Addendum No. 2
TO WILSONVILLE POLICE/PUBLIC WORKS SRGP SEIMIC IMPROVEMENT PROJECT CONTRACT DOCUMENTS, PROJECT PLANS AND SPECIFICATIONS

DATE:	March 4, 2019
ADDRESSEE:	PLAN HOLDERS
RE:	REVISIONS TO CONTRACT DOCUMENTS, PROJECT PLANS AND SPECIFICATIONS

Prior Addenda: 1

The following Addenda to the Contract Documents, Project Plans and Specifications shall be considered merged with the original bid package as if they were whole.

Add the following documents to the Contract Documents, Project Plans and Specifications.

- Geotechnical Engineering Report by GeoDesign Inc. dated June 7, 2018
- Hazardous Materials Survey by APEX Environmental Consulting dated October 2018

Acknowledgement of receipt of this ADDENDUM within the bid submittal is required.

BIDDERS ARE HIGHLY ENCOURAGE TO ATTEND THE OPTIONAL PRE-BID MEETING SCHEDULED FOR FRIDAY, MARCH 8, 2019 AT 9:00 AM AT THE POLICE/PUBLIC WORKS BUILDING – 30000 SW TOWN CENTER LOOP E, WILSONVILLE, OR.

REPORT OF GEOTECHNICAL ENGINEERING SERVICES

City of Wilsonville - Police/Public Works Building
30000 Town Center Loop East
Wilsonville, Oregon

For
City of Wilsonville
June 7, 2018

GeoDesign Project: CWilson-14-01

GEODESIGN INC

June 7, 2018

City of Wilsonville
29799 SW Town Center Loop East
Wilsonville, OR 97070

Attention: Delora Kerber

Report of Geotechnical Engineering Services
City of Wilsonville - Police/Public Works Building
30000 Town Center Loop East
Wilsonville, Oregon
GeoDesign Project: CWilson-14-01

GeoDesign, Inc. is pleased to submit this geotechnical engineering report for the planned improvements to the City of Wilsonville's police/public works building located at 30000 Town Center Loop East in Wilsonville, Oregon. Our services for this project were conducted in accordance with our proposal dated February 2, 2018.

We appreciate the opportunity to be of service to you. Please call if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.

Brett A. Shipton, P.E., G.E.
Principal Engineer

GJS:BAS:kt
Attachments
One copy submitted (via email only)
Document ID: CWilson-14-01-060718-geor.docx

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APPENDICES (continued)

ACRONYMS AND ABBREVIATIONS

AC	asphalt concrete
AOS	apparent opening size
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
BGS	below ground surface
CRBG	Columbia River Basalt Group
CSZ	Cascadia Subduction Zone
fps	feet per second
g	gravitational acceleration (32.2 feet/second^2)
GMM	ground motion model
H:V	horizontal to vertical
IBC	International Building Code
km	kilometers
MCE	maximum considered earthquake
MCE_R	risk-targeted maximum considered earthquake
OSHA	Occupational Safety and Health Administration
OSSC	Oregon Standard Specifications for Construction (2018)
pcf	pounds per cubic foot
pci	pounds per cubic inch
PGA	peak ground acceleration
psf	pounds per square foot
PSHA	probabilistic seismic hazard analysis
psi	pounds per square inch
SOSSC	State of Oregon Structural Specialty Code
SPT	standard penetration test
USGS	U.S. Geological Survey
UST	underground storage tank

1.0 INTRODUCTION

GeoDesign, Inc. is pleased to submit this geotechnical engineering report for the planned improvements to the City of Wilsonville's existing police/public works building located at 30000 Town Center Loop East in Wilsonville, Oregon. Figure 1 shows the site relative to existing topographic and physical features.

Improvements will include a seismic upgrade of the existing building. The building is a two-story structure that has a footprint of approximately 5,200 square feet. We understand that existing column loads are 32 kips and that gravity loads will not increase. We have assumed that seismic loads will be on the order of 40 kips.

Acronyms and abbreviations used herein are defined above, immediately following the Table of Contents.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to evaluate subsurface conditions and provide geotechnical engineering recommendations for the proposed improvements. Specifically, we performed the following scope of services:

- Reviewed readily available, published geologic data and our in-house files for existing information on subsurface conditions in the site vicinity.
- Coordinated and managed a field investigation, including locating utilities, coordinating with existing tenants, and scheduling subcontractors.
- Completed a subsurface exploration program consisting of two borings drilled to a depth of 41.5 feet BGS.
- Maintained continuous logs of the explorations and collected samples at representative intervals.
- Completed a laboratory testing program consisting of the following tests:
  - Nine moisture content determinations in general accordance with ASTM D2216
  - Three particle-size analyses in general accordance with ASTM D1140
  - One Atterberg limits test in general accordance with ASTM D4318
- Provided recommendations for site preparation and grading, including demolition, temporary and permanent slopes, fill placement criteria, suitability of on-site soil for fill, subgrade preparation, and recommendations for wet weather construction.
- Provided recommendations for excavation and excavation support.
- Evaluated groundwater conditions at the site and provided general recommendations for dewatering during construction and subsurface drainage.
- Provided recommendations for retrofitting the existing foundations for seismic loading, including helical anchors and micropiles for underpinning the foundations and enlarged bearing surfaces for existing shallow foundations
- Evaluated allowable seismic bearing pressures for footings.
- Provided recommendations for use in design of conventional retaining walls, including backfill and drainage requirements, static and dynamic lateral earth pressures, passive pressures, and friction coefficients.

- Provided seismic design recommendations in accordance with the procedures outlined in ASCE 41-13.
- Completed a site-specific seismic evaluation in accordance with the 2014 SOSSC.
- Prepared this geotechnical engineering report that presents our findings, conclusions, and recommendations.

3.0 SITE CONDITIONS

3.1 GEOLOGY

The site is located on the northern margin of the Central Willamette Valley physiographic province. Tertiary marine sedimentary and volcanic bedrock units form the western and eastern margins, respectively, of a depositional basin. The geologic profile is mapped as Miocene (14.5 million years before present) to recent Valley unconsolidated sediments (Burns et al., 1997). The geologic unit is a compilation of generally unconsolidated modern stream deposits, fine-grained catastrophic flood deposits, and Miocene to Pleistocene Age fluvial and lacustrine sediments. The flood deposits in the site vicinity generally consist of a thin cover of fine sand and silt overlying reworked gravel and cobbles from flood waters entering the Central Willamette Valley from the Tualatin and Portland basins located to the north. The flood deposits range in thickness from less than 20 feet to 50 feet (Gannett and Caldwell, 1998; Schlicker and Finlayson, 1979).

The flood deposits overlie fluvial and lacustrine sediments that consist of poorly to well-cemented conglomerate, sandstone, siltstone, and claystone equivalent to the Troutdale Formation and Sandy River Mudstone described in the Portland Basin located to the north of the site (Gannett and Caldwell, 1998; Burns et al., 1997; Schlicker and Finlayson, 1979; Hart and Newcomb, 1965). The fluvial and lacustrine sediments range in thickness from 285 to 315 feet in the site vicinity.

The bedrock unit that forms the bottom of the basin and underlies the Valley unconsolidated sediments is the CRBG. The CRBG is middle Miocene (16.5 million to 15 million years before present) in age and consists of a series of basalt flows that originated from southeastern Washington and northeastern Oregon. The CRBG is considered the geologic basement unit for this report (Gannett and Caldwell, 1998; Burns et al., 1997; Schlicker and Finlayson, 1979; Hart and Newcomb, 1965).

According to the Natural Resources Conservation Service's web soil survey, the near-surface soil in the existing and proposed channel areas is Woodburn silt loam. The soil's parent material consists of stratified glaciolacustrine deposits and is described as moderately well-drained. The typical soil profile of the Woodburn silt loam consists of silt loam to silty clay loam from the ground surface to 5 feet BGS.

3.2 SURFACE CONDITIONS

The site is bound by Town Center Loop East to the west, SW Wilsonville Road to the south, and municipal office buildings to the north and east. The site is currently occupied by a two-story building with AC parking lots to the north and south. The ground surface at the site generally grades downward from an approximate elevation of 180 feet in the northern portion of the site to an approximate elevation of 170 feet in the southern portion of the site.

3.3 SUBSURFACE CONDITIONS

Our subsurface explorations consisted of drilling two borings (B-1 and B-2) to a depth of 41.5 feet BGS. The approximate locations of our explorations are shown on Figure 2. A description of our field exploration and laboratory testing programs, explorations logs, and results of laboratory testing are presented in Appendix A.

The borings were drilled in the paved parking areas and encountered approximately 2 inches of AC over approximately 4 to 6 inches of aggregate base at the surface. Our explorations generally encountered undocumented fill over native silt, sand, and clay to the maximum depth explored. The following sections summarize each of the subsurface units encountered in the explorations.

3.3.1 Undocumented Fill

Undocumented fill was encountered under the pavement section in boring B-1 and extends to an approximate depth of 7 feet BGS. The undocumented fill consists of silt with sand and trace gravel and organics. SPT results indicate that the undocumented fill is medium stiff to stiff in consistency. Laboratory testing indicates that the moisture content of the undocumented fill was 29 percent at the time of our explorations.

3.3.2 Upper Silt

Native silt with varying sand content underlies the undocumented fill in boring B-1 and the pavement section in boring B-2 and extends to depths between approximately 22.5 and 36 feet BGS. SPT results indicate that the silt is medium stiff to stiff in consistency. Laboratory testing indicates that the silt is non-plastic and that the moisture content of the silt was approximately 27 to 38 percent at the time of our explorations.

3.3.3 Silty Sand

Silty sand underlies the upper silt layer in boring B-2 and extends to an approximate depth of 28 feet BGS. SPT results indicate that the silty sand is medium dense in consistency.

3.3.4 Clay with Gravel

Clay with gravel underlies the upper silt in boring B-1 and the silty sand in boring B-2 and extends to an approximate depth of 35 feet BGS in boring B-2 and to the maximum explored depth of 41.5 feet BGS in boring B-1. SPT results indicate that the clay is very stiff in consistency. Laboratory testing indicates that the moisture content of the clay was approximately 22 percent at the time of our explorations.

3.3.5 Lower Silt

Silt with varying sand content underlies the clay in boring B-2 and extends to the maximum explored depth of 41.5 feet BGS. SPT results indicate that the silt is stiff to very stiff in consistency.

3.3.6 Groundwater

Groundwater was not encountered in the borings during our explorations. Perched groundwater zones are likely to develop in the upper soil at the site, particularly during extended periods of wet weather. The depth to groundwater may fluctuate in response to prolonged rainfall, seasonal changes, changes in surface topography, and other factors not observed during this study.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our subsurface explorations and engineering analyses, it is our opinion that the site can be developed as proposed. We anticipate that the following factors will influence the design and construction of the proposed development:

- The proposed new footings can be supported on shallow foundations bearing on firm native soil or on structural fill over firm native soil.
- The on-site soil is suitable for use as structural fill, provided it is properly moisture conditioned.
- The soil at the site will likely be sensitive to small changes in moisture content and difficult, if not impossible, to adequately compact during wet weather or when the moisture content of the soil is more than a few percent above the optimum required for compaction.
- The base of the excavation is above the regional groundwater table. We do not anticipate extensive construction dewatering.

5.0 SITE DEVELOPMENT RECOMMENDATIONS

5.1 SITE PREPARATION

5.1.1 Demolition

Demolition includes the complete removal of the existing structures, concrete footings, pavement, utilities, and various other former site improvements that may be encountered during construction. We recommend that all abandoned underground vaults, USTs, septic tanks, manholes, utility lines, foundation elements, and other subsurface structures that are beneath new structural components be entirely removed.

Voids resulting from the removal of improvements should be backfilled with compacted structural fill, as discussed in the “Structural Fill” section. Utility lines abandoned under new structural components should be completely removed and backfilled with structural fill. Firm subgrade should be exposed at the bottom of the excavations before backfilling, and the sides of the temporary excavations should be sloped at a minimum of 1.5H:1V.

Demolished material should be transported off site for disposal. Soft soil encountered during site preparation should be replaced with structural fill.

5.1.2 Undocumented Fill

Undocumented fill was observed at the site in boring B-1. It is possible that additional undocumented fill is present at other locations. Any undocumented fill that is encountered should be removed from the influence zone of new building foundations. Undocumented fill should be evaluated during construction where it exists beneath existing foundations, pavements, and floor slabs.

The exposed subgrade should be closely evaluated by a geotechnical engineer during the construction process. Soil processing, including moisture conditioning and the removal of roots, cobbles, and other deleterious material from the soil, may be required to use the excavated material as structural fill. Compaction should be performed as described in the "Structural Fill" section.

5.1.3 Wet Weather/Wet Soil Grading

The soil present at this site can easily be disturbed. If not carefully executed, site preparation, utility trench work, and excavations can create extensive soft areas and significant repair costs can result. Earthwork planning, regardless of the time of year, should include considerations for minimizing subgrade disturbance. Trafficability of the soil may be difficult during or after extended wet periods or when the moisture content of the surface soil is more than a few percentage points above optimum. Wet subgrade should be assumed to be present under existing building slabs and pavements regardless of the time of year. When wet, the surficial soil is easily disturbed and may provide inadequate support for construction equipment. If construction occurs during the wet season or wet subgrade is present, site preparation activities may need to be accomplished using track-mounted equipment, loading removed material into trucks supported on granular haul roads, or working progressively across the site over unexposed surfaces. A qualified geotechnical engineer should evaluate the subgrade by probing with a steel rod rather than by proof rolling. Wet soil that has been disturbed during site preparation activities or soft or loose zones identified during probing should be removed and replaced with structural fill.

The base rock thickness for building slab areas is intended to support post-construction design loads. This design base rock thickness may not support construction traffic construction when the subgrade soil is wet. Accordingly, if construction is planned for periods when the subgrade soil is wet, staging and haul roads with increased thicknesses of base rock will be required. The amount of staging and haul road areas, as well as the required thickness of granular material, will vary with the contractor's sequencing of the project and the type/frequency of construction equipment. Based on our experience, between 8 and 12 inches of granular material is generally required in staging areas and between 12 and 18 inches in haul road areas. The actual thickness will depend on the contractor's means and methods and, accordingly, should be the contractor's responsibility.

The granular material should meet the requirements for imported granular material or stabilization material, as described in the "Structural Fill" section. We recommend that a geotextile be placed as a barrier between the subgrade and imported granular material in areas of repeated construction traffic. The geotextile should have a minimum Mullen burst strength of 250 psi for puncture resistance and an AOS between U.S. Standard No. 70 and No. 100 sieves.

5.2 EXCAVATION

Shallow soil at the site consists of fine-grained native and fill soil, and excavations should be achievable with conventional excavation equipment. Shoring will be required for excavations deeper than 4 feet. A wide variety of shoring and dewatering systems are available. Consequently, we recommend that the contractor be responsible for selecting the appropriate shoring and dewatering systems.

If box shoring is used, it should be understood that box shoring is a safety feature used to protect workers and does not prevent caving. If the excavations are left open for extended periods of time, caving of the sidewalls may occur. The presence of caved material will limit the ability to properly backfill and compact the trenches. The contractor should be prepared to fill voids between the box shoring and the sidewalls of the trenches with sand or gravel before caving occurs.

If shoring is used, we recommend that the type and design of the shoring system be the responsibility of the contractor, who is in the best position to choose a system that fits the overall plan of operation.

All excavations should be made in accordance with applicable OSHA requirements and regulations of the state, county, and local jurisdiction. While this report describes certain approaches to excavation and dewatering, the contract documents should specify that the contractor is responsible for selecting excavation and dewatering methods, monitoring the excavations for safety, and providing shoring (as required) to protect personnel and adjacent structural elements.

Groundwater was not encountered in the borings during the our explorations. However, dewatering might be required to control perched groundwater conditions. We anticipate that perched groundwater, if encountered, will diminish over time and can be addressed using sumps and pumps internal to the excavation.

5.3 PERMANENT SLOPES

While not anticipated for the project, permanent cut or fill slopes should not exceed a gradient of 2H:1V, unless specifically evaluated for stability. Upslope buildings, access roads, and pavements should be set back a minimum of 5 feet from the crest of such slopes. Slopes should be planted with appropriate vegetation to provide protection against erosion as soon as possible after grading. Surface water runoff should be collected and directed away from slopes to prevent water from running down the face of the slope.

5.4 STRUCTURAL FILL

Structural fill includes fill beneath foundations, slabs, pavements, other areas intended to support structures, or within the influence zones of structures. Fill should only be placed over a subgrade that has been prepared in conformance with the “Site Preparation” section. All material used as structural fill should be free of organic matter or other unsuitable material. Structural fill should have a maximum particle size of 3 inches. A brief characterization of some of the acceptable materials and our recommendations for their use as structural fill is provided below.

5.4.1 Native Soil

The native on-site soil is suitable for use as general structural fill, provided it is properly moisture conditioned; free of debris, organic material, and particles over 3 inches in diameter. We anticipate that some moisture conditioning may be required to dry the soil to a moisture content near optimum. This will require an extended period of dry weather, typically experienced between early July and mid-October. It will be difficult, if not impossible, to adequately compact on-site soil during the rainy season or during prolonged periods of rainfall.

When used as structural fill, the on-site soil should be placed in lifts with a maximum uncompacted thickness of 6 to 8 inches and compacted to not less than 92 percent of the maximum dry density for fine-grained soil and 95 percent of the maximum dry density for granular soil, as determined by ASTM D1557.

5.4.2 Imported Granular Material

Imported granular material used for structural fill should be pit- or quarry-run rock, crushed rock, or crushed gravel and sand. Imported granular material should be fairly well-graded between coarse and fine material, should have less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve, and should have at least two mechanically fractured faces.

When used as structural fill, imported granular material should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557. During the wet season or when wet subgrade conditions exists, the initial lift should be approximately 18 inches in uncompacted thickness and should be compacted by rolling with a smooth-drum roller without using vibratory action.

5.4.3 Aggregate Base Rock

Imported granular material used as base rock for building floor slabs should consist of ¾- or 1½-inch-minus material and should have less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve. The material should consist of clean, crushed rock or crushed gravel and sand that is fairly well graded between coarse and fine and should have at least two mechanically fractured faces.

The aggregate base rock material should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

5.4.4 Trench Backfill

Trench backfill for the utility pipe base and pipe zone should consist of crushed, well-graded, granular material with a maximum particle size of 1 inch and less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve. The material should be free of roots, organic matter, and other unsuitable material. Backfill for the pipe base and pipe zone should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557, or as recommended by the pipe manufacturer.

