



Swan Lake Closed Hydrobasin Update

August 27th BCC Staff Report

Possible Direction to Staff:

- Continue to fund flood response activities
- Design and competitively bid projects to create volume in lake
- Obtain Board approval on required agreements for use of property, easements, licenses



Swan Lake Closed Hydrobasin Update

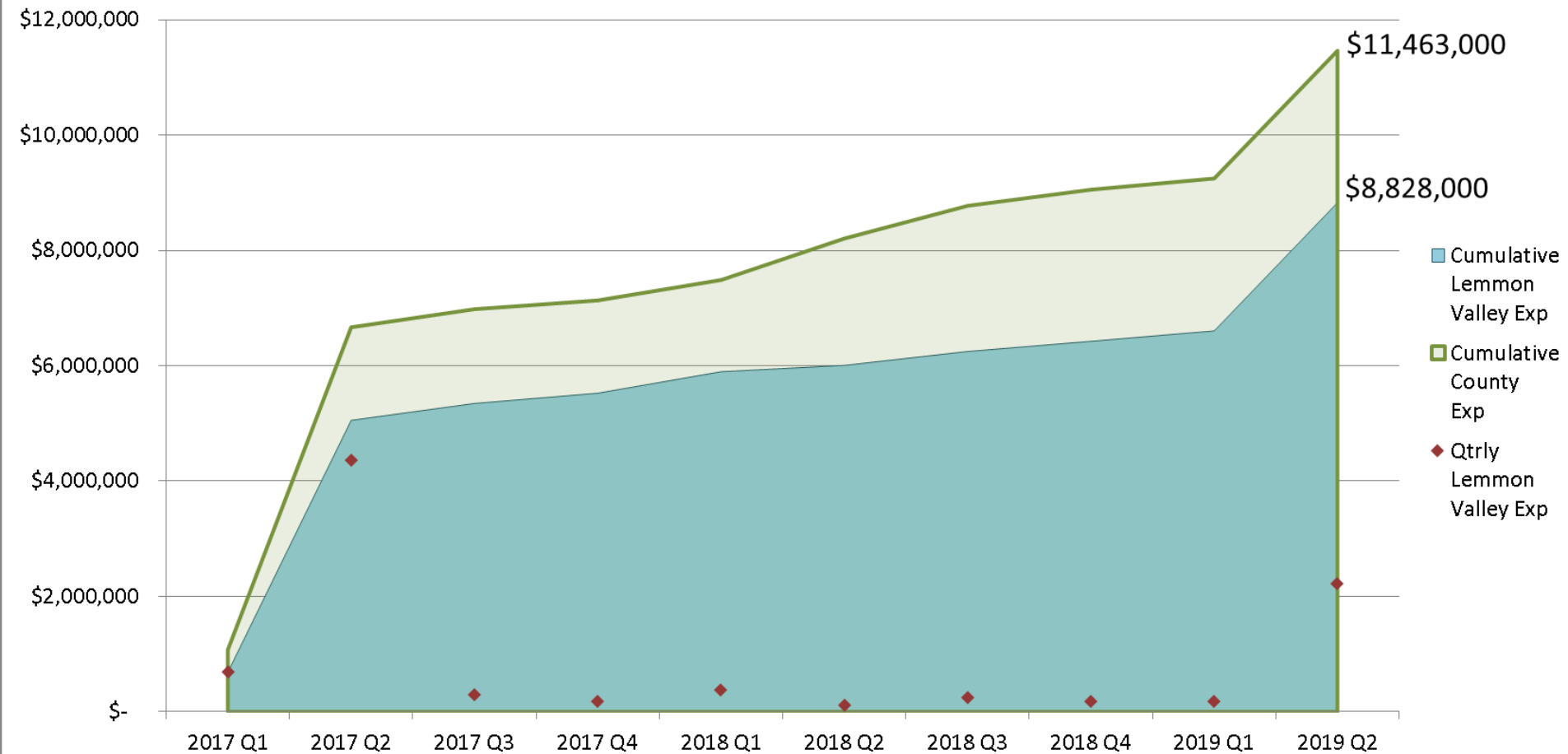
WASHOE COUNTY COMMISSION DIRECTIVES

- Manage Swan Lake within current boundaries
 - Prevent water from entering homes and businesses
 - Maintain open roadways for emergency responders
- **Flood response funding; general fund contingency, stabilization and water rights sale proceeds (June 27, 2017 and Sept 12, 2017)**
- **Total Washoe County flood response**
 - **\$11.45M**
 - **Lemmon Valley flood response**
 - **\$8.83M**
 - **Average monthly operation and maintenance - \$230K**



