

Subject **EIS Scoping Comments**
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- DUAL Estuary Lake Design-16 No Signature.pdf (494 KB)
 - DELIscopingCOMMENTSnov2018.docx (17 KB)

Attached are my scoping comments for the Capitol Lake EIS plus the DELI document from which they were derived.

Steve Shanewise

Sent from [Mail](#) for Windows 10

SCOPING COMMENTS FOR CAPITOL LAKE EIS

Introduction

The comments below regard issues that should be investigated in the Capitol Lake EIS relative to the Dual Estuary/Lake Idea (DELI). These suggestions have been gleaned from the DELI document produced in January 2017 that garnered wide spread support from the public (see attachment). These suggestions are likely not fully inclusive; qualified engineers should be able to find more. In addition, I have started off with new information on the wildlife benefits of DELI.

Value of Freshwater Habitat

The reflective pool of freshwater proposed for the east portion of the north basin with DELI will not just be a visually aesthetic stimulus or a swimming beach. The west portion of the new lake, outside the swim areas, will be high value wildlife habitat. Waterfowl will rest here when tides are low where they can drink and bathe. Bats will be afforded a source of insect feed hopefully similar, though reduced, from what they do now. With roost logs, shorebirds will hang out during high tides to the delight of anyone walking around the new lake. Adding a freshwater component to the Estuary restoration of Capitol Lake would have profound benefits for wildlife use and human enjoyment.

THINGS TO CONSIDER FOR EIS

Rubble-mound Dike

- use same construction techniques used to build the railroad embankment between the north and middle basins or the dike at the SW end of the middle basin that created the two sediment basins.
- source rock from Black Lake Quarry; investigate hauling material via rail.
- investigate sealing inside wall of rubble-mound dike with an impervious barrier to simultaneously prevent salt water intrusion or drainage of freshwater from the new lake basin at low tides.
- investigate building a pedestrian walkway atop the new dike.

New Freshwater Lake

- investigate groundwater availability to supply the lake; primarily locate test well(s) near base of the Capitol Hill bluff along south shore of north basin.
- investigate potential for using LOTT reclaimed water as a supplemental water source.
- investigate construction of a variable primary outfall to the new lake with an adjustable invert from 0' to lake OHWM +2'.
- investigate potential to use new lake basin for stormwater detention during winter flooding events.
- investigate using artesian flows supplying new lake as emergency fresh water drinking source in the event of a disaster (major earthquake).

Swim Beach

- investigate using liner to place sand atop for a clean beach.
- investigate hydraulic effects of the east side input water flowing toward the secondary OHWM outlets along the west side of new lake dike for purposes of maintaining water quality.
- investigate building docks for the swim beach and installing log booms to separate swimming areas.

Sediment Management

- investigate sediment transport scenarios with the Marathon Park opening left intact and removal of the 5th Avenue dam gateway (leave existing dam orifice at same width, just remove all of the water control structures). The idea would be to compare sediment transport effects from a small opening vs. a large one (500') at both sites.
- investigate leaving existing sediments in the middle and south basins to provide substrate for establishment of salt marsh vegetation.
- investigate installing a permanent, electric dredge pumping system at the SW portion of the middle basin that annually deposits dredged material into at least one old sediment basin so it can dewater and be hauled away as dry material.

Tidal Generation

- investigate installing tidal generators at various locations where water speeds will accelerate (5th Avenue Dam; Marathon Park; Percival Cove; under the I-5 bridge; west wall of new lake dike).

Steve Shanewise

13 Nov 2018

DELI

DUAL ESTUARY/LAKE IDEA

A PLAN TO FIX CAPITOL LAKE

January 2017

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Introduction

This document is for people interested in fixing the Capitol Lake situation. It presents an idea for having a dual system of both an estuary and a freshwater lake, something that has been reviewed and rejected in the past. However, I believe the review was biased and the rejection unfounded. In short, they exaggerated the volume and cost of materials needed to build a wall to contain a new lake, and simply summarily dismissed the ability to construct a rubble mound dike to enclose a lake on the soft mud even though the railroad crossing at Marathon Park already occurs on one.

