ENVIRONMENTAL CHECKLIST

for the proposed

University of Washington IMA Addition Project

UNIVERSITY *of* WASHINGTON

October 2021

EA Engineering, Science, and Technology, Inc., PBC
GeoEngineers
PBS Engineering and Environmental, Inc.

PREFACE

The purpose of this Environmental Checklist is to identify and evaluate probable environmental impacts that could result from ***The University of Washington IMA Addition Project*** and to identify measures to mitigate those impacts. ***The University of Washington IMA Addition Project*** would include the development of an approximately 3,700 gsf addition to the existing IMA Building including an expanded swimming pool and renovated locker room facilities.

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 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), 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 ***University of Washington IMA Addition Project***. Analysis associated with the proposed project contained in this Environmental Checklist is based on schematic plans for the project. While not construction-level detail, the schematic plans accurately represent the eventual size, location and configuration of the proposed project and is considered adequate for analysis and disclosure of environmental impacts.

This Environmental Checklist is organized into three major sections. *Section A* of the Checklist (beginning 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 8) 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 34) contains the signature of the proponent, confirming the completeness of this Environmental Checklist.

Project-relevant analyses that served as a basis for this Environmental Checklist include: *Geotechnical Engineering Report* (GeoEngineers, 2021), *Greenhouse Gas Emissions Worksheet* (EA, 2021), and *Preliminary Hazardous Materials Survey Report* (PBS, 2021).

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[1] Chapter 43.21C. RCW

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PURPOSE

The State Environmental Policy Act (SEPA), Chapter 43.21 RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. The purpose of this checklist is to provide information to help identify impacts from the proposal (and to reduce or avoid impacts, if possible) and to help the University of Washington to make a SEPA threshold determination.

A. BACKGROUND

1. Name of Proposed Project:

University of Washington IMA Addition Project

2. Name of Applicant:

University of Washington

3. Address and Phone Number of Applicant and Contact Person:

Applicant
University of Washington
Facilities, Asset Management
Box 352205
Seattle, WA 98195-2205

Contact
Julie Blakeslee
Environmental and Land Use Planner
University of Washington
Facilities, Asset Management
Box 352205
Seattle, WA 98195-2205
206-543-5200

4. Date Checklist Prepared

The Checklist was prepared on October 25, 2021 by the University of Washington as the lead agency under the authority of WAC 478-324

5. Agency Requesting Checklist

University of Washington
Facilities, Asset Management
Box 352205
Seattle, WA 98195-2205

6. Proposed Timing or Schedule (including phasing, if applicable):

Construction of the proposed ***University of Washington IMA Addition Project*** is anticipated to begin in Spring 2022 and is anticipated to continue until approximately Summer 2023.

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.

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

The following environmental review documents were prepared for the University of Washington 2018 Seattle Campus Master Plan:

- University of Washington 2018 Seattle Campus Master Plan Draft EIS (2016)
- University of Washington 2018 Seattle Campus Master Plan Final EIS (2017)

The following environmental review information was prepared in support of the proposed project:

- *Geotechnical Engineering Report* (GeoEngineers, 2021);
- *Greenhouse Gas Emission Worksheet* (EA Engineering, 2021); and,
- *Preliminary Hazardous Materials Survey Report* (PBS Engineering and Environmental, Inc., 2021).

These reports are included as appendices to this Checklist.

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 ***University of Washington IMA Addition Project*** site.

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

University of Washington

- Project approval, design approval, authorization to prepare contract documents, and authorization to Call-for-Bids.

City of Seattle

- *Department of Construction and Inspections*

  Permits/approvals associated with the proposed project, including:
  - Master Use Permit
  - Grading/Shoring Permit
  - Building Permit
  - Mechanical Permits
  - Electrical and Fire Alarm Permits
  - Comprehensive Drainage Control Plan and Construction Stormwater Control Plan Approval

King County

- *Department of Public Health – Environmental Health Services*
  - Plumbing Permit

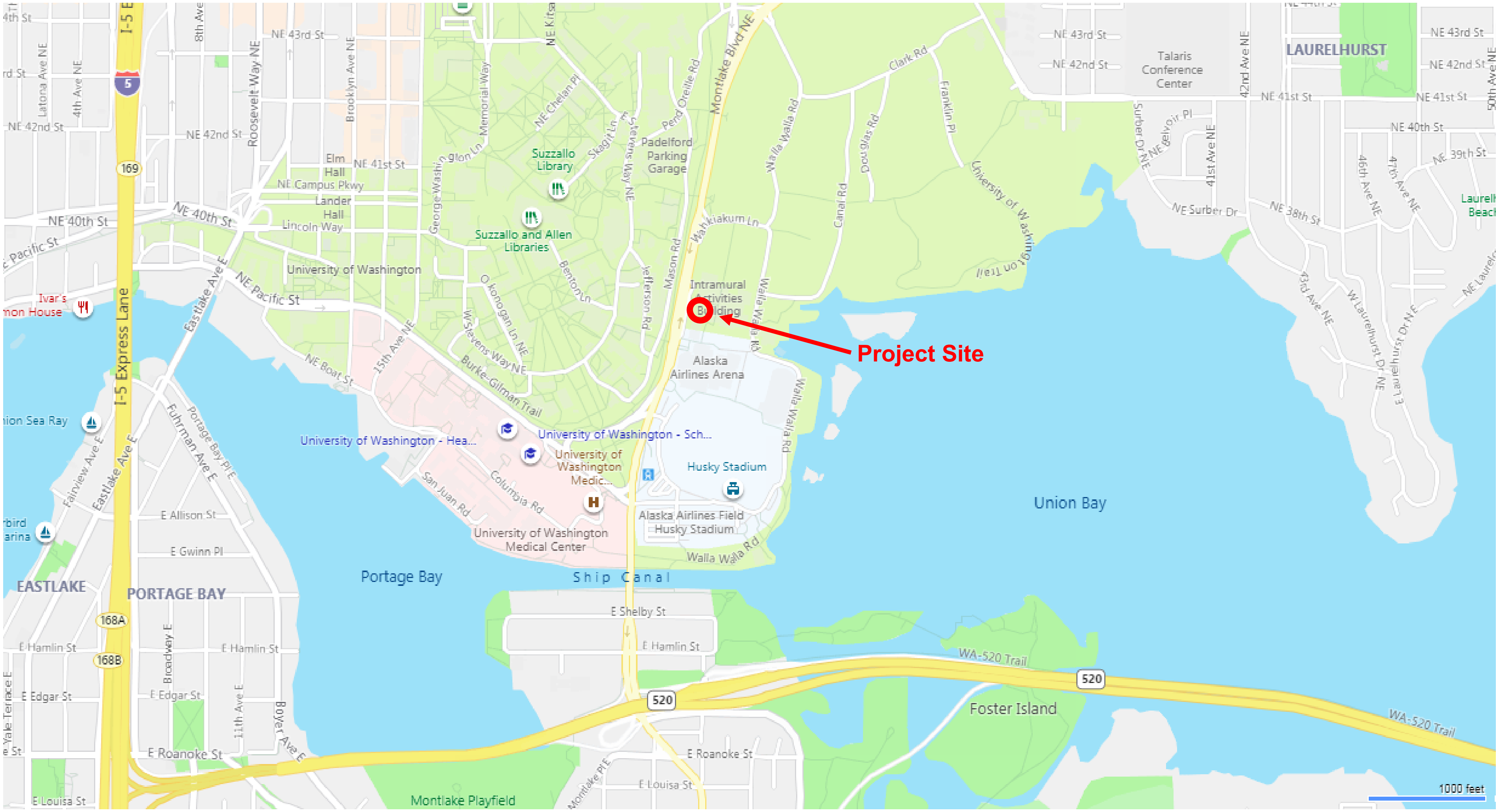
11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

Existing Site Conditions

The proposed ***University of Washington IMA Addition Project*** site is located in the East Campus area which is the athletic/recreation center of the campus and home to numerous University athletic and recreation facilities. The existing IMA building was originally built in 1968. It is approximately 46-feet tall at its highest point and contains approximately 266,100 square feet of building space. The building serves as the primary recreation facility on campus for students and staff and includes weight rooms and recreation space, a swimming pool, basketball courts, handball courts, locker rooms, offices, and other athletic facilities. An existing sun deck/patio area is located in the recessed south portion of the building, with a small parking/loading area located in the recessed north portion of the building. Substantial additions were completed for the building in 1982 and 2001. The 2001 addition expanded the footprint of the building by approximately 30 percent.

The project site is immediately adjacent to the existing IMA building, within the recessed south portion of the building, and north of an existing access, loading, and pedestrian driveway (see **Figure 1** for a vicinity map of the site). The existing site is generally comprised of an existing sun deck/patio for the IMA building and associated landscaping (see **Figure 2** for an aerial map of the project site).

University of Washington IMA Addition Project
Environmental Checklist



North

Note: This figure is not to scale.

Source: Bing Maps and EA Engineering, 2021

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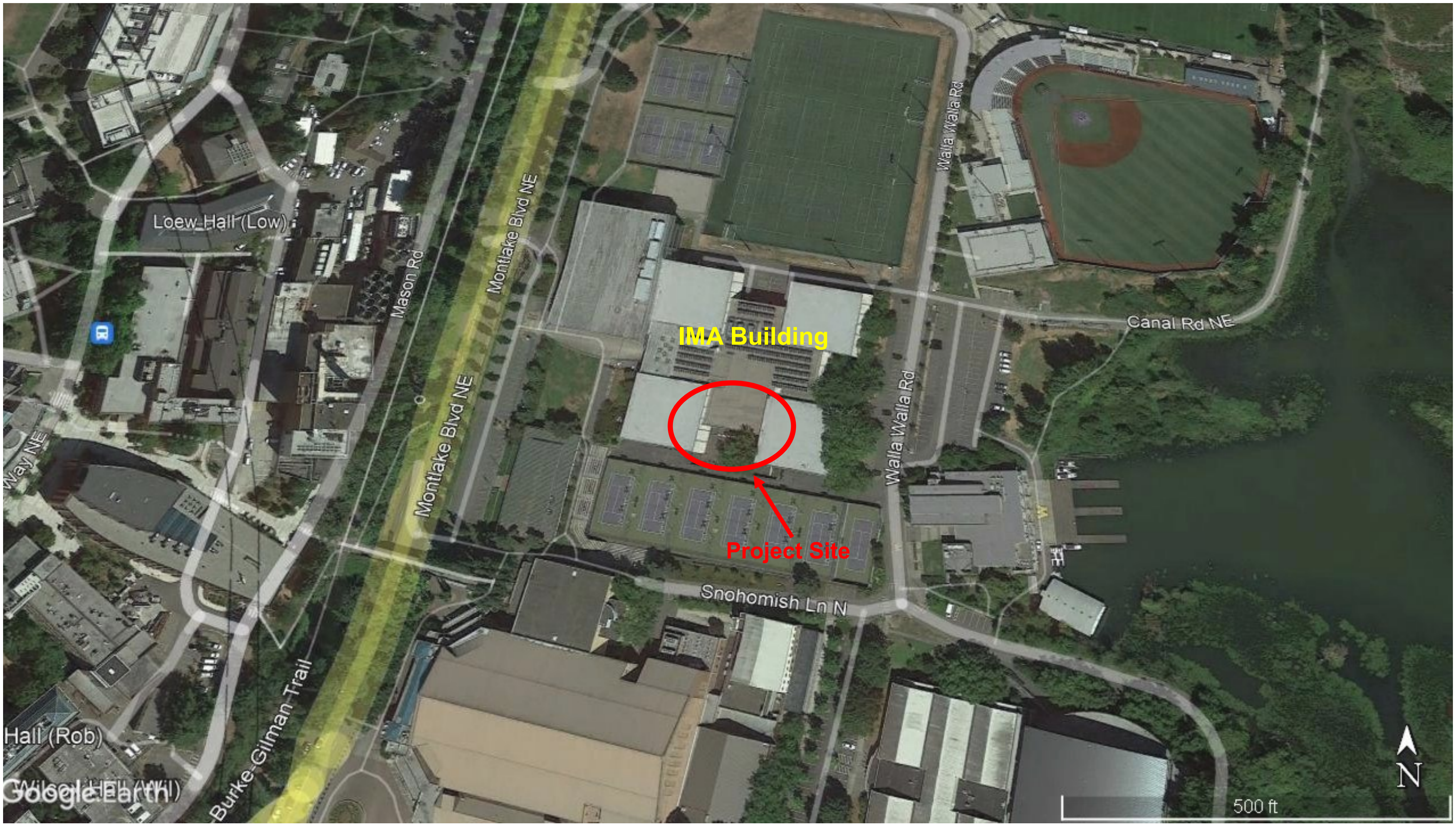
Figure 1

Vicinity Map

University of Washington IMA Addition Project
Environmental Checklist



Source: Google Earth and EA Engineering, 2021

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Figure 2

Aerial Map

Proposed Project

The proposed ***University of Washington IMA Addition Project*** is intended to expand the existing IMA building to provide a renovated and expanded swimming pool area; upgrades and renovations to the existing locker rooms would also be provided. The proposed addition would be located with the recessed south portion of the existing IMA building and would be approximately 30 feet tall, which would be lower than the existing building height of 46 feet. The proposal would add approximately 3,700 square feet of new interior building space. Because the proposed design includes a cantilevered portion of the building within Level 1, the proposed project would contain approximately 2,500 square feet of new roof area above the proposed addition (see **Figure 3** for a site plan).

The proposed addition would expand the existing swimming pool at the IMA to include approximately 14 lap lanes with a depth ranging from four feet at the shallow end to nine feet at its deepest point (an approximately 30-foot x 30-foot wide area). A new pool deck would surround the expanded swimming pool with pool deck storage areas and the existing office areas and restrooms adjacent to the pool would be renovated.

As part of the project, existing locker room space would also be renovated to provide both gender-specific locker rooms and gender-neutral/inclusive locker rooms. Gender-neutral/inclusive locker room space would be located within the east portion of level 1 (adjacent to the east side of the pool) and include approximately 2,000 lockers, 26 cabanas, changing rooms, lounge areas, and storage space. Existing gender-specific locker room space located to the west of the pool would also be renovated. Existing lockers within the gender-specific locker rooms would remain and new lighting, updated equipment rooms, and revised wall configurations for egress would be provided.

The proposed project would include an approximately 100-square foot non-infiltrating bioretention planter for stormwater management that would be provided as part of the existing, larger bioretention planter located to the south of the proposed addition. Upgrades to the existing access/loading and pedestrian driveway located immediately south of the existing building would also be provided to enhance the pedestrian zone and lighting. Modifications to this driveway would be made to create an ADA accessible egress at the south side of the IMA building.

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. If a proposal would occur over a range of area, provide the range or boundaries of the site(s).

The proposed ***University of Washington IMA Addition Project*** site is located in the East Campus area. The site of the proposed addition is located immediately adjacent to the south portion of the existing IMA building and north of an existing facilities access, loading, and pedestrian driveway (see **Figures 1** and **2**).

University of Washington IMA Addition Project
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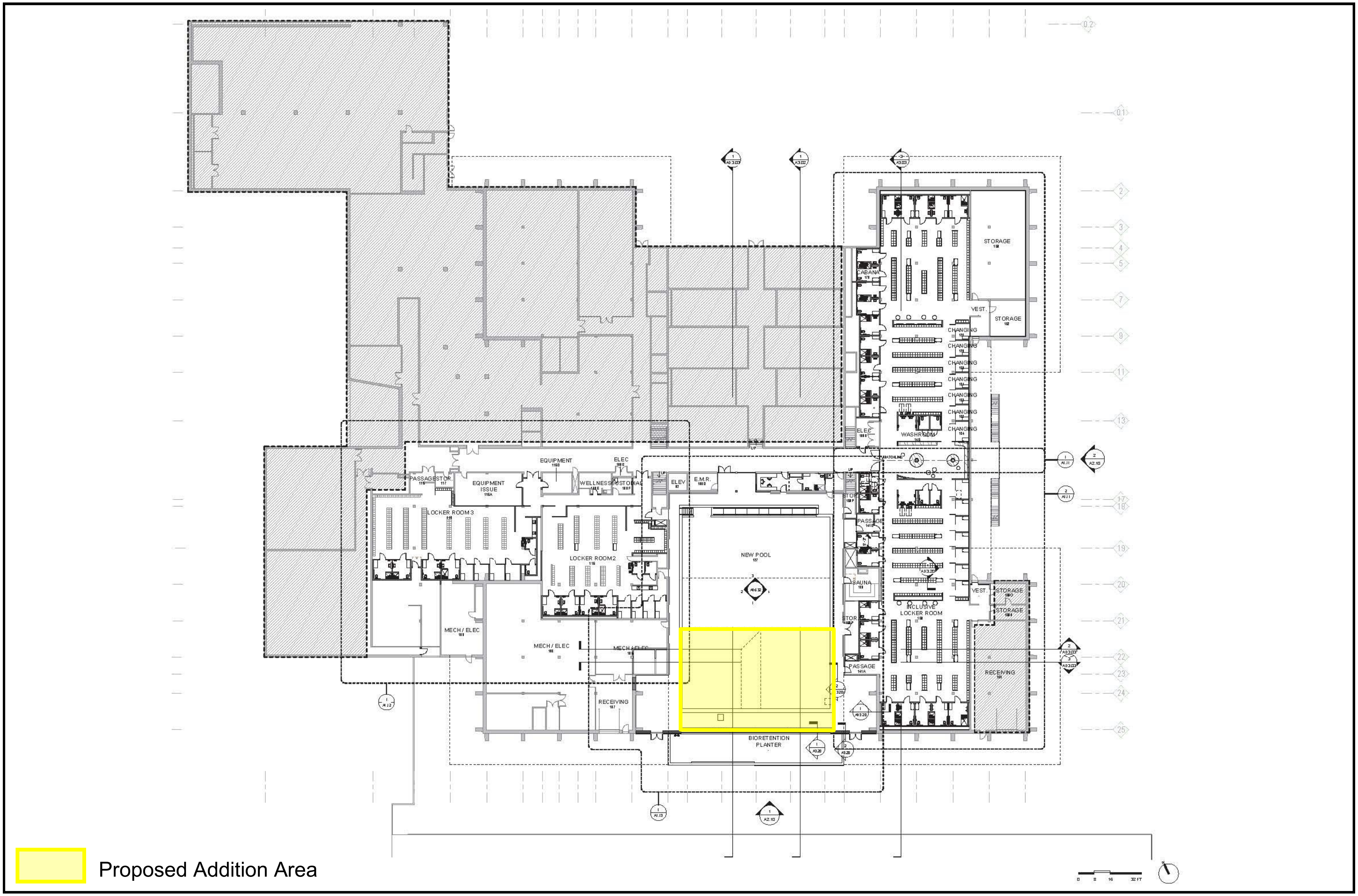

Source: OPSIS, 2021

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

Figure 3

Site Plan

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one):
Flat, rolling, hilly, steep slopes, mountainous,
other:____

The ***University of Washington IMA Addition Project*** site is currently occupied by an existing sun deck/patio including a wood deck and hardscape/landscape areas. The ground surface of this area is generally flat.

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

According to the City of Seattle's Environmentally Critical Areas (ECA) Maps, there are no steep slope hazard areas located on the site. The site is generally flat and contains virtually no sloped areas. The ground surface of the area is located at approximate Elevation 26 feet (see **Appendix A**).

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, geologic maps were reviewed for the area. The area east of Montlake Boulevard, including the project site area, are mapped as peat and artificial fill deposits. Two borings were drilled within the site area as part of the investigations for the geotechnical report; results from previous borings and test pits in the site vicinity were also reviewed. Soils encountered within the borings generally consisted of fill (approximately 8 to 13 feet deep) and deposits of pre-Fraser Glaciation. However, previous explorations in the project area encountered fill (4 to 10 feet deep), as well as peat and alluvial deposits, and Pre-Fraser or till-like glacially consolidated deposits

According to the City of Seattle's Environmentally Critical Areas (ECA) Maps, the site is listed as a peat-settlement prone area, a liquefaction-prone area, and within 1,000 feet of an abandoned landfill. See **Appendix A** for the Geotechnical Report.

The proposed project site does not contain 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. According to the City of Seattle ECA Maps, there are no steep slope areas, potential slide areas or known slide areas on the site or adjacent to the site. However, the site is listed as a liquefaction-prone area in association with lake deposits around Lake Washington (*City of Seattle, 2021*).

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

Approximately 15,200 square feet of grading would be required as part of the proposed project, including excavation for the expansion of the swimming pool. Any soil removed from the site would be transported to an approved location. The source of fill is unknown at this time but would also be from an approved source.

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

Temporary 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)?

The majority of the site is currently covered with existing impervious surfaces, including the existing sun deck/patio areas (approximately 85 percent hard surface coverage). With the proposed project, the existing sun deck/patio and landscape areas would be replaced with the proposed building addition to the existing IMA building; a small bioretention planter and landscaping areas would also be located adjacent to the south portion of the addition. The 2018 Seattle Campus Master Plan EIS identifies anticipated increases in impervious surfaces with future development of the campus and states that "development would result in an overall increase in hard surfaces associated with buildings and paths/walkways; however, there would be a reduction in hard surfaces associated with streets and surface parking areas". Similarly, the proposed project would generally replace existing hard surfaces of the sun deck/patio area with the proposed building addition and any change in hard surface area would be anticipated to be negligible.

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

The mitigation of erosion impacts are addressed in individual permit reviews under the *Grading and Drainage Control Codes* (*SMC 22.170*), and in critical area locations by the *Seattle Critical Areas ordinance* (*SMC 25.09*), which prescribed best management practices for excavation and grading on critical areas. The 2018 Seattle Campus Master Plan EIS identifies the site areas as having a high potential for earth-related impacts. General methods to address impacts to earth are identified in Section 3.1.1 and Section 3.1.3 of the Final EIS, including the implementation of TESC measures.

The site is identified on the City of Seattle ECA maps as within a peat-settlement prone area, a liquefaction-prone area, and within 1,000 feet of an abandoned landfill. However, the geotechnical report recommended that deep foundations for the project would effectively mitigate potential settlement issues due to peat and potential liquefaction-induced settlement (see **Appendix A**).

Recommendations are also provided in the Geotechnical Report regarding the site location within a methane buffer associated with an abandoned landfill. The report recommends placing a perforated pipe within a gravel layer below the floor slabs and venting the pipe outside of the building. Methane vapor mitigation should also include placing a 30-mil polyvinyl chloride (PVC) geomembrane beneath the floor slab to act as a methane and water vapor barrier (see **Appendix A**).

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

2. Air

a. What type of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

During construction, the ***University of Washington IMA 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, as described above under the Earth discussion, TESC measures would be implemented for the project and air quality emission impacts are not anticipated to be significant.

Temporary, localized emissions associated with carbon monoxide and hydrocarbons would 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 be from emissions from operation of the buildings and from vehicles travelling to and from the site. Operation of the project is not anticipated to generate new vehicle trips. 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 **(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 project would approximate 3,411 $MTCO_2e$[2]. Based on an assumed building life of 62.5 years,[3] the proposed building addition would be estimated to generate approximately 55 $MTCO_2e$ annually.

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 Montlake Boulevard NE, Snohomish Lane, and Walla Walla Road, as well as vehicle traffic associated with Parking Area E7 and E8. Emissions from existing buildings in the vicinity (Alaska Airlines Arena, Nordstrom Tennis Center, Dempsey Indoor Center, and Husky Stadium) also contribute to emissions in the vicinity of the site. There are no known offsite sources of air emissions or odors that would affect the proposed project.

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2 $MTCO_2e$ is defined as Metric Ton Carbon Dioxide Equivalent and is a standard measure of amount of CO2 emissions reduced or sequestered.

3 According to the Greenhouse Gas Emissions Worksheet, 62.5 years is the assumed building life for educational buildings.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for air quality impacts.

Short-term impacts to air quality arising for construction, (fugitive dust and airborne particulates) are mitigated by adherence to *Puget Sound Clean Air Agency regulations PSCAA - Reg 1 - Section 9.15* (*1-9 Emission Standards*), *PSCAA – Reg 3 – Article 4 (Asbestos Control Standards)*, the *Seattle Stormwater Drainage Code 22.800*, and *Grading Code 22.170* and the best management practices for controlling erosion described above from the Seattle Municipal Code.

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

3. Water

a. Surface:

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 ***University of Washington IMA Addition Project*** site. The nearest surface water body is Union Bay, which is located approximately 400 feet to the east of the project site (see **Figure 1**).

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 will 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 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, 2021)*.

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:

1) **Will ground water be withdrawn, or will water be discharged to ground water? 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 general description, purpose, and approximate quantities if known.**

   Groundwater investigations were also completed as part of the soil borings for the geotechnical report (**Appendix A**). Groundwater was encountered at depths of approximately 20 to 25 feet below the ground surface and was encountered on top of relatively impermeable silt and lean clay layers within the pre-Fraser Glaciation deposits. No groundwater would be withdrawn or water discharged to ground water as part of the proposed project.

2) **Describe waste material that will be discharged into the ground from septic tanks or other sources; 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 storm water):**

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.**

The ***University of Washington IMA Addition Project*** site is currently occupied by an existing sun deck/patio including a wood deck and hardscape/landscape areas. The primary source of stormwater within the site area is the existing building and sun deck/patio and existing stormwater management facilities are incorporated as part of the existing building. Currently, stormwater runoff sheet-flows from the sun deck/patio and is collected in catch basins to the east and west of the building.

With the proposed project, stormwater from the site would be designed in accordance with the *City of Seattle Stormwater and Drainage Code, SMC Title 22* and similar to the surrounding areas would be conveyed to the University of Washington system which ultimately drains to the Union Bay area of Lake Washington. Proposed site storm water drainage patterns would generally match the existing conditions. Existing catch basins to the east and west of the building would remain and new catch basins would be added within the access driveway. Onsite stormwater management for the project would include the development of a approximately 100-square foot, bioretention planter which would be located within the existing larger bioretention planter to the south of the proposed addition.

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

The existing and proposed 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.

d. **Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:**

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for stormwater impacts. Stormwater for the proposed project site would discharge to the University of

Washington's storm drainage system which ultimately drains to the Union Bay area of Lake Washington. The existing on-site system at UW is estimated to have adequate capacity for the proposed IMA Addition Project.

Additionally all existing local regulations under the *Stormwater and Drainage Code, SMC Title 22*, apply. Pursuant to the Overview Policy at SMC 25.05.665, no further mitigation is warranted.

4. Plants

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

X_deciduous tree:
__evergreen tree:
X_shrubs
X_ grass
__ pasture
__ crop or grain
__ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
__ water plants: water lily, eelgrass, milfoil, other
__ other types of vegetation

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

Four trees are located within the project site area, including three trees that are greater than six-inches in diameter at standard height and one tree that is less than six-inches. According to the University's Urban Forest Specialist (a certified arborist), none of the existing trees meet the City of Seattle's definition of an Exceptional Tree (City of Seattle Director's Rule 16-2008).

The four existing trees would be removed from the site as part of the proposed project. Existing trees located outside of the project area but adjacent to the eastern edge of the existing IMA building would be retained and protected during the construction process.

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

No known threatened or endangered 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:

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for plant impacts. The proposed project design would be approved by the University of Washington Landscape Advisory Committee. This committee includes experts in planning, botany, landscape architecture, urban design, horticulture, art, architectural history and grounds maintenance.

As part of the project, new replacement trees would be provided at a ratio of two new trees for every one tree removed that is six inches or greater in diameter. In-lieu of onsite tree replacement, a fee could be paid to the University for every tree not replaced onsite. Project tree replacement would be anticipated to meet or exceed City of Seattle tree replacement requirements and would be in accordance with the University's Tree Management Plan. A small bioretention planter and landscape area would be located adjacent to the south portion of the addition.

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. Circle (underlined) any birds and animals that have been observed on or near the site or are known to be on or near the site:

birds: **songbirds,** hawk, heron, eagle**, other:** **seagulls**, **pigeons,**
mammals: deer, bear, elk, beaver**, other:** **squirrels**, **raccoons**, **rats**, **mice**
fish: bass, salmon, trout, herring, shellfish**, other:** **None**.

Birds and small mammals tolerant of urban conditions may use and may be present on and near the ***University of Washington IMA Addition Project*** site. Mammals likely to be present in the site vicinity include: raccoon, eastern gray squirrel, mouse, rat, and opossum.

Birds common to the area include: European starling, house sparrow, rock dove, American crow, seagull, western gull, Canada goose, American robin, and house finch.

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

The following are listed threatened or endangered species that could affected by development on the site or surrounding vicinity based on data from the U.S. Fish and Wildlife Service: marbled murrelet, streaked horned lark, yellow-billed cuckoo, bull trout, and grey wolf[4]. However, it should be noted that none of these species have been

[4] U.S. Fish and Wildlife Service. IPaC. https://ecos.fws.gov/ipac/location/index. Accessed August 2021.

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 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:

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for wildlife impacts. In addition, the 2018 Seattle Campus Master Plan contains an extensive open space element (section 1V, p. 54) which was analyzed in the 2018 Seattle Campus Master Plan Final EIS (Section 3.11). These preserved open space areas provide mitigation for encroachment of development on campus into areas which may provide habitat for native wildlife.

It is recommended that any tree removal occur outside of the nesting season for most birds (early February to mid-August). If tree removal occurs during the nesting season, it is recommended that a biologist visit the site prior to removal to check the trees for active nests. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

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

Invasive species known to be located in King County include European starling, House sparrow, Eastern gray squirrel, and Nutria.

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 and natural gas are the primary source of energy that would serve the proposed ***University of Washington IMA Addition Project*** and would generally be utilized for lighting, electronics, and heating.

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 use of solar energy by adjacent properties.

d. 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 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for energy impacts. The proposed development would conform to the applicable provisions of the State of Washington Energy Code and the City of the Seattle Energy Code which is an adopted and amended version of the International Energy Conservation Code. The proposed project would also be designed to meet the certification requirements for LEED Gold, including energy efficiency measures such as premium efficiency fan motors on new fans, 70 percent effective heat recovery for the pool, and high efficiency plumbing fixtures.

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

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 as a result of this proposal? If so, describe.

As with any construction project, accidental spills of hazardous materials from equipment or vehicles could occur during the construction of the ***University of Washington IMA Addition Project***; however, a spill prevention plan would minimize the potential of an accidental release of hazardous materials into the environment.

According to the City of Seattle ECA Maps, the project site is located within the 1,000-foot methane buffer area of an abandoned landfill. The geotechnical report for the project identified preventative measures such as methane barriers and a vent pipe system that would be implemented into the construction of the proposed addition (see **Appendix A** for details).

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

A hazardous materials survey was completed for the project and included inspections for asbestos-containing materials (ACM), lead-containing paint (LCP), PCB-containing components, mercury-containing components, and silica-containing materials. ACM was identified within materials on the existing sun deck and portions of the proposed renovated areas of the existing building. LCP was found in areas of the pool deck, mechanical room and women's locker room. PCB materials were identified in areas of the sun deck. Silica-containing materials are assumed to be present within concrete flooring, wallboard systems, plaster on columns and ceramic tile/grout. All light tubes within the project are also assumed to contain mercury-containing components (see **Appendix C** for further details).

As noted above, the site is also located in an area of a former abandoned landfill. It is anticipated that the fill over the former landfill is at a depth where there is a possibility to encounter waste during excavation activities on the site. Debris piling, testing, and appropriate disposal and safety protocols would be followed in accordance with the University's Montlake Landfill Project Guide and no significant impacts would be anticipated.

2) **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.**

As noted in the hazardous materials survey, all affected ACM would be removed by a licensed asbestos abatement contractor in accordance with applicable regulations. Construction activities that would impact LCP and Silica-containing materials would be performed in accordance with Washington Labor and Industries (L&I) regulations for Lead in Construction and L&I regulations for Silica in Construction. The contractor would also address worker protection and proper handling, removal and disposal of PCB-containing products and mercury-containing components during demolition (see **Appendix C** for further details).

3) **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.**

During construction, gasoline and other petroleum-based products would be used for the operation of construction vehicles and equipment.

During the operation, chemicals that would be used on the site would be limited to cleaning supplies and would be stored in an appropriate and safe location.

4) 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 or UWPD.

5) Proposed measures to reduce or control environmental health hazards, if any:

Washington State occupational health and safety standards and local fire code requirements ensuring the use of toxic or flammable materials is adequately addressed in the campus setting. Measures to prevent the potential accumulation of methane gas would also be provided as part of construction, such as methane barriers and a vent pipe system (see **Appendix A** for details). In addition, as noted in the hazardous materials survey, all hazardous materials within the area of the proposed project would be removed as part of the construction process in accordance with applicable regulations (see **Appendix C** for details).

In addition, during excavation activities, debris piling, testing, and appropriate disposal and safety protocols would be followed in accordance with the University's Montlake Landfill Project Guide. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

b. Noise

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

Traffic noise associated with adjacent roadways and parking areas (Montlake Boulevard, Snohomish Lane, Walla Walla Road and Parking Areas E7 and E8), as well as activity associated with surrounding facilities (Husky Stadium, Alaska Airlines Area, Nordstrom Tennis Center, Husky Ballpark, and the Softball Stadium) are the primary source of noise in the vicinity of the project site. Existing noise in the site vicinity is not anticipated to adversely affect the proposed ***University of Washington IMA Addition Project***.

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 site.**

Short-Term Noise

Temporary construction-related noise would occur as a result of on-site construction activities associated with the project. The proposed project would comply with provisions of Seattle's Noise Code (SMC, Chapter 25.08) as it relates to construction-related noise to reduce noise impacts during construction.

Long-Term Noise

The proposed ***University of Washington IMA Addition Project*** would likely result no changes to existing noise levels as the moderate change to activities would be inside the building. No significant noise impacts would be anticipated.

3) **Proposed measures to reduce or control noise impacts, if any:**

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a medium potential for noise impacts. Short-term noise impacts deriving from construction projects are mitigated primarily through the adoption of construction noise control best practice, typically including limiting hours of construction. Measures such as the following are considered appropriate mitigation for this project:

- In accordance with City of Seattle regulations, construction activities would be limited to applicable noise levels per the City's noise regulations covering construction noise (*Seattle Municipal Code 25.08.425*).
- Given the level of existing environmental noise in the vicinity and the anticipated level of post-construction noise, no measures would be necessary to reduce or control post-construction noise impacts from the proposed project.

Permanent onsite operations at the UW Campus are regulated by *Seattle Municipal Code Chapter 25.08* regarding maximal noise levels. Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

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 site of the proposed ***University of Washington IMA Addition Project*** is located in the East Campus area and is immediately adjacent to the existing IMA building, within the recessed south portion of the building, and north of an existing access, loading, and pedestrian driveway (see **Figure 1** for a vicinity map of the site). The existing site is generally comprised of an existing sun deck/patio for the IMA building and associated hardscape/landscaping (see **Figure 2** for an aerial map of the project site).

The area surrounding the existing IMA Building is generally characterized by University athletic facility uses. To the north of the building are tennis courts, artificial turf recreation fields, and Parking Area E6. Further to the north is Wahkiakum Road and Parking Areas E18 and E1. To the northeast are additional University athletic facilities, including the Husky Ballpark, Husky Soccer Stadium, and Husky Track (these facilities are primarily utilized by the University's intercollegiate athletic programs).

The area to the east includes Parking Area E7, Walla Walla Road, Parking Area E8, and the Conibear Shellhouse. Further to the east is Union Bay.

To the south of the existing building is a facilities access, loading, and pedestrian driveway and tennis courts (these courts are used for the University's intercollegiate athletic program as well as for recreational use). Further to the south is Snohomish Lane, Parking Area E9, Alaska Airlines Arena, and Husky Stadium. To the southeast are additional University athletic facilities, including the Nordstrom Tennis Center, the Dempsey Indoor Center, and the new Softball Performance Center.

The area to the west includes existing landscaped areas, Parking Area E97, and Montlake Boulevard. Further to the west is the Burke Gilman Trail and the Central Campus area.

Similar to other uses in the site vicinity, the site would be utilized for athletic use purposes and would not be anticipated to affect existing buildings and uses that are adjacent to the site.

Policies and standards under the 2019 Seattle Campus Master Plan related to minimizing potential impacts would be followed under the proposed project. Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

b. Has the 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 as a result 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 ***University of Washington IMA Addition Project*** site includes an existing sun deck/patio for the IMA building and associated hardscape/landscaping.

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

The existing sun deck/patio would be demolished as a result of the proposed project. Portions of the existing IMA building would also be demolished to allow for internal connections with the proposed addition.

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

The site is currently zoned as Major Institution Overlay with a 65-foot height limit (MIO-65) established pursuant to the *2019 Seattle Campus Master Plan*.

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

The current comprehensive plan designation for the site is Major Institution. (*City of Seattle, 2018*).

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

The project site is not located within the City's designated shoreline master program boundary.

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

According to the City of Seattle Environmentally Critical Areas Map, the project site (and surrounding site vicinity) is located within a peat settlement-prone area, a liquefaction-prone area and within the methane buffer of a former abandoned landfill (refer to Section 1, Earth, for additional information on earth conditions). However, recommendations identified in the Geotechnical Report would effectively mitigate any issues associated with these critical areas (see **Appendix A**). No other environmentally critical areas are located on or adjacent to the project site (*City of Seattle, 2021*).

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

The proposed ***University of Washington IMA Addition Project*** would not provide any residential opportunities. Development of the project would create new recreation space within the existing IMA building but would not be anticipated to result in any new 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 impacts would occur and 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 2018 Seattle Campus Master Plan EIS identifies the site areas as having a low potential for land use impacts. The site is designated as "Major Institution" under the City of Seattle Comprehensive Plan. Under the *1998 City-University Agreement*, the City of Seattle required the University of Washington to develop a conceptual Master Plan for its Seattle campus. The 2019 Seattle Campus Master Plan, developed pursuant to the Agreement and adopted by the University and the Seattle City Council, governs future development within the Major Institution Overlay zone. Pursuant to the Overview Policy at *SMC* [25.05.665], no further mitigation is warranted.

m. Proposed measures to ensure the proposal is compatible with nearby 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 ***University of Washington IMA Addition 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:

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for housing impacts. As noted above, the site is located with the Major Institution Overlay zone under the 2019 Seattle Campus Master Plan. Adherence to the 2019 Seattle Campus Master Plan is de facto compliance with the Seattle Comprehensive Plan policies and Map. Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

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 IMA building is approximately 46 feet. The proposed building addition would be approximately 30 feet at its tallest point, which would be below the 65-foot height limit that is identified by the existing zoning and in the 2019 Seattle Campus Master Plan.

The exterior building materials for the proposed ***University of Washington IMA Addition Project*** would be intended to be complementary with the existing building and surrounding buildings in the site vicinity. Principal exterior building materials would include a concrete base, Aluminum metal panel cladding, and glass.

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

Views of the site are generally limited due to the presence of existing buildings surrounding the project site area. The proposed ***University of Washington IMA Addition Project*** would be located within the recessed south portion of the existing IMA building and would be most visible from the south. The addition would generally appear as a continuation of the existing IMA building and would be complementary with other existing athletic facility development in the site area.

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

The 2018 Seattle Campus Master Plan EIS identifies the site areas as having a low potential for aesthetics impacts. The 2019 Seattle Campus Master Plan contains adopted policies and development standards for the whole of the Campus. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

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 project site (to meet safety requirements) may be necessary, which would be noticeable proximate to the project site. In general, however, light and glare from construction of the proposed project are not anticipated to adversely affect adjacent land uses.

Long-Term Light and Glare

Under the proposed ***University of Washington IMA Addition Project***, there would be an increase in light and glare with the proposed building addition. Exterior lighting would be provided with the project and would be designed to enhance pedestrian safety along the access driveway to the south of the building and to focus light on the site to minimize impacts to adjacent properties. Light and glare on the site is anticipated to remain similar to the existing conditions and would not result in significant impacts to surrounding areas.

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 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for light and glare impacts. The proposed IMA Addition is designed to be consistent with the University's existing internal design review process which considers the effect of architectural glazing, lighting, landscape designs to ensure that impacts from light and glare are adequately mitigated. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

12. Recreation

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

There are several University athletic/recreational facilities in the vicinity (approximately 0.5 miles) of the ***University of Washington IMA Addition Project*** site, including:

- The North Tennis Courts and Artificial Turf Recreation Fields are located immediately north of the existing building;
- The South Tennis Courts are located immediately to the south of the building;
- Husky Ballpark is located immediately to the northeast of the existing building
- Husky Soccer Stadium is located approximately 0.1 miles to the northeast of the building;
- Husky Track is located approximately 0.2 miles to the northeast;
- The Pavilion Pool and Alaska Airlines Arena are located approximately 0.1 miles to the south;
- The Nordstrom Tennis Center and Softball Performance Center are located 0.1 miles to the southeast;
- The Dempsey Indoor Center is located 0.2 miles to the southeast;

- Husky Stadium is located approximately 0.2 miles to the south;
- Husky Softball Stadium is located approximately 0.2 miles to the southeast; and,
- The Golf Driving Range is located approximately 0.5 miles to the northeast.

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

The project would not displace any existing recreational uses. The proposed addition would expand the existing pool at the IMA and provide increased recreational opportunities at the IMA.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for park and recreation impacts. The University Campus is open to the public during normal daylight hours and provides an extensive network of public trails and open space. The City of Seattle Comprehensive Plan relies upon the UW campus as an element of the City's public open space inventory. The 2019 Seattle Campus Master Plan identifies and categorizes open space areas on campus.

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

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 located on or near the site? If so, specifically describe.

There existing IMA building was originally constructed in 1968, with substantial additions to the building in 1982, 2001, and 2011. A Historic Property Inventory Report was completed for the building in 2017. The report concluded that substantial alterations and expansions of the building have significantly diminished the building's integrity and ability to convey its historic significance. As a result, it is not considered eligible for listing on the National Register of Historic Places (NRHP). See **Appendix C** for details.

There are no buildings in the immediate vicinity of the project site that are listed on national, state or local historic registers. According to the Washington State Department Archaeology and Historic Preservation's (DAHP) Washington Information System for

Architectural and Archaeological Records Data (WISAARD), the closest eligible buildings/structures is the Graves Building located to the southwest of the site (constructed in 1963 and determined eligible in 2013).

Husky Stadium and Alaska Airlines Arena (Hec Edmundson Pavilion) are also located to the south of the site respectively, and are over 45 years old. However, both of these buildings were determined to be not eligible for listing in 2013 due to substantial alterations that have occurred to the buildings since they were originally constructed. The Pavilion Pool was also deemed ineligible in 2018 by the Seattle Landmarks Board.

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 project site is not located within the designated City of Seattle Government Meander Line Buffer, with properties located within that area required to prepare an archaeological investigation as part of the SEPA and MUP processes. The cultural resources sensitivity analysis conducted for the 2018 Seattle Campus Master Plan EIS indicates that the site area has a low potential to encounter sensitive cultural resource conditions and standard best practices and code compliance would be adequate.

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 the City of Seattle Department of Neighborhoods Landmarks Map and List 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. Additionally, the cultural resources sensitivity analysis in the 2018 Seattle Campus Master Plan EIS indicates that the site has a low potential for sensitive cultural resource conditions.

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 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for historic and cultural resources impacts.

Mitigation measures were identified in the 2018 Seattle Campus Master Plan Final EIS and would be applicable for this project, including:

- The University of Washington's existing site selection and internal design review processes (architectural, landscape, environmental review, and Board or Regents) would continue to review and authorize major building projects in terms of siting, scale, and the use of compatible materials relative to recognized historic structures.

Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

14. Transportation

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

The ***University of Washington IMA Addition Project*** site is located within the recessed south portion of the existing IMA building. Montlake Boulevard is located to the west of the existing building and Walla Walla Road is located to the east. An existing driveway is located immediately south of the proposed addition site and provides access for loading/unloading and pedestrians.

No changes to site access or parking are proposed.

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

The University of Washington Link Light Rail station is located approximately 0.2 miles to the southwest of the ***University of Washington IMA Addition Project*** site and provides service to Capitol Hill, Downtown Seattle and SeaTac Airport. King County Metro Transit (Metro) provides bus service in the vicinity of the site. Numerous transit routes have stops within the Montlake Triangle area (approximately 0.25 miles to the southwest of the site, including Route 43, 44, 45, 71, 73, 167, 197, 271, 277, 373, 540, 541, 542, 556 and 586.

c. **How many additional parking spaces would the completed project have? How many would the project or proposal eliminate?**

The total number of parking spaces on campus is set by the 2019 Seattle Campus Master Plan. No individual project provides parking for itself. Pursuant to the Council Adopted 2019 Seattle Campus Master Plan, parking is provided on a campus-wide basis. Pursuant to the Overview Policy at SMC 25.05.665, no further mitigation is warranted.

Several existing parking areas are located within 0.5 miles of the project site, including Parking Areas E1, E6, E7, E8, E9, E18 and E97. No additions or elimination of parking spaces is proposed. The proposed project is not anticipated to generate an increased demand for parking due to the fact that students and employees that would utilize the facility are already traveling to campus.

d. **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 proposed project would include upgrades to the existing access/loading and pedestrian driveway located immediately south of the existing building to enhance the pedestrian zone and lighting. Modifications to this driveway would be made to create an ADA accessible egress at the south side of the IMA building. No other improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities are anticipated.

e. **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. As noted above, the University of Washington Link Light Rail Station is located to the southwest of the site and is utilized by University students, faculty, and employees.

f. **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?**

Construction of the proposed project would temporarily generate some additional vehicle trips associated with construction workers and equipment/vehicles travelling to and from the site during the construction process. Construction activities would be in compliance with applicable University of Washington and City of Seattle regulations, which would include preparation of a Construction Management Plan to minimize potential construction-related transportation issues.

The proposed project is not anticipated to generate increased demand vehicle trips to the site or the overall University campus due to the fact that the project would be utilized by students and employees that are already traveling to campus currently.

g. 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.

There are no agricultural or forest product uses in the immediate site vicinity and the project would not interfere with, affect or be affected by the movement of agricultural or forest products.

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

Pursuant to the 2019 Seattle Campus Master Plan, the UW operates the U-Pass program which is a comprehensive regional transportation mitigation and monitoring program with a goal of reducing SOV use. This program is outlined in Chapter 8 of the 2019 Seattle Campus Master Plan and serves as mitigation for traffic generated by the UW.

Construction activities would occur in compliance with applicable University of Washington and City of Seattle regulations, and would include the preparation of a Construction Management Plan to control and minimize potential construction-related transportation issues.

This project would also fall under the University's Transportation Management Plan (TMP), including elements such as parking pricing and the U-Pass Program to help discourage single-occupancy vehicle trips and encourage transit use, carpooling and other alternative modes of transportation.

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

15. Public Services

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

The ***University of Washington IMA Addition Project*** 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 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for public service impacts. General methods to address impacts to public services are identified in Section 3.14.3 of the EIS, including all development constructed in accordance with applicable Seattle Fire Code requirements; review of development projects for life/safety and security issues; and, UWPD could increase its staff capacity and operations, if necessary, to meet security needs for the campus. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

16. Utilities

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

All utilities are currently available at the site, including electricity, natural gas, water, sanitary sewer, telephone, cable/internet services, and refuse service.

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 immediate vicinity that might be needed.

Proposed ***University of Washington IMA Addition Project*** would connect to existing services on the site for water, sanitary sewer, electricity, and telecommunications. An existing natural gas main is located to the south of the site within the access/loading driveway. The existing IMA building does not connect to this main and it would remain in place during construction.

