SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

May 3, 2018

Planning and Building Department
City of Kirkland
123 5th Avenue
Kirkland, WA 98033

Attn: Mr. Tony Leavitt

RE: PUBLIC AGENCY EXCEPTION ASSESSMENT, PETER KIRK ELEMENTARY SCHOOL REPLACEMENT PROJECT, LAKE WASHINGTON SCHOOL DISTRICT, KIRKLAND, WASHINGTON

Shannon & Wilson, Inc. was contracted by the Lake Washington School District (School District) to provide natural resource and permitting support services for the Peter Kirk Elementary School Replacement Project (the project). The School District has requested a Public Agency Exception (PAE) from the City of Kirkland (City), which will exempt the project from sections of the Kirkland Zoning Code (KZC) Chapter 90 that would otherwise prevent the school replacement from moving forward. Specifically, the PAE will be used for the following sections of KZC 90.[1]

1. KZC 90.60 Wetland Modification and 90.70 Stream Modification
2. KZC 90.75 Daylighting of Streams[2]
3. KZC 90.130 Vegetative Buffer Standards
4. KZC 90.140 Structure Setback from Critical Area Buffer

This letter will discuss why the project is requesting a PAE, and will outline how the project's request meets the PAE decisional criteria within KZC 90.45 Public Agency and Public Utility Exceptions.

[1] City of Kirkland (City), 2017, Kirkland Zoning Code (KZC) Chapter 90 critical areas – wetlands, streams, minor lakes, fish wildlife habitat areas, and frequently flooded areas: Kirkland, Wash., adopted December 13, 2016, available: http://www.codepublishing.com/WA/Kirkland/

[2] The School District's analysis concludes that KZC 90.75 does not require daylighting of the stream in this instance. We understand that City staff concur with this conclusion. However, City staff have requested that the School District's conclusion be referenced as a part of the PAE Assessment.

400 NORTH 34TH STREET, SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103-8636
206-632-8020 FAX: 206-695-6777
www.shannonwilson.com

BACKGROUND

The School District submitted the project's draft critical areas report, *Wetland and Stream Delineation Report, Peter Kirk Elementary School,*[3] to the City in April 2017. The City's third party critical areas reviewer provided comments on the report, which were incorporated into the project's final critical areas report.[4] The School District has also provided the City with a Buffer Mitigation Plan to support the project's permit applications.[5]

The eastern third of the school parcel is encumbered by critical areas and their associated buffers. The critical areas report describes three onsite wetlands, two of which are associated with an un-named stream that enters the project site from the north, flows along the eastern parcel boundary, and leaves the project site at the southern project boundary. The project critical areas report meets the requirements outlined in KZC 90.110 Critical Areas Report.

DEMONSTRATED NEED FOR PUBLIC AGENCY EXCEPTION (PAE)

As noted above, the project is requesting a PAE for several specific sections of the KZC Chapter 90. Descriptions of the proposed design elements and accompanying code constraints are described below.

KZC 90.60 Wetland Modification and 90.70 Stream Modification

The proposed design will not impact the site wetlands or stream but will result in permanent and temporary buffer impacts. While buffer impacts are allowed under KZC 90.60 and 90.70, the requirements of these sections cannot be met because per the code, a buffer modification must be associated with a wetland or stream impact. This understanding of the KZC is based on communications with Joan Lieberman-Brill, a City senior land use planner, during coordination

[3] Shannon & Wilson, 2017, Draft Wetland and Stream Delineation Report, Peter Kirk Elementary School, Kirkland, Washington: Report prepared by Shannon & Wilson, Inc, Seattle Wash., 21-1-12553-002, for Lake Washington School District, Redmond, Wash., March, 108 p.
[4] Shannon & Wilson, 2017, Wetland and stream delineation report, Peter Kirk Elementary School, City of Kirkland, Washington: Report prepared by Shannon & Wilson, Inc., Seattle, Wash., 21-1-12553-002, for Lake Washington School District, Redmond, Wash., August, 124 p.
[5] Shannon & Wilson, 2018, Buffer mitigation plan, Peter Kirk Elementary School Replacement, City of Kirkland, Washington, 21-1-12553-205, for Lake Washington School District, Redmond, Wash., April, 23 p.

for a separate school project[6]. However, we understand this to be a universal interpretation and is not project-specific. Therefore, the project's temporary impacts to only buffer must be processed under a PAE.

The project site is heavily encumbered by existing critical areas and buffers, site topography, and the location of the existing school campus. Unavoidable buffer impacts include the main activities below. These buffer impacts have been minimized to the extent possible through a thorough mitigation sequencing process.

Permanent Buffer Impacts

The onsite permanent buffer impacts total 44,717 square feet, which includes a portion of the new school building, a fire lane made of porous grass pavement, portable classrooms, and other elements associated with the school, such as pathways and landscaping, as well as for the establishment of a new structure setback.

Temporary Buffer Impacts

Temporary buffer impacts total 49,200 square feet and will result from construction-related activities, such as site access and staging and removal of hazard trees. Also, a gravel driveway and rockery associated with an old residence will be removed from the buffer, resulting in temporary earth disturbance.

The areas of permanent and temporary buffer impacts are located in portions of the buffer that are currently developed or are actively used on a daily basis by the elementary school. The buffer mitigation strategy includes averaging (adding) an existing 7,606-square-foot mature forest to the buffer and providing onsite buffer enhancement measures. A description of the buffer mitigation sequencing and buffer mitigation measures are included in the project's buffer mitigation plan.

---

[6] Lieberman-Brill, Joan, 2016, Updates to City of Kirkland chapter 90 (thread titled "Juanita HS Wetlands Meeting Agenda Oct. 17, 2016"): Personal communication (email) between Joan Lieberman-Brill, Janice Coogan, Teresa Swan, and Jeremy McMahan, City of Kirkland, Kirkland, Wash., and Sarah Corbin, Shannon & Wilson, Inc., Seattle, Wash., and Stacy Shewell, Lake Washington School District, Redmond, Wash., and Kim Young, Integrus Architecture, Seattle, Wash., November 3.

KZC 90.75 Daylighting of Streams

KZC 90.75 does not require stream daylighting, but does "encourage" it (KZC 90.75.1) and identifies circumstances when the City "may require" as part of a Process IIA or IIB permit project approval that a stream be daylighted where proportionate to the scope and nature of the project (KZC 90.75.4). The code's stated purpose for a stream daylighting requirement is to "… improve the values and functions of the stream, including maintaining water quality, reducing storm and flooding water flow, and providing wildlife habitat." An analysis of the project as relates to the code's stated purpose for a daylighting requirement is set forth in letters prepared by Shannon & Wilson, Inc. dated August 10, 2017[1] and April 24, 2018[2]. These letters demonstrate that daylighting this short section of the stream, particularly in the context of the project, "…would result in largely insignificant benefits to the stream system…," and would not fulfill the purpose of KZC 90.75.1.

As noted above, the sole trigger for the analysis in this case is that the project is being processed as a Process IIB permit because it is a school located in a low-density residential zone on more than 5 acres. Considering that the site already contains that use, no change in use is proposed, the project is not proposing to modify the stream channel or impact wetlands, and that daylighting the stream does not meet the stated code purpose in this instance, the School District does not believe that imposition of a daylighting requirement would be proportionate to the scope and nature of the permit.

The City has asked that the School District use the PAE regulations to request an exception to application of KZC 90.75 to this particular project. Using KZC 90.45.4.c, that provision states that "The public agency or public utility shall submit a stream daylighting plan demonstrating that the requirements in KZC 90.75(3) cannot be met." As stated above, the School District does not believe that KZC 90.75 is applicable in any instance to the project and thus an exception to such a requirement is not needed. The School District is not submitting a daylighting plan given the analysis in the Shannon & Wilson letters and discussions with the City regarding the lack of

[1] Shannon & Wilson, 2017, Stream daylighting assessment, Peter Kirk Elementary Replacement Project, Kirkland, Washington: Letter prepared by Shannon & Wilson, Inc., Seattle, Wash., 21-1-12553-207, for Lake Washington School District, Redmond, Wash., August, 10 p.
[2] Shannon & Wilson, 2017, Response to The Watershed Company review of stream daylighting assessment, Peter Kirk Elementary Replacement Project, Kirkland, Washington: Letter prepared by Shannon & Wilson, Inc., Seattle, Wash., 21-1-12553-207, for Lake Washington School District, Redmond, Wash., April, 25 p.

a nexus with the impacts of the project and the stated purposes when daylighting would be required as proportionate to the scope and nature of the project. Specifically, daylighting the stream would not fulfill the stated purposes of daylighting in KZC 90.75 and instead would require an unnecessary expenditure of taxpayer dollars. Preliminary design and construction cost estimates indicate that the stream daylight could cost the School District up to $1,000,000.

KZC 90.130 Vegetative Buffer Standards

The KZC 90.130 Vegetative Buffer Standards describes wetland and stream buffer standards that will be required for projects that meet the following criteria:

1. The total net new impervious surface on the entire subject property exceeds 1,000 square feet or
2. The cost of new or replacement improvements exceeds 50 percent of the assessed or appraised value of the existing improvements on the entire subject property, whichever is greater (City, 2017).

The project will: (1) result in a net increase in impervious surface greater than 1,000 square feet and (2) although the City does not assess the value of public lands, it is probable that an appraisal would show exceedance of the 50 percent value. Therefore, the vegetative buffer standards would apply to the project. These standards require native cover of at least 80 percent throughout the wetland and stream buffer area, at least 20 percent areal cover of forest and shrubs, less than 10 percent noxious weed cover, and removal of existing improvements and structures. The proposed project is going to meet the vegetation buffer standards by revegetating the buffer with a native meadow seed mix, trees, and shrubs, and will control invasive species. However, an existing network of trails and a footbridge in the forested buffer are used daily by students, parents, and the community, and will not be removed as part of this project. Because the project cannot implement KZC 90.130 entirely, a PAE is requested.

KZC 90.140 Structure Setback from Critical Area Buffer

The KZC 90.140 outlines required structure setback widths for specific improvement types from critical area buffers. The code requires a structure setback of 10 feet from the buffer edge and identifies other improvements that may extend further into the structure setback. The proposed design has incorporated the setback improvement requirements detailed in KZC 90.140.1 to the

extent possible. The proposed gravel pathways and the porous grass pavement fire lane extend no more than 9 feet into the setback, as required by the KZC. However, the project is unable to meet the setback requirements where a new gravel pathway crosses through the setback and joins an existing gravel trail located in the buffer. The implication of KZC 90.40.6.c, which allows for trails and stream crossings in buffers, is that a proposed trail to access an existing, legal crossing would likewise be allowed to pass through the structure setback. If City interpretation differs, then extension of the proposed trail to connect to the existing trail through the full 10-foot structure setback is included in this PAE request. Therefore, a PAE is requested for this improvement that exceeds the allowances within KZC 90.140.

DECISIONAL CRITERIA

This section outlines how the project meets each of the PAE decisional criteria in KZC 90.45.3. The specific criteria are shown below in *italics,* followed by the project's response.

1. *There is no other practical alternative to the proposed project with less impact on the critical areas or buffer.*

   The size of the school site and presence of critical areas and their associated buffers severely restricts the school replacement available area. Implementation of the avoidance and minimization measures described in the project's mitigation plan have allowed the project design to avoid impacts to the site's wetland and stream system and has minimized impacts to the site's critical areas buffer to the extent possible.

2. *Strict application of this chapter would unreasonably restrict or prohibit the ability to provide public utilities or public agency services to the public.*

   Strict application of the code sections identified above would prevent the project from moving forward (site encumbrance necessitates use of KZC 90.60 and 90.70), and would eliminate currently active and accessible nature trails and pedestrian crossing of the stream/wetland used by students and the general public to access the school grounds (KZC 90.130 and 90.140).

3. *The proposal minimizes impacts to the critical area or buffer through mitigation sequencing, and through type and location of mitigation, pursuant to KZC 90.145 and 90.150, if applicable, including such installation measures as locating facilities in previously disturbed areas, boring rather than trenching, and using pervious or other*

low impact materials.

In accordance with KZC 90.145, a thorough mitigation sequencing process has resulted in avoidance of impacts to the site wetlands and stream, and has minimized impacts to the site buffers. The project mitigation plan describes the implemented mitigation sequencing in detail and outlines consistency with the requirements found in KZC 90.150.

4. *The proposal protects and/or enhances critical area and buffer functions and values, consistent with the best available science and with the object of no net loss of critical area functions and values.*

   Through impact avoidance to the site wetland and stream system, and implementation of the proposed mitigation measures, the proposed design increases the existing function and value of the onsite critical areas. Additionally, the proposed design incorporates enhanced stormwater treatment for currently untreated pavement that discharges to the site stream. The proposed addition of water quality treatment will improve water quality within the site wetland and stream system, thereby enhancing the hydrologic function within the system and within waterbodies downstream of the site.

CONCLUSIONS

Strict application of the KZC sections 90.60, 90.70, 90.75, 90.130, and 90.140 would prevent the proposed school replacement from moving forward under the City's permitting process and, in the instance of KZC 90.75, is not required. The project has demonstrated the need for a PAE and has outlined how the proposed design meets the PAE decisional criteria in KZC 90.45.3. The School District, therefore, requests that the City employ a PAE to permit the project.

LIMITATIONS

The findings and conclusions documented in this letter have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this letter are professional opinions based on interpretation of information currently available to us and are made within the

operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

We appreciate the opportunity to be of service to you. If you have any questions or would like clarification of the information provided herein, please contact me at scc@shanwil.com or (206) 695-6674.

Sincerely,

SHANNON & WILSON, INC.

Sarah C. Corbin

Sarah Corbin, PWS
Senior Biologist

SCC:AJS:KLW/scc

Buffer Mitigation Plan
Peter Kirk Elementary School Replacement
City of Kirkland, Washington

August 31, 2017

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Excellence. Innovation. Service. Value.

Since 1954.

Submitted To:
Mr. Jon Shepherd
Lake Washington School District
15212 NE 95th Street
Redmond, Washington 98052

By:
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, Washington 98103

21-1-12553-205

SHANNON & WILSON, INC.

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 BACKGROUND 1
2.1 Project Background 1
2.2 Existing Conditions 1

3.0 PROJECT IMPACTS 2
3.1 Mitigation Sequencing 2
3.1.1 Avoid 3
3.1.2 Minimize 3
3.1.3 Restore 4
3.1.4 Reduce or Eliminate 4
3.1.5 Compensate 4
3.1.6 Monitor 4
3.2 Buffer Impacts 4

4.0 PROPOSED MITIGATION 5
4.1 Buffer Averaging 6
4.2 Buffer Enhancement 7
4.2.1 Enhancement Area Construction Sequence 7
4.2.2 Performance Standards 8
4.2.3 Monitoring Plan 9
4.2.4 Maintenance 10

5.0 CLOSURE 10

6.0 REFERENCES 12

TABLES

1 Buffer Impacts 5
2 Tree Comparison in Buffer Impact and Buffer Averaging Areas 6
3 Vegetation Performance Standards 8

FIGURES

1 Vicinity Map
2 Site Plan
3 Mitigation Plan Sheet

TABLE OF CONTENTS (cont.)

SHANNON & WILSON, INC.