Within building, pavement, and other structural areas, trench backfill placed above the pipe zone should consist of imported granular material as specified above. The backfill should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D1557, at depths greater than 2 feet below the finished subgrade and 95 percent of the maximum dry density, as determined by ASTM D1557, within 2 feet of finished subgrade. In all other areas, trench backfill above the pipe zone should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D1557.

5.4.5 Stabilization Material

Stabilization material used in staging areas, or as trench stabilization material, should consist of 4- or 6-inch-minus pit- or quarry-run rock, crushed rock, or crushed gravel and sand. The material should have a maximum particle size of 6 inches, should have less than 5 percent by dry weight passing the U.S. Standard No. 4 sieve, and should have at least two mechanically fractured faces. The material should be free of organic matter and other deleterious material. Stabilization material should be placed in lifts between 12 and 24 inches thick and compacted to a well-keyed, firm condition.

5.4.6 Drain Rock

Drain rock should consist of angular, granular material with a maximum particle size of 2 inches and should meet the specifications provided in OSSC 00430.11 (Granular Drain Backfill Material). The material should be free of roots, organic matter, and other unsuitable material; should have less than 2 percent by dry weight passing the U.S. Standard No. 200 sieve (washed analysis); and should have at least two mechanically fractured faces. Drain rock should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and compacted to a well-keyed, firm condition.

6.0 DESIGN RECOMMENDATIONS

6.1 SHALLOW FOUNDATIONS

6.1.1 Bearing Capacity

Footings established on firm, undisturbed native soil or structural fill over firm, undisturbed native silt and sand soil should be evaluated using an allowable bearing pressure of 3,000 psf. This bearing pressure is a net bearing pressures and applies to the total of dead and long-term live loads and may be doubled when considering seismic or wind loads. The weight of the footing and any overlying backfill can be ignored in calculating footing loads. The allowable bearing pressure includes a factor of safety of 3; accordingly, an ultimate bearing capacity of 9,000 psf can be used for footings on native silt.

Any new foundations should not be established on undocumented fill that may be encountered in portions of the site. Removed material should be replaced with structural fill as described in the “Structural Fill” section. Based on our review of the explorations, fine-grained native silt will be present at the base of new or enlarged footings in many locations. Accordingly, we recommend a minimum of 3 inches of gravel be placed in the base of all new or enlarged footings after evaluation of the subgrade by GeoDesign and prior to forming and rebar placement regardless of the time of year construction occurs.

6.1.2 Settlement

Since static loads are not expected to increase, long-term settlement is not expected. Seismic loads are short-term loads and are not expected to cause consolidation settlement.

6.1.3 Resistance to Sliding

Lateral loads can be resisted by passive earth pressure on the sides of footings and by friction on the base of footings. We recommend that a friction coefficient of 0.30 be used to compute the frictional resistance for footings bearing on native silt soil and 0.40 for footings in contact with granular pads.

An ultimate equivalent fluid unit weight of 350 pcf is recommended to compute passive earth pressure acting on footings constructed in direct contact with compacted structural fill or native soil. This value is based on the assumptions that the adjacent confining structural fill or native soil is level and that groundwater remains below the base of the footing. The top 1 foot of soil should be neglected when calculating lateral earth pressures unless the foundation area is covered with pavement or is inside a building.

6.1.4 Subgrade Evaluation

All footing subgrades should be evaluated by a member of our geotechnical staff to evaluate bearing conditions. Observations should also evaluate whether all loose or soft material, organics, unsuitable fill, prior topsoil zones, and softened subgrades (if present) have been removed. Localized deepening of footing excavations may be required to penetrate debris, fill, or deleterious material.

6.2 MICROPILE AND ANCHOR RECOMMENDATIONS

Micropiles or anchors may be used to resist uplift or overturning. These elements will achieve the majority of their capacity through skin friction in the underlying medium stiff to very stiff silt and clay. Various types of anchors are available. Depending on the construction technique and anchor type, we anticipate that an allowable skin friction of 1 to 4 kips per square foot is achievable in the native silt and clay. This does not include a factor of safety. A factor of safety of 2 is typical for compressive loads and 1.5 is typical for short-term tensile loads if the anchors or micropiles are load tested to confirm their capacity.

Design and construction of anchor systems are typically completed by specialty contractors who are responsible for selection of the appropriate depth, bond length, and grouting methods based on the loads provided by the structural engineer. Due to variable construction techniques and anchor types, we recommend the contractor be responsible for selecting the length and appropriate design skin friction.

We recommend that all anchors be tested in accordance with *Recommendations for Prestressed Rock and Soil Anchors* (Post-Tensioning Institute, 2014).

6.3 FLOOR SLABS

Satisfactory subgrade support for building floor slabs supporting floor loads of up to 150 psf can be obtained provided the subgrade is prepared in accordance with the "Site Preparation" section. A minimum 6-inch-thick layer of crushed rock (imported granular material) should be placed and compacted over the prepared subgrade to provide a firm surface and to assist as a capillary break. The imported granular material should be crushed rock or crushed gravel and sand meeting the requirements outlined in the "Structural Fill" section. The imported granular material should be placed in one lift and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557. Floor slab base rock contaminated with excessive fines (greater than 5 percent by dry weight passing the U.S. Standard No. 200 sieve) should be replaced.

A subgrade modulus of 100 pci may be used to design the floor slab constructed on subgrade prepared as recommended in the "Site Preparation" section. Settlement of floor slabs supporting the anticipated design loads and constructed as recommended is not expected to exceed approximately ½ inch.

Vapor barriers are often required by flooring manufacturers to protect flooring and flooring adhesives. Many flooring manufacturers will warrant their product only if a vapor barrier is installed according to their recommendations. Selection and design of an appropriate vapor barrier (if needed) should be based on discussions among members of the design team. We can provide additional information to assist you with your decision.

6.4 PERMANENT RETAINING STRUCTURES

Our retaining wall design recommendations are based on the following assumptions: (1) the walls are conventional, cantilevered retaining walls, (2) the walls are less than 10 feet in height, (3) the retained soil is level, and (4) adequate drainage is provided behind the wall to prevent hydrostatic pressures from developing. Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project varies from these assumptions.

6.4.1 Wall Design Parameters

For unrestrained retaining walls, an active pressure of 35 pcf equivalent fluid pressure should be used for design. For unrestrained retaining walls, a superimposed seismic lateral force should be calculated based on a dynamic force of $6H^2$ pounds per lineal foot of wall (where H is the height of the wall in feet) and applied a distance of 0.6H above the base of the wall. Where retaining walls are restrained from rotation prior to being backfilled, a pressure of 55 pcf equivalent fluid pressure should be used for design. Upon request, we can provide recommendations for seismic lateral forces acting on walls restrained from rotation, which will depend on specific wall types and configurations.

If surcharges (e.g., retained slopes, building foundations, vehicles, steep slopes, terraced walls, etc.) are located within a horizontal distance from the back of a wall equal to twice the height of the wall, additional pressures will need to be accounted for in the wall design. Figure 3 presents additional pressures resulting from some common loading scenarios. Our office should be contacted for additional pressures resulting from alternate loading scenarios.

The base of the wall footing excavations should extend a minimum of 18 inches below lowest adjacent grade. The footing excavations should then be lined with a minimum 6-inch-thick layer of compacted imported granular material, as described in the "Structural Fill" section. At locations where there is a slope in front of the retaining wall, we recommend that a 3-foot-wide, horizontal bench be placed between the wall and the top of the slope.

Settlement of up to 1 percent of the wall height commonly occurs immediately adjacent to the wall as the wall rotates and develops active lateral earth pressures. Consequently, we recommend that construction of flatwork adjacent to retaining walls be postponed at least four weeks after construction, unless survey data indicates that settlement is complete prior to that time.

The retaining wall footings should also be designed in accordance with the "Shallow Foundations" section.

6.4.2 Wall Drainage and Backfill

The above design parameters have been provided assuming drains will be installed to prevent hydrostatic pressures from developing. If a drainage system is not installed, our office should be contacted for revised design forces.

The backfill material placed behind the walls and extending a horizontal distance of ½H (where H is the height of the retaining wall) should consist of imported granular material as specified in the "Structural Fill" section. The wall backfill should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557. However, backfill located within a horizontal distance of 3 feet from the retaining walls should only be compacted to approximately 92 percent of the maximum dry density, as determined by ASTM D1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactor). If flatwork (sidewalks or pavements) will be placed atop the wall backfill, we recommend that the upper 2 feet of material be compacted to 95 percent of the maximum dry density, as determined by ASTM D1557.

A minimum 12-inch-wide zone of drain rock, extending from the base of the wall to within 6 inches of finished grade, should be placed against the back of all retaining walls. Geotextile filter fabric should be installed between the drain rock and fill/native soil to prevent the migration of fines into the drain rock. Perforated collector pipes that are 4 to 6 inches in diameter should be embedded at the base of the drain rock. The geotextile should meet the requirements of OSSC 02320.20 (Geotextile Property Values) for drainage. The drain rock should meet the requirements provided in the "Structural Fill" section. The perforated collector pipes should be sloped to drain (minimum slope of 0.5 percent) toward a suitable discharge at an appropriate location away from the base of the wall. The discharge pipe(s) should not be tied directly into stormwater drain systems, unless measures are taken to prevent backflow into the wall's drainage system.

6.5 DRAINAGE CONSIDERATIONS

We recommend that roof drains be connected to a tightline leading to storm drain facilities. Pavement surfaces and open space areas should be sloped such that surface water runoff is collected and routed to suitable discharge points. We also recommend that ground surfaces adjacent to buildings be sloped to facilitate positive drainage away from the buildings.

6.6 SEISMIC DESIGN CRITERIA

6.6.1 IBC Parameters

We understand that the seismic upgrades will be designed and constructed in accordance with the procedures outlined in ASCE 41-13. Base shear forces can be computed using the parameters provided in Table 1. These parameters were obtained from USGS seismic design maps (USGS, 2014). Based on our calculations, the site class is D.

Table 1. Seismic Design Parameters

Seismic Hazard Level	S_s (g)	S_1 (g)	S_{xs} (g)	S_{x1} (g)
BSE-1N	Not applicable	Not applicable	0.696	0.433
BSE-2N	0.923	0.408	1.044	0.650
BSE-1E	0.283	0.107	0.446	0.254
BSE-2E	0.683	0.301	0.856	0.541

GeoDesign also completed a site-specific seismic hazard evaluation based on the 2014 SOSSC. This evaluation is presented in Appendix B.

7.0 OBSERVATION OF CONSTRUCTION

Satisfactory foundation and earthwork performance depends to a large degree on quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during the subsurface exploration. Recognition of changed conditions often requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect if subsurface conditions change significantly from those anticipated.

We recommend that GeoDesign be retained to observe earthwork activities, including footing subgrade preparation, performing laboratory compaction and field moisture-density tests, and observation of subgrade and base rock for floor slabs.

8.0 LIMITATIONS

We have prepared this report for use by the City of Wilsonville and members of the design and construction teams for the proposed project. The data and report may be used for bidding or estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions.

We have made recommendations based on subsurface explorations completed at the site that indicate the soil conditions at only the specific locations and only to the depths penetrated. These observations do not necessarily reflect soil types, strata thickness, or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are observed during excavation and construction, re-evaluation will be necessary.

When the design has been finalized, we recommend the final design and specifications be reviewed by our firm to see that our recommendations have been interpreted and implemented as intended. If there are changes in the grades, location, configuration, or type of construction for the building, the conclusions and recommendations presented may not be applicable. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

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

◆ ◆ ◆

We appreciate the opportunity to be of service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

GeoDesign, Inc.

Gregory J. Schaertl (California)
Project Engineer

Brett A. Shipton, P.E., G.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
56207
OREGON
July 11, 2000
BRETT A. SHIPTON
EXPIRES: 6/30/18

REFERENCES

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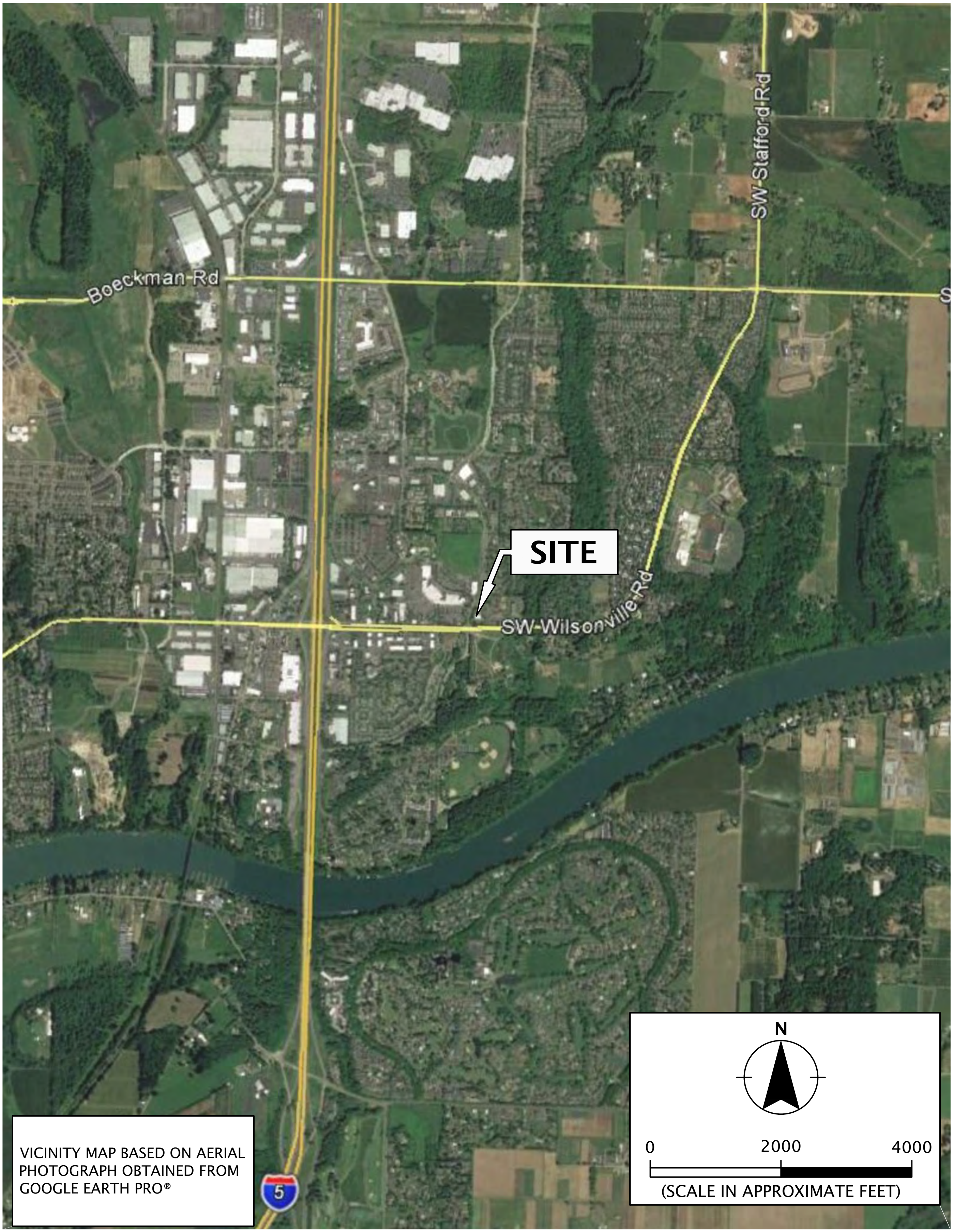
FIGURES



VICINITY MAP BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®

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VICINITY MAP

POLICE/PUBLIC WORKS BUILDING
WILSONVILLE, OR

FIGURE 1

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LEGEND:

— - —	SITE BOUNDARY
B-1◕	BORING

N

0 30 60

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH
OBTAINED FROM GOOGLE EARTH PRO®,
MAY 14, 2018

FIGURE 2

SITE PLAN

POLICE/PUBLIC WORKS BUILDING
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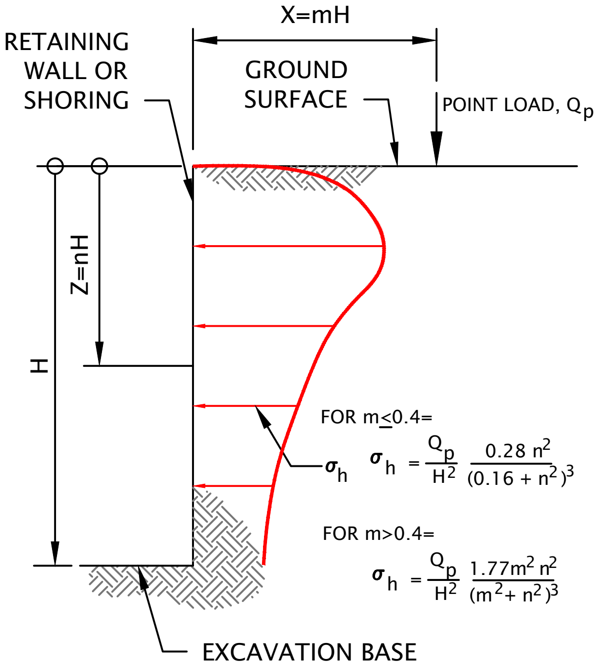
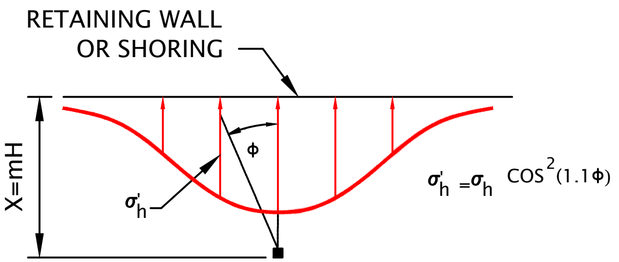
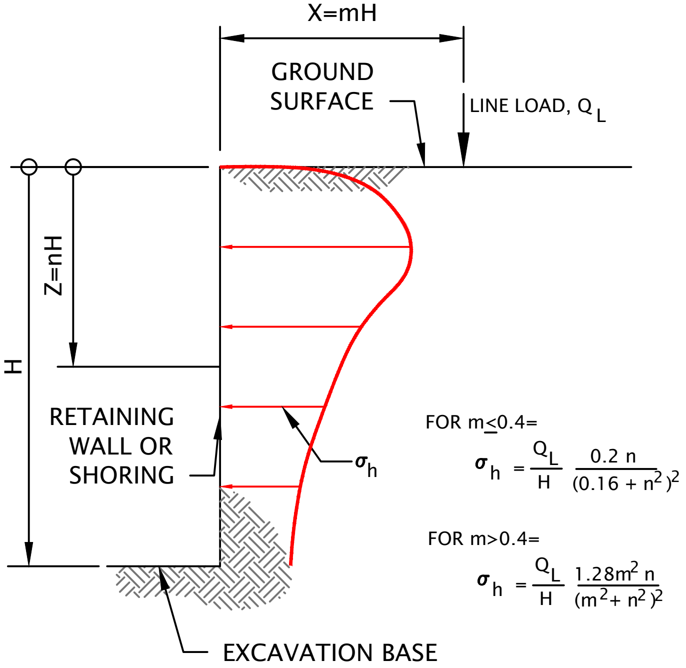
File Name: J:\A-D\CWilson\CWilson-14\CWilson-14-01\Figures\CAD\CWilson-14-01-SP01.dwg | Layout: FIGURE 2



