

Current Project - OAS Application Data - Clackamas

Project: **Z0358-26**

Request Number: **TEMP-PLAND-88314**

Report date: **09/03/2026 11:28 AM**

FIELD	VALUE
Submitter First	Sam
Submitter Last	Huck
Submitter Email	sam.huck@3j-consulting.com
Description of Proposal	The Oregon City School District is proposing a modification of the existing site for proposed improvements that include resurfacing the play area located to the east of the main school building, and the construction of an approximately 1,292 square-foot solar canopy structure to be placed directly south of the existing primary elementary school building where the main entrance to the school is located. No change in enrollment at Redland Elementary is proposed with this application.
Application Type	Land Use Application
Land Use Application Type	Nonconforming Use
Applicant Business Name	Oregon City School District
Applicant First Name	David
Applicant Last Name	Hobbs
Applicant Address	PO Box 2110
Applicant City	Oregon City
Applicant State	OR
Applicant Zip	97045
Applicant Phone 1	5037858531
Applicant Email	david.hobbs@orecity.k12.or.us
Additional Contact First Name	Sam
Additional Contact Last Name	Huck
Additional Contact Address	9600 SW Nimbus Ave. Suite 100
Additional Contact City	Beaverton
Additional Contact State	OR
Additional Contact Zip	97008
Additional Contact Phone	9712534220
Additional Contact Email	sam.huck@3j-consulting.com

Current Project - OAS Application Data - Clackamas

Project: **Z0358-26**

Request Number: **TEMP-PLAND-88314**

Report date: **09/03/2026 11:28 AM**

FIELD	VALUE
Project Address	18131 S REDLAND RD OREGON CITY OR 97045
Project TaxLot	33E06B 00800
Additional Taxlot 1	33E06B 00970
Acknowledgement1	I hereby certify that the statements contained herein, along with the evidence submitted, are in all respects true and correct to the best of my knowledge.
Acknowledgement2	I acknowledge that I am authorized to initiate the land use application because I am either: The owner of the subject property; The contract purchaser of the subject property, if the application is accompanied by proof of the purchaser's status as such; The agent of the owner or contract purchaser of the subject property, if the application is duly authorized in writing by the owner or the contract purchaser, and accompanied by proof of the agent's authority; or If the application is for Comprehensive Plan designation or zoning of a Historic District or Historic Corridor, the owners or contract purchasers of at least 60% of the property within the area to be so designated or zoned.
Acknowledgement3	I understand failing to contact the Planning department and/or failing to contact the Septic department (when not connected to sewer) regarding the project feasibility prior to submitting this land use application could extend review times.
Acknowledgement4	I understand the review process will not begin until all required documents are uploaded in ProjectDox, the prescreen by the County is complete and the associated fees are paid.
feesSign	I, being the authorized applicant, acknowledge that: I have personally examined and am familiar with all the information submitted in response to the questions contained in this application, and any attachments, and attest that all information submitted is true, correct and complete; and I understand and agree that clicking the box above will be deemed the equivalent of a signature in electronic form.
Signature	Sam Huck
Signature Date	2026-9-3 09:27:48

Appendix A - Land Use Application



Planning and Zoning
Department of Transportation and Development
Development Services Building
150 Beavercreek Road | Oregon City, OR 97045
503-742-4500 | zoninginfo@clackamas.us
www.clackamas.us/planning

STAFF USE ONLY

RECEIVED

Sep 10 2026

Clackamas County
Planning & Zoning Division

Staff Initials: File Number:
Z0358-26

Land use application for:

NONCONFORMING USE
VERIFICATION, RESTORATION, REPLACEMENT,
AND/OR ALTERATION

APPLICANT INFORMATION

Applicant name: David Hobbs, OCSD Capital Bond Director	Applicant email: david.hobbs@orecity.k12.or.us	Applicant phone: 503-785-8531	
Applicant mailing address: 995 South End Road	City: Oregon City	State: OR	ZIP: 97045
Contact person name (if other than applicant): Sam Huck, 3J Consulting, Inc.	Contact person email: sam.huck@3j-consulting.com	Contact person phone: 971-253-4220	
Contact person mailing address: 9600 SW Nimbus Ave, Ste 100	City: Beaverton	State: OR	ZIP: 97008

PROPOSAL

Brief description of proposal:

The applicant is requesting an alteration to a non-conforming use to make site improvements including the replacement of the existing play equipment, resurfacing of the play area, and to construct an approximately 1,500 square-foot solar canopy structure.

SITE INFORMATION

Site address: 18131 South Redland Road	Comprehensive Plan designation: Unincorporated Community Residential (UCR)	Zoning district: RA1
Map and tax lot #: Township: <u>3S</u> Range: <u>3E</u> Section: <u>06</u> Tax Lot: <u>00800</u> Township: <u>3S</u> Range: <u>3E</u> Section: <u>06</u> Tax Lot: <u>00970</u> Township: _____ Range: _____ Section: _____ Tax Lot: _____		Land area: 10.23 acres
Adjacent properties under same ownership: Township: _____ Range: _____ Section: _____ Tax Lot: _____ Township: _____ Range: _____ Section: _____ Tax Lot: _____		

Printed names of all property owners:

David Hobbs

Signatures of all property owners:

David
Hobbs

Digitally signed by David
Hobbs
Date: 2026.08.28
08:31:27 -07'00'

Date(s):

I hereby certify that the statements contained herein, along with the evidence submitted, are in all respects true and correct to the best of my knowledge.

Applicant signature:

David Hobbs

Digitally signed by David Hobbs
Date: 2026.08.28 08:31:58 -07'00'

Date:

A. Review applicable land use rules:

This application is subject to the provisions of Section 1206, Nonconforming Uses and Vested Rights of the Clackamas County Zoning and Development Ordinance (ZDO).

It is also subject to the definitions, procedures, and other general provisions, as well as to the specific rules of the subject property's zoning district and applicable development standards as outlined in the ZDO.

B. Turn in all of the following:

- ☒ **Complete application form:** Respond to all the questions and requests in this application, and make sure all owners of the subject property sign the first page of this application. Applications without the signatures of *all* property owners are incomplete.
- ☒ **Application fee:** Refer to the FAQs at the end of this form and to the adopted Fee Schedule for applicable fees and refund policies. A notification surcharge may also apply if an expanded notification area is required by ZDO Section 1307. Payment can be made by cash, by check payable to "Clackamas County", or by credit/debit card with an additional card processing fee using the Credit Card Authorization Form available from the Planning and Zoning website. Payment is due when the application is submitted.
- ☒ **Site plan:** Provide a site plan (also called a plot plan). A Site Plan Sample is available from the Planning and Zoning website. The site plan must be accurate and drawn to-scale on paper measuring no larger than 11 inches x 17 inches. The site plan must illustrate all of the following (when applicable):
 - Lot lines, lot/parcel numbers, and acreage/square footage of lots;
 - Contiguous properties under the same ownership;
 - All existing and proposed structures, fences, roads, driveways, parking areas, and easements, each with identifying labels and dimensions;
 - Setbacks of all structures from lot lines and easements;
 - Significant natural features (rivers, streams, wetlands, slopes of 20% or greater, geologic hazards, mature trees or forested areas, drainage areas, etc.); and
 - Location of utilities, wells, and all onsite wastewater treatment facilities (e.g., septic tanks, septic drainfield areas, replacement drainfield areas, drywells).
- ☐ **Floor plans:** Attach detailed, accurate, and to-scale floor plans for all structures to be considered in this application. Label all rooms with their existing and proposed use, show all of their dimensions, include the square footage of each room, and identify all doors and partition walls.
- ☒ **Building elevation diagrams:** Attach drawings of all structures to be considered in this application. The drawings must be to-scale and must show each side of the building and any windows, doors, or other appurtenances. Include all measurements (height, length, width, and area).
- ☒ **Evidence of lawful establishment:** Attach evidence (e.g. building permits, tax records, dated photographs, dated aerial images, financial statements, signed affidavits, and previous land use approvals) substantiating that the nonconforming use to be verified, restored, replaced, and/or altered was lawfully established.

C. For *verification* of a nonconforming use:

If you are requesting verification of nonconforming use pursuant to ZDO Subsection 1206.05, answer the following questions here in Part C. Attach additional pages, if necessary, and copies of supporting documentation.

For the purposes of Part C, the “nonconforming use” is the land use(s), structure(s), and/or physical improvement(s) for which you are seeking nonconforming use verification.

1. What is the nonconforming use? Describe the nonconforming use in detail, including buildings, vehicles, equipment, and materials used, days and hours of operation, the number of employees, and other operational and physical information, as applicable:

Elementary School including including main school building and additions, playground and covered play area, walkways, courtyard, parking lots, school bus drop-off area, and playfields. Operations occur September through June, generally between 7am-4pm.

2. When did the nonconforming use first become nonconforming to the County's zoning regulations?

Date: October 31, 1969. File no. Z0308-01-E determined that the existing school facility was nonconforming

3. What *current* zoning regulations do/does the nonconforming use described in response to Question C.1 not conform to?

ZDO Table 316-1

4. When was the nonconforming use described in response to Question C.1 established? Attach evidence that supports your response.

Date: 1965

5. Describe any changes in the nonconforming use since being established, and identify, with supporting documentation, when those changes occurred:

1965 Original building constructed
1971 Building Addition (CU-58-71)
2001 Alteration of Nonconforming Use for covered play are (Z0308-01-E)
2016 Alteration of Nonconforming Use for shipping container storage (Z0383-16-E)

6. Did the existence, continuity, nature, or extent of the nonconforming use discontinue for any 24-month period in the 20 years immediately preceding the date of this application? (If the nonconforming use is surface mining or marijuana production, see ZDO Subsection 1206.04 for the allowed discontinuance period.)

☒ NO, and supporting documentation is attached.

☐ NO, and supporting documentation is attached to prove the existence, continuity, nature, and extend of the nonconforming use for the *10-year* period immediately preceding the date of this application. Pursuant to ZDO Subsection 1206.05(B), this creates a rebuttable presumption that the nonconforming use, as proven, lawfully existed at the time of, and has continued uninterrupted since, the adoption of restrictive zoning regulations, or a change in the zoning or zoning regulations, that have the effect of prohibiting the nonconforming use under the current provisions of the ZDO.

☐ YES, as explained in the box below:

D. For restoration or replacement of a nonconforming use:

If this application requests restoration or replacement of a nonconforming use, answer the following questions here in Part D. Attach additional pages, if necessary, and copies of supporting documentation.

For the purposes of Part D, the “nonconforming use” is the land use(s), structure(s), and/or physical improvement(s) you are seeking to restore or replace.

1. What damaged or destroyed the nonconforming use?

☐ Fire

☐ Other casualty (i.e., an unfortunate or unforeseen happening), explained in the box below:

N/A

☐ Natural disaster, explained in the box below:

N/A

2. When was the nonconforming use damaged or destroyed by the incident(s) identified in response to Question D.1?

Date: N/A

3. Explain in the box below, and demonstrate in your attached site plan and other supporting documentation, how your proposed restoration or replacement will *not* alter or change the nature or extent of the nonconforming use as lawfully established prior to the incident(s) identified in response to Question D.1.

(Note: If you are requesting an alteration or change in the nature or extent of the nonconforming use, you must complete Part E of this application.)

N/A

4. Identify how the nonconforming use status of the existing use will be, or already has been, verified pursuant to ZDO Subsection 1206.05:

- ☐ Verification is being requested in Part C of this application.
- ☐ Verification was previously approved by the County within the last 24 months.

File No. of approved verification: Z_____

- ☐ Verification was previously approved by the County more than 24 months ago, and documentation is attached showing that the nonconforming use has not discontinued for 24 consecutive months since that approved verification.

File No. of approved verification: Z_____

E. For *alteration* of a nonconforming use:

If this application requests alteration of a nonconforming use, answer the following questions here in Part E. Attach additional pages, if necessary, and copies of supporting documentation.

For the purposes of Part E, the “existing use” is the nonconforming land use(s), structure(s), and/or physical improvement(s) you are seeking to alter.

1. Describe the proposed alteration:

OCSD is proposing a modification of the existing nonconforming use on the subject site for proposed improvements that include replacement of the existing play equipment and resurfacing of the play area and an approximately 1,500 square-foot solar canopy structure. No change in enrollment at Redland Elementary is proposed with this application.

2. Explain how the alteration will, after the imposition of conditions of approval deemed necessary to ensure the mitigation of any adverse impacts, have no greater adverse impact on the neighborhood than the existing use:

The proposed alteration of the nonconforming use, including the construction of an approximately 1,500-square-foot solar canopy, will not result in greater adverse impacts to the surrounding neighborhood than the existing school use. The solar canopy will be located within the existing Redland Elementary School site and will be accessory to the existing school use. The proposed replacement of the existing play equipment and resurfacing of the existing play area will improve existing site facilities and will not expand the area or intensity of the existing school use.

The proposed improvements will not increase enrollment or otherwise change the intensity of the existing school use. The existing site access and circulation patterns will remain unchanged, and the Applicant is not proposing any changes to the existing use or operations of the school. The solar canopy will provide covered area for the existing school site without introducing a new use or activity that would generate additional traffic, noise, or other impacts associated with an increase in the intensity of the school use.

County Staff has concluded in the previous approval that this standard does not strictly require that the proposed use be compatible in all respects with surrounding development, only that the proposed alteration of the existing nonconforming use will not cause greater adverse impacts to the surrounding neighborhood when compared with the existing prior nonconforming use.

Based on the location and nature of the proposed improvements, the lack of an increase in school enrollment or change in site access, and the continued use of the property for the existing school use, the proposed alterations will not result in greater adverse impacts to the surrounding neighborhood than the existing nonconforming use.

3. Identify how the nonconforming use status of the existing use will be, or already has been, verified pursuant to ZDO Subsection 1206.05:

- ☒ Verification is being requested in Part C of this application.
- ☐ Verification was previously approved by the County within the last 24 months.

File No. of approved verification: Z _____

- ☒ Verification was previously approved by the County more than 24 months ago, and documentation is attached showing that the nonconforming use has not discontinued for 24 consecutive months since that approved verification.

File No. of approved verification: Z 0383-16-E

4. Will the alteration expand the existing use from one lot of record to another?

- ☒ NO, the alteration will be on the same lot of record.
- ☐ YES, but the lot of record on which expansion is proposed, *and* the lot of record on which the existing use is currently located, have been part of the same tract continuously since the date the existing use became nonconforming, as evidenced by attached documentation.
- ☐ YES, but the expansion would allow only for facilities necessary to support the existing use, such as driveways, storm water management facilities, and on-site wastewater treatment systems. The alteration on the other lot of record are necessary to support the existing use for the following reasons:

FAQs

What is a nonconforming use?

A “nonconforming use” is a use of any building, structure or land allowed by right when established or that obtained a required land use approval when established but, due to a change in the zone or zoning regulations, is now prohibited in the zone.

When is a Nonconforming Use permit required?

The County’s Zoning and Development Ordinance (ZDO) lists the uses, structures, and other physical improvements that are allowed in each zone. However, the ZDO also allows uses, structures, and other physical improvements to continue, even if they do not conform to current ZDO rules, provided they were legally established and meet other criteria.

Formal verification by the County that a nonconforming use/structure/improvement was legally established and meets the other criteria requires an application for nonconforming use verification using Part C of the Nonconforming Use permit application form.

The ZDO allows a verified nonconforming use to be restored or replaced if it was damaged or destroyed by fire, other casualty, or natural disaster, provided it is restored or replaced to the nature and extent of the nonconforming use as lawfully established prior to the incident, and subject to certain criteria. Requests for restoration or replacement are made using Part D of the Nonconforming Use permit application form. Restoration or replacement must be lawfully commenced, as defined by Subsection 1206.06(B) of the ZDO, within one year of the occurrence of the damage or destruction.

The ZDO also allows a verified nonconforming use to be altered (e.g., expanded), subject to certain criteria; such requests are made using Part E of the Nonconforming Use permit application form. Per ZDO Subsection 1206.07(A), the alteration of any nonconforming use that is necessary to comply with any lawful requirement does not require a Nonconforming Use permit.

What is the permit application process?

Nonconforming Use permits are subject to a “Type II” land use application process, as provided for in [Section 1307](#) of the ZDO. Type II decisions include notice to owners of nearby land, the Community Planning Organization (if active), service providers (sewer, water, fire, etc.), and affected government agencies. If the application is approved, the applicant must comply with any conditions of approval identified in the decision. The Planning Director’s decision can be appealed to the County Land Use Hearings Officer.

What is needed for the County to approve a land use permit?

Nonconforming use verifications, restorations, replacements, and/or alterations *may* be permitted after an evaluation by the County of applicable standards of the ZDO. The applicant is responsible for providing evidence that their proposal does or can meet those standards. In order to address the standards, the information requested in this application should be as thorough and complete as possible. A permit will only be approved or denied after a complete application is received and reviewed. The County approves an application only if it finds that the proposal meets the standards or can meet the standards with conditions.

FAQs continued

How long will it take the County to make a decision about an application?

The County makes every effort to issue a decision on a Type II land use application within 45 days of when we deem the application to be complete. State law generally requires a final County decision on a land use permit application in an urban area within 120 days of the application being deemed complete, and within 150 days for a land use permit in a rural area, although there are some exceptions.

If an application is submitted and then withdrawn, will a refund be given?

Please see Planning & Zoning Fee Schedule under "Other Fees" [here](#). The \$5 Technology Fee is non-refundable.

Who can help answer additional questions?

For questions about the County's land use permit requirements and this application form, contact Planning and Zoning at **503-742-4500** or zoninginfo@clackamas.us. You can also find information online at the Planning and Zoning website: www.clackamas.us/planning.

Clackamas County is committed to providing meaningful access and will make reasonable accommodations, modifications, or provide translation, interpretation or other services upon request. Please contact us at 503-742-4545 or drenhard@clackamas.us.

503-742-4545: ¿Traducción e interpretación? | Требуется ли вам устный или письменный перевод?
翻译或口译? | Cần Biên dịch hoặc Phiên dịch? | 번역 또는 통역?



OCSD - REDLAND ELEMENTARY SCHOOL

Type II Alteration of a Nonconforming Use

Submittal Date:	September 1 , 2026
Submitted to:	City of Oregon City 695 Warner Parrott Rd Oregon City, OR 97045
Applicant:	Oregon City School District
3J Job Number:	24987

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Appendices

Appendix A – Land Use Application

Appendix B – Stormwater Management Report, KPFF, January 2026

Appendix C – Evidence of Continuous Use and Previous Approval

Appendix D – Land Use Plans

- C1.00 – Existing Conditions Plan
- C1.01 – Existing Conditions Plan
- C1.02 – Existing Conditions Plan
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- C3.00 – Site Plan
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- C4.00 – Grading Plan
- C6.00 – Utility and Storm Drainage Plan
- C6.50 – Storm Facility Sections
- EC1.00 – Erosion and Sediment Control Plan
- LU0.01 – Canopy Drawings
- E0.04 – Site Plan – Lighting Photometrics
- Lighting Cutsheets

GENERAL INFORMATION

Property Owner and
Applicant:

Oregon City School District
PO Box 2110
Oregon City, OR 97045
Contact: David Hobbs
Phone: (503) 785-8531
Email: david.hobbs@orecity.k12.or.us

Planning Consultant:

3J Consulting, Inc.
9600 SW Nimbus Avenue, Suite 100
Beaverton, OR 97008
Contact: Sam Huck, AICP
Phone: (971) 253-4220
Email: sam.huck@3j-consulting.com

Civil Engineer:

KPFF
111 SW 5th Avenue, Suite 2400
Portland, OR 97204
Contact: Alexi Brooks, PE
Phone: (503) 542-3818
Email: alexi.brooks@kpff.com

Architect:

BRIC Architecture, Inc.
1233 NW Northrup Street, Suite 100
Portland, OR 97209
Contact: Ed Herrera
Phone: (503) 595-4900
Email: ed.herrera@bric-arch.com

SITE INFORMATION

Parcel Number:

33E06B 00800 and 33E06B 00970

Address:

18131 S Redland Road

Gross Site Area:

~ 10.23 acres

Zoning Designation:

Rural Area Residential (RA-1)

Existing Use:

Redland Elementary School

Surrounding Zoning:

The properties to the north, south, east and west are all zoned RA-1.

Street Classification:

Redland Road is classified as a major arterial road, and Redland School Road is classified as a local road.

INTRODUCTION

APPLICANT'S REQUEST

Oregon City School District ("the District") proposes site improvements and seeks approval of an Alteration of a Nonconforming Use Application. This narrative has been prepared to describe the proposed development and to document compliance with the relevant sections of Clackamas County's Zoning and Development Ordinance.

Alteration of a Nonconforming Use applications are evaluated under the Type II Administrative decision process. The Planning Director will render the Type II decision.

SITE DESCRIPTION/SURROUNDING LAND USE

The subject property is located at 18131 S Redland Road in unincorporated Clackamas County. The property is identified as tax lots 33E06B 00800 and 33E06B 00970 and is approximately 9.35 acres in size. The site has frontage and takes access from S Redland Road, a major arterial road, and Redland School Road, which is classified as a local road.

The properties to the north, south, east and west are all zoned RA-1 and are primarily developed with rural residences. Some of the surrounding properties appear to be used for pasture or hay production.

Redland Elementary School was established shortly after the property was purchased by the Redland School District (now Oregon City School District) in 1965, predating the adoption of zoning regulations and the adoption of the RA-1 zoning designation by Clackamas County in 1969. The school is a legally established non-conforming use which was acknowledged by Clackamas County in the review and approval of File No. Z0308-01-E in January 2002 and File No. Z0383-16-E in 2016.

PROPOSAL

The District is proposing a modification of the existing site for proposed improvements that include resurfacing the play area located to the east of the main school building, and the construction of an approximately 1,292 square-foot solar canopy structure to be placed directly south of the existing primary elementary school building where the main entrance to the school is located. No change in enrollment at Redland Elementary is proposed with this application.

APPLICABLE CRITERIA

The following sections of Clackamas County's Zoning and Development Ordinance have been extracted as they have been deemed to be applicable to the proposal. Following each **bold** applicable criteria or design standard, the Applicant has provided a series of draft findings. The intent of providing code and detailed responses and findings is to document that the proposed development has satisfied the approval criteria for a Type II Alteration of a Nonconforming Use application.

Section 300: Urban and Rural Residential Districts

316 Rural Area Residential 1-Acre (RA-1)

316.03 Uses Permitted

- A. Uses permitted in each rural residential and future urban residential zoning district are listed in Table 316-1, Permitted Uses in the Rural Residential and Future Urban Residential Zoning Districts. Uses not listed are prohibited.
- B. As used in Table 316-1:
 - 1. "P" means the use is a primary use.
 - 2. "A" means the use is an accessory use.
 - 3. "C" means the use is a conditional use, approval of which is subject to Section 1203, Conditional Uses.
 - 4. "CPUD" means the use is allowed as a conditional use in a planned unit development.
 - 5. "X" means the use is prohibited.
 - 6. "Type II" means the use requires review of a Type II application, pursuant to Section 1307, Procedures.
 - 7. Numbers in superscript correspond to the notes that follow Table 316-1.
- C. Permitted uses are subject to the applicable provisions of Subsection 316.04, Dimensional Standards; Section 1000, Development Standards; and Section 1100, Development Review Process.

Table 316-1: Permitted Uses in the Rural Residential and Future Urban Residential Zoning Districts

Use	RA-1
Schools, subject to Section 805	C ²⁵

²⁵ Schools are prohibited within the areas identified as Employment, Industrial, and Regionally Significant Industrial on the Metropolitan Service District's 2040 Growth Concept Map.

Applicant's Finding: Schools are listed as a conditional use in table 316-1. The subject property is the site of the Redland Elementary School facility. The existing elementary school was established shortly after the property was purchased by the Redland School District in 1965. Prior to the adoption of the RA-1 zoning designation in 1969, the property was unzoned and not subject to any restrictive zoning regulations. The existing elementary school was established shortly after the property was purchased by the Redland School District in 1965. A conditional use permit, file no. CU-58-71 authorized an addition to the existing school. That request was filed in November of 1971 and approved in December of that year.

Over the years, the School District has applied for and obtained Alteration of Nonconforming Use approvals for the subject site. In 2001, the County approved an Alteration of a Nonconforming Use application, file no. Z0308-01-E, permitting the construction of a 50-foot by 70-foot play area cover. In that application, the County determined that the existing school facility was a lawfully established nonconforming use.

The School District has obtained various building, septic and other County permits over the years for improvements to the school facilities. The records available indicate that the original school facility was established prior to the adoption of zoning regulations on October 31, 1969.

Therefore, the application will be processed as an Alteration of a Nonconforming Use application, and evaluated under the Type II Administrative decision process. The Applicant addresses the standards in ZDO Section 1206: Nonconforming Uses And Vested Rights below.

Section 800: Special Use Requirements

805 Schools

805.01 Standard

The minimum side setback for a school is 20 feet.

Applicant's Finding: The proposed solar canopy structure is located approximately 143 feet to the nearest property line to the south. The proposed structure will be located approximately 264 feet from the east side property line, and approximately 204 feet from the west side property line. The minimum side setbacks are exceeded as demonstrated on the Site Plan (Sheet C3.01), provided in Appendix D. This standard is met.

Section 1200: Criteria for Discretionary Permits

1206 Nonconforming Uses And Vested Rights

[...]

1206.02 STATUS

A nonconforming use may be continued although not in conformity with the regulations for the zoning district in which the use is located. Nonconforming use status applies to the lot(s) of record on which the nonconforming use is located and may not be expanded onto another lot of record, except as provided under Subsection 1206.07(B)(3)(a) and (b) or, in the case of nonconforming premises for marijuana production, with an alteration approved pursuant to Subsection 1206.07(C). A change in ownership or operator of a nonconforming use is permitted.

Applicant's Finding: The school use has been in continuous operation since 1965 and has remained in Oregon City School District ownership.

In 2016, the County approved an Alteration of a Nonconforming Use application, file no. Z0383-16-E, permitting the School District to place an eight-foot by 40-foot

shipping container for storage uses on the subject property. In that approval, County staff determined that based upon the zoning and land use permitting history of the subject property, the use of the property for a public elementary school was established as a nonconforming use as defined in Sec. 202 of the ZDO when the RA-1 zoning was adopted on October 31, 1969.

1206.03 MAINTENANCE

Normal maintenance of a nonconforming use necessary to maintain a nonconforming use in good repair is permitted provided there are not significant use or structural alterations. Normal maintenance may include painting; roofing; siding; interior remodeling; re-paving of access roads, parking areas, or loading areas; replacement of landscaping elements; and similar actions.

Applicant's Finding: The proposed alterations include maintenance items including internal building maintenance supported by the approved bond, and the replacement and resurfacing of the existing playground. All proposed exterior improvements have been shown on the Site Plan submitted with this application in Appendix D.

1206.05 VERIFICATION OF A NONCONFORMING USE

Verification of nonconforming use status requires review as a Type II application pursuant to Section 1307, Procedures, and shall be subject to the following standards and criteria:

- A. The nonconforming use lawfully existed at the time of the adoption of zoning regulations, or a change in zoning regulations, which prohibited or restricted the use, and the nonconforming use has not been subsequently abandoned or discontinued. Once an applicant has verified that a nonconforming use was lawfully established, an applicant need not prove the existence, continuity, nature, and extent of the nonconforming use for a period exceeding 20 years immediately preceding the date of application for verification; or**
- B. The existence, continuity, nature, and extent of the nonconforming use for the 10- year period immediately preceding the date of the application is proven. Such evidence shall create a rebuttable presumption that the nonconforming use, as proven, lawfully existed at the time of, and has continued uninterrupted since, the adoption of restrictive zoning regulations, or a change in the zoning or zoning regulations, that have the effect of prohibiting the nonconforming use under the current provisions of this Ordinance.**

Applicant's Finding: The subject property is currently zoned Rural Area Residential, RA-1. This zoning designation generally permits single family residential uses. This designation was adopted on October 31, 1969, as the first application of zoning regulations. The use and development of properties within the RA-1 zoning district is subject to the provisions of Sec. 316 of the ZDO. Schools are listed as a use that may be permitted subject to County Conditional Use Permit approval.

Prior to the adoption of the RA-1 zoning designation in 1969, the property was unzoned and not subject to any restrictive zoning regulations.

The existing elementary school was established shortly after the property was purchased by the Redland School District in 1965. A conditional use permit, file no. CU-58-71 authorized an addition to the existing school. That request was filed in November of 1971 and approved in December of that year.

In 2001, the County approved an Alteration of a Nonconforming Use application, file no. Z0308-01-E, permitting the construction of a 50-foot by 70-foot play area cover. In that application, the County determined that the existing school facility was a lawfully established nonconforming use.

The School District has obtained various building, septic and other County permits over the years for improvements to the school facilities. The records available indicate that the original school facility was established prior to the adoption of zoning regulations on October 31, 1969.

In 2016, the County approved an Alteration of a Nonconforming Use application, file no. Z0383-16-E, permitting the School District to place an eight-foot by 40-foot shipping container for storage uses on the subject property. In that approval, County staff determined that based upon the zoning and land use permitting history of the subject property, the use of the property for a public elementary school was established as a nonconforming use as defined in Sec. 202 of the ZDO when the RA-1 zoning was adopted on October 31, 1969.

Aerial photography and a copy of planning file number Z0383-16-E has been provided in Appendix C demonstrating the continuous use from April 2015 to June 2026, demonstrating that the nonconforming use has not been subsequently abandoned or discontinued since the last verification of nonconforming use in 2016 was approved by county staff.

Therefore, County staff can find again that based upon the zoning and land use permitting history of the subject property discussed above, the use of the property for a public elementary school was established as a nonconforming use as defined in Sec. 202 of the ZDO when the RA-1 zoning was adopted on October 31, 1969.

1206.07 ALTERATION

A. Alterations Required by Law:

- 1. The alteration of any nonconforming use shall be permitted when necessary to comply with any lawful requirement for alteration of the use or structure, subject to building, plumbing, sanitation, and other specialty code permit requirements in effect at the time the alteration is commenced. Additional conditions shall not be imposed upon the continuation of a nonconforming use when an alteration is required to comply with local or state health or safety requirements, except as provided in Oregon Revised Statutes (ORS) 215.215 pertaining to the re-establishment of nonfarm uses in the EFU District.**

2. **Alterations to a premises for which a marijuana producer holds a production license issued under ORS 475B.070 shall be permitted when necessary to comply with a lawful requirement for alteration in production.**

Applicant's Finding: The proposed alteration is not required by law. The requirements of this section are not applicable.

