



Regional Board Report

Request for Decision

Approved for Board Consideration

A handwritten signature in black ink, appearing to read "Brian Reardon".

Brian Reardon, CAO

To: Regional Board

From: David Komaike, Director of Engineering Services

Date: September 26, 2022

Subject: Killiney Beach and Westshore Estates Water Study:
Summary and Evaluation of Supply and Treatment Options

Voting Entitlement: *All Directors – Unweighted Corporate Vote – Simple Majority (LGA s.207(5))*

Purpose: To present the Killiney Beach and Westshore Estates Water Study and review preferred upgrade options for the water system, and the provision of generators during periods of power failure in the North Westside.

Executive Summary:

The Regional District operates six (6) water systems, three of which are located in the West Electoral Area:

- | | |
|--|-------------------------------------|
| • Killiney Beach Water System | - 268 Connections (427 at buildout) |
| • Westshore Water System | - 293 Connections (526 at buildout) |
| • Fintry/Shalal/Valley of the Sun Water System | - 164 Connections (330 at buildout) |

For the past decade, the province led by Interior Health, have pushed all water system operators to meet or exceed the Canadian Drinking Water Guidelines. Currently, only 4 of the 6 Regional District Water Systems meet this guideline. Both the Killiney and Westshore Water Systems are noncompliant as the only method of treatment for the water from Lake Okanagan is chlorine disinfection. This treatment process:

- Does not provide a 3-log reduction or inactivation of Giardia and Cryptosporidium.
- Does not reduce turbidity below 1 NTU, and
- Does not provide a second form of treatment (UV).

Since 2010, no less than 13 reports have been commissioned to investigate the Killiney and Westshore Water Systems. These various studies have investigated options for the supply and treatment of drinking water including; well vs lake vs creek water supplies; filtration deferral options including UV treatment; relocation of water intakes and treatment plant options among others. In July, 2021, Urban System was contracted to review all past recommendations, alternatives, and options in order to determine the best approach available to meet the Provincial drinking water objectives.

Also, pursuant to the Board Motion of February 28th, 2022, the consultant was asked to review the use of generators within the water systems. Urban Systems has reviewed the need for generators and considered various options available to meet drinking water objectives.

Next steps should the board support the preferred options outlined in the study would be for staff to prepare a project plan with recommendations for a phased implementation.

Recommendation(s):

1st Recommendation

THAT the Regional Board receive the Killiney Beach and Westshore Estates Water Systems Study: Summary and Evaluation of Supply and Treatment Options (rev.5) as prepared by Urban Systems, and attached to the report from the Director of Engineering Services dated September 26, 2022 for information.

AND THAT the Regional Board support staff preparing a Killiney & Westshore Water System Upgrade project plan for Board consideration at a future meeting based on the recommended Option 1 (A or B) as outlined in the Killiney Beach and Westshore Estates Water Systems Study;

2nd Recommendation:

THAT the Regional Board receive the RDCO Backup Power Review Memorandum dated September 20, 2022 as prepared by Urban Systems, and attached to the report from the Director of Engineering Services dated September 26, 2022;

AND THAT the Regional Board, based on the data provided by BC Hydro regarding the frequency of outages, support Option 1 of the recommendation of Urban Systems and not consider the addition of generators at this time.

Respectfully Submitted:



David Komaïke, P.Eng.
Director of Engineering Services

Attachment(s): Killiney Beach and Westshore Estates Water Study
Killiney Beach and Westshore Estates Generator Review

Strategic Plan Alignment:

Priorities: Sustainable Communities, Economic Development

Values: Good Governance, Resiliency

Discussion:

Killiney Beach and Westshore Estates Water Systems Review

While the Killiney and Westshore Estates Water Systems are relatively small water systems, they are required by the province to meet the same drinking water guidelines as any large purveyor of water. This means that reasonable steps must be taken to protect water from known sources of contamination and to ensure appropriate treatment is in place. Currently both the Killiney and Westshore Water Systems lack three (3) important treatment elements:

1. Our water treatment does not provide a 3-log reduction or inactivation of *Giardia* and *Cryptosporidium*.
“Cryptosporidium and Giardia lamblia infect the intestinal tract, which offers ideal conditions for them to multiply. They attach to the intestinal wall and eventually line it, reducing the body’s ability to absorb nutrients from food.”
2. Does not reduce turbidity below 1 NTU.
“Turbidity, in and of itself, does not usually pose a threat to human health, but it can be an indicator of the potential presence of human pathogens. For example, levels of Giardia and Cryptosporidium tend to increase with turbidity levels.”
3. Does not provide a second form of treatment.
“While chlorine is effective in deactivating water-borne pathogens, a secondary form treatment, such as ultraviolet light is required to ensure viruses are neutralized in the treatment/distribution system.”

Over the past 12 years, the RDCO has commissioned numerous studies aimed at finding the most appropriate approach to meet the Drinking Water Guidelines, but none of these solutions have been actioned. In July 2021 Urban Systems was commissioned to complete a study for the Killiney and Westshore water systems, to review previous recommendations, identify knowledge gaps and provide alternative options. The attached report can be considered the culmination of 13 studies spanning more than 12 years from 6 separate different engineering firm and ministries.