APPENDICES

A Comparison of Trees Removed from Buffer and Trees in Buffer Averaging Area
B Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report

BUFFER MITIGATION PLAN
PETER KIRK ELEMENTARY SCHOOL REPLACEMENT
CITY OF KIRKLAND, WASHINGTON

1.0 INTRODUCTION

Shannon & Wilson, Inc. (Shannon & Wilson) was contracted by the Lake Washington School District (District) to complete a buffer mitigation plan for the proposed Peter Kirk Elementary School Replacement project in the City of Kirkland, Washington (City). The school is located at 1312 6th Street, Kirkland, Washington, 98033, on King County parcels 398270-1890, 398270-1990, 398270-1210, 398270-1155, 398270-1190, 398270-1160, 398270-1130, 398270-1120, 398270-0915, 398270-0925, and 398270-0960 in the NE quarter of Section 25, Township 25N, and Range 5E, Willamette Meridian (Figure 1). This report will support the project's permit applications to the City. The proposed project will be permitted using a Public Agency Exception outlined in Kirkland Zoning Code (KZC) 90.45.

2.0 BACKGROUND

2.1 Project Background

The Peter Kirk Elementary School Rebuild and Enlarge project consists of replacing the main school building, new ballfields and play areas, new staff and visitor parking, and maintaining spaces for future expansion (Figure 2). The District proposes to build a new 78,263 square feet (sf) (two-story) elementary school, with construction of the new school occurring while the existing school is open. After completion of the new school, the existing school will be demolished and the area will be converted to parking and play areas for the new school. The project also includes a student drop off loop and a bus loop.

2.2 Existing Conditions

Three wetlands (Wetlands A, B, and C) and one unnamed stream (Stream 1) were identified on the site. Wetlands A and B are associated with Stream 1 and are Category III wetlands according to the Washington Department of Ecology's (Ecology's) 2014 rating system. Wetland C is located in a small depression with no apparent outlet that abuts single-family residential property on the site's southern boundary and is rated as a Category IV wetland.

Stream 1 is a perennial stream associated with site Wetlands A and B. On site, Stream 1 flows through defined and undefined channels as well as through an approximately 150-foot-long culvert. Downstream of the site, Stream 1 continues through a series of culverts for

approximately 1.4 miles until it outlets into Lake Washington. Stream 1 was rated as Type F (fish-bearing), due to presence of potential fish habitat, based on KZC 90.65.

Additional description of the site wetlands and stream can be found in the project Wetland and Stream Delineation Report, dated August 10, 2017 (Shannon & Wilson, 2017).

3.0 PROJECT IMPACTS

After conducting a thorough mitigation sequencing process, discussed below, the final project design has no impacts to the wetlands or stream but will result in buffer impacts. The following discussion describes the mitigation sequencing process for the project and characterizes and quantifies the remaining impacts.

3.1 Mitigation Sequencing

KZC 90.145 states that:

> "The intent of mitigation sequencing is to evaluate and implement opportunities to avoid, minimize, eliminate or compensate for impacts to critical areas while still meeting the objectives of the project. When a modification to a critical area and buffer is proposed, the modification shall be avoided, minimized, or compensated for, as outlined by WAC 197-11-768, in the following order of preference:
>
> 1. Avoiding the impact altogether by not taking a certain action or parts of actions;
> 2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
> 3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
> 4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
> 5. Compensating for the impact by replacing or providing substitute resources or environments; and/or
> 6. Monitoring the impacts and compensation projects and taking appropriate corrective measures.
>
> In the required critical areas study, the applicant shall include a discussion of how the proposed project will utilize mitigation sequencing to avoid, minimize, and mitigate impacts to critical areas and associated buffers. The applicant shall seek to avoid, minimize and mitigate overall impacts based on the functions and values of all relevant critical areas."

The proposed project has implemented mitigation sequencing analysis throughout the design process, focused primarily on the location and configuration of the new school building and required fire lane with respect to the buffer. The project's mitigation sequencing process is described below.

3.1.1 Avoid

The proposed project has modified the design to avoid impacts in a number of ways. The project will not impact any site wetlands or streams. Additionally, the configuration of the project elements has been designed to avoid impacting the mature forest inside and outside the buffer. For example, the entire school building has been located as far south as possible, within 15 feet of the existing school, in order to avoid impacting the forest that is contiguous with Wetland A in the northern part of the site. A new parking area on the south was laid out to avoid impacting a coniferous forest associated with Wetlands B and C. The project also avoids impacting a large mature western red cedar that stands alone within the temporary buffer impact area. By avoiding impacts to the onsite mature forested areas, the proposed project has avoided alteration of important food, cover, perch, breeding, resting, or riparian shade functions associated with the onsite buffers.

The project design also concentrates impacts in currently developed areas of buffer. For example, the south wing of the building was oriented in order to overlap with a portion of the existing sand playfield located in the buffer.

3.1.2 Minimize

The proposed project elements are the minimum size needed to meet the elementary school's needs and to satisfy local regulations, specifically those related to safety and stormwater management. As previously mentioned, all permanent and temporary buffer impacts are restricted to lawn or other improved areas. Strategies the design team has employed to minimize buffer impacts include the following.

- The removal of woody vegetation within the buffer is limited to hazard trees and those necessary to accommodate the proposed design configuration.
- The building footprint was laid out to reduce regrading on the site and the fire lane was narrowed to the extent allowable to minimize cut slopes/earth disturbance within buffer, while still meeting safety requirements.
- Stormwater vault size was reduced to extent allowable, given code requirements.

- The stormwater basins for the redeveloped site will closely match the basin areas of the existing site. Discharge into the wetland buffer from the easterly basin is proposed to be at the same location as the existing discharge point.
- The fire lane will be constructed with pervious "grass modular grid pavement" to minimize impervious surface within the buffer areas.
- The majority of the school building is designed as a two-story building to minimize buffer impacts and reduce impervious pavement throughout the site.

3.1.3 Restore

The buffer temporarily disturbed during construction, is currently used by the existing elementary school, contains a sand playfield and lawn, and is within the mitigation plan's buffer enhancement area. Therefore, all temporary buffer impacts from construction will be restored to better than existing condition through implementation of the mitigation plan.

3.1.4 Reduce or Eliminate

The project design has reduced and eliminated impacts to critical areas and buffers to the extent possible. The project will remove approximately 15,000 sf of existing sand playfield from the buffer and will eliminate daily use and regular maintenance/mowing from 42,900 sf of the buffer through implementation of the buffer enhancement plan. An existing home, driveway, retaining wall, and shipping container will also be removed from a portion of the buffer at the north end of the property.

3.1.5 Compensate

Section 4 of this report describes in detail the proposed mitigation for the buffer impacts. As required in KZC 90.145.3 mitigation location preference, the buffer mitigation will be provided on-site and in-kind.

3.1.6 Monitor

Mitigation for impacts to buffers will be monitored for five years, with detailed reports provided to the City. See Section 4.2.3 of this report for a description of the monitoring protocol and conditions. If any portion of the mitigation appears to be failing during the monitoring period, the District would be required to implement a contingency plan.

3.2 Buffer Impacts

The project will result in temporary and permanent buffer impacts. The buffer will be permanently impacted by a portion of the new school building, a fire lane, portable classrooms,

other elements associated with the school, such as pathways and landscaping, as well as for the establishment of a new structure setback. Temporary buffer impacts will result from construction (access, staging, etc.). Table 1 quantifies the buffer impacts.

TABLE 1
BUFFER IMPACTS

Buffer Impact Type	Impact Area (square feet)
Temporary	49,200
Permanent	44,717

Much of the permanent and temporary buffer impact areas are either currently developed or are actively used on a daily basis by the elementary school. Impact areas that are not developed consist of lawn, isolated trees, or ornamental plantings and provide extremely limited hydrologic, water quality, and habitat function. The vegetated buffer impact area provides only moderate erosion protection, as the existing lawn is generally sparse and trampled.

Based on the surveyed site trees and project arborist's report, 18 trees will be removed from the buffer impact area (American Forest Management [AFM], 2017). These include a row of Lombardy poplars, several fruit trees part of an old orchard, four isolated Douglas firs, a big leaf maple, and a bitter cherry. Hazard trees identified for removal are not included in the removal count because they would be removed regardless of this project action. A quantification of trees that will be removed from the buffer, their diameter at breast height, and dripline area is included in Appendix A. The proposed removed trees currently provide some habitat function, including contribution of leaf litter in the fall, forage, refuge, and nesting habitat for birds; however, the trees are isolated by developed areas from the contiguous forested riparian area adjacent to the site wetlands and stream.

4.0 PROPOSED MITIGATION

Due to existing site development and cost constraints, the District has designed the project mitigation plan with modified mitigation elements that balance the project constraints and also meet the City's goal of a net functional increase in the onsite buffer. To permit the alternative approach, the project will require a Public Agency Exception outlined in KZC 90.145 for sections of the KZC that the project is not able to meet, namely 90.60 Critical Area Modifications, KZC 90.40 Structure Setback from Critical Area Buffer, KZC 90.130 Vegetative Buffer Standards, and elements of KZC 90.145 Mitigation that relate to the vegetative buffer standards.

The proposed buffer mitigation plan consists of a combination of buffer averaging and buffer enhancement (Figure 3). As required by KZC 90.145.3, the proposed mitigation strategy will be implemented on the project site and will provide in-kind, and in many instances improved, replacement of the permanent buffer impacts. In KZC 90.150.2, the City requires that buffer impacts be mitigated at a 1:1 ratio through either creation, rehabilitation, or enhancement, or possible combinations thereof (Kirkland, 2016). The project proposes to offset the 44,717 sf of permanent buffer impact with 7,606 feet of buffer averaging and 49,200 sf of buffer enhancement, for a total of 56,806 sf of mitigation provided at a 1:1.3 enhancement ratio.

4.1 Buffer Averaging

The project will employ buffer averaging to offset impacts to woody vegetation within the buffer. A 7,606-foot area of mature, mixed coniferous-deciduous forest adjacent to forested buffer in the northern tip of the project area will be added. This would provide a wider buffer on the more sensitive, higher functioning, northern portion of Wetland A and would reduce the buffer width in the area of permanent buffer impacts, where the existing buffer is almost entirely developed and provides minimal function.

The buffer averaging area contains 18 trees made up of a mix of Douglas fir, bitter cherry, big leaf maple, Virginian juniper, and Western red cedar. This is the same number of trees that the project will remove from the permanent buffer impact area. However, while the removed trees are generally isolated individuals, the buffer averaging trees are contiguous with the existing forested buffer and provide greater forested cover than the sum of the trees being removed. For example, the total forested cover of the individual removed trees tallies 3,853 feet, while the buffer averaging area contains 4,949 feet of forested cover (Appendix A). Table 2 below compares the number, types, and cover of trees that will be removed from the buffer with those that will be gained within the buffer averaging area.

TABLE 2
TREE COMPARISON IN BUFFER IMPACT AND BUFFER AVERAGING AREAS

	Trees Removed from Buffer	Trees Gained in Buffer Averaging Area	Net Change
Number of Deciduous Trees	14	6	-8
Deciduous Cover (square feet)	3,039	2,212	-827
Number of Coniferous Trees	4	12	+8
Coniferous Cover (square feet)	814	2,737	1,923
Total Number of Trees	18	18	0
Total Cover (square feet)	3,853	4,949	+1,096

The buffer averaging area contains a larger number of conifers and an overall greater forested cover than the trees that will be removed from the buffer impact area. The increased cover is a functional gain for wildlife habitat, including refuge, nesting, and foraging for small mammals and passerines. The connectivity provided by the buffer averaging area to existing forested buffer creates a larger wildlife corridor in the buffer and the protection of the mature forested area will enable the improved buffer functions to be preserved.

4.2 Buffer Enhancement

The buffer enhancement portion of the mitigation plan consists of removing existing development, such as play structures and the sand playfield and converting the entire area to a naturalized meadow. A large English holly tree will also be removed from the northeast corner of the enhancement area. Mowing, recreation, and daily activities within the enhancement area will cease. The conversion of lawn to native meadow species and the exclusion of daily disturbance will greatly improve the function of the buffer within the enhancement area. Hydrologic and erosion control function will improve as the meadow grass root systems establish and allow greater infiltration of stormwater than the existing hardpacked lawn and playfield currently allow. Additionally, the tall meadow grass will increase small mammal habitat, which will draw raptors to the area and the meadow wildflowers will attract pollinators and hummingbirds.

4.2.1 Enhancement Area Construction Sequence

The sequences below summarize the steps that should be taken to implement the buffer enhancement area.

1. Following construction of the school facilities, the buffer enhancement area shall be cleared of all construction debris.
2. Prior to the start of mitigation work, flagging or stakes shall be used to identify in the field the locations of the proposed enhancement area.
3. Install erosion control Best Management Practices (BMPs) such as High Visibility Fencing to protect existing native woody vegetation that is not to be impacted. Earth disturbance in these areas should be avoided to prevent damaging existing tree roots in the area.
4. Remove the English holly from the enhancement area using a combination of cutting and grubbing out the roots. Invasive species should be disposed of where they cannot reestablish in critical areas or buffers. Care shall be taken during invasive species removal to preserve nearby native trees and shrubs.

5. Remove sand and gravel from the playfield area and backfill with native soil. Finish the backfill with a minimum of 6 inches of topsoil at the surface.
6. De-compact the enhancement area to a minimum of 6 inches, with care taken to avoid existing root systems of preserved trees.
7. Till 3 inches of compost into the upper 6 inches of soil in the enhancement area. Areas under the dripline of preserved trees shall not be tilled to avoid harming the tree root systems.
8. The enhancement area shall be seeded with hydroseed application using the seed mix and application rate identified in Figure 3.
9. Install split-rail fencing or similar, around the buffer mitigation area, as shown In Figure 3.
10. Remove construction debris and any other unnatural refuse. Remove BMPs after site is stabilized.
11. The Contractor shall submit copies of the seed mix invoice showing species and quantities.
12. The enhancement area shall be watered with 1-inch of water once per week during the dry season (June 1 through October 15) for the first year after seeding.
13. Following the first year of growth, areas of exposed soil shall be hydroseeded again in the early spring or fall.

4.2.2 Performance Standards

Native herbaceous cover and invasive cover standards are established to measure enhancement plan success. The proposed performance standards are summarized in Table 3.

TABLE 3
VEGETATION PERFORMANCE STANDARDS

Monitoring Year	Herbaceous Native Cover*	Invasive/Non-native Cover (%)
Year 1	60	≤10**
Year 3	≥90	
Year 5	≥95	

Notes:
* Includes native plants that are naturally recruiting.
** Applies to noxious weeds included in the King County weed list. If weed cover exceeds 10 percent during vegetation monitoring, this performance standard can be met by removing weeds within 60 days of vegetation monitoring.

4.2.3 Monitoring Plan

Monitoring will be conducted by a qualified biologist and will consist of documenting plant cover and general species presence in Year 1, and estimating percent native cover every year thereafter. Percent cover will be measured using designated 1-meter plots method, or similar, as adapted during the fieldwork. Methodology will be determined and documented during the baseline monitoring effort. Monitoring will also include identifying maintenance needs as they relate to plant survival and weed control.

1. Installation. A biologist will inspect and approve the seed mix prior to hydroseeding, including any substitutions. The biologist should also observe the seeding area for compliance with the plan details.
2. Baseline Documentation. Within 30 days of completion of the buffer enhancement installation, the site will be visited to document the as-built condition. Any approved departures from the plan will be mapped and recorded. Recommendations for correcting any unauthorized plan deviations will be included in a Baseline Monitoring Report. Permanent photo points and monitoring plots will be established during the as-built site visit to provide a record of the monitoring area. These locations will be noted on the map and baseline photos included in the report.
3. Vegetation Monitoring.
   - Year 1: The buffer enhancement area will be visited at the end of the growing season, prior to September 30. Invasive species cover will be visually estimated. Total percent cover of native and invasive vegetation will be measured. Native volunteer species may be counted in the cover assessment. Photos will be taken from each photo point.
   - Years 3 and 5: The enhancement area will be visited once annually at the end of the growing season, by September 30. Total percent cover of native vegetation will be measured, as will presence of invasive species. Photos will be taken from each photo point.