B. Alterations Not Required by Law: Except as provided in Subsection 1206.07(C), an alteration of a nonconforming structure or other physical improvements, or a change in the use, requires review as a Type II application pursuant to Section 1307, Procedures, and shall be subject to the following standards and criteria:

1. **The alteration or change will, after the imposition of conditions pursuant to Subsection 1206.07(B)(4), have no greater adverse impact to the neighborhood than the existing structure, other physical improvements, or use.**

Applicant's Finding: The proposed alteration of the nonconforming use, including the construction of an approximately 1,500-square-foot solar canopy, will not result in greater adverse impacts to the surrounding neighborhood than the existing school use. The solar canopy will be located within the existing Redland Elementary School site and will be accessory to the existing school use. The proposed resurfacing of the existing play area and the placement of the solar canopy will improve existing site facilities and will not expand the area or intensity of the existing school use.

The proposed improvements will not increase enrollment or otherwise change the intensity of the existing school use. The existing site access and circulation patterns will remain unchanged, and the Applicant is not proposing any changes to the existing use or operations of the school. The solar canopy will provide covered area for the existing school site without introducing a new use or activity that would generate additional traffic, noise, or other impacts associated with an increase in the intensity of the school use.

County Staff has concluded in the previous approval that this standard does not strictly require that the proposed use be compatible in all respects with surrounding development, only that the proposed alteration of the existing nonconforming use will not cause greater adverse impacts to the surrounding neighborhood when compared with the existing prior nonconforming use.

Based on the location and nature of the proposed improvements, the lack of an increase in school enrollment or change in site access, and the continued use of the property for the existing school use, the proposed alterations will not result in greater adverse impacts to the surrounding neighborhood than the existing nonconforming use.

This standard is met.

2. The nonconforming use status of the existing use, structure(s), and/or physical improvements is verified pursuant to Subsection 1206.05.

Applicant's Finding: The nonconforming use status of the existing use, structures, and improvements has been verified pursuant to Subsection 1206.05. Subsection 1206.05 has been addressed within this narrative. This standard is met.

3. The alteration or change will not expand the nonconforming use from one lot of record to another unless:

- 1. The lot of record on which expansion is proposed and the lot of record on which the nonconforming use currently is established have been part of the same tract continuously since the date the nonconforming use became nonconforming; or**
- 2. The expansion would allow only for facilities necessary to support the nonconforming use, such as driveways, storm water management facilities, and on-site wastewater treatment systems.**

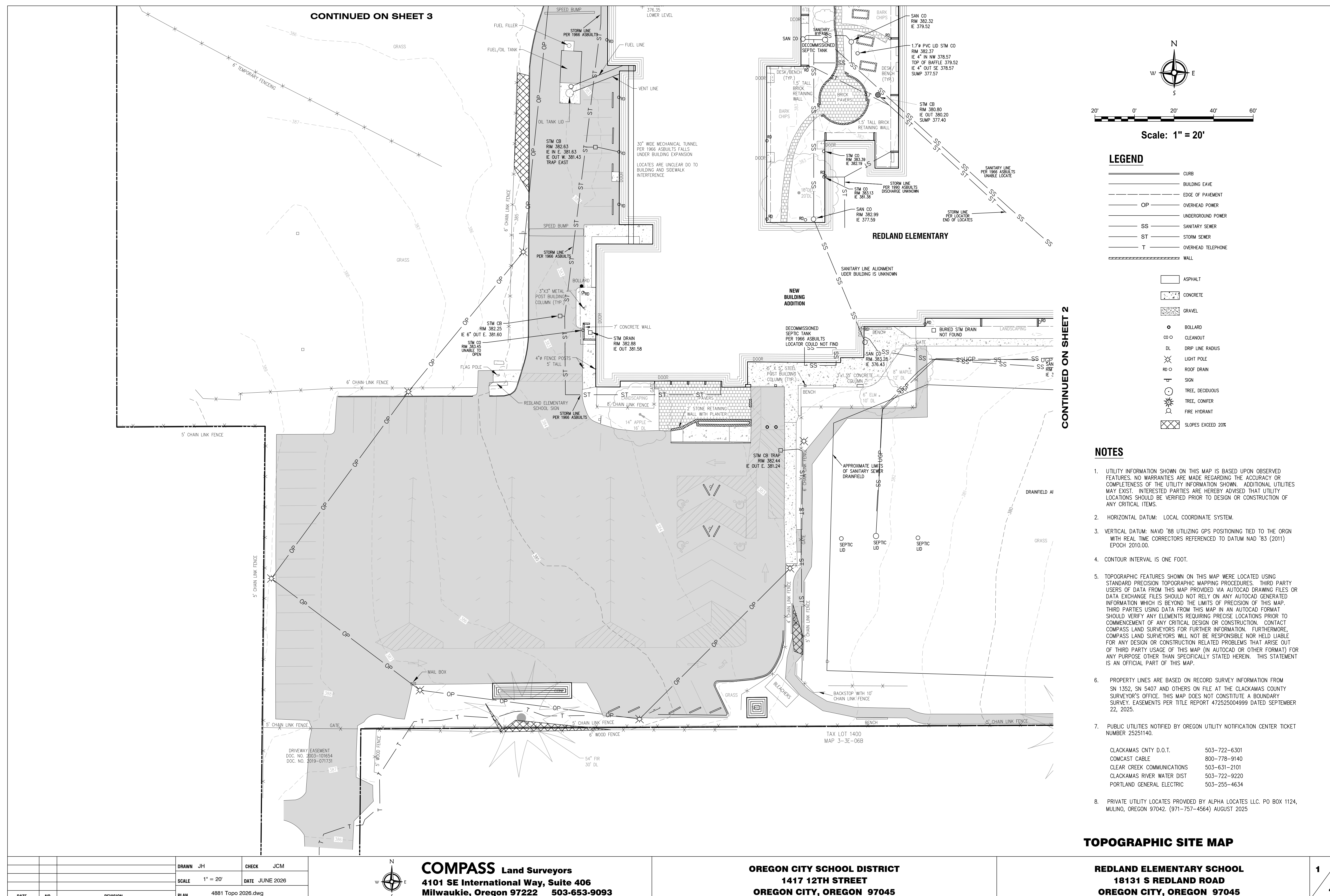
Applicant's Finding: The proposed alteration will not expand the nonconforming use from one lot of record to another. The entirety of the proposed improvements will occur on the subject parcel, Tax Lots 800 and 970, which have the established nonconforming use. This standard is met.

4. Conditions of approval may be imposed on any alteration of a nonconforming structure or other physical improvements, or a change in the use, permitted under Subsection 1206.07(B), when deemed necessary to ensure the mitigation of any adverse impacts.

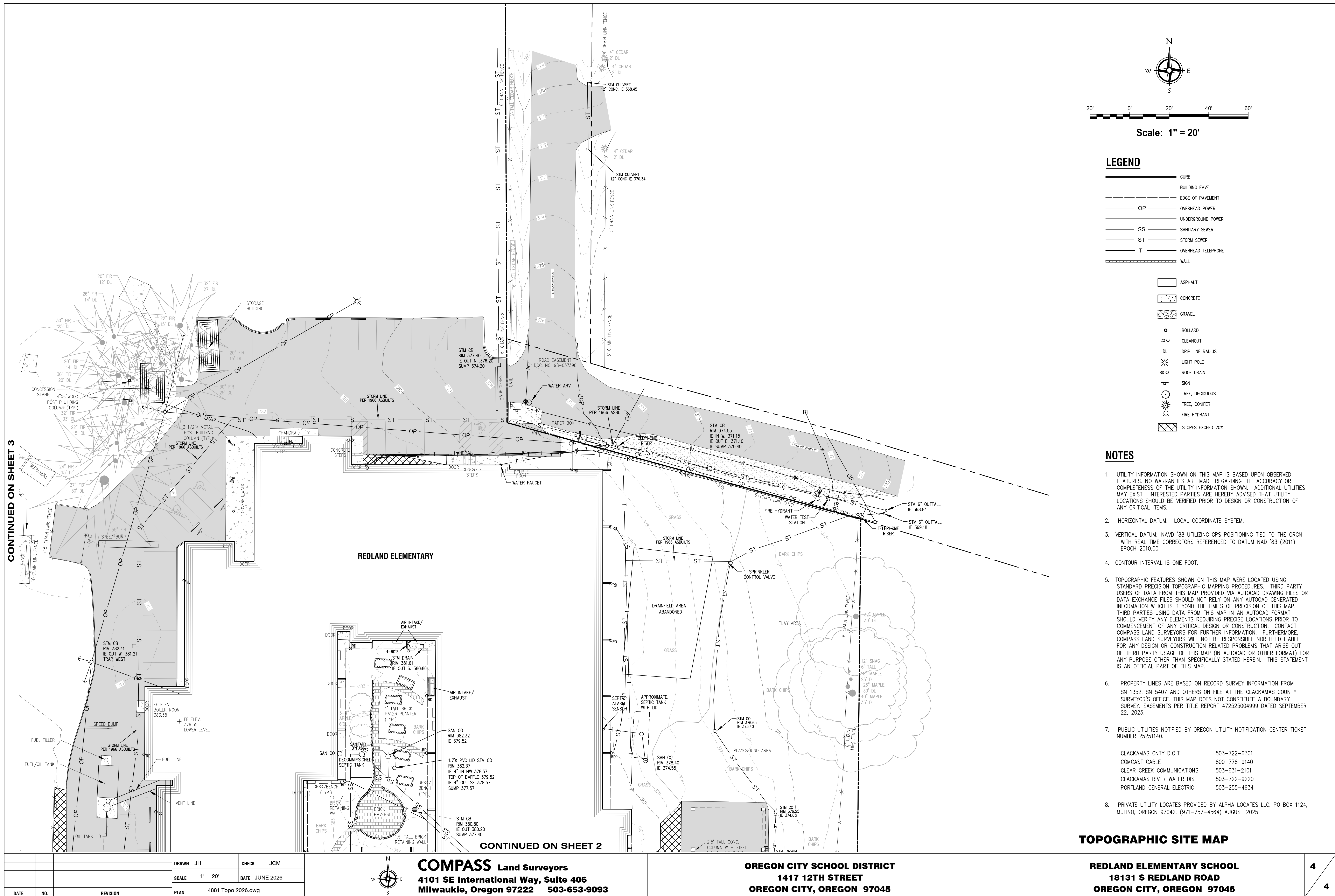
Applicant's Finding: The applicant acknowledges that conditions of approval may be imposed on the proposed alteration if deemed necessary to ensure the mitigation of any adverse impacts. This standard is met.

SUMMARY AND CONCLUSION

Based upon the materials submitted herein, the Applicant respectfully requests approval from the Clackamas County's Planning Department for this Type II application.

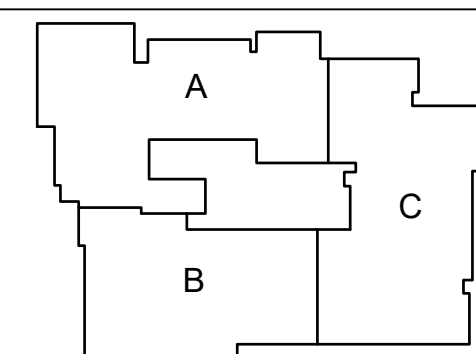


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18131 S Redland Rd,
Oregon City, OR 97045
OREGON CITY SCHOOL DISTRICT 62
T 555-555-5555

PRELIMINARY
NOT FOR
CONSTRUCTION



key plan

[illegible]

phase	LAND USE
date	08/21/2026
project	25011-152

SITE PLAN

C3.00

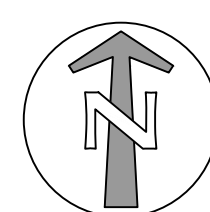
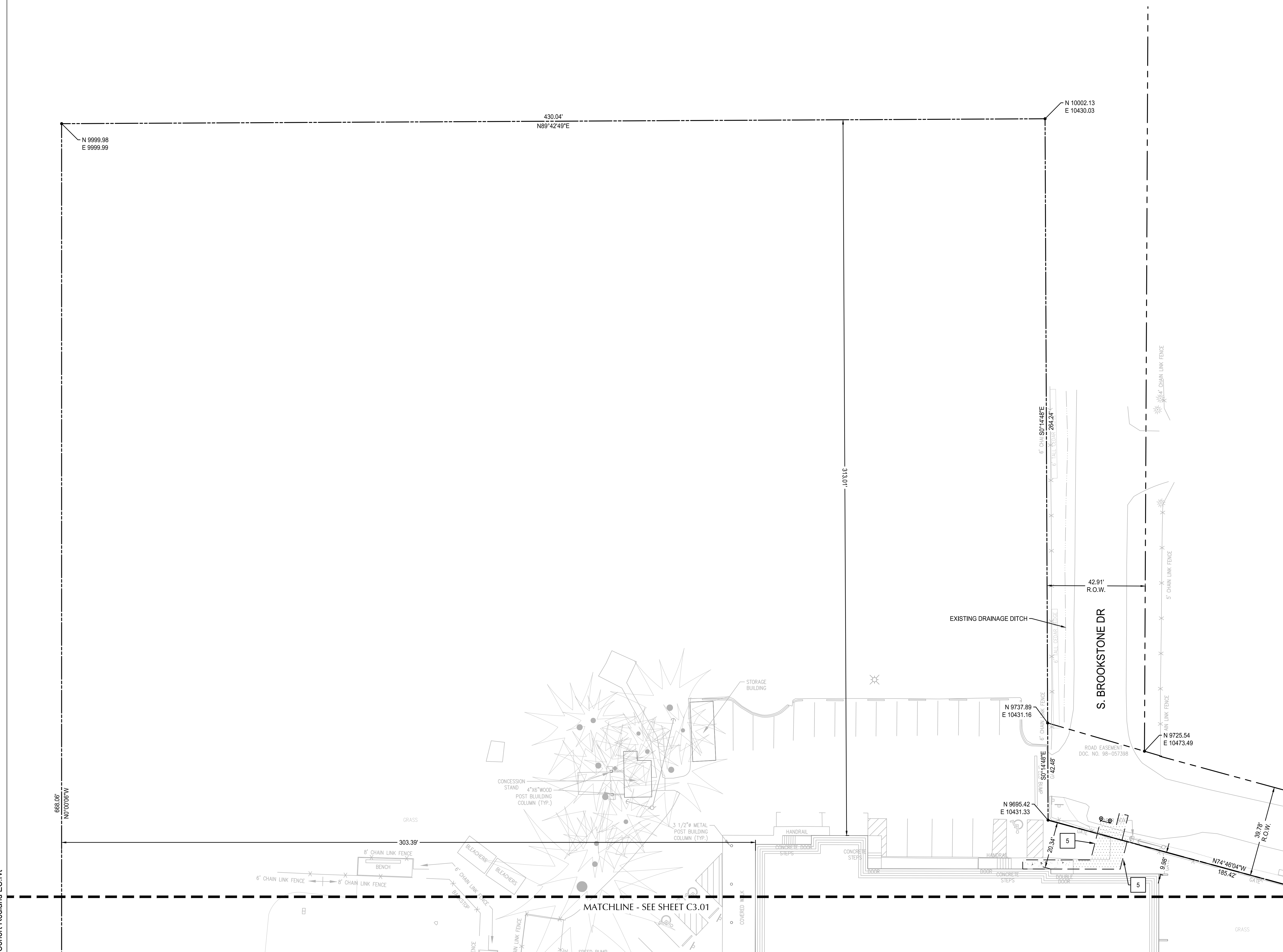
1. ALL DIMENSIONS ARE TO FACE OF CURB OR FACE OF WALL.
2. SEE LANDSCAPE PLANS FOR PLANTING AND ADDITIONAL SITE FEATURES

9' X 18' STANDARD PARKING STALLS: 61
9' X 18' ANGLED PARKING STALLS: 55
ADA PARKING STALLS: 7

TOTAL PARKING ONSITE: 123

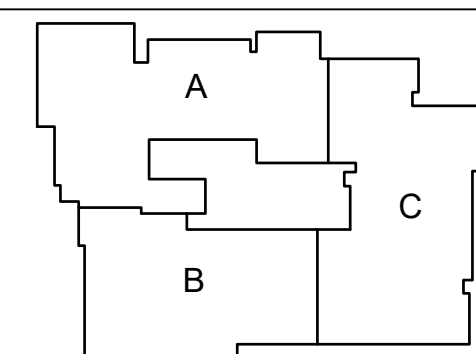
KEY NOTES		
#	DESCRIPTION	DETAIL REF.
1	NEW PLAY SURFACING - SEE LANDSCAPE PLANS	
2	FLUSH CURB - SEE LANDSCAPE PLANS	
3	NEW WALL - SEE LANDSCAPE PLANS	
4	STORMWATER FACILITY - SEE SHEET C6.00 AND C6.50	1/C6.50
5	SAWCUT LINE	
6	PV CANOPY - SEE ARCHITECTURAL AND ELECTRICAL PLANS	
7	TRANSFORMER - SEE ELECTRICAL PLANS	
8	GUARDRAIL - SEE LANDSCAPE PLANS	
9	BOLLARD	X/C7.00

	PROPERTY LINE	
	SAWCUT LINE	
	PLAY SURFACING - SEE LANDSCAPE PLANS	
	STANDARD ASPHALT PAVEMENT	
	STORMWATER RAIN GARDEN	
	PEDESTRIAN CONCRETE PAVEMENT - SEE LANDSCAPE PLANS	
	PV CANOPY - SEE ARCHITECTURE PLANS	
	RETAINING WALL - SEE LANDSCAPE PLANS	



18131 S Redland Rd,
Oregon City, OR 97045
OREGON CITY SCHOOL DISTRICT 62
T 555-555-5555

PRELIMINARY
NOT FOR
CONSTRUCTION



key pla

[illegible]

phase	LAND USE
date	08/21/2026
project	25011-152

SITE PLAN

C3.01

1. ALL DIMENSIONS ARE TO FACE OF CURB OR FACE OF WALL.
2. SEE LANDSCAPE PLANS FOR PLANTING AND ADDITIONAL SITE FEATURES

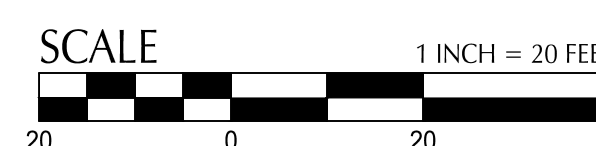
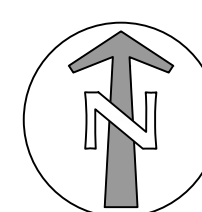
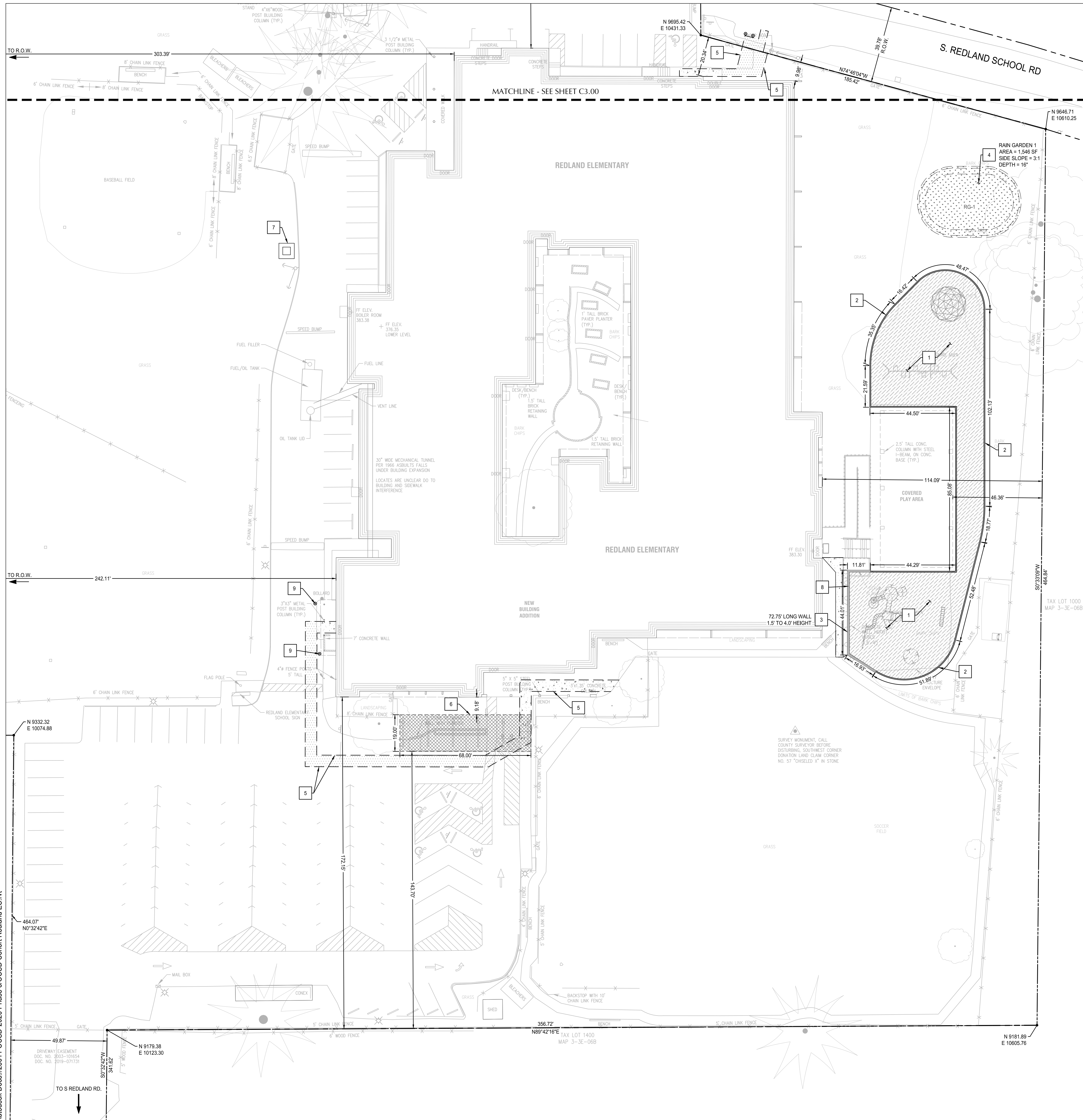
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9	BOLLARD	X/C7.00

	PROPERTY LINE	
	SAWCUT LINE	
	PLAY SURFACING - SEE LANDSCAPE PLANS	
	STANDARD ASPHALT PAVEMENT	
	STORMWATER RAIN GARDEN	
	PEDESTRIAN CONCRETE PAVEMENT - SEE LANDSCAPE PLANS	
	PV CANOPY - SEE ARCHITECTURE PLANS	
	RETAINING WALL - SEE LANDSCAPE PLANS	

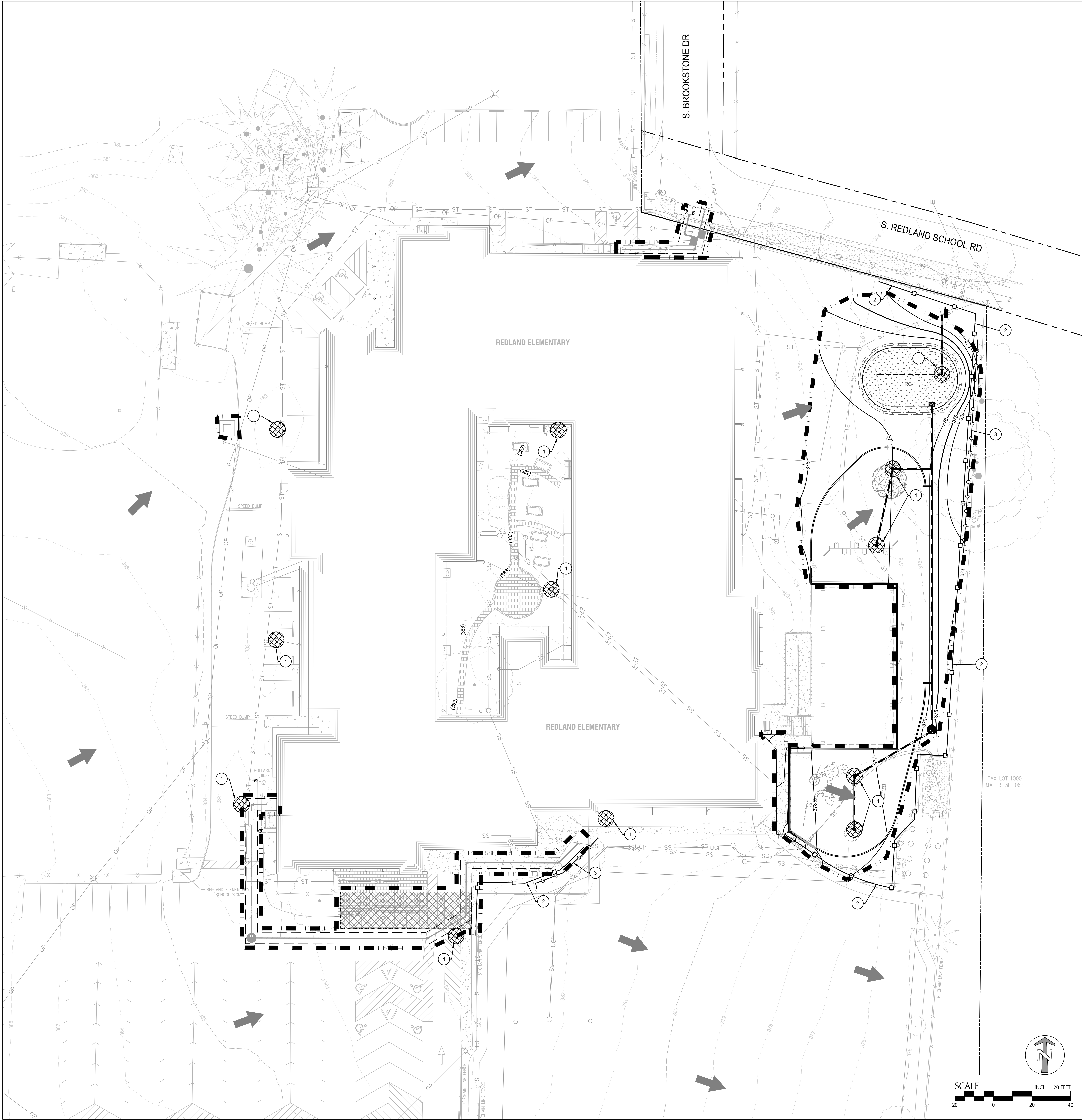
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 5/28/2026 7:40:36 PM
 Autodesk Docs://25011 OCSD-2026 Phase 3/OCSD Cohort Redland ES.nt





C6.00





ⓧ KEY NOTES

1

INSTALL CATCH BASIN PROTECTION

2

INSTALL SEDIMENT FENCE

3

INSTALL TREE PROTECTION FENCE

SHEET LEGEND

PROPERTY LINE

EX. CONTOUR MINOR

EX. CONTOUR MAJOR

449

PROP. CONTOUR MINOR

450

PROP. CONTOUR MAJOR

EXTENT OF WORK

SEDIMENT CONTROL FENCE, PLACE AT PROPERTY LINES, UNO (SHOWN OFFSET FOR CLARITY).

