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Anticipated climate change and sea level rise could affect future City projects

The anticipated effects of climate change and sea level rise are triggering a review of some shoreline projects and long-term infrastructure replacement planning in Campbell River.

Findings of a recently-completed detailed study of the potential effects of sea level rise at Ostler Park, where the shoreline elevation is relatively low, indicate that a modified design would be required to accommodate severe winter storms.

“During the feasibility planning for Ostler Park repairs, it looked like we could accommodate sea level rise with minimal change to the park footprint,” says Ross Milnthorp, the City’s general manager of parks, recreation and culture. *“With a revised analysis of the expected frequency of major storms and the increasing wave intensity when high winds and high tides combine, it’s in the best public interest to develop a more conservative plan to protect this key downtown park.”*

“We appreciate all the time people have taken to provide input on this project, and we realize this delay might be disappointing, but it’s wise to ensure we build this project on the most solid science,” says City manager Deborah Sargent. *“New information has become available since the feasibility plan for Ostler Park upgrades was first presented. To be fiscally prudent, this project will be postponed until we have a revised design that incorporates these new realities.”*

While a revised plan is in development, the City will use some of the already-budgeted Ostler Park project funding for a short-term repair on the existing riprap (armouring with large boulders) along the shore to minimize storm damage to the seawalk, park furniture and plantings.

The \$839,000 originally budgeted for 2017 will be considered by Council for re-allocation to other priority projects during 2017 financial planning.

City staff have also proposed funding in the 2017 budget for a study of how to protect infrastructure along the entire stretch of the community’s waterfront.

“An important step in the City’s asset maintenance process will involve reviewing the scheduled replacement plans for critical infrastructure that may be affected by sea level rise to ensure that we select locations and alignments that minimize risk,” explains Ron Neufeld, deputy City manager and general manager of operations. *“For example, over the long-term, sewer and water lines that are currently buried on the water side of the highway may be relocated farther inland to provide better protection and access.”*

Storm drains are another infrastructure system to be reviewed. Historically, heavy rain combined with strong south-east winds and king tides slow the flow of storm water from low-lying areas.

“With rising sea levels and with more frequent storms anticipated, we can expect that our existing storm drain system will be overwhelmed more often,” Neufeld adds *“As a result, we will need to make changes and improvements to the way we manage storm water within the community, and particularly in those areas most affected by sea level rise.”*

“Coastal communities throughout British Columbia are facing similar challenges around how soon and how high sea levels could rise, especially for development in low-lying areas,” says Mayor Andy Adams. *“As new studies are available, we are sharing information on what to anticipate and the best ways to adapt to the changing environment.”*

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Contact: Ron Neufeld, Deputy City Manager and General Manager Operations 250-286-5765

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Frequently asked questions

What is sea level rise?

The US National Oceanic and Atmospheric Administration website states:

“Global sea level has been rising at an increasing rate since the 20th century. Analysis of a global network of tide gauge records shows that sea level has been rising at the rate of about 0.6 inches per decade since 1900. Since 1992, satellite altimeters indicate that the rate of rise has increased to 1.2 inches per decade—a significantly larger rate than at any other time over the last 2000 years. In the next several decades, continued sea level rise and land subsidence will cause tidal flood frequencies to rapidly increase due to typical storm surges and high tides in many coastal regions.”

The increased rate of sea level rise is linked to carbon emissions (greenhouse gases) released to the atmosphere that warm ocean temperatures and melt glaciers and polar ice caps, changing weather patterns and storm severity.

What’s at risk?

Sea level rise puts coastal communities at risk due to more frequent severe storms and potential flooding, which can erode land and damage infrastructure along the shoreline and in low-lying areas. Also, as seawater reaches farther inland, it can cause erosion, flooding of wetlands, contamination of aquifers and agricultural soils, and lost habitat for fish, birds and plants.

How does weather affect flooding in downtown Campbell River?

During severe winter storms, high-high tide and strong winds can cause sea water to enter the storm system outfalls and back up the drain pipes. As a result, the flow of rainwater draining to the ocean through the storm water system is held back. This can cause short-term, localized flooding at the lowest elevations. Areas most vulnerable to flooding in downtown Campbell River include the intersection near the Courthouse and Mariner Square (Dogwood St./Cedar St. and 13th Ave.), 16th Ave. near Nunns Creek in Campbellton and along Shoppers Row.