C. SIGNATURES

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

Signature:

____

Name of Signee:

Julie Blakeslee

Position and Agency/Organization:

SEPA Responsible Official

Date:

October 25, 2021

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Appendix A

GEOTECHNICAL REPORT

Geotechnical Engineering Services

University of Washington
IMA Pool and Locker Room Upgrades
Seattle, Washington

for
University of Washington

August 5, 2021

GeoEngineers

17425 NE Union Hill Road, Suite 250
Redmond, Washington 98052
425.861.6000

Geotechnical Engineering Services

University of Washington
IMA Pool and Locker Room Upgrades
Seattle, Washington

File No. 0183-148-00

August 5, 2021

Prepared for:

University of Washington
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1.0 INTRODUCTION

This report presents the results of GeoEngineers, Inc.'s (GeoEngineers) geotechnical engineering services for the proposed University of Washington (UW) Intramural Activities Building (IMA) Pool and Locker Room Upgrades project located at the UW Campus in Seattle, Washington. The location of the site and general configuration of the proposed upgrades is shown on the Vicinity Map and Site Plan, Figures 1 and 2, respectively.

1.1. Project Description

The IMA Pool and Locker Room Upgrades project includes extending a section of the IMA building to the south, as shown on Figure 2, and renovating and expanding the existing swimming pool. The planned building extension will increase the building footprint by about 3,500 square feet. The deepest area of the new pool will be about 9 feet below the Level 1 pool deck (Elevation 26.0 feet, City of Seattle datum). We understand that the new building extension footprint will be supported on deep foundations. A bioretention planter is planned directly south of the building expansion footprint in the area of the existing wood deck. The outdoor UW Tennis courts are located to the south of the IMA building and separated from the IMA building by an asphalt paved access drive.

1.2. Purpose and Scope

The purpose of our services is to evaluate soil and groundwater conditions as a basis for developing design criteria for the geotechnical aspects of the UW IMA Pool and Locker Room Upgrades project. Field explorations and laboratory testing were performed to identify and evaluate subsurface conditions in the planned project area to develop engineering recommendations for use in design of the project. Our services were performed in general accordance with our contract with the UW for Project No. 205781 executed on April 28, 2021.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1. Field Explorations

Subsurface conditions were evaluated through a field exploration program that consisted of drilling and sampling two hollow-stem auger borings, designated B-1 and B-2. The borings were located at each end of the existing brick wall on the south of the planned building extension footprint adjacent to the alley. At the time that the explorations were completed the Validation Report for the project (dated February 2020) showed the building footprint expansion extending south to the brick wall and immediately adjacent to the north side of the alley. The borings were completed using truck-mounted drilling equipment. The approximate locations of the borings are shown on Figure 2.

The borings were advanced to depths of 41.5 (B-1) and 51.5 (B-2) feet below the ground surface (bgs), respectively. Locations of the borings were determined in the field by measuring from physical features on site to the desired locations. Appendix A includes logs of the borings (Figures A-2 and A-3) and details of the subsurface borings performed.

2.2. Laboratory Testing

Soil samples obtained from the borings were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate engineering properties of the soil. Representative samples were selected for laboratory testing consisting of moisture content, percent passing the U.S. No. 200 sieve (%F), sieve analyses, and Atterberg limits. The tests were performed in general accordance with test methods of the ASTM International (ASTM) or other applicable procedures. A brief discussion of the laboratory tests and test results is included in Appendix B.

2.3. Previous Explorations

The logs of selected explorations from previous studies in the project vicinity were reviewed, including the logs from the original IMA project. The logs of the explorations from previous projects referenced for this study are presented in Appendix C.

3.0 SITE DESCRIPTION

3.1. Geologic Map

We reviewed the Geologic Map of Northeastern Seattle (Part of the Seattle North 7.5'x15' Quadrangle), King County (Booth et al. 2009). The soils across most of the campus upslope and west of the IMA building are mapped as glacial till, which generally consists of dense to very dense silty sand with gravel, cobbles and occasional boulders deposited below glaciers. Glacial till commonly includes an upper medium dense weathered zone.

The lower slope on the east side of the campus along Montlake Boulevard is mapped as pre-Fraser glaciation deposits, which generally consists of very dense interbedded sand, gravel, silt/clay, and widely sorted sediment that was deposited prior to the last glaciation and subsequently consolidated by glaciers.

The area east of Montlake Boulevard, and south of the north side of the IMA building to the Montlake Cut is mapped as peat and artificial fill deposits. The highly compressible peat was deposited in the shallow water at the north end of Union Bay and these soils were exposed when the level of Lake Washington was dropped after the completion of the Ballard Locks. The Montlake (Ravenna) landfill located immediately north of the IMA building was operated from about 1926 to 1966, and landfill materials were placed on top of the peat deposits. Artificial fill is mapped throughout the area east of Montlake Boulevard and is associated with previous development of this portion of campus.

3.2. Surface Conditions

The site of the IMA building expansion is currently occupied by a wood deck and adjacent hardscape. The ground surface is generally flat and at approximate Elevation 26 feet (City of Seattle Datum). We understand there is an approximate 1.5-to-2-foot vertical gap between the top of the wood deck and the underlying ground surface. An existing approximately 7-foot-tall brick wall exists along the south, west and east sides of the wood deck. Chain-link gates are located beneath the IMA overhangs on the east and west sides of the wood deck and between the IMA building and the brick wall. The area outside the brick wall is surfaced with asphalt pavement.

3.3. Subsurface Soil Conditions

Borings B-1 and B-2 were drilled through the asphalt pavement located immediately outside the existing brick wall. Logs of the borings are included in Appendix A. In general, the soils encountered in the borings consisted of the following.

- **Fill:** Approximately 8 to 13 feet of fill was observed in the borings. The fill is associated with the past grading activities in this area for developed of the existing structures. The fill generally consists of very loose to medium dense silty sand with variable gravel content.
- **Deposits of pre-Fraser Glaciation:** Dense to very dense/very stiff to hard pre-Fraser glaciation deposits were encountered beneath the fill in each boring to the full depth explored. The deposits consist of interbedded silty sand, sand, and silt and clay with varying amounts of silt and gravel in the sandy layers. Although not encountered in our borings, glacial deposits commonly include cobbles and boulders.

Several previous explorations are located in the project area including borings associated with the original IMA building design project and test pits associated with the outdoor tennis courts to the south.

- Three borings, designated A-6-65, A-7-65, and A-10-65 were drilled in the vicinity of the planned building extension and within the footprint of the existing IMA building. These boring indicated fill ranging from about 4 feet deep in boring A-6-65, to 10 and 9 feet deep in borings A-10-65 and A-7-65, respectively. Peat and alluvial deposits were observed in boring A-7-65 at depths ranging from about 9 to 14 feet. Pre-Fraser and/or till-like glacially consolidated deposits were encountered below the fill and alluvium/peat in each of the borings and extending to the full depth of the borings, which ranged from about 28 to 50 feet deep. Groundwater was observed about 4 to 8 feet deep in the borings.
- Three test pits, designated TP-2-68, TP-3-68, and TP-8-68 were excavated on the north side of the outdoor tennis courts to the south of the IMA building extension footprint. Very dense glacial till deposits were noted at a depth of about 2.5 and 1.6 feet in test pits TP-3 and TP-8, respectively. However, about 2.6 feet of fill was observed over softer alluvial silt/clay deposits extending at least 6 feet deep in test pit TP-2. Minor groundwater seepage was observed at a depth of about 4.5 feet in TP-2.

3.4. Groundwater Conditions

Groundwater was observed in sandy layers at depths of about 20 to 25 feet in borings B-1 and B-2 and was encountered on top of relatively impermeable silt and lean clay layers within the pre-Fraser Glaciation deposits. As described above, groundwater was also encountered in the three borings (A-6-65, A-7-65, and A-10-65) located directly north of the IMA expansion footprint at depths ranging from approximately 4 to 8 feet beneath the pre-development ground surface. Observed groundwater may be associated with Lake Washington, as well as perched groundwater seepage, and may fluctuate with the lake level, as well as in response to precipitation, the wet season, and other factors.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary

A summary of the primary geotechnical considerations is provided below. The summary is prepared for introductory purposes only and should be used in conjunction with the complete recommendations presented in this report.

- The site is located within three environmentally critical areas (ECA) based on the Seattle Department of Construction and Inspections (SDCI) GIS website. These ECAs include peat settlement prone area, abandoned landfill buffer area, and liquefaction prone area.
- The site is designated Site Class F, per ASCE 41-17, because of the presence of potentially liquefiable soils in the existing borings drilled to the north of the footprint expansion. ASCE 41-17 requires a site-specific response analysis when in Site Class F soils, unless the mapped risk-targeted maximum-considered earthquake (MCE_R) Spectral Response Acceleration at Short Period (S_S) is less than 0.2g. Given the seismic activity in the region, the S_S will not be less than 0.2g and a site-specific response analysis will be required. GeoEngineers can complete a site-specific response analysis, if requested.

  Based on the exploration data from borings B-1 and B-2 and the existing borings, as well as the observed groundwater levels, the groundwater elevations are variable in this area because of the complex geologic conditions and past filling of the site. Additional boring(s) that will be completed within the footprint of the wood deck and/or pool addition may be pertinent in determining the actual elevation of the groundwater in the expansion footprint and may eliminate the need to perform a site specific response analysis, if liquefiable soils are not present.
- The expansion of the IMA may be supported on deep foundations consisting of micropiles and/or drilled augercast piles connected with grade beams. The piles should be embedded at least 25 feet into the underlying glacial soils. Piles will likely need to extend at least 35 to 40 feet deep.
- Ancillary structures, such as the bioretention planter, may be supported on shallow foundations bearing on at least 2 feet of properly compacted structural fill, assuming that seismic induced settlement can be tolerated by the structure. Footings supported on the properly compacted structural fill may be designed using a maximum allowable bearing pressure of 2,000 pounds per square foot (psf). The allowable bearing pressure may be increased by one-third for short duration loads such as wind or seismic events.
- Excavations for the pool will extend up to about 10 feet deep to construct the southwest side of the new pool. Temporary open cut slopes inclined at 1.5H:1V (horizontal to vertical) may be used for areas where possible, although we anticipate that temporary shoring consisting of soldier piles and lagging may be needed for deeper excavations.
- Imported gravel borrow should be used as structural fill under all building elements, especially in wet weather conditions.

Our specific geotechnical recommendations are presented in the following sections of this report.

4.2. Environmentally Critical Areas

Based on review of ECA maps on the SDCI GIS website, the site is located in peat settlement prone, abandoned landfill buffer, and liquefaction prone ECAs.

The peat settlement prone ECA is associated with historic peat deposits around Lake Washington. Peat was not encountered in our borings B-1 and B-2, however, peat was encountered in previously completed borings to the north of the IMA expansion footprint, as observed in boring A-7-65. In our opinion, the use of deep foundations for the IMA expansion will effectively mitigate potential settlement issues due to the peat.

The site is located within 1,000 feet of the Montlake landfill, which is an abandoned methane-producing landfill. Seattle Municipal Code (SMC) 25.09.220 requires evaluation of methane gas accumulation. Recommendations regarding landfill gas mitigation is discussed in more detail in Section 4.7.

The liquefaction prone area is associated with lake deposits around Lake Washington encountered in the previous borings. In our opinion, the planned use of deep foundations to support the building expansion will effectively mitigate liquefaction induced settlement. Liquefaction is discussed in more detail in Section 4.3.2.

4.3. Earthquake Engineering

We evaluated the site for seismic hazards including liquefaction, lateral spreading, fault rupture and earthquake induced landsliding.

4.3.1. ASCE 41-17 Seismic Design Information

The site is designated Site Class F, per ASCE 41-17, because of the presence of potentially liquefiable soils in the existing borings to the north of the footprint expansion. ASCE 41-17 requires a site-specific response analysis when in Site Class F soils, unless the Mapped MCE_R Spectral Response Acceleration at Short Period (S_S) is less than 0.2g. Given the seismic activity in the region, the S_S will not be less than 0.2g and a site-specific response analysis will be required. GeoEngineers can complete a site-specific response analysis, if requested.

Based on the exploration data from borings B-1 and B-2 and the existing borings, as well as the observed groundwater levels, the groundwater elevations are variable in this area because of the complex geologic conditions and past filling of the site. Additional boring(s) that will be completed within the footprint of the wood deck and/or pool addition may be pertinent in determining the actual elevation of the groundwater in the expansion footprint and may eliminate the need to perform a site-specific response analysis, if liquefiable soils are not present.

4.3.2. Liquefaction Potential

Liquefaction refers to the condition by which vibration or shaking of the ground, usually from earthquake forces, results in the development of excess pore pressures in saturated soils with subsequent loss of strength in the deposit of soil so affected. In general, soils that are susceptible to liquefaction include very loose to medium dense, clean to silty sands that are below the water table.

The evaluation of liquefaction potential depends on numerous site parameters, including soil grain size, soil density, site geometry, static stresses and the design ground acceleration. Typically, the liquefaction potential of a site is evaluated by comparing the cyclic shear stress ratio (the ratio of the cyclic shear stress to the initial effective overburden stress) induced by an earthquake to the cyclic shear stress ratio required to cause liquefaction. We evaluated the earthquake-induced cyclic shear stress ratio at this site using an empirical relationship developed by researchers for this purpose.

Analysis of SPT data from borings B-1 and B-2 indicate that there is a low potential for liquefaction because the depth to groundwater is within dense native glacial soils. However, data from previous borings (A-6-65, A-7-65, and A-10-65) to the north of the proposed building expansion indicate that there is a potential for liquefaction in silty sand and sandy silt layers within alluvium deposits encountered in these borings. We estimate that the factor of safety is less than 1 for layers of silty sand and sandy silt located at depths ranging from 5 to 12 feet bgs.

Liquefaction-induced free-field ground settlement of the potentially liquefiable zones for each boring is estimated to be on the order of 0.2 to 0.5 inches, 1 to 2 inches, and less than 0.2 inches for borings A-6-65, A-7-65, and A-10-65, respectively, for the design-level earthquake. The magnitude of liquefaction-induced ground settlement will vary as a function of the characteristics of the earthquake (earthquake magnitude, location, duration and intensity) and the soil and groundwater conditions. Once a site-specific response analysis is completed, these settlement estimates will be updated.

It is our opinion that the use of piles to support the building foundations will effectively mitigate the risk of liquefaction-induced settlement to the structure, provided the piles are embedded in the underlying glacially consolidated soils.

4.3.3. Lateral Spreading

Ground rupture from lateral spreading is associated with liquefaction. Lateral spreading involves lateral displacements of large volumes of liquefied soil, and can occur on near-level ground as blocks of surface soils displace relative to adjacent blocks.

Preliminary analyses were performed to assess lateral spreading potential due to liquefiable soils during the design level earthquake. Lateral spreading analyses were performed based on bathymetry data shown in a nautical chart developed by the National Oceanic and Atmospheric Administration (NOAA). The chart provides rough bathymetry data in Union Bay. The building is located approximately 470 feet west of Union Bay. Based on our analyses, ground rupture due to lateral spreading is unlikely at the site, and therefore, piles supporting the building should not be impacted by laterally spreading soils.

4.3.4. Ground Rupture

Ground rupture from lateral spreading is associated with liquefaction. Lateral spreading involves lateral displacements of large volumes of liquefied soil, and can occur on near-level ground as blocks of surface soils displace relative to adjacent blocks. In our opinion, ground rupture resulting from lateral spreading at the site is low if the building will be pile supported.

Because of the thickness of the Quaternary sediments below the site, which are commonly more than 1,000 feet thick, the potential for surface fault rupture is considered remote.

4.4. Excavation Support

Excavations are anticipated to be up to about 10 feet below the existing pool deck. We anticipate that cantilever soldier pile shoring may be required for certain areas of the excavation because of site constraints. Where sufficient space is available, temporary cut slopes are considered feasible for the excavations, provided that the recommended inclinations are maintained between adjacent structures/walls and the base of the excavation. Temporary excavations should not encroach within a 1.5H:1V prism extending from the base of adjacent structures/walls.

The City of Seattle requires that shoring walls be designed to limit lateral deflections to 1 inch or less in order to reduce the risk of damage to existing improvements. The City of Seattle requires that remedial measures be implemented when lateral deflections reach 1 inch.

4.4.1. Excavation Considerations

The site soils may be excavated with conventional heavy-duty excavation equipment, such as trackhoes. The contractor should be prepared to deal with occasional cobbles and boulders in the site soils. Likewise, the surficial fill may contain foundation elements and/or utilities from previous site development, debris, rubble, and/or cobbles and boulders. We recommend that procedures be identified in the project specifications for measurement and payment of work associated with obstructions.

4.4.2. Cantilever Soldier Pile Walls

Soldier pile walls consist of steel beams that are concreted into drilled vertical holes located along the wall alignment, typically about 8 feet on center. Timber lagging is typically installed behind the flanges of the steel beams to retain the soil located between the soldier piles.

The shoring system should be designed to limit lateral deflections to less than 1 inch in order to reduce the risk of damage to existing improvements.

Geotechnical design recommendations for each of these components of the soldier pile wall system are presented in the following sections.

4.4.2.1. Soldier Piles

We recommend that soldier pile walls be designed using the earth pressure diagram presented in Figure 3. The earth pressures presented in Figure 3 are for full-height cantilever soldier pile walls and the pressures represent the estimated loads that will be applied to the wall system for various wall heights.

The earth pressures presented in Figure 3 does not include loading from maintenance equipment or truck surcharge. In addition, other surcharge loads, such as cranes, construction equipment or construction staging areas, should be applied to the shoring system as recommended in Figure 4. No seismic pressures have been included in Figure 3 because it is assumed that the shoring will be temporary.

We recommend that the embedded portion of the soldier piles be at least 2 feet in diameter and extend a minimum distance of 10 feet below the base of the excavation to resist "kick-out." The axial capacity of the soldier piles must resist downward vertical loads, as appropriate. We recommend using an allowable end bearing value of 30 kips per square foot (ksf) for piles supported on the glacially consolidated soils. The allowable end bearing value should be applied to the base area of the drilled hole into which the soldier pile is concreted. This value includes a factor of safety of about 2.5. The allowable end bearing value assumes that the shaft bottom is cleaned out immediately prior to concrete placement. If necessary, an allowable pile skin friction of 1.5 ksf may be used on the embedded portion of the soldier piles to resist the vertical loads.

4.4.2.2. Lagging

Table 1 presents recommend lagging thicknesses (roughcut) as a function of soldier pile clear span and depth.

TABLE 1. RECOMMENDED LAGGING THICKNESS

	Recommended Lagging Thickness (roughcut) for clear spans of:					
Depth (feet)	**5 feet**	**6 feet**	**7 feet**	**8 feet**	**9 feet**	**10 feet**
0 to 12	2 inches	3 inches	3 inches	3 inches	4 inches	4 inches

Lagging should be installed promptly after excavation, especially in areas where perched groundwater is present or where fill or alluvial soils are located, where clean sand and gravel soils are present, and where caving soils conditions are likely. The workmanship associated with lagging installation is important for maintaining the integrity of the excavation.

The space behind the lagging should be filled with soil as soon as practicable. The City of Seattle requires that voids be backfilled immediately or within a single shift, depending on the selected method of backfill. Placement of this material will help reduce the risk of voids developing behind the wall and damage to existing improvements located behind the wall.

Material used as backfill in voids located behind the lagging should not cause buildup of hydrostatic pressure behind the wall. Lean concrete or controlled density fill (CDF) are suitable options for use as backfill behind the walls. Lean concrete and CDF will reduce the volume of voids present behind the wall. Alternatively, lean concrete or CDF may be used for backfill behind the upper 8 feet of the excavation to limit caving and sloughing of the upper soils, with on-site soils used to backfill the voids for the remainder of the excavation. Based on our experience, the voids between each lean concrete or CDF lift are sufficient for preventing the buildup of hydrostatic pressure behind the wall.

4.4.2.3. Drainage

A suitable drainage system should be installed to prevent the buildup of hydrostatic groundwater pressures behind the soldier pile and lagging wall. Seepage flows at the bottom of the excavation should be contained and controlled. Drainage should be provided for permanent below-grade walls as described in Section 4.10.

4.4.2.4. Construction Considerations

Shoring construction shall be completed by a qualified shoring contractor. A shoring contractor is qualified if they have successfully completed at least 10 projects of similar size and complexity in the Seattle/Bellevue area during the previous 5 years. Interested shoring contractors should prepare a submittal documenting their qualifications, unless this requirement is waived by GeoEngineers. The shoring contractor's superintendent shall have a minimum of 3 years' experience supervising cantilever soldier pile shoring construction and the drill operators and on-site supervisors shall have a minimum of 3 years' experience installing shoring. The personnel experience shall be included in the qualification's submittal.

Temporary casing or drilling fluid will be required to install the soldier piles where:

- Fill, alluvium or peat is present;
- The native soils do not have adequate cementation or cohesion to prevent caving or raveling; and/or
- Groundwater is present.

GeoEngineers should be allowed to observe and document the installation of the shoring to verify conformance with the design assumptions and recommendations.

4.4.3. Shoring Wall Performance

Temporary shoring walls typically move on the order of 0.1 to 0.2 percent of H, where H is the vertical distance between the existing ground surface and the base of excavation.

The deflections and settlements are usually highest at the excavation face and decrease to negligible amounts beyond a distance behind the wall equal to the height of the excavation. Localized deflections may exceed the above estimates and may reflect local variations in soil conditions (such as around side sewers) or may be the result of the workmanship used to construct the shoring wall. Given that some movement is expected, existing improvements located adjacent to the temporary shoring system that are not pile supported will also experience movement. The deformations discussed above are not likely to cause structural damage to structurally sound existing improvements; however, some cosmetic damage should be expected (for instance, cracks in drywall finishes; widening of existing cracks; minor cracking of slabs-on-grade/hardscapes; cracking of sidewalks, curbs/gutter, and pavements/pavement panels; etc.). For this reason, it is important to complete a pre-construction survey and photo documentation of existing improvements adjacent to the excavation prior to shoring construction. Refer to Appendix D for more detailed recommendations for shoring monitoring and preconstruction survey.

4.4.4. Temporary Cut Slopes

The stability of open-cut slopes is a function of soil type, groundwater seepage, slope inclination, slope height and nearby surface loads. The use of inadequately designed open cuts could impact the stability of adjacent improvements/work areas, could affect existing utilities and could endanger personnel.

Temporary unsupported cut slopes more than 4 feet high in the fill and alluvium deposits may be inclined at maximum of 1½H:1V. Flatter slopes may be necessary if seepage is present on the face of the cut slopes or if localized sloughing occurs. For open cuts at the site, we recommend that:

- No adjacent foundations, traffic, construction equipment, stockpiles or building supplies be allowed at the top of the cut slopes within a distance of at least 5 feet from the top of the cut;
- Exposed soil along the slope be protected from surface erosion by using waterproof tarps or plastic sheeting;
- Construction activities be scheduled so that the length of time the temporary cut is left open is reduced to the extent practicable;
- Erosion control measures be implemented as appropriate such that runoff from the site is reduced to the extent practicable;

- Surface water be diverted away from the slope; and
- The general condition of the slopes be observed daily by the general contractor and periodically by the geotechnical engineer to confirm adequate stability.

Because the contractor has control of the construction operations, the contractor should be made responsible for the stability of cut slopes, as well as the safety of the excavations. Shoring and temporary slopes must conform to applicable local, state and federal safety regulations.

Temporary cut slopes should be planned such that they do not encroach on a 1.5H:1V influence line projected down from the edges of nearby or planned foundation elements.

Water that enters the excavation must be collected and routed away from prepared subgrade areas. We anticipate that this may be accomplished by installing a system of drainage ditches and sumps along the toe of the cut slopes. Some sloughing and raveling of the cut slopes should be expected. Temporary covering, such as heavy plastic sheeting with appropriate ballast, should be used to protect these slopes during periods of wet weather. Surface water runoff from above cut slopes should be prevented from flowing over the slope face by using berms, drainage ditches, swales or other appropriate methods.

4.5. Building Support – Deep Foundations

Unsuitable soils consisting of fill and alluvium exist below the planned building expansion. Based on borings completed for the site, we anticipate that competent bearing soils are present approximately 8 to 15 feet below existing site grades. Estimated liquefaction induced settlement from the design level earthquake will impact the proposed building addition if the building addition is not pile supported.

Deep foundations are appropriate to support the building and should extend through the unsuitable soils (fill, alluvium and peat) and be embedded in the underlying glacially consolidated soils. We recommend using 8- to 10-inch-diameter micropiles or 12-, 16-, and 18-inch augercast piles depending on the required loads and uplift requirements.

4.5.1. Micropile Foundations

Micropiles may be used for foundation support. Micropiles are high capacity, small diameter (typically on the order of 6 to 10 inches in diameter), drilled and grouted piles. Micropiles are constructed by drilling a hole, placing reinforcement and grouting the hole. When installing within loose fill or alluvium, or where groundwater exists, casing is typically required to prevent caving during installation but removed after placement of the grout and reinforcement. Reinforcement generally consists of a large steel reinforcing bar installed down the center. Structural detailing at the tops of the piles is made to connect to the foundation. The grouting method used to construct the micropiles has a significant impact on capacity. Micropiles installed by gravity grouting have lower capacities, and micropiles installed by pressure grouting or post-grouting (two-stage grouting process) can achieve much higher capacities.

Micropiles are generally cost-effective where high load capacities are required, and limited access is available. The construction methodology and equipment have a large influence on the micropile capacity, and, as a result, micropiles are typically design-build foundation elements. The micropile contractor can modify its equipment and grouting techniques to achieve the required pile capacity. A pile load test program is recommended to be completed to confirm that the required pile capacities have been achieved.

4.5.1.1. Axial Capacity

Axial load capacity in compression and tension will be developed from side frictional resistance in the dense glacial soils beneath the fill and alluvium. We recommend that the diameter of the micropiles be at least 6 inches and extend a minimum of 25 feet into the dense glacial deposits. We recommend micropiles be designed with a load transfer of 3 kips per foot within the glacial soils. The load transfer may be applied in both compression and tension. Allowable axial capacities are recommended to be limited to 150 kips.

Load transfer in the fill and alluvium should be neglected. Fill and alluvium are estimated to extend to depths of 8 to 15 feet below existing site grades, based on the results of borings around the project area. A downdrag load of 8 kips should be subtracted from the allowable axial capacity due to the potential liquefaction of the fill and alluvium during the design earthquake.

Allowable pile capacities were evaluated based on Allowable Stress Design (ASD) and are for combined dead plus long-term live loads and may be increased by one-third when considering design loads of short duration such as seismic forces. The allowable capacities are based on the strength of the supporting soils and include a factor of safety of 2. The capacities apply to single piles. We recommend a minimum pile spacing of 3 feet. In our opinion, if piles are spaced at least 3 feet on center, no reduction of axial capacity for group action is needed.

We recommend that a minimum no-load or unbonded length of 5 feet be incorporated in the design of the micropiles. The final design load transfer value should be determined by the specialty pile contractor for the proposed installation and grouting methods.

Micropile foundations should only be used for gravity loads. Micropiles can provide limited lateral capacities and GeoEngineers can provide those capacities, if needed.

4.5.1.2. Installation Recommendations

We recommend that all micropiles be installed by a competent foundation contractor experienced with this type of construction. All micropiles should be drilled with straight drilling equipment with sufficient torque to penetrate through the very dense glacial soils. Drilling mud should not be used unless approved by GeoEngineers before the start of construction.

After the hole is drilled to the planned depth, all cuttings must be removed from the hole, either mechanically or by using pressurized air. Water should not be used to remove cuttings from the hole. The installation of each micropile should be observed by a representative from GeoEngineers. If the hole is within tolerance with respect to location, depth and verticality, it should be grouted immediately using a proper grout mix. After the grouting is completed, properly sized steel bars should be installed with centering devices.

4.5.1.3. Test Pile Program

We recommend that a test pile program be established to confirm that the required capacities of micropile foundations have been achieved. We recommend that at least one sacrificial pile load test be completed. Tension load tests should be completed in general accordance with ASTM D3689 Section 8 Procedure for Standard Test Methods for Deep Foundations Under Static Axial Tensile Load.

Pile load testing should be completed using a load frame capable of distributing large test loads into the near-surface soils without damaging existing structural elements or below-slab utilities. The large test loads frequently cause damage to slabs-on-grade and other nearby improvements, and the location of pile load tests should be reviewed during the design phase to minimize impacts to existing improvements.

4.5.2. Augercast Piles

Augercast piles (12-, 16-, or 18-inch-diameter) may also be used for foundation support, if site constraints allow for their use. Augercast piles are constructed using a continuous-flight, hollow-stem auger attached to a set of leads supported by a crane or installed with a fixed-mast drill rig. The first step in the pile casting process consists of drilling the auger into the ground to the specified tip elevation of the pile. Grout is then pumped through the hollow stem during steady withdrawal of the auger, replacing the soils on the flights of the auger. The final step is to install a steel reinforcing cage and typically a center bar into the column of fresh grout. One benefit of using augercast piles is that the auger provides support for the soils during the pile installation process, thus eliminating the need for temporary casing or drilling fluid.

Installation of augercast piles produces nominal noise and ground vibrations, which may be beneficial given the proximity of the surrounding existing improvements.

4.5.2.1. Construction Considerations

The augercast piles should be installed using a continuous-flight, hollow-stem auger. Given the distinct contrast in stiffness between the fill, alluvium and peat deposits and the underlying glacial soils, and the need to develop pile capacity from these soils, it is important that the piles achieve a consistent embedment into the glacial soils. In order to confirm that the piles are consistently embedded into the glacially consolidated soils, we recommend that the contractor use drilling equipment instrumented to measure and display crowd speed, crowd force, and/or drill pressure during augercast pile installation.

These measurements can be used as an indication of the transition from softer fill, peat and alluvium deposits to denser glacial soils, which can be used to estimate pile embedment in the glacial soils. Production piles located in close proximity to one of the geotechnical borings completed for this project should be installed at the beginning of pile construction to calibrate the typical resistance measured for the fill, peat and alluvium deposits, and the glacial soils. This process will provide the required information to determine whether the piles have been installed to an appropriate length and may eliminate the need for static pile load testing. This approach has been used successfully on previous projects in Seattle that GeoEngineers provided construction observation for.

As is standard practice, the pile grout must be pumped under pressure through the hollow stem as the auger is withdrawn. Maintenance of adequate grout pressure at the auger tip is critical to reduce the potential for encroachment of adjacent native soils into the grout column. The rate of withdrawal of the auger must remain constant throughout the installation of the piles in order to reduce the potential for necking of the piles. Failure to maintain a constant rate of withdrawal of the auger should result in immediate rejection of that pile. Reinforcing steel for bending and uplift should be placed in the fresh grout column as soon as possible after withdrawal of the auger. Centering devices should be used to provide concrete cover around the reinforcing steel.

The contractor should adhere to a waiting period of at least 12 hours between the installation of piles spaced closer than 8 feet, center-to-center. This waiting period is necessary to avoid disturbing the curing concrete in previously cast piles.

Grout pumps must be fitted with a volume-measuring device and pressure gauge so that the volume of grout placed in each pile and the pressure head maintained during pumping can be observed. A minimum grout line pressure of 100 pounds per square inch (psi) should be maintained. The rate of auger withdrawal should be controlled during grouting such that the volume of grout pumped is equal to at least 115 percent of the theoretical pile volume. A minimum head of 10 feet of grout should be maintained above the auger tip during withdrawal of the auger to maintain a full column of grout and to prevent hole collapse.

The geotechnical engineer of record should observe the drilling operations, monitor grout injection procedures, record the volume of grout placed in each pile relative to the calculated volume of the hole, and evaluate the adequacy of individual pile installations.

4.5.2.2. Axial Capacity

Axial pile load capacity at this site will primarily be developed from end bearing in the very dense/hard glacial soils with some additional capacity attributed to side frictional resistance. Uplift pile capacity will also be developed from side frictional resistance in these soils. Augercast piles should be embedded at least 25 feet into the dense to very dense glacial soils to develop the required axial capacity. Recommended maximum allowable axial capacities for augercast piles are presented in Table 2, assuming a 25-foot embedment into dense glacial soils.

TABLE 2. AUGERCAST ALLOWABLE AXIAL CAPACITIES

Pile Type	Allowable Axial Capacity (kips)	Allowable Uplift Capacity (kips)
12-inch Augercast	165	100
16-inch Augercast	265	145
18-inch Augercast	315	165

Allowable pile capacities were evaluated based on Allowable Stress Design (ASD), and are for combined dead plus long-term live loads and may be increased by one-third when considering design loads of short duration such as seismic forces. The allowable capacities are based on the strength of the supporting soils and include a factor of safety of 2 for end bearing and pile friction. The capacities apply to single piles. If piles are spaced at least three pile diameters on center, as recommended, no reduction of axial capacity for group action is needed, in our opinion.

The structural characteristics of pile materials and structural connections may impose limitations on pile capacities and should be evaluated by the structural engineer.

4.5.2.3. Lateral Capacity

Lateral loads can be resisted by passive soil pressure on the vertical piles and by the passive soil pressures on the pile cap. Because of the potential separation between the pile-supported foundation components and the underlying soil from settlement, base friction along the bottom of the pile cap should not be included in calculations for lateral capacity.

We evaluated the lateral pile capacity for 12-, 16-, and 18-inch augercast piles using LPILE v2019 by Ensoft, Inc. Evaluations for the lateral pile capacities were completed for liquefied soil condition/seismic loading. Liquefied soil parameters were modeled in LPILE by applying P-multipliers and residual soil strengths for the liquefiable fill and alluvium deposits. P-multipliers for the liquefied soil were developed based on the average $(N_1)_{60cs}$ for the alluvium deposits per the 2019 Washington State Department of Transportation (WSDOT) Geotechnical Design Manual (GDM).

Pile shear and bending moments were evaluated as described above by controlling lateral deflections at the top of the pile. LPILE runs were completed for deflections of ¼, ½, 1, and 2 inches. Plots from LPILE of deflection vs depth, shear force vs depth, and bending moment vs depth are provided in Figures 5 through 22. The recommended design parameters for the primary soil units are summarized in Table 3. The structural engineer may use the recommended design LPILE soil parameters to evaluate lateral pile capacities for other loading conditions or pile sizes.

TABLE 3. LATERAL PILE DESIGN PARAMETERS

Soil Unit	Approximate Depth to Bottom of Soil Unit (ft)	LPILE Soil Model	Effective Unit Weight (pcf)	Friction Angle (degrees)	LPILE Soil Modulus, k (pci)	P-Multiplier	Undrained Cohesion (psf)	E50
Fill/Alluvium	6	Sand (Reese)	120	32	90	-	-	-
Fill/Alluvium (below GWT)	15	Soft Clay (Matlock)	57.6 (below GWT)	-	-	0.1	415	0.02
Glacial Soils	100	Sand (Reese)	67.6 (below GWT)	40	200	-	-	-

Notes:

pcf – pounds per cubic foot

pci – pounds per cubic inch

psf – pounds per square foot

Piles spaced closer than five pile diameters apart will experience group effects that will result in a lower lateral load capacity for trailing rows of piles with respect to leading rows of piles for an equivalent deflection. We recommend that the lateral load capacity for piles in a pile group spaced less than five pile diameters apart be reduced in accordance with the factors in Table 4.

TABLE 4. SHAFT P-MULTIPLIERS, P_M, FOR MULTIPLE ROW SHADING

Shaft Spacing (in terms of shaft diameter)[1]	P-Multipliers, P_m[2, 3]		
	Row 1 (leading row)	Row 2 (1st trailing row)	Row 3 and higher (2nd trailing row)
3D	0.8	0.4	0.3
5D	1.0	0.85	0.7

Notes:

1. The P-multipliers in the table above are a function of the center to center spacing of shafts in the group in the direction of loading expressed in multiples of the shaft diameter, D.

2. The values of P_m were developed for vertical shafts only per 2017 ASHTO LRFD Table 10.7.4-1.

3. The P-multipliers are dependent on the shaft spacing and the row number in the direction of the loading to establish values of P_m for other shaft spacing values, interpolation between values should be conducted.

The WSDOT GDM does not require that the reduction in P-multiplier for group effects be combined with the P-multiplier for liquefied soil conditions.

We recommend that the passive soil pressure acting on the pile cap be estimated using an equivalent fluid density of 300 pounds per cubic foot (pcf) where the soil adjacent to the foundation consists of adequately compacted structural fill. This passive resistance value includes a factor of safety of 1.5 and assumes a minimum lateral deflection of 1 inch to fully develop the passive resistance. Deflections that are less than 1 inch will not fully mobilize the passive resistance in the soil.

4.5.3. Pile Settlement

We estimate that the post-construction settlement of pile foundations, designed and installed as recommended, will be on the order of ½-inch or less. Maximum differential settlement should be less than about one-half the post-construction settlement. Most of this settlement will occur rapidly as loads are applied.

4.6. Shallow Foundations

4.6.1. Allowable Bearing Capacity

We recommend that ancillary structures, such as the bioretention planter, be supported on conventional spread footings or on mat footings bearing on at least 2 feet of properly compacted structural fill. Footings supported on structural fill may be designed using an allowable bearing pressure of 2,000 psf. The allowable bearing pressures may be increase by one-third for short duration loads such as wind or seismic events.

The overexcavated areas should be backfilled with imported gravel borrow or crushed rock. Two feet of existing soil should be removed from below foundations to accomplish this. The exposed subgrade should then be compacted to the extent practical, and then 2 feet of properly compacted structural fill should be placed. The structural fill should extend at least two feet beyond the edges of the foundations.

4.6.2. Foundation Settlement

We estimate that the post-construction static settlement of footings founded on 2 feet of properly compacted structural fill, as recommended above, will be less than 1 inch. Differential settlement over a 30-foot distance should be less than ½ inch. Loose or disturbed soils not removed from footing excavations prior to placing concrete will result in additional settlement.

As mentioned in the "Liquefaction Potential" section above, liquefaction-induced free-field ground settlement of the potentially liquefiable zones for each boring is estimated to be less than 2 inches.

4.6.3. Modulus of Subgrade Reaction

For mat foundations designed as a beam on an elastic foundation, a static modulus of subgrade reaction of 15 pounds per cubic inch (pci) may be used for mat foundations bearing on 2 feet of compacted structural fill as described above. GeoEngineers should review the structural engineer's estimated deformation and applied bearing pressures to confirm that this subgrade modulus is appropriate and is consistent with our foundation design.

4.6.4. Lateral Resistance

Lateral loads can be resisted by passive resistance on the sides of the footings and by friction on the base of the footings. Passive resistance should be evaluated using an equivalent fluid density of 300 pcf where footings are poured neat against native soil or are surrounded by structural fill compacted to at least

95 percent of maximum dry density (MDD), as recommended. Resistance to passive pressure should be calculated from the bottom of adjacent paving or below a depth of 1 foot where the adjacent area is unpaved, as appropriate. Frictional resistance can be evaluated using 0.35 for the coefficient of base friction against footings. The above values incorporate a factor of safety of about 1.5.

If soils adjacent to footings are disturbed during construction, the disturbed soils must be recompacted, otherwise the lateral passive resistance value must be reduced.

4.6.5. Construction Considerations

Immediately prior to placing concrete, all debris and loose soils that accumulated in the footing excavations during forming and steel placement must be removed. Debris or loose soils not removed from the footing excavations will result in increased settlement.

If wet weather construction is planned, we recommend that all footing subgrades be protected using a lean concrete mud mat. The mud mat should be placed the same day that the footing subgrade is excavated and approved for foundation support.

We recommend that all completed footing excavations, as well as the overexcavated/backfill areas, be observed by a representative of our firm prior to placing mud mat, reinforcing steel, and structural concrete. Our representative will confirm that the bearing surface has been prepared in a manner consistent with our recommendations and that the subsurface conditions are as expected.

4.7. Landfill Gas Collection

Provisions should be made under the floor and pool slabs in contact with the soil to vent potential accumulations of landfill gas (which includes methane). We recommend placing perforated pipes within a gravel layer below the slabs and venting the pipes outside the building. Methane vapor mitigation should also include placing a 30-mil polyvinyl chloride (PVC) geomembrane beneath the slab system to act as a methane and water vapor barrier.

4.7.1. Methane Barrier

We recommend that the methane barrier consist of a 30-mil PVC geomembrane. The geomembrane should be installed by an approved and experienced contractor. All seams and penetrations must be sealed/welded in accordance with the manufacturer's recommendations. All tears or punctures must be repaired in accordance with the manufacturers' requirements. Equipment traffic and foot traffic on top of the installed barrier must be kept to a minimum. Cushion geotextiles should also be used to protect the geomembrane from potential damage below and above the barrier. The contractor must not drive any form stakes through the barrier or otherwise damage the barrier during construction.

The geomembrane should be installed in such a manner as to provide an impermeable seal at all pipe penetrations or discontinuities, such as interior and exterior foundations, pile foundations, grade beams, and utility pipes, which penetrate the barrier. On subgrade surfaces, all sharp points and projections must be removed to limit rips, tears and punctures of the geomembrane. If damage is identified during geomembrane installation, it must be repaired immediately. The geomembrane installation should be constructed in accordance with the manufacturer's recommendations.

Geomembrane integrity testing should also be completed in accordance with the manufacturer/installer approved quality assurance manual. Where punctures, tears and/or unsatisfactory welded seams are identified, appropriate repairs should be made until no evidence of potential leaks are detected. These repairs should be documented and approved by the owner's representative. The engineer should observe the installer's quality assurance/quality control (QA/QC) program during construction.

4.7.2. Vent Pipe System

For planning purposes, we recommend perforated vent pipes be installed under the pool deck slab around the perimeter of the new pool. The perforated pipes should be placed within a 6-inch-layer of clean crushed gravel with negligible sand or silt in conformance with Section 9-03.1(4)C, Grading No. 67 of the 2021 WSDOT Standard Specifications. This layer will act as a capillary break and methane collection layer. We recommend that lateral perforated vent pipes extend to the south and vent to the atmosphere on the south side of the exterior building wall. The methane pipes should then vent vapors to the atmosphere by extending vertical riser pipes on the outside of the building to a point at least 10 feet above the exterior grades of the building. The vent pipes should be designed such that precipitation or animals cannot enter the pipe.

The perforated pipes used under the pool deck should consist of 4-inch-diameter, machine slotted PVC pipe, or an approved equal. Solid wall (blank) PVC pipe should be used in below-grade pipe runs that extend outside the building footprint. GeoEngineers can assist with the layout and design of the methane venting and geomembrane, if needed.

4.8. Footing Drains

We recommend that perimeter footing drains be installed at the base of the exterior south building addition footings as shown on Figure 23. The perimeter drains should be provided with cleanouts and should consist of at least 4-inch-diameter perforated pipe placed on a 3-inch bed of, and surrounded by, 6 inches of drainage material enclosed in a non-woven geotextile fabric such as Mirafi 140N (or approved equivalent) to prevent fine soil from migrating into the drain material. We recommend against using flexible tubing for footing drainpipes. The perimeter drains should be sloped to drain by gravity, if practicable, to a suitable discharge point, preferably a storm drain. We recommend that the cleanouts be covered and be placed in flush mounted utility boxes. Water collected in roof downspout lines must not be routed to the footing drain lines.

4.9. Slab-on-Grade Floor

4.9.1. Subgrade Preparation

The exposed subgrade should be evaluated after site grading is complete. Probing should be used to evaluate the subgrade. The exposed soil should be firm and unyielding, and without significant water. Disturbed areas should be recompacted if possible or removed and replaced with compacted structural fill.

4.9.2. Design Parameters

Conventional slabs may be supported on-grade, provided the subgrade soils are properly prepared. We recommend that the slab be founded on a 2-foot-thick layer of properly placed and compacted structural fill. For slabs designed as a beam on an elastic foundation, a modulus of subgrade reaction of 100 pci may be used for subgrade soils prepared as recommended.

We recommend that the slab-on-grade floors be underlain by a 6-inch-thick capillary break layer consisting of material meeting the requirements of Mineral Aggregate Type 22 (¾-inch crushed gravel), City of Seattle Standard Specification 9-03.14. The capillary break should be underlain by a geotextile filter fabric meeting the requirements of construction geotextile for underground drainage, WSDOT Standard Specification 9-33. The purpose of the geotextile fabric is to provide separation between the on-site soils and the open graded capillary break material and to prevent buildup of fine soil/sediment within the capillary break material over time.

Provided that loose soil is removed and the subgrade is prepared as recommended, we estimate that slabs-on-grade will not settle appreciably.

4.9.3. Below-Slab Drainage

We expect the groundwater level to be encountered approximately 5 to 10 feet below the pool deck in the pool excavation area. Therefore, the pool should be designed to resist hydrostatic uplift pressures or a drainage system be installed to prevent the build-up of hydrostatic pressures. The underslab drainage system may include a perimeter drain around the deeper portion of the swimming pool. The location of the drainage system will depend on the pile foundations and pool footprint. The depth of the underslab drain system should be based on the measured groundwater level and we recommend that a groundwater monitoring well be installed in at least one of the borings that will be drilled within the building expansion footprint. The civil engineer should develop a conceptual slab underdrain plan for GeoEngineers to review. The drains should consist of perforated Schedule 40 polyvinyl chloride (PVC) pipes with a minimum diameter of 4 inches. The underslab drainage system pipes should have adequate slope (at least 0.25 percent) to allow positive drainage to the sump/gravity drain.

The drainage pipe should be perforated. Perforated pipe should have two rows of ½-inch holes spaced 120 degrees apart and at 4 inches on center. The pipe perforations should be oriented down. The underslab drainage system trenches should be backfilled with Mineral Aggregate Type 22 or Type 5 (1-inch washed gravel), City of Seattle Standard Specification 9-03.14, or an alternative approved by GeoEngineers. The Type 22 or Type 5 material should be wrapped with a nonwoven geotextile filter fabric meeting the requirements of construction geotextile for underground drainage, WSDOT Standard Specification 9-33. The underslab drainage system pipes should be connected to a header pipe and routed to a sump or gravity drain. Appropriate cleanouts for drainpipe maintenance should be installed. A larger-diameter pipe will allow for easier maintenance of drainage systems. The flow rate for the planned excavation in the below slab drainage and below-grade wall drainage systems is anticipated to be less than 10 gallons per minute.

If no special waterproofing measures are taken, leaks and/or seepage may occur in localized areas of the deeper portions of the pool, even if the recommended underslab drainage and below-slab drainage provisions are constructed. If leaks or seepage is undesirable, below-grade waterproofing should be specified. A vapor barrier should be used below slab-on-grade floors located in occupied portions of the building. Specification of the vapor barrier requires consideration of the performance expectations of the occupied space, the type of flooring planned and other factors, and is typically completed by other members of the project team.

4.10. Below-Grade Walls and Retaining Walls

The following recommendations should be used for the design of below-grade walls that are intended to act as retaining walls and for other retaining structures that are used to achieve grade changes.

4.10.1. Below-grade Walls against Shoring

Permanent below-grade walls for the pool or other structures built against temporary shoring (if required) should be designed for the pressures presented in Figure 3 with the addition of a seismic surcharge pressure equal to 7H (where H is the height of the wall in feet) and hydrostatic pressure equal to 62.4 pcf (triangular distribution) below the groundwater elevation. Surcharge loads should be designed for surcharge pressures presented in Figure 4.

The soil pressures recommended above assume that wall drains will be installed to prevent the buildup of hydrostatic pressure behind the walls or that the wall is designed to resist hydrostatic pressures. The drains should be tied to permanent drains to remove water to suitable discharge points.

4.10.2. Cast-in-Place Walls

Conventional cast-in-place walls may be necessary for the pool if temporary cut slopes are used to complete the excavation. The lateral soil pressures acting on cast-in-place subsurface walls will depend on the nature, density and configuration of the soil behind the wall and the amount of lateral wall movement that can occur as backfill is placed.