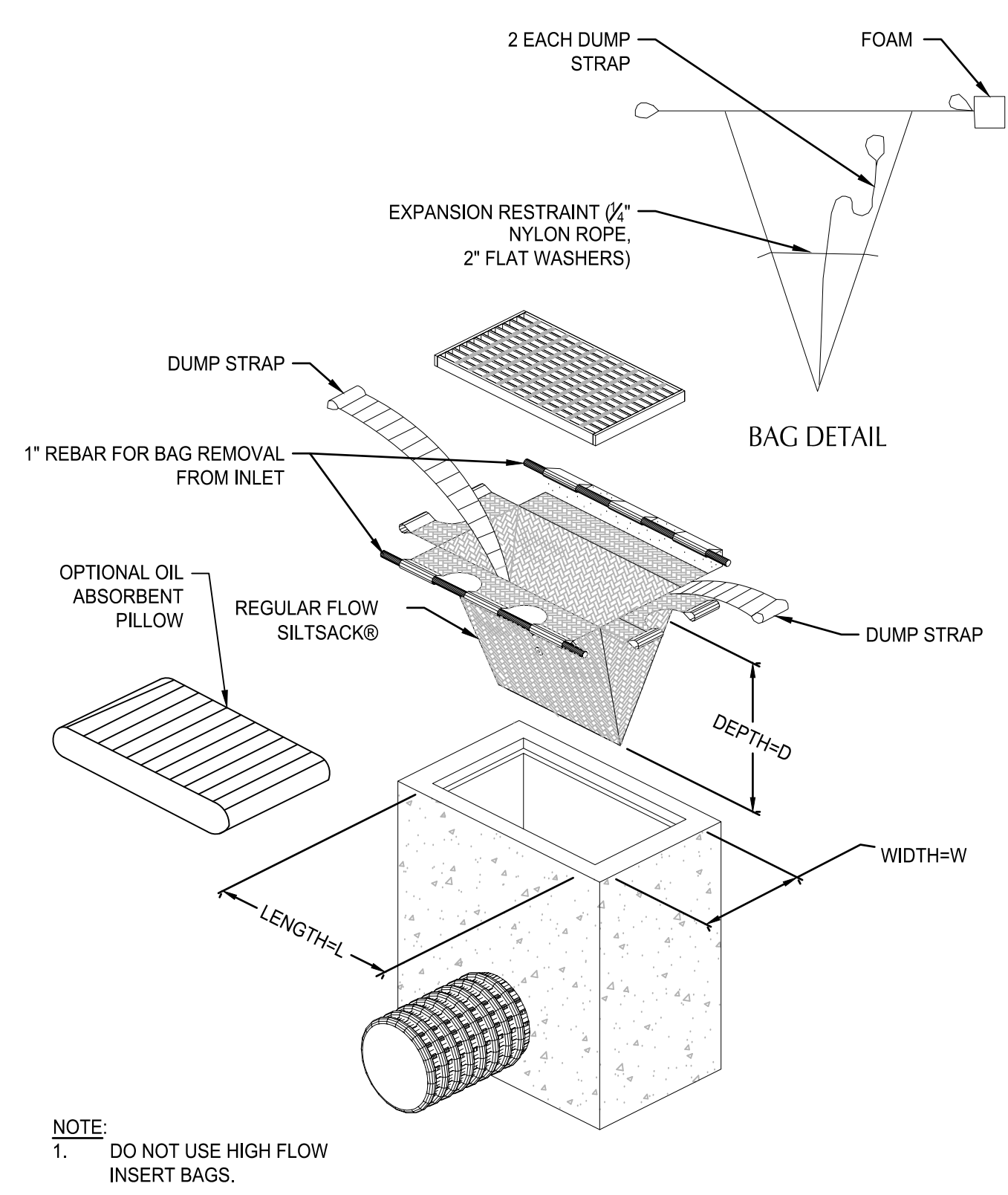
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INLET PROTECTION

→

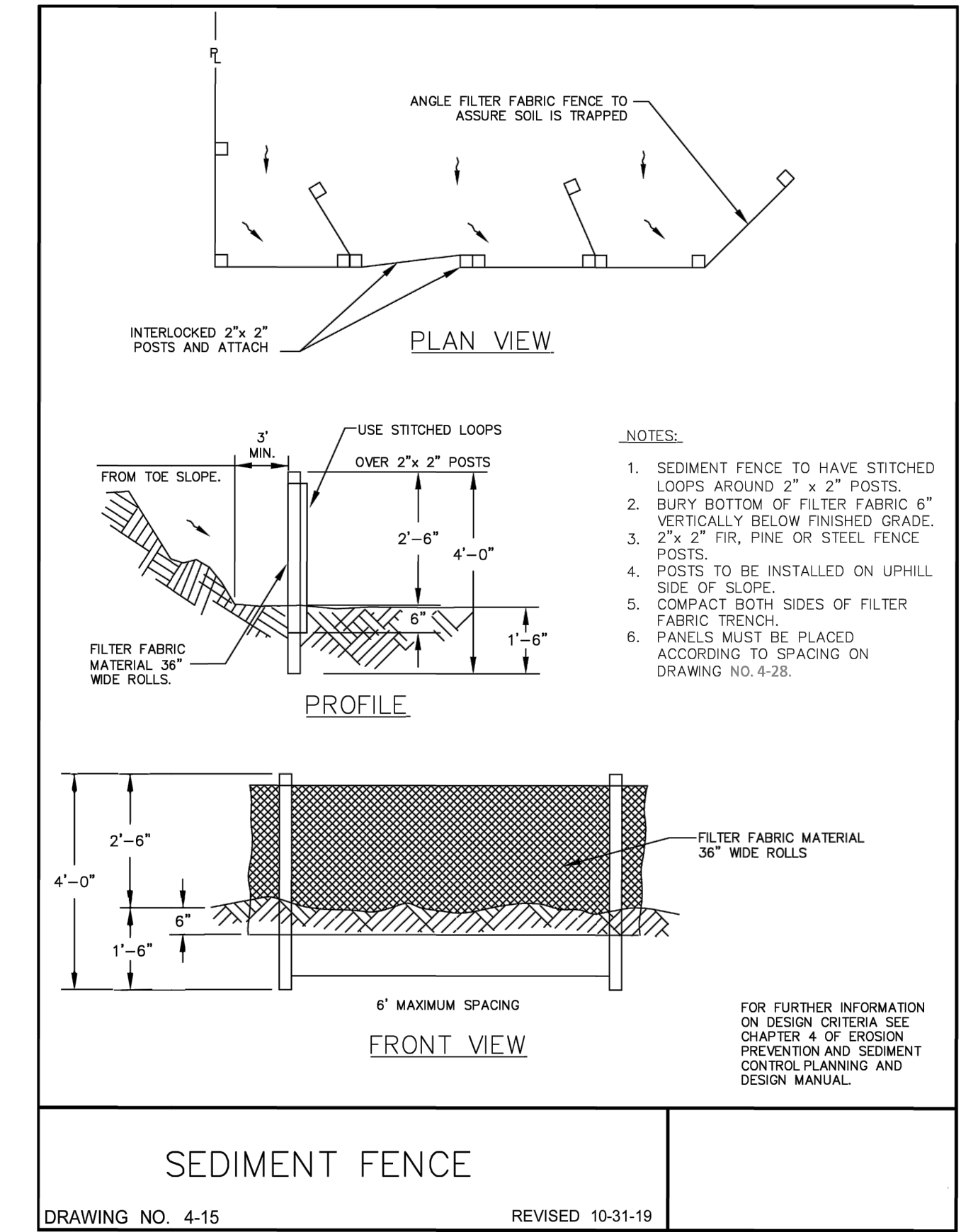
SURFACE FLOW DIRECTION

TREE PROTECTION FENCE, GENERAL LAYOUT SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL REFER TO LANDSCAPE PLANS FOR FINAL FENCING LAYOUT.



1 INLET SEDIMENT PROTECTION

SCALE: NTS



2 SEDIMENT FENCE

SCALE: NTS

BR|IC

ARCHITECTURE

OCSD62

BOND

2025

kpff

111 SW Fifth Ave., Suite 2600
Portland, OR 97204
P: 503.542.3860
F: 503.274.4661
www.kpff.com

REDLAND ELEMENTARY

SCHOOL

18131 S. Redland Rd.
Oregon City, OR 97045
OREGON CITY SCHOOL DISTRICT 62
T 555-555-5555

PRELIMINARY

NOT FOR

CONSTRUCTION

key plan

A

B

C

date

revisions

phase

LAND USE

date

08/21/2026

project

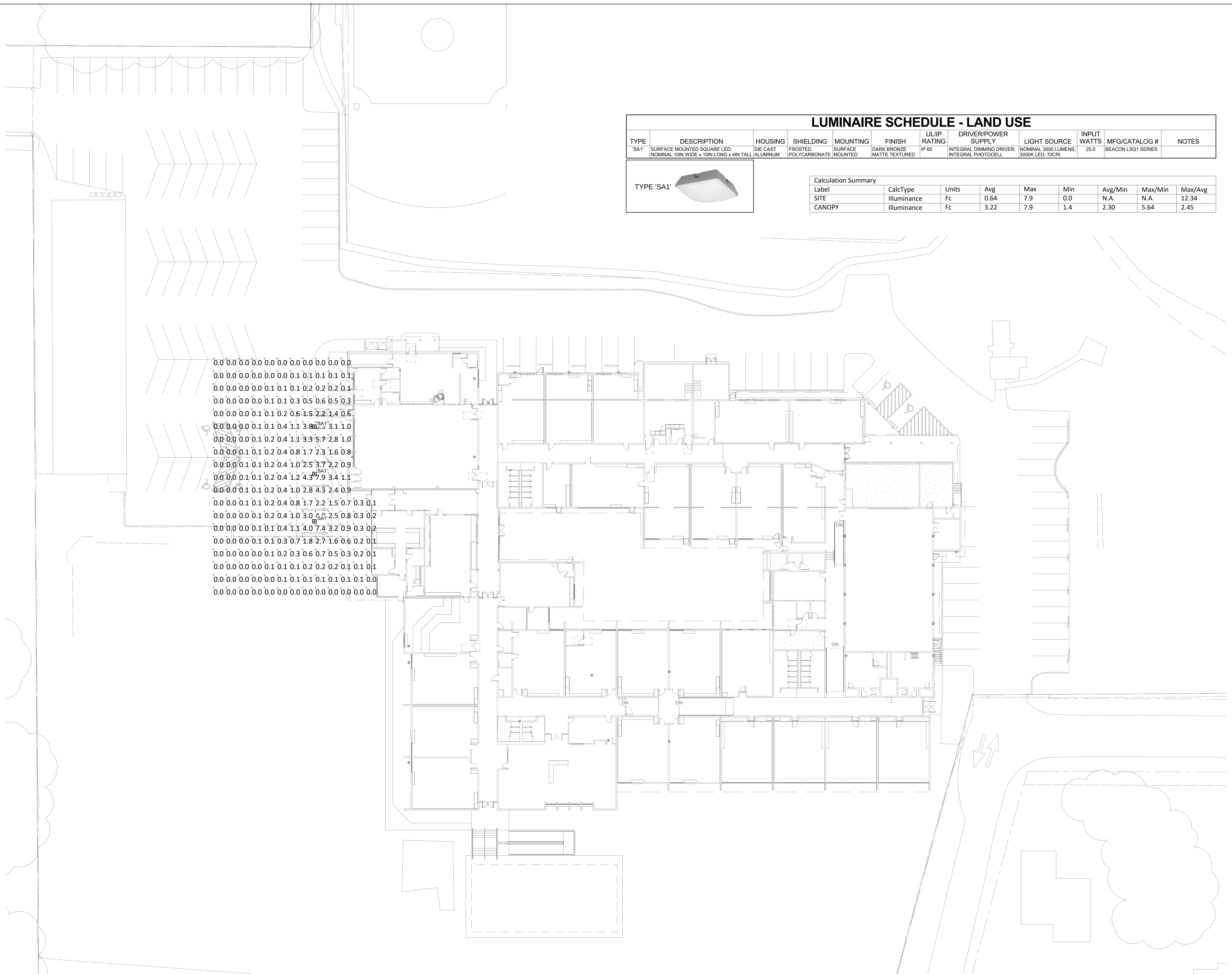
25011-152

EROSION & SEDIMENT

CONTROL PLAN

EC1.00

SITE PLAN - LIGHTING PHOTOMETRICS



1 SITE PLAN - LIGHTING PHOTOMETRICS

Appendix B - Stormwater Management Report

Stormwater Management Report

Redland Elementary School Renovation Land Use

Prepared for: Clackamas County

Prepared by: Jules Kampe, PE

Project Manager: Alexi Brooks, PE

Principal Engineer: Mark Reuland, PE

August 2026 | KPFF Project #2500190

KPFF'S COMMITMENT TO SUSTAINABILITY

As a member of the US Green Building Council, KPFF is committed to the practice of sustainable design and the use of sustainable materials in our work.

When hardcopy reports are provided by KPFF, they are prepared using recycled and recyclable materials, reflecting KPFF's commitment to using sustainable practices and methods in all of our products.

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Appendices

Appendix A

- Existing Conditions
- NRCS Soil Map
- Geotechnical Report

Appendix B

- Site Basin Map
- BMP Sizing Report
- Utility Plan

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Project Overview and Description

Purpose

This report describes the stormwater management strategies for the proposed improvements at Redland Elementary School in Clackamas County, Oregon. The purpose of this report is to provide the design methodology and facility design parameters for use in the permit submittal process and verify conformance to Clackamas County Water Environment Services (WES) requirements.

Existing Conditions

Redland Elementary School is on approximately 9.0-acre site located at 18131 S Redland Road in Oregon City, Oregon. The campus is bounded by residential development on all sides and some commercial development to the east. The school is accessed by S Redland Road to the south and S Redland School Road at the northeast corner of the property. The school is centered on the site with an asphalt parking lot at the southwest corner, a grass field at the southeast corner, a playground and covered play to the east and two grass sports fields to the west.

The property generally slopes from southwest to northeast, promoting overland storm runoff from paved surfaces to public and private storm inlets. The parking lot, asphalt loop and the courtyard drain to catch basins at localized low points and are piped along the west side of the building and discharge into a public main in S Redland School Road. Roof generated runoff from the building and covered play area is managed by gutters that connect below grade to storm pipes that convey runoff to the public storm main in S Redland School Road. The storm main in S Redland School Road drains to the east and discharges into a ditch on the south side of the road.

Proposed Conditions

This project proposes a reconstruction of the existing playground facility and the addition of a solar canopy in the parking lot. A new transformer and grease interceptor will be installed on the west side of the school building. Additionally, there will be a new fire protection point of connection from S Redland School Road with a post indicator valve and fire department connection

The 7,570 square foot playground reconstruction will remain in its current location, with new pervious soft play surfacing and playground equipment proposed throughout. Contained crushed stone base rock with a poured rubber base mat and turf roll surfacing will be installed to support new play equipment. Underdrains will be installed below the playground surface, which will be tied into a proposed stormwater treatment facility.

The 1,300 square foot solar canopy will be located on the north side of the parking lot and provide covered drop-off for the students. Runoff from this structure will be collected by gutters and piped to an existing private storm main that discharges to the public main in S Redland School Road. Due to existing site features, utilities and elevations, the solar canopy runoff cannot be piped to the proposed stormwater treatment facility. There will be approximately 4,800 square feet of existing pedestrian sidewalks and the covered play that will be directed and managed in the proposed stormwater treatment facility in lieu of the 1,300 square feet solar canopy.

Stormwater generated by proposed impervious surfaces will be managed onsite where feasible in a proposed rain garden. The rain garden will be located at the northeast corner of the play area to treat runoff from the

turfed play surfacing and proposed pedestrian sidewalk, as well as the existing covered play and pedestrian sidewalks.

Methodology

Stormwater management design adheres to the WES Stormwater Standards, April 2023.

Stormwater Management

The proposed project will result in greater than 5,000 square feet of new and replaced impervious surface area, so the design is subject to comply with WES requirements for water quality and flow control performance standards. The proposed stormwater management facility is sized to adequately capture and treat the runoff from the water quality design storm. This storm is defined as 1-inch of rainfall over a 24-hour period, which represents 80 percent of the average annual runoff volume. Flow control standards require that the duration of post development peak flow rates does not exceed pre-developed conditions for flows ranging from 42 percent of the 2-year peak flow rate up to the 10-year peak flow rate. When site conditions allow, infiltration is the preferred strategy to achieve stormwater management performance standards. Compliance with these requirements was confirmed using the Clackamas County-approved BMP Calculator, which uses continuous hydrologic and hydraulic modeling based off long-term local rainfall data.

Onsite Soils

According to the Geotechnical Report dated May 2026 by Apex Companies, the site soil is classified as hydrologic soil group “C”. The Geotechnical Engineer performed infiltration testing at two locations. The infiltration measured at a rate of 0.7 inches/hour with a factor of safety of 2 to 4 at one test location. The Geotechnical Engineer does not recommend using the other test location for design purposes as it does not appear representative of the overall site conditions. An infiltration rate of zero was assumed for design calculations since neither test location is near the proposed stormwater facility.

Clackamas County standards do not define the pre-developed condition for the project site, but Clackamas County’s BMP Sizing Tool is intended for use in conjunction with Oregon City’s Stormwater Standards. Due to the project site’s proximity to Oregon City, the 1851 vegetation map in Oregon City’s 2020 Stormwater and Grading Design Standards was used to determine the pre-developed condition of the site. The pre-developed condition of the site is forested.

Basin Analysis

The project limits, or disturbed area, are delineated into one drainage management area (DMA) which defines the contributing drainage area to each stormwater treatment facility. For the purpose of stormwater design, the drainage management area has been divided into basins based on the type of ground material.

Basin 1 – Existing Impervious

This 4,801 square foot basin includes the existing hardscape that drains to the proposed stormwater facility, or Rain Garden 1. The basin includes the existing covered play and existing paved pedestrian walkways. This area will be treated and used to offset the new impervious area around the site that will not be treated. The areas that will not be treated are a new 1,300 square foot solar canopy in the parking lot and a 64 square foot concrete pad for a new transformer on the west side of the school building.

Basin 2 – New Sidewalk

This 287 square foot basin includes the new sidewalk on the west side of the playground. The runoff will be collected in an area drain within the playground and directed to Rain Garden 1.

Basin 3 – New Playground Surfacing

Stormwater runoff generated by the 7,901 square foot soft play area will permeate through the turf roll and poured rubber base mat to the contained crushed stone base, which is surrounded by flush curb. The playground surface will include perforated subdrainage within the crushed stone base layer to promote infiltration through the facility and into the below-grade storm system. All runoff generated by Basin 3 will be collected by the subdrainage system and piped to Rain Garden 1.

Basin 4 – Pervious

This 8,846 square foot basin includes the new and existing landscape area associated with the reconstructed soft play area. Most runoff generated by Basin 4 runs overland to Rain Garden 1, while a small portion sheet flows to the playground area and is collected in area drains, ultimately draining to Rain Garden 1.

Table 1: Basin Summary

Basin	Description	Area (sf)	Hydrologic Soil Group	Stormwater Management Facility
1	Existing Impervious	4,081	C	RG-1
2	New Sidewalk	287	C	RG-1
3	New Playground Surfacing	7,901	C	RG-1
4	Pervious	8,846	C	RG-1
TOTAL		21,835		

Stormwater Facility Analysis

Rain Garden 1 – Infiltration

This rain garden is located north of the proposed play area at the northeast corner of the site. This facility has been sized to treat and detain runoff from the new playground surfacing, new sidewalk and existing hardscape including the covered play and pedestrian walkways. Per the Clackamas County's BMP Sizing Tool application, the minimum area for a lined rain garden is 1,546 square feet with a 0.9-inch diameter orifice. All stormwater runoff will be directed to a rain garden with top of ponding area of 1,546 square feet with 4 inches of freeboard and 12 inches of ponding depth. The rain garden will be unlined to take advantage of infiltration rates, if any. After runoff is treated in the vegetated growing media, the existing soil has the capacity to fully infiltrate the design storm. Rainfall with a greater intensity than the 10-year storm will pond to a depth of 16-inches before safely overflowing into a beehive inlet piped to S Redland School Road stormwater infrastructure.

Table 2: Rain Garden Summary

Stormwater Management Facility	Top Area (sf)	Area Managed (sf)	Rain Garden as a Percentage of Contributing Area	Basin Contributing	Infiltration Rate (in./hr.)	Discharge Point
1	1,546	21,835	7.1%	1, 2, 3, 4	0	Infiltration, overflow to roadside ditch in S Redland School Road

Conclusion

Based on the requirements of the WES Stormwater Standards, including the engineering assumptions and calculations provided in this report, all facility components have the capacity for treatment and flow control of the imperious areas generated by the proposed development. An Operations and Maintenance Guide will be provided for school staff to maintain the proposed stormwater facilities.

2500190-kg

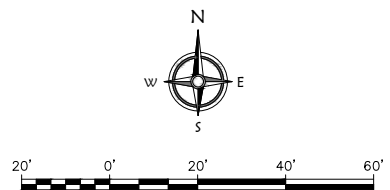
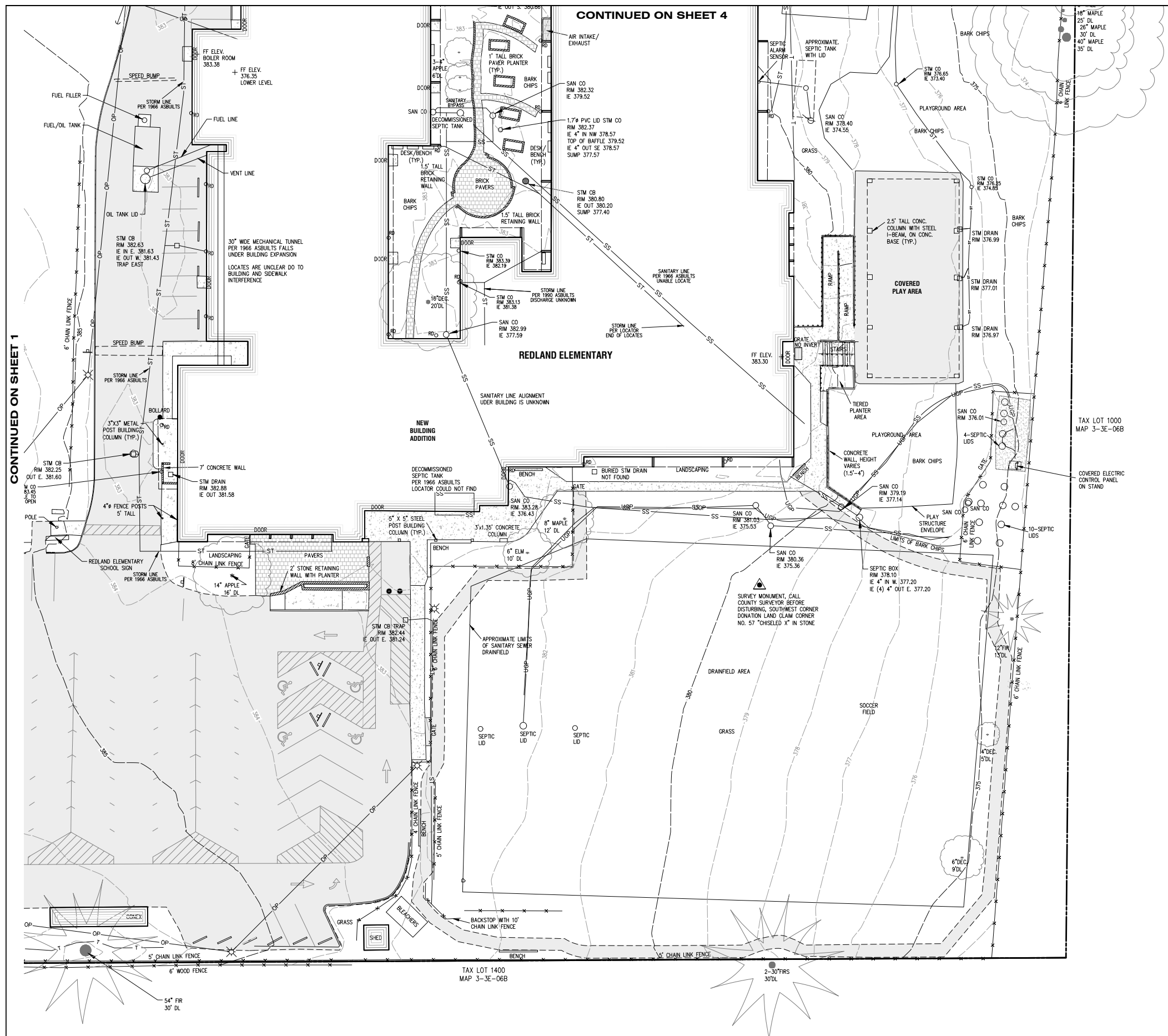
Appendix A

Existing Conditions

NRCS Soil Map

Geotechnical Report

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LEGEND

- | | |
|---|--------------------|
| | CURB |
|  | BUILDING EAVE |
| | EDGE OF PAVEMENT |
|  OP | OVERHEAD POWER |
| UGP | UNDERGROUND POWER |
|  SS | SANITARY SEWER |
| ST | STORM SEWER |
| T | OVERHEAD TELEPHONE |
|  | WALL |

- | | |
|--|------------------|
|  | ASPHALT |
|  | CONCRETE |
|  | GRAVEL |
|  | BOLLARD |
| CO  | CLEANOUT |
| DL  | DRIP LINE RADIUS |
|  | LIGHT POLE |
| RD  | ROOF DRAIN |
|  | SIGN |
|  | TREE, DECIDUOUS |
|  | TREE, CONIFER |
|  | FIRE HYDRANT |

NOTES

1. UTILITY INFORMATION SHOWN ON THIS MAP IS BASED UPON OBSERVED FEATURES. NO WARRANTIES ARE MADE REGARDING THE ACCURACY OR COMPLETENESS OF THE UTILITY INFORMATION SHOWN. ADDITIONAL UTILITIES MAY EXIST. INTERESTED PARTIES ARE HEREBY ADVISED THAT UTILITY LOCATIONS SHOWN SHOULD BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION OF ANY CRITICAL ITEMS.
2. HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM.
3. VERTICAL DATUM: NAVD '88 UTILIZING GPS POSITIONING TIED TO THE ORGN WITH REAL TIME CORRECTORS REFERENCED TO DATUM NAD '83 (2011) EPOCH 2010.00.
4. CONTOUR INTERVAL IS ONE FOOT.
5. TOPOGRAPHIC FEATURES SHOWN ON THIS MAP WERE LOCATED USING STANDARD PRECISION TOPOGRAPHIC MAPPING PROCEDURES. THIRD PARTY USERS OF DATA FROM THIS MAP PROVIDED VIA AUTOCAD DRAWING FILES OR DATA EXCHANGE FILES SHOULD NOT RELY ON ANY AUTOCAD GENERATED INFORMATION WHICH IS BEYOND THE LIMITS OF PRECISION OF THIS MAP. THIRD PARTIES USING DATA FROM THIS MAP IN AN AUTOCAD FORMAT SHOULD VERIFY ANY ELEMENTS REQUIRING PRECISE LOCATIONS PRIOR TO COMMENCEMENT OF ANY CRITICAL DESIGN OR CONSTRUCTION. CONTACT COMPASS LAND SURVEYORS FOR FURTHER INFORMATION. FURTHERMORE, COMPASS LAND SURVEYORS WILL NOT BE RESPONSIBLE NOR HELD LIABLE FOR ANY DESIGN OR CONSTRUCTION RELATED PROBLEMS THAT ARISE OUT OF THIRD PARTY USAGE OF THIS MAP (IN AUTOCAD OR OTHER FORMAT) FOR ANY PURPOSE OTHER THAN SPECIFICALLY STATED HEREIN. THIS STATEMENT IS AN OFFICIAL PART OF THIS MAP.
6. PROPERTY LINES ARE BASED ON RECORD SURVEY INFORMATION FROM SN 1352, SN 5407 AND OTHERS ON FILE AT THE CLACKAMAS COUNTY SURVEYOR'S OFFICE. THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY. EASEMENTS PER TITLE REPORT 472525004999 DATED SEPTEMBER 22, 2025.
7. PUBLIC UTILITIES NOTIFIED BY OREGON UTILITY NOTIFICATION CENTER TICKET NUMBER 25251140.

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COMCAST CABLE	800-778-9140
CLEAR CREEK COMMUNICATIONS	503-631-2101
CLACKAMAS RIVER WATER DIST	503-722-9220
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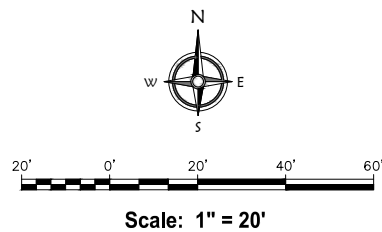
TOPOGRAPHIC SITE MAP

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DATE	NO.	REVISION	PLAN 4881 Topo 2026.dwg	



OREGON CITY SCHOOL DISTRICT
1417 12TH STREET
OREGON CITY, OREGON 97045

REDLAND ELEMENTARY SCHOOL
18131 S REDLAND ROAD
OREGON CITY, OREGON 97045



LEGEND

- CURB
- BUILDING EAVE
- EDGE OF PAVEMENT
- OP OVERHEAD POWER
- UGP UNDERGROUND POWER
- SS SANITARY SEWER
- ST STORM SEWER
- T OVERHEAD TELEPHONE
- WALL

- ASPHALT
- CONCRETE
- GRAVEL
- BOLLARD
- CLEANOUT
- DL DRIP LINE RADIUS
- LIGHT POLE
- RD ROOF DRAIN
- SIGN
- TREE, DECIDUOUS
- TREE, CONIFER
- FIRE HYDRANT

NOTES

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TOPOGRAPHIC SITE MAP

REDLAND ELEMENTARY SCHOOL
18131 S REDLAND ROAD
OREGON CITY, OREGON 97045

3

4

CONTINUED ON SHEET 1

REDLAND ELEMENTARY

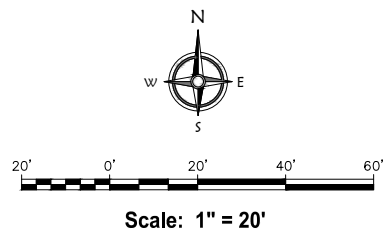
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OREGON CITY SCHOOL DISTRICT
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OREGON CITY, OREGON 97045



LEGEND

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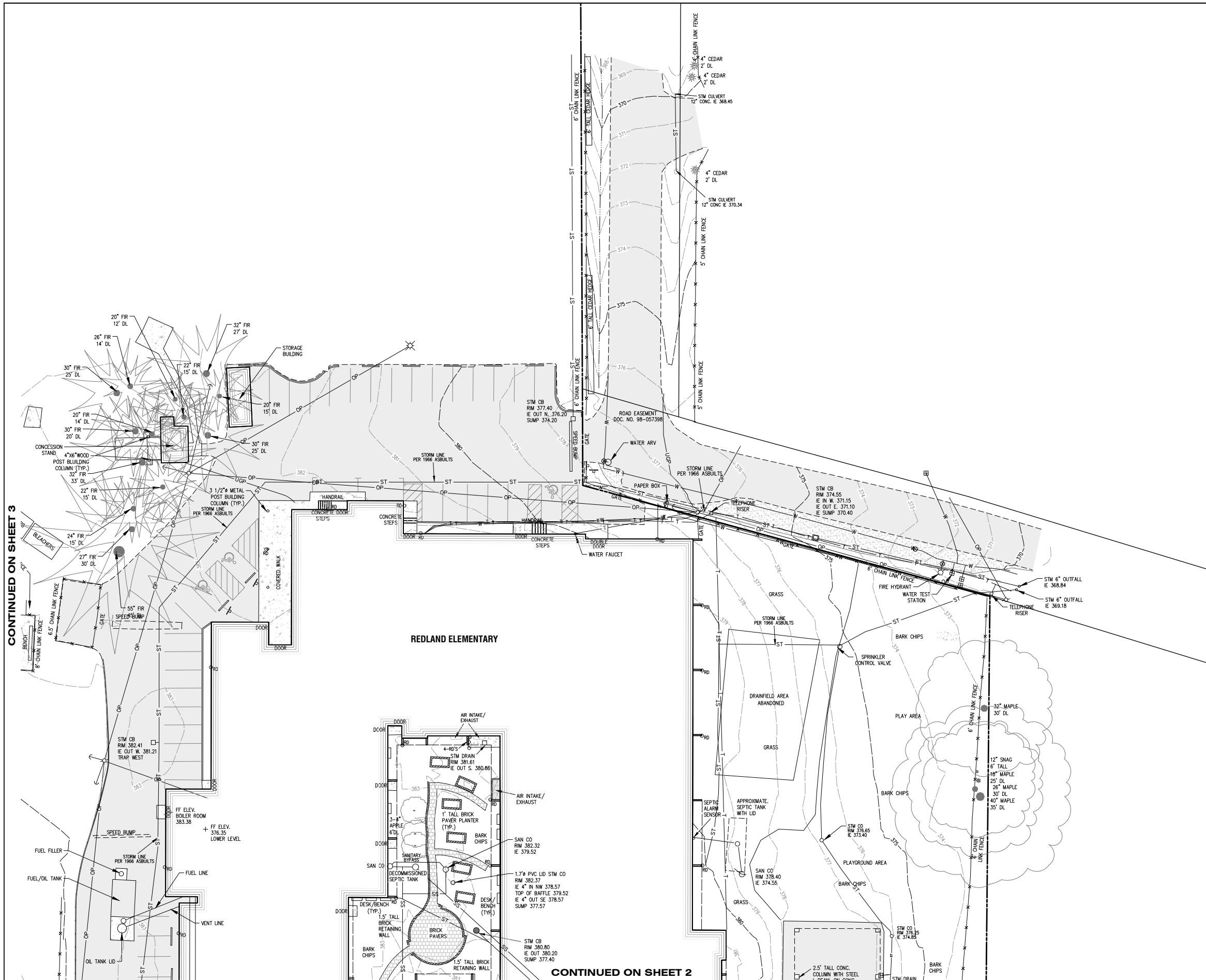
- ASPHALT
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TOPOGRAPHIC SITE MAP