The monitoring reports for the end-of-growing season monitoring visits will be submitted to the City by December 31 of each reporting year, and will include the following description/data:

1. Site plan and location map.
2. History of project, including date of seeding, current year of monitoring, and restatement of performance standards.
3. Plant cover within the enhancement area, in the context of assessing achievement of performance standards.
4. Incidental observations of wildlife or their sign.

5. Assessment of nuisance/exotic biota and recommendations for management.
6. Color photographs taken from permanent photo points established during the baseline visit.
7. Summary of maintenance and contingency measures proposed for the next visit, and those completed since the most recent visit.

Any deficiency discovered during any monitoring or inspection visit must be corrected within 60 days. If any monitoring report reveals that the mitigation plan has failed in whole or in part, and if that failure is beyond the scope of routine maintenance, a Contingency Plan shall be prepared and submitted. Once approved, contingency measures may be installed and will replace the approved buffer mitigation plan.

4.2.4 Maintenance

The Contractor will be responsible for maintenance of the mitigation areas for the first year following seeding. The District will be responsible for maintenance of the mitigation areas for the remaining four years of the monitoring period. Maintenance will consist of removing all classes of noxious weeds (see Washington State Noxious Weeds List, Washington Administrative Code 16-750-005), and implementing any other measures needed to ensure enhancement success.

In the buffer enhancement area, water shall be provided during the dry season (June 1 through October 15) for the first year after seeding. Water should be applied at a rate of one inch of water, once per week.

5.0 CLOSURE

The findings and conclusions documented in this report have been prepared for specific application to this project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions and recommendations presented in this report are professional opinions based on interpretation of information currently available to us, and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

Shannon & Wilson has prepared Appendix B, "Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report," to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.

Sarah L. Corbin

Sarah Corbin, PWS
Senior Biologist

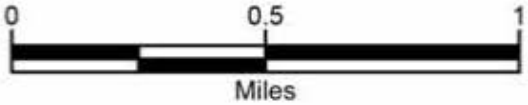
SCC:KLW/scc

6.0 REFERENCES

American Forest Management (AFM), 2017, Arborist report for Peter Kirk Elementary School, Kirkland, WA: Report prepared by American Forest Management, Kirkland, Wash., for Bush, Roed & Hitchings, Inc., Seattle, Wash., March.

Kirkland, Wash., (Kirkland), 2016, Critical areas – wetlands, streams, minor lakes, fish wildlife habitat areas, and frequently flooded areas: Kirkland Zoning Code (KZC) Chapter 90, available: http://www.codepublishing.com/WA/Kirkland/.

Shannon & Wilson, Inc. (Shannon & Wilson), 2017, Wetland and stream delineation report, Peter Kirk Elementary School, City of Kirkland, Washington: Report prepared by Shannon & Wilson, Inc., Seattle Wash. 21-1-12553-002, for Lake Washington School District, Redmond, Wash., August, 118 p.



Buffer Mitigation Plan
Peter Kirk Elementary School
City of Kirkland, Washington

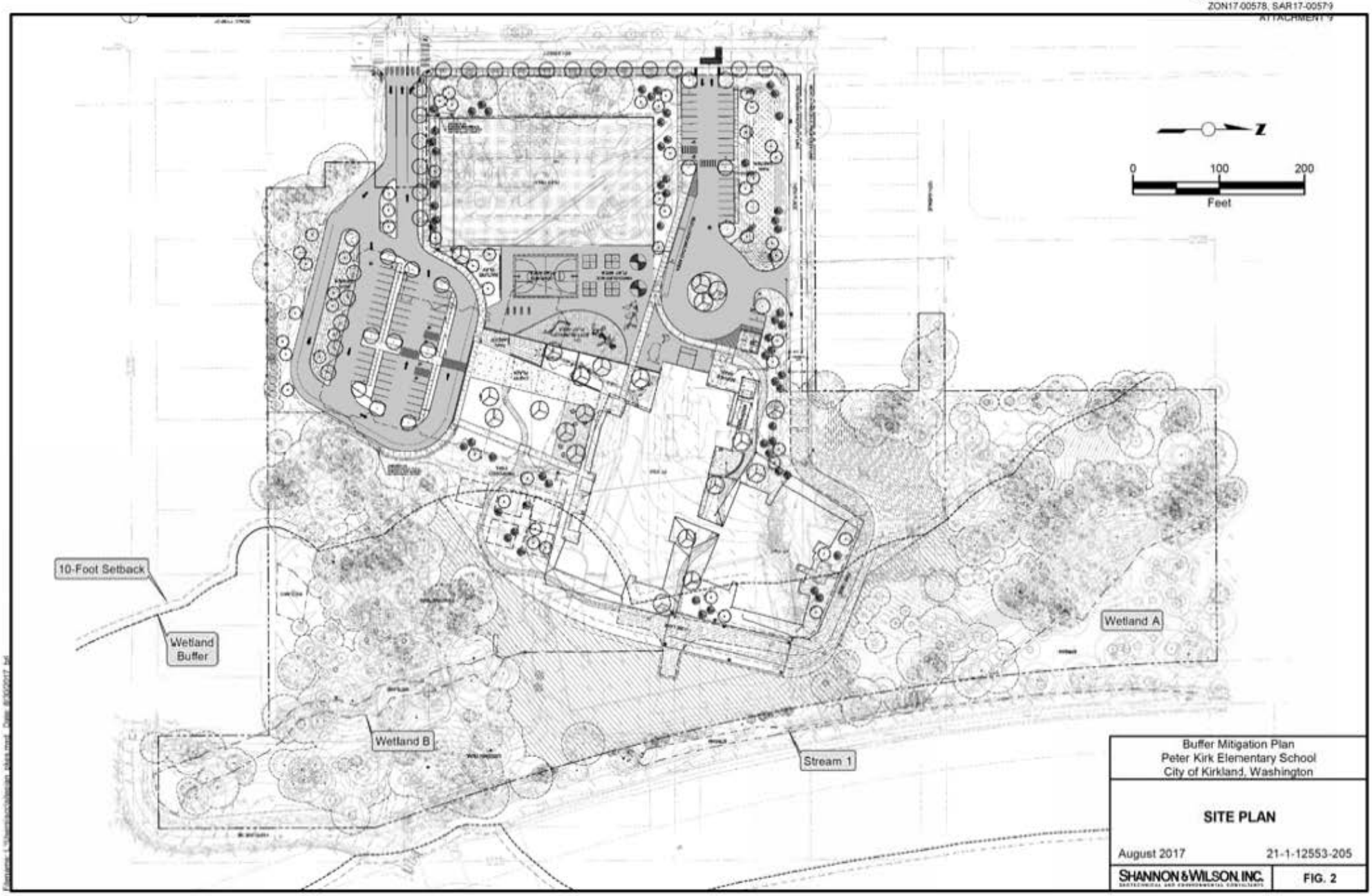
VICINITY MAP

August 2017 | 21-1-12553-205

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

Filename: I:\WIP\21-1\12553 LWSD Natural Resources\-002 Peter Kirk\GIS\MXD\VicinityMap.mxd Date: 3/23/2017 beo



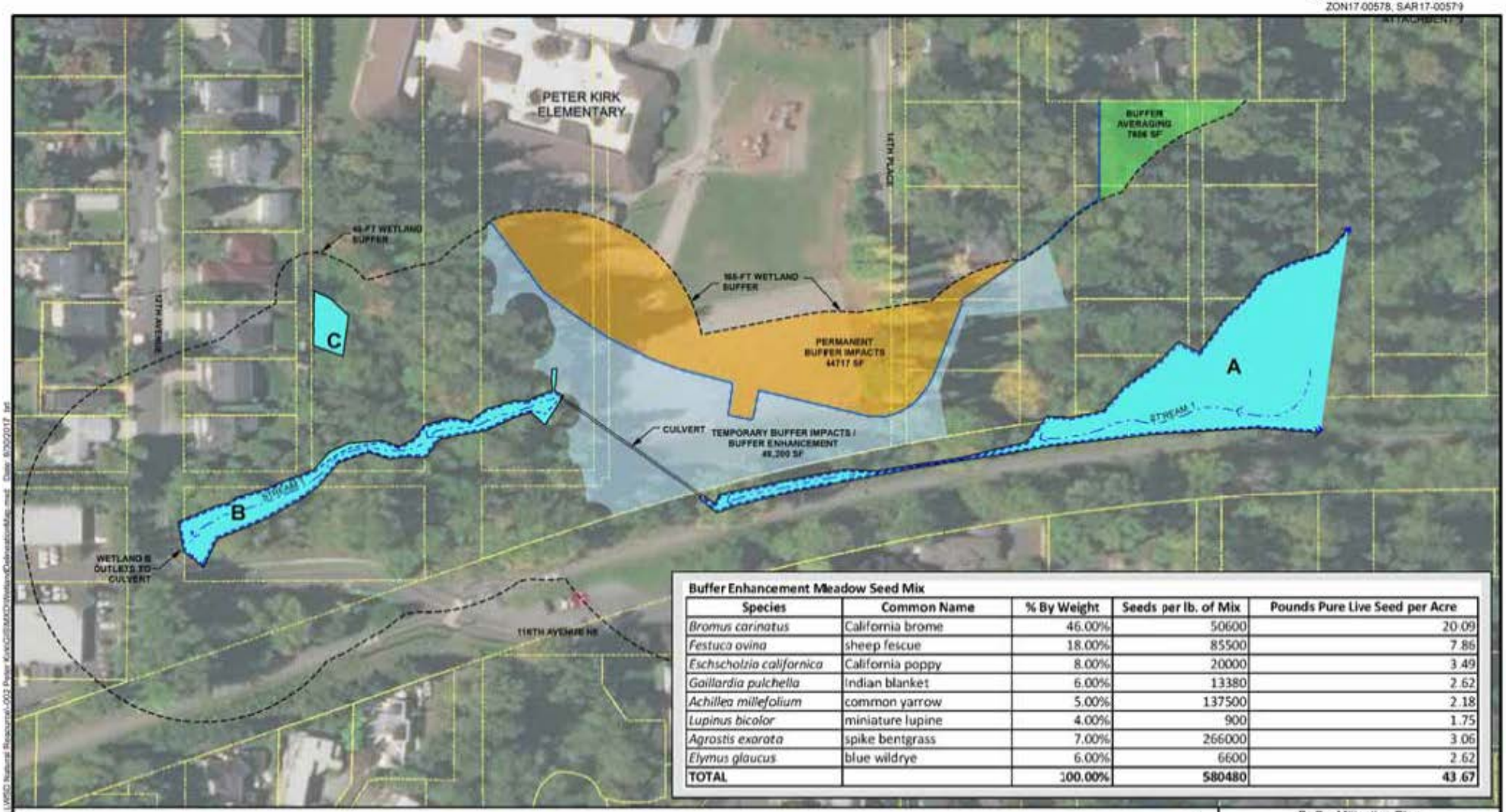
Buffer Mitigation Plan
Peter Kirk Elementary School
City of Kirkland, Washington

SITE PLAN

August 2017 | 21-1-12553-205

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2



Buffer Enhancement Meadow Seed Mix

Species	Common Name	% By Weight	Seeds per lb. of Mix	Pounds Pure Live Seed per Acre
Bromus carinatus	California brome	46.00%	50600	20.09
Festuca ovina	sheep fescue	18.00%	85500	7.86
Eschscholzia californica	California poppy	8.00%	20000	3.49
Gaillardia pulchella	Indian blanket	6.00%	13380	2.62
Achillea millefolium	common yarrow	5.00%	137500	2.18
Lupinus bicolor	miniature lupine	4.00%	900	1.75
Agrostis exarata	spike bentgrass	7.00%	266000	3.06
Elymus glaucus	blue wildrye	6.00%	6600	2.62
TOTAL		**100.00%**	**580480**	**43.67**

LEGEND

- Fence
- Stream 1 Ordinary High Water Mark (OHWM)
- Parcel
- A Wetland and Wetland Designation

N

0 100 200
Feet

Buffer Mitigation Plan
Peter Kirk Elementary School
City of Kirkland, Washington

MITIGATION PLAN SHEET

August 2017 21-1-12553-205

SHANNON & WILSON, INC.

FIG. 3

APPENDIX A

COMPARISON OF TREES REMOVED FROM BUFFER AND TREES IN BUFFER AVERAGING AREA

Comparison of Trees Removed from Buffer and Trees in Buffer Averaging Area

Trees Removed from Buffer

Tree #	Species	DBH (in)	Average Dripline Radius (ft)	Estimated Area of Dripline (ft^2)	Notes
8653	English holly	7,13,14	11	380	Invasive, not counted
8212	Pacific crab apple	13, 16	7	154	
2527	Lombardy poplar	22	6	113	
8350	big leaf maple	9, 10, 11	14	616	
8198	ornamental	6		0	Ornamental not counted
8199	apple	11	10	314	
8220*	fruit	6	4	50	
8219	apple	7, 3, 4	10.25	330	
8353*	fruit	6	4	50	
2543*	Lombardy poplar	25	6	113	
2542	bitter cherry	9	10	314	
2541*	Lombardy poplar	24	6	113	
2536	Doug fir	11	8	201	
2535	Doug fir	9	5	79	
2532	Doug fir	9	7	154	
2531	Doug fir	11	11	380	
510	Lombardy poplar	44	8	201	
2444	Lombardy poplar	80	13	531	
2530	Lombardy poplar	15	3.75	44	
2528	Lombardy poplar	15	5.5	95	

* = Radius approximated

Summary

Number of deciduous	14
Deciduous area ft^2	3039
Number of conifers	4
Coniferous area ft^2	814
Total trees	**18**
Total dripline area	**3853**

Trees in Averaging Area

Tree #	Species	DBH (in)	Average Dripline Radius (ft)	Estimated Area of Dripline (ft^2)
9175	Doug fir	14	7	154
9035	Doug fir	24	10	314
9033	Doug fir	19	7	154
9024	bitter cherry	10	5	79
9022	big leaf maple	24	15	707
8935	Doug fir	29	15	707
8934	big leaf maple	3-7 (9)	8.75	241
8928	Virginian juniper/Eastern red cedar	6	7	154
8929	Virginian juniper/Eastern red cedar	6	7	154
8930	Virginian juniper/Eastern red cedar	6	5	79
8931*	Virginian juniper/Eastern red cedar	6	6	113
8932*	Virginian juniper/Eastern red cedar	6	6	113
8902	bitter cherry	11	15	707
8927	bitter cherry	11, 10, 5	10	314
8925	Western red cedar	15	8	201
9050	Doug fir	27	8.25	214
8903	bitter cherry	6	7.25	165
9049	Doug fir	33	11	380

*= Radius approximated

Summary

Number of deciduous	6
Deciduous area ft^2	2212
Number of conifers	12
Coniferous area ft^2	2737
Total trees	**18**
Total dripline area	**4949**

Notes: Tree number, species, diameter at breast height, and average dripline radius derived from the project arborist report (AFM, 2017). Hazard trees are not included in the tree removal count because they would be removed regardless of this project action.

Reference:

American Forest Management (AFM), 2017, Arborist report for Peter Kirk Elementary School, Kirkland, WA: Report prepared by American Forest Management, Kirkland, Wash., for Bush, Roed & Hitchings, Inc., Seattle, Wash., March.