DELI stands for **D**ual **E**stuary/**L**ake **I**dea, and should be considered a third alternative to CLIPA (Capitol Lake Improvement and Protection Association) which proposes an all lake option and DERT (Deschutes Estuary Restoration Team) which proposes an all estuary option. It should also be considered an option that will give everyone almost all of what they want rather than making half the community angry at the outcome. Restoring an estuary will not be cheap mostly because of roadway needs, but including the cost of a lake containment wall would give massive added taxpayer value to the dollars spent because then almost everyone would be happy with the built condition.

Please read this document with an open mind and a careful eye because I know DELI can be made better. My presentation always improves each time I do a bout of editing. Developing ideas should be like whittling arrowheads where each little chip makes the outcome better and better until you finally have something you can mount on a shaft. DELI needs to get there.

Basic Concept

Remove the existing 5th Avenue dam and elevate the roadway to create an opening beneath for restoring tidal flows. Build a new lake impoundment by completing the circle of the existing Heritage Park wall to create an isolated, freshwater lake in the east part of the North Basin with hydrology supplied by groundwater flows. Then restore everything west and south of the new lake wall to estuary from the new 5th Avenue bridge up to Tumwater Falls and including Percival Cove.



LEGEND

-  = Restored Estuary
-  = Swim Area
-  = Piped Groundwater Inflows
-  = OHWM Lake Outlets
-  = Variable Lake Outfall
-  = Tidal Generators
-  = Dredge Location
-  = New Roadways
-  = Armored Roadway
-  = Sediment Deflection Wall
-  = New Boardwalk

Figure 1: Dual Estuary/Lake Idea (DELI)

New Lake Impoundment Wall

Complete Heritage Park Bulkhead Circle

Build a barrier wall to contain a new Capitol Lake by completing the circle of the existing Heritage Park bulkhead. This would create a smooth edge on the lake side that should be visually pleasing within the developed urban environment of downtown Olympia. Everything inside the circle would be freshwater lake, while everything outside it to the west would be tidal estuary.

Build Rock Containment Wall

Driving sheet-piles to bedrock in tidal mudflats is what you need to do to build buildings, not water control structures. The latter can be built with piled boulders in a rubble mound dike, just like they used for building the existing railroad beds across the lake and along the west shoreline of Budd Inlet. These railroad beds have survived over a half century of use and several major earthquakes without any significant damage. Building a rock wall to impound a new lake is completely doable.

Use Black Lake Quarry Basalt

Material for the new containment wall could be sourced from Black Lake Quarry and brought to the site by rail (Percival Creek spur). This would eliminate damage to city streets from heavy trucks as well as a lot of traffic disruptions. Rock from here could be delivered and installed for about \$21/cubic yard which is considerably less than the \$74/cubic yard (minimum) cost estimate used in the CLAMP report.

Create Pedestrian Walkway

Top off the new lake barrier wall with decreasingly smaller rock so that you end up with a gravel pedestrian walkway on top similar to the one along the existing Heritage Park wall. This would allow people to walk all the way around the new lake on a trail just like the one they walk on now around the east side of the lake. And if settling occurs on the wall, just fill in the surface cavity with more gravel.

