



ADMINISTRATIVE REPORT

Report Date: June 30, 2017
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RTS No.: 12088
VanRIMS No.: 08-2000-20
Meeting Date: July 25, 2017

TO: Vancouver City Council
FROM: General Manager of Engineering Services
SUBJECT: Vancouver Waterfront Initiative

RECOMMENDATION

- A. THAT Council direct staff to complete a hydraulic model and water quality performance model of the False Creek basin to better understand the complex nature of the basin and opportunities for water quality improvement.
- B. THAT Council direct staff to explore a floating swimming pool in False Creek.
- C. THAT Council direct staff to explore a swimming beach at North East False Creek park in the current design process.

REPORT SUMMARY

The purpose of this report is to provide information in response to Council's Motion requesting the City to establish a Waterfront Initiative for major natural waterways surrounding the City of Vancouver and more specifically establish a series of Quick Starts to improve water quality and make high use waterways in Trout Lake and False Creek safely accessible by swimmers.

This report provides a summary of historic initiatives and programs that have improved the water quality of False Creek and Trout Lake and provides an update on recent and upcoming initiatives related to recreational water quality protection.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

On May 30, 2017, Council passed a motion for the City of Vancouver to establish a Waterfront Initiative for major natural waterways including the Burrard Inlet, False Creek, Lost Lagoon, the Fraser River and Trout Lake that engages First Nations, industry, senior levels of government and adjacent municipalities, and the community to support three goals:

- A Thriving Working Waterfront
- Safe, Accessible Waterfront Recreation
- Restoring Aquatic and Riparian Ecology and Traditional First Nation's Food Sources

On May 2nd, Council approved the recommendation in RTS # 11851 "Update on Protecting Vancouver's Recreational Water Quality" which identified proposed activities and by-law amendments to strengthen water quality protection.

CITY MANAGER'S/GENERAL MANAGER'S COMMENTS

The General Managers of Engineering Services and Parks support the recommendation to support the City's ongoing efforts for recreational water quality protection.

REPORT

Background/Context

Clean Water and Access to Nature are key components of Vancouver's Greenest City Action Plan. Closures of swimming beaches are rare in Vancouver but do occasionally occur in the summer, often tied to warm, dry weather and increased boating activity in English Bay and False Creek. Trout Lake is also closed sporadically when E. coli levels exceed guidelines for swimming; however, waterfowl and gulls appear to be the largest contributor of bacterial contamination in Trout Lake.

Improving the water quality of the Vancouver's surrounding water bodies has been a focus for the City and Park Board for decades. False Creek in particular faces unique challenges as the area continues to transition from a heavy industrialized area to a more mixed-use residential and park space neighbourhood. False Creek is subject to poor water circulation due to limited tidal exchange and the reduced existence of natural filtration systems that existed in the intertidal zones prior to development. Historical industrial activities have also influenced the sediment and water quality of the basin. Hydraulic modeling of the basin would provide a better understanding of the complex nature of False Creek including flow dynamics, contaminant movement and dispersion and water quality performance.

Historically, False Creek was developed as an industrial area and a receiving environment for sewage. With the construction of the Iona Wastewater Treatment plant in the 1960's and the sewer separation program shortly thereafter water quality started to improve. Prior to sewer separation there was no recreational activity in False Creek and bacteria levels were thousands to hundreds of thousands of times greater than what we experience today.

Since Expo 86, recreation in False Creek has grown tremendously. More recently, a combination of increased non-motorized use and significant development planning for the North East False Creek (NEFC) project has prioritized investigating and improving False Creek Water Quality even further. Secondary contact (e.g. paddling, rowing) water quality standards are regularly met which support increasingly popular recreational water activities. False Creek is not classified as a primary contact recreational water body (i.e. it is not a swimming area) by Vancouver Coastal Health. E. coli levels in the east basin are regularly beyond the primary recreational contact limits.

In 2016 the City created a multi-agency working group, the False Creek Water Quality Working Group (FCWQWG), comprised of representatives from Environmental Protection, Engineering, Park Board, Vancouver Coastal Health, Metro Vancouver, Transport Canada, Port of Vancouver, and the BC Ministry of Environment to assess short and long-term issues and opportunities to improve False Creek water quality. One result of this working group was the May 2nd, 2017 Council adoption of proposed activities and by-law amendments to strengthen water quality protection in Vancouver.