CONTINUED ON SHEET 3

CONTINUED ON SHEET 2

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4

4



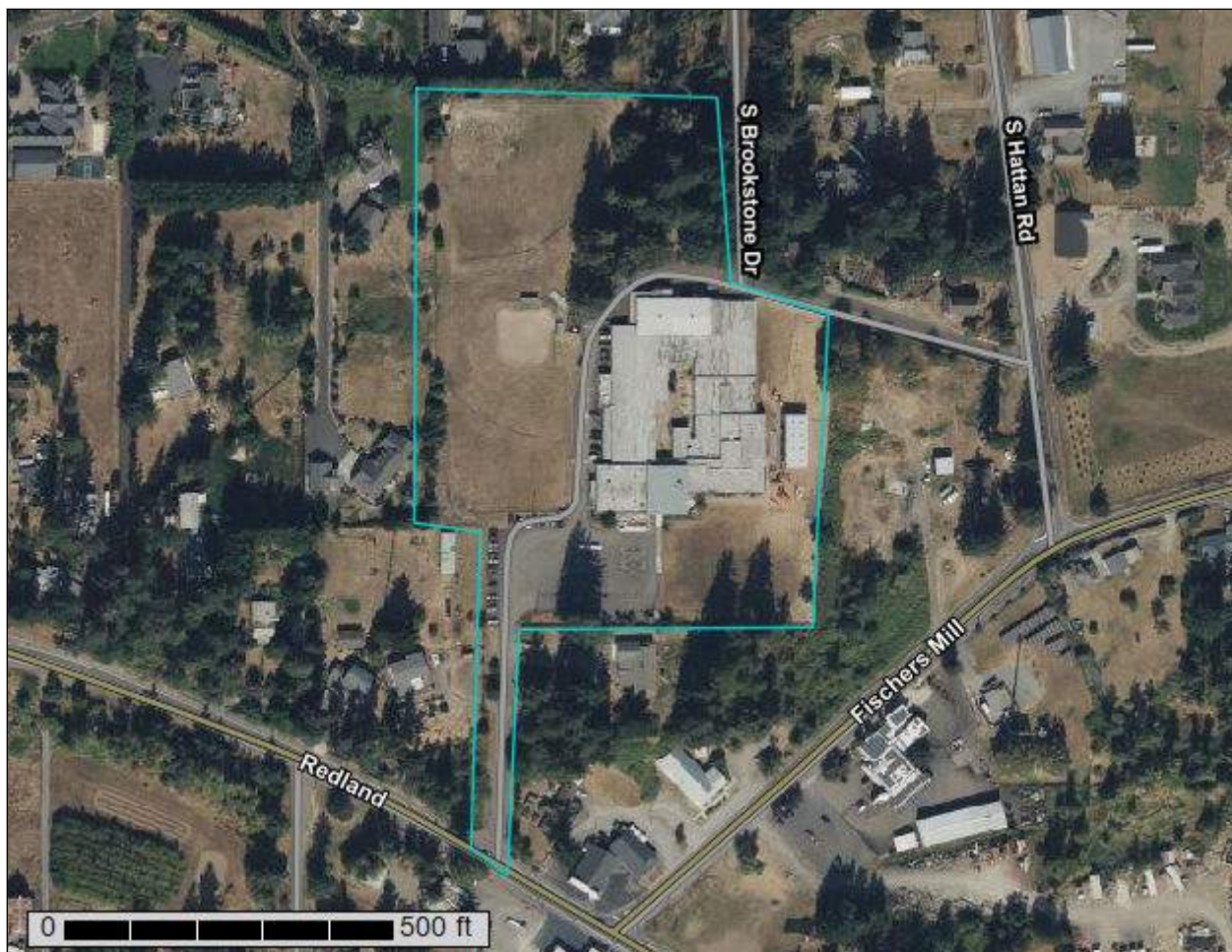
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Clackamas County Area, Oregon**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

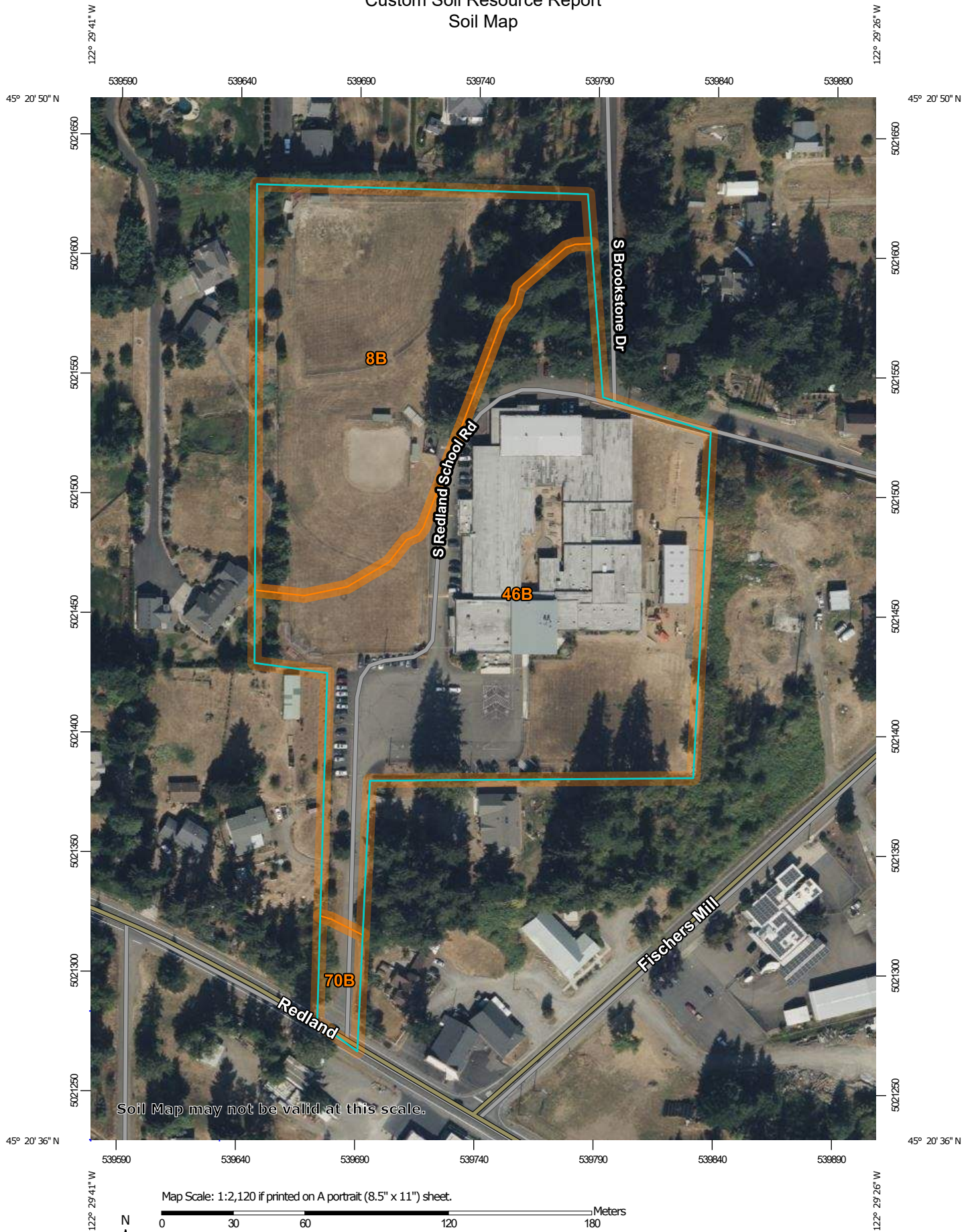
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 22, Sep 9, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 26, 2022—Oct 11, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8B	Bornstedt silt loam, 0 to 8 percent slopes	3.9	37.2%
46B	Jory stony silt loam, 3 to 8 percent slopes	6.4	60.8%
70B	Powell silt loam, 0 to 8 percent slopes	0.2	1.9%
Totals for Area of Interest		10.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clackamas County Area, Oregon

8B—Bornstedt silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227t
Elevation: 300 to 650 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bornstedt and similar soils: 85 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bornstedt

Setting

Landform: Hillslopes, Terraces
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Interfluvium, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 33 inches: silty clay loam
H3 - 33 to 71 inches: silty clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F002XB006OR - Foothill Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Borges

Percent of map unit: 5 percent
Landform: Hillslopes, Depressions on high terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquults

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

46B—Jory stony silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2251
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Jory and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jory

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

H1 - 0 to 8 inches: stony silt loam
H2 - 8 to 48 inches: stony silty clay
H3 - 48 to 60 inches: stony silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Ecological site: R002XC012OR - Red Hill Group

Forage suitability group: Well drained < 15% Slopes (G002XY002OR)

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

70B—Powell silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 226l

Elevation: 250 to 1,400 feet

Mean annual precipitation: 50 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Powell and similar soils: 80 percent

Minor components: 6 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Powell

Setting

Landform: High terraces

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Silty material over old silty alluvium

Typical profile

H1 - 0 to 7 inches: silt loam

H2 - 7 to 15 inches: silt loam

H3 - 15 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 15 to 23 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 15 to 24 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F002XB004OR - Fragipan Hill Group
Forage suitability group: Somewhat Poorly Drained (G002XY005OR)
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 4 percent
Landform: High terraces, Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquepts

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

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Geotechnical Engineering Report

Redland Elementary School Improvements
18131 S Redland Road
Oregon City, Oregon 97045

Prepared for:
Oregon City School District
PO Box 2110 (1417 12th Street)
Oregon City, Oregon 97045

May 15, 2026
Apex Project 25009145



4412 S CORBETT AVENUE
PORTLAND, OR 97239
503.248.1939 MAIN
866.727.0140 FAX
APEXCOS.COM



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Prepared by:

A handwritten signature in black ink that reads 'JPowell'.

Jack Powell, RG
Project Geologist

A handwritten signature in black ink that reads 'Brian Ackerman'.

Brian Ackerman, PE
Geotechnical Project Engineer

Reviewed by:



Ryan White, PE, GE
Principal Geotechnical Engineer

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1 INTRODUCTION

1.1 General

This report presents results of Apex Companies, LLC (Apex) geotechnical engineering services for the proposed improvements to Redland Elementary School located at 18131 S Redland Road in Oregon City, Oregon (site). The general site location is shown on the Vicinity Map, Figure 1. The locations of Apex's explorations in relation to existing site features are shown on the Site Plan, Figure 2.

1.2 Purpose and Scope

The purpose of Apex's services was to develop geotechnical design and construction recommendations in support of the planned site improvements. This was accomplished by performing the following scope of services.

1.2.1 Literature and Records Review

Apex reviewed various published geologic maps of the area for information regarding geologic conditions and hazards at or near the site.

1.2.2 Subsurface Explorations

Six borings were advanced to depths ranging from approximately 4 to 13 feet below the existing ground surface (bgs). The borings were logged and representative soil samples collected by a member of the Apex geotechnical engineering staff. The approximate boring locations are shown on the Site Plan, Figure 2. The interpreted boring logs are presented as Figures A1 through A6 in Appendix A, Field Explorations.

Two cone penetration test (CPT) probes, designated as CPT-1 and CPT-1A, were advanced to depths ranging from approximately 13 to 19 feet bgs. The CPT logs are presented as Figures A7 and A8 in Appendix A, Field Explorations.

1.2.3 Field Infiltration Testing

Two cased-hole, falling-head field infiltration tests were completed in borings B-2 and B-6 at depths of approximately 3.5 to 4 feet bgs. Infiltration testing was monitored by Apex geotechnical engineering staff.

1.2.4 Soils Testing

Soil samples were returned to our laboratory and classified in general accordance with the Unified Soil Classification System (ASTM D2487) and/or the Visual-Manual Procedure (ASTM D2488). Laboratory tests included natural moisture contents, grain-size analyses, and Atterberg limits. Laboratory test results are included in the exploration logs in Appendix A, Field Explorations; and in Appendix B, Laboratory Testing.

1.2.5 Geotechnical Engineering Analysis

Data collected during the subsurface exploration, literature research, and testing were used to develop site-specific geotechnical design parameters and construction recommendations.

1.2.6 Report Preparation

This Geotechnical Engineering Report summarizes the results of our explorations, testing, and analyses, including information relating to the following:

- Field exploration logs and site plan showing approximate exploration locations
- Laboratory test results
- Infiltration test results
- Groundwater levels and considerations

- Geologic hazards discussion
- Liquefaction potential
- Shallow foundation recommendations:
 - Minimum embedment
 - Allowable bearing pressure
 - Estimated settlement
 - Sliding coefficient
- Earthwork and grading, cut, and fill recommendations:
 - Structural fill materials and preparation
 - Utility trench excavation and backfill requirements
 - Slab and pavement subgrade preparation
 - Wet weather considerations
- Seismic design criteria in accordance with American Society of Civil Engineers (ASCE 41-23) and 2025 Oregon Structural Specialty Code (OSSC) standards
- Slab-on-grade design recommendations
- Asphalt concrete (AC) pavement section recommendations

1.3 Project Understanding

Apex understands improvements to Redland Elementary School include a new covered walkway and covered play structure southwest of the existing school, and new paved parking areas and drive lanes.

2 SITE CONDITIONS

2.1 Surface Description

The site is roughly rectangular and is generally bordered to the north by S Redland School Road, to the west by athletic fields and neighboring residential parcels, and to the south and east by scattered, rural residential parcels. The site is currently occupied by the elementary school including buildings, recreation fields, play structures, landscaping, and asphalt paved drive lanes and parking areas. Based on review of available Oregon Department of Geology and Mineral Industries (DOGAMI) topographic and lidar data, the site has generally gentle slopes grading slightly downward to the south and east. Ground surface elevations range from a maximum of about 390 feet near the western extent of the school parcel to a minimum of about 370 feet at the southern and eastern edges of the site (NAVD88; DOGAMI, 2026). Outside of the site, the ground surface continues to slope gently to moderately down toward the south and east, toward an unnamed Clear Creek tributary, and gently upward to west.

2.2 Geologic Setting

The site is located within the Portland-Vancouver Basin, a tectonic depression within the physiographic province of the Puget-Willamette Lowland that separates the Cascade Range from the Coast Range, and extends from the Puget Sound, Washington, to Eugene, Oregon (Yeats et al., 1996). The Puget-Willamette Lowland is situated along the Cascadia Subduction Zone (CSZ) where oceanic rocks of the Juan de Fuca Plate are subducting beneath the North American Plate, resulting in deformation and uplift of the Coast Range and volcanism in the Cascade Range. Northwest-trending faults accommodating clockwise rotation of the North American Plate are found throughout the Puget-Willamette Lowland (Brocher et al., 2017; USGS, 2026).

The greater Portland Basin is underlain by Columbia River Basalt Group (CRBG) flows consisting of numerous fine-grained volcanic eruptions between approximately 17 million years ago (Ma) and 6 Ma from fissures located in eastern Oregon, eastern Washington, and western Idaho (Beeson et al., 1991). These fissures released thousands of square kilometers of lava, inundating areas east of the Cascade Range and entering

western Oregon through a Miocene gap in the Cascade Range (present day Columbia Gorge) before reaching the ocean. Magmatic compositions of the CRBG allow the flows to be subdivided into distinct formations that can be further divided into members-based geochemical, paleomagnetic, and lithological properties.

Numerous northwest-trending faults govern the topography within the basin. Uplift and down dropping of crustal blocks have created topographic high points by offsetting regional scale flood basalts and down dropping basement rocks, creating depressions and sediment basins that accommodate the fluvial deposition of Miocene to Pliocene age terrestrial sedimentary rocks (commonly Troutdale Formation and/or Sandy River Mudstone) over the older CRBG basalt flows (Beeson et al., 1991; Evarts et al., 2004). Of these sedimentary deposits, the Troutdale Formation is the most widespread unit within the basin. These friable to moderately strong conglomerates, with minor interbeds of sandstone and claystone, consist of well-rounded CRBG clasts and other exotic metamorphic and plutonic clasts. Above these conglomerates, younger quaternary deposits have accumulated.

Cyclical Pleistocene age cataclysmic glacial floods deposited sediments and recarved the landscape within the Portland Basin more than 40 times over a 3,000-year timespan (Burns and Coe, 2012). As floodwaters entered the basin from the Columbia River Gorge, they slowed, depositing suspended sediments and bed loads. Topographic highpoints within the basin deflected floodwaters and generated areas that were scoured and eroded into older sediments and bedrock. These geomorphic features dominate the modern-day landscape and are indistinguishable within the Portland Basin lidar.

2.3 Local Geology

The site is mapped as underlain by Pleistocene aged rocks of the Boring Volcanic Field (Wells et al., 2020). These rocks are described as consisting of primarily basalt and basaltic andesite flows, breccia, and tuff up to 200 feet thick. At the site, they are described as gray, massive, fine grained, olivine basaltic andesite that have been deeply weathered at the surface. Older gravel of Cascade Arc origin is also mapped slightly to the north of the site. These Pleistocene to Pliocene sediments are described as consisting of primarily unconsolidated sand and gravel with local diamicton, including sandstone and conglomerate of the Springwater Formation. Gravels are commonly reported to consist of rounded andesitic volcanic rock.

Based on the geologic mapping, the underlying deposits are likely either Troutdale Formation or Sandy River mudstone, both of which are described as sedimentary deposits consisting of primarily claystone, siltstone, sandstone, and conglomerate (Madin, 2009).

2.4 Subsurface Conditions

The site was explored by drilling six borings, designated B-1 through B-6, to depths of approximately 4 to 13 feet bgs. Drilling was performed by Dan J. Fischer Excavating, Inc., of Forest Grove, Oregon, using a trailer-mounted drill rig and solid-stem auger drilling techniques. Two CPTs, designated as CPT-1 and CPT-1A, were completed to depths of approximately 13 to 19 feet bgs by Oregon Geotechnical Explorations, Inc., using a track-mounted CPT rig. Both CPTs were terminated due to practical refusal on a very dense layer we interpret to be weathered bedrock.

Apex has summarized the subsurface units as follows:

ASPHALT/BASE ROCK: Approximately 4 inches of asphalt concrete (AC) pavement overlying approximately 7 to 8 inches of base rock was encountered at the ground surface in borings B-4 and B-5.

TOPSOIL:	Approximately 2 to 3 inches of brown topsoil with roots was encountered at the ground surface within borings B-1, B-2, B-3, and B-6. The topsoil was generally silty with roots and trace organics.
Residual Soil – Lean CLAY (CL), SILT (ML):	Gray, brown, and black to orange-red, soft to stiff lean clay and silt with varying amounts of fine- to coarse-grained sand and fine to coarse, subangular to subrounded gravel was encountered below the topsoil/base rock in all explorations. The upper lean clay and silt layers exhibited characteristics of residual soil and generally extended to 2.5 to 5 feet bgs.
Decomposed Basaltic Rock – Remolds to Lean CLAY (CL), Clayey SAND (SC):	Brown-gray to orange-red, stiff to hard lean clay and loose to dense clayey sand was encountered below the residual clay and silt soils in all drilled borings. The material within these deeper layers exhibited characteristics of severely decomposed basaltic rock. These deeper clay-like layers were encountered in all borings, which tended to have increasing amounts of fine- to coarse-grained sand and fine to coarse, subangular to subrounded gravel at depth. Clayey sand layers were encountered from roughly 7.5 to 12.5 feet bgs in boring B-4 and generally below 12 feet bgs in both CPTs. The clayey sand was generally fine- to coarse-grained with fine to coarse, subangular gravel.
Weathered Basaltic BEDROCK (RX):	Below the decomposed basaltic rock that remolded to lean clay/clayey sand, hard/very dense weathered basalt bedrock in the form of clayey to sandy gravels was encountered at depths between 4 to 18 feet bgs in all explorations, where practical refusal was met as the material presumably transitioned into a harder portion of the weathered basaltic bedrock. The gravel was generally brown-gray to red and black, and fine to coarse with fine- to coarse-grained sand.

2.5 Groundwater

Based on our field explorations and literature review, the depth of static groundwater may vary within the site vicinity. Static groundwater was encountered at approximately 7 feet bgs in boring B-6 and 10 feet bgs in boring B-4. However, pore pressure dissipation testing completed in the CPTs indicated perched groundwater may be present at depths as shallow as approximately 4 feet bgs in some areas of the site. Regional groundwater logs provided by the Oregon Water Resources Department (OWRD) also report varied findings, with several logs indicating static groundwater levels between 6 to 10 feet bgs, and others reporting groundwater at depths around 30 feet bgs.

Please note that groundwater levels can fluctuate during the year depending on climate, irrigation season, extended periods of precipitation, drought, and other factors.

2.6 Infiltration Testing

Apex completed two cased-hole, falling-head infiltration tests in borings B-2 and B-6 at depths of approximately 3.5 to 4 feet bgs. The infiltration tests were conducted within a 6-inch diameter PVC pipe inserted into the boring. The pipe was filled with water to achieve a minimum 1-foot-high column of water. After a period of saturation, the height of the water column in the pipe was then measured initially and at regular, timed intervals. Results of our field infiltration testing are presented in Table 1.

Table 1. Infiltration Test Results

Test Location	Depth (feet bgs)	Field Measured Infiltration Rate (in/hr)	Soil Classification	USDA Hydrologic Soil Group
B-2	4	0.7	Decomposed Basalt, Remolds to Lean CLAY (CL) with Sand and Gravel	C
B-6	3.5	4.3*	Decomposed Basalt, Remolds to Gravelly lean CLAY (CL) with Sand	C

*The measured rate at B-6 does not appear to be representative of broader site conditions and is not recommended for use in design.

The infiltration rates listed in Table 1 are not permeabilities/hydraulic conductivities, but are field-measured rates, and do not include correction factors related to long-term infiltration rates. The design engineer should determine the appropriate correction factors to account for the planned level of pre-treatment, maintenance, vegetation, siltation, etc. Field-measured infiltration rates are typically reduced by a minimum factor of 2 to 4 for use in design.

Based on the relatively high fine-grained content of the lean clay encountered at B-6, and the substantial difference between the measured infiltration rate at this location compared to the rates measured at the other test location in a similar soil type, the result from the B-6 test location does not appear representative of overall site conditions. Accordingly, we do not recommend using the B-6 infiltration rate for design purposes.

The presence of shallow decomposed bedrock and shallow groundwater at the site must also be considered, as this may result in mounding or further limit infiltration and make on-site stormwater disposal infeasible.

Soil types can vary significantly over relatively short distances. The infiltration rates noted above are representative of one discrete location and depth. Installation of infiltration systems within the layer the field rate was measured is considered critical to proper performance of the systems.

2.6.1 USDA Hydrologic Soil Groups

The United States Department of Agriculture (USDA) categorizes soils in four hydrologic soil groups, A through D, and are designated mainly by particle size and hydraulic conductivity. Table 2 below shows general characteristics of each group as they are identified by the USDA.

Review of the USDA Soil Web Survey indicates the site consists of predominately of Jory stony silt loam and Bornstedt silt loam, which both have a USDA hydrologic soil classification of group C (USDA, 2026). Our site-specific infiltration tests indicated that soils have infiltration rates that categorize them as group C.

Table 2. USDA Hydrologic Soil Group Parameters

Soil Properties	Hydrologic Soil Group			
	A	B	C	D
Saturated Hydraulic Conductivity (k) (inches/hour)	$k > 5.67$	$1.42 < k < 5.67$	$0.14 < k < 1.42$	$k < 0.14$

3 GEOLOGIC HAZARDS

Geologic and seismic hazards are defined as conditions associated with the geologic and seismic environment that could influence existing and/or proposed improvements. Geologic and seismic hazards that could affect the site's development are identified below and should be considered during the planning process. Apex reviewed GIS layers within the Oregon HazVu Statewide Geohazards Viewer and associated reports to assess potential geologic hazards for the study area. In general, the geologic and seismic hazards most commonly associated with the physical and chemical characteristics of near-surface soil, rock, and groundwater include the following:

- Slope stability
- Adverse soils
- Land subsidence
- Subsurface voids
- Hydrology and drainage
- Hazardous minerals
- Erosion and sedimentation
- Hydrogeology and groundwater
- Volcanic hazards
- Permafrost and freeze-thaw
- Seismic hazards (liquefaction, lateral spreading, earthquake-induced landslides, **ground shaking**, fault ground rupture, tsunamis, and seiches)

Those shown in bold above are geologic and seismic hazards that could affect the site development and should be considered in the planning process. Ground shaking is a geologic hazard at the site related to seismicity, which is discussed further in the following sections.

3.1 Slope Stability

Slope stability is influenced by various factors including: (1) the geometry of the soil mass and subsurface materials, (2) the weight of materials overlying a potential failure surface, (3) the shear strength of soils along the failure surface, and (4) the hydrostatic pressure (groundwater levels) along the failure surface. The stability of a slope is expressed in terms of factor of safety (FS), which is defined as the ratio of resisting forces to driving forces. At equilibrium, the FS is equal to 1.0 and the driving forces are balanced by the resisting forces. Failure occurs when the driving forces exceed the resisting forces, i.e., FS less than 1.0. An increase in the FS above 1.0, whether by increasing the resisting forces and/or decreasing the driving forces, reflects a corresponding increase in the stability of the mass. The actual FS may differ from the calculated FS due to uncertainty in soil strengths, subsurface geometry, failure surface location and orientation, groundwater levels, and other factors that are not completely known or understood.

Based on a review of Oregon HazVu, the majority of the site is shown as having a low susceptibility to landslides, with one isolated area along the east part of the school building shown as having moderate shallow landslide susceptibility. However, site slopes all appeared relatively consistent, sloping gently to moderately down in areas toward the south and east, similar to the surrounding developed areas. Apex observed no obvious signs of recent slope instability at the site.

3.2 Expansive Soils

Soils with moderate plasticity were encountered in some of our explorations. However, provided the recommendations for dry soil conditions included in this report are followed, we do not anticipate the presence of these soils will negatively affect the new foundations.

3.3 Seismicity and Faulting

3.3.1 Historical Seismicity

Regional historical seismicity information was acquired from the Advanced National Seismic System (ANSS) Comprehensive Catalog, hosted by the Northern California Earthquake Data Center (NCEDC), and is presented on Figure 3. These data include earthquakes with magnitudes exceeding M 2.5, within a 150-km radius of the city of Portland, Oregon, and recorded between 1963 and 2017 (NCEDC, 2017). Magnitudes within the ANSS dataset are recorded as local magnitude, surface-wave magnitude, body-wave magnitude, moment magnitude, and magnitude of completeness.

3.3.2 Seismic Sources

Several types of seismic sources exist in the Pacific Northwest, which are outlined below. Volcanic sources beneath the Cascade Range are not considered further in this study. Cascade Range earthquakes rarely exceed about M 5.0 in size and are believed to be far enough removed to not pose a threat to the site (NCEDC, 2017).

3.3.2.1 Crustal Earthquakes and Faults

Review of the USGS Quaternary Fault Database indicates the site is located within close proximity (less than 15.5 miles or 25 km) to numerous Quaternary faults (Figure 4; USGS, 2025). Due to their proximity, the crustal faults are significant seismic sources for severe ground motion and shaking within the area, and we note that the Portland Hills fault is mapped within less than 1 kilometer northwest of the site.

Table 3. Faults within the Site Vicinity

Fault Zone Name	Fault ID	Approximate Distance to Site (Surface Projection in km)
Portland Hills fault	877	1
Damascus-Tickle Creek fault zone	879	3
Bolton fault	874	4
Oatfield fault	875	6
Canby-Molalla fault	716	15
Grant Butte fault	878	17
East Bank fault	879	21
Lacamas Lake fault	880	24

3.3.2.2 Cascadia Subduction Zone (CSZ) – Interface Earthquakes

The CSZ represents the boundary between the subducting Juan de Fuca tectonic plate and the overriding North American tectonic plate (Figure 5). Recurrence intervals for subduction zone earthquakes are based on

studies of the geologic record, with studies estimating a recurrence interval between 500 to 530 years for a full rupture event, and on the order of 300 years for smaller events exceeding M_w 8.0+ (Goldfinger et al., 2012). Geologic evidence and written records from Japan suggest the most recent earthquake occurred in January 1700. The 1700 earthquake probably ruptured much of the approximate 620-mile (1,000 km) length of the CSZ and was estimated at moment magnitudes of M_w 9.0. The horizontal distance from the edge of the CSZ megathrust is located approximately 139 miles (223 km) from Portland, Oregon. The current US Geological Survey risk-based maximum credible earthquake for CSZ megathrust is M_w 9.0 $\pm$ 0.2 (USGS, 2008).

3.3.2.3 Intralab Earthquakes

Intralab earthquakes occur within the subducting slab. They are problematic in the sense that they do not have a surface expression or rupture the ground surface and their seismicity generates deformation along many faults within the slab (Kirby et al., 2002). The CSZ has generated significant intralab destructive earthquakes including the 2001 M_w 6.8 Nisqually earthquake in the Puget lowland. The estimated depth to the subducting Juan de Fuca plate under Portland is approximately 28 miles (40 km) (Blair et al., 2011) and should therefore be considered a seismic source.

3.3.2.4 Liquefaction and Lateral Spreading

Liquefaction is defined as a decrease in the shear resistance of loose, saturated, cohesionless soil (e.g., sand) or low plasticity silt soils, due to the buildup of excess pore pressures generated during an earthquake. This could result in a temporary transformation of the soil deposit into a viscous fluid. Liquefaction can result in ground settlement, foundation bearing capacity failure, and lateral spreading of ground.

Based on a review of Oregon HazVu, the site is shown as having no liquefaction hazard. Based on the subsurface conditions encountered in our explorations, our current opinion is that the risk of structurally damaging liquefaction settlement and lateral spreading at the site is low to absent.

3.3.3 Other Seismic Hazards

Other site-specific seismic hazards considered include earthquake-induced landslides, fault rupture, seiche and tsunami inundation, and earthquake shaking. Due to the location of the site, the risks of seiche and tsunami inundation are absent. Based on the gentle surface topography and geology at the site, the risk from landslides and earthquake-induced landslides is generally low. Though faults are mapped within less than 5 kilometers of the site, no faults are mapped as crossing the site; subsequently, the risk of fault rupture at the site is low (Madin et al., 2013). Strong to very strong earthquake ground shaking will occur during a code-based seismic event on the CSZ and from local faults. Shaking duration during a CSZ event is expected to last for 5 to 7 minutes along the coast, decreasing inland to around 2 minutes closer to Portland and Seattle (Oregon Emergency Management, 2025; Hickey, 2017). Based on our current project understanding, our opinion is that effects of earthquake ground motions can be accounted for by using code-based design procedures and the code-based design response spectrum.

