John Muir Elementary Early Learning Addition Project

Draft SEPA Checklist

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For questions and more information about this document, please contact the following:

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While the John Muir Elementary Early Learning Addition Project Draft State Environmental Policy Act (SEPA) Checklist is accessible and ADA compliant, the attached figures and appendices which support the checklist contain complex material that are not accessible. The following is a description of what is contained in the figures and appendices:

- Figure 1 – John Muir Elementary Site Vicinity Map, Seattle, Washington
  Figure 1 is a vicinity map that shows the John Muir Elementary campus and the surrounding neighborhood in the site vicinity. The school campus site is outlined in red on the map.

- Figure 2 – John Muir Elementary Aerial Map, Seattle, Washington
  Figure 2 is an aerial map of the John Muir Elementary campus and the surrounding neighborhood in the site vicinity. The school campus area is outlined in red on the map.

- Figure 3 – Proposed Site Plan, Seattle, Washington
  Figure 3 is a site plan of the proposed project. The proposed Early Learning Addition is highlighted in yellow on the plan.

- Appendix A – Geotechnical Report
  Appendix A consists of the Geotechnical Report that was prepared by AESI, dated December 16, 2022. The report presents the results of the subsurface exploration, geologic hazard analysis, geotechnical engineering, and stormwater infiltration feasibility analysis for the project. The report includes figures and appendices, including an exploration location map, the exploration logs for the report, historic exploration logs, and laboratory test results.

- Appendix B – Construction Best Management Practices
  Appendix B consists of construction best management practices that could be implemented during the construction of the project.

- Appendix C – GHG Emissions Worksheet
  Appendix C consists of the GHG Emissions Worksheet that was prepared by EA Engineering, Science, and Technology, Inc. PBC, dated June 2023. This worksheet includes the table and supporting documentation that was utilized to estimate the GHG emissions from the project.

- Appendix D – Arborist Report
  Appendix D consists of the Arborist Report that was prepared for the project by Tree Solutions, Inc., dated April 5, 2023. The report identifies and documents the existing trees on the project site and evaluates potential construction impacts from the project. Photographs and maps showing the location of the existing trees are included. A summary table of trees is also provided that includes the size and condition of each tree.

- Appendix E – Hazardous Building Materials Survey Report
  Appendix E consists of the Hazardous Building Materials Survey Report for the project that was prepared by Terracon, dated January 19, 2023. The report presents the results of the hazardous building materials inspection that was conducted in the existing building. Appendices are provided in the report, including sample location maps, photographs, and laboratory analytical results.

- Appendix F – Cultural Resources Assessment Report
  Appendix F consists of the Cultural Resources Assessment Report for the project that was prepared by Perteet, dated July 25, 2023. The Cultural Resources Assessment Report details the background research and previous onsite investigations that were completed on the school campus and provides recommendations for the project. Due to the confidential nature of archaeological materials discussed in the report, a full copy of the report is not included in this electronic version. However, a non-confidential version of the report is available upon request from Seattle Public Schools.

- Appendix G – Transportation Technical Report
  Appendix G consists of the Transportation Technical Report for the project that was prepared by Heffron Transportation, Inc., dated July 24, 2023. The report provides a description and analysis of background transportation conditions for the area surrounding the site, including traffic volumes, traffic operations (level of service), parking, transit, and non-motorized facilities. The report analyzes and addresses potential impacts with the proposed project on those same transportation conditions and provides recommendations. Attached to the end of the report are Appendix A – Level of Service Definitions, and Appendix B – Parking Utilization Study Data. There are figures and tables throughout this document, including in the Appendices, which graphically depict and organize data to support the findings in the report.

This concludes the description of the Draft SEPA Checklist figures and appendices for the John Muir Elementary Early Learning Addition Project.

DRAFT ENVIRONMENTAL CHECKLIST

for the proposed

John Muir Elementary Early Learning Addition Project

prepared by

July 2023

EA Engineering, Science, and Technology, Inc., PBC
AESI
Tree Solutions, Inc.
Terracon
Perteet
Heffron Transportation, Inc.

PREFACE

The purpose of this Draft Environmental Checklist is to identify and evaluate probable environmental impacts that could result from the ***John Muir Elementary Early Learning Addition Project*** and to identify measures to mitigate those impacts. The proposed project would provide a one-story building addition at the northeast corner of the existing John Muir Elementary building that would increase the overall building space by approximately 5,178 sq. ft. (approximately 5,877 sq. ft. of new building addition minus approximately 699 sq. ft. of demolished existing building space). In total, the school would contain approximately 64,120 sq. ft. of building space with the proposed project. The proposed addition would include three new classrooms for the school's early learning program with before- and after-school child care support spaces. Interior renovations would also be provided within the existing building which would convert existing open floor plan classrooms into three separate classrooms.

The State Environmental Policy Act (SEPA)[1] requires that all governmental agencies consider the environmental impacts of a proposal before the proposal is decided upon. This Draft Environmental Checklist has been prepared in compliance with the State Environmental Policy Act; the SEPA Rules, effective April 4, 1984, as amended (Chapter 197-11, Washington Administrative Code); and the Seattle City Code (25.05), which implements SEPA.

This document is intended to serve as SEPA review for site preparation work, building construction, and operation of the proposed development comprising the ***John Muir Elementary Early Learning Addition Project.*** Analysis associated with the proposed project contained in this Environmental Checklist is based on plans for the project, which are on-file with Seattle Public Schools. While not construction-level detail, the plans accurately represent the eventual size, location and configuration of the proposed project and are considered adequate for analysis and disclosure of environmental impacts.

This Environmental Checklist is organized into three major sections. *Section A* of the Checklist (starting on page 1) provides background information concerning the *Proposed Action* (e.g., purpose, proponent/contact person, project description, project location, etc.). *Section B* (beginning on page 6) contains the analysis of environmental impacts that could result from implementation of the proposed project, based on review of major environmental parameters. This section also identifies possible mitigation measures. *Section C* (page 37) contains the signature of the proponent, confirming the completeness of this Environmental Checklist.

Appendices to this Environmental Checklist include: the Geotechnical Report *(AESI, 2022)*, the Greenhouse Gas Emissions Worksheet *(EA Engineering, 2023)*, the Arborist Report (*Tree Solutions, Inc., 2023*), the Hazardous Building Materials Survery Report (*Terracon, 2023*), the Cultural Resources Assessment (*Perteet, 2023*), and the Transportation Technical Report (*Heffron Transportation, Inc., 2023*).

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[1] Chapter 43.21C. RCW

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SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization, or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. **You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown.** You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to **all parts of your proposal,** even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for lead agencies

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B, plus the Supplemental Sheet for Nonproject Actions (Part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in "Part B: Environmental Elements" that do not contribute meaningfully to the analysis of the proposal.

A. Background

1. Name of proposed project, if applicable:

John Muir Elementary Early Learning Addition Project

2. Name of applicant:

Seattle School District No. 1 (Seattle Public Schools)

3. Address and phone number of applicant and contact person:

Matisia Hollingsworth
Project Manager
Seattle Public Schools
2445 3rd Avenue S
Seattle, WA 98134
206-252-0901

4. Date checklist prepared:

July 28, 2023

5. Agency requesting checklist:

Seattle School District No. 1
2445 – 3rd Avenue South
MS 22-332, P.O. Box 34165
Seattle, WA 98124-1165

6. Proposed timing or schedule (including phasing, if applicable):

The ***John Muir Elementary Early Learning Addition Project*** that is analyzed in this Draft Environmental Checklist involves site preparation work, construction, and operation of the project. Site preparation and construction could begin in summer 2024 with operation in fall 2025.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No future plans for further development of the project site are proposed at this time.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

The following environmental information has been prepared for the project and is included as appendices to this Checklist:

- *Geotechnical Report* (AESI, December 16, 2022);
- *Greenhouse Gas Emissions Worksheet* (EA Engineering, June 2023);
- *Arborist Report* (Tree Solutions, April 2023);
- *Hazardous Building Materials Survey Report* (Terracon, January 2023);
- *Cultural Resources Assessment* (Perteet, July 2023)[2];
- *Transportation Technical Report* (Heffron Transportation, July 2023)

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

There are no known other applications that are pending approval for the ***John Muir Elementary Early Learning Addition Project*** site.

10. List any government approvals or permits that will be needed for your proposal, if known.

City of Seattle

- *Seattle Department of Construction and Inspections (SDCI)*

  Permits/approvals associated with the proposed project, including:
  - Demolition Permit
  - Master Use Permit
  - Building Permit
  - Mechanical Permits
  - Electrical and Fire Alarm Permits
  - Drainage and Side Sewer Permit
  - Comprehensive Drainage Control Plan Approval
  - Drainage Control Plan with Construction Best Management Practices, Erosion and Sediment Control Approval
  - Land Use Code Departure Approval (lot coverage, setbacks, and onsite bicycle parking)

[2] The cultural resources assessment is on-file with Seattle Public Schools.

- *Seattle Department of Transportation (SDOT)*
  - Street Use and Construction Use Permit (temporary – construction related)
  - Street Use and Utility Permit
  - Street Improvement Permit

King County

- Plumbing Permit
- Sewer Treatment Capacity Charge Approval
- Health Department Approval

Puget Sound Clean Air Agency

- Air Quality Permit – Demolition

Washington State Department of Ecology

- NPDES Construction Stormwater General Permit

Washington State Department of Archaeology and Historic Preservation

- Governor's Executive Order 21-02 Review

11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

Existing Site Conditions

The proposed ***John Muir Elementary Early Learning Addition Project*** site is situated within the northeast corner of the John Muir Elementary campus which is located at 3301 S Horton Street in the Mount Baker neighborhood of Seattle (see **Figure 1** for a vincity map and **Figure 2** for an aerial view of the site).

The existing John Muir Elementary building is located in the northern portion of the approximately 2.75 acre site and contains approximately 58,423 gross sq. ft. of building space, including 25 classrooms, one of which is currently utilized for the Head Start Pre-K early learning program. Two portable classroom buildings are located in the southwest corner of the school campus. The existing school currently has an operational capacity of approximately 342 students.

Recreational areas are generally located in the south portion of the site. A covered play area is attached to the south portion of the existing building. Playground equipment and associated space is located to the southwest of the existing building. Hard surface play areas are located to the south and southeast of the existing building and include a basketball court, four-square courts and other hard surface play spaces. An additional small covered play area and hard surface play area are located at the northeast corner of the existing

building. The City of Seattle Parks and Recreation Department's York Playground is also located immediately to the south of the school property and is also utilized by the school for recreation uses pursuant to the joint-use agreement (JUA) between Seattle Public Schools and Seattle Parks and Recreation.

Onsite parking for the school is provided within an existing parking area in the northwest corner of the school campus. The parking area contains approximately 18 stalls and is accessed from a driveway off of S Horton Street. A small service/delivery area is located on the east side of the building with access from 34th Avenue S; a gated driveway is also located off of 34th Avenue S and provides maintenance access to the hard surface play areas.

Since 2016, recent student enrollment at the John Muir Elementary has ranged from approximately 402 students (2016) to 325 students (2019). As of March 2023, the student enrollment was approximately 343 students, including 20 in the existing Pre-K program. The school also has approximately 67 employees, including 42 full-time employees, 21 part-time employees (including tutors), and 4 employees for the current early learning program.

The site of the proposed early learning addition is generally located in the northeast corner of the school campus, adjacent to the existing building. The proposed building addition project area is generally comprised of a portion of the northeast corner of the existing building, a small hard surface play area, walkways, and existing landscaping and trees.

Proposed Project

The proposed ***John Muir Elementary Early Learning Addition Project*** would provide a one-story building addition at the northeast corner of the existing John Muir Elementary building that would increase the overall building space by approximately 5,178 sq. ft. (approximately 5,877 sq. ft. of new building addition less approximately 699 sq. ft. of demolished existing building space). In total, the school would have approximately 64,120 sq. ft. of building space with the proposed project (58,423 sq. ft. of existing building space plus 5,877 sq. ft. of the proposed addition).

The proposed addition would include three new classrooms for the school's early learning program with before- and after-school child care support spaces. Selective demolition would be required at the northeast portion of the existing building to create internal connections between the existing building and the proposed addition. Interior renovations would also be provided within the existing building which would convert existing open floor plan classrooms into three separate classrooms; window replacements, fire alarm and system upgrades, lighting and electrical upgrades and modernization of the loading dock would also be provided (see **Figure 3** for the proposed site plan for the project).

It is anticipated that students and staff would remain onsite during the construction process for the project. Once completed the capacity of the school would be increased to approximately 382 students (compared to a 342 students under the existing condition). The school would also have space for an additional 11 employees (eight within the Pre-K early learning program and three for general education) which would result in a total of 78 employees at the school.

Recreational space in the south portion of the site would generally remain unchanged with the proposed project. New bicycle parking would be provided adjacent to the existing covered play area. The existing small covered play area and hard surface area in the northeast corner of the site would be removed to accommodate the proposed addition project. New recreation space would be provided near the western portion of the proposed addition and would include new modular playground equipment to create a dedicated recreation area for the younger students in the early learning program.

The proposed project would include modifications to the eastern end of the existing onsite parking area to meet accessibility requirements. The identified modifications would result in the loss of two onsite parking stalls (overall reduction from 18 to 16 parking stalls). Street improvements would also be provided along S Horton Street as required by the City of Seattle's Street Improvement Permit (SIP) process and would include frontage, accessibility and curb ramp improvements. The existing school bus load/unload zone would remain unchanged in their location along 34th Avenue E and no changes to the number of school buses would be anticipated.

Construction of the ***John Muir Elementary Early Learning Addition Project*** is anticipated to begin in summer 2024 with occupancy in fall 2025.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The John Muir Elementary campus is located at 3301 S Horton Street within Seattle's Mount Baker neighborhood (a portion of the NW Quarter of Section 15, Township 24, and Range 4). The school campus is generally bounded by S Horton Street to the north, 34th Avenue S to the east, York Playground to the south, and residential properties to the west (see **Figures 1** and **2**). The site of the proposed Early Learning Addition is located adjacent to the northeast corner of the existing building (see **Figure 3**).

B. Environmental Elements

1. Earth

a. General description of the site:
Circle or highlight one: Flat, rolling, hilly, steep slopes, mountainous, other:

The ***John Muir Elementary Early Learning Addition Project*** site is located in the northeast corner of the campus and is generally flat with a gradual slope to the southwest. The overall John Muir Elementary campus itself is also generally flat with an overall vertical relief of approximately 10-12 feet (*AESI, 2022*).

b. What is the steepest slope on the site (approximate percent slope)?

As noted above, the area of the proposed addition is generally flat. The overall school campus does contain steep slope areas along the western property boundary. According to the City of Seattle's Environmentally Critical Areas (ECA) Maps, an ECA steep slope area is located along much of the western school campus boundary, and descends to the west. The approximate slope to the western property line is approximately 50 percent (*City of Seattle, 2023*). The Geotechnical Report (**Appendix A**) that was prepared for the project by AESI included a review of this slope area and determined that the slope is approximately 300 feet away from the proposed addition location and appears that the area was filled to achieve final site grades which would suggest that the slope was created as a result of previous legal grading activities. Given the location of the addition and the fact that the project would not alter the existing conditions of the slope or impose any loads on the slope it is anticipated that there would be no impacts to the steep slope area (*AESI, 2022*).

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them, and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

As part of the Geotechnical Report for the project (**Appendix A**), four site exploration borings were completed in the vicinity of the proposed addition project. Borings were completed to a depth of approximately 8 to 11 feet deep. The soils encountered on the site generally consisted of three inches of sod/topsoil underlain by a layer of fill that ranged from approximately 2-3 feet deep. Fill consisted of medium dense to dense, moist, dark brown, silty, fine to medium sand with variable gravel content. The existing fill soils overlay Vashon lodgement till which consisted of dense to very dense, slightly moist, tannish gray to gray silty fine sand with trace to some gravel (*AESI, 2023*).

The project site does not contain any agricultural land areas of commercial significance.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

There are no indications or history of unstable soils on the site or adjacent to the site and no evidence of landslide activity or unstable soils has been observed.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Approximately 1,500 cubic yards of excavation would be required for the project and approximately 250 cubic yards of fill material would be imported to the site. The specific source of fill material is not known at this time but would be obtained from a source approved by the City of Seattle.

f. Could erosion occur because of clearing, construction, or use? If so, generally describe.

Erosion is possible in conjunction with any construction activity. Site work would expose soils on the site, but the implementation of a Temporary Erosion Sedimentation Control (TESC) plan that is consistent with City of Seattle standards and the implementation of best management practices (BMPs) during construction would mitigate any potential impacts.

Once the project is operational, no erosion is anticipated.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 74 percent of the John Muir Elementary campus is currently covered with impervious surfaces, including buildings, hard surface play areas, walkways, and other impervious surfaces.

With the completion of the proposed building addition project, approximately 77 percent of the campus would be covered with impervious surfaces. Impervious surfaces would primarily consist of the existing building and proposed building addition, hard surface play areas, walkways, and other impervious surfaces.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any.

No significant erosion is anticipated with the construction of the proposed project. The proposed project would comply with City of Seattle regulations, including providing a Temporary Erosion and Sedimentation Control (TESC) Plan and Best Management Practices (BMPs). See **Appendix B** for a list of typical construction BMPs for SPS projects. **Appendix A** also identifies measures to minimize the potential for erosion, including:

- Construction activity should be scheduled or phased as much as possible to reduce the amount of earthwork activity that is performed during winter months.
- The winter performance of a site is dependent on a well conceived plan for control of site erosion and stormwater runoff. The TESC Plan should include ground-cover measurs, access roads, and staging areas.
- TESC measures for a given area, to be graded or otherwise worked, should be installed prior to any activity within that area.
- During the wetter months, or when large storm events are predicted during the summer months, each work area should be stabilized so that if precipitation occurs, the work area can receive the rainfall without excessive erosion or sedimentation transport.
- All disturbed areas should be revegetated as soon as possible.
- Surface runoff and discharge should be controlled during and following development.
- Soils that are to be reused around the site should be stored in a manner as to reduce erosion from the stockpile.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

During construction, the ***John Muir Elementary Early Learning Addition Project*** could result in temporary increases in localized air emissions associated with particulates and construction-related vehicles. It is anticipated that the primary source of temporary, localized increases in air quality emissions would result from particulates associated with demolition, on-site excavation and site preparation. While the potential for increased air quality emissions could occur throughout the construction process, the timeframe of greatest potential impact would be at the outset of the project in conjunction with the site preparation and excavation/grading activities. However, with the implementation of a TESC plan and construction BMPs, air quality emission impacts are not anticipated to be significant. Temporary, localized emissions associated with carbon monoxide and hydrocarbons would also result from diesel and gasoline-powered construction equipment operating on-site, construction traffic accessing the project site, and construction worker traffic. However, emissions from these vehicles and equipment would be small and temporary and are not anticipated to result in a significant impact.

Upon completion of the project, the primary source of emissions would continue to be from vehicles travelling to and from the site, including buses and commuter vehicles. The increase in vehicles travelling to the site would not be anticipated to substantially increase emissions in the area. In addition, Seattle Public Schools continues to maintain an anti-idling policy for buses which minimizes potential emissions on the school campus. As a result, significant

adverse air quality impacts would not be anticipated.

Another consideration with regard to air quality and climate relates to Greenhouse Gas Emissions (GHG). In order to evaluate climate change impacts of the proposed project relative to the requirements of the City of Seattle, a Greenhouse Gas Emissions Worksheet has been prepared (see **Appendix C** of this Environmental Checklist).

This Worksheet estimates the emissions from the following sources: embodied emissions; energy-related emissions; and, transportation-related emissions. In total, the estimated lifespan emissions for the proposed new building addition would be approximately 5,436 $MTCO_2e$[3]. Based on an assumed building life of 62.5 years[4], the proposed building addition project would be estimated to generate approximately 87 $MTCO_2e$ annually. For reference, the Washington State Department of Ecology threshold for potential significant GHG emissions is 25,000 $MTCO_2e$ annually. Therefore, the proposed project would not be anticipated to generate a significant amount of GHG emissions.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

The primary off-site source of emissions in the site vicinity is vehicle traffic on surrounding roadways, including S Horton Street and 34th Avenue S, as well as Rainier Avenue S and Martin Luther King Jr Way S which are further to the west. There are no known off-site sources of air emissions or odors that may affect the proposed project.

c. Proposed measures to reduce or control emissions or other impacts to air, if any.

No significant air quality impacts are anticipated with the construction of the proposed project. Construction activities would be required to comply with Puget Sound Clean Air Agency (PSCAA) regulations, including Regulation I, Section 9.11 (prohibiting the emission of air contaminants that would be injurious to human health) and Regulation I, Section 9.15 (prohibiting the emission of fugitive dust, unless reasonable precautions are employed). Additional mitigation measures to minimize air quality impacts during construction are identified in **Appendix B**.

[3] $MTCO_2e$ is defined as Metric Ton Carbon Dioxide Equivalent and is a standard measure of amount of CO_2 emisssions reduced or sequestered.

[4] According to the Greenhouse Gas Emissions Worksheet, 62.5 years is the assumed building lifespan for educational buildings.

3. Water

a. Surface Water:

1. **Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.**

   There is no surface water body on or in the immediate vicinity of the ***John Muir Elementary Early Learning Addition Project*** site. The nearest surface water body is Lake Washington, which is located approximately 0.4 miles to the east of the project site.

2. **Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.**

   The proposed project would not require any work over, in, or adjacent (within 200 feet) to any water body.

3. **Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.**

   No fill or dredge material would be placed in or removed from any surface water body as a result of the proposed project.

4. **Will the proposal require surface water withdrawals or diversions? Give a general description, purpose, and approximate quantities if known.**

   The proposed project would not require any surface water withdrawals or diversions.

5. **Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**

   The proposed project site does not lie within a 100-year floodplain and is not identified as a flood prone area on the City of Seattle Environmentally Critical Areas map (*City of Seattle, 2023)*.

6. **Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.**

   There would be no discharge of waste materials to surface waters.

b. Ground Water:

1. **Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give a general description, purpose, and approximate quantities if known.**

   No groundwater would be withdrawn, or water discharged to ground water as part of the proposed project.

   Geotechnical investigations that were completed in November 2022 did not encounter any groundwater within the excavation boring locations on the site (approximately 8 to 11 feet deep). See **Appendix A** for details.

2. **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (domestic sewage; industrial, containing the following chemicals…; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

   Waste material would not be discharged into the ground from septic tanks or other sources as a result of the proposed project.

c. Water Runoff (including stormwater):

1. **Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.**

   Approximately 74 percent of the John Muir Elementary campus is currently covered with impervious surfaces, including buildings, hard surface play areas, walkways, and other hard surfaces. Existing stormwater at the site is managed by catch basins, downspouts and underground conveyance pipe. Downspouts and catch basins located on the north and east sides of the existing school building collect stormwater from the site and eventually discharge to a 12-inch public storm drainage main located in the S Horton Street right-of-way. Stormwater runoff collected in downspouts and catch basins located south and west of the existing school building is collectd and conveyed to an existing 12-inch public storm drain mainlocated southeast of the school building which runs through the school property, extends to the west and discharges into a stormwater system within S Hinds Street. Both of the public storm drainage mains eventually discharge to a King County combined sewer main.

   With completion of the ***John Muir Elementary Early Learning Addition Project***, approximately 77 percent of the campus would be covered with impervious surfaces, including the existing building and proposed addition, hard surface play areas, walkways,

and other hard surfaces. Stormwater management for the proposed project would be designed to be consistent with the City of Seattle's current stormwater code and would include on-site stormwater management (OSM) measures, such as bioretention, which are deemed feasible as required by the City of Seattle. Additional catch basins, trench drains, downspouts and underground conveyance pipe would be added to the existing on-site stormwater system to collect and convey stormwater runoff from the proposed addition and other associated project site improvements. Stormwater from the site would continue to be discharged at the existing locations within the S Horton Street and S Hinds Street rights-of-way.

2. **Could waste materials enter ground or surface waters? If so, generally describe.**

   The existing stormwater management system for the site would continue to ensure that waste materials would not enter ground or surface waters as a result of the proposed project.

3. **Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.**

   The proposed project would not alter or otherwise affect drainage patterns in the site vicinity.

4. **Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any.**

   The following measures would be implemented to control surface, ground and runoff water impacts:

   - A Temporary Erosion and Sedimentation Control (TESC) Plan and Construction Best Management Practices (BMPs) would be implemented during construction to reduce erosion and minimize impacts to water resources.

   - Stormwater management for the proposed project would comply with applicable City requirements, including the City's Stormwater Code (*SMC 22.800*).

4. Plants

a. Check the types of vegetation found on the site:

☒ deciduous tree: alder, maple, aspen, other: European beech

☒ evergreen tree: fir, cedar, pine, other: Giant sequoia

☒ shrubs

☒ grass

☐ pasture

☐ **crop or grain**

☐ **orchards, vineyards, or other permanent crops.**

☐ **wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other**

☐ **water plants: water lily, eelgrass, milfoil, other**

☐ **other types of vegetation**

A draft Arborist Report was completed for the project by Tree Solutions and is included as **Appendix D**. The Arborist Report included an assessment of nine trees that are currently located within the project area, including Giant sequoia, Red maple, Western white pine, Quaking aspen, and European beech. The existing trees range in size from approximately 9 inches in diameter to approximately 32 inches in diameter. Of the trees that were assessed, five of the trees meet the criteria for an exceptional tree that is outlined in the City of Seattle Director's Rule 16-2008, including two Giant sequoias and three Quaking aspens.

b. What kind and amount of vegetation will be removed or altered?

Development of the proposed John Muir Elementary Early Learning Addition Project would require the removal of existing vegetation within the proposed building addition site area, including the removal of some trees and landscaping/grass areas. As noted in the Arborist Report, it is anticipated five trees would be removed as part of project development, including three Quaking aspen trees that meet the criteria for an exceptional tree. The remaining four trees that were evaluated in the Arborist Report would be anticipated to be retained, including two exceptional Giant sequoia trees.

c. List threatened and endangered species known to be on or near the site.

No known threatened or endangered plant species are located on or proximate to the project site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.

New landscaping would be provided onsite as part of the project and would include replacement trees that would be consistent with City of Seattle requirements at the time of permitting. Proposed landscaping for the project would be consistent with city codes and include climate adapted species of shrubs (including evergreen shrubs) and ornamental shrubs. New landscaping would place an emphasis on utilizing plants that would be appropriate for an early learning environment and provide seasonal interest. Additional landscaping would also include seeded areas to provide erosion control and consistency with the existing school campus.

All trees that would be removed during construction would be replaced in accordance with the City's requirements at the time of permit submittal. Existing trees that are proposed to be retained would be protected during construction by following the tree protection measures that are outlined in **Appendix D.**

e. List all noxious weeds and invasive species known to be on or near the site.

Noxious weeds or invasive species that could be present in the vicinity of the site include giant hogweed, English Ivy, and Himalayan blackberry.

5. Animals

a. List any birds and other animals that have been observed on or near the site or are known to be on or near the site.
Examples include:

- **Birds: hawk, heron, eagle, songbirds, other: crows, pigeons, seagulls**
- **Mammals: deer, bear, elk, beaver, other: squirrels, raccoons, rats, opossums**
- **Fish: bass, salmon, trout, herring, shellfish, other:**

Urban wildlife have been observed on and in the vicinity of the ***John Muir Elementary Early Learning Addition Project*** site, including, crows, pigeons, squirrels, raccoons, rats, and opossums. Data from the U.S. Fish and Wildlife Service indicates that eagles could be found in the vicinity; however, there are no known observations of eagles within the site or adjacent areas (US Fish and Wildlife, 2023). Additionally, the City of Seattle GIS Environmentally Critical Areas Maps indicate that there are no wildlife habitat areas on or adjacent to the project site (City of Seattle, 2023).

b. List any threatened and endangered species known to be on or near the site.

The following are listed threatened, endangered or candidate species in the vicinity based on data from the U.S. Fish and Wildlife Service that could be affected by development: marbled murrelet, yellow-billed cuckoo, monarch butterfly, bull trout, and north american wolverine (US Fish and Wildlife, 2023). However, it should be noted that none of these species have been observed at the site and due to the urban location of the site, it is unlikely that these animals are present on or near the site.

c. Is the site part of a migration route? If so, explain.

The proposed project site is not located within a specific migration route. However, in general, the entire Puget Sound area is within the Pacific Flyway, which is a major north-south flyway for migratory birds in America—extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or travelling to overwintering sites.

d. Proposed measures to preserve or enhance wildlife, if any.

New landscaping and trees would be provided as part of the project in accordance with City of Seattle requirements at the time of permit submittal. The project is not anticipated to have a substantial impact on wildlife located in the vicinity of the site.

e. List any invasive animal species known to be on or near the site.

There are no known invasive animal species on or adjacent to the project site; however, invasive species known to be located in King County include European starling, house sparrow and eastern gray squirrel.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity is currently utilized by the existing school building and would continue to be the primary source of energy that would serve the school. The proposed ***John Muir Elementary Early Learning Addition Project*** would utilize electricity for lighting and heating, as well as electronics.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

The proposed project would not affect the potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.

The proposed project would be designed to meet the requirements of the City of Seattle Energy Code, as well as the Washington Sustainable Schools Protocol. Energy conservation features that would be provided as part of the project include the following:

- The proposed addition would be designed with a highly efficient exterior envelope.
- The proposed addition would utilize the existing highly efficient ground source heating system with occupancy sensor-based controls for temperature and air flow, as well as demand control ventilation. HVAC returns would also be ducted to provide improved air quality.
- Proposed classrooms would be daylit with operable windows.
- High-efficiency electric LED lights would be provided and automatically dimmed in

response to available daylight.

- A portion of the rooftop area of the proposed addition would be designated to be solar-ready in the event that SPS decides to add solar panels in the future.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur because of this proposal? If so, describe.

A *Hazardous Building Materials Survey Report* (**Appendix E**) was completed for the existing building as part of the proposed project (Terracon, 2023). As part of the report, the existing building was inspected for the following regulated building materials: Asbestos-containing materials (ACM), assumed Asbestos-containing materials; Lead-containing coatings (paints); Mercury-containing light tubes, switches and thermostats; suspected high-intensity discharge (HID) lamps; and, suspected Polychlorinated biphenyls (PCB)-containing fluorescent light ballasts.

ACM was found in two samples within exterior door frames, behind exterior brick siding, and on some concrete walls; assumed ACM was also discovered in electrical panel internal components and fire doors. Asbestos-related work must be performed in compliance with Washington State worker protection and environmental protection regulations, including WAC 296-62, WAC 296-65, and PSCAA Regulation III, Article 4.

Two samples were found to contain detectable levels of lead. The Washington State Department of Labor and Industries requires an exposure assessment be conducted during operations that may disturb the lead paint in such a way that the airborne exposure may reach or exceed the action level of 30 micrograms per cubic meter (µg/m3) or the Permissible Exposure Limit of 50 µg/m3. The worker protection requirements of WAC 296-155-176 "Lead in Construction" may apply. If portions of the building to be demolished contain detectable levels of lead, a toxicity characteristic leachate procedure (TCLP) sample that is representative of the waste stream must be collected and analyzed per the requirements of WAC 173-303. If the results of the TCLP analysis determine the waste to be a "dangerous waste" as defined by WAC 173-303, it must be disposed of accordingly.

Fluorescent light tubes, HID lamps, switches, and thermostats within the building may contain mercury. Fluorescent light ballasts and HID lamp ballasts may also contain PCBs. In Washington State, even ballasts labeled with "No PCBs" may have regulated quantities of PCBs and therefore should be handled in accordance with Washington Department of Ecology requirements. Employees must also be informed of mercury and PCB hazards in accordance with WAC 296-800-170. See **Appendix E** for further details on potential hazardous building materials.

Accidental spills of hazardous materials from equipment or vehicles could occur in conjunction with any construction activity. However, the construction contractor would develop a spill prevention/control plan to prevent the accidental release of hazardous materials to the environment.

1. Describe any known or possible contamination at the site from present or past uses.

As indicated above, a *Hazardous Building Materials Survey Report* was completed for the project to identify potential hazardous materials within the existing building. This report is summarized under Section B.7.a and is included as **Appendix E**.

The Washington State Department of Ecology website was reviewed to identify any potential contaminated soils on or in the vicinity of the site, as well as potential issues related to the former Tacoma Asarco Smelter Plume. There are no records of any contaminated soils on or adjacent to the project site and the site is located in an area where levels of arsenic and lead associated with the former smelter plume are anticipated to be below state cleanup levels.

Two sites (3646 33rd Avenue S and 3700 Rainier Avenue S) that are located approximately two blocks south of the ***John Muir Elementary Early Learning Addition Project*** site are listed as a cleanup sites by Ecology. These sites are both currently undergoing a cleanup action in coordination with Ecology. An additional site (3333 Rainier Avenue S) that is located approximately four blocks to the northwest of the project site is also listed as a cleanup site and Ecology is currently monitoring the cleanup progress associated with that site (*Washington State Department of Ecology, 2023*).

a. Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

No existing hazardous chemicals/conditions are located within the project area that would affect the proposed project.

b. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Chemicals stored and used during construction would be limited to gasoline and other petroleum products that are utilized by construction equipment and vehicles.

Similar to the existing conditions, once the proposed project is operational the potential chemicals that would be used on the site would generally be limited to cleaning supplies and would be stored in an appropriate and safe location.

c. Describe special emergency services that might be required.

No special emergency services are anticipated to be required as a result of the project. As is typical of urban development, it is possible that normal fire, medical, and other emergency services may, on occasion, be needed from the City of Seattle for field activities (i.e. injuries during athletic events, etc.).

d. Proposed measures to reduce or control environmental health hazards, if any.

The following measures would be provided to minimize environmental health hazards:

- Measures related to hazardous building materials are identified in the Hazardous Building Materials Survey Report (**Appendix E**) and include the following:
  - Asbestos-related work must be performed in compliance with Washington State worker protection and environmental protection regulations, including WAC 296-62, WAC 296-65, and PSCAA Regulation III, Article 4.
  - An exposure assessment would be conducted during operations that may disturb the lead paint in such a way that the airborne exposure may reach or exceed the Action level of 30 micrograms per cubic meter (µg/m3) or the Permissible Exposure Limit of 50 µg/m3. The worker protection requirements of WAC 296-155-176 "Lead in Construction" may apply.
  - If portions of the building to be demolished contain detectable levels of lead, a toxicity characteristic leachate procedure (TCLP) sample that is representative of the waste stream must be collected and analyzed per the requirements of WAC 173-303.
  - All light ballasts should be handled in accordance with Washington Department of Ecology requirements. Employees must also be informed of mercury and PCB hazards in accordance with WAC 296-800-170.

- A spill prevention plan would be developed and implemented during construction to minimize the potential for an accidental release of hazardous materials into the environment.

b. Noise

1. **What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?**

   There are no existing sources of noise in the area that would affect the proposed ***John Muir Elementary Early Learning Addition Project***. Noise associated with vehicular traffic associated with adjacent roadways (S Horton Street, 34th Avenue S, and Rainier Avenue S) is the primary sources of noise in the vicinity of the project site.

2. **What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site)?**

   Short-Term Noise

   Temporary construction-related noise would occur as a result of on-site construction activities associated with the project. Construction activities including, excavation/grading, demolition, and construction of the building addition would be the primary sources of construction noise during the development process.

   Existing residential land uses surrounding the school, as well as the existing school operations that would remain on the site during the construction process, would be the most sensitive noise receptors and could experience occasional noise-related impacts throughout the construction process. Pursuant to Seattle's Noise Code (SMC, Chapter 25.08), maximum sound levels in residential communities shall not exceed 55 dBA. However, per SMC 25.08 and based on the Neighborhood Residential 3 (NR3) zoning for the site, construction activities are allowed to exceed the maximum noise levels between 7 AM and 10 PM on weekdays and 9 AM to 10 PM on weekends. Construction equipment may exceed the sound level limits during construction periods by 25 dB(A) and portable powered equipment may exceed the limits by 20 dB(A). The proposed project would comply with the provisions of Seattle's Noise Code (*SMC, Chapter 25.08*) as it relates to construction-related noise to reduce noise impacts during construction. Contractors are aware of the City of Seattle Noise Ordinance requirements and are contractually required by Seattle Public Schools to abide by them.

   Long-Term Noise

   The proposed ***John Muir Elementary Early Learning Addition Project*** and associated increase in student capacity would likely result in a potential minor increase in noise from human voices and vehicles travelling to and from the site, particularly during the school day and during student drop-off and pickup. The potential increase in noise is anticipated to be minor and as a result, no significant noise impacts would be anticipated.

3. Proposed measures to reduce or control noise impacts, if any.

No significant noise impacts are anticipated with the proposed project. However, the project includes the following measures would be provided to minimize noise during the construction process.

- As noted, the project would comply with provisions of the City's Noise Ordinance (*SMC 25.08*); specifically: construction hours would be limited to standard construction hours (non-holiday) from 7 AM to 10 PM and Saturdays and Sundays from 9 AM to 10 PM.

- To reduce noise impacts during construction, contractors would comply with all local and state noise regulations. Contractors may also implement the following measures to further reduce or control noise impacts during construction:
  - Construction would generally occur between 7 AM and 5 PM on weekdays, although, per SMC 25.08, construction is allowed to occur between 7 AM and 10 PM on weekdays and 9 AM to 10 PM on weekends and holidays.
  - Minimize idling time of equipment and vehicle operation.
  - Operate equipment only during hours approved by the City of Seattle.
  - Use well-maintained and properly functioning equipment and vehicles.
  - Locate stationary equipment away from receiving properties.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The project site is currently utilized for the existing John Muir Elementary and would continue to be utilized as part of the school. The proposed project would not be anticipated to affect current land uses on adjacent properties.

The John Muir Elementary campus is comprised of the existing one- to three-story, approximately 58,423-gross square foot school building that is located in the north portion of the campus. Surface parking and vehicular access is located to the north of the building, adjacent to S Horton Street. A small covered play area and hard surface play area are located in the northeast corner of the site, adjacent to the existing building. Recreation space is located in the south portion of the site, including a covered play area, playground equipment areas, and hard surface play areas (e.g., basketball court, four-square court, and other open play space). Two existing portable classroom buildings are also located in the southwest corner of the site.

The site of the proposed ***John Muir Elementary Early Learning Addition Project*** is located at the northeast corner of the existing building. The site area is generally comprised of portions of the existing building, hard surface play area, walkways, and landscaping, grass and trees. See **Figure 2** for an aerial photo of the existing site and **Figure 3** for the proposed site plan for the project.

Existing land uses surrounding the John Muir Elementary campus include existing residences to the north, east and west of the school. York Playground is located immediately to the south of the school with residences located further to the south. Commercial uses are also located further to the west and south of the school, adjacent to Rainier Avenue S and Martin Luther King Jr Way S.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses because of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The project site has no recent history of use as a working farmland or forest land.

1. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how?

The project site is located in an urban area and would not affect or be affected by working farm or forest land; no working farm or forest land is located in the vicinity of this urban site.

c. Describe any structures on the site.

The existing John Muir Elementary building ranges from one- to two-stories in height and is primarily constructed of brick. A covered play area is extended from the south side of the existing building, as well as at the northeast corner of the building. Two portable classroom buildings are located in the southwest corner of the school campus.

d. Will any structures be demolished? If so, what?

Modifications would be provided at the northeast corner of the existing building to allow for internal connections between the existing building and the proposed addition

e. What is the current zoning classification of the site?

The current zoning classification for the site is Neighborhood Residential 3 (NR3) (*City of*

Seattle, 2023).

f. What is the current comprehensive plan designation of the site?

The comprehensive plan future land use designation for the site is Urban Center (*City of Seattle, 2023*)

g. If applicable, what is the current shoreline master program designation of the site?

The project site is not located within the City of Seattle designated shoreline boundary.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

As noted in Section B.1.b, an ECA steep slope area is located along the western school campus boundary, and descends to the west (*City of Seattle, 2023*). The Geotechnical Report (**Appendix A**) for the project included a review of this slope area and determined that the slope is approximately 300 feet away from the proposed addition location and appears that the area was filled to achieve final site grades which would suggest that the slope was created as a result of previous legal grading activities. Given the location of the addition and the fact that the project would not alter the existing conditions of the slope or impose any loads on the slope it is anticipated that there would be no impacts to the steep slope area (*AESI, 2022*).

The City of Seattle ECA GIS maps also indicate that a portion of the western area of the school campus is listed as a liquefaction-prone area (*City of Seattle, 2023*). This area is located approximately 250 feet from the proposed addition site and was reviewed as part of the Geotechnical Report. A review of the shallow sediments that were observed below the proposed addition site indicated that the soil was unsaturated and consisted of dense to very dense lodgement till which are not expected to be prone to liquefaction due to their high relative density and absence of shallow groundwater. As such, it was determined that a detailed liquefaction hazard analysis was not warranted and the potential risk for damage due to liquefaction would be low (*AESI, 2022*). See **Appendix A** for further details.

No other environmentally critical areas are located on or adjacent to the project site.

i. Approximately how many people would reside or work in the completed project?

The proposed project would not provide any residential opportunities. John Muir Elementary currently has approximately 67 employees, including 46 full-time employees and 21 part-time employees. Upon completion, the ***John Muir Elementary Early Learning Addition Project*** would create new and renovated classrooms that would provide for a

net capacity increase of approximately 40 students (total school capacity of approximately 382 students). The proposed project would also result in an anticipated increase of 11 new full-time employees, including new Pre-K staff and teachers (total of 78 school employees).

j. Approximately how many people would the completed project displace?

The proposed project would not displace any people.

k. Proposed measures to avoid or reduce displacement impacts, if any.

No displacement would occur and therefor no mitigation measures are necessary.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

The proposed project would renovate portions of the existing school building and construct a new addition to the existing building, and as with most Seattle Public School facilities, it is located within a residential neighborhood. The proposed project would be compatible with existing land uses and plans.

The Seattle Municipal Code includes development standards for public schools in residential zones (SMC 23.51B.002) and includes procedures through which departures from the required development standards of the code can be granted for public school structures (SMC 23.79). Due to the existing site characteristics and project design goals, the project is requesting land use departures for the following: lot coverage, setbacks, and onsite bicycle parking (reduction of short-term spaces with an equal number of long-term spaces added to the site). Seattle Public Schools is continuing to coordinate with the City of Seattle regarding the departures for the project and would comply with the requirements of the City's departures process.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any.

The project site is not located near agricultural or forest lands and no mitigation measures are necessary.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

No housing units would be provided as part of the project.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

No housing presently exists on the site, and none would be eliminated.

c. Proposed measures to reduce or control housing impacts, if any.

No housing impacts would occur, and no mitigation would be necessary.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The tallest height of the existing John Muir Elemementary building is approximately 52 feet tall and the existing building exterior is primarily comprised of brick masonry.

The proposed ***John Muir Elementary Early Learning Addition Project*** would be approximately 25 feet tall at its highest point and would be intended to closely match the overall height in the northeast corner of the building to allow for internal connections between the proposed addition and existing building. The principal exterior building materials for the proposed addition would be intended to complement the existing building and include brick masonry with small amounts of smooth-faced metal panels and ceramic tile.

b. What views in the immediate vicinity would be altered or obstructed?

View of the site and school campus woud generally continue to be reflective of the existing school use of the site. The proposed addition would increase the amount of building area on the site and views of the proposed addition would primarily be available from areas that are proximate to the north and east corners of the school campus (see **Figure 3** for the proposed site plan). Existing views across this area of the school campus are limited due to the generally flat topography of the surrounding area and the presence of the existing two- and three-story portions of the school building. New landscaping and retained and replacement trees would provide a partial buffer between the proposed addition and adjacent areas.

The City of Seattle maintains public view protection policies are which are intended to "protect public views of significant natural and human-made features: Mount Rainier, the Olympic and Cascade Mountains, the downtown skyline, and major bodies of water including Puget Sound, Lake Washington, Lake Union, and the Ship Canal, from public places consisting of specified viewpoints, parks, scenic routes, and view corridors

identified in Attachment 1 to the SEPA code[5]. However, there are no SEPA protected view sites on or in the immediate vicinity of the ***John Muir Elementary Early Learning Addition Project*** site.

View protection from City-designated Scenic Routes is encouraged[6]. According to documentation from the City of Seattle, the are no City-designated Scenic Routes in the immediate vicinity of the project site.

Views of designated historic structures are also a consideration[7]. However, there are no designated historic structures or landmarks on or immediately adjacent to the ***John Muir Elementary Early Learning Addition Project*** site.

There are no designated views of the Space Needle on or adjacent to the project site[8].

c. Proposed measures to reduce or control aesthetic impacts, if any.

No significant impacts are anticipated with regard to aesthetic impacts and no additional measures are proposed.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Short-Term Light and Glare

At times during the construction process, area lighting of the job site (to meet safety requirements) may be necessary, which would be noticeable proximate to the project site; however, such lighting would be temporary and is not anticipated to occur on a regular basis during construction. In general, light and glare from construction of the proposed project is not anticipated to adversely affect adjacent land uses.

Long-Term Light and Glare

Under the proposed ***John Muir Elementary Early Learning Addition Project***, there would be an increase in light and glare with the proposed building addition which would be

[5] Seattle Municipal Code Chap. 25.05.675 P.2.a.i. and the accompanying *Seattle Views: An Inventory of 86 Public View Sites Protected under SEPA (May 2002)* document.

[6] Ord. #97025 (Scenic Routes Identified by the Seattle Engineering Department's Traffic Division) and Ord. #114057 (Seattle Mayor's Recommended Open Space Policies).

[7] Seattle Municipal Code Chapter 25.05.675 P.2.b.i.

[8] Seattle Municipal Code Chap. 25.05.675 P. and Seattle DCLU, 2001.

proximate to the north and east property lines and adjacent residential uses. Light and glare sources would primarily consist of interior and exterior building lighting, as well as lights from additional vehicles travelling to and from the site. Exterior building lighting and other proposed outdoor lighting would be designed to focus light on the site and minimize impacts to adjacent properties. The presence of existing street trees, retained trees, and proposed landscaping and new trees also would help to provide a buffer between the proposed addition and existing off-site uses and minimize light and glare toward adjacent properties. Measures to further minimize light spillage on adjacent properties are also identified below and significant light and glare impacts would not be anticipated.

Glare from building materials (e.g., window glazing or other building materials) could also occur during certain times of day but would not be anticipated to create a significant impact.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Light and glare associated with the proposed project would not be expected to cause a safety hazard or interfere with views.

c. What existing off-site sources of light or glare may affect your proposal?

No off-site sources of light or glare are anticipated to affect the proposed project.

d. Proposed measures to reduce or control light and glare impacts, if any.

The proposed design for the new addition is also intended to minimize lighting energy use by daylighting the classrooms and other design features which would minimize the amount of the light utilized and emitted from the new building addition. High-efficiency electric LED lights would be provided and automatically dimmed in response to available daylight. All exterior lighting would be shielded and directed toward the site to minimize light spillage

Evening activities/events currently occur periodically during the school year at John Muir Elementary and increase light during the evening on those days; however, the number of evening events is not anticipated to substantially change with the proposed addition and the amount of light would not be anticipated to result in a significant impact. Existing street trees, retained onsite trees, and proposed new landscaping and trees would also provide a partial buffer to reduce light spillage from the proposed building addition.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Existing recreation uses at John Muir Elementary are primarily located south of the existing building in the southern portion of the site. Recreation areas include a covered play area, playground equipment areas, and hard surface play areas (including a basketball court, four square courts, and other open play space). In addition, a small covered play area and hard surface play area are also located in the northeast corner of the site. In total, approximately 39,500 sq. ft. of recreation space is currently located on the school campus.

In addition, the Seattle Parks and Recreation Department's York Playground is located immediately to the south of the school campus and the school also utilizes this area for recreation pursuant to the existing joint use agreement between SPS and Seattle Parks and Recreation Department. This agreement also allows Seattle Parks and Recreation and other community users to utilize the school areas when it is not in use by the school.

There are also several parks and recreation areas in the vicinity of the project site (approximately 1.0 mile), including:

- York Playground is located immediately to the south of the site.
- Lake People Park is located approximately 0.3 miles to the south.
- York Park is located approximately 0.3 miles to the southeast.
- Mount Baker Park is located approximately 0.4 miles to the northeast.
- Jefferson Park and Golf Course is located approximately 0.5 miles to the southwest.
- Stan Sayres Memorial Park is located approximately 0.6 miles to the east.
- Genesse Park and Playfield is located approximately 0.6 miles to the southeast.
- Cheasty Greenspace is located approximately 0.6 miles to the southeast.
- Rainier Playfield is located approximately 0.7 miles to the south.
- Martin Luther King Jr Memorial Park is located approximately 0.7 miles to the north.
- Coleman Park is located approximately 0.7 miles to the north.
- Lake Washington Boulevard Park is located approximately 0.7 miles to the northeast.

b. Would the proposed project displace any existing recreational uses? If so, describe.

The proposed project would displace the existing covered play area and hard surface play area in the northeast corner of the campus to accommodate the development of the proposed addition. New recreation space would be provided to the west of the proposed building addition to provide recreation areas for younger students associated with the

early learning addition. Existing recreation areas in the south portion of the school campus would generally remain unchanged. In total, approximately 39,400 sq. ft. of recreation space would be provided on the campus with the proposed project (compared to 39,500 sq. ft. under existing conditions).

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any.

As noted above, the proposed ***John Muir Elementary Early Learning Addition Project*** would result in a slight reduction in overall recreation space on the campus (39,500 sq. ft. existing compared to 39,400 sq. ft proposed). However, the proposed project would create a new and enhanced recreation area adjacent to the west side of the proposed building addition which would be focused on providing recreation space specifically for younger students and include new playground equipment within the space. No additional impacts to recreation would occur and no additional mitigation is necessary.

13. Historic and Cultural Preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

John Muir Elementary was originally constructed in 1903 with additions constructed in 1903, 1910 and 1924. Those buildings were since demolished and the current school consists of a three-story building that was constructed in 1971 and a one- to two-story building that was constructed in 1991. In 2009, the current John Muir Elementary was determined to be not eligible for listing in the National Register of Historic Places (NRHP) (*DAHP, 2023*). The building is also not listed as a City of Seattle Landmark (*City of Seattle, 2023*).

According to the Washington State Department Archaeology and Historic Preservation's (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD), the closest listed structures are the Mount Baker Park Improvement Club Clubhouse (located approximately 0.3 miles to the northeast and listed on the NRHP and Washington Heritage Register [WHR]) and the Joseph Kraus House (located approximately 0.3 miles to the northeast and listed on the NRHP and WHR). Mount Baker Park Boulevard is also listed on the NRHP and WHR and is located approximately 0.2 miles to the north. In addition, the Mount Baker Park Historic District is located to the north and east of the site along Mount Baker Ridge adjacent to Lake Washington (approximately 0.1 miles and 0.2 miles away, respectively) and is listed on the NRHP and WHR (*DAHP, 2023*).

According to the City of Seattle Landmarks Map and Database (*City of Seattle, 2023*), the closest listed City of Seattle Landmarks in the site vicinity include Franklin High School (located approximately 0.2 miles to the northwest of the project site) and the Mount

Baker Presbyterian Church (located approximately 0.2 miles to the northeast of the project site)

SPS has been in consultation with DAHP as part of the process for Governor's Executive Order 21-02. SPS submitted project information to DAHP for their review and DAHP concluded that the existing building is not eligible for listing in the NRHP and that no historic resources would be impacted by the project (see **Appendix F** for a copy of the letter from DAHP). Tribal consultation is also a part of the Executive Order 21-02 process and is descrbed futher below in Section B.13.c.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

The DAHP WISAARD predictive model indicates that the project site is comprised of area that could be considered very high risk for archaeological resources and recommends/advises that a project-specific cultural resources assessment be conducted.

A cultural resources assessment (**Appendix F**) was completed for the project site (*Perteet, 2023*) and included an analysis of the natural and cultural setting, a discussion of previous cultural resource investigations in the site vicinity, review of geotechnical investigations on the site, and an on-site investigation. Prior to conducting onsite field work, letters were sent to local Tribes (including the Duwamish Tribe, Muckleshoot Tribe, Snoqualmie Tribe, Suquamish Tribe, and Tulalip Tribe) to inform the Tribes of the upcoming onsite cultural resource investigation and solicit comments. A representative from the Duwamish Tribe was on site with Perteet during the archaeological field survey.

The onsite investigations were conducted on the project site, including a pedestrian survey of the site and two shovel probe excavations within the proposed building addition development area. Recent fill atop glacial sediment was encountered in both shovel probe locations. Cultural materials were only encounted in one of the shovel probe locations and included modern debris, brick fragments, one non-diagnostic green glass fragment, one non-diagnostic brown glass fragment, charcoal fragments, plastic sheeting fragments and paint/plaster fragments. No potentially significant historic materials were encountered during onsite investigations; historic materials that were encountered were generally modern, non-diagnostic, and limited to fill deposits. No pre-contact cultural materials or features were found during the investigations. No buried soils were encountered; fill was directly atop glacial sediment. Therefore, former ground surfaces with the potential for pre-contact human occupation are unlikely to be extant in the project area.

Since no potentially significant cultural material was observed during field investigations and extant buried surfaces are highly unlikely to be within the project area, there is a low probability for encountering intact pre-contact cultural deposits during ground disturbing activities for the proposed ***John Muir Elementary Early Learning Addition Project***. Further, sediments within the project area are likely to have been extensively disturbed by previous construction activities at the school, and anthropogenic cut and fill modifications.

As a result, no further cultural resource investigations are recommended for the site. Although the likelihood to encounter buried archaeological resources on the site is low, an inadvertent discovery plan (IDP) has been prepared for the project as part of the cultural resources assessment which outlines policies and procedures that would be followed in the event that an inadvertent discovery is encountered during the construction process. In addition, it is recommended that affected Tribes be notified in advance of ground disturbing activities and given the opportunity to observe ground disturbance. Additionally, construction crews should be briefed on the IDP prior to ground disturbance and a copy of the IDP should be available on the site throughout construction (*Perteet, 2023*). See **Appendix F** for details[9].

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

The DAHP website, WISAARD, and City of Seattle Landmarks website were consulted to identify any potential historic or cultural sites in the surrounding area, as well as the potential for encountering archaeological resources in the area.

In addition, a Cultural Resources Assessment was completed for the project (*Perteet, 2023*). The assessment included a summary of the site geology/soils and cultural setting, a discussion of previous cultural resource investigations on the site and in the site vicinity, an onsite investigation including two shovel probe excavations, and a summary of conclusions and recommendations for the project (see **Appendix F** for details[10]).

SPS is also in the process of consultation and review with DAHP as part of the process for Governor's Executive Order 21-02. SPS submitted project information to DAHP for their review and DAHP concluded that the existing building is not eligible for listing in the NRHP and that no historic resources would be impacted by the project (see **Appendix F** for a copy of the letter from DAHP). The Executive Order 21-02 process also includes

[9] The cultural resources assessment is on-file with Seattle Public Schools.
[10] The cultural resources assessment is on-file with Seattle Public Schools.

consultation with local Tribes. Consultation letters were sent to local Tribes on May 30, 2023 via certified mail and email; additional follow up outreach was conducted via phone call messages on June 6, 2023 and June 9, 2023. The Snoqualmie Tribe requested the opportunity to be onsite during ground disturbing activities. The Duwamish Tribe requested that archaeological monitoring occur during ground disturbing activities and the preparation of an IDP. The Suquamish Tribe commented that they did not have any concerns related to the project.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

The cultural resources assessment (*Perteet, 2023*) included the preparation of an IDP which identifies policies and procedures that would be followed in the event of an inadvertent discovery, including contacts with local Tribes. Construction crews should be briefed on the IDP prior to ground disturbance and a copy of the IDP should be available on the site throughout construction The cultural resources assessment also recommended that local Tribes be notified in advance of ground disturbance activities for the project in order to allow them the opportunity to observe ground disturbance construction activities.

14. Transportation

A Transportation Technical Report (*Heffron Transportation, Inc., 2023*) has been prepared for the proposed project and the results of the report are summarized in this section. For further details on the Transportation Technical Report, please refer to **Appendix G** of this Checklist.

It should be noted that while the Transportation Technical Report provides an analysis of parking with the project, the State of Washington recently adopted SEPA-related amendments on January 20, 2023 which removed parking as an element of the environment in WAC 197-11-444(2)(c)(iv), as well as the removal of parking-related question from the environmental checklist in WAC 197-11-960(B)(14)(c). Pursuant to these amendments, the City of Seattle will no longer identify and analyze parking impacts in its SEPA analysis.

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

The John Muir Elementary campus is bounded on the north by S Horton Street, on the east by 34th Avenue S, on the south by a Seattle Park known as York Playground, and on the west by private residential properties. The existing school building is located at the northern half of the site; there are two portables located at the southwest corner of the

site.

The school has an on-site parking lot with 18 striped stalls located at the northwest corner of the site and accessed from one driveway on S Horton Street just east of the S McClintock Avenue / S Walden Street intersection. There is a small service/delivery area on the east side of the main school building where trash and recycling bins are stored and accessed from a curb-cut on 34th Avenue S. There is a gated driveway on 34th Avenue S that provides maintenance access to the hard-surface playground on the south portion of the site.

School-bus load/unload occurs on the west side of 34th Avenue S south of S Horton Street. There is a school load zone for automobiles adjacent to the site on the south side of S Horton Street west of 34th Avenue S.

The project is expected to modify the eastern end of the on-site parking lot for accessibility needs, which would result in the loss of two on-site parking stalls—reducing from 18 to 16. The project would also make frontage, accessibility, and curb ramp improvements along S Horton Street as required by the City through the Street Improvement Permit (SIP) process. No other changes are proposed with this project that would affect the overall site, assembly spaces, buildings, or the site access driveways. The school-bus load/unload zones adjacent to the school on 34th Avenue E would remain and no changes to the number of school buses is anticipated (see **Appendix G** for further details).

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

King County Metro Transit (Metro) and Sound Transit provide public transit service to the site vicinity. The closest bus stops are located about 700 feet to the southwest of the school site on Rainier Avenue S immediately south of the S Walden Street intersection. The stops (for northbound and southbound buses) are served by Metro Route 7, which provides all-day service seven days per week between Rainier Beach and Downtown Seattle with weekday headways (time between consecutive buses) of 7 to 10 minutes. The school is also located within one-half mile of Sound Transit's McClellan Station with existing light rail service between Des Moines and Northgate.

School bus transportation is made available to John Muir Elementary students who qualify for transportation. The existing school is served by one smaller SPED bus and one Head Start bus (see **Appendix G** for details).

c. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle, or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

The project would make frontage, accessibility, and curb ramp improvements along S Horton Street as required by the City of Seattle through the SIP process.

d. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The project would not use or occur in the immediate vicinity of water or air transportation. However, the school is also located within one-half mile of Sound Transit's McClellan Station with existing light rail service between Des Moines and Northgate. Some school employees or visitors may use light rail to access the site vicinity.

e. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

The traffic analysis conducted for this SEPA Checklist reflected conditions with the early learning classroom addition and increased enrollment capacity up to 382 students (a net increase of 40 students compared to the school's current capacity. Based on daily trip generation rates published for elementary schools by the Institute of Transportation Engineers and adjusted based on peak period counts at and around the John Muir Elementary site, the added capacity is expected to generate a net increase of about 120 trips per day (60 in, 60 out). The peak traffic volumes would continue to occur in the morning just before classes begin (between 7:30 and 8:30 a.m.) and in the afternoon around dismissal (between 2:15 and 3:15 p.m.).

In spring 2023, the school was served by one smaller special education (SPED) bus and one Head Start bus; no change to the number of buses is anticipated. Other truck trips expected to continue serving the site include deliveries of food and supplies, trash and recycling pick-up, and occasional maintenance. Overall, school buses and small trucks likely represent about 1or 2% of the total daily traffic.

For more information about the anticipated school traffic generation, refer to **Appendix G**.

f. Will the proposal interfere with, affect, or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

The proposal would not interfere with the movement of agricultural or forest products on streets in the area because no agricultural or working forest lands are located within the vicinity of the project site.

g. Proposed measures to reduce or control transportation impacts, if any.

The additional peak hour trips expected to be generated by the proposed project are expected to add negligible delay (less than two seconds) to the study area intersections and are not expected to change the overall level of service at any of the analysis intersections. All would continue to operate at LOS C or better overall with the project during both analysis periods. The site access driveway is forecast to continue operating at LOS A overall with all movements operating at LOS B or better with the project during both peak hours.

At the proposed enrollment capacity of 382 students, school-day parking demand may increase by 13 vehicles. On-street parking within the site vicinity was 60% occupied on school days with more than 275 unused parking spaces. With the potential increase in school-generated demand, overall school-day utilization is expected to remain below 65% with the project.

The proposed ***John Muir Elementary Early Learning Addition Project*** would not result in significant adverse impact to the transportation system in the site vicinity. The school will be in session during construction; therefore, the following measure will be implemented to reduce the short-term construction-related traffic and parking impacts of the project.

- **Construction Transportation Management Plan (CTMP):** The District will require the selected contractor to develop a CTMP that addresses traffic and pedestrian control during construction of the classroom addition. It will define truck routes, lane closures, walkway closures, and parking or load/unload area disruptions, as necessary. To the extent possible, the CTMP will direct trucks along the shortest route to arterials and away from residential streets to avoid unnecessary conflicts with resident and pedestrian activity. To the extent possible, truck movements (including earthwork transport and deliveries of materials to the site) will not occur during morning arrival or afternoon dismissal periods for the school. The CTMP could also include measures to keep adjacent streets clean on a daily basis at the truck exit points (such as street sweeping or on-site truck wheel cleaning) to reduce tracking dirt offsite (see **Appendix G** for details).

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

While the ***John Muir Elementary Early Learning Addition Project*** would result in increased student capacity at the school, it is not anticipated to generate a significant increase in the need for public services. To the extent that emergency service providers have planned for gradual increases in service demands, no significant impacts are anticipated.

b. Proposed measures to reduce or control direct impacts on public services, if any.

The increase in capacity of the school and number of students and staff on the site may result in incrementally greater demand for emergency services; however, it is anticipated that adequate service capacity is available within the Mount Baker neighborhood to preclude the need for additional public facilities/services.