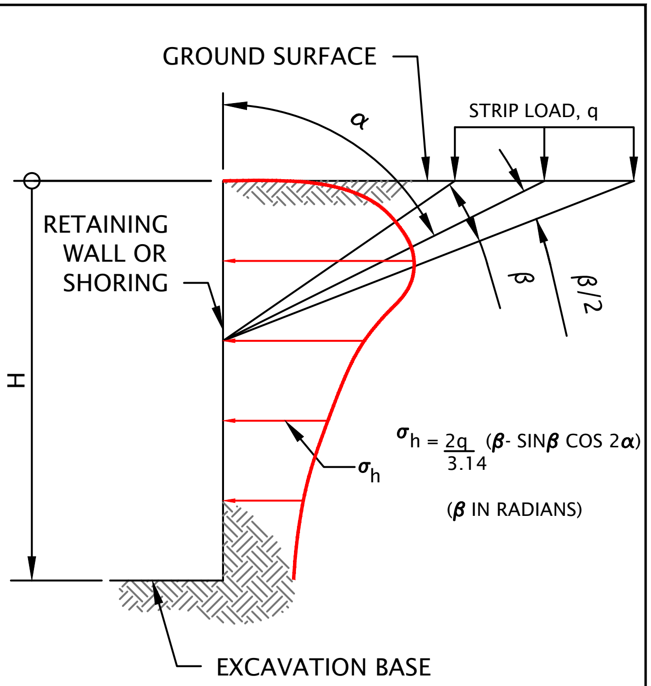


DISTRIBUTION OF HORIZONTAL PRESSURES

VERTICAL POINT LOAD



LINE LOAD PARALLEL TO WALL



STRIP LOAD PARALLEL TO WALL

NOT TO SCALE

NOTES:

1. FIGURE SHOULD BE USED IN CONJUNCTION WITH REPORT TEXT.
2. THESE GUIDELINES APPLY TO RIGID WALLS WITH POISSON'S RATIO ASSUMED TO BE 0.5 FOR BACKFILL MATERIALS.
3. LATERAL PRESSURES FROM ANY COMBINATION OF ABOVE LOADS MAY BE DETERMINED BY THE PRINCIPLE OF SUPERPOSITION.

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SURCHARGE-INDUCED LATERAL EARTH PRESSURES

JUNE 2018

POLICE/PUBLIC WORKS BUILDING
WILSONVILLE, OR

FIGURE 3

APPENDIX A

APPENDIX A

FIELD EXPLORATIONS

GENERAL

Subsurface conditions at the site were explored by drilling two borings (B-1 and B-2) to a depth of 41.5 feet BGS. Drilling services were provided by Western States Soil Conservation, Inc. of Hubbard, Oregon, using mud rotary drilling methods. The exploration logs are presented in this appendix.

The approximate locations of our explorations are shown on Figure 2. The locations of the explorations were determined in the field by pacing from existing site features. This information should be considered accurate only to the degree implied by the methods used.

SOIL SAMPLING

We collected representative samples of the various soils encountered in the explorations for geotechnical laboratory testing. Soil samples were collected from the borings by conducting SPTs in general conformance with ASTM D1586. The sampler was driven with a 140-pound hammer free-falling 30 inches. The hammer was lifted using an automatic-trip hammer. The number of blows required to drive the sampler 1 foot, or as otherwise indicated, into the soil is shown adjacent to the sample symbols on the exploration logs. Disturbed samples were collected from the split barrel for subsequent classification and index testing. Higher quality, relatively undisturbed samples were collected using a standard Shelby tube in general accordance with ASTM D1587, the Standard Practice for Thin-walled Tube Sampling of Soils. Sampling methods and intervals are shown on the exploration logs.

The average efficiency of the automatic SPT hammer used by Western States Soil Conservation, Inc. was 81.4 percent. The calibration testing results are presented at the end of this appendix.

SOIL CLASSIFICATION

The soil samples were classified in accordance with the “Exploration Key” (Table A-1) and “Soil Classification System” (Table A-2), which are presented in this appendix. The exploration logs indicate the depths at which the soils or their characteristics change, although the change actually could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications are shown on the exploration logs.

LABORATORY TESTING

CLASSIFICATION

The soil samples were classified in the laboratory to confirm field classifications. The laboratory classifications are shown on the exploration logs if those classifications differed from the field classifications.

MOISTURE CONTENT

The natural moisture content of select soil samples was determined in general accordance with ASTM D2216. The natural moisture content is a ratio of the weight of the water to dry soil in a test sample and is expressed as a percentage. The test results are presented in this appendix.

ATTERBERG LIMITS

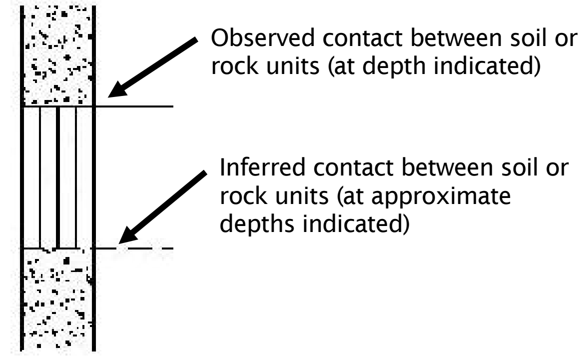
Atterberg limits testing was performed on a select soil sample in general accordance with ASTM D4318. Atterberg limits include the liquid limit, plastic limit, and the plasticity index of soil. These index properties are used to classify soil and for correlation with other engineering properties of soil. The test results are presented in this appendix.

PARTICLE-SIZE ANALYSIS

Particle-size analysis was performed on select soil samples in general accordance with ASTM D1140. This test is a quantitative determination of the amount of material finer than the U.S. Standard No. 200 sieve expressed as a percentage of soil weight. The test results are presented in this appendix.

SYMBOL	SAMPLING DESCRIPTION
◨	Location of sample obtained in general accordance with ASTM D 1586 Standard Penetration Test with recovery
▮	Location of sample obtained using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D 1587 with recovery
▤	Location of sample obtained using Dames & Moore sampler and 300-pound hammer or pushed with recovery
▥	Location of sample obtained using Dames & Moore and 140-pound hammer or pushed with recovery
⧅	Location of sample obtained using 3-inch-O.D. California split-spoon sampler and 140-pound hammer
☒	Location of grab sample
▩	Rock coring interval
▽	Water level during drilling
▼	Water level taken on date shown

Graphic Log of Soil and Rock Types



GEOTECHNICAL TESTING EXPLANATIONS

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density		
DS	Direct Shear	RES	Resilient Modulus
HYD	Hydrometer Gradation	SIEV	Sieve Gradation
MC	Moisture Content	TOR	Torvane
MD	Moisture-Density Relationship	UC	Unconfined Compressive Strength
NP	Nonplastic	VS	Vane Shear
OC	Organic Content	kPa	Kilopascal

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
		MS	Moderate Sheen
ppm	Parts per Million	HS	Heavy Sheen

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EXPLORATION KEY

TABLE A-1

RELATIVE DENSITY - COARSE-GRAINED SOIL

Relative Density	**Standard Penetration Resistance**	**Dames & Moore Sampler (140-pound hammer)**	**Dames & Moore Sampler (300-pound hammer)**
Very Loose	0 – 4	0 - 11	0 - 4
Loose	4 – 10	11 - 26	4 - 10
Medium Dense	10 – 30	26 - 74	10 - 30
Dense	30 – 50	74 - 120	30 - 47
Very Dense	More than 50	More than 120	More than 47

CONSISTENCY - FINE-GRAINED SOIL

Consistency	**Standard Penetration Resistance**	**Dames & Moore Sampler (140-pound hammer)**	**Dames & Moore Sampler (300-pound hammer)**	**Unconfined Compressive Strength (tsf)**
Very Soft	Less than 2	Less than 3	Less than 2	Less than 0.25
Soft	2 - 4	3 – 6	2 - 5	0.25 - 0.50
Medium Stiff	4 - 8	6 – 12	5 - 9	0.50 - 1.0
Stiff	8 - 15	12 – 25	9 - 19	1.0 - 2.0
Very Stiff	15 - 30	25 – 65	19 – 31	2.0 - 4.0
Hard	More than 30	More than 65	More than 31	More than 4.0

PRIMARY SOIL DIVISIONS			**GROUP SYMBOL**	**GROUP NAME**
COARSE-GRAINED SOIL (more than 50% retained on No. 200 sieve)	GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)	GW or GP	GRAVEL
		GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)	GW-GM or GP-GM	GRAVEL with silt
			GW-GC or GP-GC	GRAVEL with clay
		GRAVEL WITH FINES (> 12% fines)	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)	SW or SP	SAND
		SAND WITH FINES (≥ 5% and ≤ 12% fines)	SW-SM or SP-SM	SAND with silt
			SW-SC or SP-SC	SAND with clay
		SAND WITH FINES (> 12% fines)	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOIL (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50	ML	SILT
			CL	CLAY
			CL-ML	silty CLAY
			OL	ORGANIC SILT or ORGANIC CLAY
		Liquid limit 50 or greater	MH	SILT
			CH	CLAY
			OH	ORGANIC SILT or ORGANIC CLAY
HIGHLY ORGANIC SOIL			PT	PEAT

MOISTURE CLASSIFICATION

Term	**Field Test**
dry	very low moisture, dry to touch
moist	damp, without visible moisture
wet	visible free water, usually saturated

ADDITIONAL CONSTITUENTS

Secondary granular components or other materials such as organics, man-made debris, etc.					
Percent	**Silt and Clay In:**		**Percent**	**Sand and Gravel In:**	
	Fine-Grained Soil	**Coarse-Grained Soil**		**Fine-Grained Soil**	**Coarse-Grained Soil**
< 5	trace	trace	< 5	trace	trace
5 – 12	minor	with	5 – 15	minor	minor
> 12	some	silty/clayey	15 – 30	with	with
			> 30	sandy/gravelly	Indicate %

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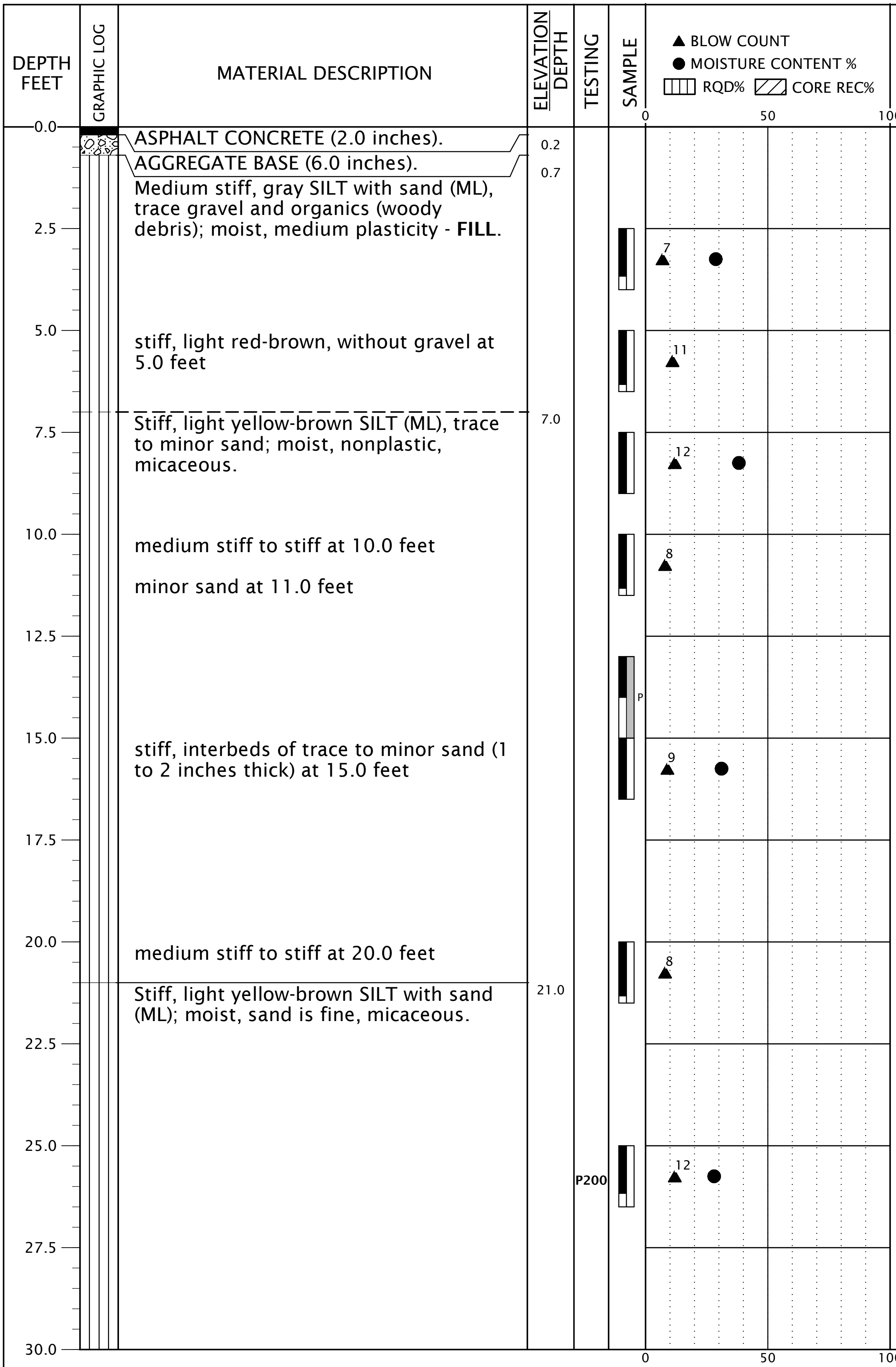
SOIL CLASSIFICATION SYSTEM

TABLE A-2

MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	INSTALLATION AND COMMENTS
ASPHALT CONCRETE (2.0 inches).	0.2		
AGGREGATE BASE (6.0 inches).	0.7		
Medium stiff, gray SILT with sand (ML), trace gravel and organics (woody debris); moist, medium plasticity - **FILL**.			
stiff, light red-brown, without gravel at 5.0 feet			
Stiff, light yellow-brown SILT (ML), trace to minor sand; moist, nonplastic, micaceous.	7.0		
medium stiff to stiff at 10.0 feet			
minor sand at 11.0 feet			
stiff, interbeds of trace to minor sand (1 to 2 inches thick) at 15.0 feet			
medium stiff to stiff at 20.0 feet			
Stiff, light yellow-brown SILT with sand (ML); moist, sand is fine, micaceous.	21.0		
		P200	P200 = 71%



DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Hook
COMPLETED: 05/09/18

BORING METHOD: mud rotary (see document text)
BORING BIT DIAMETER: 3 7/8 inches

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BORING B-1

POLICE/PUBLIC WORKS BUILDING
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FIGURE A-1

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC%	INSTALLATION AND COMMENTS
30.0		(continued from previous page)			▮	▲ 15	
35.0		light gray-brown at 35.0 feet			▮	▲ 26	
	▨	Very stiff, light gray-brown with orange mottled CLAY with gravel (CL), minor sand; moist, gravel is subangular to subrounded and partially decomposed (40%).	36.0				
40.0					▮	▲ 29	
		Exploration completed at a depth of 41.5 feet. Hammer efficiency factor is 81.4 percent.	41.5				Surface elevation was not measured at the time of exploration.

DRILLED BY: Western States Soil Conservation, Inc.

LOGGED BY: J. Hook

COMPLETED: 05/09/18

BORING METHOD: mud rotary (see document text)

BORING BIT DIAMETER: 3 7/8 inches

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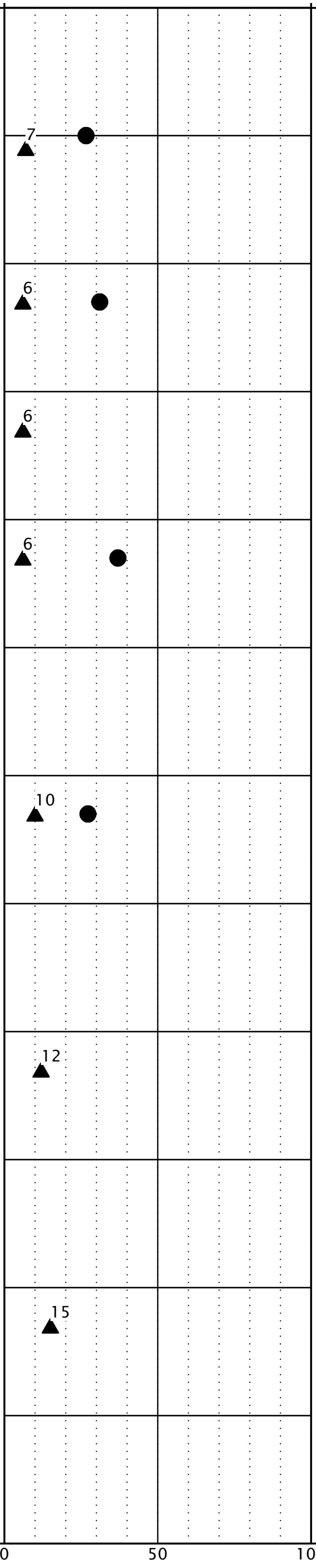
BORING B-1
(continued)

POLICE/PUBLIC WORKS BUILDING
WILSONVILLE, OR

FIGURE A-1

DEPTH FEET	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	▲ BLOW COUNT	INSTALLATION AND COMMENTS
0.0	ASPHALT CONCRETE (2.0 inches).	0.2			
	AGGREGATE BASE (4.0 inches).	0.5			
	Medium stiff, light yellow-brown SILT (ML), minor to with sand; moist, nonplastic, sand is fine, micaceous.				
2.5				7	
5.0			ATT	6	LL = NP PL = NP
7.5	with sand to sandy at 7.5 feet			6	
10.0	interbeds of minor to with sand (1 to 2 inches thick) at 10.0 feet			6	
12.5					
	Stiff, light yellow-brown SILT with sand (ML); moist, sand is fine, micaceous.	13.5			
15.0			P200	10	P200 = 74%
17.5					
20.0				12	
22.5	Medium dense, light yellow-brown, silty SAND (SM); moist, fine, micaceous.	22.5			
25.0				15	
27.5					
	Very stiff, light gray-brown with orange mottled CLAY with gravel (CL), minor sand, trace silt; moist, gravel is subangular and partially decomposed	28.0			
30.0					



DRILLED BY: Western States Soil Conservation, Inc.