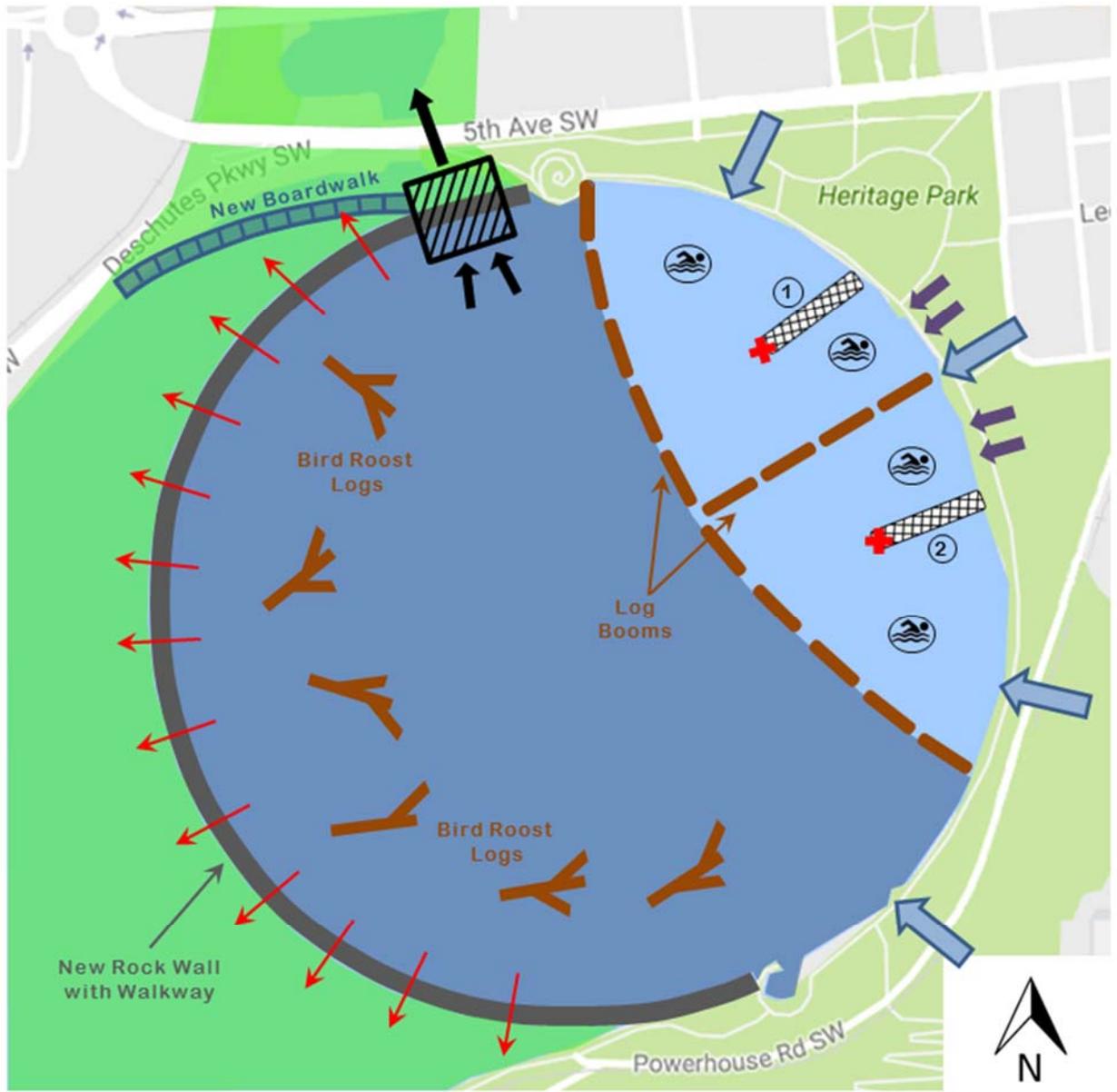
Build New Pedestrian Footbridge

Because the new 5th Avenue bridge would be elevated like the 4th Avenue Bridge, the existing trail that connects from Heritage Park to the Deschutes Parkway would not fit well here. A new footbridge could instead be built from the toe of the 5th Avenue Bridge across the estuary mouth to the Deschutes Parkway to provide a connection that would allow people to walk a level path around to Marathon Park and then back to Heritage Park just like they do now. This pedestrian bridge would also help keep joggers off the walkway around the new lake impoundment wall.

Use New Wall to Protect Downtown from Floods

The outside (west) edge of the new lake impoundment wall should be designed to protect downtown Olympia from high waters. This would include both flood flows from the Deschutes River to the south and high tides and rising sea levels from the north. To this end, designing the wall to be built higher in the future with relative ease would seem prudent given the potential for continuing sea level rise.

New Freshwater Lake



LEGEND

HABITAT

- Estuary
- Freshwater Lake with Silt Bottom
- Swim Area with Sand/Gravel Bottom atop Liner
- Urban Uplands

WATER REGIME

- ← Groundwater Inputs
- ← LOTT Inputs
- ← OHWM Outlets
- Primary, Variable Outfall (0' to OHWM +2')

DOCKS

- Dock with water barrier beneath
- ① Dock for General Public
- ② Dock for Kids/Families Only
- + Lifeguard Stations

Approx. Scale
1" = 375'

Figure 2: Proposed New Freshwater Lake and Governance (New)

Groundwater Inputs

The new Capitol Lake basin could be supplied with freshwater via groundwater flows tapped into the local aquifer. This water source is clean and abundant, but testing would be needed to determine if the volumes required to maintain a clean lake could be removed without too much drawdown around the wells. Passive flows may need to be enhanced with pumps in order to supply enough water to the lake. Putting valves on these pipes would allow for complete control of the flow for management purposes.