16. Utilities

a. Circle utilities currently available at the site: <u>electricity</u>, natural gas, <u>water</u>, <u>refuse service</u>, <u>telephone</u>, <u>sanitary sewer</u>, septic system, other:

All utilities that are underlined above currently available at the site. There is currently no existing natural gas service for the existing John Muir Elementary building.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The proposed ***John Muir Elementary Early Learning Addition Project*** would continue to utilize the existing utilities as noted below:

- Electrical (Seattle City Light) – Existing electrical service is provided from an underground feed that originates from a utility pole that is located on the eastside of the 34th Avenue S right-of-way. There are no proposed changes to the existing electrical service connections for the site.
- Water (Seattle Public Utilities) – The existing water service to the site is provided through a four-inch service connection and a two-inch service connection, both of which are provided from the existing eight-inch water main that is located within the 34th Avenue S right-of-way. The existing fire sprinkler room for the school would be relocated within the proposed building addition on the east side of the building, adjacent to the proposed loading dock.

- Sewer (Seattle Public Utilities) – The existing building is served by a 24-inch public sanitary sewer main line system that runs diagonally through the site to the southeast of the existing school building. There are multiple existing sanitary side sewer connections to the 24-inch main line. Sewer service for the proposed building addition would be extended from the existing building and no new connections to the 24-inch sewer main are proposed as part of the project.
- Refuse Service (Seattle Public Utilities/Waste Management Northwest) – Seattle Public Utilities, through a contract with Waste Management Northwest, provides refuse service for the south Seattle area, including the project site, and would continue to provide service.
- Telecommunications – Telecommunications services would remain for the existing building and also serve the proposed building addition.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Matisia Hollingsworth 07/27/28

Type name of signee: Matisia Hollingsworth

Position and agency/organization: Project Manager, Seattle Public Schools

Date submitted: 7/28/2023

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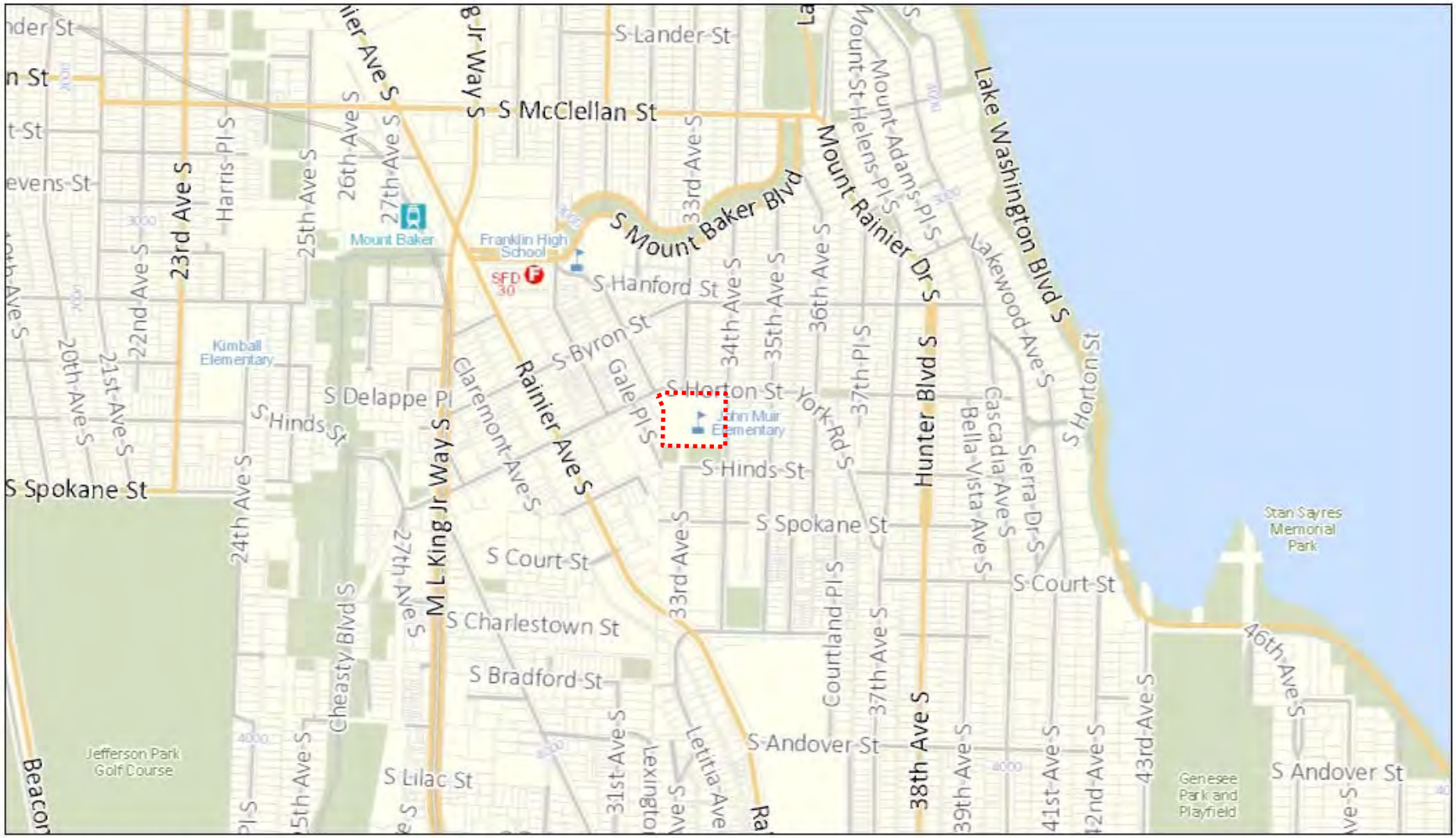
John Muir Elementary Early Learning Addition Project
Environmental Checklist



Project Site

Note: This figure is not to scale.

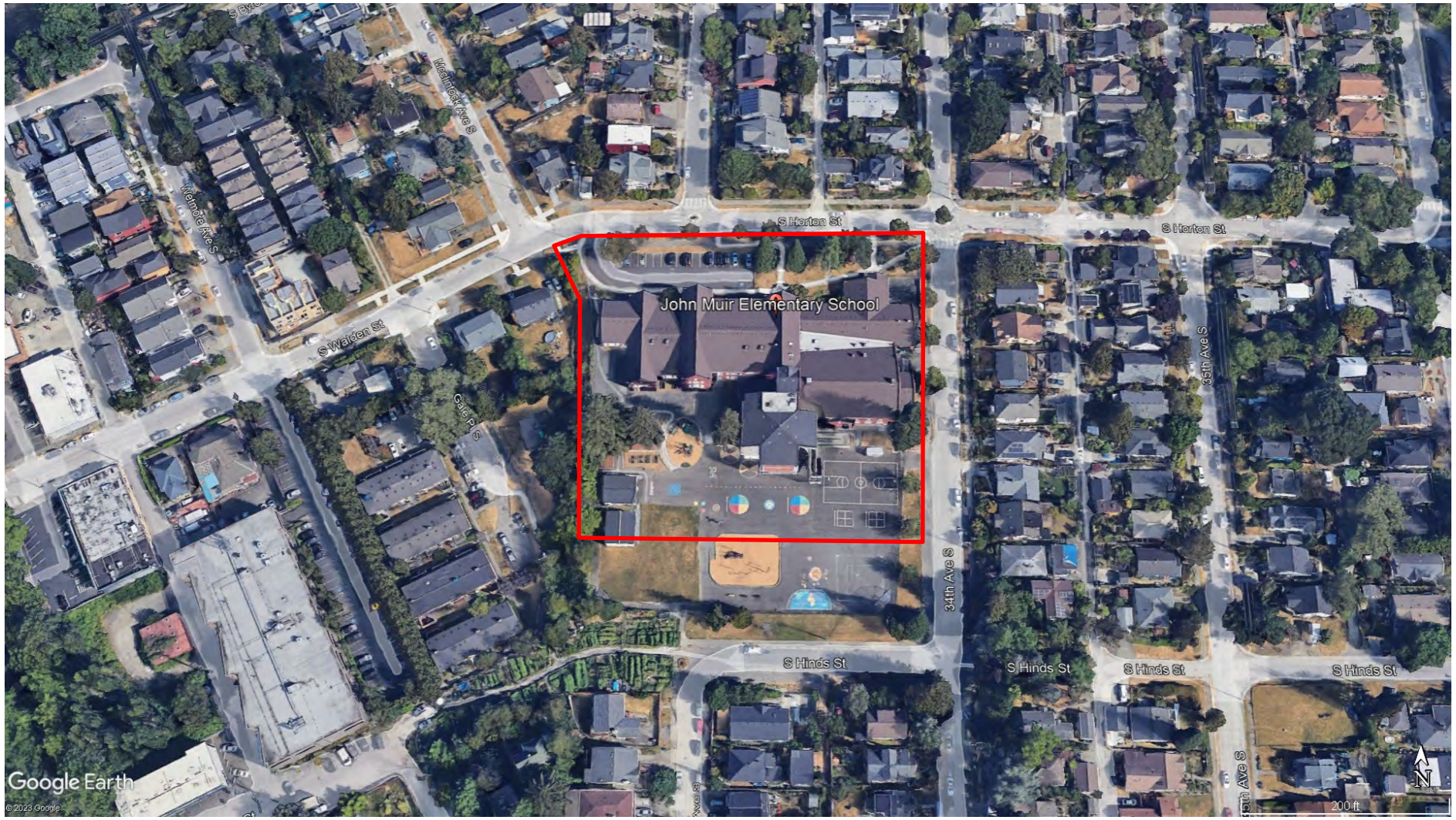
North

Source: City of Seattle and EA Engineering, 2023.

EA Engineering, Science, and Technology, Inc., PBC

Figure 1

Vicinity Map



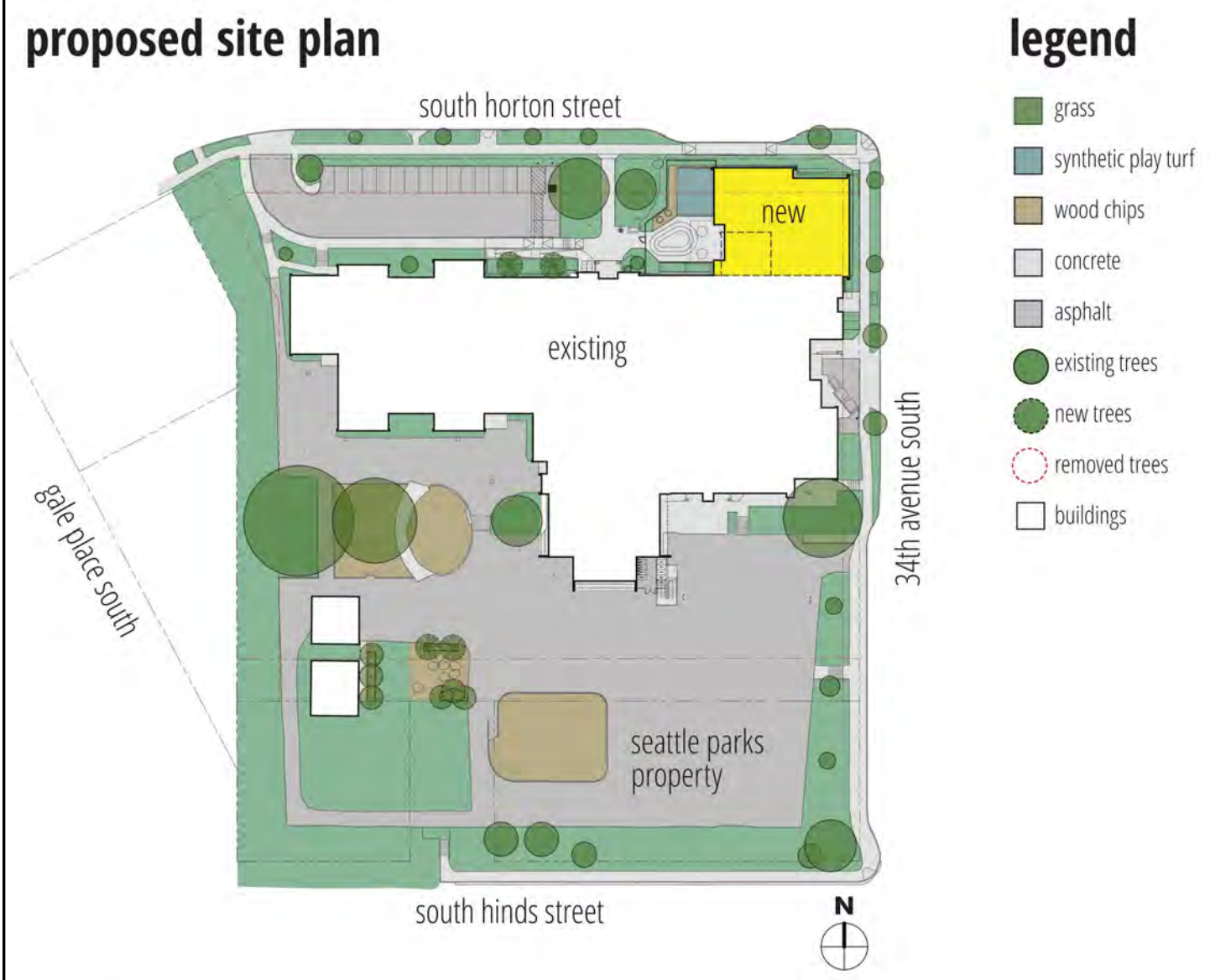
Project Site

Source: Google Earth and EA Engineering, 2023.

EA Engineering, Science, and Technology, Inc., PBC

Figure 2

Aerial Map



Note: This figure is not to scale.

Source: Anjali Grant Design, 2023.

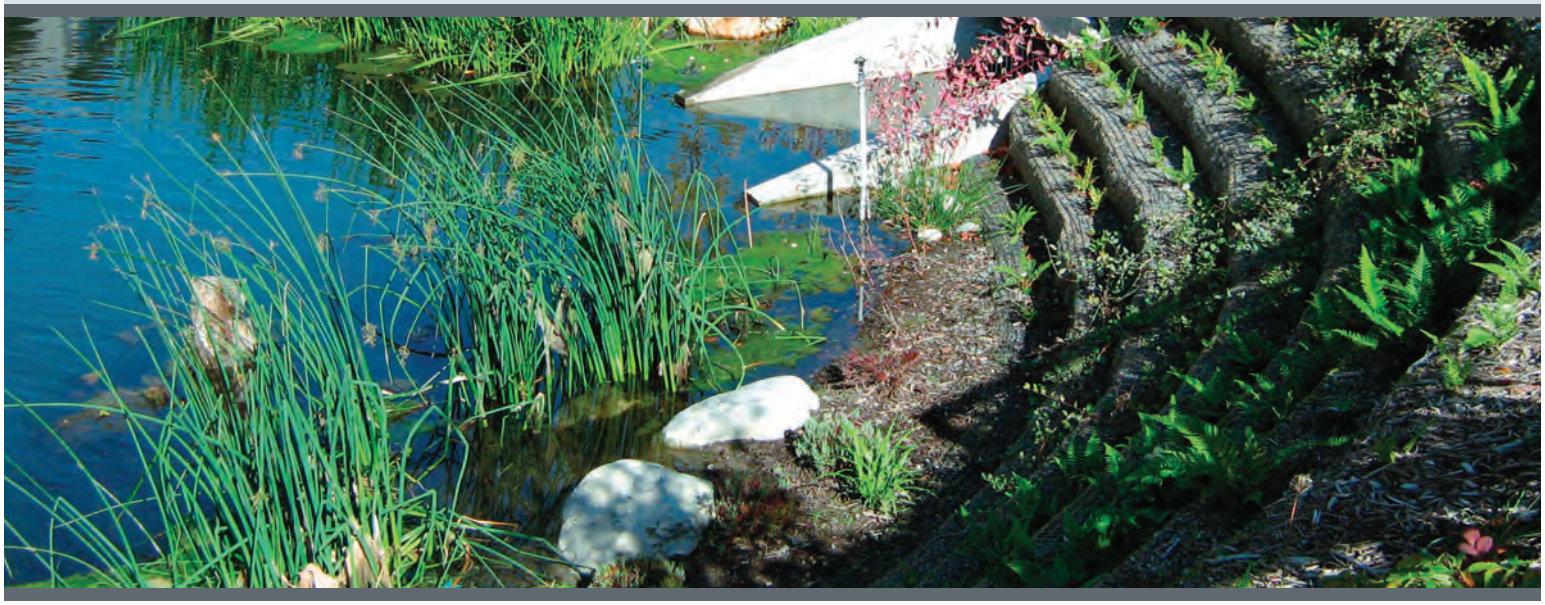
EA Engineering, Science, and Technology, Inc., PBC

Figure 3
Site Plan

APPENDIX A

Geotechnical Report

associated
earth sciences
incorporated



Subsurface Exploration, Geologic Hazard,
and Geotechnical Engineering Report

JOHN MUIR ELEMENTARY SCHOOL EARLY LEARNING ADDITION

Seattle, Washington

Prepared For:

SEATTLE SCHOOL DISTRICT NO. 1

Project No. 20220317E001
December 16, 2022

Associated Earth Sciences, Inc.

www.aesgeo.com

Kirkland | Mount Vernon | Tacoma

December 16, 2022
Project No. 20220317E001

Seattle School District No. 1
2445 3rd Avenue South
Seattle, Washington 98134

Attention: Matisia Hollingsworth

Subject: Subsurface Exploration, Geologic Hazard, and Geotechnical Engineering Report
John Muir Elementary School Early Learning Addition
3301 South Horton Street
Seattle, Washington

Dear Ms. Hollingsworth:

We are pleased to present this copy of our geotechnical engineering report for the referenced project. This report summarizes the results of our subsurface exploration, geologic hazard, and geotechnical engineering evaluation, and offers recommendations for the design and development of the proposed project. Project plans were in the conceptual phase at the time this report was prepared. We recommend that we be allowed to review the recommendations contained in this report and modify them, if necessary, once project plans have been finalized.

We have enjoyed working with you on this study and are confident that the recommendations presented in this report will aid in the successful completion of your project. If you should have any questions, or if we can be of additional help to you, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Kurt D. Merriman, P.E.
Senior Principal Engineer

KDM/ld - 20220317E001-002

SUBSURFACE EXPLORATION, GEOLOGIC HAZARD, AND GEOTECHNICAL ENGINEERING REPORT

JOHN MUIR ELEMENTARY SCHOOL EARLY LEARNING ADDITION

Seattle, Washington

Prepared for:
Seattle School District No. 1
2445 3rd Avenue South
Seattle, Washington 98134

Prepared by:
Associated Earth Sciences, Inc.
911 5th Avenue
Kirkland, Washington 98033
425-827-7701

December 16, 2022
Project No. 20220317E001

I. PROJECT AND SITE CONDITIONS

1.0 INTRODUCTION

This report presents the results of Associated Earth Sciences, Inc.'s (AESI's) subsurface exploration, geologic hazard analysis, geotechnical engineering, and stormwater infiltration feasibility evaluation for the proposed addition to the existing John Muir Elementary School in Seattle, Washington. Our recommendations are preliminary in that the project is still in the design phase. Our current understanding of the project is based on our review of the John Muir Draft Master Plan prepared by Mahlum Architects, dated February 2022. The site location is shown on the "Vicinity Map," Figure 1. The approximate locations of explorations completed for this study relative to existing and proposed site features are shown on the "Existing Site and Exploration Plan," Figure 2, and the "Proposed Site and Exploration Plan," Figure 3. Interpretive exploration logs of subsurface explorations completed for this study are included in Appendix A.

1.1 Purpose and Scope

The purpose of this study was to provide subsurface data and geotechnical engineering design recommendations to be utilized in the development and design of the project. Our study included reviewing available geologic literature, advancing four exploration borings, and performing geologic studies to assess the type, thickness, distribution, and physical properties of the subsurface sediments and shallow groundwater at the site. Geotechnical engineering studies were completed to formulate recommendations for site preparation, temporary cut slopes, erosion control, structural fill, foundations, seismic site class, floor slabs, site drainage, and infiltration feasibility. This report summarizes our current fieldwork and offers recommendations based on our present understanding of the project. We recommend that we be allowed to review the recommendations presented in this report and revise them, if needed, when a project design has been finalized.

1.2 Authorization

Authorization to proceed with this study was granted by means of a Contract for Consulting Services (Contract No. P2029) issued by Seattle School District No. 1 and executed on October 4, 2022. Our study was accomplished in general accordance with our proposal, dated September 20, 2022. This report has been prepared for the exclusive use of Seattle School District No. 1 and their agents, for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering and engineering geology practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

2.0 PROJECT AND SITE DESCRIPTION

The project site is located at the existing John Muir Elementary School in Seattle, Washington. Based on information contained in the Draft Master Plan, we understand the existing school site dates back to 1903, with building additions constructed in 1903, 1910, and 1924 which have since been demolished. The existing school building as it remains today consists of a three-story structure built in 1971 and a one- and two-story structure built in 1991, both of which were constructed as additions. The site is approximately 2.75 acres composed of two primary areas. The southern portion of the site is relatively flat and occupied by an existing asphalt playground. The existing playground is partly owned by Seattle School District No. 1 and partly owned by Seattle Parks and Recreation. The northern portion of the site is also relatively flat and is occupied by the existing school building.

The site is bordered to the north by South Horton Street, to the east by 34th Avenue South, to the south by South Hinds Street, and to the west by existing single-family residences. The topography at the site generally slopes down to the southwest with an overall vertical relief of approximately 10 to 12 feet.

We understand that the proposed site improvements are focused on the northeast corner of the school building which include a partial demolition and modernization of the existing building, a new single-story building addition totaling about 4,500 square feet, a new outdoor play area totaling approximately 2,500 square feet, utility improvements, and frontage street improvements consisting of new curb ramps. The project also includes a third-floor interior classroom at the south-central portion of the school building; however, we understand that no additions are proposed in this area that would warrant a geotechnical evaluation.

3.0 HISTORICAL EXPLORATIONS BY OTHERS

We reviewed subsurface data available on the Washington State Department of Natural Resources (DNR) Geologic Information Portal. Our search of the referenced database provided two references for historical explorations completed by others at the project site, as discussed below.

In 1989, Converse Consultants Northwest completed a subsurface exploration program onsite including nine exploration borings (B-1 through B-9, see Figure 2) ranging from approximately 8 to 23 feet in depth. The exploration borings encountered existing medium dense fill up to approximately 11 feet thick in seven of the nine borings. Underlying the fill where it was present, borings encountered very dense lodgement till and glacial lacustrine sediments. One of the borings from this study, boring B-1, is located within the southern footprint of the planned building improvements and encountered fill to a depth of 2 feet underlain by dense to very dense

glaciolacustrine sediments and glacial till. Copies of the exploration logs are attached in Appendix B.

In 1970, Herman Adalist & Associates, Inc. advanced two exploration borings (TH-1 and TH-2, see Figure 2) on the school property near the center and south end of the existing school building. TH-1 and TH-2 were terminated at depths of 16.5 and 12.5 feet, respectively, and encountered surficial fill underlain by dense grading to very dense silty gravelly sand identified as glacial till. No groundwater was reported. Copies of the exploration logs are attached in Appendix B.

4.0 SUBSURFACE EXPLORATION

Our field studies were conducted for this project in November 2022 and included advancing four exploration borings (EB-1 through EB-4) in the vicinity of the proposed school addition (see Figures 2 and 3). The conclusions and recommendations presented in this report are based, in part, on the explorations completed for this study. The number, locations, and depths of the explorations were completed within site and budgetary constraints. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between field explorations is necessary. It should be noted that differing subsurface conditions may be present due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of variations between the field explorations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

4.1 Exploration Borings

The exploration borings were completed by Geologic Drill Partners, Inc., an independent firm working under subcontract to AESI, at the locations shown on Figures 2 and 3. The borings were completed by advancing a 6-inch outside-diameter, hollow-stem auger with a track-mounted drill rig. During the drilling process, samples were obtained at generally 2.5-to 5-foot-depth intervals. After completion of drilling, each borehole was backfilled with bentonite chips, and the surface was patched with the excavated soil in landscape areas and with asphalt cold patch in pavement areas.

Disturbed but representative samples were obtained by using the Standard Penetration Test (SPT) procedure. This test and sampling method consists of driving a 2-inch outside-diameter, split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance (“N”) or blow count. If a total of 50 is recorded within one 6-inch interval, the blow count is recorded as the number of blows for the corresponding number of inches of penetration.

The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils; these values are plotted on the attached exploration boring logs.

The exploration borings were continuously observed and logged by a geologist from our firm. The samples obtained from the split-barrel sampler were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification and laboratory testing, as necessary. The exploration logs presented in Appendix A are based on the N-values, field observations, and drilling action.

5.0 SUBSURFACE CONDITIONS

Subsurface conditions at the project site were inferred from the field explorations accomplished for this study, our visual reconnaissance of the site, and review of selected geologic literature. The various types of sediments, as well as the depths where the characteristics of the sediments changed, are indicated on the exploration logs presented in Appendix A. The depths indicated on the logs where conditions changed may represent gradational variations between sediment types. If changes occurred between sample intervals in our exploration borings, they were interpreted.

The exploration borings completed for our study generally encountered existing fill soils overlying Vashon lodgement till. The following section presents more detailed subsurface information organized from the shallowest (youngest) to the deepest (oldest) sediment types.

5.1 Site Stratigraphy

Asphalt

Asphalt was encountered at the surface of exploration EB-3. The asphalt layer was approximately 3 inches in thickness. This asphalt will likely be removed during the construction phase of the project.

Sod/Topsoil

Organic-rich brown to dark brown topsoil and grass were encountered at the ground surface in explorations EB-1, EB-2, and EB-4. The observed sod/topsoil thickness was approximately 3 inches at these locations. Due to the abundance of organic content, this material is not suitable for building or slab-on-grade support or reuse as structural fill.

Fill

Directly below the asphalt and sod/topsoil, we encountered fill soils (those not naturally placed) in all explorations to depths ranging from about 2 to 3 feet below the existing ground surface. The fill generally consisted of medium dense to dense, moist, dark brown, silty, fine to medium sand with variable gravel content and scattered organics (roots/rootlets), transitioning to a moist brown to tannish gray silty fine to medium sand with some gravel and organics becoming thinner with depth.

Due to the inherent variability of the fill and unknown placement and compaction methods, the fill soils are not considered suitable for direct foundation support and may require remedial measures for support of new pavements, hardscapes, and slabs-on-grade. Excavated fill material may be suitable for reuse in structural fill applications if such reuse is specifically allowed by project plans and specifications, if excessively organic and any other deleterious materials are removed, and if moisture content is adjusted to allow compaction to the specified level and to a firm and unyielding condition. Fill soils are also likely present in unexplored areas of the site near the existing buildings, within existing utility trenches, and below previously graded/backfilled areas. Existing fill is not suitable for infiltration of stormwater runoff.

Vashon Lodgement Till

Directly below the fill soils within all explorations, we encountered dense to very dense, slightly moist, tannish gray to gray silty fine sand, with trace to some gravel to the termination depth of all borings (8 to 11 feet). We interpreted these sediments to be representative of Vashon lodgement till. The Vashon till was deposited by basal, debris-laden, glacial ice during the Vashon Stade of the Fraser Glaciation, approximately 12,500 to 15,000 years ago. The high relative density characteristic of the Vashon lodgement till is due to its consolidation by the massive weight of the glacial ice from which it was deposited. Consequently, lodgement till soils are typically dense to very dense and possess high shear strength and low-compressibility and low-permeability characteristics.

The lodgement till soils are favorable for support of foundations, floor slabs, and pavements, with proper preparation. Lodgement till soils are generally suitable for structural fill applications provided that these materials are placed and compacted at or near optimum moisture content. Lodgement till is not considered a suitable receptor for infiltration due to its high density and silt content.

5.2 Regional Geologic and Soils Mapping

Review of the regional geologic map of the project area (*The Geologic Map of Seattle – A Progress Report,* U.S. Geological Survey (USGS), Open-File Report OF-2005-1252, 1:24,000 scale [2005])

indicates that the surficial geology at the site consists of Vashon lodgement till. The geologic map is in general agreement with the subsurface conditions encountered in our explorations as lodgement till was observed directly below the existing fill in all our explorations completed for this study.

Review of the U.S. Department of Agriculture (USDA), Soils Conservation Service (SCS), now referred to as Natural Resources Conservation Service (NRCS), web soil survey indicates that the subject site is underlain predominately by Urban land-Alderwood complex soils. The Urban land-Alderwood complex soils are derived from glacial drift (lodgement till) and/or glacial outwash over dense glaciomarine deposits. Our explorations are in general agreement with the soils mapping.

5.3 Hydrology

No groundwater seepage was encountered within any of the borings advanced for this study at the time of drilling (November 2022); however, it is common to have thin zones of perched groundwater within existing fill soils just above the contact with the underlying dense lodgement till. Perched groundwater occurs when surface water infiltrates down through relatively permeable soils, such as existing fill or coarser-grained natural soils, and becomes trapped or "perched" atop a comparatively low-permeability barrier, such as silty unweathered till. When the water becomes perched, it may travel laterally and follow flow paths related to ground surface topography.

Although groundwater was not encountered during our exploration, it should be noted that the occurrence and level of groundwater seepage below the site may vary in response to such factors as changes in season, amounts of precipitation, changes in site use, and other on- and off-site factors.

5.4 Laboratory Testing

AESI performed two grain-size analyses (sieves) on representative samples of the existing fill and the Vashon lodgement till sediments collected from EB-1 at depths of about 1 foot and 7.5 feet, respectively. The grain-size analysis test results are summarized in Table 1 below (and attached in Appendix C) with soil descriptions based on the ASTM D-2487 Unified Soil Classification System (USCS).

Table 1
Summary of Grain-Size Analyses

Exploration Boring No.	Sample Depth (feet)	Geologic Unit	USCS Soil Description	Fines Content (%)
EB-1	1	Existing Fill	Gravelly silty SAND (SM)	25.3
EB-1	7.5	Vashon Lodgement Till	Very sandy SILT, trace gravel (ML)	56.9

USCS = Unified Soil Classification System
% = percent of total weight passing the U.S. No. 200 Sieve

II. GEOLOGIC HAZARDS AND MITIGATIONS

The following discussion of potential geologic hazards is based on the geologic, slope, and ground and surface water conditions, as observed and discussed herein. The discussion will be limited to landslide, seismic, and erosion hazards. Individual geologic hazard topics are discussed in further detail below.

6.0 LANDSLIDE HAZARDS AND MITIGATIONS

Chapter 25.09 of the *Seattle Municipal Code* (SMC) provides definitions and regulations regarding environmentally critical areas (ECAs) with respect to landslide hazards. The SMC separates landslide hazard ECAs into three main categories: Steep Slope ECA, Potential Slide ECA, and Known Slide ECA. Based on our review of the Seattle Department of Construction and Inspections (SDCI) Geographic Information System (GIS) portal, there are no mapped Potential Slide or Known Slide ECAs at the project site or vicinity; however, the site is mapped as having a Steep Slope ECA along the western property boundary of the school property, approximately 300 feet west of the proposed school addition. This slope is estimated to have a maximum height of about 14 feet and descends to the west toward neighboring residential properties. Based on nearby historical exploration boring B-7 (performed by Converse Consultants NW in 1989, see Figure 2 and Appendix B), it appears the western margin of the site was filled to achieve final site grades which suggests this slope was created as a result of previous legal grading activities. Based on our visual reconnaissance of the site, the steep slope along the western property boundary appears to have performed well with no visual indication of accelerated erosion or instability. We did not observe any other landslide hazard ECAs in the vicinity of the proposed school addition.

Since the proposed school addition is located at the northeast corner of the property, approximately 300 feet east of the Steep Slope ECA, and will not alter the existing conditions of the slope or impose any additional loads at the top of the slope, it is our opinion that no mitigation measures are necessary for this project. No detailed quantitative slope stability assessment was completed as part of this study, and none is warranted to support the project as currently proposed, in our opinion.

7.0 SEISMIC HAZARDS AND MITIGATIONS

The following discussion is a general assessment of seismic hazards that is intended to be useful to the project design team in terms of understanding seismic issues, and to the structural engineer for design.

All of Western Washington is at risk of strong seismic events resulting from movement of the tectonic plates associated with the Cascadia Subduction Zone (CSZ), where the offshore Juan de Fuca plate subducts beneath the continental North American plate. The site lies within a zone of strong potential shaking from subduction zone earthquakes associated with the CSZ. The CSZ can produce earthquakes up to magnitude 9.0, and the recurrence interval is estimated to be on the order of 500 years. Geologists infer the most recent subduction zone earthquake occurred in 1700 (Goldfinger et al., 2012[1]). Three main types of earthquakes are typically associated with subduction zone environments: crustal, intraplate, and interplate earthquakes. Seismic records in the Puget Sound region document a distinct zone of shallow crustal seismicity (e.g., the Seattle Fault Zone [SFZ]). These shallow fault zones may include surficial expressions of previous seismic events, such as fault scarps, displaced shorelines, and shallow bedrock exposures. The shallow fault zones typically extend from the surface to depths ranging from 16 to 19 miles. A deeper zone of seismicity is associated with the subducting Juan de Fuca plate. Subduction zone seismic events produce intraplate earthquakes at depths ranging from 25 to 45 miles beneath the Puget Lowland including the 1949, 7.2-magnitude event; the 1965, 6.5-magnitude event; and the 2001, 6.8-magnitude event) and interplate earthquakes at shallow depths near the Washington coast including the 1700 earthquake, which had a magnitude of approximately 9.0. The 1949 earthquake appears to have been the largest in this region during recorded history and was centered in the Olympia area. Evaluation of earthquake return rates indicates that an earthquake of the magnitude between 5.5 and 6.0 is likely within a given 20-year period.

Generally, there are four types of potential geologic hazards associated with large seismic events: 1) surficial ground rupture, 2) seismically induced landslides or lateral spreading, 3) liquefaction, and 4) ground motion. The potential for each of these hazards to adversely impact the proposed project is discussed below.

7.1 Surficial Ground Rupture

Seattle Fault Zone

The site is located within the mapped limits of the SFZ. The SFZ is a broad east-west oriented zone that extends from approximately Issaquah to Alki Beach, and is approximately 2.5 to 4 miles in width from north to south. The SFZ is speculated to contain multiple distinct fault "strands," some of which are well understood and some of which may be poorly understood or unknown. Mapping of individual fault strands is imprecise, as a result of pervasive modification of the land surface by development, which has obscured possible surficial expression of past seismic events. Studies by the USGS and others have provided evidence of surficial ground rupture along strands

[1] Goldfinger, C., Nelson, C.H., Morey, A.E., Johnson, J.E., Patton, J.R., Karabanov, E., Gutierrez-Pastor, J., Eriksson, A.T., Gracia, E., Dunhill, G., Enkin, R.J, Dallimore, A., and Vallier, T., 2012, *Turbidite Event History—Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone*: U.S. Geological Survey Professional Paper 1661–F, 170.

of the SFZ (USGS, 2010[2]; Pratt et al., 2015[3]; Haugerud, 2005[4]; Liberty et al., 2008[5]). According to USGS studies the latest movement of this fault was about 1,100 years ago when about 20 feet of surficial displacement took place. This displacement can presently be seen in the form of raised, wave-cut beach terraces along Alki Point in West Seattle and Restoration Point at the south end of Bainbridge Island. Based on our review of the DNR website, inferred fault traces associated with the SFZ are located about 0.2 miles north and 3 miles south of the site. Due to the suspected long recurrence interval, and the distance of the site to the fault traces, the potential for surficial ground rupture along the SFZ is considered to be low during the expected life of the proposed addition.

7.2 Seismically Induced Landslides

Similar to the discussion in Section 6.0, "Landslide Hazards and Mitigations," it is our opinion that the potential risk of damage to the proposed improvements by seismically induced slope failures is low and that no mitigation measures are warranted for the project due to the lack of steep slopes in the immediate project area.

7.3 Liquefaction

Liquefaction is a process through which unconsolidated soil loses strength as a result of vibrations, such as those which occur during a seismic event. During normal conditions, the weight of the soil is supported by both grain-to-grain contacts and by the fluid pressure within the pore spaces of the soil below the water table. Extreme vibratory shaking can disrupt the grain-to-grain contact, increase the pore pressure, and result in a temporary decrease in soil shear strength. The soil is said to be liquefied when nearly all of the weight of the soil is supported by pore pressure alone. Liquefaction can result in deformation of the sediment and settlement of overlying structures. Areas most susceptible to liquefaction include those areas underlain by very soft to stiff, non-cohesive silt and very loose to medium dense, non-silty to silty sands with low relative densities, accompanied by a shallow water table.

The western margin of the school property is identified as a potential Liquefaction Hazard ECA by the SDCI GIS portal, approximately 250 feet west of the proposed school addition. The shallow sediments below the proposed school addition were observed to be unsaturated and consisted

[2] U.S. Geological Survey, 2010, *Quaternary Fault and Fold Database for the United States*, accessed November 10, 2010, from USGS web site: http://earthquake.usgs.gov/hazards/qfaults/.

[3] Pratt et al., 2015, *Kinematics of Shallow Backthrusts in the Seattle Fault Zone, Washington State*: Geosphere, v. 11, no. 6, p. 1-27).

[4] Haugerud, R.A., 2005, *Preliminary Geologic Map of Bainbridge Island, Washington*: U.S. Geological Survey Open-File Report 2005-1387, version 1.0, 1 sheet, scale 1:24,000.

[5] Liberty, Lee M.; Pratt, Thomas L., 2008, *Structure of the Eastern Seattle Fault Zone, Washington State - New Insights from Seismic Reflection Data*: Bulletin of the Seismological Society of America, v. 98, no. 4, p. 1681-1695.

of dense to very dense lodgement till soils which are not expected to be prone to liquefaction due to their high relative density and absence of shallow groundwater. In our opinion, the potential risk of damage to the proposed school addition by liquefaction is low. No detailed liquefaction hazard analysis was performed as part of this study, and none is warranted, in our opinion.

7.4 Ground Motion/Seismic Site Class (2018 *International Building Code*)

It is our opinion that earthquake damage to the proposed school addition, when founded on suitable bearing strata in accordance with the recommendations contained herein, will likely be caused by the intensity and acceleration associated with the event. We anticipate that structural design of the building will follow the 2018 *International Building Code* (IBC) standards. Based on the subsurface conditions encountered within our exploration borings, we recommend using Site Class "C" as defined in Table 20.3-1 of American Society of Civil Engineers (ASCE) 7-16 *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*.

8.0 EROSION CONTROL

The sediments underlying the site generally consist of sand with varying amounts of silt. These sediments will be susceptible to erosion and off-site sediment transport when exposed during construction. Therefore, the project should follow best management practices (BMPs) to mitigate erosion hazards and potential for off-site sediment transport. To mitigate the potential for off-site sediment transport, we recommend the following:

1. Construction activity should be scheduled or phased as much as possible to reduce the amount of earthwork activity that is performed during the winter months. It should be noted that the City of Seattle has implemented a grading season moratorium period between November 1 and March 31. Any grading proposed outside of the moratorium period requires authorization through a grading season extension application.

2. The winter performance of a site is dependent on a well-conceived plan for control of site erosion and stormwater runoff. The project temporary erosion and sediment control (TESC) should include ground-cover measures, access roads, and staging areas. The contractor must implement and maintain the required measures.

3. TESC measures for a given area, to be graded or otherwise worked, should be installed prior to any activity within that area. The recommended sequence of construction within a given area would be to install sediment traps and/or ponds and establish perimeter flow control prior to starting earthwork.

4. During the wetter months of the year, or when large storm events are predicted during the summer months, each work area should be stabilized so that if precipitation occurs, the work area can receive the rainfall without excessive erosion or sediment transport. The required measures for an area to be "buttoned-up" will depend on the time of year and the duration the area will be left unworked. During the winter months, areas that are to be left unworked for more than 2 days should be mulched or covered with plastic. During the summer months, stabilization will usually consist of seal-rolling the subgrade. Such measures will aid in the contractor's ability to get back into a work area after a storm event. The stabilization process also includes establishing temporary stormwater conveyance channels through work areas to route runoff to the approved treatment facilities.

5. All disturbed areas should be revegetated as soon as possible. If it is outside of the growing season, the disturbed areas should be covered with mulch, or as recommended in the erosion control plan. Straw mulch provides a cost-effective cover measure and can be made wind-resistant with the application of a tackifier after it is placed.

6. Surface runoff and discharge should be controlled during and following development. Uncontrolled discharge may promote erosion and sediment transport.

7. Soils that are to be reused around the site should be stored in such a manner as to reduce erosion from the stockpile. Protective measures may include, but are not limited to, covering with plastic sheeting, the use of low stockpiles in flat areas, or the use of straw bales/silt fences around pile perimeters. During the local wet season period, between November 1 and March 31, these measures are required.

It is our opinion that with the proper implementation of the TESC plans and by field-adjusting appropriate mitigation elements (BMPs) throughout construction, the potential for adverse impacts from erosion hazards on the project may be mitigated.

III. DESIGN RECOMMENDATIONS

9.0 INTRODUCTION

Our explorations indicate that, from a geotechnical engineering standpoint, the proposed project is feasible provided the recommendations contained herein are properly followed. At the locations explored, we encountered a surficial horizon of existing fill ranging in thickness from about 2 to 3 feet, underlain by native Vashon lodgement till soils consisting of dense to very dense silty sand. The Vashon lodgement till soils will provide suitable support for conventional spread and strip footings. The existing fill soils are not considered suitable for direct foundation support and may require remedial measures for support of new pavements, hardscapes, and slabs-on-grade.

The following sections provide our recommendations for site preparation, temporary and permanent slopes, structural fill, foundation support, drainage considerations, and slab-on-grade support.

10.0 SITE PREPARATION

Erosion and surface water control should be established around the perimeter of the excavation to satisfy City of Seattle requirements. Site preparation should include removal of all existing pavements, structures, buried utilities, and any other deleterious material below the building footprint. After any required demolition is complete, disturbed soils below finished grade should be removed. Existing fill should be removed from below the building foundations until suitable native soils are exposed, and the fill removal should extend laterally at least 2 feet beyond the footing limits. The resulting surface should then be compacted and proof-rolled before placing structural fill, as necessary, to reach planned grades.

During any required demolition, excavation, and foundation construction, support for the existing building foundations should be maintained. Excavation into the support soils for the existing foundations should not be attempted unless underpinning or other risk management strategies are used. AESI should be allowed to offer situation-specific recommendations for areas where disturbance of existing foundation support soils is necessary. Existing foundation support soils should be considered to include all soils below a line projected down and away from existing footings at an inclination of 1H:1V (Horizontal:Vertical).

10.1 Site Disturbance

The existing fill and native soils onsite contain substantial quantities of fine-grained material (silt) and are considered to be highly moisture-sensitive. Sediments containing more than approximately 5 percent fines (silt and clay) will be moisture-sensitive and subject to disturbance when wet. The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and the area brought to grade with structural fill. If crushed rock is considered for the access and staging areas, it should be underlain by stabilization fabric (such as Mirafi 500X or approved equivalent) to reduce the potential of fine-grained materials pumping up through the rock and turning the area to mud. The fabric will also aid in supporting construction equipment, thus reducing the amount of crushed rock required. We recommend that at least 10 inches of rock be placed over the fabric; however, due to the variable nature of the near-surface soils and differences in wheel loads, this thickness may have to be adjusted by the contractor in the field.

10.2 Temporary and Permanent Slopes

In our opinion, stable construction slopes should be the responsibility of the contractor and should be determined during construction. For estimating purposes, however, we anticipate that temporary, unsupported cuts into the existing fill or native soils can be made near vertical to a maximum depth of 4 feet. If excavations greater than 4 feet are required, then temporary, unsupported cut slopes can be planned at maximum inclinations of 1.5H:1V in existing fill and at 1H:1V in dense to very dense Vashon lodgement till. These slope angles are for areas where groundwater seepage is not present at the faces of the slopes. If groundwater or surface water is present when the temporary excavation slopes are exposed, flatter slope angles may be required. As is typical with earthwork operations, some sloughing and raveling may occur, especially if groundwater seepage is present in the excavation cuts, and cut slopes may have to be adjusted in the field. In addition, WISHA/OSHA regulations should be followed at all times.

Permanent cut and structural fill slopes that are not intended to be exposed to surface water should be designed at inclinations of 2H:1V or flatter. All permanent cut or fill slopes should be compacted to at least 95 percent of the modified Proctor maximum dry density, as determined by ASTM D-1557, and the slopes should be protected from erosion by sheet plastic until vegetation cover can be established during favorable weather.

11.0 STRUCTURAL FILL

We anticipate that placement of structural fill may be necessary to establish desired grades at the site and for backfilling within utility trenches and around foundation elements. All references

to structural fill in this report refer to subgrade preparation, fill type, and placement and compaction of materials as discussed in this section.

11.1 Subgrade Compaction

After overexcavation/stripping have been performed to the satisfaction of the geotechnical engineer or engineering geologist, the upper 12 inches of exposed ground should be recompacted to a firm and unyielding condition. If the subgrade contains too much moisture, suitable recompaction may be difficult or impossible to attain and should probably not be attempted. In lieu of recompaction, the area to receive fill should be blanketed with washed rock or quarry spalls to act as a capillary break between the new fill and the wet subgrade. Where the exposed ground remains soft and further overexcavation is impractical, placement of an engineering stabilization fabric may be necessary to prevent contamination of the free-draining layer by silt migration from below. After recompaction of the exposed ground is tested and approved, or a free-draining rock course is laid, structural fill may be placed to attain desired grades.

11.2 Structural Fill Compaction

Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8-inch loose lifts, with each lift being compacted to at least 95 percent of the modified Proctor maximum dry density using ASTM D-1557 as the standard. Utility trench backfill should be placed and compacted in accordance with applicable municipal codes and standards.

11.3 Use of On-Site Soils as Structural Fill

The existing fill and native lodgement till soils onsite consisting of silty sand are suitable for use as structural fill provided they are free of roots or other deleterious materials and have a moisture content suitable for achieving the specified compaction. At the time of our exploration, the moisture content for the majority of the near-surface fill and native sediments encountered in our exploration appeared to be near or slightly above optimum for achieving suitable compaction.

Soils in which the amount of fine-grained material (smaller than No. 200 sieve) is greater than approximately 5 percent (measured on the minus No. 4 sieve size) should be considered moisture-sensitive. The existing fill and lodgement till soils contain a substantial amount of silt and are considered highly moisture-sensitive. These soils may require moisture-conditioning before use as structural fill. Good construction practices and erosion control measures will be necessary to protect the fine-grained soils and prevent over-optimum moisture conditions from developing in the finer-grained soil areas.

If structural fill is placed during wet weather or if proper compaction cannot be obtained, a select import material consisting of a clean, free-draining gravel and/or sand should be used. Free-draining fill consists of non-organic soil, with the amount of fine-grained material (silt and clay) limited to 5 percent by weight when measured on the minus No. 4 sieve fraction, and at least 25 percent retained on the No. 4 sieve.

11.4 Structural Fill Testing

Compaction testing will likely be required by the City of Seattle. We recommend that a representative from our firm observe the subgrades and be present during placement of structural fill to observe the work and perform a representative number of in-place density tests. In this way, the adequacy of the earthwork may be evaluated as filling progresses and any problem areas may be corrected at that time.

12.0 FOUNDATIONS

Based on the explorations completed for this study, native lodgement till sediments suitable for foundation conventional shallow foundation support were observed at about 2 to 3 feet below the existing ground surface. Spread and strip footings may be used for building support when founded either directly on dense to very dense Vashon lodgement till sediments properly prepared as described in this report, or on structural fill placed over these materials after removal of existing fill. If loose lodgement till sediments are discovered below planned foundation areas at the time of construction, we recommend that the upper 12 inches of the lodgement till be recompacted to a firm and unyielding condition prior to structural fill placement.

For footings founded either directly upon dense to very dense lodgement till, or on structural fill placed over these native sediments, we recommend using a maximum allowable bearing pressure of 3,000 pounds per square foot (psf) for design purposes, including both dead and live loads. An increase in the allowable bearing pressure of one-third may be used for short-term wind or seismic loading. If structural fill is placed below footing areas, the structural fill should extend horizontally beyond the footing by at least 1 foot.

Perimeter footings should be buried at least 18 inches into the surrounding soil for frost protection. However, all foundations must penetrate to the prescribed bearing strata, and no foundations should be constructed in or above loose, organic, or existing fill soils. Anticipated settlement of footings founded as recommended should be less than 1 inch with differential settlement one-half of the anticipated total settlement. Most of this movement should occur during initial dead load applications. However, disturbed material not removed from footing trenches prior to footing placement could result in increased settlements. All footing areas should be observed by AESI prior to placing concrete to verify that the foundation subgrades are

undisturbed and construction conforms to the recommendations contained in this report. Foundation bearing verification by AESI will likely be required by the City as a condition of permitting. Perimeter footing drains should be provided as discussed under the "Drainage Considerations" section of this report.

It should be noted that the area bounded by lines extending downward at 1H:1V from any footing must not intersect another footing or intersect a filled area that has not been compacted to at least 95 percent of ASTM D-1557. In addition, a 1.5H:1V line extending down and away from any footing must not daylight because sloughing or raveling may eventually undermine the footing. Thus, footings should not be placed near the edges of steps or cuts in the bearing soils.

The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and foundations extended down to competent natural soil. If foundation excavation will occur during the wet season, consideration should be given to "armoring" the exposed subgrade with a thin layer of rock to provide a working surface during foundation construction. We recommend a 6-inch layer of crushed rock for this purpose.

13.0 FOUNDATION WALLS

The following recommendations may be applied to conventional walls up to 5 feet tall. We should be allowed to offer situation-specific input for taller walls. All backfill behind foundation walls or around foundation units should be placed as per our recommendations for structural fill and as described in this section of the report. Horizontally backfilled walls, which are free to yield laterally at least 0.1 percent of their height, may be designed to resist lateral earth pressure represented by an equivalent fluid equal to 35 pounds per cubic foot (pcf). Fully restrained, horizontally backfilled, rigid walls that cannot yield should be designed for an equivalent fluid of 55 pcf. Walls with sloping backfill up to a maximum gradient of 2H:1V should be designed using an equivalent fluid of 55 pcf for yielding conditions or 75 pcf for fully restrained conditions. If parking areas are adjacent to walls, a surcharge equivalent to 250 psf should be added to the wall height in determining lateral design forces.

As required by the 2018 IBC, retaining wall design should include a seismic surcharge pressure in addition to the equivalent fluid pressures presented above. Considering the site soils and the recommended wall backfill materials, we recommend a seismic surcharge pressure of 10H and 15H psf, where H is the wall height in feet for the "active" and "at-rest" loading conditions, respectively. The seismic surcharge should be modeled as a rectangular distribution with the resultant applied at the midpoint of the walls. Surcharges from adjacent footings or heavy construction equipment must be added to the above values.

Perimeter footing drains should be provided for all retaining walls, as discussed under the "Drainage Considerations" section of this report. It is imperative that proper drainage be provided so that hydrostatic pressures do not develop against the walls.

13.1 Passive Resistance and Friction Factors

Lateral loads can be resisted by friction between the base of the foundation and the natural soils or supporting structural fill soils and by passive earth pressure acting on the buried portions of the foundations. The foundations must be backfilled with structural fill and compacted to at least 95 percent of the maximum dry density to achieve the passive resistance provided below. We recommend the following allowable design parameters which include a factor of safety of 1.5:

- Passive equivalent fluid = 300 pcf
- Coefficient of friction = 0.30

14.0 FLOOR SUPPORT

Slab-on-grade floors may be constructed directly on dense native sediments, on structural fill placed over native sediments, or on a minimum of 2 feet of structural fill where deeper existing fill soils are encountered. We recommend that the native sediments and any existing fill to remain in place be recompacted to a firm and unyielding condition prior to placement of the structural fill. All fill placed beneath the slab must be compacted to at least 95 percent of ASTM D-1557.

Interior floor slabs should be cast atop a minimum of 4 inches of washed crushed "chip" rock or pea gravel to act as a capillary break. Interior floor slabs should also be protected from dampness by a plastic moisture vapor retarder at least 10 mils thick. The moisture vapor retarder should be placed between the capillary break material and the concrete slab.

15.0 DRAINAGE CONSIDERATIONS

Traffic across the on-site soils when they are damp or wet will result in disturbance of the otherwise firm stratum. Therefore, during site work and construction, the contractor should provide surface drainage and subgrade protection, as necessary.

Any retaining walls and all perimeter foundation walls should be provided with a drain at the base of the footing elevation. Drains should consist of rigid, perforated, PVC pipe surrounded by washed gravel. The level of the perforations in the pipe should be set at or slightly below the bottom of the footing at all locations and the drains should be constructed with sufficient

gradient to allow gravity discharge away from the structure. In addition, any retaining or subgrade walls should be lined with a minimum, 12-inch-thick, washed gravel blanket, backfilled completely with free-draining material over the full height of the wall (excluding the first 1 foot below the surface). Composite drainage mats such as Mira Drain 6000 installed in accordance with manufacturer's recommendations may be used in lieu of the free-draining aggregate blanket for walls that will not be completed as habitable space on the interior. This drainage aggregate or composite should tie into and freely communicate with the footing drains. Roof and surface runoff should not discharge into the footing drain system, but should be handled by a separate, rigid, tightline drain.

Exterior grades adjacent to walls should be sloped downward away from the structure to achieve natural surface drainage. Final exterior grades should promote free and positive drainage away from the building at all times. Water must not be allowed to pond or to collect adjacent to the foundation or within the immediate building area. It is recommended that a gradient of at least 3 percent for a minimum distance of 10 feet from the building perimeter be provided, except in paved locations. In paved locations, a minimum gradient of 1 percent should be provided unless provisions are included for collection and disposal of surface water adjacent to the structure. Additionally, pavement subgrades should be crowned to provide drainage toward catch basins and pavement edges.

16.0 INFILTRATION FEASIBILITY

The project site is generally underlain by existing fill soils and dense to very dense Vashon lodgement till. The fill soils are not considered suitable receptor soils for infiltration due to the relatively high silt content observed and variable composition. The Vashon lodgement till sediments are also not considered suitable receptor soils for infiltration due to the relatively high silt content and high relative density. Based on our experience with similar soil types in the Puget Sound region, the field infiltration rate of the Vashon lodgement till sediments is anticipated to be on the order of 1 to 2 inches per month. Therefore, it is our opinion that shallow infiltration is not feasible at the site.

17.0 PROJECT DESIGN AND CONSTRUCTION MONITORING

We recommend that AESI perform a geotechnical review of the plans prior to final design completion. In this way, we can confirm that our recommendations have been correctly interpreted and implemented in the design. The City may require a plan review by the geotechnical engineer as a condition of permitting.

The City may also require geotechnical special inspections during construction and preparation of a final summary letter when construction is complete. We are available to provide geotechnical engineering services during construction. The integrity of the earthwork and foundations depends on proper site preparation and construction procedures. In addition, engineering decisions may have to be made in the field in the event that variations in subsurface conditions become apparent.

We have enjoyed working with you on this study and are confident these recommendations will aid in the successful completion of your project. If you should have any questions or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Brendan C. Young, L.G.
Senior Staff Geologist

Kurt D. Merriman, P.E.
Digitally signed by Kurt D. Merriman, P.E.
Date: 2022.12.16 12:28:06 -08'00'

KURT D. MERRIMAN
STATE OF WASHINGTON
23580
REGISTERED
PROFESSIONAL ENGINEER

G. Bradford Drew, P.E.
Senior Engineer

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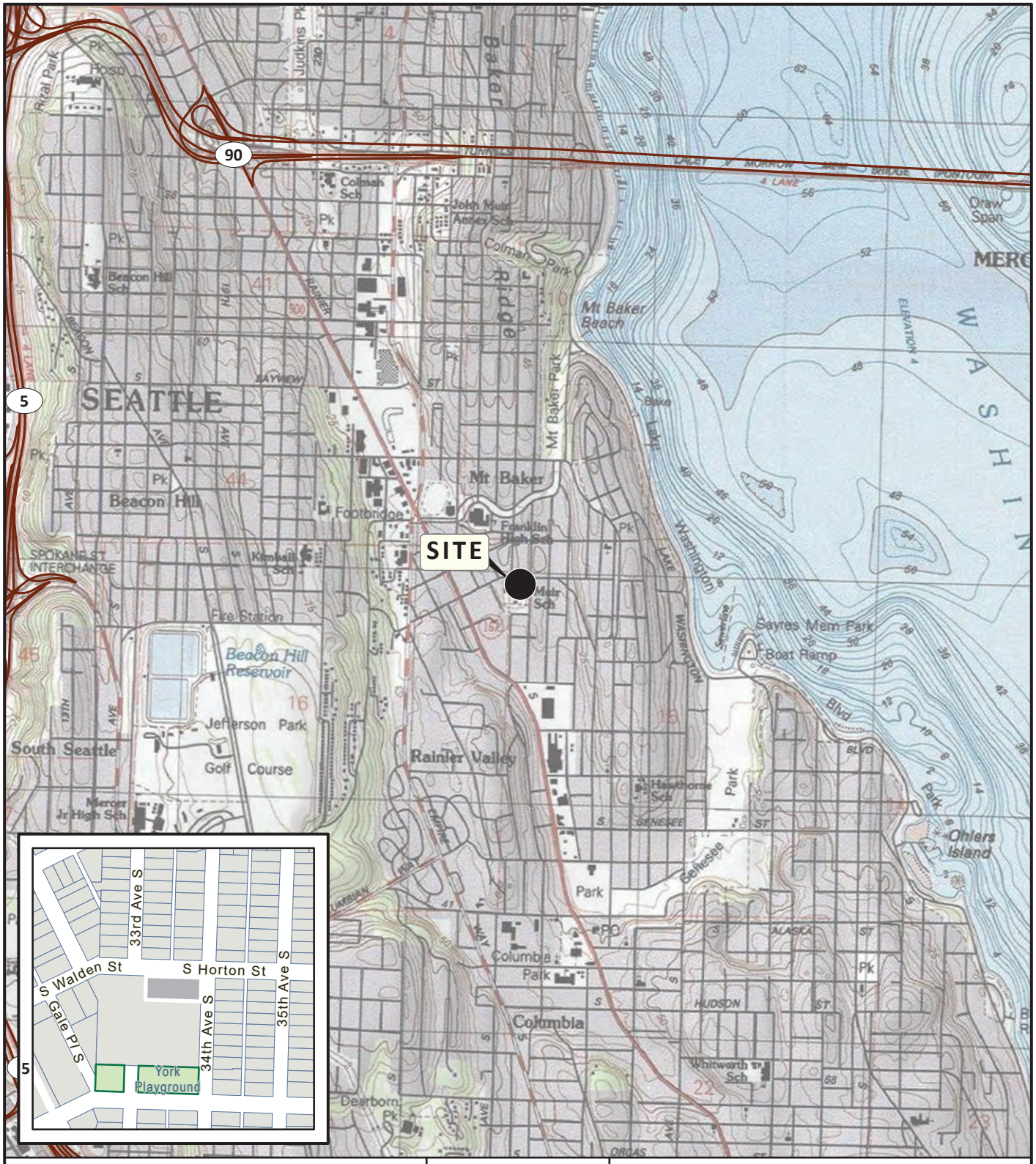
Senior Principal Engineer

Attachments:
Figure 1: Vicinity Map
Figure 2: Existing Site and Exploration Plan
Figure 3: Proposed Site and Exploration Plan
Appendix A: Exploration Logs
Appendix B: Historical Exploration Logs by Others
Appendix C: Laboratory Test Results



DATA SOURCES / REFERENCES:
USGS: 7.5' SERIES TOPOGRAPHIC MAPS, ESRI/I-CUBED/NGS 2013
KING CO: STREETS 5/22, PARCELS 4/22, CITY LIMITS, PARKS 9/21
LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION

associated earth sciences incorporated

VICINITY MAP

JOHN MUIR ES EARLY LEARNING ADDITION
SEATTLE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
20220317E001	12/22	1

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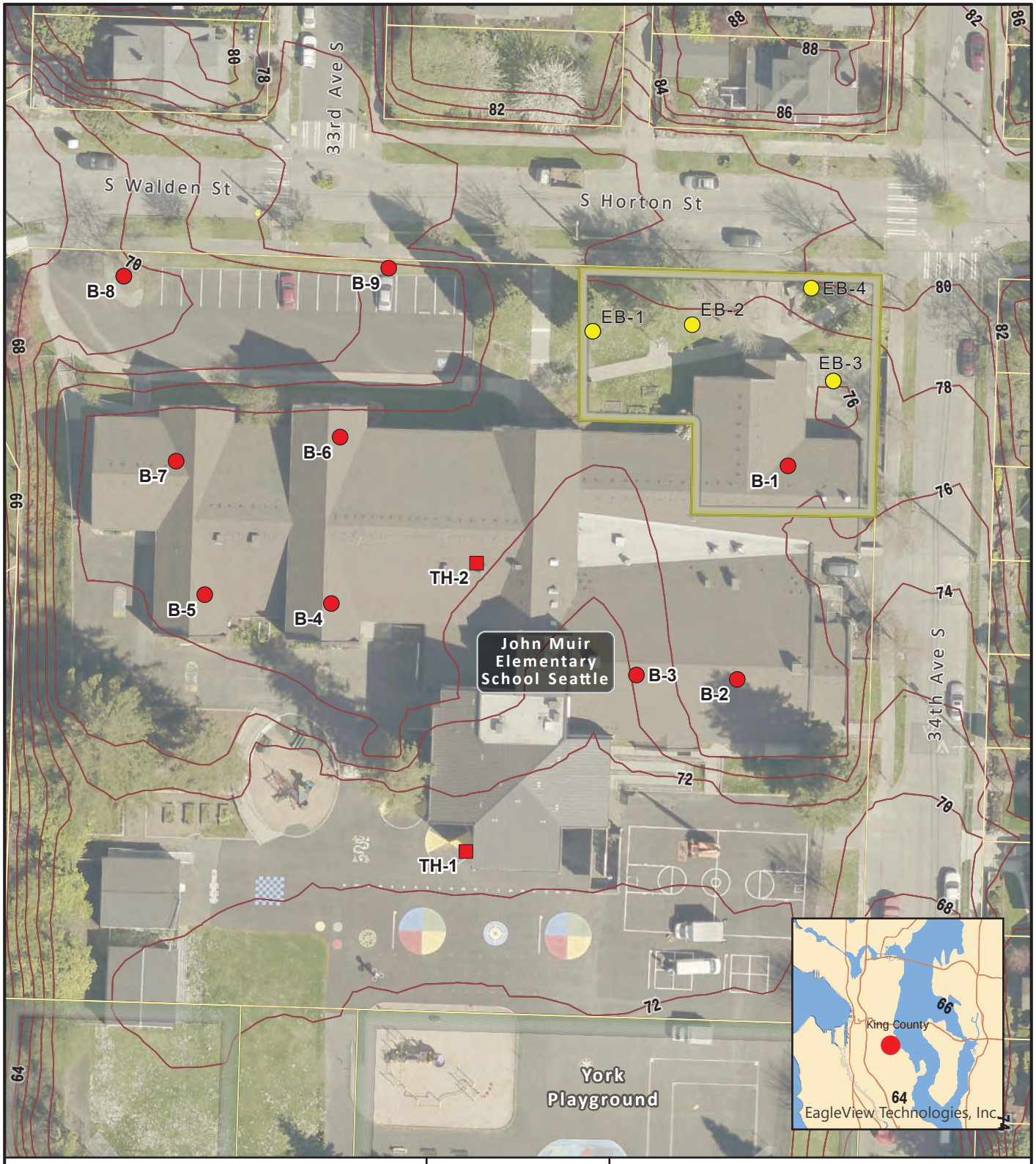

AESI EXPLORATION BORING, 2022

CONVERSE CONSULTANTS NW, 1989

HERMAN ADALIST AND ASSOCIATES, INC., 1970

SITE

PARCEL

CONTOUR 2 FT

N

0 60

FEET

DATA SOURCES / REFERENCES:
KING CO: STREETS, PARCELS, 4/22. CONTOURS FROM WADNR WGS: WA LIDAR PORTAL KING CO. 2021, USGS 3DEP, GRID CELL SIZE 1.5', FLOWN 4/2021. AERIAL: PICTOMETRY INT. 2021. WADNR: SUBSURFACE DATABASE.