APPENDIX B

IMPORTANT INFORMATION ABOUT YOUR WETLAND DELINEATION/MITIGATION AND/OR STREAM CLASSIFICATION REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-12553-205

Date: August 31, 2017
To: Mr. Jon Shepherd
Lake Washington School District

IMPORTANT INFORMATION ABOUT YOUR WETLAND DELINEATION/MITIGATION AND/OR STREAM CLASSIFICATION REPORT

A WETLAND/STREAM REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Wetland delineation/mitigation and stream classification reports are based on a unique set of project-specific factors. These typically include the general nature of the project and property involved, its size, and its configuration; historical use and practice; the location of the project on the site and its orientation; and the level of additional risk the client assumed by virtue of limitations imposed upon the exploratory program. The jurisdiction of any particular wetland/stream is determined by the regulatory authority(s) issuing the permit(s). As a result, one or more agencies will have jurisdiction over a particular wetland or stream with sometimes confusing regulations. It is necessary to involve a consultant who understands which agency(s) has jurisdiction over a particular wetland/stream and what the agency(s) permitting requirements are for that wetland/stream. To help reduce or avoid potential costly problems, have the consultant determine how any factors or regulations (which can change subsequent to the report) may affect the recommendations.

Unless your consultant indicates otherwise, your report should not be used:

- If the size or configuration of the proposed project is altered.
- If the location or orientation of the proposed project is modified.
- If there is a change of ownership.
- For application to an adjacent site.
- For construction at an adjacent site or on site.
- Following floods, earthquakes, or other acts of nature.

Wetland/stream consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of our final report.

Wetland boundaries identified and stream classifications made by Shannon & Wilson, Inc. are considered preliminary until validated by the U.S. Army Corps of Engineers (Corps) and/or the local jurisdictional agency. Validation by the regulating agency(s) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(s) until a specified date, or until the regulations are modified, and that the stream has been properly classified. Only the regulating agency(s) can provide this certification.

MOST WETLAND/STREAM "FINDINGS" ARE PROFESSIONAL ESTIMATES.

Site exploration identifies wetland/stream conditions at only those points where samples are taken and when they are taken, but the physical means of obtaining data preclude the determination of precise conditions. Consequently, the information obtained is intended to be sufficiently accurate for design, but is subject to interpretation. Additionally, data derived through sampling and subsequent laboratory testing are extrapolated by the consultant who then renders an opinion about overall conditions, the likely reaction to proposed construction activity, and/or appropriate design. Even under optimal circumstances, actual conditions may differ from those thought to exist because no consultant, no matter how qualified, and no exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time. Nothing can be done to prevent the unanticipated, but steps can be taken to help reduce their impacts. For this reason, most experienced owners retain their consultants through the construction or wetland mitigation/stream classification stage to identify variances, to conduct additional evaluations that may be needed, and to recommend solutions to problems encountered on site.

WETLAND/STREAM CONDITIONS CAN CHANGE.

Since natural systems are dynamic systems affected by both natural processes and human activities, changes in wetland boundaries and stream conditions may be expected. Therefore, delineated wetland boundaries and stream classifications cannot remain valid for an indefinite period of time. The Corps typically recognizes the validity of wetland delineations for a period of five years after completion. Some city and county agencies recognize the validity of wetland delineations for a period of two years. If a period of years have passed since the wetland/stream report was completed, the owner is advised to have the consultant reexamine the wetland/stream to determine if the classification is still accurate.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or water fluctuations may also affect conditions and, thus, the continuing adequacy of the wetland/stream report. The consultant should be kept apprised of any such events and should be consulted to determine if additional evaluation is necessary.

THE WETLAND/STREAM REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when plans are developed based on misinterpretation of a wetland/stream report. To help avoid these problems, the consultant should be retained to work with other appropriate professionals to explain relevant wetland, stream, geological, and other findings, and to review the adequacy of plans and specifications relative to these issues.

DATA FORMS SHOULD NOT BE SEPARATED FROM THE REPORT.

Final data forms are developed by the consultant based on interpretation of field sheets (assembled by site personnel) and laboratory evaluation of field samples. Only final data forms customarily are included in a report. These data forms should not, under any circumstances, be drawn for inclusion in other drawings because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to reduce the possibility of misinterpreting the forms. When this occurs, delays, disputes, and unanticipated costs are frequently the result.

To reduce the likelihood of data from misinterpretation, contractors, engineers, and planners should be given ready access to the complete report. Those who do not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of information always insulates them from attendant liability. Providing the best available information to contractors, engineers, and planners helps prevent costly problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because a wetland delineation/stream classification is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in written transmittals. These are not exculpatory clauses designed to foist the consultant's liabilities onto someone else; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

THERE MAY BE OTHER STEPS YOU CAN TAKE TO REDUCE RISK.

Your consultant will be pleased to discuss other techniques or designs that can be employed to mitigate the risk of delays and to provide a variety of alternatives that may be beneficial to your project.

Contact your consultant for further information.

THE WATERSHED COMPANY

SCIENCE & DESIGN

April 23, 2018

Tony Leavitt
Senior Planner
City of Kirkland Planning Department
123 5th Avenue
Kirkland, WA 98033

Re: Peter Kirk Elementary, Public Agency Exception Mitigation Plan Review
The Watershed Company Reference Number: 170622.22

Dear Tony:

The Lake Washington School District is proposing a rebuild of Peter Kirk Elementary in the City of Kirkland. Background critical areas studies have determined that wetland and stream buffers encumber much of the southern and eastern portions of the school property. The following documents summarize the wetland, stream, and buffer constraints on the property:

- *Wetland and Stream Delineation Report Submittal, Peter Kirk Elementary School Project, Kirkland, Washington*. DRAFT. (Shannon & Wilson, Inc. March 24, 2017).
- *Peter Kirk Elementary School Stream & Wetland Delineation & Classification Review* (The Watershed Company. June 6, 2017).

Given the extent of the buffer encumbrances on the property, the School District is applying for a Public Agency Exception (PAE) to allow for uses and activities within the buffers that are not allowed under the standard provisions of the Kirkland Zoning Code (KZC). The general approach for complying with the PAE requirements are summarized in the following documents:

- *Public Agency Exception Assessment, Peter Kirk Elementary School Replacement Project, Lake Washington School District, Kirkland, Washington* (Shannon & Wilson. March 29, 2018) (PAE Assessment)
- *Buffer Mitigation Plan Peter Kirk Elementary School Replacement City of Kirkland, Washington* (Shannon and Wilson, Inc. August 31st, 2017) (Mitigation Plan).

750 Sixth Street South | Kirkland, WA 98033
p 425.822.5242 | f 425.827.8136 | watershedco.com

This letter represents our review of the PAE Assessment and Mitigation Plan.

Summary

The PAE Assessment identifies three primary components of the proposed school redevelopment that do not comply with the allowed use or standard provisions in Chapter 90 of the Kirkland Zoning Code:

1. **Critical Area Modifications**

The PAE Assessment notes that adhering to the allowed critical area modifications under KZC 90.60 and 90.70 is infeasible. We agree that the proposed project cannot comply with KZC 90.60.1.d, which states that impacts to buffers may only be proposed as part of a wetland modification.

2. **Vegetative Buffer Standards**

The Mitigation Plan notes that maintaining a naturally vegetated buffer in accordance with KZC 90.130 is infeasible given the existing constraints on the property, although further information is not provided. The Watershed Company agrees that strict adherence to these provisions would place an undue burden on the School District by effectively eliminating the feasibility of constructing the new school facilities while continuing to operate the existing school. There are no other alternative locations where the school could be built that would allow the vegetated buffer standards of KZC 90.130 to be implemented.

Mitigation Plan Vegetated Buffer Standards

The PAE Assessment states: "*The School District is not proposing to plant the enhancement area with woody vegetation for the following reasons: 1) the proposed mitigation strategy provides significant functional lift in the buffer and mitigates the project's impacts as proposed and 2) the cost associated with planting, maintaining and performing long term monitoring on over an acre of land would be cost prohibitive and impact school funding available for the School District's educational facilities and programs*." The mitigation plan, as currently proposed, includes only a meadow seed mix in the buffer mitigation area. While the impact area (buffer loss area) is low-functioning, mowed lawn and sand areas, enhancing the remaining buffer with a meadow seed mix is not sufficient to maintain and enhance ecological functions (as required by KZC 90.145.6.a.2), especially in the instance where the buffers are being reduced by as much as 65 percent of the standard width. Cost is not typically a factor in determining appropriate mitigation and code compliance. Given the extent of buffer loss being proposed, it seems reasonable and prudent to adhere to the revegetation provisions required for mitigation areas in Kirkland.

Under KZC 90.160.2.a.4), which is intended to bring a *standard* buffer into conformance with the vegetated buffer standards (KZC 90.130), mitigation areas much achieve "*at least 80 percent native vegetation coverage on average throughout the mitigation area*." Additionally, "*two (2) out of three (3) of the following strata of native plant species each must compose at least 20 percent areal cover: (1) Trees; (2) Shrubs; and (3) Woody groundcover (such as kinnikinnick, salal and sword fern).*" The proposed mitigation plan does not include any of the required strata. The groundcover species proposed are not woody. The Mitigation Plan notes that "*Mowing, recreation, and daily activities within the enhancement area will cease*." Since daily use of the enhancement area will cease, there does not appear to be any reason why the area cannot be enhanced per the requirements of KZC 90.160. A meadow area can certainly be incorporated into the mitigation plan, the site should achieve at least 20 percent cover of two woody strata. We recommend incorporating tree and shrub strata, particularly if the meadow area will comprise a significant portion of the mitigation area. This will provide increased ecological buffer function, while also screening the school from the adjacent Cross Kirkland Corridor. This requirement is accentuated since the plan proposed discharging stormwater through the buffer (even if at the same location as existing). We further recommend modifying the performance standards to reflect the additional requirements for woody plantings.

To further maintain and improve buffer functions, we recommend that trees removed from the buffer be placed in the mitigation area as habitat features.

The vegetation monitoring plan stipulates one annual monitoring visit in Years 1, 3, and 5. According to KZC 90.160.4.d, monitoring inspections are required every 12 months, including twice in each of the first two years. In conjunction with adding tree and shrub strata, we recommend revising the monitoring plan to incorporate regular monitoring inspections as required under KZC 90.160.4.d.

The mitigation plan does not include a requirement for irrigation. KZC 90.130.4.h requires "*a reliable temporary irrigation source must be available while the vegetation is being established and the source must be indicated on the planting plan.*" Irrigation should be stipulated in the mitigation plan.

3. **<u>Structure Setback from Critical Area Buffer</u>**

The PAE Assessment notes that it cannot comply with the 10-foot structure setback required under KZC 90.140 in areas where proposed gravel pathways join existing gravel trails located in the buffer. Gravel trails are allowed to protrude up to nine feet into the structure setback. If the requirements of the setback cannot be adhered to, the intrusion should be included as an additional buffer impact and mitigated accordingly.

Stream 1 Daylighting

According to KZC 90.75.1, "*The City encourages opening up a stream that is located in a culvert to restore the stream to a more natural and open condition. The purpose is to improve the values and functions of the stream, including maintaining water quality, reducing storm and flooding water flow, and providing wildlife habitat*." The Watershed Company previously assessed the ecological benefits of daylighting the piped segment of Stream 1 [*Peer Review Assessment of Stream Daylighting Habitat Effects, Stream at Peter Kirk Elementary (#WRIA 8-0246)* (March 14, 2018)] (Daylighting Assessment). The Daylighting Assessment concluded that returning the piped segment to an open channel provides an opportunity for improving water quality, storm flow attenuation, and habitat quality in Kirkland, as well as an educational opportunity for the school. The applicant has previously indicted to City staff that daylighting the stream channel will not be proposed. Applying KZC 90.75.1 is ultimately an administrative decision that will be made by the Planning Department and/or the City Council.

Decision Criteria

The PAE Assessment sufficiently addresses most of the decisional criteria. It has demonstrated that there is no other practical alternative to the proposed project with less impact on the critical areas or buffer; that strict application of Chapter 90 would unreasonably restrict or prohibit the ability to provide public utilities or public agency services to the public, and that impacts have been partially minimized through appropriate mitigation sequencing. However, it does not appear the criteria that requires impacts are minimized "*through type and location of mitigation pursuant to KZC 90.145 and 90.150.*" The applicant has also not sufficiently demonstrated that "*The proposal protects and/or enhances critical area and buffer functions and values, consistent with the best available science and with the object of no net loss of critical area functions and values*." As discussed above, the PAE Assessment states that seeding a meadow as mitigation provides a "significant functional lift in the buffer." This assertion is not supported by best available science, even in combination with enhanced stormwater control.

Summary

The Mitigation Plan has sufficiently demonstrated the avoidance and minimization requirements of mitigation sequencing under KZC 90.145.2.a-e. Modifications to the site plan have allowed for preservation of the highest functioning buffer areas as well avoided impacts to critical areas. Reducing the footprint of the fire land and using porous grass pavement along with removing some existing structures from the buffer further minimizes the impacts. The Mitigation Plan has also demonstrated that the project cannot reasonably comply with the standard provisions of the Kirkland Zoning Code, necessitating a Public Agency Exception. However, the Mitigation Plan has not demonstrated how the proposed mitigation adequately compensates for the proposed

impacts and loss of buffer area. The Mitigation Plan has similarly not demonstrated why the mitigation requirements under KZC 90.160 cannot be implemented. Since a PAE is requesting allowances beyond the standard code provisions, all reasonable efforts should be implemented to ensure the maintaining and improving of buffer functions in the reduced buffer areas. Based on the information provided, we recommend the following:

- If further buffer impacts are necessary to accommodate the building setback, these impacts should be quantified and appropriately mitigated.
- Add tree and shrub strata to the proposed mitigation plan. A meadow component is allowed as part of the restoration area, but the standard for a minimum 20 percent areal cover of two different woody strata (recommended tree and shrub) should be satisfied.
- Require trees removed from the buffer be placed in the mitigation area as large woody debris.
- Add a temporary irrigation system to the mitigation plan.
- Revise the performance standards to reflect the additional vegetative strata.
- Revise the monitoring plan to require annual monitoring in each of the five monitoring years, including at least two inspections in Years 1 and 2.
- Revise the monitoring plan to include appropriate monitoring methods for a tree and shrub community. We recommend incorporating the line-intercept method.
- Revise the Mitigation Plan to include Critical Area Protection Signage in accordance with KZC 90.190.4.
- Prior to commencement of any grading or other development activities on the subject property, a six-foot-high construction chain link fence with silt fencing should be installed along the entire edge of the buffer, in accordance with KZC 90.190.2.

The information contained in this letter is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria outlined above. All discussions, conclusions and recommendations reflect the best professional judgment of the author and are based upon information available to us at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to

verification and agreement by the appropriate local, State and Federal regulatory authorities. No other warranty, expressed or implied, is made.

Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

Ryan Kahlo, PWS
Ecologist

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

April 27, 2018

Lake Washington School District
15212 NE 95th Street
Redmond, WA 98052

Attn: Mr. Jon Shepherd

RE: PUBLIC AGENCY EXCEPTION ASSESSMENT REVIEW RESPONSE, PETER KIRK ELEMENTARY SCHOOL REPLACEMENT PROJECT, LAKE WASHINGTON SCHOOL DISTRICT, KIRKLAND, WASHINGTON

Shannon & Wilson, Inc. was contracted by the Lake Washington School District (School District) to provide natural resource and permitting support services for the Peter Kirk Elementary School (Peter Kirk) Project in the City of Kirkland (City), Washington. The school is located at 1312 6th Street in the NE quarter of Section 25, Township 25N, and Range 5E, Willamette Meridian.

Shannon & Wilson provided a Public Agency Exception (PAE) assessment letter for the project on March 29, 2018[1]. Per the City's request, the City's consultant (The Watershed Company [TWC]) provided peer review of the PAE assessment.[2] This letter outlines the peer review recommendations and provides the School District's associated response; see Table 1 below.