Trout Lake, in John Hendry Park, is an iconic part of Vancouver's recreation system and is the only location for natural freshwater swimming in the city. Swimming has occurred in the lake for over 100 years, and the Park Board has managed a swimming beach at the south end of Trout Lake since World War II. It has a swimming raft, a floating boundary to define the swimming area, a sand beach, washrooms and lifeguards from Victoria Day to Labour Day (late May to early September). Potable water is added to the lake during the summer months (mid-May to mid-September approximately) to maintain the lake level.

E. coli levels at the Trout Lake swimming beach are tested on a weekly basis during the swimming season by Vancouver Coastal Health. If testing indicates E. coli is beyond standards for swimming, a swimming advisory can occur and the beach is closed by the Park Board. Two closures occurred in 2016, but they are generally much less frequent than previous decades. Birds (gulls, geese, ducks, etc.) appear to be one of the largest contributors to E. coli levels in Trout Lake based on previous analyses by UBC and others. Drainage improvements have reduced or prevented surface water or shallow subsurface water from entering the lake, which reduces the risk that human sources of contamination influence water quality.

Strategic Analysis

Multiple initiatives are currently underway to further improve water quality in False Creek and can broadly be grouped into source control improvements, basin opportunities, and access to water.

Source Control Improvement

- **Sewer Separation** - The annual capital sewer separation program is ongoing to eliminate city-wide combined sewer overflows by 2050. Three sewer catchments lead to False Creek East. The Downtown South and Terminal catchments are both >95% separated, while the Heather/Cambie catchment is approximately 50% separated.
- **Sanitary Cross Connection** - Sanitary service cross connection teams investigate sewer service connection problems that result in sanitary and storm flow discharging into the incorrect pipe. This can occur due to poor plumbing installations or illegal plumbing work. The City helps to coordinate and ensures the timely correction of sewer cross connections.
- **Green Infrastructure** - Green Infrastructure in False Creek catchments will help to treat and delay storm water from entering False Creek. Treating storm water will reduce contaminant loading into False Creek, and delaying storm water will reduce the intensity and duration of combined sewer overflow events prior to full sewer separation. Green Infrastructure will not help to "flush" False Creek. There is

insufficient storm water volume to “flush” False Creek, and more importantly most rainfall occurs during the fall and winter months, outside of the primary recreational season.

- **Vancouver Building By-Law (VBBL) and Health By-law updates** – Amendments to both By-Laws were approved by council to strengthen boat based sewage handling. Under the old By-Laws existing marinas were only required to provide pump-outs to legal liveaboards, and newly constructed marinas were required to provide pump-outs for visiting vessels and non-liveaboards vessels. Existing marinas were not required to provide pump-out services to non-legal liveaboards.

The updated By-Laws requires all marinas provide easily accessible pump-out facilities or services, and provides a transition period of three months for existing marinas to provide a pump-out facility or service.

The Health By-Law formerly contained a section for Marinas that included requirements for management of sewage, oil discharge, and garbage management. The update reinstated these requirements as any sewage releases affect water quality. Additionally, requirements for marina owners to ensure that sewage is properly managed in their facilities were strengthened.

- **Marine Discharge** - There is some suspicion that boats might be discharging sewage into False Creek. It is illegal to discharge any sewage in False Creek under the current Canada Shipping Act. The City has limited jurisdictional tools, and must rely on other authorities enforcing their legislative tools.
- **Next Steps in Reducing Waste from Boats** - Over the coming months, the City and Park Board will initiate several strategies to further reduce the discharge of sewage waste from boats in False Creek:
 - Work toward installation of a mobile pump-out service in False Creek for recreational boaters
 - Test effective solutions for identifying offenders, including the use of divers
 - Continue to report suspicious activities to Transport Canada to enforce sewage discharge prohibition. We will work with the VPD Marine Unit and City’s environmental Protection Officers on measures escalating from education and warning to prosecutions

False Creek Basin Hydraulics

- **False Creek Flushing** - The full flushing of False Creek was evaluated. A Burrard Inlet and False Creek Hydraulic feasibility study was performed to investigate a hydraulic connection between Burrard Inlet and False Creek. While theoretically possible, the scope, physical scale and financial impact of the required infrastructure is impractical.
- **China Creek Connection** - The False Creek Flats Rainwater Framework (DRAFT) examined the feasibility of a waterbody connecting China Creek Park North with False Creek. Similar to the outcomes of the Burrard Inlet and False Creek Hydraulic connection study, the available flow is insufficient to satisfactorily flush False Creek East and unavailable during the recreational summer months. The waterbody size necessary to convey the available flow safely would be on the order of 40 meters wide

at ground level, 2 meters deep and 1700 meters long. Moreover, the China Creek catchment is heavily developed and may also contribute additional contaminants into False Creek.

