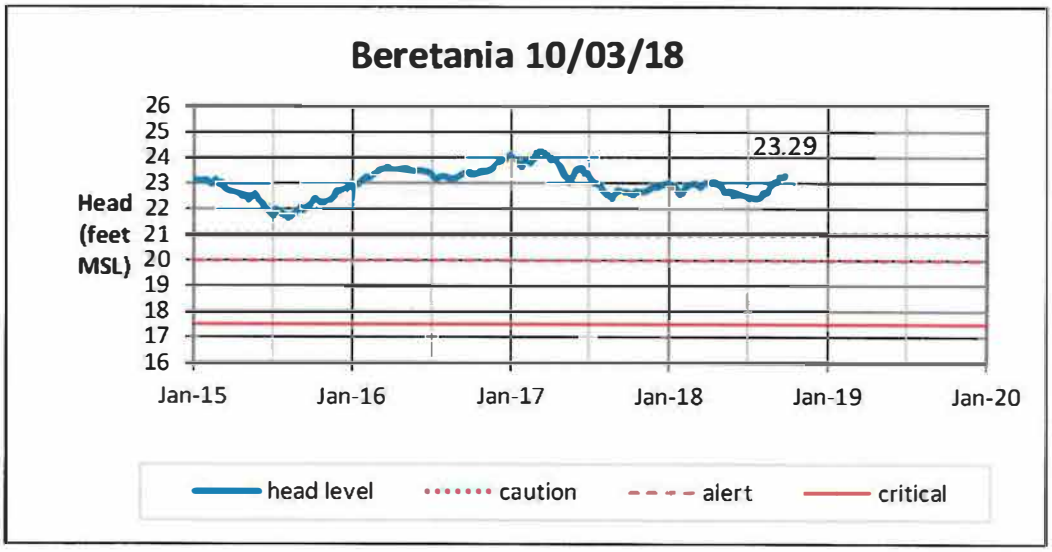
IMPORT/EXPORT BETWEEN WATER USE DISTRICTS

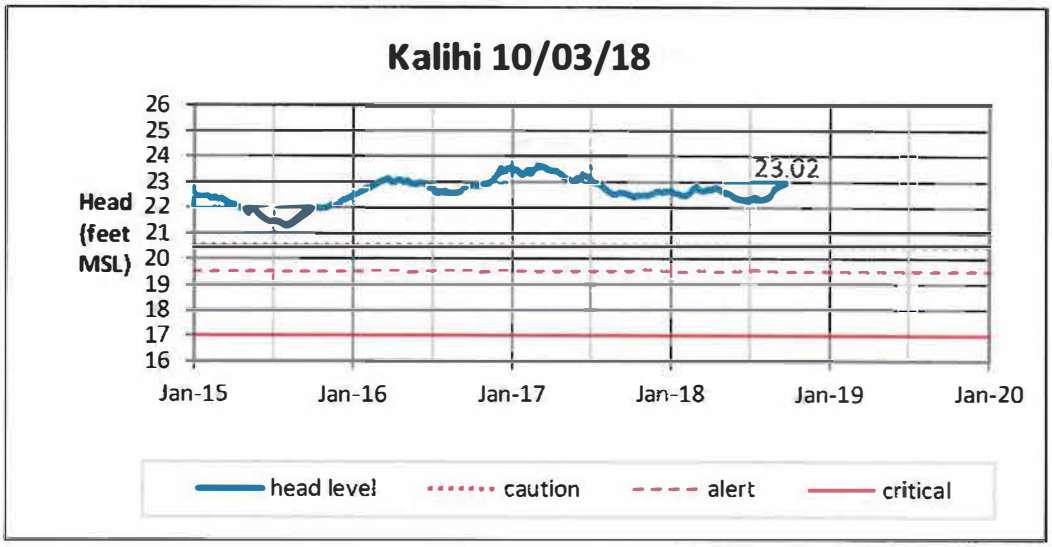
FROM	TO		MGD
2	1	WINDWARD EXPORT	1.15
7	8	BARBERS PT LB	5.56

	WATER USE DISTRICTS	SUBTOTAL	IMPORT	EXPORT	EFFECTIVE WATER DEMAND
1	HONOLULU	63.14	1.15	-	64.29
2	WINDWARD	10.87	-	1.15	9.71
3	NORTH SHORE	3.20	-	-	3.20
4	MILILANI	4.05	-	-	4.05
5	WAHIAWA	3.06	-	-	3.06
6	PEARL CITY-HALAWA	7.77	-	-	7.77
7	WAIPAHU-EWA	33.83	-	5.56	28.27
8	WAIANAE	2.79	5.56	-	8.35
	TOTAL:	128.70	6.71	6.71	128.70