LOTT Inputs

LOTT has a Purple Pipe with reclaimed water that passes through Heritage Park. It's current capacity of 3 million gallons a day of flow will be doubled in the near future. This is also a potential water source for a new Capitol Lake that could supplement groundwater flows. Furthermore, because the LOTT reclaimed water can be considerably warmer in summer than groundwater flows, it could create a more enjoyable swimming area if funneled through a confined space. Using swim docks with hydrologic barriers would easily do this (see Figure 2).

Install Impervious Liner

To keep the freshwater in the new lake isolated from the saltwater on the other side of the rock impoundment wall, an impervious liner could be installed. The easiest approach might be to just sandwich a layer of fabric between two layers of dredged silt placed along the lake side of the wall. Putting this barrier along the inside edge would cause it to be held in place by the water pressure of the lake.

New Swimming Beach

A swimming area could be created by laying down a few acres of impervious fabric over the existing mud and then covering it with a layer of sand and gravel to make a beach. Locating this swim beach at the northeast shoreline of the new lake would give the best sun exposure. The lake inputs of freshwater could be flushed from the swim beach shoreline towards multiple outlets along the west side of the new containment wall to create circulation that keeps the water fresh and clean. A log-boom barrier to intercept floatables from the rest of the lake could circumscribe the swim area to prevent the downwind accumulation of debris here. Adding a dog-leg that separates the General Public from Kids/Families swim areas would also be useful.

Fish/Wildlife Habitat

The lake portion outside of the swim beach could be managed for fish and wildlife habitat. Submersed aquatic vegetation should be encouraged to grow here to provide a healthy, productive environment. Roost logs could be anchored along the west lake edge to accommodate shorebirds and waterfowl. Water birds using the estuary should also use the freshwater lake for drinking, bathing and roosting.

Capitol Dome Reflective Pool

The new lake basin would act as a beautiful reflective pool for the capitol dome from the north side of Heritage Park. The circular aspect of the new containment wall would create a built landscape that focuses highlights towards the dome without straight-line directness.

Keep Lake Level Low for Stormwater Detention

Because inflows and outfalls to the new lake would be completely controlled, the ability to create a large volume of stormwater detention capacity is significant. The lake could be partially drained on low tides while the inputs are stopped with valves, leaving a basin with many acre feet of storage potential. The basin could become a large temporary detention pond for downtown stormwater, especially as sea level rise continues.

Potable Water for Disaster Relief

When the big earthquake hits Olympia, it is very likely that most water mains will break. Supplying potable water to the public will be an immediate, dire need. The artesian groundwater flows used to maintain a new Capitol lake could easily meet this need. Artesian flows work by gravity, so even if all our power infrastructure fails in a disaster, potable water could still be there for us to drink with a DELI built condition.

New Estuary

DELI Promotes an Estuary Same as DERT

The DELI proposed estuary is basically the same as DERT's, just a little smaller because of the new freshwater lake basin added on. The existing area of Capitol Lake that would be restored to tidal flow with DELI would be around 80% of the landscape. All costs and considerations for Estuary restoration should be the same with DELI or DERT.

Keep Marathon Park

Even though Marathon Park is fill, it is also an iconic part of downtown Olympia. Keeping this landscape feature will not significantly harm estuary restoration, and having tidal flows pulse through the constriction formed between the middle and north basins might even benefit water circulation.

Emphasize Natural Volunteer Regrowth

Estuary restoration should strongly emphasize natural, volunteer establishment of tidal plant and animal communities to reduce costs and make sure we get it right in the long run. Let the estuary figure out itself where everything should go rather than trying to achieve a predicted design made by people. This will ultimately give us the best habitat available at the lowest cost. Primary human intervention with plant and animal establishment should focus on controlling any unwanted species.