TABLE 1
PUBLIC AGENCY EXCEPTION REVIEW RECOMMENDATION AND RESPONSE

Review Recommendation	School District Response
If further buffer impacts are necessary to accommodate the building setback, these impacts should be quantified and appropriately mitigated.	All buffer impacts have been mitigated. In fact, the proposed mitigation plan provides an excess of 12,089 square feet (sf) of mitigation.
Add tree and shrub strata to the proposed mitigation plan. A meadow component is allowed as part of the restoration area, but the	The project will result in 44,717 sf of permanent buffer impact. The mitigation plan includes 7,606 sf of mature coniferous forest buffer averaging, leaving 37,111 sf

[1] Shannon & Wilson, 2018, Public agency exception assessment, Peter Kirk Elementary School Replacement Project, Lake Washington School District, Kirkland, Washington: Letter prepared by Shannon & Wilson, Inc., Seattle Wash. 21-1-12553-204, for Lake Washington School District, Redmond, Wash., March, 7p.
[2] The Watershed Company, 2018, Peter Kirk Elementary, Public agency exception mitigation plan review: Letter prepared by The Watershed Company, Kirkland, Wash., 170622.22, for City of Kirkland Planning Department, Kirkland, Wash., April 23, 6 p.

Review Recommendation	School District Response
standard for a minimum 20 percent areal [sic] cover of two different woody strata (recommended tree and shrub) should be satisfied.	needed, which is met through buffer enhancement. Therefore, the project will include 14,845 sf (37,111 sf x 0.40) of tree and shrub vegetation plantings in the buffer enhancement area.
Require trees removed from the buffer be placed in the mitigation area as large woody debris.	Native trees that are removed from the permanently impacted buffer will be placed in the buffer enhancement area.
Add a temporary irrigation system to the mitigation plan.	A temporary irrigation system will be provided in the tree and shrub planting area.
Revise the performance standards to reflect the additional vegetative strata.	Performance standards for tree and shrub planting areas are included in Table 3 of the Buffer Mitigation Plan.
Revise the monitoring plan to require annual monitoring in each of the five monitoring years, including at least two inspections in Years 1 and 2.	The monitoring schedule in Section 4.2.3 of the Buffer Mitigation Plan has been revised.
Revise the monitoring plan to include appropriate monitoring methods for tree and shrub community.	Monitoring methods for tree and shrub areas are included in Section 4.2.3 of the Buffer Mitigation Plan.
Revise the Mitigation Plan to include Critical Area Protection Signage in accordance with KZC 90.190.4	Critical areas signage will be installed along the buffer fence, as indicated on Figure 3 of the Buffer Mitigation Plan.
Prior to commencement of any grading or other development activities on the subject property, a six-foot-high construction chain link fence with silt fence should be installed along the entire edge of the buffer, in accordance with KZC 90.190.2.	As required in 90.190.2, a construction fence will be installed at the edge of the project impact area, along with temporary erosion and sediment control Best Management Practices, as appropriate.

The findings and conclusions documented in this letter have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this letter are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

SHANNON & WILSON, INC.

We appreciate the opportunity to be of service to you. If you have any questions or would like clarification of the information provided herein, please contact me at scc@shanwil.com or (206) 695-6674.

Sincerely,

SHANNON & WILSON, INC.

Sarah L. Corbin

Sarah Corbin, PWS
Senior Biologist

SCC:AJS:KLW/scc

Buffer Mitigation Plan
Peter Kirk Elementary School Replacement
City of Kirkland, Washington

April 30, 2018

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Excellence. Innovation. Service. Value.

Since 1954.

Submitted To:
Mr. Jon Shepherd
Lake Washington School District
15212 NE 95th Street
Redmond, Washington 98052

By:
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, Washington 98103

21-1-12553-205

SHANNON & WILSON, INC.

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 BACKGROUND 1
2.1 Project Background 1
2.2 Existing Conditions 1

3.0 PROJECT IMPACTS 2
3.1 Mitigation Sequencing 2
3.1.1 Avoid 3
3.1.2 Minimize 3
3.1.3 Restore 4
3.1.4 Reduce or Eliminate 4
3.1.5 Compensate 4
3.1.6 Monitor 4
3.2 Buffer Impacts 4

4.0 PROPOSED MITIGATION 5
4.1 Buffer Averaging 6
4.2 Buffer Enhancement 7
4.2.1 Enhancement Area Construction Sequence 7
4.2.2 Performance Standards 8
4.2.3 Monitoring Plan 9
4.2.4 Maintenance 10

5.0 CLOSURE 11

6.0 REFERENCES 12

TABLES

1 Buffer Impacts 5
2 Tree Comparison in Buffer Impact and Buffer Averaging Areas 6
3 Vegetation Performance Standards 9

FIGURES

1 Vicinity Map
2 Site Plan
3 Mitigation Plan Sheets (2 sheets)

TABLE OF CONTENTS (cont.)

SHANNON & WILSON, INC.

APPENDICES

A Comparison of Trees Removed from Buffer and Trees in Buffer Averaging Area
B Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report

SHANNON & WILSON, INC.

BUFFER MITIGATION PLAN
PETER KIRK ELEMENTARY SCHOOL REPLACEMENT
CITY OF KIRKLAND, WASHINGTON

1.0 INTRODUCTION

Shannon & Wilson was contracted by the Lake Washington School District (District) to complete a buffer mitigation plan for the proposed Peter Kirk Elementary School Replacement project in the City of Kirkland, Washington (City). The school is located at 1312 6th Street, Kirkland, Washington, 98033, on King County parcels 398270-1890, 398270-1990, 398270-1210, 398270-1155, 398270-1190, 398270-1160, 398270-1130, 398270-1120, 398270-0915, 398270-0925, and 398270-0960 in the NE quarter of Section 25, Township 25N, and Range 5E, Willamette Meridian (Figure 1). This report will support the project's permit applications to the City. The proposed project will be permitted using a Public Agency Exception outlined in Kirkland Zoning Code (KZC) 90.45.

2.0 BACKGROUND

2.1 Project Background

The Peter Kirk Elementary School Replacement project consists of replacing the main school building; adding new ballfields, play areas, and staff and visitor parking; and maintaining spaces for future expansion (Figure 2). The District proposes to build a new 78,263-square-foot (sf) (two-story) elementary school, with construction of the new school occurring while the existing school is open. After completion of the new school, the existing school will be demolished and the area will be converted to parking and play areas for the new school. The project also includes a student drop-off loop and a bus loop.

2.2 Existing Conditions

Three wetlands (Wetlands A, B, and C) and one unnamed stream (Stream 1) were identified on the site. Wetlands A and B are associated with Stream 1 and are Category III wetlands according to the Washington Department of Ecology's (Ecology's) 2014 rating system. Wetland C is located in a small depression with no apparent outlet that abuts single-family residential property on the site's southern boundary and is rated as a Category IV wetland.

Stream 1 is a perennial stream associated with site Wetlands A and B. On site, Stream 1 flows through defined and undefined channels as well as through an approximately 150-foot-long culvert. Downstream of the site, Stream 1 continues through a series of culverts for

approximately 1.4 miles until it outlets into Lake Washington. Stream 1 was rated as Type F (fish-bearing), due to presence of potential fish habitat, based on KZC 90.65.

Additional description of the site wetlands and stream can be found in the project Wetland and Stream Delineation Report dated August 10, 2017 (Shannon & Wilson, 2017).

3.0 PROJECT IMPACTS

After conducting a thorough mitigation sequencing process, discussed below, the final project design has no impacts to the wetlands or stream but will result in buffer impacts. The following discussion describes the mitigation sequencing process for the project and characterizes and quantifies the remaining impacts.

3.1 Mitigation Sequencing

KZC 90.145 states that:

> "The intent of mitigation sequencing is to evaluate and implement opportunities to avoid, minimize, eliminate or compensate for impacts to critical areas while still meeting the objectives of the project. When a modification to a critical area and buffer is proposed, the modification shall be avoided, minimized, or compensated for, as outlined by WAC 197-11-768, in the following order of preference:
>
> 1. Avoiding the impact altogether by not taking a certain action or parts of actions;
> 2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
> 3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
> 4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
> 5. Compensating for the impact by replacing or providing substitute resources or environments; and/or
> 6. Monitoring the impacts and compensation projects and taking appropriate corrective measures.
>
> In the required critical areas study, the applicant shall include a discussion of how the proposed project will utilize mitigation sequencing to avoid, minimize, and mitigate impacts to critical areas and associated buffers. The applicant shall seek to avoid, minimize and mitigate overall impacts based on the functions and values of all relevant critical areas."

The proposed project has implemented mitigation sequencing analysis throughout the design process, focused primarily on the location and configuration of the new school building and

required fire lane with respect to the buffer. The project's mitigation sequencing process is described below.

3.1.1 Avoid

The proposed project has modified the design to avoid impacts in a number of ways. The project will not impact any site wetlands or streams. Additionally, the configuration of the project elements has been designed to avoid impacting the mature forest inside and outside the buffer. For example, the entire school building has been located as far south as possible, within 15 feet of the existing school, in order to avoid impacting the forest that is contiguous with Wetland A in the northern part of the site. A new parking area on the south was laid out to avoid impacting a coniferous forest associated with Wetlands B and C. The project also avoids impacting a large mature western red cedar that stands alone within the temporary buffer impact area. By avoiding impacts to the onsite mature forested areas, the proposed project has avoided alteration of important food, cover, perch, breeding, resting, or riparian shade functions associated with the onsite buffers.

The project design also concentrates impacts in currently developed areas of buffer. For example, the south wing of the building was oriented in order to overlap with a portion of the existing sand playfield located in the buffer.

3.1.2 Minimize

The proposed project elements are the minimum size needed to meet the elementary school's needs and to satisfy local regulations, specifically those related to safety and stormwater management. As previously mentioned, all permanent and temporary buffer impacts are restricted to lawn or other improved areas. Strategies the design team has employed to minimize buffer impacts include the following:

- The removal of woody vegetation within the buffer is limited to hazard trees and those necessary to accommodate the proposed design configuration.
- The building footprint was laid out to reduce regrading on the site and the fire lane was narrowed to the extent allowable to minimize cut slopes/earth disturbance within buffer, while still meeting safety requirements.
- Stormwater vault size was reduced to extent allowable, given code requirements.
- The stormwater basins for the redeveloped site will closely match the basin areas of the existing site. Discharge into the wetland buffer from the easterly basin is proposed to be at the same location as the existing discharge point.

- The fire lane will be constructed with pervious "grass modular grid pavement" to minimize impervious surface within the buffer areas.
- The majority of the school building is designed as a two-story building to minimize buffer impacts and reduce impervious pavement throughout the site.

3.1.3 Restore

The buffer temporarily disturbed during construction is currently used by the existing elementary school, contains a sand playfield and lawn, and is within the mitigation plan's buffer enhancement area. Therefore, all temporary buffer impacts from construction will be restored to better than existing condition through implementation of the mitigation plan.

3.1.4 Reduce or Eliminate

The project design has reduced and eliminated impacts to critical areas and buffers to the extent possible. The project will remove approximately 15,000 sf of existing sand playfield from the buffer and will eliminate daily use and regular maintenance/mowing from 42,900 sf of the buffer through implementation of the buffer enhancement plan. An existing home, driveway, retaining wall, and shipping container will also be removed from a portion of the buffer at the north end of the property.

3.1.5 Compensate

Section 4 of this report describes in detail the proposed mitigation for the buffer impacts. As required in KZC 90.145.3 mitigation location preference, the buffer mitigation will be provided on site and in kind.

3.1.6 Monitor

Mitigation for impacts to buffers will be monitored for five years, with detailed reports provided to the City. See Section 4.2.3 of this report for a description of the monitoring protocol and conditions. If any portion of the mitigation appears to be failing during the monitoring period, the District would be required to implement a contingency plan.

3.2 Buffer Impacts

The project will result in temporary and permanent buffer impacts. The buffer will be permanently impacted by a portion of the new school building, a fire lane, portable classrooms, other elements associated with the school, such as pathways and landscaping, as well as for the establishment of a new structure setback. Temporary buffer impacts will result from construction (access, staging, etc.). Table 1 quantifies the buffer impacts.

TABLE 1
BUFFER IMPACTS

Buffer Impact Type	Impact Area (square feet)
Temporary	49,200
Permanent	44,717

Most of the permanent buffer impact area is developed and actively used by the school on a daily basis (existing residence, existing portable classroom, play structures, paved pathways, sand playfield, etc.). The area of temporary buffer impact is comprised of the sand playfield, play structures, and mowed lawn play areas. Due to the existing development and very limited vegetation, the impact areas provide extremely limited hydrologic, water quality, and habitat function. For example, the existing lawn play area is generally sparse and trampled and provides limited erosion protection or flow control.

Based on the surveyed site trees and project arborist's report, 18 trees will be removed from the buffer impact area (American Forest Management [AFM], 2017). These include a row of Lombardy poplars, several fruit trees that are part of an old orchard, four isolated Douglas-firs, a big leaf maple, and a bitter cherry. Hazard trees identified for removal are not included in the removal count, because they would be removed regardless of this project action. A quantification of trees that will be removed from the buffer, their diameter at breast height, and dripline area is included in Appendix A. The proposed removed trees currently provide some habitat function, including contribution of leaf litter in the fall, forage, refuge, and nesting habitat for birds; however, the trees are isolated by developed areas from the contiguous forested riparian area adjacent to the site wetlands and stream.

4.0 PROPOSED MITIGATION

Due to existing site development constraints, the District has designed the project mitigation plan with modified mitigation elements that balance the project constraints and also meet the City's goal of a net increase in the onsite buffer function. To permit the alternative approach, the project will require a Public Agency Exception outlined in KZC 90.145 for sections of the KZC that the project is not able to meet, namely KZC 90.60 and 90.70 Critical Area Modifications.

The proposed buffer mitigation plan consists of a combination of buffer averaging and buffer enhancement (Figure 3). As required by KZC 90.145.3, the proposed mitigation strategy will be implemented on the project site and will provide in-kind and improved replacement of the permanently impacted buffer. In KZC 90.150.2, the City requires that buffer impacts be mitigated at a 1:1 ratio through creation, rehabilitation, enhancement, or possible combinations

thereof (Kirkland, 2016). The project proposes to offset the 44,717 sf of permanent buffer impact with 7,606 feet of buffer averaging and 49,200 sf of buffer enhancement, for a total of 56,806 sf of mitigation. The buffer enhancement will include 14,845 sf of woody vegetation plantings ([44,717sf of permanent impact – 7,606sf of mature forest averaging]x0.40=14,845sf). This plan provides an excess of 12,089 sf of mitigation, which is equivalent to a 1:1.3 enhancement ratio.

4.1 Buffer Averaging

The project will employ buffer averaging to offset impacts to woody vegetation within the buffer. A 7,606-sf area of mature, mixed coniferous-deciduous forest adjacent to forested buffer in the northern tip of the project area will be added. This would provide a wider buffer on the more sensitive, higher-functioning, northern portion of Wetland A and would reduce the buffer width in the area of permanent buffer impacts, where the existing buffer is almost entirely developed and provides minimal function.

The buffer averaging area contains 18 trees made up of a mix of Douglas-fir, bitter cherry, big leaf maple, Virginian juniper, and western red cedar. This is the same number of trees that the project will remove from the permanent buffer impact area. However, while the removed trees are generally isolated individuals, the buffer averaging trees are contiguous with the existing forested buffer and provide greater forested cover than the sum of the trees being removed. For example, the total forested cover of the individual removed trees tallies 3,853 sf, while the buffer averaging area contains 4,949 sf of forested cover (Appendix A). Table 2 below compares the number, types, and cover of trees that will be removed from the buffer with those that will be gained within the buffer averaging area.