3.4 Flooding

Flooding occurs when local creeks, streams, rivers, and bays are not able to transfer water away from a local area faster than the rate of accumulating water. This can occur on a local or regional scale and is highly variable based upon the configuration of individual watersheds. In the context of the Willamette River, distant upland precipitation or rapid snowmelt can have significant impact far downstream where the weather may be different. Regardless, destruction of land, infrastructure, and personal property can occur when banks, levees, and flood plains are inundated with stormwater or rapid snowmelt.

Review of available FEMA National Flood Hazard maps indicate the site is located outside of the 100- and 500-year mapped flood zone.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Geotechnical Design Considerations

The subsurface conditions at the site generally consist of stiff residual soils and decomposed bedrock. Based on our observations and analyses, conventional foundation support on shallow spread footings is feasible for the proposed new structures.

However, SPT samples obtained at a depth of approximately 2.5 feet bgs in borings B-3 and B-6, as well as relatively low cone resistance values in CPT-1 within or near the proposed structure footprints, indicate the presence of localized softer fine-grained soils. Subsequent samples in these borings encountered stiff to hard soils, and cone resistance values in CPT-1 increased progressively with depth below this interval.

To avoid basing the design on localized “worst-case” subsurface conditions, our geotechnical recommendations are based on the subsurface conditions encountered across the majority of the site. This approach requires overexcavation of any soft fine-grained soils encountered within foundation areas. Overexcavation should extend to the underlying stiffer residual soils or decomposed bedrock and be backfilled with structural fill placed and compacted in accordance with section 5.3 of this report.

Our explorations encountered decomposed bedrock at depths of 5 feet bgs or shallower. Excavations through this material may require heavy-duty equipment.

4.2 Shallow Foundations

Shallow spread footings bearing on stiff residual soils or decomposed bedrock may be used to support loads associated with the proposed new structures, provided the recommendations in this report are followed. Footings should not be supported on undocumented fill or soft fine-grained soils.

4.2.1 Minimum Footing Widths and Design Bearing Pressure

Allowable and ultimate bearing resistances considering 18 inches of embedment are presented in Figure 6 as a function of footing width. Allowable bearing resistances considered an allowable stress design (ASD) FS equal to 3. These are net bearing pressures that can be used to evaluate existing footings or design new footings. The weight of the footing and overlying backfill can be disregarded in calculating footing sizes. The recommended bearing pressures apply to the total of dead plus long-term live loads. Allowable bearing pressures may be increased by one-third for seismic and wind loads for new footings, and one-half for seismic loading of existing footings.

Any new continuous wall and isolated spread footings should be at least 18 and 24 inches wide, respectively. New footings will settle in response to column and wall loads. Based on our evaluation of the subsurface conditions and our analysis, we estimate post-construction settlement will be less than 1 inch for the column and perimeter foundation loads. Differential settlement will be on the order of one-half of the total settlement between new footings.

4.2.2 Footing Embedment Depths

Apex recommends that all footings be founded a minimum of 18 inches below the lowest, adjacent grade. The footings should be founded below an imaginary line projecting upward at a 1H:1V (horizontal to vertical) slope from the base of any adjacent, parallel utility trenches or deeper excavations.

4.2.3 Footing Preparation

Excavations for footings should be carefully prepared to a neat and undisturbed state and compacted until stiff. A representative from Apex should confirm suitable bearing conditions and evaluate all exposed footing subgrades. Observations should also confirm that loose or soft materials have been removed from new footing excavations and concrete slab-on-grade areas. Localized deepening of footing excavations may be required to penetrate loose, wet, or deleterious materials.

Apex recommends a 4-inch-thick layer of compacted, crushed rock be placed over the footing subgrades to help protect them from disturbance.

4.2.4 Lateral Resistance

Lateral loads can be resisted by passive earth pressure on the sides of footings and grade beams, and by friction at the base of the footings. A passive earth pressure calculated using an equivalent fluid weight (EFW) of 250 pounds per cubic foot (pcf) may be used for footings confined by native soils and new structural fills. The allowable passive pressure has been reduced by a factor of two to account for the large amount of deformation required to mobilize full passive resistance. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent unpaved areas should not be considered when calculating passive resistance. For footings supported on native soils or new structural fills, use a coefficient of friction equal to 0.35 when calculating resistance to sliding. These values do not include a factor of safety (FS).

4.3 Floor Slabs

Satisfactory subgrade support for building floor slabs can be obtained from the stiff residual clay or silt subgrade prepared in accordance with our recommendations presented in the Site Preparation, Wet/Freezing Weather and Wet Soil Conditions, and Select Granular Fill sections of this report. A minimum 6-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade. Thicker aggregate sections may be necessary where undocumented fill is present, soft/loose soils are present at subgrade elevation, and/or during wet conditions. Imported granular material should be composed of crushed rock or crushed gravel that is relatively well graded between coarse and fine, contains no deleterious materials, has a maximum particle size of 1 inch, and has less than 5% by dry weight passing the US Standard No. 200 Sieve.

Floor slabs supported on a subgrade and base course prepared in accordance with the preceding recommendations may be designed using a modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci).

4.4 Retaining Walls

The proposed new development may include retaining walls up to 6 feet tall. The following recommendations are based on the assumption of flat conditions in front of and behind the wall and fully drained backfill. For unrestrained walls allowed to rotate at least $0.005H$ about the base, where H is the height of the wall, we recommend using an active earth pressure calculated using an EFW of 35 pcf. Where walls are constrained against rotation, we recommend using an at-rest earth pressure calculated using an EFW of 55 pcf. We recommend any retaining walls founded on native soil or compacted structural fill be provided with adequate drainage and backfilled with clean, angular, crushed rock fill, in accordance with the recommendations provided in section 5.3.

Per section 1803.5.12 of the 2025 OSSC, the determination of dynamic seismic lateral earth pressures on site retaining walls less than 6 feet tall is not required.

If vertical surcharge loads, q , are present within $0.5H$ of the wall, a lateral surcharge of $0.3q$ (for walls allowed to rotate) and $0.5q$ (for restrained walls) should be applied as a uniform horizontal surcharge active over the full height of the wall. These values assume that the wall is vertical and the backfill behind the wall is horizontal. Additional lateral pressures due to surcharge loads can be estimated using the guidelines shown on Figure 7, Lateral Surcharge Detail.

Lateral loads can also be resisted by a passive resistance using an EFW of 250 pcf acting against retaining walls and foundations, and by friction acting on the base of spread footings or mats using a friction coefficient of 0.35.

4.4.1 Drainage

Recommended lateral earth pressures assume that walls are fully drained and no hydrostatic pressures develop. For cantilevered concrete walls, a minimum 2-foot-wide zone of free-draining material meeting the requirements of ODOT SS 00430.11 – Granular Drain Backfill Material should be installed immediately behind the wall. A 4-inch diameter, perforated drainpipe should be installed at the base of the drain rock and routed to a suitable discharge point approved by the civil engineer.

4.5 Seismic Design Considerations

4.5.1 Seismic Site Class

Based on the presence of decomposed bedrock at relatively shallow depths in each of our subsurface explorations, Site Class C is appropriate for use in design.

4.5.2 ASCE 41-23 Code-Based Seismic Design Parameters

Apex understands the seismic evaluation for existing structures will be completed in accordance with ASCE 41-23 (Seismic Evaluation and Retrofits of Existing Buildings), which also references ASCE 7-22 (Minimum Design Loads for Buildings and Other Structures). ASCE 41-23 provides recommendations for evaluating seismic hazards based on four hazard levels: BSE-1N, BSE-2N, BSE-1E, and BSE-2E. These hazard levels represent the Basic Performance Objective Equivalent to New Building Standards (BPON) and Basic Performance Objective for Existing Buildings (BPOE).

The seismic design criteria, in accordance with ASCE 41-23, are summarized in Table 4.

Table 4. ASCE 41-23 Seismic Design Parameters

Parameter	Short Period	1 Second
Site Class	C	
BSE-2N: Adjusted Spectral Acceleration	$S_{XS} = 0.90 \text{ g}$	$S_{X1} = 0.42 \text{ g}$
BSE-1N: Adjusted Spectral Acceleration	$S_{XS} = 0.60 \text{ g}$	$S_{X1} = 0.28 \text{ g}$
BSE-2E: Adjusted Spectral Acceleration	$S_{XS} = 0.64 \text{ g}$	$S_{X1} = 0.30 \text{ g}$
BSE-1E: Adjusted Spectral Acceleration	$S_{XS} = 0.23 \text{ g}$	$S_{X1} = 0.10 \text{ g}$

g = Acceleration due to gravity

4.5.3 2025 OSSC Code-Based Seismic Design Parameters

ASCE 7-22 and the 2024 International Building Code (IBC) are the reference documents for the 2025 Oregon Structural Specialty Code (OSSC). The seismic design criteria, in accordance with the 2025 OSSC, are summarized in Table 5.

Table 5. 2025 OSSC Seismic Design Parameters

Parameter	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	$S_s = 0.80 \text{ g}$	$S_1 = 0.30 \text{ g}$
Site Class	C	
Adjusted Spectral Acceleration	$S_{MS} = 0.90 \text{ g}$	$S_{M1} = 0.42 \text{ g}$
Design Spectral Response Acceleration Parameters	$S_{DS} = 0.60 \text{ g}$	$S_{D1} = 0.28 \text{ g}$
Site-Modified Peak Ground Acceleration	$PGA_M = 0.40 \text{ g}$	

g = Acceleration due to gravity

4.6 Temporary and Permanent Slopes

All temporary cut slopes should be excavated with a smooth-bucket excavator, with the slope surface repaired if disturbed. In addition, upslope surface runoff should be rerouted to not run down the face of the slopes. Equipment should not be allowed to induce vibration or infiltrate water above the slopes, and no surcharges are allowed within 25 feet of the slope crest.

Based on our current understanding, no permanent cut or fill slopes are planned.

4.7 Ground Moisture

The perimeter ground surface and hard-scape should be sloped to drain away from all structures and away from adjacent slopes. Gutters should be tight-lined to a suitable discharge and maintained as free-flowing. All crawl spaces should be adequately ventilated and sloped to drain to a suitable, exterior discharge.

4.8 Pavement Design

The provided pavement recommendations were developed using the American Association of State Highway and Transportation Officials (AASHTO) design methods and references the associated Oregon Department of Transportation (ODOT) specifications for construction. Our evaluation considered a maximum of 10 school buses per day for a 20-year design life.

4.8.1 General

Heavy construction traffic on new pavements or partial pavement sections (such as base course over the prepared subgrade) will likely exceed the design loads and could potentially damage or shorten the pavement life; therefore, we recommend construction traffic not be allowed on new pavements, or that the contractor take appropriate precautions to protect the subgrade and pavement during construction.

If construction traffic is to be allowed on newly constructed pavement sections, an allowance for this additional traffic will need to be made in the design pavement section.

4.8.2 Asphalt Concrete

The minimum recommended pavement section thicknesses are provided in Table 6. Depending on weather conditions at the time of construction, a thicker aggregate base course section could be required to support construction traffic during preparation and placement of the pavement section.

Table 6. Minimum AC Pavement Sections

Traffic Loading	AC (inches)	Base Course (inches)	Subgrade
Pull-in Car Parking Only	3	9	Stiff subgrade as verified by Apex personnel*
Drive Lanes and Access Roads	4	9	

* Subgrade must pass proofroll

The asphalt cement binder should be selected following ODOT SS 00744.11 – Asphalt Cement and Additives. The AC should consist of ½-inch hot mix asphalt concrete (HMAC) with a maximum lift thickness of 3 inches. The AC should conform to ODOT SS 00744.13 and 00744.14 and be compacted to 91% of the maximum theoretical density (Rice value) of the mix, as determined in accordance with ASTM D2041.

4.8.3 Portland Cement Concrete

The minimum recommended PCC pavement section thicknesses are provided in Table 6Table 7. Depending on weather conditions at the time of construction, a thicker aggregate base course section could be required to support construction traffic during preparation and placement of the pavement section.

Table 7. Minimum PCC Pavement Sections

PCC (inches)	Aggregate Base (inches)	Subgrade
6	6	Stiff subgrade as verified by Apex personnel*

*Subgrade must pass proofroll

The recommended PCC pavement section is contingent on the following recommendations being implemented during construction.

- Adequate drainage should be provided at the surface such that the subgrade soils are not allowed to become saturated by infiltration of surface runoff.
- Concrete slumps should be between 3 and 4 inches. The concrete should be properly cured in accordance with Portland Cement Association (PCA) recommended procedures and vehicular traffic should not be allowed for 3 days (automobile traffic) or 7 days (truck traffic).
- Construction joint spacing should not exceed 12 feet.
- Longitudinal and transverse joint spacing should not exceed 12 feet and 15 feet, respectively.
- Over-finishing of concrete pavements should be avoided. Typically, a broom or burlap drag finish should be used.

5 CONSTRUCTION RECOMMENDATIONS

5.1 Site Preparation

Construction of the proposed site improvements may involve clearing and grubbing of the existing vegetation or demolition of possible existing structures. In vegetated areas, site stripping should include removing topsoil, roots, and other deleterious materials to a minimum depth of 6 inches bgs. Demolition should include removing existing pavement, utilities, etc., throughout the proposed improvements area. Underground utility lines or other abandoned structural elements should also be removed. The voids resulting from removal of

foundations or loose soil in utility lines should be backfilled with compacted structural fill. The base of these excavations should be excavated to stiff native subgrade before filling, with sides sloped at a minimum of 1H:1V to allow for uniform compaction. Materials generated during demolition should be transported off site or stockpiled in areas designated by the owner's representative.

5.1.1 Proofrolling/Subgrade Verification

Following site preparation and prior to placing aggregate base over shallow foundation, floor slab, and pavement subgrades, the exposed subgrade should be evaluated either by proofrolling or another method of subgrade verification. The subgrade should be proofrolled with a fully loaded dump truck or similar heavy, rubber-tire construction equipment to identify unsuitable areas. If evaluation of the subgrades occurs during wet conditions, or if proofrolling the subgrades will result in disturbance, they should be evaluated by Apex using a steel foundation probe. We recommend that Apex be retained to observe the proofrolling and perform the subgrade verifications. Unsuitable areas identified during the field evaluation should be compacted to a stiff condition or be excavated and replaced with structural fill.

5.1.2 Wet/Freezing Weather and Wet Soil Conditions

Due to the presence of fine-grained clay, silt, and sands in the near-surface materials at the site, construction equipment may have difficulty operating on the near-surface soils when the moisture content of the surface soil is more than a few percentage points above the optimum moisture required for compaction. Soils disturbed during site preparation activities, or unsuitable areas identified during proofrolling or probing, should be removed and replaced with compacted structural fill.

Site earthwork and subgrade preparation should not be completed during freezing conditions, except for mass excavation to the subgrade design elevations.

Protection of the subgrade is the responsibility of the contractor. Construction of granular haul roads to the project site entrance may help reduce further damage to the pavement and disturbance of site soils. The actual thickness of haul roads and staging areas should be based on the contractors' approach to site development, and the amount and type of construction traffic. The imported granular material should be placed in one lift over the prepared undisturbed subgrade and compacted using a smooth-drum, non-vibratory roller. A geotextile fabric should be used to separate the subgrade from the imported granular material in areas of repeated construction traffic. The geotextile should meet the specifications of ODOT SS Section 02320.10 and SS 02320.20, Table 02320-4 for soil separation. The geotextile should be installed in conformance with ODOT SS Section 00350 – Geosynthetic Installation.

5.1.3 Dry Weather Conditions

Clay soils should be covered within 4 hours of exposure by a minimum of 4 inches of crushed rock or plastic sheeting during the dry season. Exposure of these materials should be coordinated with the geotechnical engineer so that the subgrade suitability can be evaluated prior to being covered.

5.2 Excavation

Depending on the depth of site excavation, additional equipment may be required to advance excavations through the harder rock. For the purposes of this report, rock excavation would apply to subsurface materials that require systematic drilling and blasting or the use of a pneumatic rock hammer that cannot be excavated with a CAT 235 excavator, or equivalent, equipped with rock teeth. The project schedule and budget should include a contingency for rock excavation and increased backfill volumes. Apex should be retained to review the grading and utility plans when they are available for comparison with encountered field conditions. Additional work may be required to better define the impact on the project.

All excavations should be made in accordance with applicable Occupational Safety and Health Administration (OSHA) and state regulations. The contractor is solely responsible for adherence to the OSHA requirements. Trench cuts should stand relatively vertical to a depth of approximately 4 feet bgs, provided no groundwater seepage is present in the trench walls. Open excavation techniques may be used provided the excavation is configured in accordance with the OSHA requirements, groundwater seepage is not present, and with the understanding that some sloughing may occur. Trenches/excavations should be flattened if sloughing occurs or seepage is present. Use of a trench shield or other approved temporary shoring is recommended if vertical walls are desired for cuts deeper than 4 feet bgs. If dewatering is used, we recommend that the type and design of the dewatering system be the responsibility of the contractor, who is in the best position to choose systems that fit the overall plan of operation.

5.3 Structural Fill

The extent of site grading is currently unknown; however, Apex estimates that cuts and fills will be on the order of up to 2 feet to raise the grades within the proposed site. Structural fill should be placed over subgrade that has been prepared in conformance with the Site Preparation and Wet/Freezing Weather and Wet Soil Conditions sections of this report. Structural fill material should consist of relatively well-graded soil, or an approved rock product that is free of organic material and debris, and contains particles not greater than 4 inches nominal dimension.

The suitability of soil for use as compacted structural fill will depend on the gradation and moisture content of the soil when it is placed. As the amount of fines (material finer than the US Standard No. 200 Sieve) increases, soil becomes increasingly sensitive to small changes in moisture content and compaction becomes more difficult to achieve. Soils containing more than about 5% fines cannot consistently be compacted to a dense, non-yielding condition when the water content is significantly greater (or significantly less) than optimum.

5.3.1 On-Site Soil

Based on the presence of decomposed bedrock within approximately 5 feet bgs and the moderate to high plasticity of the residual soils, including soils formed by remolding of the decomposed bedrock, we do not anticipate that on-site soils will be suitable for reuse as structural fill.

5.3.2 Borrow Material

Borrow material for general structural fill construction should meet the requirements set forth in ODOT SS 00330.12 – Borrow Material. When used as structural fill, borrow material should be placed in lifts with a maximum uncompacted thickness of approximately 8 inches and compacted to not less than 92% of the maximum dry density, as determined by ASTM D1557.

5.3.3 Select Granular Fill

Selected granular backfill used during periods of wet weather for structural fill construction should meet the specifications provided in ODOT SS 00330.14 – Selected Granular Backfill. The imported granular material should be uniformly moisture conditioned to within about 2% of the optimum moisture content and compacted in relatively thin lifts using suitable mechanical compaction equipment. Selected granular backfill should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and be compacted to not less than 95% of the maximum dry density, as determined by ASTM D1557.

5.3.4 Crushed Aggregate Base

Crushed aggregate base course below floor slabs, spread footings, and asphalt concrete pavements should be clean crushed rock or crushed gravel that contains no deleterious materials and meets the specifications

provided in ODOT SS 02630.10 – Dense-Graded Aggregate, and has less than 5% by dry weight passing the US Standard No. 200 Sieve. The crushed aggregate base course should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and be compacted to at least 95% of the maximum dry density, as determined by ASTM D1557.

5.3.5 Utility Trench Backfill

Pipe bedding placed to uniformly support the barrel of pipe should meet specifications provided in ODOT SS 00405.12 – Bedding. The pipe zone that extends from the top of the bedding to at least 8 inches above utility lines should consist of material prescribed by ODOT SS 00405.13 – Pipe Zone Material. The pipe zone material should be compacted to at least 90% of the maximum dry density, as determined by ASTM D1557, or as required by the pipe manufacturer.

Under pavements, paths, slabs, or beneath building pads, the remainder of the trench backfill should consist of well-graded granular material with less than 10% by dry weight passing the US Standard No. 200 Sieve, and should meet standards prescribed by ODOT SS 00405.14 – Trench Backfill, Class B or D. This material should be compacted to at least 92% of the maximum dry density, as determined by ASTM D1557 or as required by the pipe manufacturer. The upper 2 feet of the trench backfill should be compacted to at least 95% of the maximum dry density, as determined by ASTM D1557. Controlled low-strength material (CLSM), ODOT SS 00405.14 – Trench Backfill, Class E, can be used as an alternative.

Outside of structural improvement areas (e.g., pavements, sidewalks, or building pads), trench material placed above the pipe zone may consist of general structural fill materials that are free of organics and meet ODOT SS 00405.14 – Trench Backfill, Class A. This general trench backfill should be compacted to at least 90% of the maximum dry density, as determined by ASTM D1557, or as required by the pipe manufacturer or local jurisdictions.

5.3.6 Retaining Wall Backfill

Backfill material placed behind retaining walls and extending a horizontal distance of 0.5H should consist of granular material meeting ODOT SS 00510.12 – Granular Wall Backfill, which recommends ODOT SS 02630.11 – Open-Graded Aggregate. We recommend the granular wall backfill be separated from general fill, native soil, and/or topsoil using a geotextile fabric that meets the requirements provided in ODOT SS 02320.10 – Geosynthetics, Acceptance, and ODOT SS 02320.20 – Geotextile Property Values, Table 02320-4 for separation geotextile. The geotextile should be installed in conformance with ODOT SS Section 00350 – Geosynthetic Installation.

The wall backfill should be compacted to a minimum of 92% 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 90% 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 jumping jack or vibratory plate compactors).

5.3.7 Stabilization Material

Stabilization rock should consist of pit or quarry run rock that is well-graded, angular, crushed rock consisting of 4- or 6-inch-minus material with less than 5% passing the US Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material. ODOT SS 00330.16 – Stone Embankment Material can be used as a general specification for this material with the stipulation of limiting the maximum size to 6 inches.

6 ADDITIONAL SERVICES AND CONSTRUCTION OBSERVATIONS

In most cases, other services beyond completion of a final geotechnical engineering report are necessary or desirable to complete the project. Occasionally, conditions or circumstances arise that require additional work that was not anticipated when the geotechnical report was written. Apex offers a range of environmental, geological, geotechnical, and construction services to suit the varying needs of our clients.

Apex should be retained to review the plans and specifications for this project before they are finalized. Such a review allows us to verify that our recommendations and concerns have been adequately addressed in the design.

Satisfactory earthwork performance depends on the 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. We recommend that Apex be retained to observe general excavation, stripping, fill placement, and footing subgrades. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

7 LIMITATIONS

This report has been prepared for the exclusive use of the addressee, and their architects and engineers, for aiding in the design and construction of the proposed development and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without express written consent of the client and Apex. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials, and contractors to ensure correct implementation of the recommendations.

The opinions, comments, and conclusions presented in this report are based upon information derived from our literature review, field explorations, laboratory testing, and engineering analyses. It is possible that soil, rock, or groundwater conditions could vary between or beyond the points explored. If soil, rock, or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Apex is notified immediately so that we may reevaluate the recommendations of this report.

Unanticipated fill, soil and rock conditions, and seasonal soil moisture and groundwater variations are commonly encountered and cannot be fully determined by merely taking soil samples or completing explorations such as soil borings and CPTs. Such variations may result in changes to our recommendations and may require additional funds for expenses to attain a properly constructed project; therefore, we recommend a contingency fund to accommodate such potential extra costs.

The scope of work for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, if conditions have changed due to natural causes or construction operations at or adjacent to the site, or if the basic project scheme is significantly modified from that assumed, this report should be reviewed to determine the applicability of the conclusions and recommendations presented herein. Land use, site conditions (both on and off site), or other factors may change over time and could materially affect our findings; therefore, this report should not be relied upon after three years from its issue, or in the event that the site conditions change.

8 REFERENCES

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Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual site-wide subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists.*

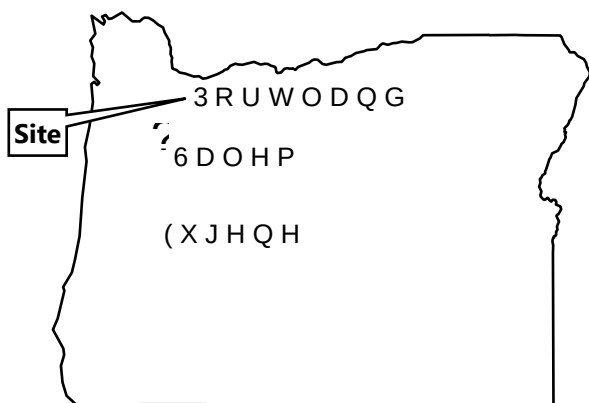
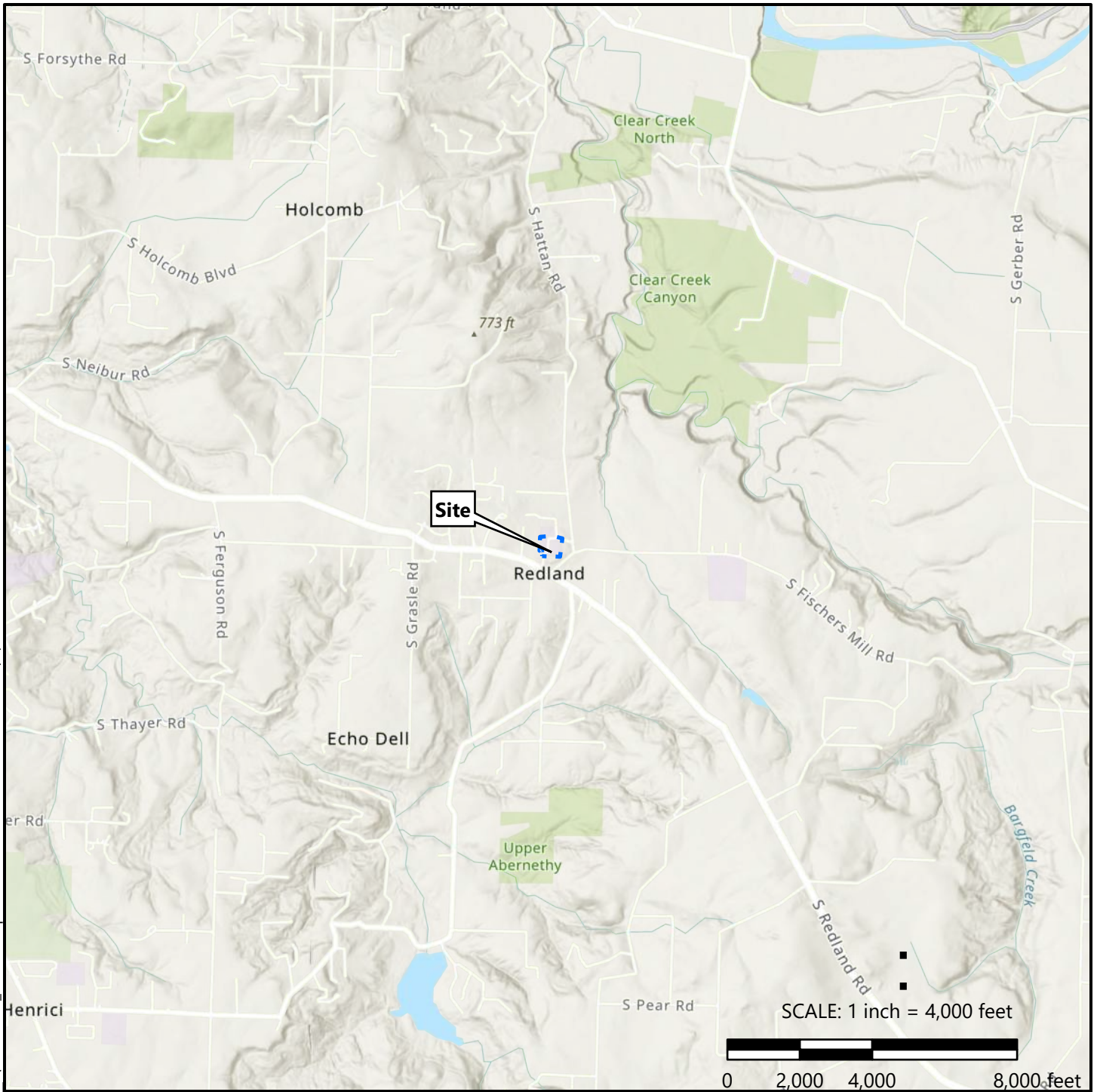


**GEOPROFESSIONAL
BUSINESS
ASSOCIATION**

Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org

Figures



VICINITY MAP
REDLAND ELEMENTARY SCHOOL
IMPROVEMENTS
OREGON CITY, OREGON

DATE: MAY 2026 · PROJECT: 25009145



FIGURE

1

Path: L:\Gis\GEOTECH-GIS\project\25009145_Redland\25009145_Redland.aprx User: Jack.Powell Date Saved: 2/4/2026 11:14 AM

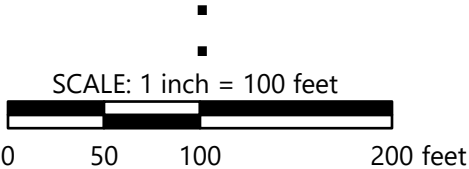


EXPLANATION

- CPT-1 - CPT name and approximate location
- B-1 - Boring name and approximate location
- B-2 - Boring name and approximate location with infiltration test
- Approximate site boundary