Lateral earth pressures for design of below-grade walls and retaining structures should be evaluated using an equivalent fluid density of 35 pcf (triangular distribution) provided that the walls will not be restrained against rotation when backfill is placed. If the walls will be restrained from rotation, we recommend using an equivalent fluid density of 55 pcf (triangular distribution). Walls are assumed to be restrained if top movement during backfilling is less than H/1000, where H is the wall height. These lateral soil pressures assume that the ground surface behind the wall is horizontal. These lateral soil pressures do not include the effects of surcharges such as floor loads, traffic loads or other surface loading. Surcharge effects should be included as appropriate. Potential impacts to adjacent structures should also be evaluated by the structural engineer. Below-grade walls for the building should also include seismic earth pressures. Seismic earth pressures should be included as a rectangular distribution determined using 7H in psf, where H is the wall height. These walls should also be designed for hydrostatic pressures below the groundwater elevation as described in the section above.

If vehicles can approach the tops of exterior walls to within half the height of the wall, a traffic surcharge should be added to the wall pressure. For car parking areas, the traffic surcharge can be approximated by the equivalent weight of an additional 1 foot of soil backfill (about 125 psf) behind the wall. For delivery truck parking areas and access driveway areas, the traffic surcharge can be approximated by the equivalent weight of an additional 2 feet (250 psf) of soil backfill behind the wall. These traffic surcharge loads can also be calculated based on a rectangular distributed load (equivalent fluid density) to the wall of 35 psf for car parking areas and 70 psf for truck parking areas. Positive drainage should be provided behind below-grade walls and retaining structures as discussed below.

4.10.3. Drainage

We expect the groundwater level to be encountered approximately 5 to 10 feet below the pool deck in the pool excavation area. Therefore, the pool should be designed to resist hydrostatic uplift pressures or a drainage system be installed to prevent the build-up of hydrostatic pressures.

4.11. Earthwork

Based on the subsurface soil conditions encountered in the borings, we expect that the soils at the site may be excavated using conventional heavy-duty construction equipment. Cobbles and debris were not observed in the fill material during our borings, however; fill can contain cobbles and debris. Accordingly, the contractor should be prepared to deal with cobbles and debris, if encountered. Wood has also been observed in the native soils and within the fill in nearby borings; therefore, the contractor should also be prepared to deal with these materials.

The fill contains sufficient fines (material passing the U.S. standard No. 200 sieve) to be highly moisture-sensitive and susceptible to disturbance, especially when wet. Ideally, earthwork should be undertaken during extended periods of dry weather when the surficial soils will be less susceptible to disturbance and provide better support for construction equipment. Dry weather construction will help reduce earthwork costs and increase the potential for using the drier native soils as structural fill.

Trafficability on the site is not expected to be difficult during dry weather conditions. However, the native soils will be susceptible to disturbance from construction equipment during wet weather conditions and pumping and rutting of the exposed soils under equipment loads may occur.

4.11.1. Clearing and Site Preparation

All existing utilities should be removed from the building expansion footprint and rerouted if needed.

Areas to be developed or graded should be cleared of surface and subsurface deleterious matter including any debris, shrubs, trees and associated stumps and roots. Graded areas should be stripped of organic soils.

The organic soils can be stockpiled and used later for landscaping purposes or may be spread over disturbed areas following completion of grading. If spread out, the organic strippings should be in a layer less than 1-foot-thick, should not be placed on slopes greater than 3H:1V and should be track-rolled to a uniformly compacted condition. Materials that cannot be used for landscaping or protection of disturbed areas should be removed from the project site.

4.11.2. Subgrade Preparation

Prior to placing new fills, pavement base course materials or gravel below on-grade floor slabs, subgrade areas should be probed to locate any soft or pumping soils. If soft or pumping soils are observed, they should be removed and replaced with structural fill.

If deep pockets of soft or pumping soils are encountered outside the building area, it may be possible to limit the depth of overexcavation by placing a non-woven geotextile fabric such as TenCate Mirafi 500X (or equivalent) on the overexcavated subgrade prior to placing structural fill. The geotextile will provide additional support by bridging over the soft material and will help reduce fines contamination into the structural fill.

After completing the probing, the subgrade areas should be recompacted to a firm and unyielding condition, if possible. The degree of compaction that can be achieved will depend on when the construction is performed. If the work is performed during dry weather conditions, we recommend that all subgrade areas be recompacted to at least 95 percent of the MDD in accordance with the ASTM D 1557 test procedure (modified Proctor). If the work is performed during wet weather conditions, it may not be possible to recompact the subgrade to 95 percent of the MDD. In this case, we recommend that the subgrade be compacted to the extent possible without causing undue heaving or pumping of the subgrade soils.

Subgrade disturbance or deterioration could occur if the subgrade is wet and cannot be dried. If the subgrade deteriorates during compaction, it may become necessary to modify the compaction criteria or methods.

4.11.3. Structural Fill

All fill, whether existing on-site fill soil or imported soil, that will support slabs, pavement areas or foundations, or be placed against retaining walls or in utility trenches should generally meet the criteria for structural fill presented below. The suitability of soil for use as structural fill depends on its gradation and moisture content.

4.11.3.1. Materials

Materials used as backfill for foundations, slabs, structures, below-grade walls, drainage layers, utility trenches, and paved areas are classified as structural fill for the purpose of this report. We recommend specifying materials using the 2020 City of Seattle Standard Specifications (Seattle Mineral Aggregate) or the 2021 WSDOT Standard Specifications. Structural fill material quality varies depending upon its use as described below:

1. Structural fill placed below all structures and during wet weather conditions should consist of imported gravel borrow, as described in Section 9-03.14(1) of the 2021 WSDOT Standard Specifications or City of Seattle Mineral Aggregate Type 17, with the additional restriction that the fines content be limited to no more than 5 percent.
2. Structural fill placed to backfill utility trenches may consist of on-site suitable fill soils provided that the soils are conditioned for the required compaction. On-site fill soils may be suitable for use as structural fill during dry weather conditions in areas needing 90 percent compaction. The existing soil will require moisture conditioning prior to use as structural fill. If structural fill is placed during wet weather, the structural fill should consist of imported gravel borrow, as described above. On-site alluvial soils and peat should not be planned for reuse as structural fill.
3. Structural fill placed immediately outside below-grade walls (drainage zone) should consist of washed gravel, such as Seattle Mineral Aggregate Type 5 or conform to Section 9-03.12(4) of the 2021 WSDOT Standard Specifications, surrounded by a nonwoven geotextile separator, as shown on Figure 23. Alternatively, Seattle Mineral Aggregate Type 26 may be used without a geotextile fabric in conjunction with a geocomposite wall drainage board.
4. Structural fill placed as crushed surfacing base course (CSBC) below pavements should conform to Section 9-03.9(3) of the 2021 WSDOT Standard Specifications or Seattle Mineral Aggregate Type 2.

5. Structural fill placed as capillary break below slabs should consist of 1-inch minus clean crushed rock with negligible sand or silt in conformance with Section 9-03.1(4)C, grading No. 67 of the 2021 WSDOT Standard Specifications or Seattle Mineral Aggregate Type 22 with negligible fines or sand content.

4.11.3.2. Reuse of On-site Soils

The fill soils contain a high percentage of fines and will be sensitive to changes in moisture content and difficult to handle and compact during wet weather.

The fill soils are expected to be suitable for use as structural fill in areas requiring compaction to at least 95 percent of MDD (per ASTM D 1557), provided the work is accomplished during the normally dry season (June through September) and that the soil can be properly moisture conditioned. Imported structural fill consisting of sand and gravel (gravel borrow) should be planned under all building floor slabs and foundation elements and as wall backfill, especially if construction occurs during wet weather. On-site alluvial soils and peat should not be reused as structural fill.

The contractor should plan to cover and maintain all fill stockpiles with plastic sheeting if it will be used as structural fill. The reuse of on-site soils is highly dependent on the skill and cooperation of the contractor and schedule, and we will work with the design team and contractor to maximize the reuse of on-site glacial soils during the wet and dry seasons.

4.11.3.3. Fill Placement and Compaction Criteria

Structural fill should be mechanically compacted to a firm, non-yielding condition. Structural fill should be placed in loose lifts not exceeding 12 inches in thickness when using heavy compaction equipment and not more than 6 inches when using hand operated compaction equipment. The actual thickness will be dependent on the structural fill material used and the type and size of compaction equipment. Each lift should be moisture conditioned to within about 2 percent of the optimum moisture content to achieve proper compaction to the specified density before placing subsequent lifts. Compaction of all structural fill at the site should be in accordance with the ASTM D 1557 (modified proctor) test method. Structural fill should be compacted to the following criteria:

1. Structural fill placed below floor slabs and foundations should be compacted to 95 percent of the MDD.
2. Structural fill placed behind below-grade walls should be compacted to between 90 to 92 percent of the MDD estimated in accordance with ASTM D 1557. Care should be taken when compacting fill near the face of below-grade walls to avoid over-compaction and hence overstressing the walls. Hand operated compactors should be used within 5 feet behind the wall. The upper 2 feet of fill below floor slab subgrade should also be compacted to at least 95 percent of the MDD. The contractor should keep all heavy construction equipment away from the top of retaining walls a distance equal to half the height of the wall, or at least 5 feet, whichever is greater.
3. Structural fill in new pavement and hardscape areas, including utility trench backfill, should be compacted to at least 90 percent of the MDD, except that the upper 2 feet of fill below final subgrade should be compacted to at least 95 percent of the MDD as shown in Figure 24.
4. Non-structural fill, such as fill placed in landscape areas, should be compacted to at least 90 percent of the MDD.

4.11.3.4. Weather Considerations

Disturbance of near surface soils should be expected if earthwork is completed during periods of wet weather. During dry weather, the soils will: (1) be less susceptible to disturbance; (2) provide better support for construction equipment; and (3) be more likely to meet the required compaction criteria.

The wet weather season generally begins in October and continues through May in Western Washington; however, periods of wet weather may occur during any month of the year. For earthwork activities during wet weather, we recommend that the following steps be taken:

- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded so that areas of ponded water do not develop. Measures should be taken by the contractor to prevent surface water from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.
- Earthwork activities should not take place during periods of moderate to heavy precipitation.
- Slopes with exposed soils should be covered with plastic sheeting.
- The contractor should take necessary measures to prevent on-site soils and soils to be used as fill from becoming wet or unstable. These measures may include the use of plastic sheeting, sumps with pumps and grading. The site soils should not be left uncompacted and exposed to moisture. Sealing the surficial soils by rolling with a smooth-drum roller prior to periods of precipitation will help reduce the extent that these soils become wet or unstable.
- The contractor should cover all soil stockpiles that will be used as structural fill with plastic sheeting.
- Construction traffic should be restricted to specific areas of the site, preferably areas that are surfaced with the existing asphalt or working pad materials not susceptible to wet weather disturbance.
- Construction activities should be scheduled so that the length of time that soils are left exposed to moisture is reduced to the extent practical.

Routing of equipment on the fill subgrade soils during the wet weather months will be difficult and the subgrade will likely become highly disturbed and rutted. In addition, a significant amount of mud can be produced by routing equipment directly on the existing fill soils in wet weather. Therefore, to protect the subgrade soils and to provide an adequate wet weather working surface for the contractor's equipment and labor, we recommend that the contractor protect exposed subgrade soils with crushed rock.

4.11.4. Permanent Cut and Fill Slopes

We recommend that permanent cut or fill slopes be constructed at inclinations of 2H:1V or flatter, and be blended into existing slopes with smooth transitions. To achieve uniform compaction, we recommend that fill slopes be overbuilt slightly and subsequently cut back to expose well compacted fill.

To reduce erosion, newly constructed slopes should be planted or hydroseeded shortly after completion of grading. Until the vegetation is established, some sloughing and raveling of the slopes should be expected. This may necessitate localized repairs and reseeding. Temporary covering, such as clear heavy plastic sheeting, jute fabric, or erosion control blankets (such as American Excelsior Curlex 1 or North American Green SC150) could be used to protect the slopes during periods of rainfall.

4.11.5. Utility Trenches

Trench excavation, pipe bedding, and trench backfilling should be completed using the general procedures required by the City of Seattle or specified by the project civil engineer. The fill soils encountered at the site are generally of low corrosivity based on our experience in the Puget Sound area; however the alluvium and peat soils have a moderate to high potential for corrosion.

Utility trench backfill should consist of structural fill and should be placed in loose lifts not exceeding 12 inches in thickness when using heavy compaction equipment and not more than 6 inches when using hand operated compaction equipment such that adequate compaction can be achieved throughout the lift. Each lift must be compacted prior to placing the subsequent lift. Prior to compaction, the backfill should be moisture conditioned to within 2 percent of the optimum moisture content, if necessary. The backfill should be compacted in accordance with the criteria discussed above. Figure 24 illustrates recommended trench compaction criteria under pavement and non-structural areas.

4.11.6. Sedimentation and Erosion Control

In our opinion, the erosion potential of the on-site soils is low to moderate. Construction activities including stripping and grading will expose soils to the erosional effects of wind and water. The amount and potential impacts of erosion are partly related to the time of year that construction actually occurs. Wet weather construction will increase the amount and extent of erosion and potential sedimentation.

Erosion and sedimentation control measures may be implemented by using a combination of interceptor swales, straw bale barriers, silt fences and straw mulch for temporary erosion protection of exposed soils. All disturbed areas should be finish graded and seeded as soon as practicable to reduce the risk of erosion. Erosion and sedimentation control measures should be installed and maintained in accordance with the requirements of the City of Seattle.

4.12. Surface Water Drainage Considerations

All paved and landscaped areas should be graded so that surface drainage is directed away from the building expansion and the IMA to appropriate catch basins.

Water collected in roof downspout lines must not be routed to the footing drain lines. Collected downspout water should be routed to appropriate discharge points in separate pipe systems.

4.13. Infiltration Considerations

Sieve analyses and percent fines were performed on selected soil samples collected from explorations completed at the site. The soil samples typically consisted of fill overlying alluvium deposits and glacial soils at depth. The fill typically has about 16 to 46 percent fines (silt). We anticipate that perched water zones will be encountered within the fill and alluvium.

In our opinion, infiltration facilities should not be planned at this site because there is significant risk that such systems can impact the building floor slab and methane gas collection systems. The floor slab system and methane collection system should be protected from potential seepage to prevent the capillary break and methane venting system from being inundated from water. The bioretention planter planned on the south side of the building should be designed to prevent stormwater from impacting the building walls, perimeter footing drain system, or the methane collection system.

4.14. Pavement Subgrade Preparation

We recommend the subgrade soils in new pavement areas be prepared and evaluated as described in the "Earthwork" section of this report. We recommend all subgrade areas for new asphalt pavement or concrete paver sections be prepared by placing at least 12 inches of imported structural fill compacted to at least 95 percent of the MDD (ASTM D-1557).

If existing subgrade soils are loose or soft, it may be necessary to excavate localized areas and replace them with additional gravel borrow or gravel base material. Pavement subgrade conditions should be observed and proof-rolled during construction and prior to placing the subbase materials in order to evaluate the presence of unsuitable subgrade soils and the need for over-excavation.

4.15. Recommended Additional Geotechnical Services

Throughout this report, recommendations are provided where we consider additional geotechnical services to be appropriate. These additional services are summarized below:

- Additional boring(s) should be completed within the footprint of the building expansion, as discussed with the UW.
- GeoEngineers should review the project plans and specifications when complete to confirm that our design recommendations have been implemented as intended and submit a review letter to the City of Seattle as required.
- During construction, GeoEngineers should observe temporary cut slopes, observe installation of deep foundations, observe temporary shoring installation (if needed), observe overexcavation of unsuitable soils, observe installation of the geomembrane barrier and methane venting system, evaluate the suitability of floor slab subgrades, observe retaining wall backfill, observe installation of subsurface drainage measures, observe and test structural backfill, and provide a summary letter of our construction observation services. The purposes of GeoEngineers construction phase services are to confirm that the subsurface conditions are consistent with those observed in the borings and other reasons described in Appendix E, Report Limitations and Guidelines for Use.

5.0 LIMITATIONS

We have prepared this report for use by the UW and members of the design team for use in design of this project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix E for additional information pertaining to use of this report.

6.0 REFERENCES

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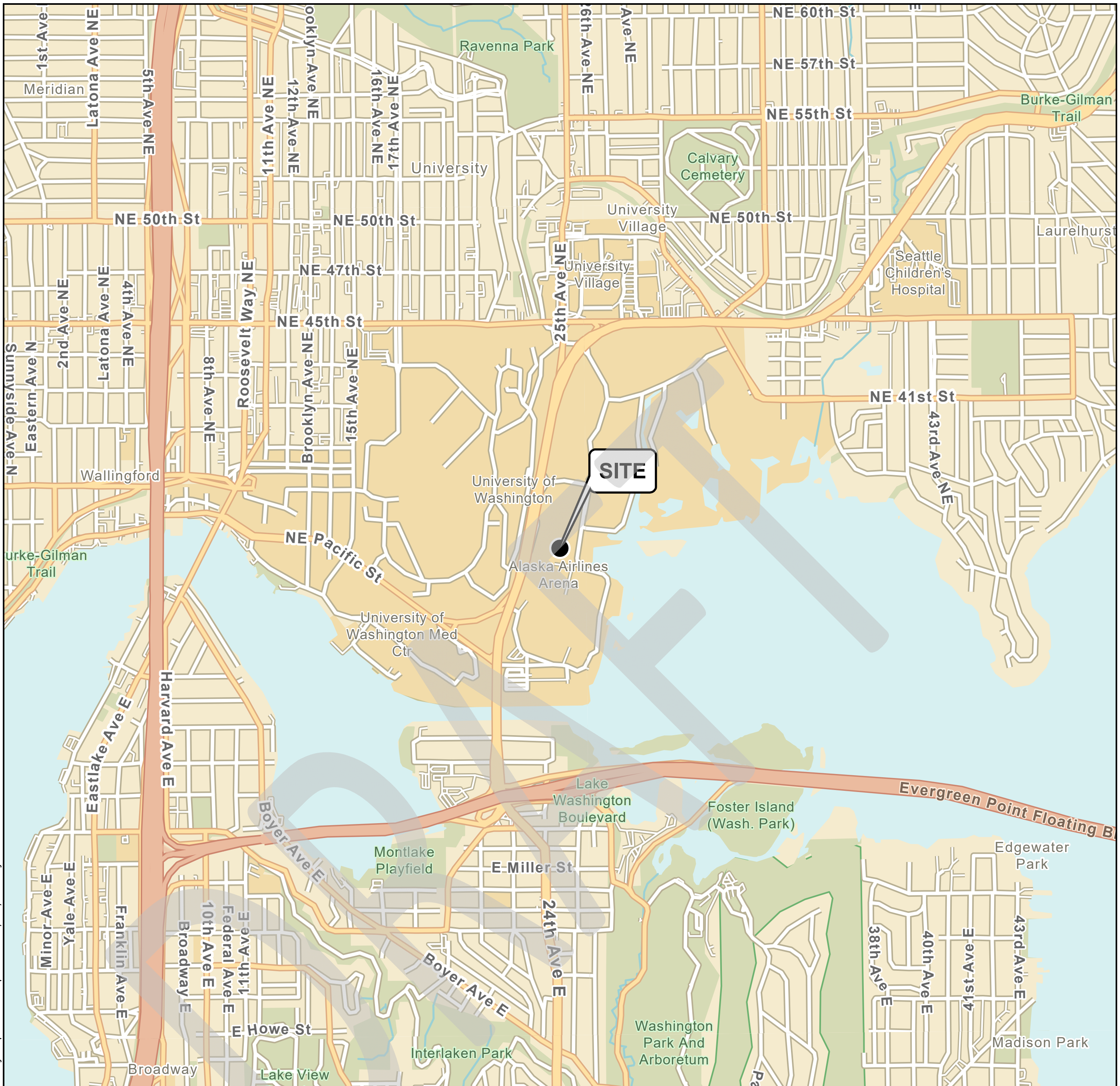

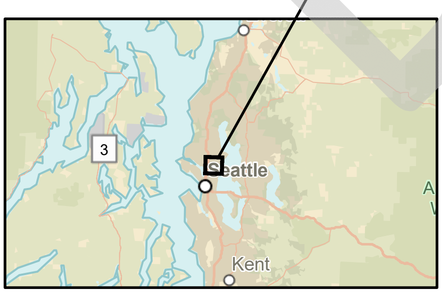

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Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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Figure 1

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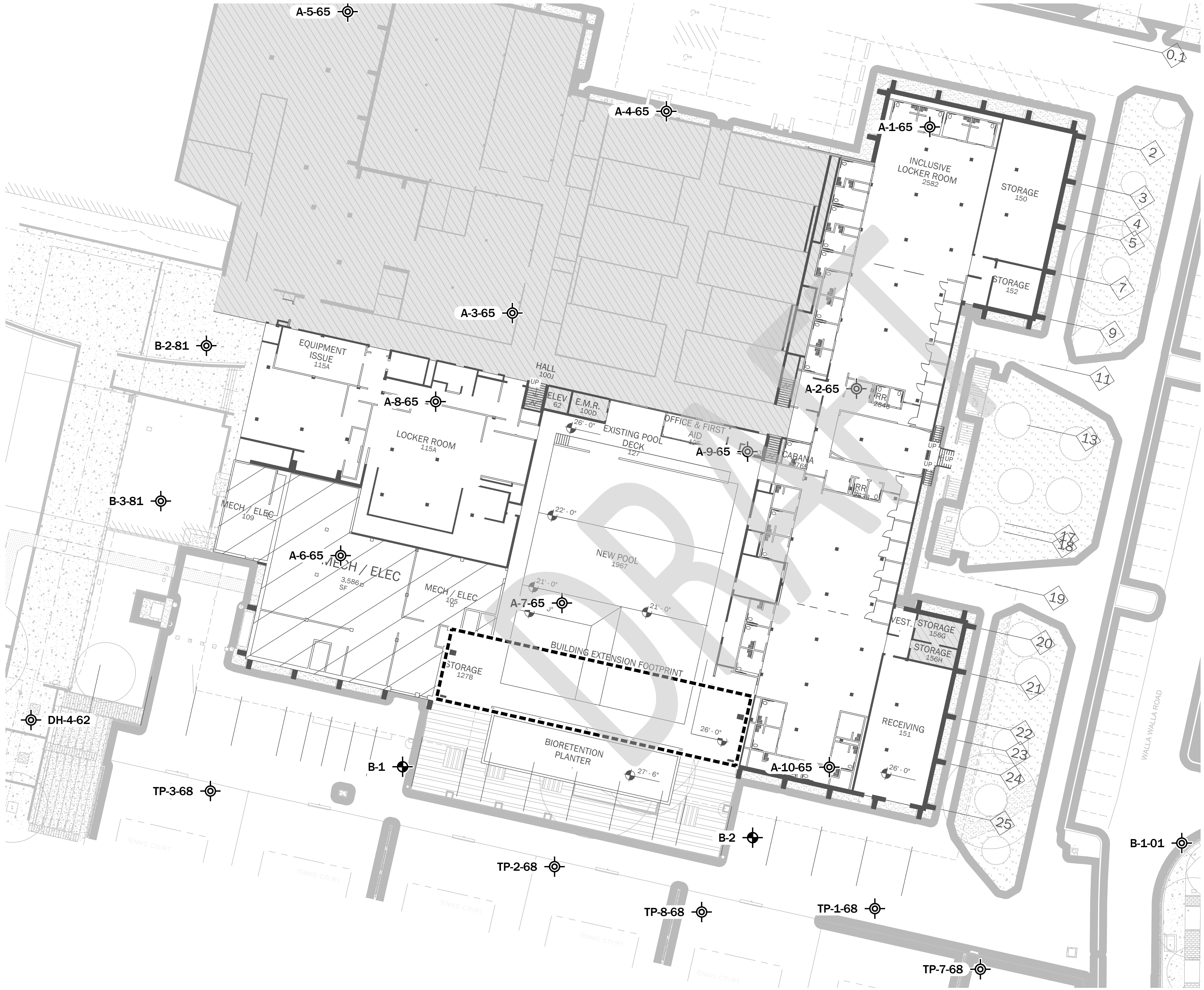

Legend

- B-1 — Boring by GeoEngineers, Inc., 2021
- A-2-65 — Explorations by Others
- Building Extension Footprint

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Background data from opsis dated 07/15/21.

Projection: Washington State Plane, North Zone, NAD83, US Foot

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40 0 40
Scale in Feet

Site Plan

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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Figure 2

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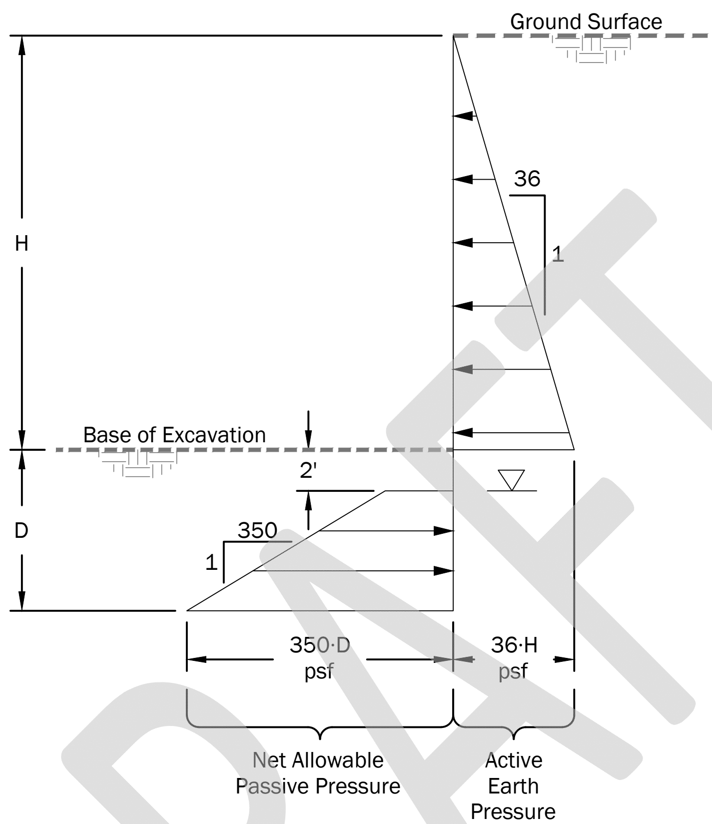
Cantilever Soldier Pile



Legend

H = Height of Excavation, Feet

D = Vertical Embedment Depth, Feet

▽ Design Groundwater Elevation for Drained Walls/ Passive Resistance Design

Not To Scale

Notes:

1. Active earth pressure and traffic surcharge pressure act over the pile spacing above the base of the excavation.
2. Passive earth pressure acts over 2.5 times the concreted diameter of the soldier pile, or the soldier pile spacing, whichever is less.
3. Passive pressure includes a factor of safety of 1.5
4. Additional surcharge from footings of adjacent buildings should be included in accordance with recommendations provided on Figure 4.
5. This pressure diagram is appropriate for temporary cantilever soldier pile walls. If additional surcharge loading (such as from soil stockpiles, excavators, dumptrucks, cranes, or concrete trucks) is anticipated, GeoEngineers should be consulted to provide revised surcharge pressures.

Earth Pressure Diagram
Temporary Cantilever Soldier Pile Wall

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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Figure 3

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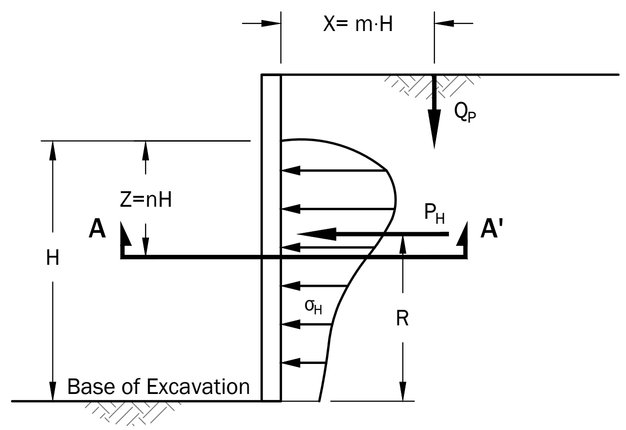
Lateral Earth Pressure from Point Load, Q_P (Spread Footing)



For $m \leq 0.4$

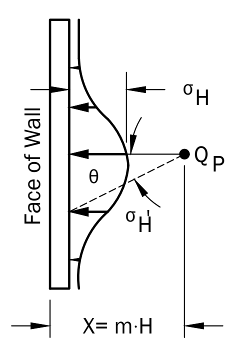
$$\sigma_H = \frac{k \cdot 0.28 Q_P n^2}{H^2(0.16+n^2)^3}$$

For $m > 0.4$

$$\sigma_H = \frac{k \cdot 1.77 Q_P m^2 n^2}{H^2(m^2+n^2)^3}$$

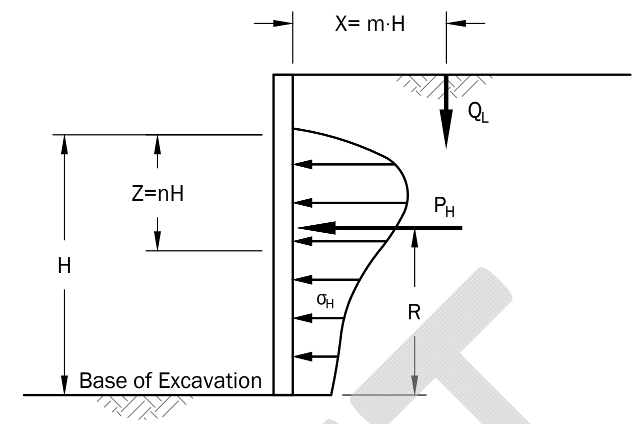
$$\sigma'_H = \sigma \, COS^2 (1.1\theta)$$

m	$P_H \left(\frac{H}{Q_P}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



Section A-A'
Pressures from Point Load Q_P

Lateral Earth Pressure from Line Load, Q_L (Continuous Wall Footing)



For $m \leq 0.4$

$$\sigma_H = \frac{k \cdot 0.2n \cdot Q_L}{H(0.16+n^2)^2}$$

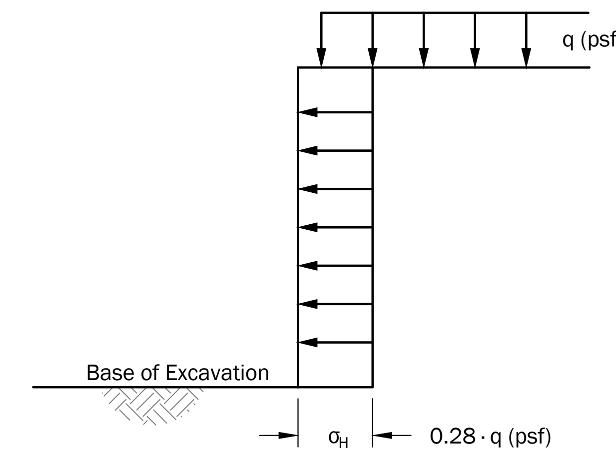
For $m > 0.4$

$$\sigma_H = \frac{k \cdot 1.28 m^2 n Q_L}{H(m^2+n^2)^2}$$

$$\text{Resultant } P_H = \frac{0.64 Q_L}{(m^2+1)}$$

m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H

Uniform Surcharges, q (Floor Loads, Large Foundation Elements or Traffic Loads)



σ_H = Lateral Surcharge Pressure from Uniform Surcharge

Wall Type	Surcharge Factor, k
Rigid	1.0
Flexible	0.5

Notes:
1. Procedures for estimating surcharge pressures shown above are based on Manual 7.02 Naval Facilities Engineering Command, September 1986 (NAVFAC DM 7.02).
2. Lateral earth pressures from surcharge should be added to earth pressures presented on Figure 3.
3. See report text for where surcharge pressures are appropriate.
4. Determination of surcharge factor (k). Flexible is for a system that allows small movements (temporary shoring, retaining walls, etc.) and rigid is for a system that does not allow small movements (permanent basement walls, below grade utility structures, etc.). If permanent basement walls are cast/poured directly against temporary shoring, then the lateral surcharge factor should be assumed as flexible when analyzing lateral surcharges.

Definitions:

- Q_P = Point load in pounds
- Q_L = Line load in pounds/foot
- H = Excavation height below footing, feet
- σ_H = Lateral earth pressure from surcharge, psf
- q = Surcharge pressure in psf
- θ = Radians
- σ'_H = Distribution of σ_H in plan view
- P_H = Resultant lateral force acting on wall, pounds
- R = Distance from base of excavation to resultant lateral force, feet
- X = Resultant lateral force acting on wall, pounds
- Z = Depth of σ_H to be evaluated below the bottom of Q_P or Q_L
- m = Ratio of X to H
- n = Ratio of Z to H

Not To Scale

Recommended Surcharge Pressure

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Seattle, Washington

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Figure 4

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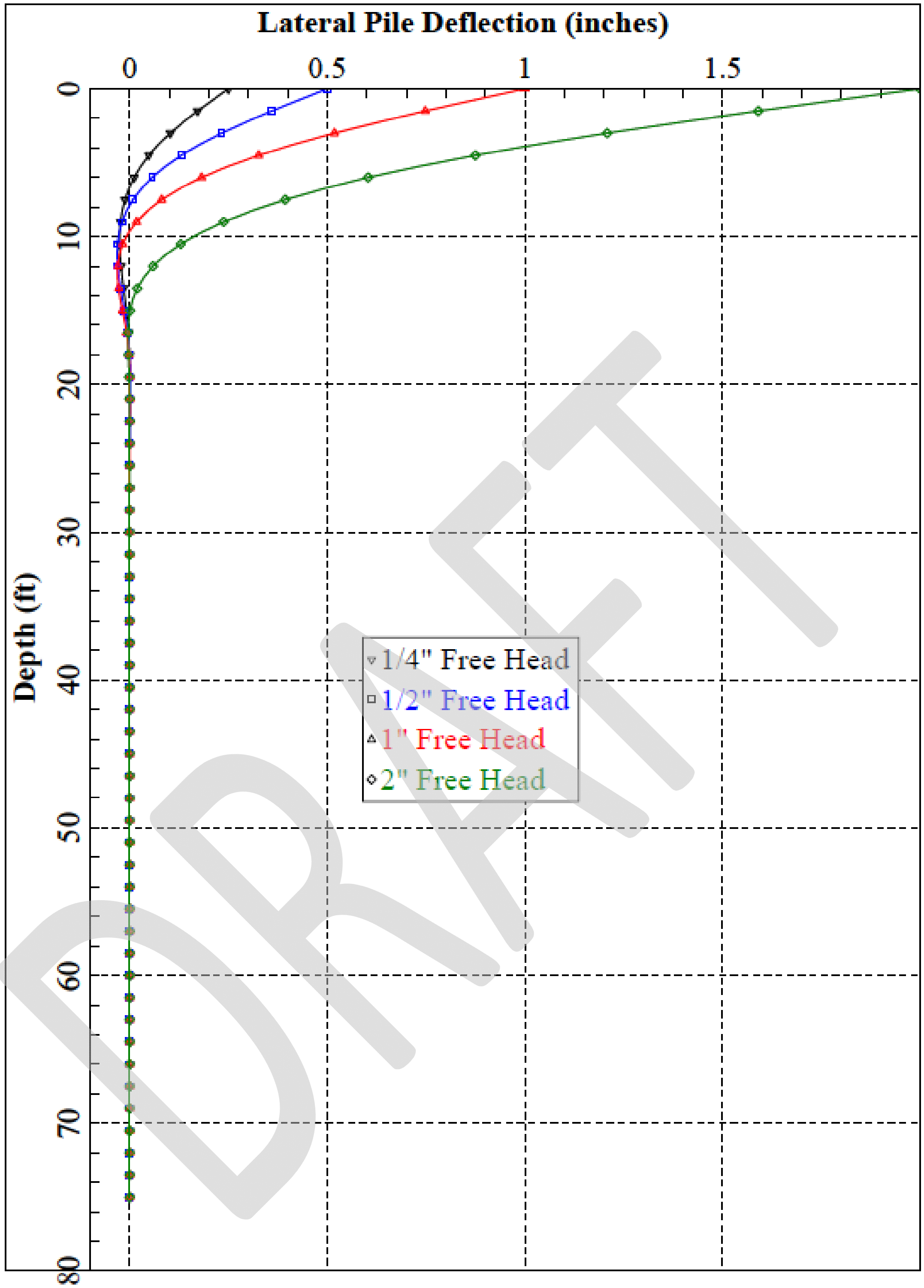

Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Deflection vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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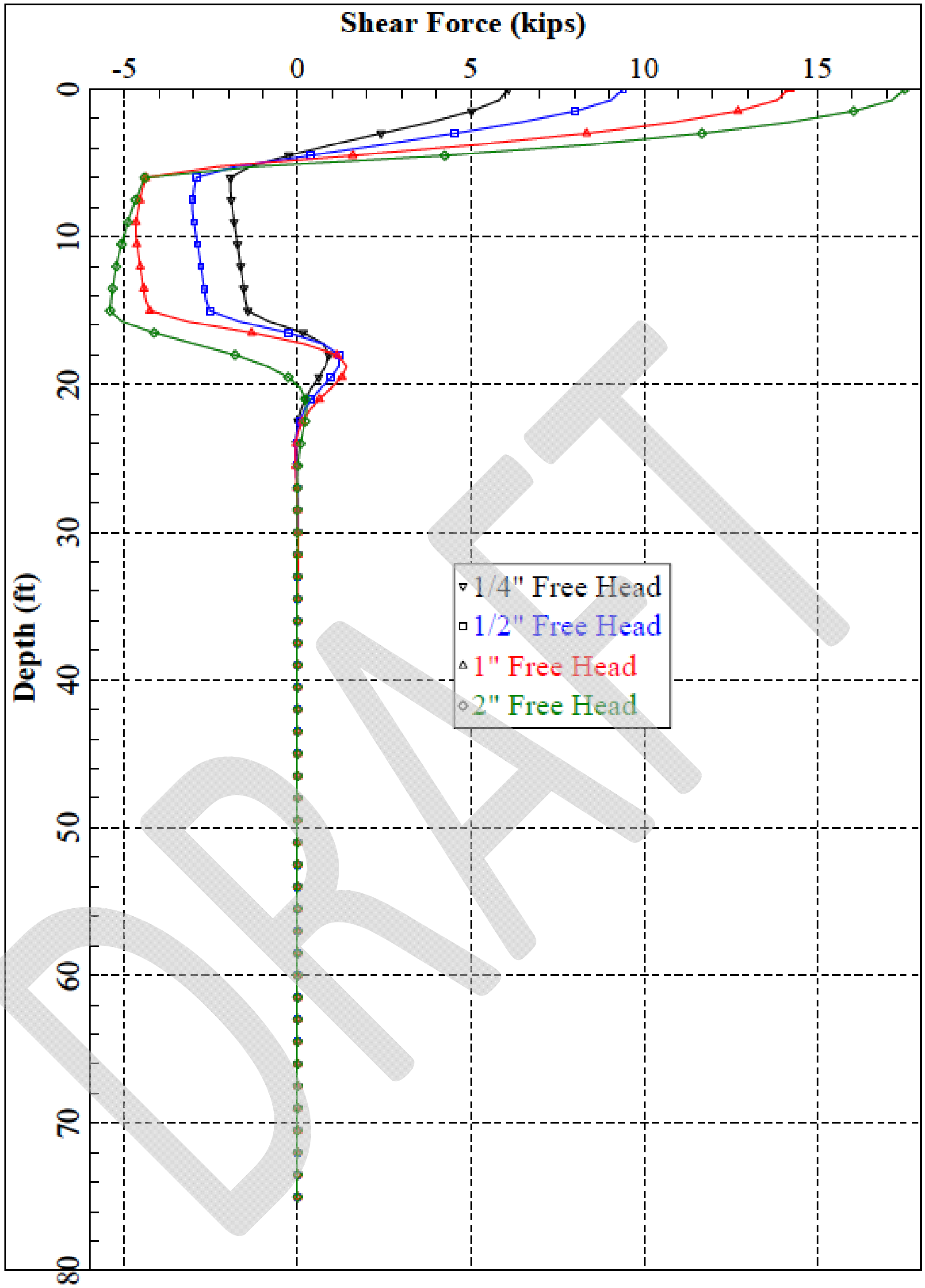
Figure 5



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Shear vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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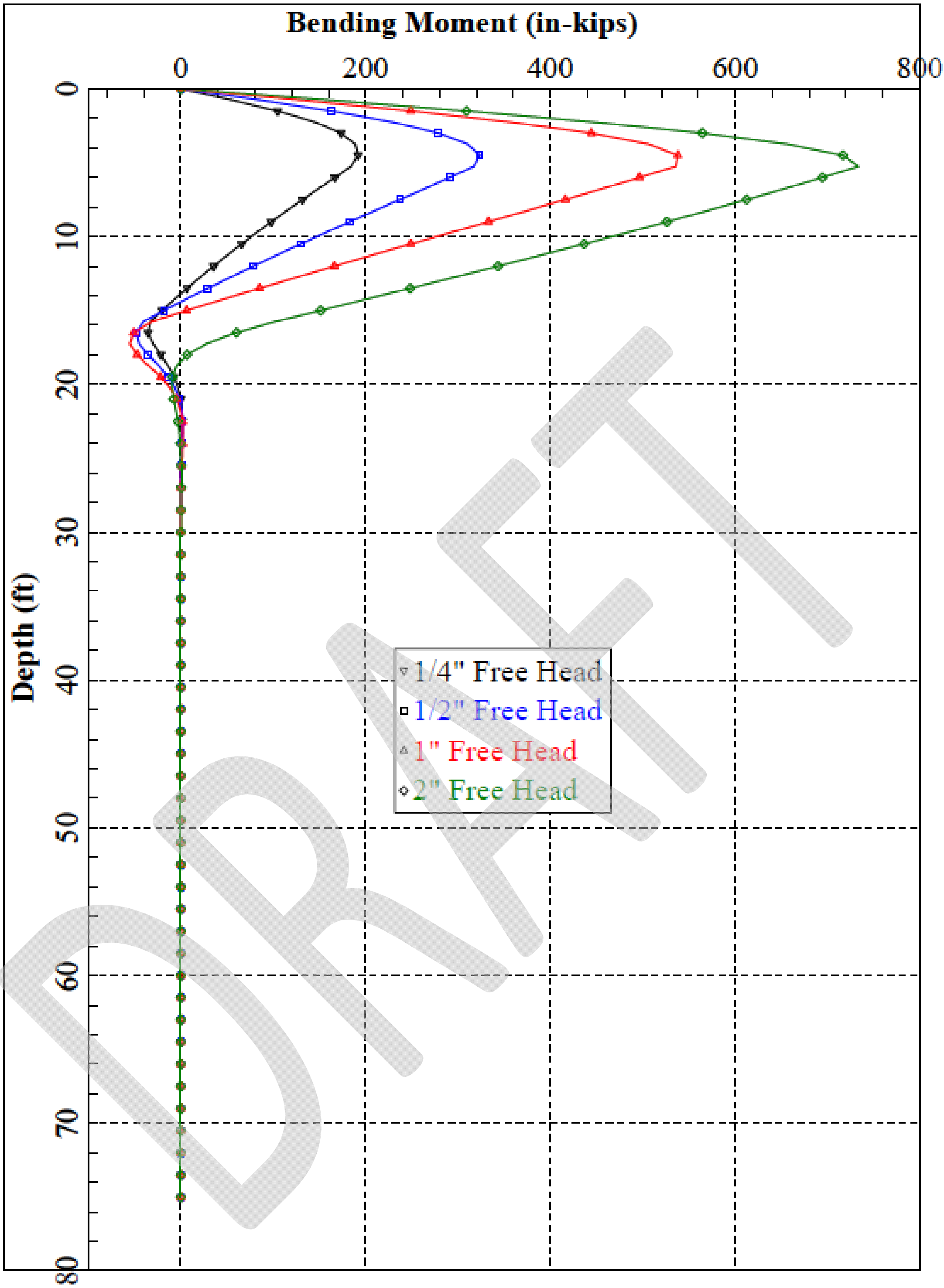
Figure 6



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Moment vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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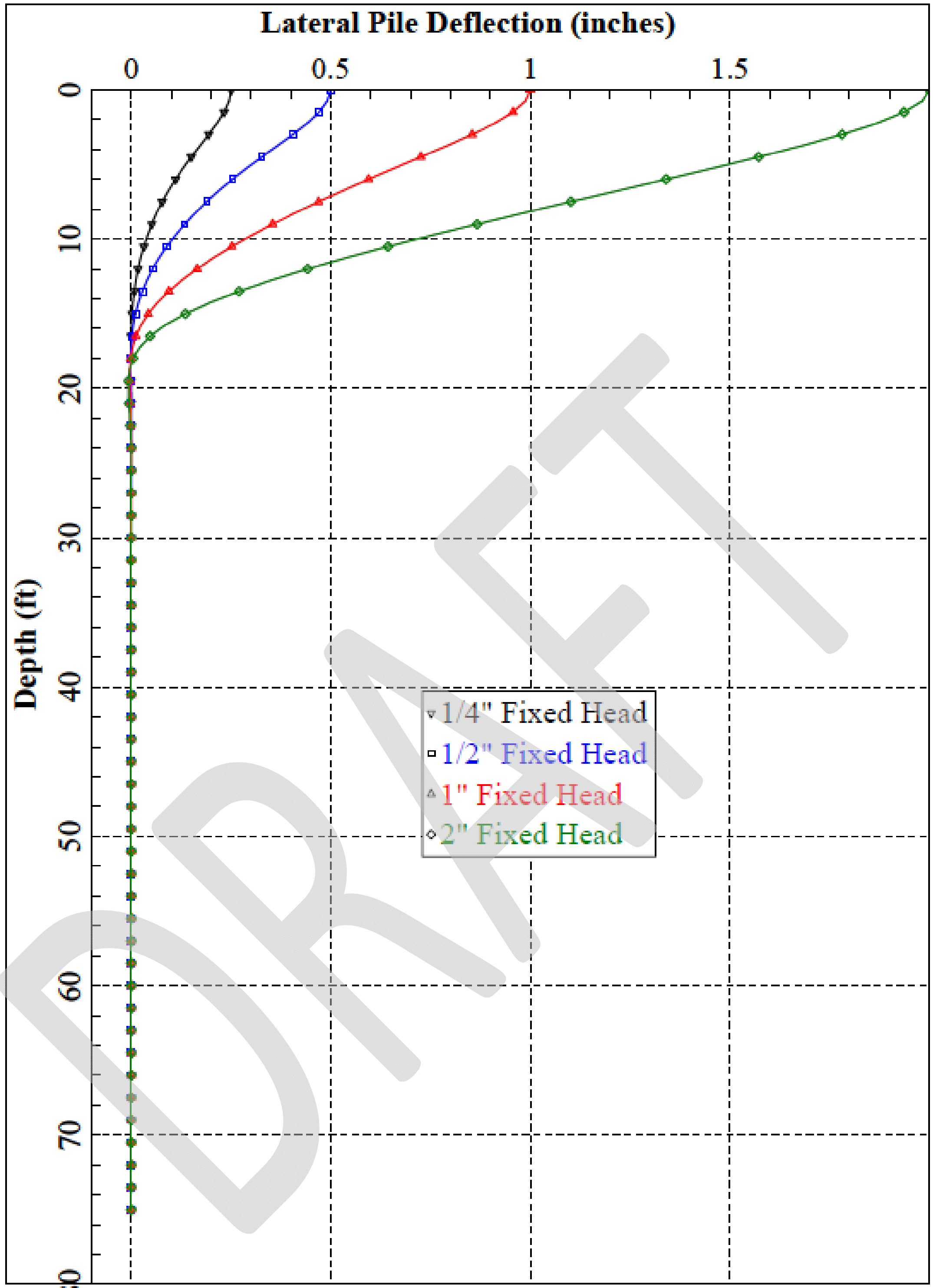
Figure 7