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION

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EXISTING SITE AND EXPLORATION PLAN

JOHN MUIR ES EARLY LEARNING ADDITION
SEATTLE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
20220317E001	12/22	2

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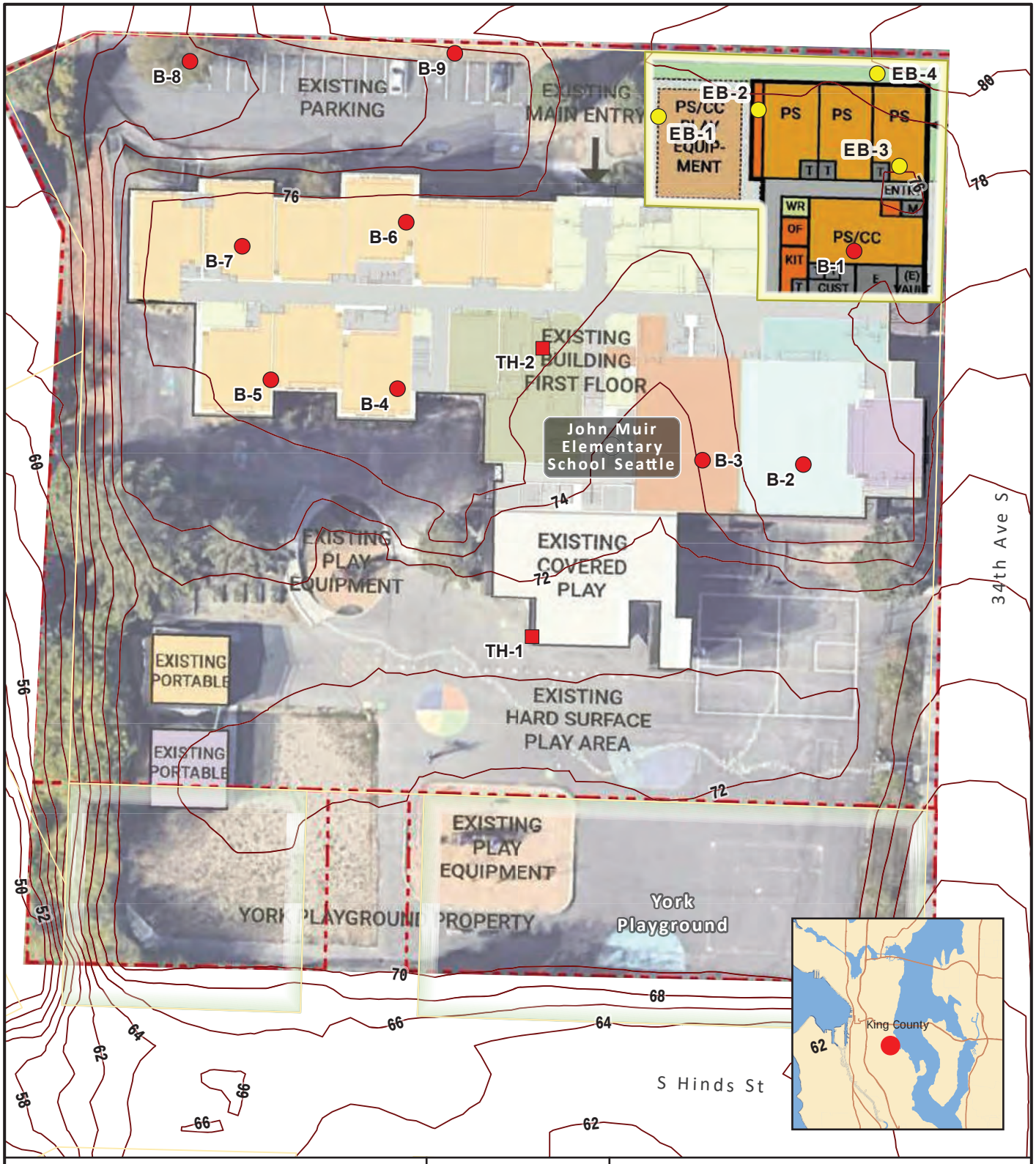

AESI EXPLORATION BORING, 2022
CONVERSE CONSULTANTS NW, 1989
HERMAN ADALIST AND ASSOCIATES, INC., 1970
SITE
PARCEL
CONTOUR 2 FT

DATA SOURCES / REFERENCES:
SITE PLAN: MAHLUM ARCHITECTS INC., BTA V MASTER PLANNING REPORT, SECTION 5.1, JOHN MUIR ELEMENTARY SCHOOL MASTER PLAN SITE AND FIRST FLOOR PLAN, FEBRUARY 2022. CONTOURS: WADNR WGS: WA LIDAR PORTAL. KING CO. 2021, USGS 3DEP, GRID CELL SIZE 1.5', FLOWN 4/2021. KING CO: STREETS, PARCELS, 4/22. WADNR: SUBSURFACE DATABASE
LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE

N
0
60
FEET

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION

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PROPOSED SITE AND EXPLORATION PLAN

JOHN MUIR ES EARLY LEARNING ADDITION
SEATTLE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
20220317E001	12/22	3

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APPENDIX A

Exploration Logs

Coarse-Grained Soils - More than 50%[1] Retained on No. 200 Sieve	Gravels - More than 50%[1] of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines[2]	GW	Well-graded gravel and gravel with sand, little to no fines
			GP	Poorly-graded gravel and gravel with sand, little to no fines
		≥12% Fines[2]	GM	Silty gravel and silty gravel with sand
			GC	Clayey gravel and clayey gravel with sand
	Sands - 50%[1] or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines[2]	SW	Well-graded sand and sand with gravel, little to no fines
			SP	Poorly-graded sand and sand with gravel, little to no fines
		≥12% Fines[2]	SM	Silty sand and silty sand with gravel
			SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50%[1] or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Terms Describing Relative Density and Consistency

	Density	SPT[3] blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50
	Consistency	**SPT[3] blows/foot**
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Chemical
DD = Dry Density
K = Permeability

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

[4] Estimated Percentage

Component	Percentage by Weight
Trace	<5
Some	5 to <12
Modifier (silty, sandy, gravelly)	12 to <30
Very *modifier* (silty, sandy, gravelly)	30 to <50

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

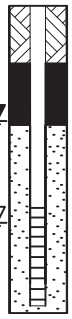
Symbols

Sampler Type and Description

- 10 / 15 / 20 Blows/6" or portion of 6"
- Split-Spoon Sampler (SPT)
- California Sampler
- Ring Sampler
- Continuous Sampling
- Grab Sample
- Portion not recovered

Groundwater depth

- ATD At time of drilling
- Static water level (date)



- Cement grout surface seal
- Bentonite seal
- Filter pack with blank casing section
- Screened casing or Hydrotip with filter pack
- End cap

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

(1) Percentage by dry weight
(2) Combined USCS symbols used for fines between 5% and 12%
(3) (SPT) Standard Penetration Test (ASTM D-1586)
(4) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)

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EXPLORATION LOG KEY

FIGURE: A1

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Exploration Boring — EB-1

John Muir Elementary School Early Learning Addition — Sheet: 1 of 1

Seattle, WA	Start Date: 11/11/2022	Logged By: BCY
20220317E001	Ending Date: 11/11/	Approved By: CMM

Driller/Equipment: Geologic Drill Partners/Mini-Track HSA
Hammer Weight/Drop: 140#/30"
Hole Diameter (in): 6
Total Depth (ft): 11
Ground Surface Elevation (ft): 77
Datum: NAVD88
Groundwater Depth ATD (ft): Not encountered
Groundwater Depth Post Drilling (ft) (Date): ()

Depth (ft)	Sample Type	Sample	% Recovery	Graphic Symbol	Description	Water Level	Blows/6"	Blows/Foot (10 / 20 / 30 / 40 / 50+)	Other Tests
0		1			**Sod/Topsoil - 3 inches**		9		
		2			**Fill** Moist, dark brown, gravelly, silty, SAND; scattered organics; roots/rootlets (SM). Moist, gray, silty, SAND, some gravel, trace organics/construction debris (SM).		17 15	32	
2.5		3			Moist, brown to dark brown, silty, SAND, some gravel; rootlets/ construction debris (SM).		4 10 20	30	
					Vashon Lodgement Till Slightly moist, gray, silty, fine SAND, trace to some gravel; unsorted; minor stratifications (SM).				
5		4			Slightly moist, tan transitioning to gray, silty, fine SAND, some gravel; unsorted (SM).		26 39 50/3"	50/3"	
7.5		5			Dry to slightly moist, gray, very sandy, SILT, trace gravel; unsorted (ML).		27 50/6"	50/6"	
10		6			Dry to slightly moist, gray, silty, fine SAND, some gravel; unsorted (SM). Refusal due to hard drilling at 11 feet.		29 50/6"	50/6"	
					No groundwater encountered.				
12.5									
15									
17.5									

12/8/2022

20220317E001

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Exploration Boring — EB-2

John Muir Elementary School Early Learning Addition — Sheet: 1 of 1

Seattle, WA	Start Date: 11/11/2022	Logged By: BCY
20220317E001	Ending Date: 11/11/	Approved By: CMM

Driller/Equipment: Geologic Drill Partners/Mini-Track HSA
Hammer Weight/Drop: 140#/30"
Hole Diameter (in): 6
Total Depth (ft): 10.50
Ground Surface Elevation (ft): 77
Datum: NAVD88
Groundwater Depth ATD (ft): Not encountered
Groundwater Depth Post Drilling (ft) (Date): ()

Depth (ft)	Sample Type	Sample	% Recovery	Graphic Symbol	Description	Water Level	Blows/6"	Blows/Foot (10 20 30 40 50+)	Other Tests
0		1			**Sod/Topsoil - 3 inches**		4	16	
					Fill		6		
					Moist, dark brown, silty, SAND, some gravel; scattered organics (rootlets); transitioning to tannish gray, silty, fine SAND; trace construction debris (SM).		10		
2.5		2			Moist, tannish gray, silty, fine to medium SAND, some gravel; trace organics (rootlets) in upper 8 inches (SM).		18	60	
					Vashon Lodgement Till		29		
							31		
5		3			Slightly moist, tannish gray, silty, fine to medium SAND, some gravel; unsorted (SP-SM).		28	50/6"	
							50/6"		
7.5		4			Slightly moist, light gray, silty, fine to medium SAND, some gravel; transitioning to darker gray, silty, fine to medium SAND, some gravel at tip of spoon (SP-SM).		50/5"	50/5"	
10		5			Slightly moist, gray, silty, fine SAND, some gravel; unsorted; diamict (SM). Refusal due to hard drilling at 10.5 feet.		50/6"	50/6"	
					No groundwater encountered.				
12.5									
15									
17.5									

12/8/2022

20220317E001

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Exploration Boring — EB-3

John Muir Elementary School Early Learning Addition — Sheet: 1 of 1

Seattle, WA	Start Date: 11/11/2022	Logged By: BCY
20220317E001	Ending Date: 11/11/	Approved By: CMM

Driller/Equipment: Geologic Drill Partners/Mini-Track HSA
Hammer Weight/Drop: 140#/30"
Hole Diameter (in): 6
Total Depth (ft): 8
Ground Surface Elevation (ft): 76
Datum: NAVD88
Groundwater Depth ATD (ft): Not encountered
Groundwater Depth Post Drilling (ft) (Date): ()

Depth (ft)	Sample Type	Sample	% Recovery	Graphic Symbol	Description	Water Level	Blows/6"	Blows/Foot (10 20 30 40 50+)	Other Tests
0		1			**Asphalt - 3 inches**		17 30 27	57	
					Fill Slightly moist, tannish gray, silty, fine SAND, some gravel; unsorted; broken gravel in spoon; blow counts overstated (SM).				
2.5		2			**Vashon Lodgement Till** Slightly moist, tannish gray, silty, fine SAND, some gravel; unsorted; diamict (SM).		15 15 29	44	
5		3			Slightly moist, tannish gray, very silty, fine SAND, some gravel; color becomes more gray and more silt with depth; unsorted; diamict (SM).		17 50/6"	50/6"	
7.5		4			Slightly moist, gray, silty, fine SAND, some gravel; unsorted (SM). Refusal due to hard drilling at 8 feet.		50/6"	50/6"	
					No groundwater encountered.				
10									
12.5									
15									
17.5									

12/8/2022

20220317E001

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Exploration Boring — EB-4

John Muir Elementary School Early Learning Addition — Sheet: 1 of 1

Seattle, WA	Start Date: 11/11/2022	Logged By: BCY
20220317E001	Ending Date: 11/11/	Approved By: CMM

Driller/Equipment: Geologic Drill Partners/Mini-Track HSA
Hammer Weight/Drop: 140#/30"
Hole Diameter (in): 6
Total Depth (ft): 10.92
Ground Surface Elevation (ft): 80
Datum: NAVD88
Groundwater Depth ATD (ft): Not encountered
Groundwater Depth Post Drilling (ft) (Date): ()

Depth (ft)	Sample Type	Sample	% Recovery	Graphic Symbol	Description	Water Level	Blows/6"	Blows/Foot (10 20 30 40 50+)	Other Tests
0		1			**Sod/Topsoil - 3 inches**		4		
					Fill		18		
					Moist, dark brown transitioning to tan, silty, fine to medium SAND, some gravel; abundant organics (rootlets) (SM).		21	39	
					Vashon Lodgement Till				
2.5		2			Slightly moist, tan, fine SAND, some silt, some gravel; occasional silt layer (1/8 inch thick) (SP-SM).		14		
							26		
							50/5"	50/5"	
5		3			Slightly moist, tan, silty, fine SAND, some gravel; unsorted; broken gravel in spoon; blow counts may be overstated (SM).		30		
							37		
							50/6"	50/6"	
7.5		4			Slightly moist, gray with some area of light gray, silty, fine SAND, trace to some gravel; unsorted (SM).		32		
							50/6"	50/5"	
10		5			As above.		30		
					Refusal due to hard drilling at 10.92 feet.		50/5"		
					No groundwater encountered.				
12.5									
15									
17.5									

12/8/2022

20220317E001

APPENDIX B

Historical Exploration Logs by Others

LOG OF BORING NO. B-1

Sheet 1 of 1

Date drilled 11/21/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 69

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
					This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
					ASPHALT 3-inches SILTY SAND (Fill); gray-brown, fine to medium, trace cobbles; trace gravel, medium dense, moist				
		1	12 50		SILT (Glacio-Lacustrine Sediments); gray-brown, little fine sand, very thinly laminated to bedded with sandy silt and silty sand with gravel; hard, very moist			28	
	65								
5									
		2	43 50/ 5"		SILTY SAND (Glacial Till); gray, fine to medium, trace gravel; very dense, moist			14	G
	60								
10									
		3	31 53/ 3"		-grades with laminations of fine sand, slightly fissured as sub parallel partings				
	55								
15									
		4	40 50						
	50								
					11/30/89 ▽				
20					SANDY SILT (Glacio-Lacustrine Sediments); gray, fine, very thinly laminated with sand; hard, moist				
		5	50						
					Bottom of boring at depth 23 feet. Standpipe piezometer installed. G = grain size distribution test.				

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

for Seattle Public Schools

86-35238

Converse Consultants NW Geotechnical Engineering and Applied Earth Sciences

Figure No.

A-1

LOG OF BORING NO. B-2

Sheet 1 of 1

Date drilled 11/21/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 69

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
					This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
					ASPHALT 3-inches SILTY SAND (Fill); gray brown, fine to medium, few gravel; medium dense, moist				
		1	13 16 21		SILT (Fill); gray-brown mottled, little clay and organics, trace fine sand, trace wood and gravel; hard, very moist			27	
5	65								
		2	5 3 3		SILTY SAND (Fill); gray green, few gravel, trace organics and roots; loose, moist			15	
10	60								
		3	50/ 3"		SILTY SAND (Glacial Till); gray, fine to medium, trace gravel and cobbles; very dense, moist				
15	55								
		4	50/ 5"		SILT (Glacio-Lacustrine Sediments); gray, some fine sand, trace gravel; hard, moist				
20	50								
		5	48 50/ 3"		-grades with trace gravel				
					Bottom of boring at depth 23.3 feet. Boring backfilled with granulated bentonite to 2 feet depth, capped with concrete.				

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Figure No.

A-2

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LOG OF BORING NO. B-3

Sheet 1 of 1

Date drilled 11/21/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 70

This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
	70				ASPHALT 2-inches SILTY SAND (Fill); brown, fine to medium, trace gravel, trace roots; medium dense, moist				
		1	6 9 18		SILT (Fill); brown mottled rust, trace roots, little clay, brick fragments; very stiff, very moist			29	
5	65				ATD				
		2	27 25 19		SILT (Glacio-Lacustrine Sediments); gray-brown mottled, little fine sand, laminated; hard, moist			16	
10	60				11/30/89				
		3	50/ 4"		SILT (Glacio-Lacustrine Sediments); gray, little gravel, laminated with clay and sand; hard, moist			15	
15	55				SILT (Glacio-Lacustrine Sediments); gray, very thinly laminated with fine to medium sand; hard, moist				
		4	50		Bottom of boring at depth 18 feet. Standpipe piezometer installed.				

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86-35238

Figure No.

A-3

Converse Consultants NW Geotechnical Engineering and Applied Earth Sciences

LOG OF BORING NO. B-4

Sheet 1 of 1

Date drilled 11/22/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 69

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
					This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
					ASPHALT 2-inch SILTY SAND (Fill); red-brown, fine to medium, trace gravel; medium dense, moist				
		1	17		SILT (Glacio-Lacustrine Sediments); gray-brown, trace fine sand, very thinly laminated with scattered laminations of clay and sand; hard, moist			19	
	65		50/3"						
5									
		2	50/4"		SILTY SAND (Glacial Till); gray, fine to medium, trace gravel and cobbles; very dense, moist				
	60								
10									
		3	50/3"						
	55								
15									
		4	50						
					Bottom of boring at depth 18 feet. Boring backfilled with granulated bentonite to 2 feet depth, capped with concrete.				

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

86-35238

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LOG OF BORING NO. B-5

Sheet 1 of 1

Date drilled 11/22/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 68

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
					This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
					ASPHALT 3-inch SILTY SAND (Fill); gray, fine to medium, few to little gravel; medium dense, moist				
	65	1	2 3 5		-grades to red-brown with trace organics			19	G
5					SILTY SAND (Fill); gray-brown, fine to medium; medium dense, moist				
	60	2	9 32					12	
			50		SILTY SAND (Glacial Till); gray, fine to medium, trace clay, little gravel; very dense, moist				
10									
	55	3	50		-grades to gray in color				
15									
					SILT (Glacio-Lacustrine Sediments); gray, thinly laminated with clay and fine sand; hard, moist	▽			
	50	4	22 50						
					Bottom of boring at depth 18.5 feet. Standpipe piezometer installed G = grain size distribution test.				

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

for Seattle Public Schools

86-35238

Converse Consultants NW Geotechnical Engineering and Applied Earth Sciences

Figure No.

A-5

LOG OF BORING NO. B-6

Sheet 1 of 1

Date drilled 11/22/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 70

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
	70				This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
		1	42 50/ 3"		ASPHALT 2-inches SANDY SILT (Glacial Till); gray-brown, fine to medium, trace gravel; very dense, moist			15	G
5	65								
		2	50/ 5"					12	
10	60								
		3	50						
15	55				SILT WITH CLAY (Glacio-Lacustrine Sediments); gray, trace fine gravel; hard, moist				
		4	42 50/ 4"		Bottom of boring at depth 18.3 feet. Boring backfilled with granulated bentonite to 2 feet depth, capped with concrete. G = grain size distribution test.				

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

for Seattle Public Schools

86-35238

LOG OF BORING NO. B-7

Sheet 1 of 1

Date drilled 11/22/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 68

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
					This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
					ASPHALT 1 1/2-inches SILTY SAND (Fill); brown, fine to medium, trace gravel, thinly bedded with irregular layers of clay and silt, trace wood; loose, very moist				
	65	1	3 3 2					27	
5					SILTY SAND (Fill) gray-brown mottled rust, trace organics, trace gravel, thinly bedded with layers of sand; medium dense, very moist				
	60	2	5 10 8					21	
10					SILTY SAND (Glacial Till); gray brown, fine to medium, little clay and gravel; very dense, moist				
	55	3	50					12	
15					SANDY SILT to SILT (Glacio-Lacustrine Sediments); gray- brown mottled laminated; hard, moist				
		4	50/4"		Bottom of boring at depth 17.8 feet. Boring backfilled with granulated bentonite to 2 feet depth, capped with concrete.				

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

for Seattle Public Schools

86-35238

LOG OF BORING NO. B-8

Sheet 1 of 1

Date drilled 11/22/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 62

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
					This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.				
					SOD 5-inches				
	60				SILTY SAND (Weathered Glacial Till); brown, fine to medium, few gravel, trace roots; medium dense, moist				
		1	50		-grades to gray-brown (Unweathered Glacial Till); very dense, moist			12	G
5									
	55				SILT (Glacio-Lacustrine Sediments); gray, little sand, very thinly laminated; hard, moist to very moist				
		2	40 50/3"					21	
					Bottom of boring at depth 9.3 feet. Boring backfilled with granulated bentonite to 2 feet depth, capped with concrete. G = grain size distribution.				

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

for Seattle Public Schools

86-35238

Converse Consultants NW Geotechnical Engineering and Applied Earth Sciences

Figure No.

A-8

LOG OF BORING NO. B-9

Date drilled 11/22/89 Driving Weight and Drop 140 lbs/30" Elevation (ft) 66

Depth, ft	Elevation	Samples	Blows/6"	Graphic Symbol	DESCRIPTION	Observation Well	Dry density pcf	Moisture Content, %	Other tests
	65				SOD 6-inches SILTY SAND (Fill); gray-brown, fine to medium, few gravel, trace roots, brick fragments; medium dense, moist				
		1	50		SANDY SILT (Glacial Till); brown, very thinly laminated; hard, moist			16	
5	60				SILTY SAND (Glacial Till); gray-brown, fine to medium, few gravel; very dense, moist				
		2	50					12	
					Bottom of boring at depth 8 feet. Boring backfilled with granulated bentonite to 2 feet depth, capped with concrete.				

This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Project No.

JOHN MUIR ELEMENTARY SCHOOL

Seattle, Washington

86-35238

for Seattle Public Schools

...N ADALIST & ASSOCIATES, INC. 1905 S. JACKSON SEATTLE, WASHINGTON 98144 EA 3-3900

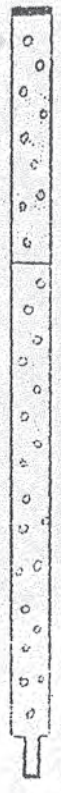
#538797

PROJECT: John Muir School ADDRESS: 3301 S. Horton

ARCHITECT: Bridges/Burke, Architects ENGINEER: Arnold Green & Associates

CERTIFICATE NUMBER: 2804

TEST HOLE #1



Blacktop

@ 3' Gray-brown silty till with rocks to 1½". Blow count: 3/6", 14/6", 30/6".

@ 6' Blue silty till with rock. Blow count: 17/6", 33/6", 41/6".

@ 9' Blow count: 14/6", 33/6", 52/6"
(Blue silty till with rock)

@ 15' Blow count: 14/6", 17/6", 35/6" (Blue silty till with rock)

Bottom of drive sample, 16½'.

TEST HOLE #2

Blacktop

@ 3' Light brown silt. Blow count: 7/6", 8/6", 22/6".

@ 6' Grey-brown till with some rock.

@ 8' Grey-brown till. Blow count: 28/6", 33/6", 60/6".

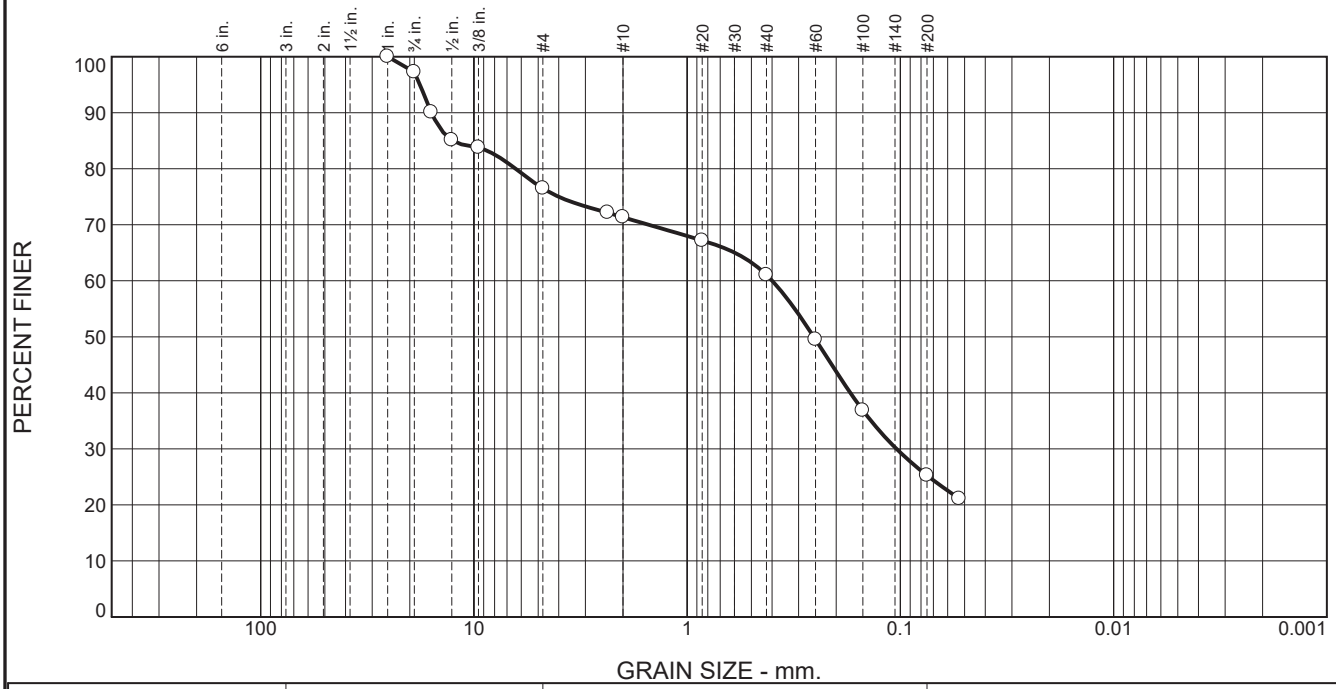
@ 11' Blue till with rocks. Blow count: 23/6", 36/6", 50/5".

Bottom of drive sample, 12½'

APPENDIX C

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.7	20.8	5.2	10.3	35.7	25.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	97.3		
5/8"	90.1		
1/2"	85.1		
3/8"	83.8		
#4	76.5		
#8	72.2		
#10	71.3		
#20	67.2		
#40	61.0		
#60	49.5		
#100	36.9		
#200	25.3		
#270	21.1		

* (no specification provided)

Material Description

gravelly, silty SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 15.8367 D_{85}= 12.5638 D_{60}= 0.3994
D_{50}= 0.2549 D_{30}= 0.1043 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/14/2022 **Date Tested:** 11/17/2022

Tested By: CI

Checked By: BCY/BD

Title:

Location: Onsite
Sample Number: EB-1 **Depth:** 1'

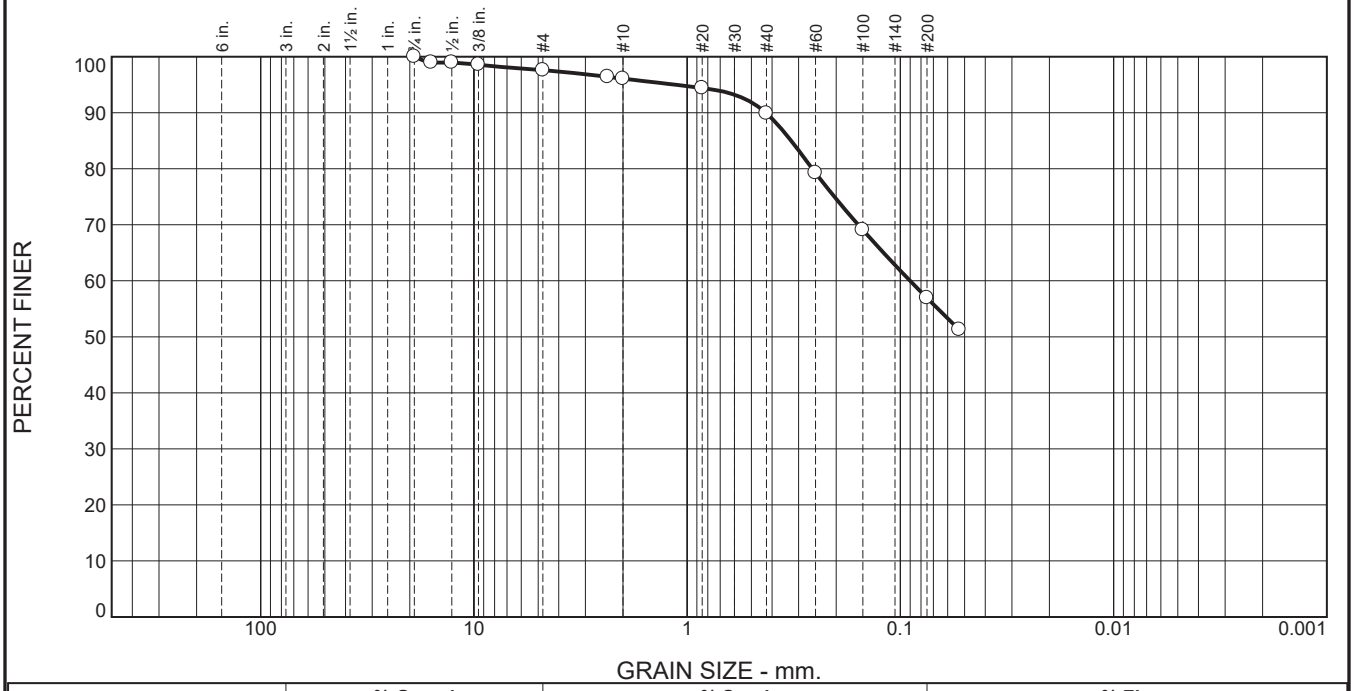
Date Sampled: 11/11/2022

associated earth sciences incorporated

Client: Seattle Public Schools
Project: John Muir ES Early Learning Addition

Project No: 20220317 E001 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	1.5	6.2	33.0	56.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
5/8"	99.0		
1/2"	99.0		
3/8"	98.6		
#4	97.6		
#8	96.4		
#10	96.1		
#20	94.4		
#40	89.9		
#60	79.2		
#100	69.1		
#200	56.9		
#270	51.3		

* (no specification provided)

Material Description

very sandy SILT, trace gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.4280 D_{85}= 0.3254 D_{60}= 0.0900
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/14/2022 **Date Tested:** 11/17/2022

Tested By: CI

Checked By: BCY/BD

Title:

Location: Onsite
Sample Number: EB-1 **Depth:** 7.5'

Date Sampled: 11/11/2022

associated earth sciences incorporated

Client: Seattle Public Schools
Project: John Muir ES Early Learning Addition

Project No: 20220317 E001 **Figure**

APPENDIX B

Construction Best Management Practices

APPENDIX B

CONSTRUCTION BEST MANAGEMENT PRACTICES

The contractor will be required to implement measures to ensure the minimal environmental impacts throughout the construction process, which could include the following:

- The contractor will submit a written earthwork plan to the Project Engineer for approval prior to the commencing with any mass excavation or filling. The earthwork plan will also include:
  - Sequencing of the earthwork and grading activities;
  - Proposed equipment to be utilized;
  - Surface water diversion and control (description of how existing catch basins at the project site would remain intact and measures used to protect them from sediment during construction);
  - Proposed protection methods for excavated stockpiled fill materials and trenches;
  - Soil drying procedures; and,
  - Any other information pertinent to the manner in which the earthwork and grading will be performed.

- The contractor will obtain the City of Seattle's Department of Construction and Inspection approval that erosion control measures are in place and functioning, and will maintain erosion control measures as earthwork and utility construction commences in accordance with City of Seattle Standards.

- Surface water controls (i.e., temporary interceptor swales, check dams, silt fences, etc.) will be constructed simultaneously with clearing and grading for project development.

- Surface water and erosion control measures will be relocated or new measures will be installed so as site conditions change, erosion control measures remain in accordance with City of Seattle Best Management Practice (BMP) requirements during the construction period.

- All construction areas inactive for more than seven days during the dry season (April 1st to October 31st) or two days during the wet season (November 1st to March 31st) will be covered.

- Mitigation measures to reduce and/or control impacts to air will include:
  - Watering surfaces to control dust, the use of temporary ground covers, sprinkling the project site with approved dust palliatives, or use of temporary stabilizations practices upon the completion of grading.
  - Wheel-cleaning stations will be provided to ensure construction vehicle wheels and undercarriages do not carry excess dirt from the site onto adjacent roadways.

  - Streets will be regularly cleaned to ensure excess dust and debris is not transported from the construction site onto adjacent roads.
  - Construction activities will be planned to minimize exposing areas of earth for extended periods.
  - The contractor will be required to comply with the Puget Sound Clean Air Agency's (PSCAA) Regulation I, Section 9.15, requiring reasonable precautions to avoid dust emissions and Regulation I, Section 9.11, requiring the best available measures to control emissions of odor-bearing contaminants. The contractor will be required to comply with recommendations in the Washington Associated General Contractor brochure "Guide to Handling Fugitive Dust from Construction Projects."

- During construction, BMPs would be implemented to ensure that sediment originating from disturbed soils would be retained within the limits of disturbance. BMP measures may include installation of filter fabric between grate and rings of all catch basin inlets, fabric fencing, barriers, check dams, etc.

- Construction activities will be restricted to hours designated by the City of Seattle Noise Control Ordinance (SMC 25.08.425). If construction activities exceed permitted noise levels, the District would instruct the contractor to implement measures to reduce noise impacts to comply with the Noise Ordinance, which may include additional muffling of equipment.

- Construction vehicle traffic to and from the site will be minimized during peak traffic hours.

- Construction vehicles will not be parked in traffic lanes.

- Flaggers will be provided as required.

- Barriers, flashing lights, walkways, guardrails, and night lighting will be provided as required for safety and control.

- Fire lanes and roadways to existing buildings will be retained, as required by the fire department.

- Walkways leading past the site will remain clear of construction vehicles and debris and will remain safe at all times.

APPENDIX C

Greenhouse Gas Emissions Worksheet

City of Seattle Department of Planning and Development
SEPA GHG Emissions Worksheet
Version 1.7 12/26/07

Introduction

The Washington State Environmental Policy Act (SEPA) requires environmental review of development proposals that may have a significant adverse impact on the environment. If a proposed development is subject to SEPA, the project proponent is required to complete the SEPA Checklist. The Checklist includes questions relating to the development's air emissions. The emissions that have traditionally been considered cover smoke, dust, and industrial and automobile emissions. With our understanding of the climate change impacts of GHG emissions, the City of Seattle requires the applicant to also estimate these emissions.

Emissions created by Development

GHG emissions associated with development come from multiple sources:

- The extraction, processing, transportation, construction and disposal of materials and landscape disturbance (Embodied Emissions)
- Energy demands created by the development after it is completed (Energy Emissions)
- Transportation demands created by the development after it is completed (Transportation Emissions)

GHG Emissions Worksheet

This GHG Emissions Worksheet has been developed to assist applicants in answering the SEPA Checklist question relating to GHG emissions. The worksheet was originally developed by King County, but the City of Seattle and King County are working together on future updates to maintain consistency of methodologies across jurisdictions.

The SEPA GHG Emissions worksheet estimates all GHG emissions that will be created over the life span of a project. This includes emissions associated with obtaining construction materials, fuel used during construction, energy consumed during a buildings operation, and transportation by building occupants.

Using the Worksheet

1. Descriptions of the different residential and commercial building types can be found on the second tabbed worksheet ("Definition of Building Types"). If a development proposal consists of multiple projects, e.g. both single family and multi-family residential structures or a commercial development that consists of more than on type of commercial activity, the appropriate information should be estimated for each type of building or activity.

2. For paving, estimate the total amount of paving (in thousands of square feet) of the project.

3. The Worksheet will calculate the amount of GHG emissions associated with the project and display the amount in the "Total Emissions" column on the worksheet. The applicant should use this information when completing the SEPA checklist.

4. The last three worksheets in the Excel file provide the background information that is used to calculate the total GHG emissions.

5. The methodology of creating the estimates is transparent; if there is reason to believe that a better estimate can be obtained by changing specific values, this can and should be done. Changes to the values should be documented with an explanation of why and the sources relied upon.

6. Print out the “Total Emissions” worksheet and attach it to the SEPA checklist. If the applicant has made changes to the calculations or the values, the documentation supporting those changes should also be attached to the SEPA checklist.

John Muir Elementary Early Learning Addition Project

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e)			Lifespan Emissions (MTCO2e)
			Embodied	Energy	Transportation	
Single-Family Home	0		98	672	792	**0**
Multi-Family Unit in Large Building	0		33	357	766	**0**
Multi-Family Unit in Small Building	0		54	681	766	**0**
Mobile Home	0		41	475	709	**0**
Education		5.2	39	646	361	**5436**
Food Sales		0.0	39	1,541	282	**0**
Food Service		0.0	39	1,994	561	**0**
Health Care Inpatient		0.0	39	1,938	582	**0**
Health Care Outpatient		0.0	39	737	571	**0**
Lodging		0.0	39	777	117	**0**
Retail (Other Than Mall)		0.0	39	577	247	**0**
Office		0.0	39	723	588	**0**
Public Assembly		0.0	39	733	150	**0**
Public Order and Safety		0.0	39	899	374	**0**
Religious Worship		0.0	39	339	129	**0**
Service		0.0	39	599	266	**0**
Warehouse and Storage		0.0	39	352	181	**0**
Other		0.0	39	1,278	257	**0**
Vacant		0.0	39	162	47	**0**

Section II: Pavement

Pavement		0.00				**0**

Total Project Emissions: **5436**

Version 1.7 12/26/07

Definition of Building Types

Type (Residential) or Principal Activity (Commercial)	Description
Single-Family Home.....	Unless otherwise specified, this includes both attached and detached buildings
Multi-Family Unit in Large Building	Apartments in buildings with more than 5 units
Multi-Family Unit in Small Building	Apartments in building with 2-4 units
Mobile Home.....	
Education	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."
Food Sales	Buildings used for retail or wholesale of food.
Food Service	Buildings used for preparation and sale of food and beverages for consumption.
Health Care Inpatient	Buildings used as diagnostic and treatment facilities for inpatient care.
Health Care Outpatient	Buildings used as diagnostic and treatment facilities for outpatient care. Doctor's or dentist's office are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).
Lodging	Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.
Retail (Other Than Mall).....	Buildings used for the sale and display of goods other than food.
Office	Buildings used for general office space, professional office, or administrative offices. Doctor's or dentist's office are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).
Public Assembly	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.
Public Order and Safety	Buildings used for the preservation of law and order or public safety.
Religious Worship	Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).
Service	Buildings in which some type of service is provided, other than food service or retail sales of goods
Warehouse and Storage	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).
Other	Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category.
Vacant	Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace.

Sources: .....

Residential — 2001 Residential Energy Consumption Survey
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Commercial — Commercial Buildings Energy Consumption Survey (CBECS),
Description of CBECS Building Types
http://www.eia.doe.gov/emeu/cbecs/pba99/bldgtypes.html

Embodied Emissions Worksheet

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# thousand sq feet/ unit or building	Life span related embodied GHG missions (MTCO2e/ unit)	Life span related embodied GHG missions (MTCO2e/ thousand square feet) - See calculations in table below
Single-Family Home	2.53	98	39
Multi-Family Unit in Large Building	0.85	33	39
Multi-Family Unit in Small Building	1.39	54	39
Mobile Home	1.06	41	39
Education	25.6	991	39
Food Sales	5.6	217	39
Food Service	5.6	217	39
Health Care Inpatient	241.4	9,346	39
Health Care Outpatient	10.4	403	39
Lodging	35.8	1,386	39
Retail (Other Than Mall)	9.7	376	39
Office	14.8	573	39
Public Assembly	14.2	550	39
Public Order and Safety	15.5	600	39
Religious Worship	10.1	391	39
Service	6.5	252	39
Warehouse and Storage	16.9	654	39
Other	21.9	848	39
Vacant	14.1	546	39

Section II: Pavement

All Types of Pavement			50

	Columns and Beams	Intermediate Floors	Exterior Walls	Windows	Interior Walls	Roofs		
Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building	5.3	7.8	19.1	51.2	5.7	21.3		
Average Materials in a 2,272-square foot single family home	0.0	2269.0	3206.0	285.0	6050.0	3103.0	Total Embodied Emissions (MTCO2e)	Total Embodied Emissions (MTCO2e/ thousand sq feet)
MTCO2e	0.0	8.0	27.8	6.6	15.6	30.0	88.0	38.7

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building

Athena EcoCalculator
Athena Assembly Evaluation Tool v2.3- Vancouver Low Rise Building
Assembly Average GWP (kg) per square meter
http://www.athenasmi.ca/tools/ecoCalculator/index.html
Lbs per kg 2.20
Square feet per square meter 10.76

Average Materials in a 2,272-square foot single family home

Buildings Energy Data Book: 7.3 Typical/Average Household
Materials Used in the Construction of a 2,272-Square-Foot Single-Family Home, 2000
http://buildingsdatabook.eren.doe.gov/?id=view_book_table&TableID=2036&t=xls
See also: NAHB, 2004 Housing Facts, Figures and Trends, Feb. 2004, p. 7.

Average window size

Energy Information Administration/Housing Characteristics 1993
Appendix B, Quality of the Data. Pg. 5.
ftp://ftp.eia.doe.gov/pub/consumption/residential/rx93hcf.pdf

Pavement Emissions Factors
MTCO2e/thousand square feet of asphalt
or concrete pavement 50 (see below)

Embodied GHG Emissions…….Worksheet Background Information

Buildings
Embodied GHG emissions are emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass).

Estimating embodied GHG emissions is new field of analysis; the estimates are rapidly improving and becoming more inclusive of all elements of construction and development.

The estimate included in this worksheet is calculated using average values for the main construction materials that are used to create a typical family home. In 2004, the National Association of Home Builders calculated the average materials that are used in a typical 2,272 square foot single-family household. The quantity of materials used is then multiplied by the average GHG emissions associated with the life-cycle GHG emissions for each material.

This estimate is a rough and conservative estimate; the actual embodied emissions for a project are likely to be higher. For example, at this stage, due to a lack of comprehensive data, the estimate does not include important factors such as landscape disturbance or the emissions associated with the interior components of a building (such as furniture).

King County realizes that the calculations for embodied emissions in this worksheet are rough. For example, the emissions associated with building 1,000 square feet of a residential building will not be the same as 1,000 square feet of a commercial building. However, discussions with the construction community indicate that while there are significant differences between the different types of structures, this method of estimation is reasonable; it will be improved as more data become available.

Additionally, if more specific information about the project is known, King County recommends two online embodied emissions calculators that can be used to obtain a more tailored estimate for embodied emissions: www.buildcarbonneutral.org and www.athenasmi.ca/tools/ecoCalculator/.

Pavement
Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle. For specifics, see the worksheet.

Special Section: Estimating the Embodied Emissions for Pavement

Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle.

The results of the studies are presented in different units and measures; considerable effort was undertaken to be able to compare the results of the studies in a reasonable way. For more details about the below methodology, contact matt.kuharic@kingcounty.gov.

The four studies, Meil (2001), Park (2003), Stripple (2001) and Treolar (2001) produced total GHG emissions of 4-34 MTCO2e per thousand square feet of finished paving (for similar asphalt and concrete based pavements). This estimate does not including downstream maintenance and repair of the highway. The average (for all concrete and asphalt pavements in the studies, assuming each study gets one data point) is ~17 MTCO2e/thousand square feet.

Three of the studies attempted to thoroughly account for the emissions associated with long term maintenance (40 years) of the roads. Stripple (2001), Park et al. (2003) and Treolar (2001) report 17, 81, and 68 MTCO2e/thousand square feet, respectively, after accounting for maintenance of the roads.

Based on the above discussion, King County makes the conservative estimate that 50 MTCO2e/thousand square feet of pavement (over the development's life cycle) will be used as the embodied emission factor for pavement until better estimates can be obtained. This is roughly equivalent to 3,500 MTCO2e per lane mile of road (assuming the lane is 13 feet wide).

It is important to note that these studies estimate the embodied emissions for roads. Paving that does not need to stand up to the rigors of heavy use (such as parking lots or driveways) would likely use less materials and hence have lower embodied emissions.

Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available: http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf

Park, K, Hwang, Y., Seo, S., M.ASCE, and Seo, H. , "Quantitative Assessment of Environmental Impacts on Life Cycle of Highways," Journal of Construction Engineering and Management , Vol 129, January/February 2003, pp 25-31, (DOI: 10.1061/(ASCE)0733-9364(2003)129:1(25)).

Stripple, H. Life Cycle Assessment of Road. A Pilot Study for Inventory Analysis. Second Revised Edition. IVL Swedish Environmental Research Institute Ltd. 2001. Available: http://www.ivl.se/rapporter/pdf/B1210E.pdf

Treloar, G., Love, P.E.D., and Crawford, R.H. Hybrid Life-Cycle Inventory for Road Construction and Use. Journal of Construction Engineering and Management. P. 43-49. January/February 2004.

Energy Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	Energy consumption per building per year (million Btu)	Carbon Coefficient for Buildings	MTCO2e per building per year	Floorspace per Building (thousand square feet)	MTCE per thousand square feet per year	MTCO2e per thousand square feet per year	Average Building Life Span	Lifespan Energy Related MTCO2e emissions per unit	Lifespan Energy Related MTCO2e emissions per thousand square feet
Single-Family Home	107.3	0.108	11.61	2.53	4.6	16.8	57.9	672	266
Multi-Family Unit in Large Building	41.0	0.108	4.44	0.85	5.2	19.2	80.5	357	422
Multi-Family Unit in Small Building	78.1	0.108	8.45	1.39	6.1	22.2	80.5	681	489
Mobile Home	75.9	0.108	8.21	1.06	7.7	28.4	57.9	475	448
Education	2,125.0	0.124	264.2	25.6	10.3	37.8	62.5	16,526	646
Food Sales	1,110.0	0.124	138.0	5.6	24.6	90.4	62.5	8,632	1,541
Food Service	1,436.0	0.124	178.5	5.6	31.9	116.9	62.5	11,168	1,994
Health Care Inpatient	60,152.0	0.124	7,479.1	241.4	31.0	113.6	62.5	467,794	1,938
Health Care Outpatient	985.0	0.124	122.5	10.4	11.8	43.2	62.5	7,660	737
Lodging	3,578.0	0.124	444.9	35.8	12.4	45.6	62.5	27,826	777
Retail (Other Than Mall)	720.0	0.124	89.5	9.7	9.2	33.8	62.5	5,599	577
Office	1,376.0	0.124	171.1	14.8	11.6	42.4	62.5	10,701	723
Public Assembly	1,338.0	0.124	166.4	14.2	11.7	43.0	62.5	10,405	733
Public Order and Safety	1,791.0	0.124	222.7	15.5	14.4	52.7	62.5	13,928	899
Religious Worship	440.0	0.124	54.7	10.1	5.4	19.9	62.5	3,422	339
Service	501.0	0.124	62.3	6.5	9.6	35.1	62.5	3,896	599
Warehouse and Storage	764.0	0.124	95.0	16.9	5.6	20.6	62.5	5,942	352
Other	3,600.0	0.124	447.6	21.9	20.4	74.9	62.5	27,997	1,278
Vacant	294.0	0.124	36.6	14.1	2.6	9.5	62.5	2,286	162

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Energy consumption for residential buildings

2007 Buildings Energy Data Book: 6.1 Quad Definitions and Comparisons (National Average, 2001)
Table 6.1.4: Average Annual Carbon Dioxide Emissions for Various Functions
http://buildingsdatabook.eren.doe.gov/
Data also at: http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html

Energy consumption for commercial buildings
and
Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Note: Data in plum color is found in both of the above sources (buildings energy data book and commercial buildings energy consumption survey).

Carbon Coefficient for Buildings

Buildings Energy Data Book (National average, 2005)
Table 3.1.7. 2005 Carbon Dioxide Emission Coefficients for Buildings (MMTCE per Quadrillion Btu)
http://buildingsdatabook.eere.energy.gov/?id=view_book_table&TableID=2057
Note: Carbon coefficient in the Energy Data book is in MTCE per Quadrillion Btu.
To convert to MTCO2e per million Btu, this factor was divided by 1000 and multiplied by 44/12.

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

average lief span of buildings,
estimated by replacement time method

	Single Family Homes	Multi-Family Units in Large and Small Buildings	All Residential Buildings
New Housing Construction, 2001	1,273,000	329,000	1,602,000
Existing Housing Stock, 2001	73,700,000	26,500,000	100,200,000
Replacement time:	57.9	80.5	62.5

(national average, 2001)

Note: Single family homes calculation is used for mobile homes as a best estimate life span.
Note: At this time, KC staff could find no reliable data for the average life span of commercial buildings.
Therefore, the average life span of residential buildings is being used until a better approximation can be ascertained.

Sources:

New Housing Construction, 2001
Quarterly Starts and Completions by Purpose and Design - US and Regions (Excel)
http://www.census.gov/const/quarterly_starts_completions_cust.xls
See also: http://www.census.gov/const/www/newresconstindex.html

Existing Housing Stock, 2001
Residential Energy Consumption Survey (RECS) 2001
Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001
Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001
Million U.S. Households, 2001
http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf

Transportation Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	# people/ unit or building	# thousand sq feet/ unit or building	# people or employees/ thousand square feet	vehicle related GHG emissions (metric tonnes CO2e per person per year)	MTCO2e/ year/ unit	MTCO2e/ year/ thousand square feet	Average Building Life Span	Life span transportation related GHG emissions (MTCO2e/ per unit)	Life span transportation related GHG emissions (MTCO2e/ thousand sq feet)
Single-Family Home	2.8	2.53	1.1	4.9	13.7	5.4	57.9	792	313
Multi-Family Unit in Large Building	1.9	0.85	2.3	4.9	9.5	11.2	80.5	766	904
Multi-Family Unit in Small Building	1.9	1.39	1.4	4.9	9.5	6.8	80.5	766	550
Mobile Home	2.5	1.06	2.3	4.9	12.2	11.5	57.9	709	668
Education	30.0	25.6	1.2	4.9	147.8	5.8	62.5	9247	361
Food Sales	5.1	5.6	0.9	4.9	25.2	4.5	62.5	1579	282
Food Service	10.2	5.6	1.8	4.9	50.2	9.0	62.5	3141	561
Health Care Inpatient	455.5	241.4	1.9	4.9	2246.4	9.3	62.5	140506	582
Health Care Outpatient	19.3	10.4	1.9	4.9	95.0	9.1	62.5	5941	571
Lodging	13.6	35.8	0.4	4.9	67.1	1.9	62.5	4194	117
Retail (Other Than Mall)	7.8	9.7	0.8	4.9	38.3	3.9	62.5	2394	247
Office	28.2	14.8	1.9	4.9	139.0	9.4	62.5	8696	588
Public Assembly	6.9	14.2	0.5	4.9	34.2	2.4	62.5	2137	150
Public Order and Safety	18.8	15.5	1.2	4.9	92.7	6.0	62.5	5796	374
Religious Worship	4.2	10.1	0.4	4.9	20.8	2.1	62.5	1298	129
Service	5.6	6.5	0.9	4.9	27.6	4.3	62.5	1729	266
Warehouse and Storage	9.9	16.9	0.6	4.9	49.0	2.9	62.5	3067	181
Other	18.3	21.9	0.8	4.9	90.0	4.1	62.5	5630	257
Vacant	2.1	14.1	0.2	4.9	10.5	0.7	62.5	657	47

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

people/ unit

Estimating Household Size for Use in Population Estimates (WA state, 2000 average)
Washington State Office of Financial Management
Kimpel, T. and Lowe, T. Research Brief No. 47. August 2007
http://www.ofm.wa.gov/researchbriefs/brief047.pdf
Note: This analysis combines Multi Unit Structures in both large and small units into one category;
the average is used in this case although there is likely a difference

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

employees/thousand square feet

Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)
Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set1/2003excel/b2.xls

Note: Data for # employees/thousand square feet is presented by CBECS as square feet/employee.
In this analysis employees/thousand square feet is calculated by taking the inverse of the CBECS number and multiplying by 1000.

vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)_

56,531,930,000	2006 Annual WA State Vehicle Miles Traveled
	Data was daily VMT. Annual VMT was 365*daily VMT.
	http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm
6,395,798	2006 WA state population
	http://quickfacts.census.gov/qfd/states/53000.html
8839	vehicle miles per person per year
0.0506	gallon gasoline/mile
	This is the weighted national average fuel efficiency for all cars and 2 axle, 4 wheel light trucks in 2005. This includes pickup trucks, vans and SUVs. The 0.051 gallons/mile used here is the inverse of the more commonly known term “miles/per gallon” (which is 19.75 for these cars and light trucks).
	Transportation Energy Data Book. 26th Edition. 2006. Chapter 4: Light Vehicles and Characteristics. Calculations based on weighted average MPG efficiency of cars and light trucks.
	http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf
	Note: This report states that in 2005, 92.3% of all highway VMT were driven by the above described vehicles.
	http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls
24.3	lbs CO2e/gallon gasoline
	The CO2 emissions estimates for gasoline and diesel include the extraction, transport, and refinement of petroleum as well as their combustion.
	Life-Cycle CO2 Emissions for Various New Vehicles. RENew Northfield.
	Available: http://renewnorthfield.org/wpcontent/uploads/2006/04/CO2%20emissions.pdf
	Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel,
2205	with a emissions factor of 26.55 lbs CO2e/gallon was not estimated.
4.93	lbs/metric tonne
	vehicle related GHG emissions (metric tonnes CO2e per person per year)

average lief span of buildings, estimated by replacement time method — See Energy Emissions Worksheet for Calculations

Commercial floorspace per unit — EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

APPENDIX D

Arborist Report

Tree Solutions Inc
Consulting Arborists

Project No. TS - 8890

Preliminary Arborist Report

To:	Seattle Public Schools c/o Matisia Hollingsworth
Site:	John Muir Elementary School- 3301 S. Horton St. Seattle WA 98144
Re:	Tree Inventory and Assessment
Date:	April 5, 2023
Project Arborist:	Sean Dugan, Registered Consulting Arborist # 457 ISA Board Certified Master Arborist PN- 5459B ISA Qualified Tree Risk Assessor
Referenced Documents:	Exceptional Tree Diagram (Anjali Grant Design LLC.; March 7, 2023)
Attached:	Tree Inventory - Table of Trees SDCI GIS Web Map Tree and Plant Protection Specification (TPPS) TSI Steel Plate Installation Specification

Summary

Tree Solutions Inc. inventoried and assessed nine trees, 6-inches or greater in diameter at standard height (DSH), on this site. Of the trees assessed, five meet the exceptional tree criteria outlined in the Seattle Director's Rule 16-2008. Four trees are proposed to be retained, including two exceptional trees. These trees should be protected as outlined in the report and according to the District's Tree and Plant Protection Specification, which is attached.

Four trees within the proposed building envelop are proposed to be removed, which includes three exceptional Quaking aspen trees.

While we have assessed impacts from a preliminary plan design, we have not reviewed finalized design or construction plans at this time. We recommend finalized plans are provided to Tree Solutions Inc. to review impacts to the retained trees prior to construction.

No city owned trees were assessed as part of the project scope.

Updated tree code changes are pending, with a vote by city council to be held May of 2023. The proposed tree code updates would alter the regulated tree sizes and tree replacement requirements. See Table 1 Construction Impacts section for the proposed changes to tree designations.

Assignment and Scope of Work

This report documents the site visit by Sean Dugan of Tree Solutions Inc. on February 24 and March 14, 2023 to the above referenced site. Included are findings and recommendations regarding proposed

development plans and trees. Matisia Hollingsworth, Project Manager for Capital Projects at Seattle Public Schools, requested these services to acquire information for project planning.

We were asked to evaluate the specified regulated trees on the site and identify any exceptional trees, as defined by Seattle Director's Rule 16-2008. We were asked to produce a preliminary Arborist Report outlining our findings and provide management recommendations. We have been asked to provide further review of the proposed development plans when they are available.

Observations and Discussion

Site

The 119,638 square foot site fronts South Horton Street to the north and 34th Avenue South is to the east in the Mount Baker neighborhood of Seattle. The site contains school buildings, playgrounds, and visitor/employee parking area. The properties to the south are owned by the Seattle Department of Parks and Recreation and are home to the York Playground at John Muir.

Based on Seattle Department of Construction and Inspections GIS maps there is a small environmental critical area 40 percent steep slope (ECA 1) on the west perimeter of the site that is outside of the project area. (See attached SDCI GIS Web Map).

Trees

I assessed all regulated trees on the eastern side of the property within the proposed project limits. This includes one additional tree located on the west side of the upper-level classrooms by the outdoor recess area. We have included an aerial photograph (Figure 2) with approximate location of the trees on site to serve as the site map and attached an inventory - table of trees that has detailed information about each tree.

Tree species in the project area consist of Giant sequoia (*Sequoiadendron giganteum*), Red maple (*Acer rubrum*), Western white pine (*Pinus monticola*), Quaking aspen (*Populus tremuloidies*), and European beech (*Fagus sylvatica*).

Four of the trees in the project limits (Trees 1, 4, 5, 6, and 8) are considered exceptional as they met the criteria outlined in Director's Rule 16-2008.

Deciduous trees were out of leaf at the time of my inspection. We recommend Tree Solutions Inc. documents and reassesses the trees in leaf prior to construction.

Discussion—Construction Impacts

This report is preliminary. We recommend finalized plans are provided to Tree Solutions inc. to properly assess the construction impacts to the retained trees.

Trees 1 & 2

Two Giant sequoia tees located near the entryway into the school (Photo 1). Tree 1 meets the exceptional size designation, while tree 2 is currently 1 inch in diameter below the threshold. There is a history of root pruning throughout the root zone when there has been root/infrastructure conflicts. Roots up to 10 inches in diameter have been cut near the walkway that runs between both trees (Photo 2).

These trees are proposed to be retained. Plans are being developed that would likely require improvements within the root zone. A preferred protected area is 21 radial feet around the tree, extending from the base and nothing below the dripline. Any activity within the 21 feet should be addressed according to the guidelines within the Tree and Plant Protection Specification (attached).

There is the potential for the walkway between the trees to be replaced where it is lifting (Photo 2). Alternative methods should be considered prior to severing the roots. One approach to consider is the use of steel plates over the roots, which will extend the life of the pavement (Figure 1). I have attached a TSI Steel Plate Installation Specification that can be referred to in determining the preferred approach.

Figure 1. Photo Credit to Gordon Mann. Taken from the Seattle Department of Transportation Trees and Sidewalks Operations Plan [1]

Tree 3

A native Western white pine tree has development proposed east of the tree (Photo 3). The tree is in good health and structure. The tree's color is slightly chlorotic, which is likely a result of the sandy soil texture and the leaching of nutrients.

Based on the preliminary design the retention of the tree may not be feasible. The structure is shown a few feet from the base of the tree (Figure 3). Excavation will likely have a significant adverse impact on the tree's root system, which will destabilize the tree and lead to long-term health issues. At minimum, eight feet of the root system needs be retained on the east side of the tree to reasonable assure stability.

Trees 4, 5 & 6

Three exceptional size Quaking aspen trees appear to be in good health and structure (Photo 4). There was a fourth aspen tree adjacent with these trees that had failed at the roots (Photo 5). It is not clear as to why the tree failed, but it appears that the shallow root system pulled out from the high sand texture soil. Sandy soils provide limited holding areas for roots, which reduces friction, and can result in roots

[1] https://www.seattle.gov/documents/Departments/SDOT/Trees/TreeSidewalksOperationsPlan_final215.pdf

pulling through the soil with greater ease then when located in other soil texture types. This might be an issue for the remaining trees, although no indicators were observed during my assessment.