TABLE 2
TREE COMPARISON IN BUFFER IMPACT AND BUFFER AVERAGING AREAS

	Trees Removed from Buffer	Trees Gained in Buffer Averaging Area	Net Change
Number of Deciduous Trees	14	6	-8
Deciduous Cover (square feet)	3,039	2,212	-827
Number of Coniferous Trees	4	12	+8
Coniferous Cover (square feet)	814	2,737	1,923
Total Number of Trees	18	18	0
Total Cover (square feet)	3,853	4,949	+1,096

The buffer averaging area contains a larger number of conifers and an overall greater forested cover than the trees that will be removed from the buffer impact area. The increased cover is a

functional gain for wildlife habitat, including refuge, nesting, and foraging for small mammals and passerines. The connectivity provided by the buffer averaging area to existing forested buffer creates a larger wildlife corridor in the buffer, and the protection of the mature forested area will enable the improved buffer functions to be preserved.

4.2 Buffer Enhancement

The buffer enhancement portion of the mitigation plan consists of removing existing development, such as play structures and the sand playfield, and converting the entire area to a naturalized meadow with shrub and forest communities. Native trees that are removed from the buffer in the permanent impact area will be placed in the buffer enhancement area as downed wood. A large English holly tree will also be removed from the northeast corner of the enhancement area. Mowing, recreation, and daily activities within the enhancement area will cease. The conversion of sand playfield and lawn to native meadow and woody vegetation, and the exclusion of daily disturbance, will greatly improve the function of the buffer within the enhancement area. Hydrologic and erosion control function will improve as the vegetation's root systems establish and allow greater infiltration of stormwater than the existing hardpacked lawn and sand playfield currently allow. Additionally, the tall meadow grass, shrubs, and trees will increase small mammal and passerine habitat, which will draw raptors to the area, and the meadow wildflowers will attract pollinators and hummingbirds. The downed wood will provide additional wildlife habitat.

4.2.1 Enhancement Area Construction Sequence

The sequences below summarize the steps that should be taken to implement the buffer enhancement area.

1. Following construction of the school facilities, the buffer enhancement area shall be cleared of all construction debris.
2. Prior to the start of mitigation work, flagging or stakes shall be used to identify in the field the locations of the proposed enhancement area.
3. Install erosion control Best Management Practices (BMPs) such as silt fence and a six-foot-high chain link fence at the edge of the project impact area.
4. Remove the English holly from the enhancement area using a combination of cutting and grubbing out the roots. Invasive species should be disposed of where they cannot reestablish in critical areas or buffers. Care shall be taken during invasive species removal to preserve nearby native trees and shrubs.
5. Remove sand and gravel from the playfield area and backfill with native soil. Finish the backfill with a minimum of 6 inches of topsoil at the surface.

6. De-compact the enhancement area to a minimum of 6 inches, with care taken to avoid existing root systems of preserved trees.
7. Till 3 inches of compost into the upper 6 inches of soil in the enhancement area. Areas under the dripline of preserved trees shall not be tilled to avoid harming the tree root systems.
8. Place the approximately seven native trees removed from the buffer in the enhancement area as shown on Figure 3, Sheet 1.
9. The enhancement meadow area shall be seeded with hydroseed application using the seed mix and application rate identified in Figure 3, Sheet 2.
10. Dig circular pits with vertical sides and install plants, Figure 3, Sheet 2. Backfill with native soil.
11. Water plants thoroughly to avoid capillary stress. Plants should be watered with approximately 1 inch of water after planting.
12. Mulch the woody vegetation planting area with 6 inches of wood chips to discourage weed establishment, taking care to keep mulch away from plant stems to prevent rot.
13. Install split-rail fencing or similar, around the buffer mitigation area, as shown in Figure 3, Sheet 1.
14. Remove construction debris and any other unnatural refuse. Remove BMPs after site is stabilized.
15. The Contractor shall submit copies of the seed mix and plant invoices showing species and quantities.
16. Using a temporary irrigation system tied into the school's water line, the buffer enhancement area shall be watered with 1 inch of water twice per week during the dry season (June 1 through October 15) for five years.
17. Following the first year of growth, areas of exposed soil (greater than 2 feet by 2 feet) in the meadow shall be hydroseeded again in the early spring or fall.

4.2.2 Performance Standards

Native herbaceous cover and invasive cover standards are established to measure enhancement plan success. The proposed performance standards are summarized in Table 3.

TABLE 3
VEGETATION PERFORMANCE STANDARDS

Performance Standards	Year 1	Year 2	Year 3	Year 4	Year 5
Plant Survival					
Shrub and Trees	100%	80%	--	--	--
Percent Cover					
Herbaceous Native Cover[a]	60%	70%	90%	90%	90%
Woody Native Cover[b]	--	--	40%	60%	80% (with no less than 20% each of tree and shrub strata)
Noxious Weed Cover[c]	≤10%	≤10%	≤10%	≤10%	≤10%

Notes:
All cover performance standards include native plants that are naturally recruiting.
[a] In meadow portion of the enhancement area.
[b] In woody vegetation portion of the enhancement area.
[c] Applies to noxious weeds included in the King County weed list. If weed cover exceeds 10% during vegetation monitoring, this performance standard can be met by removing weeds within 60 days of vegetation monitoring.

4.2.3 Monitoring Plan

Monitoring will be conducted by a qualified biologist and will consist of evaluating whether the performance standards outlined in Table 3 are being met. Percent cover will be measured using the line-intercept method, or similar, as adapted during the fieldwork. Methodology will be determined and documented during the baseline monitoring effort. Monitoring will also include identifying maintenance needs as they relate to plant survival and weed control.

1. Installation. A biologist will inspect and approve the seed mix and plants prior to installation. The biologist should also observe the seeding and planting area for compliance with the plan details.
2. Baseline Documentation. Within 30 days of completion of the buffer enhancement installation, the site will be visited to document the as-built condition. Any approved departures from the plan will be mapped and recorded. Recommendations for correcting any unauthorized plan deviations will be included in a Baseline Monitoring Report. Permanent photo points and monitoring plots will be established during the as-built site visit to provide a record of the monitoring area. These locations will be noted on the map and baseline photos included in the report.
3. Vegetation Monitoring.
   - Years 1 and 2: The buffer enhancement area will be visited early in the growing season, by May 30, to identify maintenance needs, and performance standard

monitoring will occur at the end of the growing season, prior to September 30. Invasive species cover will be visually estimated.

- Years 3, 4, and 5: The enhancement area will be visited once annually at the end of the growing season, by September 30, to evaluate achievement of performance standards. Total percent cover of native vegetation will be measured, as will presence of invasive species.

The monitoring reports for the end-of-growing-season monitoring visits will be submitted to the City by December 31 of each reporting year, and will include the following description/data:

1. Site plan and location map.
2. History of project, including date of seeding and planting, current year of monitoring, and restatement of performance standards.
3. Plant cover within the enhancement area, in the context of assessing achievement of performance standards.
4. Incidental observations of wildlife or their sign.
5. Assessment of nuisance/exotic biota and recommendations for management.
6. Color photographs taken from permanent photo points established during the baseline visit.
7. Summary of maintenance and contingency measures proposed for the next visit, and those completed since the most recent visit.

Any deficiency discovered during any monitoring or inspection visit must be corrected within 60 days. If any monitoring report reveals that the mitigation plan has failed in whole or in part, and if that failure is beyond the scope of routine maintenance, a Contingency Plan shall be prepared and submitted. Once approved, contingency measures may be installed and will replace the approved buffer mitigation plan.

4.2.4 Maintenance

The Contractor will be responsible for maintenance of the mitigation areas for the first year following seeding and planting. The District will be responsible for maintenance of the mitigation areas for the remaining four years of the monitoring period. Maintenance will consist of removing noxious weeds as necessary (see Washington State Noxious Weeds List, Washington Administrative Code 16-750-005) and implementing any other measures needed to ensure enhancement success.

In the buffer enhancement area, water shall be provided during the dry season (June 1 through October 15) for the duration of the five-year monitoring period. Water should be applied at a rate of 1 inch of water, twice per week.

5.0 CLOSURE

The findings and conclusions documented in this report have been prepared for specific application to this project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions and recommendations presented in this report are professional opinions based on interpretation of information currently available to us, and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

Shannon & Wilson has prepared Appendix B, "Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report," to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.

Sarah L. Corbin

Sarah Corbin, PWS
Senior Biologist

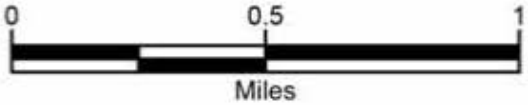
SCC:AJS:KLW/scc

6.0 REFERENCES

American Forest Management (AFM), 2017, Arborist report for Peter Kirk Elementary School, Kirkland, WA: Report prepared by American Forest Management, Kirkland, Wash., for Bush, Roed & Hitchings, Inc., Seattle, Wash., March.

Kirkland, Wash., (Kirkland), 2016, Critical areas – wetlands, streams, minor lakes, fish wildlife habitat areas, and frequently flooded areas: Kirkland Zoning Code (KZC) Chapter 90, available: http://www.codepublishing.com/WA/Kirkland/.

Shannon & Wilson, Inc. (Shannon & Wilson), 2017, Wetland and stream delineation report, Peter Kirk Elementary School, City of Kirkland, Washington: Report prepared by Shannon & Wilson, Inc., Seattle Wash. 21-1-12553-002, for Lake Washington School District, Redmond, Wash., August, 118 p.



Wetland and Stream Delineation Report
Peter Kirk Elementary School
City of Kirkland, Washington

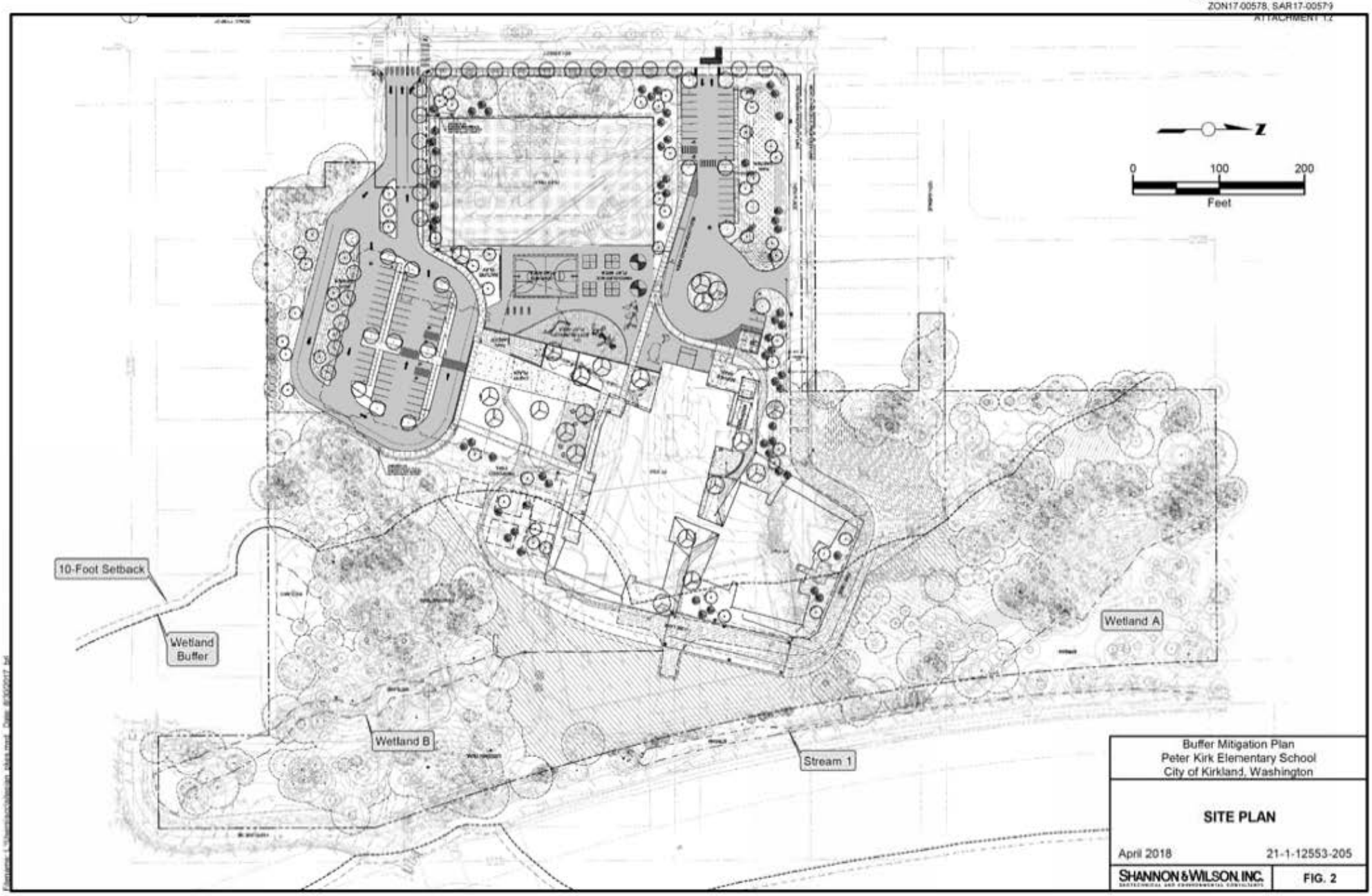
VICINITY MAP

April 2018 | 21-1-12553-002

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

Filename: I:\WIP\21-1\12553 LWSD Natural Resources\-002 Peter Kirk\GIS\MXD\VicinityMap.mxd Date: 3/23/2017 beo