Notes:

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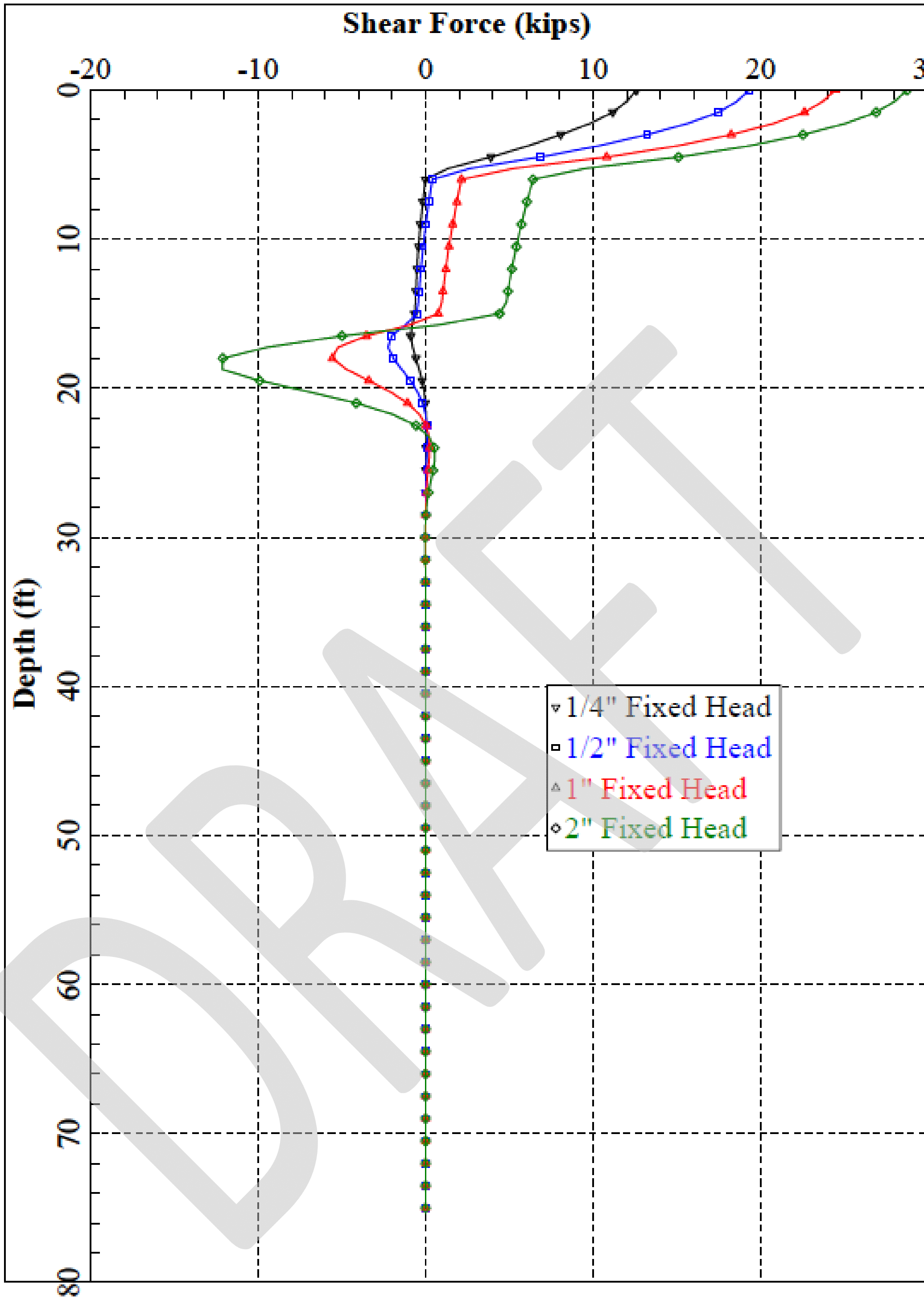
2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Deflection vs Depth (Fixed Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

GeoEngineers

Figure 8



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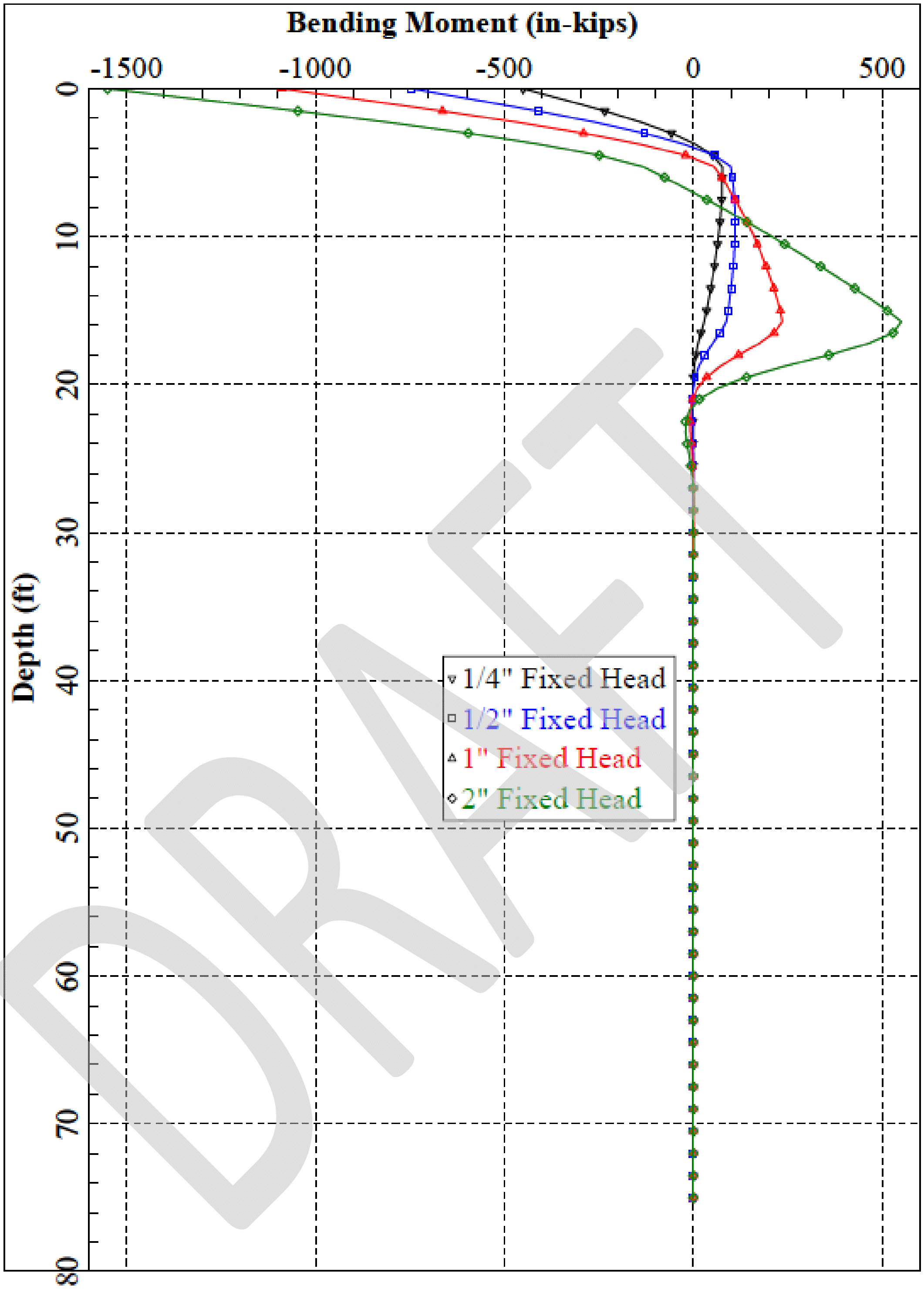
Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile Shear vs Depth (Fixed Head)	
UW IMA Pool and Locker Room Upgrades Seattle, Washington	
GeoEngineers	Figure 9



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Moment vs Depth (Fixed Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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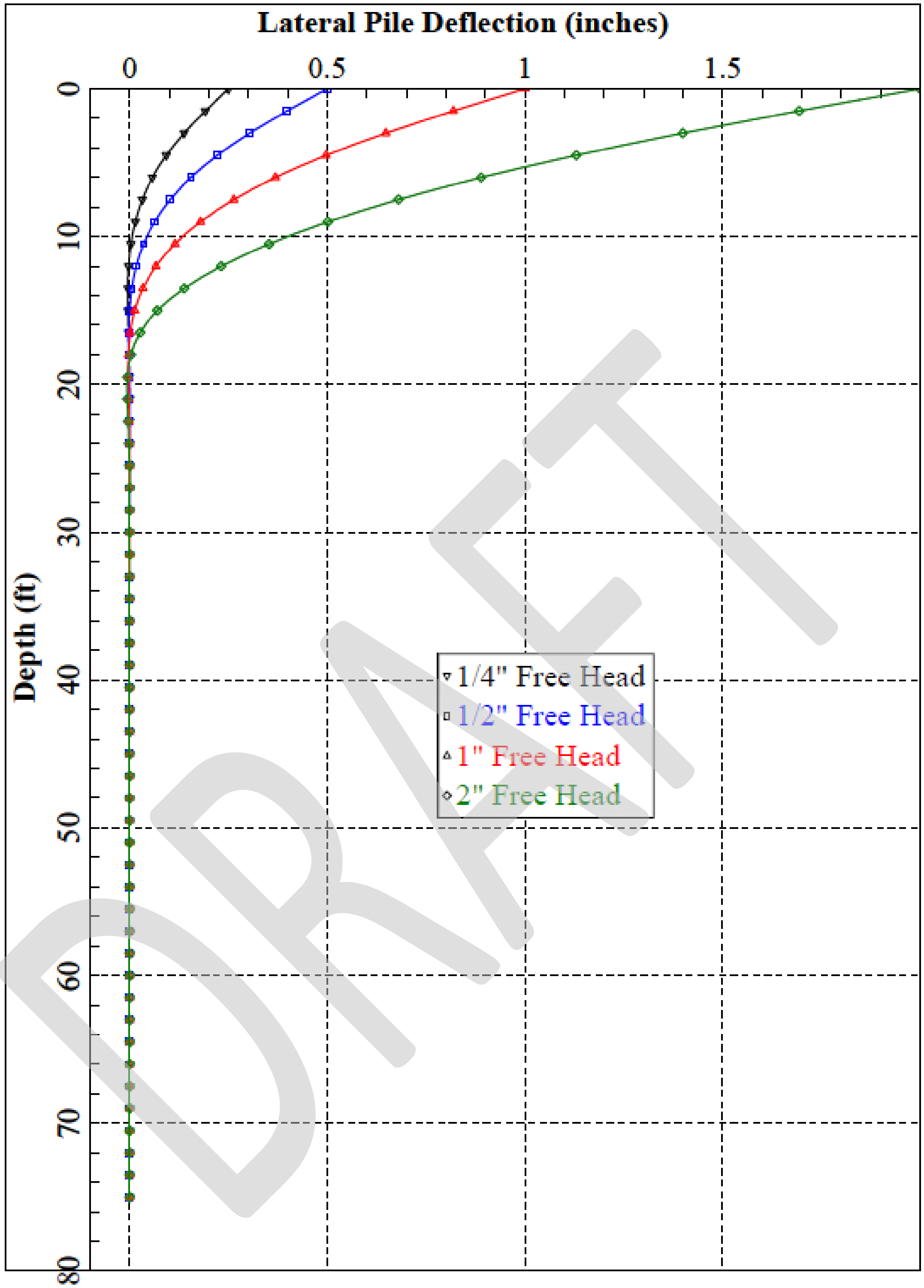
Figure 10



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile
Deflection vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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Figure 11

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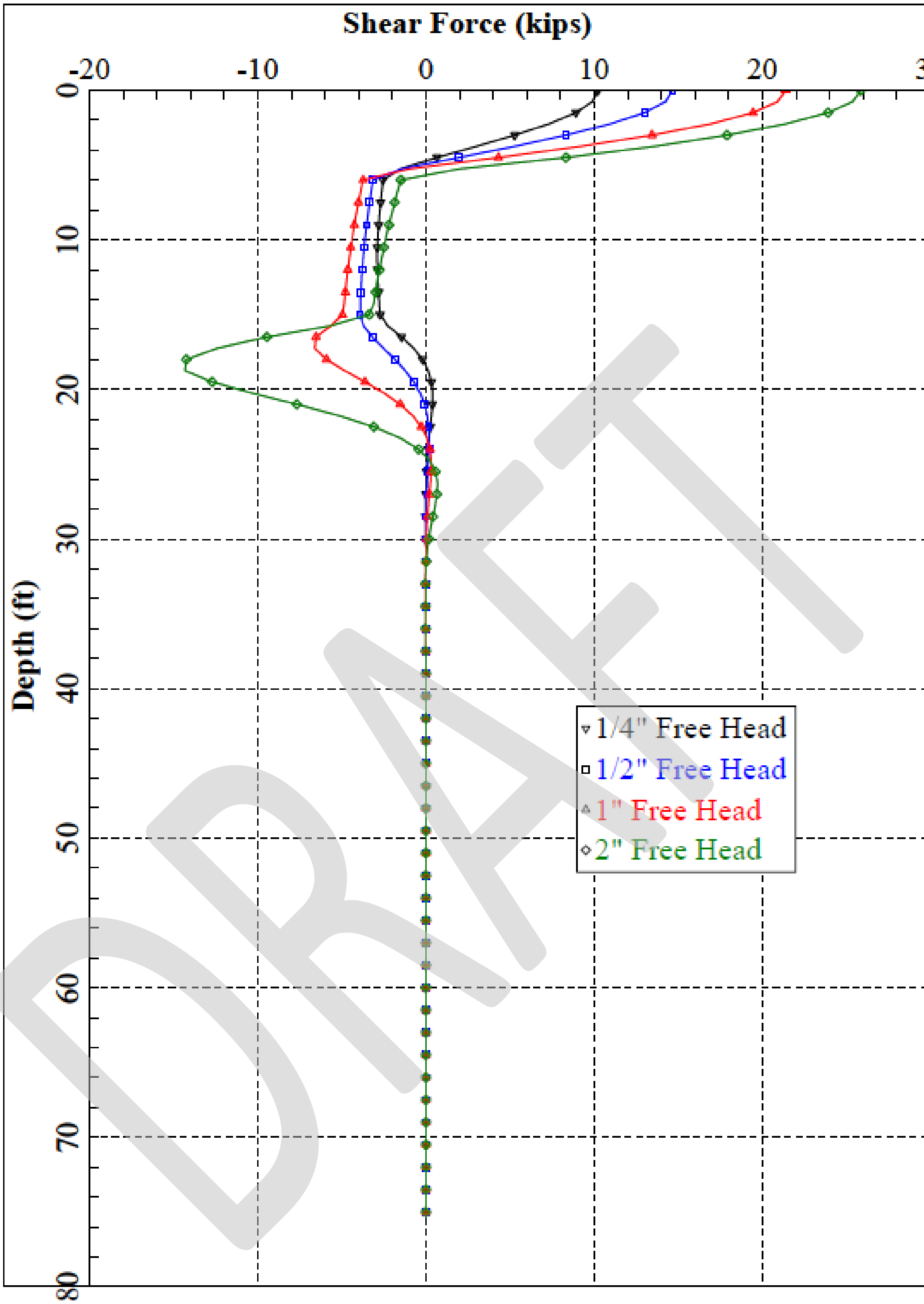

Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile
Shear vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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Figure 12

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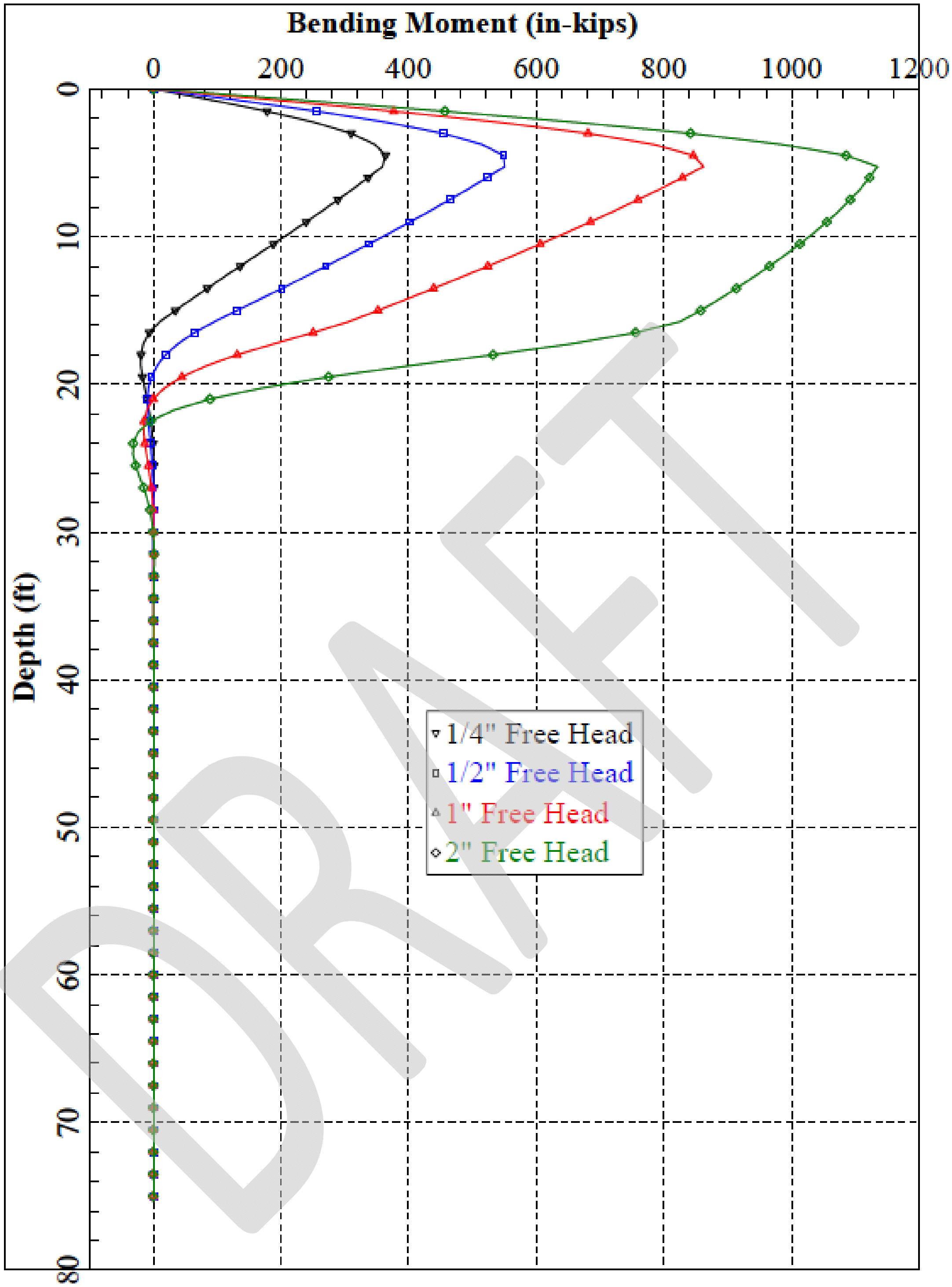
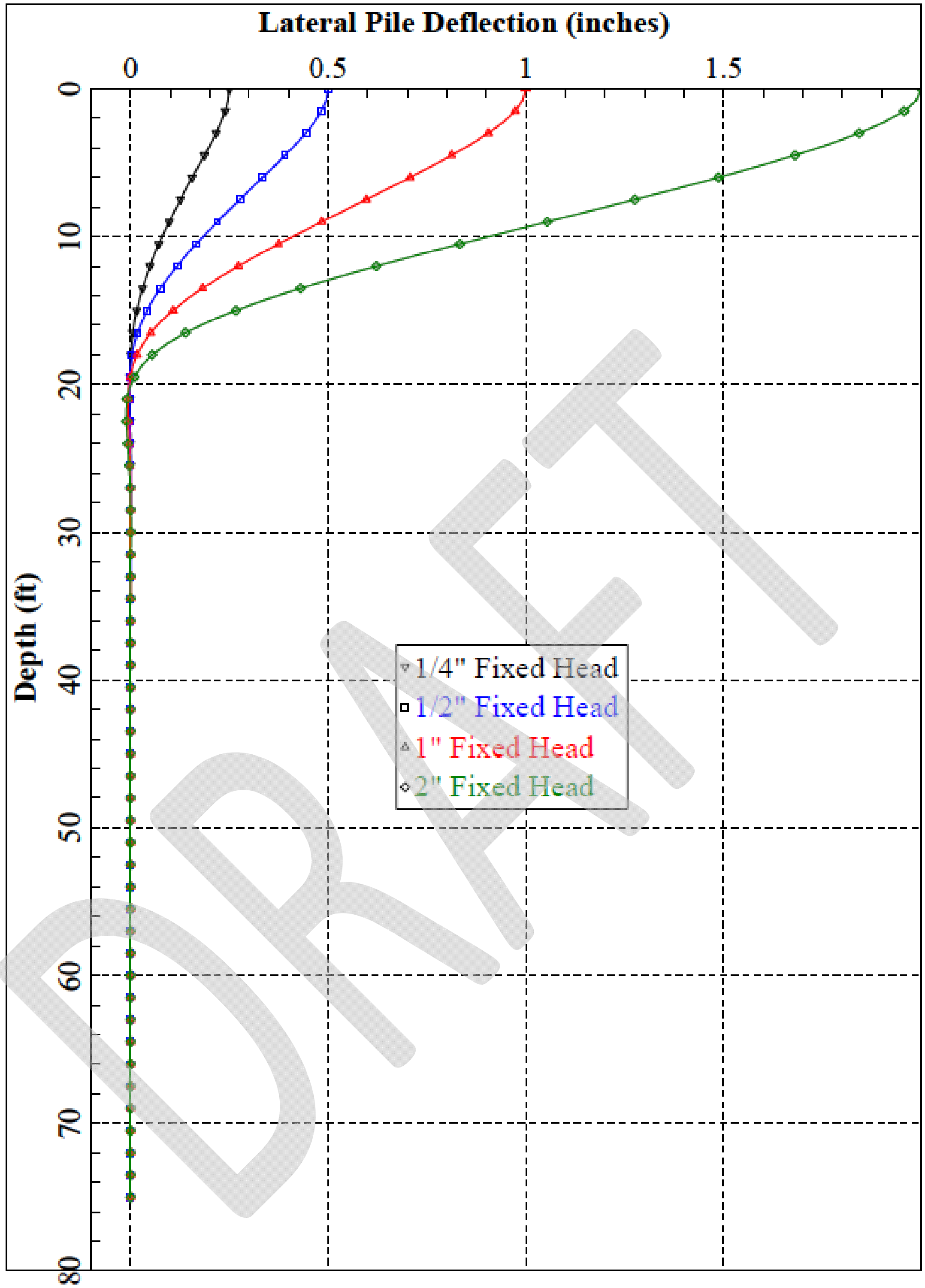


Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile Moment vs Depth (Free Head)	
UW IMA Pool and Locker Room Upgrades Seattle, Washington	
GeoEngineers	**Figure 13**

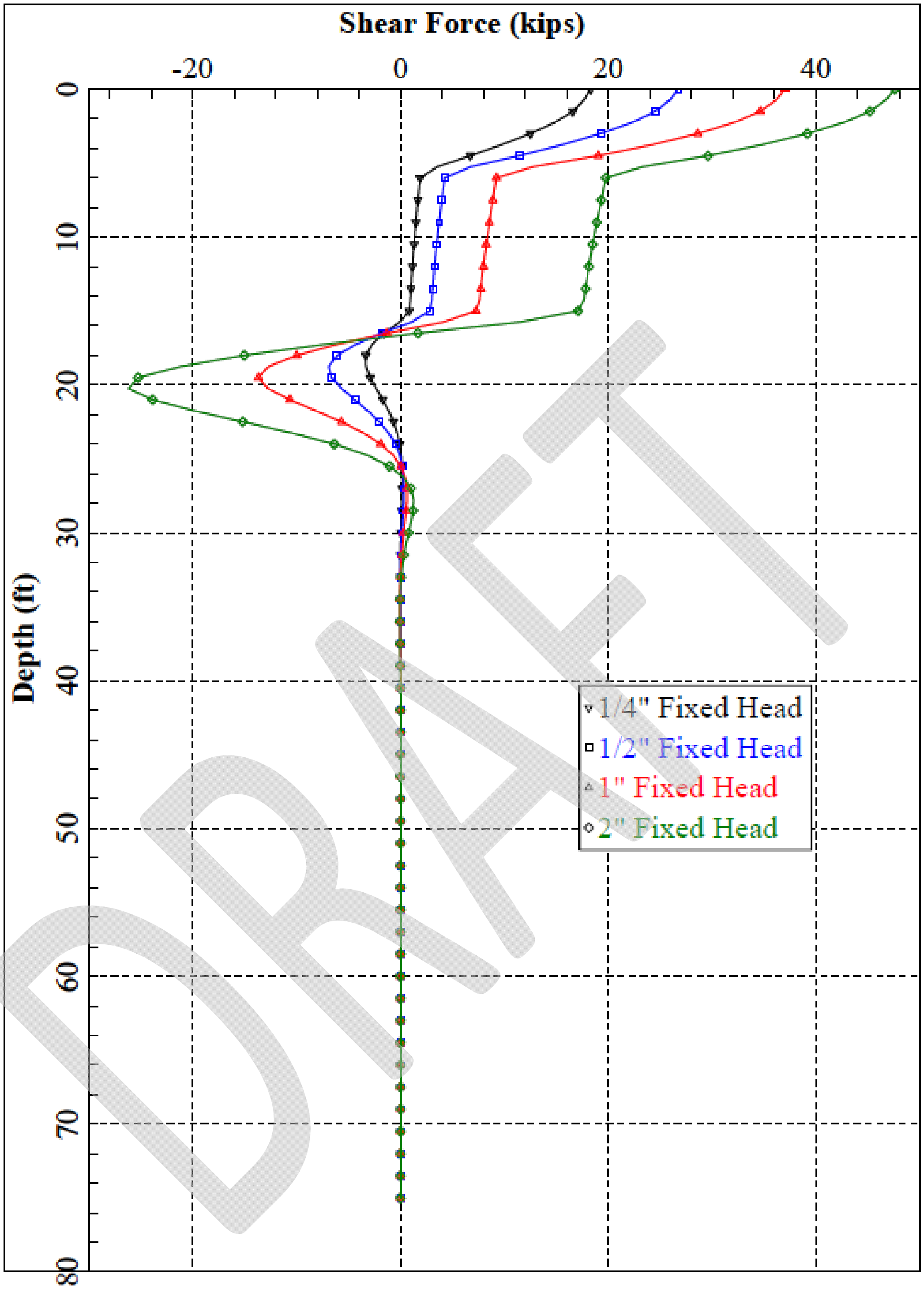


Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile Deflection vs Depth (Fixed Head)	
UW IMA Pool and Locker Room Upgrades Seattle, Washington	
GeoEngineers	**Figure 14**



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile
Shear vs Depth (Fixed Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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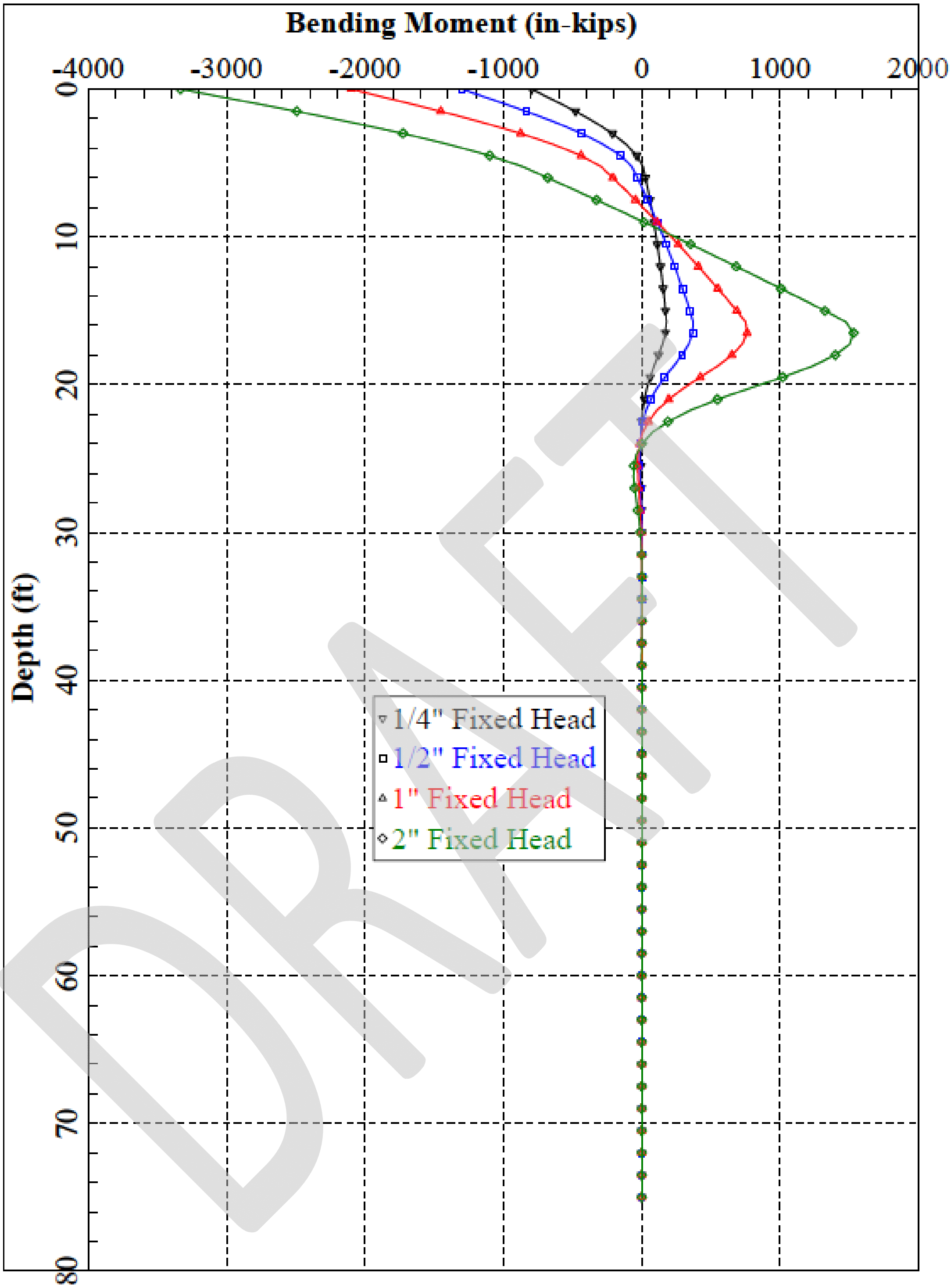
Figure 15

0183-148-00 Date Exported: 8/3/21



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile
Moment vs Depth (Fixed Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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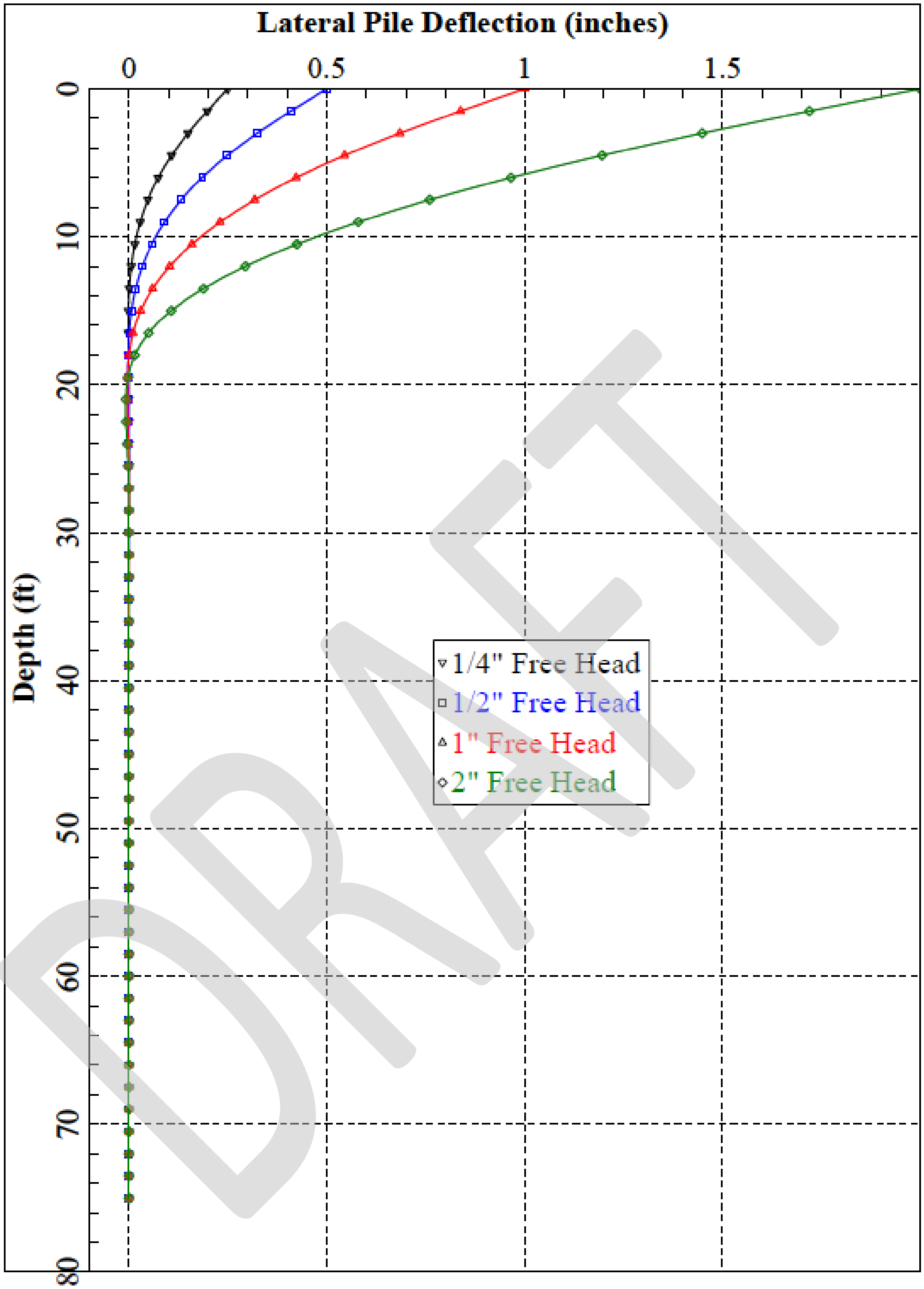
Figure 16



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

18-inch Augercast Pile
Deflection vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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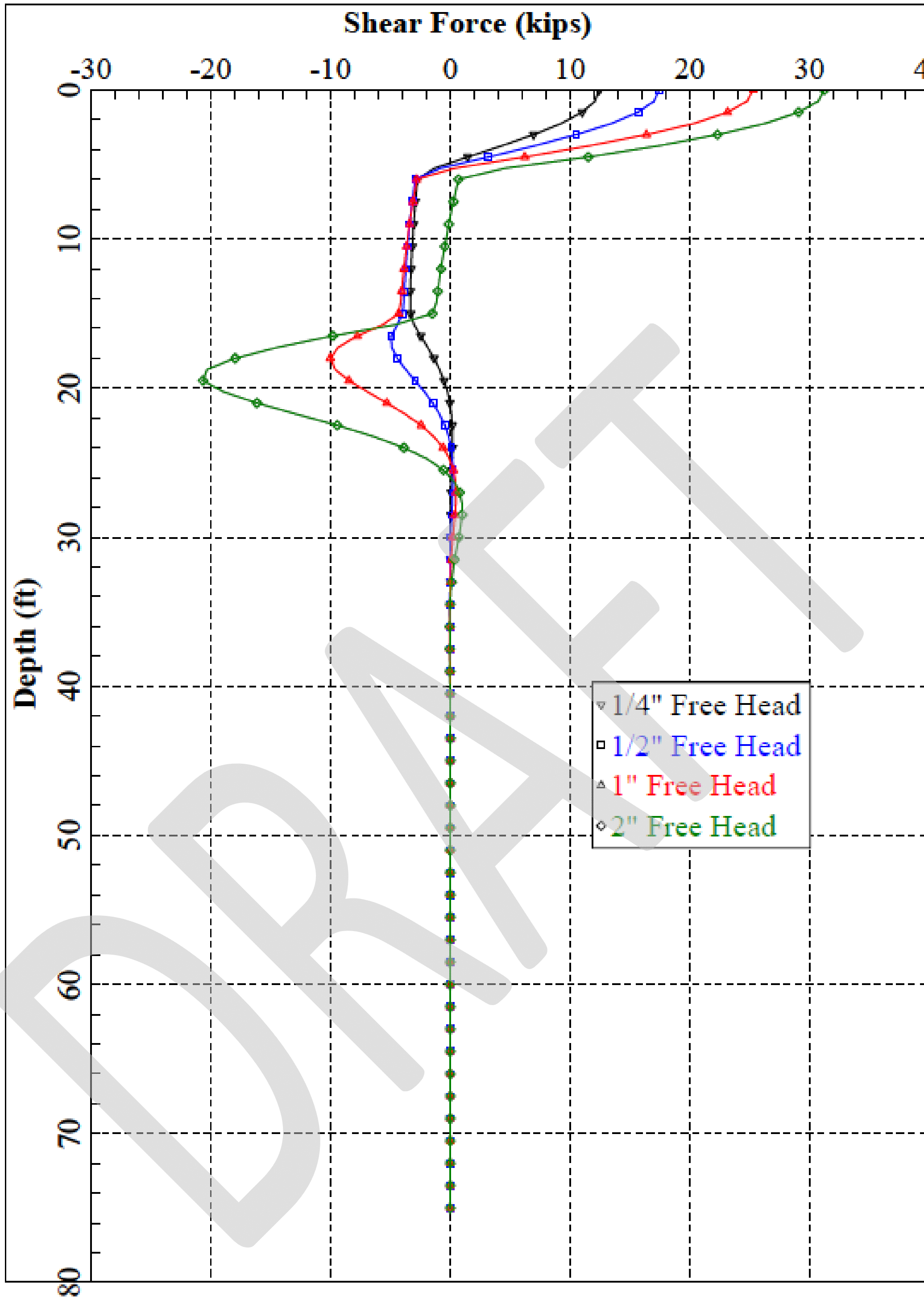
Figure 17



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

18-inch Augercast Pile
Shear vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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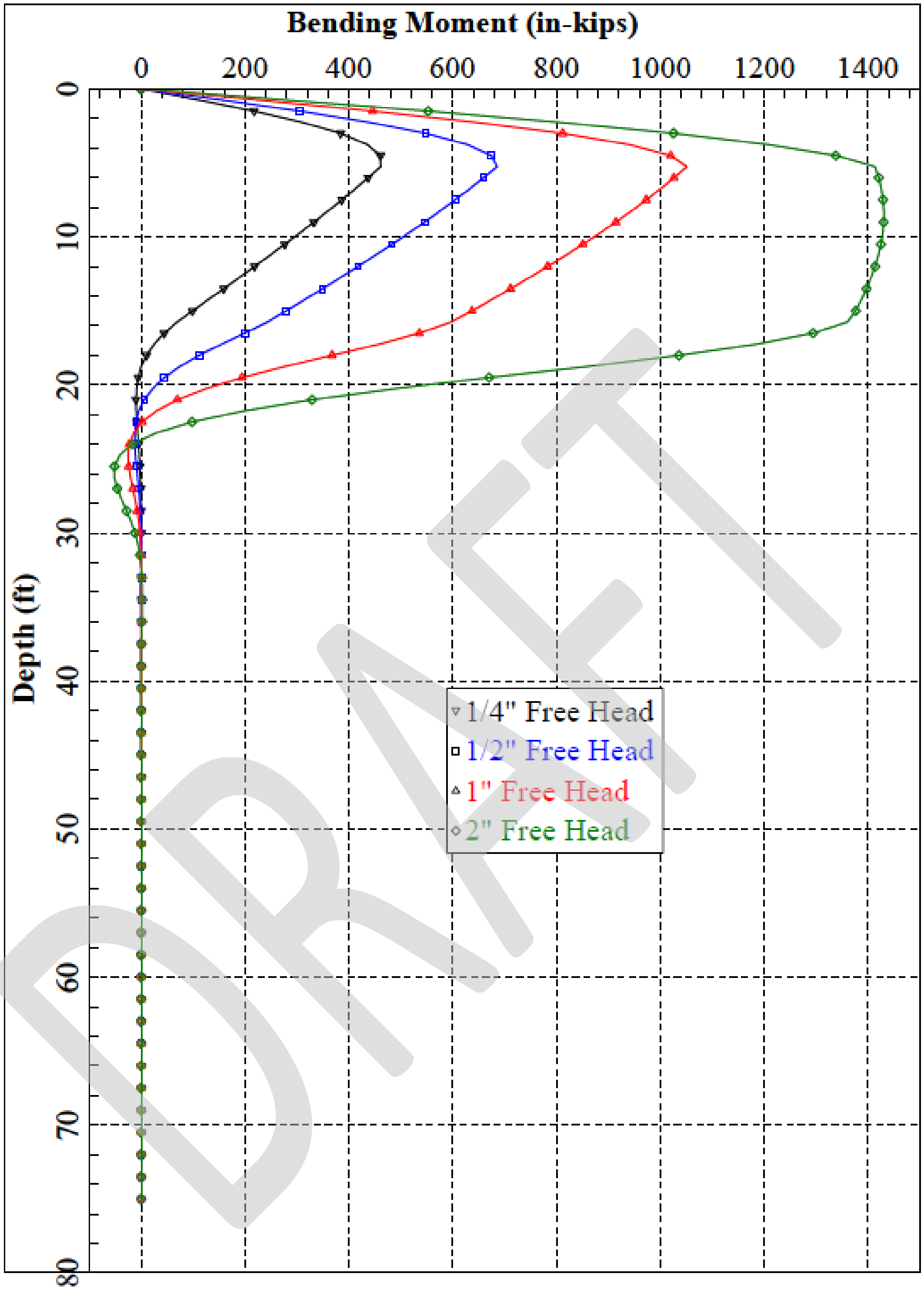
Figure 18

0183-148-00 Date Exported: 8/3/21



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

18-inch Augercast Pile
Moment vs Depth (Free Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

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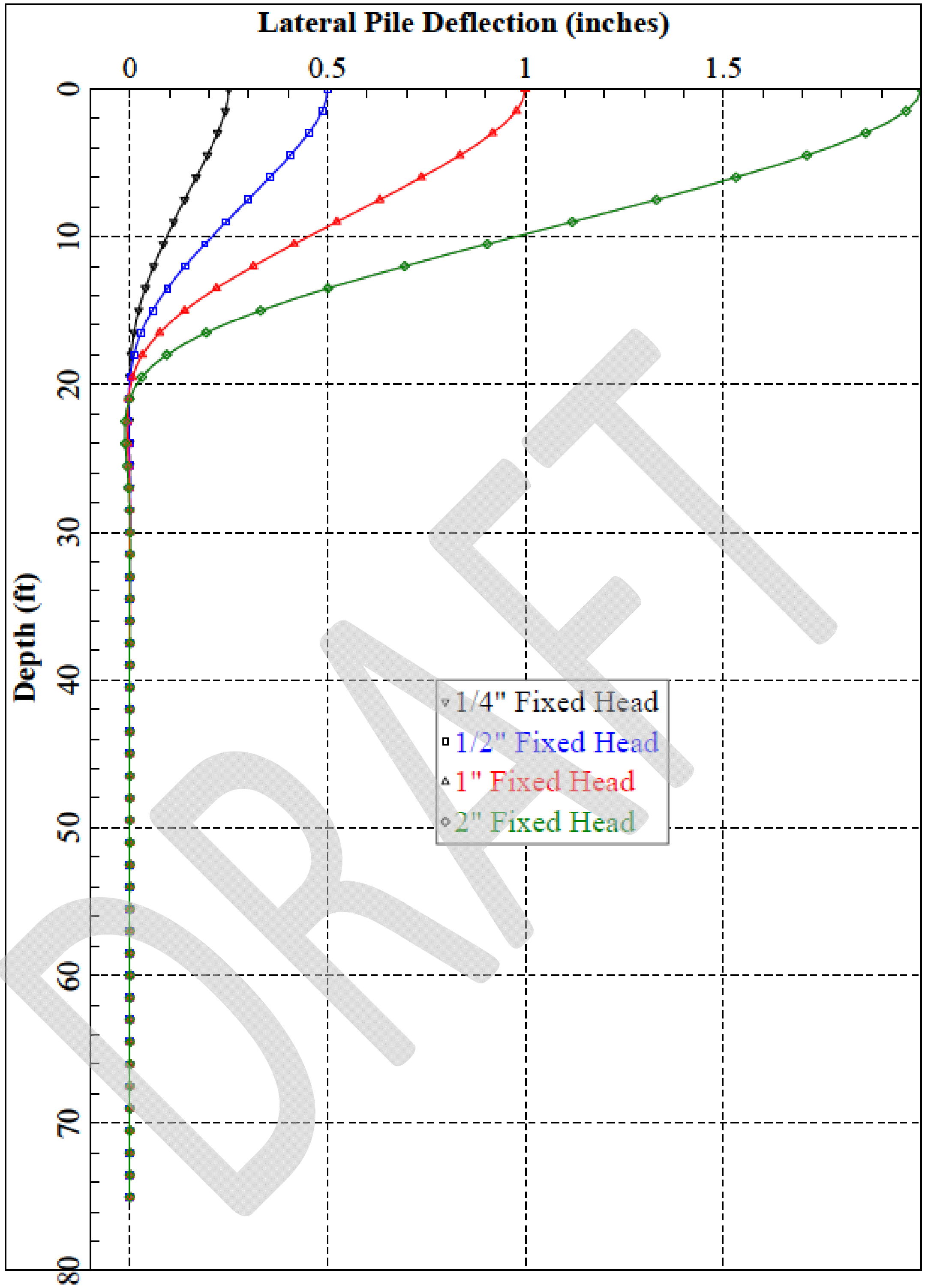
Figure 19