The three trees are within the proposed building envelop and will need to be removed (Figure 3).

Tree 7
A European birch tree in good health and structure (Photo 6). The tree is within the proposed building envelop and will need to be removed (Figure 3).

Tree 8
A Giant sequoia is located within the central portion of the site (Photo 7). The facade of the adjacent upper classroom area is proposed to be improved. This will likely require a minor level of clearance pruning on the east side of the tree to allow for scaffolding to be erected. This pruning will have a negligible consequence for the tree. The root zone area should be protected with a minimum of 6 inches of arborist woodchips placed over the soil surface. A ¾ inch thick plywood layer can be placed over the mulch for additional protection.

Roots from the tree do extend below the surrounding pavement area. If the pavement is to be replaced an evaluation of the potential negative impacts should be made.

Tree 9
A Red maple tree is in good health and structure (Photo 7). The root system from this tree is shallow in a heavily compacted soil area. There are no current plans available that indicate there will be any negative impacts to the tree. The tree is proposed to be retained.

Tree Protection
Per the Seattle Municipal Code (SMC) 25.11.050.B tree protection area shall be the dripline. For exceptional trees the tree protection area and may be reduced to one third of the outer half of the dripline, the feeder root zone, if approved by the Director. The inner half of the dripline, or inner root zone, cannot be impacted.

Tree protection measures must be used within the driplines of all impacted trees to reduce compaction, limit impacts from excavation, and retain roots within the subgrade. These measures include but are not limited to construction monitoring by the owner's arborist, soil protection, mulching, temporary irrigation, alternative excavation methods, and tree protection fencing. Alternative excavation measures include pneumatic excavation, hand digging, hydro excavation, or use of flat front buckets with the arborist spotting for roots.

Tree protection fencing should be placed at the edges of tree driplines as identified in the attached table of trees and may be relocated only when required work within that area is occurring in coordination with the owner's arborist. No demolition, trenching, excavation, or fill activities may occur within the tree protection zone of retained trees without coordination from the owner's arborist.

Further information regarding tree protection specifications can be found in the attached Tree and Plant Protection Specification (TPPS).

City Trees
No trees were assessed on Seattle Department of Transportation or Parks and Recreation properties.

Proposed Tree Code Changes

There is a pending vote in May 2023 to update the existing tree code. If the updated tree code changes are adopted as currently written regulated tree designations will change to what is listed in Table 1 below.

Table 1. 2023 Proposed Tree Regulation Changes

Tree category	Definitions	During development – Part of a permit application	Not part of a permit application
Tier 1	Includes trees designated as heritage trees	May not be removed unless deemed hazardous or in need of emergency action with documentation required	May not be removed unless deemed hazardous or in need of emergency action with documentation required
Tier 2	Includes trees 24" at DSH or greater, tree groves, and specific tree species as provided by updated Director's Rule	Approval for removal is part of overall development permit	May not be removed unless deemed hazardous or in need of emergency action with documentation required
Tier 3	Includes trees 12" at DSH or greater but less than 24" at DSH that are not considered Tier 2 trees as provided by updated Director's Rule	Approval for removal is part of overall development permit. Documentation required for hazardous and emergency actions	May not be removed unless deemed hazardous or in need of emergency action with documentation required
Tier 4	Includes trees 6"at DSH but less than 12" at DSH	Approval for removal is part of overall development permit	May not be removed unless deemed hazardous or in need of emergency action with documentation required

The proposed code changes will require all Tier 1, 2, and 3 trees to be identified on site plans. Tree protection areas and tree protection fencing will be required to be shown for all Tier 1, 2 and 3 trees.

Additionally, the code proposes changes to tree replacement for all Tier 1, 2 and 3 trees removed due to development. Tree replacement will require a combination of on-site replacement of tree canopy that is proportional at maturity to the canopy of the tree removed, and off-site tree replacement or a fee in lieu.

Recommendations

- Provide Tree Solutions Inc. with a full plan set, including civil, design, and landscape plans in order to finalize this report with tree protection, retention, and removal recommendations.
- Create a tree layer to be used as a common tree base across all plan sets. It is critical that the tree layer includes the following:
    - Tree number and letter identifiers for trees on- and off-site.
    - Accurate dripline measurements, which are provided in the attached tree table.
    - Tree protection zone and location of tree protection fencing for all retained trees both on- and off-site.
- Have Tree Solutions Inc. document and reassesses deciduous trees in leaf prior to construction.

- Include a reference to the Tree and Plant Protection Specifications on all design and construction plans.
- Site planning around exceptional trees must follow the guidelines outlined in SMC 25.11.050. [2]
- All pruning should be conducted by a registered SDCI Tree Service Provider arborist that is and all pruning follow the applicable methods outlined in the ANSI A300 specifications.[3]

Respectfully submitted,

Sean Dugan,
Principal Consulting Arborist

[2] Seattle Municipal Code 25.11.050. General Provisions for Exceptional Trees

[3] Accredited Standards Committee A300 (ASC 300). ANSI A300 (Part 1) Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning). Londonderry: Tree Care Industry Association, 2017.

Appendix A **Figures**

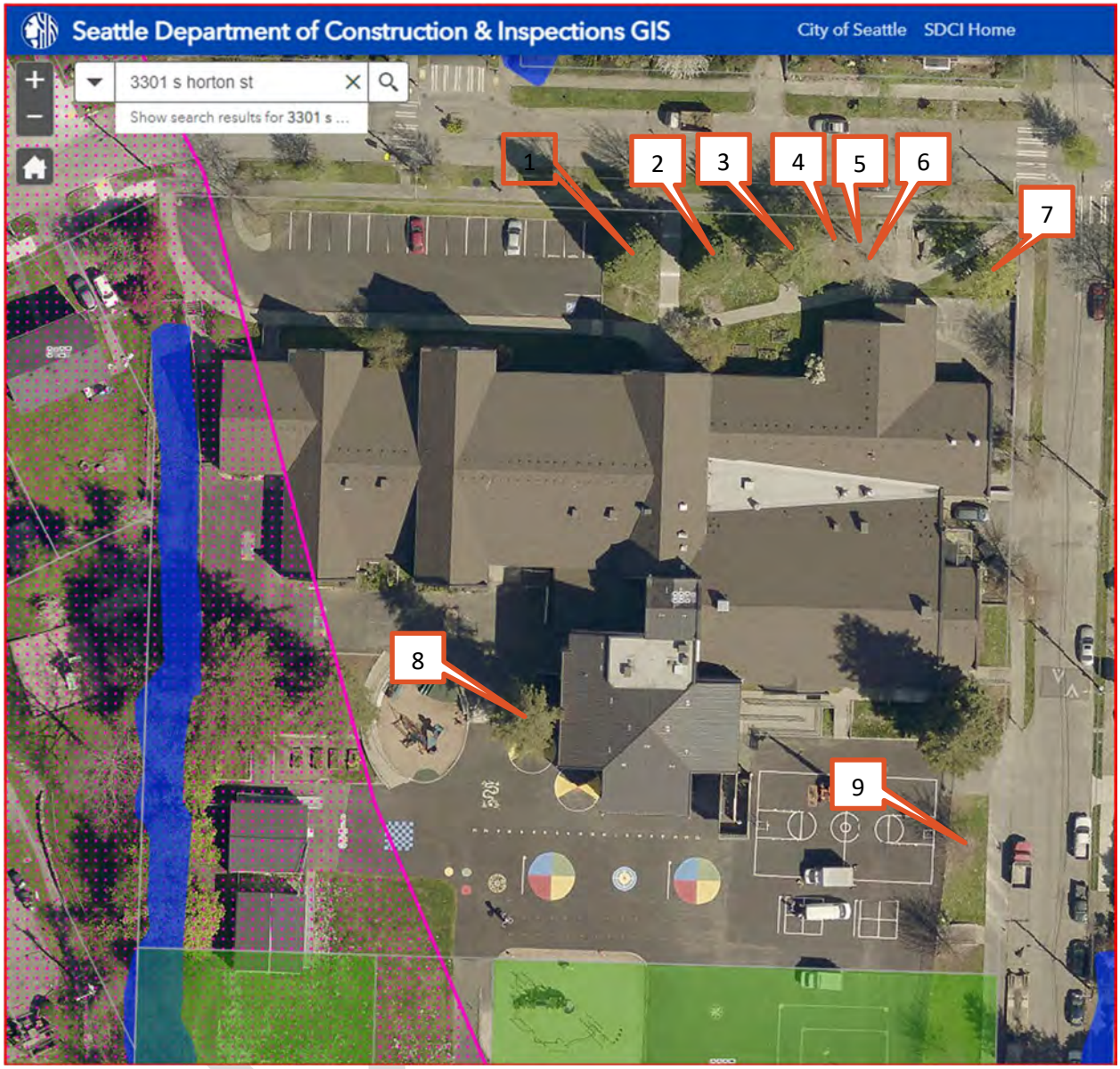


Figure 2. Aerial photograph taken from the SDCI GIS web map (attached to this report).

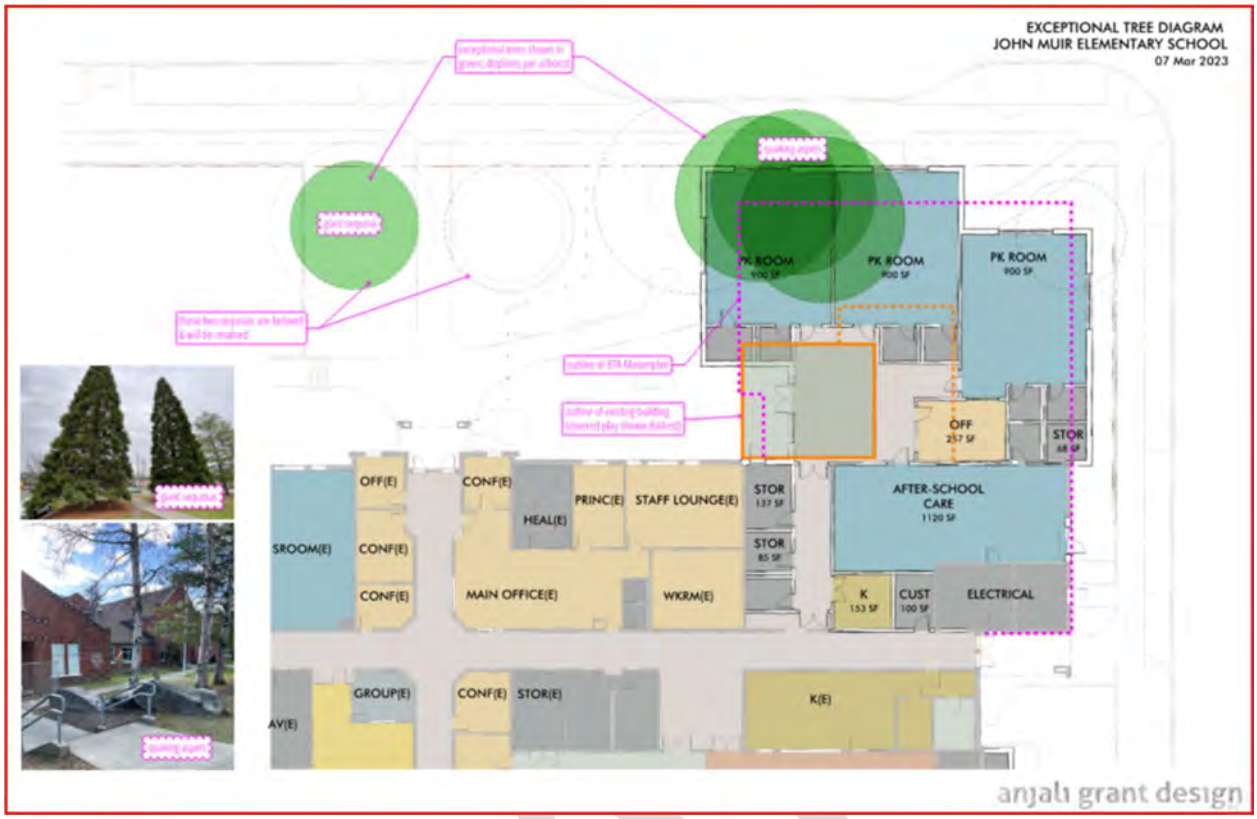


Figure 3. Exceptional tree diagram (Anjali Grant Design, March 07, 2023)

Appendix B **Photographs**

Photo 1. View looking to the south at trees 1 and 2.

Photo 2. View looking to the north at the base of trees 1 and 2. Structural roots have been cut at the walkway where conflicts have occurred. Future walkway repair should consider alternative methods prior to root removal.

Photo 3. View looking to the east at tree 3.

Photo 4. View looking to the south at three 4, 5 and 6.

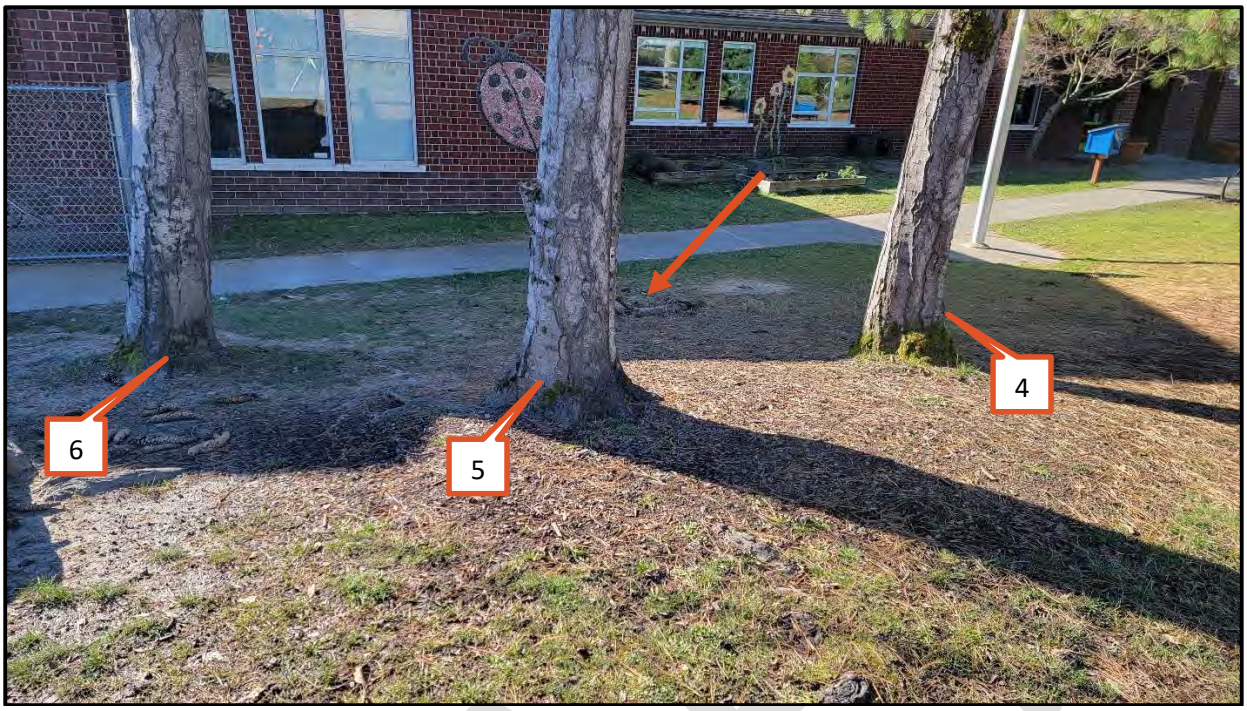


Photo 5. View looking at the base of the tree exceptional trees. The red arrow points to an aspen tree, of similar size, that failed at the roots.

Photo 6. View looing to the southeast at tree 7. (*Source Google Street View*)

Photo 7. View looing to the west at trees 8 and 9. Both trees are currently proposed to be retained.

Appendix C **Methods**

Measuring

We measured the diameter of each tree at 54 inches above grade, diameter at standard height (DSH). If a tree had multiple stems, we measured each stem individually at standard height and determined a single-stem equivalent diameter by using the method outlined in the city of Seattle Director's Rule 16-2008. A tree is regulated based on this single-stem equivalent diameter value.

Tagging

We did not tag trees on the project.

Evaluating

We evaluated tree health and structure utilizing visual tree assessment (VTA) methods. The basis behind VTA is the identification of symptoms, which the tree produces in reaction to a weak spot or area of mechanical stress. A tree reacts to mechanical and physiological stresses by growing more vigorously to re-enforce weak areas, while depriving less stressed parts. An understanding of the uniform stress allows the arborist to make informed judgments about the condition of a tree.

Rating

When rating tree health, we took into consideration crown indicators such as foliar density, size, color, stem and shoot extensions. When rating tree structure, we evaluated the tree for form and structural defects, including past damage and decay. Tree Solutions Inc. has adapted our ratings based on the Purdue University Extension formula values for health condition (*Purdue University Extension bulletin FNR-473-W - Tree Appraisal*). These values are a general representation used to assist arborists in assigning ratings.

Health

Excellent - Perfect specimen with excellent form and vigor, well-balanced crown. Normal to exceeding shoot length on new growth. Leaf size and color normal. Trunk is sound and solid. Root zone undisturbed. No apparent pest problems. Long safe useful life expectancy for the species.

Good - Imperfect canopy density in few parts of the tree, up to 10% of the canopy. Normal to less than ¾ typical growth rate of shoots and minor deficiency in typical leaf development. Few pest issues or damage, and if they exist they are controllable or tree is reacting appropriately. Normal branch and stem development with healthy growth. Safe useful life expectancy typical for the species.

Fair - Crown decline and dieback up to 30% of the canopy. Leaf color is somewhat chlorotic/necrotic with smaller leaves and "off" coloration. Shoot extensions indicate some stunting and stressed growing conditions. Stress cone crop clearly visible. Obvious signs of pest problems contributing to lesser condition, control might be possible. Some decay areas found in main stem and branches. Below average safe useful life expectancy

Poor - Lacking full crown, more than 50% decline and dieback, especially affecting larger branches. Stunting of shoots is obvious with little evidence of growth on smaller stems. Leaf size and color reveals overall stress in the plant. Insect or disease infestation may be severe and uncontrollable. Extensive decay or hollows in branches and trunk. Short safe useful life expectancy.

Structure

Excellent - Root plate undisturbed and clear of any obstructions. Trunk flare has normal development. No visible trunk defects or cavities. Branch spacing/structure and attachments are free of any defects.

Good - Root plate appears normal, with only minor damage. Possible signs of root dysfunction around trunk flare. Minor trunk defects from previous injury, with good closure and less than 25% of bark section missing. Good branch habit; minor dieback with some signs of previous pruning. Codominant stem formation may be present, requiring minor corrections.

Fair - Root plate reveals previous damage or disturbance. Dysfunctional roots may be visible around the main stem. Evidence of trunk damage or cavities, with decay or defects present and less than 30% of bark sections missing on trunk. Co-dominant stems are present. Branching habit and attachments indicate poor pruning or damage, which requires moderate corrections.

Poor - Root plate disturbance and defects indicate major damage, with girdling roots around the trunk flare. Trunk reveals more than 50% of bark section missing. Branch structure has poor attachments, with several structurally important branches dead or broken. Canopy reveals signs of damage or previous topping or lion-tailing, with major corrective action required.

Appendix D **Glossary**

ANSI A300: American National Standards Institute (ANSI) standards for tree care

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade (Council of Tree and Landscape Appraisers 2019)

ISA: International Society of Arboriculture

Regulated Tree: A tree required by municipal code to be identified in an arborist report.

Visual Tree Assessment (VTA): method of evaluating structural defects and stability in trees by noting the pattern of growth. Developed by Claus Mattheck (Mattheck & Breloer 1994)

Appendix E **References**

Accredited Standards Committee A300 (ASC 300). ANSI A300 (Part 1) Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning). Londonderry: Tree Care Industry Association, 2017.

Council of Tree and Landscape Appraisers, Guide for Plant Appraisal, 10th Edition, Second Printing. Atlanta, GA: The International Society of Arboriculture (ISA), 2019.

Mattheck, Claus and Helge Breloer, The Body Language of Trees.: A Handbook for Failure Analysis. London: HMSO, 1994.

Seattle Municipal Code 25.09.070. Standards for Trees and Vegetation in Critical Areas.

Seattle Municipal Code 25.11.050. General Provisions for Exceptional Trees.

Sugimura, D.W. "DPD Director's Rule 16-2008". Seattle, WA, 2009

Appendix F **Assumptions & Limiting Conditions**

1 Consultant assumes that the site and its use do not violate, and is in compliance with, all applicable codes, ordinances, statutes or regulations.

2 The consultant may provide a report or recommendation based on published municipal regulations. The consultant assumes that the municipal regulations published on the date of the report are current municipal regulations and assumes no obligation related to unpublished city regulation information.

3 Any report by the consultant and any values expressed therein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event, or upon any finding to be reported.

4 All photographs included in this report were taken by Tree Solutions, Inc. during the documented site visit, unless otherwise noted. Sketches, drawings and photographs (included in, and attached to, this report) are intended as visual aids and are not necessarily to scale. They should not be construed as engineering drawings, architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by the consultant as to the sufficiency or accuracy of the information.

5 Unless otherwise agreed, (1) information contained in any report by consultant covers only the items examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, climbing, or coring.

6 These findings are based on the observations and opinions of the authoring arborist, and do not provide guarantees regarding the future performance, health, vigor, structural stability or safety of the plants described and assessed.

7 Measurements are subject to typical margins of error, considering the oval or asymmetrical cross-section of most trunks and canopies.

8 Tree Solutions did not review any reports or perform any tests related to the soil located on the subject property unless outlined in the scope of services. Tree Solutions staff are not and do not claim to be soils experts. An independent inventory and evaluation of the site's soil should be obtained by a qualified professional if an additional understanding of the site's characteristics is needed to make an informed decision.

9 Our assessments are made in conformity with acceptable evaluation/diagnostic reporting techniques and procedures, as recommended by the International Society of Arboriculture.

Tree Solutions Inc
Consulting Arborists

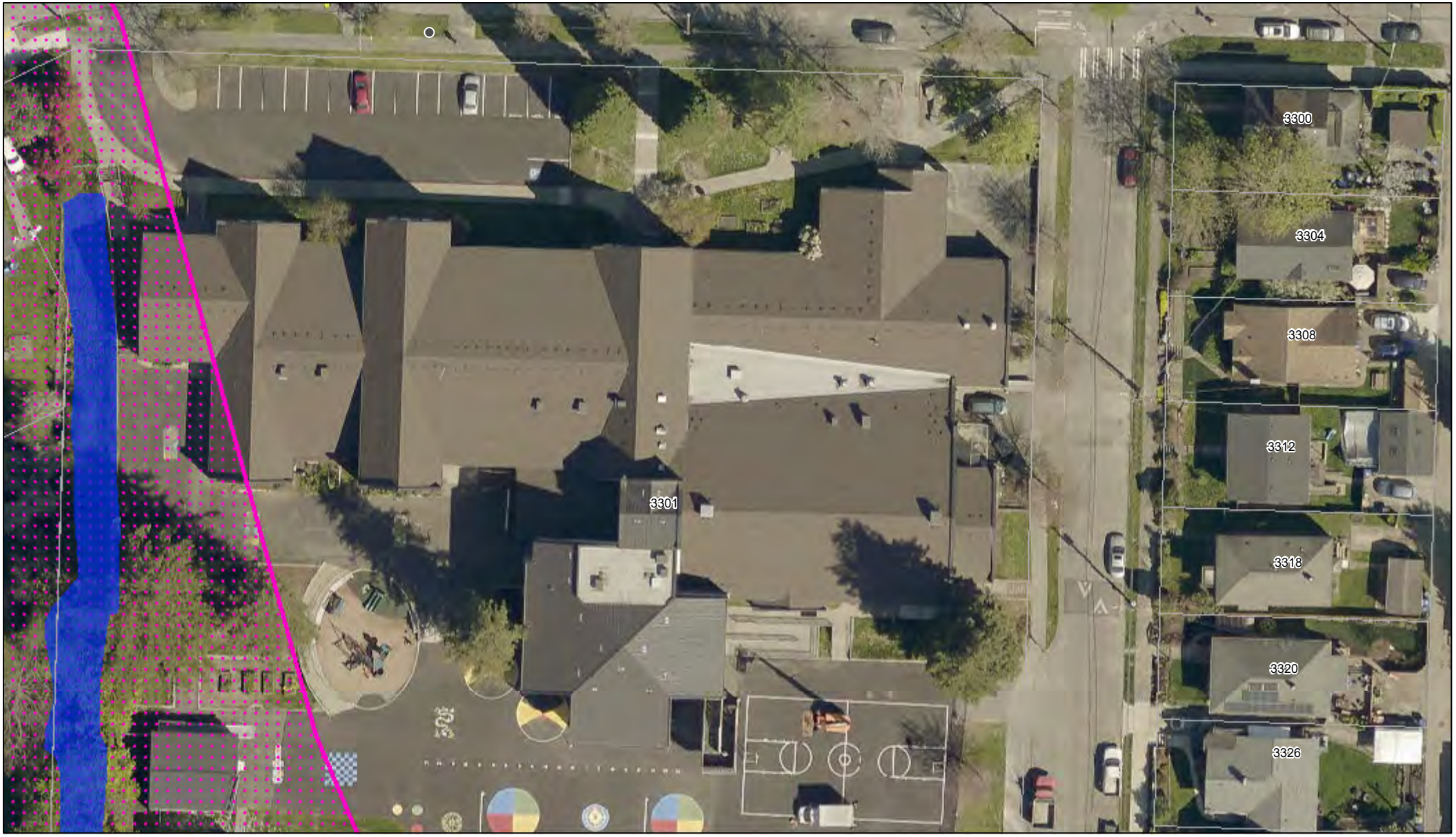
Inventory - Table of Trees
John Muir ES
3301 South Horton St., Seattle, WA

Arborist: S. Dugan
Inventory: 02.24.2023
Table Prepared: 03.07.2023

DSH (Diameter at Standard Height) is measured 4.5 feet above grade, or as specified in the Guide for Plant Appraisal, 10th Edition, published by the Council of Tree and Landscape Appraisers.
DSH for multi-stem trees are noted as a single stem equivalent, which is calculated using the method defined in the Director's Rule 16-2008.
Dripline is measured from the center of the tree to the outermost extent of the canopy.

								Dripline Radius. (ft)							
Tree ID	**Code**	**Scientific Name**	**Common Name**	**DSH Single Stem Input**	**DSH Multistem**	**Health Condition**	**Structural Condition**	**N**	**E**	**S**	**W**	**Exceptional Threshold**	**Exceptional by Size**	**Proposed Action**	**Notes**
1	*segi*	*Sequoiadendron giganteum*	Giant sequoia	31.5		Good	Good	14.0	14.0	14.0	14.0	*30.0*	Exceptional	Retain	10" dia root cut at walk to south; Multiple 6" dia. Roots cut near walk to east, root infrustructure conflicts at walk to east and north; roots visible throughout turf area; protect minimum 15' CRZ, 21' CRZ preferred
2	*segi*	*Sequoiadendron giganteum*	Giant sequoia	29		Good	Good	14.0	14.0	14.0	14.0	*30.0*	-	Retain	Root infrastructure conflicts at walk to west and north; roots visible throughout turf area; protect minimum 15' CRZ, 21' CRZ preferred
3	*pimo*	*Pinus monticola*	Western white pine	17.2		Good	Good	20.0	15.0	21.0	21.0	*24.0*	-	Remove	Color slightly less green then other trees within species; sandy soils could result in nutrient leaching that may be the reason for "off-color"; proposed development to the east of the tree.
4	*potr*	*populus tremuloidies*	Quaking aspen	13.2		Good	Good	18.0	7.0	12.0	13.0	*12.0*	Exceptional	Remove	trees may be located in an area proposed for development; shallow roots in sandy soil; one tree of the same species has uprooted and failed - removed
5	*potr*	*populus tremuloidies*	Quaking aspen	14.5		Good	Good	18.0	16.0	12.0	16.0	*12.0*	Exceptional	Remove	trees may be located in an area proposed for development; shallow roots in sandy soil; one tree of the same species has uprooted and failed - removed
6	*potr*	*populus tremuloidies*	Quaking aspen	15.9		Good	Good	14.0	18.0	18.0	13.0	*12.0*	Exceptional	Remove	trees may be located in an area proposed for development; shallow roots in sandy soil; one tree of the same species has uprooted and failed - removed
7	*FASY*	*European beech*	Fagus sylvatica	12.8	8, 10	Good	Good	12.0	12.0	12.0	12.0	*30.0*	-	Remove	
8	*segi*	*Sequoiadendron giganteum*	Giant sequoia	30+		Good	Good					*30.0*	Exceptional	Retain	Prune for clearance, protect root system with arborist woodchips and playwood as needed.
9	*acru*	*Acer rubrum*	Red maple	9.3		Good	Good	11.0	11.0	11.0	14.0	*25.0*	-	Retain	shallow roots, heavy ompacted soil, possibly negatively impacted by new bike shed

SDCI GIS Web Map



4/5/2023, 7:10:18 AM

Parcels

Street Number

Steep Slope (40% average) - ECA1

Liquefaction Prone Area - ECA5

1:600

0 0.005 0.01 0.02 mi

0 0.0075 0.015 0.03 km

City of Seattle

015639
TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.1 INTENT

A. It is the intent of this section that these requirements apply to all sections of the project specifications such that the General Contractor and all subcontractors must comply with the restrictions on work within designated Tree and Plant Protection Zones.

1.2 PROJECT TEAM ROLES AND RESPONSIBILITIES

A. The General Contractor and its subcontractors shall coordinate and work with each other and the entities listed below to complete the requirements of all sections of the tree and plant protection specification. The General Contractor maintains overall responsibility for such coordination.
   1. Owner: Manages and hires the General Contractor, and Owner's Arborist. Makes all final decisions regarding tree protection when questions arise. Ensures compliance of Tree and Plant Protection Specification. The Owner shall have authority to enforce Section 015639 Tree and Plant Protection and any disputes shall be decided upon by the Owner and Owner's Arborist.
   2. Landscape Architect: Landscape Architectural firm contracted by the Owner or its architect to provide design and technical services and to advise the Owner and design team. Duties include but are not limited to identifying understory vegetation and lawn areas to be retained on site, working with the Owner's Arborist to create the Tree and Plant Protection Plan, and including tree and plant protection specifications on the plan set.
   3. General Contractor: Implements tree protection measures and specifications across the site in coordination with the Owner and Owner's Arborist. Contracts with and manages the Tree Service and Landscape Contractor.
   4. Owner's Arborist: Arboricultural consulting firm contracted to provide planning and design services, technical assistance, and advice to the Owner and design team. Duties include but are not limited to the following: site investigation and documentation (design phase inventories, assessments, root investigations, etc.); work with Landscape Architect to develop tree protection plan; recommend tree protection methods, details, and specifications; provide final document review; conduct site inspections; monitoring of the Tree Service and Landscape Firm; and construction oversight near trees. The Owner's Arborist is contracted directly to the Owner and acts specifically on behalf of the Owner concerning tree related issues.
   5. Tree Service: Arboricultural firm contracted to implement the approved tree protection plans on site. Arboricultural operations may include, but are not limited to pruning, tree protection device installation and maintenance (fence, matting, etc.), root pruning, air tool root excavation/exploration, soil care activities, soil testing, mulch application, pesticide/chemical applications, and tree removal. Special qualifications submittal is required for review and approval below. Tree Service is sub-contracted by the General Contractor or its Landscape Contractor.
   6. Landscape Contractor: Landscape Contractor contracted to aid in implementation and management of tree and plant protection measures. Duties may include, but are not limited to, tree protection device installation and maintenance (fence, matting, etc.), air tool root excavation/exploration, soil care activities, soil testing, mulch application, pesticide/chemical applications per approval by the Seattle Public Schools' IPM coordinator, vegetation removal, and temporary irrigation installation. Special qualifications submittal is required for review and approval below. Landscape firm is sub-contracted by the General Contractor.

1.3 SUMMARY

A. The scope of work includes all labor, materials, tools, equipment, facilities, transportation, and services necessary for, and incidental to performing all operations in connection with protection of existing trees and other plants as shown on the drawings and as specified herein. "Oversight" does

not diminish the overall responsibilities of the Responsible Party.

	Work	Responsible Party	Oversight By
1.	Preconstruction tree evaluation	Owner's Arborist	Owner
2.	Construction phase tree evaluation	Owner's Arborist and General Contractor	Owner
3.	Installation of tree protection fencing and signage	General Contractor with qualified subs	Owner's Arborist
4.	Protection of root zones	General Contractor with qualified subs	Owner's Arborist
5.	Soil protection during construction	General Contractor with qualified subs	Owner's Arborist
6.	Construction monitoring near trees	Owner's Arborist	Owner
7.	Excavation using alternative construction methods near trees	General Contractor	Owner's Arborist
8.	Maintenance of retained trees and plants: ● Pruning ● Irrigation ● Soil management (mulch, amendment) ● Pest and disease control	General Contractor with qualified subs	Owner's Arborist
9.	Tree and vegetation removal	General Contractor with qualified subs	Owner's Arborist
10.	Removal of tree protection fencing and signage	General Contractor	Owner's Arborist
11.	Clean up and disposal of waste materials	General Contractor	Owner

1.4 CONTRACT DOCUMENTS

A. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any parts shall be as binding as if called for in all parts.
   1. Contract Drawings
   2. Owner's Arborist Report
   3. General and Supplementary Contract Provisions
   4. Division 1 Specifications

1.5 RELATED DOCUMENTS AND REFERENCES

Note to specifier: *List to be updated based on documents provided by SPS. Referenced specs to be reviewed during the design phase of the project prior to permitting.*

A. Related Sections:
   1. Division 1 – GENERAL REQUIREMENTS for limits placed on General Contractor's use of the site.
   2. Section 31 10 00 – Site Preparation
   3. Section 31 11 00 – Clearing and Grubbing
   4. Section 31 20 00 – Earthwork
   5. Section 32 31 13 – Chain Link Fences and Gates
   6. Section 32 91 00 – Soil and Subgrade Preparation
   7. Section 00 30 00 – Available Project Information - Arborist Report
   8. Section 32 93 00 – Planting Specifications

9. List additional sections as required

B. References: The most current edition of the following specifications and standards listed here form a part of the specification to the extent required by the references thereto. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.

1. ANSI A300 (Part 5) –Tree, Shrub, and other Woody Plant Management – Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction); published by Tree Care Industry Association, Inc.
2. ANSI A300 (Part 1) –Tree, Shrub, and other Woody Plant Management – Standard Practices (Pruning); published by Tree Care Industry Association, Inc.
3. ANSI Z133 – American National Standards for Arboricultural Operations – Safety Requirements; published by International Society of Arboriculture.
4. Guide for Plant Appraisal; Published by the Council of Tree and Landscape Appraisers).
5. Building Soil – Guidelines and Resources for Implementing Soil Quality and Depth, BMP T5.13; published by the Washington Department of Ecology.

C. Seattle Municipal Code (SMC)

Note to specifier: *Ensure that the most up to date code sections are listed below.*

1. Title 25 Environmental Protection and Historic Preservation, Chapter 25.11 Tree Protection
2. Director's Rule 16-2008

D. SHOP DRAWINGS:
1. Refer to required shop drawing that show equipment routes and materials storage in relation to Tree and Plant Protection Zones (TPPZ)

1.6 PERMITS AND REGULATIONS

A. The General Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The General Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the General Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the General Contractor shall promptly notify the Owner in writing including a description of any necessary plan changes and changes to the contract price resulting from changes in the work.

B. In case of conflict among any referenced standards or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply, or Owner shall determine which shall govern.

1.7 PROTECTION OF WORK, PROPERTY AND PERSON

A. The General Contractor shall protect the work, adjacent property, and the public, and shall be responsible for any damages due to the General Contractor's or their sub-contractor's actions.

1.8 CORRECTION OF WORK

A. If damages result from non-conforming Work which has not been executed in accordance with this specification and the Contract Drawings, the General Contractor shall be responsible for:
1. Tree and Plant Repair and Replacement.
2. Damages for Loss or Injury to Trees or Plants Within Tree and Plant Protection Zones.

1.9 DEFINITIONS

All terms in this specification shall be as defined in the "Glossary of Arboricultural Terms" or as modified below.

A. American Society of Consulting Arborists (ASCA): ASCA is a professional organization for consulting

arborists that elevates the practice and professionalism of consulting arborists through education, training, and outreach. ASCA administers the Registered Consulting Arborist (RCA) certification.

B. Construction Oversight: To ensure tree protection measures are in place and to monitor change in tree health. Additional management recommendations may be made during construction to increase likelihood of successful tree and plant preservation.

C. Diameter at Standard Height (DSH): diameter measured at a height of 54 inches (1.4m) above the ground line.

D. Drip Line: Defined by Seattle Municipal Code as the area encircling the base of a tree, the minimum extent of which is delineated by a vertical line extending from the outer limit of a tree's branch tips down to the ground (SMC). The Drip Line of all trees within the project area shall be shown on drawings.
   1. Feeder Root Zone (FRZ): An area encircling the base of a tree equal to twice the diameter of the drip line. The SMC Director may establish conditions for protecting the tree during construction within the feeder root zone.
   2. Inner Root Zone (IRZ): An area encircling the base of a tree equal to one-half (1/2) the diameter of the drip line.
   3. Outer Root Zone (ORZ): The outer half of the area within the drip line that extends from the IRZ to the outer edge of the drip line.
   4. Critical Root Zone (CRZ): The area containing the roots necessary for the tree's health and stability in which no grading or construction activity should occur.

E. International Society of Arboriculture (ISA): Is an international professional organization that promotes the professional practice of arboriculture. It administers professional credentials, delivers continuing education units (CEUs), and creates industry best management practices (BMPs). The certified arborist and Tree Risk Assessment Qualification (TRAQ) are ISA's standard certifications.

F. Tree Failing to Fully Foliate: A tree designated to remain with 25 percent or more of the canopy not having healthy leaves.

G. Tree or Plant Injury: Any damage caused to a tree or plant including but not limited to scraping or removing part of the root system, soil compaction or contamination leading to root loss, striking, or injuring the trunk, tearing, or ripping a branch out of the canopy.

H. Tree or Plant Loss: A tree or plant that the Owner's Arborist designates to be incapable of recovering or restoring to a normal growth pattern due to irreparable damage that is greater than 25 percent injury to the canopy, or circumference of the trunk, or root system; causes a hazard condition; and / or causes a tree to fail to fully foliate.

I. Tree and Plant Protection Zone (TPPZ): The area surrounding individual trees, groups of trees, and plants to be protected during construction as indicated on the Contract Drawings. The TPPZ contains Zone A and Zone B as well as any associated landscapes as shown on the Tree Protection Plan.
   1. The TPPZ is defined at minimum by the drip line or an area that the Owner's Arborist deems large enough to provide adequate protection.
   2. The TPPZ of multiple trees with connecting canopies will be established at the shared drip line.
   3. The TPPZ shall also include any associated areas of landscape identified to remain by the Landscape Architect.

J. TPPZ - Zone A: The inner half of the TPPZ as shown on Contract Drawings. Per SMC, no construction activities may occur within Zone A for Exceptional trees.

K. TPPZ - Zone B: The outer half of the TPPZ. Owner's Arborist must be present for, and must approve, all activities within Zone B.

L. Weed: Any plant found on the following County and State official listings:
   1. King County Noxious Weed List (most recent edition), https://kingcounty.gov/services/environment/animals-and-plants/noxious-weeds.aspx

2. Washington Stated Department of Agriculture Weed Lists A, B, C, https://www.nwcb.wa.gov/

1.10 SUBMITTALS

A. QUALIFICATIONS: Each applicable consultant or contractor shall provide a written list of qualifications and references per 015639.1.14.A. Provide a document listing the project names, addresses, reference names and contact information. Acceptable references include owners, landscape architects, engineers, or contractors.

B. PROFESSIONAL CERTIFICATION: Each applicable consultant or contractor shall provide copies of all required professional certifications per 015639.1.14.B. Professional certifications must be current.

C. PHOTOGRAPHIC DOCUMENTATION:
1. The Owner's Arborist shall photograph all trees to remain as shown on the Contract Drawings within the Limits of Work and those within 10 feet of the Limits of Work. Photos shall be taken prior to any construction activities and again after plants produce a full canopy of leaves if initial photographs are taken when plants were bare of leaves.
   a. Photographs of each tree from the cardinal directions (north, east, south, west), labeled with:
      1.) Tree inventory number (tag number) unique to each tree.
      2.) Cardinal direction the photograph was taken from.
      3.) Date the photo was taken.

D. SHOP DRAWINGS:
1. The General Contractor shall create a plan showing equipment routes, materials storage, site staging and trenching in relation to TPPZ(s)
2. Tree and plant protection measures and activities to be identified and approved CPM schedule and 3 week look ahead schedule.

E. The General Contractor will provide a sample of the Tree and Plant Protection signage that will be posted.

F. PRUNING SCHEDULE:
1. Written schedule detail, in accord with current ANSI A300 standards, scope and extent of pruning required for trees to remain that interfere with or are affected by construction.
   a. Tree ID number
   b. Species and DSH
   c. Location of tree on the Tree and Plant Protection Plan.
   d. Pruning goal.
   e. Type of pruning cuts.
   f. Maximum quantity of material to be removed (pruning budget).
   g. Location of pruning cuts.
   h. Description of maintenance following pruning if applicable.

F. TEMPORARY IRRIGATION SYSTEM AND SCHEDULE
1. The General Contractor shall provide a written proposal for a temporary irrigation system and irrigation schedule detailing the method of irrigation and amount of water required by individual or groups of existing trees noted in the Arborists Report and Landscape Architect's shop drawings. To be submitted by April 1 of the first year of construction if work begins prior to that date or 15 business days prior to the start of construction when beginning during the drought season May through September.
   a. The General Contractor shall consult with the Landscape Firm or Landscape Architect and the Owner's Arborist to determine method of irrigation. Acceptable irrigation systems shall be based on availability of water hook up, site access, and be one of the options detailed in 015639.3.9.A.3 A temporary irrigation plan included in the Contract Drawings shall override the requirement for detailing methods of irrigation.
   b. The irrigation schedule shall be based on the species and maturity of the trees, weather conditions, irrigation schedule prior to development, and amount of expected construction impacts.
   c. The schedule shall be a starting point and require updates based on monitoring of soil

moisture and plant condition by the Owner's Arborist.

d. Schedule to detail how irrigation will be adjusted as needed and who the responsible parties are.

G. OWNER'S ARBORIST INSPECTION REPORTS: Field compliance report delivered within 3 business days after site inspection to Owner, Architect, Landscape Architect and General Contractor detailing observations and recommendations for tree protection.

1. The final inspection report produced prior to issuing the Certificate of Occupancy shall provide a punch list of final recommendations addressing maintenance items such as pruning broken or dead tree branches, addressing damaged surface roots, or repairing compacted soils in the TPPZ, etc. Owner shall provide General Contractor direction on which items shall be addressed.

H. TPPZ WORK REQUEST FORM: A request form submitted by the General Contractor to the Owner and Owner's Arborist 3 business days prior to any work being conducted in the TPPZ. Request will include work to be completed, methods of construction, methods of soil protection, access routes, and adjusted tree protection fencing. A TPPZ Form Template is included at the end of the Tree Protection Specification Section. The Owners Arborist shall be included in all pre-construction meetings that have an element of site disturbance.

I. CONSTRUCTION MONITORING FIELD REPORT: The Owner's Arborist will record tree protection measures implemented and impacts to trees from work completed while on site. Field reports shall include:

1. Type and location of work completed.
2. Impacted tree identification numbers and photos
3. Soil protection measures used.
4. Excavation methods used.
5. Amount of grading in relation to trunk(s).
6. Number, diameter, and distance of root cuts to trunk.
7. Root protection measures employed (to maintain moisture and protect exposed roots from damage)
8. Any required canopy pruning.
9. Unplanned damage to tree(s).
10. Assessment of impacts to structural stability of trees.
11. Management recommendations.

J. PRODUCT DATA AND SAMPLES: Submit manufacturer product data and literature describing all products required by this section to the Owner for approval. Provide product data and samples of each material itemized per 015639.2 four weeks before the start of any work at the site.

K. TREE AND VEGETATION REMOVAL WORK PLAN:

1. Provided by Tree Service / General Contractor to Owner, Landscape Architect and Owner's Arborist.
2. Work Plan to include:
   a. Schedule for tree and vegetation removal based on Contract Drawings.
   b. Indicate tree stumps to be retained or removed. For stumps being removed indicate method of removal per 015639.3.7.E.
   c. Indicate trees to be cut to snags per the Contract Drawings. Include height for each snag.
   d. Protection measures for retaining trees adjacent to those being removed.
   e. Access routes and equipment storage in relation to TPPZs.
   f. Safety plan if not already included in standard construction daily work plans.
   g. Tree harvest plan as applicable:
      1.) Identify which trees are to be harvested.
      2.) Length of log or part (root wad) to be retained.
      3.) Where the harvested materials will be stored and under whose care.

1.12 PRE-CONSTRUCTION CONFERENCE

A. The General Contractor shall schedule a TREE AND PLANT PROTECTION pre-construction meeting with the Owner at least seven (7) days before beginning ANY work ON SITE.

B. The following project representatives shall attend the preconstruction conference:
   1. Owner.
   2. Design Team Representative(s) (Engineer, Architect, Landscape Architect).
   3. General Contractor.
   4. Owner's Arborist.
   5. Tree Service and Landscape Contractor as necessary.
   6. Trade or Earthwork Contractor (all contractors that may be required to dig or trench into the soil).
   7. Municipal Arborist if required.

C. Prior to this meeting, the General Contractor shall mark all trees and plants to remain and or be removed as described in this specification for review and approval by the Owner's Arborist.

D. Review methods and procedures related to temporary tree and plant protection including but not limited to the following:
   1. Tree protection measures to be installed.
   2. Ongoing maintenance requirements in the TPPZ.
   3. Tree pruning required for clearance and acceptable standards.
   4. Work to be completed near trees.
   5. Excavation / alternative excavation methods to be used.
   6. General Contractor's responsibilities
   7. Owner's Arborist's responsibilities.
   8. Responsibilities of each contractor present.
   9. Coordination of and timeline for all Work within the TPPZ.
   10. Quality Assurance.
   11. Submittals.

E. General Contractor to create work plan memo detailing all methods and procedures per above covered and decided upon during the meeting and furnish a copy to each participant within 3 business days.

1.13 PRE-LANDSCAPE INSTALLATION CONFERENCE

A. The General Contractor shall schedule a pre-landscape installation meeting with the Owner at least seven (7) days prior to beginning work.

B. The following contractors shall attend the conference:
   1. General Contractor.
   2. Landscape Architect.
   3. Owner's Arborist.
   4. Landscape Installation Firm.
   5. Earthwork Contractor.
   6. Tree Service as necessary.

C. Review methods and procedures related to temporary tree and plant protection including but not limited to the following:
   1. Tree protection measures to be maintained.
   2. Ongoing maintenance requirements in the TPPZ.
   3. Tree pruning required and acceptable standards.
   4. Work to be completed near trees.
   5. Excavation / alternative excavation methods to be used.
   6. General Contractor's responsibilities.
   7. Landscape Architect's responsibilities.
   8. Owner's Arborist's responsibilities.
   9. Landscape Installation Firm's responsibilities.

10. Responsibilities of any other contractors present.
11. Coordination of Work.
12. Quality Assurance.
13. Submittals.

D. General Contractor to record discussions and agreements in a memo and furnish a copy to each participant within 3 business days.

1.14 QUALITY ASSURANCE

A. Qualifications:
   1. Owner's Arborist, Tree Service, and Landscape Contractor performing any tree services: Must each have at least 3 years' experience of completed similar development, tree protection, pruning, and pesticide application projects. Submit information and references per 015639.1.11.A.

B. Certifications: Current and up to date professional certifications are require for each consultant or contractor according to the following list. Submit copies of certifications per 015639.1.11.B.
   1. Owner's Arborist: Board Certified Master Arborist (ISA), or Registered Consulting Arborist (American Society of Consulting Arborists – ASCA), or a Certified Arborist (ISA) with Tree Risk Assessment Qualification (ISA).
   2. Tree Service: At minimum one ISA Certified Arborist who directly oversees work of each crew conducting arboricultural operations onsite.
   3. Landscape Firm: At minimum one Certified Landscape Technician (Washington Association of Landscape Professionals) or Certified Professional Horticulturist (Washington State Nursery and Landscape Association) who directly oversees each crew conducting work within the TPZ onsite.
   4. Pest Management: Any contractor conducting or recommending pest management onsite must show proof of Washington State Pest Applicators License. Any pesticide application shall be approved by the Seattle Public Schools' Integrated Pest management coordinator.

C. The Owner's Arborist has the authority to conduct the following with final approval from the Owner:
   1. Review and approve the location of Tree and Plant Protection Fencing.
   2. Monitor any work within the TPPZ of all trees shown to remain on the Tree and Plant Protection Plan, including demolition, excavation, and all resurfacing of sidewalks and roadbeds.
   3. Determine the methods used to excavate within the TPPZ, such as the use of pneumatic air tools, hand tools, or other as deemed appropriate.
   4. Determine extents of pruning and stump grinding.
   5. Identify trees and stumps that require further management or treatment during the course of the construction project.
   6. Determine and recommend treatment for trees that either promote or prohibit growth.
   7. Review extents of clearing impacting TPPZs marked onsite.
   8. Confirm trees flagged for removal prior to removal.

D. Owner's Arborist Site Inspections: Owner's Arborist shall conduct site inspection to ensure that tree protection measures (fencing, signage, and soil protection) are in place, that no unplanned work has occurred within the TPPZ, and that no damage has occurred to any protected trees or plants. Inspections during the drought season (May through September) will include monitoring of soil moisture and working with the General Contractor managing irrigation operations to identify repairs and adjust schedules.
   1. The Owner's Arborist shall submit an inspection report to the Owner and General Contractor per 015639.1.11.G.
   2. Inspections shall be conducted on a weekly to monthly basis as determined by the Owner and Owner's Arborist and based on site activities. For example, more frequent inspections are recommended during the earthwork phase of the project. At minimum, inspections will occur at the following project milestones:
      a. Pre-demolition.

b. Pre-construction.
c. Once per month during drought season (May through September) with Contractor (General Contractor or Landscape Contractors representative) managing irrigation operations.
d. At start of grading and utility installation.
e. At end of grading and utility installation.
f. At start of finish grading and hardscape installation.
g. At end of finish grading and hardscape installation.
h. At start of landscape installation.
i. At end of landscape installation.
j. At end of project prior to issuing Certification of Occupancy.
k. During first spring after project completion to assess foliation.

Note to specifier: *Ensure that the spring post construction inspection (item "K" above) is written into the maintenance establishment period and outcomes are reported to the Owner.*

E. Owner's Arborist Construction Monitoring
1. The Owner's Arborist shall review the TPPZ workplan request per 015639.1.11.H for all construction planned and occurring within the TPPZ and determine whether arborist construction monitoring is required.
a. The General Contractor shall request and schedule the Owner's Arborist for construction monitoring 3 business days prior to conducting work.
b. Construction monitoring shall occur within the first shift unless otherwise authorized by the owner.
c. The Owner's Arborist will:
1.) Ensure that agreed upon tree protection measures are in place, that excavation is being conducted as planned to the specification, and that any root or canopy part pruning is done properly. The General Contractor and its Subcontractors remain responsible for compliance with such items.
2.) Remain onsite for the entire duration of work conducted within the TPPZ.
3.) Assess and record impacts to trees from construction, assess any possible changes in structural stability of trees, and make recommendations. These observations and recommendations will be included in a field report per 015639.1.11.I.

F. Repairs and Financial Responsibility for Not Maintaining and Addressing Tree and Plant Protection Measures
1. The General Contractor shall be responsible for maintaining Tree and Plant Protection Measures throughout the project. The following expectations are to be met:
a. Maintain Tree Protection Fencing at edge of TPPZ, location per the Contract Drawings, or agreed upon location with the Owner's Arborist.
b. Maintain Tree Protection Mulch per 015639.3.5.C.
c. Conduct irrigation according to the agreed upon plan per 015639.3.9.A.4.
2. Ensure that no prohibited activities occur per 015639.1.15. If these conditions are not maintained, the Owner's Arborist will detail the noncompliance in the Site Inspection Report and the General Contractor will have 72 hours to resolve or submit a plan to repair the condition.
3. Any noncompliant conditions that require repair shall be at the General Contractor's expense according to 015639.3.13, 015639.3.14, and 015639.3.15.
4. Any noncompliant condition that persists beyond 72 hours shall be noted in the General Contractor performance record.

1.15 FIELD CONDITIONS

A. The following practices are prohibited in the TPPZ.
1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles.
3. Foot traffic unrelated to planned work within the TPPZ.
4. Erection of sheds or structures.

5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated and monitored by the Owner's Arborist.
7. Attachment of signs or wrapping materials around trees unless otherwise indicated.

B. Do not direct the exhaust of vehicles or equipment toward TPPZs. If this is not feasible, the General Contractor shall create conditions to prevent exhaust damage to the canopies of retained trees or alter equipment so that exhaust is directed away from trees.

C. Prohibit sources of heat, flame, and ignition, including smoking near TPZs and organic mulch.

PART 2 – MATERIALS

2.1 TREE PROTECTION MULCH

A. Site-Generated Wood Chip Mulch: Generate wood chip mulch from trees designated for removal that would otherwise be disposed of.

B. Imported Wood Chip Mulch: Import wood chips from a local supplier or Tree Service. Imported chips need to be inspected by Owners Arborist for size and quality.

C. Wood chip mulch requirements:
1. Consist of chipped tree branches, leaves, and stumps.
2. Minimum range of fine particles shall be 3/8 inch or less in size and a maximum size of individual pieces shall be approximately 1 to 1-1/2 inch in diameter and maximum length of approximately 2 to 5 inches.
3. No more that 25 percent of the total volume shall be fine particles, and no more than 20 percent of total volume be large pieces.
4. Shall not be composted.
5. Shall not contain a high volume of bark.
6. Free of invasive weeds.
7. Free of turf or sod.
8. Shall contain no foreign material such as construction debris or household waste.

D. Submit supplier's product data that shows product meets the requirements and two-gallon sample for approval by the Owner's Arborist prior to application within the TPPZ.

2.2 TREE PROTECTION FENCING

A. Chain Link Fence: Chain link fencing shall be the standard tree protection fencing for all TPPZs.
1. Use 6 feet tall by 8-foot-wide metal chain link fence set in metal frame panels.
2. Mesh shall have a maximum 2-inch opening.
3. Clamp and bolt or lock panels together at every connection.
4. Secure location of fencing by driving posts into the ground, bolting stands to existing hardscape, or weighting fencing in place with core drilled concrete blocks sufficient in size to deter movement.

B. Plastic Mesh Fence: Plastic protection fencing shall only be used if demonstrated during the General Contractors submittals for tree and plant protection plan review phase that no reasonable alternative exists. Use of plastic fencing must be approved by the Owner's Arborist.
1. Heavy-duty high visibility non-fading orange plastic mesh fencing fabric 48 inches wide. Fencing shall be attached to metal "U" or "T" post driven into the ground of sufficient depth to hold the fabric solidly in place without sagging. Posts shall be spaced not more than 96 inches apart.
2. The fabric shall be attached to the post using attachment ties of sufficient number and strength to hold up the fabric without sagging.
3. The Owner's Arborist may request, at any time, additional post, deeper post depths and or additional fabric attachments if the fabric begins to sag, lean or otherwise not present a sufficient barrier to access.

C. Submit supplier's product data that product meets the requirements for approval.

2.3 TREE PROTECTION SIGNAGE

A. Heavy-duty, waterproof, corrugated plastic, 24 inches x 24 inches, brightly colored background with black 2 inch high or larger letters block letters.

B. The sign shall read:

TREE PROTECTION ZONE

DO NOT MOVE FENCE

This tree and the adjacent soil are being protected by this fence. No moving of the fence is allowed without the Owner's Arborist present. No trespassing, stockpiling, staging, dumping, or excavation may occur in this area without the direct approval of Project Superintendent. Unauthorized activities will result in a fine of $XXXX or the appraised value, whichever is greater.

Failure to follow these requirements may also result in a jurisdictional stop work order and civil penalties. Report a suspected SDCI code violation to 206-615-0808.

Project Superintendent, Name, Telephone Number
Permit Number:

C. Per direction from the Owner and Owner's Arborist, signage may also be required to include the tree's identification number, the common name, and the appraised value.

D. Attach a laminated copy of the Tree Protection Detail from the Contract Drawings to the back of the sign.

E. The signs shall be attached to the tree protection fence every 24 feet on center (one sign every third fence panel) and at minimum one sign facing in every cardinal direction toward the interior of project site.

F. Note that tree protection signage in the city of Seattle standard plans is not sufficient for this project.

G. Provide a sample of the signage to the Owner and Owner's Arborist for approval. An example can be found at the end of the Tree Protection Specification Section.

2.4 TREE MANAGEMENT TOOLS

A. The General Contractor shall have the following tools and materials onsite for managing tree protection conditions as they arise. Tools shall be maintained in good, and where applicable, sharp condition.
   1. Sharp bypass pruners
   2. Sharp bypass loppers
   3. Sharp pruning saw
   4. Reciprocating saw with sharp blades
   5. Garden spade or round point shovel
   6. Black visqueen
   7. Burlap

2.5 COIR FABRIC

A. Geocoir@DeKoWe 400 by Belton Industries, Koir Mat 400 by Nedia Enterprises, or approved equivalent product to meet jurisdictional requirements.

B. Submit supplier's product data sheet showing that the product meets the requirements and a one square foot sample for approval.

2.6 MATTING (SOIL AND ROOT PROTECTION)

A. Matting for vehicle and work protection shall be heavy duty matting designed for vehicle loading over

tree roots, Alturnamats as manufactured by Alturnamats, Inc. Franklin, PA 16323 or approved equal.

B. Submit supplier's product data sheet to show that product meets the requirements for approval.

2.7 PESTICIDES

A. Any proposed use of pesticides including all organic or inorganic chemicals used for the management of vegetation, plant pathogens, insects, or rodents must be approved by the Seattle Public School's IPM Coordinator prior to use in the field.

B. Submit an application for an exception to the IPM Superintendent Policy 6895SP including the supplier's product data sheet and material safety data sheet (MSDS) to the Seattle Public Schools IPM Coordinator.

2.8 STUMP HERBICIDE

Note to specifier: *This product should only remain in the specification if it is determined to be required on the project by the Owner's Arborist and approved for use by the Seattle Public Schools' IPM Coordinator during the design and initial inventory phase.*

A. EZ-JECT Copperhead Herbicide Shells by EZ-Ject, Inc. 1-888-395-6732, or accepted equivalent product as approved for use by the Seattle Public Schools' IPM Coordinator.

B. Prior to field use, submit an application for an exception to the IPM Superintendent Policy 6895SP including the supplier's product data sheet and the MSDS for approval by the Seattle Public Schools' Facility Grounds Maintenance Foreman and or their Supervisor.

PART 3 – EXECUTION

3.1 SITE EXAMINATION

A. Examine the site, tree, plant, and soil conditions. Notify the Owner and Owner's Arborist in writing of any conditions that may impact the successful Tree and Plant Protections that is the intent of this section.

B. The Owner's Arborist shall visit the site after notice to proceed and prior to construction to photograph all trees shown to remain on the Contract Drawings. Photographs shall be taken in each cardinal direction and be submitted to the Owner and General Contractor per 015639.1.11.C.

3.2 PROTECTION:

C. Protect the TPPZ(s) at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves and roots of all plants; and contamination of the soil, bark or leaves with construction materials, debris, silt, fuels, oils, and any chemicals substance. Notify the Owner and Owner's Arborist of any spills, compaction or damage and take corrective action immediately using methods approved by the Owner's Arborist.

3.3 COORDINATION WITH PROJECT WORK

A. The General Contractor shall coordinate with all other work that may impact the completion of tree and plant protection.

B. Prior to the start of Work, prepare a detailed schedule of the work for coordination with other trades.

3.4 PREPARATION

A. Prior to the Tree and Plant Protection preconstruction meeting, layout the limits of the Tree and Plant Protection Zone(s) and the alignments of required Tree and Plant Protection Fencing. Obtain the Owner's Arborist's approval of the limits of the protection area and the alignment of all fencing.

B. Flag all trees and shrubs to be removed by wrapping orange flagging tape around the trunk and obtain the Owner's Arborist's approval of all trees and shrubs to be removed prior to the start of tree and shrub removal. After approval, mark all trees and shrubs to be removed with orange paint in a

band completely around the base of the tree or shrub 4.5 feet above the ground.

C. Flag all trees to be cut to a snag by wrapping blue flagging tape completely tied around the trunk. Obtain the Owner's Arborist's approval of all trees to be snagged prior to the start of tree and shrub removal.

D. Flag all trees and shrubs to remain with white flagging tape tied completely around the trunk or each tree and on a prominent branch for each shrub. Obtain the Owner's Arborist and Landscape Architect approval of all trees and shrubs to remain prior to the start of tree and shrub removal.

E. Prior to any construction activity at the site including utility work, grading, storage of materials, or installation of temporary construction facilities, install all tree protection fencing, Filter Fabric, silt fence, tree protection signs, Geogrid, Mulch and or Wood Chips as shown on the drawings.

3.5 TREE AND PLANT PROTECTION MEAURES: The Tree and Plant Protection Zone(s) is defined as all areas indicated on the Tree Protection Plan.

A. Tree and Plant Protection Fencing:
   1. Install Tree and Plant Protection Fencing prior to the start of demolition / abatement and any construction activity, including material deliveries.
   2. Install Tree and Plant Protection Fencing at the edge of the TPPZ unless otherwise shown on the plans.
   3. The fencing shall encompass groups of trees with connecting canopies at their shared TPPZ.
   4. The Owner's Arborist may approve locating the Tree and Plant Protection Fencing within the TPPZ at the edge of hardscape, only if the hardscape is being maintained for the duration of the project.
   5. Where Work is planned within the TPPZ, Tree and Plant Protection Fencing shall be maintained at the TPPZ until such work occurs under the monitoring of the Owner's Arborist. The Owner's Arborist will determine the fence location once Work is completed in the TPPZ.
   6. Do not relocate the Tree and Plant Protection Fencing at any time without written approval from the Owner.
   7. Temporary access to the TPPZ is permitted subject to pre-approval in writing by the Owner's Arborist. Do not move or enter the Tree Protection Fencing, even temporarily, without the Owner's Arborist's presence or written consent.
   8. Removal of Tree and Plant Protection Fencing may occur only after construction and landscape operations are complete under approval of the Owner's Arborist.