LOGGED BY: J. Hook

COMPLETED: 05/09/18

BORING METHOD: mud rotary (see document text)

BORING BIT DIAMETER: 3 7/8 inches

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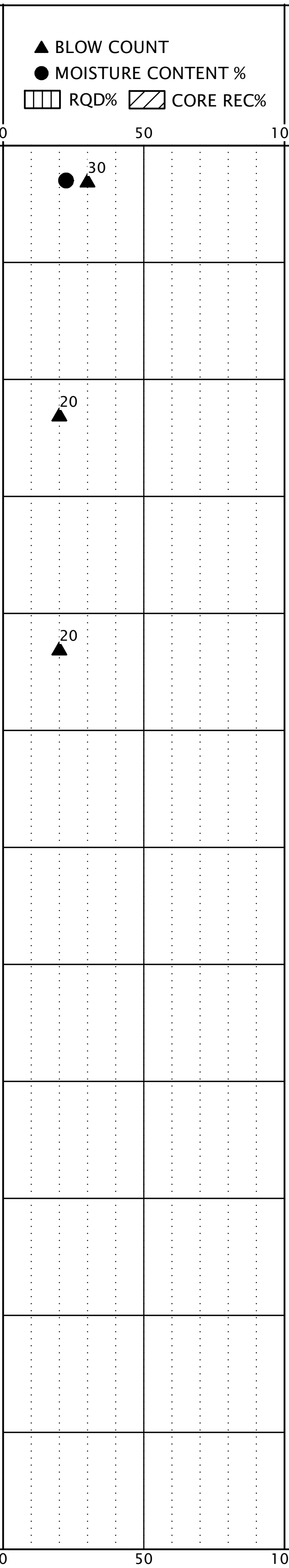
BORING B-2

POLICE/PUBLIC WORKS BUILDING
WILSONVILLE, OR

FIGURE A-2

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	INSTALLATION AND COMMENTS
30.0		(30%).		P200		P200 = 83%
32.5						
35.0		Very stiff, light yellow-brown, sandy SILT (ML); moist, sand is fine, micaceous.	35.0			
37.5						
40.0		light gray-brown with orange mottles; coarse at 40.0 feet				
		Stiff, light yellow-brown SILT with sand (ML); moist to wet, sand is fine, micaceous.	41.0			Surface elevation was not measured at the time of exploration.
42.5		Exploration completed at a depth of 41.5 feet. Hammer efficiency factor is 81.4 percent.	41.5			
45.0						
47.5						
50.0						
52.5						
55.0						
57.5						
60.0						



DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Hook
COMPLETED: 05/09/18

BORING METHOD: mud rotary (see document text)
BORING BIT DIAMETER: 3 7/8 inches

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BORING B-2
(continued)

POLICE/PUBLIC WORKS BUILDING
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FIGURE A-2

SAMPLE INFORMATION			MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
B-1	2.5		29							
B-1	7.5		38							
B-1	15.0		31							
B-1	25.0		28				71			
B-2	2.5		27							
B-2	5.0		31					NP	NP	NP
B-2	10.0		37							
B-2	15.0		27				74			
B-2	30.0		22				83			

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SUMMARY OF LABORATORY DATA

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FIGURE A-3

Summary of SPT Test Results

Project: WSSC-8-03, Test Date: 5/9/2018

EMX: Maximum Energy

ETR: Energy Transfer Ratio - Rated

Start Depth ft	Final Depth ft	**N Value**	**N60 Value**	Average EMX ft-lb	Average ETR %
25.00	26.50	**12**	**16**	290.01	82.9
30.00	31.50	**16**	**21**	280.85	80.2
35.00	36.50	**26**	**35**	287.04	82.0
40.00	41.50	**29**	**39**	282.85	80.8
			Overall Average Values:	284.81	81.4
			Standard Deviation:	6.09	1.7
			Overall Maximum Value:	295.59	84.5
			Overall Minimum Value:	268.85	76.8

APPENDIX B

APPENDIX B

SITE-SPECIFIC SEISMIC HAZARD EVALUATION

INTRODUCTION

The information in this appendix summarizes the results of a site-specific seismic hazard evaluation for the planned improvements to the City of Wilsonville's existing police/public works building located at 30000 Town Center Loop East in Wilsonville, Oregon. The improvements include a seismic upgrade to the existing two-story building.

This seismic hazard evaluation was performed in accordance with the requirements of the 2014 SOSSC and ASCE 7-10.

SITE CONDITIONS

REGIONAL GEOLOGY

A detailed description of the geologic setting is presented in the main report.

SUBSURFACE CONDITIONS

A detailed description of site subsurface conditions is presented in the main report.

SEISMIC SETTING

Earthquake Source Zones

Three scenario earthquakes were considered for this study consistent with the local seismic setting. Two of the possible earthquake sources are associated with the CSZ, and the third event is a shallow, local crustal earthquake that could occur in the North American plate. The three earthquake scenarios are discussed below.

Regional Events

The CSZ is the region where the Juan de Fuca Plate is being subducted beneath the North American Plate. This subduction is occurring in the coastal region between Vancouver Island and northern California. Evidence has accumulated suggesting that this subduction zone has generated eight great earthquakes in the last 4,000 years, with the most recent event occurring approximately 300 years ago (Weaver and Shedlock, 1991). The fault trace is mapped approximately 50 to 120 km off the Oregon Coast. Two types of subduction zone earthquakes are possible and considered in this study:

1. An interface event earthquake on the seismogenic part of the interface between the Juan de Fuca Plate and the North American Plate on the CSZ. This source is reportedly capable of generating earthquakes with a moment magnitude of between 8.5 and 9.0.
2. A deep intraplate earthquake on the seismogenic part of the subducting Juan de Fuca Plate. These events typically occur at depths of between 30 and 60 km. This source is capable of generating an event with a moment magnitude of up to 7.5.

Local Events

A significant earthquake could occur on a local fault near the site within the design life of the facility. Such an event would cause ground shaking at the site that could be more intense than the CSZ events, though the duration would be shorter. Figure B-1 shows the locations of faults with potential Quaternary movement within a 20-mile radius of the site (USGS, 2006). Figure B-2 shows the interpreted locations of seismic events that occurred between 1898 and 2017 (NCEDC, 2016; PNSN, 2017). The most significant faults in the site vicinity are the Canby-Molalla fault, the Newberg fault, the Oatfield fault, and the Portland Hills fault. A discussion of these faults is provided below.

Canby-Molalla Fault

The mapped trace of the north-northwest-striking Canby-Molalla fault is based on a linear series of northeast-trending discontinuous aeromagnetic anomalies that probably represent significant offset of Eocene basement and volcanic rocks of the Miocene Columbia River Basalt beneath Neogene sediments that fill the northern Willamette River Basin. The fault has little geomorphic expression across the gently sloping floor of the Willamette Valley, but a small, laterally restricted berm associated with the fault may suggest young deformation. Deformation of probable Missoula flood deposits in a high-resolution seismic reflection survey conducted across the aeromagnetic anomaly east of Canby suggests possible Holocene deformation. Sense of displacement of the Canby-Molalla fault is poorly known, but the fault shows apparent right-lateral separation of several transverse magnetic anomalies, and down-west vertical displacement is also apparent in water well logs (Personius, 2002a).

Newberg Fault

The Newberg fault is part of the Gales Creek-Mount Angel structural zone, a northwest-striking zone of dextral-reverse faults that has been active at least since the Miocene when they controlled the emplacement of Miocene CRBG lava flows in the northern Willamette Valley. The fault primarily is mapped in the subsurface on the basis of water well, aeromagnetic, and gravity data. Unequivocal evidence of displacement in Quaternary deposits has not been described, but most of the fault trace is covered by a thick sequence of silty sediment deposited by the Missoula Floods that may have buried evidence of pre-latest Quaternary displacement (Personius, 2002b).

Oatfield Fault

The northwest-striking Oatfield fault forms northeast-facing escarpments in volcanic rocks of the Miocene Columbia River Basalt Group in the Tualatin Mountains and northern Willamette Valley. The fault may be part of the Portland Hills-Clackamas River structural zone. The Oatfield fault is primarily mapped as a very high-angle, reverse fault with apparent down-to-the-southwest displacement, but a few kilometer-long reach of the fault with down-to-the-northeast displacement is mapped in the vicinity of the Willamette River. This apparent change in displacement direction along strike may reflect a discontinuity in the fault trace or could reflect the right-lateral, strike-slip displacement that characterizes other parts of the Portland Hills-Clackamas River structural zone. The fault has also been modeled as a 70-degree, east-dipping reverse fault. Reverse displacement with a right-lateral, strike-slip component is consistent with the tectonic setting, mapped geologic relations, and microseismicity in the area. Fault scarps on surficial deposits have not been described, but exposures in a light rail tunnel showing offset of approximately 1 M_a Boring Lava across the fault indicate Quaternary displacement (Personius, 2002c).

Portland Hills Fault

The northwest-striking Portland Hills fault forms the prominent linear northeastern margin of the Tualatin Mountains (Portland Hills) and the southwestern margin of the Portland Basin; this basin may be a right-lateral pull-apart basin in the forearc of the CSZ or a piggyback synclinal basin formed between antiformal uplifts of the Portland fold belt. The fault is part of the Portland Hills-Clackamas River structural zone, which controlled the deposition of Miocene CRBG lavas in the region. The crest of the Portland Hills is defined by the northwest-striking Portland Hills anticline. Sense of displacement on the Portland Hills fault is poorly known and controversial. The fault was originally mapped as a down-to-the-northeast normal fault. The fault has also been mapped as part of a regional-scale zone of right-lateral oblique slip faults and as a steep escarpment caused by asymmetrical folding above a southwest-dipping blind thrust. Reverse displacement with a right-lateral strike-slip component may be most consistent with the tectonic setting, mapped geologic relations, aeromagnetic data, and microseismicity in the area. Fault scarps on surficial Quaternary deposits have been described along the fault trace, but some geomorphic (steep, linear escarpment, triangular facets, over-steepened and knick-pointed tributaries) and geophysical (aeromagnetic, seismic reflection, and ground-penetrating radar) evidence suggest Quaternary displacement. (Personius, 2017).

Table B-1. Significant Crustal Faults

Source	Closest Mapped Distance[1] (km)	Mapped Length[1] (km)
Canby-Molalla Fault	6.1	50
Newburg Fault	15.6	5
Oatfield Fault	16.0	29
Portland Hills Fault	17.5	49

1. Reported by USGS (USGS, 2014)

SEISMIC RESPONSE ANALYSIS

TARGET BEDROCK SPECTRUM

In order to complete a site response analysis, a target bedrock spectrum is required. The target bedrock spectrum was taken as the spectrum corresponding to a shear wave velocity of approximately 2,500 fps (Site Class B).

The target bedrock spectrum was determined using Next Generation Attenuation West 2 (NGA-West2) coded in the EZ-FRISK 8.0 software application. The values represent the average horizontal component considering 5 percent damping. The relationships, excluding Idriss (2014), include basin amplification components to model basins, such as the relatively shallow

Portland Basin. The attenuation relationships and weighting used in analysis is presented in Table B-2. In our opinion, the use of five attenuation relationships addresses epistemic uncertainty at the site.

Table B-2. Attenuation Relationships Weights for Seismic Sources

Faulting Type	Ground Motion Prediction Equation	2014 USGS Weight
Shallow Faults and Shallow Crustal Background Seismicity	Abrahamson et al. (2014)	0.22
	Boore et al. (2014)	0.22
	Campbell and Bozorgnia (2014)	0.22
	Chiou and Youngs (2014)	0.22
	Idriss (2014)	0.12
Subduction (CSZ)	Zhao et al. (2006)	0.3
	BC Hydro (Abrahamson et al., 2016)	0.3
	Atkinson-Macias (2009)	0.1
	Atkinson and Boore (2003) Global Model	0.3
Deep Intraslab	Atkinson and Boore (2003) Cascadia Model	0.1667
	Zhao et al. (2006)	0.33
	BC Hydro (Abrahamson et al., 2016)	0.33
	Atkinson and Boore (2003) Global Model	0.1667

The 2014 USGS fault source parameters were used in conjunction with the NGA-West2 attenuation relationships.

GMMs used in the hazard calculation compute the average horizontal component of ground motions. Therefore, scaling factors were applied to adjust the PSHA MCE site response results to the maximum rotated component as described in ASCE 7-10 (C21.2). According to ASCE 7-10 supplement 1, a scale factor of 1.1 should be used for periods of 0.2 second and shorter, a scale factor of 1.3 should be used for periods of 1.0 second, and a scaling factor of 1.5 was used for periods greater than 5 seconds (with averaging in between 0.2 and 1 second and between 1 second and 1.5 seconds).

The results of the PSHA MCE site response were also modified with risk coefficients using Method 2 outlined in ASCE 7-10 Section 21.2.1.2. A risk coefficient of C_{RS} = 0.899 was applied to the spectrum at periods of 0.2 second or less and a risk coefficient of C_{R1} = 0.871 was applied to the spectrum at periods greater than 1 second. Linear interpolation was used to compute risk coefficients between periods of 0.2 and 1 second. The intent of this is to achieve a 1 percent collapse of the structure in a 50-year period.

The target bedrock spectrum used in analysis is presented in Table B-3.

Table B-3. Target Bedrock Spectrum

Period (seconds)	MCE_R Target Bedrock Spectrum (g)
0.01	0.376
0.02	0.397
0.03	0.429
0.05	0.506
0.075	0.662
0.1	0.780
0.15	0.860
0.2	0.825
0.25	0.773
0.3	0.732
0.4	0.652
0.5	0.576
0.75	0.460
1	0.392
1.5	0.274
2	0.218
3	0.136
4	0.101
5	0.077
7.5	0.046
10	0.034

BASE GROUND MOTIONS

Six recorded base ground motions were selected to represent the local seismic setting. Based on deaggregation at the assumed fundamental period of the building, ground motions are generally controlled by a crustal event (approximately 75 percent of hazard) and the CSZ interface event (approximately 25 percent of hazard). Based on the deaggregation, we selected two time-histories for the CSZ and four time-histories for the crustal event. Table B-4 provides the ground motions selected for this study.

Table B-4. Selected Ground Motions

Ground Motion/Year/Recording Station	Magnitude	Distance (km)	Component
Crustal Records			
San Fernando/1971/LA – Hollywood Stor FF	6.6	22.8	090
Imperial Valley-06/1979/El Centro Array #3	6.5	12.9	140
Superstition Hills-02/2008/Westmorland Fire Station	6.5	13.0	90
Darfield New Zealand/2010/Christchurch Cashmere High School	7.0	17.6	10E
Subduction Zone Records			
Maule 2010/Colegio Las Americas Tohoku	8.8	81.9	NS
Tohoku 2011/Tsukuba City Hall	9.0	106.9	004

SITE CONDITION MODELING

We determined acceleration response spectra for the postulated scenarios discussed above by performing a site-specific seismic response analysis. An equivalent linear seismic response analysis as described in ASCE 7-10 Section 21.1.2. The site response analysis was performed using the SHAKE 91+ module of the EZ-FRISK 8.0 software package.

Soil Model

The input soil model used in our analysis is based on the findings of the subsurface exploration program. A detailed description of site subsurface conditions is provided in the main report. Table B-5 provides a summary of the soil model used in our analysis. The acceleration response spectra produced by our equivalent linear seismic response analysis is presented on Figure B-3.

Table B-5. Input Soil Profile

Depth Interval (feet)	Subsurface Unit	Shear Wave Velocity (fps)	Modulus Reduction Curve	Damping Curve
0 to 30	Silt	600-800	Various (Vucetic and Dobry, 1991)	Various (Vucetic and Dobry, 1991)
30 to 35	Sand	500	Darendeli 2004	Darendeli 2004
35 to 45	Clay	1,000	Sun et al. 1988	Various (Vucetic and Dobry, 1991
45 to 50	Silt	1,000	Various (Vucetic and Dobry, 1991	Various (Vucetic and Dobry, 1991)
50 to 100	Clay	1,000	Sun et al. 1988	Various (Vucetic and Dobry, 1991)

1. Ground motions input at the base of this layer

DETERMINISTIC MCE_R RESPONSE SPECTRUM

The deterministic approach considers the maximum ground acceleration that may occur at the site as a result of a characteristic earthquake on all known active faults in the region. ASCE 7-10 Section 21.2.2 requires that the spectral response at each period be calculated as an 84th percentile 5 percent damped spectral response acceleration in the direction of maximum horizontal response. However, the lower limit is computed in accordance with Figure 21.2-1 in ASCE 7-10 where F_a and F_v are determined using Tables 11.4-1 and 11.4-2 in ASCE 7-10. Figure B-4 shows the deterministic lower limit as prescribed by ASCE 7-10 Section 21.2.2.

SITE-SPECIFIC MCE_R RESPONSE SPECTRUM

As outlined in ASCE 7-10 Section 21.2.3, the site-specific MCE_R shall be taken as the lesser of the probabilistic MCE_R and the deterministic MCE_R. Figure B-4 shows the site-specific design response spectrum.

DESIGN RESPONSE SPECTRUM

ASCE 7-10 Section 21.3 states that the site-specific MCE_R response spectrum is reduced to two-thirds of the acceleration at any period. However, the lower bound for design ground motions is 80 percent of the generalized response spectrum as outlined in ASCE 7-10 Section 11.4.5.