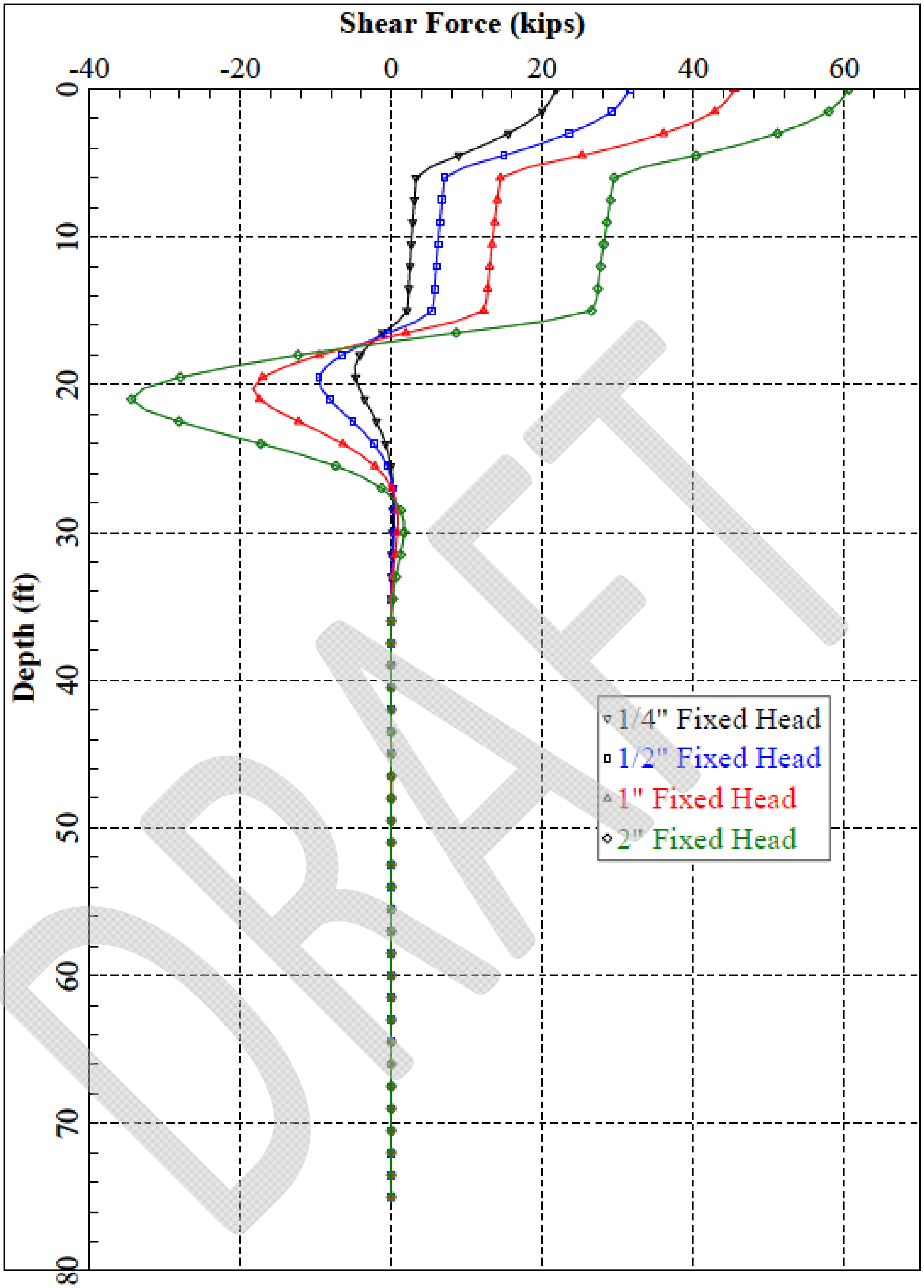


Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

18-inch Augercast Pile Deflection vs Depth (Fixed Head)	
UW IMA Pool and Locker Room Upgrades Seattle, Washington	
GeoEngineers	**Figure 20**



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Free-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

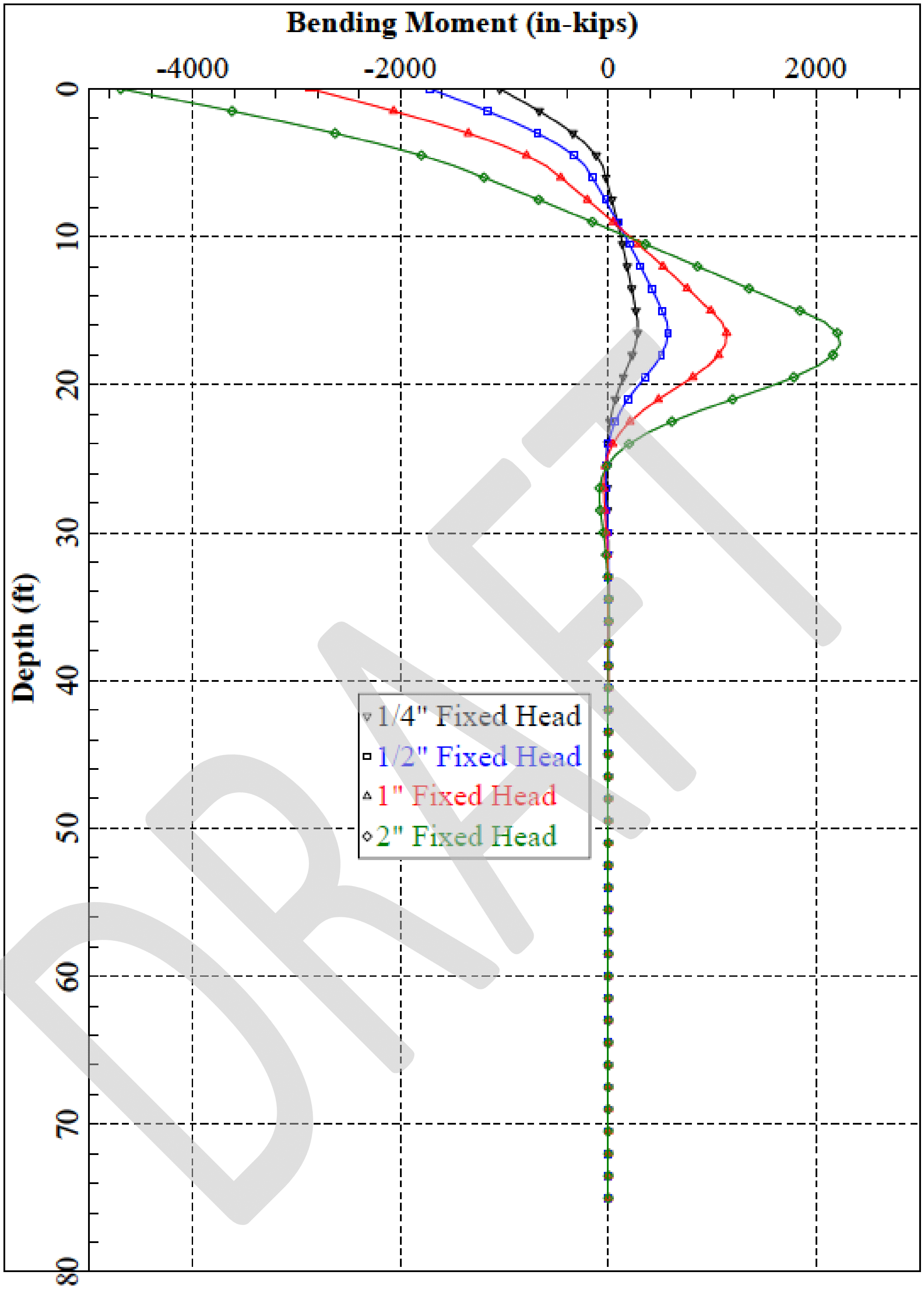
18-inch Augercast Pile
Shear vs Depth (Fixed Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

GeoEngineers

Figure 21

0183-148-00 Date Exported: 8/3/21



Notes:

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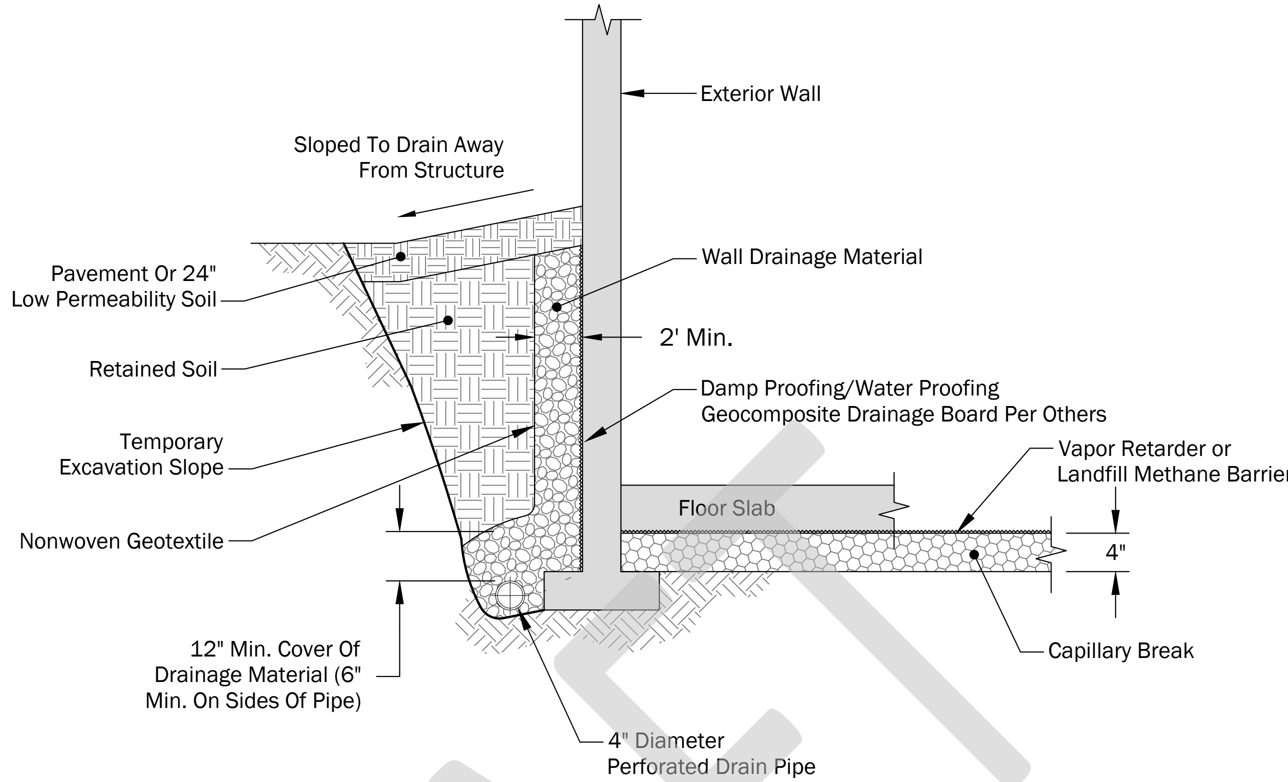
18-inch Augercast Pile
Moment vs Depth (Fixed Head)

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

GeoEngineers

Figure 22



Not To Scale

MATERIALS:

A. WALL DRAINAGE MATERIAL

Shall consist of pea gravel (Seattle Mineral Aggregate Type 9) or washed gravel (Seattle Mineral Aggregate Type 5) surrounded with a non-woven geotextile such as TenCate Mirafi 140N (or approved equivalent). Alternatively Seattle Mineral Aggregate Type 26 may be used without a geotextile fabric. However, a minimum of 12 inches of Seattle Mineral Aggregate Type 5 or Type 9 surrounded with a geotextile fabric should be used around the drain pipe with 2 inches under the pipe.

B. RETAINED SOIL

Should consist of imported structural fill, either on-site soil or imported. The backfill should be compacted in loose lifts not exceeding 6 inches. Wall backfill should consist of imported sand and gravel such as Seattle Mineral Aggregate Type 17 or WSDOT Standard Specification 9-03.14 compacted to at least 95 percent ASTM D1557. Backfill not sidewalks or pavement should be compacted to 90 to 92 percent of the maximum dry density, per ASTM D1557. Backfill supporting sidewalks or pavement areas should be compacted to at least 95 percent in the upper two feet. Only hand-operated equipment should be used for compaction within 5 feet of the walls and no heavy equipment should be allowed within 5 feet of the wall.

C. CAPILLARY BREAK

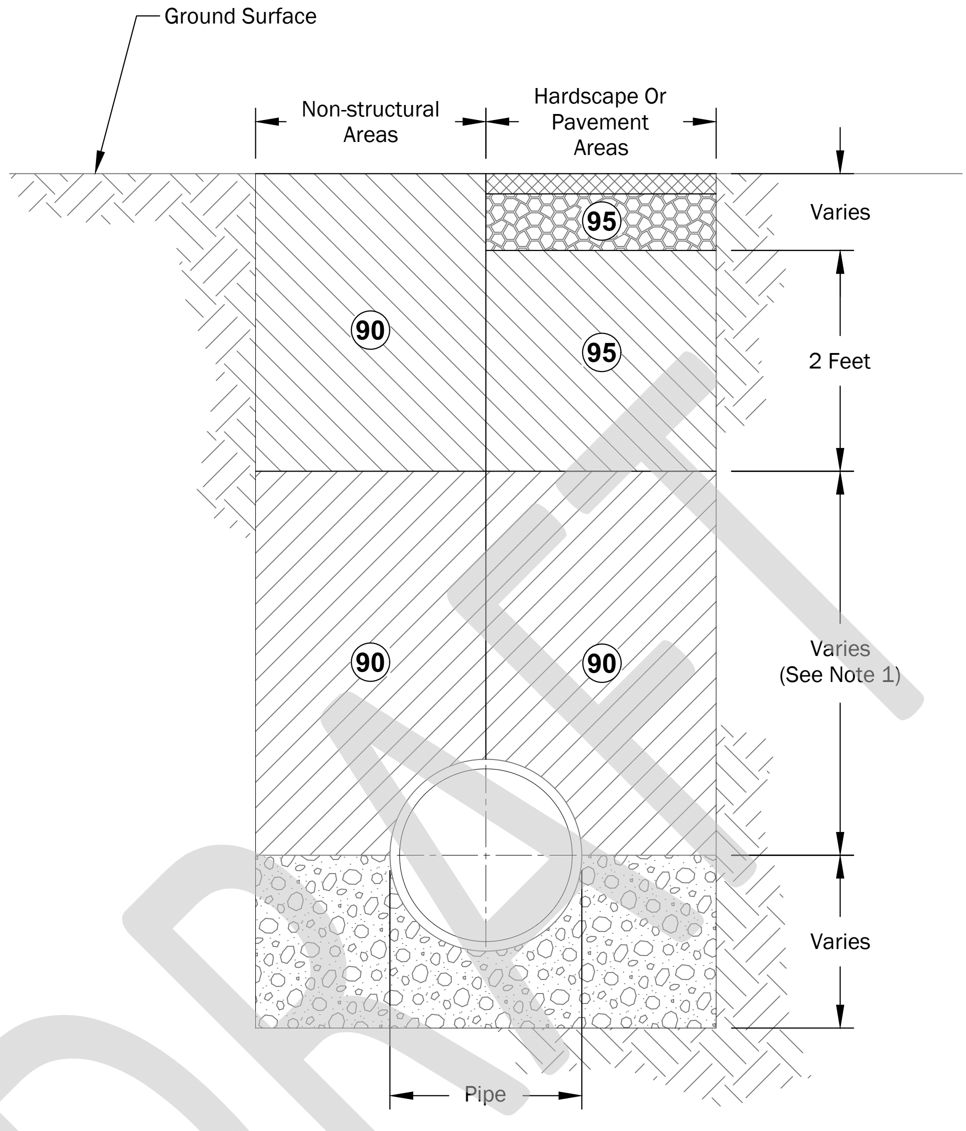
Should consist of at least 4 inches of clean crushed gravel with a maximum size of 1 inch and negligible sand or fines, such as Seattle Mineral Aggregate Type 22.

D. PERFORATED DRAIN PIPE

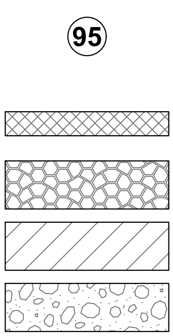
Should consist of a 4-inch diameter perforated heavy-wall solid pipe (SDR-35 PVC) or rigid corrugated polyethylene pipe (ADS N-12) or equivalent. Drain pipes should discharge to the storm water collection system.

Wall Drainage and Backfill	
UW IMA Pool and Locker Room Upgrades Seattle, Washington	
GEOENGINEERS	**Figure 23**

P:\0\0183148\CAD\00\Geotech\018314800_F04_Wall Drainage and Backfill.dwg TAB:F03 Date Exported: 08/02/21 - 13:56 by tbyrd



Legend



Recommended Compaction as a Percentage of Maximum Dry Density, by Test Method ASTM D1557 (Modified Proctor)

Concrete or Asphalt Pavement

Base Course

Trench Backfill

Pipe Bedding

Notes:

1. All backfill under building areas should be compacted to at least 95 percent per ASTM D1557.

Compaction Criteria for Trench Backfill

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

GeoEngineers

Figure 24

P:\0\0183148\CAD\00\Geotech\018314800_F06_Compaction Criteria for Trench Backfill.dwg TAB:F04 Date Exported: 08/02/21 - 14:24 by tbyrd

APPENDIX A
Field Explorations

APPENDIX A
FIELD EXPLORATIONS

Borings B-1 and B-2 were completed on June 21, 2021 at the approximate locations shown on Figure 2. The borings were advanced to depths of about 41.5 and 51.5 feet below ground surface (bgs), respectively. The borings were completed using a Diedrich D120 truck-mounted drill rig owned and operated by Holocene Drilling, Inc.

The borings were continuously monitored by a geologist from our firm who evaluated and classified the soils encountered, obtained representative soil samples, and observed groundwater conditions. Our representative maintained a detailed log of each boring. Disturbed samples of the representative soil types were obtained from the borings using standard penetration test (SPT) sampling procedures. SPT sampling was performed using a 2-inch outside diameter split-spoon sampler driven with a standard 140-pound hammer in accordance with ASTM International (ASTM) D 1586.

The soils encountered in the borings were typically sampled at 2½- to 5-foot vertical intervals with the SPT split spoon sampler. Samples were obtained by driving the sampler 18 inches into the soil with an automatic hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration is recorded. The standard penetration resistance ("N-value") of the soil is calculated as the number of blows required for the final 12 inches of penetration (blows per foot). This value is shown on the boring logs. This resistance, or N-value, provides a measure of the relative density of granular soils and the relative consistency of cohesive soils. If the high penetration resistance encountered in the very dense soils precluded driving the total 18-inch sample interval, the penetration resistance for the partial penetration is entered on logs as follows: if the penetration is greater than 6 inches and less than 18 inches, then the number of blows is recorded over the number of inches driven; 30 blows for 6 inches and 50 for 3 inches, for instance, would be recorded as 80/9". The blow counts are shown on the boring logs at the respective sample depths. The SPT is a useful quantitative tool from which soil density/consistency was evaluated.

Soils encountered in the borings were classified in the field in general accordance with ASTM D 2488, the Standard Practice for Classification of Soils, Visual-Manual Procedure, which is summarized in Figure A-1. Logs of the borings are provided in Figures A-2 and A-3.

Boring locations were determined in the field by measuring from physical features on site. Boring locations should be considered accurate to the degree implied by the method used. Ground surface elevations at the boring locations were determined from Google Earth and a 2016 Lidar map of King County.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- 2.4-inch I.D. split barrel
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

GEOENGINEERS

Figure A-1

Rev 09/2020

Drilled — Start: 6/21/2021; End: 6/21/2021	Total Depth (ft): 41.5	Logged By: ND; Checked By: CWM	Driller: Holocene Drilling, Inc.
Drilling Method: Hollow-stem Auger	Surface Elevation (ft): 36; Vertical Datum: NAVD88	Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment: Diedrich D120 truck-mounted drill rig
Easting (X): 1278599; Northing (Y): 241706	System Datum: WA State Plane North NAD83 (feet)	See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Sample Name / Testing	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
35	0			1 / SA	AC	Approximately 4 inches asphalt pavement	8	16	No sheen
					SM	Gray and brown silty fine to coarse sand with gravel (very loose, moist) (fill)			
		3	2	2 / MC			9		No sheen
					SM	Brown silty fine to medium sand with gravel (loose, moist)			
30	5	4	6	3 / MC			12		No sheen
					SM	Brown silty fine sand (medium dense, moist)			
		18	20	4A					No sheen
				4B	CL	Gray lean clay (very stiff, moist) (pre-fraser glaciation deposits)			No sheen
					CL	Gray-brown lean clay with sand (hard, moist)			
25	10	18	39	5 / AL			19		AL (LL = 37; PI = 17) No sheen
					SM	Brown/gray silty fine to medium sand (very dense, moist)			
20	15	18	50/6"	6					No sheen
					SM	Gray silty fine to medium sand (dense, moist)			
15	20	18	41	7 / %F			15	18	Groundwater observed from 20 to 25 feet below ground surface during drilling No sheen
					SP	Gray fine to medium sand (dense, moist to wet)			
10	25	18	25*	8A / %F 8B			19	5	No sheen Driller noted about 1 to 2 feet of heave; water added in attempt to control heave *Blow counts understated due to heave
					CL	Gray lean clay (hard, moist)			
5	30	18	67	9A 9B / AL			24		AL (LL = 42; PI = 18)
	35								

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Aerial Imagery.

Log of Boring B-1

GeoEngineers

Project: UW IMA Pool and Locker Room Upgrades
Project Location: Seattle, Washington
Project Number: 0183-148-00

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
0	35		11	52		10						
								ML	Gray sandy silt (hard, moist)			
-5	40		18	60		11						

Log of Boring B-1 (continued)

GeoEngineers

Project: UW IMA Pool and Locker Room Upgrades
Project Location: Seattle, Washington
Project Number: 0183-148-00

Figure A-2
Sheet 2 of 2

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/21/2021	6/21/2021	51.5	ND	CWM	Holocene Drilling, Inc.	Hollow-stem Auger

Surface Elevation (ft) Vertical Datum	36 NAVD88	Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D120 truck-mounted drill rig
Easting (X) Northing (Y)	1278738 241678	System Datum	WA State Plane North NAD83 (feet)	See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0							AC	Approximately 4 inches asphalt pavement			
35						1 / SA		SM	Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)	8	24	No sheen
			6	13		2 / MC		SM	Brown silty fine to medium sand with occasional gravel (medium dense, moist)	11		No sheen
30	5		18	20		3 / %F		SM	Brown silty fine to medium sand (medium dense, moist)	14	46	No sheen
			18	14		4						No sheen
25	10		18	17		5						No sheen
								SM	Brown silty fine sand with occasional gravel (dense, moist) (pre-fraser glaciation deposits)			
20	15		18	35		6						No sheen
								ML	Gray silt with occasional sand and gravel (hard, moist)			Hard drilling
15	20		18	42		7						No sheen
								SP	Gray fine to medium sand (very dense, wet)			
10	25		0	50/4"		8						
			6	50/2"		9 / %F				16	5	Groundwater observed at approximately 25 feet below ground surface during drilling
5	30		3	50/3"		10			With gravel			
								ML	Gray silt with sand and occasional gravel (hard, moist)			
	35											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Aerial Imagery.

DRAFT

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Log of Boring B-2

GeoEngineers

Project: UW IMA Pool and Locker Room Upgrades
Project Location: Seattle, Washington
Project Number: 0183-148-00

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
0	35	X	12	50/6"		11						
								SP-SM	Gray fine to medium sand with silt (very dense, moist)			
-5	40	X	18	50/5"		12 / %F				16	7	Driller noted about 3 to 4 feet of heave; water added in attempt to control heave
								SP	Gray fine to medium sand (dense, moist)			
-10	45	X	18	30*		13 / %F				18	5	*Blow counts understated due to heave
-15	50	X	18	44		14						

Log of Boring B-2 (continued)

GeoEngineers

Project: UW IMA Pool and Locker Room Upgrades
Project Location: Seattle, Washington
Project Number: 0183-148-00

APPENDIX B
Laboratory Testing

APPENDIX B
LABORATORY TESTING

Soil samples obtained from the borings were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate engineering properties of the soil. Representative samples were selected for laboratory testing that consisted of moisture content determinations, percent fines, sieve analyses, and Atterberg limits. The tests were performed in general accordance with test methods of the ASTM International (ASTM) or other applicable procedures.

Soil Classifications

All soil samples obtained from the borings were visually classified in the field and/or in our laboratory using a system based on the Unified Soil Classification System (USCS) and ASTM classification methods. ASTM test method D 2488 was used to visually classify the soil samples, while ASTM D 2487 was used to classify the soils based on laboratory tests results. These classification procedures are incorporated in the boring logs shown in Figures A-2 and A-3, in Appendix A.

Moisture Content Determinations

Moisture contents were determined in general accordance with ASTM D 2216 for numerous samples obtained from the borings. The results of these tests are presented on the exploration logs at the respective sample depth in Appendix A.

Percent Passing U.S. No. 200 Sieve (%F)

Selected samples were "washed" through the U.S. No. 200 mesh sieve to estimate the relative percentages of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve. These tests were conducted to verify field descriptions and to estimate the fines content for analysis purposes. The tests were conducted in accordance with ASTM D 1140, and the results are shown on the exploration logs in Appendix A at the respective sample depths.

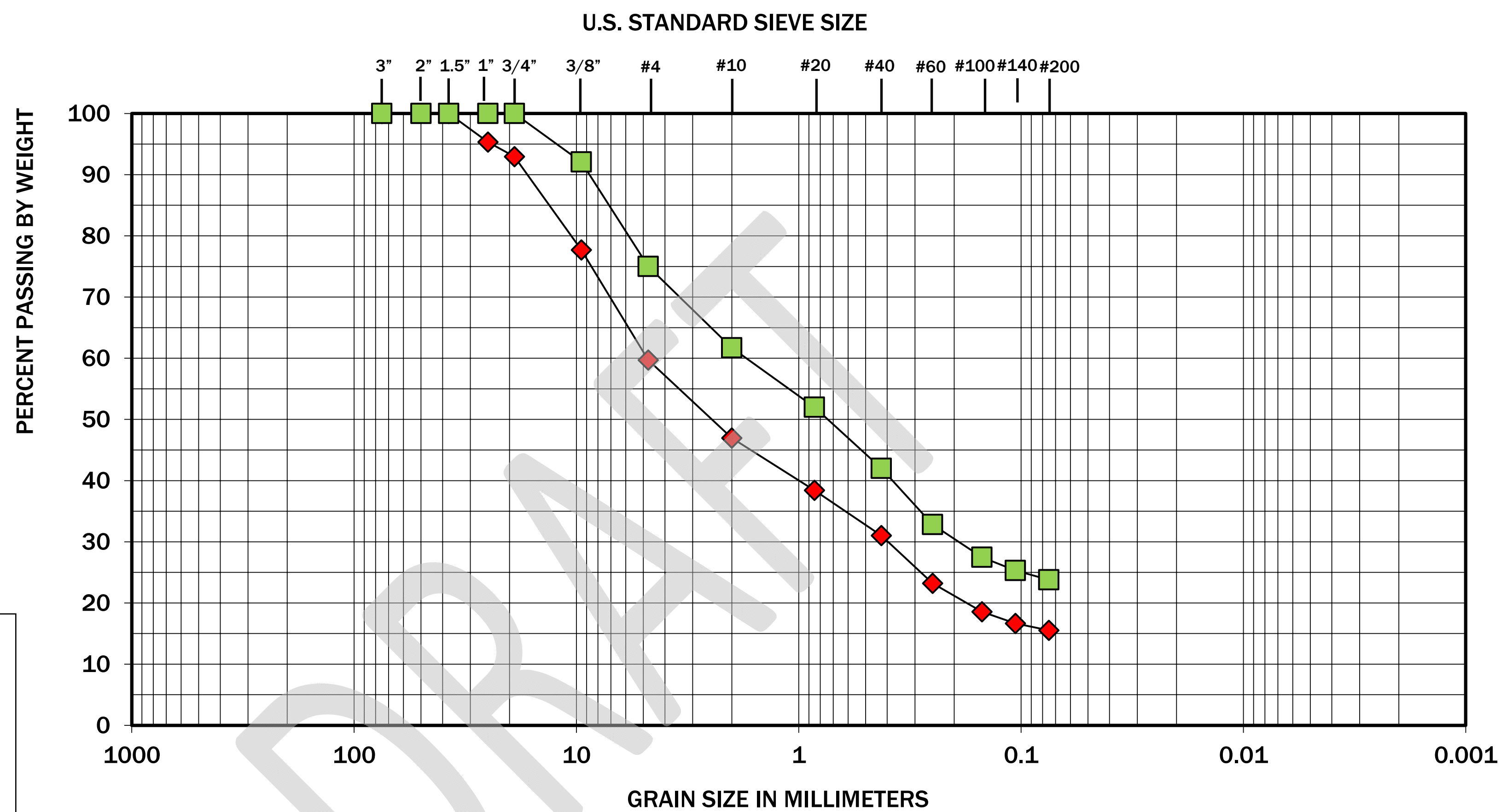
Sieve Analysis

Sieve analyses were performed on selected samples obtained from the borings. The analyses were conducted in general accordance with ASTM C 136. The wet sieve analysis method was used to determine the percentage of soil greater than the U.S. No. 200 mesh sieve. The results of the sieve analyses were plotted, classified in general accordance with the USCS, and presented in in Figure B-1.

Atterberg Limits Testing

Atterberg limits testing was performed on selected fine-grained soil samples. The tests were used to classify the soil as well as to evaluate index properties. The liquid limit and the plastic limit were estimated through a procedure performed in general accordance with ASTM D 4318. The results of the Atterberg limits testing are presented in Figure B-2.

0183-148-00 Date Exported: 07/02/2021



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	B-1	0.5	8	Silty fine to coarse sand with gravel (SM)
■	B-2	0.5	8	Silty fine to coarse sand with gravel (SM)

AASHTO ACCREDITED

The grain size analysis results were obtained in general accordance with ASTM C 136. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

GEOENGINEERS

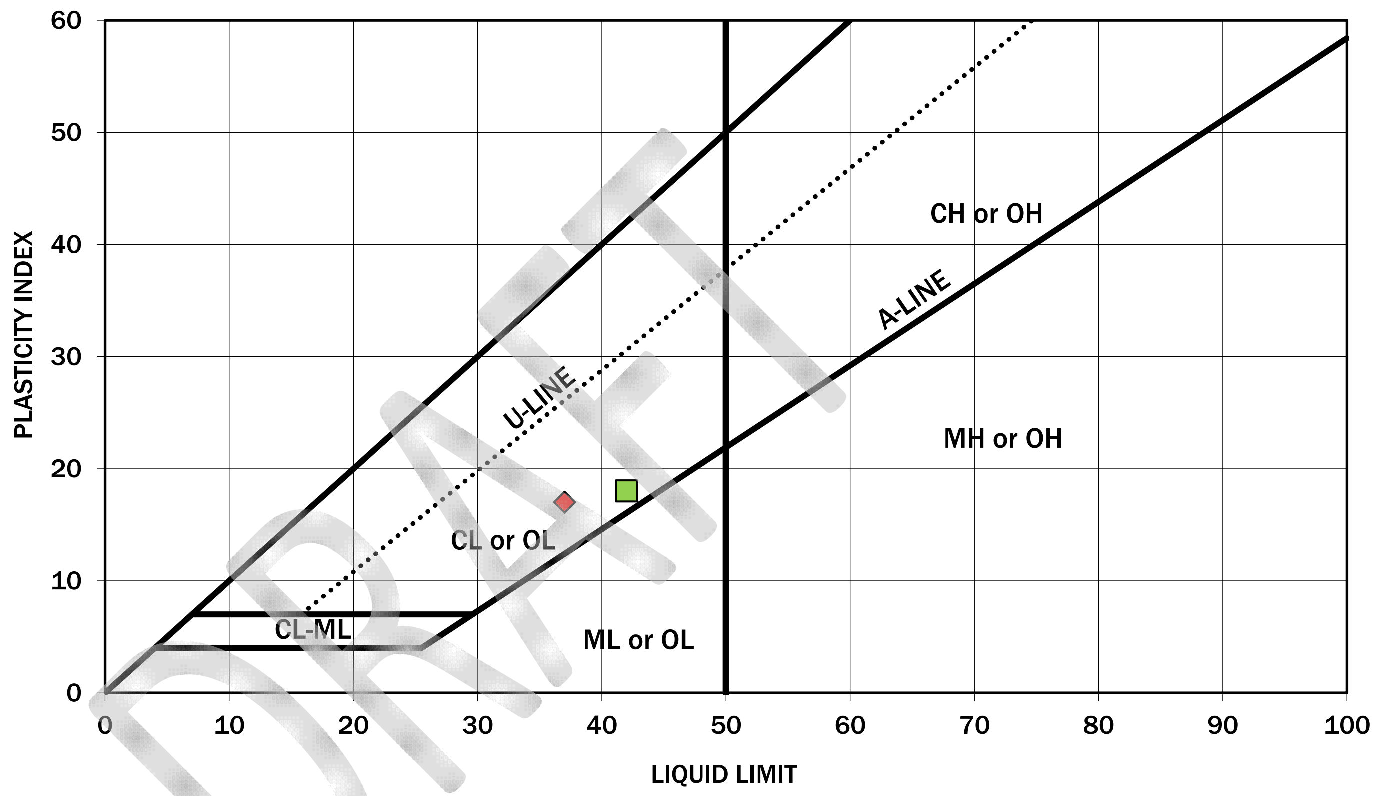
UW IMA Pool and Locker Room Upgrades
Seattle, Washington

Sieve Analysis Results

Figure B-1

0183-148-00 Date Exported: 07/02/2021

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆ (red)	B-1	10	19	37	17	Lean clay with sand (CL)
■ (green)	B-1	30	24	42	18	Lean clay (CL)

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Atterberg Limits Test Results

UW IMA Pool and Locker Room Upgrades
Seattle, Washington

GeoEngineers

Figure B-2

APPENDIX C
Boring Logs from Previous Studies

APPENDIX C
EXPLORATION LOGS FROM PREVIOUS STUDIES

Appendix C includes exploration logs from the following previous studies completed in the immediate vicinity of the project site.

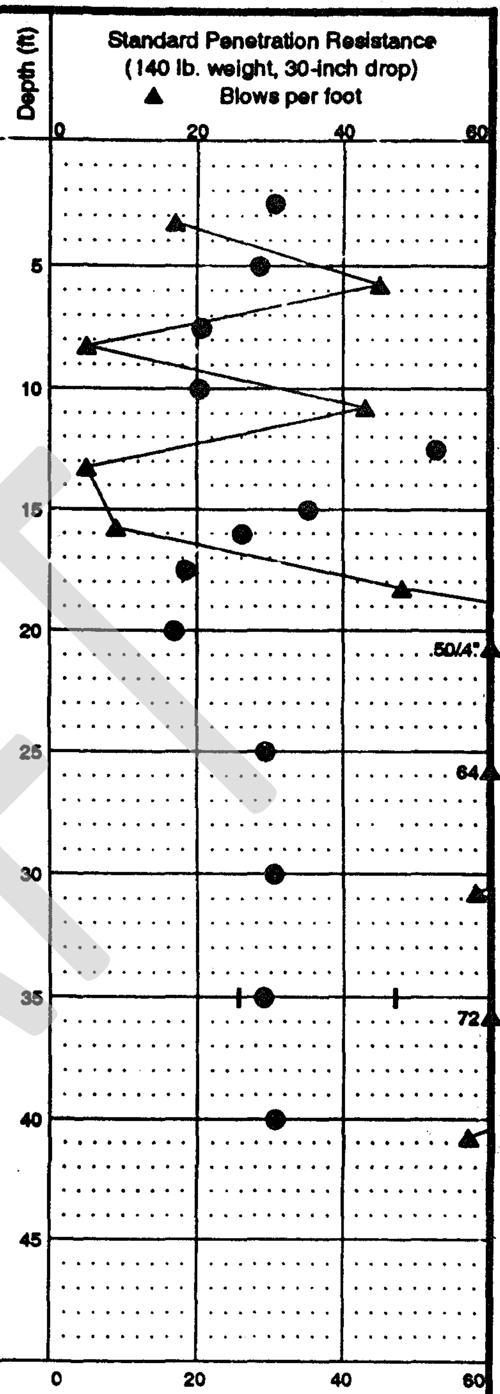
- Shannon and Wilson, Inc. 2001. "Geotechnical Report, Intramural Activities Building Expansion, University of Washington, Seattle, Washington" dated February 5, 2001.
- Hart Crowser and Associates, Inc. 1981. "Soils Report, 3972 Montlake Blvd. NE" dated July 1981.
- Shannon and Wilson, Inc. 1968. "Proposed Tennis Courts, Intramural Project Area, University of Washington" dated April 29, 1968.
- Dames and Moore, 1965. "Intramural Athletics Building" dated July 25, 1965.
- Shannon And Wilson, Inc. 1962. "Foundation Investigation, Proposed Athletic Department Office Building, University of Washington" dated July 1962.

SOIL DESCRIPTION	Depth (ft)
Surface Elevation: Approx. 28 Ft.	
GRASS and TOPSOIL	0.5
Medium dense to dense, gray and brown, silty, fine SAND; moist to wet; trace gravel, mottled with wood, glass, plastic; (Fill) SM.	13.0
Soft, dark gray to black, fibrous PEAT and WOOD mixed with clayey SILT; moist; PT.	15.5
Dense to very dense, gray, slightly gravelly, silty, fine to medium SAND; moist; wet at 16 feet with interbedded silt seams; SM.	23.0
Hard, gray, silty CLAY; moist; massive to faintly laminated; occasional slickensides; CL.	41.5
BOTTOM OF BORING COMPLETED 2/18/99	

Symbol | Samples | Ground Water | Depth (ft)

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Ground Water: During Drilling ∇



LEGEND

- • Sample Not Recovered
- 2-inch O.D. Split Spoon Sample
- 3-inch O.D. Shelby Tube Sample
- ∇ Ground Water Level ATD

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of the subsurface materials.
3. Groundwater level, if indicated above, is for the date specified and may vary.
4. Refer to KEY for explanation of "Symbols" and definitions.
5. USCS designation is based on visual-manual classification and selected laboratory index testing.

Intramural Activities Building Expansion
University of Washington
Seattle, Washington

LOG OF BORING B-1

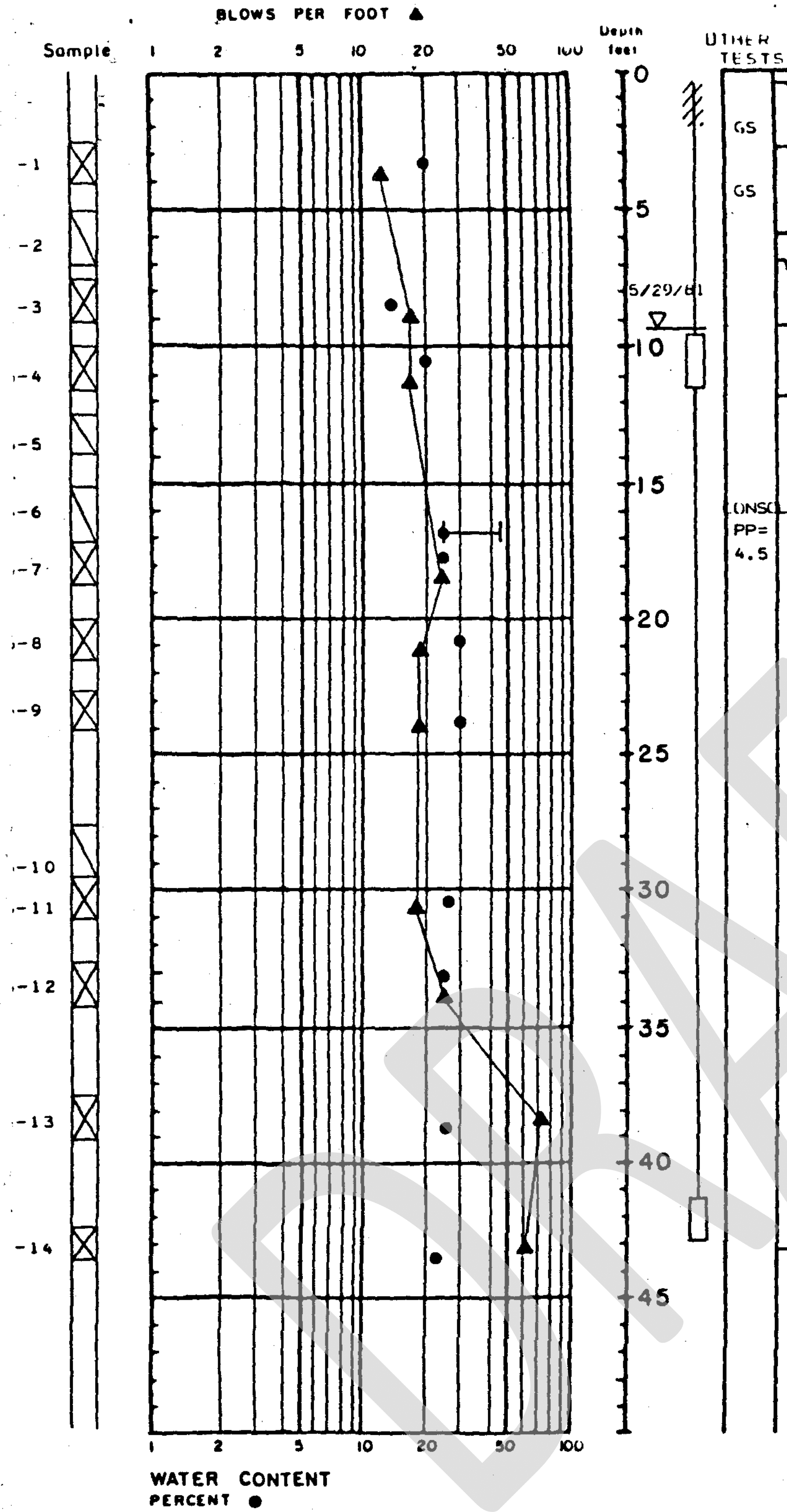
January 2001 W-8564-01

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-2

MASTER_LOG W8564-01.GPJ SHAN_WIL.GDT 1/30/01 Log: BMR Rev: Typ: PEC

B-1-01



GROUND SURFACE ELEVATION APPROXIMATELY 24 FEET ±

ASPHALT

SOFT, WET, BROWN & GRAY MOTTLED SILT WITH OCCASIONAL SCATTERED ORGANICS, SANDY ZONES (FILL)

MEDIUM DENSE, DAMP, GRAY TO BROWN, CLAYEY, VERY SILTY, FINE TO MEDIUM SAND (FILL)

MEDIUM, DENSE, DAMP, BROWN, VERY SANDY SILT WITH TRACES OF GRAVEL (PROBABLE FILL).

DRILL ACTION INDICATES GRAVELLY ZONE.

MEDIUM DENSE SATURATED BROWN, SLIGHTLY SILTY FINE TO MEDIUM SAND.

VERY STIFF, DAMP, GRAY, VERY SILTY CLAY.

BECOMES HARD.

BOTTOM OF BORING AT 43.5 FEET.
COMPLETED 5/18/81.

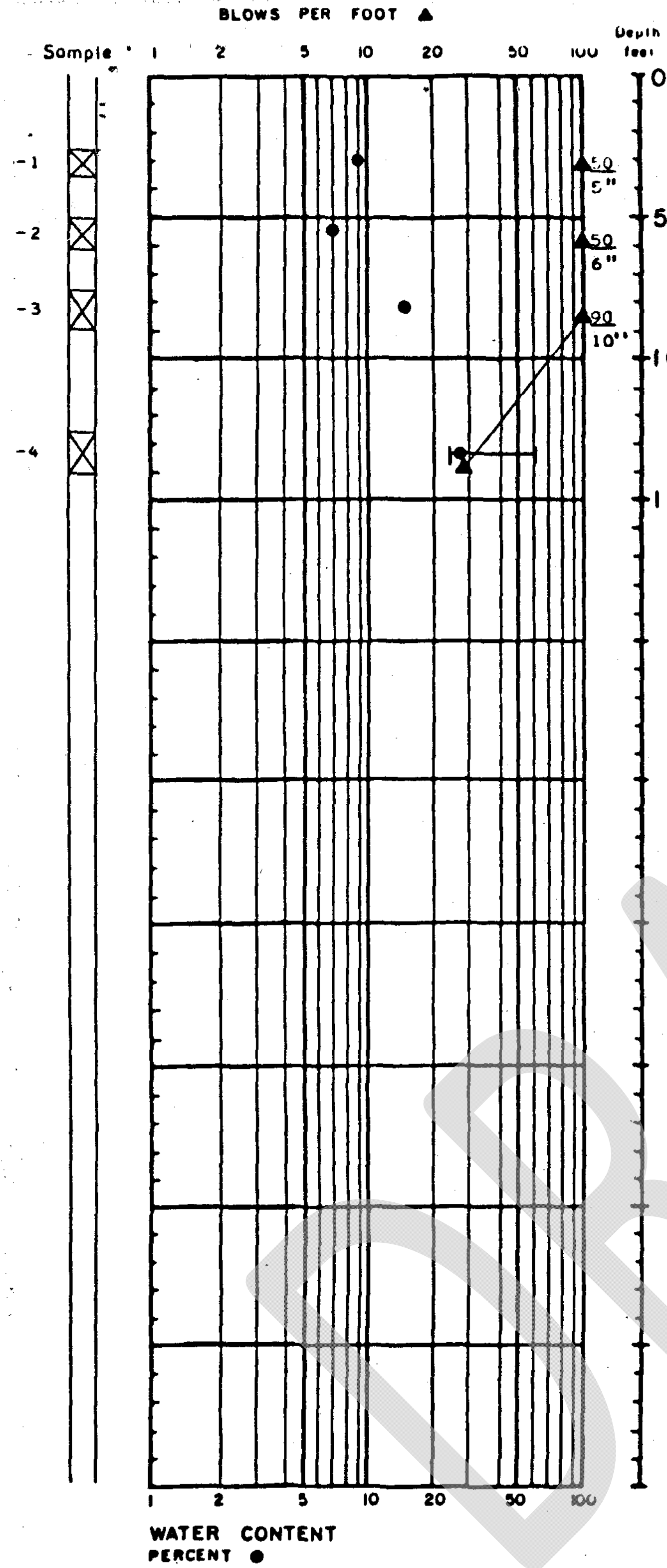
LEGEND

- 2" O.D. Split Spoon Sample
- 3" O.D. Shelby Sample
- No Sample Recovery
- Bentonite Seal
- ATD Water Level (At Time of Drilling)
- Observation Well
- Liquid Limit
- Plastic Limit
- PP Pocket Penetrometer (tsf)
- tv Torvane (tsf)
- GS Grain Size Analysis

NOTE: Soil descriptions are interpretive and actual changes may be gradual.

J-1027 July 1981
HART-CROWSER & associates inc.
Figure A-2 B-2

B-2-81



GROUND SURFACE ELEVATION APPROXIMATELY 24 FEET ± 1 FT.

ASPHALT AND BASE COARSE.

VERY DENSE, DAMP, GRAY, SILTY, GRAVELLY SAND (GLACIAL TILL).

VERY STIFF, DAMP, GRAY, VERY SILTY CLAY.

BOTTOM OF BORING AT 14.0 FEET.
COMPLETED 5/19/81.

