



CITY OF KIRKLAND

Department of Public Works

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www.kirklandwa.gov

MEMORANDUM

To: Kurt Triplett, City Manager

From: Noel Hupprich, P.E., Senior Project Engineer
Ray Steiger, P.E., Public Works Director

Date: November 3, 2011

Subject: TOTEM LAKE FLOOD CONTROL MEASURES – PROJECT UPDATE

RECOMMENDATION:

It is recommended that City Council receive this update on the Totem Lake Flood Control Measures Project (CSD-0059)

BACKGROUND DISCUSSION:

It was their regular meeting on July 19, 2011, that City Council received an earlier update on the Totem Lake Flood Control Measures Project. That update described analysis and design work completed by staff and the City's consultant, CH2MHill, Bellevue, WA, together with recommendations for maintenance work that would reduce the frequency and severity of flooding in the Totem Lake area. The analysis included a detailed survey of the Totem Lake drainage system and located "stream barriers" where accumulation of sediment, invasive vegetation and beaver dams are impacting the flow of water out of Totem Lake. The recommended maintenance work involved removal of accumulated sediment and vegetation at three locations, and the removal of one active beaver dam (Attachment A).

The original Project budget for 2011 was \$117,000 and estimates to perform the recommended work exceeded that amount. At their regular meeting of August 2, 2011, City Council authorized the use of an additional \$218,000 from the Surface Water Reserve Fund to complete the work, bringing the total available funding for 2011 to \$335,000. Permitting conditions required that the sediment and vegetation removal be completed by August 31, 2011; this was accomplished by an expedited permitting review process, cooperation from private property owners and from WSDOT, along with the City's ability to contract with the King County Rivers Team through an existing interlocal agreement. The sediment and vegetation removal work began in mid August and was complete by the end of August; the beaver dam removal was permitted separately and City crews completed that work in early September.

The following photos show the before (May, 2011) and the after (September, 2011) conditions at the three sediment and vegetation removal locations, including the beaver dam:

1 - Totem Lake Outlet



May, 2011



September, 2011

2 - Settling Basin



May, 2011



September, 2011

3 - Drainage Channel East Side of I-405



May, 2011



September, 2011

4 - Beaver Dam West of 116th Ave NE



May, 2011



September, 2011

The City's consultant, CH2MHill, conducted a new survey and collected water surface elevations after the maintenance work was finished. The results of that survey showed a decrease in the water surface elevation of three feet within the drainage system, between Totem Lake and the east side of I-405. The drop in water surface elevation exposed culverts within the system that had been submerged for over ten years, providing City crews an opportunity to inspect and repair one culvert known to be damaged, but previously submerged and inaccessible.

The work completed this year focused on "stream barriers" located between I-405 and Totem Lake. These activities allowed for the identification of other barriers not previously evident, particularly the area of drainage channel from the west side of I-405 to 116th Ave NE. The initial survey of the drainage channel found the area to be built up with sediment and vegetation; now that the drainage channel upstream has been cleaned out, it is clear that sediment and vegetation removal in the area between I-405 and 116th Ave NE will further improve flows out of Totem Lake. City staff and the design consultant will be working together to develop a plan for 2012 work to address further maintenance needs in this area.

To immediately address the stream barriers on the west side of I-405 during this year's wet season (November through April), staff is currently working on a hydraulic pumping plan to move water around the sediment and vegetation "hump" that exists between I-405 and 116th Ave NE. The strategy for pumping during the wet season is to begin this activity in advance of significant storm events, or when the lake level rises above a determined elevation. The intent is to maintain storage capacity in the Lake to allow for an increase in volume during large storm events. The City's consultant is currently working on the analysis to define a water level that will trigger pumping.