DESIGN ACCELERATION PARAMETERS

To develop the final design response spectrum, the lesser of the values obtained from the probabilistic MCE and the deterministic MCE are taken at each period. The parameter S_{DS} is taken from the site-specific response spectrum at a period of 0.2 second but shall not be smaller than 90 percent of the peak spectral acceleration taken at any period larger than 0.2 second. The parameter S_{D1} is taken as the greater of the spectral acceleration at 1 second or two times the acceleration at 2 seconds. Figure B-5 shows the design response spectrum.

GEOLOGIC HAZARDS

In addition to ground shaking, site-specific geologic conditions can influence the potential for earthquake damage. Deep deposits of loose or soft alluvium can amplify ground motions, resulting in increased seismic loads on structures. Other geologic hazards are related to soil failure and permanent ground deformation. Permanent ground deformation could result from liquefaction, lateral spreading, landsliding, and fault rupture. The following sections provide additional discussion regarding potential seismic hazards that could affect the planned development.

SURFACE FAULT RUPTURE

The closest mapped fault is the Canby-Molalla fault zone, which is approximately 6.1 km southwest of the site. Quaternary faults are not mapped directly beneath the site; therefore, it is our opinion that the probability of fault rupture beneath the site is low.

LIQUEFACTION

Liquefaction is caused by a rapid increase in pore water pressure that reduces the effective stress between soil particles to near zero. Granular soil, which relies on interparticle friction for strength, is susceptible to liquefaction until the excess pore pressure can dissipate. In general, loose, saturated sand soil with low silt and clay content is the most susceptible to liquefaction. Soil susceptible to liquefaction was not encountered in the explorations. Consequently, liquefaction is not considered a site hazard.

LATERAL SPREADING

Since liquefaction is not expected, the site is also not susceptible to lateral spreading under design levels of ground shaking.

GROUND MOTION AMPLIFICATION

Soil capable of significantly amplifying ground motions beyond the levels determined by our site-specific seismic response analysis were not encountered during the subsurface exploration program. The main report provides a detailed description of the subsurface conditions encountered. We conclude that the level of amplification determined by our response analysis is appropriate and the building can be designed using the levels of ground shaking prescribed by ASCE 7-10.

LANDSLIDE

Earthquake-induced landsliding generally occurs in steeper slopes comprised of relatively weak soil deposits. The site and surrounding area are relatively flat, and landslides are unlikely during postulated seismic scenarios.

SETTLEMENT

Settlement due to earthquakes is most prevalent in relatively deep deposits of dry, clean sand. We do not anticipate that significant settlement in addition to liquefaction-induced settlement will occur during design levels of ground shaking.

SUBSIDENCE/UPLIFT

Subduction zone earthquakes can cause vertical tectonic movements. The movements reflect coseismic strain release accumulation associated with interplate coupling in the subduction zone. Based on our review of the literature, the locked zone of the CSZ is located in excess of 60 miles from the site. Consequently, we do not anticipate that subsidence or uplift is a significant design concern.

LURCHING

Lurching is a phenomenon generally associated with very high levels of ground shaking, which cause localized failures and distortion of the soil. The anticipated ground accelerations shown on Figure B-3 are below the threshold required to induce lurching of the site soil.

SEICHE AND TSUNAMI

The site is inland and elevated away from tsunami inundation zones and away from large bodies of water that may develop seiches. Seiches and tsunamis are not considered a hazard in the site vicinity.

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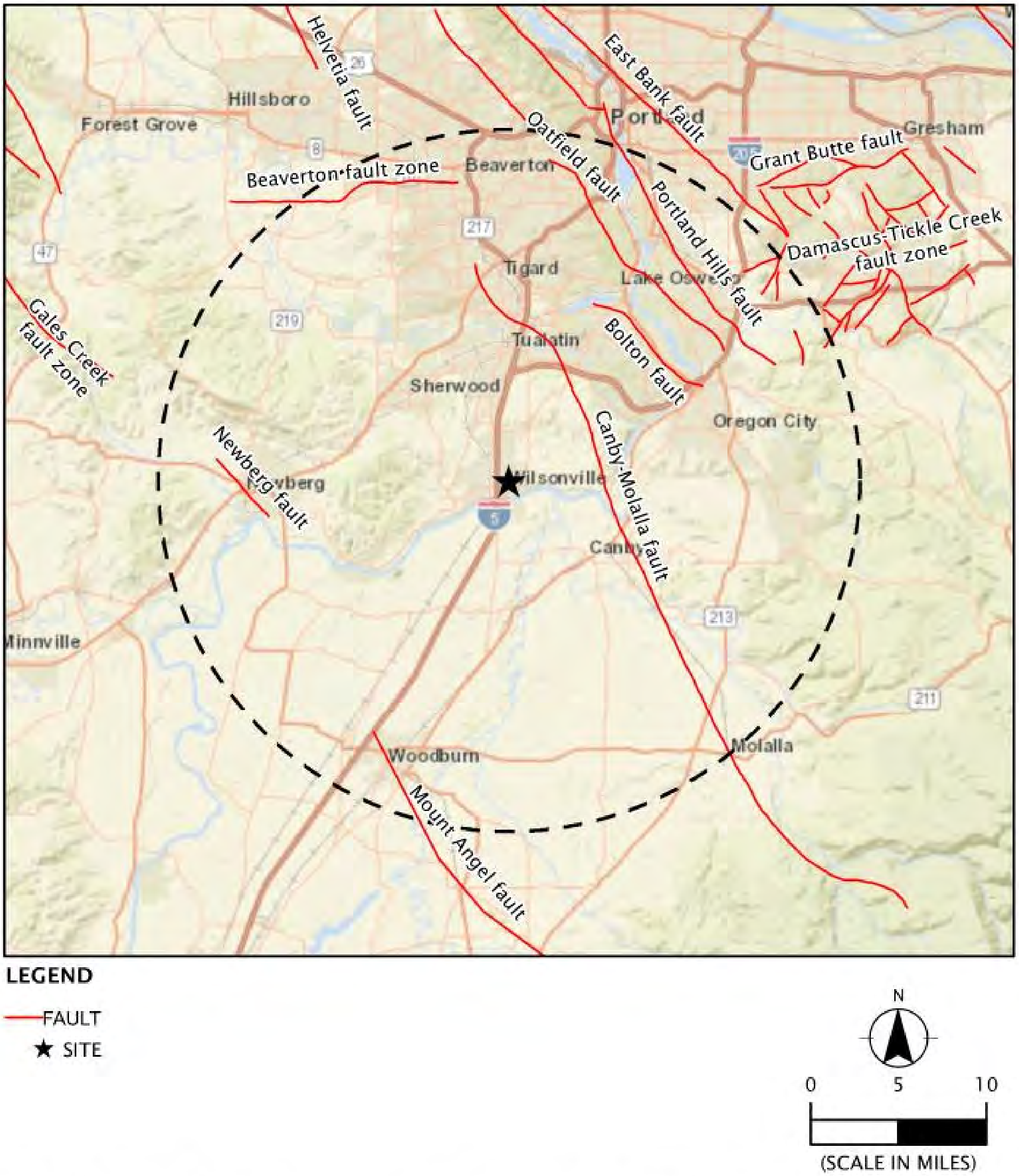
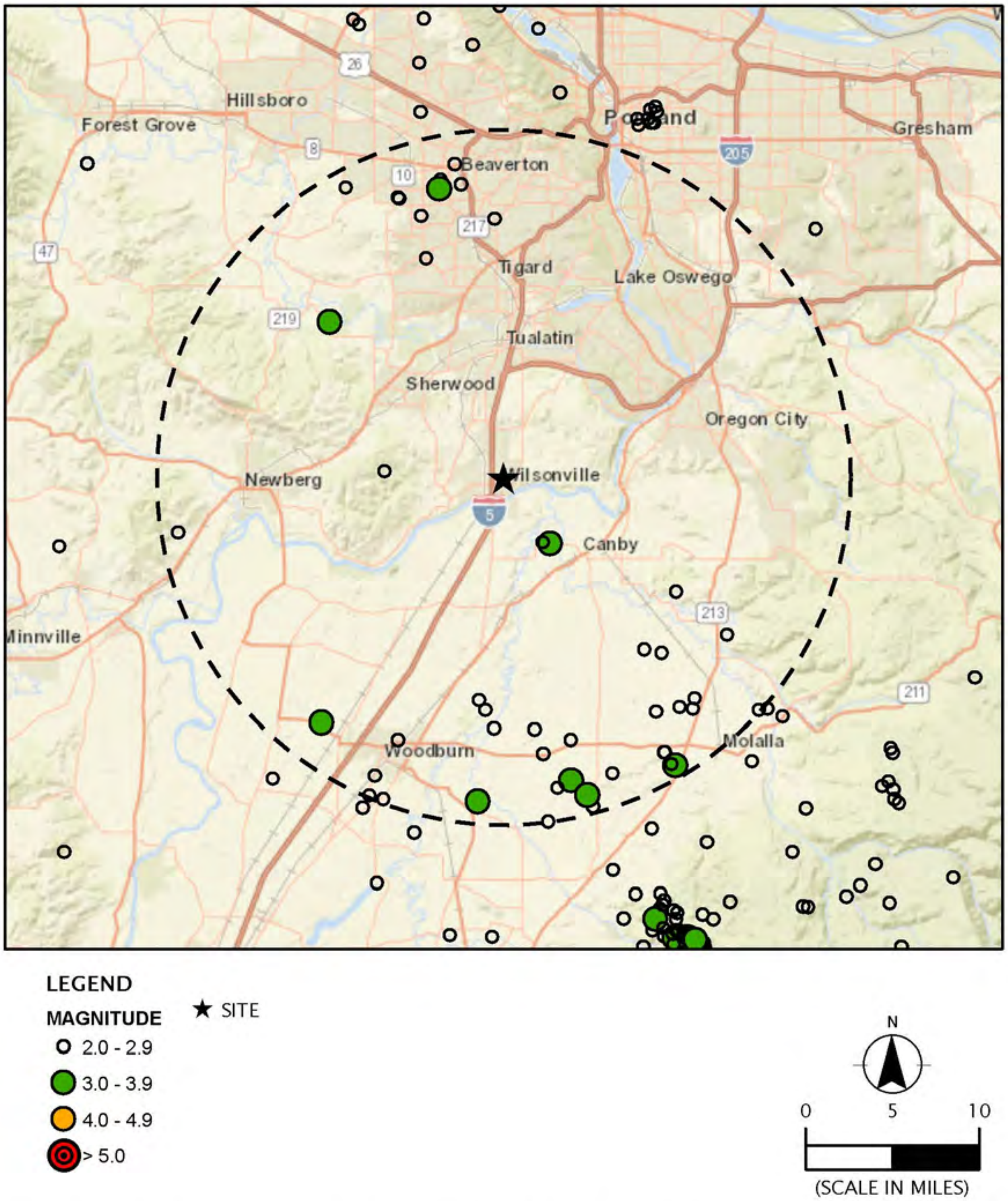


FAULTS PROVIDED BY THE USGS (2006) QUATERNARY FAULT AND FOLD DATABASE, ACCESSED 5/16/18
FROM: http//earthquakes.usgs.gov/hazards/qfaults/

GEODESIGN INC 9450 SW Commerce Circle - Suite 300 Wilsonville OR 97070 503.968.8787 www.geodesigninc.com	CWILSON-14-01	**QUATERNARY FAULT MAP**	
	JUNE 2018	POLICE/PUBLIC WORKS BUILDING WILSONVILLE, OR	**FIGURE B-1**

CWilson-14-01-FB1_B2.docx Print Date: 6/7/18



HISTORICAL EARTHQUAKES 1898–1969 PROVIDED BY THE ANSS COMPREHENSIVE CATALOG, NCEDC (2016)
HISTORICAL EARTHQUAKES 1969–2017 PROVIDED BY THE PNSN AUTHORATIVE CATALOG (2017)

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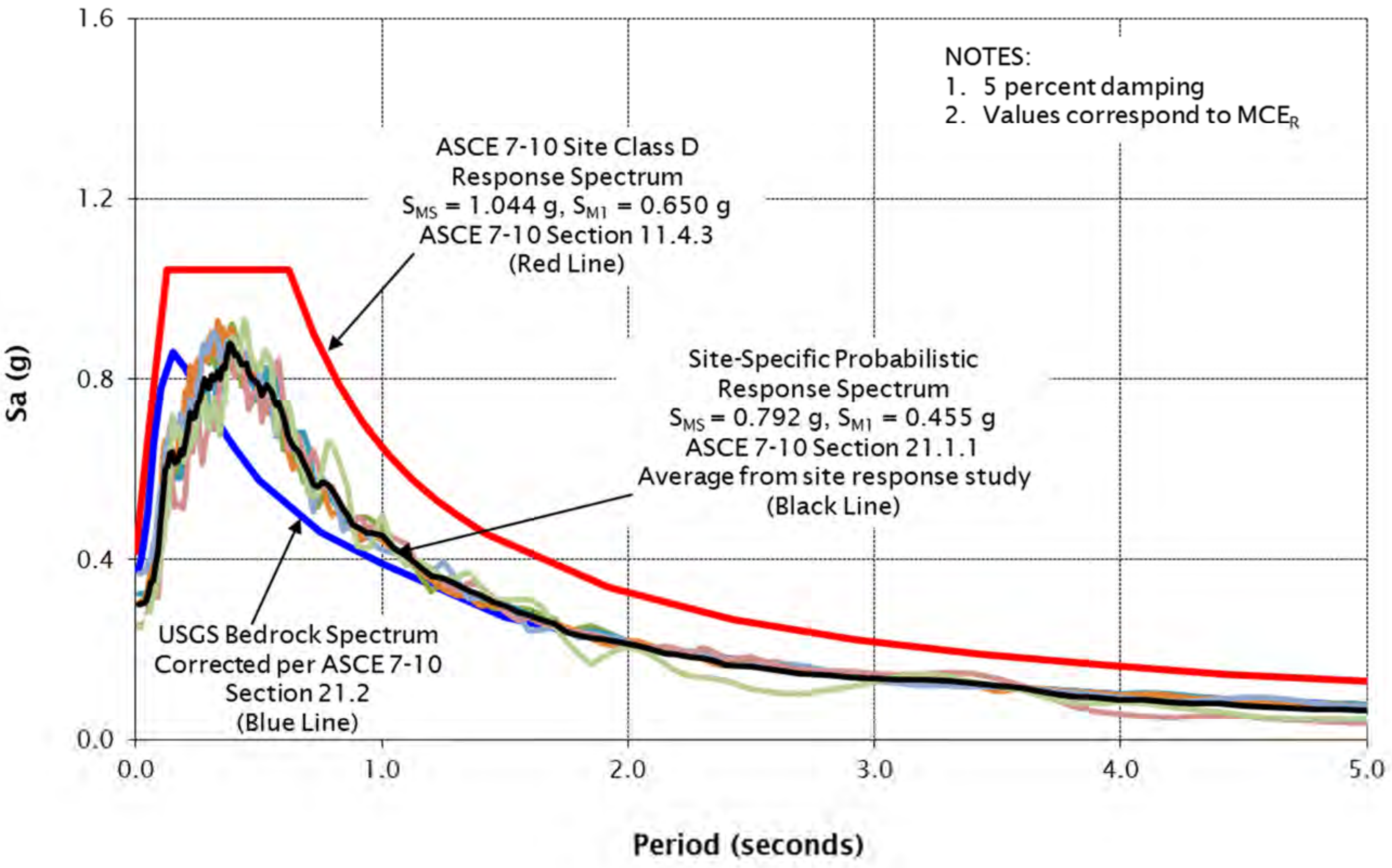
JUNE 2018

HISTORICAL SEISMICITY MAP

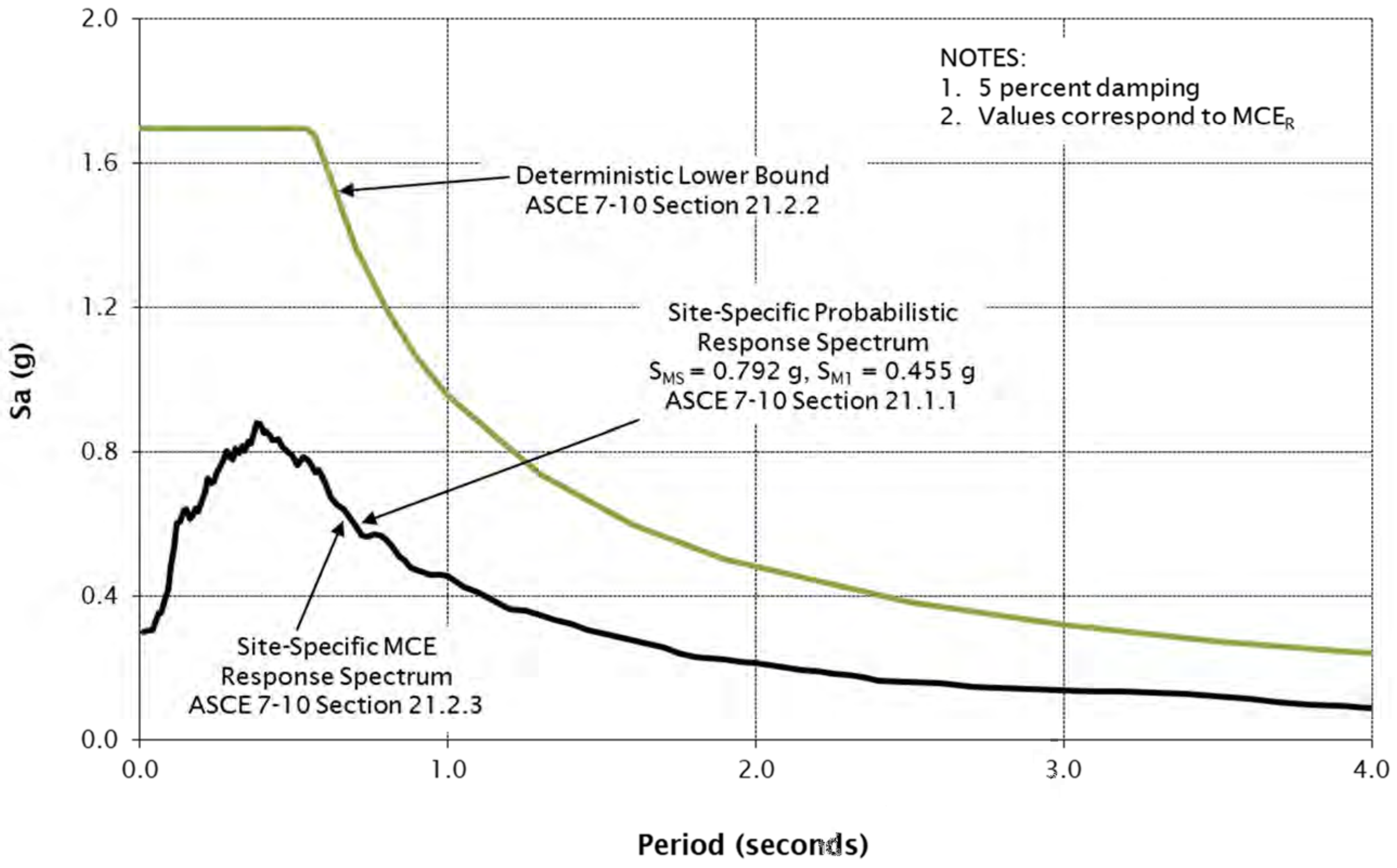
POLICE/PUBLIC WORKS BUILDING
WILSONVILLE, OR