LEGEND

2" O.D. Split Spoon Sample
3" O.D. Shelby Sample
No Sample Recovery

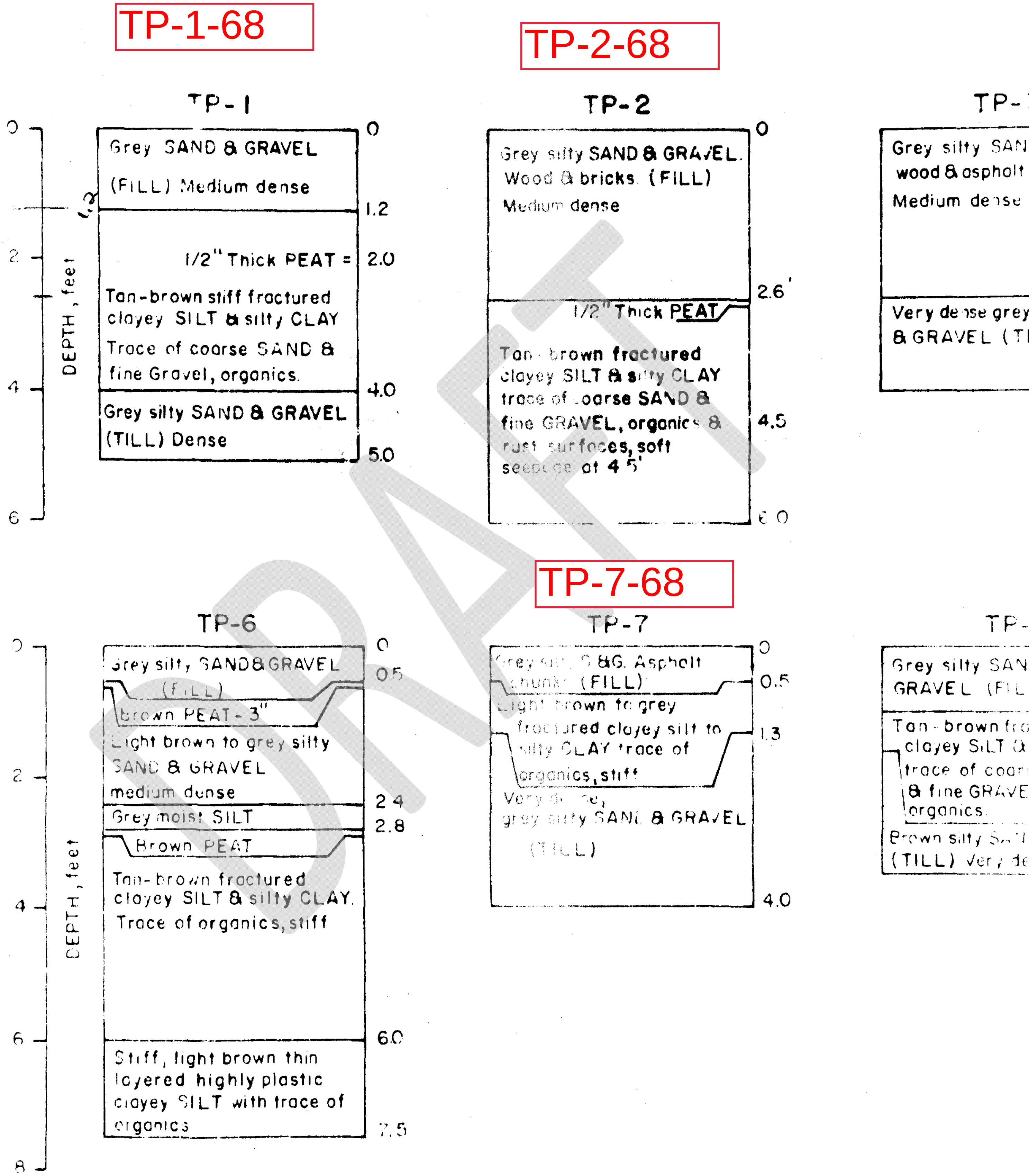
Bentonite Seal
Water Level (At Time of Drilling) ATD
Observation Well

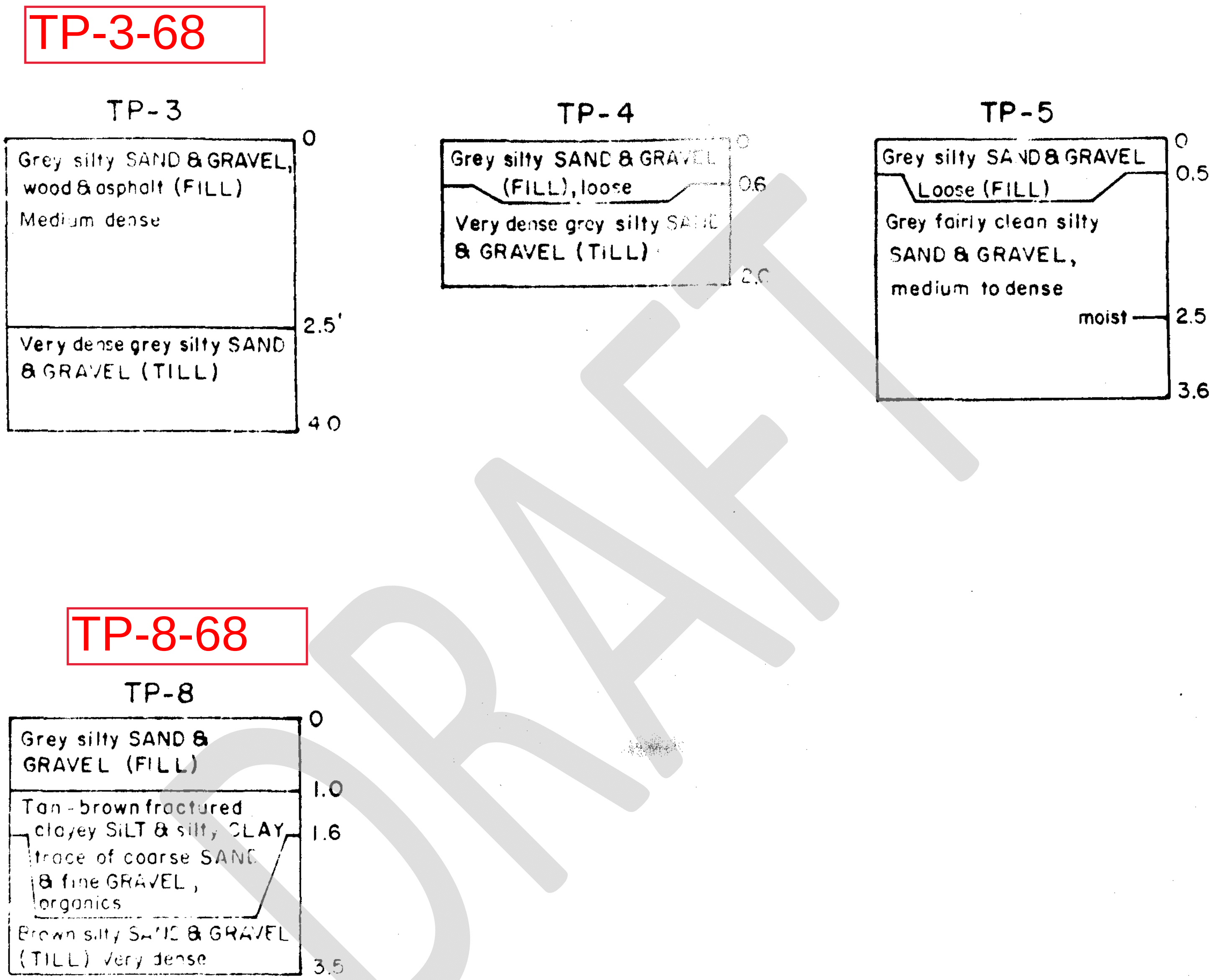
Liquid Limit
Plastic Limit
PP Pocket Penetrometer (tsf)
tv Torvane (tsf)
GS Grain Size Analysis

NOTE: Soil descriptions are interpretive and actual changes may be gradual.

J-1027 July 1981
HART-CROWSER & associates inc.
Figure A-3 B-3

B-3-81


TP-1-68
TP-2-68
TP-7-68
TP-1
Grey SAND & GRAVEL (FILL) Medium dense
1/2" Thick PEAT
Tan-brown stiff fractured clayey SILT & silty CLAY Trace of coarse SAND & fine Gravel, organics.
Grey silty SAND & GRAVEL (TILL) Dense
0
1.2
2.0
4.0
5.0
DEPTH, feet
TP-2
Grey silty SAND & GRAVEL. Wood & bricks. (FILL) Medium dense
1/2" Thick PEAT
Tan-brown fractured clayey SILT & silty CLAY trace of coarse SAND & fine GRAVEL, organics & rust surfaces, soft seepage at 4.5'
0
2.6'
4.5
6.0
TP-
Grey silty SAN wood & asphalt Medium dense
Very dense grey & GRAVEL (TI
TP-6
Grey silty SAND & GRAVEL (FILL)
Brown PEAT - 3"
Light brown to grey silty SAND & GRAVEL medium dense
Grey moist SILT
Brown PEAT
Tan-brown fractured clayey SILT & silty CLAY. Trace of organics, stiff
Stiff, light brown thin layered highly plastic clayey SILT with trace of organics
0
0.5
2.4
2.8
6.0
7.5
DEPTH, feet
TP-7
Grey silty S&G. Asphalt chunks (FILL)
Light brown to grey fractured clayey silt to silty CLAY trace of organics, stiff
Very dense, grey silty SAND & GRAVEL (TILL)
0
0.5
1.3
4.0
TP-
Grey silty SAN GRAVEL (FIL
Tan-brown fra clayey SILT & trace of coar & fine GRAVE organics.
Brown silty SAN (TILL) Very de
DRAFT



TENNIS COURTS
INTRAMURAL PROJECT AREA
UNIVERSITY OF WASHINGTON

LOGS OF TEST PITS

U. of W. P.O. 175 679-L

APRIL 22, 1968 W-1488

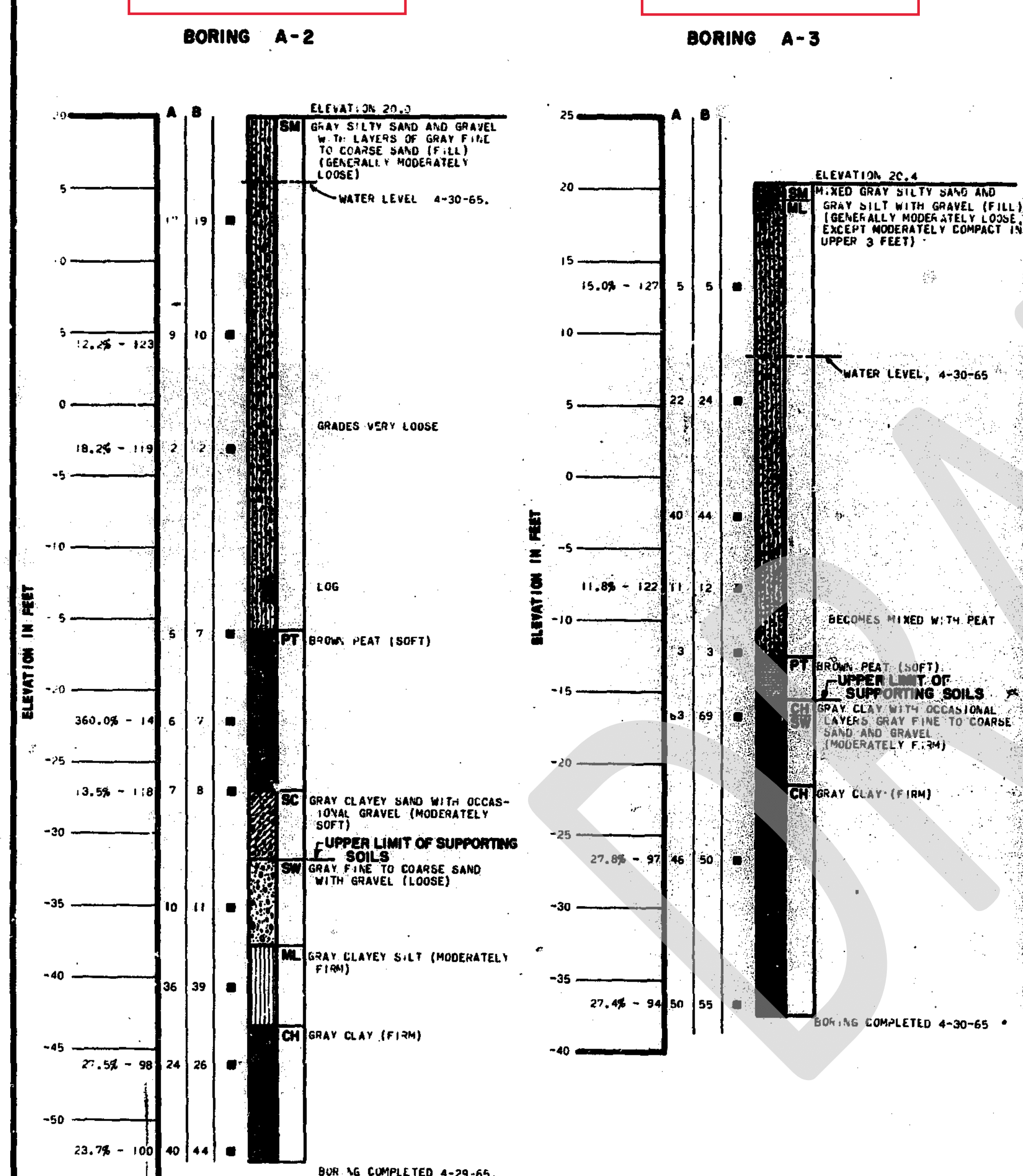
SHANNON & WILSON
SOIL MECHANICS & FOUNDATION ENGINEERS

FIG. 2

KODAK SAFETY ▲ FILM

A-2-65

A-3-65



BORING COMPLETED 4-29-65.

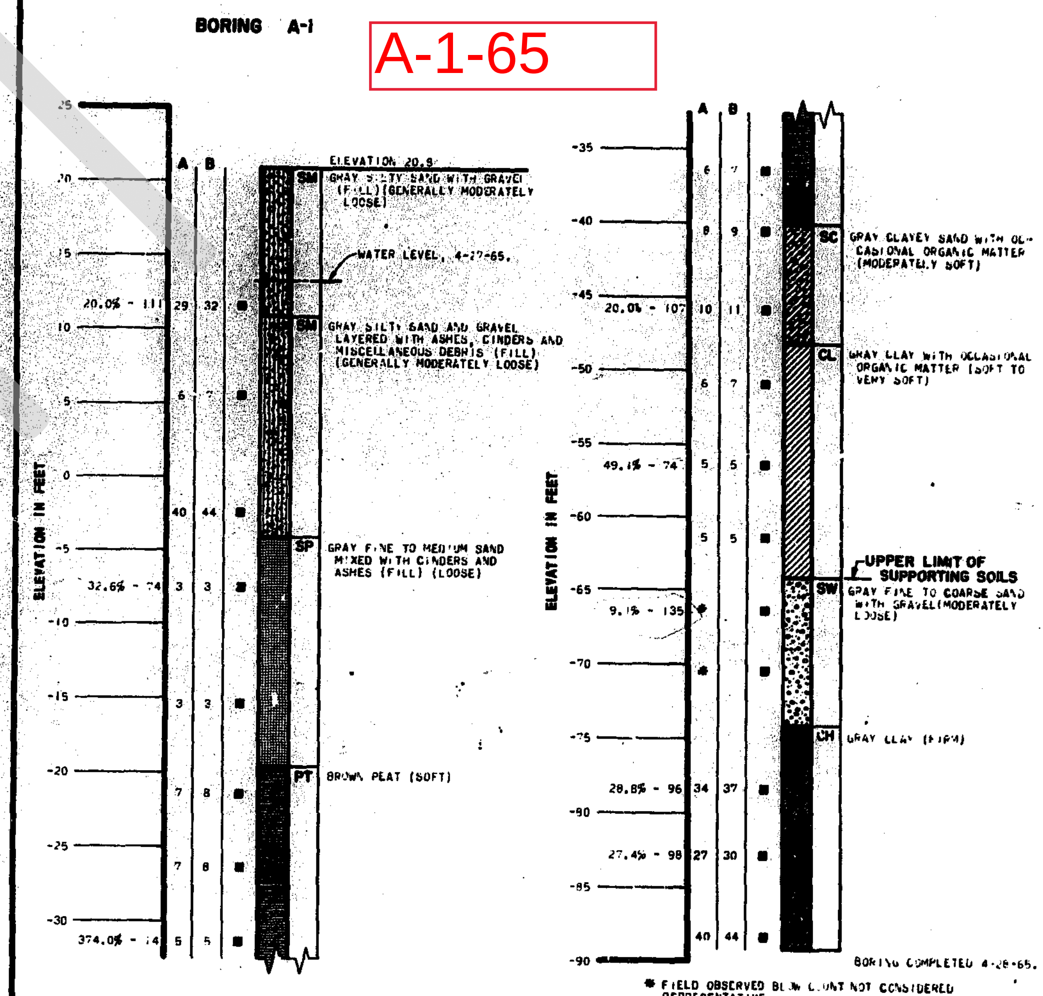
NOTE:
GAS, BELIEVED TO ORIGINATE IN THE PEAT LAYER WAS IGNITED IN BORING A-2. NO GAS WAS OBSERVED IN BORING A-3. NO HYDROGEN SULFIDE ODOR IN EITHER OF THESE BORINGS.

LOG OF BORINGS

DAMES & MOORE
APPLIED EARTH SCIENCES

PLATE 3

A-1-65



* FIELD OBSERVED BLOW COUNT NOT CONSIDERED REPRESENTATIVE.

KEY:

COLUMN A: FIELD OBSERVED BLOW COUNT WITH DAMES AND MOORE SAMPLER USING WEIGHT = 400 LBS., STROKE = 26 INCHES.

COLUMN B: EQUIVALENT NUMBER OF BLOWS WITH STANDARD SPLIT SPOON SAMPLER PENETRATION TEST. (WEIGHT = 140 LBS., STROKE = 30 INCHES)

MOISTURE CONTENT / DRY DENSITY: 27.4%-98 ■ INDICATES DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED.

NOTE:
NO GAS WAS OBSERVED BY FIELD ENGINEER OR DRILL CREW IN BORING A-1, BUT MAY BE PRESENT IN SMALL CONCENTRATIONS.

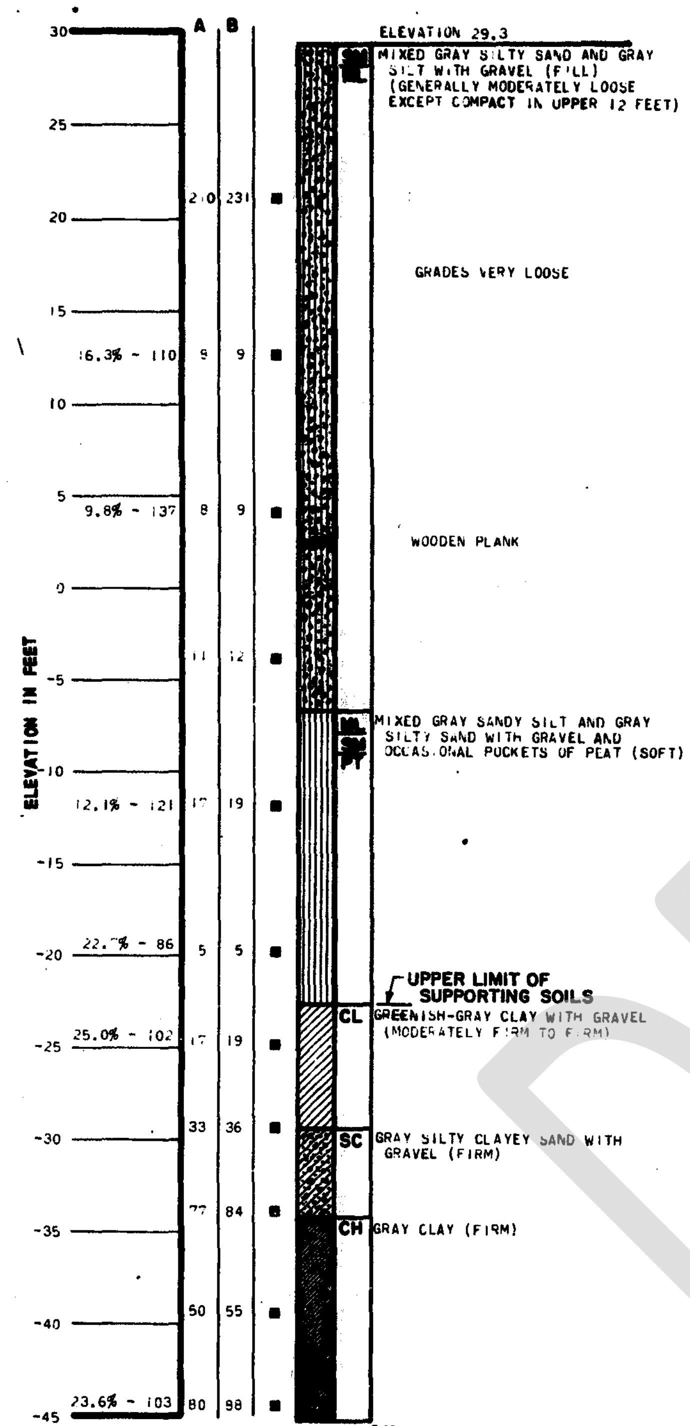
LOG OF BORINGS

DAMES & MOORE
APPLIED EARTH SCIENCES

PLATE 2

021744

A-5-65



NOTE:
NO GAS WAS OBSERVED BY FIELD ENGINEER OR DRILL CREW IN BORING A-5, BUT MAY BE PRESENT IN SMALL CONCENTRATIONS.

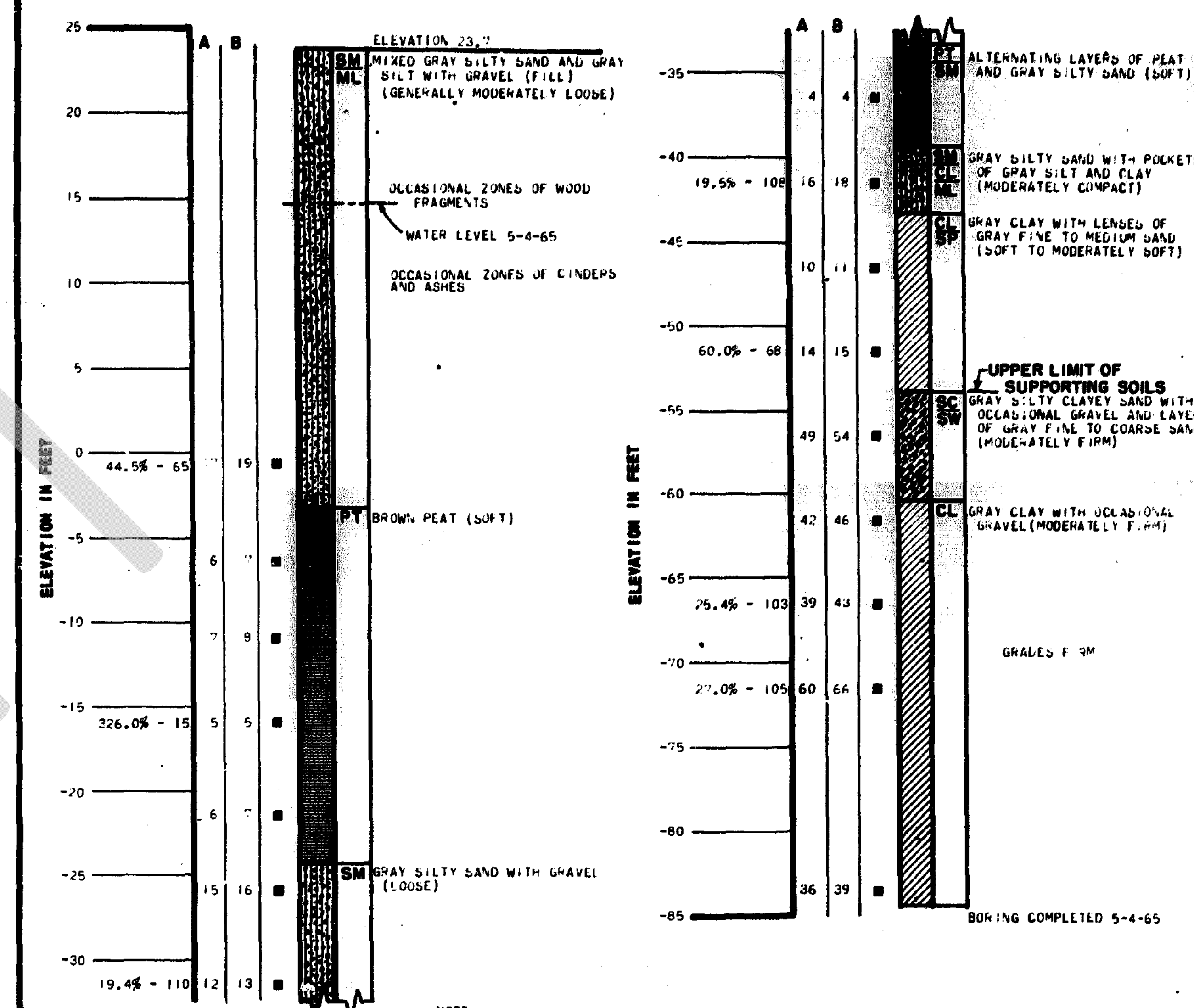
LOG OF BORINGS

DAMES & MOORE
APPLIED EARTH SCIENCES

PLATE 5

FILE 0681-006 UNIV OF WASH-SEATTLE
BY G.A. LINDBERG DATE 5-7-65

A-4-65



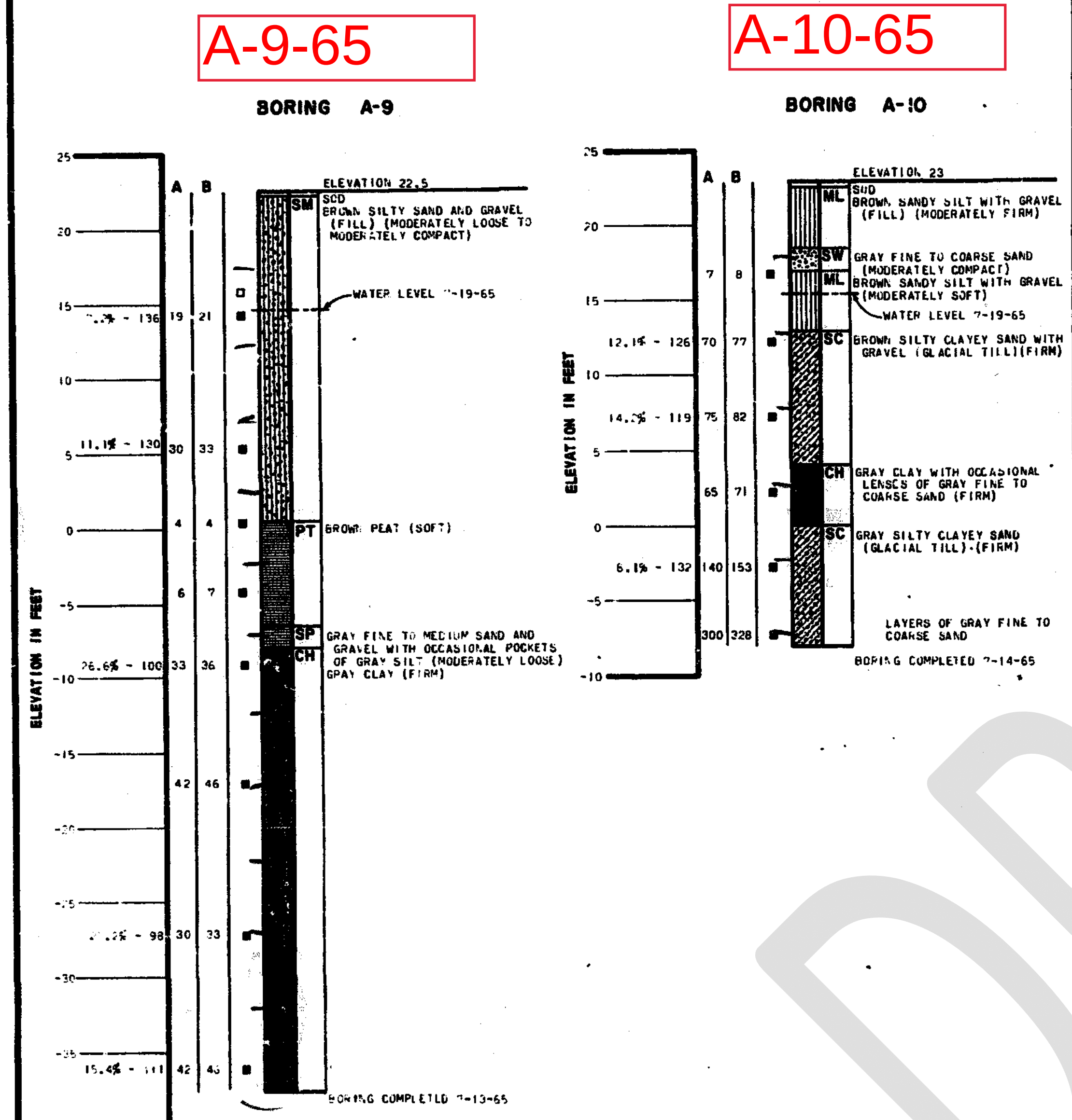
NOTE:
STRONG HYDROGEN SULFIDE ODOR WAS OBSERVED BETWEEN APPROXIMATELY DEPTHS OF 5 AND 12 FEET IN BORING A-4. NO GARBAGE WAS SPECIFICALLY OBSERVED BUT ODOR INDICATES SUCH TO BE NEAR THIS LOCATION. NO HYDROGEN SULFIDE ODOR WAS OBSERVED BELOW DEPTH OF 15 FEET. GAS, PROBABLY METHANE, WAS IGNITED AT A DEPTH OF 8 FEET. SEVERAL ATTEMPTS TO IGNITE GAS WERE MADE AT GREATER DEPTH IN THE FILL AND PEAT, BUT GAS CONCENTRATION WAS INSUFFICIENT TO CAUSE IGNITION.

LOG OF BORINGS

DAMES & MOORE
APPLIED EARTH SCIENCES

PLATE 4

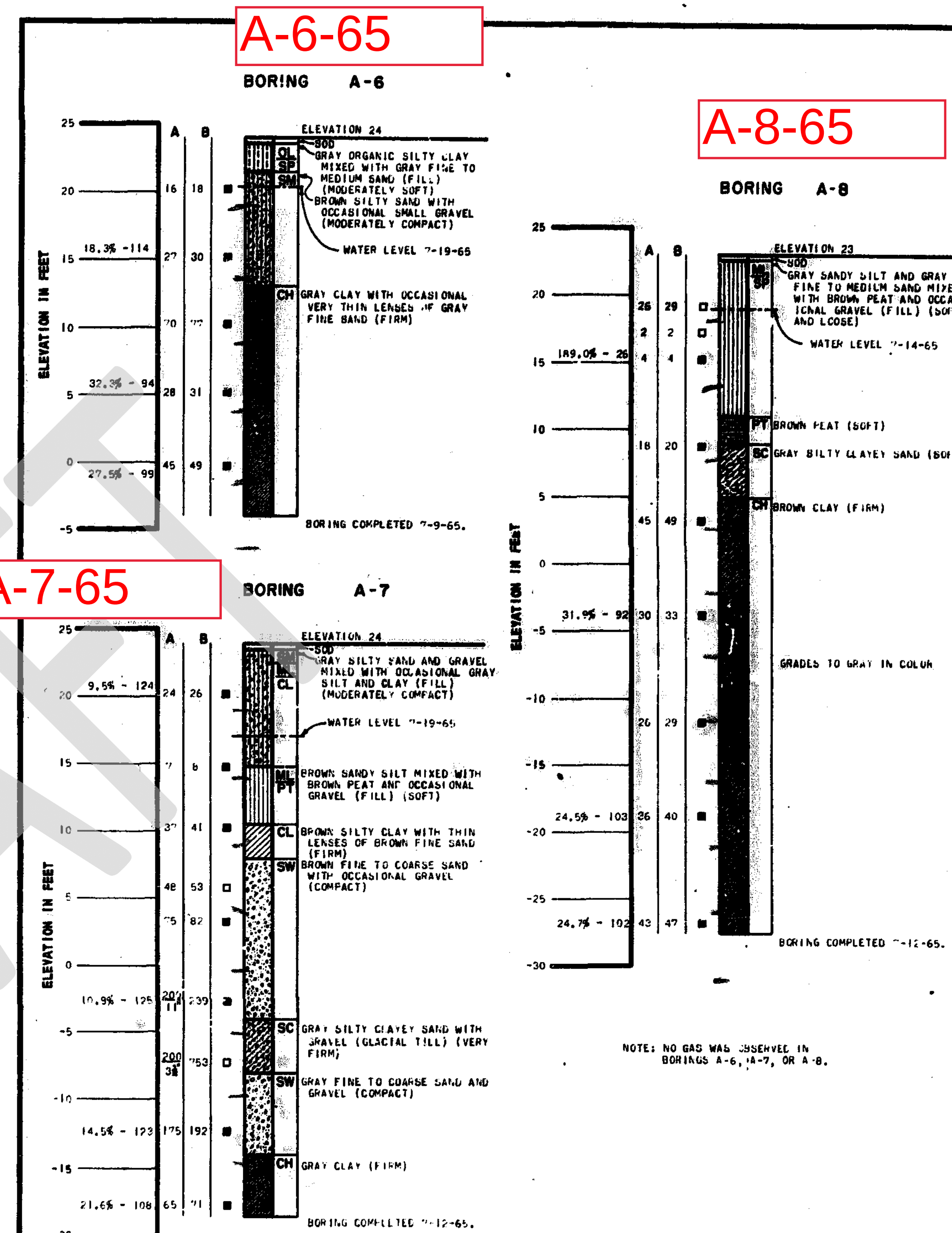
FILE 0681-006 UNIV OF WASH-SEATTLE
BY G.A. LINDBERG DATE 5-7-65



NOTE: GAS BELIEVED TO ORIGINATE IN THE PEAT LAYER WAS IGNITED IN BORING A-9. NO GAS WAS OBSERVED IN BORING A-10.

LOG OF BORINGS

DAMES & MOORE



NOTE: NO GAS WAS OBSERVED IN BORINGS A-6, A-7, OR A-8.

NOTE: ELEVATIONS REFER TO CITY OF SEATTLE DATUM.

KEY:

COLUMN A: FIELD OBSERVED BLOW COUNT WITH DAMES AND MOORE SAMPLER USING WEIGHT = 400 LBS., STROKE = 26 INCHES.

COLUMN B: EQUIVALENT NUMBER OF BLOWS WITH STANDARD SPLIT SPOON SAMPLER PENETRATION TEST (WEIGHT = 140 LBS., STROKE = 30 INCHES)

MOISTURE CONTENT / DRY DENSITY: 21.6% - 108 ■ INDICATES DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED.

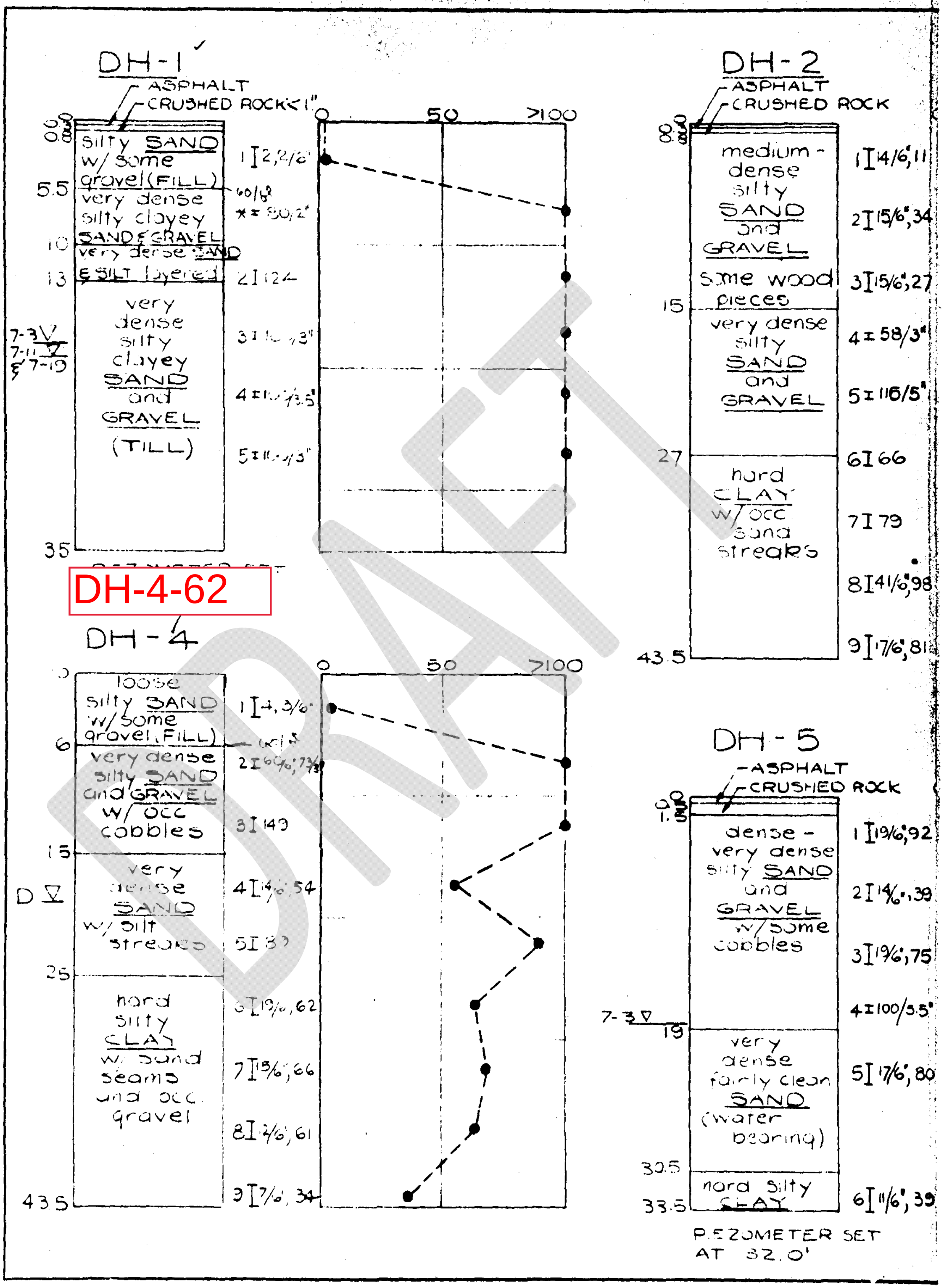
□ INDICATES DEPTH SAMPLE NOT RECOVERED.

LOG OF BORINGS

DAMES & MOORE

DRAFT

02176 A


DH-1
ASPHALT
CRUSHED ROCK<1"
silty SAND w/ some gravel (FILL)
very dense silty clayey SAND & GRAVEL
very dense SAND & SILT layered
very dense silty clayey SAND and GRAVEL (TILL)
0 50 >100
DH-4-62
DH-4
loose silty SAND w/ some gravel, FILL)
very dense silty SAND and GRAVEL w/ occ cobbles
very dense SAND w/ silt streaks
hard silty CLAY w/ sand seams and occ gravel
DH-2
ASPHALT
CRUSHED ROCK
medium-dense silty SAND and GRAVEL
some wood pieces
very dense silty SAND and GRAVEL
hard CLAY w/ occ sand streaks
DH-5
ASPHALT
CRUSHED ROCK
dense - very dense silty SAND and GRAVEL w/ some cobbles
very dense fairly clean SAND (water bearing)
hard silty CLAY
PIEZOMETER SET AT 32.0'
DRAFT

APPENDIX D
Shoring Monitoring Program

APPENDIX D
SHORING MONITORING PROGRAM

Preconstruction Survey

A shoring monitoring program should be established to monitor the performance of the temporary shoring walls and to provide early detection of deflections that could potentially damage nearby improvements. We recommend that a preconstruction survey of adjacent improvements, such as streets, utilities and buildings, be performed prior to commencing construction. The preconstruction survey should include a video or photographic survey of the condition of existing improvements to establish the preconstruction condition, with special attention to existing cracks in streets or buildings.

Optical Survey

The shoring monitoring program should include an optical survey monitoring program. The recommended frequency of monitoring should vary as a function of the stage of construction as presented in the following table.

Construction Stage	Monitoring Frequency
During excavation and until wall movements have stabilized	Twice weekly
During excavation if lateral wall movements exceed 1 inch and until wall movements have stabilized	Three times per week
After excavation is complete and wall movements have stabilized, and before the floors of the building reach the top of the excavation	Twice monthly

Monitoring should include vertical and horizontal survey measurements accurate to at least 0.01 feet. A baseline reading of the monitoring points should be completed prior to beginning excavation. The survey data should be provided to GeoEngineers for review within 24 hours.

For shoring walls, we recommend that optical survey points be established along the top of the shoring walls and at adjacent buildings. The survey points along the top of the shoring wall should be spaced every other soldier pile and every 25 feet for adjacent buildings. GeoEngineers recommends that a survey monitoring plan be developed for GeoEngineers' review prior to establishing the survey points in the field. If lateral wall movements are observed to be in excess of ½ inch between successive readings or if total wall movements exceed 1 inch, construction of the shoring walls should be stopped to determine the cause of the movement and to establish the type and extent of remedial measures required.

APPENDIX E
Report Limitations and Guidelines for Use

APPENDIX E
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for use by the University of Washington and members of the design team for use in the design of the IMA Pool and Locker Room Upgrades project . This report may be made available to prospective contractors for bidding or estimating purposes; but our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers, Inc. (GeoEngineers) structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. No one except the University of Washington and members of the design team should rely on this report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

A Geotechnical Engineering or geologic Report is Based on A Unique Set of Project-Specific Factors

This report has been prepared for the proposed IMA Pool and Locker Room Upgrades project at the University of Washington in Seattle. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;
- Elevation, configuration, location, orientation or weight of the proposed structure;
- Composition of the design team; or
- Project ownership.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

Most Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the borings, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Do not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Give Contractors a Complete Report and Guidance

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, or assessment of the presence of Biological Compounds which are Pollutants in or around any structure. Accordingly, this report includes no interpretations, recommendations, findings, or conclusions for the purpose of detecting, assessing, or abating Biological Pollutants. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

Appendix B

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.

University of Washington IMA 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) Embodied	Energy	Transportation	Lifespan Emissions (MTCO2e)
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		0.0	39	646	361	**0**
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		3.7	39	733	150	**3411**
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: **3411**

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	Total Embodied Emissions (MTCO2e)	Total Embodied Emissions (MTCO2e/ thousand sq feet)
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		
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 C

PRELIMINARY HAZARDOUS MATERIALS REPORT

Preliminary Hazardous Materials Survey Report
Summary of Findings/Good Faith Survey

IMA Locker Rooms and Pool Upgrades
UW 205781
3924 Montlake Blvd NE
Seattle, Washington

Prepared for:
University of Washington
Facilities - Project Delivery Group
Facilities Services Admin. Bldg. (FSAB)
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April 21, 2021
PBS Project No. 40035.905

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APPENDICES

APPENDIX A: Sample Location Figures and Photo Sheet

APPENDIX B: PLM Bulk Sampling Information
PLM Bulk Sample Inventory
PLM Bulk Sample Laboratory Data Sheets
PLM Bulk Sample Chain of Custody Documentation

APPENDIX C: AA Lead Paint Chip Sampling Information
AA Lead Sample Inventory
AA Lead Laboratory Data Sheets
AA Lead Chain of Custody Documentation

APPENDIX D: PCB Sampling Information
PCB Sample Inventory
PCB Laboratory Data Sheets
PCB Chain of Custody Documentation

APPENDIX E: PRIOR SURVEY DATA
- IMA Laundry Facility - Hazmat Report Inventory
- Regulated Materials Office Sampling Data

APPENDIX E: Certifications

1 PROJECT BACKGROUND

PBS Engineering and Environmental Inc. performed a limited hazardous materials survey as part of the planned demolition and remodel projects at the University of IMA Building including:

- 1st Floor Women's and Men's Locker Rooms, Offices, Pool, Mechanical rooms (penthouse and 1st floor) and exterior south elevation (deck area).

Based on the primary plans provided by the UW, it is our understanding that the work will include a substantial interior renovation and new addition. It is the intent of this investigation to comply with applicable regulatory requirements for the identification of ACMs prior to renovation activities, and to identify selected other regulated materials as indicated that may exist in areas of the project to be impacted. Areas inspected were determined through communication with the UW and project Validation Report submitted by SRG Partnership Inc. dated February 2020.

At the request of Scott Carlson of UW Facilities Project Delivery Group, all accessible areas of the project scope were inspected for the presence of asbestos-containing materials (ACM) and lead-containing paint (LCP), polychlorinated biphenyls (PCBs), and mercury-containing components.

The University of Washington IMA building was originally built in 1968 and has undergone various renovation and construction projects throughout the years. Interior spaces impacted by the renovation project generally consist of locker rooms, mechanical rooms, offices, and pool area. Interior finishes generally consist of carpet and ceramic tile floor, concrete masonry unit, plaster, and gypsum wallboard walls, and gypsum wallboard and lay-in ceiling tile ceilings. The roof is flat with a built-up roof system on a concrete deck. The exterior of the building consists of marble-crete texture with metal framed windows and doors.

Heating and cooling are provided by a forced air HVAC system with fiberglass insulated duck work.

2 SURVEY PROCESS

Accessible areas included in the project scope were inspected by AHERA-Certified Building Inspector Ryan Hunter (Cert. No. IRO-21-7254B Exp. 2/23/2022) and Willem Mager (Cert. IR-21-0536B Exp. 1/21/2022) on March 25, 2021. The survey was limited and involved non-destructive sampling. Inaccessible spaces are defined as those requiring selective demolition (such as chases), fall protection, or confined-space entry protocols to gain access. When observed, suspect asbestos-containing materials were sampled, assigned a unique identification number, and transmitted for analysis to Seattle Asbestos Test (NVLAP # 201057-0) under chain-of-custody protocols.

Samples were analyzed according to EPA Method 600R-93/116 using Polarized Light Microscopy (PLM), which has a reliable limit of quantification of 1% asbestos by volume. PBS endeavors to determine the presence and estimate the condition of suspect materials in all accessible areas included in the scope of work. PBS reviewed limited previous inspection surveys and data obtained from the project areas as available, and pertinent information is incorporated into this report and attached. Reviewed prior surveys include:

- IMA Laundry Facility - Hazmat Report Inventory (1/24/2017)
- Regulated Materials Office Sampling Data

3 FINDINGS

3.1 Asbestos Containing Materials

Federal and state regulations define an asbestos-containing material (ACM) per PLM analysis as any material that contains greater than 1% asbestos. ACMs are identified below per location.

- ACM sparkling skim coat (quartz like material) on exterior columns – South elevation at Sun Deck (approx. 1,200 SF)
- ACM caulk at exterior columns joints – South elevation at Sun Deck (approx. 500 LF)
- ACM Pipe fitting insulation – Mechanical rooms (penthouse, ground level & pipe chases (approx. 900 EA)
- ACM straight run pipe insulation – Mechanical rooms (approx. 1,200 LF ground level mech. rooms)
- Concealed ACM pipe fitting insulation – Ceiling plenums and wall cavities (assumed 400 EA)
- Presumed ACM roofing membrane and vapor barrier* (assumed 20,000 SF)
- Presumed ACM mastics/sealants associated with rooftop HVAC equipment* (assumed 200 SF)
- Presumed ACM gaskets associated with pipe valves (heating/chiller water) – assumed 50 gaskets
- Presumed ACM vapor barrier associated with the in-door pool system (walls and pool subfloor – assumed approximately 2,000 SF)
- Presumed ACM mastic associated with mirrors – Men's and Women's Locker Rooms (approx. 250 SF)

*Additional investigation with UW Roofing Shop will be completed in May 2021 to confirm quantity and types of ACMs. As well presumed materials will be sampled prior to construction to determine asbestos concentrations.