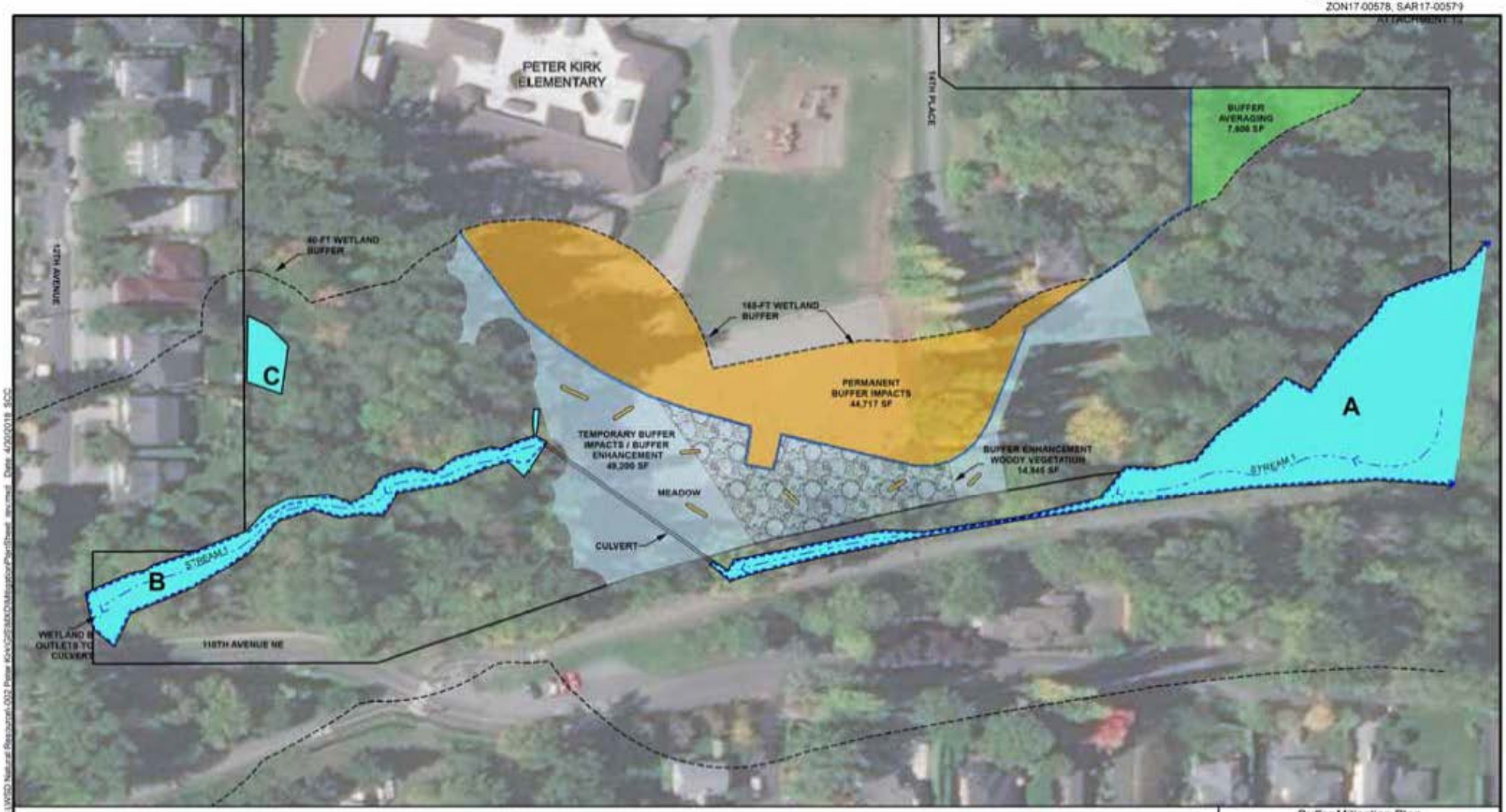
Buffer Mitigation Plan
Peter Kirk Elementary School
City of Kirkland, Washington

SITE PLAN

April 2018 | 21-1-12553-205

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2



LEGEND

- Fence
- Stream 1 Ordinary High Water Mark (OHWM)
- ProjectSite
- A Wetland and Wetland Designation

Mitigation Type

- Buffer Averaging - 7,606 SF
- Buffer Enhancement - 49,200 SF Total
- Woody Vegetation in Buffer Enhancement - 14,845 SF
- Habitat Log - Locations and Number Approximate

Notes:
The woody vegetation planting boundaries are approximate and may be modified during mitigation

0 100 200
Feet

N

Buffer Mitigation Plan
Peter Kirk Elementary School
City of Kirkland, Washington

BUFFER MITIGATION PLAN SHEET

April 2018 | 21-1-12553-205

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 3
SHEET 1 of 2

Filename: I:\EF21-1 SEA\12500s\12553 WSD Natural Resources\.003 Peter Kirk\GIS\MXD\Mitigation\PlanSheet_en.mxd Date: 4/20/2018 SCC

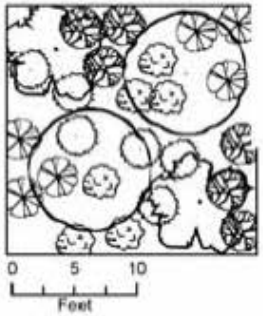
SHANNON & WILSON BUFFER ENHANCEMENT PLANT SCHEDULE

Symbol	Common Name	*Scientific Name*	Size/Condition	Spacing[1]	Quantity[2]
Shrubs					
	tall Oregon grape	*Mahonia aquifolium*	1-Gallon Container; >12 inches in height	4-ft O.C.	100
	Osoberry	*Oemleria cerasiformis*			290
	Red Elderberry	*Sambucus racemosa*			195
	Oceanspray	*Holodiscus discolor*			195
Trees					
	big leaf maple	*Acer macrophyllum*	2-Gallon Container; >24 inches in height	10-ft O.C.	75
	Douglas Fir	*Pseudotsuga menziesii*			74

1 Place in random, natural clusters (see Typical). Spacing is cumulative on center (O.C.) spacing.

2 Quantities based on a total planting area of 14,845 square feet.

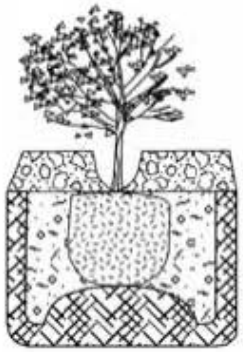
BUFFER PLANT TYPICAL



Buffer Enhancement Meadow Seed Mix

Species	Common Name	% By Weight	Seeds per lb. of Mix	Pounds Pure Live Seed per Acre
Bromus carinatus	California brome	46.00%	50600	20.09
Festuca ovina	sheep fescue	18.00%	85500	7.86
Eschscholzia californica	California poppy	8.00%	20000	3.49
Gaillardia pulchella	Indian blanket	6.00%	13380	2.62
Achillea millefolium	common yarrow	5.00%	137500	2.18
Lupinus bicolor	miniature lupine	4.00%	900	1.75
Agrostis exarata	spike bentgrass	7.00%	266000	3.06
Elymus glaucus	blue wildrye	6.00%	6600	2.62
TOTAL		**100.00%**	**580480**	**43.67**

CONTAINER DETAIL (NTS)



Buffer Mitigation Plan
Peter Kirk Elementary School
Cit of Kirkland, Washington

BUFFER MITIGATION PLAN SHEET

April 2018 | 21-1-12553-205

SHANNON & WILSON, INC. | FIG. 3 SHEET 2 OF 2

APPENDIX A

COMPARISON OF TREES REMOVED FROM BUFFER AND TREES IN BUFFER AVERAGING AREA

Comparison of Trees Removed from Buffer and Trees in Buffer Averaging Area

Trees Removed from Buffer

Tree #	Species	DBH (in)	Average Dripline Radius (ft)	Estimated Area of Dripline (ft^2)	Notes
8653	English holly	7,13,14	11	380	Invasive, not counted
8212	Pacific crab apple	13, 16	7	154	
2527	Lombardy poplar	22	6	113	
8350	big leaf maple	9, 10, 11	14	616	
8198	ornamental	6		0	Ornamental not counted
8199	apple	11	10	314	
8220*	fruit	6	4	50	
8219	apple	7, 3, 4	10.25	330	
8353*	fruit	6	4	50	
2543*	Lombardy poplar	25	6	113	
2542	bitter cherry	9	10	314	
2541*	Lombardy poplar	24	6	113	
2536	Doug fir	11	8	201	
2535	Doug fir	9	5	79	
2532	Doug fir	9	7	154	
2531	Doug fir	11	11	380	
510	Lombardy poplar	44	8	201	
2444	Lombardy poplar	80	13	531	
2530	Lombardy poplar	15	3.75	44	
2528	Lombardy poplar	15	5.5	95	

* = Radius approximated

Summary

Number of deciduous	14
Deciduous area ft^2	3039
Number of conifers	4
Coniferous area ft^2	814
Total trees	**18**
Total dripline area	**3853**

Trees in Averaging Area

Tree #	Species	DBH (in)	Average Dripline Radius (ft)	Estimated Area of Dripline (ft^2)
9175	Doug fir	14	7	154
9035	Doug fir	24	10	314
9033	Doug fir	19	7	154
9024	bitter cherry	10	5	79
9022	big leaf maple	24	15	707
8935	Doug fir	29	15	707
8934	big leaf maple	3-7 (9)	8.75	241
8928	Virginian juniper/Eastern red cedar	6	7	154
8929	Virginian juniper/Eastern red cedar	6	7	154
8930	Virginian juniper/Eastern red cedar	6	5	79
8931*	Virginian juniper/Eastern red cedar	6	6	113
8932*	Virginian juniper/Eastern red cedar	6	6	113
8902	bitter cherry	11	15	707
8927	bitter cherry	11, 10, 5	10	314
8925	Western red cedar	15	8	201
9050	Doug fir	27	8.25	214
8903	bitter cherry	6	7.25	165
9049	Doug fir	33	11	380

*= Radius approximated

Summary

Number of deciduous	6
Deciduous area ft^2	2212
Number of conifers	12
Coniferous area ft^2	2737
Total trees	**18**
Total dripline area	**4949**

Notes: Tree number, species, diameter at breast height, and average dripline radius derived from the project arborist report (AFM, 2017). Hazard trees are not included in the tree removal count because they would be removed regardless of this project action.

Reference:

American Forest Management (AFM), 2017, Arborist report for Peter Kirk Elementary School, Kirkland, WA: Report prepared by American Forest Management, Kirkland, Wash., for Bush, Roed & Hitchings, Inc., Seattle, Wash., March.

APPENDIX B

IMPORTANT INFORMATION ABOUT YOUR WETLAND DELINEATION/MITIGATION AND/OR STREAM CLASSIFICATION REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-12553-205

Date: April 30, 2018

To: Mr. Jon Shepherd
Lake Washington School District

IMPORTANT INFORMATION ABOUT YOUR WETLAND DELINEATION/MITIGATION AND/OR STREAM CLASSIFICATION REPORT

A WETLAND/STREAM REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Wetland delineation/mitigation and stream classification reports are based on a unique set of project-specific factors. These typically include the general nature of the project and property involved, its size, and its configuration; historical use and practice; the location of the project on the site and its orientation; and the level of additional risk the client assumed by virtue of limitations imposed upon the exploratory program. The jurisdiction of any particular wetland/stream is determined by the regulatory authority(s) issuing the permit(s). As a result, one or more agencies will have jurisdiction over a particular wetland or stream with sometimes confusing regulations. It is necessary to involve a consultant who understands which agency(s) has jurisdiction over a particular wetland/stream and what the agency(s) permitting requirements are for that wetland/stream. To help reduce or avoid potential costly problems, have the consultant determine how any factors or regulations (which can change subsequent to the report) may affect the recommendations.

Unless your consultant indicates otherwise, your report should not be used:

- If the size or configuration of the proposed project is altered.
- If the location or orientation of the proposed project is modified.
- If there is a change of ownership.
- For application to an adjacent site.
- For construction at an adjacent site or on site.
- Following floods, earthquakes, or other acts of nature.

Wetland/stream consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of our final report.

Wetland boundaries identified and stream classifications made by Shannon & Wilson, Inc. are considered preliminary until validated by the U.S. Army Corps of Engineers (Corps) and/or the local jurisdictional agency. Validation by the regulating agency(s) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(s) until a specified date, or until the regulations are modified, and that the stream has been properly classified. Only the regulating agency(s) can provide this certification.

MOST WETLAND/STREAM "FINDINGS" ARE PROFESSIONAL ESTIMATES.

Site exploration identifies wetland/stream conditions at only those points where samples are taken and when they are taken, but the physical means of obtaining data preclude the determination of precise conditions. Consequently, the information obtained is intended to be sufficiently accurate for design, but is subject to interpretation. Additionally, data derived through sampling and subsequent laboratory testing are extrapolated by the consultant who then renders an opinion about overall conditions, the likely reaction to proposed construction activity, and/or appropriate design. Even under optimal circumstances, actual conditions may differ from those thought to exist because no consultant, no matter how qualified, and no exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time. Nothing can be done to prevent the unanticipated, but steps can be taken to help reduce their impacts. For this reason, most experienced owners retain their consultants through the construction or wetland mitigation/stream classification stage to identify variances, to conduct additional evaluations that may be needed, and to recommend solutions to problems encountered on site.

WETLAND/STREAM CONDITIONS CAN CHANGE.

Since natural systems are dynamic systems affected by both natural processes and human activities, changes in wetland boundaries and stream conditions may be expected. Therefore, delineated wetland boundaries and stream classifications cannot remain valid for an indefinite period of time. The Corps typically recognizes the validity of wetland delineations for a period of five years after completion. Some city and county agencies recognize the validity of wetland delineations for a period of two years. If a period of years have passed since the wetland/stream report was completed, the owner is advised to have the consultant reexamine the wetland/stream to determine if the classification is still accurate.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or water fluctuations may also affect conditions and, thus, the continuing adequacy of the wetland/stream report. The consultant should be kept apprised of any such events and should be consulted to determine if additional evaluation is necessary.

THE WETLAND/STREAM REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when plans are developed based on misinterpretation of a wetland/stream report. To help avoid these problems, the consultant should be retained to work with other appropriate professionals to explain relevant wetland, stream, geological, and other findings, and to review the adequacy of plans and specifications relative to these issues.

DATA FORMS SHOULD NOT BE SEPARATED FROM THE REPORT.

Final data forms are developed by the consultant based on interpretation of field sheets (assembled by site personnel) and laboratory evaluation of field samples. Only final data forms customarily are included in a report. These data forms should not, under any circumstances, be drawn for inclusion in other drawings because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to reduce the possibility of misinterpreting the forms. When this occurs, delays, disputes, and unanticipated costs are frequently the result.

To reduce the likelihood of data from misinterpretation, contractors, engineers, and planners should be given ready access to the complete report. Those who do not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of information always insulates them from attendant liability. Providing the best available information to contractors, engineers, and planners helps prevent costly problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because a wetland delineation/stream classification is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in written transmittals. These are not exculpatory clauses designed to foist the consultant's liabilities onto someone else; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

THERE MAY BE OTHER STEPS YOU CAN TAKE TO REDUCE RISK.

Your consultant will be pleased to discuss other techniques or designs that can be employed to mitigate the risk of delays and to provide a variety of alternatives that may be beneficial to your project.

Contact your consultant for further information.

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

August 10, 2017

Lake Washington School District
15212 NE 95th Street
Redmond, WA 98052

Attn: Mr. Jon Shepherd

RE: STREAM DAYLIGHTING ASSESSMENT, PETER KIRK ELEMENTARY REPLACEMENT PROJECT, KIRKLAND, WASHINGTON

Shannon & Wilson, Inc. (S&W) was contracted by the Lake Washington School District to perform a stream daylighting assessment for the Peter Kirk Elementary School (Peter Kirk) Project in the City of Kirkland (City), Washington. The school is located at 1312 6th Street in the NE quarter of Section 25, Township 25N, and Range 5E, Willamette Meridian. S&W was asked to assess the ecological benefits of daylighting an approximately 150-foot-long portion of an un-named, piped stream that crosses through the southeast corner of the school property.

BACKGROUND

The Lake Washington School District is currently coordinating with the City on the submittal of the Master Use Permit as part of the Peter Kirk Project permitting process. The Peter Kirk property is highly encumbered with critical areas and the associated buffers; however, the project does not currently include any impacts to onsite wetlands or to the onsite stream. The project is implementing mitigation sequencing to avoid and minimize impacts to buffer to the extent possible. As part of the permit coordination, the City has requested that the project provide an ecological assessment of daylighting the site stream, per Kirkland Zoning Code (KZC) 90.75.4 (Kirkland, Wash., [Kirkland], 2016).

EXISTING STREAM CONDITIONS

The small, perennial stream flows through defined and undefined channel segments within the school property. The stream enters the site at the northeast corner of the property in an undefined channel associated with a depressional wetland, and then narrows to an open, straight

400 NORTH 34TH STREET, SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103
206-632-8020 FAX 206-695-6777
TDD 1-800-833-6388
www.shannonwilson.com

ditch between the Cross Kirkland Corridor and the Peter Kirk playfield along the east property boundary. The stream then flows through an approximately 150-foot-long, 30-inch-diameter corrugated metal pipe (CMP) culvert and enters a conifer-dominated forested area in the southeast corner of the property. Within the forest, the stream channel is well defined with short stretches of riffle and small pools and contains large woody debris. After leaving the school property, the stream flows south through approximately 1.4 miles of a continuous series of culverts until it outlets into Lake Washington at Marina Park (Kirkland, 2017).