FIGURE B-2

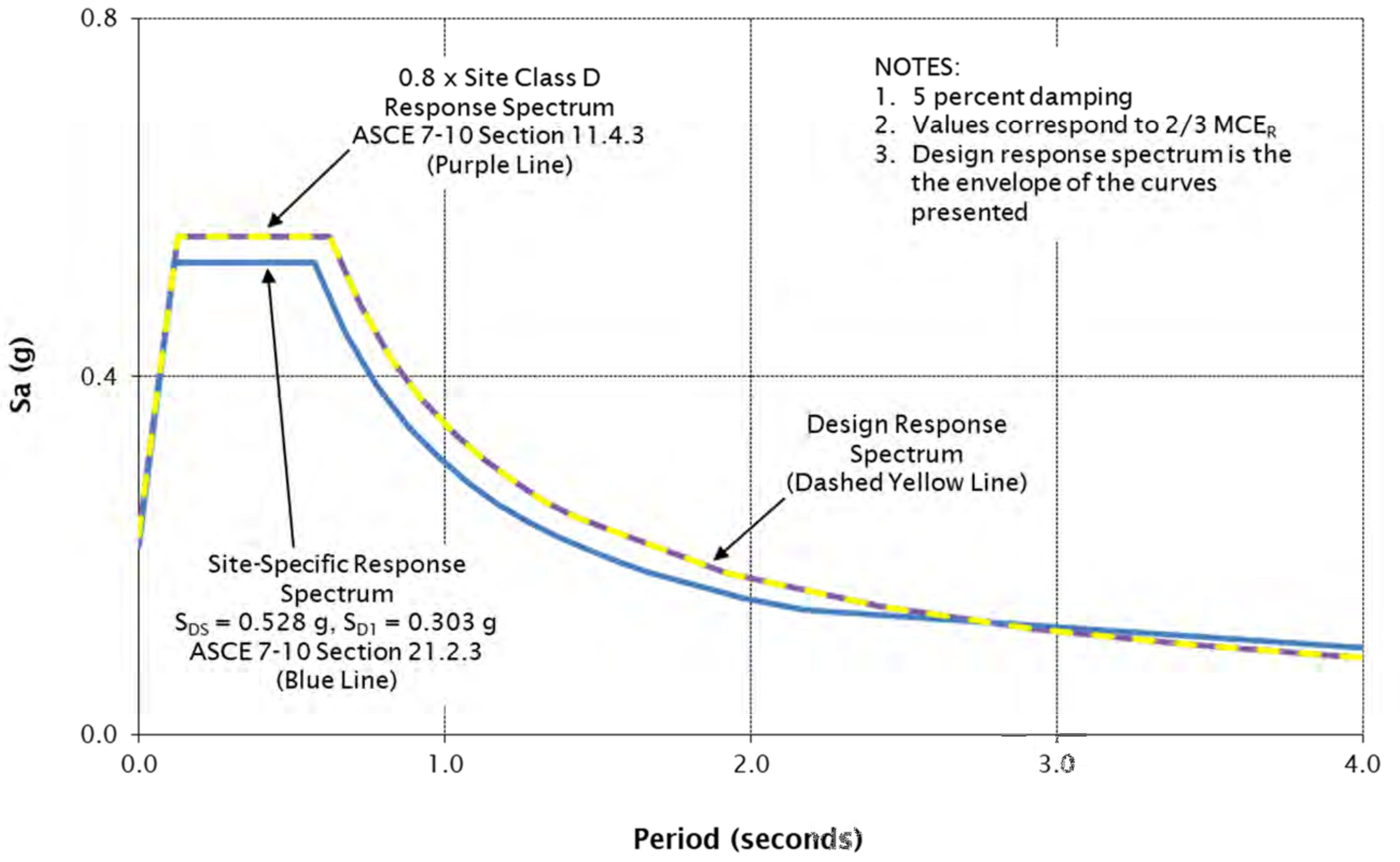


NOTES:
1. 5 percent damping
2. Values correspond to MCE_R

GEODESIGN INC 9450 SW Commerce Circle - Suite 300 Wilsonville OR 97070 503.968.8787 www.geodesigninc.com	CWILSON-14-01 JUNE 2018	**SITE RESPONSE SPECTRA** POLICE/PUBLIC WORKS BUILDING WILSONVILLE, OR
		FIGURE B-3



GEODESIGN INC 9450 SW Commerce Circle - Suite 300 Wilsonville OR 97070 503.968.8787 www.geodesigninc.com	CWILSON-14-01	**SITE-SPECIFIC RESPONSE SPECTRA**	
	JUNE 2018	POLICE/PUBLIC WORKS BUILDING WILSONVILLE, OR	**FIGURE B-4**



NOTES:
1. 5 percent damping
2. Values correspond to 2/3 MCE_R
3. Design response spectrum is the the envelope of the curves presented

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	JUNE 2018	POLICE/PUBLIC WORKS BUILDING WILSONVILLE, OR
		FIGURE B-5

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HAZARDOUS MATERIALS SURVEY

For

Wilsonville Public works & Police
30000 Town Center Loop E
Wilsonville OR 97070

Produced for:
City of Wilsonville
29799 Town Center Loop E
Wilsonville, OR 97070

APEX
ENVIRONMENTAL CONSULTING

PO Box 1445
Wilsonville, OR 97070
(503) 682-9737

October 2018

Inspection Summary

Building Data	**Client Data**
30000 Town Center Loop E	City of Wilsonville
Seismic Upgrades and Renovation	29799 Town Center Loop E
Wilsonville, Oregon 97070	Wilsonville, OR 97070

1.0 SCOPE OF WORK

Apex Environmental provided an asbestos survey investigation of the seismic upgrades and renovation of the Wilsonville Public Works and Police building.. The purpose of this investigation was to document known and suspect asbestos containing materials within the subject space that may be impacted by the upcoming renovation of the areas. All materials suspected to be impacted by the renovation were tested for asbestos. Apex has compiled this report to include following the scope of work.

1. Inspect and sample accessible suspect asbestos-containing building materials (ACBM) in accordance with state and federal regulations (OSHA and ASHARA). Limited destructive testing performed.
2. Collect bulk samples of suspect asbestos materials to be analyzed by PLM (Polarized Light Microscopy) by and accredited NVLAP Laboratory.
3. Collect representative samples of paint for lead analysis using Atomic Absorption (AA) methodology.
4. Create a report that outlines the presence, location, quantity, and condition of positive ACBMs and results of lead based paint utilizing information found within this survey.

CERTIFICATION/LIMITATIONS

Apex Environmental has conducted a physical inspection of the building and compiled this report consistent with the survey scope and certifies that the information is correct and accurate within the standards of professional quality and contractual obligations. Apex has performed this investigation in accordance with state and federal regulations that apply.

The results of this survey do not apply beyond the planned renovation described above and as shown in the drawings submitted to Apex prepared by Oh Planning and Architecture dated September 11, 2018. Materials located in areas not included in this inspection should be considered suspect and tested if impact is anticipated. Should the scope of the renovation change during the course of construction the City of Wilsonville and their representatives should be contacted to determine if materials contain asbestos or are lead based paint. Building materials should be assumed to contain asbestos unless testing shows otherwise.

Jose Godinez	Tulla Stocker
AHERA Inspector	AHERA Inspector
15876	43633 IR
Jose Godinez	*Tulla Stocker*
Signature	Signature

2.0 INSPECTION SUMMARY

Apex Environmental conducted an Asbestos survey of suspect asbestos-containing materials at the following site:

Seismic Upgrades & Renovation
Public Works, and Police 1st & 2nd level
30000 Town Center Loop E, Wilsonville, Oregon

The survey team consisted of Jose Godinez (AHERA Inspector), and Tulla Stocker (AHERA Inspector). All sampling was conducted in accordance with the Oregon Department of Environmental Quality (DEQ) and Occupational Safety and Health Administration (OSHA) testing protocol. The survey characterized the extent of suspect asbestos-containing materials in the building. This survey was performed to document asbestos containing materials within the building to accommodate the upcoming renovation of the subject areas.

Results for samples collected by Apex indicate that there is asbestos in the black window caulking. The tables below summarize the asbestos containing materials in the subject space and the materials that tested positive. Fiberglass insulation was observed above the ceilings, however this material was determined to be non-suspect insulation.

Table 1
Materials testing positive for asbestos

Material Description	Location	Approximate Quantity
Black Window caulking	Windows throughout	500 Linear Feet

Materials testing negative for asbestos

Material Description	Location
Yellow mastic under carpet	Underneath the carpet throughout first and second floor
Blue 12” x 12” VCT and mastic	Break room 2nd floor
Rubber divider between door	At door entrances throughout first and second floor
2’x4’ lay in ceiling tiles	Throughout first and second floor ceiling
Beige 12” x 12” VCT and mastic	Break room 2nd floor/ 1st floor hallway
Red filling compound between pipe penetrations	Work room 2nd floor
Gypsum wallboard, joint compound, and plaster	First and second floors
Gray linoleum and black mastic	Bathrooms and showers on first and second floors
Yellow mastic behind wall trim	2nd floor restrooms
Putty on duct seams	Air duct above ceiling first and second floor
Spray on coating on sink	Break room sink on second floor
Black & tan Vinyl cove base and white mastic	Throughout first and second floor
12” x 12” cream VCT and mastic	Work room 2nd floor
Grout	Men’s and women’s shower 1st floor
Cinderblock and grout	Work room 1st floor, and exterior
Stucco	Perimeter exterior walls
Black tar	Exterior wood stairs/deck
Built up roofing	North and south ends
Fiberglass insulation*	Above ceilings

*non suspect

2.1 COLLECTION AND ANALYTICAL METHOD

Samples were collected of accessible suspect asbestos-containing materials. All analytical methods utilized were in accordance with EPA "Interim Method of the Determination of Asbestos in Bulk Insulation Samples." Bulk samples were delivered to the laboratory of CA Labs, accompanied by proper sample chain-of-custody documentation. CA Labs is accredited and participates in the National Voluntary Laboratory Accreditation Program (NVLAP).

Samples were analyzed by Polarized Light Microscopy (PLM) to a quantitation limit of 1 percent. A homogenous area is considered not to contain asbestos only if the results of all samples collected from the area show asbestos in amounts of less than 1%. The number of samples collected of each homogeneous material was determined using the Occupational Safety and Health Administration (OSHA) requirements.

Asbestos Containing Window caulk

Asbestos containing window caulk was observed in perimeter of the interior window frames on both the first and second floors. If this material is impacted it must be removed by a certified abatement contractor prior to renovation or disturbance and disposed of per DEQ regulations (OAR 340-032-5650) the window caulk appeared to be in good condition at the time of this inspection.

Limitations

No environmental investigation can eliminate all uncertainty. Samples collected for analysis may not be representative of all site conditions. Observations, findings, and conclusions included in this report are based solely on the site conditions at the time of investigation and do not imply a warrantee or guarantee for the site. Nothing in this report constitutes a legal opinion or service and should not be relied on as such.

Table 2
City of Wilsonville
Public Works Building
Sampling Inventory

Sample No.	Material Description	Location	Results
CW-01	Roofing	North end	NAD
CW-02	Roofing	South end	NAD
CW-03	Gypsum wallboard, joint compound, and plaster	Open office U02	NAD
CW-04	Gypsum wallboard, joint compound, and plaster	Open office U02	NAD
CW-05	2’ x 4’ drop ceiling tile	Open office U02	NAD
CW-06	2’ x 4’ drop ceiling tile	Open office U02	NAD
CW-07	Black vinyl cove base and black mastic	Open office U02	NAD
CW-08	Black vinyl cove base and black mastic	Open office U02	NAD
CW-09	Yellow mastic under carpet	Outside break room	NAD
CW-10	Yellow mastic under carpet	Outside break room	NAD
CW-11	Black divider between door and clear mastic	Outside break room	NAD
CW-12	Black divider between door and clear mastic	Outside break room	NAD
CW-13	Blue 12” x 12” VCT and grey mastic	Break room	NAD
CW-14	Blue 12” x 12” VCT and grey mastic	Break room	NAD
CW-15	Beige 12” x 12” VCT and grey mastic	Break room	NAD
CW-16	Beige 12” x 12” VCT and grey mastic	Break room	NAD
CW-17	Grey coating under sink	Break room	NAD
CW-18	Grey coating under sink	Break room	NAD

NAD: No asbestos detected

Table 2
City of Wilsonville
Public Works Building
Sampling Inventory (continued)

Sample No.	Material Description	Location	Results
CW-19	Tan cove base with white mastic	Break room	NAD
CW-20	Tan cove base with white mastic	Break room	NAD
CW-21	Cream 12” x 12” VCT and grey mastic	Work room	NAD
CW-22	Cream 12” x 12” VCT and grey mastic	Work room	NAD
CW-23	Red compound inside pipe	Work room	NAD
CW-24	Red compound inside pipe	Work room	NAD
CW-25	Cinderblock and grout	Work room	NAD
CW-26	Cinderblock and grout	Work room	NAD
CW-27	Green putty on duct seams	Open office U07 above ceiling	NAD
CW-28	Green putty on duct seams	Open office U07 above ceiling	NAD
CW-29	**Black Caulk**	**Interior break room window**	**5% CH**
CW-30	Black Caulk	Interior break room window	N/A
CW-31	Black cove base with brown mastic	1st floor storage room	NAD
CW-32	Black cove base with brown mastic	1st floor storage room	NAD
CW-33	Beige 12” x 12” VCT with yellow mastic	1st floor hallway	NAD
CW-34	Beige 12” x 12” VCT with yellow mastic	1st floor hallway	NAD
CW-35	Gypsum wallboard and joint compound	1st floor hallway	NAD
CW-36	Gypsum wallboard and joint compound	1st floor hallway	NAD
CW-37	Grout in shower	Women’s restroom 1st floor	NAD
CW-38	Grout in shower	Women’s restroom 1st floor	NAD

NAD: No Asbestos Detected
N/A: Not Analyzed Due to Previous Positive
CH: Chrysotile Asbestos

City of Wilsonville
Public Works Building
Sampling Inventory (continued)

Sample No.	Material Description	Location	Results
CW-39	Grey linoleum with black and yellow mastic	Men's restroom 1st floor	NAD
CW-40	Grey linoleum with black and yellow mastic	Men's restroom 1st floor	NAD
CW-41	Yellow mastic behind wall trim	Men's restroom 2nd floor	NAD
CW-42	Yellow mastic behind wall trim	Men's restroom 2nd floor	NAD
CW-43	Exterior cinderblocks and grout	Exterior main entrance	NAD
CW-44	Exterior cinderblocks and grout	Exterior main entrance	NAD
CW-45	Stucco	North exterior wall	NAD
CW-46	Stucco	West exterior wall	NAD
CW-47	Stucco	East exterior wall	NAD
CW-48	Stucco	South exterior wall	VOID
CW-49	Black coating/tar	Exterior ramp/deck	NAD
CW-50	Black coating/tar	Exterior ramp/deck	NAD

NAD: No asbestos detected
N/A: Not analyzed due previous positive
CH: Chrysotile asbestos

Lead-Containing Paint

No “safe” level of lead in paint has been determined by OR-OSHA or the Center for Disease Control, therefore based upon the sample results all exterior painted surfaces are presumed to contain some level of lead. Sample PWPOP-04 revealed 241.77 parts per million of lead in the paint. All interior samples showed levels less than the analytical methods limit of detection.

The current OR-OSHA Lead in Construction Regulations apply to all construction work where work is performed impacting lead painted surfaces (including manual demolition, scraping, drilling, welding, etc.) where an employee may be exposed. The regulation outlines “trigger” tasks and appropriate personal protective equipment and engineering controls to be utilized when performing these tasks. This standard applies to work involving *any* amount of lead. Personal exposure assessment must be performed and appropriate personal protective equipment (PPE) worn when impacting these surfaces. PPE may be reduced based upon exposure assessments.