Past reports reviewed:

- Two source water supply options:
 - Surface water supply:
 - Okanagan Lake: considered the most reliable source overall
 - Surface water source alternatives: Whiteman, Hope and Norris creeks
 - Groundwater supply:
 - Fintry/Shorts Creek Aquifer (Aquifer 358): considered the most reliable groundwater source
 - Alternate groundwater sources: Sugarloaf Mountain and Whiteman Creek aquifers
- The location and depth of water intakes as it relates to water quality;
- The addition of UV to the treatment system;
- The installation of dedicated waterline for increasing chlorine contact time;

- The use of one common water treatment plant for both systems, connected via a submerged waterline; and
- The use of two water treatment plants; one for each system

In addition, Urban Systems reviewed the use of alternative technologies not previously studied i.e.: Point of Entry Treatment Systems (POE).

Summary of Options

The Urban Systems report identified five main options for the supply and treatment of drinking water for the Killiney and Westshore water systems. There are slight variations within each option, but they fit into the following categories:

Option 1A: Fintry/Shorts Creek Aquifer groundwater supply with a submarine transmission main submerged in Okanagan Lake.

Option 1B: Fintry/Shorts Creek Aquifer groundwater supply with an overland transmission main adjacent to Westside Road.

Option 2A: Independent intakes and water treatment plants (UV & chlorine disinfection and filtration) for Killiney and Westshore

Option 2B: Independent intakes and dual disinfection treatment facilities (UV and chlorine) for Killiney and Westshore in the near term; common intake, filtration water treatment plants and submarine transmission main (submerged in Okanagan Lake) for both systems in the long term

Option 3: Common intake and water treatment plant (UV & chlorine disinfection and filtration) at Killiney for both water systems and an interconnecting submarine transmission main submerged in Okanagan Lake.

Recommendations (Killiney Beach and Westshore Estates Water Systems Review)

The Urban Systems Report ranked Option 1B, with a common groundwater source and water treatment plant at the Fintry/Shorts Creek Aquifer, and an overland transmission main as the most favourable, for the following reasons:

- Lifecycle Costs - Its estimated total capital cost is the lowest of the options. Option 1B also has the lowest 40-year lifecycle cost.
- Eliminates Waste - There are no lost investments in infrastructure with Option 1B. All work that would be completed in the initial phase is used in the ultimate scenario.
- Operations - From an operations standpoint, one site for all disinfection is preferred. As long as the groundwater remains non-GARP, filtration will likely not be required with current regulations.
- Grant Funding - Combining the water systems will likely be viewed positively by the Province of BC if grant funding is sought.
- Service Extension - The overland transmission main alignment may create opportunities for extending servicing to new areas.

The report ranked Option 1A, with a common groundwater source and water treatment plant at the Fintry/Shorts Creek Aquifer, with a submarine transmission main, as the second most favourable option. If a suitable alignment from MOTI or a right-of-way on crown land is not available, Option 1A may become the preferred option.

Killiney Beach and Westshore Estates Generator Review

Pursuant to the Board Motion of February 28th, 2022,

THAT the Regional Board direct staff to bring forward a report which identifies options for the provision of backup power to Electoral Area West public water systems.

Urban Systems was asked to expand the scope of the water study to include a review of the water systems to determine options available for improving the reliability of the water supply to the communities during a power failure.

Summary of Options

- 1) Do nothing or defer decision;
- 2A) Add permanent backup power;
- 2B) Purchase a trailered generator(s);
- 3) Rent trailered generator(s); or
- 4) Increase water storage.

The performance of each option was reviewed against an “assumed power failure frequency and duration” of “3 times per year and 24 hours in duration”.

Recommendations (Killiney Beach and Westshore Estates Generator Review)

The Urban Systems Review recommendations are subject to information to be provided from BC Hydro:

- If the power interruptions are on average less than 12 hours per event, Urban Systems would recommend Option 1 (Do Nothing);
- If the power interruptions are equal to or greater than our assumption (up to 3 power failures per year, each requiring backup power for 24 hours per event), Urban Systems would recommend Option 2A (Permanent back-up power with automatic transfer switches); or
- If the power interruptions fall between the above scenarios (i.e., average duration of power failure per event is between 12 and 24 hours), Urban Systems would recommend Option 1 (Do Nothing).

Conclusion:

Since receipt of the memorandum from Urban Systems, BC Hydro has provided data confirming the power failure frequency and duration since 2012.

Total Power Outages:	54	
Power Outages between 0 – 12 hours duration:	46	
Power Outages between 12 – 24 hours duration:	5	
Power outages greater than 24 hours:	3	2-Whiterock Lake Wildfire (2021) 1-Tree (2017)

Based upon this additional information supplied by BC Hydro, Urban Systems is recommending Option 1 (Do Nothing) as it relates to the installation of generators for the Killiney Beach and Westshore Water Systems.

Considerations:

Organizational/External:

The recommended changes to the delivery of services to the Killiney and Westshore Estates Water Systems could have a significant impact on the number and qualifications of RDCO staff. The long-term impacts of any proposed changes must be viewed considering any short-term interim steps that might be taken to improve the water systems.

Financial:

The proposed improvement options outlined in the Urban Systems reports will have a significant financial impact upon the water utilities in both service areas. However, these plans form the basis of future grants application which could significantly lessen the financial burden on the area residents. Longer-term planning and phased implementation will be necessary to ensure compliance with Drinking Water Guidelines.

Legal/Statutory Authority:

The Regional District, as the operators and owners of the water distribution systems, is required to meet the conditions of our operating permits, as issued by the Ministry, and enforced by Interior Health.

Alternate Recommendation:

THAT the Regional Board receive the Killiney Beach and Westshore Estates Water Study and Generator Review as prepared by Urban Systems, submitted by the Director of Engineering Services dated September 26, 2022 for information.