The portion of the onsite stream under review for daylighting is the stretch within the onsite 30-inch CMP culvert. The 30-inch CMP was constructed with a concrete headwall and concrete wing walls on both the inlet and outlet, and woody vegetation surrounds both culvert ends (Photo 1). The culvert inlet is surrounded by a cluster of large, mature, black cottonwood (*Populus balsamifera trichocarpa*) trees and smaller Douglas-fir (*Pseudotsuga menziesii*) overstory with a Himalayan blackberry (*Rubus armeniacus*) shrub understory (Photos 2 and 3). The culvert outlet is shaded by a mature red alder (*Alnus rubra*) and surrounded by Himalayan blackberry, mature red-osier dogwood (*Cornus sericea*), salmon berry (*Rubus spectabilis*), and cherry trees (*Prunus* sp.). With the exception of a large western red cedar (*Thuja plicata*) and two smaller cedars growing immediately adjacent to the culvert's mid-span, the majority of the culvert alignment is covered with a grassed slope (Photo 4).

The onsite stream, including the culvert inlet and outlet, does not exhibit detrimental channel erosion, such as scour, downcutting, or incision.

Based on Washington State Department of Ecology's surface water quality database, the unnamed stream is not identified as having any degree of impaired water quality throughout its entirety. Near the stream's outlet at Marina Park into Lake Washington, the lake is listed as impaired for bacteria.

Fish were not observed in the stream during our site visits. The Washington Department of Fish and Wildlife (WDFW) SalmonScape mapping application has no documented presence and no modeled potential presence for salmonids within the stream system (WDFW, 2017). The stream is unlikely to ever provide salmonid habitat given the continuous system of culverts between the school property and Lake Washington (Photo 5). However, Stream 1 is rated as Type F (fish-bearing) based on KZC 90.65 due to presence of potential fish habitat (Kirkland, 2016).

SHANNON & WILSON, INC.

STREAM DAYLIGHTING ASSESSMENT

Stream daylighting can provide many ecological benefits to impaired stream systems, including increased flood control, slowing of water velocity and associated erosion, improved water quality and riparian habitat conditions, and habitat connectivity (Pinkham, 2000). Daylighting is frequently used for restoring historic salmonid spawning and rearing habitat and migration corridors. However, stream daylighting is not a one-size-fits-all solution and may not be an ecologically preferable choice for all culverted streams.

Removal of the onsite culvert would require the removal of several mature coniferous and deciduous trees from around the culvert inlet and outlet. The trees currently provide numerous ecological benefits, including refuge for passerines and other wildlife; shade of the open-air sections of stream, which cools water temperatures and helps retain dissolved oxygen; contribution of allochthonous, or external, organic material to the stream, which is used by macroinvertebrates; and stabilization of the stream bank to prevent erosion. Table 1 below summarizes the species and associated diameter at breast height of trees that would be removed or harmed (to the point of removal) by the culvert removal. This list was prepared utilizing the site survey of the culvert alignment and surveyed tree locations, as well as ground truthing in the field.

TABLE 1
TREE REMOVAL ASSOCIATED WITH CULVERT REMOVAL

Species	Approximate Location	Diameter at Breast Height (inches)
Western red cedar (*Thuja plicata*)	Mid-span culvert alignment	42
Western red cedar	Mid-span culvert alignment	6
Western red cedar	Mid-span culvert alignment	6
Black cottonwood (*Populus balsamifera trichocarpa*)	Culvert inlet	40
Black cottonwood	Culvert inlet	34
Black cottonwood	Culvert inlet	20
Black cottonwood	Culvert inlet	28
Black cottonwood	Culvert inlet	10
Douglas fir (*Pseudotsuga menziesii*)	Culvert inlet	8
Douglas fir	Culvert inlet	8

Species	Approximate Location	Diameter at Breast Height (inches)
Douglas fir	Culvert inlet	6
Douglas fir	Culvert inlet	5
Douglas fir	Culvert inlet	4
Red alder (*Alnus rubra*)	Culvert outlet	8
Red alder	Culvert inlet	5

The ecological benefits that typically accompany a stream daylighting project can be present in varying degrees and can depend on the existing health and condition of the subject stream. Table 2 below summarizes typical benefits of stream daylighting and the expected effect of that benefit on the Peter Kirk property stream.

TABLE 2
DAYLIGHTING BENEFITS AS APPLIED TO PETER KIRK STREAM

Potential Ecological Benefit of Daylighting	Impact to Site Stream	Rationale
Flood control	Insignificant	▪ Flooding is not a known problem in or downstream of the site stream. ▪ Water staining on culvert indicates that culvert is approximately 30 percent full at typical high flows.
Velocity control to reduce downstream erosion	Insignificant	▪ No observed scour or incision observed at culvert inlet/outlet or along open portions of stream. ▪ Downstream of school property, stream is entirely underground; erosion is not a problem.
Water quality improvement	Detrimental over the next several decades, until functions provided by mature trees are replaced	▪ Removal of mature trees associated with daylighting will reduce shade, bank stability, and organic matter inputs. ▪ Water quality is not currently a known problem within the stream. ▪ Removal of stream from pipe will increase water temperature, even more so until a mature canopy can establish.
Riparian habitat	Detrimental over the next several decades, until functions provided by mature trees are replaced	▪ Removal of mature trees will temporarily reduce available wildlife forage, refuge, and nesting habitat.

Potential Ecological Benefit of Daylighting	Impact to Site Stream	Rationale
Connectivity to downstream habitat	Insignificant	▪ Entire corridor downstream from the Peter Kirk property is underground and continues to be redeveloped without requirements of daylighting. As an example, Park Place Center is being redeveloped currently and was not required to mitigate or daylight its 850-foot-long portion of the corridor.
Fish Passage	Insignificant	▪ No fish have been observed or have been documented in site stream. ▪ The downstream culverted 1.4 miles of stream through the heart of the Kirkland urban corridor and the potential for daylighting any of the corridor is remote. Therefore, future fish access to this portion of the stream is extremely unlikely.

CONCLUSIONS

While daylighting provides many environmental benefits to impaired stream systems, daylighting the short segment of the un-named stream on the Peter Kirk property would result in largely insignificant benefits to the stream system and would result in a temporal decrease in water quality and habitat function until the mature canopy at the culvert inlet and outlet are replaced. If the onsite culverted stream were required to be daylighted, new plantings could be used to replace the damaged riparian cover. However, many of the impacted trees are estimated to be between 20 and 30 years old and the associated functional loss over the next several decades would be greater than the potential benefits derived from daylighting the short segment of stream. Therefore, the project does not include stream daylighting.

LIMITATIONS

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this report are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

SHANNON & WILSON, INC.

We appreciate the opportunity to be of service to you. If you have any questions or would like clarification of the information provided herein, please contact me at scc@shanwil.com or (206) 695-6674.

Sincerely,

SHANNON & WILSON, INC.

Sarah Corbin, PWS
Senior Biologist

SCC:KLW/scc

Enc: References
Site Photos

REFERENCES

Kirkland, Wash., (Kirkland), 2016, Critical areas – wetlands, streams, minor lakes, fish wildlife habitat areas, and frequently flooded areas: Kirkland Zoning Code (KZC) Chapter 90, available: http://www.codepublishing.com/WA/Kirkland/.

Kirkland, Wash. (Kirkland), 2017, Kirkland sensitive areas map: City of Kirkland, Wash., IT/GIS department, 2017/CityESAMap, January 17, available: http://www.kirklandwa.gov/Assets/IT/GIS/Sensitive+Areas+Map.pdf.

Pinkham, Richard, 2000, Daylighting - new life for buried streams: Snowmass, Colo., Rocky Mountain Institute, 63 p., available: https://d231jw5ce53gcq.cloudfront.net/wp-content/uploads/2017/05/RMI_Document_Repository_Public-Reprts_W00-32_Daylighting.pdf.

Washington State Department of Fish and Wildlife (WDFW), 2017, SalmonScape web application: Olympia, Wash., Washington State Dept. of Fish and Wildlife, available: http://apps.wdfw.wa.gov/salmonscape/, accessed July 2017.

Photo 1: Downstream outlet of culverted section of onsite stream, viewing northeast, taken on July 11, 2017.

Photo 2: Mature trees surrounding culvert inlet, viewing west, taken on July 11, 2017.

Photo 3: Mature black cottonwood trees adjacent to culvert inlet, viewing south, taken July 11, 2017.

Photo 4: Mature Western red cedar adjacent to culvert alignment, viewing northeast, taken July 11, 2017.

Photo 5: Downstream of the Peter Kirk School property, the stream flows south in a culvert along 8th Street, viewing south, taken on July 11, 2017.

THE WATERSHED COMPANY

SCIENCE & DESIGN

March 14, 2018

Tony Leavitt, Senior Planner
City of Kirkland Planning and Building Department
123 Fifth Avenue
Kirkland, WA 98033
tleavitt@kirklandwa.gov

Re: Peer Review Assessment of Stream Daylighting Habitat Effects, Stream at Peter Kirk Elementary (#WRIA 8-0246)
The Watershed Company Reference Number: 170622.22

Dear Tony:

Thank you for the opportunity to review the *Stream Daylighting Assessment, Peter Kirk Elementary Replacement Project, Kirkland, Washington* prepared by Shannon and Wilson, Inc. for the Lake Washington School District, dated August 10, 2017. The site address for Peter Kirk Elementary School is 1312 6th St, Kirkland, WA 98033, parcel number 398270-1890. Greg Johnston, Senior Fisheries Biologist at The Watershed Company, also made a site visit, on March 1, 2018, to verify reported site and stream conditions and to get an overview of stream basin characteristics.

According to *Daylighting of Streams*, KZC 90.75.1, "The City encourages opening up a stream that is located in a culvert to restore the stream to a more natural and open condition. The purpose is to improve the values and functions of the stream, including maintaining water quality, reducing storm and flooding water flow, and providing wildlife habitat." Each of these three value and function categories are evaluated below with respect to the potential daylighting of the stream section at Peter Kirk Elementary.

Opportunity

As the daylighting assessment points out, some short-term impacts in the form of tree and shrub losses would be realized were daylighting to take place. This short-term and limited loss of function should be weighed against the potential and significant future benefits of restoring a stream channel and buffer system, which would support many more individual trees, native shrubs and groundcovers. This opportunity loss is significant since maintaining the piped stream now guarantees the stream will not be

daylighted for many more decades, if ever within the foreseeable life cycle of the school facility.

Additionally, the larger trees, particularly the black cottonwood and western red cedars, have the propensity to reach very large sizes. Indeed they are amongst the largest coniferous and deciduous trees in the region. In the case of the cottonwood, these trees are prone to limb failure and are frequently considered dangerous when located near buildings and other infrastructure. Should these trees pose risks to the new school or its occupants, removal could very well be recommended by arborists. Furthermore, large trees such as these can have root structures that would eventually jeopardize the integrity of the pipe and may need to be removed anyway to prevent pipe failure.

Maintaining Water Quality

Water quality improvements would be realized by an open stream channel in three ways. First, a vegetated buffer of some minimum width would be required and vegetated under the PAUE process. This buffer would provide improvements to water quality through biofiltration before stormwater reaches and enters the stream channel. Currently this water likely infiltrates to a limited degree and otherwise flows eventually to the city stormwater system. A stream buffer with properly amended soils and planted with native species would infiltrate at a higher capacity that the existing grass turf and dirt/gravel playfield. It would also be a much better at filtering, providing uptake of or adsorbing more pollutants than the current condition.

Second, the elimination of turf also eliminates any fertilizer or pesticide currently used or that would be used in the future since such applications would not be applied to the native vegetation.

Third, if the channel were to be daylighted, inclusion of a gravel substrate along the daylighted length would provide a high degree of biofiltration due to subsurface flows through the gravel where organic inputs and pollutants would be decomposed by microorganisms and aquatic insects.

Reducing Storm and Flooding Water Flow

Similar to water quality, storm and floodwater flow reduction would be improved by increasing roughness, infiltration and evapotranspiration compared to turf and unvegetated dirt/gravel. Contrary to the daylighting assessment, a mapped floodplain is identified in Peter Kirk Park in the Kirkland GIS system and therefore could be damaged during flooding events. Also, the pipe may currently be sufficient to carry the existing flows but there are at least twelve undeveloped lots and two unopened rights of

way in the immediate upstream basin. Future development in these lots and the basin overall could result in larger future flows that exceed the capacity of the pipe.

Providing Wildlife Habitat

Despite the current lack of fish in the channel, on-site habitat would be improved through additional vegetation in the buffer and access for wildlife to an open channel. A suitable buffer restoration plan would provide additional food, cover, nest and perching resources by elevating the diversity of plants, increasing habitat complexity, incorporating woody debris and adding additional vegetation layers. Additionally, the current condition of flow in the pipe does not allow for support of aquatic organisms beyond fish. Macroinvertebrates and other benthic organisms, including insects falling into the channel, would provide food for terrestrial species using the buffer and feeding along the stream. Accumulation of organic material, primarily leaves and litter but also including insects and other benthos, also has downstream beneficial effects that are exported downstream in Lake Washington. Finally, an opened channel and buffer would provide a missing link in a habitat corridor that would connect at least two mapped wetlands (located to the north and south), a currently-separated stream channel, and their buffers.

Conclusion

The prospect of returning the piped stream segment to an open channel is an opportunity to improve water quality, storm flow attenuation and habitat quality in Kirkland. Additionally, it could benefit the school district as an educational feature that the students, parents and community could participate in.

Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

Greg Johnston
Senior Fisheries Biologist

Hugh Mortensen, PWS
President / Senior Wetland Ecologist

750 Sixth Street South | Kirkland, WA 98033
p 425.822.5242 | f 425.827.8136 | watershedco.com

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

April 24, 2018

Lake Washington School District
15212 NE 95th Street
Redmond, WA 98052

Attn: Mr. Jon Shepherd

RE: RESPONSE TO THE WATERSHED COMPANY REVIEW OF STREAM DAYLIGHTING ASSESSMENT, PETER KIRK ELEMENTARY REPLACEMENT PROJECT, KIRKLAND, WASHINGTON

Shannon & Wilson, Inc. was contracted by the Lake Washington School District to perform a stream daylighting assessment for the Peter Kirk Elementary School (Peter Kirk) Project in the City of Kirkland (City), Washington. The school is located at 1312 6th Street in the NE quarter of Section 25, Township 25N, and Range 5E, Willamette Meridian.

BACKGROUND

In a meeting with the City and the City's consultant (The Watershed Company [TWC]) on June 21, 2017, Shannon & Wilson was asked to assess the ecological benefits of daylighting an approximately 150-foot-long piped portion of an un-named stream that crosses through the southeast corner of the school property. Shannon & Wilson provided the analysis in August 2017 (Shannon & Wilson, 2017a). See attached and as referenced herein. Per the City's request, TWC provided peer review of our daylighting assessment. The peer review resulted in two separate review letters that were provided to the Peter Kirk project team in March 2018.

This letter will outline the Kirkland Zoning Code (KZC) stream daylighting requirement and will provide responses to the TWC peer review.

KIRKLAND ZONING CODE (KZC) STREAM DAYLIGHTING REQUIREMENTS

Section 90.75 of the KZC addresses stream daylighting (Kirkland, 2016). KZC 90.75.1 explicitly lists ecological benefits as the purpose for encouraging stream daylighting:

400 NORTH 34TH STREET, SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103
206-632-8020 FAX 206-695-6777
TDD 1-800-833-6388
www.shannonwilson.com