B. Tree and Plant Protection Signage:
   1. Install Tree and Plant Protection Signage in visibly prominent manner approved by the Owner's Arborist.
   2. Install one sign on every third panel (24 feet on center).
   3. Install a minimum of one sign per cardinal direction.
   4. Maintain signs in readable condition for the duration of the project.
   5. Update contact information on signage within 5 business days of any role changes.
   6. Removal of Tree and Plant Protection Signage may occur only after construction and landscape operations are complete under approval of the Owner's Arborist.

C. Tree and Plant Protection Mulch:
   1. Apply and maintain a 6inch uniform thickness of Tree and Plant Protection Mulch within Zones A and B unless otherwise indicated on the Tree Protection Plan. Do not exceed indicated thickness of mulch.
   2. Apply Tree and Plant Protection Mulch over exposed soil, turf, and areas left bare by weed removal. When applying mulch over turf, use a mower with its blade on the lowest setting to scalp the surface prior to application except where this approach would cause damage to surface structural roots.
   3. Apply Tree and Plant Protection Mulch over exposed surfaces caused by grading or excavation activities within the TPPZ. Mulch shall be applied within 2 days after completion of construction

activities within the TPPZ.

4. Apply Tree and Plant Protection Mulch over coir fabric on slopes of greater than 3 percent.
5. Do not place mulch against the trunks of trees or bases of plants designated for retention in the Tree and Plant Protection Plan:
   a. Keep mulch 6 inches away from the trunks of trees.
   b. Keep mulch 3 inches away from the bases of shrubs or herbaceous plants.
   c. Do not mulch over groundcovers.
6. Tree and Plant Protection Mulch shall remain in the TPPZ post construction and landscape improvements. Do not remove Tree and Plant Protection Mulch to replace with composted mulch. Tree Protection Mulch may be topped up with additional wood chips or composted mulch.

3.6 ACCESS TO TREE AND PLANT PROTECTION ZONES

A. The General Contractor shall not engage in any construction activity within the TPPZ without the approval of the Owner and Owner's Arborist including operating, moving, or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks.

B. Scheduling: Schedule work in the TPPZ with the Owner's Arborist a minimum of three days in advance of the work. Submit a TPPZ Work Request Form per 015639.1.11.H. The Owner's Arborist may request a site meeting with the General Contractor in advance of the work to discuss and determine the construction approach.

C. Arborist Monitoring: The Owner's Arborist shall monitor all work within the TPPZ. In select circumstances the Owner's Arborist may determine that work can proceed in a fenced area of the TPPZ without monitoring if existing work, infrastructure, or impacts exceed the disturbance of the proposed work.

D. Additional Protection Measures for Work Occurring in the TPPZ:
   1. Trunk Protection: Per recommendation from the Owner's Arborist, protect the trunk of each tree to remain by covering it with a ring of 8 foot long 2-inch x 6-inch planks loosely banded onto the tree with 3 steel bands. Staple the bands to the planks as necessary to hold them securely in place. Trunk protection must be kept in place no longer than the duration of the work occurring adjacent to the tree within the TPPZ and up to a maximum period of one month.
   2. Soil Protection:
      a. Where possible conduct work in the TPPZ by hand or with machinery staged outside of the TPPZ.
      b. Machinery may only enter the TPPZ upon approval from the Owner and Owner's Arborist.
      c. Areas where heavy vehicle traffic is anticipated:
         1.) Top up Tree and Plant Protection Mulch to a depth of 12 inches.
         2.) Apply approved Matting or ¾ inch plywood overtop of the mulch.
         3.) Remove matting and rake Tree Protection Mulch out to a depth of 6 inches or remove any excess Tree and Plant Protection Mulch within 2 business days of completing the work. Do not leave matting and Tree Protection Mulch at a depth of 12 inches for greater than one month.
      d. Areas where lightweight vehicle traffic or lightweight materials storage is anticipated:
         1.) Ensure depth of Tree and Plant Protection Mulch is at 6 inches. If the mulch has decomposed to a shallower depth, top up mulch to 6 inches.
         2.) Apply approved Matting or ¾-inch plywood overtop of the wood chips.
         3.) Remove matting and rake Tree and Plant Protection mulch to alleviate any compaction of mulch surface within 2 business days of completing the work. Do not leave matting in place for a period of longer than one month.
      e. The Owner's Arborist shall approve the appropriate level of protection.
      f. In the above requirements, light vehicle is defined as a track skid steer with a ground pressure of 4 psi or lighter. A heavy vehicle is any vehicle with a tire or track pressure of

greater than 4 psi. Lightweight materials are any packaged materials that can be physically moved by hand into the location. Bulk materials such as soil, or aggregate shall never be stored within the Tree and Plant Protection Area.

3.7 TREE AND VEGETATION REMOVAL:

A. Tree and vegetation removal may commence once a notification to proceed has been granted for the construction project and the Owner and Owner's Arborist have approved the Tree Removal Work Plan per 015639.1.11.K. and the Owner's Arborist and Landscape Architect have reviewed and approved the flagging indicating retention and removal on site per 015639.3.4.
   1. All trees, shrubs, herbaceous plants, and groundcovers are to remain unless otherwise indicated on the Contract Drawings.
      a. Weeds shall only be removed if indicated on the Contract Drawings or as recommended by the Owner's Arborist.

B. Removed trees and shrub should be chipped onsite to produce Site-Generated Wood chips to be used as Tree Protection Mulch.

C. Tree Removal:
   1. Use soil protection measures per 015639.3.6.D.2. if machinery must enter the TPPZ of retained trees.
   2. Do not drop trees with a single cut unless the tree will fall in an area not included in the Tree and Plant Protection Area.
   3. No tree to be removed within 50 feet of the TPPZ shall be pushed over or up-rooted using a piece of grading equipment.
   4. Protect adjacent paving, soil, trees, shrubs, ground cover plantings and understory plants to remain from damage during all tree removal operations, and from construction operations. Protection shall include the root system, trunk, limbs, and crown from breakage or scarring, and the soil from compaction.

D. Snagging:
   1. Consult with the Owner's arborist to determine snagging approach prior to starting work.
      a. Stagger the heights of tree snags where more than one snag side by side.
      b. Determine the height of snags by measuring the distance to potential targets and assessing potential risk of failure.
      c. Leave all side branches below the snag cuts.
      d. Create a jagged natural looking cut at the top to mimic a break.
      e. Consider adding slits or holes for wildlife habitat.

E. Stump Management: Acceptable methods for managing stumps at the edge of and within the TPPZ of retained trees include the following:
   1. Where stump removal is not required, cut trunk as close to grade as possible and leave root wad in place. This is the preferred method in the TPPZ where new planting can obscure remaining stumps.
      a. For remaining stumps that may develop sprouts, treat tree stump with Stump Herbicide approved by the Seattle Public Schools' IPM Coordinator.
         1.) Apply Stump Herbicide per manufacturer's instructions.
         2.) Mechanically inject Stump Herbicide into individual tree stumps. Painted Application may be acceptable if approved by the Seattle Public Schools' IPM Coordinator.
         3.) Repeat applications of Stump Herbicide may be required in subsequent seasons to assure effective treatment as indicated by Owner's Arborist and approved for use by the Seattle Public Schools' IPM Coordinator.
   2. Grind trunk bases and large buttress roots to a depth of the largest buttress root or at least 18 inches below the topmost roots whichever is less and over the area of three times the diameter of the trunk (DSH).
      a. For trees where the stump will fall under new paved areas, grind roots to a total depth of 18

inches below the existing grade. If the sides of the stump hole still have greater than approximately 20 percent wood visible, continue grinding operation deeper and or wider until the resulting hole has less than 20 percent wood. Remove all wood chips produced by the grinding operation and back fill in 8-inch layers with controlled fill of a quality acceptable to the site engineer for fill material under structures, compacted to 95 percent of the maximum dry density standard proctor. The Owner's Arborist shall approve each hole at the end of the grinding operation.

b. In areas where the tree location is to be a planting bed or lawn, remove all woodchips and backfill stump holes with planting soil as defined in Specification Section Planting Soil, in maximum of 12-inch layers and compact to 80 – 85 percent of the maximum dry density standard proctor.

3. Hydro-vac excavation may be used in areas where stump grinding is not feasible per approval of the Owner's Arborist.
   a. Hydrovac a trench around the perimeter of the largest buttress roots to a depth of 36 inches.
   b. Sever all roots uncovered by trenching.
   c. Use machine from outside the TPPZ or with soil protection to remove root wad once roots are severed.

F. Understory Vegetation Removal
   1. Vegetation removal shall be done in a manner that avoids and minimizes damage to retained trees and understory vegetation.
   2. Noxious weed removal should be planned by consulting the King County Noxious Weed BMPs.
   3. Acceptable methods of vegetation removal include:
      a. Hand grubbing plant and root parts. Most noxious weeds require removal of root parts to be effective.
      b. Cutting plant stems at grade and leaving roots in ground. This method is only appropriate for plants that will not regenerate from the cut stems.
      c. Mowing and line trimming may be used only if care is taken to prevent damage to any existing surface roots and retained vegetation.
   4. Coordinate any noxious weed removal or proposed use of herbicide application with the Seattle Public Schools' IPM coordinator.

3.8 CONSTRUCTION IN TPPZ

A. Demolition: Demolition within the TPPZ shall be conducted with care not to compact soils or damage any retained trees and their root systems.
   1. Hardscape Surfaces: Retain hardscape surfaces for as long as practical.
      a. Remove hardscape that does not require machinery to traverse newly exposed soil. Stage machinery on hardscape surface and back out of the TPPZ over that surface during demolition.
   2. Utilities: Abandon utilities in place to the extent feasible. If utilities must be removed, consult with the Owner's Arborist on the best methods for utility demolition.

B. TESC Filtration Fencing: Filtration fencing shall be installed outside of the TPPZ. Where filtration fencing must enter the TPPZ the following methods shall be used:
   1. Filter fencing within the TPPZ shall be installed in a manner that does not sever roots. Do not trench to insert fabric into the ground.
   2. Install so that fabric sits on the ground and is weighted in place by:
      a. Sandbags.
      b. Gravel.

C. Grading
   1. Maintain existing grades within the TPPZ(s).
   2. The Owner's Arborist shall monitor all regrading within or at the edge of the TPPZ per 015639.1.14.E.

3. Lowering Grade: Where new finish grade is indicated below existing grade, slope grade away from trees. Coordinate with the Owner's Arborist to determine method of excavation.
4. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the TPPZ. Maintain existing grades within the TPPZ.
    a. Minor fill within the TPPZ may be allowed per approval by the Owner's Arborist.
5. Minimize over-excavation toward trees by installing shoring or by benching excavation.

D. Excavation
1. Excavation is only allowed within the TPPZ if it is shown on the Contract Drawings or is the result of a change order under the direction of the Owner and permitted by the city.
2. Consult with the Owner's Arborist to determine method of excavation or grading for all work within or at the edge of the TPPZ. Owner shall have final approval of excavation method(s).
3. The Owner's Arborist shall monitor all excavation within or at the edge of the TPPZ per 015639.1.14.E.
4. Required excavation shall be limited to the smallest area of impact possible.
5. Acceptable methods of alternative excavation include:
    a. Hand Excavation: Using shovels, hard rakes, and / or trowels, done in a manner to prevent damage to structural roots and limit damage to the fine absorptive root system.
    b. Pneumatic Air Excavation:
        1.) Remove the Wood Chips from an area approximately 18 inches beyond the limits of the hole or trench to be excavated. Cover the Wood Chips for a distance of not less than 15 feet around the limit of the excavation area with Filter Fabric or plastic sheeting to protect the Wood Chips from silt. Mound the Wood Chips so that the plastic slopes towards the excavation.
        2.) Wet the soil using a sprinkler or soaker hose, apply water slowly to the area of the excavation for a period of at least 4 hours, approximately 12 hours prior to the work so that the ground water level is at or near field capacity at the beginning of the work. For excavations that go beyond the damp soil, rewet the soil as necessary to keep soil moisture near field capacity.
        3.) Only use an air excavation tool specifically designed and manufactured for the intended purpose, and at pressures recommended by the manufacturer of the equipment, fracture the existing soil to the shape and the depths required. Work at rates and using techniques that do not harm tree roots. Air pressure shall be a maximum of 90-100 psi.
            a.) The air excavation tool shall be "Air-Spade" as manufactured by Concept Engineering Group, Inc., Verona, PA (412) 826-8800, or Air Knife as manufactured by Easy Use Air Tools, Inc. Allison Park, Pa (866) 328-5723 or approved equal.
        4.) Remove soil using a commercial, high-powered vacuum truck if required, remove the soil from the excavation produced by the Air Knife excavation. The vacuum truck should generally operate simultaneously with the hose operator, such that the soil produced is picked up from the excavation hole, and the exposed roots can be observed and not damaged by the ongoing operation.
    c. Tunneling methods: directional boring, auger boring, jack-piping, or drilling.
    d. Hydro-vac excavation: Using high pressure water with a high-volume vacuum to excavate trenches or edges of trenches is acceptable where roots crossing the trench cannot be retained.
        1.) Hydrovac excavation shall be considered in areas where excavation must be conducted perpendicular to roots, in areas of multiple trees and where a high density of roots is expected.
        2.) Hydrovac excavation may also be used to remove stumps where grinding is not an option.
        3.) Dispose of all soil in a manner that meets local laws and regulations.
6. Backhoe with flat front bucket: In some cases, excavation with a backhoe and flat front bucket can be used per approval of the Owner's arborist.
7. Restore soil within the trench as soon as the work is completed. Utilize soil removed during

excavation or soil of similar texture to the removed soil and lightly compact with hand tools. Leave soil mounded over the trench to a height of approximately 10% of the trench depth to account for settlement.

a. Where gravel is required to be placed around utility lines or structures apply soil to the top 3 feet of the trench per the above specification.

E. Root Management:

1. The Owner's Arborist shall monitor and direct all root pruning within or at the edge of the TPZ per 015639.1.14.E.
2. In the areas where roots are encountered, work shall be performed and scheduled to close excavations as quickly as possible over exposed roots. Schedule the work so that foundations or utility work is completed immediately after the excavation.
3. Retain roots:
   a. Retain all structural roots crossing trenches and in graded surfaces wherever possible.
   b. Redirect exposed roots in backfill areas where possible at the direction of the Owner's Arborist. It may be necessary to expose roots beyond the excavation limits to bend and relocate them without breaking.
   c. Work around in a manner that does not break the outer layer of the root surface (bark).
   d. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Root pruning:
   a. Prune roots with a sharp saw or bypass lopper or pruner under the direction of the Owner's Arborist.
   b. Prune roots approximately 3 inches back from the trench edge or new construction.
   c. Do not use excavation equipment to sever or tear roots.
   d. Owner's Arborist shall measure and record the diameter of the root cut(s) and distance to the trunk to assess impacts to and structural stability of the tree.
5. Exposed roots and root cuts:
   a. Roots and root cuts shall be maintained above permanent wilt point at all times. Do not let the roots dry out.
      1.) Cover the roots in wood chips, temporary earth cover, or pack with wet burlap and apply soil or wood chips on top.
      2.) Mist the roots several times during the day.
      3.) If the excavated area must remain open overnight, mist the roots and cover the excavation with black plastic.
      4.) Remove all plastic and burlap prior to backfilling or covering with soil.

F. Soil Management In TPPZ:

Note to specifier: *Consult with the Landscape Architect to reference the correction sections of the specification regarding soil testing and appropriate soil product specifications in cases where additional soil must be added within the TPZ.*

1. Soil Testing: Prior to soil amendment and aeration, submit samples of existing soil to a certified third-party soil testing laboratory for analysis to determine if amendment is necessary and for amendment recommendations (see Section 32.90.00.2.01)
2. Application of New Soil within the TPPZ: To the extent possible, use stockpiled topsoil from excavation activities elsewhere onsite. The soil shall have a similar texture to the existing soil in the TPPZ from excavation activities elsewhere onsite.
   a. Stockpile existing topsoil during grading activities to be used withing the TPPZ and other planting areas onsite.
   b. If topsoil from the site is not available, the Landscape Architect and Owner's Arborist shall identify an appropriate topsoil blend for use within the TPPZ.
   c. Use pneumatic air tools to roughen the soil surface to a depth of 6 inches prior to application of new soils within the TPPZ. Do not use mechanical tools like rototillers, that will cause damage to root systems, to scarify the soil surface.

3. Soil Amendment: Soil amendment shall only be conducted within the TPPZ according to recommendations based on soil testing.
    a. Soil amendment may be conducted if the soil test results indicate low levels of organic matter. Rates of less than 2-5% organic matter are typically considered low in Western Washington. Areas for soil amendment are called out on the Soils Plan.
    b. Amendment Method:
        1.) Use pneumatic air tools to loosen the top 6 to 8 inches of soil. Avoid damaging the bark of any exposed roots during this process.
        2.) Make chemical adjustment as recommended by the soil test and add 2 to 3 inches of compost over the soil.
        3.) Use pneumatic air tools to mix the compost into the top 6 inches of loosened soil.
        4.) Apply approximately one inch of water over the loosened soil at the completion of application.
4. Soil Aeration: Where the soil within the TPPZ is assessed to be compacted near or above root limited levels in the upper soil horizon as a result of traffic or other mechanical compaction, aerate soil surface per recommendations by the Landscape Architect and Owner's Arborist.
    a. Modifications Option 1 – Soil Loosening:
        1.) Remove the tops of all plants to be removed from the compaction zone. Remove sod with a walk behind sod cutter. Do not remove the tops of plants to be retained in the compaction zone. Do not grub out the roots of plants to be removed.
        2.) Moisten soil to field capacity, applying water until soil is moist to a depth of 8 – 12 inches, 24 hours prior to conducting work.
        3.) Use a pneumatic air tool (Air Knife or Air Spade) to loosen the top 9 – 12 inches of the soil.
        4.) Surface roots may move and separate from soil during this process. Do not damage the bark on roots.
        5.) Make chemical adjustment as recommended by the soil test and add 2 - 3 inches of compost over the soil.
        6.) Using the pneumatic air knife, mix the compost into the top 8 inches of the loosened soil.
        7.) Work in sections such that the entire process - including irrigation - can be completed in one day. Apply approximately one inch of water over the loosened soil at the completion of each day's work. Apply mulch or turf as indicated on the drawings within one week of the completion of work.
    b. Modifications Option 2 – Vertical Trenching:
        1.) Remove the tops of all plants to be removed from the compaction zone. Remove sod with a walk behind sod cutter. Do not remove the tops of plants to be retained in the compaction zone. Do not grub out the roots of plants to be removed.
        2.) Moisten soil to field capacity, applying water until soil is moist to a depth of 8 – 12 inches, 24 hours prior to conducting work.
        3.) Use a pneumatic air tool (Air Knife or Air Spade) to create small holes 1 to 2 feet on center to a depth of 8 - 12 inches. Keep tip of tool below the soil surface.
        4.) Surface roots may move and separate from soil during this process. Do not damage the bark on roots.
        5.) Rake 3 inches of compost or a soil compost mix over and into the vertical trenches.
        6.) Make chemical adjustment as recommended by the soil test.
        7.) Work in sections such that the entire process - including irrigation - can be completed in one day. Apply approximately one inch of water over the loosened soil at the completion of each day's work. Apply mulch or turf as indicated on the drawings within one week of the completion of work.

3.9 TREE AND PLANT MAINTENANCE

A. Irrigation:
    1. The General Contractor shall be fully responsible to ensure that adequate water is supplied and provided to all plants to be preserved during the entire construction period. Adequate water is defined to be maintaining soil moisture above the permanent wilt point to a depth of 8 inches or

greater.
2. The system shall be installed no later than May 1 or within two weeks of receiving Notice to Proceed by owner if the project starts after May 1.
3. Acceptable methods of irrigation are:
   a. Automatic sprinkler system with solar and/or battery-operated timers.
   b. Automatic drip irrigation system with solar and/or battery-operated timers.
   c. Watering with a watering truck equipped with rotating overhead sprayers and hoses with spray nozzles.
   d. Tree watering bag are allowed if approved by the Owner and refilled twice weekly.
4. The General Contractor or Landscape Firm shall adjust the automatic irrigation system, if available, or apply additional water, using hoses or water tanks as required.
5. The Owner's Arborist shall test the moisture content in the soil within the root zone to determine the water content and inform irrigation schedule changes.

B. Soil Moisture:
1. Volumetric soil moisture level, in all soils within the Tree and Plant Protection Area shall be maintained above permanent wilt point to a depth of at least 8 inches. No soil work or other activity shall be permitted within the Tree and Plant Protection Area when the volumetric soil moisture is above field capacity. The permanent wilt point and field capacity for each type of soil texture shall be defined as follows (numbers indicate percentage volumetric soil moisture).

Soil type	**Permanent wilt point v/v**	**Field capacity v/v**
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

2. The Owner's Arborist shall measure volumetric soil moisture with a digital, electric conductivity meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent meter.
3. If the moisture is too high, suspend operations until the soil moisture drains to below field capacity.
4. The contractor managing irrigation operations shall attend one site inspection with the Owner's Arborist per month during the drought season from May through September. At that time the irrigation system will be inspected for repairs and adjustment to watering schedules.

C. Pruning:
1. Standards:
   a. All pruning shall be done in accordance with the current ANSI A300, ISA BMP Tree Pruning (latest edition).
2. Tools:
   a. Use sharp pruning saws, by-pass pruners or loppers to make clean cuts. Do not break or chop branches.
3. Clearance:
   a. Tree branches that interfere with the construction may be tied back or pruned to clear only to the point necessary to complete the work. Other branches shall only be removed when specifically indicated by the Owner's Arborist. Tying back or trimming of all branches shall be in accordance with accepted arboricultural practices (ANSI A300, part 8) and be performed under supervision of the Owner's Arborist.
4. Maintenance:
   a. Within one month of the estimated date of substantial completion, prune all dead, broken, or hazardous branches larger than 2 inch in diameter from all trees to remain.
   b. Implement all pruning recommendations found in the Pruning Schedule per 015639.1.11.E.

c. Prune any low, hanging branches and vines from existing trees and shrubs that overhang walks, streets and drives, or parking areas as follows:
1.) Walks - within 8 feet vertically of the proposed walk elevation.
2.) Parking areas - within 12 feet vertically of the proposed parking surface elevation.
3.) Streets and drives - within 14 feet vertically of the proposed driving surface elevation.

5. Disease Prevention:
a. Where tree specific disease vectors require, sterilize all pruning tools between the work in individual trees.

6. Debris Management:
a. Chip branches removed from trees and spread where indicated or as directed by the Owner's Arborist or Landscape Architect.

7. Schedule
a. Perform other pruning tasks as indicated on the drawings or requested by the Owner's Arborist per 015639.1.11.E.

D. Cabling and Bracing:
1. Have Tree Service install tree support systems per Owner's Arborist Report or recommendation.
2. Conduct installation according to current ANSI A300 (Part 3) standard and ISA BMP for Tree Support Systems - Cabling, Bracing, Guying, and Propping (current edition).

E. Weed Removal:
1. During the construction period, control any plants that seed in and around the fenced TPPZ at least three times a year per the direction of the Owner's Arborist.
a. All plants that are not shown on the planting plan or on the Tree and Plant Protection Plan to remain shall be considered as weeds.
2. At the end of the construction period provide one final weeding of the TPPZ.

F. Insect and Disease Control:
1. Monitor all plants to remain for disease and insect infestations during the entire construction period. Provide all disease and insect control required to keep the plants in a healthy state using the principles of Integrated Plant Management (IPM). All pesticides shall be applied by a certified pesticide applicator and approved by the Seattle Public Schools' IPM Coordinator

3.10 CLEAN-UP

A. During tree and plant protection work, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
1. Immediately report and clean up any spilled or tracked soil, fuel, oil, trash, or debris deposited on all surfaces within the project or on public right of ways and neighboring property according to the Washington State Department of Ecology regulatory requirements and guidelines.

3.11 REMOVAL OF FENCING AND OTHER TREE AND PLANT PROTECTION

A. At the end of the construction period and under the approval of the Owner's Arborist:
1. Remove all Tree and Plant Protection Fencing, and Signage.
2. Disassemble temporary irrigation. Consult with the Owner to determine whether any automated irrigation system parts shall be salvaged and saved for other SPS projects.
3. Wash soil and mulch from hardscape and other structures.
4. Ensure that Tree and Plant Protection Mulch is confined to planting beds. Tree and Plant Protection Mulch shall remain in the TPPZ post construction and landscape improvements.
a. Do not remove Tree Protection Mulch to replace with composted mulch.
b. Tree and Plant Protection Mulch may be topped up with additional wood chips or composted mulch within or at the edge of the TPPZ to achieve the desired aesthetic or to match differences in the depth of mulch between the TPPZ and any surrounding landscape beds.
c. As necessary, light hand raking may be used to manage the mulch layer, no more than 1 inch of the mulch layer within the TPPZ should be disturbed.

3.12 DISPOSAL OF WASTE MATERIALS

A. Remove excess materials including excavated soil, unused mulch, unused removed tree parts and logs from the Owner's property.

B. Dispose of materials according to local regulations.

C. Burning of materials is not permitted.

3.13 REPAIR DAMAGED TREES AND PLANTS

A. Promptly employ mitigation measures, in the endeavor to repair or treat tree or plant trunk, limbs or roots damaged by construction within 24 hours of receipt of written instructions from the Owner's Arborist.

B. Any remedial work on damaged retained plants recommended by the Owner's Arborist shall be completed by the General Contractor at no cost to the owner. Remedial work shall include but is not limited to soil compaction remediation and vertical mulching, pruning and or cabling, insect and disease control approved by the Seattle Public Schools' IPM Coordinator, compensatory watering, and additional mulching.

C. Remedial work may extend up to two years following the completion of construction to allow for any requirements of multiple applications or the need to undertake applications at required seasons of the year.

3.14 DAMAGE OR LOSS TO EXISTING PLANTS TO REMAIN

Note to specifier: *This clause is not written to cover high value heritage trees. A specification to address high value heritage trees should be added here if any exist on the project.*

A. Any trees or plants designated to remain which are irreparably damaged by the General Contractor's failure to protect and/or maintain such tree and designated to be incapable of restoring to a normal growth pattern by the Owner's Arborist resulting in tree or plant loss, shall be removed, and replaced in kind by the General Contractor at their own expense. The Owner shall provide final approval of removal and replacement.
   1. The Owner's Arborist shall conduct the assessment of irreparable damage and loss according to the following parameters:
      a. Hazard Condition: Damage leading to moderate to high-risk condition using the ISA TRAQ method.
      b. Damage Threshold: Damage affecting more than 25 percent of the crown, or 25 percent of the trunk circumference, or 25 percent of the root protection area shall be considered requiring replacement or appraisal.
      c. Trees failing to fully foliate the first spring following project completion.

B. Removal and replacement shall be conducted according to the following:
   1. The Owner may elect to retain an irreparably damaged tree or plant and replant in another location.
   2. Tree removal shall include all cleanup of all wood parts and grinding of the stump to a depth sufficient to plant the replacement tree or plant, removal of all chips from the stump site and filling the resulting hole with topsoil.
   3. Trees shall be replaced with a tree of a species recommended by the Landscape Architect and of equal size or 4-inch caliper whichever is less.
   4. Shrubs and perennials shall be replaced with a plant of similar species and equal size or the largest size plants reasonably available whichever is less. Where replacement plants are to be less than the size of the plant that is damaged, the Landscape Architect shall approve the size and quality of the replacement plant.
   5. Location of the tree(s) or plant(s) shall be determined by the Landscape Architect with final approval from the Owner.
   6. Provide full subgrade preparation prior to planting or repair subgrade per the Landscape Architect

and Owner’s Arborist recommendations in any areas impacted due to construction activity of any kind, including vehicle access, storage of material, or clearing.

7. All trees and plants shall be installed per the requirements of the Landscape Architect and Owner’s Arborist. including applying approved mulch over bare soil after planting.
8. Establish a TPPZ around the newly planted tree(s) or plant(s) and limit construction activity, machinery, and vehicular access based on the Owner’s Arborist recommendations during and after repair activities.
9. Newly planted trees and plants are subject to inspection for Acceptance by the Owner’s Arborist and Landscape Architect.

3.15 MONETARY PAYMENTS FOR LOSS OR INJURY TO TREES WITHIN TREE AND PLANT PROTECTION ZONES

A. It is Owner’s option, to require monetary compensation from the General Contractor in addition to replanting trees. The Owner may elect to retain the tree and still hold the General Contractor liable for compensation.

B. In the event of tree loss or irreparable damage, the amount of damages to be paid by the General Contractor to the Owner for each tree lost will be the larger amount of either:
   1. A sum equal to the value of each lost tree as determined on the Tree Appraisal Value Table prepared by the Owner's Arborist. The Tree Appraisal Value Table is based on the latest edition of the Trunk Formula Method established by the Council of Tree and Landscape Appraisers and indicated by the city of Seattle in their Tree Code.
   2. A sum of $8,000.

C. In the event of tree injury, the amount of damages to be paid by the General Contractor to the Owner for each injury event shall be:
   1. A sum of $2,500.

END OF SECTION 015639

Tree Solutions Inc
Consulting Arborists

Steel Plates Over Roots - Installation Specification

1. Materials
   A. Steel Plates
      1. Minimum 10-gauge (9/64-inch) thickness
   B. Lag Bolts
      1. Minimum 3/8-inch diameter
   C. Gravel
      1. Angular gravel with no fines of a size necessary for the type of paving being used.
2. Methods
   A. Pavement Removal
      1. Existing Pavement must be removed by hand or using a small excavator with a flat front bucket, working slowly to avoid damage to roots.
         a. When feasible, an arborist should be on-site to monitor and guide the excavation.
      2. Excavators used for pavement removal must remain on existing pavement. If an excavator must work from areas without pavement, soils must be protected. A minimum of 6-inches of wood chip mulch over the soil and 1-inch-thick steel plates for heavy machinery, or 6 inches of wood chips and/or 1-inch-thick plywood for light machinery. AlturnaMats® or arborist approved equivalent may also be used for soil protection.
      3. At no time may an excavator traverse unprotected soils within the dripline of retained trees.
   B. Root Excavation
      1. Root excavation must occur by hand or with pneumatic air excavation. Hydro-vac excavation may not be used due to the high risk of stripping bark off roots planned for retention.
      2. Cover roots which will be exposed for more than 8 hours with wet burlap or wood chip mulch to prevent desiccation.
   C. Root Shaving/Planing
      1. Only roots greater than 3-inches in diameter and interfering with new pavement may be shaved.
      2. Up to one-third of the root diameter may be shaved without ISA Certified Arborist consultation.
      3. Up to one-half of the root diameter may be shaved with ISA Certified Arborist Consultation and approval.
      4. Shaving of roots must occur using a sharp planing tool or sharp debarking tool.
   D. Steel Plate Installation - (on shaved or unshaved roots)
      1. Drill pilot holes through steel plates and roots 3-inches diameter and greater.
      2. Attach steel plates to roots using specified lag bolts.
   E. Gravel Placement
      1. Install gravel between and over steel plates to obtain the grades necessary for paving.
   F. Pavement Installation
      1. Install pavement directly over steel plates or gravel as necessary.

References:

Mann, Gordon, RCA. Sidewalk and Root Conflicts: Mitigating the Conflict - An Overview. Accessed on Municipal Research and Services Center (MRSC) website at: http://mrsc.org/getmedia/4DD1A628-BD5A-49E3- B1EE-3D09525F63BE/m58mannmade.aspx

APPENDIX E

Hazardous Building Materials Survey Report

Hazardous Building Materials Inspection Report

John Muir Elementary School Early Learning Addition Project
3301 South Horton Street
Seattle, Washington

January 19, 2023
Terracon Project No.81227372

Prepared for:
Seattle School District No. 1
Seattle, Washington

21905 64th Ave West, Suite 100
Mountlake Terrace, WA 98043
P (425) 771-3304

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Mountlake Terrace, WA 98043
P (425) 771-3304
Terracon.com

January 19, 2023

Seattle School District No. 1
Mail Stop 22-331
PO Box 34165
Seattle, Washington 98124

Attn: Ms. Matisia Hollingsworth

RE: Hazardous Building Materials Inspection
John Muir Elementary School Early Learning Addition Project
3301 South Horton Street
Seattle, Washington

Terracon Project No. 81227372

Dear Ms. Hollingsworth:

This report presents the results of the hazardous building materials inspection conducted in support of the John Muir Elementary School Early Learning Addition Project, located at 3301 South Horton Street in Seattle, Washington. The scope of the services provided is described in Terracon Proposal Number P81227372 dated August 1, 2022.

We appreciate the opportunity to be of service to you on this project. If there are any questions regarding this report or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
Terracon Consultants, Inc.

for Jacob Lindberg
Industrial Hygienist

Scott Parker
Principal / Department Manager

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EXECUTIVE SUMMARY

Seattle School District No. 1 retained Terracon Consultants, Inc. (Terracon) to conduct a targeted hazardous building materials inspection in support of the John Muir Elementary School Early Learning Addition Project, located at 3301 South Horton Street in Seattle, Washington. Terracon's representative, Mr. Jacob Lindberg, conducted the inspection on November 21-23, 2022.

Terracon inspected the building for the following regulated building materials:

- Asbestos-containing materials (ACM)
- Assumed asbestos-containing materials
- Lead-containing coatings (paints)
- Mercury-containing light tubes, switches, and thermostats
- Suspected high-intensity discharge (HID) lamps
- Suspected Polychlorinated biphenyls (PCB)-containing fluorescent light ballasts

Asbestos

One-hundred and three bulk samples of suspect asbestos-containing materials were collected and analyzed using Polarized Light Microscopy (PLM). Two of the sampled materials were found to contain greater than one percent asbestos and are therefore considered ACM and two materials were assumed to be ACM. In addition, one material was visually inspected and determined to be non-suspect.

Lead

Twenty-six paint chip samples were collected and analyzed for total lead content. Two of the paint chip samples were found to contain detectable levels of lead.

Other Regulated Materials

Mercury-containing fluorescent light tubes were identified in the building. Observed light ballasts were electronic and therefore not suspected of containing PCBs.

Mercury-containing switches and thermostats were not observed in the project area.

High intensity discharge lamps were observed in the project area.

1.0 INTRODUCTION

Seattle School District No. 1 retained Terracon Consultants, Inc. (Terracon) to conduct a targeted hazardous building materials inspection in support of the John Muir Elementary School Early Learning Addition Project, located at 3301 South Horton Street in Seattle, Washington. Terracon's representative, Mr. Jacob Lindberg, conducted the inspection on November 21-23, 2022.

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- Suspected high-intensity discharge (HID) lamps
- Suspected Polychlorinated biphenyls (PCB)-containing fluorescent light ballasts

2.0 PROJECT BACKGROUND

This report presents the results of our hazardous building materials inspection in support of the John Muir Elementary School Early Learning Addition Project. The purpose of the inspection was to identify potential asbestos-containing material, lead-containing coatings, PCB-containing light ballasts, and mercury-containing components prior to building renovation and for purposes of hazard communication and on-going management. The inspection included targeted materials on the interior and exterior of the building that will potentially be impacted by the renovation scope listed below. This inspection did not include other areas of the interior, the exterior, or the roof of the building.

John Muir Elementary School Early Learning Addition Project scope:

- Addition of four new classrooms
- Renovation of the 3rd open space to classrooms
- Replacement of the window glazing on the 2nd and 3rd floors of the 1971 building
- Replacement/upgrade of the fire alarm and fire suppression system
- Replacement of existing lighting
- Replacement/upgrade of the electrical service including expanding main electrical room
- Replacement of water heater
- Modernization of loading dock, playground, bicycle parking, and ramp

The John Muir Elementary School consists of two sections identifiable by their build dates. The northern section of the school was built in the 1990's and consists of the majority of the 1st and 2nd floor classrooms, gymnasium, auditorium, offices, mechanical spaces, restrooms, and kitchen. The southern section of the school was built in the 1970's and consists of classrooms, mechanical spaces, restrooms, and an elevator. For purposes of this report, they are referenced as "1990's build" and "1970's build" respectively.

During the inspection, the following areas were not accessible and therefore not included in the inspection:

- Speaker boxes throughout the school
- Glued on ceiling tiles and hard lid ceilings in the gymnasium
- Glued on ceiling tiles on hard lid ceilings in the 2nd floor classrooms of the 1970's addition
- Elevator shaft and cab of the 1970's addition
- Stick pin mastic presumed to be present above ceiling insulation and behind acoustic wall panels in the 1970's addition

This inspection report will assist Seattle School District No. 1 with communicating the presence of regulated building materials, and the presence, location, and quantity of ACM to employees, vendors, and contractors working in the project area and to meet the requirements for an asbestos survey for the Puget Sound Clean Air Agency (PSCAA) and a good faith inspection as required by Washington State Department of Labor and Industries' Division of Occupational Safety and Health (DOSH) regulations prior to building renovation. Regulations require that a complete copy of this report be kept in a conspicuous location on-site at all times during activities that may impact known and suspect ACM.

2.1 Sources of Information

During the course of the inspection, the following individuals and drawings provided assistance to the Terracon inspector:

- Mr. Ken Sawicki, Custodial Engineer of John Muir Elementary School, assisted with navigation and access
- Ms. Matisia Hollingsworth, Project Manager, Seattle Public Schools
- John Muir Elementary School, Architectural Drawings, prepared by Streeter/Dermanis and Associated Architects, dated May 8, 1990, sheets A2.3, A2.4, and A2.5
- Record Drawing For: John Muir Elementary School, Existing Floor Plan Drawings, prepared by Mahlum, dated February 2022

2.2 Building Description

BUILDING INFORMATION			
Address	3301 South Horton Street, Seattle, Washington		
Building Use	Elementary School		
Building Square Footage	56,827 ft^2	Number of Floors	3
Construction Date(s)	1970 and 1990		
Main Structure	Concrete masonry units (CMU) blocks, brick, and poured concrete walls with metal, steel, and wood framing		
Roof Type	Not included in the project scope		
PROJECT AREA OR BUILDING CONSTRUCTION			
Building Insulation	Fiberglass insulation		
Flooring Substrate	Reinforced concrete		
Flooring Finishes	Vinyl floor tiles, concrete, carpet squares		
Interior Wall Finishes	Gypsum wallboard and cement masonry units (CMU) block		

Ceiling Finishes	Suspended acoustical ceiling tile, glued-on ceiling tile, and gypsum wallboard
Heating System	Interior HVAC equipment located in mechanical spaces feeds ducting with ceiling-mounted diffusers
Domestic Water	Hot water is provided by hot water tanks in the boiler room.
Pipe Insulation	Observed heating, cooling and domestic water lines are insulated with neoprene and plastic wrapped yellow fiberglass

3.0 ASBESTOS ASSESSMENT

3.1 Building Assessment

Mr. Jacob Lindberg, an Asbestos Hazard Emergency Response Act (AHERA)-accredited building inspector (Certification 185923, expiration date: 8/10/2023) from Terracon, performed the sampling on November 21-23, 2022. Terracon's inspector collected 103 samples of materials identified as suspect ACM.

This inspection was conducted using a modified protocol adapted from AHERA. The protocol is as follows:

- Identify suspect asbestos-containing materials.
- Group materials into homogeneous sampling areas/materials.
- Quantify each homogeneous material and collect representative samples. The number of samples collected of miscellaneous materials was determined by the inspector.
- Samples of each material were taken to the substrate, ensuring that all components and layers of the material were included.
- Sample locations are referenced on the field data forms according to sample number.
- Sampling was performed by an AHERA-accredited building inspector, and the use of proper protective equipment and procedures were followed.

3.2 Sampling Procedures

This sampling was conducted using the following procedures:

1. Spread the plastic drop cloth (if needed) and set up other equipment, e.g., ladder.
2. Don protective equipment (respirator and protective clothing if needed).
3. Label sample container with its identification number and record number. Record sample location and type of material sampled on a sampling data form.
4. Moisten area where sample is to be extracted (spray the immediate area with water).
5. Extract sample using a clean knife, drill capsule, or cork boring tool to cut out or scrape off approximately one tablespoon of the material. Penetrate all layers of material.
6. Place sample in a container and tightly seal it.
7. Wipe the exterior of the container with a wet wipe to remove material that may have adhered to it during sampling.
8. Clean tools with wet wipes and wet mop; or vacuum area with HEPA vacuum to clean all debris.

9. Discard protective clothing, wet wipes and rags, cartridge filters, and drop cloth in a labeled plastic waste bag.

3.3 Analytical Methodology

Suspect ACMs were sampled in general accordance with 40 CFR 763.86 by an Environmental Protection Agency (EPA) AHERA-accredited building inspector. Each sample was collected and stored in a heavy-duty, self-sealing plastic bag, and delivered to EMSL Analytical, Inc in Seattle, Washington. Quality control bulk samples were collected and stored in the same manner, and delivered to Seattle Asbestos Test in Seattle, Washington. Samples were analyzed via polarized light microscopy (PLM) in accordance with EPA/600/R-93/116. In addition, samples were further analyzed by PLM point count method. EMSL Analytical, Inc and Seattle Asbestos Test are accredited to perform PLM analysis by the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NVLAP).

3.4 Asbestos Results

Table 3.4-1 provides a list of suspect homogeneous material sample descriptions, material locations, and results for this sampling. Also indicated within the table is the AHERA classification of Surfacing (S), Thermal System Insulation (TSI), or Miscellaneous (M). Asbestos-containing materials and assumed asbestos-containing materials are presented in bold text. Refer to the attached Figures for sample locations and room number designations. Refer to the Appendix for photographs that are representative the homogenous materials.

Table 3.4-1. Results of Bulk Sample Analyses

Material No.	Material Description	Material Location	Results
1 (M)	■ Black/brown sealant	Exterior windowsill seams of the 1970s build	ND
2 (M)	■ Black sealant	Exterior windowsill seams and expansion joints of 1990s build	ND
3 (M)	■ White sealant	Exterior window frame seams of the 1970s build	ND
4 (M)	■ Grey sealant	Exterior door frame seams of the 1990s build	ND
5 (M)	■ Black vapor barrier	Associated with some exterior door frames in the 1970s build; assumed to be behind exterior brick siding throughout the 197**0's build**	10% Chrysotile
6 (M)	■ Black residual mastic	Residual mastic on some **exterior 4' concrete walls** on the west side of the 1970s build	3% Chrysotile

Table 3.4-1. Results of Bulk Sample Analyses

Material No.	Material Description	Material Location	Results
7 (M)	■ Grey cement masonry unit (CMU) blocks and mortar	Predominant interior walls in the 1990s build	ND (all layers)
8 (M)	■ Grey sealant	Associated with interior door and relight frames of the 1990s build	ND
9 (S)	■ Grey spray-applied fireproofing	Present on corrugated metal ceilings and structural support beams in 1990s build where accessible; assumed to be present above gypsum ceilings	ND
10 (M)	■ 2'x4' White suspended acoustical ceiling tile with 2'x2' pattern	Predominant ceiling finish throughout the 1990s build	ND
11 (M)	■ White joint compound with paint and paper ■ White gypsum wallboard with paper	Classroom and office ceilings and walls in portions of the 1990s build	ND (all layers)
12 (T)	■ Pink fiberglass batt insulation ■ Black asphaltic mastic with paper	Attic spaces of the 1990s build	ND (all layers)
13 (M)	■ Grey sealant	Associated with the base of the rain spout in the loading bay	ND
14 (M)	■ Red brick ■ Grey mortar	Exterior walls of the 1990s build	ND (all layers)
15 (M)	■ Black asphaltic vapor barrier with mastic	Associated with exterior seam between foundation slab and exterior walls of 1990s build	ND (all layers)
16 (M)	■ White joint compound with paint and paper ■ White gypsum wallboard with paper	Classroom and office ceilings and walls in portions of the 1970s build	ND (all layers)

Table 3.4-1. Results of Bulk Sample Analyses

Material No.	Material Description	Material Location	Results
17 (M)	■ Tan mastic	Associated with the east wall of the 3rd floor mechanical room in the 1970s build	ND
18 (M)	■ 1′x1′ White acoustic ceiling tile ■ Brown mastic	Ceiling and top portion of walls in the 2nd and 3rd floor classrooms of the 1970s build	ND (all layers)
19 (M)	■ White/tan pipe dope	Associated with fire suppression system pipe threads in the 1990s build	ND
20 (M)	■ Red fire stop sealant	Present at wall and ceiling penetrations associated with conduit lines in the 1990s build	ND
21 (M)	■ Grey sealant	Associated with HVAC system seams of the 1990s build	ND
22 (M)	■ Black vibration isolator	1st floor mechanical room of the 1990s build	ND
23 (M)	■ Black rubber gasket	Square flanges in the 1st floor mechanical room associated with the fire suppression system in the 1990s build	ND
24 (M)	■ 2′x4′ White suspended acoustical ceiling tile	Ceiling finish in 1st floor kindergarten and daycare of 1990s build	ND
25 (M)	■ Grey leveling compound	Floor finish in east end of 2nd floor mechanical space in 1990s build	ND
26 (M)	■ Black vibration isolator	Associated with HVAC systems in 1970s build	ND
27 (M)	■ Grey cement masonry unit (CMU) block ■ Grey mortar	Predominant interior walls in the 1970s build	ND (all layers)
28 (M)	■ Grey/green sealant	Associated with HVAC system seams of the 1970s build	ND

Table 3.4-1. Results of Bulk Sample Analyses

Material No.	Material Description	Material Location	Results
29 (M)	■ Grey sealant	Associated with interior door frames of the 1970s build	ND
30 (M)	■ 2'x4' White suspended acoustical ceiling tile with 2'x2' pattern	Predominant ceiling finish throughout the 1970s build	ND
31 (T)	■ Yellow foam insulation	Present at wall and ceiling penetrations associated with conduit lines in the 1970s build	Visually assessed and determined to be non-suspect
32 (M)	■ White pipe dope	Associated with fire suppression system pipe threads in the 1970s build	ND
33 (M)	■ 1'x1' White acoustical ceiling tile ■ Brown mastic	Present on walls above suspended ceiling within the 3rd floor elevator hallway of the 1970's build	ND (all layers)
34 (M)	■ Electrical panel internal components	Located in mechanical spaces, electrical closets, and some hallways throughout the 1970s build	Assumed to be asbestos containing (inaccessible)
35 (M)	■ Fire doors and associated fire door frames	Doorways in places throughout the building	Assumed to be asbestos containing (inaccessible)

ND: none detected, Material No.: homogenous material that is uniform in color, texture, general appearance, and construction and application date, S: Surfacing material per AHERA, T: Thermal system insulation per AHERA, M: Miscellaneous material per AHERA

Table 3.4-2 provides a list of sample IDs for the quality control samples collected. The material location references the information in Table 3.4-1 for the corresponding homogenous material. Asbestos-containing materials are presented in bold text. It should be noted that quality control sample locations are not shown on the Figures. The sample locations are the same as the corresponding sample ID without the "Q" designation. For example, quality control sample 1-03-QC was collected by breaking sample 1-03 in half.

Table 3.4-2. Results of Quality Control Bulk Sample Analyses

Sample No.	Material Description	Material Location	Results
1-03QC (M)	■ Black/brown sealant	Exterior windowsill seams of the 1970s build	ND

Table 3.4-2. Results of Quality Control Bulk Sample Analyses

Sample No.	Material Description	Material Location	Results
3-01QC (M)	■ White sealant	Exterior window frame seams of the 1970s build	ND
9-06QC (S)	■ Grey spray-applied fireproofing	Present on corrugated metal ceilings and structural support beams in 1990s build where accessible; assumed to be present above gypsum ceilings	ND
16-05QC (M)	■ White joint compound with paint and paper ■ White gypsum wallboard with paper	Classroom and office ceilings and walls in portions of the 1970s build	ND (all layers)

ND: none detected, Material No.: homogenous material that is uniform in color, texture, general appearance, and construction and application date, S: Surfacing material per AHERA, M: Miscellaneous material per AHERA.

The quality control sample results were consistent with the laboratory analytical results for the corresponding materials in the main batch of samples.

If the analytical results indicate that all the samples collected per homogenous material do not contain asbestos, then the material is not considered an ACM. However, if the analytical results of one or more of the samples collected per homogenous material indicate that asbestos is present in quantities of greater than one percent as defined by the EPA, the homogeneous material is considered to be ACM regardless of other analytical results (unless a representative number of samples have been analyzed by PLM point counting as described below, and the results indicate the material contains less than one percent asbestos).

Any material that contains greater than one percent asbestos is considered an ACM and must be handled according to Occupational Safety and Health Administration (OSHA), EPA, and applicable state and local regulations. The EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) 40 CFR 61, Subparts A and M has a requirement related to inspection of suspect ACM in buildings. When the asbestos content of a friable material is visually estimated by PLM to be detectable but less than ten percent, your firm may elect to (1) assume the amount is greater than one percent and treat the material as asbestos-containing or (2) require verification of the amount by the PLM point counting technique. If the results obtained by point counting and visual estimation are different, the point count result must be used. When no asbestos is detected by PLM, point counting is not required.

4.0 LEAD ASSESSMENT

Homogeneous areas of suspected lead-containing coatings (paints) were identified and sampled in accessible areas throughout the John Muir Elementary School Early Learning Addition Project located at 3301 South Horton Street in Seattle, Washington. Homogeneous painted surfaces were defined by substrate, application, and color.

4.1 Sampling Methodology

Paint chip samples were collected to the substrate to ensure that all layers present at the location sampled were included in the laboratory analysis. Each sample was collected and stored in a heavy-duty, self-sealing plastic bag and delivered to EMSL Analytical, Inc in Indianapolis, Indiana. Samples were analyzed via Atomic Absorption Spectrophotometry in accordance with Method EPA 7000B. EMSL Analytical, Inc in Indianapolis, Indiana is accredited by the American Industrial Hygiene Association (AIHA) for lead analysis.

4.2 Lead Sampling Results

Twenty-six paint chip samples were collected and analyzed for lead. Two samples had reportable levels of lead. The results of the analyses are presented in Table 4.2-1.

Table 4.2-1. Paint Chip Sample Results

Paint Number and Description	Paint Location	Sample Result (in ppm)
Pb1: Grey paint on concrete	Western exterior concrete walls of 1970s build	<80
Pb2: Grey paint on concrete	Eastern exterior concrete walls of 1970s build	<80
Pb3: White paint on CMU block	Interior walls in hallways of some classrooms and offices of 1990s build	<80
Pb4: Grey paint on CMU block	Lower 8 feet of interior gymnasium walls in 1990s build	<80
Pb5: Blue paint on CMU block	Lower 4 feet of interior hallways of 1990s build	<80
Pb6: Grey paint on concrete	Exterior cap of red brick half-wall in the loading bay	<80
Pb7: Off-white paint on gypsum wallboard	Predominant paint on walls and ceilings throughout the 1970s build	<80
Pb8: Grey paint on metal	Predominant paint on interior door frames in 1990s build	<80 to 2,800
Pb9: Green paint on metal	Predominant paint on interior doors in 1990s build	<80 to <97
Pb10: Light blue paint on gypsum wallboard	Interior walls in the library of the 1990s build	<80
Pb11: White paint on gypsum wallboard	Predominant paint on interior walls and ceilings throughout the 1990s build	<80
Pb12: Green paint on metal	Predominant paint on interior doors in 1970s build	<80
Pb13: Grey paint on metal	Predominant paint on interior door frames in 1970s build	2,100

Table 4.2-1. Paint Chip Sample Results

Paint Number and Description	Paint Location	Sample Result (in ppm)
Pb14: White paint on CMU block	Interior walls in hallways, some classrooms, and offices of 1970s build	<80
Pb15: Light blue paint on gypsum	Interior classroom accent walls in 1970s build	<80
Pb16: White paint on gypsum	Predominant paint on interior walls and ceilings throughout the 1970s build	<80

<: below the reporting limit, ppm: parts per million, CMU: concrete masonry unit, BOLD: lead detected

5.0 OTHER REGULATED BUILDING MATERIALS

5.1 Methodology – Universal Wastes

An inventory of fluorescent light tubes, HID lamps, and potential PCB-containing ballasts was conducted in accessible areas of the project.

Mercury-containing light tubes were counted and documented in an inventory by length. Light tubes were determined to be two-foot tubes and four-foot tubes

Magnetic ballasts are suspected of containing PCBs in the potting material or in the dielectric fluid in the capacitor. Electronic ballasts are not suspected of containing PCBs. A Philips Advance Sensor Switch "ballast checker" was used to identify magnetic versus electronic ballasts. The ballast checker is used by pointing the device at a powered light fixture, and the device indicates whether the ballast is electronic or magnetic.

Where high intensity discharge lamps could not be accessed or examined, the following assumptions were made:

- Each HID lamp contains one ballast
- Each HID lamp contains a minimum of one mercury bulb, sodium vapor bulb, or metal halide bulb

5.2 Results

Fluorescent light tubes were observed throughout the building interior. HID lamps were observed in the theater and on the building exterior. Observed light ballasts were electronic and therefore not suspected of containing PCBs. Mercury-containing switches and thermostats were not observed in the project area. Universal wastes were identified in the following quantities:

Table 5.2-1. Universal Wastes Results

Other Regulated Building Materials Description	Approximate Quantity (EA)
Mercury-containing fluorescent light tubes (4' length)	1,400

Table 5.2-1. Universal Wastes Results

Mercury-containing fluorescent light tubes (2′ length)	18
Mercury-containing HID lights (theater and exterior)	13

EA: each

6.0 CONCLUSIONS AND RECOMMENDATIONS

On November 21-23, 2022, Terracon conducted a hazardous building materials inspection of the John Muir Elementary School Early Learning Addition Project located at 3301 South Horton Street in Seattle, Washington.

6.1 Asbestos

The results of the asbestos inspection conducted at the John Muir Elementary School Early Learning Addition Project indicate that the following building materials sampled are ACMs or are assumed to contain greater than one percent asbestos.

Table 6.1-1. ACM and Assumed ACM

Material No.	Material Description	Material Location	Approximate Quantity
5 (M)	■ ACM black vapor barrier	Associated with some exterior door frames in the 1970s build; assumed to be behind exterior brick siding throughout the 1970′s build	3,100 SF
6 (M)	■ ACM black residual mastic	Residual mastic on some exterior 4′ concrete walls on the west side of the 1970s build	4 SF
34 (M)	■ Assumed ACM electrical panel internal components	Located in mechanical spaces, electrical closets, and some hallways throughout the 1970s build	4 EA
35 (M)	■ Assumed ACM fire doors and associated fire door frames	Doorways in places throughout the building	Double doors and frames: 6 EA Single doors and frames: 7 EA

Material No.: Homogenous material that is uniform in color, texture, general appearance, and construction and application date, M: Miscellaneous material per AHERA, SF: square feet, EA: Each

Asbestos-related work must be performed in compliance with Washington State worker protection and environmental protection regulations. See WAC 296-62, WAC 296-65, and PSCAA Regulation III, Article 4 for additional information.

Additional suspect ACMs may be present in areas not inspected or that were inaccessible or concealed. These spaces include, but are not limited to, areas outside of the targeted project

area, areas/materials listed in section 2.0, above hard ceiling decks, electrical systems, pipe chases, spaces between wall/ceiling/door/floor cavities, interior of mechanical components, beneath foundation pads, etc. If future maintenance, renovation, and/or demolition activities make these areas accessible, Terracon recommends that a thorough inspection of these spaces be conducted at that time to identify and confirm the presence or absence of additional suspect ACMs. Until then, all such unidentified materials must be treated as assumed ACMs in accordance with applicable federal, state, and local regulations.

6.2 Lead

Of the 26 samples analyzed, two were found to contain detectable levels of lead.

The Washington State Department of Labor and Industries requires an exposure assessment be conducted during operations that may disturb the lead paint in such a way that the airborne exposure may reach or exceed the Action level of 30 micrograms per cubic meter (µg/m^3) or the Permissible Exposure Limit of 50 µg/m^3. The worker protection requirements of WAC 296-155-176 "Lead in Construction" may apply.

Some of the coatings contained detectable levels of lead. If this building or portions of it will be demolished and disposed of, a toxicity characteristic leachate procedure (TCLP) sample that is representative of the waste stream must be collected and analyzed per the requirements of WAC 173-303. If the results of the TCLP analysis determine the waste to be a "dangerous waste" as defined by WAC 173-303, it must be disposed of accordingly.

6.3 Other Regulated Building Materials

Fluorescent light tubes, HID lamps, switches, and thermostats may contain mercury. Fluorescent light ballasts and HID lamp ballasts may contain PCBs. In Washington State, even ballasts labeled with "No PCBs" may have regulated quantities of PCBs and therefore should be handled in accordance with Washington Department of Ecology requirements. Employers must inform their employees of mercury and PCB hazards in accordance with WAC 296-800-170.

7.0 LIMITATIONS

This report presents the results of the hazardous building materials inspection conducted at the John Muir Elementary School Early Learning Addition Project located at 3301 South Horton Street in Seattle, Washington. The inspection was for the purposes of identifying ACM, lead-containing paint, mercury-containing components, PCB ballasts, and HID lamps prior to renovation.

The lead paint chip sampling and reporting conducted as a part of this inspection does not nor is intended to meet the requirements of the Environmental Protection Agency's Lead; Renovation, Repair, and Painting rule (RRP). Refer to EPA regulation 40CFR745 and Washington State regulation WAC 365-230 for additional information.

Regulated building material inspections are non-comprehensive and subject to many limitations, including those presented below. Our inspection has considered risks pertaining to asbestos, lead in coatings, fluorescent lamps, mercury switches, PCB ballasts, and HID lamps; however, this inspection is limited to only those locations and materials inspected. This inspection was not designed to identify all potential concerns or to eliminate all risks associated with renovation, demolition, material removal, construction, or transferring of

property title. Evaluation of other risks not specifically described in the Scope of Work have not been included; for example: structural integrity; engineering loads; electrical; mechanical; radon gas; slope stability; building settlement; and evaluation of toxic and hazardous substances in, or in contact with, soil and groundwater. No warranty, expressed or implied, is made.

Terracon has performed the services set forth in the Scope of Work in accordance with generally accepted industrial hygiene practices in the same or similar localities, related to the nature of the work accomplished, at the time the services were performed.

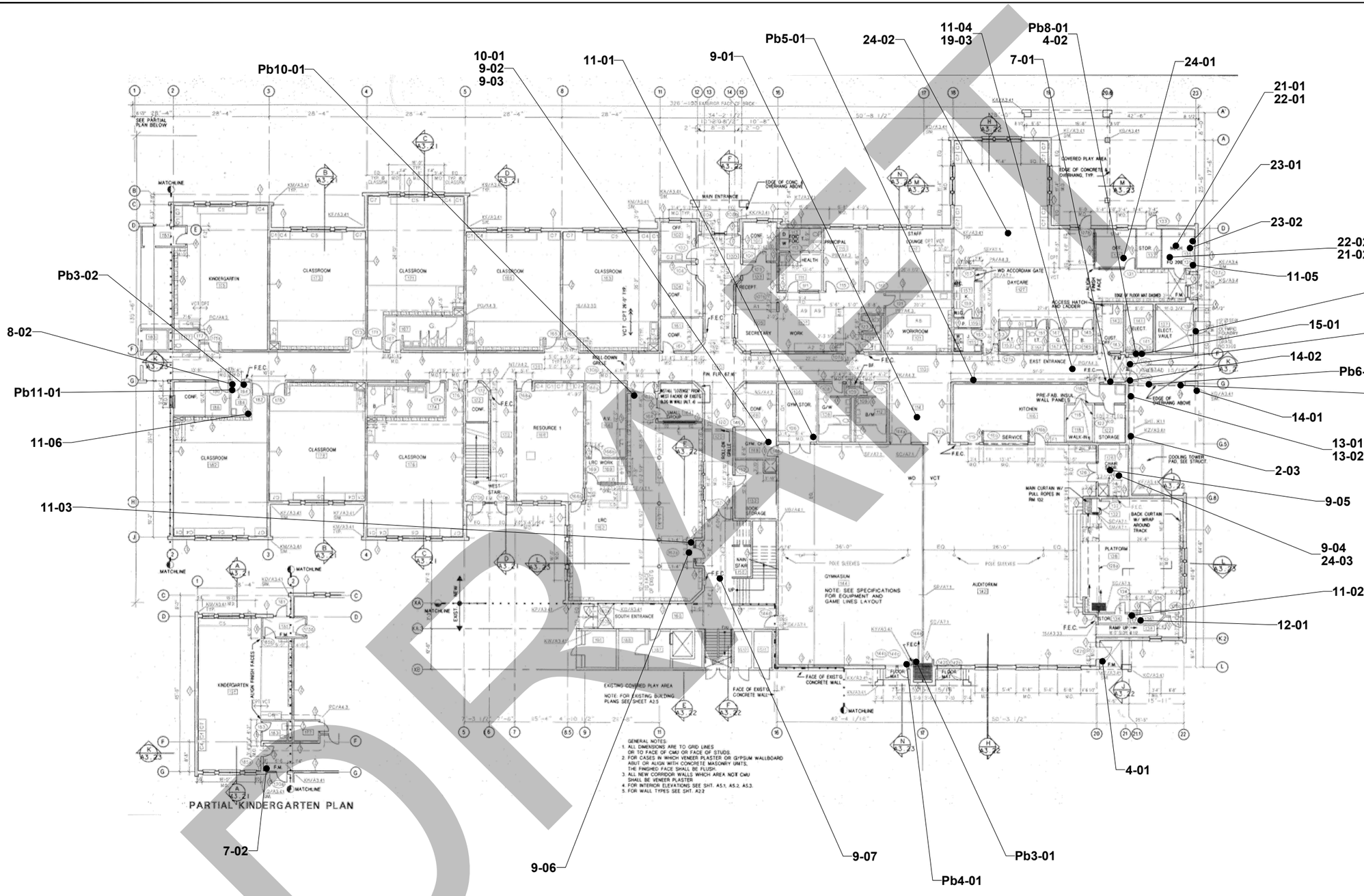
The regulated building materials and conditions presented in this report represent those observed on the dates we conducted the sampling. This sampling is intended for the exclusive use of Seattle School District No. 1 for specific application to the referenced property. This report does not replace nor can be used as professionally developed construction or demolition plans, specifications, or bidding documents. This report is not a legal opinion.