From prior sampling by PBS and others, the following materials within the scope of work were analyzed to contain asbestos in concentrations **greater than 1%** as determined by PLM microscopy:

- ACM Marble-crete wall material – North exterior elevation (not anticipated to be impacted)
- ACM Off-white rubbery caulking* – Roof level at concrete column and parapet

Non-Asbestos Containing Materials: The following materials were sampled by PBS and ***do not* contain** asbestos in detectible concentrations:

- Gypsum wallboard and joint compound – Men's and Women's Locker Rooms
- Plaster skim coat on columns – Men's and Women's Locker Rooms
- Interior and exterior marble-crete texture – Women's Locker Room and Exterior
- White 2'x4' lay-in ceiling tiles - Pool
- 4" blue cove base with brown mastic – Men's and Women's Locker Rooms
- Gray sheet vinyl flooring - Offices
- Yellow carpet mastic – Men's and Women's Locker Room
- Leveling compound – Men's and Women's Locker Rooms
- 1" blue ceramic tile and grout – Men's and Women's Locker Rooms
- Ceramic wall tile and grout – Men's and Women's Locker Rooms
- 2" blue ceramic tile and grout – Men's and Women's Locker Rooms
- 1" yellow ceramic tile and grout – Men's and Women's Locker Rooms
- Grout associated with quarry tile – Men's and Women's Saunas
- Vibration cloth associated with air handler units – East and West Penthouse
- Cloth with fiberglass insulation and mastic on air handling units and associated duct work – Penthouse and Mechanical Room

- Insulation cloth blanket associated with piping – East and West Penthouse
- White foam insulation associated with tank – Mechanical Room
- Concrete masonry unit and mortar – Men's and Women's Locker Room, Offices, and Corridors
- Tan duct sealant – East and West Penthouse
- Gray duct sealant – East and West Penthouse
- White caulk at ceramic tile and gypsum wallboard ceiling – Men's and Women's Locker Rooms
- Off-white caulk at pool vent – Pool Deck
- Black interior window frame caulk – Pool Deck
- Black interior door frame caulk – Pool Deck
- Black sink undercoat – Women's Locker Room Changing area

Refer to the attachments for sample location figures, photo sheets and sample inventory with description of materials sampled and their general location.

Advisory Notice - ACM Caution (Hidden Materials): The possibility exist that suspect ACM may be present at concealed locations in wall and ceiling cavities, within HVAC equipment and potentially in other concealed areas and the space below and above. These may include, but are not limited to wall mastics, caulking, and sealants on HVAC equipment, gaskets, construction adhesives, wiring and electrical insulators, pipe covering and insulation and vapor barriers and roofing. Stop work immediately and promptly inform the UW if suspect materials are noted.

3.2 Lead-Containing Paint (LCP)

Representative coatings, grout and ceramic tile from the project areas were collected by PBS and analyzed for lead content. The samples were assigned unique identification numbers and transmitted to NVL Laboratories, Inc. (AIHA IH #101861) in Seattle, Washington under chain-of-custody protocols for analysis using Flame Atomic Absorption (FAA).

Per analytical method via FAA, Lead was detected in three (3) of the samples collected. The following is a list of samples collected and location:

- Red paint on structural steel assemblies and frames – Pool area at roof deck (0.085% lead)
- Tan paint on fiberglass tank – Mechanical room pool water treatment system (0.51% lead)
- Grout associated with ceramic wall tile – Women's locker room and restroom (0.0042% lead)

Samples determined **NOT** to contain lead above detectable limits include:

- Off-white paint on gypsum wallboard walls – Men's locker room shower area
- White paint on CMU walls – Women's locker room shower area
- Green paint on plaster walls – Men's locker room shower area
- Beige paint on concrete ceiling – Women's locker room
- Blue paint on plaster columns – Women's locker room restroom
- Off-white paint on gypsum wallboard wall – Women's locker room
- White paint on concrete wall – Pool deck
- Blue paint on concrete wall – pool deck
- Beige paint on CMU wall – Mechanical room 103
- Beige paint on metal door frame – Women's locker room
- Gray paint on metal pedestal – Mechanical room chill water system
- 1" yellow ceramic tile – Men's locker room
- 1" blue ceramic tile – Women's locker room shower area

- 2" blue ceramic tile – Women's locker room
- Ceramic wall tile – Women's locker room
- Grout associated with quarry tile – Women's sauna
- Mortar associated with CMU wall – Women's locker room pipe chase
- Grout associated with yellow ceramic floor tile – Men's locker room
- Grout associated with blue ceramic floor tile – Women's locker room shower
- Grout associated with blue ceramic floor tile – Women's locker room

For locations and results of paint sampling see Appendix B.

3.3 PCB-Containing Components

PBS inspected representative fluorescent light fixture ballasts that are to be removed to facilitate the planned demolition. Fluorescent light fixtures throughout the building were inspected and found to contain electronic ballasts. Electronic ballasts do not contain suspect PCB oils.

PCB Caulking: PBS collected bulk samples of caulking at representative locations throughout the building. All samples were assigned a unique identification number and transmitted for analysis to Fremont Analytical in Seattle, Washington under chain-of-custody protocols. Samples were analyzed for PCB content according to EPA Method 8082. See attached sample inventory, laboratory data, and chain of custody documentation for sample locations and results.

The following caulking were determined to contain PCBs.

- Gray caulk at south elevation exterior column joints at Sun Deck – 7,800 ppm

3.4 Mercury-Containing Components

Compact fluorescent light tubes and compact fluorescent light bulb are present throughout the work areas. All light tubes within the areas of work are presumed to contain mercury vapors in small concentrations.

3.5 Silica-Containing Materials

Certain building materials, including but not limited to fireproofing, concrete panels, plaster walls/ceilings, wall blocks, mortar, ceiling tiles and gypsum walls may contain silica. PBS performed visual observations for silica-containing materials. Based on the field observations and the scope of work, the following materials are assumed to contain silica:

- Concrete floor
- Wallboard system (with mud/tape)
- Plaster on columns
- Marble-crete texture
- Ceramic tile and grout
- CMU walls and mortar

4 RECOMMENDATIONS

4.1 Asbestos-Containing Materials (ACM)

ACMs are present in the areas to be impacted by the project.

PBS recommends that ACMs that may be impacted by the planned upgrades and be removed prior to construction activities, or impacted, only by a qualified Washington State licensed asbestos abatement contractor according to applicable local, state and federal regulations (not limited to WAC 296-62-077).

A qualified Washington State licensed asbestos abatement contractor should be employed to manage, handle, and remove all such ACMs according to applicable local, state and federal regulations.

These state and federal regulations include, but not limited to Washington State Labor and Industries' WAC 296-62, 296-65, local clean Air Pollution Agency rules, AHERA 40 CFR 763, OSHA 29 CFR and US EPA NESHAP 40- CFR Part 61.

Advisory Notice - ACM Caution (Hidden Materials). The possibility exist that suspect ACM may be present at concealed locations in wall and ceiling cavities, within HVAC equipment and potentially in other select concealed areas. These may include, but are not limited to waterproofing membrane, vapor barriers, internal gasketing, mastics, caulking, and sealants on HVAC equipment, construction adhesives, electrical insulators, below grade pipe covering and insulation. In the event that suspect ACMs not included in this report are encountered during construction, contractors should stop work immediately and inform the Owner promptly for confirmation testing. All untested materials should be presumed asbestos-containing or tested for asbestos content prior to impact.

4.2 Lead-Containing Paint (LCP)

Representative painted coatings from the project locations were found to contain lead by laboratory analysis.

Impact of painted surfaces with detectable concentrations of Lead requires construction activities to be performed according to Washington Labor and Industries regulations for Lead in Construction (not limited to WAC 296-155-176). Workers impacting LCP should be Lead/Metals trained, provided proper personal protective equipment and use proper work methods to limit occupational and environmental exposure to lead until an initial exposure assessment has been conducted. Handling of painted coatings that contain lead content must be in accordance with 40 CFR Part 745 Lead. Disposal of components that contain lead and other regulated metals must be performed in accordance with 40 CFR Part 261 and WAC 173-303 (debris profile test such as Toxicity Characteristic Leaching Procedure for classifying materials for disposal options).

Painted coatings may exist in inaccessible areas of the work area or in secondary coatings. Any previously unidentified painted coatings should be considered lead-containing until sampled and proven otherwise. Dust control and housekeeping is crucial in preventing worker and occupant exposure.

4.3 PCB-Containing Components

PBS recommends all light ballasts be inspected prior to disposal. Magnetic ballasts should be presumed to contain PCBs and properly removed, stored, transported/shipped, and disposed of in accordance with Washington Administrative Code (WAC) 173-303 Dangerous Waste Regulations and 40 CFR Part 761 Subpart D. Electronic ballasts do not contain PCB's and can be disposed of as general debris in compliance with applicable codes and endpoint facility requirements.

PCB Caulking: PBS recommends the contractor address worker protection and provide proper handling, management, removal, segregation, and disposal of PCB-containing products. Caulking/sealants containing above 50 ppm of PCBs per regulation must be treated as hazardous/dangerous waste and be managed and disposed of in accordance with applicable regulations and Owner's disposal protocols and work practices. The removal and disposal of PCB-containing caulking should be completed in accordance with federal, state and local regulations including WAC 173-303 and 40 CFR Part 761 Subpart D.

4.4 Mercury-Containing Components

All compact fluorescent lights (bulbs and tubes) are presumed to be mercury-containing. Mercury is known to be toxic and requires special handling and proper disposal, ideally through recycling. PBS recommends that fluorescent light tubes and compact lights be properly handled, managed, and recycled in accordance with applicable regulations and the Owner's policy during demolition/renovation activities.

4.5 Silica-Containing Materials

Suspect silica-containing materials are assumed to be in concrete walls, CMU walls, brick walls, and concrete floor and wallboard system.

Construction activities including, but not limited to, chipping, sawing and jack hammering require control of potentially airborne silica dust. Impact of these building materials with detectable concentrations of silica should be performed according to Washington Labor and Industries regulations for Silica in Construction (WAC 296-840 and 296-841 - Airborne Contaminants).

Workers impacting these building materials should be crystalline Silica trained, provided the proper personal protective equipment and use proper work methods and engineering controls to limit occupational and environmental exposure to silica until an initial exposure assessment has been conducted.

5 LIMITATIONS

Suspect materials (regulated lead-containing paint or asbestos) may exist in inaccessible areas at the project site, such as in ceiling/wall cavities and in interstitial spaces. PBS endeavors to determine the presence and estimate the condition of suspect materials in all accessible areas included in the scope of work. In the event suspect materials are uncovered during construction, contractor should contact immediately the UW and PBS for associated asbestos or other regulated hazardous materials confirmation testing.

Report prepared by:
PBS Engineering and Environmental Inc.

Prepared by:
Ryan Hunter
AHERA Building Inspector
Cert. No. IRO-20-7254B Exp. 3/05/2021

Willem Mager
Sr. Project Mgr., AHERA Building Inspector
Cert. #IR-21-0536B, exp. 1/21/2022

APPENDIX A

Sample Location Figures (Included with final Report)
Photo Sheet

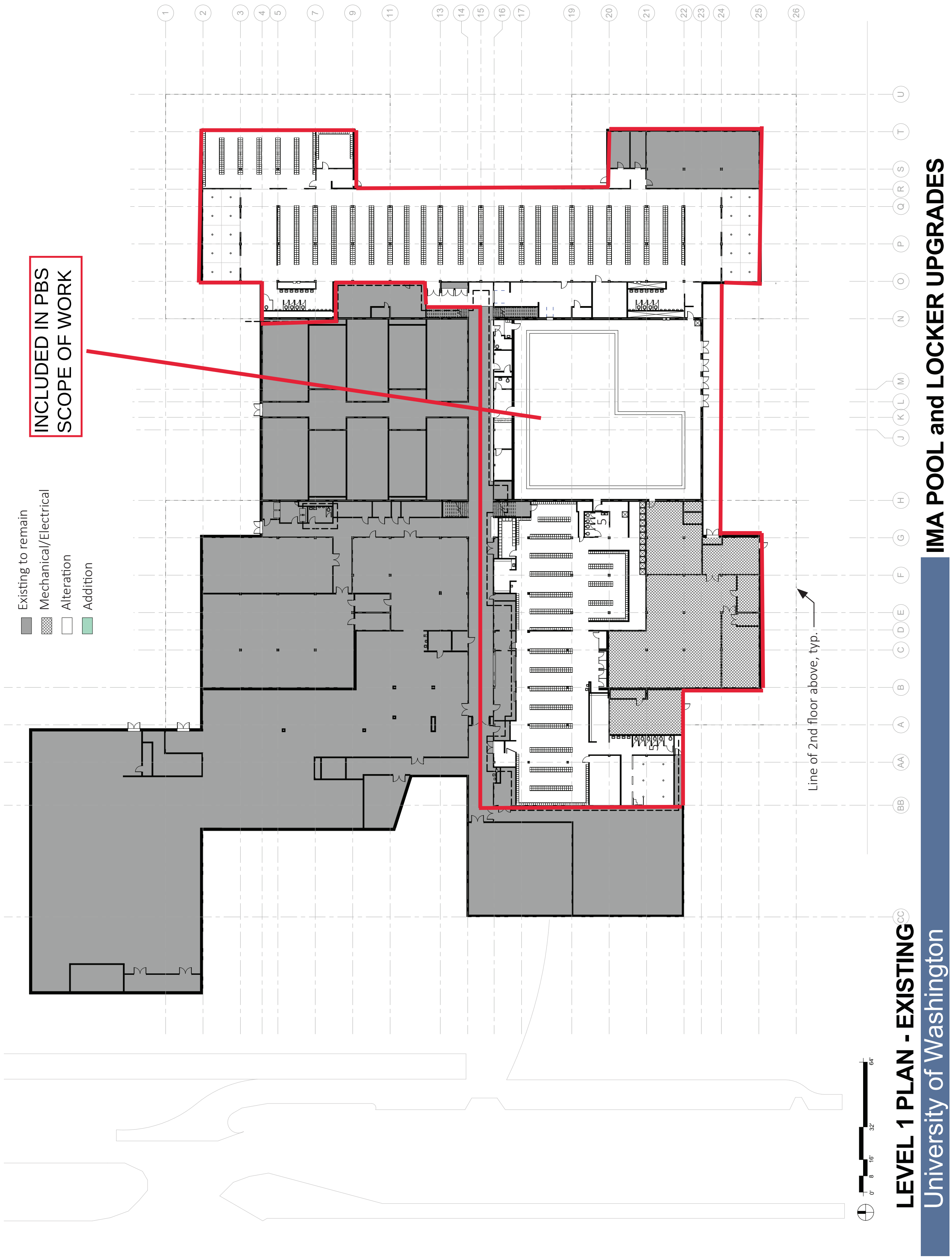

Figure A-1: Existing Level 1 Plan

Photo 1: Women's Locker Room Restroom.

Photo 2: Women's Locker Room.

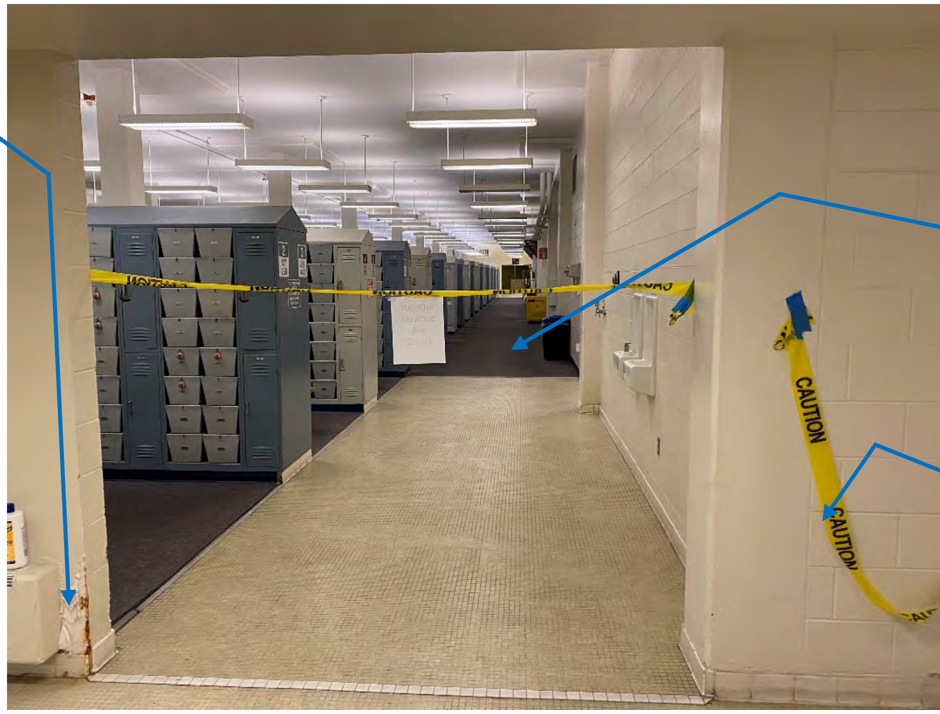

Photo 3: Men's Locker Room.

Photo 4: Pool Area.

Photo 5: East Penthouse mechanical room.

Photo 6: Ground Floor (1st floor) Mechanical Room (north). ACM Pipe & Fitting insulation and ACM pipe valve gaskets and select blanket insulation.

Photo 7: Sun Deck South Elevation

Photo 8: Sun Deck South Elevation.

APPENDIX B

PLM Asbestos Sample Inventory
PLM Asbestos Laboratory Analysis
PLM Asbestos Sample Chain of Custody

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.905 -001	Joint compound Gypsum wallboard	Women's locker room, shower ceiling	Layer 1: White compacted powdery material with paint Layer 2: Thin white chalky material with paper	NAD NAD	NVL
40035.905 -002	Plaster skim coat	Women's locker room, middle column	Layer 1: Off-white brittle material Layer 2: White crumbly material	NAD NAD	NVL
40035.905 -003	Plaster skim coat	Women's locker room, bathroom column	Layer 1: Off-white brittle material Layer 2: White crumbly material	NAD NAD	NVL
40035.905 -004	Plaster skim coat	Men's locker room, shower column	Layer 1: White compacted powdery material with layered paint	NAD	NVL
40035.905 -005	Marble crete wall	Women's locker room, middle wall	Layer 1: Loose white brittle material with layered paint Layer 2: Loose white sandy crumbly material with paint	NAD NAD	NVL
40035.905 -006	Marble crete wall	Exterior sun deck, East side	Layer 1: Thin white brittle material Layer 2: White sandy brittle material with paint	NAD NAD	NVL
40035.905 -007	Marble crete wall	Exterior sun deck, West side	Layer 1: White brittle material with debris Layer 2: Thin white sandy brittle material with paint and debris	NAD NAD	NVL
40035.905 -008	Exterior column material	South elevation at sun deck	Layer 1: Gray brittle material	2% Chrysotile	NVL
40035.905 -009	White 2'x4' lay-in ceiling tile	Pool ceiling	Layer 1: Beige compressed fibrous material with paint	NAD	NVL
40035.905 -010	White 2'x4' lay-in ceiling tile	Pool ceiling	Layer 1: Beige compressed fibrous material with paint	NAD	NVL
40035.905 -011	4" Blue cove base Cream mastic	Women's locker room at lockers	Layer 1: Blue rubbery material Layer 2: Off-white soft mastic with thin yellow soft mastic and debris	NAD NAD	NVL
40035.905 -012	4" Blue cove base Brown mastic	Men's locker room staff lockers	Layer 1: Blue rubbery material with debris Layer 2: Off-white soft mastic with debris	NAD NAD	NVL

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.905 -013	4" Blue cove base	Women's locker room at West entrance	Layer 1: Blue rubbery material with debris	NAD	NVL
			Layer 2: Thin off-white soft mastic with paint	NAD	
	Brown mastic		Layer 3: Brown brittle mastic	NAD	
40035.905 -014	Gray sheet vinyl flooring	Office area #3	Layer 1: Blue/gray patterned vinyl material with debris	NAD	NVL
			Layer 2: Thin off-white soft mastic with debris	NAD	
40035.905 -015	Yellow carpet mastic	Women's locker room at West entrance	Layer 1: Gray crumbly material with off-white brittle mastic and debris	NAD	NVL
	Leveling compound		Layer 2: Thin soft tan adhesive with trace gray brittle material	NAD	
40035.905 -016	Yellow carpet mastic	Women's locker room, East side	Layer 1: Yellow soft mastic with thin gray crumbly material	NAD	NVL
40035.905 -017	Yellow carpet mastic and underlayment	Women's locker room, vanity area	Layer 1: Gray brittle crumbly material with thin off-white mastic with debris	NAD	NVL
40035.905 -018	Yellow carpet mastic	Men's locker room at North showers	Layer 1: Black soft adhesive with debris	NAD	NVL
40035.905 -019	Yellow carpet mastic	Men's locker room staff lockers	Layer 1: Yellow soft adhesive with thin tan soft mastic with debris	NAD	NVL
40035.905 -020	1" Blue ceramic floor tile	Women's locker room shower	Layer 1: Off-white speckled ceramic tile	NAD	NVL
			Layer 2: Blue brittle material	NAD	
			Layer 3: Beige brittle material	NAD	
	Grout		Layer 4: Off-white crumbly sandy material with black plastic	NAD	
40035.905 -021	Ceramic wall tile	Women's locker room, restroom	Layer 1: Off-white ceramic material	NAD	NVL
	Grout		Layer 2: Gray brittle crumbly material	NAD	
40035.905 -022	2" Blue ceramic floor tile	Women's locker room, locker area	Layer 1: Blue ceramic tile with debris	NAD	NVL
	Grout		Layer 2: Gray brittle crumbly material	NAD	
			Layer 3: Blue brittle material	NAD	

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.905 -023	1" Yellow ceramic floor tile Grout	Men's locker room, exit	Layer 1: Yellow speckled ceramic tile Layer 2: Gray crumbly material Layer 3: Gray brittle material with debris Layer 4: White soft crumbly material with debris	NAD NAD NAD NAD	NVL
40035.905 -024	Grout associated with quarry tile	Women's sauna	Layer 1: Gray brittle material with debris	NAD	NVL
40035.905 -025	Vibration cloth	Exhaust fan #6	Layer 1: White woven fibrous material with gray soft crumbly material and paint with debris	NAD	NVL
40035.905 -026	Vibration cloth	Supply fan #5	Layer 1: White woven fibrous material with gray soft crumbly material and paint with debris	NAD	NVL
40035.905 -027	Vibration cloth	Exhaust fan #1	Layer 1: White woven fibrous material with gray soft crumbly material and paint	NAD	NVL
40035.905 -028	Cloth with fiberglass insulation	Supply #3 AHU and ductwork	Layer 1: White woven fibrous material with paint Layer 2: Brown fibrous material with black asphaltic mastic Layer 3: Tan fibrous material with white mastic and foil Layer 4: Yellow fluffy fibrous material	NAD NAD NAD NAD	NVL
40035.905 -029	Cloth with fiberglass insulation	Exhaust #3 AHU	Layer 1: White woven fibrous material with paint Layer 2: White fibrous mesh with paper and white mastic with foil Layer 3: Brown fibrous material with black asphaltic mastic and paint Layer 4: Yellow fluffy fibrous material	NAD NAD NAD NAD	NVL
40035.905 -030	Cloth with fiberglass insulation	Duct at AHU #6	Layer 1: Off-white woven fibrous material with paint Layer 2: Brown fibrous material with black asphaltic mastic Layer 3: Yellow fluffy fibrous material	NAD NAD NAD	NVL
40035.905 -031	Insulation cloth blanket	Supply #3 AHU	Layer 1: White woven fibrous material	NAD	NVL
40035.905 -032	White foam insulation	First floor mechanical room	Layer 1: White soft material with debris Layer 2: Yellow foamy material	NAD NAD	NVL

NAD - No Asbestos Detected

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.905 -033	Pipe fitting insulation	Supply fan #4	Layer 1: White woven fibrous mesh with paint Layer 2: Off-white fibrous material Layer 3: Off-white crumbly material	NAD 56% Chrysotile 6% Chrysotile	NVL
40035.905 -034	Concrete masonry unit Mortar	Men's locker room exit	Layer 1: Pale gray brittle crumbly material with paint Layer 2: White brittle sandy material with paint	NAD NAD	NVL
40035.905 -035	Mortar associated with concrete masonry unit	Women's locker room chase	Layer 1: White brittle sandy material with debris	NAD	NVL
40035.905 -036	Tan duct sealant	Pool area above drop ceiling	Layer 1: Beige crumbly material with debris	NAD	NVL
40035.905 -037	Gray duct sealant	Exhaust #6	Layer 1: Beige crumbly material with paint	NAD	NVL
40035.905 -038	Gray duct sealant	Exhaust #1	Layer 1: Beige crumbly material with paint	NAD	NVL
40035.905 -039	White caulk at ceramic tile and ceiling	Women's locker room, individual showers	Layer 1: Off-white soft material	NAD	NVL
40035.905 -040	Caulk at vent	Pool deck, East side	Layer 1: Off-white crumbly material with soft blue coating and debris	NAD	NVL
40035.905 -041	Black interior window frame caulk	Pool area, store front windows	Layer 1: Black soft rubbery material with debris	NAD	NVL
40035.905 -042	Black interior door frame caulk	Pool area, Store front door	Layer 1: Black soft crumbly material with debris	NAD	NVL
40035.905 -043	Exterior caulk at column	Sun deck at marble crete	Layer 1: White soft rubbery material with debris	2% Chrysotile	NVL
40035.905 -044	Black sink undercoat	Women's locker room, drying area	Layer 1: Loose black crumbly asphaltic material	NAD	NVL

March 30, 2021

Ryan Hunter
PBS Environmental - Seattle
214 E Galer St. Suite. 300
Seattle, WA 98102

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2105619.00

Client Project: 40035.905
Location: UW - IMA Locker ad Pool Upgrades

Dear Mr. Hunter,

Enclosed please find test results for the 18 sample(s) submitted to our laboratory for analysis on 3/29/2021.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Matt Macfarlane, Asbestos Lab Supervisor

Lab Code: 102063-0

Enc.: Sample Results

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: **Mr. Ryan Hunter**
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105619.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600/R-93/116

Lab ID: 21040503 **Client Sample #: 40035.905-001**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Calcareous binder, Calcareous particles, Paint	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Thin white chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Gypsum/Binder, Fine grains, Fine particles	Cellulose	25%	**None Detected ND**

Lab ID: 21040504 **Client Sample #: 40035.905-002**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** Off-white brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** White crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Glass debris Fine particles, Foamed glass	None Detected	ND	**None Detected ND**

Lab ID: 21040505 **Client Sample #: 40035.905-003**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** Off-white brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** White crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Glass debris	Cellulose	<1%	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/30/2021
Reviewed by: Matt Macfarlane **Date:** 03/30/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASB-02

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105619.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600/R-93/116

Fine particles, Foamed glass

Lab ID: 21040506 **Client Sample #: 40035.905-004**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** White compacted powdery material with layered paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Calcareous binder, Calcareous particles, Paint	Cellulose <1%	**None Detected ND**

Lab ID: 21040507 **Client Sample #: 40035.905-005**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Unsure of correct layer sequence.

Layer 1 of 2 **Description:** Loose white brittle material with layered paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Mineral grains, Fine particles Paint	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Loose white sandy crumbly material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Sand, Fine particles Fine grains	None Detected ND	**None Detected ND**

Lab ID: 21040508 **Client Sample #: 40035.905-006**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Unsure of correct layer sequence.

Layer 1 of 2 **Description:** Thin white brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Mineral grains, Fine particles	None Detected ND	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/30/2021
Reviewed by: Matt Macfarlane **Date:** 03/30/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASB-02

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105619.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600/R-93/116

Layer 2 of 2 **Description:** White sandy brittle material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Sand, Fine particles	None Detected	ND	**None Detected ND**
Fine grains			

Lab ID: 21040509 **Client Sample #: 40035.905-007**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** White brittle material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine particles	None Detected	ND	**None Detected ND**
Debris			

Layer 2 of 2 **Description:** Thin white sandy brittle material with paint and debris

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Sand, Fine particles	Cellulose	<1%	**None Detected ND**
Fine grains, Paint, Debris			

Lab ID: 21040510 **Client Sample #: 40035.905-008**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Gray brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**Chrysotile 2%**
Mineral grains			

Lab ID: 21040511 **Client Sample #: 40035.905-009**

Location: UW - IMA Locker ad Pool Upgrades

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/30/2021
Reviewed by: Matt Macfarlane **Date:** 03/30/2021

Matt Macfarlane, Asbestos Lab Supervisor

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105619.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600/R-93/116

Layer 1 of 1 **Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Glass debris, Fine particles Fine grains, Paint	Glass fibers 87%	**None Detected ND**

Lab ID: 21040512 **Client Sample #: 40035.905-010**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Glass debris, Fine particles Fine grains, Paint	Glass fibers 89%	**None Detected ND**

Lab ID: 21040513 **Client Sample #: 40035.905-011**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** Blue rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Vinyl/Binder, Fine particles	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Off-white soft mastic with thin yellow soft mastic and debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Mastic/Binder, Fine particles, Debris	Cellulose <1%	**None Detected ND**

Lab ID: 21040514 **Client Sample #: 40035.905-012**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** Blue rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Vinyl/Binder, Fine particles, Debris	Glass fibers <1%	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/30/2021
Reviewed by: Matt Macfarlane **Date:** 03/30/2021

Matt Macfarlane, Asbestos Lab Supervisor

Bulk Asbestos Fibers Analysis
By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: **Mr. Ryan Hunter**
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105619.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600/R-93/116

Layer 2 of 2 **Description:** Off-white soft mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine particles, Debris	None Detected	ND	**None Detected ND**

Lab ID: 21040515 **Client Sample #: 40035.905-013**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 3 **Description:** Blue rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Vinyl/Binder, Fine particles, Debris	None Detected	ND	**None Detected ND**

Layer 2 of 3 **Description:** Thin off-white soft mastic with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine particles, Paint	None Detected	ND	**None Detected ND**

Layer 3 of 3 **Description:** Brown brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine particles	Wollastonite	4%	**None Detected ND**

Lab ID: 21040516 **Client Sample #: 40035.905-014**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** Blue/gray patterned vinyl material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Vinyl/Binder, Fine particles, Fine grains	Cellulose	<1%	**None Detected ND**

Layer 2 of 2 **Description:** Thin off-white soft mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine particles, Debris	Cellulose	<1%	**None Detected ND**

Lab ID: 21040518 **Client Sample #: 40035.905-015**
Location: UW - IMA Locker ad Pool Upgrades
Comments: Unsure of correct layer sequence.

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/30/2021
Reviewed by: Matt Macfarlane **Date:** 03/30/2021
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector.

ASB-02

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: **Mr. Ryan Hunter**
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105619.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600/R-93/116

Layer 1 of 2 **Description:** Gray crumbly material with off-white brittle mastic and debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine particles	Cellulose	3%	**None Detected ND**
Mastic/Binder, Debris	Synthetic fibers	<1%	

Layer 2 of 2 **Description:** Thin soft tan adhesive with trace gray brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Adhesive/Binder, Fine particles, Fine grains	None Detected	ND	**None Detected ND**

Lab ID: 21040519 **Client Sample #: 40035.905-016**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Yellow soft mastic with thin gray crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine grains, Fine particles	Cellulose	<1%	**None Detected ND**

Lab ID: 21040521 **Client Sample #: 40035.905-017**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Gray brittle crumbly material with thin off-white mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine particles	Cellulose	<1%	**None Detected ND**
Mineral grains, Debris			

Lab ID: 21040523 **Client Sample #: 40035.905-018**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Black soft adhesive with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Adhesive/Binder, Fine particles, Debris	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/30/2021
Reviewed by: Matt Macfarlane **Date:** 03/30/2021

Matt Macfarlane, Asbestos Lab Supervisor

ASBESTOS LABORATORY SERVICES

NVL

Company	PBS Environmental - Seattle	**NVL Batch Number**	**2105619.00**
Address	214 E Galer St. Suite. 300 Seattle, WA 98102	**TAT**	1 Day **AH** No
		Rush TAT	
Project Manager	Mr. Ryan Hunter	**Due Date**	3/30/2021 **Time** 12:00 PM
Phone	(206) 233-9639	**Email**	ryan.hunter@pbsusa.com
		Fax	(866) 727-0140

Project Name/Number: 40035.905 **Project Location:** UW - IMA Locker ad Pool Upgrades

Subcategory PLM Bulk

Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 18 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	21040503	40035.905-001		A
2	21040504	40035.905-002		A
3	21040505	40035.905-003		A
4	21040506	40035.905-004		A
5	21040507	40035.905-005		A
6	21040508	40035.905-006		A
7	21040509	40035.905-007		A
8	21040510	40035.905-008		A
9	21040511	40035.905-009		A
10	21040512	40035.905-010		A
11	21040513	40035.905-011		A
12	21040514	40035.905-012		A
13	21040515	40035.905-013		A
14	21040516	40035.905-014		A
15	21040518	40035.905-015		A
16	21040519	40035.905-016		A
17	21040521	40035.905-017		A
18	21040523	40035.905-018		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Courier				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	3/29/21	1200
Analyzed by	Hilary Crumley		NVL	3/30/21	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions: See client COC for reporting instructions (*)

Date: 3/29/2021
Time: 12:00 PM
Entered By: Fatima Khan

PBS 2105619 ORATORY CHAIN OF CUSTODY

Project: UW – IMA Locker ad Pool Upgrades
Project #: 40035.905

Analysis requested: PLM
Date: 3/26/2021

Relinq'd by/Signature: Ryan Hunter / [signature]
Date/Time: 3/26/2021

Received by/Signature: [signature]
Date/Time: 3/29/2021 1200 courier

Email ALL INVOICES to: seattleap@pbsusa.com

E-mail results to:

- [ ] Brian Stanford
- [x] Willem Mager
- [ ] Gregg Middaugh
- [ ] Mark Hiley
- [ ] Tim Ogden
- [ ] Prudy Stoudt-McRae
- [ ] Janet Murphy
- [ ] Kaitlin Soukup
- [ ] Martin Estira
- [ ] Justin Day
- [ ] Claire Tsai
- [ ] Holly Tuttle
- [ ] Mike Smith
- [ ] Ferman Fletcher
- [x] Ryan Hunter
- [x] Michelle Dodson
- [ ] ______________

TURN AROUND TIME:

- [ ] 1 Hour
- [ ] 2 Hours
- [ ] 4 Hours
- [x] 24 Hours
- [ ] 48 Hours
- [ ] 3-5 Days
- [ ] Other______________

PAGE 1 OF 2

SAMPLE DATA FORM

Sample #	Material	Location	Lab
40035.905-001	Joint Compound / Gypsum Wallboard *	Women's Locker Room Shower Ceiling	NVL
40035.905-002	Plaster Skim Coat	Women's Locker Room Middle Column	↓
40035.905-003	Plaster Skim Coat	Women's Locker Room Bathroom Column	
40035.905-004	Plaster Skim Coat	Men's Locker Room Shower Column	
40035.905-005	Marble Crete Wall	Women's Locker Room Middle Wall	
40035.905-006	Marble Crete Wall	Exterior Sun Deck East Side	
40035.905-007	Marble Crete Wall	Exterior Sun Deck West Side	
40035.905-008	Exterior Column Material	South Elevation at Sun Deck	
40035.905-009	White 2'x4' Lay-in Ceiling Tile	Pool Ceiling	
40035.905-010	White 2'x4' Lay-in Ceiling Tile	Pool Ceiling	
40035.905-011	4" Blue Cove Base w/ Cream Mastic	Women's Locker Room @ Lockers	
40035.905-012	4" Blue Cove Base w/ Cream/Brown Mastic	Men's Locker Room Staff Lockers	
40035.905-013	4" Blue Cove Base w/ Cream/Brown Mastic	Women's Locker Room @ West Entrance	
40035.905-014	Gray Sheet Vinyl Flooring	Office Area #3	
40035.905-015	Yellow Carpet Mastic & Leveler	Women's Locker Room @ West Entrance	
40035.905-016	Yellow Carpet Mastic	Women's Locker Room East Side	
40035.905-017	Yellow Carpet Mastic & Underlayment	Women's Locker Room Vanity Area	
40035.905-018	Yellow Carpet Mastic	Men's Locker Room @ North Showers	↓

* IF POSITIVE ANALYZE AS COMPOSITE SAMPLE

March 29, 2021

Ryan Hunter
PBS Environmental - Seattle
214 E Galer St. Suite. 300
Seattle, WA 98102

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2105621.00

Client Project: 40035.905
Location: UW - IMA Locker ad Pool Upgrades

Dear Mr. Hunter,

Enclosed please find test results for the 26 sample(s) submitted to our laboratory for analysis on 3/29/2021.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Matt Macfarlane, Asbestos Lab Supervisor

Lab Code: 102063-0

Enc.: Sample Results

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Lab ID: 21040524 **Client Sample #: 40035.905-019**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Yellow soft adhesive with thin tan soft mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Adhesive/Binder, Mastic/Binder, Fine particles	Cellulose	2%	**None Detected ND**
Debris	Synthetic fibers	<1%	

Lab ID: 21040525 **Client Sample #: 40035.905-020**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Unsure of correct layer sequence.

Layer 1 of 4 **Description:** Off-white speckled ceramic tile

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Ceramic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 4 **Description:** Blue brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Mineral grains, Fine grains	None Detected	ND	**None Detected ND**
Fine particles			

Layer 3 of 4 **Description:** Beige brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Mineral grains	None Detected	ND	**None Detected ND**
Fine particles			

Layer 4 of 4 **Description:** Off-white crumbly sandy material with black plastic

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Sand, Fine particles	None Detected	ND	**None Detected ND**
Fine grains, Plastic			

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASB-02

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Lab ID: 21040526 **Client Sample #: 40035.905-021**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** Off-white ceramic material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Ceramic/Binder, Fine particles	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Gray brittle crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles Mineral grains	None Detected ND	**None Detected ND**

Lab ID: 21040527 **Client Sample #: 40035.905-022**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Unsure of correct layer sequence.

Layer 1 of 3 **Description:** Blue ceramic tile with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Ceramic/Binder, Fine particles, Debris	None Detected ND	**None Detected ND**

Layer 2 of 3 **Description:** Gray brittle crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles Mineral grains	None Detected ND	**None Detected ND**

Layer 3 of 3 **Description:** Blue brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine grains	None Detected ND	**None Detected ND**

Lab ID: 21040528 **Client Sample #: 40035.905-023**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Unsure of correct layer sequence.

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: **Mr. Ryan Hunter**
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Layer 1 of 4 **Description:** Yellow speckled ceramic tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Ceramic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 4 **Description:** Gray crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	Cellulose	2%	**None Detected ND**

Layer 3 of 4 **Description:** Gray brittle material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine particles Debris	None Detected	ND	**None Detected ND**

Layer 4 of 4 **Description:** White soft crumbly material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine particles Debris	None Detected	ND	**None Detected ND**

Lab ID: 21040529 **Client Sample #: 40035.905-024**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Small sample size.

Layer 1 of 1 **Description:** Gray brittle material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine particles Debris	Cellulose	<1%	**None Detected ND**

Lab ID: 21040530 **Client Sample #: 40035.905-025**

Location: UW - IMA Locker ad Pool Upgrades

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: **Mr. Ryan Hunter**
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Layer 1 of 1 **Description:** White woven fibrous material with gray soft crumbly material and paint with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles, Paint	Glass fibers	53%	**None Detected ND**
Debris	Cellulose	<1%	

Lab ID: 21040531 **Client Sample #: 40035.905-026**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** White woven fibrous material with gray soft crumbly material and paint with debris

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles, Paint	Glass fibers	51%	**None Detected ND**
Debris	Cellulose	<1%	

Lab ID: 21040532 **Client Sample #: 40035.905-027**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** White woven fibrous material with gray soft crumbly material and paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles, Paint	Glass fibers	52%	**None Detected ND**
	Cellulose	<1%	

Lab ID: 21040533 **Client Sample #: 40035.905-028**
Location: UW - IMA Locker ad Pool Upgrades
Comments: Unsure of correct layer sequence.

Layer 1 of 4 **Description:** White woven fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles, Paint	Cellulose	84%	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Layer 2 of 4 **Description:** Brown fibrous material with black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Asphalt/Binder, Fine particles	Cellulose 51%	**None Detected ND**

Layer 3 of 4 **Description:** Tan fibrous material with white mastic and foil

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Metal foil, Mastic/Binder	Cellulose 59%	**None Detected ND**

Layer 4 of 4 **Description:** Yellow fluffy fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Glass debris, Fine particles	Glass fibers 96%	**None Detected ND**

Lab ID: 21040534 **Client Sample #: 40035.905-029**

Location: UW - IMA Locker ad Pool Upgrades

Comments: Unsure of correct layer sequence.

Layer 1 of 4 **Description:** White woven fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Paint	Cellulose 86%	**None Detected ND**

Layer 2 of 4 **Description:** White firbrous mesh with paper and white mastic with foil

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Metal foil, Mastic/Binder	Cellulose 53%	**None Detected ND**
	Glass fibers 14%	

Layer 3 of 4 **Description:** Brown fibrous material with black asphaltic mastic and paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Asphalt/Binder, Fine particles	Cellulose 52%	**None Detected ND**
Paint		

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Layer 4 of 4 **Description:** Yellow fluffy fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Glass debris, Fine particles	Glass fibers 93%	**None Detected ND**

Lab ID: 21040535 **Client Sample #: 40035.905-030**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 3 **Description:** Off-white woven fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	Cellulose 87%	**None Detected ND**

Layer 2 of 3 **Description:** Brown fibrous material with black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Asphalt/Binder, Fine particles	Cellulose 50%	**None Detected ND**

Layer 3 of 3 **Description:** Yellow fluffy fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Glass debris, Fine particles	Glass fibers 93%	**None Detected ND**

Lab ID: 21040536 **Client Sample #: 40035.905-031**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** White woven fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Glass debris	Glass fibers 96%	**None Detected ND**
	Cellulose <1%	

Lab ID: 21040537 **Client Sample #: 40035.905-032**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 2 **Description:** White soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Debris	None Detected ND	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Bulk Asbestos Fibers Analysis
By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Layer 2 of 2 **Description:** Yellow foamy material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Synthetic foam	None Detected ND	**None Detected ND**

Lab ID: 21040538 **Client Sample #: 40035.905-033**
Location: UW - IMA Locker ad Pool Upgrades
Comments: Unsure of correct layer sequence.

Layer 1 of 3 **Description:** White woven fibrous mesh with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Paint	Cellulose 87%	**None Detected ND**

Layer 2 of 3 **Description:** Off-white fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles	None Detected ND	**Chrysotile 56%**

Layer 3 of 3 **Description:** Off-white crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Glass debris	Glass fibers 27%	**Chrysotile 6%**
	Cellulose <1%	

Lab ID: 21040539 **Client Sample #: 40035.905-034**
Location: UW - IMA Locker ad Pool Upgrades
Comments: Unsure of correct layer sequence.

Layer 1 of 2 **Description:** Pale gray brittle crumbly material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Glass debris	None Detected ND	**None Detected ND**
Fine grains, Paint		

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis
By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Layer 2 of 2 **Description:** White brittle sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Sand, Fine particles	Cellulose <1%	**None Detected ND**
Fine grains, Paint		

Lab ID: 21040540 **Client Sample #: 40035.905-035**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** White brittle sandy material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Sand, Fine particles	Cellulose <1%	**None Detected ND**
Fine grains, Debris	Spider silk <1%	

Lab ID: 21040541 **Client Sample #: 40035.905-036**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Beige crumbly material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Debris	Cellulose <1%	**None Detected ND**

Lab ID: 21040542 **Client Sample #: 40035.905-037**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Beige crumbly material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Fine grains	None Detected ND	**None Detected ND**

Lab ID: 21040543 **Client Sample #: 40035.905-038**
Location: UW - IMA Locker ad Pool Upgrades

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021
Matt Macfarlane, Asbestos Lab Supervisor

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Layer 1 of 1 **Description:** Beige crumbly material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Fine grains	Cellulose <1%	**None Detected ND**

Lab ID: 21040544 **Client Sample #: 40035.905-039**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Off-white soft material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles	Cellulose <1%	**None Detected ND**

Lab ID: 21040545 **Client Sample #: 40035.905-040**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Off-white crumbly material with soft blue coating and debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Fine grains Debris	Cellulose <1%	**None Detected ND**

Lab ID: 21040546 **Client Sample #: 40035.905-041**
Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Black soft rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Debris	None Detected ND	**None Detected ND**

Lab ID: 21040547 **Client Sample #: 40035.905-042**
Location: UW - IMA Locker ad Pool Upgrades
Comments: Small sample size.