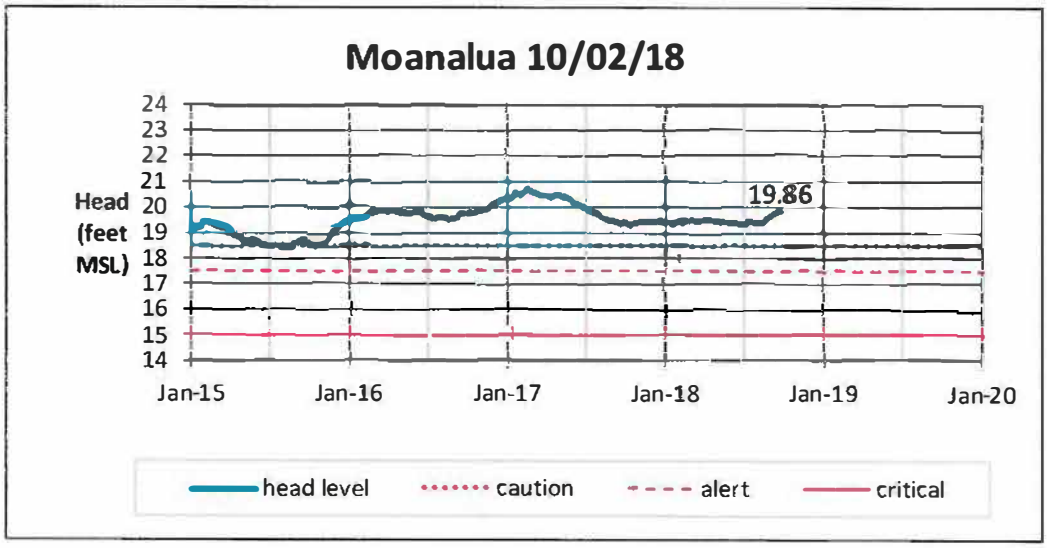
Weekly Head Report

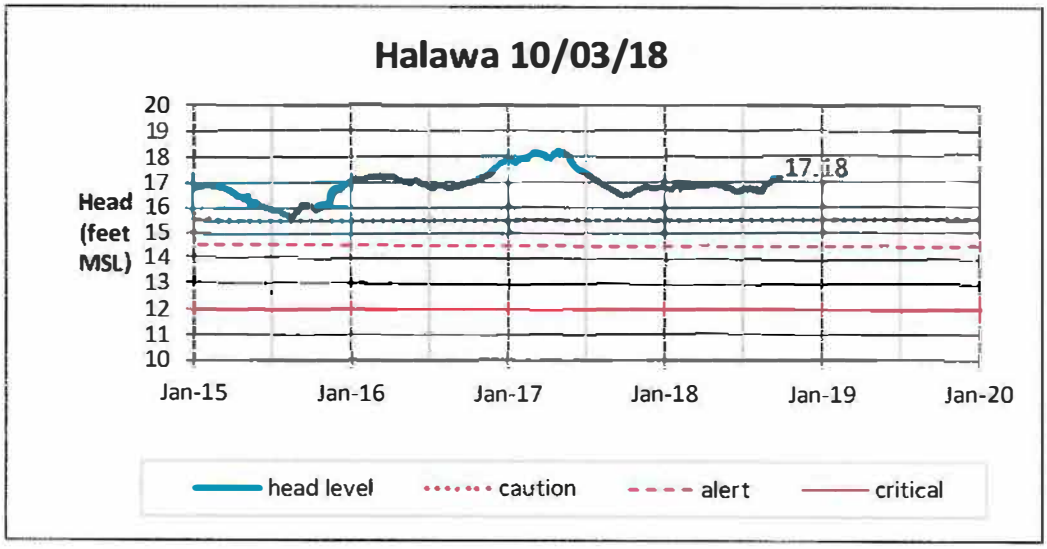


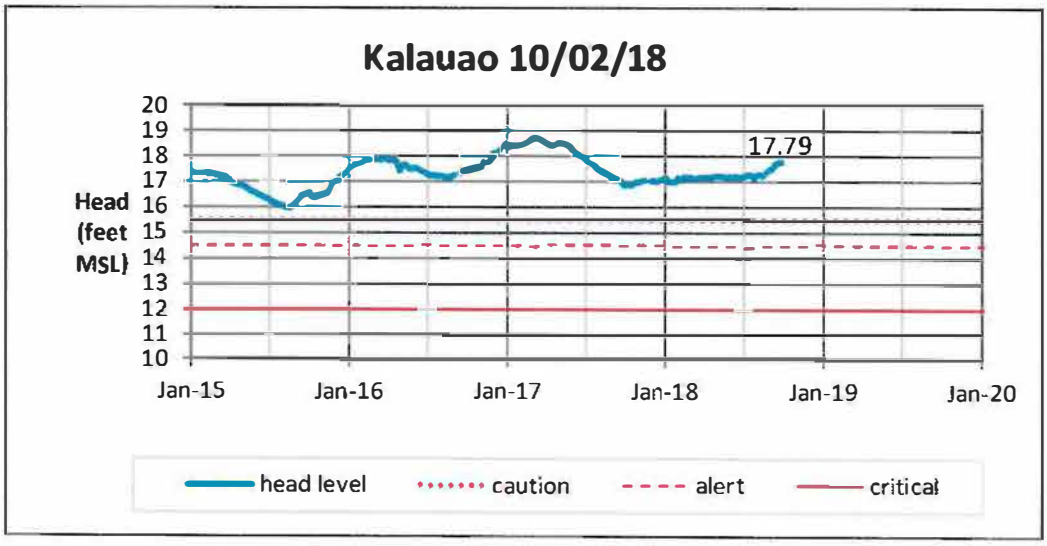




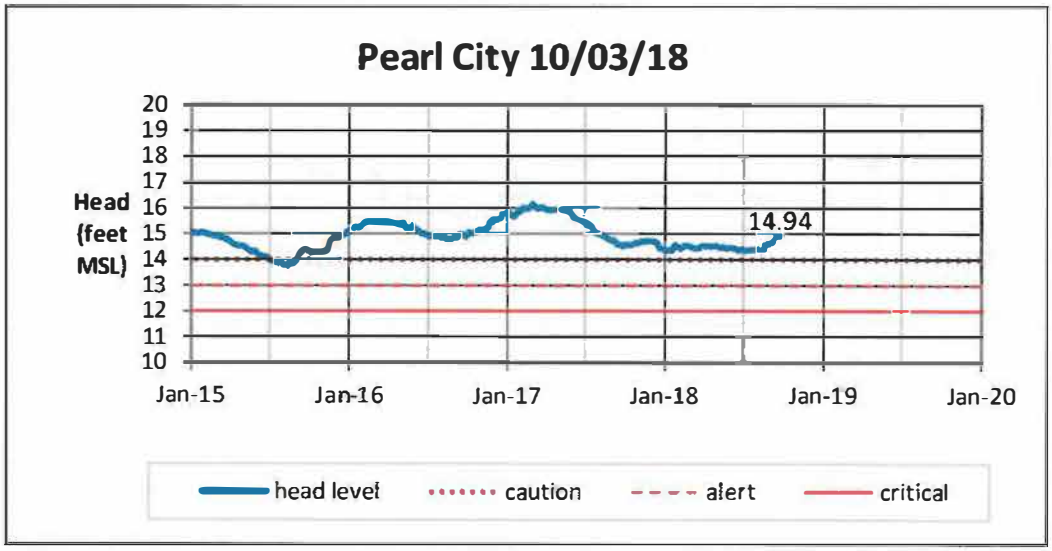