7.1 Reliance

This Report(s) was prepared for the exclusive use and reliance of the Client. Reliance by any other party is prohibited without the written authorization of the Client and Terracon. If the Client is aware of additional parties that will require reliance on the Report, the names, addresses and relationship of these parties must be provided for to Terracon for approval. Terracon will grant reliance on the Report to those approved parties upon receipt of a fully executed Reliance Agreement (available upon request) and receipt of an additional fee of $350.00 per relying party.

Reliance on the Report by the Client and all authorized parties will be subject to the terms, conditions and limitations stated in the Agreement for Services (and sections of this proposal incorporated therein), the Reliance Agreement, and the Report.

Appendix A
Sample Location Figure(s)



LEGEND

XX-XX — ASBESTOS SAMPLE NUMBER / MATERIAL NUMBER

PbX-XX — LEAD SAMPLE NUMBER / LEAD NUMBER

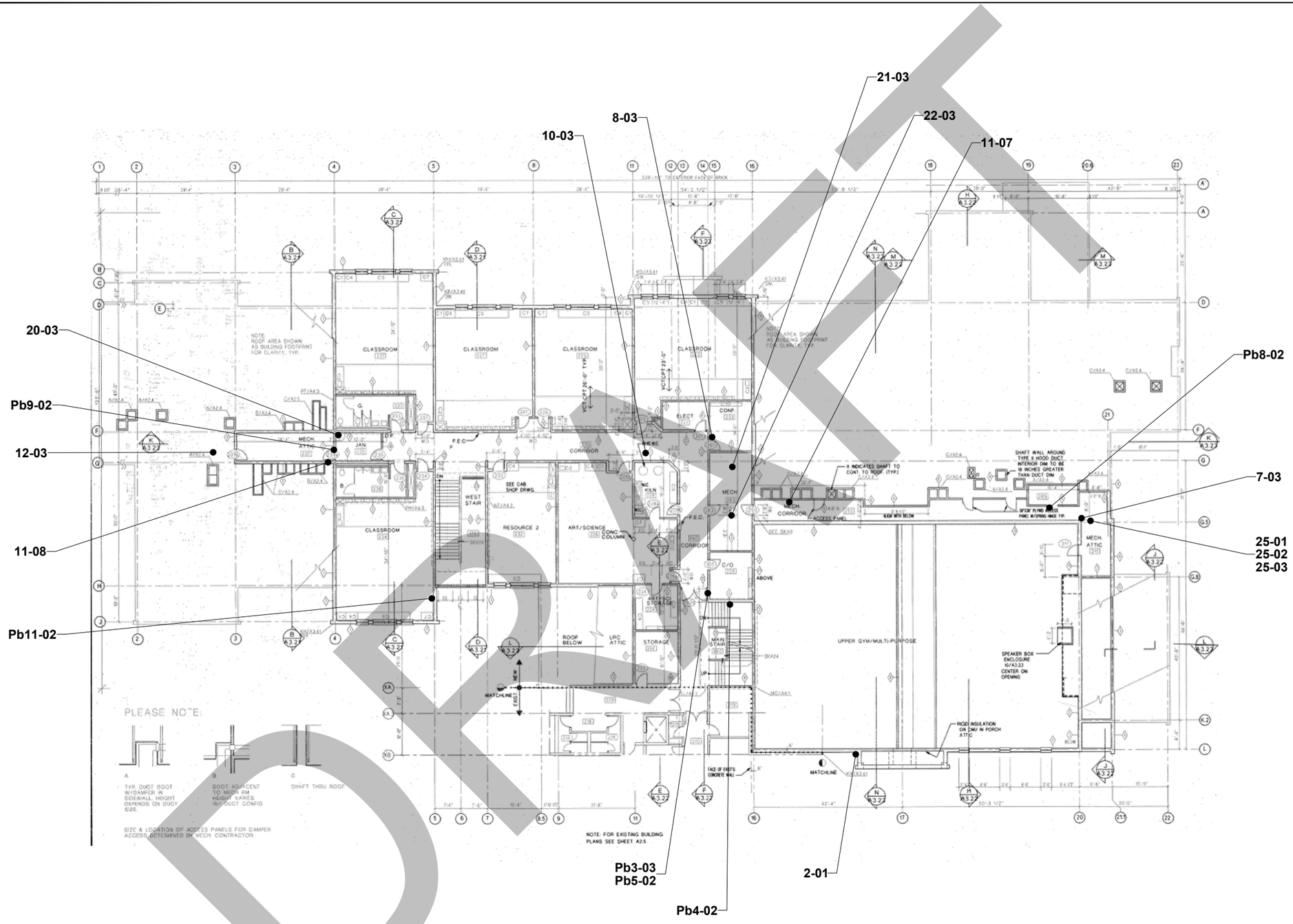
Project Mngr:	CAA
Drawn By:	AMP
Checked By:	JAL
Approved By:	SRP
Project No.	81227372
Scale:	N.T.S.
File No.	Exhibit 1
Date:	January 2023

Terracon
Explore with us
21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043
PH. (425) 771-3304 FAX. (425) 771-3549

FIRST FLOOR OF 1990's BUILD - SAMPLE LOCATION DIAGRAM

John Muir Elementary School Early Learning Addition Project
3301 S Horton St
Seattle, Washington

EXHIBIT 1



LEGEND

XX-XX
- XX — ASBESTOS SAMPLE NUMBER
- XX — MATERIAL NUMBER

PbX-XX
- X — LEAD SAMPLE NUMBER
- XX — LEAD NUMBER

Project Mngr:	CAA
Drawn By:	AMP
Checked By:	JAL
Approved By:	SRP
Project No.	81227372
Scale:	N.T.S.
File No.	Exhibit 2
Date:	January 2023

Terracon
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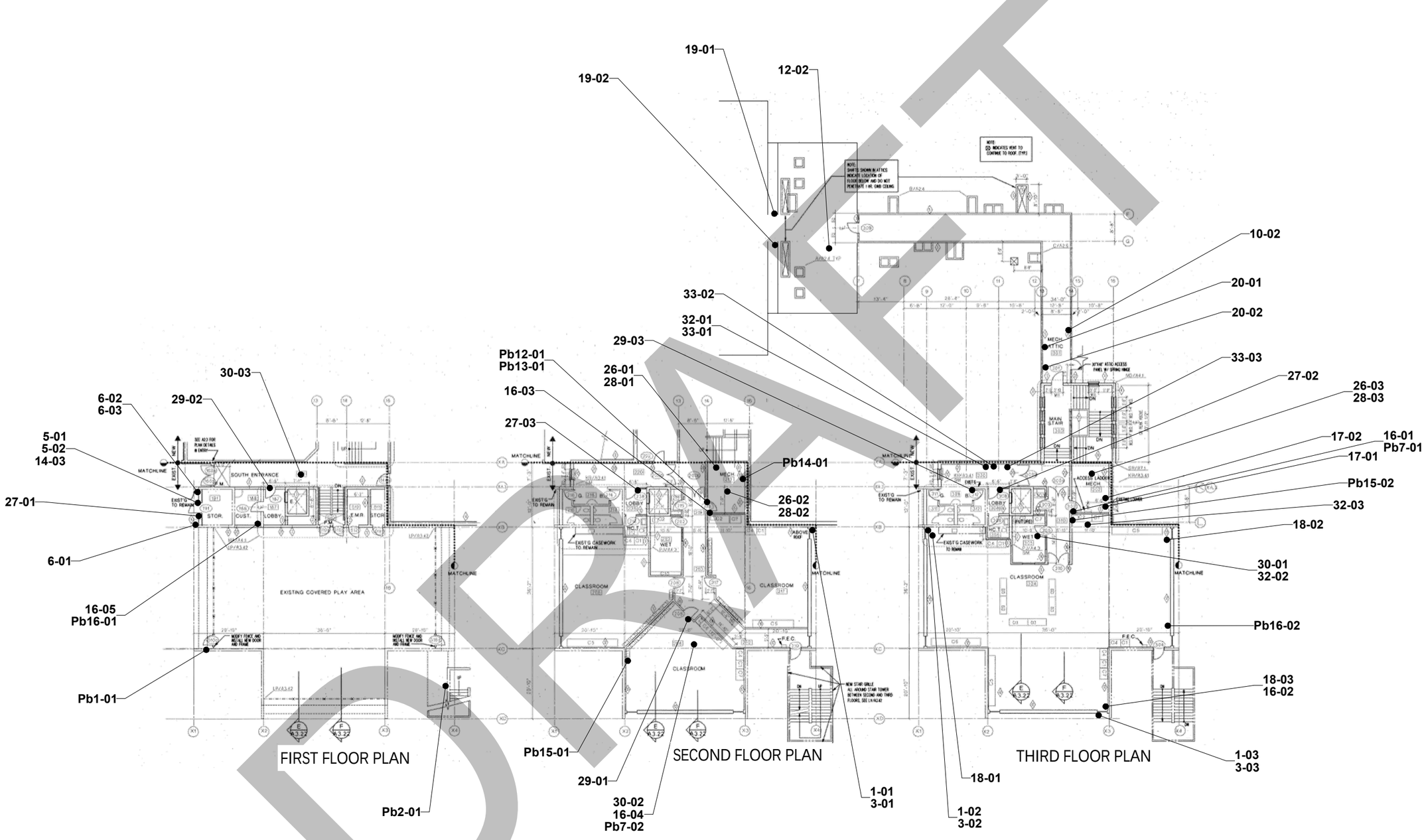
21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043
PH. (425) 771-3304 FAX. (425) 771-3549

SECOND FLOOR OF 1990's BUILD - SAMPLE LOCATION DIAGRAM

John Muir Elementary School Early Learning Addition Project
3301 S Horton St
Seattle, Washington

EXHIBIT 2



LEGEND

XX-XX — ASBESTOS SAMPLE NUMBER / MATERIAL NUMBER

PbX-XX — LEAD SAMPLE NUMBER / LEAD NUMBER

Project Mngr:	CAA
Drawn By:	AMP
Checked By:	JAL
Approved By:	SRP
Project No.	81227372
Scale:	N.T.S.
File No.	Exhibit 3
Date:	January 2023

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1ST, 2ND, AND 3RD FLOOR OF 1970's BUILD - SAMPLE LOCATION DIAGRAM

John Muir Elementary School Early Learning Addition Project
3301 S Horton St
Seattle, Washington

EXHIBIT 3

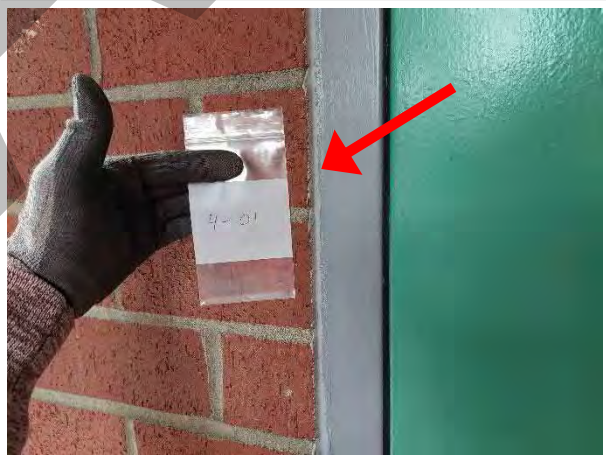
Appendix B
Photographs

Material 1

Material 2

Material 3

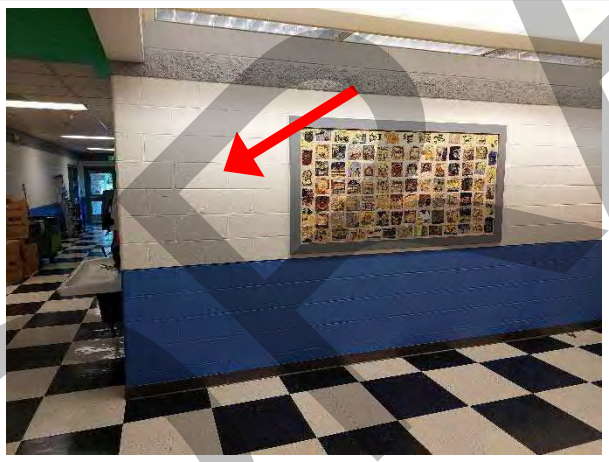
Material 4



Material 5

Material 6

Material 7

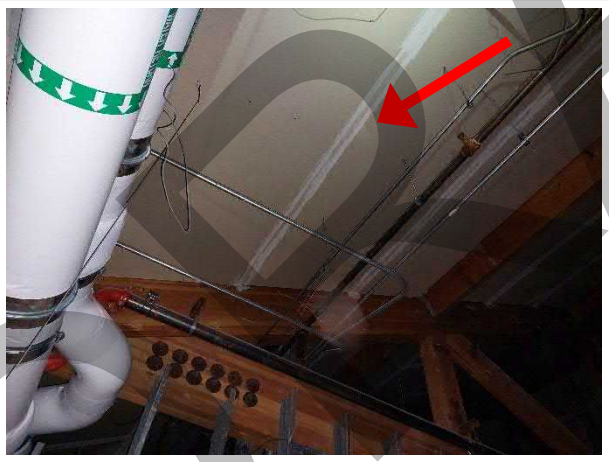


Material 8

Material 9

Material 10

Material 11



Material 12

Material 13

Material 14

Material 15

Material 16

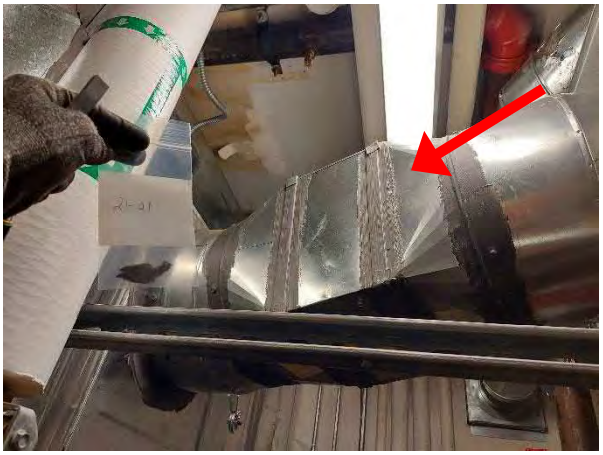
Material 17

Material 18

Material 19

Material 20

Material 21



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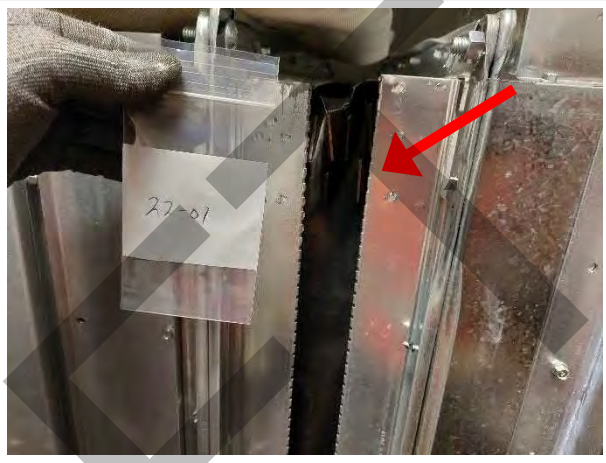

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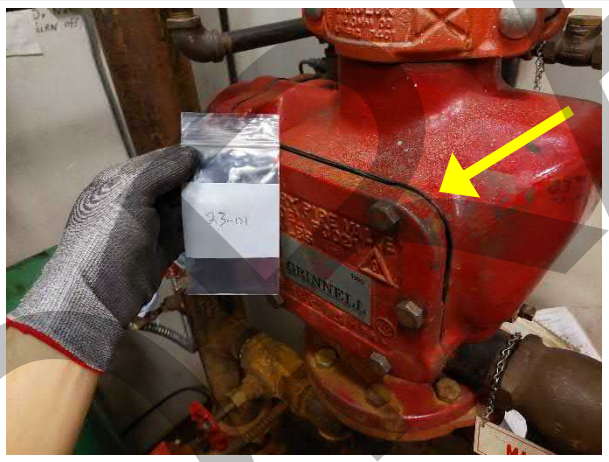


Material 24

Material 25

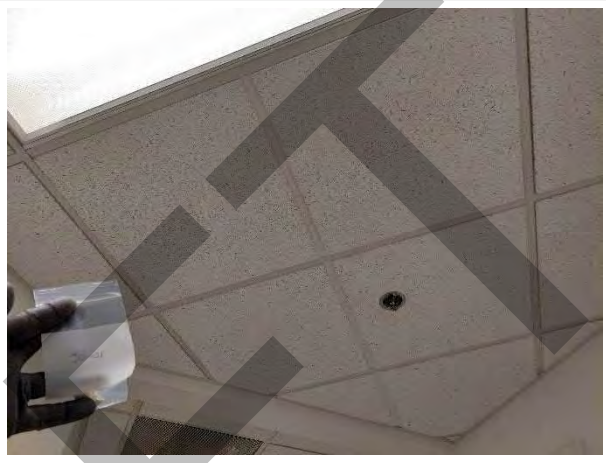
Material 26

Material 27

Material 28

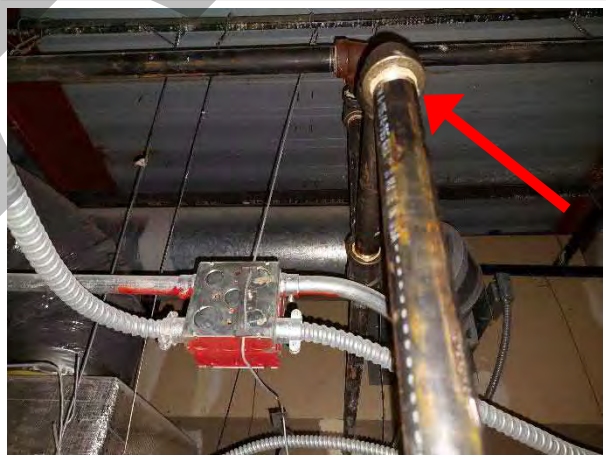
Material 29

Material 30



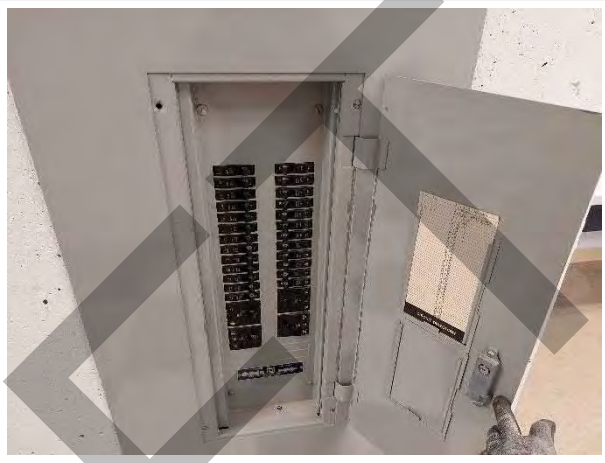
Material 31

Material 32



Material 33

Material 34



Material 35

Appendix C

Asbestos Laboratory Analytical Results

EMSL Analytical, Inc.

5900 4th Avenue S, Suite 100, 1st Floor Seattle, WA 98108

Tel/Fax: (206) 269-6310 / (206) 900-8789

http://www.emsl.com / seattlelab@emsl.com

EMSL Order:	512203102
Customer ID:	TCWA25
Customer PO:	81227372
Project ID:	

Attention:	Jacob Lindberg	**Phone:**	(425) 771-3304
	Terracon Consultants, Inc.	**Fax:**	(425) 771-3549
	21905 64th Ave. W.	**Received Date:**	12/01/2022 10:25 AM
	Suite 100	**Analysis Date:**	12/02/2022 - 12/06/2022
	Mountlake Terrace, WA 98043	**Collected Date:**	11/21/2022
Project:	81227372		

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
1-01 *512203102-0001*		Brown Non-Fibrous Homogeneous	HA: 1	100% Non-fibrous (Other)	None Detected
1-02 *512203102-0002*		Brown Non-Fibrous Homogeneous	HA: 1	100% Non-fibrous (Other)	None Detected
1-03 *512203102-0003*		Black Non-Fibrous Homogeneous	HA: 1	100% Non-fibrous (Other)	None Detected
2-01 *512203102-0004*		Gray Non-Fibrous Homogeneous	HA: 2	100% Non-fibrous (Other)	None Detected
2-02 *512203102-0005*		Gray Non-Fibrous Homogeneous	HA: 2	100% Non-fibrous (Other)	None Detected
2-03 *512203102-0006*		Brown Non-Fibrous Homogeneous	HA: 2	100% Non-fibrous (Other)	None Detected
3-01 *512203102-0007*		White Non-Fibrous Homogeneous	HA: 3	100% Non-fibrous (Other)	None Detected
3-02 *512203102-0008*		White Non-Fibrous Homogeneous	HA: 3	100% Non-fibrous (Other)	None Detected
3-03 *512203102-0009*		White Non-Fibrous Homogeneous	HA: 3	100% Non-fibrous (Other)	None Detected
4-01 *512203102-0010*		Gray Non-Fibrous Homogeneous	HA: 4	100% Non-fibrous (Other)	None Detected
4-02 *512203102-0011*		Gray Non-Fibrous Homogeneous	HA: 4	100% Non-fibrous (Other)	None Detected
4-03 *512203102-0012*		Black Non-Fibrous Homogeneous	HA: 4	100% Non-fibrous (Other)	None Detected

Initial report from: 12/08/2022 11:50:00

EMSL Analytical, Inc.
5900 4th Avenue S, Suite 100, 1st Floor Seattle, WA 98108
Tel/Fax: (206) 269-6310 / (206) 900-8789
http://www.emsl.com / seattlelab@emsl.com

EMSL Order: 512203102
Customer ID: TCWA25
Customer PO: 81227372
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
5-01 *512203102-0013*		Black Fibrous Homogeneous	3% Cellulose 15% Glass HA: 5	72% Non-fibrous (Other)	10% Chrysotile
5-02 *512203102-0014*		Black Fibrous Homogeneous	15% Glass HA: 5	75% Non-fibrous (Other)	10% Chrysotile
6-01 *512203102-0015*		Black Non-Fibrous Homogeneous	HA: 6	97% Non-fibrous (Other)	3% Chrysotile
6-02 *512203102-0016*		Black Non-Fibrous Homogeneous	HA: 6	97% Non-fibrous (Other)	3% Chrysotile
6-03 *512203102-0017*		Black Fibrous Homogeneous	HA: 6	97% Non-fibrous (Other)	3% Chrysotile
7-01 *512203102-0018*		Gray Non-Fibrous Homogeneous	HA: 7	10% Quartz 90% Non-fibrous (Other)	None Detected
7-02 *512203102-0019*		Gray Non-Fibrous Homogeneous	HA: 7	10% Quartz 90% Non-fibrous (Other)	None Detected
7-03 *512203102-0020*		Gray Non-Fibrous Homogeneous	HA: 7	15% Quartz 85% Non-fibrous (Other)	None Detected
8-01 *512203102-0021*		Gray Non-Fibrous Homogeneous	HA: 8	100% Non-fibrous (Other)	None Detected
8-02 *512203102-0022* *The sample group is not homogeneous*		Red Non-Fibrous Homogeneous	HA: 8	100% Non-fibrous (Other)	None Detected
8-03 *512203102-0023* *Inseparable paint / coating layer included in analysis.*		Tan/White/Blue Non-Fibrous Homogeneous	HA: 8	100% Non-fibrous (Other)	None Detected
9-01 *512203102-0024*		Gray Fibrous Homogeneous	95% Min. Wool HA: 9	5% Non-fibrous (Other)	None Detected
9-02 *512203102-0025*		Gray Fibrous Homogeneous	95% Min. Wool HA: 9	5% Non-fibrous (Other)	None Detected
9-03 *512203102-0026*		Gray Fibrous Homogeneous	90% Min. Wool HA: 9	10% Non-fibrous (Other)	None Detected

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EMSL Order: 512203102
Customer ID: TCWA25
Customer PO: 81227372
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
9-04 *512203102-0027*		Gray Fibrous Homogeneous	95% Min. Wool HA: 9	5% Non-fibrous (Other)	None Detected
9-05 *512203102-0028*		Gray Fibrous Homogeneous	80% Min. Wool HA: 9	20% Non-fibrous (Other)	None Detected
9-06 *512203102-0029*		Gray Fibrous Homogeneous	95% Min. Wool HA: 9	5% Non-fibrous (Other)	None Detected
9-07 *512203102-0030*		Gray Fibrous Homogeneous	80% Min. Wool HA: 9	20% Non-fibrous (Other)	None Detected
10-01 *512203102-0031* *Inseparable paint / coating layer included in analysis*		Gray Fibrous Homogeneous	25% Cellulose 40% Min. Wool HA: 10	15% Perlite 20% Non-fibrous (Other)	None Detected
10-02 *512203102-0032*		Gray Fibrous Homogeneous	20% Cellulose 35% Min. Wool HA: 10	10% Perlite 35% Non-fibrous (Other)	None Detected
10-03 *512203102-0033*		Gray Fibrous Homogeneous	35% Cellulose 35% Min. Wool HA: 10	15% Perlite 15% Non-fibrous (Other)	None Detected
11-01-Texture *512203102-0034*	Ceiling	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
11-01-Tape *512203102-0034A*	Ceiling	White Fibrous Homogeneous	85% Cellulose HA: 11	15% Non-fibrous (Other)	None Detected
11-01-Joint Compound *512203102-0034B*	Ceiling	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
11-01-Gypsum Wallboard *512203102-0034C*	Ceiling	Brown/White Fibrous Homogeneous	10% Cellulose HA: 11	65% Gypsum 25% Non-fibrous (Other)	None Detected
11-02-Texture *512203102-0035*	Corner	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
11-02-Tape *512203102-0035A*	Corner	White Fibrous Homogeneous	85% Cellulose HA: 11	15% Non-fibrous (Other)	None Detected
11-02-Joint Compound *512203102-0035B*	Corner	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
11-02-Gypsum Wallboard *512203102-0035C*	Corner	Brown/White Fibrous Homogeneous	15% Cellulose HA: 11	65% Gypsum 20% Non-fibrous (Other)	None Detected
11-03-Tape *512203102-0036*	Corner	Beige Fibrous Homogeneous	98% Cellulose HA: 11	2% Non-fibrous (Other)	None Detected
11-03-Joint Compound *512203102-0036A*	Corner	White Non-Fibrous Homogeneous	HA: 11	45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
11-03-Gypsum Wallboard *512203102-0036B*	Corner	Brown/White Fibrous Homogeneous	20% Cellulose <1% Glass HA: 11	65% Gypsum <1% Micaceous Flakes 15% Non-fibrous (Other)	None Detected
11-04 *512203102-0037*	Mid ceiling	Brown/White Fibrous Homogeneous	15% Cellulose HA: 11	65% Gypsum 20% Non-fibrous (Other)	None Detected
11-05-Texture *512203102-0038*	Corner	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
11-05-Tape *512203102-0038A*	Corner	White Fibrous Homogeneous	85% Cellulose HA: 11	15% Non-fibrous (Other)	None Detected
11-05-Joint Compound *512203102-0038B*	Corner	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
11-05-Gypsum Wallboard *512203102-0038C*	Corner	Brown/White Fibrous Homogeneous	15% Cellulose HA: 11	65% Gypsum 20% Non-fibrous (Other)	None Detected
11-06-Joint Compound *512203102-0039*	Corner	White Non-Fibrous Homogeneous	HA: 11	45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
11-06-Tape *512203102-0039A*	Corner	Beige Fibrous Homogeneous	98% Cellulose HA: 11	2% Non-fibrous (Other)	None Detected
11-06-Gypsum Wallboard *512203102-0039B*	Corner	Brown/White Fibrous Homogeneous	20% Cellulose 2% Glass HA: 11	65% Gypsum 13% Non-fibrous (Other)	None Detected
11-07-Texture *512203102-0040*	Midwall	White Non-Fibrous Homogeneous	HA: 11	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
11-07-Gypsum Wallboard *512203102-0040A*	Midwall	Brown/White Fibrous Homogeneous	15% Cellulose HA: 11	60% Gypsum 25% Non-fibrous (Other)	None Detected
11-08-Tape *512203102-0041*	Corner	Beige Fibrous Homogeneous	98% Cellulose HA: 11	2% Non-fibrous (Other)	None Detected
11-08-Joint Compound *512203102-0041A*	Corner	White Non-Fibrous Homogeneous	HA: 11	45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
11-08-Gypsum Wallboard *512203102-0041B*	Corner	Brown/White Fibrous Homogeneous	15% Cellulose <1% Glass HA: 11	65% Gypsum 20% Non-fibrous (Other)	None Detected
12-01-Wrap *512203102-0042*		Brown/White Fibrous Homogeneous	80% Cellulose HA: 12	20% Non-fibrous (Other)	None Detected
12-01-Insulation *512203102-0042A*		Pink Fibrous Homogeneous	95% Glass HA: 12	5% Non-fibrous (Other)	None Detected
12-02-Wrap *512203102-0043*		Brown/White Fibrous Homogeneous	80% Cellulose HA: 12	20% Non-fibrous (Other)	None Detected
12-02-Insulation *512203102-0043A*		Pink Fibrous Homogeneous	95% Glass HA: 12	5% Non-fibrous (Other)	None Detected
12-03-Wrap *512203102-0044*		Brown/Black Fibrous Homogeneous	80% Cellulose HA: 12	20% Non-fibrous (Other)	None Detected
12-03-Insulation *512203102-0044A*		Pink Fibrous Homogeneous	97% Glass HA: 12	3% Non-fibrous (Other)	None Detected
13-01 *512203102-0045*		Gray Non-Fibrous Homogeneous	HA: 13	100% Non-fibrous (Other)	None Detected
13-02 *512203102-0046*		Gray Non-Fibrous Homogeneous	HA: 13	100% Non-fibrous (Other)	None Detected
14-01-Brick *512203102-0047*		Red Non-Fibrous Homogeneous	HA: 14	10% Quartz 90% Non-fibrous (Other)	None Detected
14-01-Mortar *512203102-0047A*		Gray Non-Fibrous Homogeneous	HA: 14	20% Quartz 80% Non-fibrous (Other)	None Detected

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
14-02-Brick *512203102-0048*		Red Non-Fibrous Homogeneous	HA: 14	10% Quartz 90% Non-fibrous (Other)	None Detected
14-02-Mortar *512203102-0048A*		Gray Non-Fibrous Homogeneous	HA: 14	20% Quartz 80% Non-fibrous (Other)	None Detected
14-03-Brick *512203102-0049*		Red Non-Fibrous Homogeneous	HA: 14	10% Quartz 90% Non-fibrous (Other)	None Detected
14-03-Mortar *512203102-0049A*		Gray Non-Fibrous Homogeneous	HA: 14	15% Quartz 85% Non-fibrous (Other)	None Detected
15-01 *512203102-0050*		Brown/Orange Fibrous Homogeneous	75% Cellulose HA: 15	25% Non-fibrous (Other)	None Detected
15-02 *512203102-0051*		Brown/Orange Fibrous Homogeneous	75% Cellulose HA: 15	25% Non-fibrous (Other)	None Detected
15-03 *512203102-0052*		Tan/Black Non-Fibrous Homogeneous	65% Cellulose HA: 15	35% Non-fibrous (Other)	None Detected
16-01-Texture *512203102-0053*		White Non-Fibrous Homogeneous	HA: 16	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
16-01-Gypsum Wallboard *512203102-0053A*		Brown/White Non-Fibrous Homogeneous	15% Cellulose HA: 16	65% Gypsum 20% Non-fibrous (Other)	None Detected
16-02-Texture *512203102-0054*		White Non-Fibrous Homogeneous	HA: 16	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
16-02-Tape *512203102-0054A*		White Non-Fibrous Homogeneous	85% Cellulose HA: 16	15% Non-fibrous (Other)	None Detected
16-02-Joint Compound *512203102-0054B*		White Non-Fibrous Homogeneous	HA: 16	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
16-02-Gypsum Wallboard *512203102-0054C*		Brown/White Fibrous Homogeneous	15% Cellulose HA: 16	65% Gypsum 20% Non-fibrous (Other)	None Detected
16--03-Texture *512203102-0055*		White Non-Fibrous Homogeneous	HA: 16	40% Ca Carbonate 60% Non-fibrous (Other)	None Detected

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
16--03-Tape *512203102-0055A*		Beige Fibrous Homogeneous	98% Cellulose HA: 16	2% Non-fibrous (Other)	None Detected
16--03-Joint Compound *512203102-0055B*		White/Beige Non-Fibrous Homogeneous	HA: 16	45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
16--03-Gypsum Wallboard *512203102-0055C*		Brown/White Fibrous Homogeneous	15% Cellulose 2% Glass HA: 16	65% Gypsum 18% Non-fibrous (Other)	None Detected
16-04-Texture *512203102-0056*		White Non-Fibrous Homogeneous	HA: 16	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
16-04-Tape *512203102-0056A*		White Fibrous Homogeneous	85% Cellulose HA: 16	15% Non-fibrous (Other)	None Detected
16-04-Joint Compound *512203102-0056B*		White Non-Fibrous Homogeneous	HA: 16	50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
16-04-Gypsum Wallboard *512203102-0056C*		Brown Fibrous Homogeneous	15% Cellulose HA: 16	65% Gypsum 20% Non-fibrous (Other)	None Detected
16-05-Joint Compound *512203102-0057*		Beige Non-Fibrous Homogeneous	HA: 16	55% Ca Carbonate 45% Non-fibrous (Other)	None Detected
16-05-Tape *512203102-0057A*		Beige Fibrous Homogeneous	98% Cellulose HA: 16	2% Non-fibrous (Other)	None Detected
16-05-Gypsum Wallboard *512203102-0057B*		Brown/White Fibrous Homogeneous	15% Cellulose 2% Glass HA: 16	65% Gypsum 18% Non-fibrous (Other)	None Detected
17-01 *512203102-0058*		Tan Non-Fibrous Homogeneous	HA: 17	100% Non-fibrous (Other)	None Detected
17-02 *512203102-0059*		Tan Non-Fibrous Homogeneous	HA: 17	100% Non-fibrous (Other)	None Detected
18-01-Ceiling Tile *512203102-0060*		Gray Fibrous Homogeneous	20% Cellulose 45% Min. Wool HA: 18	10% Perlite 25% Non-fibrous (Other)	None Detected
18-01-Mastic *512203102-0060A*		Brown Non-Fibrous Homogeneous	HA: 18	100% Non-fibrous (Other)	None Detected

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
18-02-Ceiling Tile *512203102-0061*		Gray Fibrous Homogeneous	20% Cellulose 45% Min. Wool HA: 18	10% Perlite 25% Non-fibrous (Other)	None Detected
18-02-Mastic *512203102-0061A*		Brown Non-Fibrous Homogeneous	HA: 18	100% Non-fibrous (Other)	None Detected
18-03-Ceiling Tile *512203102-0062* *Inseparable paint / coating layer included in analysis.*		Brown/White Fibrous Homogeneous	35% Cellulose 35% Min. Wool HA: 18	20% Perlite 10% Non-fibrous (Other)	None Detected
18-03-Mastic *512203102-0062A*		Brown Non-Fibrous Homogeneous	HA: 18	100% Non-fibrous (Other)	None Detected
19-01 *512203102-0063*		White Fibrous Homogeneous	40% Wollastonite HA: 19	60% Non-fibrous (Other)	None Detected
19-02 *512203102-0064* *The sample group is not homogeneous*		Tan Fibrous Homogeneous	40% Wollastonite HA: 19	60% Non-fibrous (Other)	None Detected
19-03 *512203102-0065*		Gray/Tan Non-Fibrous Homogeneous	20% Wollastonite HA: 19	80% Non-fibrous (Other)	None Detected
20-01 *512203102-0066*		Red Non-Fibrous Homogeneous	3% Cellulose HA: 20	97% Non-fibrous (Other)	None Detected
20-02 *512203102-0067*		Red Non-Fibrous Homogeneous	3% Cellulose HA: 20	97% Non-fibrous (Other)	None Detected
20-03 *512203102-0068*		Red Fibrous Homogeneous	7% Glass HA: 20	93% Non-fibrous (Other)	None Detected
21-01 *512203102-0069*		Gray Non-Fibrous Homogeneous	HA: 21	100% Non-fibrous (Other)	None Detected
21-02 *512203102-0070*		Gray Non-Fibrous Homogeneous	HA: 21	100% Non-fibrous (Other)	None Detected
21-03 *512203102-0071*		Gray Non-Fibrous Homogeneous	HA: 21	100% Non-fibrous (Other)	None Detected
22-01 *512203102-0072*		Black Fibrous Homogeneous	45% Glass HA: 22	55% Non-fibrous (Other)	None Detected

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
22-02 *512203102-0073*		Black Fibrous Homogeneous	45% Glass HA: 22	55% Non-fibrous (Other)	None Detected
22-03 *512203102-0074*		Black Fibrous Homogeneous	40% Glass HA: 22	60% Non-fibrous (Other)	None Detected
23-01 *512203102-0075*		Black Non-Fibrous Homogeneous	HA: 23	100% Non-fibrous (Other)	None Detected
23-02 *512203102-0076*		Black Non-Fibrous Homogeneous	HA: 23	100% Non-fibrous (Other)	None Detected
24-01 *512203102-0077* *Inseparable paint / coating layer included in analysis*		Gray Fibrous Homogeneous	15% Cellulose 35% Min. Wool HA: 24	15% Perlite 35% Non-fibrous (Other)	None Detected
24-02 *512203102-0078*		Gray Fibrous Homogeneous	15% Cellulose 35% Min. Wool HA: 24	15% Perlite 35% Non-fibrous (Other)	None Detected
24-03 *512203102-0079* *Inseparable paint / coating layer included in analysis*		White/Beige Fibrous Homogeneous	25% Cellulose 45% Min. Wool HA: 24	15% Perlite 15% Non-fibrous (Other)	None Detected
25-01 *512203102-0080*		Gray Non-Fibrous Homogeneous	HA: 25	20% Quartz 80% Non-fibrous (Other)	None Detected
25-02 *512203102-0081*		Gray Non-Fibrous Homogeneous	HA: 25	20% Quartz 80% Non-fibrous (Other)	None Detected
25-03 *512203102-0082*		Gray Non-Fibrous Homogeneous	HA: 25	15% Quartz 85% Non-fibrous (Other)	None Detected
26-01 *512203102-0083*		Black Fibrous Homogeneous	40% Glass HA: 26	60% Non-fibrous (Other)	None Detected
26-02 *512203102-0084*		Black Fibrous Homogeneous	40% Glass HA: 26	60% Non-fibrous (Other)	None Detected
26-03 *512203102-0085*		Black Fibrous Homogeneous	40% Glass HA: 26	60% Non-fibrous (Other)	None Detected
27-01-Masonry *512203102-0086*		Gray Non-Fibrous Homogeneous	HA: 27	15% Quartz 85% Non-fibrous (Other)	None Detected

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
27-01-Mortar *512203102-0086A*		Gray Non-Fibrous Homogeneous	HA: 27	10% Quartz 90% Non-fibrous (Other)	None Detected
27-02-Masonry *512203102-0087* *Inseparable paint / coating layer included in analysis*		Gray Non-Fibrous Homogeneous	HA: 27	15% Quartz 85% Non-fibrous (Other)	None Detected
27-02-Mortar *512203102-0087A* *Inseparable paint / coating layer included in analysis*		Gray Non-Fibrous Homogeneous	HA: 27	10% Quartz 90% Non-fibrous (Other)	None Detected
27-03-Masonry *512203102-0088*		Gray/White Non-Fibrous Homogeneous	HA: 27	10% Quartz 90% Non-fibrous (Other)	None Detected
27-03-Mortar *512203102-0088A*		Gray Non-Fibrous Homogeneous	HA: 27	15% Quartz 85% Non-fibrous (Other)	None Detected
28-01 *512203102-0089*		Gray Non-Fibrous Homogeneous	HA: 28	100% Non-fibrous (Other)	None Detected
28-02 *512203102-0090*		Gray Non-Fibrous Homogeneous	HA: 28	100% Non-fibrous (Other)	None Detected
28-03 *512203102-0091*		Gray Non-Fibrous Homogeneous	HA: 28	100% Non-fibrous (Other)	None Detected
29-01 *512203102-0092*		White Non-Fibrous Homogeneous	HA: 29	100% Non-fibrous (Other)	None Detected
29-02 *512203102-0093*		White Non-Fibrous Homogeneous	HA: 29	100% Non-fibrous (Other)	None Detected
29-03 *512203102-0094*		Gray Non-Fibrous Homogeneous	HA: 29	100% Non-fibrous (Other)	None Detected
30-01 *512203102-0095*		Gray Non-Fibrous Homogeneous	20% Cellulose 40% Min. Wool HA: 30	10% Perlite 30% Non-fibrous (Other)	None Detected
30-02 *512203102-0096*		Gray Fibrous Homogeneous	20% Cellulose 35% Min. Wool HA: 30	10% Perlite 35% Non-fibrous (Other)	None Detected
30-03 *512203102-0097* *Inseparable paint / coating layer included in analysis*		White/Beige Fibrous Homogeneous	25% Cellulose 40% Min. Wool	15% Perlite 20% Non-fibrous (Other)	None Detected

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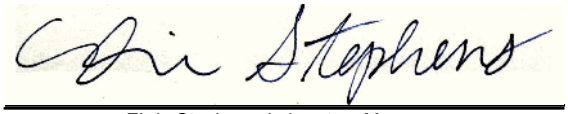
Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
			HA: 30		
32-01 *512203102-0098*		Tan Non-Fibrous Homogeneous	35% Wollastonite HA: 32	65% Non-fibrous (Other)	None Detected
32-02 *512203102-0099*		Tan Fibrous Homogeneous	35% Wollastonite HA: 32	65% Non-fibrous (Other)	None Detected
32-03 *512203102-0100*		White Non-Fibrous Heterogeneous	 HA: 32	100% Non-fibrous (Other)	None Detected
33-01-Ceiling Tile *512203102-0101*		White Fibrous Homogeneous	5% Cellulose 55% Min. Wool HA: 33	40% Non-fibrous (Other)	None Detected
33-01-Mastic *512203102-0101A*		Brown Non-Fibrous Homogeneous	 HA: 33	100% Non-fibrous (Other)	None Detected
33-02-Ceiling Tile *512203102-0102*		White Fibrous Homogeneous	5% Cellulose 60% Min. Wool HA: 33	35% Non-fibrous (Other)	None Detected
33-02-Mastic *512203102-0102A*		Brown Non-Fibrous Homogeneous	 HA: 33	100% Non-fibrous (Other)	None Detected
33-03-Ceiling Tile *512203102-0103* *Inseparable paint / coating layer included in analysis*		Gray/White Fibrous Homogeneous	5% Cellulose 70% Min. Wool HA: 33	25% Non-fibrous (Other)	None Detected
33-03-Mastic *512203102-0103A*		Brown Non-Fibrous Homogeneous	3% Fibrous (Other) HA: 33	97% Non-fibrous (Other)	None Detected

Analyst(s)
Claudiu Nistor (53)
Carolyn Yeo (93)



Ehrin Stephens, Laboratory Manager
or Other Approved Signatory

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Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (*Lab Use Only*): #512203102

Company : Terracon Consultants, Inc.	**EMSL-Bill to:** ☐ Same ☑ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 21905 64th Ave. W. Suite 100	
City: Mountlake Terrace **State/Province:** WA	**Zip/Postal Code:** 98043 **Country:** US
Report To (Name): Jacob Lindberg	**Telephone #:**
Email Address: Jacob.Lindberg@Terracon.com	**Fax #:** **Purchase Order:**
Project Name/Number: 81227372	**Please Provide Results:** ☐ Fax ☑ Email ☐ Mail
U.S. State Samples Taken: WA	**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☒ 1 Week ☐ 2 Week

**For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PLM - Bulk (reporting limit)	TEM – Bulk
☒ PLM EPA 600/R-93/116 (<1%) ES	☐ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
☐ PLM EPA NOB (<1%)	☐ NY ELAP Method 198.4 (TEM)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ Chatfield Protocol (semi-quantitative)
Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
☐ NIOSH 9002 (<1%)	☐ TEM Qualitative via Filtration Prep Technique
☐ NY ELAP Method 198.1 (friable in NY)	☐ TEM Qualitative via Drop Mount Prep Technique
☐ NY ELAP Method 198.6 NOB (non-friable-NY)	**Other**
☐ OSHA ID-191 Modified	☐
☐ Standard Addition Method	

☐ **Check For Positive Stop – Clearly Identify Homogenous Group** **Date Sampled:** 11/21 to 11/23

Samplers Name: Jacob Lindberg **Samplers Signature:** [signature]

Sample #	HA #	Sample Location	Material Description
01	1		
02	1		
03	1		
01	2		
02	2		
03	2		
01	3		
02	3		
03	3		
01	4		

Client Sample # (s): 1-01 to 33-03 **Total # of Samples:** 103

Relinquished (Client): Jacob Lindberg **Date:** 11/28/22 **Time:** 1145

Received (Lab): Claudia N M **Date:** 12/1/22 **Time:** 10:25 AM

Comments/Special Instructions:

BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention. Phone: 913-599-6886 Email: Purchase Order:

3912 8207 0690

EMSL ANALYTICAL, INC.
LABORATORY · PRODUCTS · TRAINING

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

#512203102

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	HA #	Sample Location	Material Description
02	4		
03	4		
01	5		
02	5		
01	6		
02	6		
03	6		
01	7		
02	7		
03	7		
01	8		
02	8		
03	8		
01	9		
02	9		
03	9		
04	9		
05	9		
06	9		
07	9		
01	10		
02	10		
03	10		
01	11	Ceiling	

***Comments/Special Instructions:**

BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Phone: 913-599-6886 Email: Purchase Order:

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

#512203102

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	HA #	Sample Location	Material Description
02	11	Corner	
03	11	corner	
04	11	mid wall Ceiling	
05	11	Corner	
06	11	Corner	
07	11	mid wall	
08	11	Corner	
01	12		
02	12		
03	12		
01	13		
02	13		
01	14		
02	14		
03	14		
01	15		
02	15		
03	15		
01	16	Corner	
02	16	Corner	
03	16	Corner	
04	16	Soffit seam	
05	16	corner	
01	17		

***Comments/Special Instructions:**

BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Phone: 913-599-6886 Email: Purchase Order:

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

#5122031 02

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	HA #	Sample Location	Material Description
02	17		
01	18		
02	18		
03	18		
01	19		
02	19		
03	19		
01	20		
02	20		
03	20		
01	21		
02	21		
03	21		
01	22		
02	22		
03	22		
01	23		
02	23		
01	24		
02	24		
03	24		
01	25		
02	25		
03	25		

***Comments/Special Instructions:**

BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Phone: 913-599-6886 Email: Purchase Order:

Page 4 of 5 pages

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(Lab Use Only)*:

#512203102

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	HA #	Sample Location	Material Description
01	26		
02	26		
03	26		
01	27		
02	27		
03	27		
01	28		
02	28		
03	28		
01	29		
02	29		
03	29		
01	30		
02	30		
03	30		
01	32		
02	32		
03	32		
01	33		
02	33		
03	33		

***Comments/Special Instructions:**

BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Phone: 913-599-6886 Email: Purchase Order:

Page 5 of 5 pages

SEATTLE ASBESTOS TEST, LLC

Lynnwood Laboratory: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel: 425.673.9850, Fax: 425.673.9810, NVLAP Lab Code: 200768-0

www.seattleasbestostest.com, admin@seattleasbestostest.com

Project Manager:	Christina Anderson	Date Analyzed:	11/28/2022
Client:	Argus Pacific - A Terracon Company	Client Job#:	81227372
Address:	21905 64th Ave W, Mountlake Terrace, Suite 100, WA 98043	Project Location:	John Muir ES
Tel:	206.285.3373	Laboratory batch#:	202211548
Date Report Issued:	11/28/2022	Samples Received:	4

Enclosed please find the test results for the bulk samples submitted to our laboratory for asbestos analysis. Analysis was performed using polarized light microscopy (PLM) in accordance with Test Method US EPA - 40 CFR Appendix E of Part 763, Interim Method of Determination of Asbestos in Bulk Insulation Samples and Test Method US EPA/600/R-93/116.

Percentages for this report are done by visual estimate and relate to the suggested acceptable error ranges by the method. Since variation in data increases as the quantity of asbestos decreases toward the limit of detection, the EPA recommends point counting for samples containing between <1% and 10% asbestos (NESHAP, 40 CFR Part 61). Statistically, point counting is a more accurate method. If you feel a point count might be beneficial, please feel free to call and request one.

The test results refer only to the samples or items submitted and tested. The accuracy with which these samples represent the actual materials is totally dependent on the acuity of the person who took the samples. This report must not be used by the client to claim product certification, approval, or endorsement by Seattle Asbestos Test, LLC, NVLAP, NIST, or any agency of the Federal government. The test report or calibration certificate shall not be reproduced except in full, without written approval of the laboratory. If the sample is inhomogeneous the sub-samples of the components are analyzed separately as layers.This report in its entirety consists of this cover leter, the customer sampling COC or data sheet, and the analytical report which is page numbered.

This report is highly confidential and will not be released without your consent. Samples are archived for 30 days after the analysis, and disposed of as hazardous waste thereafter.

Thank you for using our service and let us know if we can further assist you.

Sincerely

SZhang

Steve (Fanyao) Zhang
Approved Signatory

2022115648

SEATTLE ASBESTOS TEST, LLC

Analyzing Quality

Lynnwood Lab: 19701 Scriber Lake Road, Suite 103, WA 98036, Tel:425.673.9850, Fax:425.673.9810
Bellevue Lab: 12727 Northup Way, Suite 1, Bellevue, WA 98005, Tel:425.861.1111, Fax:425.861.1118
Seattle Lab: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel:206.633.1111, Fax:206.633.4747, Email:admin@seattleasbestostest.com

CHAIN OF CUSTODY

☒ Bulk Asbestos ☐ Point Count 400 ☐ Point Count 1000 ☐ Point Count Gravimetric ☐ Other (Specify)

☐ 1 Hour ☐ 2 Hours ☐ Same day (4 to 6 Hrs.) ☐ 1 Day ☒ 5 Days

Terracon/Arqus Pacific

21905 64th Ave W, Suite 100 Mountlake Terrace, WA 98043 Tel: 425-771-3304

Number of Samples 4 PO# 81227372 Project Location John Muir ES

Project Manager (Check one or more):

☒	Christina Anderson	360.303.7452	Christina.Anderson@terracon.com	☐	Derica Escamilla	425.697.1122	Derica.Escamilla@terracon.com
☐	Kyle Fitzpatrick	253.709.8258	Kyle.Fitzpatrick@terracon.com	☐	John McCaslin	206.795.1338	John.Mccaslin@terracon.com
☐	Scott Parker	206.714.7152	Scott.Parker@terracon.com	☐	Daniel Sheppard	425.273.6046	Daniel.Sheppard@terracon.com
☐				☐	Mackie Reed	714.351.8381	Mackie.Reed@terracon.com
				☒	Jacob Lindberg	602.980.4468	Jacob.Lindberg@terracon.com

SEQ#	CLIENT SAMPLE #	SAMPLE DESCRIPTION	LOCATION	NOTES
1	1-03 QC			
2	3-01 QC			
3	9-06 QC			
4	16-05 QC			
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

	Print Name	Signature	Company	Date	Time
Sampled:	Jacob Lindberg		Terracon/Arqus	11-21-22	1200
Relinquished:	Jacob Lindberg		Terracon/Arqus	11-28-22	1200
Delivered:	Jacob Lindberg		Terracon/Arqus	11-28-22	1230
Received:			Seattle Asbestos Test	11/28/22	12:10
Analyzed:			Seattle Asbestos Test	11/28/22	13:45
Reported:			Seattle Asbestos Test		

Results reporting method: ☐ Phone ☐ Fax ☒ Email ☐ Pick-up

☐ Composite all wallboard samples ☐ Text result to phone ☐ Point count ..... % or less asbestos

SEATTLE ASBESTOS TEST

Lynnwood Laboratory: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel: 425.673.9850, Fax: 425.673.9810, NVLAP Lab Code: 200768-0

ANALYTICAL LABORATORY REPORT

[PLM] EPA – 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples; [PLM] EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Attn.: Christina Anderson
Client: Argus Pacific - A Terracon Company
Address: 21905 64th Ave W, Mountlake Terrace, Suite 100, WA 98043
Job#: 81227372
Batch#: 202211548
Date Received: 11/28/2022
Samples Rec'd: 4
Date Analyzed: 11/28/2022
Samples Analyzed: 4
Project Loc.: John Muir ES

Analyzed by: Steve (Fanyao) Zhang
Approved Signatory: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
1	1-03-QC	1	Black soft/elastic material		None detected	Binder, Filler	4	Cellulose
2	3-01QC	1	White soft/elastic material		None detected	Binder, Filler	4	Cellulose
3	9-06QC	1	Gray fibrous material		None detected	Filler, Perlite	65	Cellulose
4	16-05QC	1	White powdery material with paint and paper		None detected	Binder/filler, Paint	35	Cellulose
		2	White chalky material with paper		None detected	Binder/filler, Gypsum/binder	25	Cellulose

Appendix D
Lead Laboratory Analytical Results

EMSL Analytical, Inc.
6340 CastlePlace Dr., Indianapolis, IN 46250
Phone/Fax: (317) 803-2997 / (317) 803-3047
http://www.EMSL.com indianapolislab@emsl.com

EMSL Order:	162227952
CustomerID:	TCWA25
CustomerPO:	81227372
ProjectID:	

Attn: **Jacob Lindberg**
Terracon Consultants, Inc.
21905 64th Ave. W.
Suite 100
Mountlake Terrace, WA 98043

Phone:	(425) 771-3304
Fax:	(425) 771-3549
Received:	12/2/2022 10:00 AM
Collected:	

Project: **81227372**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	Collected	Analyzed	Weight	RDL	Lead Concentration
Pb1-01 *162227952-0001*		12/5/2022	0.2598 g	80 ppm	<80 ppm
Pb2-01 *162227952-0002*		12/5/2022	0.2571 g	80 ppm	<80 ppm
Pb3-01 *162227952-0003*		12/5/2022	0.2576 g	80 ppm	<80 ppm
Pb3-02 *162227952-0004*		12/5/2022	0.2586 g	80 ppm	<80 ppm
Pb3-03 *162227952-0005*		12/5/2022	0.255 g	80 ppm	<80 ppm
Pb4-01 *162227952-0006*		12/5/2022	0.2519 g	80 ppm	<80 ppm
Pb4-02 *162227952-0007*		12/5/2022	0.2542 g	80 ppm	<80 ppm
Pb5-01 *162227952-0008*		12/5/2022	0.2517 g	80 ppm	<80 ppm
Pb5-02 *162227952-0009*		12/5/2022	0.252 g	80 ppm	<80 ppm
Pb6-01 *162227952-0010*		12/5/2022	0.2556 g	80 ppm	<80 ppm
Pb7-01 *162227952-0011*		12/5/2022	0.2511 g	80 ppm	<80 ppm

Aleksandrea Kuchenbrod

Aleksandrea Kuchenbrod, Inorganic Chemistry Lab Manager
or other approved signatory

* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.
Samples analyzed by EMSL Analytical, Inc. Indianapolis, IN AIHA LAP, LLC-ELLAP Accredited #157245, OH E10040

Report Amended: 12/21/2022 16:15:59 Replaces the Inital Report 12/09/2022 08:18:14. Reason Code: Data Entry-Change to Appearance

EMSL Analytical, Inc.
6340 CastlePlace Dr., Indianapolis, IN 46250
Phone/Fax: (317) 803-2997 / (317) 803-3047
http://www.EMSL.com indianapolislab@emsl.com

EMSL Order:	162227952
CustomerID:	TCWA25
CustomerPO:	81227372
ProjectID:	

Attn: **Jacob Lindberg**
Terracon Consultants, Inc.
21905 64th Ave. W.
Suite 100
Mountlake Terrace, WA 98043

Phone:	(425) 771-3304
Fax:	(425) 771-3549
Received:	12/2/2022 10:00 AM
Collected:	

Project: **81227372**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	Collected	Analyzed	Weight	RDL	Lead Concentration
Pb7-02 *162227952-0012*		12/5/2022	0.2509 g	80 ppm	<80 ppm
Pb8-01 *162227952-0013*		12/5/2022	0.2531 g	80 ppm	<80 ppm
Pb8-02 *162227952-0014*		12/5/2022	0.2506 g	80 ppm	2800 ppm
Pb9-01 *162227952-0015*		12/5/2022	0.2577 g	80 ppm	<80 ppm
Pb9-02 *162227952-0016*		12/5/2022	0.2052 g	97 ppm	<97 ppm
Pb10-01 *162227952-0017*		12/5/2022	0.2523 g	80 ppm	<80 ppm
Pb11-01 *162227952-0018*		12/5/2022	0.2526 g	80 ppm	<80 ppm
Pb11-02 *162227952-0019*		12/5/2022	0.2587 g	80 ppm	<80 ppm
Pb12-01 *162227952-0020*		12/5/2022	0.2528 g	80 ppm	<80 ppm
Pb13-01 *162227952-0021*		12/5/2022	0.2547 g	80 ppm	2100 ppm
Pb14-01 *162227952-0022*		12/5/2022	0.2514 g	80 ppm	<80 ppm

Aleksandrea Kuchenbrod

Aleksandrea Kuchenbrod, Inorganic Chemistry Lab Manager
or other approved signatory

Report Amended: 12/21/2022 16:15:59 Replaces the Inital Report 12/09/2022 08:18:14. Reason Code: Data Entry-Change to Appearance

EMSL Analytical, Inc.
6340 CastlePlace Dr., Indianapolis, IN 46250
Phone/Fax: (317) 803-2997 / (317) 803-3047
http://www.EMSL.com indianapolislab@emsl.com

EMSL Order:	162227952
CustomerID:	TCWA25
CustomerPO:	81227372
ProjectID:	

Attn: **Jacob Lindberg**
Terracon Consultants, Inc.
21905 64th Ave. W.
Suite 100
Mountlake Terrace, WA 98043

Phone: (425) 771-3304
Fax: (425) 771-3549
Received: 12/2/2022 10:00 AM
Collected:

Project: **81227372**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	Collected	Analyzed	Weight	RDL	Lead Concentration
Pb15-01 *162227952-0023*		12/5/2022	0.2506 g	80 ppm	<80 ppm
Pb15-02 *162227952-0024*		12/5/2022	0.2595 g	80 ppm	<80 ppm
Pb16-01 *162227952-0025*		12/5/2022	0.2538 g	80 ppm	<80 ppm
Pb16-02 *162227952-0026*		12/5/2022	0.254 g	80 ppm	<80 ppm

Aleksandrea Kuchenbrod

Aleksandrea Kuchenbrod, Inorganic Chemistry
Lab Manager
or other approved signatory

* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.
Samples analyzed by EMSL Analytical, Inc. Indianapolis, IN AIHA LAP, LLC-ELLAP Accredited #157245, OH E10040

Report Amended: 12/21/2022 16:15:59 Replaces the Inital Report 12/09/2022 08:18:14. Reason Code: Data Entry-Change to Appearance

OrderID: 162227952

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Lead (Pb) Chain of Custody

EMSL Order ID *(Lab Use Only)*: 162227952

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Company: Terracon Consultants, Inc. TCWA25	**EMSL-Bill to:** ☑ Different ☐ Same If Bill to is Different note instructions in Comments**
Street: 21905 64th Ave. W. Suite 100	*Third Party Billing requires written authorization from third party*
City: Mountlake Terrace **State/Province:** WA	**Zip/Postal Code:** 98043 **Country:** US
Report To (Name): Jacob Lindberg	**Telephone #:** 425-771-3304
Email Address: Jacob.Lindberg@terracon.com	**Fax #:** 425-771-3549 **Purchase Order:**
Project Name/Number: 81227372	**Please Provide Results:** ☐ FAX ☑ E-mail ☐ Mail
U.S. State Samples Taken: WA	**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hour | ☐ 6 Hour | ☐ 24 Hour | ☐ 48 Hour | ☐ 72 Hour | ☐ 96 Hour | ☒ 1 Week | ☐ 2 Week

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Price Guide*

Matrix	Method	Instrument	Reporting Limit	Check
Chips ☐ % by wt. ☐ mg/cm² ☒ ppm	SW846-7000B	Flame Atomic Absorption	0.01%	☒
Air	NIOSH 7082	Flame Atomic Absorption	4 µg/filter	☐
	NIOSH 7105	Graphite Furnace AA	0.03 µg/filter	☐
	NIOSH 7300 modified	ICP-AES/ICP-MS	0.5 µg/filter	☐
Wipe* ASTM ☐ non ASTM ☐ *if no box is checked, non-ASTM Wipe is assumed	SW846-7000B	Flame Atomic Absorption	10 µg/wipe	☐
	SW846-6010B or C	ICP-AES	1.0 µg/wipe	☐
	SW846-7000B/7010	Graphite Furnace AA	0.075 µg/wipe	☐
TCLP	SW846-1311/7000B/SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	SW846-1131/SW846-6010B or C	ICP-AES	0.1 mg/L (ppm)	☐
Soil	SW846-7000B	Flame Atomic Absorption	40 mg/kg (ppm)	☐
	SW846-7010	Graphite Furnace AA	0.3 mg/kg (ppm)	☐
	SW846-6010B or C	ICP-AES	2 mg/kg (ppm)	☐
Wastewater Unpreserved ☐ Preserved with HNO_3 pH < 2 ☐	SM3111B/SW846-7000B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	EPA 200.9	Graphite Furnace AA	0.003 mg/L (ppm)	☐
	EPA 200.7	ICP-AES	0.020 mg/L (ppm)	☐
Drinking Water Unpreserved ☐ Preserved with HNO_3 pH < 2 ☐	EPA 200.9	Graphite Furnace AA	0.003 mg/L (ppm)	☐
	EPA 200.8	ICP-MS	0.001 mg/L (ppm)	☐
TSP/SPM Filter	40 CFR Part 50	ICP-AES	12 µg/filter	☐
	40 CFR Part 50	Graphite Furnace AA	3.6 µg/filter	☐
Other:				☐

Name of Sampler: Jacob Lindberg **Signature of Sampler:** [signature]

Sample #	Location	Volume/Area	Date/Time Sampled
Pb1-01			
Pb2-01			
Pb3-01			
↓ 02			
↓ 03			

Client Sample #'s Pb1 -01 to Pb16-02 **Total # of Samples:** 26

Relinquished (Client): Jacob Lindberg **Date:** 11/28/22 **Time:** 10:00

Received (Lab): Claudia Nin **Date:** 12/1/22 **Time:** 10:25AM

Comments:
BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Scott Rinear Phone: 913-599-6886 Email: fmreiber@terracon.com Purchase Order:

3912 8207 0690
Fedex

RCVD (Indy) SS
12/2/22 10am Rx

OrderID: 162227952

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

LEAD (Pb) CHAIN OF CUSTODY

EMSL ORDER ID *(Lab Use Only):*

27952

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Location	Volume/Area	Date/Time Sampled
Pb4-01			
" 02			
Pb5-01			
" 02			
Pb6-01			
Pb7-01			
" 02			
Pb8-01			
" 02			
Pb9-01			
" 02			
Pb10-01			
Pb11-01			
" 02			
Pb12-01			
Pb13-01			
Pb14-01			
Pb15-01			

Comments/Special Instructions:
BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Scott Rinear Phone: 913-599-6886 Email: fmreiber@terracon.com Purchase Order:

OrderID: 162227952

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

LEAD (Pb) CHAIN OF CUSTODY

EMSL ORDER ID *(Lab Use Only):*

27952

EMSL Analytical, Inc.
3317 3rd Ave S
Suite D
Seattle, WA 98134
PHONE: (206) 269-6310
FAX: (206) 900-8789

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Location	Volume/Area	Date/Time Sampled
Pb15-02			
Pb16-01			
" -02			

Comments/Special Instructions:
BillTo: Terracon Consultants, Inc., 18001 West 106th Street, Suite 300, Olathe, KS, 66061, US
Attention: Scott Rinear Phone: 913-599-6886 Email: fmreiber@terracon.com Purchase Order:

Page 3 of 3 pages

Appendix E

Personnel and Laboratory Accreditations

Certificate of Completion

This is to certify that

Jacob A. Lindberg

has satisfactorily completed
4 hours of online refresher training as an

AHERA Building Inspector

to comply with the training requirements of
TSCA Title II, 40 CFR 763 (AHERA)

EPA Provider # 1085

185923
Certificate Number

ARGUS PACIFIC
TRAINING • CONSULTING
A Terracon COMPANY

Aug 10, 2022 Expires in 1 year.
Date(s) of Training

Exam Score: N/A
(if applicable)

Instructor: Andre Zwanenburg

ARGUS PACIFIC, INC / 21905 64th AVE W, SUITE 100 / MOUNTLAKE TERRACE, WASHINGTON 98043 / 206.285.3373 / ARGUSPACIFIC.COM

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200613-0

EMSL Analytical, Inc.