Swan Lake Closed Hydrobasin Update

Washoe County Flood Expenses - As of June 30, 2019





Swan Lake Closed Hydrobasin Update

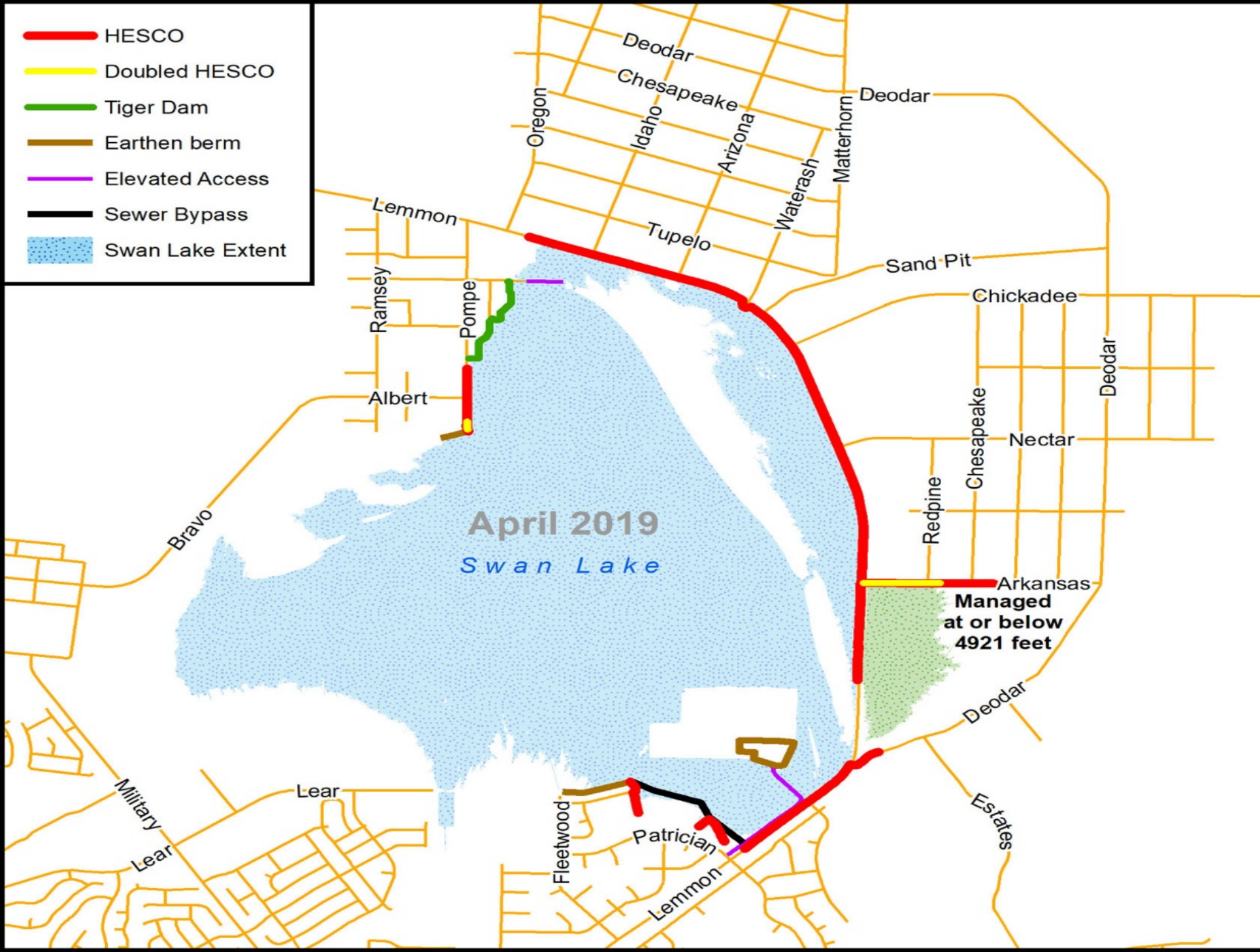
FEMA Reimbursements

Total Requested	\$ 3,043,952
Total Received to Date	\$ 849,229

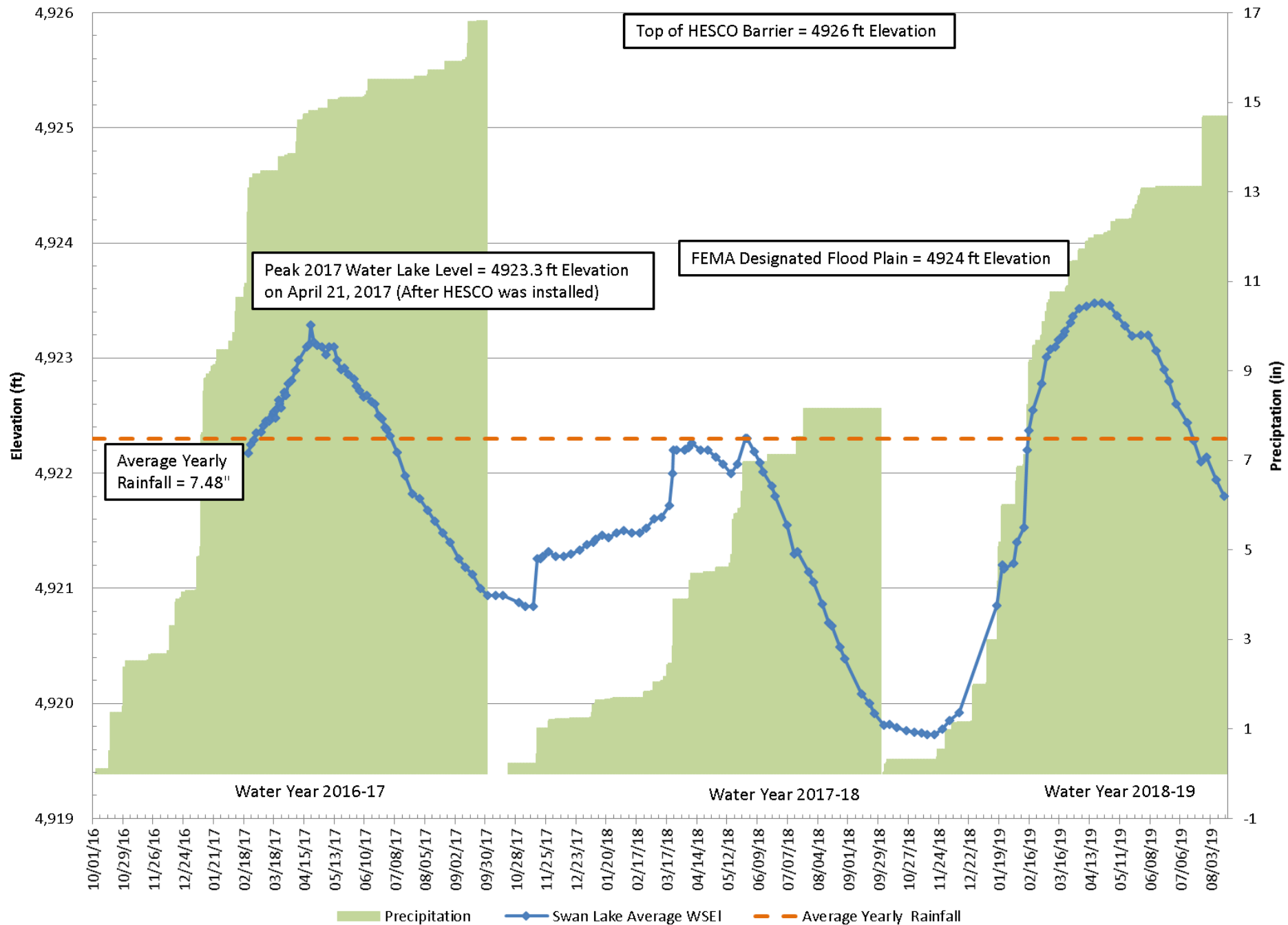
Project Completion Deadlines

	From Declaration Date	4303 January Flood	4307 February Flood
Debris clearance - category A	6 months	08/17/17	09/27/17
Emergency work - category B	6 months	08/17/17	09/27/17
Permanent work - category C-G	18 months	08/17/18	09/27/18