Weekly Head Report

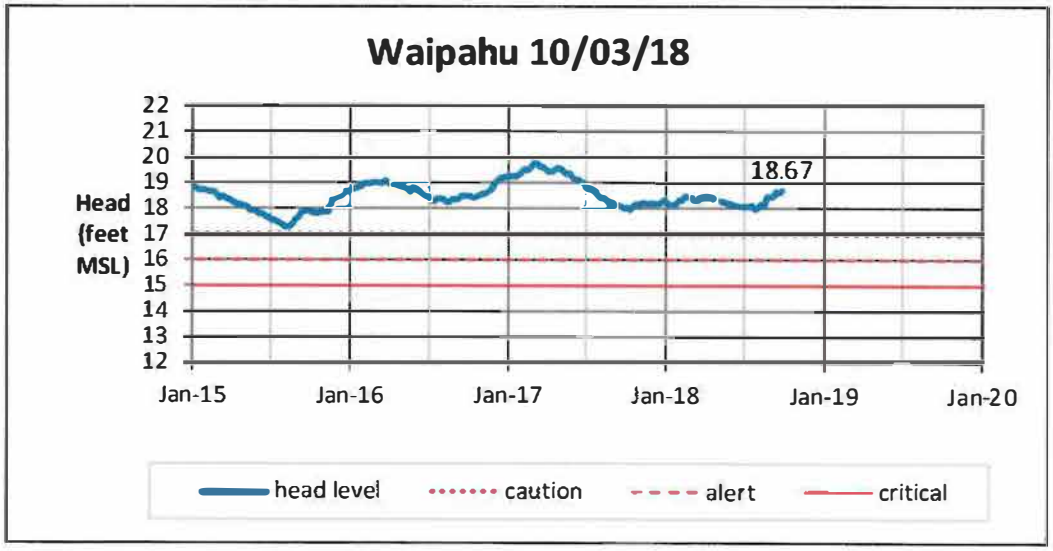


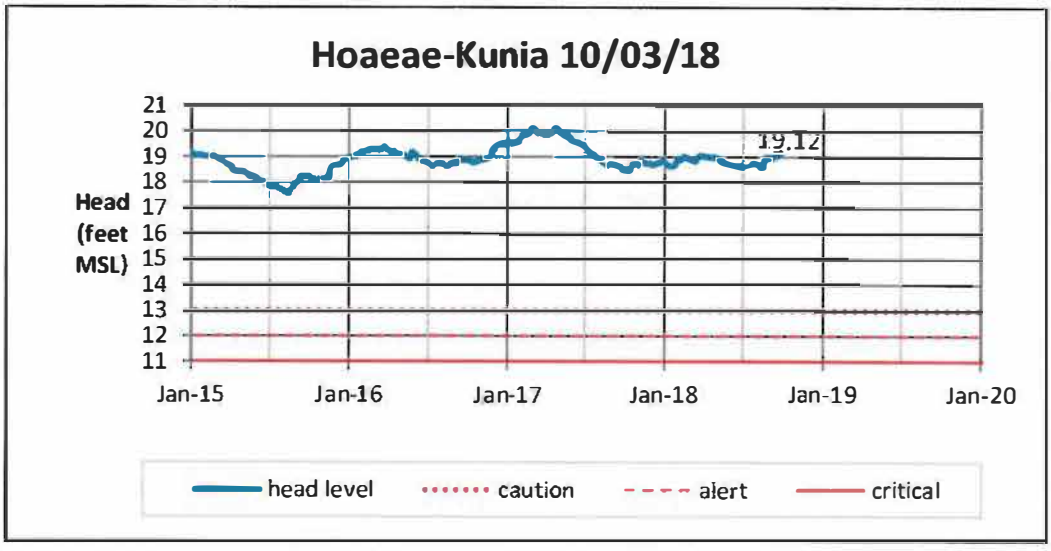




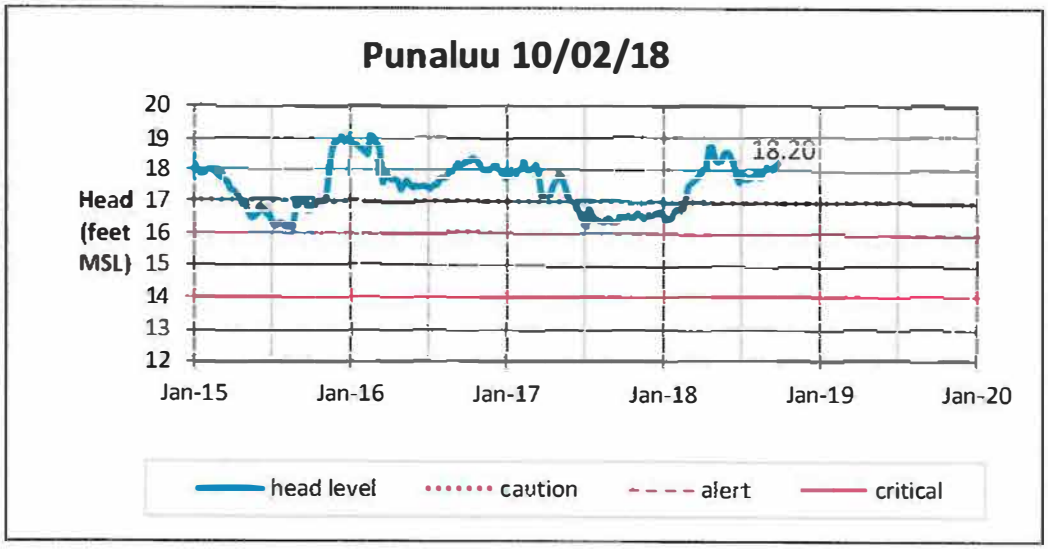
Weekly Head Report