Table 3
City of Wilsonville
Public Works Building
Lead Based Paint Sampling Inventory

Sample No.	Sample Description	Location	Results (parts per million)
PWPOP-01	Cream paint on gypsum	Office area	<86.92
PWPOP-02	Blue/gray paint on wall	Storage area/break room	<98.14
PWPOP-03	Brown paint on trim	Printer room	<97.85
PWPOP-04	**Red paint on wood wall**	**Building exterior**	**241.77**

<: less than the limit of detection

REPRESENTATIVE PHOTOS

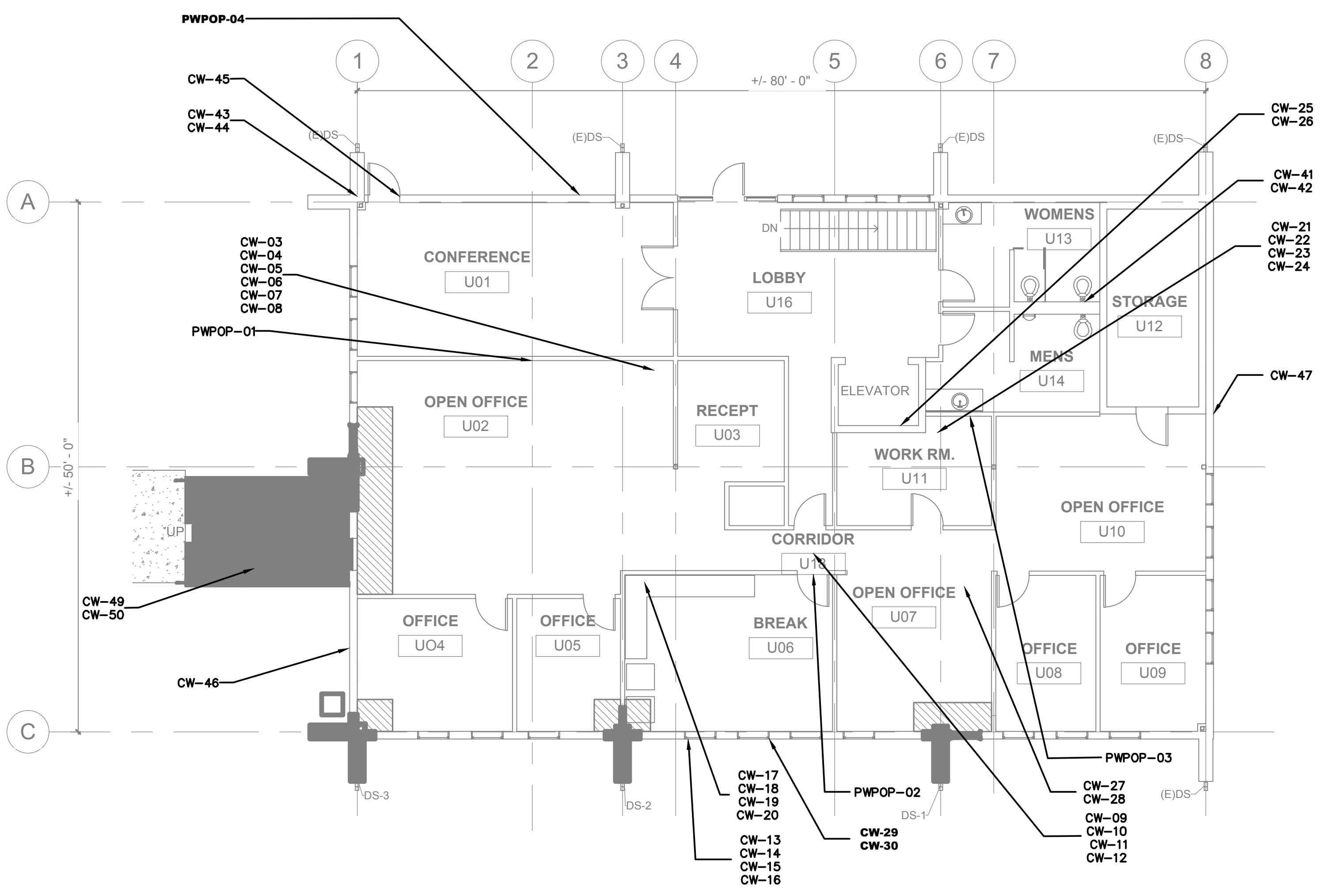
Asbestos containing window caulk

Sample No.	Sample Description	Results (parts per million)
PWPOP-01	Cream paint on gypsum	<86.92
PWPOP-02	Blue/gray paint on wall	<98.14
PWPOP-03	Brown paint on trim	<97.85
PWPOP-04	**Red paint on wood wall**	**241.77**
<: less than the limit of detection		

Sample No.	Material Description	Results
CW-01	TPO Roofing	NAD
CW-02	TPA roofing	NAD
CW-03	Gypsum wallboard and joint compound	NAD
CW-04	Gypsum wallboard and joint compound	NAD
CW-05	2'x4' lay in ceiling tile	NAD
CW-06	2'x4' lay in ceiling tile	NAD
CW-07	Black vinyl cove and white mastic	NAD
CW-08	Black vinyl cove and white mastic	NAD
CW-09	Yellow mastic under carpet	NAD
CW-10	Yellow mastic under carpet	NAD
CW-11	Black carpet divider with clear mastic	NAD
CW-12	Black carpet divider with clear mastic	NAD
CW-13	Blue 12"x12" vinyl floor tile with gray mastic	NAD
CW-14	Blue 12"x12" vinyl floor tile with gray mastic	NAD
CW-15	Beige 12"x12" vinyl floor tile with grey mastic	NAD
CW-16	Beige 12"x12" vinyl floor tile with grey mastic	NAD
CW-17	Gray coating under sink	NAD
CW-18	Gray coating under sink	NAD
CW-19	Tan cove base with white mastic	NAD
CW-20	Tan cove base with white mastic	NAD
CW-21	12"x12" cream tile with gray mastic	NAD
CW-22	12"x12" cream tile with gray mastic	NAD

NAD: No Asbestos Detected

Sample No.	Material Description	Results
CW-23	Red compound inside pipe	NAD
CW-24	Red compound inside pipe	NAD
CW-25	Cinder block and grout	NAD
CW-26	Cinder block and grout	NAD
CW-27	Gray/green putty on duct seams	NAD
CW-29	Gray/green putty on duct seams	NAD
CW-29	**Black caulking**	**5% chrysotile**
CW-30	**Black caulking**	**5% chrysotile**
CW-41	Yellow mastic behind wall trim	NAD
CW-42	Yellow mastic behind wall trim	NAD
CW-43	Exterior cinderblock and grout	NAD
CW-44	Exterior cinderblock and grout	NAD
CW-45	Stucco	NAD
CW-46	Stucco	NAD
CW-47	Stucco	NAD
CW-48	Stucco	VOID
CW-49	Black coating and tar	NAD
CW-50	Black coating and tar	NAD



1 ASBESTOS AND LEAD INVESTIGATION - MAIN FLOOR

1/16" = 1'-0"

GENERAL NOTES

1. THIS DRAWING IS DIAGRAMMATIC. IT SHOULD BE USED FOR GENERAL INFORMATION AND SAMPLE LOCATIONS ONLY. CONTRACTOR IS TO FIELD VERIFY ALL MATERIAL LOCATIONS AND QUANTITIES.
2. THE BLACK WINDOW CAULKING TESTED POSITIVE FOR ASBESTOS. ALL WINDOW CAULKING MUST BE REMOVED BY A CERTIFIED ABATEMENT CONTRACTOR IF RENOVATION IMPACTS WINDOWS.
3. BASED UPON THE AGE OF THE BUILDINGS ALL PAINT SHOULD BE CONSIDERED LEAD CONTAINING. FOLLOW OSHA AND EPA RRP REGULATIONS IF IMPACTING.

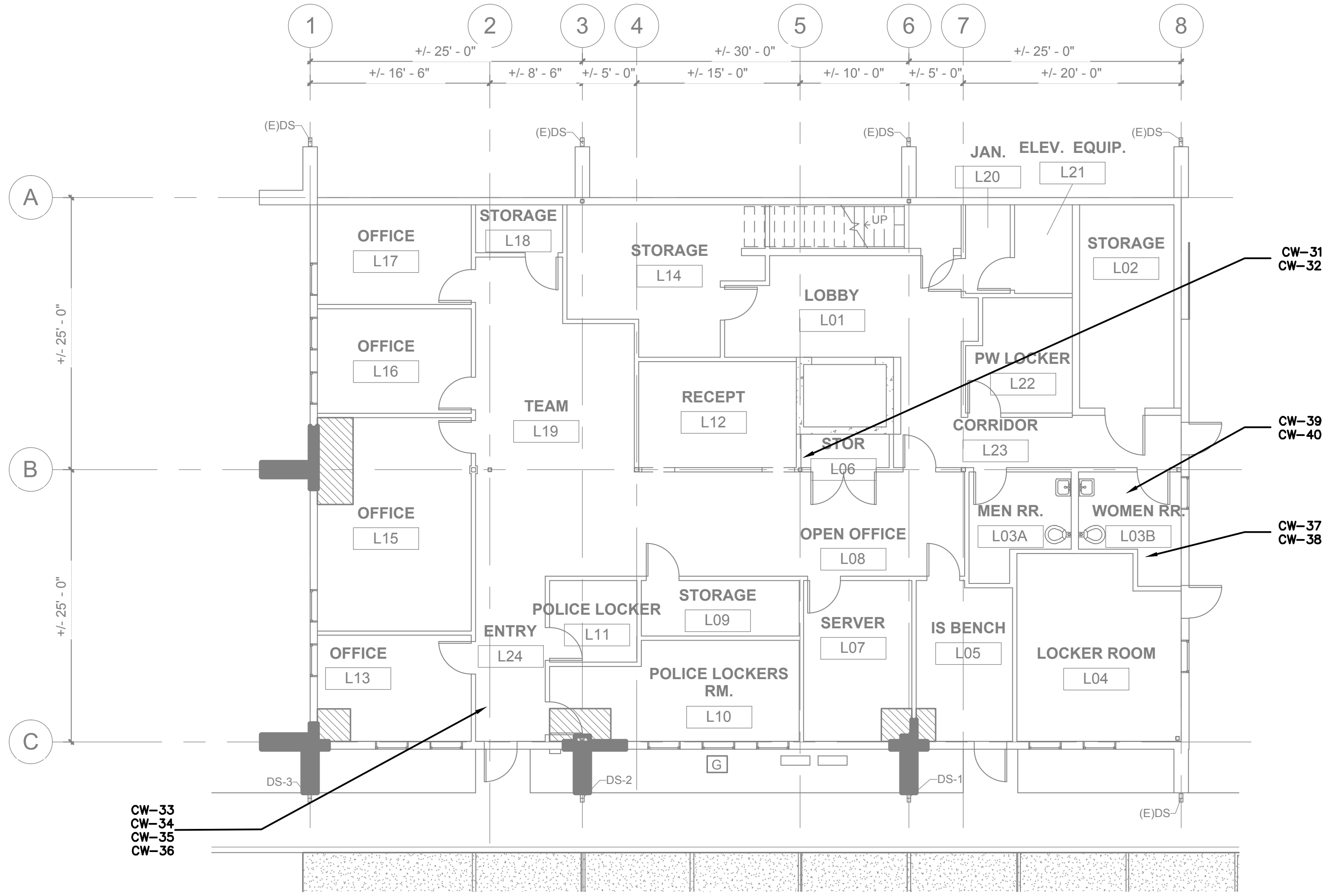
CITY OF WILSONVILLE
POLICE/PUBLIC WORKS BUILDING
30000 SE TOWN CENTER LOOP EAST
WILSONVILLE, OR 97070

APEX
ENVIRONMENTAL CONSULTING
P.O. Box 1445
Wilsonville, OR 97070
(503) 682-9737

DATE	LEVEL
OCT. 2018	MAIN HM-200

Sample No.	Material Description	Results
CW-31	Black cove base with brown mastic	NAD
CW-32	Black cove base with brown mastic	NAD
CW-33	Beige 12"x12" floor tile with yellow mastic	NAD
CW-34	Beige 12"x12" floor tile with yellow mastic	NAD
CW-35	Gypsum wallboard and joint compound	NAD
CW-36	Gypsum wallboard and joint compound	NAD
CW-37	Grout in women's shower	NAD
CW-38	Grout in women's shower	NAD
CW-39	Grey linoleum with black and yellow mastic	NAD
CW-40	Grey linoleum with black and yellow mastic	NAD

NAD: No Asbestos Detected



1 ASBESTOS AND LEAD INVESTIGATION - LOWER FLOOR

1/16" = 1'-0"

GENERAL NOTES

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2. THE BLACK WINDOW CAULKING TESTED POSITIVE FOR ASBESTOS. ALL WINDOW CAULKING MUST BE REMOVED BY A CERTIFIED ABATEMENT CONTRACTOR IF RENOVATION IMPACTS WINDOWS.
3. BASED UPON THE AGE OF THE BUILDINGS ALL PAINT SHOULD BE CONSIDERED LEAD CONTAINING. FOLLOW OSHA AND EPA RRP REGULATIONS IF IMPACTING.

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POLICE/PUBLIC WORKS BUILDING
30000 SE TOWN CENTER LOOP EAST
WILSONVILLE, OR 97070

APEX
ENVIRONMENTAL CONSULTING
P.O. Box 1445
Wilsonville, OR 97070
(503) 682-9737

DATE	LEVEL
OCT. 2018	LOWER HM-201

LABORATORY RESULTS

CA Labs
Dedicated to Quality

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Carrollton, TX 75006
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Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

APEX Environmental Consulting
P.O. Box 1445
Wilsonville, OR 97070

Attn: Tulla Stocker
Customer Project: Public Works/ Police
Reference #: CBR18105053Amend
Date: 10/23/2018

Analysis and Method

Summary of polarizing light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of stereomicroscopy. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated of asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may have trace amounts of actinolite-tremolite, where not found be PLM should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may even contain a related asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be delectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Quantification of <1% will actually be reported as <=1% (allowable variance close to 1% is high). Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos and the "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). All analysts have a college degree in a natural science (geology, biology, or environmental science) or are recognized by a state professional board in one these disciplines .Extensive in-house training programs are used to augment education background of the analyst. The group leader of polarized light has received supplemental McCrone Research training for asbestos identification. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*
LDEQ

Overview of Project Sample Material Containing Asbestos

Customer Project: Public Works/ Police

CA Labs Project #: CBR18105053Amend

Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
CW-29	*1*	*Black Sealant*	***5% Chrysotile***	***Black Sealant*** ***No Sample Submitted***
CW-30	*1*	*Black Sealant*	***5% Chrysotile***	
CW-48	*1*	*No Sample Submitted*		

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Tulla Stocker
APEX Environmental Consulting
P.O. Box 1445
Wilsonville, OR 97070

Phone # 503-682-9737
Fax # 503-682-0525

Customer Project:
Public Works/ Police

Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo-geneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-01		*1*	*White Fibrous Insulation*	*Y*	***None Detected***	100% fg	
		2	*White Drywall*	*Y*	***None Detected***	3% ce	97% qu, gy
CW-02		*1*	*Green Covering*	*Y*	***None Detected***	10% sy	90% qu, ma
		2	*White Fibrous Insulation*	*Y*	***None Detected***	100% fg	
		3	*White Drywall*	*Y*	***None Detected***	3% ce	97% qu, gy
CW-03		*1*	*White Compound*	*Y*	***None Detected***		100% qu, mi, pe, ca
		2	*White Drywall with Paper*	*N*	***None Detected***	10% ce	90% qu, gy

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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pa - palygorskite (clay)

Approved Signatories:

Daniel LaCour

Daniel LaCour
Analyst

Senior Analyst
Alicia Stretz

Chris Willi

Laboratory Director
Chris Williams

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Polarized Light Asbestiform Materials Characterization

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Wilsonville, OR 97070

Phone # 503-682-9737
Fax # 503-682-0525

Customer Project:
Public Works/ Police

Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-04		*1*	*White Surfaced White Compound*	*N*	***None Detected***		100% qu, mi, pe, bi, ca
		2	*White Drywall with Paper*	*N*	***None Detected***	10% ce	90% qu, gy
CW-05		*1*	*White Surfacing*	*Y*	***None Detected***		100% qu, bi, ca
		2	*Tan Ceiling Tile*	*Y*	***None Detected***	20% fg 70% ce	10% qu, pe
CW-06		*1*	*White Surfacing*	*Y*	***None Detected***		100% qu, bi, ca
		2	*Tan Ceiling Tile*	*Y*	***None Detected***	20% fg 70% ce	10% qu, pe
CW-07		*1*	*Black Cove Base*	*Y*	***None Detected***		100% qu, ma

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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Senior Analyst
Alicia Stretz

Chris Wil

Laboratory Director
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2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Tulla Stocker
APEX Environmental Consulting
P.O. Box 1445
Wilsonville, OR 97070

Phone # 503-682-9737
Fax # 503-682-0525

Customer Project:
Public Works/ Police

Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		2	*White Mastic*	*Y*	***None Detected***		100% qu, bi, ca
CW-08		*1*	*Black Cove Base*	*Y*	***None Detected***		100% qu, ma
		2	*White Mastic*	*Y*	***None Detected***		100% qu, bi, ca
CW-09		*1*	*Yellow Mastic*	*Y*	***None Detected***		100% qu, bi
CW-10		*1*	*Yellow Mastic*	*Y*	***None Detected***		100% qu, bi
CW-11		*1*	*Black Sealant*	*Y*	***None Detected***		100% qu, ma
		2	*Clear Mastic*	*Y*	***None Detected***		100% qu, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
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10. TEM analysis suggested

Polarized Light Asbestiform Materials Characterization

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CBR18105053Amend

Date: 10/23/2018
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Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-12		*1*	*Black Sealant*	*Y*	***None Detected***		100% qu, ma
		2	*Clear Mastic*	*Y*	***None Detected***		100% qu, bi
CW-13		*1*	*Blue Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca
		2	*Gray Mastic*	*Y*	***None Detected***		100% qu, bi
CW-14		*1*	*Blue Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca
		2	*Gray Mastic*	*Y*	***None Detected***		100% qu, bi
CW-15		*1*	*Tan Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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Polarized Light Asbestiform Materials Characterization

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CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo-geneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		2	*Gray Mastic*	*Y*	***None Detected***		100% qu, bi
CW-16		1	*Tan Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca
		2	*Gray Mastic*	*Y*	***None Detected***		100% qu, bi
CW-17		1	*Gray Sealant*	*Y*	***None Detected***	5% ce	95% qu, bi
CW-18		1	*Gray Sealant*	*Y*	***None Detected***	5% ce	95% qu, ma, bi
CW-19		1	*Tan Cove Base*	*Y*	***None Detected***		100% qu, ma
		2	*White Mastic*	*Y*	***None Detected***		100% qu, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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mi - mica
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ot -other
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qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

Approved Signatories:

Daniel LaCour
Daniel LaCour
Analyst

Senior Analyst
Alicia Stretz

Chris Wil
Laboratory Director
Chris Williams

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10. TEM analysis suggested

CA Labs

Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Tulla Stocker
APEX Environmental Consulting
P.O. Box 1445
Wilsonville, OR 97070

Phone # 503-682-9737
Fax # 503-682-0525

Customer Project:
Public Works/ Police

Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-20		1	*Tan Cove Base*	*Y*	***None Detected***		100% qu, ma
		2	*White Mastic*	*Y*	***None Detected***		100% qu, bi
CW-21		1	*Tan Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca
		2	*Gray and Yellow Mastic*	*N*	***None Detected***		100% qu, bi
CW-22		1	*Tan Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca
		2	*Gray and Yellow Mastic*	*N*	***None Detected***		100% qu, bi
CW-23		1	*Red Sealant*	*Y*	***None Detected***	4% wo	96% qu, ma, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