Layer 1 of 1 **Description:** Black soft crumbly material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Binder/Filler, Fine particles, Debris	None Detected ND	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASB-02

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105621.00
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 26
Samples Analyzed: 26
Method: EPA/600/R-93/116

Lab ID: 21040548 **Client Sample #: 40035.905-043**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** White soft rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Debris	Cellulose <1%	**Chrysotile 2%**

Lab ID: 21040549 **Client Sample #: 40035.905-044**

Location: UW - IMA Locker ad Pool Upgrades

Layer 1 of 1 **Description:** Loose black crumbly asphaltic material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Fine particles	Cellulose 2%	**None Detected ND**

Sampled by: Client
Analyzed by: Hilary Crumley **Date:** 03/29/2021
Reviewed by: Matt Macfarlane **Date:** 03/29/2021

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASB-02

ASBESTOS LABORATORY SERVICES

Company	PBS Environmental - Seattle	**NVL Batch Number**	**2105621.00**
Address	214 E Galer St. Suite. 300 Seattle, WA 98102	**TAT**	1 Day **AH** No
		Rush TAT	
Project Manager	Mr. Ryan Hunter	**Due Date**	3/30/2021 **Time** 12:00 PM
Phone	(206) 233-9639	**Email**	ryan.hunter@pbsusa.com
		Fax	(866) 727-0140

Project Name/Number: 40035.905 **Project Location:** UW - IMA Locker ad Pool Upgrades

Subcategory PLM Bulk

Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 26

Rush Samples

	Lab ID	Sample ID	Description	A/R
1	21040524	40035.905-019		A
2	21040525	40035.905-020		A
3	21040526	40035.905-021		A
4	21040527	40035.905-022		A
5	21040528	40035.905-023		A
6	21040529	40035.905-024		A
7	21040530	40035.905-025		A
8	21040531	40035.905-026		A
9	21040532	40035.905-027		A
10	21040533	40035.905-028		A
11	21040534	40035.905-029		A
12	21040535	40035.905-030		A
13	21040536	40035.905-031		A
14	21040537	40035.905-032		A
15	21040538	40035.905-033		A
16	21040539	40035.905-034		A
17	21040540	40035.905-035		A
18	21040541	40035.905-036		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Courier				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	3/29/21	1200
Analyzed by	Hilary Crumley		NVL	3/29/21	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 3/29/2021
Time: 12:04 PM
Entered By: Fatima Khan

ASBESTOS LABORATORY SERVICES

NVL

Company PBS Environmental - Seattle
Address 214 E Galer St. Suite. 300
Seattle, WA 98102
Project Manager Mr. Ryan Hunter
Phone (206) 233-9639

NVL Batch Number **2105621.00**
TAT 1 Day **AH** No
Rush TAT
Due Date 3/30/2021 **Time** 12:00 PM
Email ryan.hunter@pbsusa.com
Fax (866) 727-0140

Project Name/Number: 40035.905 **Project Location:** UW - IMA Locker ad Pool Upgrades

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 26

Rush Samples

	Lab ID	Sample ID	Description	A/R
19	21040542	40035.905-037		A
20	21040543	40035.905-038		A
21	21040544	40035.905-039		A
22	21040545	40035.905-040		A
23	21040546	40035.905-041		A
24	21040547	40035.905-042		A
25	21040548	40035.905-043		A
26	21040549	40035.905-044		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Courier				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	3/29/21	1200
Analyzed by	Hilary Crumley		NVL	3/29/21	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 3/29/2021
Time: 12:04 PM
Entered By: Fatima Khan

40035.905-019	Yellow Carpet Mastic	Men's Locker Room Staff Lockers	NVL
40035.905-020	1" Blue Ceramic Floor Tile & Grout	Women's Locker Room Shower	
40035.905-021	Ceramic Wall Tile & Grout	Women's Locker Room Restroom	
40035.905-022	2" Blue Ceramic Floor Tile & Grout	Women's Locker Room Locker Area	
40035.905-023	1" Yellow Ceramic Floor Tile & Grout	Men's Locker Room Exit	
40035.905-024	Grout A/w Quarry Tile	Women's Sauna	
40035.905-025	Vibration Cloth	Exhaust Fan #6	
40035.905-026	Vibration Cloth	Supply Fan #5	
40035.905-027	Vibration Cloth	Exhaust Fan #1	
40035.905-028	Cloth w/ Fiberglass Insulation	Supply #3	
40035.905-029	Cloth w/ Fiberglass Insulation	Exhaust #3	
40035.905-030	Cloth w/ Fiberglass Insulation	Duct @ AHU #6	
40035.905-031	Insulation Cloth Blanket	Supply #3	
40035.905-032	White Foam Insulation	1st Floor Mechanical Room	
40035.905-033	Pipe Fitting Insulation	Supply Fan #4	
40035.905-034	CMU & Mortar	Men's Locker Room Exit	
40035.905-035	Mortar A/w CMU	Women's Locker Room Chase	
40035.905-036	Tan Duct Sealant	Pool Area Above Drop Ceiling	
40035.905-037	Gray Duct Sealant	Exhaust #6	
40035.905-038	Gray Duct Sealant	Exhaust #1	
40035.905-039	White Caulk @ Ceramic Tile & Ceiling	Women's Locker Room Individual Showers	
40035.905-040	Caulk @ Vent	Pool Deck East Side	
40035.905-041	Black Interior Window Frame Caulk	Pool Area Store Front Windows	
40035.905-042	Black Interior Door Frame Caulk	Pool Area Store Front Door	
40035.905-043	Exterior Caulk @ Column	Sun Deck @ Marble Crete	
40035.905-044	Black Sink Undercoat	Women's Locker Room Drying Area	

PBS

LABORATORY CHA 2105621

Project: UW – IMA Locker ad Pool Upgrades
Project #: 40035.905

Analysis requested: PLM
Date: 3/26/2021

Relinq'd by/Signature: Ryan Hunter / [signature]
Date/Time: 3/26/2021

Received by/Signature: [signature]
Date/Time: 3/29/2021 1200 courier

Email ALL INVOICES to: seattleap@pbsusa.com

E-mail results to:

- ☐ Brian Stanford
- ☒ Willem Mager
- ☐ Gregg Middaugh
- ☐ Mark Hiley
- ☐ Tim Ogden
- ☐ Prudy Stoudt-McRae
- ☐ Janet Murphy
- ☐ Kaitlin Soukup
- ☐ Martin Estira
- ☐ Justin Day
- ☐ Claire Tsai
- ☐ Holly Tuttle
- ☐ Mike Smith
- ☐ Ferman Fletcher
- ☒ Ryan Hunter
- ☒ Michelle Dodson
- ☐ ____________

TURN AROUND TIME:

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ☒ 24 Hours
- ☐ 48 Hours
- ☐ 3-5 Days
- ☐ Other____________

PAGE 1 OF 2

SAMPLE DATA FORM

Sample #	Material	Location	Lab
40035.905-001	Joint Compound / Gypsum Wallboard *	Women's Locker Room Shower Ceiling	NVL
40035.905-002	Plaster Skim Coat	Women's Locker Room Middle Column	↓
40035.905-003	Plaster Skim Coat	Women's Locker Room Bathroom Column	
40035.905-004	Plaster Skim Coat	Men's Locker Room Shower Column	
40035.905-005	Marble Crete Wall	Women's Locker Room Middle Wall	
40035.905-006	Marble Crete Wall	Exterior Sun Deck East Side	
40035.905-007	Marble Crete Wall	Exterior Sun Deck West Side	
40035.905-008	Exterior Column Material	South Elevation at Sun Deck	
40035.905-009	White 2'x4' Lay-in Ceiling Tile	Pool Ceiling	
40035.905-010	White 2'x4' Lay-in Ceiling Tile	Pool Ceiling	
40035.905-011	4" Blue Cove Base w/ Cream Mastic	Women's Locker Room @ Lockers	
40035.905-012	4" Blue Cove Base w/ Cream/Brown Mastic	Men's Locker Room Staff Lockers	
40035.905-013	4" Blue Cove Base w/ Cream/Brown Mastic	Women's Locker Room @ West Entrance	
40035.905-014	Gray Sheet Vinyl Flooring	Office Area #3	
40035.905-015	Yellow Carpet Mastic & Leveler	Women's Locker Room @ West Entrance	
40035.905-016	Yellow Carpet Mastic	Women's Locker Room East Side	
40035.905-017	Yellow Carpet Mastic & Underlayment	Women's Locker Room Vanity Area	
40035.905-018	Yellow Carpet Mastic	Men's Locker Room @ North Showers	↓

* IF POSITIVE ANALYZE AS COMPOSITE SAMPLE

APPENDIX C

FAA Lead Paint Chip Sample Inventory
FAA Lead Paint Chip Laboratory Analysis
FAA Lead Paint Chip Sample Chain of Custody

AA LEAD PAINT CHIP SAMPLE INVENTORY

PBS Sample #	Paint Color / Component or Substrate	Sample Location	Results (mg/kg)	Results (%)	Lab
40035.905 -Pb01	Off-white / Gypsum wallboard / Wall	Men's locker room shower	<51	<0.0051	NVL
40035.905 -Pb02	White / Concrete masonry unit / Wall	Women's locker room shower area	<92	<0.0092	NVL
40035.905 -Pb03	Green / Plaster / Column	Men's locker room shower	<51	<0.0051	NVL
40035.905 -Pb04	Beige / Concrete / Ceiling	Women's locker room	<50	<0.0050	NVL
40035.905 -Pb05	Blue / Plaster / Column	Women's locker room bathroom	<54	<0.0054	NVL
40035.905 -Pb06	Off-white / Gypsum wallboard / Wall	Women's locker room, South wall	<53	<0.0053	NVL
40035.905 -Pb07	White / Concrete / Wall	Pool area, South wall	<71	<0.0071	NVL
40035.905 -Pb08	Blue / Concrete / Wall	Pool area, South wall	<110	<0.011	NVL
40035.905 -Pb09	Beige / Concrete masonry unit / Wall	Mechanical room 103	<72	<0.0072	NVL
40035.905 -Pb10	Red / Metal / Bracing	Pool area at roof deck	850	0.085	NVL
40035.905 -Pb11	Beige / Metal / Frame	Women's locker room, staff locker door	<120	<0.012	NVL
40035.905 -Pb12	Gray / Metal / Platform	Chill water system	<180	<0.018	NVL
40035.905 -Pb13	Tan / Fiberglass / Tank	Pool water treatment system	5100	0.51	NVL
40035.905 -Pb14	1" Yellow ceramic floor tile	Men's locker room	<28	<0.0028	NVL
40035.905 -Pb15	1" Blue ceramic floor tile	Women's locker room shower	<28	<0.0028	NVL
40035.905 -Pb16	2" Blue ceramic floor tile	Women's locker room	<19	<0.0019	NVL
40035.905 -Pb17	Ceramic wall tile	Women's locker restroom	<38	<0.0038	NVL

mg/kg = Milligrams per kilogram
< = Less than the Limit of Detection

PBS Sample #	Paint Color / Component or Substrate	Sample Location	Results (mg/kg)	Results (%)	Lab
40035.905 -Pb18	Grout associated with quarry tile	Women's sauna	<35	<0.0035	NVL
40035.905 -Pb19	Mortar associated with concrete masonry unit	Women's locker room chase	<28	<0.0028	NVL
40035.905 -Pb20	Grout associated with yellow ceramic floor tile	Men's locker room exit	<53	<0.0053	NVL
40035.905 -Pb21	Grout associated with blue ceramic floor tile	Women's locker room shower	<60	<0.0060	NVL
40035.905 -Pb22	Grout associated with blue ceramic floor tile	Women's locker area	<51	<0.0051	NVL
40035.905 -Pb23	Grout associated with ceramic wall tile	Women's locker room restroom	42	0.0042	NVL

mg/kg = Milligrams per kilogram
< = Less than the Limit of Detection

March 30, 2021

Ryan Hunter
PBS Environmental - Seattle
214 E Galer St. Suite. 300
Seattle, WA 98102

NVL Batch # 2105625.00

RE: Total Metal Analysis
Method: EPA 7000B Lead by FAA <paint>
Item Code: FAA-02

Client Project: 40035.905
Location: UW - IMA Locker ad Pool Upgrades

Dear Mr. Hunter,

NVL Labs received 18 sample(s) for the said project on 3/29/2021. Preparation of these samples was conducted following protocol outlined in EPA 3051/7000B , unless stated otherwise. Analysis of these samples was performed using analytical instruments in accordance with EPA 7000B Lead by FAA <paint>. The results are usually expressed in mg/Kg and percentage (%). Test results are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissible exposure levels, please call your local regulatory agencies for more detail.

At NVL Labs all analyses are performed under strict guidelines of the Quality Assurance Program. This report is considered highly confidential and will not be released without your approval. Samples are archived after two weeks from the analysis date. Please feel free to contact us at 206-547-0100, in case you have any questions or concerns.

Sincerely,

Shalini Patel, Lab Supervisor

Enc.: Sample results

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Analysis Report

Total Lead (Pb)

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker ad Pool Upgrades

Batch #: 2105625.00
Matrix: Paint
Method: EPA 3051/7000B
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 18
Samples Analyzed: 18

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
21040595	40035.905-Pb01	0.1972	51	< 51	<0.0051
21040596	40035.905-Pb02	0.1085	92	< 92	<0.0092
21040597	40035.905-Pb03	0.1974	51	< 51	<0.0051
21040598	40035.905-Pb04	0.2012	50	< 50	<0.0050
21040599	40035.905-Pb05	0.1842	54	< 54	<0.0054
21040600	40035.905-Pb06	0.1892	53	< 53	<0.0053
21040601	40035.905-Pb07	0.1414	71	< 71	<0.0071
21040602	40035.905-Pb08	0.0952	110	< 110	<0.011
21040603	40035.905-Pb09	0.1390	72	< 72	<0.0072
21040604	40035.905-Pb10	0.0840	120	850	0.085
21040605	40035.905-Pb11	0.0845	120	< 120	<0.012
21040606	40035.905-Pb12	0.0570	180	< 180	<0.018
21040607	40035.905-Pb13	0.0562	180	5100	0.51
21040608	40035.905-Pb14	0.3532	28	< 28	<0.0028
21040609	40035.905-Pb15	0.3525	28	< 28	<0.0028
21040610	40035.905-Pb16	0.5239	19	< 19	<0.0019
21040611	40035.905-Pb17	0.2609	38	< 38	<0.0038
21040612	40035.905-Pb18	0.2861	35	< 35	<0.0035

Sampled by: Client
Analyzed by: Yasuyuki Hida   Date Analyzed: 03/30/2021
Reviewed by: Shalini Patel   Date Issued: 03/30/2021

Shalini Patel, Lab Supervisor

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000
RL = Reporting Limit
'<' = Below the reporting Limit
Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

Bench Run No: 2021-0330-3

FAA-02

LEAD LABORATORY SERVICES

Company	PBS Environmental - Seattle	**NVL Batch Number**	**2105625.00**
Address	214 E Galer St. Suite. 300 Seattle, WA 98102	**TAT**	2 Days **AH** No
		Rush TAT	
Project Manager	Mr. Ryan Hunter	**Due Date**	3/31/2021 **Time** 12:00 PM
Phone	(206) 233-9639	**Email**	ryan.hunter@pbsusa.com
		Fax	(866) 727-0140

Project Name/Number: 40035.905 **Project Location:** UW - IMA Locker ad Pool Upgrades

Subcategory Flame AA (FAA)

Item Code FAA-02 EPA 7000B Lead by FAA <paint>

Total Number of Samples 18 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	21040595	40035.905-Pb01		A
2	21040596	40035.905-Pb02		A
3	21040597	40035.905-Pb03		A
4	21040598	40035.905-Pb04		A
5	21040599	40035.905-Pb05		A
6	21040600	40035.905-Pb06		A
7	21040601	40035.905-Pb07		A
8	21040602	40035.905-Pb08		A
9	21040603	40035.905-Pb09		A
10	21040604	40035.905-Pb10		A
11	21040605	40035.905-Pb11		A
12	21040606	40035.905-Pb12		A
13	21040607	40035.905-Pb13		A
14	21040608	40035.905-Pb14		A
15	21040609	40035.905-Pb15		A
16	21040610	40035.905-Pb16		A
17	21040611	40035.905-Pb17		A
18	21040612	40035.905-Pb18		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Courier				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	3/29/21	1200
Analyzed by	Yasuyuki Hida		NVL	3/30/21	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 3/29/2021
Time: 12:17 PM
Entered By: Fatima Khan

PBS

LABORATORY C 2105625

Project: UW – IMA Locker ad Pool Upgrades

Project #: 40035.905

Analysis requested: FAA – Total Lead Paint Chip Analysis

Date: 3/26/2021

Relinq'd by/Signature: Ryan Hunter / Ryan Hunter

Date/Time: 3/26/2021

Received by/Signature: [illegible]

Date/Time: 3/29/2021 [illegible]

Email ALL INVOICES to: seattleap@pbsusa.com

E-mail results to:

- ☐ Brian Stanford
- ☒ Willem Mager
- ☐ Gregg Middaugh
- ☐ Mark Hiley
- ☐ Tim Ogden
- ☐ Prudy Stoudt-McRae
- ☐ Janet Murphy
- ☐ Kaitlin Soukup
- ☐ Martin Estira
- ☐ Justin Day
- ☐ Claire Tsai
- ☐ Holly Tuttle
- ☐ Mike Smith
- ☐ Ferman Fletcher
- ☒ Ryan Hunter
- ☒ Michelle Dodson
- ☐ ____________

TURN AROUND TIME:

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ~~☒ 24 Hours~~
- ☒ 48 Hours RH
- ☐ 5 Day
- ☐ Other____________

PAGE 1 OF 2

SAMPLE DATA FORM

Sample #	Material	Location	Lab
40035.905-Pb01	Off-white / GWB / Wall	Men's Locker Room Shower	NVL
40035.905-Pb02	White / CMU / Wall	Women's Locker Room Shower Area	
40035.905-Pb03	Green / Plaster / Column	Men's Locker Room Shower	
40035.905-Pb04	Beige / Concrete / Ceiling	Women's Locker Room	
40035.905-Pb05	Blue / Plaster / Column	Women's Locker Room Bathroom	
40035.905-Pb06	Off-white/ GWB / Wall	Women's Locker Room South Wall	
40035.905-Pb07	White / Concrete / Wall	Pool Area South Wall	
40035.905-Pb08	Blue / Concrete / Wall	Pool Area South Wall	
40035.905-Pb09	Beige / CMU / Wall	Mechanical Room 103	
40035.905-Pb10	Red / Metal / Bracing	Pool Area @ Roof Deck	
40035.905-Pb11	Beige / Metal / Frame	Women's Locker Room Staff Locker Door	
40035.905-Pb12	Gray / Metal / Platform	Chill Water System	
40035.905-Pb13	Tan / FG / Tank	Pool Water Treatment System	
40035.905-Pb14	1" Yellow Ceramic Floor Tile	Men's Locker Room	
40035.905-Pb15	1" Blue Ceramic Floor Tile	Women's Locker Room Shower	
40035.905-Pb16	2" Blue Ceramic Floor Tile	Women's Locker Room	
40035.905-Pb17	Ceramic Wall Tile	Women's Locker Restroom	
40035.905-Pb18	Grout A/w Quarry Tile	Women's Sauna	

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY + MANAGEMENT + TRAINING

March 30, 2021

Ryan Hunter
PBS Environmental - Seattle
214 E Galer St. Suite. 300
Seattle, WA 98102

NVL Batch # 2105626.00

RE: **Total Metal Analysis**
Method: EPA 7000B Lead by FAA <paint>
Item Code: FAA-02

Client Project: 40035.905
Location: UW - IMA Locker ad Pool Upgrades

Dear Mr. Hunter,

NVL Labs received 5 sample(s) for the said project on 3/29/2021. Preparation of these samples was conducted following protocol outlined in EPA 3051/7000B , unless stated otherwise. Analysis of these samples was performed using analytical instruments in accordance with EPA 7000B Lead by FAA <paint>. The results are usually expressed in mg/Kg and percentage (%). Test results are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissible exposure levels, please call your local regulatory agencies for more detail.

At NVL Labs all analyses are performed under strict guidelines of the Quality Assurance Program. This report is considered highly confidential and will not be released without your approval. Samples are archived after two weeks from the analysis date. Please feel free to contact us at 206-547-0100, in case you have any questions or concerns.

Sincerely,

Shalini Patel, Lab Supervisor

Enc.: Sample results

ANNIVERSARY 25 1995 - 2020

ilac-MRA

ENVIRONMENTAL LEAD ISO/IEC 17025:2017 Accredited Laboratory Pb Lead AIHA LAP, LLC AIHAACCREDITEDLABS.ORG Lab ID # 101861

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Analysis Report

Total Lead (Pb)

Batch #: 2105626.00

Client: PBS Environmental - Seattle

Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter

Project Location: UW - IMA Locker ad Pool Upgrades

Matrix: Paint
Method: EPA 3051/7000B
Client Project #: 40035.905
Date Received: 3/29/2021
Samples Received: 5
Samples Analyzed: 5

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
21040613	40035.905-Pb19	0.3637	27	< 28	<0.0028
21040614	40035.905-Pb20	0.1887	53	< 53	<0.0053
21040615	40035.905-Pb21	0.1679	60	< 60	<0.0060
21040616	40035.905-Pb22	0.1978	51	< 51	<0.0051
21040617	40035.905-Pb23	0.2904	34	42	0.0042

Sampled by: Client
Analyzed by: Yasuyuki Hida — Date Analyzed: 03/30/2021
Reviewed by: Shalini Patel — Date Issued: 03/30/2021

Shalini Patel, Lab Supervisor

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000
RL = Reporting Limit
'<' = Below the reporting Limit

Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

Bench Run No: 2021-0330-2

FAA-02

LEAD LABORATORY SERVICES

Company	PBS Environmental - Seattle	**NVL Batch Number**	**2105626.00**
Address	214 E Galer St. Suite. 300 Seattle, WA 98102	**TAT**	2 Days **AH** No
		Rush TAT	
Project Manager	Mr. Ryan Hunter	**Due Date**	3/31/2021 **Time** 12:00 PM
Phone	(206) 233-9639	**Email**	ryan.hunter@pbsusa.com
		Fax	(866) 727-0140

Project Name/Number: 40035.905 **Project Location:** UW - IMA Locker ad Pool Upgrades

Subcategory Flame AA (FAA)

Item Code FAA-02 EPA 7000B Lead by FAA <paint>

Total Number of Samples 5 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	21040613	40035.905-Pb19		A
2	21040614	40035.905-Pb20		A
3	21040615	40035.905-Pb21		A
4	21040616	40035.905-Pb22		A
5	21040617	40035.905-Pb23		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Courier				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	3/29/21	1200
Analyzed by	Yasuyuki Hida		NVL	3/30/21	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 3/29/2021
Time: 12:19 PM
Entered By: Fatima Khan

PBS

LABORATORY C **2105626**

Project: UW – IMA Locker ad Pool Upgrades

Project #: 40035.905

Analysis requested: FAA – Total Lead Paint Chip Analysis

Date: 3/26/2021

Relinq'd by/Signature: Ryan Hunter / Ryan Ht

Date/Time: 3/26/2021

Received by/Signature: Kellaflen [illegible]

Date/Time: 3/29/2021 Rob Lourie

Email ALL INVOICES to: seattleap@pbsusa.com

E-mail results to:

- ☐ Brian Stanford
- ☒ Willem Mager
- ☐ Gregg Middaugh
- ☐ Mark Hiley
- ☐ Tim Ogden
- ☐ Prudy Stoudt-McRae
- ☐ Janet Murphy
- ☐ Kaitlin Soukup
- ☐ Martin Estira
- ☐ Justin Day
- ☐ Claire Tsai
- ☐ Holly Tuttle
- ☐ Mike Smith
- ☐ Ferman Fletcher
- ☒ Ryan Hunter
- ☒ Michelle Dodson
- ☐ ____________

TURN AROUND TIME:

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ~~☒ 24 Hours~~
- ☒ 48 Hours RH
- ☐ 5 Day
- ☐ Other____________

PAGE 1 OF 2

SAMPLE DATA FORM

Sample #	Material	Location	Lab
40035.905-Pb01	Off-white / GWB / Wall	Men's Locker Room Shower	NVL
40035.905-Pb02	White / CMU / Wall	Women's Locker Room Shower Area	↓
40035.905-Pb03	Green / Plaster / Column	Men's Locker Room Shower	
40035.905-Pb04	Beige / Concrete / Ceiling	Women's Locker Room	
40035.905-Pb05	Blue / Plaster / Column	Women's Locker Room Bathroom	
40035.905-Pb06	Off-white/ GWB / Wall	Women's Locker Room South Wall	
40035.905-Pb07	White / Concrete / Wall	Pool Area South Wall	
40035.905-Pb08	Blue / Concrete / Wall	Pool Area South Wall	
40035.905-Pb09	Beige / CMU / Wall	Mechanical Room 103	
40035.905-Pb10	Red / Metal / Bracing	Pool Area @ Roof Deck	
40035.905-Pb11	Beige / Metal / Frame	Women's Locker Room Staff Locker Door	
40035.905-Pb12	Gray / Metal / Platform	Chill Water System	
40035.905-Pb13	Tan / FG / Tank	Pool Water Treatment System	
40035.905-Pb14	1" Yellow Ceramic Floor Tile	Men's Locker Room	
40035.905-Pb15	1" Blue Ceramic Floor Tile	Women's Locker Room Shower	
40035.905-Pb16	2" Blue Ceramic Floor Tile	Women's Locker Room	
40035.905-Pb17	Ceramic Wall Tile	Women's Locker Restroom	
40035.905-Pb18	Grout A/w Quarry Tile	Women's Sauna	↓

PAGE 2 OF 2

40035.905-Pb19	Mortal A/w CMU	Women's Locker Room Chase	NVL
40035.905-Pb20	Grout A/w Yellow Ceramic Floor Tile	Men's Locker Room Exit	↓
40035.905-Pb21	Grout A/w Blue Ceramic Floor Tile	Women's Locker Room Shower	
40035.905-Pb22	Grout A/w Blue Ceramic Floor Tile	Women's Locker Area	
40035.905-Pb23	Grout A/w Ceramic Wall Tile	Women's Locker Room Restroom	

APPENDIX D

PCB Sample Inventory
PCB Laboratory Analysis
PCB Chain of Custody

PCB SAMPLE INVENTORY

PBS Sample #	Sample Location	Analyte	Lab Results (mg/kg)	Lab
40035.905 -PCB01	Black interior window frame caulk	Aroclor 1016	ND	NVL
		Aroclor 1221	ND	
		Aroclor 1232	ND	
		Aroclor 1242	ND	
		Aroclor 1248	ND	
		Aroclor 1254	ND	
		Aroclor 1260	ND	
40035.905 -PCB02	Black interior window frame caulk	Aroclor 1016	ND	NVL
		Aroclor 1221	ND	
		Aroclor 1232	ND	
		Aroclor 1242	ND	
		Aroclor 1248	ND	
		Aroclor 1254	ND	
		Aroclor 1260	ND	
40035.905 -PCB03	Exterior caulk at columns	Aroclor 1016	ND	NVL
		Aroclor 1221	ND	
		Aroclor 1232	ND	
		Aroclor 1242	ND	
		Aroclor 1248	7800.00	
		Aroclor 1254	ND	
		Aroclor 1260	ND	

mg/kg = Milligrams per kilogram
< = Less than the Limit of Detection

April 2, 2021

Ryan Hunter
PBS Environmental - Seattle
214 E Galer St. Suite. 300
Seattle, WA 98102

RE: Organic Analysis, NVL Batch # 2105644.00

Dear Mr. Hunter,

Enclosed please find test results for the samples submitted to our laboratory for analysis. Preparation and analysis of these samples were conducted for the presence of organic compounds using instruments specified in accordance with EPA, NIOSH and other published methods.

Test results for bulk sample are usually expressed in milligrams per kilogram (mg/Kg) and/or parts per million (ppm). Air samples are usually reported in milligrams per cubic meter (mg/m3). Dust wipe samples are expressed in micrograms per square foot (ug/ft2). The reported test results pertain only to items tested and are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissable exposure limits, please call your local regulatory agencies for more details.

This report is considered highly confidential and will not be released without your approval. Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Evelyn Ahulu, EM Lab Manager

Enc.: Sample Results

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Analysis Report
Polychlorinated Biphenyls (PCBs)

NVL

Client: PBS Environmental - Seattle
Address: 214 E Galer St. Suite. 300
Seattle, WA 98102

Attention: Mr. Ryan Hunter
Project Location: UW - IMA Locker and Pool Upgrades

NVL Batch #: 2105644.00
Method No.:
Client Project #: 40035.905
Date Received: 3/29/2021
Matrix: Bulk
Samples Received: 3
Samples Analyzed: 3

Lab Sample ID:	21040735	21040736	21040737	
Client Sample ID:	40035.905-PCB01	40035.905-PCB02	40035.905-PCB03	
Sample Description:	Caulk	Caulk	Caulk	
Sample Weight (g)	0.4301	0.2427	1.3170	
PCB Type	mg/Kg(ppm)	mg/Kg(ppm)	mg/Kg(ppm)	
Aroclor 1016	ND	ND	ND	
Aroclor 1221	ND	ND	ND	
Aroclor 1232	ND	ND	ND	
Aroclor 1242	ND	ND	ND	
Aroclor 1248	ND	ND	7800.00	
Aroclor 1254	ND	ND	ND	
Aroclor 1260	ND	ND	ND	
Total: PCB Concentration	ND	ND	7800.0	
Reporting Limit (RL)	4.7	8.2	760.0	

Remarks: mg/Kg = Milligrams per kilogram
ppm = Parts per million by weight
ND = None Detected (less than RL)
<RL = Below the reporting limit of instrument

Sampled by: Client
Analyzed by: Shalini Patel **Date:** 03/30/2021
Reviewed by: Evelyn Ahulu **Date:** 04/02/2021

Evelyn Ahulu, EM Lab Manager

Preparation and analysis of these samples were conducted in accordance with published test methods. Unless stated otherwise, the condition of all samples was acceptable at time of receipt. Reported sample results are based on dry weight and method QC results are acceptable unless stated otherwise. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc.. Responsibility for interpretation of the reported data rests with the client.

ORGANICS LABORATORY SERVICES

NVL

Company	PBS Environmental - Seattle	**NVL Batch Number**	**2105644.00**
Address	214 E Galer St. Suite. 300 Seattle, WA 98102	**TAT**	5 Days **AH** No
		Rush TAT	
Project Manager	Mr. Ryan Hunter	**Due Date**	4/5/2021 **Time** 12:00 PM
Phone	(206) 233-9639	**Email**	ryan.hunter@pbsusa.com
		Fax	(866) 727-0140

Project Name/Number: 40035.905 **Project Location:** UW - IMA Locker and Pool Upgrades

Subcategory Quantitative analysis

Item Code ORG-05 8082 PCB Aroclors <Bulk>

Total Number of Samples 3

Rush Samples

	Lab ID	Sample ID	Description	A/R
1	21040735	40035.905-PCB01		A
2	21040736	40035.905-PCB02		A
3	21040737	40035.905-PCB03		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Courier				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	3/29/21	1200
Analyzed by	Shalini Patel		NVL	3/30/21	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 3/29/2021
Time: 1:12 PM
Entered By: Kelly AuVu

PBS

LABORATORY CH 2105644

Project: UW – IMA Locker ad Pool Upgrades
Project #: 40035.905

Analysis requested: EPA 8082 - PCB
Date: 3/26/2021

Relinq'd by/Signature: Ryan Hunter / [signature]
Date/Time: 3/26/2021

Received by/Signature: [signature]
Date/Time 3/29/21 1200 courier

Email ALL INVOICES to: seattleap@pbsusa.com

E-mail results to:

- ☐ Brian Stanford
- ☒ Willem Mager
- ☐ Gregg Middaugh
- ☐ Mark Hiley
- ☐ Tim Ogden
- ☐ Prudy Stoudt-McRae
- ☐ Janet Murphy
- ☐ Kaitlin Soukup
- ☐ Martin Estira
- ☐ Justin Day
- ☐ Claire Tsai
- ☐ Holly Tuttle
- ☐ Mike Smith
- ☐ Ferman Fletcher
- ☒ Ryan Hunter
- ☒ Michelle Dodson
- ☐ ______________

TURN AROUND TIME:

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ☐ 24 Hours
- ☐ 48 Hours
- ☒ 5 Day
- ☐ Other____________

SAMPLE DATA FORM

Sample #	Material	Location	Lab
40035.905-PCB01	Black Interior Window Frame Caulk	Pool Area Store Front Windows	NVL
40035.905-PCB02	Black Interior Window Frame Caulk	Pool Area Store Front Windows	↓
40035.905-PCB03	Exterior Caulk @ Columns	Sun Deck @ Marble Crete	↓

214 EAST GALER STREET, SUITE 300, SEATTLE, WA 98102 ▪ 206.233.9639 MAIN ▪ 866.727.0140 FAX ▪ PBSUSA.COM

APPENDIX E

Prior Survey Data
IMA Laundry facility Hazardous Materials Inventory
Regulated Materials Office Sampling Data

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.790 -1	Mudded pipe fitting - 4" outside diameter pipe	Room 112 storage room, at ceiling (north)	Layer 1: Gray powdery material with fibrous material	5% Chrysotile	SAT
40035.790 -2	Mudded pipe fitting - 4" outside diameter pipe	Room 112, south chase	Layer 1: Gray powdery material with fibrous material	6% Chrysotile	SAT
40035.790 -3	Debris in pipe chase - pipe fitting insulation	Room 112, south chase	Layer 1: Gray powdery material with fibrous material	5% Chrysotile	SAT
40035.790 -4	Canvas wrap	Room 112, ceiling level	Layer 1: Yellow woven fibrous material	NAD	SAT
	Straight run pipe insulation		Layer 2: Yellow fibrous material	NAD	
40035.790 -5	Duct sealant - tan	Room 112, east duct work	Layer 1: Tan brittle material	NAD	SAT
40035.790 -6	Wall sealant - gray patch	Room 112, concrete masonry wall (at chase)	Layer 1: Gray brittle material with sand	NAD	SAT
40035.790 -7	Black covebase	West hallway, adjacent to Rooms 112 & 114	Layer 1: Black/dark blue rubbery material	NAD	SAT
	Beige mastic		Layer 2: Beige mastic	NAD	
40035.790 -8	White vinyl sheet flooring	West hallway	Layer 1: White sheet vinyl	NAD	SAT
	Gray mastic		Layer 2: Gray mastic	NAD	
	Gray material		Layer 3: Trace gray brittle material	NAD	
	Black mastic		Layer 4: Trace black mastic	3% Chrysotile	
40035.790 -9	Tan/off-white vinyl sheet flooring	North hall exit vestibule by Room 112	Layer 1: Tan/off-white sheet vinyl	NAD	SAT
	Gray mastic		Layer 2: Gray mastic	NAD	
	Black mastic		Layer 3: Trace gray brittle material	NAD	
			Layer 4: Trace black mastic	3% Chrysotile	

NAD - No Asbestos Detected

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
	Concrete slab		Layer 5: Trace gray sandy/brittle material		
40035.790 -10	Plaster skim coat	North hall exit vestibule by 112	Layer 1: White brittle material with paint and sand	NAD	SAT
40035.790 -11	Plaster skim coat	East vestibule wall by radiator	Layer 1: White sandy/brittle material	NAD	SAT
40035.790 -12	Plaster skim coat	East vestibule ceiling plenum	Layer 1: White sandy/brittle material	NAD	SAT
40035.790 -13	2 x 4 Textured ceiling tile	West hall suspended ceiling by Room 112	Layer 1: Off-white fibrous material with paint	NAD	SAT
40035.790 -14	2 x 4 Textured ceiling tile	Northwest vestibule by exit door	Layer 1: Off-white fibrous material with paint	NAD	SAT
40035.790 -15	Beige duct sealant	West hall ceiling by Room 112	Layer 1: Beige soft/elastic material	NAD	SAT
	Yellow fiberglass insulation		Layer 2: Yellow fibrous material	NAD	
40035.790 -16	Beige duct sealant covered by gray duct tape	West hall ceiling by 112 - on yellow fiberglass	Layer 1: Beige soft/elastic material	NAD	SAT
		in ceiling plenum	Layer 2: Yellow fibrous material	NAD	

NAD - No Asbestos Detected

AA LEAD PAINT CHIP SAMPLE INVENTORY

PBS Sample #	Paint Color / Component or Substrate	Sample Location	Results (mg/kg)	Results (%)	Lab
40035.790 -L1	Off-white / White / Concrete Masonry Unit / Wall	Vestibule hall north of Room 112	2300.0	0.2300	NVL
40035.790 -L2	White / Steel / Radiator	Vestibule hall north of Room 112	<52.0	<0.0052	NVL
40035.790 -L3	Concrete Masonry Unit gray mortar	Room 112 north wall	<50.0	<0.0050	NVL
40035.790 -L4	Tan / Steel / Door frame	Room 112 door	98.0	0.0098	NVL

mg/kg = Milligrams per kilogram
< = Less than the Limit of Detection

<u>Ceiling Material Summary for IMA</u>

Material Type	Sample Result	Location of Sample	Notes
White 2’ x 4’ ceiling tile	No ACM	Multiple locations throughout basement floor	WO# 25323
White 2’ x 4’ ceiling tile	No ACM	Multiple locations throughout the main floor	WO# 25323
Off-white fireproofing	No ACM	Above dropped ceiling throughout the main floor	WO# 25323
White 2’x4’ rough texture 2’x2’ pattern drop-in ceiling tile	No ACM	Ceilings of hallway outside 115A	WO# 26796
White painted drywall with joint compound	No ACM	Exposed ceilings throughout 200L lobby area	WO# 26992
Unpainted drywall with joint compound	No ACM	Second ceiling layer throughout 200L lobby area	WO# 26992
Unpainted green drywall without joint compound	No ACM	Third ceiling layer throughout 200L lobby area	WO# 26992

Exterior Materials Summary for IMA

Material Type	Sample Result	Location of Sample	Notes
Off-white rubbery caulking with an underlying layer of foam weather stripping	**Caulking: 8% ACM**	**South facing wall of the east building section on the roof level at the second concrete column east of the short parapet wall on the west side of the roof area**	WO# 19589
Gray and black sealants		South facing wall of the east building section on the roo level at the second concrete column east of the short parapet wall on the west side of the roof area from the t of the metal flashing near the roof level	WO# 19589
Dark gray rubbery caulking	**Off-white caulking material that contained 7% ACM**	**South facing wall of the east building section on the roof level at the first concrete column east of the short parapet wall on the west side of the roof area**	WO# 19589
Off-white, dark gray and gray with black sealant	No PCBs	South facing wall of the east building section on the roo level	WO# 19589
Gray sealant with white foam rubber backing	**Sealant: 13% ACM**	**North side exterior of the building at the junction of exterior concrete wall panels and columns**	WO# 20859
Marblecrete wall material	**14% ACM**	**North side exterior of the building**	WO# 20859
Gray sealant with white foam rubber backing	**42 parts per million of PCBs**	**North side exterior of the building at the junction of exterior concrete wall panels and columns**	WO# 20859
Sparkling skim coating on columns	No ACM	North side near NE corner – 15 feet above driveway	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	North side of building near center – 15 feet above driveway	WO# 20871
Bottom layer of Marblecrete material on wall panels	No ACM	North side near center – 15 feet above driveway	WO# 20871
Top layer of sparkling skim coating on columns	No ACM	North side from cantilevered column/beam assembly	WO# 20871
Bottom layer of sparkling skim coating on columns	No ACM	North side of building from cantilevered column/beam assembly	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	North side near NW corner 12 feet above driveway	WO# 20871
Bottom layer of Marblecrete material on wall panels	No ACM	North side near NW corner 12 feet above driveway	WO# 20871
Top layer of white caulk adjacent to sparkling skim coating	**10% ACM**	**North side near NW corner 12 feet above driveway**	WO# 20871
Bottom layer of white caulk adjacent to sparkling skim coating	No ACM	North side near NW corner 12 feet above driveway	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	South side near SE corner 12 feet above driveway	WO# 20871
Bottom layer of Marblecrete material on wall panels	No ACM	South side near SE corner 12 feet above driveway	WO# 20871
Sparkling skim coating on columns with canvas repair cloth	No ACM	South side near SE corner 12 feet above driveway	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	South side near SW corner 12 feet above driveway	WO# 20871
Bottom layer of Marblecrete material on wall panels	No ACM	South side near SW corner 12 feet above driveway	WO# 20871
Sparkling skim coating on columns	No ACM	South side near SW corner 12 feet above driveway	WO# 20871
Top layer of white caulk adjacent to sparkling skim coating	**12% ACM**	**South side near SW corner 12 feet above driveway**	WO# 20871
Bottom layer of white caulk adjacent to sparkling skim coating	No ACM	South side near SW corner 12 feet above driveway	WO# 20871
Sparkling skim coating on columns	No ACM	East side near NE corner 6 feet above sidewalk	WO# 20871
Top layer of white caulk not adjacent to sparkling skim coating	**3% ACM**	**East side near door to locker room 4 feet above driveway**	WO# 20871
Bottom layer of white caulk not adjacent to	No ACM	East side near door to locker room 4 feet above drivew	WO# 20871

sparkling skim coating			
Top layer of Marblecrete material on wall panels	No ACM	East side at upper walkway 0 feet above side-walk near door to Room 245	WO# 20871
Bottom layer of Marblecrete material on wall panels	No ACM	East side at upper walkway 0 feet above side-walk near door to Room 245	WO# 20871
Sparkling skim coating on columns with canvas repair cloth	No ACM	East side at upper walkway 0 feet above side-walk near door to Room 245	WO# 20871
Top layer of white caulk adjacent to sparkling skim coating	**15% ACM**	**East side at upper walkway 0 feet above side-walk near door to Room 245**	WO# 20871
Bottom layer of white caulk adjacent to sparkling skim coating	No ACM	East side at upper walkway 0 feet above side-walk near door to Room 245	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	North side near NE corner – 30 feet above driveway lev	WO# 20871
Bottom layer of Marblecrete material on wall panels	**4% ACM**	**North side near NE corner – 30 feet above driveway level**	WO# 20871
Sparkling skim coating on columns	**3% ACM**	**North side near NE corner – 30 feet above driveway level**	WO# 20871
Marblecrete material on wall panels	No ACM	North side near NW corner – 30 feet above driveway le	WO# 20871
Sparkling skim coating on columns	**3% ACM**	**North side near NE corner – 30 feetabove driveway level**	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	South side near SE corner – 30 feet above driveway lev	WO# 20871
Bottom layer of Marblecrete material on wall panels	**4% ACM**	**South side near SE corner – 30 feet above driveway level**	WO# 20871
Top layer of sparkling skim coating on columns	**5% ACM**	**South side near SE corner – 30 feet above driveway level**	WO# 20871
Bottom layer of sparkling skim coating on columns	**2% ACM**	**South side near SE corner – 30 feet above driveway level**	WO# 20871
Top layer of Marblecrete material on wall panels	No ACM	South side near SW corner – 30 feet above driveway le	WO# 20871
Bottom layer of Marblecrete material on wall panels	**4% ACM**	**South side near SW corner – 30 feet above driveway level**	WO# 20871
Sparkling skim coating on columns	**4% ACM**	**South side near SW corner – 30 feet above driveway level**	WO# 20871
Gray sealant with white foam rubber backing material	**Sealant: 13% ACM**	**North side exterior at junction of exterior concrete panels and columns**	WO# 20871
Marblecrete wall material	**14% ACM**	**From exterior of building at junction of exterior concrete wall panels and columns**	WO# 20871
White cement based material with white rocks	No ACM	Gravel strip/parking lot on the North side	WO# 22785
White cement based material with white rocks	No ACM	Lawn/walk way on the East side	WO# 22785
White cement based material with white rocks	No ACM	Gravel strip on the South side	WO# 22785

Flooring Material Summary for IMA

Material Type	Sample Result	Location of Sample	Notes
Off-white sheet vinyl with densely packed small, gray and tan spots and underlying materials	No ACM	Damaged area of flooring on the east side of the Vending Area	WO# 20253
Green sheet vinyl accent material	No ACM	Underlying materials was collected from the east side of the Vending Area behind the machines	WO# 20253
Blue carpet with black and gold highlights and associated tan mastic	No ACM	North side of Room 1158	WO# 22550
Blue carpet with black and gold highlights and associated tan mastic	No ACM	South side of Room 1158	WO# 22550
Blue 1” ceramic floor tile with black vapor barrier, tan mastic and off-white grout	No ACM	Women’s locker room	WO# 25179
Blue carpet with yellow mastic and leveling compound	No ACM	Floors of 115A	WO# 26796
Multi-colored mosaic pattern sheet vinyl with yellow mastic and leveling compound	No ACM	Floors of 115A	WO# 26796

TSI and Surfacing Materials Summary for IMA

Material Type	Sample Result	Location of Sample	Notes
1/8" O.D. tan woven wire insulation	**60% ACM**	**Light fixtures in the ceilings of the squash and racquetball courts**	WO# 20292
1/8" O.D. black woven wire insulation	**55% ACM**	**Light fixtures in the ceilings of the squash and racquetball courts**	WO# 20292
white fibrous insulation	**88% ACM**	**Light fixtures in the ceilings of the squash and racquetball courts**	WO# 20292
1/8" O.D. tan plastic wire insulation	**53% ACM**	**Light fixtures in the ceilings of the squash and racquetball courts**	WO# 20292
4"-6" Outer diameter white fiberglass pipe insulation with paper wrapped runs and plastic wrapped fittings	No ACM	Pipe insulation found throughout ceiling space in 200L lobby area	WO# 26992
Off-white spray-applied fireproofing on ceiling joists and decking	No ACM	Fireproofing found in ceiling space throughout 200L lobby area	WO# 26992
White chalky pipe insulation	No ACM	Pipe runs at seats in Mechanical Room 109	WO# 27182

Wall Materials Summary for the Ground Floor of IMA

Material Type	Sample Result	Location of Sample	Notes
Trowel-applied wall plaster	No ACM	East wall of the Men's Locker Room at an open space between locker rows 15 and 16 located across the hallway from the east wall lockers	WO# 19806
Trowel-applied wall plaster	No ACM	East wall of the Men's Locker Room at an open space between locker rows 23 and 24 located across the hallway from the east wall lockers	WO# 19806
Trowel-applied wall plaster	No ACM	East wall of the Men's Locker Room at an open space between locker rows 35 and 36 located across the hallway from the east wall lockers	WO# 19806
4 inch blue cove base with underlying tan and brown mastics	No ACM	Base of the metal locker racks in the Men's Locker Room at rows 15 and 16 located across the hallway from the east wall lockers	WO# 19806
4 inch blue cove base with underlying tan and brown mastics	No ACM	Base of the metal locker racks in the Men's Locker Room at rows 29 and 30 located across the hallway from the east wall lockers	WO# 19806
White painted, white skim coating over grey plaster	No ACM	Gym A south wall	WO# 23502
Tan 4" ceramic tile cove base with gray grout	No ACM	Women's locker room	WO# 25179
Gypsum wallboard, joint compound (M) and skim coat	No ACM	Walls throughout main floor of the IMA	WO# 25323
Off-white painted skim coat	No ACM	On walls throughout the basement floor of the IMA	WO# 25323
Off-white CMU with mortar	No ACM	Walls throughout the basement floor of the IMA	WO# 25323
Drywall with joint compound	No ACM	Upper walls between 115A and hallway	WO# 26796
Blue 4" cove base with brown mastic	No ACM	Base of walls between 115A and hallway	WO# 26796
Gray CMU brick and mortar/grout	No ACM	Wall between 115A and hallway	WO# 26796
White painted plaster walls with skim coat	No ACM	Walls of room 220	WO# 26887
White painted drywall with joint compound	No ACM	Walls throughout 200L lobby area	WO# 26992
Painted skim coat over CMU/cement wall	No ACM	Damaged wall of pool area	WO# 27261
White grout associated with ceramic wall tiles	No ACM	Damaged wall of pool area	WO# 27261
Tan/off-white mastic associated with ceramic wall tiles	No ACM	Damaged wall of pool area	WO# 27261

Wall Materials Summary for Floor 4 of IMA

Material Type	Sample Result	Location of Sample	Notes
Off-white painted sheetrock walls with joint compound	No ACM	4th floor sheetrock walls by elevator and sheetrock walls in room 212	WO# 27584

Paint Samples Collected at IMA

Paint Color	Sample Result	Location of Sample	Building Component	Notes
White	<0.0049%	Gym A south wall	Plaster	WO# 23502
Off-white	<0.0057%	Women's locker room	CMU blocks	WO# 25179
Off-white	<0.0054%	Multiple locations throughout the main floor	Wallboard	WO# 25323
Purple	<0.0052%	Multiple locations throughout the main floor	Wallboard	WO# 25323
Off-white	<0.0055%	On walls throughout the basement floor	CMU and concrete	WO# 25323
White	<0.0055%	Wall between 115A and hallway	CMU wall	WO# 26796
Gray	<0.0054%	Wall between 115A and hallway	CMU wall	WO# 26796
White/gray	<0.0052%	Upper wall between 115A and hallway and walls in 115A	Drywall/joint compound	WO# 26796
White	**0.0057%**	**Walls of room 220**	**Brick**	WO# 26887
White	<0.0050%	Walls throughout 200L lobby area	Gypsum walls	WO# 26992
White	<0.0051%	Ceilings throughout 200L lobby area	Gypsum ceilings	WO# 26992
Teal	<0.0050%	Damaged wall of pool area	Skim coat over concrete	WO# 27261
White	<0.0050%	Damaged wall of pool area	Skim coat over concrete	WO# 27261
Off-white	<0.0046%	4th floor sheetrock walls by elevator	Sheetrock	WO# 27584
Off-white	<0.0044%	Sheetrock walls in room 212	Sheetrock	WO# 27584

APPENDIX F

Certifications

THIS IS TO CERTIFY THAT

RYAN HUNTER

HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE

for

ONLINE AHERA ASBESTOS INSPECTOR REFRESHER

In accordance with TSCA Title II, Part 763, Subpart E, Appendix C of 40 CFR

Course Date: 02/23/2021

Course Location: Portland, OR

Certificate: IRO-21-7254B

PBS

4-Hour Online AHERA Inspector Refresher Training; AHERA is the Asbestos Hazard Emergency Response Act enacting Title II of Toxic Substance Control Act (TSCA)

Expiration Date: 02/23/2022

For verification of the authenticity of this certificate contact:
PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, Oregon 97239
503.248.1939

Andy Fridley, Instructor

THIS IS TO CERTIFY THAT

WILLEM MAGER

HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE

for

ASBESTOS INSPECTOR REFRESHER

In accordance with TSCA Title II, Part 763, Subpart E, Appendix C of 40 CFR

Course Date: 01/21/2021

Course Location: Portland, OR

Certificate: IR-21-0536B

PBS

CCB #SRA0615 4-Hr Training

4-Hour AHERA Inspector Refresher Training; AHERA is the Asbestos Hazard Emergency Response Act enacting Title II of Toxic Substance Control Act (TSCA)

Expiration Date: 01/21/2022

For verification of the authenticity of this certificate contact:
PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, Oregon 97239
503.248.1939

Andy Fridley, Instructor