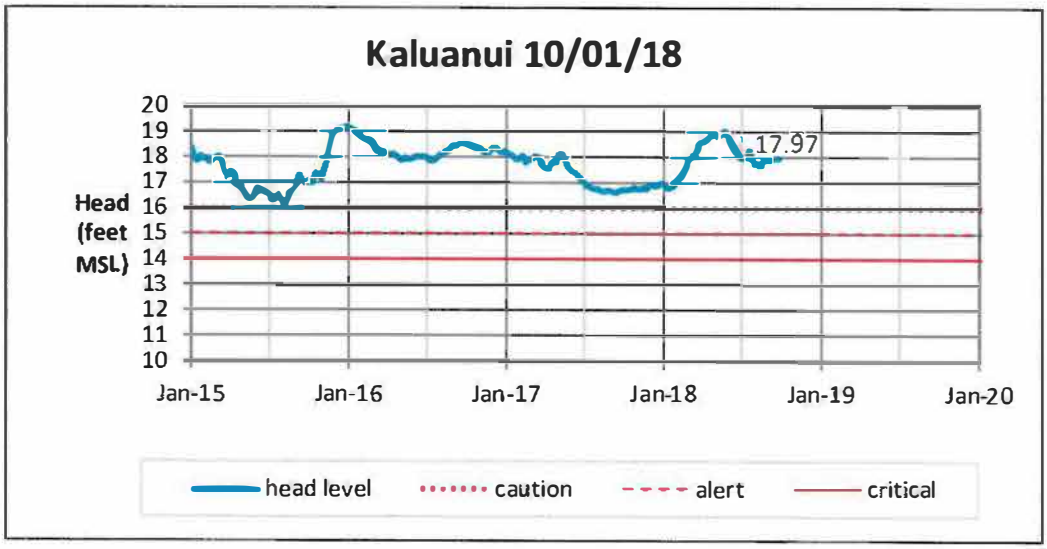


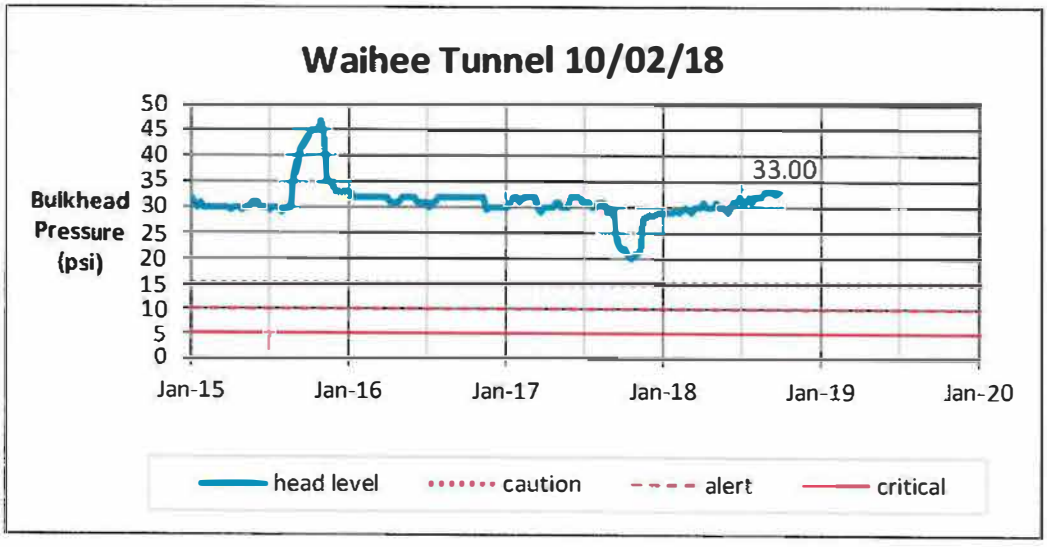




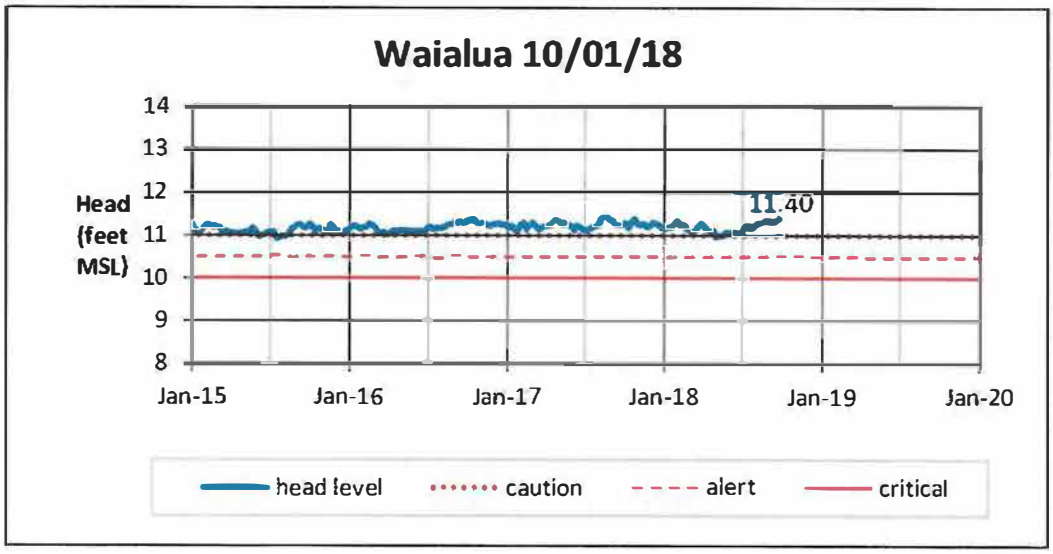
Weekly Head Report

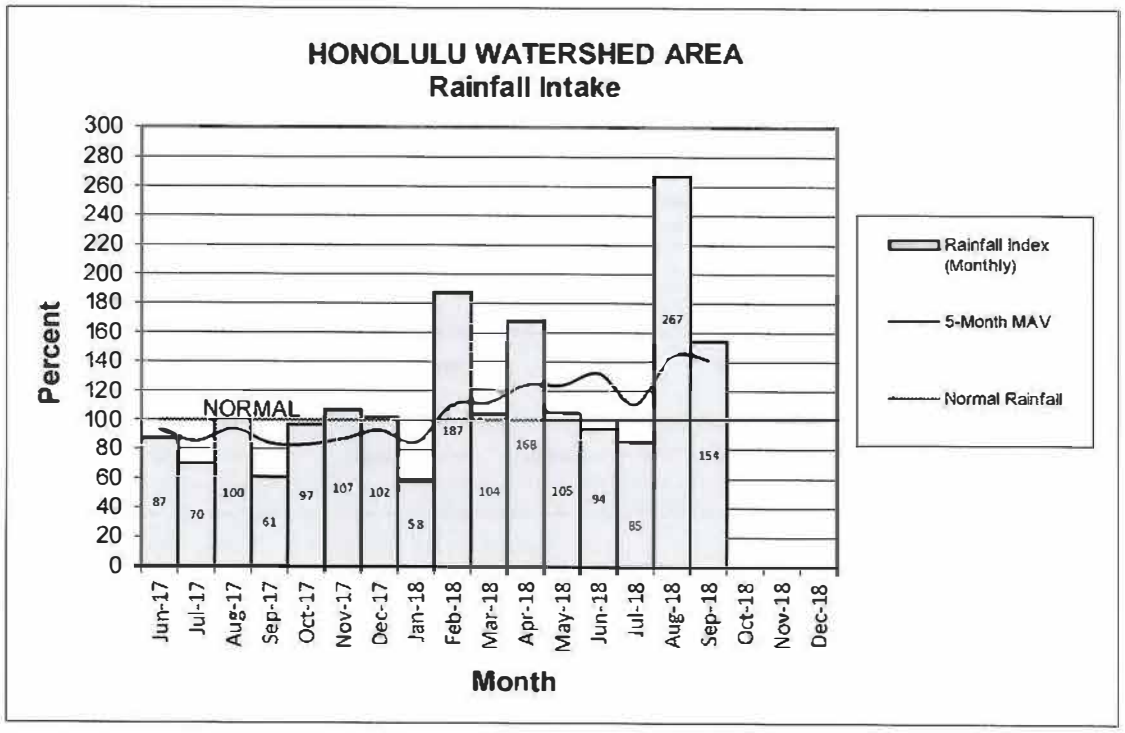