- HESCO
- Doubled HESCO
- Tiger Dam
- Earthen berm
- Elevated Access
- Sewer Bypass
- Swan Lake Extent



Swan Lake Water Elevations 2017-19





HESCO Barrier

- In place since March 2017
- Concerns raised by various groups from time to time
- Hired third-party professional for evaluation
- Fit for purpose, well-constructed, performing very well, recommendations made

Response

- Have completed consultant recommendations
- Continue to inspect/maintain

To: Washoe County – Community Services Department
From: Keith Anderson – Flood Defense Group
Date: 13 June 2019
RE: Review of installed HESCO Bastion Barrier Protection Systems

Dear Washoe County

This is a report that summarizes my review of the HESCO Bastion flood defenses around Swan Lake in Washoe County, NV.

Initial Introduction:

Flood Defense Group specializes in the supply, installation, and/or support of temporary flood defense measures throughout North America. As an organization, we represent largest variety of products and solutions within this region and cover the majority of designs regularly deployed within this market space. Our unique expertise lies in the ability to provide objective feedback on a broad variety of products and solutions unique to the needs of the end user or flood event in question. One of our options include the HESCO Bastion line of flood barriers.

Flood Defense Group has not been involved in any aspect of the HESCO Bastion built in Washoe County and I have been called out to review the current material in place based on experience and understanding of the product. I have had significant experience with building HESCO Bastion since 2003 and am currently listed on contract as a technical support responder for flood defense deployments by the USACE with this product which has remained their primary tool for flood defense since around 2014.

Initial Summary:

After reviewing the HESCO Bastion flood barriers installed within Washoe County, it is my belief that these barriers are fit for purpose and can be expected to perform as designed and as floodwaters rise. These barriers appeared to be in good condition and built correctly except for some foot print issues along Lerimon Drive. Discussion on reinforcing this section and general repairs are detailed below but none of these issues cause concern for a catastrophic failure.

Below lies a detailed review of the HESCO Bastion flood defenses built within/by Washoe County. This includes aspects from product selection, product design, project construction, product performance, existing problems, corrective actions, general maintenance, and what to expect with regard to life span of this project and how to extend it as required.




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DATE: August 12, 2019

TO: Dave Solaro, Recovery Director: North Valleys Flood 2017 and Interim County Manager

FROM: James English, Environmental Health Supervisor 

SUBJECT: Review of analytical results for surface water testing of Swan Lake

On August 8, 2019, the Washoe County Health District (WCHD) was sent and requested to review analytical sample results from various sampling events of Swan Lake in the late spring/early summer of 2019. The review was requested by the Washoe County Community Services Division and as part of the review, these samples were compared with sample results taken in 2018. Samples were reviewed and evaluated based on guidance documents developed by the United States Environmental Protection Agency (EPA) for recreational bodies of water and surface water standards for bodies of water not used as potable water supplies. Samples taken on 4/17/2019, 5/23/2019 and 6/25/2019 were tested for Total Coliform, E. Coli, water quality parameters, anions, flow injection analysis, trace metals and Mercury. Additionally, samples were collected on 05/06/2019 which were only tested for Total Coliform and E. Coli. Review of the submitted results show proper chain of custody and associated Quality Control Reports with the results.

Review of the ten samples taken over the four sampling events show a range of Total Coliforms from 8.4 to greater than 2419.6 MPN/100ml. These results only demonstrate the presence of potential bacteria in the water. The sample results for E. Coli had a range of non-detect (ND) to 71.7 MPN/100ml (ND, ND, ND, 2.0, 3.1, 4.0, 5.2, 9.7, 24.3 and 71.7). Therefore, the results are well below the limits for bacterial contamination for a recreational water body. The highest test result for E. Coli reviewed by the WCHD in 2018 was 18.9 colony forming units per 100mL (cfu/100ml) whereas the Environmental Protection Agency's (EPA) recommended guidance for the geometric mean (GM) and statistical threshold value (STV) should not exceed 126 and 410 cfu/100mL respectively. For clarity, CFU refers to "colony forming units" which is the actual count of the test plate whereas MPN refers to "most probable number" and is the statistical probability of the number of organisms on the plate.