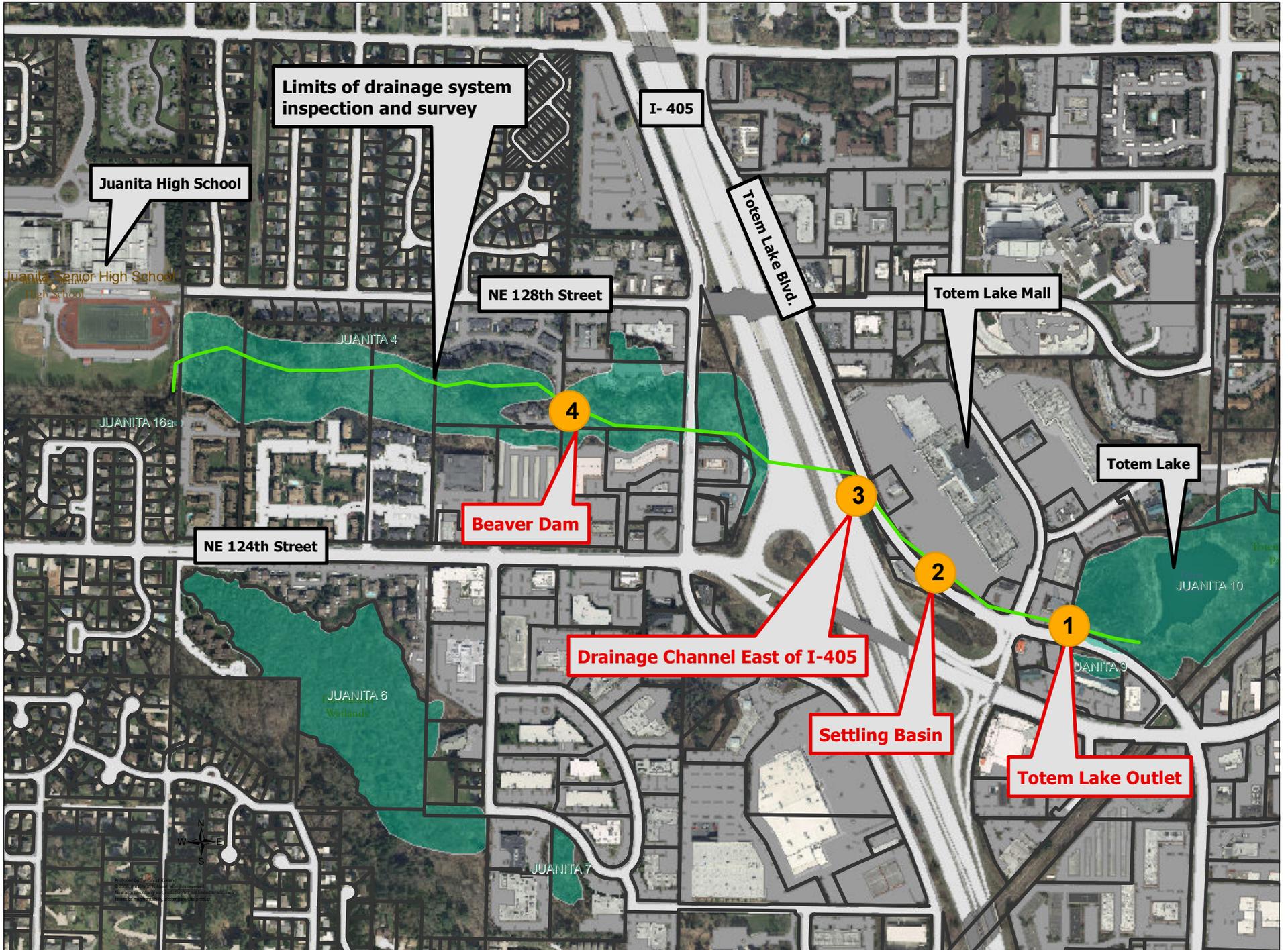
The pumping plan will draw water from culverts beneath I-405 and divert it around the sediment and vegetation between I-405 and 116th Ave NE. The discharge water will be moved downstream where the drainage channel gradient is steeper and water does not typically back up (Attachment B). City maintenance crews are securing all material and equipment needed for the pumping system. The system will be comprised of a rigid intake pipe and a flexible hose discharge line. A large capacity pump will be brought to the site as needed; however, the intake and discharge lines will be left in place to allow for quick and easy set up.

City staff and the consultant have met with representatives from Department of Ecology, the Army Corps of Engineers, and the Washington Department of Fish and Wildlife (WDFW) to secure all necessary environmental permits. Staff has applied for a general Hydraulic Project Approval (HPA) from WDFW and the pumping plan is presently going through a standard SEPA determination process. All formal permits are expected to be received and the pumping system will be in place by the end of November. In the mean time, WDFW has approved temporary emergency pumping through its emergency HPA process, which is based on verbal authorization in the event that flooding is eminent.

Last winter, staff sent out flood preparedness letters to business and property owners who have been affected by flooding in the Totem Lake area. This year staff has prepared a follow up letter to provide an update on the flood control efforts completed to date and to continue to encourage individual preparedness (Attachment C). The letter describes the work the City is doing to reduce the frequency and severity of flooding, and offers flood awareness advice with web based links for additional information.