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Daniel LaCour
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Alicia Stretz

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Phone # 503-682-9737
Fax # 503-682-0525

Customer Project:
Public Works/ Police

Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-24		*1*	*Red Sealant*	*Y*	***None Detected***	4% wo	96% qu, ma, bi
CW-25		*1*	*Gray Grout*	*Y*	***None Detected***		100% qu, ma, ca
CW-26		*1*	*Gray Grout*	*Y*	***None Detected***		100% qu, ma, ca
CW-27		*1*	*Gray Sealant*	*Y*	***None Detected***	3% ce	97% qu, bi
CW-28		*1*	*Gray Sealant*	*Y*	***None Detected***	3% ce	97% qu, bi
CW-29		*1*	*Black Sealant*	*Y*	***5% Chrysotile***		95% qu, ma, bi
CW-30		*1*	*Black Sealant*	*Y*	***5% Chrysotile***		95% qu, ma, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
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Approved Signatories:

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Daniel LaCour
Analyst

Senior Analyst
Alicia Stretz

Chris Williams
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Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo-geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-31		1	*Black Cove Base*	*Y*	***None Detected***		100% qu, ma
		2	*Tan and Brown Mastic*	*N*	***None Detected***		100% qu, bi
CW-32		1	*Black Cove Base*	*Y*	***None Detected***		100% qu, ma
		2	*Tan and Brown Mastic*	*N*	***None Detected***		100% qu, bi
CW-33		1	*Tan Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca
		2	*Yellow Mastic*	*Y*	***None Detected***		100% qu, bi
CW-34		1	*Tan Floor Tile*	*Y*	***None Detected***		100% qu, ma, ca

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

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Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		2	*Yellow Mastic*	Y	***None Detected***		100% qu, bi
CW-35		1	*White Compound*	Y	***None Detected***		100% qu, mi, pe, ca
		2	*White Drywall with Paper*	N	***None Detected***	10% ce	90% qu, gy
CW-36		1	*White Compound*	Y	***None Detected***		100% qu, mi, pe, ca
		2	*White Drywall with Paper*	N	***None Detected***	10% ce	90% qu, gy
CW-37		1	*Gray Grout*	Y	***None Detected***		100% qu, ma, ca
CW-38		1	*Gray Grout*	Y	***None Detected***		100% qu, ma, ca

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

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Chris Wil

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Phone # 503-682-9737
Fax # 503-682-0525

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Public Works/ Police

Turnaround Time: 2 day/8 hr

CA Labs Project #:
CBR18105053Amend

Date: 10/23/2018
Samples Received: 10/18/2018
Date Of Sampling: 10/16/2018
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
CW-39		1	*Gray Vinyl Flooring*	*Y*	***None Detected***		100% qu, ma
		2	*Black and Yellow Mastic*	*N*	***None Detected***		100% qu, bi
CW-40		1	*Gray Vinyl Flooring*	*Y*	***None Detected***		100% qu, ma
		2	*Black and Yellow Mastic*	*N*	***None Detected***		100% qu, bi
CW-41		1	*Yellow Mastic*	*Y*	***None Detected***		100% qu, bi
CW-42		1	*Yellow Mastic*	*Y*	***None Detected***		100% qu, bi
CW-43		1	*Red Surfaced Gray Grout*	*N*	***None Detected***		100% qu, ma, bi, ca

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
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CW-44		*1*	*Red Surfaced Gray Grout*	*N*	***None Detected***		100% qu, ma, bi, ca
CW-45		*1*	*Tan Surfaced Brown Stucco*	*N*	***None Detected***		100% qu, ma, bi, ca
CW-46		*1*	*Tan Surfaced Brown Stucco*	*N*	***None Detected***		100% qu, ma, bi, ca
CW-47		*1*	*Tan Surfaced Brown Stucco*	*N*	***None Detected***		100% qu, ma, bi, ca
CW-48		*1*	*No Sample Submitted*				
CW-49		*1*	*Black Sealant*	*Y*	***None Detected***		100% qu, ma, bi
CW-50		*1*	*Black Sealant*	*Y*	***None Detected***		100% qu, ma, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM *TDH 30-0370*

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Atomic Absorption Lead Report

Analysis Method: Lead in Paint analyzed by Atomic Absorption (AA)/SW-846-7420;
This analysis is not covered by the scope of accreditation by NVLAP.

Sample Prep Method: Samples are dissolved in nitric acid, extracted, and analyzed on a properly calibrated AA; Absorbency curve was calculated, bandwidth corrected, and wavelength at the time of the analysis was measured and recorded.

Client Information:
Apex Environmental
P.O. Box 1445
Wilsonville, OR 97070

Client Project:
City of Wilsonville
PWPO

CA Labs Project #:
CBR18115492

Date: 11/09/2018

Phone: 503-682-9737

Turnaround Time: 8 hr

Samples Received: 11/09/2018

Fax: 503-682-0525

Attn: Tulla Stocker

Purchase Order #:

Sample#		Sample Concentration: parts per million (ppm)	Weight Percent:
PWPOP-01		<86.92	<0.0087
PWPOP-02		<98.14	<0.0098
PWPOP-03		<97.85	<0.0098
PWPOP-04		241.77	0.0242
Lab Blank	< 1.00	----	----

Quality Control:
Duplicate: ____0____RPD
Spike: ____105____% Recovery

NVLAP # 200772-0

Approved Signatories:

Sidney Pinkerton

Chris Williams

TDH # 30-0370

Sidney Pinkerton
Analyst

Christopher Williams
Laboratory Director

Alicia Stretz
Senior Analyst

Notes:
The current guidelines for lead in paint from the Consumer Products Safety Council (CPSC) is 0.06% by weight; the Housing and Urban Development (HUD) guideline is 0.5% by weight.

This test report relates only to the items tested. This test reports relates only to the items tested. NVLAP accreditation does not imply endorsement by any US Government agency. This report may not be reproduced except in full without written permission from CA Labs.

These results are submitted pursuant to CA Labs' current terms and condition of sale, including the company's standard warranty and limitation of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping and handling fee may be assessed for the return of any samples.

Analysis performed at CA Labs, LLC. 12232 Industriplex Blvd, Suite 32, Baton Rouge, LA 70809. Phone 225-751-5632, fax 225-751-5634, after hours mobile 225-993-3471.

CA Labs
Dedicated to
Quality

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ATOMIC ABSORPTION
LEAD ANALYSIS
LABORATORY ANALYSIS REPORT

Apex Environmental
P.O. Box 1445
Wilsonville, OR 97070
reference number: CBR18115492

LABORATORY ANALYSIS:

Summary of lead analysis by atomic absorption in all relevant media using the method described in SW-846-7420. All analysts have received the necessary in-house and extramural training to perform analysis of samples for the presence of lead. A duplicate analysis is performed on greater than ten percent of all samples. A spiked concentration sample is analyzed with each sample group for instrument calibration. All analysts are required to participate in quality control analysis rounds. Instrument calibrations are performed on a daily, weekly, and monthly basis.

This report must not be used to claim product endorsement or any agency of the U.S. Government. This test relates only to the items described and tested herein. This report may not be reproduced except in full, without written permission by CA Labs. This method is not covered under the scope of accreditation of NVLAP.

METHOD:

The procedure for paint chip analysis follows AOAC5.009(974.02) and SW-846-7420. The analysis of soil, wipes, and wastewater for the presence of lead is also referenced by SW-846-7420. Methodology for the analysis of lead in air samples follows NIOSH Method 7082.

Analysis performed at CA Labs, LLC. 12232 Industriplex Blvd, Suite 32, Baton Rouge, LA 70809. Phone 225-751-5632, fax 225-751-5634, after hours mobile 225-993-3471.

BULK SAMPLE FIELD FORM

TYPE OF ANALYSIS: PLM CBR18105053Amend

Proj. Site #:

Date: 10/22

Inspector:

Apex Client:

Facility/Site: wilsonville police

Samples delivered undamaged By: **Signature:**

Samples received undamaged By: Ashley Thibodeaux **Signature:** Ashley Thibodeaux 10-23-18 10:00

Turnaround time (check one) ☒ **Same Day** ☐ **24 hour** ☐ **2 Day** ☐ **3 days** ☐ **5 days**

☐ Analyze All Samples

☒ Progressive Analysis (analyze to **first positive** for each material code and type)

Sample #	Material Code	Type	Material Description (Texture/Color)	Location
CW-01	Roof	1	Roof core	Roof
-02	"	"	↓	↓

Apex Environmental Consulting Services, Inc.
PO Box 1445
Wilsonville, OR 97070
(503)682-9737

BULK SAMPLE FIELD FORM

TYPE OF ANALYSIS: AA

CBR18115493

Proj. Site #

Date: 11/7

Inspector:

Apex Client: city of wilsonville

Facility/Site: PWPO

Samples delivered undamaged **By:** **Signature:**

Samples received undamaged **By:** Ashley Thibodeau **Signature:** 11-9-18 10:30

Turnaround time (check one) ☑ **Same Day** ☐ **24 hour** ☐ **2 Day** ☐ **3 days** ☐ **5 days**

☑ Analyze All Samples

☐ Progressive Analysis (analyze to **first positive** for each material code and type)

Sample #	Material Code	Type	Material Description (Texture/Color)	Location
PWPCP-01			cream paint	office area
-02			Blue/gray paint	storage area / Break room
-03			Brown paint	Printer room
-04			red paint	exterior wall

Apex Environmental Consulting Services, Inc.
PO Box 1445
Wilsonville, OR 97070
(503)682-9737

CERTIFICATIONS

M&C Environmental Training

Asbestos Inspector
Refresher Training Course

Tulla Stocker

has successfully completed the Asbestos Inspector Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-06

Location: **Oakland, California**

Expiration: **April 5, 2019**

Dates: **April 5, 2018**

Director of Training: **John McGinnis**

John McGinnis

Certificate Number **43633 IR**

M&C Environmental Training

Asbestos Project Designer
Refresher Training Course

Tulla Stocker

has successfully completed the Asbestos Project Designer Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-10

Location: **Oakland, California** Expiration: **April 4, 2019**

Dates: **April 4, 2018**

Director of Training: **John McGinnis**

John McGinnis

Certificate Number **43622 DR**

M&C Environmental Training

Asbestos Management Planner
Refresher Training Course

Tulla Stocker

has successfully completed the Asbestos Management Planner Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-08

Location: **Oakland, California**

Expiration: **April 5, 2019**

Dates: **April 5, 2018**

Director of Training: **John McGinnis**

John McGinnis

Certificate Number **43656 PR**

M&C Environmental Training

Asbestos Contractor/Supervisor

Refresher Training Course

Tulla Stocker

has successfully completed the Asbestos Contractor/Supervisor Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-04

Location: **Oakland, California**

Expiration: **April 6, 2019**

Dates: **April 6, 2018**

Director of Training: **John McGinnis**

John McGinnis

Certificate Number **43668 SR**

State of Oregon
Oregon Health Authority

Tulla R. Stocker

is certified by the Oregon Health Authority to conduct Lead-Based Paint Activities

Risk Assessor

Certification Number:	1062--Indv--R
Issuance Date:	6/20/2017
Expiration Date:	6/30/2020

1859

State of Oregon
Oregon Health Authority

Apex Environmental

is certified by the Oregon Health Authority to conduct Lead-Based Paint Activities

Certification Number: 1154--LBP FIRM
Issuance Date: 6/20/2017
Date of Expiration: 6/30/2020

1859

Oregon Health Authority

Student Affiliation:
Apex Environmental
99086585

Compliance Solutions
"Today's Training...Tomorrow's Solution"

3980 Quebec St., 2nd Floor, Denver CO 80207-1633 800-711-2706

Certificate of Completion

Tulla Stocker

has successfully completed training and passed all testing requirements for

40-Hour HAZWOPER
as per 29 CFR 1910.120(e)

Presented this
Thursday, September 20, 2018

Certificate Number: 754961558

Compliance Solutions Occupational Trainers, Inc.

Jeffrey E. Kline
President/CEO

Certificate of Completion

This is to certify that

Jose Godinez

has satisfactorily completed
4 hours of refresher training as an

AHERA Building Inspector

to comply with the training requirements of
TSCA Title II, 40 CFR 763 (AHERA)

EPA Provider # 1085

170313
Certificate Number

ARGUS PACIFIC
TRAINING·CONSULTING
A Terracon COMPANY

Nov 14, 2018 Expires in 1 year.
Date(s) of Training

Exam Score (if applicable):

Instructor

ARGUS PACIFIC, INC / 21905 64th AVE W, SUITE 100 / MOUNTLAKE TERRACE, WASHINGTON 98043 / 206.285.3373 / ARGUSPACIFIC.COM

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200772-0

CA Labs L.L.C.
Baton Rouge, LA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2018-01-01 through 2018-12-31
Effective Dates

Dana S Leaman
For the National Voluntary Laboratory Accreditation Program

NVLAP® National Voluntary Laboratory Accreditation Program

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

CA Labs L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809-7105
Mr. Christopher Williams
Phone: 225-751-5632 Fax: 225-751-5634
Email: calabsbr@calabsinc.com
http://www.calabsinc.com

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 200772-0

Bulk Asbestos Analysis

Code	***Description***
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code	***Description***
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program

Effective 2018-01-01 through 2018-12-31

JOHN BEL EDWARDS
GOVERNOR

CHUCK CARR BROWN, PH.D.
SECRETARY

State of Louisiana
DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

Read Receipt Requested

AI No. 165918
Activity No. ACC20170001
LELAP Lab ID # 03069
Accreditation Year FY 2018
Renewal due FY 2019

Mr. Christopher Williams
CA Laboratories LLC
12232 Industriplex Blvd Ste 32
Baton Rouge, Louisiana 70809

Re: Annual Scope of Accreditation

Dear Mr. Williams:

The Louisiana Department of Environmental Quality's laboratory accreditation program, in accordance with Louisiana Administrative Code, Title 33, Part I, Subpart 3, Laboratory Accreditation, accredits this laboratory for Fiscal Year 2018. This accreditation does not constitute an endorsement of the suitability of the listed methods for any specific purpose. The laboratory is accredited for the method as identified on the application for accreditation; if the method is partially identified on the application for accreditation, the laboratory is accredited for the versions listed on the current application or referenced in the laboratory standard operating procedure.

Louisiana Environmental Laboratory Accreditation Program (LELAP) accreditation is granted for those methods/analytes for which "STATE" is indicated as the type of accreditation. Accreditation is dependent on the laboratory's successful ongoing compliance with regulations as outlined in the Louisiana Administrative Code, Title 33, Part I, Subpart 3, Laboratory Accreditation.

The accreditation certificate is the property of the State of Louisiana. Should your accreditation be suspended or revoked, your laboratory must return the certificate of accreditation to the department and delete any electronic copies until your accreditation status is restored.

LAC 33:I.5313.A requires that the laboratory report include all relevant information. Therefore, the certificate number shall be placed in the upper right corner of all laboratory reports. If the test report includes results of any test for which the laboratory is not accredited, the unaccredited results must be clearly identified as such.

Post Office Box 4313 • Baton Rouge, Louisiana 70821-4313 • Phone 225-219-3181 • Fax 225-219-3309
www.deq.louisiana.gov

We request that you examine the scope of accreditation attachment for accuracy and completeness. If you find that an analyte for which you expected to be accredited is not listed, please examine your records to ensure that:

1. You have met the requirements for successful participation in proficiency test studies as outlined in LAC 33:I.4711.

2. In the case of accreditation by recognition, the requested analyte must be listed for the requested method and matrix on both the certificate issued by the Primary Accreditation Body ***and*** on the Louisiana application form.

If after reviewing this information, the scope and/or certificate are inaccurate, please notify us immediately.

If you have any questions, please contact your assigned assessor Grant Aucoin, Environmental Scientist at (225) 219-3301.

Sincerely,

Cheryl Sonnier Nolan
Administrator
Public Participation and Permit Support Services Division

24 May 2017
Date

CSN:PB:gra

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Is hereby granting a Louisiana Environmental Laboratory Accreditation to

CA Laboratories LLC
12232 Industriplex Blvd Ste 32
Baton Rouge, Louisiana 70809

Agency Interest No. 165918
Activity No. ACC20170001

According to the Louisiana Administrative Code, Title 33, Part I, Subpart 3, LABORATORY ACCREDITATION, the State of Louisiana formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed in the attachment.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part I, Subpart 3 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part I. Please contact the Department of Environmental Quality, Louisiana Environmental Laboratory Accreditation Program (LELAP) to verify the laboratory's scope of accreditation and accreditation status.

Accreditation by the State of Louisiana is not an endorsement or a guarantee of validity of the data generated by the laboratory. To be accredited initially and maintain accreditation, the laboratory agrees to participate in two single-blind, single-concentration PT studies, where available, per year for each field of testing for which it seeks accreditation or maintains accreditation as required in LAC 33:I.4711.

Cheryl Sonnier Nolan
Administrator
Public Participation and Permit Support Services Division

Issued Date: 26 May 2017

Effective Date: **July 1, 2017**
Expiration Date: **June 30, 2018**
Certificate Number: 03069

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Effective Date: July 1, 2017

CA Laboratories LLC
AI Number: 165918
Activity No. ACC20170001
Expiration Date: June 30, 2018

12232 Industriplex Blvd Ste 32, Baton Rouge, Louisiana 70809

Certificate Number: 03069

Air Emissions

Analyte	Method Name	Method Code	Type	AB
100173 - Asbestos by Phase Contrast Microscopy	NIOSH 7400 (A Rules)	899	State	LA
100171 - Asbestos by Transmission Electron Microscopy	EPA Level II Contract #68-02-3266	2020	NVLAP	LA
100131 - Airborne Asbestos	40 CFR Part 763, Subpart E, Appendix A (Mandatory TEM)	2062	NVLAP	LA
100172 - Asbestos by Polarized Light Microscopy	EPA 600/R-93/116	10294583	NVLAP	LA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
NONE	NONE	NONE	NONE	NONE

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
100095 - Asbestos in Bulk Insulation	40 CFR 763, Subpart E, Appendix E (Section 1.PLM)	2004	NVLAP	LA
100172 - Asbestos by Polarized Light Microscopy	EPA 600/R-93/116	10294583	NVLAP	LA
100171 - Asbestos by Transmission Electron Microscopy	EPA 600/R-93/116	10294583	NVLAP	LA

Biological Tissue

Analyte	Method Name	Method Code	Type	AB
NONE	NONE	NONE	NONE	NONE

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.