A review of the non-microbiological sample results demonstrate no analytes of concern for which WCHD would recommend people or pets stay out of the water. Recently the public has been concerned with arsenic levels in Swan Lake. The submitted analytical results for Arsenic in Swan Lake ranged from 0.019-0.040 mg/L, whereas the maximum contaminate level of arsenic allowed in drinking water is 0.010 mg/L and in surface bodies of water the EPA guidance is for less than or equal to 0.050 mg/L total arsenic.

As in the past, WCHD continues to recommend and support CSD continuing a proactive routine sampling schedule for Swan Lake to continue to demonstrate the water is not detrimental to public health or the environment. If you have any questions regarding the interpretation of this analytical data, please contact me at jenglish@washoecounty.us.

Swan Lake Water Quality

- **WC Health District tested Swan Lake water in 2017 and 2018**
- **Community Services Department collects monthly samples**
- **Swan Lake continues to meet and exceed Federal guidelines for recreational water quality standards (WC Health District Aug 12, 2019)**

Swan Lake Sampling





AUGUST 27th DIRECTION – NEXT 12 MONTHS

Projects that create volume in lake

- Land application
- Flood pool management

Projects that maintain protections

- Barrier/Berm
 - Pompe Way, east side
 - Lemmon Valley Elementary School (if triggering event occurs)
 - Patrician, Lemmon Drive (if triggering event occurs)

Operations and Maintenance

- Lemmon Valley Water Reclamation Facility
 - Mechanical spray aeration of Class C
 - Enhanced evaporative pond management



Action Item	Benefit	Status	Estimated Construction Cost*	Schedule
Land Application	Additional storage volume in lake	Installation pending property access, base-line testing	\$60K - \$200K, BCC approval needed	Winter 2019/Spring 2020
Flood Pool Management	Additional storage volume in lake	Equipment in place, requires agreement with property owner	Easement required, BCC approval needed	Continue this action
Barrier/Berm –Pompe Way, East Side	Enhanced protection	Waiting for lowest lake level, will require working in water, requires property owner(s) approval	\$300K - \$450K, WC self-perform	Begin construction mid October 2019
Barrier Additions	Enhanced protection	Materials on hand, requires property owner approval	\$40K - \$80K	Will implement if/when trigger event occurs
LVWRF - Effluent Spray Project	Reduce discharge of treated effluent	Engineering study in progress	\$75K - \$150K	Spring 2020



Swan Lake Closed Hydrobasin Update

Noticeable On-Going Activities

- Field response to precipitation and flooding events
- Roadside ditch cleaning
- Bentonite application on Pompe Way
- Maintenance of pumps and piping
- Weed abatement
- Mosquito abatement

Near-Term Activities (6-12 months)

- Install pumping and piping – land application
- Lemmon Valley Water Reclamation Facility – Berm Modifications
- Removal of inflatable dams - Pompe Way and Jean Way area
- Construction of berm behind residential properties (east side) - Pompe Way



LONG-TERM MITIGATION PLANNING

Regional Hazard Mitigation Plan (RHMP)

- A comprehensive and inclusive planning process
 - Required by FEMA every 5-years
- Development of mitigation strategies
 - Required as a condition of grant funding application
- Collaborative information sharing
 - Covering all 13 regional hazards, while focusing upon hazards that occurred over the last 5-years



- Community engagement and participation

Take our community survey today!

<https://www.surveymonkey.com/r/KBTQXMF>



LONG-TERM MITIGATION PLANNING

CLOSED BASIN MITIGATION PLAN

- FEMA Process
- Regional Stakeholders
- Feasibility studies
- Cost and funding strategies

STATUS

- Engineering studies underway
- DRI Predictive Model
- Lemmon Drive enhancements
- WRWC Support and Partial Funding



Local Mitigation Planning Handbook

March 2013



FEMA



RECAP

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QUESTIONS?





East Lemmon Valley Hydrographic Basin

SWAN LAKE HISTORIC LAKE LEVELS

INFORMATION PROVIDED BY DESERT RESEARCH INSTITUTE - DEC. 2017