Notes: Google Earth 2022 imagery, contours derived from DOGAMI lidar DEM

Coordinate System: NAD 1983 2011 StatePlane Oregon North FIPS 3601 Ft Intl



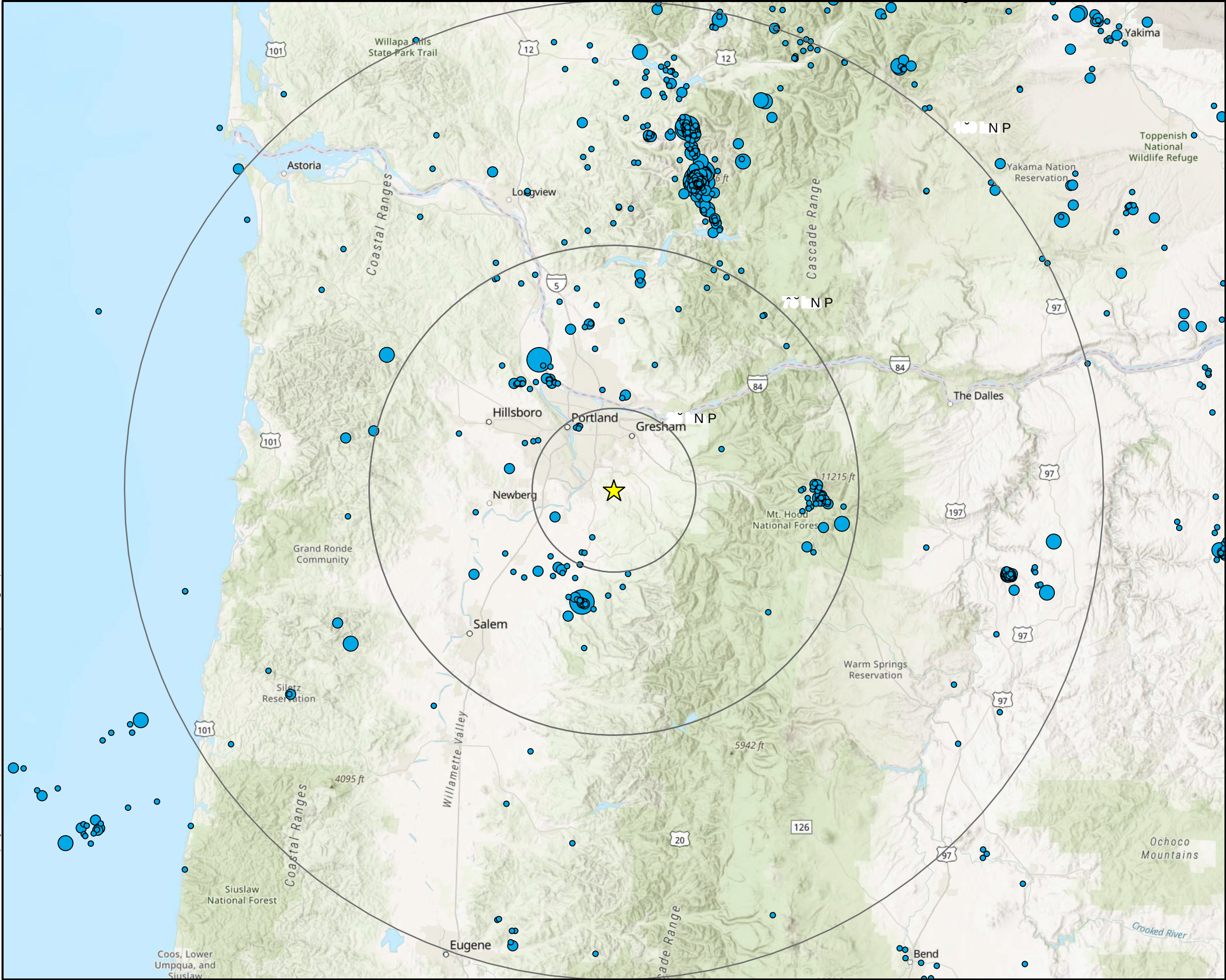
SITE PLAN
REDLAND ELEMENTARY SCHOOL
IMPROVEMENTS
OREGON CITY, OREGON

DATE: MAY 2026 · PROJECT: 25009145



FIGURE

2



EXPLANATION

- ★ Site location
- Site proximity buffer (km)

Independent seismicity (1963 - 2017)

- M 2.5 - 3.0
- M 3.1 - 4.0
- M 4.1 - 5.0
- M >5.1

Notes: Historical seismicity compiled from ANSS Comprehensive Earthquake Catalog

Coordinate System: NAD 1983 2011 StatePlane Oregon North FIPS 3601 Ft Intl



SCALE: 1 inch = 30 km



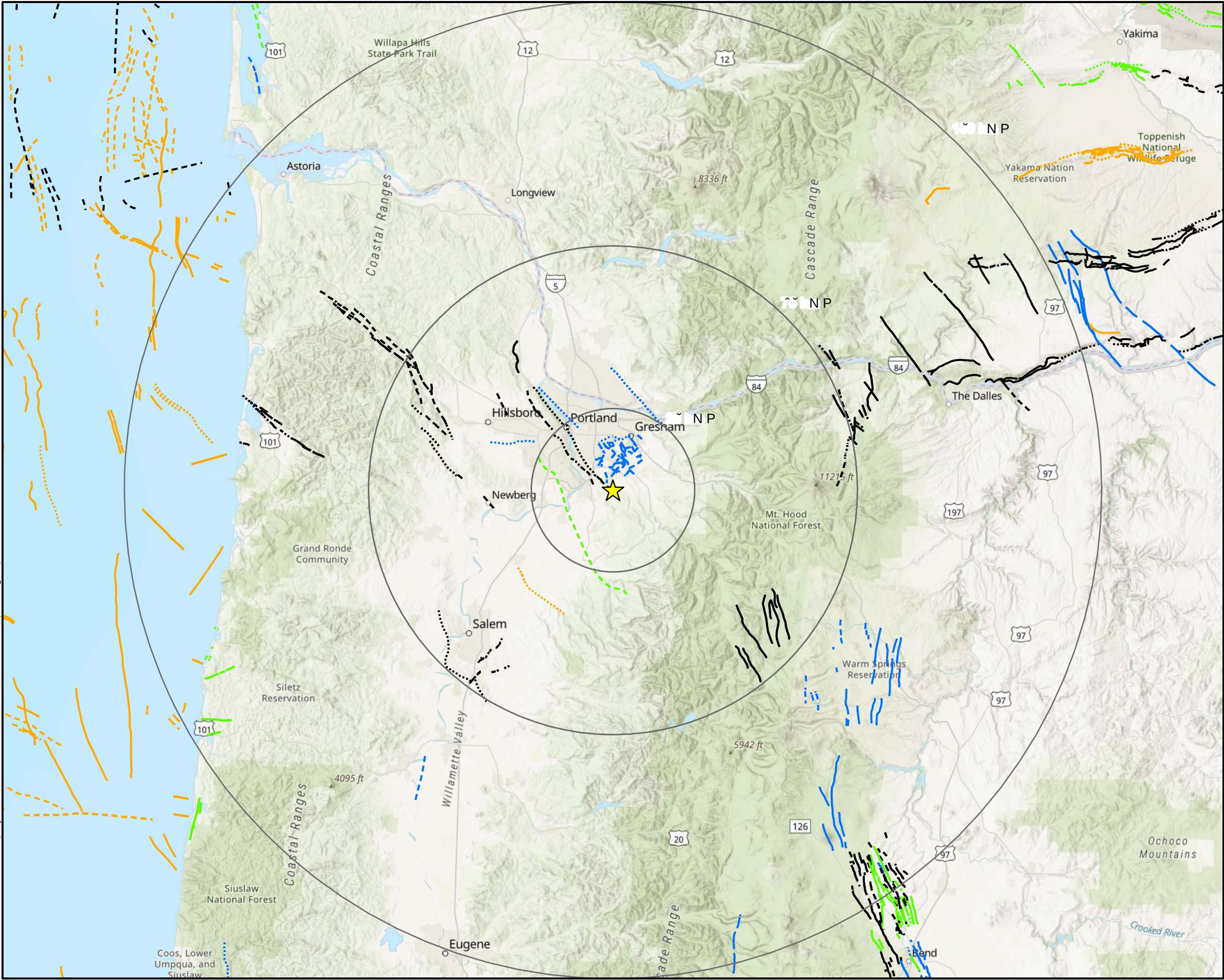
HISTORICAL SEISMICITY
REDLAND ELEMENTARY SCHOOL
IMPROVEMENTS
OREGON CITY, OREGON

DATE: MAY 2026 · PROJECT: 25009145



FIGURE

3



EXPLANATION

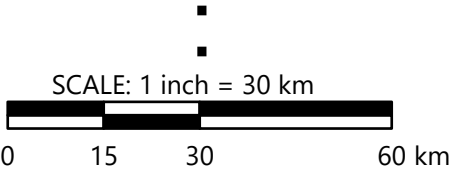
- ★ Site location
- Site proximity buffer (km)

Fault trace - solid where well constrained, dashed where moderately constrained, and dotted where inferred

- — — — — <15,000 years - latest Quaternary
- — — — — <130,000 years - late Quaternary
- — — — — <750,000 years - middle and late Quaternary
- — — — — <1.6 million years - undifferentiated Quaternary

Notes: ESRI World Topographic basemap, USGS Quaternary Faults and Fold Database

Coordinate System: NAD 1983 2011 StatePlane Oregon North FIPS 3601 Ft Intl



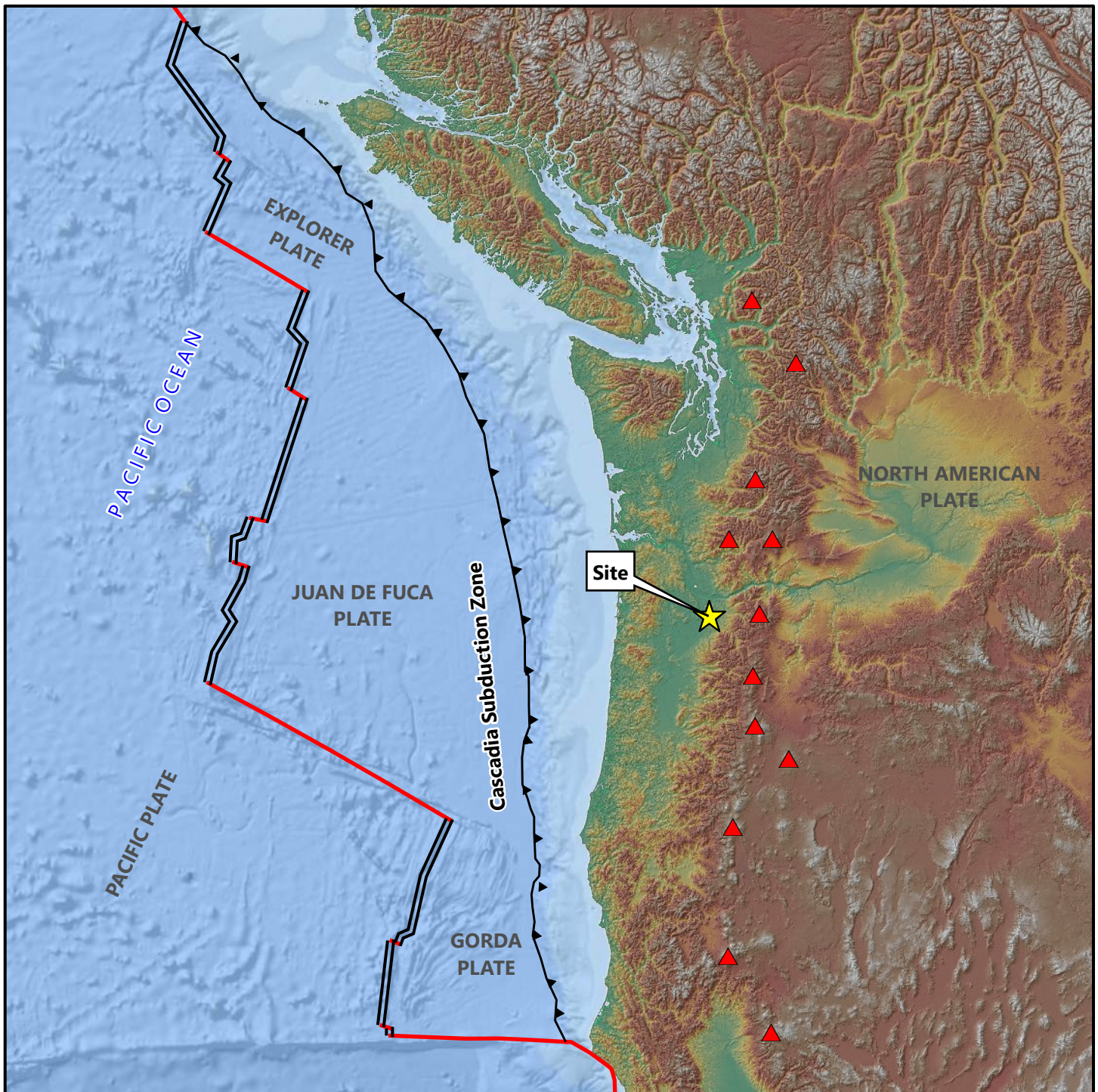
REGIONAL FAULT MAP
REDLAND ELEMENTARY SCHOOL
IMPROVEMENTS
OREGON CITY, OREGON

DATE: MAY 2026 · PROJECT: 25009145



FIGURE

4



EXPLANATION

-  Active volcano
-  Transform boundary
-  Spreading ridge
-  Thrust fault

Notes: SRTM 30-meter DEM, ESRI World Oceans Basemap, USGS Tectonic Plate Boundaries

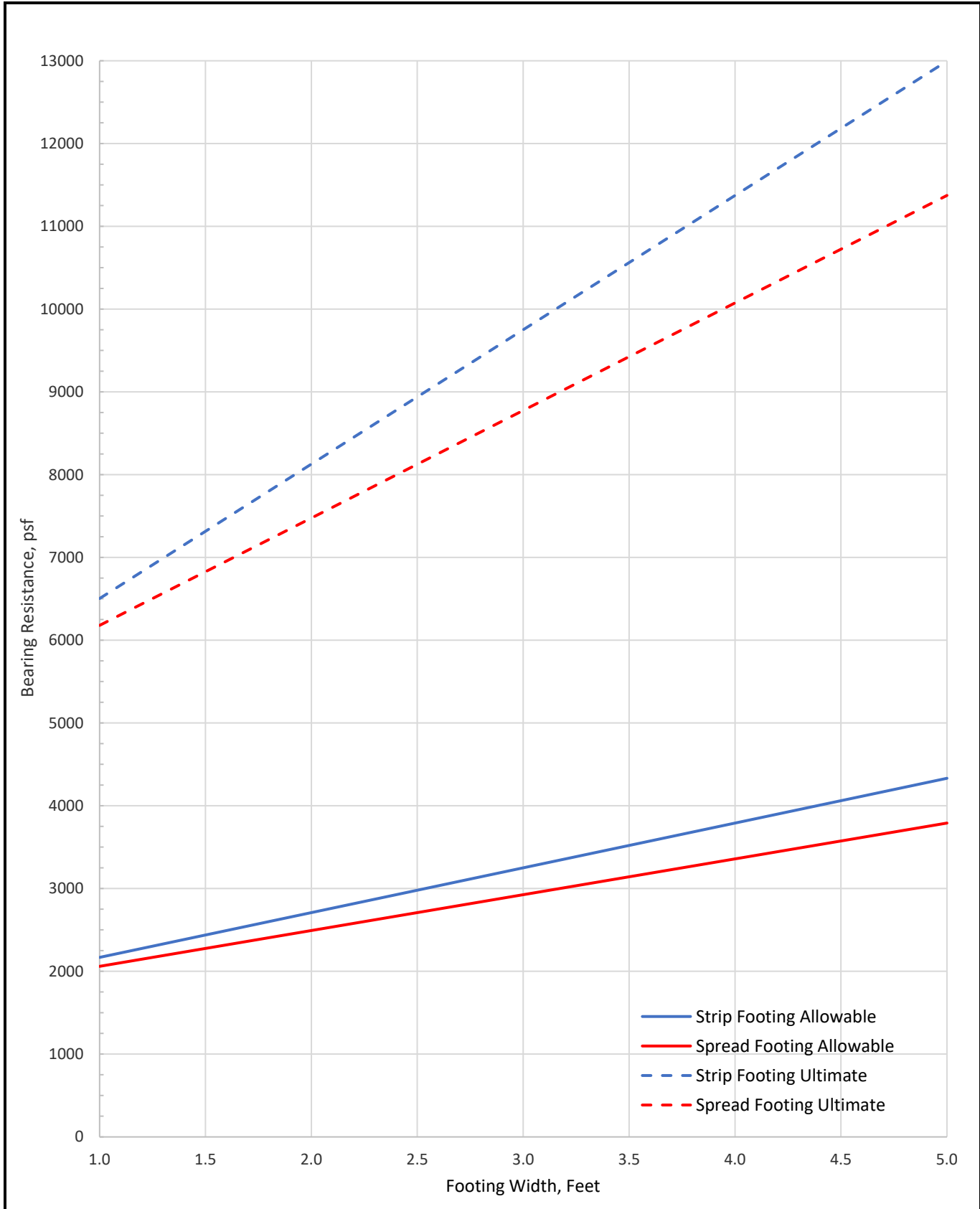
TECTONIC SETTING OF THE PACIFIC NORTHWEST REDLAND ELEMENTARY SCHOOL IMPROVEMENTS OREGON CITY, OREGON

DATE: MAY 2026 · PROJECT: 25009145



FIGURE

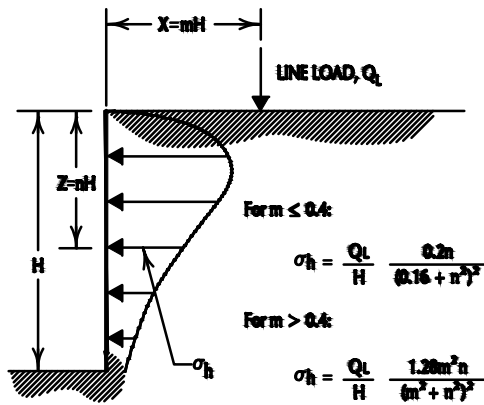
5



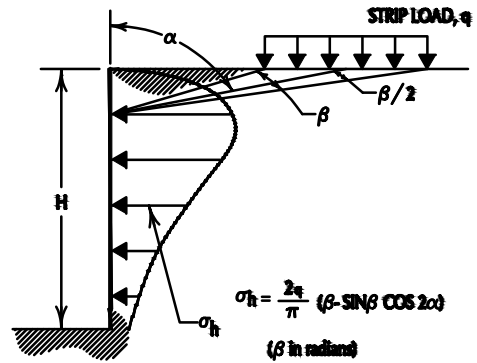
SPREAD FOOTING BEARING CAPACITY
REDLAND ELEMENTARY SCHOOL IMPROVEMENTS
OREGON CITY, OREGON

MAY 2026
25009145
FIGURE
6

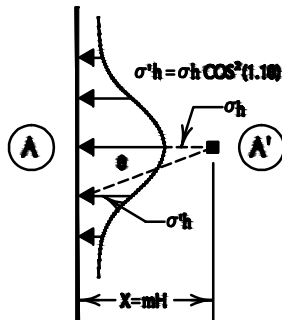
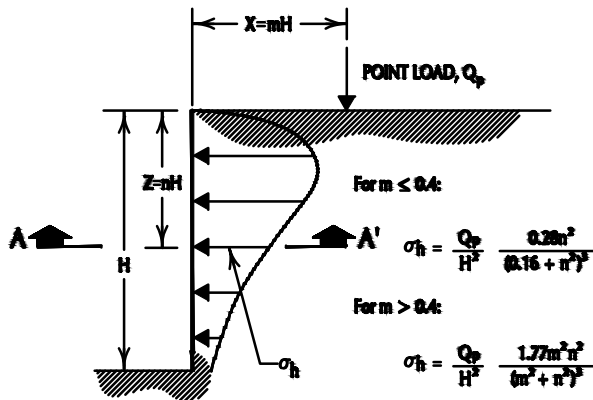
LATERAL SURCHARGE DETAIL



LINE LOAD PARALLEL TO WALL



STRIP LOAD PARALLEL TO WALL



DISTRIBUTION OF HORIZONTAL PRESSURES

VERTICAL POINT LOAD

NOTES:

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

Legend

H	=	HEIGHT OF RETAINED SOIL (FEET)
σ_h	=	LATERAL SURCHARGE PRESSURE
σ'_h	=	LATERAL SURCHARGE PRESSURE AT ANGLE ϕ

NOT TO SCALE

Appendix A

Field Explorations

Appendix A: Field Explorations

A1 GENERAL

Apex explored subsurface conditions at the project site by advancing six borings to depths of up to approximately 13 feet bgs on January 14, 2026. Two cone penetration test (CPT) probes were completed to practical refusal at depths of approximately 13 and 19 feet bgs on December 30, 2025. The approximate locations of the explorations are shown on Figure 2, Site Plan. The procedures used to advance the borings and CPTs, collect samples, and other field techniques are described in detail in the following paragraphs. Unless otherwise noted, all soil sampling and classification procedures followed engineering practices in general accordance with relevant ASTM procedures. "General accordance" means that certain local drilling/excavation and descriptive practices and methodologies have been followed.

A2 BORINGS

A2.1 Drilling

Borings were advanced with a trailer-mounted Buck Rodgers 160 or Lone Star LS-300 drill rig provided and operated by Dan J. Fischer Excavating, Inc., of Forest Grove, Oregon, using solid-stem auger drilling techniques. The borings were observed by a member of the Apex geotechnical staff, who maintained a detailed log of the subsurface conditions and materials encountered during the course of the work.

A2.2 Sampling

Disturbed soil samples were taken in the borings at selected depth intervals. The samples were obtained using a standard 2-inch outside diameter, split-spoon sampler following procedures prescribed for the standard penetration test (SPT). Using the SPT, the sampler is driven 18 inches into the soil using a 140-pound hammer dropped 30 inches. The number of blows required to drive the sampler the last 12 inches is defined as the standard penetration resistance (N-value). The N-value provides a measure of the relative density of granular soils such as sands and gravels, and the consistency of cohesive soils such as clays and plastic silts. The disturbed soil samples were examined by a member of the Apex geotechnical staff and then sealed in plastic bags for further examination and physical testing in our laboratory.

A2.3 Boring Logs

The boring logs show the various types of materials that were encountered in the borings and the depths where the materials and/or characteristics of these materials changed, although the changes may be gradual. Where material types and descriptions changed between samples, the contacts were interpreted. The types of samples taken during drilling, along with their sample identification number, are shown to the right of the classification of materials. The N-values and natural water (moisture) contents are shown farther to the right.

A3 CONE PENETRATION TESTS (CPTs)

A3.1 Field Procedures

CPTs were advanced using a track-mounted CPT rig operated by Oregon Geotechnical Explorations, Inc., of Keizer, Oregon, and results were reviewed and used for site specific seismic design calculations.

Before the start of testing, the rig is jacked up and leveled on four pads to provide a stable reaction for the cone thrust. During the test, the instrumented cone is hydraulically pushed into the ground at the rate of about 2 centimeters per second (cm/s), and readings of cone tip resistance, sleeve friction, and pore pressure are digitally recorded every second. As the cone advances, additional cone rods are added such that a "string" of rods continuously advances through the soil. As the test progresses, the CPT operator monitors the cone resistance and its deviation from vertical alignment.

A3.2 CPT Logs

In accordance with the applicable ASTM standard, the vertical axis is designated for the depth, while the horizontal axis displays the magnitude of the test values recorded. Recorded values include tip and shaft resistance and pore pressure. Final plotting scales are determined after all the tests are complete and take into consideration maximum test values and depths recorded for the project. This information is used to calculate the friction ratio and is correlated to material types, which are presented graphically in a column to the right.

A4 MATERIAL DESCRIPTION

Initially, samples were classified visually in the field. Consistency, color, relative moisture, degree of plasticity, and other distinguishing characteristics of the soil samples were noted. Afterward, the samples were reexamined in the Apex laboratory, various standard classification tests were conducted, and the field classifications were modified where necessary. The terminology used in the soil classifications and other modifiers are defined in Table A-1, Terminology Used to Describe Soil.

Soil Descriptions

Soils exist in mixtures with varying proportions of components. The predominant soil, i.e., greater than 50% based on total dry weight, is the primary soil type and is capitalized in our log descriptions (SAND, GRAVEL, SILT, or CLAY). Smaller percentages of other constituents in the soil mixture are indicated by modifier words in general accordance with the ASTM D2488 Visual-Manual Procedure. "General Accordance" means that certain local and common descriptive practices may have been followed. In accordance with ASTM D2488, group symbols (such as GP or CH) are applied on the portion of soil passing the 3-inch (75mm) sieve based on visual examination. The following explains the soil names and modifying terms used to describe fine- and coarse-grained soils.

Fine-Grained Soils (50% or greater fines passing 0.075mm, No. 200 sieve)

The primary soil type, i.e., SILT or CLAY, is designated through visual-manual procedures to evaluate soil toughness, dilatancy, dry strength, and plasticity. The following outlines the terminology used to describe fine-grained soils and may vary from ASTM D2488 terminology in the use of some common terms.

Primary Soil NAME, Symbols, and Adjectives			Plasticity Description	Plasticity Index (PI)
SILT (ML & MH)	CLAY (CL & CH)	ORGANIC SOIL (OL & OH)		
SILT		Organic SILT	Non-plastic	0 – 3
SILT		Organic SILT	Low plasticity	4 – 10
SILT/Elastic SILT	Lean CLAY	Organic SILT/ Organic CLAY	Medium Plasticity	10 – 20
Elastic SILT	Lean/Fat CLAY	Organic CLAY	High Plasticity	20 – 40
Elastic SILT	Fat CLAY	Organic CLAY	Very Plastic	>40

Modifying terms describing secondary constituents, estimated to 5% increments, are applied as follows:

Description	% Composition	
With Sand	% Sand ≥ % Gravel	15% to 25% plus No. 200
With Gravel	% Sand < % Gravel	
Sandy	% Sand ≥ % Gravel	≤30% to 50% plus No. 200
Gravelly	% Sand < % Gravel	

Borderline Symbols, for example, CH/MH, are used when soils are not distinctly in one category or when variable soil units contain more than one soil type. **Dual Symbols**, for example, CL-ML, are used when two symbols are required in accordance with ASTM D2488.

Soil Consistency terms are applied to fine-grained, plastic soils (i.e., $PI \geq 7$). Descriptive terms are based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586, as follows. SILT soils with low to non-plastic behavior (i.e., $PI < 7$) may be classified using relative density.

Consistency Term	SPT N-value	Unconfined Compressive Strength	
		tsf	kPa
Very soft	Less than 2	Less than 0.25	Less than 24
Soft	2 – 4	0.25 – 0.5	24 – 48
Medium stiff	5 – 8	0.5 – 1.0	48 – 96
Stiff	9 – 15	1.0 – 2.0	96 – 192
Very stiff	16 – 30	2.0 – 4.0	192 – 383
Hard	Over 30	Over 4.0	Over 383

Soil Descriptions

Coarse-Grained Soils (less than 50% fines)

Coarse-grained soil descriptions, i.e., SAND or GRAVEL, are based on the portion of materials passing a 3-inch (75mm) sieve. Coarse-grained soil group symbols are applied in accordance with ASTM D2488 based on the degree of grading, or distribution of grain sizes of the soil. For example, well-graded sand containing a wide range of grain sizes is designated SW; poorly graded gravel, GP, contains high percentages of only certain grain sizes. Terms applied to grain sizes follow.

Material NAME	Particle Diameter	
	Inches	Millimeters
SAND (SW or SP)	0.003 – 0.19	0.075 – 4.8
GRAVEL (GW or GP)	0.19 – 3	4.8 – 75
Additional Constituents:		
Cobble	3 – 12	75 – 300
Boulder	12 – 120	300 – 3050

The primary soil type is capitalized and the fines content in the soil are described as indicated by the following examples. Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5%. Other soil mixtures will have similar descriptive names.

Example: Coarse-Grained Soil Descriptions with Fines

>5% to < 15% fines (Dual Symbols)	≥15% to < 50% fines
Well-graded GRAVEL with silt: GW-GM	Silty GRAVEL: GM
Poorly graded SAND with clay: SP-SC	Silty SAND: SM

Additional descriptive terminology applied to coarse-grained soils follow.

Example: Coarse-Grained Soil Descriptions with Other Coarse-Grained Constituents

Coarse-Grained Soil Containing Secondary Constituents	
With sand or with gravel	≥ 15% sand or gravel
With cobbles; with boulders	Any amount of cobbles or boulders.

Cobble and boulder deposits may include a description of the matrix soils, as defined above.

Relative Density terms are applied to granular, non-plastic soils based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586.