- **Historical Contamination** - Prior industrial activities and land uses has caused historical contamination in the False Creek basin. The potential of contaminant disturbance must be understood in addition to understanding the hydraulics of the basin.
- **False Creek Hydrology** - The hydrology of the False Creek Basin is complex and not well understood. It is imperative that skilled practitioners are involved in developing this further. Limited testing to date shows that False Creek East has a warm-brackish top layer that mixes poorly. Tidal forcing does not seem to be sufficient to mix False Creek, leading to warm, stagnant water in the East Basin which appears to be a natural state for the basin. A hydraulic model would help better understand the complex nature of False Creek including flow dynamics, contaminant fate (the physical, chemical and biological processes that describe how contaminants move and how they may change as they move) and water quality performance. Hydraulic modeling would allow staff to investigate and report on multiple proposed water quality improvement methods and quantify the potential benefit.

Access to Water

- **Opportunities for a Floating Pool in False Creek** - A floating pool, likely in the south or south-east portion of False Creek, is an option for making False Creek accessible for swimming. The best known example of a floating pool is *Badeschiff* in Berlin's Spree River, which consists of a 30m x 8m pool in a repurposed barge, with a series of decks. The facility began as an art installation in 2004 and is now operated by Arena Berlin. A floating pool in False Creek would likely consist of a similar series of structures, supported by an on-land building with washrooms, change rooms and operations functions. The pool would require treated or potable water to ensure it meets water quality standards for recreation use. Use of False Creek water would likely not be possible; conventional filtration systems remove microbiological contamination but cannot address other types of contaminants that may be present in the Creek. The Park Board and REFM are currently investigating implications for constructing a floating pool, and propose undertaking a feasibility study to review potential costs, scope, location, jurisdiction, regulatory issues, relationship to other facilities, conflicts with existing marine uses, habitat impacts, access, treatment technologies and site servicing. Timing for delivery of a floating pool requires further investigation. Staff will update Council in a subsequent report.
- **On Water: Vancouver's Waterway Recreation Strategy** -The Park Board has recently initiated this strategy to guide future planning relating to non-motorized boating facilities. Development of the On Water Strategy will be informed by the Park Board's Biodiversity Strategy along with other key policy documents, and explore synergies between the protection of recreation and ecological values, including water quality.
- **Improving Water Access in CRAB Park** - CRAB Park is the only accessible shoreline park for residents in the DTES and other urban neighbourhoods in east Vancouver. However, it is not open for swimming because of historical water quality problems in

the Inner Harbour. E. coli levels at CRAB Park beach have improved dramatically over the past decade due to sewer separation and are now similar to English Bay beaches. The Park Board is assessing whether CRAB Park should be opened for swimming including providing lifeguarding services.

Implications/Related Issues/Risk (if applicable)

Financial

The cost for a hydraulic model and water quality performance model of the False Creek basin are estimated to be \$200,000. The financial resources required will be funded within the approved 2017 Engineering Water Utility operating budget.

The cost for a feasibility study and schematic design for the Floating Pool is estimated to be \$200,000. There is not currently a funding source and it is recommended that staff report back with a more detailed proposal and workplan.

Environmental

The planned and proposed initiatives detailed in this report are intended to improve the overall environmental health of recreational waters such as False Creek.

CONCLUSION

Recreational water quality in Vancouver is an important environmental and human health issue, especially with the increased recreational use of our beaches and waterways. Water quality management and improvement is complex due to the number of contaminant sources and requires a suite of strategies and plans to respond.

We have taken a number of steps to address these contaminants, including a long-term sewer separation program, marina and boat sewage management bylaws, education and enforcement. However, beyond sewage pollutants there is also significant water and sediment contamination from historical industrial land uses in the area that may pose an issue for making False Creek swimmable. Understanding the hydraulic dynamics of False Creek will allow for further understanding and future opportunities to improve water quality.

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