Seattle, WA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-10-01 through 2023-09-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

EMSL Analytical, Inc.
5900 4th Avenue S
Suite 100
Seattle, WA 98108
Ehrin Stephens
Phone: 206-269-6310
Email: estephens@emsl.com
http://www.emsl.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 200613-0

Bulk Asbestos Analysis

Code	***Description***
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

For the National Voluntary Laboratory Accreditation Program

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200768-0

Seattle Asbestos Test, LLC

Lynnwood, WA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-10-01 through 2023-09-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

AIHA Laboratory Accreditation Programs, LLC

acknowledges that

EMSL Analytical, Inc.

6340 Castleplace Drive Indianapolis, IN 46250

Laboratory ID: LAP-157245

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2017 international standard, General Requirements for the Competence of Testing and Calibration Laboratories in the following:

LABORATORY ACCREDITATION PROGRAMS

☑	**INDUSTRIAL HYGIENE**	Accreditation Expires: June 01, 2023
☑	**ENVIRONMENTAL LEAD**	Accreditation Expires: June 01, 2023
☑	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: June 01, 2023
☐	**FOOD**	Accreditation Expires:
☐	**UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached Scope of Accreditation. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2017 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached Scope of Accreditation. Please review the AIHA-LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Cheryl O. Morton

Cheryl O Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision19: 09/01/2020

Date Issued: 05/31/2021

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

EMSL Analytical, Inc.
6340 Castleplace Drive Indianapolis, IN 46250

Laboratory ID: LAP-157245
Issue Date: 05/31/2021

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

The EPA recognizes the AIHA-LAP, LLC ELLAP program as meeting the requirements of the National Lead Laboratory Accreditation Program (NLLAP) established under Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992 and includes paint, soil and dust wipe analysis. Air and composited wipes analyses are not included as part of the NLLAP.

Environmental Lead Laboratory Accreditation Program (ELLAP)

Initial Accreditation Date: 09/01/2002

Component, parameter or characteristic tested	Technology sub-type/Detector	Method	Method Description *(for internal methods only)*
Airborne Dust	AA	NIOSH 7082	N/A
Paint	AA	EPA SW-846 3050B	N/A
		EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A
Settled Dust by Wipe	AA	EPA SW-846 3050B	N/A
		EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A
Soil	AA	EPA SW-846 3050B	N/A
		EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A

A complete listing of currently accredited ELLAP laboratories is available on the AIHA-LAP, LLC website at: *http://www.aihaaccreditedlabs.org*

Cultural Resources Assessment and DAHP Letter

(Cultural Resources Assessment On-File with Seattle Public Schools)

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

May 31, 2023

Matisia Hollingsworth
Project Manager
Capital and Planning Department
Seattle Public Schools

In future correspondence please refer to:
Project Tracking Code: 2023-05-03487
Property: John Muir Elementary School Early Learning Addition and Miscellaneous Improvements Project
Re: Not Eligible for National Register of Historic Places

Dear Matisia Hollingsworth,

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced proposal. This action has been reviewed on behalf of the State Historic Preservation Officer (SHPO) under provisions of Governor's Executive Order 21-02. Our review is based upon documentation provided in your submittal.

First, it is our opinion that Property ID: 91831, John Muir Elementary School at 3301 S Horton St, Seattle, Washington, 98144 is not eligible for listing in the National Register of Historic Places. It is also our opinion that no historic resources will be impacted by the current project as proposed.

As a result of our opinion, further contact with DAHP on this proposal is not necessary. However, if new information about affected resources becomes available and/or the project scope of work changes significantly, please resume consultation as our assessment may be revised. Also, if any archaeological resources are uncovered during construction, please halt work immediately in the area of discovery and contact the appropriate Native American Tribes and DAHP for further consultation.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Maddie Levesque
Architectural Historian
(360) 819-7203
Maddie.Levesque@dahp.wa.gov

APPENDIX G

Transportation Technical Report

TRANSPORTATION TECHNICAL REPORT

for the

John Muir Elementary School Early Learning Addition

PREPARED FOR:

Seattle Public Schools

PREPARED BY:

heffron transportation inc

6544 NE 61st Street, Seattle, WA 98115
ph: (206) 523-3939 ◆ www.hefftrans.com

July 24, 2023

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1. INTRODUCTION

This report presents the transportation impact analyses for the Seattle Public Schools' (SPS) proposed early learning classroom addition to John Muir Elementary School. The scope of analysis and approach were based on extensive past experience performing transportation impact analyses for projects throughout the City of Seattle, including numerous analyses prepared for Seattle Public Schools projects. This report documents the existing conditions in the site vicinity, presents estimates of project-related traffic, and evaluates the anticipated impacts to the surrounding transportation system including transit, parking, safety, and non-motorized facilities. These analyses were prepared to support the SEPA Checklist for this project.

1.1. Project Description

SPS is proposing an addition at John Muir Elementary School, which is located at 3301 S Horton Street in the Mount Baker neighborhood of Seattle. The following sections describe the existing school site and the proposed early learning classroom addition.

1.1.1. Existing Site

The John Muir Elementary School site is bounded on north by S Horton Street, on the east by 34th Avenue S, on the south by a Seattle Park known as York Playground, and on the west by private residential properties. The existing school building is located at the northern half of the 2.75-acre site and has 25 permanent classrooms within 60,031 square feet (sf) gross floor area.[1] There are two portables located at the southwest corner of the site. One classroom in the main building is used for the Head Start Pre-K early learning program. There is a hard-surface play areas on the south portion of the site.

The school has an on-site parking lot with 18 striped stalls located at the northwest corner of the site and accessed from one driveway on S Horton Street just east of the S McClintock Avenue / S Walden Street intersection. There is a small service/delivery area on the east side of the main school building where trash and recycling bins are stored and accessed from a curb-cut on 34th Avenue S. There is a gated driveway on 34th Avenue S that provides maintenance access to the hard-surface playground on the south portion of the site. The school principal indicated that the playground area has not been used for school-event parking.

School-bus load/unload occurs on the west side of 34th Avenue S south of S Horton Street. In spring 2023, the school was served by one special education (SPED) bus and one Head Start bus. There is a school load zone for automobiles adjacent to the site on the south side of S Horton Street west of 34th Avenue S.

According to information published in *Building for Learning, Seattle Public Schools Histories, 1862-2000*,[2] the original school was in the Columbia School District and opened in about 1903. In 1910, a new school was opened and named York School after the surrounding neighborhood and the 1903 building was used as a gymnasium for the new school. The school was renamed in 1921 to honor Scottish-born naturalist John Muir (founder of the Sierra Club). The school was overcrowded in the 1920s, when a north wing addition with nine new classrooms, a lunchroom-auditorium, and two playcourts were added in 1924. Enrollment continued to grow and by 1969, there were 14 portable classrooms on the Muir Playground. Some of the portables were relocated to make room for a 1971 addition, which added open-configuration classrooms and a library. In 1989, the original 1910 structure and the 1924 addition were demolished and replaced by a new addition to the 1971 addition. The 1903 building was also replaced by a new gymnasium at that time.

1 Source: Seattle Public Schools, *2021 Facilities Master Plan Update*, 2021.
2 Nile Thompson and Carolyn J. Marr; *Building for Learning, Seattle Public Schools Histories, 1862-2000;* 2002.

From 2016 through 2022, enrollment ranged from 325 students (2019) to 402 students (2016).[3] The school currently has 67 total employees (42-full-time, 21 part-time (including tutors), plus 4 employees for the early learning component).[4] In March 2023, enrollment was 343 students, including 20 in the Pre-K program. The existing school is listed as having operational capacity of 342 students.[5]

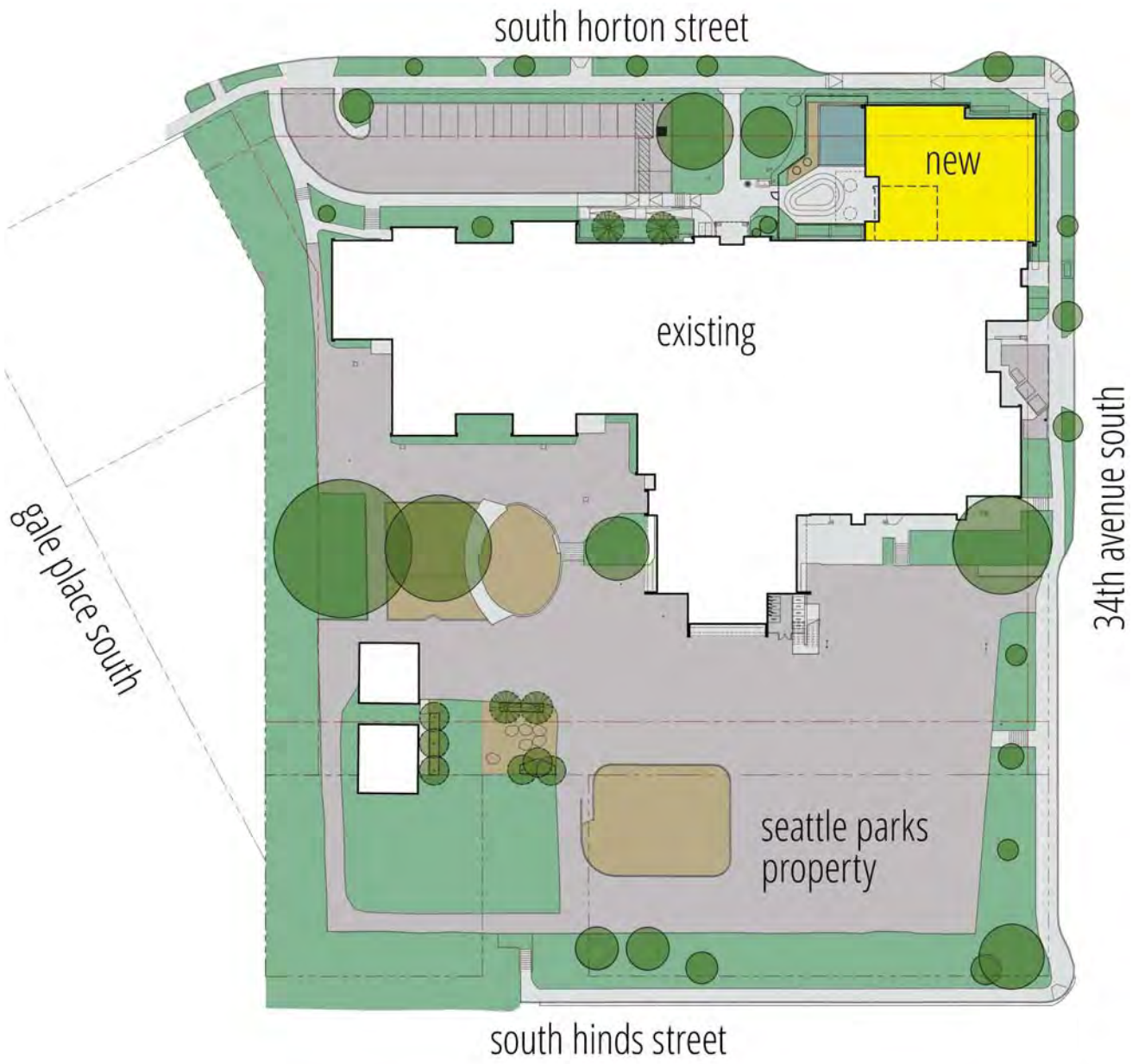
1.1.2. Proposed Site Changes

The proposed project would construct a three -classroom early learning addition with before- and after-school child care support spaces. It would also make miscellaneous improvements to renovate the 1971 addition by converting open-floor-plan classrooms into three (3) classrooms, replacing windows, fire alarm and system upgrades, and lighting and electrical upgrades, modernization of the loading dock, and, site development to add modular playground equipment, bicycle parking, and right of way curb ramp work. The result of the interior renovations would eliminate the existing Pre-K classroom; therefore, the net change in enrollment capacity would be two (2) added Pre-K classrooms (20 students each) and a total increase of 40 Pre-K students. The total capacity of the school would be increased to 382 students. With classroom addition, the school could have an additional 11 new employees (eight in the pre-K programs and 3 for general education), increasing from 67 to 78 total employees.[6]

The project is expected to modify the eastern end of the on-site parking lot for accessibility needs, which would result in the loss of two on-site parking stalls—reducing from 18 to 16. The project would also make frontage, accessibility, and curb ramp improvements along S Horton Street as required by the City through the Street Improvement Permit (SIP) process. No other changes are proposed with this project that would affect the overall site, assembly spaces, buildings, or the site access driveways. The school-bus load/unload zones adjacent to the school on 34th Avenue E would remain and no changes to the number of school buses is anticipated.[7] Figure 1 shows the site plan with the location of the proposed Pre-K classroom addition.

Construction is planned to begin in summer 2024 with occupancy of the new classrooms by fall 2025. During construction, the students would remain in the building. Future analyses (without and with the project) presented in this report reflect year 2025 conditions.

3 Seattle Public Schools, P223 Enrollment Data for Basic Enrollment report, Oct. 2016-2022, and March 2023.
4 Email communication, A. Haider, John Muir Elementary Principal, March 17, 2023.
5 Source: Seattle Public Schools, *2021 Facilities Master Plan Update*, 2021.
6 Email communication, A. Haider, John Muir Elementary Principal, March 17 and April 19, 2023.
7 Email communication, April 19, 2023.



Source: Anjali Grant Design, LLC, DRAFT Departures Presentations, July 20, 2023

SEATTLE PUBLIC SCHOOLS
John Muir Elementary
Early Learning Addition

Figure 1
Site Plan and Proposed Pre-K
Classroom Addition Location

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2. BACKGROUND CONDITIONS

This section presents the existing and future conditions without the proposed project. The impacts of the proposed project were evaluated against these base conditions. For comparison, and to provide an analysis of potential new traffic and parking impacts, year 2025 without-project conditions assume John Muir Elementary School would operate at its current enrollment capacity (342 students). The following sections describe the existing roadway network, traffic volumes, traffic operations (in terms of levels of service), traffic safety, transit facilities, non-motorized facilities, and parking. Figure 2 shows the project site location and vicinity. Five off-site intersections plus the site access driveway were selected for study based on the size of the proposed project (in terms of added student capacity), vicinity traffic counts, and travel routes used by family drivers, buses, and staff to access and egress the site area. The following study area intersections were identified for analysis for both the morning and afternoon peak hours.

- S Walden Street / Rainier Avenue S
- S Walden Street / McClintock Avenue S
- S Horton Street / 33rd Avenue S
- S Horton Street / 34th Avenue S
- S Hinds Street / 34th Avenue S

2.1. Transportation Network

2.1.1. Existing Network

The surrounding area consists of single-family residences to the north, east and south, with some multi-family and commercial development to the west. Key roadways that serve the site are described below. Roadway classifications were obtained from the City of Seattle's (City's) *Street Classification Maps*.[8] Speed limits are 25 miles per hour (mph) on arterials (unless otherwise marked) and 20 mph on local access streets. The following describes key roadways in the site vicinity.

Rainier Avenue S is a north-south Principal Arterial that connects downtown Seattle to the south City limits and continues into Renton. In the vicinity of the site, the roadway has five lanes (two in each direction plus a center turn lane or median in some locations). Approaching the signalized S Walden Street intersection, the outside lanes are designated for buses-only with right turns and bicycles allowed. The roadway has curbs and sidewalks on both sides.

S Walden Street is a non-arterial local access street extending from about S McClintock Avenue S (where it bends to become S Horton Street) on the east to just west of Martin Luther King Jr. Way S on the west. Near the school site, this unstriped roadway accommodates two-way travel with parallel parking on both sides. There are curbs, gutters, and sidewalks on both sides. Its intersection at Rainier Avenue S is signalized. Near the school, there are speed humps and a 20-mph school zone speed limit in effect when children are present.

S Horton Street is a non-arterial east-west local access street. Near the school site, it extends from about S McClintock Avenue S (where bends to become S Walden Street) on the west to 36th Avenue S / York Road S on the east. This unstriped roadway segment accommodates two-way travel with parallel parking on both sides. There are curbs, gutters, and sidewalks on both sides. Its intersections at 33rd and 34th Avenues S are controlled by traffic circles. Near the school, there are speed humps and a 20-mph school zone speed limit in effect when children are present.

[8] Seattle Department of Transportation (SDOT), online Street Classification Maps, accessed March 2023.

SEATTLE PUBLIC SCHOOLS
John Muir Elementary
Early Learning Addition

Figure 2

Site Location and Vicinity

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McClintock Avenue S is a non-arterial local access street. Near the school site, it extends two-blocks northwest from S Walden Street to S Hanford Street. This unstriped roadway segment accommodates two-way travel with parallel parking on both sides. There are curbs, gutters, and sidewalks on both sides. Its intersection at S Walden Street is uncontrolled. Near the school, there are speed humps and a 20-mph school zone speed limit in effect when children are present.

33rd Avenue S is a non-arterial north-south local access street. Near the school site, it extends north from S Horton Street to Coleman Park. This unstriped roadway segment accommodates two-way travel with parallel parking on both sides. There are curbs, gutters, and sidewalks on both sides. Its intersection at S Horton Street is controlled by a traffic circle. Near the school, there is a 20-mph school zone speed limit in effect when children are present.

34th Avenue S is a non-arterial north-south local access street. Near the school site, it extends from S Charlestown Street on the south to S Plum Street on the north. Near the school, this unstriped roadway segment accommodates two-way travel with parallel parking on both sides. There are curbs, gutters, and sidewalks on both sides. Its intersection at S Horton Street is controlled by a traffic circle. Near the school, there are speed humps and a 20-mph school zone speed limit in effect when children are present.

Healthy Streets consist of upgraded neighborhood greenways designated by SDOT in response to the COVID-19 pandemic. These streets discourage pass through traffic, but are open to people walking, rolling, and biking. They enhanced safety features like speed humps, stop signs, and crossing improvements at major streets. Local access, deliveries, waste pickup and emergency vehicles are allowed. Within the study area, the segment of S Horton Street east of 34th Avenue S to 36th Avenue S is designated as a Healthy Street. The segment of 34th Avenue S north of S Horton Street to S Mount Baker Boulevard is tentatively designated as a Healthy Street pending further review and neighborhood outreach.

2.1.2. Planned Improvements

The following plans and programs were reviewed to determine if any planned transportation improvements could affect the roadways and intersections near John Muir Elementary School by 2025 when the classroom addition project is planned to be complete and occupied.

City of Seattle's Proposed 2023-2028 Adopted Capital Improvement Program (CIP)[9] – No improvements to the transportation network were identified in the site vicinity.

Adopted Seattle Bicycle Master Plan (BMP)[10] – The plan's proposed improvements along roadways within the site vicinity including a Citywide network neighborhood greenway along 34th Avenue S and S Horton Street adjacent to the school site. This greenway has been implemented. A local neighborhood green way was recommended on S Horton Street and S Walden Street west of the site, but has not yet been implemented. The ***Seattle Bicycle Master Plan – 2021-2024 Proposed Implementation Plan***,[11] which defines the BMP priorities, was also reviewed and no projects are identified for implementation in the study area.

None of the improvements identified in the City's planning documents would affect the roadway network operations or intersection capacity within the study area by 2025. Therefore, existing roadway and traffic control were assumed to remain the same for the future conditions.

9 City of Seattle, 2022.
10. City of Seattle, March 2015.
11 SDOT, May 2021.

2.2. Traffic Volumes

2.2.1. Existing Traffic Volumes

At the time of this analysis, the school day at John Muir Elementary School started at 7:55 A.M. and ended at 2:25 P.M. with early release at 1:10 P.M. on Wednesdays. The Head Start and Seattle Pre-School Program on the site operates from 8:30 A.M. to 3:00 P.M. To capture the existing traffic conditions during the current arrival and dismissal peak periods, traffic counts were performed from 7:00 to 9:00 A.M. and from 1:30 to 4:00 P.M. on Tuesday, March 28, 2023 at the five study-area intersections and site access driveway. The counts indicated that the morning and afternoon peak hours for school traffic occurs from 7:30 to 8:30 A.M. and from 2:15 to 3:15 P.M., respectively.

2.2.2. Historical Traffic Volumes and Effect of COVID-19 Pandemic

Historic traffic data from the City of Seattle Department of Transportation (SDOT) were obtained and compiled to document traffic volume patterns prior to the COVID-19 pandemic. Rainier Avenue S volumes compiled from turning movement counts at its intersection with S Charlestown Street from May 2017 were compared to the volumes from the new counts performed at S Walden Street in March 2023. The 2023 data indicated that AM peak hour volumes are about 70% of the 2017 volume and early afternoon volumes are about 73% of the 2017 volume. These declines likely result from a combination of factors including the recent corridor changes (converting the outside lanes to bus-only) and changes in commuter habits resulting from the COVID-19 pandemic with ongoing patterns of many employees working from home on some or most days. Figure 3 shows the existing (2023) traffic volumes for the school peak hours.

2.2.3. Future Without-Project Conditions

Forecast-2025-without-project traffic volumes were developed using a compound annual growth rate. As described in the previous section, traffic data on Rainier Avenue S near the site from 2017 and 2023 indicate volumes have decreased. However, to reflect the possibility of traffic growth in non-school traffic that could occur by 2025, a 1.0% compound annual growth rate was applied to the adjusted 2023 traffic volumes. This growth rate is at the higher end of those recommended by Seattle Department of Construction and Inspections (SDCI) traffic review staff for forecasting traffic in the site vicinity.

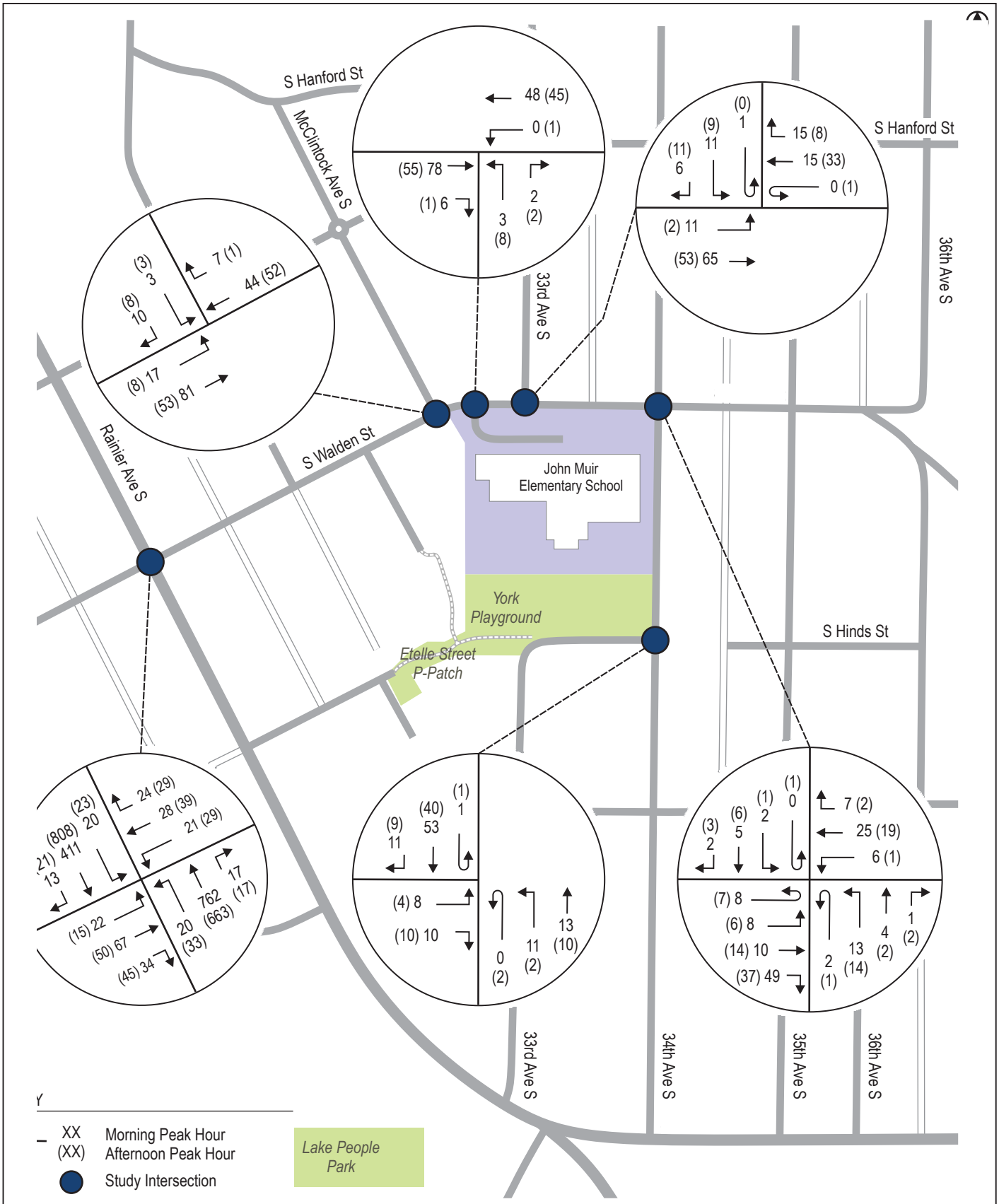
Additionally, the SDCI's Property and Building Activity permit map was reviewed to determine if any large future development projects are planned that could potentially generate additional traffic in the project study area. Based on that review, six projects (listed in Table 1 that follows) were identified for specific inclusion in the traffic forecasts. New traffic from most of these developments is primarily expected to add trips to the Rainier Avenue S corridor with some passing through the S Walden Street intersection. A small number of other potential pipeline development projects were identified farther from the site near Martin Luther King Jr. Boulevard S, but had not advanced to the stage preparing traffic impact analyses. Those are expected to have negligible impacts to traffic and parking within the study area during the identified peak hours and would be accounted for by the 1% compound annual growth rate. Figure 4 shows the 2025-without-project morning and afternoon peak hour traffic volumes.

Table 1. Pipeline Development Projects Included in Traffic Forecasts

Permit #	Project Address	Program	Pipeline Trip Estimates			Sources
			Morning	Afternoon	PM	
3039674-LU	3603 35th Ave S	49 affordable apartment units, 28 pkg spaces	25	16	23	Heffron Transp.[1]
3034544-LU	3138 Wetmore Ave S	29 efficiency units, no pkg	11	6	14	SDCI [2] Heffron Transp.[4]
3028934-LU	3421 Rainier Ave S	59 efficiency units, 10 apartments, no pkg	29	14	30	Kimley-Horn [3] Heffron Transp.[4]
3030341-LU	3235 Rainier Ave S	108 apartment, 19 pkg spaces	30	22	49	TENW [5] Heffron Transp.[4]
3033038-LU	3111 Rainier Ave S	157 apt. units, 6,500 sf commercial, 49 pkg. spaces	-33	-9	-15	TENW [6] Heffron Transp.[4]
3018722-LU	3208 Claremont Avenue S	156 apt. units, 5,875 sf commercial, 109 pkg. spaces	46	32	68	GTC [7] Heffron Transp.[4]

Source: SDCI Property and Building Activity portal, April 2023.

1. *Traffic study not available, trips estimated by Heffron Transportation, Inc. based on available program data.*
2. *Program and AM and PM peak trip estimates information from City of Seattle, Analysis and Decision of the Director of the Seattle Department of Construction and Inspections, Nov. 28, 2022.*
3. 3421 Rainier Ave Development Traffic Impact Analysis, *Kimley Horn and Associates, Inc., July 2022.*
4. *Published materials did not provide trip estimates for the school's afternoon peak hours; estimated by Heffron Transportation, Inc. based on available program data and time of day trip generation date from ITE's* Trip Generation Manual.
5. 3235 Rainier Avenue S (3030341-LU) Traffic & Parking Impact Analysis – Expanded, *Transportation Engineering NorthWest, November. 1, 2019.*
6. 3111 Rainier Avenue S (3033254-EG) Traffic & Parking Impact Analysis, *Transportation Engineering NorthWest, June 8, 2020.*
7. Link Mt Baker Traffic Impact Analysis *(SDCI# 3018722), Gibson Traffic Consultants, December 2016.*



SEATTLE PUBLIC SCHOOLS
John Muir Elementary
Early Learning Addition

Figure 3
Existing (2023) Traffic Volumes
Morning and Afternoon Peak Hours

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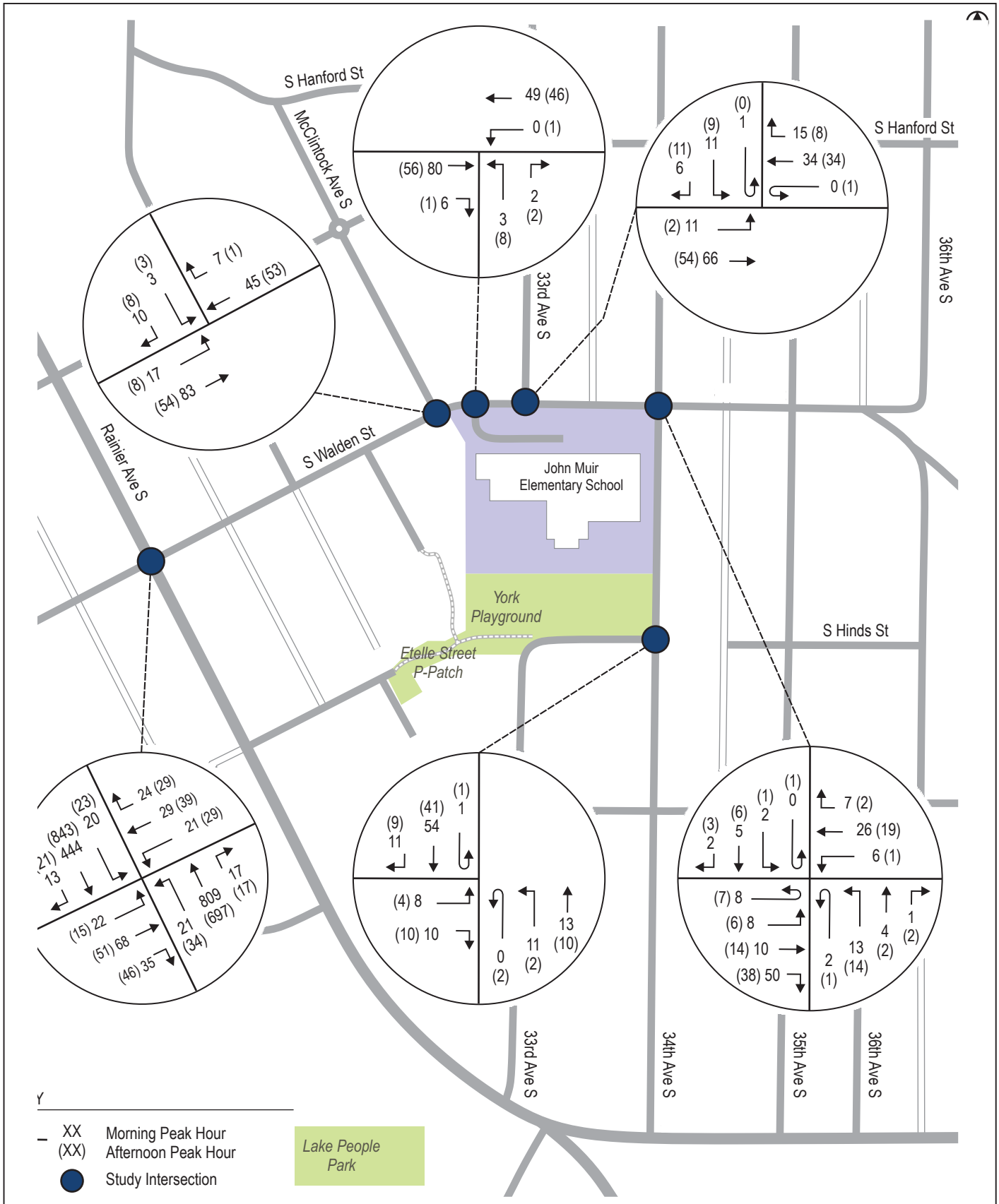


SEATTLE PUBLIC SCHOOLS
John Muir Elementary
Early Learning Addition

Figure 4
Forecast 2025-Without-Project Traffic Volumes
Morning and Afternoon Peak Hours

heffron transportation inc

2.3. Traffic Operations

Level of service (LOS) is a qualitative measure used to characterize traffic operating conditions. Six letter designations, "A" through "F," are used to define level of service. LOS A is the best and represents good traffic operations with little or no delay to motorists. LOS F is the worst and indicates poor traffic operations with long delays. The City of Seattle does not have adopted intersection level of service standards; however, project-related intersection delay that causes a signalized intersection to operate at LOS E or F, or increases delay at a signalized intersection that is projected to operate at LOS E or F without the project, may be considered a significant adverse impact. The City may tolerate delays in the LOS E or F range for minor movements at unsignalized intersections where traffic control measures (such as conversion to all-way-stop-control or signalization) are not applicable or desirable.

Levels of service for the study area intersections were determined using the methodology in the *Highway Capacity Manual, Sixth Edition [HCM 6].*[12] Appendix A includes level of service thresholds and definitions for intersections. For signalized intersections, level of service is based on the average delay for all vehicles that enter the intersection. For unsignalized intersections, level of service is determined for vehicles that must stop or yield for oncoming traffic, and delay is related to the availability of gaps in the main street's traffic flow and the ability of a driver to enter or pass through those gaps. All level-of-service calculations were performed using the *Synchro 11.1* traffic operations analysis software and reported using the *HCM 6* module. The modeling assumptions for the S Walden Street / Rainier Avenue S signal were based on current operations (which include leading pedestrian indicators (LPIs) for the crosswalk signals) determined from field observations as well as the existing and draft future signal timing cards provided by SDOT.[13] The future-conditions models reflect SDOT's planned implementation of protected-left-turn phasing. Table 2 summarizes existing and forecast 2025-without-project levels of service at the study-area intersections for morning and afternoon peak hours.

Table 2. Level of Service Summary – Existing and 2025-Without-Project Conditions

Traffic Control / Intersection	Morning Peak Hour (7:30–8:30 A.M.)				Afternoon Peak Hour (2:15–3:15 P.M.)			
	Existing		Without Project		Existing		Without Project	
Signalized	**LOS [1]**	**Delay [2]**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
S Walden Street / Rainier Avenue S	B	16.2	C	23.0	B	13.2	B	19.2
Traffic Circle Controlled [3]	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
S Horton Street / 33rd Avenue S	A	3.3	A	3.4	A	3.1	A	3.1
S Horton Street / 34th Avenue S	A	3.4	A	3.4	A	3.1	A	3.1
Uncontrolled [4]	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
S Walden Street / McClintock Ave S	A	1.7	A	1.7	A	1.4	A	1.4
Eastbound Left Turn	A	7.5	A	7.5	A	7.5	A	7.5
Southbound Approach	A	9.5	A	9.5	A	9.2	A	9.2
S Hinds Street / 34th Avenue S	A	2.4	A	2.4	A	2.6	A	2.6
Northbound Left Turn	A	7.6	A	7.6	A	7.5	A	7.5
Eastbound Approach	A	9.9	A	9.9	A	9.2	A	9.2

Source: Heffron Transportation, Inc., April 2023.

1. *Level of service.*
2. *Average seconds of delay per vehicle.*
3. *Intersections are controlled by traffic circles; evaluated using roundabout methodology.*
4. *Intersections are uncontrolled; evaluated as stop-controlled for T approaches.*

12 Transportation Research Board [TRB], 2016.
13 Email correspondence with L. Wojcicki, SDOT, March 27, 2023.

As shown, the signalized S Walden Street / Rainier Avenue S intersection currently operates at LOS B during both peak hours. It is forecast to operate at LOS C or better in 2025. The forecast added delay (6 to 7 seconds) is a result of added pipeline development traffic, the assumed background traffic growth rate, and the planned signal phasing modifications that would introduce protect left-turn phasing. All of the unsignalized study area intersections currently operate at LOS A overall with all movements at LOS A; they are forecast to remain operating at those levels in 2025 without the project. The site access driveway on S Horton Street operates at LOS A overall with all movements at LOS B during both peak hours. It is forecast to remain operating at those levels in 2025 without the project during both peak hours.

2.4. Parking Supply and Occupancy

On-street parking at and around the John Muir Elementary School site was surveyed in April 2023 to determine the existing parking supply and occupancy. The results of those surveys were used to estimate how parking occupancy could be affected by new parking demand generated by the proposed classroom addition project (which is presented later in Section 3.4). The following sections describe the on-street parking supply as well as the observed parking occupancy and utilization rates.

2.4.1. Methodology and Study Area

A detailed on-street parking study was performed according to the methodology outlined in the City's Tip #135,[14] which outlines the City's preferred methodology to determine the number and type of on-street parking spaces that may exist within a defined study area, and how much of that supply is currently utilized at different times of the day.

The study area for the on-street parking analysis included all roadways within an 800-foot *walking* distance from the school site, as is typically required by the City of Seattle. The 800-foot walking distance results in a study area that extends to just west of Rainier Avenue S, Mount Baker Boulevard to the north, just east of 36th Avenue S, and S Charlestown Street to the south. Details about parking supply and occupancy are provided in the following sections. The study area consists primarily of single-family residential land uses. Many of the residential garages and driveways in the vicinity are accessed via alleys; area residents also regularly use on-street parking.

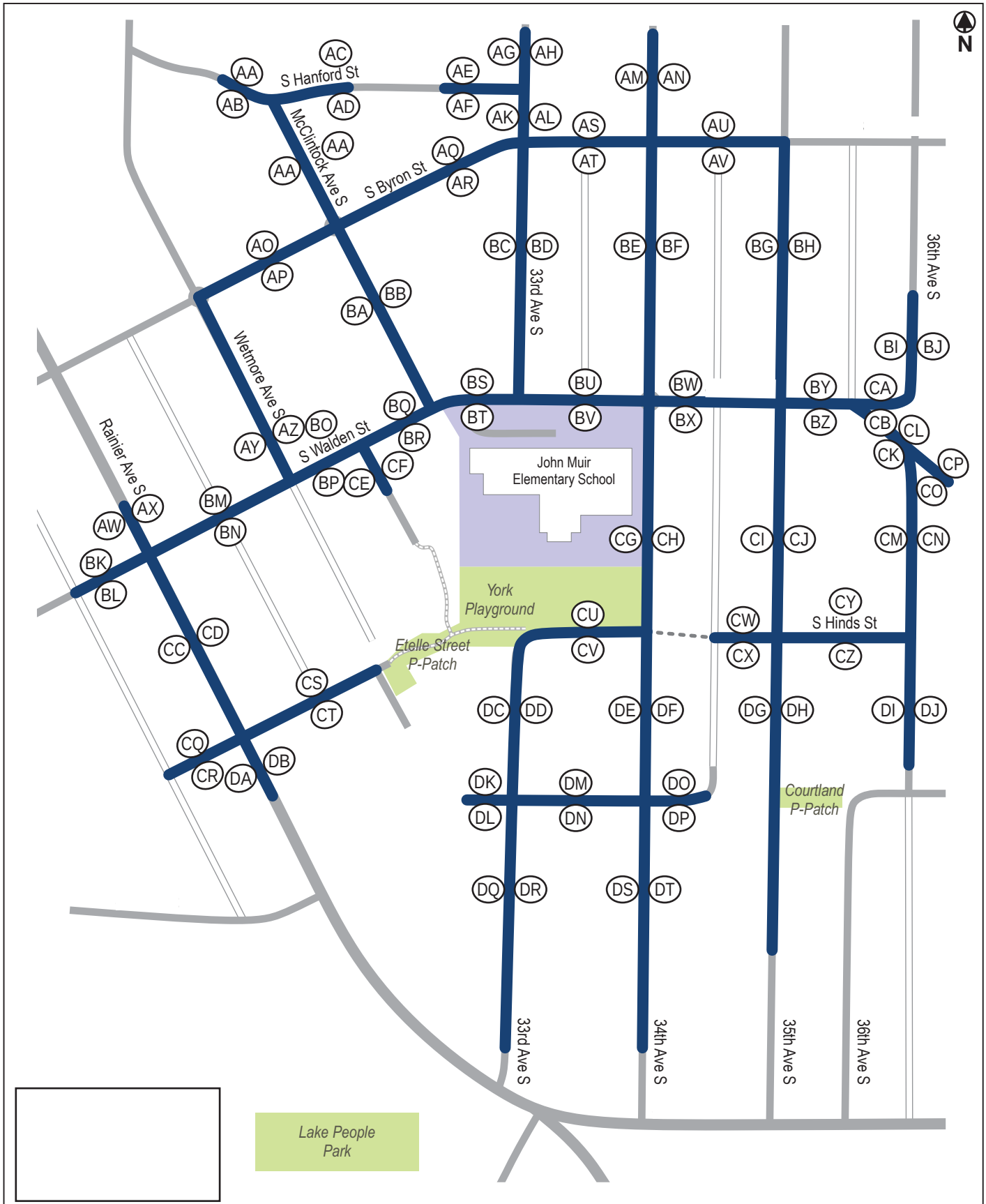
Existing On-Street Parking Supply

The study area was separated into individual block faces. A block face consists of one side of a street between two cross-streets. For example, the north side of S Horton Street, between 33rd Avenue S and 34th Avenue S is one block face (identified as block face 'BU' for this study). The study area and block face designations are shown on Figure 5.

Each block face was measured and analyzed to determine the number of legal on-street parking spaces. First, common street features—such as driveways, fire hydrants, and special parking zones— and their buffer requirements were identified according to Seattle's Municipal Code Regulations. The remaining unobstructed lengths between street features were converted to legal on-street parking spaces using values in the City's Tip #135. Detailed parking supply by block face is provided in Appendix B.

The parking supply survey determined that there are 708 on-street parking spaces within the study area and 614 have no signed restrictions. After accounting for school-bus and time-dependent no parking zones along the school frontage (totaling 10 spaces), the total supply is 698 spaces in the early morning and 708 spaces mid-morning.

[14] SDCI, October 5, 2022.



SEATTLE PUBLIC SCHOOLS
John Muir Elementary
Early Learning Addition

Figure 5
Study Area
On-Street Parking Occupancy Surveys

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On-Street Parking Occupancy

Parking occupancy counts were performed in April 2023. School-day occupancy counts were performed during early morning (between 7:00 and 7:45 A.M.), the time when staff typically begin to arrive at the school, and mid-morning (between 10:30 and 11:15 A.M.), the time when school-day parking is typically highest. The school-day counts were performed on Tuesday, April 25 and Thursday, April 27, 2023. A count was also conducted on Wednesday, April 12 during Spring Break to document weekday conditions when school is not in session. The counts for each day were compiled and results are summarized in Table 3. On-street parking utilization was calculated using the methodology described in Tip #135 and is the number of vehicles parked on-street divided by the number of legal on-street parking spaces within the study area or on a specific block face. The study area utilization totals are also shown. Detailed summaries of the on-street parking occupancy by block face for all counts are provided in Appendix B.

Table 3. On-Street Parking Demand Survey Results – April 2023

Time Period Surveyed	Parking Supply	Total Vehicles Parked	% Utilization
Weekday Early Morning (7:00 to 7:45 A.M.)			
Tuesday, April 25, 2023	698	382	55%
Thursday, April 27, 2023	698	394	56%
Average	**698**	**388**	**56%**
Wednesday, April 12, 2023 (Spring Break)	*698*	*366*	*51%*
Weekdays Mid-Morning (10:30 to 11:15 A.M.)			
Tuesday, April 25, 2023	708	431	61%
Thursday, April 27, 2023	708	423	60%
Average	*708*	*427*	*60%*
Wednesday, April 12, 2023 (Spring Break)	*708*	*367*	*52%*

Source: Heffron Transportation, Inc., April 2023.

As shown, the surveys determined that average school day parking utilization ranged from 56% to 60% occupied on school days; the number of unused parking spaces ranged from 277 to 316 spaces over four separate school-day observations. Spring Break observations found reduced parking occupancy (51% to 52%) in the overall study area, some of which is likely related to demand generated by both John Muir Elementary School and Franklin High School, which is located to the north. The State of Washington adopted SEPA-related amendments on January 20, 2023 which removed parking as an element of the environment in WAC 197-11-444(2)(c)(iv) and removed the parking-related question from the environmental checklist in WAC 197-11-960(B)(14)(c). Pursuant to these amendments, the City of Seattle no longer identifies or requires analysis of parking impacts for SEPA review. The City may examine the potential need for parking management measures if occupancy rates reach 85% or higher.

2.4.2. Off-Street Parking

John Muir Elementary School has an on-site surface parking lot with 18 striped spaces, which is accessed from S Horton Street. Vehicle counts were conducted in this lot at the same times as described in previous sections for on-street parking. When school was in session, an average of 6 vehicles parked on-site in the early morning and an average of 18 vehicles parked mid-morning.

2.4.3. Combined School-Day Parking Demand

Based on a comparison of Spring Break and average school day counts on the block faces closest to the site, some school-related parking demand occurs on-street (estimated at 45 vehicles). Therefore, a rate that considers on-site and on-street demand was derived. The combined (on- and off-site) parking demand rate for the school is estimated at 0.94-vehicles-per-employee. This rate, derived specifically for John Muir Elementary School is nearly identical to the elementary school rate of 0.95-vehicles-per-employee from ITE's *Parking Generation*.[15] The rate derived for John Muir Elementary School accounts for parking demand generated by all users, including employees (full-time and part-time) and visitors.

2.5. Traffic Safety

Collision data for the study area were obtained from SDOT's Open Data Portal for the period between January 1, 2018 and the most recent records available (last updated June 19, 2023). The data were examined to determine if there are any unusual traffic safety conditions that could impact or be impacted by the proposed project. Table 4 summarizes the collision data.

Unsignalized intersections with five or more collisions per year and signalized intersections with 10 or more collisions per year are considered high collision locations by the City. As shown, all but one collision for the period analyzed occurred at the signalized S Walden Street / Rainier Avenue S intersection. Of the 25 collisions that occurred at that location during the study period, 15 were left-turn collisions. Three of the reported collisions involved pedestrians; none of the reported collisions resulted in fatalities. The data did not identify any collisions at this location in 2022 or 2023. SDOT is planning to implement a signal phasing change to provide protected left-turns, a change which often reduces the frequency of left-turn collisions.

Table 4. Collision Summary (January 1, 2018 through June 19, 2023)

Intersection	Rear-End	Side-Swipe	Right Turn	Left Turn	Right Angle	Ped / Cycle	Other [a]	Total for 5.5 Yrs	Average/ Year
S Walden Street / Rainier Avenue S	2	0	0	15	3	3 [b]	2	25	4.6
S Walden St / McClintock Avenue S / S Horton Street / John Muir Driveway	0	0	0	0	0	0	0	0	0.0
S Horton Street / 33rd Avenue S	0	0	0	0	0	0	0	0	0.0
S Horton Street / 34th Avenue S	0	0	0	0	0	0	1	1	0.2
S Hinds Street / 34th Avenue S	0	0	0	0	0	0	0	0	0.0

Source: SDOT, March 2023. Reflects collision data for the 5.5-year time period between January 1, 2017 and June 19, 2023. Collisions that occurred recently during this time period (within 30 days) may not have been entered into the SDOT database.

a. Other collision types included one vehicle struck fixed object off roadway and two insufficient information to determine collision type.

b. Pedestrian collisions occurred 3/5/2019 at 10:31 P.M. and involved a straight-going vehicle and a pedestrian in a crosswalk; 12/19/2019 at 12:48 P.M. and involved a left-turning vehicle and a pedestrian in a crosswalk; and 8/16/2021 at 5:30 A.M. and involved a straight-going vehicle and a pedestrian.

[15] ITE, 5th Edition, 2010.

2.6. Transit Facilities and Service

King County Metro Transit (Metro) and Sound Transit provide public transit service to the site vicinity. The closest bus stops are located about 700 feet to the southwest of the school site on Rainier Avenue S immediately south of the S Walden Street intersection. The stops (for northbound and southbound buses) are served by Metro Route 7, which provides all-day service seven days per week between Rainier Beach and Downtown Seattle with weekday headways (time between consecutive buses) of 7 to 10 minutes. The school is also located within one-half mile of Sound Transit's McClellan Station with existing light rail service between Des Moines and Northgate.

School bus transportation is made available to John Muir Elementary School students who qualify for transportation. The existing school is served by one smaller SPED bus and one Head Start bus.

2.7. Non-Motorized Facilities

Sidewalks exist on both sides of the streets that surround the project site and most streets beyond the site in the vicinity. There are marked crosswalks at the S Horton Street intersections with 33rd Avenue S (west and north legs) and 34th Avenue S (east and south legs) and at the signalized S Walden Street / Rainier Avenue S intersection (all legs). There is a walking path through the Estelle Street P-Patch Community Garden that provides a non-motorized connection from the S Hinds Street / 33rd Avenue S intersection to S Estelle Street and west to Rainier Avenue S.

The Mount Baker-Columbia City-Hillman City Neighborhood Greenway (defined as a low-traffic and low-speed street where priority is given to people walking, bicycling, and rolling) exists in the study area along 34th Avenue S north of the school, on S Horton Street and York Road S to the east, and then south along 36th Avenue S. In addition, 34th Avenue S and S Horton Street adjacent to the site are identified as signed bike routes in SDOT's Bike Map.[16]

As described previously, the segment of S Horton Street east of 34th Avenue S to 36th Avenue S is designated as a Healthy Street. The segment of 34th Avenue S north of S Horton Street to S Mount Baker Boulevard is tentatively designated as a Healthy Street pending further review and neighborhood outreach.

[16] SDOT, online Bike Map, accessed March 2023.

3. PROJECT IMPACTS

This section describes the conditions that would exist with the John Muir Elementary School Early Learning Addition project and the school operating at an enrollment capacity of up to 382 students. Vehicle trip estimates associated with the early learning classroom addition were added to the 2025-without-project traffic volume forecasts. Level of service analyses were performed to determine the proposed project's impact on traffic operations in the study area. Parking demand and the potential change to on-street parking utilization was also estimated.

3.1. Transportation Network

The project may include upgrades to accessible curb ramps in some locations as required by SDOT through the Street Improvement permit (SIP) process, but no other changes to the surrounding roadway network, site frontages, or site access are proposed.

3.2. Traffic Volumes

The proposed project could result in some new vehicular, pedestrian, and bicycle activity on the surrounding transportation network. With the early learning classroom addition, the school is expected to have an enrollment capacity of up to 382 students, an increase of 40 students from the school's current enrollment and capacity. The school is expected to generate an increase in daily and peak hour traffic compared to existing conditions. The following describes the method used to estimate project-generated traffic and potential impacts.

3.2.1. School Trip Generation

Trip generation estimates for school projects are generally developed using one of two methods. For new schools, rates published in the ITE's *Trip Generation Manual*[17] can be applied. For modernizations, replacement, and/or expansions of existing schools, actual counts of the existing school can be used. Trip generation estimates were derived from the video traffic counts performed at surrounding intersections and along the roadways adjacent to the school. The resulting estimates were compared to published trip generation rates.

Based on the data collected, the school currently generates an estimated 0.89 trips per student in the morning peak hour and 0.65 trips per student in the afternoon peak hour. The rates are higher than average rates published for Elementary Schools (Land Use 520) in the *Trip Generation Manual* (0.75 trips per student in the morning peak hour and 0.45 trips per student in the afternoon peak hour), but are generally comparable to rates derived from counts at other Seattle elementary schools. Since these rates were derived specifically for the existing school, they are most appropriate for use in evaluating future conditions with the proposed early learning addition and added enrollment capacity.

The derived rates were applied to estimate trip generation by the expanded school at its proposed new enrollment capacity (382 students including the expanded early learning component). The net change in trips was derived by comparing the trips with the proposed expansion to those that existed with the enrollment level in March 2023. This is a worst-case condition since the current enrollment is lower than the school's historic enrollment, which was up to 402 students in 2016. Table 5 presents the resulting trip generation estimates, which include school bus trips, employee trips, and family-vehicle trips. As shown, the added early learning student capacity is estimated to increase trip generation at and around the site by 35 trips (18 in, 17 out) in the morning peak hour and by 25 trips (12 in, 13 out) in the afternoon peak hour. As noted previously, no change to the number of school buses serving the site is expected.

[17] ITE, 11th Edition, September 2021.

Table 5. John Muir Elementary School Project – Trip Generation Estimates

Site Condition	Enrollment	Morning Peak Hour			Afternoon Peak Hour		
		In	Out	Total	In	Out	Total
John Muir ES w-Early Learning Addition	382 students [a]	174	165	339	119	129	248
Existing John Muir Elementary School	342 students [b]	156	148	304	107	116	223
Net Change	**40 students**	**18**	**17**	**35**	**12**	**13**	**25**

Source: Heffron Transportation, Inc., April 2023.

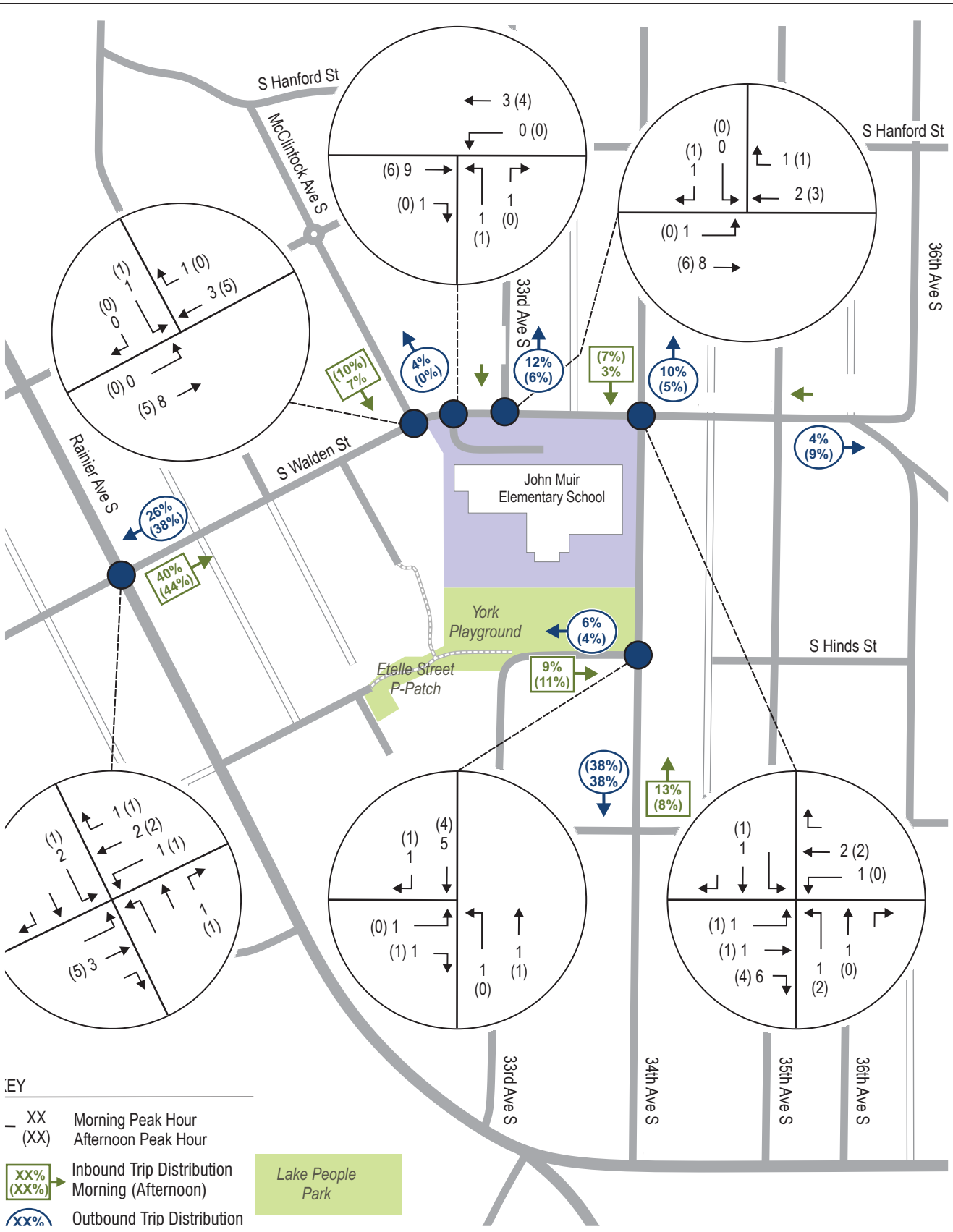
a. Proposed future capacity of the school with early learning classroom addition.

b. Enrollment and capacity of the existing school at the time of data collection (March 2023).

3.2.2. Trip Distribution and Assignment

Trip distribution patterns for the new school trips were developed based on the existing travel characteristics of the local roadway network including the location of parking supply, student drop-off/pick-up areas, bus loading areas, and the access driveways. Most of the morning and afternoon peak hour trips typically consist of passenger vehicles (for student drop off and pick up). Some trips are also generated by teachers, staff, and school buses.

School buses would continue to use the load/unload zone on the west (southbound) side of 34th Avenue S. Passenger-vehicle load/unload for students is expected to continue along the south side of S Horton Street adjacent to the site and on roadways in the vicinity of the school. Figure 6 shows the traffic distribution patterns and assignments of net new morning and afternoon peak hour trips. The net new peak hour school trips were added to the forecast 2025 without-project traffic volumes to reflect future conditions with the renovated school. Figure 7 shows the forecast 2025 with-project morning and afternoon peak hour traffic volumes.



