TECHNICAL MEMORANDUM

Date: October 21, 2016

To: Janet Quinn, City of Kenmore

From: Rob Zisette and Julia Munger, Herrera Environmental Consultants, Inc.

Subject: Aquatic Vegetation Interpretive Report

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Survey Methods

Herrera Environmental Consultants, Inc. (Herrera) conducted an aquatic vegetation survey of Lake Washington and the Sammamish River within the City of Kenmore on September 7 and 8, 2016 (Figure 1). The survey was conducted by two aquatic botanists (Rob Zisette and Julia Munger) using an inflatable boat and motor along transects spaced up to 120 feet apart. The river area was surveyed first, following one transect upriver along the south bank and then another transect downriver along the north bank, with occasional cross-river transects. The lake area south of the river was surveyed by following transects perpendicular to shore, and the remaining lake area was surveyed following parallel transects oriented in a northeast/southwest direction with additional transects located between docks.

Vegetation density and water depth data were collected along each transect using a Lowrance® HDS-7 underwater sonar and global positioning system (GPS), and data processing was provided by BioBase®. Vegetation density was calculated and interpolated between transects based on the relative proportion of plant biovolume in the water column. If there was little or no vegetation in a given location within the water column, the biovolume was recorded as a low density. If plants took up a large portion of the water column or came to the surface of the water, the biovolume was recorded as a high density.

An aquatic plant sampling rake was used to collect a total of 68 grab samples for identifying submersed plant species and estimating the percent abundance of each species in the samples. Dominant plant areas delineated based on the sample results and visual observations where one or two species that were present in higher densities than all other species, and thus determined to be dominant or co-dominant. In addition, the presence of emergent plant species was also noted with an emphasis on noxious weed species. Locations of plant species observations were recorded using separate GPS equipment.

Plant List

A total of 24 aquatic and emergent plant species were identified within the survey area (Table 1). Out of those species, 10 were classified as noxious weed species in Washington State. The remaining 14 plant species were common native species. No rare native species or non-native, non-invasive species were observed. The number and type of species observed represent a reasonably diverse aquatic plant community that is impacted by a relatively high number of invasive species.

Plant Density

Aquatic vegetation was the densest closest to the shoreline of the Sammamish River and Lake Washington (Figure 2). Vegetation density was lowest in the deepest portions of the

Sammamish River, and along the eastern shoreline of the lake. There was also a large low density area near the center of the survey area, running from the outlet of the Sammamish River toward the center of the lake. This low density area also reached to the northern-most tip of the lake, where Kenmore Air operates.

Table 1. Aquatic Plant List for the Kenmore Survey on September 7 and 8, 2016.

Plant Type	Common Name	Scientific Name	Status
Emergent Plants	Common cattail	*Typha latifolia*	Native
	Garden loosestrife	*Lysimachia vulgaris*	Noxious Weed- Class B
	Japanese knotweed	*Fallopia japonica*	Noxious Weed- Class B
	Narrow-leaf bur-reed	*Sparganium angustifolium*	Native
	Purple loosestrife	*Lythrum salicaria*	Noxious Weed- Class B
	Reed canarygrass	*Phalaris arundinacea*	Noxious Weed- Class C
	Spotted jewelweed	*Impatiens capensis*	Noxious Weed- Monitor List
	Yellow-flag iris	*Iris pseudacorus*	Noxious Weed- Class C
Floating Leaved Rooted Plants	Fragrant waterlily	*Nymphaea odorata*	Noxious Weed- Class C
	Grass-leaved pondweed	*Potamogeton gramineus*	Native
Free Floating Plants	Lesser duckweed	*Lemna minor*	Native
	Mexican water-fern	*Azolla mexicana*	Native
Submersed Plants	Brazilian elodea	*Egeria densa*	Noxious Weed- Class B
	Common waternymph	*Najas guadalupensis*	Native
	Common waterweed	*Elodea canadensis*	Native
	Coontail	*Ceratophyllum demersum*	Native
	Curly-leaf pondweed	*Potamogeton crispus*	Noxious Weed- Class C
	Eurasian watermilfoil	*Myriophyllum spicatum*	Noxious Weed- Class B
	Flat-stemmed pondweed	*Potamogeton zosteriformis*	Native
	Richardson's pondweed	*Potamogeton richardsonii*	Native
	Sago pondweed	*Potamogeton pectinatus*	Native
	Tapegrass	*Vallisneria americana*	Native
	White-stemmed pondweed	*Potamogeton praelongus*	Native
Plant-like algae	Nitella	*Nitella* sp.	Native

Dominant Plant Distribution

A total of 13 distinct dominant plant areas that were mapped within the survey area, as shown in Figure 3. These. (Figure 3). Dominant aquatic vegetation species include: Coontail (*Ceratophyllum demersum*), Eurasian watermilfoil (milfoil) (*Myriophyllum spicatum*), tapegrass (*Vallisneria americana*), white-stemmed pondweed (*Potamogeton praelongus*), Brazilian elodea (*Egeria densa*), flat-stemmed pondweed (*Potamogeton zosteriformis*), and common waterweed (*Elodea canadensis*).

Figure 3 also displays pie charts at the 68 sample locations exhibiting the relative percentages of three vegetation categories: native vegetation, Eurasian watermilfoil, and Brazilian elodea. Because these plants were found throughout the entire survey area, this figure conveys the areas in which these plants are most prevalent.