Roadway Considerations

New Elevated Roadway

The existing 5th Avenue roadway atop the dam should be replaced with an elevated ramp extending west to connect with the Deschutes Parkway and the roundabout with 4th avenue as previously proposed for estuary restoration. The opening beneath would become the estuary outfall.

Reinforce Deschutes Parkway

The Deschutes Parkway roadbed will be degraded by the leaching action of tidal waters fluctuating against it. Measures to address this issue must be taken if an estuary abuts the roadway. Armoring the flank as previously proposed for estuary restoration should still make the most sense.

Dredging

Resurrect Old Dredging Idea

Dredging of sediments deposited by the Deschutes River will be necessary at some point in the future if boats in Budd Inlet are to keep drafting into their existing berths. The idea to dredge lake sediments by pumping slurry into the holding ponds built in the southwest corner of the middle basin was a good one. This allows the dredged slurry to dewater and then be hauled away as dry material with a significant reduction in weight (and thus cost). The idea should be resurrected, but with a modified technique.

Dredge Annually

Instead of mobilizing massive dredging equipment every decade or so, install a permanent pumping station on the shoreline where the holding ponds are and make it electric so it's quiet. Then dredge every year from the adjacent mudflats within the required fish windows to remove the approximate 35,000 cubic yards of sediment deposited annually by the Deschutes River. If the dredging area is kept as a depression, sediments will naturally tend to fill in the hole. A deflecting wall could also be built on the north side of the I-5 overpass that would send the current borne sediment directly to the hole.

Longshoremen Labor

Manual labor to operate the dredge machinery could be obtained from Port of Olympia Longshoremen. These people are skilled at using heavy machinery, are conditioned to working outdoors, and are available on an on call basis. Just give them adequate training/guidance and this local work force will help keep costs down while doing a good job.

Potential Tidal Power Generation

Tidal Generation

Tidal flows can produce electricity with submersed turbines. Because the DELI design would have several constriction points that accelerate tidal flows, there is potential for producing valuable, clean energy. Turbines could be placed beneath the I-5 Bridge, the two openings at Percival Cove and Marathon Park, and finally at the new estuary outlet area beneath the 4th and 5th Avenue bridges.

Use Vertical Turbines

Tidal generators should be the kind that spin on a vertical axis, not a sideways, horizontal one like wind turbines do. This would prevent harming fish or other wildlife because things within the water column would just get passed on, not chopped up. The turbines could also be geared to spin at a low speed to further protect from harm (its water, not wind, so you can crank down the gears and still get good generation).

Governance

Give New Freshwater Lake to Olympia Parks Department

The Department of Enterprise Services should not be tasked with operating a public park with a swim beach. This is something that the Olympia Parks Department should do because that is exactly what they are designed for. Any new freshwater lake with a swim beach created through DELI should be given over to the Olympia Parks Department for Operation and Maintenance.

Give Restored Estuary to Squaxin Island Tribe

The Department of Enterprise Services should also not be tasked with managing a restored estuary; this is what natural resource agencies are for. Because DNR already owns some of the old tidelands smothered beneath Capitol Lake, they would seem a logical choice for future governance of the restored estuary. However, the Squaxin Island Tribe has similar natural resource expertise as well as an engrained, local desire to make things work well. Giving them governance over the restored estuary should ensure the best environmental stewardship.

Epilogue

The lake vs. estuary battle regarding Capitol Lake has been going on for a couple decades now with no end in sight. It's time for both sides to step back from their extreme, opposite view points and accept a compromise solution like DELI that will give everybody most of what they want.

DELI offers an outcome that will give us a clean, swimmable lake and a beautiful reflective pool for the Capitol Dome while also restoring a natural estuary to 80% of the existing, impounded landscape. DELI is also something that can actually get done because it's politically friendly.

Elected officials are loathe to get involved with divisive, community issues where each side has half the electorate in support. I believe that's the main reason the existing stalemate has lasted so long because no elected official wants to stand up and promote either side for fear of having the other side vote against them. Holding out for either an all estuary (DERT) or all lake (CLIPA) alternative will continue to prevent the allocation of funds sufficient to make something happen here. Choosing the compromise of DELI could get the funds flowing.

Steve Shanewise, PWS

January 2017