SEATTLE PUBLIC SCHOOLS
John Muir Elementary
Early Learning Addition

Figure 6
Project Trip Distribution and Assignment
Morning and Afternoon Peak Hours

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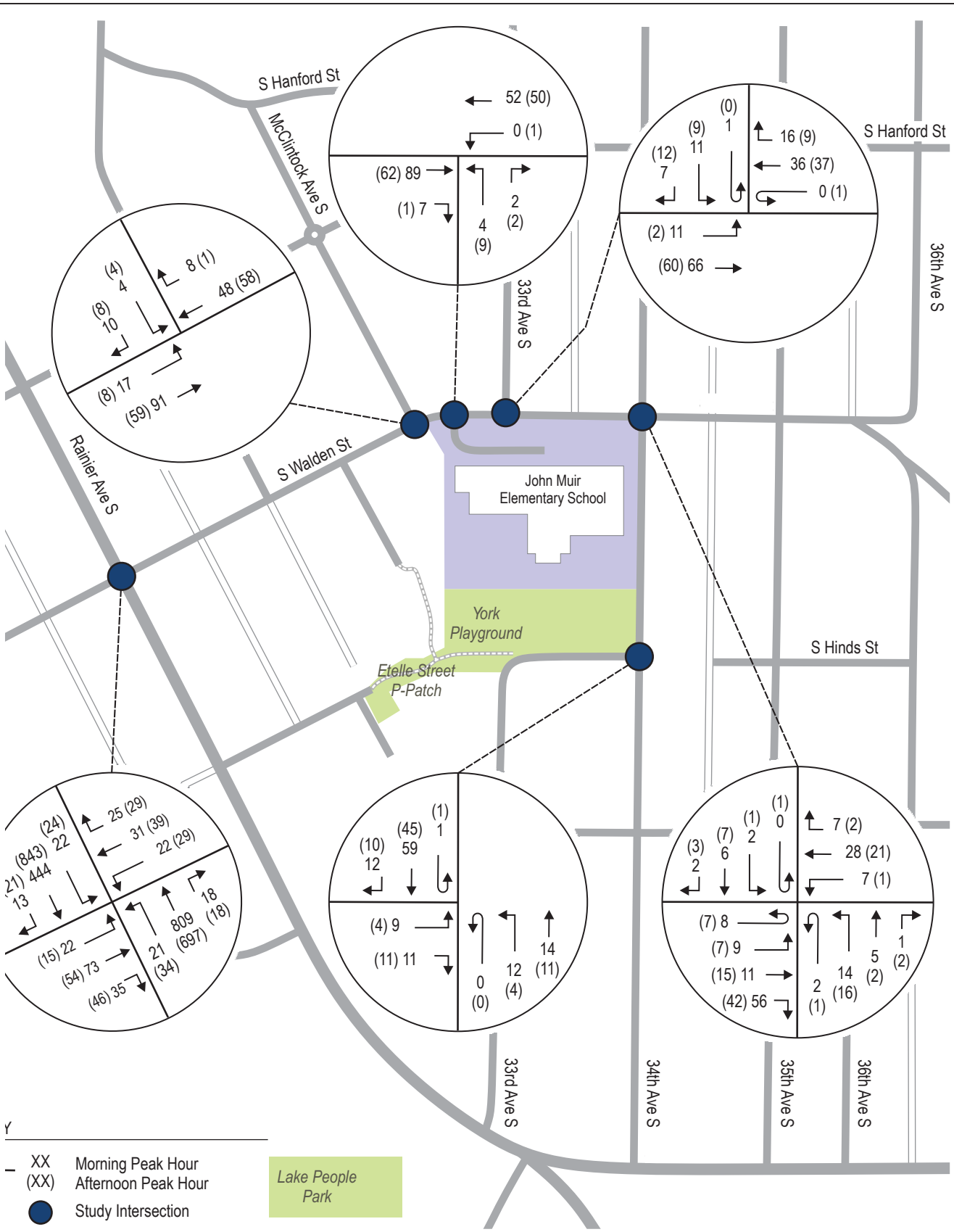

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Figure 7
Forecast 2025-With-Project Traffic Volumes
Morning and Afternoon Peak Hours

heffron transportation inc

3.3. Traffic Operations

Intersection levels of service for future with-project conditions were evaluated using the same methodology described previously. The additional enrollment capacity could result in increased pedestrian trips and could increase the number of pedestrian crossings at the nearby study intersections. The operational analyses accounted for potential increases in pedestrian crossing activity and the peaking characteristics of school traffic (school drop-off and pick-up primarily occurs during about 20 minutes in the peak hour).

Table 6 shows the results of the analysis; levels of service for the without-project conditions are shown for comparison. The proposed project is expected to add negligible delay (less than two seconds) to the study area intersections and is not expected to change the overall level of service at any of the analysis intersections. The signalized S Walden Street / Rainier Avenue S intersections would continue to operate at LOS C or better during both peak hours. The unsignalized intersections would continue to operate at LOS A overall with all movements at LOS B or better with the project during both analysis periods. The site access driveway on S Horton Street is forecast to remain operating at LOS A overall with all movements operating at LOS B or better with the project during both peak hours.

Table 6. Level of Service Summary – Forecast 2025 Conditions Without- and With-Project

Traffic Control / Intersection	Morning Peak Hour (7:30–8:30 A.M.)				Afternoon Peak Hour (2:15–3:15 P.M.)			
	Without Project		With Project		Without Project		With Project	
Signalized	**LOS [1]**	**Delay [2]**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
S Walden Street / Rainier Avenue S	C	23.0	C	24.8	B	19.2	B	19.5
Traffic Circle Controlled [3]	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
S Horton Street / 33rd Avenue S	A	3.4	A	3.4	A	3.1	A	3.2
S Horton Street / 34th Avenue S	A	3.4	A	3.5	A	3.1	A	3.2
Uncontrolled [4]	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
S Walden Street / McClintock Ave S	A	1.7	A	1.6	A	1.4	A	1.3
Eastbound Left Turn	A	7.5	A	7.6	A	7.5	A	7.5
Southbound Approach	A	9.5	A	9.7	A	9.2	A	9.3
S Hinds Street / 34th Avenue S	A	2.4	A	2.5	A	2.6	A	2.5
Northbound Left Turn	A	7.6	A	7.7	A	7.5	A	7.5
Eastbound Approach	A	9.9	B	10.1	A	9.2	A	9.3

Source: Heffron Transportation, Inc., April 2023.

1. *Level of service.*
2. *Average seconds of delay per vehicle.*
3. *Intersections are controlled by traffic circles; evaluated using roundabout methodology.*
4. *Intersections are uncontrolled; evaluated as stop-controlled for T approaches.*

3.4. Parking Supply and Demand

No permanent changes are proposed to the existing on-site or nearby on-street parking supply. The following sections describe potential project-related impacts to school-day parking conditions.

3.4.1. School Day Parking

School-day parking at elementary schools is primarily influenced by staffing levels and family-volunteer activity. With the early learning classroom addition and the added enrollment capacity (to 382 students), the school could have up to 78 total employees (an increase of 11 compared to the existing school).[18] Future parking demand estimates were developed based on the rate derived for the existing school and presented previously (0.94-vehicles-per-employee). Based on this rate, the proposed replacement school with the increased staff could generate parking demand of 73 vehicles—an increase of 11 vehicles compared to the existing school. Demand is likely to vary somewhat depending on the number of part-time employees and volunteers on site at any one time.

Demand for on-street parking in the area is likely to increase due to higher numbers of staff and school visitors/volunteers and two fewer space(s) to be provided on site. As described, school demand is partially accommodated by the on-site parking lot. However, the increase in demand from the early learning addition is likely to occur on-street—estimated at 13 vehicles. As detailed previously, on-street parking within the site vicinity averages 60% occupied midday on school days, with over 280 unused spaces. The increase in school-day on-street parking demand could be accommodated by unused supply and typical utilization is estimated to remain below 65%.

3.4.2. Evening Event Parking

John Muir Elementary School would continue to host events periodically throughout the school year; however, the early learning classroom addition is not expected to change the frequency or attendance of these events. No event-related parking impacts are anticipated from the proposed project.

3.5. Traffic Safety

The project could increase traffic at the study-area intersections and statistically, the number of collisions could increase as traffic increases. However, the project does not include any changes to the roadway network that are expected to result in new adverse safety concerns.

3.6. Transit

A small number of transit trips may be generated by the teachers or staff at the site; however, the traffic estimates do not rely on reductions in auto trips to account for any staff transit usage. The nearest stops area located on Rainier Avenue S at S Walden Street. The project would not increase the number of school buses serving the site and is not expected to result in adverse impacts to transit facilities or service.

3.7. Non-Motorized Facilities

John Muir Elementary School, with increased enrollment capacity, is expected to generate some additional pedestrian trips within the site vicinity. It is anticipated that some increase in pedestrian activity could occur along S Horton Street and 34th Avenue S adjacent to the school. There may also be small increases in bicycle trips within the site vicinity. The site frontages already have sidewalks and marked crosswalks along primary school walking routes.

The project would provide the number of additional bicycle parking spaces required by City code; however, a code departure request for the type of bicycle parking to be provided is anticipated. The request would be for a reduction of six (6) short-term spaces with an equal number of spaces added to

[18] DLR Group, April 12, 2022.

long-term bicycle parking. No significant adverse impacts to non-motorized access or facilities are expected, and no improvements to non-motorized facilities would be required.

3.8. Short-Term Construction Impacts

The school would be open and operating during construction, which is planned to start in summer 2024, and end in fall 2025 when the addition is planned to be ready for occupancy.

3.8.1. Construction-Period Access Operations

The proposed early learning classroom addition would be constructed at the northeast corner of the existing building; access from the northeastern part of the site may be limited or closed during construction. The existing school-bus load/unload zone on 34th Avenue S is not expected to be affected. During construction, pedestrians (including students) would be routed around or directed to avoid construction areas using temporary walkways, fencing, and signage.

3.8.2. Construction-Period Parking Conditions

Construction personnel are expected to park on-street in the site vicinity. Although parking demand generated by construction workers may be noticeable to local residents, the parking occupancy on the surrounding roadways was found to be about 60% utilized during weekdays with an average of about 280 unused spaces, which is expected to accommodate the temporary added demand during construction and is not expected to result in significant adverse impacts to study-area parking conditions.

3.8.3. Construction-Period Earthwork and Employee Activity

The construction effort would include some demolition and earthwork (excavation and fill for retaining walls, foundations, and grading) estimated to require removal of about 1,510 cubic yards (cy) of material and import of about 170 cy of fill. Assuming 15% swell/fluff and average of 20-cubic yards per truck (truck/trailer combination), the earthwork transport (import and export) could generate about 100 truckloads over the duration of the effort. Most of the transport activities are likely to occur during summer 2024. If consolidated to one week, this would correspond to an average of 20 truckloads per day (20 trucks in, 20 trucks out) and 2 to 3 truckloads per hour over five days. This volume of truck traffic may be noticeable to residents living adjacent to the site, but would be short in duration and would not result in significant traffic impacts.

The construction effort would also involve employee and equipment trips to and from the site. Construction workers usually arrive before the morning peak traffic period and depart prior to the commuter PM peak period; school construction work shifts are usually from 7:00 A.M. to 3:30 P.M., with workers arriving between 6:30 and 6:45 A.M., but work not starting until 7:00 A.M. Generally, it is preferred that employee arrival and departures as well as transport and delivery of materials not occur during student arrival or dismissal times to avoid conflicts. The number of workers at the project site at any one time would vary depending upon the construction element being implemented.

4. SUMMARY AND RECOMMENDATION

The following sections summarize the findings and recommendations of the analysis.

4.1. Short-Term Conditions – Construction

- Construction is planned to begin in summer 2024 with occupancy of the new early-learning classrooms by fall 2025. During construction, the students would remain in the building.
- During construction, pedestrians (including students) would be routed around or directed to avoid construction area using temporary walkways, fencing, and signage. Movements around the northeastern portion of the campus would likely be partially restricted.
- Construction personnel are expected to park on-street in the site vicinity. Unused on-street supply is expected to accommodate the temporary added demand during the construction period.
- Earthwork transport during construction is estimated to require an average of 20 truckloads day (20 trucks in, 20 trucks out) and 2 or 3 truckloads per hour, which may be noticeable to residents living adjacent to the site, but would not result in significant traffic impacts.

Because construction would occur while students remain at John Muir Elementary School, it is recommended that the contractor and SPS develop a Construction Transportation Management Plan. Details to be included in this plan are described in Section 4.3.

4.2. Long-Term Conditions – Operations

- The proposed classroom addition at John Muir Elementary School is expected to increase student capacity to 382 (40 more than its current capacity of 342) and add up to 11 employees (an increase from 67 to 78).
- The proposed early-learning classroom addition is projected to generate a net increase of 35 vehicle trips (18 in, 17 out) during the morning peak hour (from 7:30 to 8:30 A.M.) and 25 vehicle trips (12 in, 13 out) during the afternoon peak hour (from 2:15 to 3:15 P.M.).
- The project is forecast to add negligible delay (less than two seconds) and is not expected to change overall levels of service at study area intersections. The signalized S Walden Street / Rainier Avenue S intersections would continue to operate at LOS C or better during both peak hours. The unsignalized intersections would continue to operate at LOS A overall with all movements at LOS B or better with the project during both analysis periods.
- The site access driveway on S Horton Street is forecast to remain operating at LOS A overall with all movements operating at LOS B or better with the project during both peak hours.
- At the proposed enrollment capacity of 382 students, school-day parking demand may increase by 13 vehicles. On-street parking within the site vicinity was 60% occupied on school days with more than 275 unused parking spaces. With the potential increase in school-generated demand, overall school-day utilization is expected to remain below 65% with the project.

Based the above findings, the early learning classroom addition would not result in significant adverse impacts to long-term traffic operations or parking.

4.3. Recommendation

Even though the proposed John Muir Elementary School classroom addition project would not result in significant adverse impact to the transportation system in the site vicinity, the following measure is recommended to reduce the short-term construction related traffic and parking impacts of the project.

Construction Transportation Management Plan (CTMP): The District should require the selected contractor to develop a CTMP that addresses traffic and pedestrian control during construction of the classroom addition. It should define truck routes, lane closures, walkway closures, and parking or load/unload area disruptions, as necessary. To the extent possible, the CTMP should direct trucks along the shortest route to arterials and away from residential streets to avoid unnecessary conflicts with resident and pedestrian activity. To the extent possible, truck movements (including earthwork transport and deliveries of materials to the site) should not occur during morning arrival or afternoon dismissal periods for the school. The CTMP could also include measures to keep adjacent streets clean on a daily basis at the truck exit points (such as street sweeping or on-site truck wheel cleaning) to reduce tracking dirt offsite.

APPENDIX A

LEVEL OF SERVICE DEFINITIONS

Levels of service (LOS) are qualitative descriptions of traffic operating conditions. These levels of service are designated with letters ranging from LOS A, which is indicative of good operating conditions with little or no delay, to LOS F, which is indicative of stop-and-go conditions with frequent and lengthy delays. Levels of service for this analysis were developed using procedures presented in the *Highway Capacity Manual, Sixth Edition* (Transportation Research Board, 2016).

Signalized Intersections

Level of service for signalized intersections is defined in terms of average delay for all vehicles that travel through the intersection. Delay can be a cause of driver discomfort, frustration, inefficient fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average delay per vehicle in seconds. Delay is a complex measure and is dependent on a number of variables including: number and type of vehicles by movement, intersection lane geometry, signal phasing, the amount of green time allocated to each phase, transit stops and parking maneuvers. Table A-1 shows the level of service criteria for signalized intersections from the *Highway Capacity Manual, Sixth Edition.*

Table A-1. Level of Service for Signalized Intersections

Level of Service	Average Control Delay Per Vehicle
A	≤ 10 seconds
B	> 10 – 20 seconds
C	> 20 – 35 seconds
D	> 35 – 55 seconds
E	> 55 – 80 seconds
F	> 80 seconds

Source: Transportation Research Board, Highway Capacity Manual, Exhibit 19.8, 2016.

Unsignalized Intersections

For unsignalized intersections, level of service is based on the average delay per vehicle for each turning movement. The level of service for all-way stop or roundabout-controlled intersections is based upon the average delay for all vehicles that travel through the intersection. The level of service for a one- or two-way, stop-controlled intersection, delay is related to the availability of gaps in the main street's traffic flow, and the ability of a driver to enter or pass through those gaps. Table A-2 shows the level of service criteria for unsignalized intersections from the *Highway Capacity Manual, Sixth Edition*.

Table A-2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle
A	0 – 10 seconds
B	> 10 – 15 seconds
C	> 15 – 25 seconds
D	> 25 – 35 seconds
E	> 35 – 50 seconds
F	> 50 seconds

Source: Transportation Research Board, Highway Capacity Manual, Exhibit 20.2, 2016.

APPENDIX B

PARKING UTILIZATION STUDY DATA

Project **John Muir Elementary - Early Learning Center**

Block Face ID	Street Name	Street Segment	Side of Street	Parking Supply										
				Unrestricted	2hr 7a-6p Except Sun/Hol/Zone 16	4hr 7a-6p Except Sun/Hol/Zone 16	2hr 7a-6p Except Sun/Hol	30 Min L/U 7a-6p Exc Sun/Hol	15 Min School Load Only 7-9a, 12-4p Exc Sat/Sun/Hol	School Bus Only 7-9a, 12-4p Exc Sat/Sun/Hol	Disabled	3min PLZ	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
AB	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	SW	0	0	0	0	0	0	0	0	0	**0**	**0**
AC	S HANFORD ST	MCCLINTOCK AVE S AND 32ND AVE S	N	0	0	0	0	0	0	0	0	0	**0**	**0**
AD	S HANFORD ST	MCCLINTOCK AVE S AND 32ND AVE S	S	0	0	0	0	0	0	0	0	0	**0**	**0**
AE	S HANFORD ST	800' BOUNDARY AND 33RD N AVE S	N	0	0	0	0	0	0	0	0	0	**0**	**0**
AF	S HANFORD ST	800' BOUNDARY AND 33RD N AVE S	S	0	0	0	0	0	0	0	0	0	**0**	**0**
AG	33RD AVE S	800' BOUNDARY AND S HANFORD N ST	W	3	0	0	0	0	0	0	1	0	**4**	**4**
AH	33RD AVE S	800' BOUNDARY AND S HANFORD N ST	E	0	4	0	0	0	0	0	0	0	**4**	**4**
AI	MCCLINTOCK AVE S	S HANFORD ST AND S BYRON ST	SW	0	0	0	0	0	0	0	0	0	**0**	**0**
AJ	MCCLINTOCK AVE S	S HANFORD ST AND S BYRON ST	NE	8	0	0	0	0	0	0	0	0	**8**	**8**
AK	33RD AVE S	S HANFORD N ST AND S HANFORD S ST	W	0	0	0	0	0	0	0	0	0	**0**	**0**
AL	33RD AVE S	S HANFORD N ST AND S HANFORD S ST	E	0	0	0	0	0	0	0	0	0	**0**	**0**
AM	34TH AVE S	800' BOUNDARY AND S HANFORD ST	W	5	0	0	0	0	0	0	0	0	**5**	**5**
AN	34TH AVE S	800' BOUNDARY AND S HANFORD ST	E	8	0	0	0	0	0	0	0	0	**8**	**8**
AO	S BYRON ST	WETMORE AVE S AND MCCLINTOCK AVE S	NW	11	0	0	0	0	0	0	0	0	**11**	**11**
AP	S BYRON ST	WETMORE AVE S AND MCCLINTOCK AVE S	SE	9	0	0	0	0	0	0	0	0	**9**	**9**
AQ	S BYRON ST	MCCLINTOCK AVE S AND 33RD AVE S	NW	12	0	0	0	0	0	0	1	0	**13**	**13**
AR	S BYRON ST	MCCLINTOCK AVE S AND 33RD AVE S	SE	0	11	0	0	0	0	0	0	0	**11**	**11**
AS	S HANFORD ST	33RD S AVE S AND 34TH AVE S	N	8	0	0	0	0	0	0	0	0	**8**	**8**
AT	S HANFORD ST	33RD S AVE S AND 34TH AVE S	S	8	0	0	0	0	0	0	0	0	**8**	**8**
AU	S HANFORD ST	34TH AVE S AND 35TH AVE S	N	7	0	0	0	0	0	0	0	0	**7**	**7**
AV	S HANFORD ST	34TH AVE S AND 35TH AVE S	S	8	0	0	0	0	0	0	0	0	**8**	**8**
AW	RAINIER AVE S	800' BOUNDARY AND S WALDEN ST	SW	0	0	0	0	0	0	0	0	0	**0**	**0**

Project **John Muir Elementary - Early Learning Center**

Block Face ID	Street Name	Street Segment	Side of Street	Parking Supply										
				Unrestricted	2hr 7a-6p Except Sun/Hol/Zone 16	4hr 7a-6p Except Sun/Hol/Zone 16	2hr 7a-6p Except Sun/Hol	30 Min L/U 7a-6p Exc Sun/Hol	15 Min School Load Only 7-9a, 12-4p Exc Sat/Sun/Hol	School Bus Only 7-9a, 12-4p Exc Sat/Sun/Hol	Disabled	3min PLZ	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
AX	RAINIER AVE S	800' BOUNDARY AND S WALDEN ST	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
AY	WETMORE AVE S	S BYRON ST AND S WALDEN ST	SW	0	13	0	0	0	0	0	0	0	**13**	**13**
AZ	WETMORE AVE S	S BYRON ST AND S WALDEN ST	NE	0	12	0	0	0	0	0	0	0	**12**	**12**
BA	MCCLINTOCK AVE S	S BYRON ST AND S WALDEN ST	SW	13	0	0	0	0	0	0	0	0	**13**	**13**
BB	MCCLINTOCK AVE S	S BYRON ST AND S WALDEN ST	NE	16	0	0	0	0	0	0	0	0	**16**	**16**
BC	33RD AVE S	S HANFORD S ST AND S HORTON ST	W	14	0	0	0	0	0	0	1	0	**15**	**15**
BD	33RD AVE S	S HANFORD S ST AND S HORTON ST	E	20	0	0	0	0	0	0	0	0	**20**	**20**
BE	34TH AVE S	S HANFORD ST AND S HORTON ST	W	22	0	0	0	0	0	0	1	0	**23**	**23**
BF	34TH AVE S	S HANFORD ST AND S HORTON ST	E	22	0	0	0	0	0	0	0	0	**22**	**22**
BG	35TH AVE S	S HANFORD ST AND S HORTON ST	W	20	0	0	0	0	0	0	0	0	**20**	**20**
BH	35TH AVE S	S HANFORD ST AND S HORTON ST	E	17	0	0	0	0	0	0	0	0	**17**	**17**
BI	36TH AVE S	800' BOUNDARY AND S HORTON ST	W	7	0	0	0	0	0	0	0	0	**7**	**7**
BJ	36TH AVE S	800' BOUNDARY AND S HORTON ST	E	8	0	0	0	0	0	0	0	0	**8**	**8**
BK	S WALDEN ST	800' BOUNDARY AND RAINIER AVE S	NW	0	6	0	0	0	0	0	0	0	**6**	**6**
BL	S WALDEN ST	800' BOUNDARY AND RAINIER AVE S	SE	0	4	0	0	0	0	0	0	0	**4**	**4**
BM	S WALDEN ST	RAINIER AVE S AND WETMORE AVE S	NW	0	9	0	0	0	0	0	0	0	**9**	**9**
BN	S WALDEN ST	RAINIER AVE S AND WETMORE AVE S	SE	0	6	0	0	1	0	0	0	0	**7**	**7**
BO	S WALDEN ST	WETMORE AVE S AND GALE PL S	NW	4	0	0	0	0	0	0	0	0	**4**	**4**
BP	S WALDEN ST	WETMORE AVE S AND GALE PL S	SE	3	0	0	0	0	0	0	0	0	**3**	**3**
BQ	S WALDEN ST	GALE PL S AND MCCLINTOCK AVE S	NW	4	0	0	0	0	0	0	0	0	**4**	**4**
BR	S WALDEN ST	GALE PL S AND MCCLINTOCK AVE S	SE	1	0	0	0	0	0	0	0	0	**1**	**1**
BS	S HORTON ST	MCCLINTOCK AVE S AND 33RD AVE S	N	3	0	0	0	0	0	0	0	0	**3**	**3**

Project **John Muir Elementary - Early Learning Center**

				Parking Supply										
Block Face ID	Street Name	Street Segment	Side of Street	Unrestricted	2hr 7a-6p Except Sun/Hol/Zone 16	4hr 7a-6p Except Sun/Hol/Zone 16	2hr 7a-6p Except Sun/Hol	30 Min L/U 7a-6p Exc Sun/Hol	15 Min School Load Only 7-9a, 12-4p Exc Sat/Sun/Hol	School Bus Only 7-9a, 12-4p Exc Sat/Sun/Hol	Disabled	3min PLZ	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
BT	S HORTON ST	MCCLINTOCK AVE S AND 33RD AVE S	S	0	0	0	0	0	0	0	0	0	**0**	**0**
BU	S HORTON ST	33RD AVE S AND 34TH AVE S	N	8	0	0	0	0	0	0	0	0	**8**	**8**
BV	S HORTON ST	33RD AVE S AND 34TH AVE S	S	0	0	0	0	0	2	0	1	0	**1**	**3**
BW	S HORTON ST	34TH AVE S AND 35TH AVE S	N	10	0	0	0	0	0	0	0	0	**10**	**10**
BX	S HORTON ST	34TH AVE S AND 35TH AVE S	S	9	0	0	0	0	0	0	0	0	**9**	**9**
BY	S HORTON ST	35TH AVE S AND YORK RD S	N	3	0	0	0	0	0	0	0	0	**3**	**3**
BZ	S HORTON ST	35TH AVE S AND YORK RD S	S	5	0	0	0	0	0	0	0	0	**5**	**5**
CA	S HORTON ST	YORK RD S AND 36TH AVE S	N	0	0	0	0	0	0	0	0	0	**0**	**0**
CB	S HORTON ST	YORK RD S AND 36TH AVE S	S	0	0	0	0	0	0	0	0	0	**0**	**0**
CC	RAINIER AVE S	S WALDEN ST AND S ESTELLE ST	SW	0	0	0	0	0	0	0	0	0	**0**	**0**
CD	RAINIER AVE S	S WALDEN ST AND S ESTELLE ST	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
CE	GALE PL S	S WALDEN ST AND DEAD END	SW	0	0	0	0	0	0	0	0	0	**0**	**0**
CF	GALE PL S	S WALDEN ST AND DEAD END	NE	3	0	0	0	0	0	0	0	0	**3**	**3**
CG	34TH AVE S	S HORTON ST AND S HINDS ST	W	0	0	0	0	0	0	8	0	0	**0**	**8**
CH	34TH AVE S	S HORTON ST AND S HINDS ST	E	18	0	0	0	0	0	0	0	0	**18**	**18**
CI	35TH AVE S	S HORTON ST AND S HINDS ST	W	20	0	0	0	0	0	0	0	0	**20**	**20**
CJ	35TH AVE S	S HORTON ST AND S HINDS ST	E	14	0	0	0	0	0	0	0	0	**14**	**14**
CK	YORK RD S	S HORTON ST AND 36TH AVE S	SW	4	0	0	0	0	0	0	0	0	**4**	**4**
CL	YORK RD S	S HORTON ST AND 36TH AVE S	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
CM	36TH AVE S	YORK RD S AND S HINDS ST	W	13	0	0	0	0	0	0	0	0	**13**	**13**
CN	36TH AVE S	YORK RD S AND S HINDS ST	E	10	0	0	0	0	0	0	0	0	**10**	**10**
CO	YORK RD S	36TH AVE S AND 800' BOUNDARY	SW	2	0	0	0	0	0	0	0	0	**2**	**2**

Project **John Muir Elementary - Early Learning Center**

Block Face ID	Street Name	Street Segment	Side of Street	Parking Supply										
				Unrestricted	2hr 7a-6p Except Sun/Hol/Zone 16	4hr 7a-6p Except Sun/Hol/Zone 16	2hr 7a-6p Except Sun/Hol	30 Min L/U 7a-6p Exc Sun/Hol	15 Min School Load Only 7-9a, 12-4p Exc Sat/Sun/Hol	School Bus Only 7-9a, 12-4p Exc Sat/Sun/Hol	Disabled	3min PLZ	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
CP	YORK RD S	36TH AVE S AND 800' BOUNDARY	NE	8	0	0	0	0	0	0	0	0	**8**	**8**
CQ	S ESTELLE ST	DEAD END W AND RAINIER AVE S	NW	0	0	0	0	0	0	0	0	0	**0**	**0**
CR	S ESTELLE ST	DEAD END W AND RAINIER AVE S	SE	0	0	3	0	1	0	0	0	0	**4**	**4**
CS	S ESTELLE ST	RAINIER AVE S AND DEAD END E	NW	12	0	0	0	0	0	0	0	0	**12**	**12**
CT	S ESTELLE ST	RAINIER AVE S AND DEAD END E	SE	12	0	0	0	0	0	0	0	0	**12**	**12**
CU	S HINDS ST	33RD AVE S AND 34TH AVE S	N	10	0	0	0	0	0	0	0	0	**10**	**10**
CV	S HINDS ST	33RD AVE S AND 34TH AVE S	S	7	0	0	0	0	0	0	0	0	**7**	**7**
CW	S HINDS ST	DEAD END 1 AND 35TH AVE S	N	3	0	0	0	0	0	0	0	0	**3**	**3**
CX	S HINDS ST	DEAD END 1 AND 35TH AVE S	S	2	0	0	0	0	0	0	0	0	**2**	**2**
CY	S HINDS ST	35TH AVE S AND 36TH AVE S	N	8	0	0	0	0	0	0	0	0	**8**	**8**
CZ	S HINDS ST	35TH AVE S AND 36TH AVE S	S	8	0	0	0	0	0	0	0	0	**8**	**8**
DA	RAINIER AVE S	S ESTELLE ST AND 800' BOUNDARY	SW	0	0	0	0	0	0	0	0	0	**0**	**0**
DB	RAINIER AVE S	S ESTELLE ST AND 800' BOUNDARY	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
DC	33RD AVE S	S HINDS ST AND S SPOKANE ST	W	4	0	0	0	0	0	0	0	0	**4**	**4**
DD	33RD AVE S	S HINDS ST AND S SPOKANE ST	E	8	0	0	0	0	0	0	0	0	**8**	**8**
DE	34TH AVE S	S HINDS ST AND S SPOKANE ST	W	11	0	0	0	0	0	0	0	0	**11**	**11**
DF	34TH AVE S	S HINDS ST AND S SPOKANE ST	E	12	0	0	0	0	0	0	0	0	**12**	**12**
DG	35TH AVE S	S HINDS ST AND 800' BOUNDARY	W	22	0	0	0	0	0	0	0	0	**22**	**22**
DH	35TH AVE S	S HINDS ST AND 800' BOUNDARY	E	15	0	0	0	0	0	0	0	0	**15**	**15**
DI	36TH AVE S	S HINDS ST AND 800' BOUNDARY	W	7	0	0	0	0	0	0	0	0	**7**	**7**
DJ	36TH AVE S	S HINDS ST AND 800' BOUNDARY	E	7	0	0	0	0	0	0	0	0	**7**	**7**
DK	S SPOKANE ST	3RD AVE S AND DEAD END	N	4	0	0	0	0	0	0	0	0	**4**	**4**

Project **John Muir Elementary - Early Learning Center**

Block Face ID	Street Name	Street Segment	Side of Street	Parking Supply										
				Unrestricted	2hr 7a-6p Except Sun/Hol/Zone 16	4hr 7a-6p Except Sun/Hol/Zone 16	2hr 7a-6p Except Sun/Hol	30 Min L/U 7a-6p Exc Sun/Hol	15 Min School Load Only 7-9a, 12-4p Exc Sat/Sun/Hol	School Bus Only 7-9a, 12-4p Exc Sat/Sun/Hol	Disabled	3min PLZ	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	0	0	0	0	0	0	0	**0**	**0**
DL	S SPOKANE ST	3RD AVE S AND DEAD END	S	2	0	0	0	0	0	0	0	0	**2**	**2**
DM	S SPOKANE ST	33RD AVE S AND 34TH AVE S	N	7	0	0	0	0	0	0	0	0	**7**	**7**
DN	S SPOKANE ST	33RD AVE S AND 34TH AVE S	S	9	0	0	0	0	0	0	0	0	**9**	**9**
DO	S SPOKANE ST	34TH AVE S AND DEAD END 3	N	2	0	0	0	0	0	0	0	0	**2**	**2**
DP	S SPOKANE ST	34TH AVE S AND DEAD END 3	S	2	0	0	0	0	0	0	0	0	**2**	**2**
DQ	33RD AVE S	S SPOKANE ST AND 800' BOUNDARY	W	10	0	0	0	0	0	0	0	2	**12**	**12**
DR	33RD AVE S	S SPOKANE ST AND 800' BOUNDARY	E	9	0	0	6	0	0	0	1	0	**16**	**16**
DS	34TH AVE S	S SPOKANE ST AND 800' BOUNDARY	W	17	0	0	0	0	0	0	0	0	**17**	**17**
DT	34TH AVE S	S SPOKANE ST AND 800' BOUNDARY	E	16	0	0	0	0	0	0	0	0	**16**	**16**
			TOTAL	**614**	**65**	**3**	**6**	**2**	**2**	**8**	**6**	**2**	**698**	**708**

Project **John Muir Elementary - Early Learning Center**

				Parking Supply		Parking Demand							
						Early Morning (7:00 to 7:45am)				Mid-Morning (10:30 - 11:30am)			
Block Face ID	Street Name	Street Segment	Side of Street	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	**0**	**0**	0	0	0	0	0	1	0.5	0
AB	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	SW	**0**	**0**	0	0	0	0	0	0	0	0
AC	S HANFORD ST	MCCLINTOCK AVE S AND 32ND AVE S	N	**0**	**0**	0	0	0	0	0	0	0	0
AD	S HANFORD ST	MCCLINTOCK AVE S AND 32ND AVE S	S	**0**	**0**	0	0	0	0	0	0	0	0
AE	S HANFORD ST	800' BOUNDARY AND 33RD N AVE S	N	**0**	**0**	0	0	0	0	0	0	0	0
AF	S HANFORD ST	800' BOUNDARY AND 33RD N AVE S	S	**0**	**0**	0	0	0	0	0	0	0	0
AG	33RD AVE S	800' BOUNDARY AND S HANFORD N ST	W	**4**	**4**	2	1	1.5	3	5	3	4	3
AH	33RD AVE S	800' BOUNDARY AND S HANFORD N ST	E	**4**	**4**	2	4	3	3	5	4	4.5	3
AI	MCCLINTOCK AVE S	S HANFORD ST AND S BYRON ST	SW	**0**	**0**	1	0	0.5	1	0	0	0	0
AJ	MCCLINTOCK AVE S	S HANFORD ST AND S BYRON ST	NE	**8**	**8**	7	8	7.5	7	8	9	8.5	8
AK	33RD AVE S	S HANFORD N ST AND S HANFORD S ST	W	**0**	**0**	0	0	0	0	0	0	0	0
AL	33RD AVE S	S HANFORD N ST AND S HANFORD S ST	E	**0**	**0**	0	1	0.5	0	1	1	1	0
AM	34TH AVE S	800' BOUNDARY AND S HANFORD ST	W	**5**	**5**	2	5	3.5	5	3	4	3.5	4
AN	34TH AVE S	800' BOUNDARY AND S HANFORD ST	E	**8**	**8**	7	7	7	6	5	6	5.5	7
AO	S BYRON ST	WETMORE AVE S AND MCCLINTOCK AVE S	NW	**11**	**11**	5	3	4	5	8	9	8.5	9
AP	S BYRON ST	WETMORE AVE S AND MCCLINTOCK AVE S	SE	**9**	**9**	5	6	5.5	8	8	6	7	4
AQ	S BYRON ST	MCCLINTOCK AVE S AND 33RD AVE S	NW	**13**	**13**	8	7	7.5	6	11	12	11.5	4
AR	S BYRON ST	MCCLINTOCK AVE S AND 33RD AVE S	SE	**11**	**11**	2	3	2.5	2	11	7	9	3
AS	S HANFORD ST	33RD S AVE S AND 34TH AVE S	N	**8**	**8**	3	2	2.5	2	6	7	6.5	2
AT	S HANFORD ST	33RD S AVE S AND 34TH AVE S	S	**8**	**8**	0	0	0	0	8	6	7	1
AU	S HANFORD ST	34TH AVE S AND 35TH AVE S	N	**7**	**7**	5	1	3	2	6	2	4	2
AV	S HANFORD ST	34TH AVE S AND 35TH AVE S	S	**8**	**8**	4	4	4	4	4	3	3.5	4
AW	RAINIER AVE S	800' BOUNDARY AND S WALDEN ST	SW	**0**	**0**	0	0	0	0	0	0	0	0

Project **John Muir Elementary - Early Learning Center**

				Parking Supply		Parking Demand							
						Early Morning (7:00 to 7:45am)				Mid-Morning (10:30 - 11:30am)			
Block Face ID	Street Name	Street Segment	Side of Street	Total Parking Spaces (Early Morning)	Total Parking Spaces (Mid Mornign	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	**0**	**0**	0	0	0	0	0	1	0.5	0
AX	RAINIER AVE S	800' BOUNDARY AND S WALDEN ST	NE	**0**	**0**	0	0	0	0	0	0	0	0
AY	WETMORE AVE S	S BYRON ST AND S WALDEN ST	SW	**13**	**13**	12	13	12.5	8	6	9	7.5	8
AZ	WETMORE AVE S	S BYRON ST AND S WALDEN ST	NE	**12**	**12**	11	11	11	7	11	9	10	9
BA	MCCLINTOCK AVE S	S BYRON ST AND S WALDEN ST	SW	**13**	**13**	6	5	5.5	5	9	11	10	6
BB	MCCLINTOCK AVE S	S BYRON ST AND S WALDEN ST	NE	**16**	**16**	4	9	6.5	6	12	12	12	5
BC	33RD AVE S	S HANFORD S ST AND S HORTON ST	W	**15**	**15**	13	13	13	10	13	13	13	8
BD	33RD AVE S	S HANFORD S ST AND S HORTON ST	E	**20**	**20**	7	11	9	9	15	17	16	8
BE	34TH AVE S	S HANFORD ST AND S HORTON ST	W	**23**	**23**	7	7	7	5	13	13	13	5
BF	34TH AVE S	S HANFORD ST AND S HORTON ST	E	**22**	**22**	4	5	4.5	4	7	5	6	4
BG	35TH AVE S	S HANFORD ST AND S HORTON ST	W	**20**	**20**	9	9	9	10	5	4	4.5	10
BH	35TH AVE S	S HANFORD ST AND S HORTON ST	E	**17**	**17**	12	13	12.5	14	6	9	7.5	8
BI	36TH AVE S	800' BOUNDARY AND S HORTON ST	W	**7**	**7**	5	6	5.5	6	5	5	5	4
BJ	36TH AVE S	800' BOUNDARY AND S HORTON ST	E	**8**	**8**	3	3	3	5	2	3	2.5	4
BK	S WALDEN ST	800' BOUNDARY AND RAINIER AVE S	NW	**6**	**6**	4	5	4.5	5	5	2	3.5	4
BL	S WALDEN ST	800' BOUNDARY AND RAINIER AVE S	SE	**4**	**4**	3	1	2	2	3	2	2.5	3
BM	S WALDEN ST	RAINIER AVE S AND WETMORE AVE S	NW	**9**	**9**	5	2	3.5	0	8	7	7.5	6
BN	S WALDEN ST	RAINIER AVE S AND WETMORE AVE S	SE	**7**	**7**	3	3	3	1	7	8	7.5	7
BO	S WALDEN ST	WETMORE AVE S AND GALE PL S	NW	**4**	**4**	1	1	1	0	1	2	1.5	1
BP	S WALDEN ST	WETMORE AVE S AND GALE PL S	SE	**3**	**3**	3	2	2.5	3	2	1	1.5	3
BQ	S WALDEN ST	GALE PL S AND MCCLINTOCK AVE S	NW	**4**	**4**	0	0	0	0	3	3	3	2
BR	S WALDEN ST	GALE PL S AND MCCLINTOCK AVE S	SE	**1**	**1**	0	0	0	0	0	0	0	0
BS	S HORTON ST	MCCLINTOCK AVE S AND 33RD AVE S	N	**3**	**3**	0	1	0.5	0	2	3	2.5	0

Project **John Muir Elementary - Early Learning Center**

				Parking Supply		Parking Demand							
						Early Morning (7:00 to 7:45am)				Mid-Morning (10:30 - 11:30am)			
Block Face ID	Street Name	Street Segment	Side of Street	**Total Parking Spaces (Early Morning)**	**Total Parking Spaces (Mid Mornign**	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	**0**	**0**	0	0	0	0	0	1	0.5	0
BT	S HORTON ST	MCCLINTOCK AVE S AND 33RD AVE S	S	**0**	**0**	0	0	0	0	0	0	0	0
BU	S HORTON ST	33RD AVE S AND 34TH AVE S	N	**8**	**8**	1	0	0.5	0	6	7	6.5	0
BV	S HORTON ST	33RD AVE S AND 34TH AVE S	S	**1**	**3**	0	0	0	0	0	2	1	0
BW	S HORTON ST	34TH AVE S AND 35TH AVE S	N	**10**	**10**	4	4	4	4	6	5	5.5	3
BX	S HORTON ST	34TH AVE S AND 35TH AVE S	S	**9**	**9**	5	3	4	3	4	7	5.5	4
BY	S HORTON ST	35TH AVE S AND YORK RD S	N	**3**	**3**	2	2	2	3	2	1	1.5	2
BZ	S HORTON ST	35TH AVE S AND YORK RD S	S	**5**	**5**	1	1	1	1	1	2	1.5	0
CA	S HORTON ST	YORK RD S AND 36TH AVE S	N	**0**	**0**	0	0	0	0	0	0	0	0
CB	S HORTON ST	YORK RD S AND 36TH AVE S	S	**0**	**0**	0	0	0	0	0	0	0	0
CC	RAINIER AVE S	S WALDEN ST AND S ESTELLE ST	SW	**0**	**0**	0	0	0	0	0	0	0	0
CD	RAINIER AVE S	S WALDEN ST AND S ESTELLE ST	NE	**0**	**0**	0	0	0	0	0	0	0	0
CE	GALE PL S	S WALDEN ST AND DEAD END	SW	**0**	**0**	1	0	0.5	1	1	0	0.5	1
CF	GALE PL S	S WALDEN ST AND DEAD END	NE	**3**	**3**	2	2	2	2	1	1	1	3
CG	34TH AVE S	S HORTON ST AND S HINDS ST	W	**0**	**8**	0	0	0	0	0	0	0	0
CH	34TH AVE S	S HORTON ST AND S HINDS ST	E	**18**	**18**	8	11	9.5	9	14	13	13.5	8
CI	35TH AVE S	S HORTON ST AND S HINDS ST	W	**20**	**20**	13	13	13	12	6	8	7	9
CJ	35TH AVE S	S HORTON ST AND S HINDS ST	E	**14**	**14**	9	11	10	10	8	7	7.5	7
CK	YORK RD S	S HORTON ST AND 36TH AVE S	SW	**4**	**4**	5	4	4.5	2	4	4	4	1
CL	YORK RD S	S HORTON ST AND 36TH AVE S	NE	**0**	**0**	0	0	0	0	0	0	0	0
CM	36TH AVE S	YORK RD S AND S HINDS ST	W	**13**	**13**	6	8	7	10	10	7	8.5	10
CN	36TH AVE S	YORK RD S AND S HINDS ST	E	**10**	**10**	10	7	8.5	7	6	6	6	8
CO	YORK RD S	36TH AVE S AND 800' BOUNDARY	SW	**2**	**2**	0	0	0	0	0	0	0	0

Project **John Muir Elementary - Early Learning Center**

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AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	0	0	0	0	0	1	0.5	0
CP	YORK RD S	36TH AVE S AND 800' BOUNDARY	NE	8	8	3	4	3.5	4	3	3	3	4
CQ	S ESTELLE ST	DEAD END W AND RAINIER AVE S	NW	0	0	0	0	0	0	0	0	0	0
CR	S ESTELLE ST	DEAD END W AND RAINIER AVE S	SE	4	4	4	4	4	3	4	4	4	4
CS	S ESTELLE ST	RAINIER AVE S AND DEAD END E	NW	12	12	6	7	6.5	4	6	7	6.5	5
CT	S ESTELLE ST	RAINIER AVE S AND DEAD END E	SE	12	12	2	2	2	3	3	5	4	6
CU	S HINDS ST	33RD AVE S AND 34TH AVE S	N	10	10	0	1	0.5	0	0	2	1	0
CV	S HINDS ST	33RD AVE S AND 34TH AVE S	S	7	7	0	0	0	0	0	0	0	0
CW	S HINDS ST	DEAD END 1 AND 35TH AVE S	N	3	3	0	0	0	0	0	0	0	0
CX	S HINDS ST	DEAD END 1 AND 35TH AVE S	S	2	2	0	0	0	0	0	0	0	0
CY	S HINDS ST	35TH AVE S AND 36TH AVE S	N	8	8	0	1	0.5	0	0	0	0	0
CZ	S HINDS ST	35TH AVE S AND 36TH AVE S	S	8	8	0	0	0	0	0	0	0	0
DA	RAINIER AVE S	S ESTELLE ST AND 800' BOUNDARY	SW	0	0	0	0	0	0	0	0	0	0
DB	RAINIER AVE S	S ESTELLE ST AND 800' BOUNDARY	NE	0	0	0	0	0	0	0	0	0	0
DC	33RD AVE S	S HINDS ST AND S SPOKANE ST	W	4	4	7	7	7	5	4	5	4.5	5
DD	33RD AVE S	S HINDS ST AND S SPOKANE ST	E	8	8	5	5	5	7	7	5	6	6
DE	34TH AVE S	S HINDS ST AND S SPOKANE ST	W	11	11	10	9	9.5	7	7	6	6.5	7
DF	34TH AVE S	S HINDS ST AND S SPOKANE ST	E	12	12	7	6	6.5	5	5	4	4.5	5
DG	35TH AVE S	S HINDS ST AND 800' BOUNDARY	W	22	22	7	9	8	8	6	11	8.5	9
DH	35TH AVE S	S HINDS ST AND 800' BOUNDARY	E	15	15	6	8	7	10	6	6	6	9
DI	36TH AVE S	S HINDS ST AND 800' BOUNDARY	W	7	7	3	3	3	2	4	2	3	6
DJ	36TH AVE S	S HINDS ST AND 800' BOUNDARY	E	7	7	5	5	5	8	5	6	5.5	10
DK	S SPOKANE ST	3RD AVE S AND DEAD END	N	4	4	7	4	5.5	5	3	2	2.5	4

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AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	**0**	**0**	0	0	0	0	0	1	0.5	0
DL	S SPOKANE ST	3RD AVE S AND DEAD END	S	**2**	**2**	2	5	3.5	3	2	2	2	3
DM	S SPOKANE ST	33RD AVE S AND 34TH AVE S	N	**7**	**7**	7	8	7.5	6	7	6	6.5	7
DN	S SPOKANE ST	33RD AVE S AND 34TH AVE S	S	**9**	**9**	8	8	8	7	8	5	6.5	6
DO	S SPOKANE ST	34TH AVE S AND DEAD END 3	N	**2**	**2**	1	2	1.5	2	0	1	0.5	0
DP	S SPOKANE ST	34TH AVE S AND DEAD END 3	S	**2**	**2**	3	3	3	2	2	3	2.5	2
DQ	33RD AVE S	S SPOKANE ST AND 800' BOUNDARY	W	**12**	**12**	13	10	11.5	13	13	10	11.5	12
DR	33RD AVE S	S SPOKANE ST AND 800' BOUNDARY	E	**16**	**16**	13	13	13	15	13	12	12.5	12
DS	34TH AVE S	S SPOKANE ST AND 800' BOUNDARY	W	**17**	**17**	16	15	15.5	14	15	15	15	16
DT	34TH AVE S	S SPOKANE ST AND 800' BOUNDARY	E	**16**	**16**	15	17	16	15	15	13	14	14
			TOTAL	**698**	**708**	**382**	**394**	**388**	**366**	**431**	**423**	**427**	**367**

Project **John Muir Elementary - Early Learning Center**

				Parking Supply		Parking Utilization							
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AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	NA	NA	NA	NA	NA	Illegal	Illegal	NA
AB	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	SW	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AC	S HANFORD ST	MCCLINTOCK AVE S AND 32ND AVE S	N	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AD	S HANFORD ST	MCCLINTOCK AVE S AND 32ND AVE S	S	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AE	S HANFORD ST	800' BOUNDARY AND 33RD N AVE S	N	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AF	S HANFORD ST	800' BOUNDARY AND 33RD N AVE S	S	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AG	33RD AVE S	800' BOUNDARY AND S HANFORD N ST	W	4	4	50%	25%	38%	75%	125%	75%	100%	75%
AH	33RD AVE S	800' BOUNDARY AND S HANFORD N ST	E	4	4	50%	100%	75%	75%	125%	100%	113%	75%
AI	MCCLINTOCK AVE S	S HANFORD ST AND S BYRON ST	SW	0	0	Illegal	NA	Illegal	Illegal	NA	NA	NA	NA
AJ	MCCLINTOCK AVE S	S HANFORD ST AND S BYRON ST	NE	8	8	88%	100%	94%	88%	100%	113%	106%	100%
AK	33RD AVE S	S HANFORD N ST AND S HANFORD S ST	W	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AL	33RD AVE S	S HANFORD N ST AND S HANFORD S ST	E	0	0	NA	Illegal	Illegal	NA	Illegal	Illegal	Illegal	NA
AM	34TH AVE S	800' BOUNDARY AND S HANFORD ST	W	5	5	40%	100%	70%	100%	60%	80%	70%	80%
AN	34TH AVE S	800' BOUNDARY AND S HANFORD ST	E	8	8	88%	88%	88%	75%	63%	75%	69%	88%
AO	S BYRON ST	WETMORE AVE S AND MCCLINTOCK AVE S	NW	11	11	45%	27%	36%	45%	73%	82%	77%	82%
AP	S BYRON ST	WETMORE AVE S AND MCCLINTOCK AVE S	SE	9	9	56%	67%	61%	89%	89%	67%	78%	44%
AQ	S BYRON ST	MCCLINTOCK AVE S AND 33RD AVE S	NW	13	13	62%	54%	58%	46%	85%	92%	88%	31%
AR	S BYRON ST	MCCLINTOCK AVE S AND 33RD AVE S	SE	11	11	18%	27%	23%	18%	100%	64%	82%	27%
AS	S HANFORD ST	33RD S AVE S AND 34TH AVE S	N	8	8	38%	25%	31%	25%	75%	88%	81%	25%
AT	S HANFORD ST	33RD S AVE S AND 34TH AVE S	S	8	8	0%	0%	0%	0%	100%	75%	88%	13%
AU	S HANFORD ST	34TH AVE S AND 35TH AVE S	N	7	7	71%	14%	43%	29%	86%	29%	57%	29%
AV	S HANFORD ST	34TH AVE S AND 35TH AVE S	S	8	8	50%	50%	50%	50%	50%	38%	44%	50%
AW	RAINIER AVE S	800' BOUNDARY AND S WALDEN ST	SW	0	0	NA	NA	NA	NA	NA	NA	NA	NA

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AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	NA	NA	NA	NA	NA	Illegal	Illegal	NA
AX	RAINIER AVE S	800' BOUNDARY AND S WALDEN ST	NE	0	0	NA	NA	NA	NA	NA	NA	NA	NA
AY	WETMORE AVE S	S BYRON ST AND S WALDEN ST	SW	13	13	92%	100%	96%	62%	46%	69%	58%	62%
AZ	WETMORE AVE S	S BYRON ST AND S WALDEN ST	NE	12	12	92%	92%	92%	58%	92%	75%	83%	75%
BA	MCCLINTOCK AVE S	S BYRON ST AND S WALDEN ST	SW	13	13	46%	38%	42%	38%	69%	85%	77%	46%
BB	MCCLINTOCK AVE S	S BYRON ST AND S WALDEN ST	NE	16	16	25%	56%	41%	38%	75%	75%	75%	31%
BC	33RD AVE S	S HANFORD S ST AND S HORTON ST	W	15	15	87%	87%	87%	67%	87%	87%	87%	53%
BD	33RD AVE S	S HANFORD S ST AND S HORTON ST	E	20	20	35%	55%	45%	45%	75%	85%	80%	40%
BE	34TH AVE S	S HANFORD ST AND S HORTON ST	W	23	23	30%	30%	30%	22%	57%	57%	57%	22%
BF	34TH AVE S	S HANFORD ST AND S HORTON ST	E	22	22	18%	23%	20%	18%	32%	23%	27%	18%
BG	35TH AVE S	S HANFORD ST AND S HORTON ST	W	20	20	45%	45%	45%	50%	25%	20%	23%	50%
BH	35TH AVE S	S HANFORD ST AND S HORTON ST	E	17	17	71%	76%	74%	82%	35%	53%	44%	47%
BI	36TH AVE S	800' BOUNDARY AND S HORTON ST	W	7	7	71%	86%	79%	86%	71%	71%	71%	57%
BJ	36TH AVE S	800' BOUNDARY AND S HORTON ST	E	8	8	38%	38%	38%	63%	25%	38%	31%	50%
BK	S WALDEN ST	800' BOUNDARY AND RAINIER AVE S	NW	6	6	67%	83%	75%	83%	83%	33%	58%	67%
BL	S WALDEN ST	800' BOUNDARY AND RAINIER AVE S	SE	4	4	75%	25%	50%	50%	75%	50%	63%	75%
BM	S WALDEN ST	RAINIER AVE S AND WETMORE AVE S	NW	9	9	56%	22%	39%	0%	89%	78%	83%	67%
BN	S WALDEN ST	RAINIER AVE S AND WETMORE AVE S	SE	7	7	43%	43%	43%	14%	100%	114%	107%	100%
BO	S WALDEN ST	WETMORE AVE S AND GALE PL S	NW	4	4	25%	25%	25%	0%	25%	50%	38%	25%
BP	S WALDEN ST	WETMORE AVE S AND GALE PL S	SE	3	3	100%	67%	83%	100%	67%	33%	50%	100%
BQ	S WALDEN ST	GALE PL S AND MCCLINTOCK AVE S	NW	4	4	0%	0%	0%	0%	75%	75%	75%	50%
BR	S WALDEN ST	GALE PL S AND MCCLINTOCK AVE S	SE	1	1	0%	0%	0%	0%	0%	0%	0%	0%
BS	S HORTON ST	MCCLINTOCK AVE S AND 33RD AVE S	N	3	3	0%	33%	17%	0%	67%	100%	83%	0%

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AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	NA	NA	NA	NA	NA	Illegal	Illegal	NA
BT	S HORTON ST	MCCLINTOCK AVE S AND 33RD AVE S	S	0	0	NA	NA	NA	NA	NA	NA	NA	NA
BU	S HORTON ST	33RD AVE S AND 34TH AVE S	N	8	8	13%	0%	6%	0%	75%	88%	81%	0%
BV	S HORTON ST	33RD AVE S AND 34TH AVE S	S	1	3	0%	0%	0%	0%	0%	67%	33%	0%
BW	S HORTON ST	34TH AVE S AND 35TH AVE S	N	10	10	40%	40%	40%	40%	60%	50%	55%	30%
BX	S HORTON ST	34TH AVE S AND 35TH AVE S	S	9	9	56%	33%	44%	33%	44%	78%	61%	44%
BY	S HORTON ST	35TH AVE S AND YORK RD S	N	3	3	67%	67%	67%	100%	67%	33%	50%	67%
BZ	S HORTON ST	35TH AVE S AND YORK RD S	S	5	5	20%	20%	20%	20%	20%	40%	30%	0%
CA	S HORTON ST	YORK RD S AND 36TH AVE S	N	0	0	NA	NA	NA	NA	NA	NA	NA	NA
CB	S HORTON ST	YORK RD S AND 36TH AVE S	S	0	0	NA	NA	NA	NA	NA	NA	NA	NA
CC	RAINIER AVE S	S WALDEN ST AND S ESTELLE ST	SW	0	0	NA	NA	NA	NA	NA	NA	NA	NA
CD	RAINIER AVE S	S WALDEN ST AND S ESTELLE ST	NE	0	0	NA	NA	NA	NA	NA	NA	NA	NA
CE	GALE PL S	S WALDEN ST AND DEAD END	SW	0	0	Illegal	NA	Illegal	Illegal	Illegal	NA	Illegal	Illegal
CF	GALE PL S	S WALDEN ST AND DEAD END	NE	3	3	67%	67%	67%	67%	33%	33%	33%	100%
CG	34TH AVE S	S HORTON ST AND S HINDS ST	W	0	8	NA	NA	NA	NA	0%	0%	0%	0%
CH	34TH AVE S	S HORTON ST AND S HINDS ST	E	18	18	44%	61%	53%	50%	78%	72%	75%	44%
CI	35TH AVE S	S HORTON ST AND S HINDS ST	W	20	20	65%	65%	65%	60%	30%	40%	35%	45%
CJ	35TH AVE S	S HORTON ST AND S HINDS ST	E	14	14	64%	79%	71%	71%	57%	50%	54%	50%
CK	YORK RD S	S HORTON ST AND 36TH AVE S	SW	4	4	125%	100%	113%	50%	100%	100%	100%	25%
CL	YORK RD S	S HORTON ST AND 36TH AVE S	NE	0	0	NA	NA	NA	NA	NA	NA	NA	NA
CM	36TH AVE S	YORK RD S AND S HINDS ST	W	13	13	46%	62%	54%	77%	77%	54%	65%	77%
CN	36TH AVE S	YORK RD S AND S HINDS ST	E	10	10	100%	70%	85%	70%	60%	60%	60%	80%
CO	YORK RD S	36TH AVE S AND 800' BOUNDARY	SW	2	2	0%	0%	0%	0%	0%	0%	0%	0%

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Block Face ID	Street Name	Street Segment	Side of Street	Total Parking Spaces (Early Morning)	Total Parking Spaces (Mid Mornign	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	NA	NA	NA	NA	NA	Illegal	Illegal	NA
CP	YORK RD S	36TH AVE S AND 800' BOUNDARY	NE	8	8	38%	50%	44%	50%	38%	38%	38%	50%
CQ	S ESTELLE ST	DEAD END W AND RAINIER AVE S	NW	0	0	NA	NA	NA	NA	NA	NA	NA	NA
CR	S ESTELLE ST	DEAD END W AND RAINIER AVE S	SE	4	4	100%	100%	100%	75%	100%	100%	100%	100%
CS	S ESTELLE ST	RAINIER AVE S AND DEAD END E	NW	12	12	50%	58%	54%	33%	50%	58%	54%	42%
CT	S ESTELLE ST	RAINIER AVE S AND DEAD END E	SE	12	12	17%	17%	17%	25%	25%	42%	33%	50%
CU	S HINDS ST	33RD AVE S AND 34TH AVE S	N	10	10	0%	10%	5%	0%	0%	20%	10%	0%
CV	S HINDS ST	33RD AVE S AND 34TH AVE S	S	7	7	0%	0%	0%	0%	0%	0%	0%	0%
CW	S HINDS ST	DEAD END 1 AND 35TH AVE S	N	3	3	0%	0%	0%	0%	0%	0%	0%	0%
CX	S HINDS ST	DEAD END 1 AND 35TH AVE S	S	2	2	0%	0%	0%	0%	0%	0%	0%	0%
CY	S HINDS ST	35TH AVE S AND 36TH AVE S	N	8	8	0%	13%	6%	0%	0%	0%	0%	0%
CZ	S HINDS ST	35TH AVE S AND 36TH AVE S	S	8	8	0%	0%	0%	0%	0%	0%	0%	0%
DA	RAINIER AVE S	S ESTELLE ST AND 800' BOUNDARY	SW	0	0	NA	NA	NA	NA	NA	NA	NA	NA
DB	RAINIER AVE S	S ESTELLE ST AND 800' BOUNDARY	NE	0	0	NA	NA	NA	NA	NA	NA	NA	NA
DC	33RD AVE S	S HINDS ST AND S SPOKANE ST	W	4	4	175%	175%	175%	125%	100%	125%	113%	125%
DD	33RD AVE S	S HINDS ST AND S SPOKANE ST	E	8	8	63%	63%	63%	88%	88%	63%	75%	75%
DE	34TH AVE S	S HINDS ST AND S SPOKANE ST	W	11	11	91%	82%	86%	64%	64%	55%	59%	64%
DF	34TH AVE S	S HINDS ST AND S SPOKANE ST	E	12	12	58%	50%	54%	42%	42%	33%	38%	42%
DG	35TH AVE S	S HINDS ST AND 800' BOUNDARY	W	22	22	32%	41%	36%	36%	27%	50%	39%	41%
DH	35TH AVE S	S HINDS ST AND 800' BOUNDARY	E	15	15	40%	53%	47%	67%	40%	40%	40%	60%
DI	36TH AVE S	S HINDS ST AND 800' BOUNDARY	W	7	7	43%	43%	43%	29%	57%	29%	43%	86%
DJ	36TH AVE S	S HINDS ST AND 800' BOUNDARY	E	7	7	71%	71%	71%	114%	71%	86%	79%	143%
DK	S SPOKANE ST	3RD AVE S AND DEAD END	N	4	4	175%	100%	138%	125%	75%	50%	63%	100%

Project **John Muir Elementary - Early Learning Center**

				Parking Supply		Parking Utilization							
						Early Morning (7:00 to 7:45am)				Mid-Morning (10:30 - 11:30am)			
Block Face ID	Street Name	Street Segment	Side of Street	Total Parking Spaces (Early Morning)	Total Parking Spaces (Mid Mornign	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23	Tuesday 4.25.23	Thrusday 4.27.23	School Day Average	Spring Break: Wednesday 4.12.23
AA	S HANFORD ST	800' BOUNDARY AND MCCLINTOCK AVE S	NE	0	0	NA	NA	NA	NA	NA	Illegal	Illegal	NA
DL	S SPOKANE ST	3RD AVE S AND DEAD END	S	2	2	100%	250%	175%	150%	100%	100%	100%	150%
DM	S SPOKANE ST	33RD AVE S AND 34TH AVE S	N	7	7	100%	114%	107%	86%	100%	86%	93%	100%
DN	S SPOKANE ST	33RD AVE S AND 34TH AVE S	S	9	9	89%	89%	89%	78%	89%	56%	72%	67%
DO	S SPOKANE ST	34TH AVE S AND DEAD END 3	N	2	2	50%	100%	75%	100%	0%	50%	25%	0%
DP	S SPOKANE ST	34TH AVE S AND DEAD END 3	S	2	2	150%	150%	150%	100%	100%	150%	125%	100%
DQ	33RD AVE S	S SPOKANE ST AND 800' BOUNDARY	W	12	12	108%	83%	96%	108%	108%	83%	96%	100%
DR	33RD AVE S	S SPOKANE ST AND 800' BOUNDARY	E	16	16	81%	81%	81%	94%	81%	75%	78%	75%
DS	34TH AVE S	S SPOKANE ST AND 800' BOUNDARY	W	17	17	94%	88%	91%	82%	88%	88%	88%	94%
DT	34TH AVE S	S SPOKANE ST AND 800' BOUNDARY	E	16	16	94%	106%	100%	94%	94%	81%	88%	88%
			TOTAL	**698**	**708**	**55%**	**56%**	**56%**	**52%**	**61%**	**60%**	**60%**	**52%**