Attachments: (3)

Totem Lake Flood Control Measures
Site Map



Totem Lake Flood Control
Pumping Plan



November 16, 2011

[Name]
[Address]

RE: Totem Lake Flood Preparedness

Dear [Property Owner],

The City would like to update you on flood control efforts around Totem Lake. We have made significant progress towards reducing the severity and duration of seasonal flooding. Further work to minimize flooding is planned, which will provide a greater level of protection. In the meantime, we hope for the best, prepare for the worst and encourage you to also be prepared. Along with specifics of how the City has been working on this critical area, we have included our seasonal reminders of steps that individuals can take to minimize potential property impacts due to heavy rains or snow events.

This summer the City completed the first steps in a multi-year process to address flood control in the area near Totem Lake. The work included a detailed survey of 5000 feet of conveyance channel downstream of Totem Lake, water surface level monitoring, and coordination with regulatory agencies. The survey identified several areas along the drainage channel where sediment and vegetation are impacting the outflow of Totem Lake. In August the City partnered with WSDOT and King County to remove built up sediment and vegetation along the conveyance channel between Totem Lake and the east side of I-405. This work increased the conveyance capacity of the drainage channel and lowered the level of the Lake by approximately three feet which will allow for greater storage of runoff from winter rains.

The work completed this year has improved flood control in the area; however, more work is necessary. Currently, the City is completing an emergency pumping plan that will be in place shortly to further reduce the risk of flooding, and Phase II of the multi-year project (scheduled for next construction season) will include the removal of the remaining sediment and vegetation in the conveyance system from I-405 downstream and to the west along the Totem Lake conveyance channel.

In the meantime, the City is continuing to maintain its monitoring of critical drainage structures. When wet weather is anticipated, City Crews are dispatched to ensure that the structures are clean and ready to function as they were designed. In addition, a traffic detour plan has been developed for use if the intersection of Totem Lake Boulevard and 120th Ave NE becomes inundated. With some planning now on your part, your business can continue uninterrupted through the winter rains.

Winter in the Pacific Northwest, especially in a second-in-a-row La Nina year as has been predicted, can mean large amounts of rainfall. The attached map shows areas that may be at risk of flooding when the level of Totem Lake rises in response to rainfall. Your business is located in one of these areas, and we want to assist you in locating sources of information on how to prepare for flooding and how to minimize your risk of damage from it. Because of its urban nature, Totem Lake can rise quickly depending on rainfall patterns (4 feet in about 8 hours during a large storm according to recent modeling), so it is important to be prepared before a rain event starts.

Flood Preparedness

Make Plans:

- Do you have flood insurance? If not, consider purchasing flood insurance. The majority of businesses around the lake are outside the FEMA 100-year flood plain (which is used by the National Flood Insurance Program to set flood insurance premiums), so insurance costs should be relatively low. See www.floodsmart.gov for details.
- Identify areas of your property that may flood. Make a plan to move valuable items, equipment and materials out of range of floodwaters permanently or, if that is not possible, temporarily during an event (i.e. identify alternative storage locations).
- Teach employees how and when to safely turn off gas, electricity, and water lines.
- Stock sandbags and plan for sandbag placement.

During a Flood:

- Watch the weather.
 - Monitor Seattle Rain Watch (www.atmos.washington.edu/SPU/) to get a feel for how much rain has fallen and how much is coming. Totem Lake usually rises the most in response to large storm events (3 inches or more over a 24 hour period).
 - Look at the level of Totem Lake. Totem Lake Boulevard near the intersection of 120th Avenue NE is usually one of the first spots to be impacted by heavy rains, and may indicate that floodwaters are rising toward your property.
- Mark flood elevations on building and take pictures. This will help in filing flood insurance claims, and will assist engineers with modeling conditions and designing flood reduction projects.
- Follow detour routes and do not drive through floodwaters. If your car stalls in a flooded area, abandon it as soon as possible and walk to safety from the direction you came.

After a Flood:

- When re-entering your place of business, be cautious of potential gas leaks, electrical shorts, and live wires.
- Follow procedures for safe cleanup of household items, food, water supply, and property. For more information, go to www.kingcounty.gov/health/preparedness.
- Contact the City of Kirkland Building Department at (425) 587-3600 regarding any questions on repairs that normally require a building permit such as foundation repairs, drywall and insulation replacement.

Further information and resources on flood preparedness is available at www.govlink.org/storm/floods.asp.

If you would like further information about Totem Lake or about flood preparedness, please contact Jenny Gaus, Environmental Services Supervisor, at (425) 587-3850 or jgaus@ci.kirkland.wa.us. Thank you for your efforts to protect yourselves through this winter and beyond.

Sincerely,
City of Kirkland

Ellen Miller-Wolfe
Economic Development Manager

Jenny Gaus, PE, CSM
Environmental Services Supervisor