Will sea level rise make flooding worse downtown?

Sea level rise predictions indicate that short-term, localized flooding would become a more frequent event if the existing storm drain systems remain in place.

How soon will sea level rise happen?

Sea levels are already rising. Current predictions suggest that the B.C. coast will experience a rise in the sea level by as much as one metre by the year 2100.

How are other coastal communities preparing?

This is a global issue faced by all coastal communities, and there are many locations around the world where people have been working to accommodate sea level rise for many years (think of Venice and the dikes in the Netherlands).

Now that sea level rise is beginning to be experienced in coastal British Columbia, the provincial and local governments are generally still assessing risks.

For communities that have begun to work to adapt to sea level rise, such as Vancouver, Richmond and Qualicum Beach, each is assessing the risk and developing adaptation tools through a comprehensive public planning exercise.

In Richmond, diking and water pumps have been installed to address flooding issues in developed low-lying areas. Qualicum Beach has completed a study of the community’s waterfront that models how sea level rise will change the shape of the shoreline and the anticipated effects of storm damage to infrastructure along the waterfront.

How is Campbell River approaching climate change?

Campbell River is in the early stages of assessing risk and developing adaptation tools. Longer-term methods to address climate change are included in Campbell River's Community Energy and Emissions Plan, a document that provides tools to help reduce carbon emissions – the greenhouse gases that contribute to climate change, sea level rise and wilder weather, including more extreme storms.

Will land use regulations change?

Because the City is still in the early stages of assessing risk and developing adaptation tools, potential changes in land use regulations are yet to be determined.

How will we protect private property?

Because the City is still in the early stages of assessing risk and developing adaptation tools, new strategies for protecting property are yet to be determined.

How would the Ostler Park plan be modified to accommodate sea level rise?

A key element in the Ostler Park redevelopment plan was a pocket beach, which would connect people to the water and protect the shoreline from erosion by slowing down the cumulative effect of sea level rise and the power of severe winter storms.

While it originally looked like this could be achieved with minimal change to the existing footprint of the park, a detailed study reveals that, due to the park's relatively low elevation, we would need to build a natural beach that cuts farther into the park than originally planned.

To accommodate the power of waves at that location, a natural shoreline would raise the existing seawalk by as much as two metres, curve another 40 to 60 metres into the park, and include gently sloping berms toward the seawalk.

Why not re-engineer the riprap currently in place at Ostler Park to protect the current footprint of the park for as long as possible?

Riprap or armouring the shoreline is a commonly used method for protecting the foreshore from the ocean environment. As a short-term solution, while a more comprehensive re-design is being developed, this approach can protect the park.

Over the long-term, to successfully protect the Ostler Park from the more powerful storms and increased wave height, the existing riprap would have to be stacked as high as (or higher than) the large rocks that line the edge of the Maritime Heritage Centre parking lot. This would effectively cut off any ocean view for anyone in the park.

Would a revised Ostler Park design reduce downtown flooding?

It is difficult to say with certainty whether existing flooding events in the downtown can be reduced by improving the storm drain within the park, but the City will investigate all opportunities for including drainage improvements within the final Ostler Park plan.

Is Big Rock boat ramp vulnerable?

The current design for the Big Rock boat ramp is suitable when compared against the latest information regarding sea level rise because:

- Even though the boat ramp is at the water's edge, the ramp, the parking lot and future location of washrooms are at a higher elevation than Ostler Park.
- The amenities at Big Rock boat ramp will be less vulnerable to damage by wave action from powerful storms (the ramp and pier will be sheltered by an improved breakwater)
- The facility has different, more frequent replacement cycles built into its operation (ramp concrete replacement, dredging and clean-out in the basin, breakwater repair)

For these reasons, the boat ramp can be built into the surrounding environment as a useful community amenity for a reasonable period of time.

Where can I find more information?

www2.gov.bc.ca/gov/content/environment/climate-change/policy.../sea-level-rise