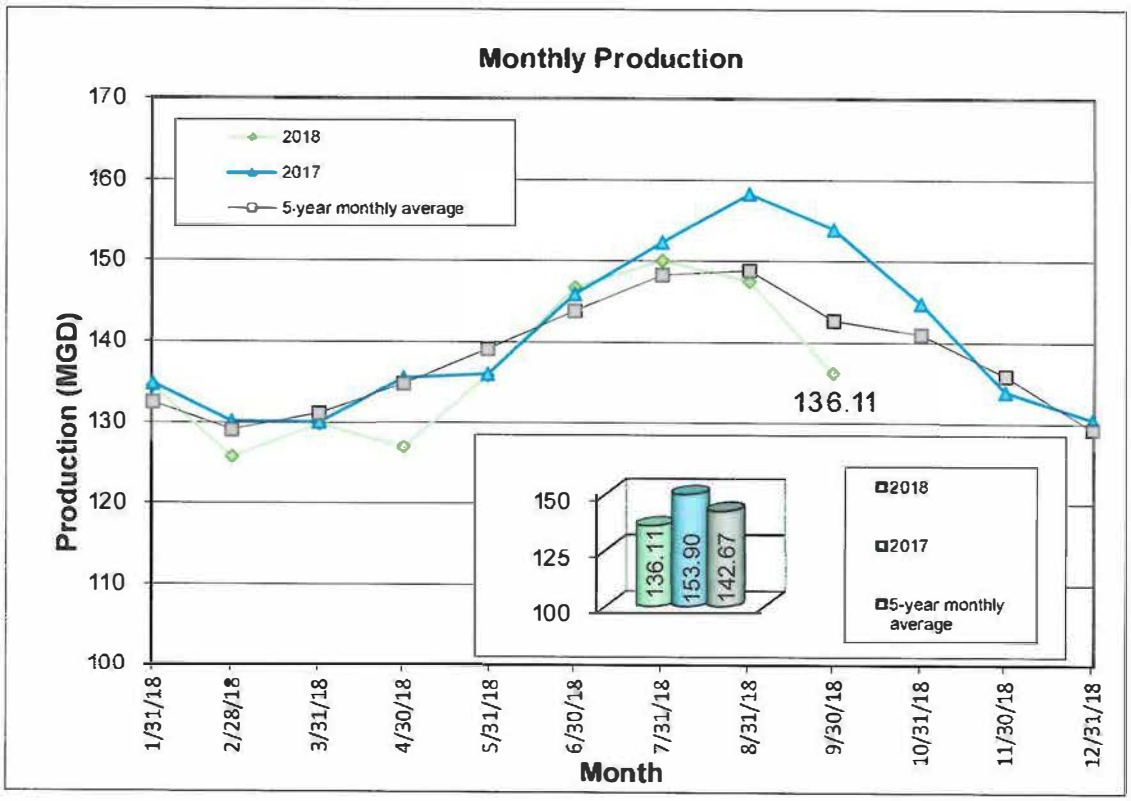




Weekly Head Report




HONOLULU WATERSHED AREA
Rainfall Intake
Percent
Month
NORMAL
87
70
100
61
97
107
102
58
187
104
168
105
94
85
267
154
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Rainfall Index (Monthly)
5-Month MAV
Normal Rainfall


Monthly Production
Production (MGD)
Month
2018
2017
5-year monthly average
136.11
153.90
142.67
2018
2017
5-year monthly average
1/31/18
2/28/18
3/31/18
4/30/18
5/31/18
6/30/18
7/31/18
8/31/18
9/30/18
10/31/18
11/30/18
12/31/18