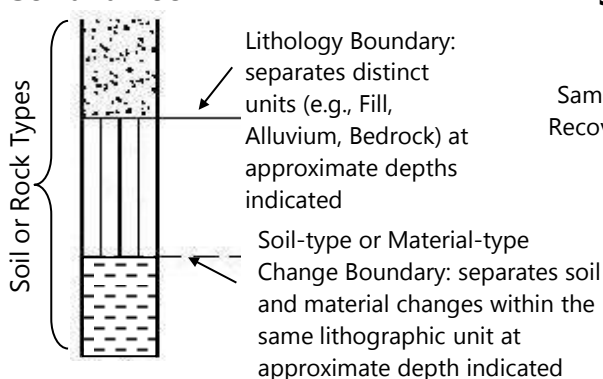
Relative Density Term	SPT N-value
Very loose	0 – 4
Loose	5 – 10
Medium dense	11 – 30
Dense	31 – 50
Very dense	> 50

SAMPLING DESCRIPTIONS

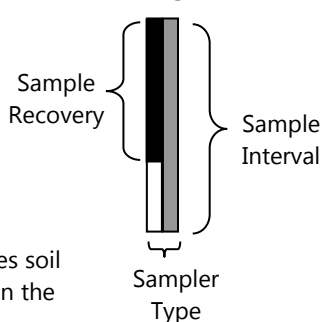
SPT Drive Sampler Standard Penetration Test ASTM D 1586	Shelby Tube Push Sampler ASTM D 1587	Specialized Drive Samplers (Details Noted on Logs)	Specialized Drill or Push Sampler (Details Noted on Logs)	Grab Sample	Rock Coring Interval	Screen (Water or Air Sampling)	Water Level During Drilling/Excavation	Water Level After Drilling/Excavation
								

LOG GRAPHICS

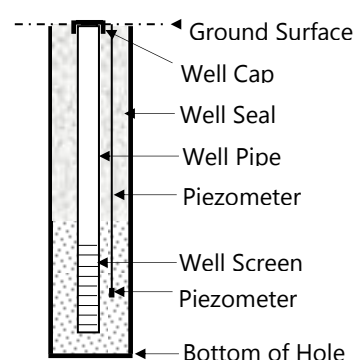
Soil and Rock



Sampling Symbols

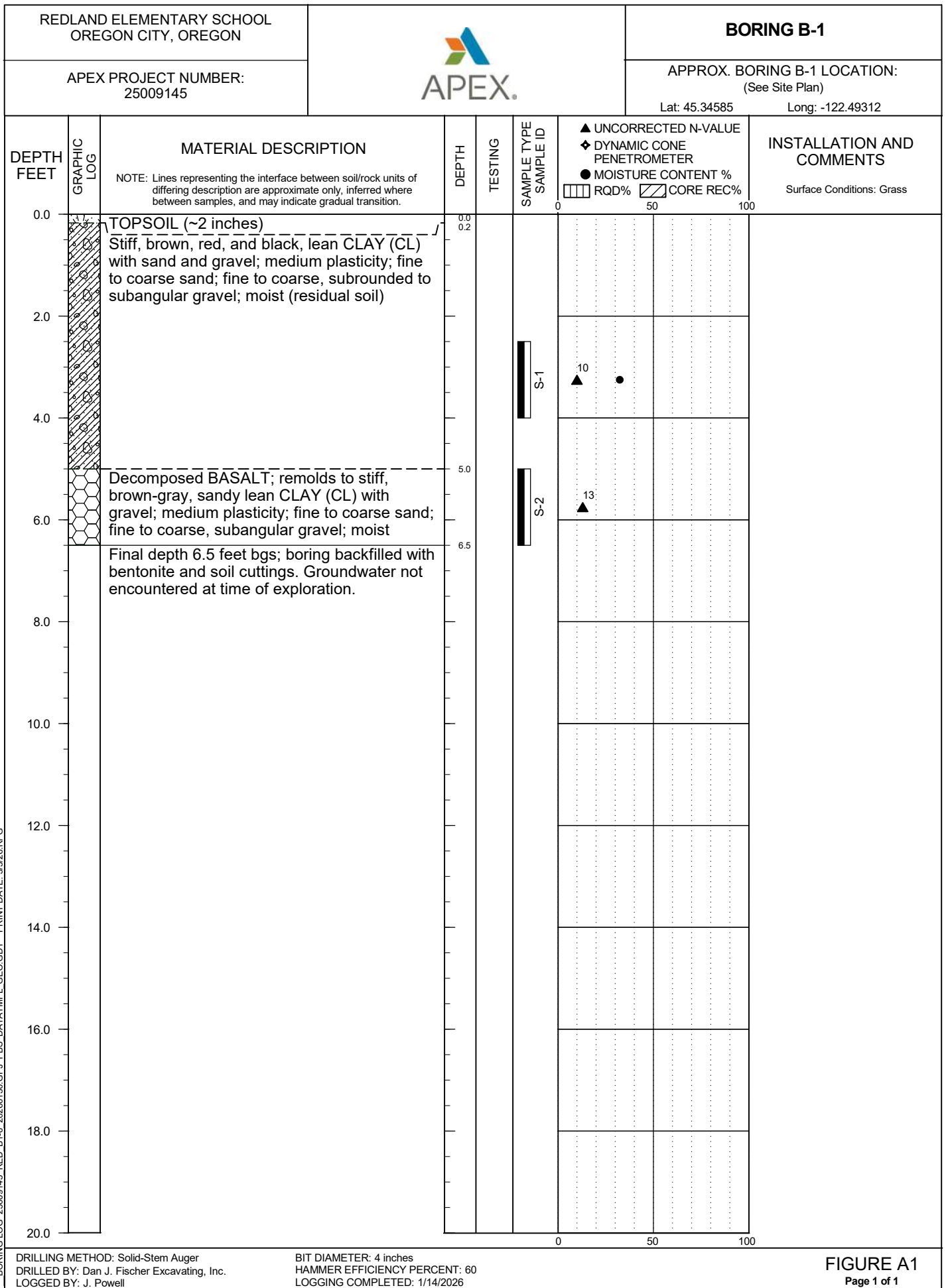


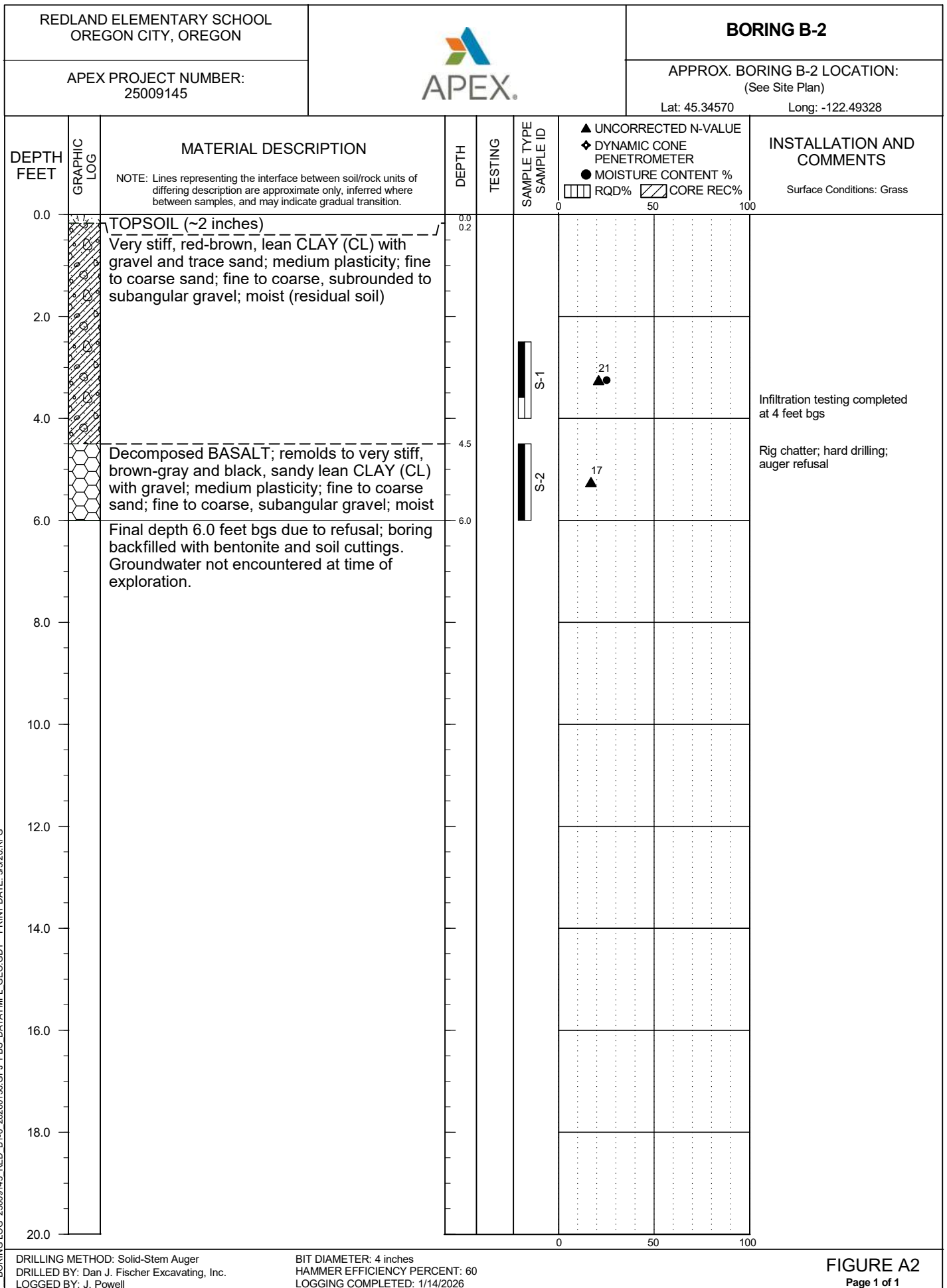
Instrumentation Detail

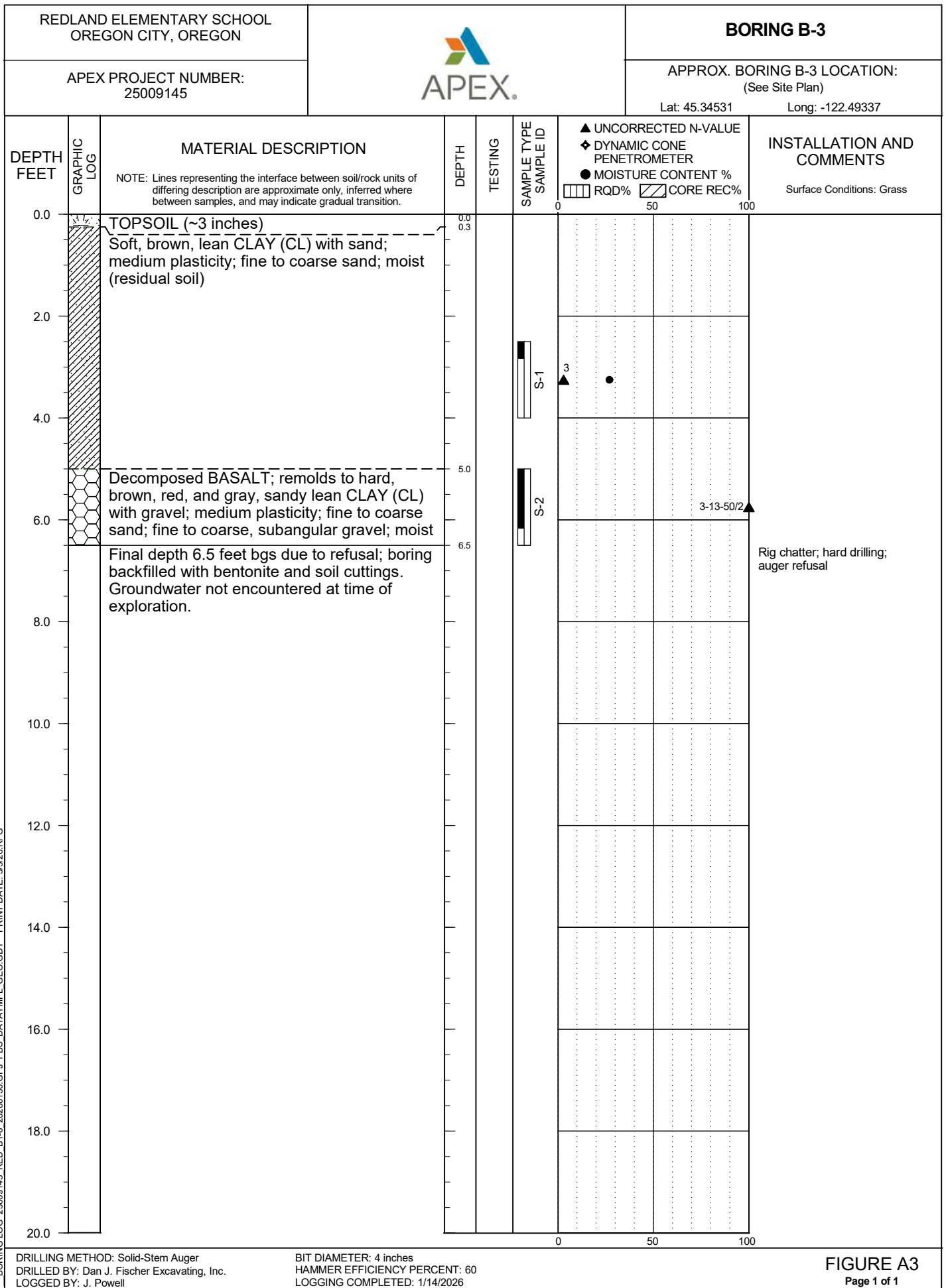


Geotechnical Testing Acronym Explanations

PP	Pocket Penetrometer	HYD	Hydrometer Gradation
TOR	Torvane	SIEV	Sieve Gradation
DCP	Dynamic Cone Penetrometer	DS	Direct Shear
ATT	Atterberg Limits	DD	Dry Density
PL	Plasticity Limit	CBR	California Bearing Ratio
LL	Liquid Limit	RES	Resilient Modulus
PI	Plasticity Index	VS	Vane Shear
P200	Percent Passing US Standard No. 200 Sieve	bgs	Below Ground Surface
OC	Organic Content	amsl	Above Mean Sea Level
CON	Consolidation	HCL	Hydrochloric Acid
UC	Unconfined Compressive Strength		







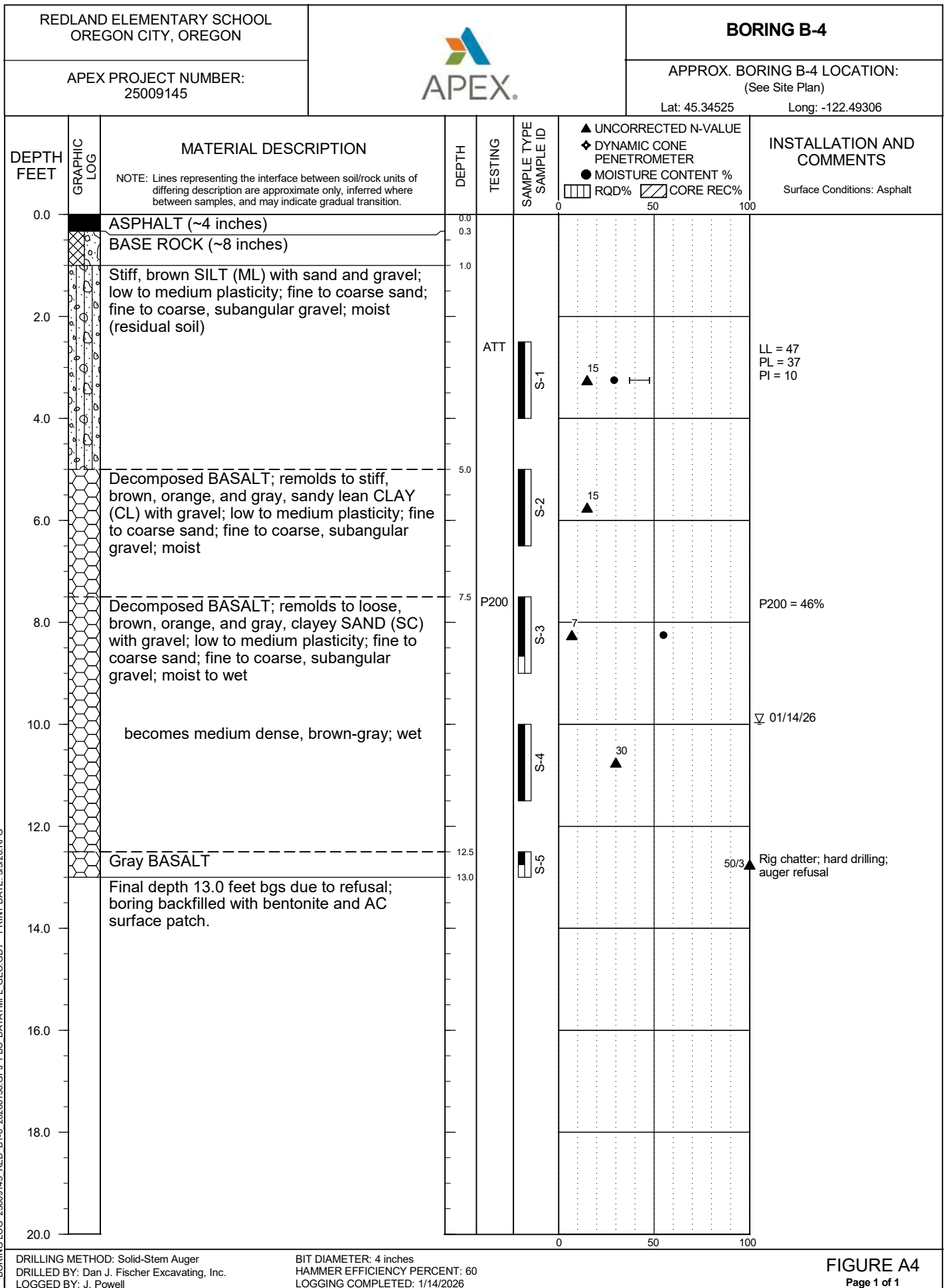
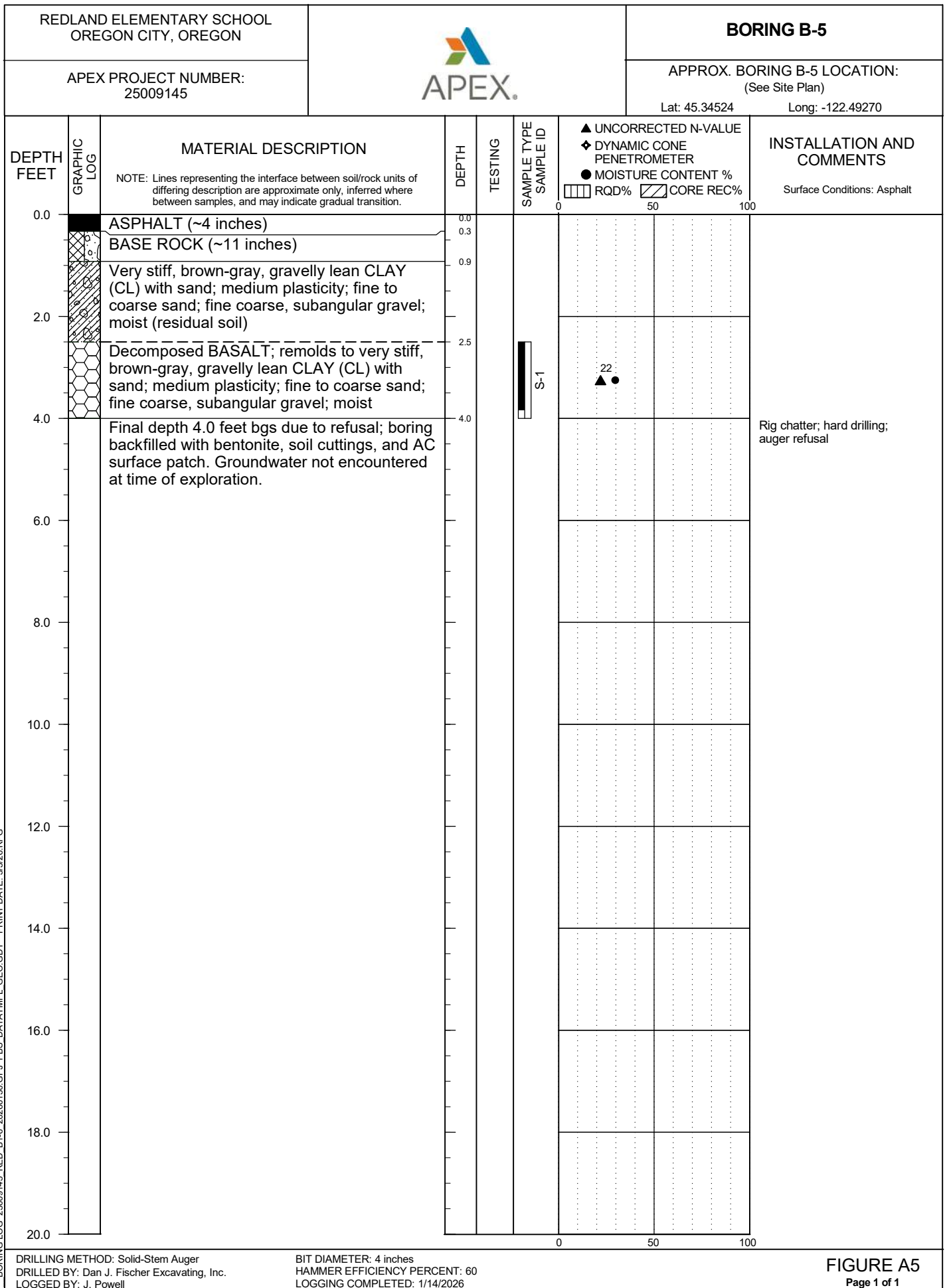


FIGURE A4
Page 1 of 1



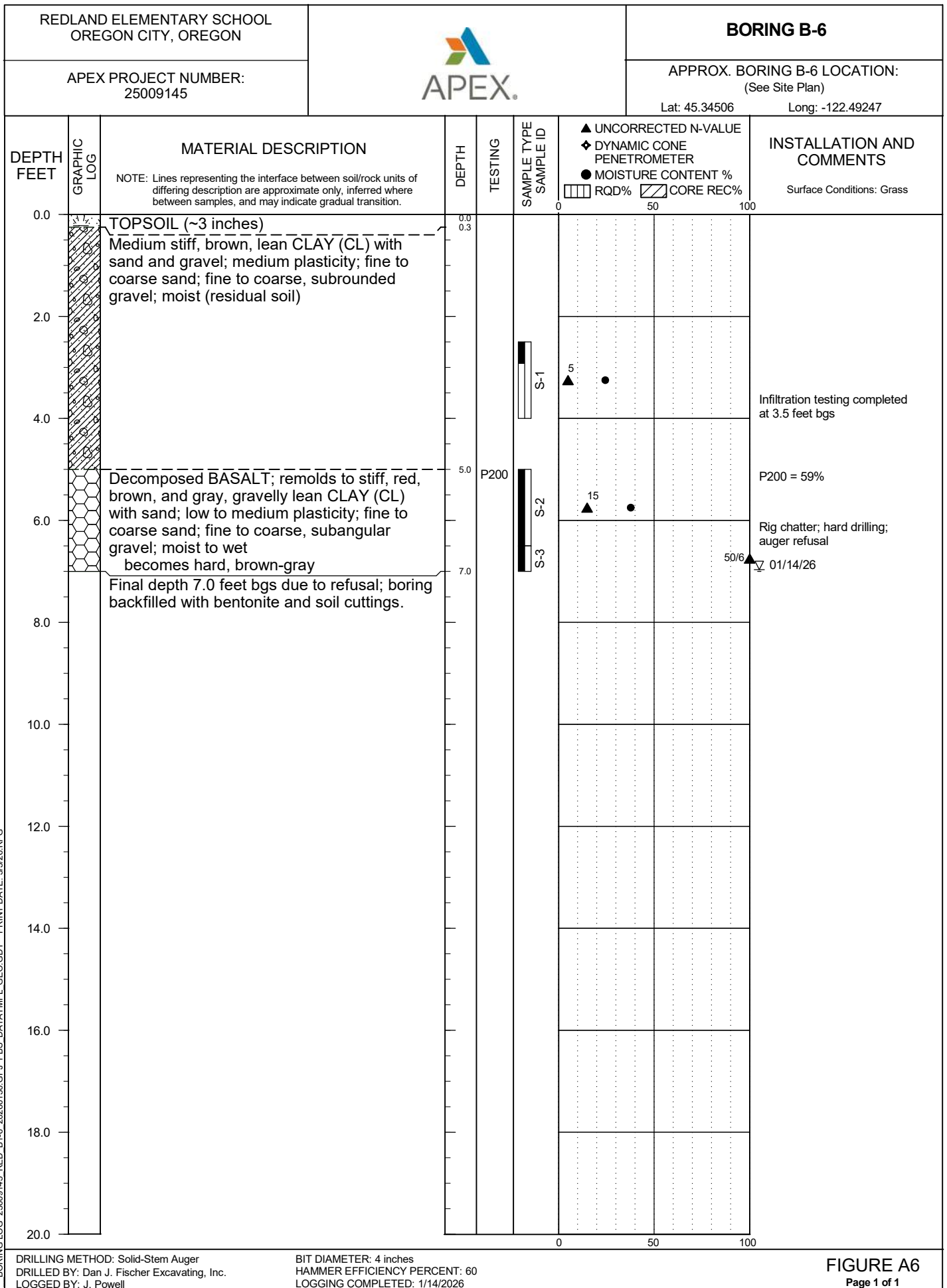
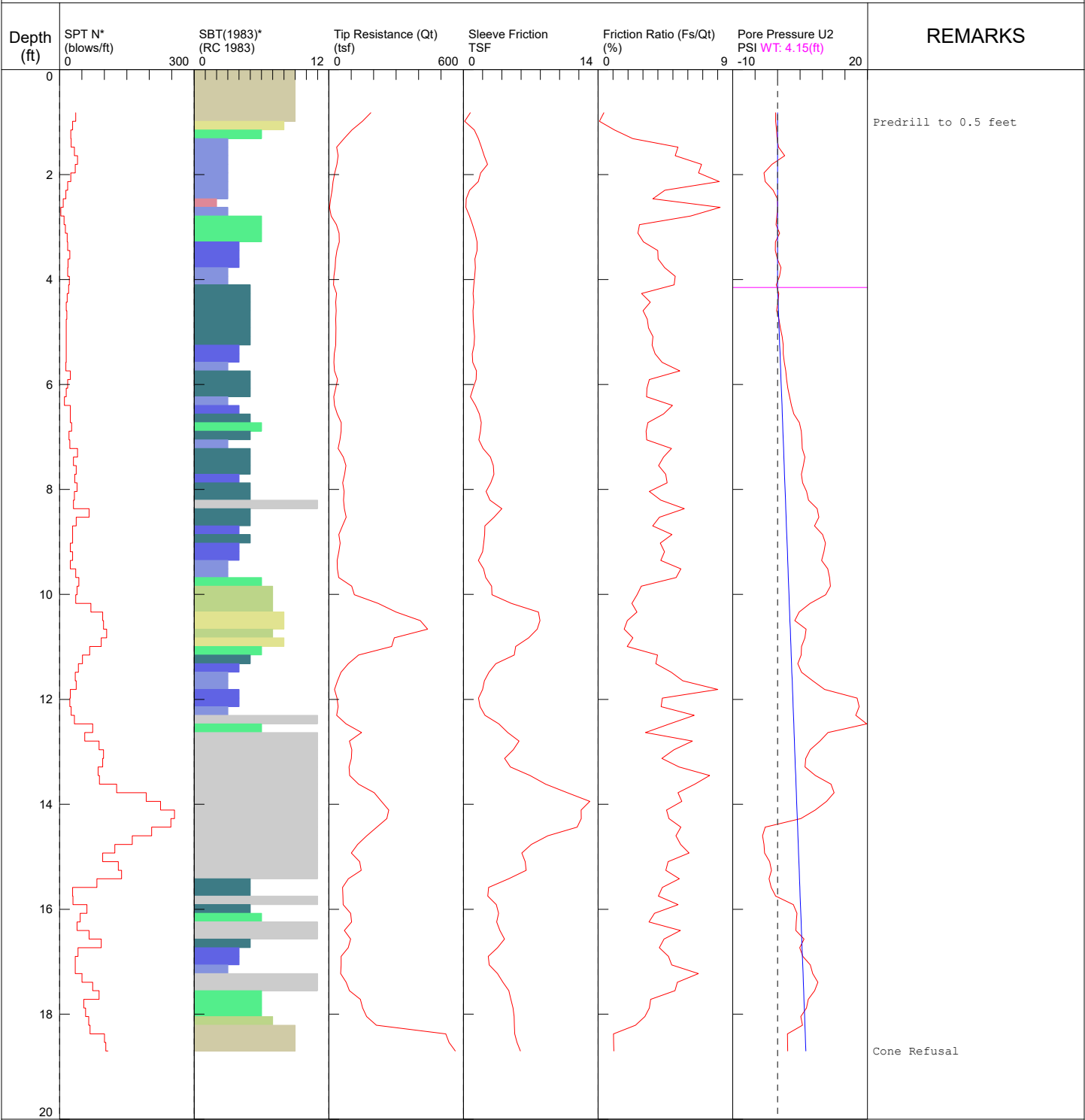


FIGURE A6
Page 1 of 1

Apex / CPT-1 / 18131 Redland Rd Oregon City

OPERATOR: OGE BAK
TEST DATE: 12/30/2025 1:51:12 PM
CONE ID: DDG1615
TOTAL DEPTH: 18.701 ft
HOLE NUMBER: CPT-1



- 1 sensitive fine grained

2 organic material

3 clay
- 4 silty clay to clay

5 clayey silt to silty clay

6 sandy silt to clayey silt
- 7 silty sand to sandy silt

8 sand to silty sand

9 sand
- 10 gravelly sand to sand

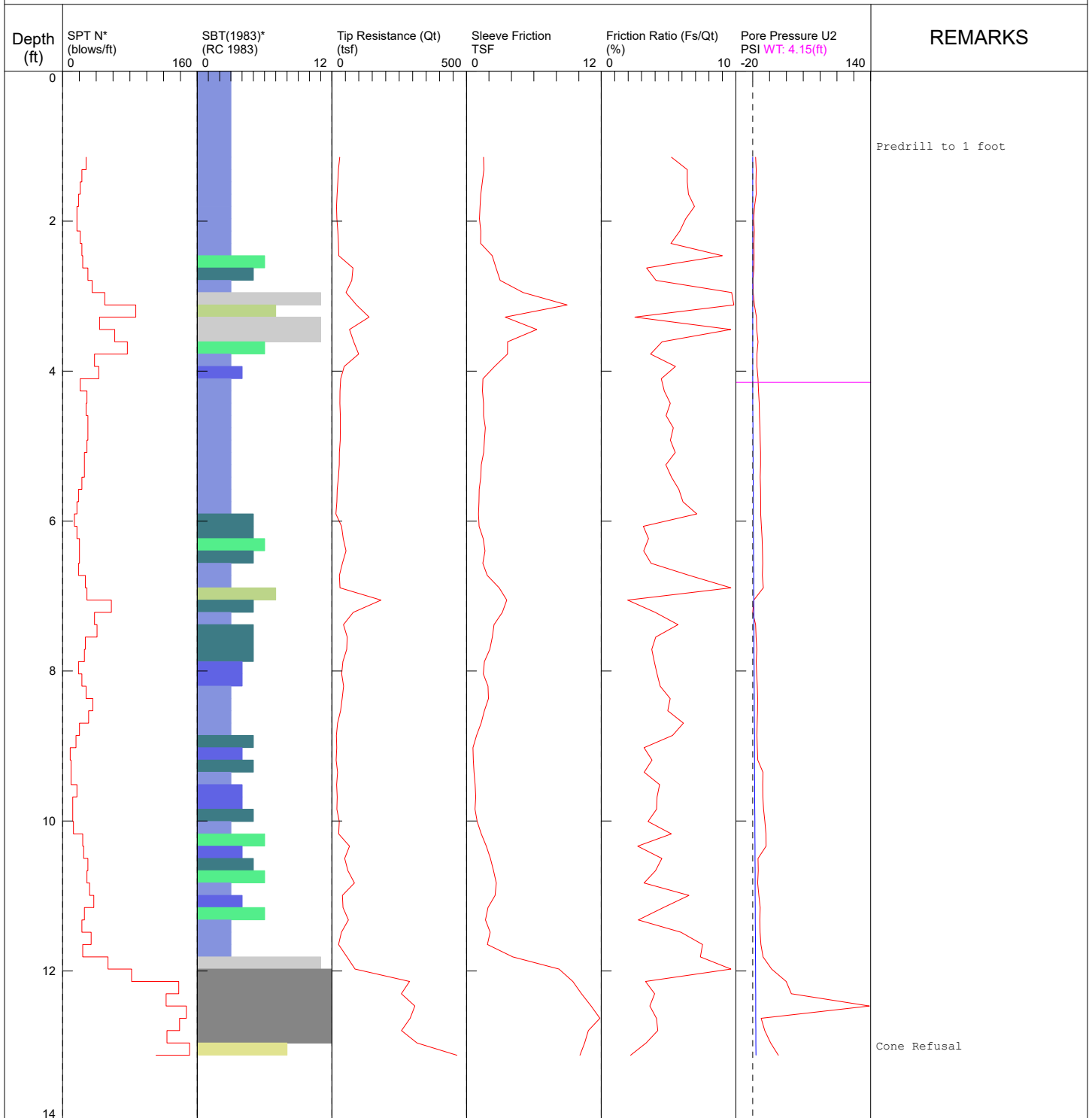
11 very stiff fine grained (*)

12 sand to clayey sand (*)
- *SBT/SPT CORRELATION: UBC-1983

FIGURE A7

Apex / CPT-1A / 18131 Redland Rd Oregon City

OPERATOR: OGE BAK
TEST DATE: 12/30/2025 2:52:31 PM
CONE ID: DDG1615
TOTAL DEPTH: 13.123 ft
HOLE NUMBER: CPT-1A



- | | | | |
|--------------------------|-----------------------------|----------------------------|--------------------------------|
| 1 sensitive fine grained | 4 silty clay to clay | 7 silty sand to sandy silt | 10 gravelly sand to sand |
| 2 organic material | 5 clayey silt to silty clay | 8 sand to silty sand | 11 very stiff fine grained (*) |
| 3 clay | 6 sandy silt to clayey silt | 9 sand | 12 sand to clayey sand (*) |
- *SBT/SPT CORRELATION: UBC-1983

FIGURE A8

Appendix B

Laboratory Testing

Appendix B: Laboratory Testing

B1 GENERAL

Samples obtained during the field explorations were examined in the Apex laboratory. The physical characteristics of the samples were noted and field classifications were modified where necessary. During the course of examination, representative samples were selected for further testing. The testing program for the soil samples included standard classification tests, which yield certain index properties of the soils important to an evaluation of soil behavior. The testing procedures are described in the following paragraphs. Unless noted otherwise, all test procedures are in general accordance with applicable ASTM standards. "General accordance" means that certain local and common descriptive practices and methodologies have been followed.