The Sammamish River was dominated by the noxious weed Eurasian watermilfoil and the native plant coontail. Lake Washington was typically dominated by the native tapegrass in shallow areas and the native white-stemmed pondweed in deeper areas. Exceptions include co-dominance by Eurasian watermilfoil and tapegrass along the southernmost shoreline adjacent to Saint Edward State Park, co-dominance by Brazilian elodea and white-stemmed pondweed in the westernmost deep area of the lake, and co-dominance by flat-stemmed pondweed and common waterweed in the easternmost deep area of the lake.

Noxious Weed Species

A total of 10 of the observed species are on the Washington state noxious weed list (NWCB 2016) (see Table 1). In Washington State, weeds are designated as Class A, B, or C by the state's Noxious Weed Control Board (NWCB):

- Class A weeds are weeds that are not yet present in the state, or occur in only a few populations. These weeds usually occur in bordering states and present a risk for widespread infestation if they are not controlled. Class A weeds are required for control throughout the entire state.
- Class B weeds are widespread in some areas of the state but not others. The NWCB requires the control of Class B weeds in counties where a particular weed is not yet widespread.
- Class C weeds are widespread throughout the state. The NWCB does not require control for Class C weeds in any county.

Each county can choose to enforce the control of Class B or C weeds throughout the county or in particular locations if the NWCB has not already done so. In King County, Japanese knotweed and Brazilian elodea (both Class B) have been designated for required removal by the King County Noxious Weed Control Board in some areas of the county. However, these species are not required for control in Lake Washington or the Sammamish River. The state NWCB also has a state monitor list, which are not designated as Class A, B, or C. They are species that may be designated as A, B, or C weeds in the future.

There are no Class A noxious weeds on the site, but there are five Class B weeds, four Class C weeds, and one weed on the state monitor list. Two of the species, garden loosestrife (*Lysimachia vulgaris*) and purple loosestrife (*Lythrum salicaria*), are required for removal in King County (King County 2016).

Emergent Noxious Weeds

Six emergent noxious weed species were observed during the vegetation survey with locations shown in Figure 4. These species include garden loosestrife, purple loosestrife, Japanese knotweed (*Fallopia japonica*), yellow-flag iris (*Iris pseudacorus*), reed canarygrass (*Phalaris arundinacea*), and spotted jewelweed (*Impatiens capensis*). Only garden loosestrife and purple loosestrife are required for control in this part of King County.

Emergent noxious weed species were primarily found along the banks of the Sammamish River. The noxious weed cover was nearly 100 percent in undeveloped areas along the Sammamish River, especially upstream of the 68th Ave NE Bridge. These noxious weeds occurred in front of developed properties as well, although with less abundance. Reed canarygrass was the dominant noxious weed species along the Sammamish River, although all of the species were observed in abundance.

All of the emergent noxious weed species (with the exception of Japanese knotweed) were also seen along the banks of Lake Washington, but with much less frequency. There was one observation each of yellow-flag iris and garden loosestrife, and two sightings of purple loosestrife. There were numerous small, infrequent patches of both spotted jewelweed and reed canarygrass on the lake shore.

Aquatic Noxious Weeds

Four aquatic noxious weeds were observed within the survey area: fragrant waterlily (*Nymphaea odorata*), which is a rooted floating-leaved plant; and Brazilian elodea (*Egeria densa*), curly-leaf pondweed (*Potamogeton crispus*), and Eurasian watermilfoil (*Myriophyllum spicatum*), all of which are submersed aquatic plants (see Figure 4). None of these species are required for control in this part of King County.

Eurasian watermilfoil and Brazilian elodea were growing densely in the Sammamish River upstream of 68th Ave NE. Eurasian water milfoil was the dominant or co-dominant species upstream of 68th Ave NE, while Brazilian elodea was subdominant upstream of Squire's Landing Park. There was no fragrant waterlily found upstream of the 68th Ave NE Bridge, but it covered the entire shallow waters on south bank of the river downstream of the 68th Ave NE Bridge, completely overtaking a side channel at the outlet of the Sammamish River. No curly-leaf pondweed was found in the Sammamish River.

Within Lake Washington, most of the fragrant water lily was confined to the northeastern shore, adjacent to the Sammamish River. There were other small patches throughout the lake, particularly near the docks at the north end of the lake. Curly-leaf pondweed was only found in one location near the northwestern portion of the lake survey area. Eurasian watermilfoil and Brazilian elodea were found throughout the lake survey area, although in varying densities.

Eurasian watermilfoil was most dense in shallow areas and near the shore, while Brazilian elodea was most dense in deep areas and toward the middle of the survey area.

A month or two before the plant survey, aquatic noxious weeds were treated with herbicides at four locations within Lake Washington and the Sammamish River. Under contract with the City of Kenmore, a licensed aquatic herbicide applicator surveyed the areas in May 2016 to determine the appropriate treatment methods. The areas were treated with the systemic herbicide Triclopyr on June 27, 2016 to control Eurasian watermilfoil, and then treated with the contact herbicide Diquat on July 29, 2016 to control Brazilian elodea. Approximate locations of the treatment areas are shown in Figure 4. There was noticeably less Eurasian watermilfoil and Brazilian elodea in the two larger treatment areas located near Log Boom Park in Lake Washington and in the Sammamish River downstream of 68th Ave. The two smaller treatment areas, located near Squire's Landing Park in the Sammamish River and the Inglewood Country Club in Lake Washington, did not appear to have less aquatic noxious weeds than adjacent areas.

References

King County. 2016. King County Noxious Weed List. Updated October 3, 2016. Accessed October 13, 2016. <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/laws/list.aspx>.

NWCB. 2016. Washington State Noxious Control Board. Accessed October 13, 2016. <http://www.nwcb.wa.gov/classes-of-noxious-weeds>.