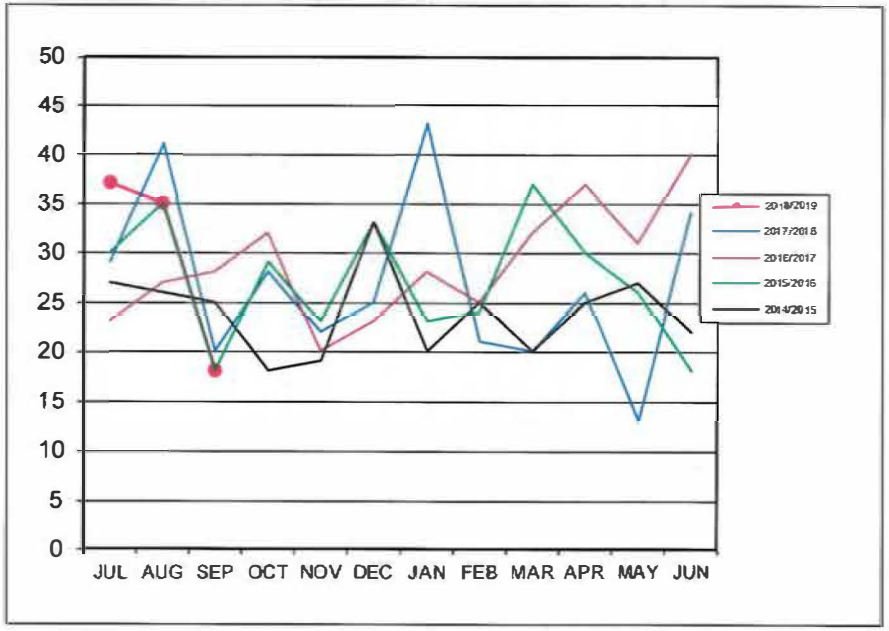
ITEM FOR INFORMATION NO. 5

WATER MAIN REPAIR REPORT

for September 2018

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Total
2018/2019	37	35	**18**										90
2017/2018	29	41	20	28	22	25	43	21	20	26	13	34	322
2016/2017	23	27	28	32	20	23	28	25	32	37	31	40	346
2015/2016	30	35	18	29	23	33	23	24	37	30	26	18	326
2014/2015	27	26	25	18	19	33	20	25	20	25	27	22	287

Date	Address	Size (In)	Pipe Type
9/2/2018	1693 Pili Aloha Pl, Honolulu	8	DI
9/6/2018	159 Lakeview Circle, Wahiawa	6	CI
9/6/2018	94-1017 Lalama Loop, Waipahu	12	PVC
9/7/2018	92-423 Akaula St, Kapolei	8	CI
9/7/2018	99-1654 Analio Pl, Aiea	8	CI
9/8/2018	47-102 Kamehameha Hwy, Kaneohe	6	CI
9/10/2018	67-218 Goodale Ave, Waialua	8	CI
9/10/2018	1625 Kapiolani Blvd, Honolulu	12	PVC
9/10/2018	2202 Pauoa Rd, Honolulul	4	GALV
9/11/2018	67-152 Kuoha St, Waialua	8	CI
9/13/2018	628 Palawiki St, Kailua	12	AC
9/13/2018	3148 Alika Ave, Honolulu	8	PVC
9/14/2018	1255 10th Ave, Honolulu	12	PVC
9/19/2018	99-274 Anounou St, Aiea	8	PVC
9/22/2018	99-528 Paihi St, Aiea	8	CI
9/24/2018	2695 Pamoa Rd, Honolulu	6	CI
9/27/2018	1063 Kamaole St, Honolulu	8	CI
9/30/2018	5129 Kalanianaole Hwy, Honolulu	4	CI



26 miles of pipelines were surveyed by the Leak Detection Team in the month of September.

DISCUSSION: Mike Fuke, Acting Field Operations Program Administrator, gave the report.

During the month of September there were 18 breaks, which is good for BWS. There were two significant breaks. The first one occurred on September 10 on Kapiolani Boulevard, where the contractor, thinking he was hoe ramming solid concrete, went right into the BWS pipe causing Kapiolani Boulevard to temporarily shut down.

The second significant break was a 4" main break on Kalanianaole Highway which caused major traffic impacts. BWS was able to keep three lanes open in the westbound direction, but unfortunately, BWS was not able to open the contraflow lanes. With the help of the State Department of Transportation and Department of Facilities Maintenance, BWS repaired three clamps that were leaking.

Mr. Andaya wanted to know when a main break occurs, does BWS sent out notices and discloses whether it was due to a contractor or not? It was pointed out that BWS does try to be very polite about it, indicating that it was due to construction or a contractor working in the area.

MOTION TO ADJOURN

There being no further business Chair Andaya at 3:35 PM called for a motion to adjourn the Regular Session. Jade Butay so moved; seconded by Ross Sasamura and unanimously carried.

Respectfully submitted,

Lorraine H. Lee

LORRAINE H. LEE

APPROVED:

BRYAN P. ANDAYA
Chair of the Board

NOV 19 2018

Date

THE MINUTES OF THE REGULAR SESSION BOARD MEETING ON OCTOBER 22, 2018 WERE APPROVED AT THE NOVEMBER 19, 2018 BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT			ABSENT
KAY C. MATSUI	X		
RAY C. SOON	X		
ROSS S. SASAMURA	X		
JADE T. BUTAY	X		
MAX J. SWORD	X		