B2 CLASSIFICATION TESTS

B2.1 Visual Classification

The soils were classified in accordance with the Unified Soil Classification System with certain other terminology, such as the relative density or consistency of the soil deposits, in general accordance with engineering practice. In determining the soil type (that is, gravel, sand, silt, or clay) the term that best described the major portion of the sample is used. Modifying terminology to further describe the samples is defined in Table A-1, Terminology Used to Describe Soil, in Appendix A.

B2.2 Moisture (Water) Contents

Natural moisture content determinations were made on samples of the fine-grained soils (that is, silts, clays, and silty sands). The natural moisture content is defined as the ratio of the weight of water to dry weight of soil, expressed as a percentage. The results of the moisture content determinations are presented on the exploration logs in Appendix A and on Figure B1, Summary of Laboratory Data, in Appendix B.

B2.3 Atterberg Limits

Atterberg limits were determined on select samples for the purpose of classifying soils into various groups for correlation. The results of the Atterberg limits test, which included liquid and plastic limits, are plotted on Figure B2, Atterberg Limits Test Results, and on the exploration logs in Appendix A, where applicable.

B2.4 Grain-Size Analyses (P200 Wash)

Washed sieve analyses (P200) were completed on samples to determine the portion of soil samples passing the No. 200 Sieve (i.e., silt and clay). The P200 test results are presented on the exploration logs in Appendix A and on Figure B1, Summary of Laboratory Data, in Appendix B.



SUMMARY OF LABORATORY DATA

REDLAND ELEMENTARY SCHOOL
OREGON CITY, OREGON

APEX PROJECT NUMBER:
25009145

SAMPLE INFORMATION

MOISTURE
CONTENT
(PERCENT)

DRY
DENSITY
(PCF)

SIEVE

ATTERBERG LIMITS

EXPLORATION
NUMBER

SAMPLE
NUMBER

SAMPLE
DEPTH
(FEET)

ELEVATION
(FEET)

GRAVEL
(PERCENT)

SAND
(PERCENT)

P200
(PERCENT)

LIQUID
LIMIT
(PERCENT)

PLASTIC
LIMIT
(PERCENT)

PLASTICITY
INDEX
(PERCENT)

B-1

S-1

2.5

32.3

B-2

S-1

2.5

25.1

B-3

S-1

2.5

26.9

B-4

S-1

2.5

29.0

47

37

10

B-4

S-3

7.5

54.8

46

B-5

S-1

2.5

29.6

B-6

S-1

2.5

24.4

B-6

S-2

5

37.7

59

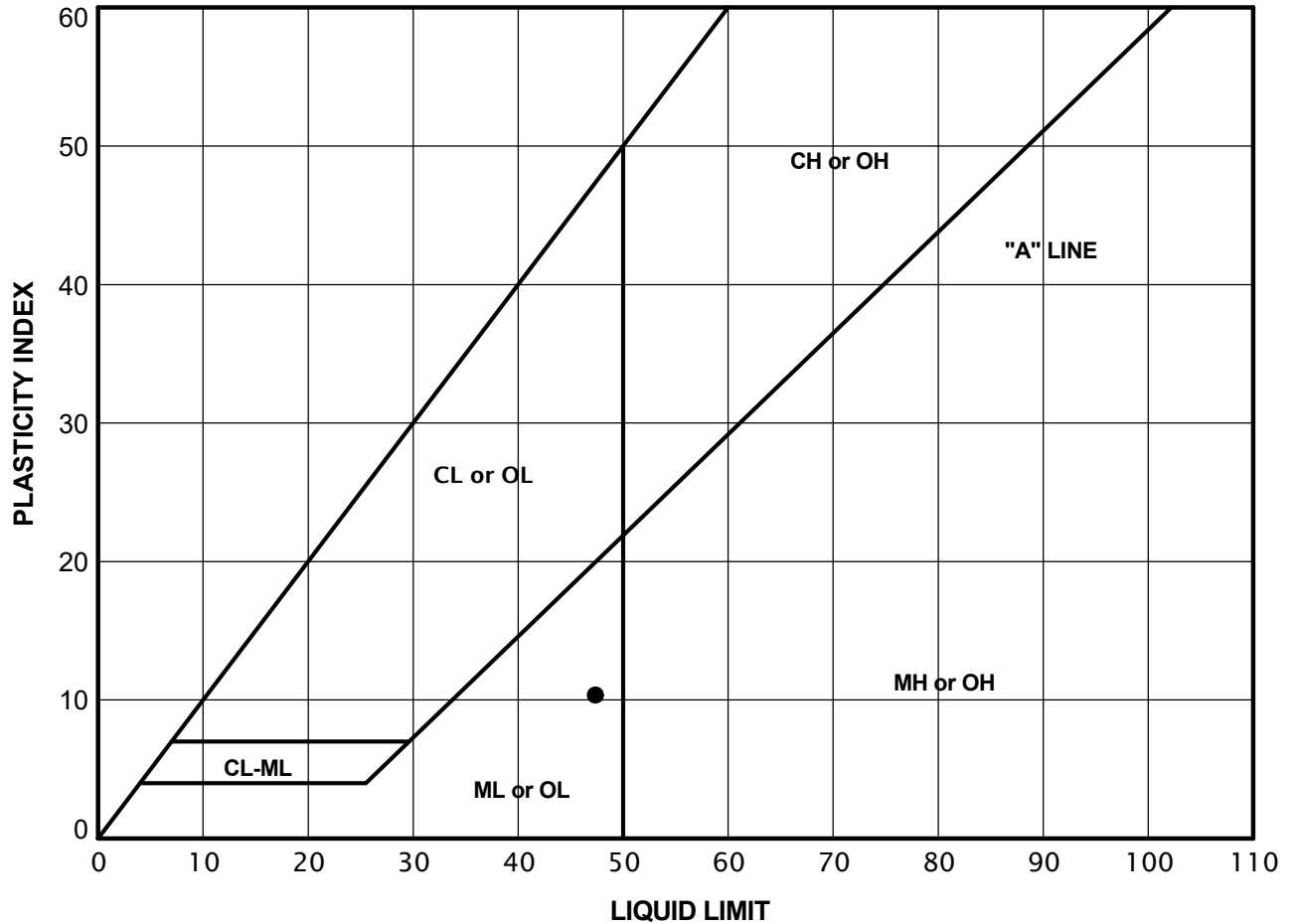


ATTERBERG LIMITS TEST RESULTS

REDLAND ELEMENTARY SCHOOL
OREGON CITY, OREGON

APEX PROJECT NUMBER:
25009145

TEST METHOD: ASTM D4318



KEY	EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	SOIL CLASSIFICATION	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
●	B-4	S-1	2.5	29.0	ML	47	37	10

FIGURE B2
Page 1 of 1

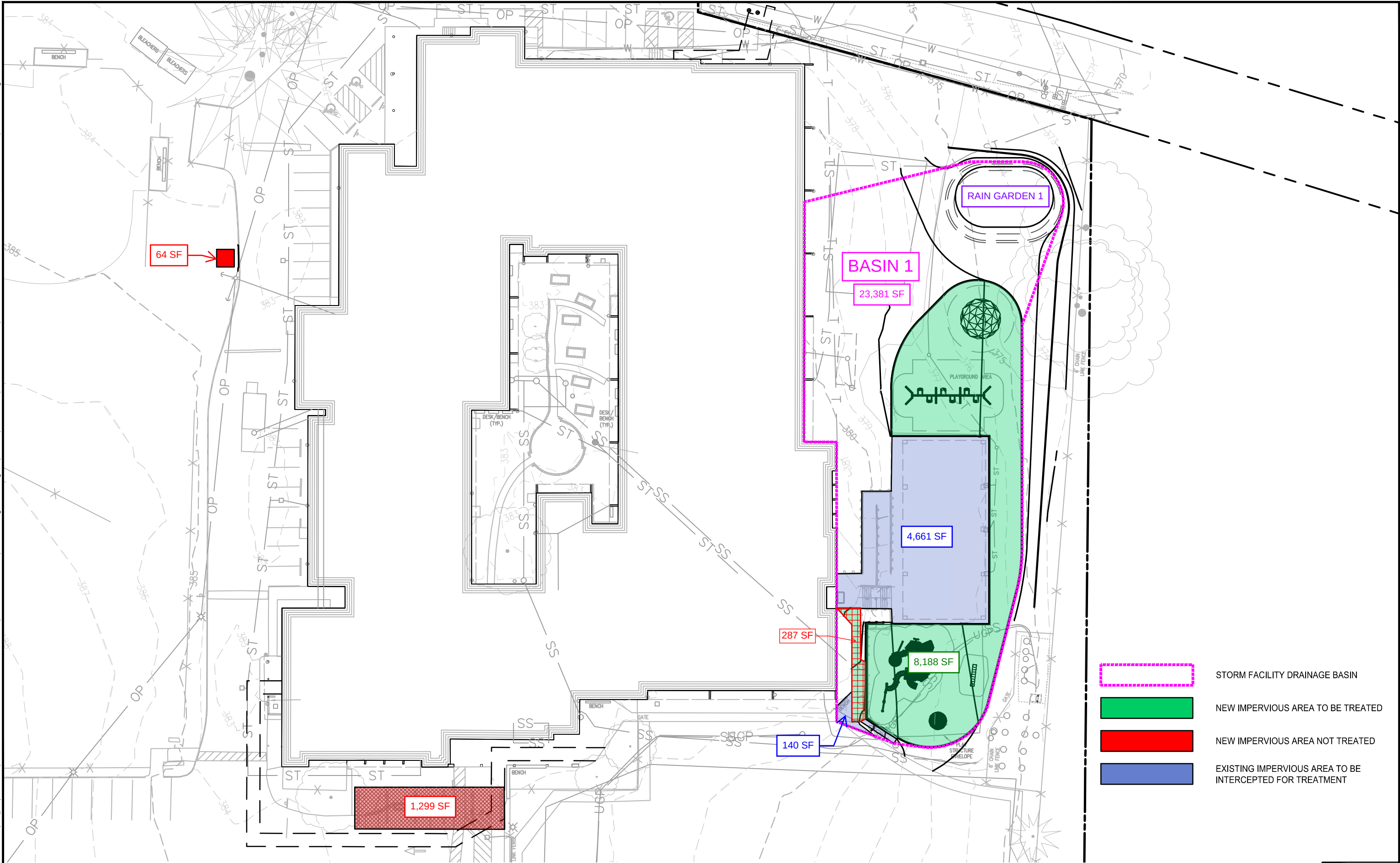
Appendix B

Site Basin Map

BMP Sizing Report

Utility Plan

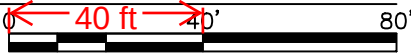
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-  STORM FACILITY DRAINAGE BASIN
-  NEW IMPERVIOUS AREA TO BE TREATED
-  NEW IMPERVIOUS AREA NOT TREATED
-  EXISTING IMPERVIOUS AREA TO BE INTERCEPTED FOR TREATMENT

RES - PROPOSED STORM BASIN

SCALE: 1"=40'



SHEET NO.

PR

WES BMP Sizing Report

Project Information

Project Name	Redland Elementary School
Project Type	Addition
Location	
Stormwater Management Area	23381
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

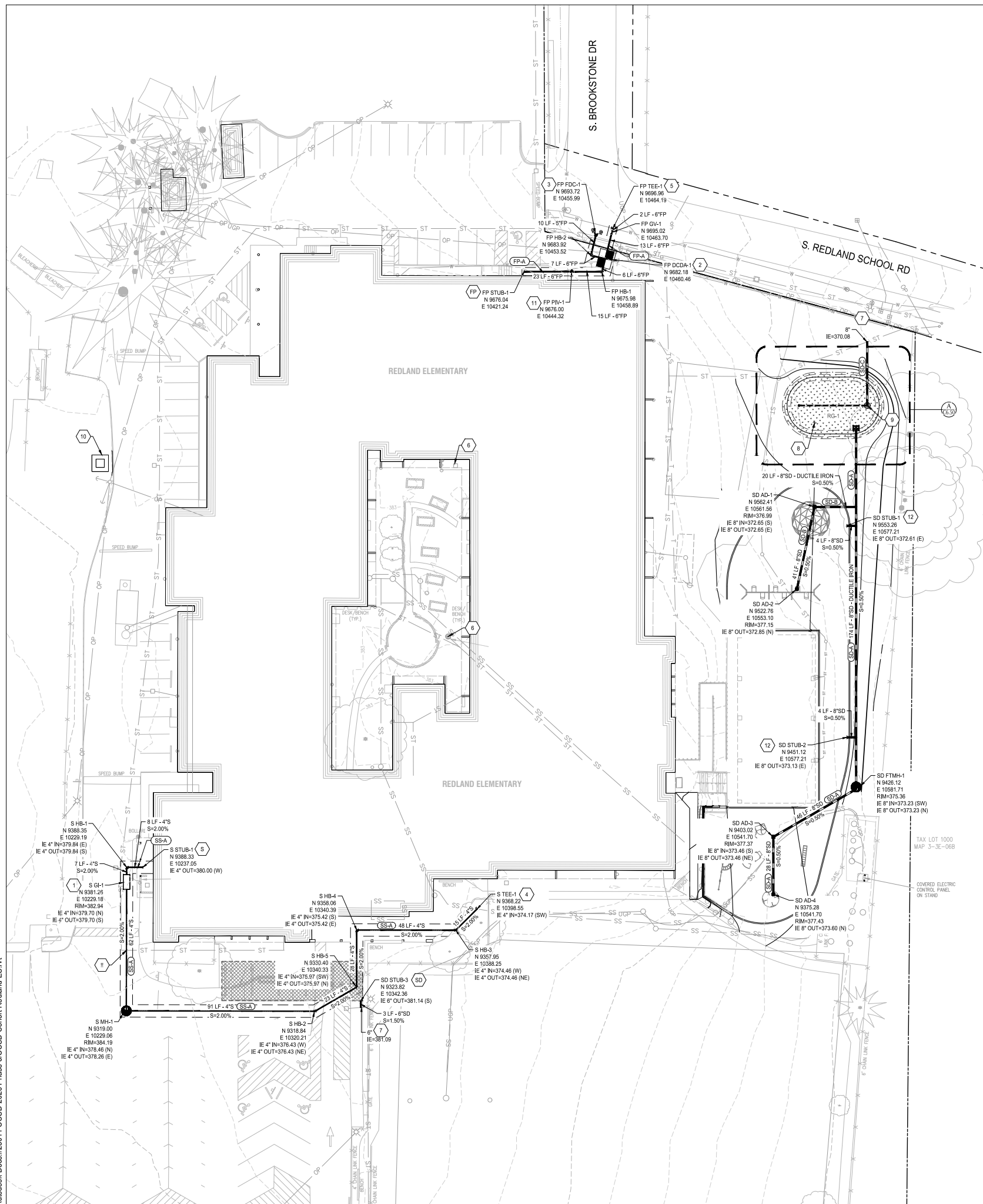
Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Existing Impervious	4,801	Forested	ConventionalConcrete	C	RG-1
New Sidewalk	287	Forested	ConventionalConcrete	C	RG-1
New Play Surfacing	7,901	Forested	OpenPorousPavers	C	RG-1
Pervious	8,846	Forested	LandscapeCsoil	C	RG-1

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
RG-1	FlowControlAndTreatment	Rain Garden - Filtration	Lined	1,545.2	1,546.0	0.9

Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only
2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).
3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.
4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF EXISTING UTILITIES AT ALL PROPOSED PIPE CROSSINGS, RAIN GARDEN CROSSINGS AND BUILDING CONNECTIONS. CONFIRM FINDINGS WITH ENGINEER.
2. STRUCTURE LOCATIONS ARE BASED ON CENTER OF STRUCTURE.
3. INSTALL WATER AND FIRE PROTECTION PIPING 3-FEET BELOW FINISHED GRADE. DEFLECT PIPES AS NECESSARY TO MAINTAIN 3-FEET OF COVER
4. RESTRAIN ALL JOINTS ON WATER AND FIRE PROTECTION LINES USING AN APPROVED RESTRAINT SYSTEM. MEAGALLUS SHALL BE PROTECTED FROM CORROSION. THRUST BLOCKS SHALL BE SUPPORTED BY UNDISTURBED SOIL. SEE DETAIL 9/C7.00.
5. WATER AND FIRE PROTECTION PIPE DEFLECTIONS SHALL NOT BE MORE THAN 1/2".
6. ON-SITE PIPE BEDDING AND BACKFILL FOR ALL UTILITIES PER DETAIL 3/C7.00.

UTILITY KEY NOTES

NOTE	DESCRIPTION	DETAIL REF.
	1 GROUND INTERCEPTOR. COORDINATE VENT PIPING TO BUILDING WITH PLUMBING. SEE PLUMBING PLAN FOR DETAILS.	
	2 INSTALL DOUBLE CHECK DETECTOR ASSEMBLY IN BELOW GRADE VALVE. PROVIDE CONDUIT FOR TAMPER SWITCH.	10/C7.00
	3 NEW FIRE DEPARTMENT CONNECTION WITH SIGN.	12&13/C7.00
	4 CONNECT TO EXISTING SANITARY LINE. CONTRACTOR TO CONFIRM INVERTS PRIOR TO CONSTRUCTION AND ALERT ENGINEER IF DIFFERENT.	
	5 CONTRACTOR TO WET-TAP EXISTING PUBLIC WATER MAIN WITH TAPPING SADDLE AND GATE VALVE ASSEMBLY.	
	6 CLEAN AND MAINTAIN STORM DRAIN OR REPLACE IF NEEDED TO ADDRESS DRAINAGE CONCERNS.	
	7 CONNECT TO EXISTING STORM LINE. CONTRACTOR TO CONFIRM INVERTS PRIOR TO CONSTRUCTION AND ALERT ENGINEER IF DIFFERENT.	
	8 UNLINED FILTRATION RAIN GARDEN	1/C6.50
	9 OVERFLOW FLOW CONTROL STRUCTURE WITH 0.54INCH ORIFICE	2/C6.50
	10 TRANSFORMER. SEE ELECTRICAL PLANS FOR MORE INFORMATION.	
	11 INSTALL POST INDICATOR VALVE	14/C7.00
	12 CONNECT PLAY SURFACE SUBDRAINAGE WITH A BACKWATER VALVE, IF AVAILABLE. COORDINATE WITH PLAY SURFACE CONTRACTOR	
FP	CONNECT TO FIRE PROTECTION SYSTEM. SEE AS NOTED. SEE PLUMBING PLANS FOR CONTINUATION.	
S	CONNECT TO WASTE LINE. SEE PLUMBING PLANS FOR CONTINUATION. SIZE AS NOTED.	
SD	CONNECT TO STORM DRAIN/RP DRAIN. SEE PLUMBING PLANS FOR CONTINUATION. SIZE AND IE AS NOTED.	
I	UTILITY CROSSING. PROVIDE 12" MIN. CLEARANCE. U.N.O.	

UTILITY LABEL LEGEND

STRUCTURE LABEL

UTILITY TYPE (SD=STORM DRAINAGE, S=SANITARY SEWER,
W=WATER, FP=FIRE PROTECTION)

STRUCTURE TYPE CALLO

XX XX-XX ID NUMBER (WHERE APPLICABLE)

N=XXXX.XX
E=XXXX.XX

LOCATION (WHERE APPLICABLE)

RIM= ← STRUCTURE INFO (WHERE

PIPE LABEL

PIPE LABEL
UTILITY LENGTH

UTILITY LENGTH
UTILITY SIZE

XXLF - XX' XX ← UT

S=X.XX% ← SLOPE (

STRUCTURE T

ALLOUT	DESCRIPTION
0	AREA DRAM

D AREA DRAIN
B CATCH BASIN

CDA	DOUBLE CHECK DETECTOR
DC	FIRE DEPARTMENT CONNECTION

FTMH	FLAT TOP MANHOLE	7/7/00
GI	GREASE INTERCEPTOR	SEE PLUMBING PLANS
GV	GATE VALVE	11/7/00
HB	HORIZONTAL BEND	
MH	MANHOLE	8/7/00
OF	OUTFALL	2/7/00
OV	OVERFLOW INLET	2/6/50
PIV	POST INDICATOR VALVE	14/7/00
STUB	STUB	
TEE	TEE CONNECTION	

BR|IC
ARCHITECTURE

BOND 2025

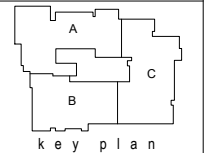
kpff

111 SW Fifth Ave., Suite 2600
Portland, OR 97204
O: 503.542.3860
F: 503.274.4681
www.kpff.com

REDLAND ELEMENTARY SCHOOL

18131 S Redland Rd,
Oregon City, OR 97045
OREGON CITY SCHOOL DISTRICT 62
T 555-555-5555

PRELIMINARY
NOT FOR
CONSTRUCTION

[illegible]

phase	SCHEMATIC DESIGN
date	06/12/2026
project	25011-152

UTILITY & STORM DRAINAGE PLAN

C6.00



SCALE 1 INCH = 20 FEET



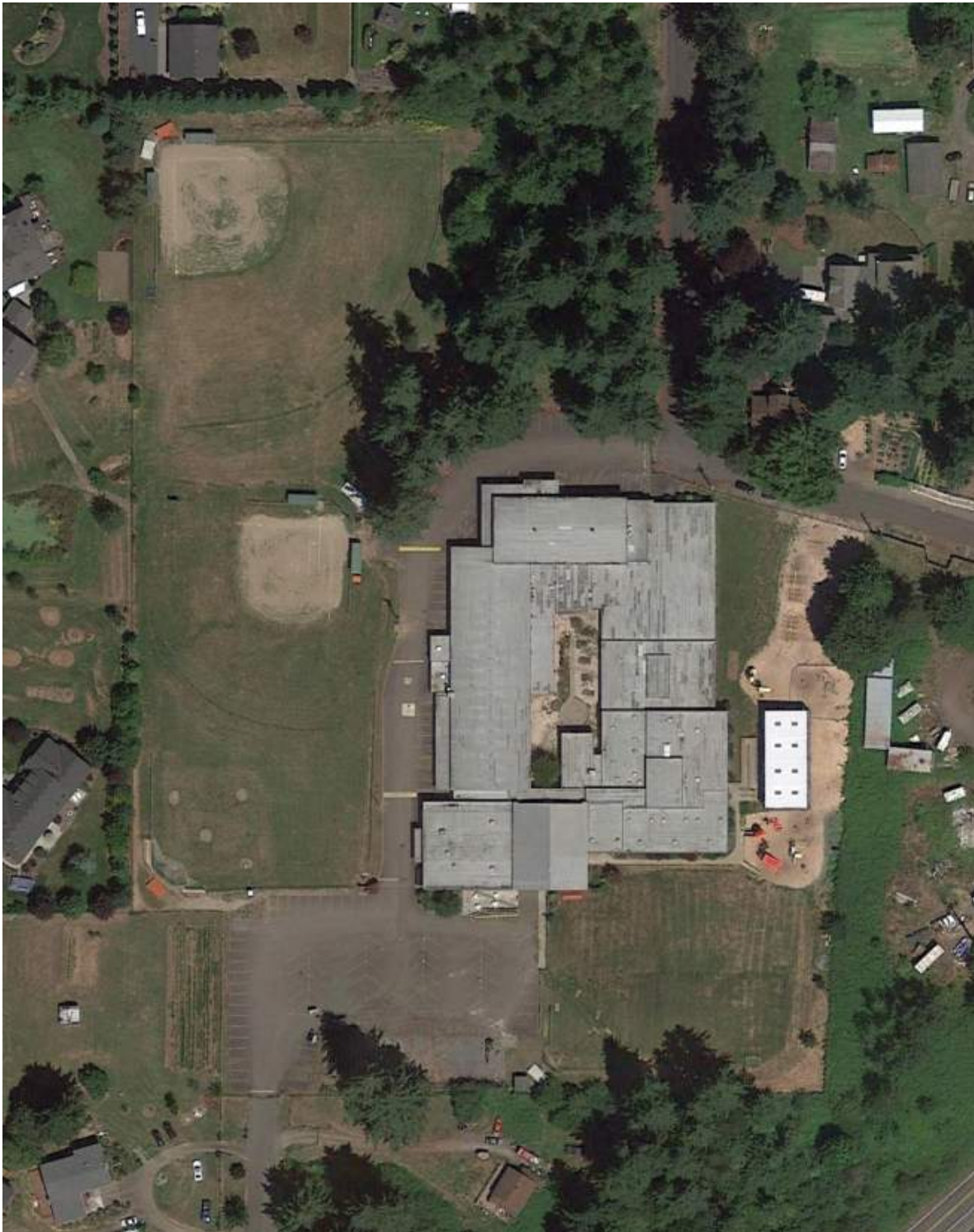
Appendix C - Evidence of Continuous Use and Previous Approval

- Aerial Images of Site from April 2015 to June 2026
- Planning File Number Z0383-16-E

Aerial Image #1 - April 2015



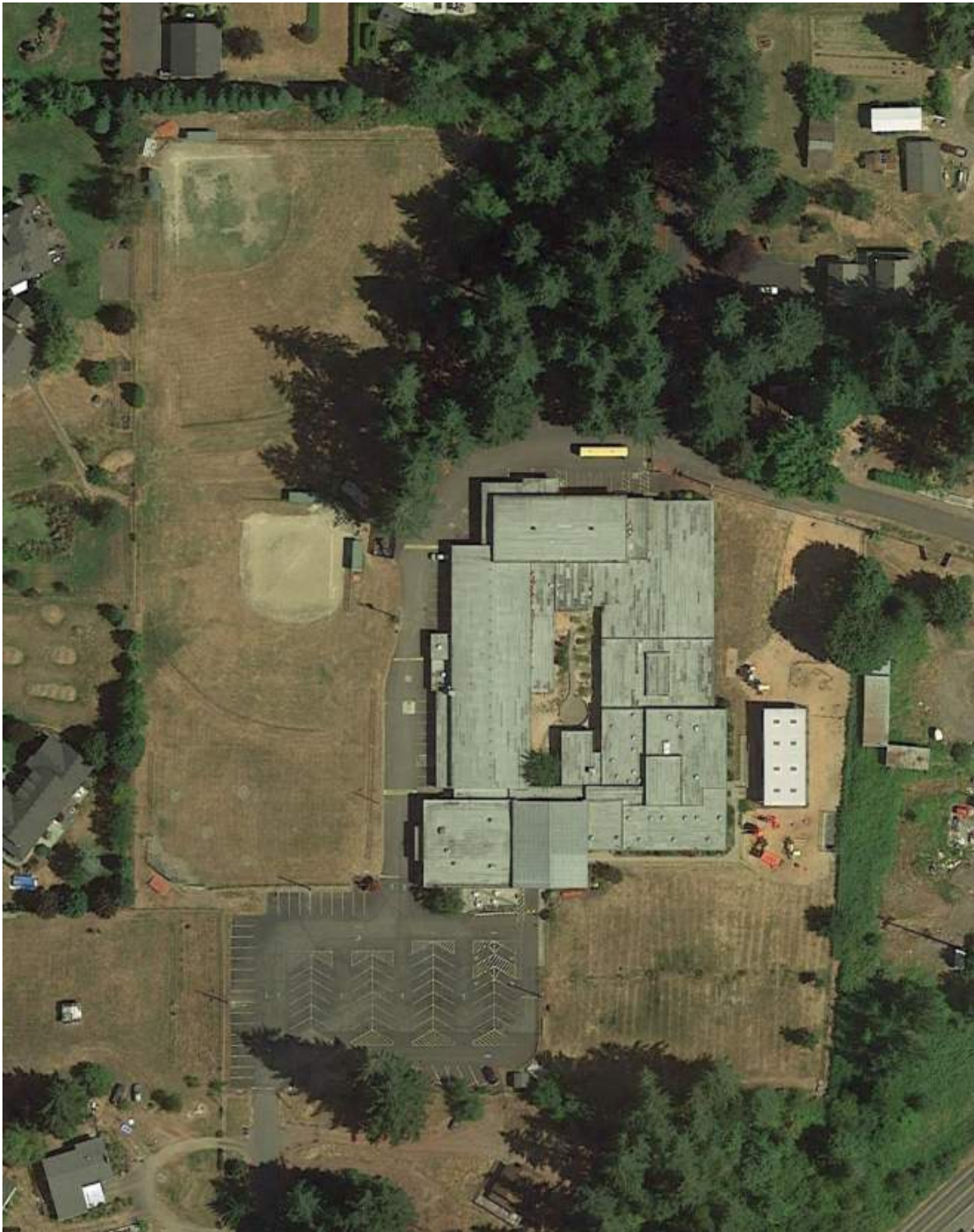
Aerial Image #2 - July 2016



Aerial Image #3 - May 2017



Aerial Image #4 - July 2018



Aerial Image #5 - May, 2019



Aerial Image #6 - August 2020



Aerial Image #7 - May 2021



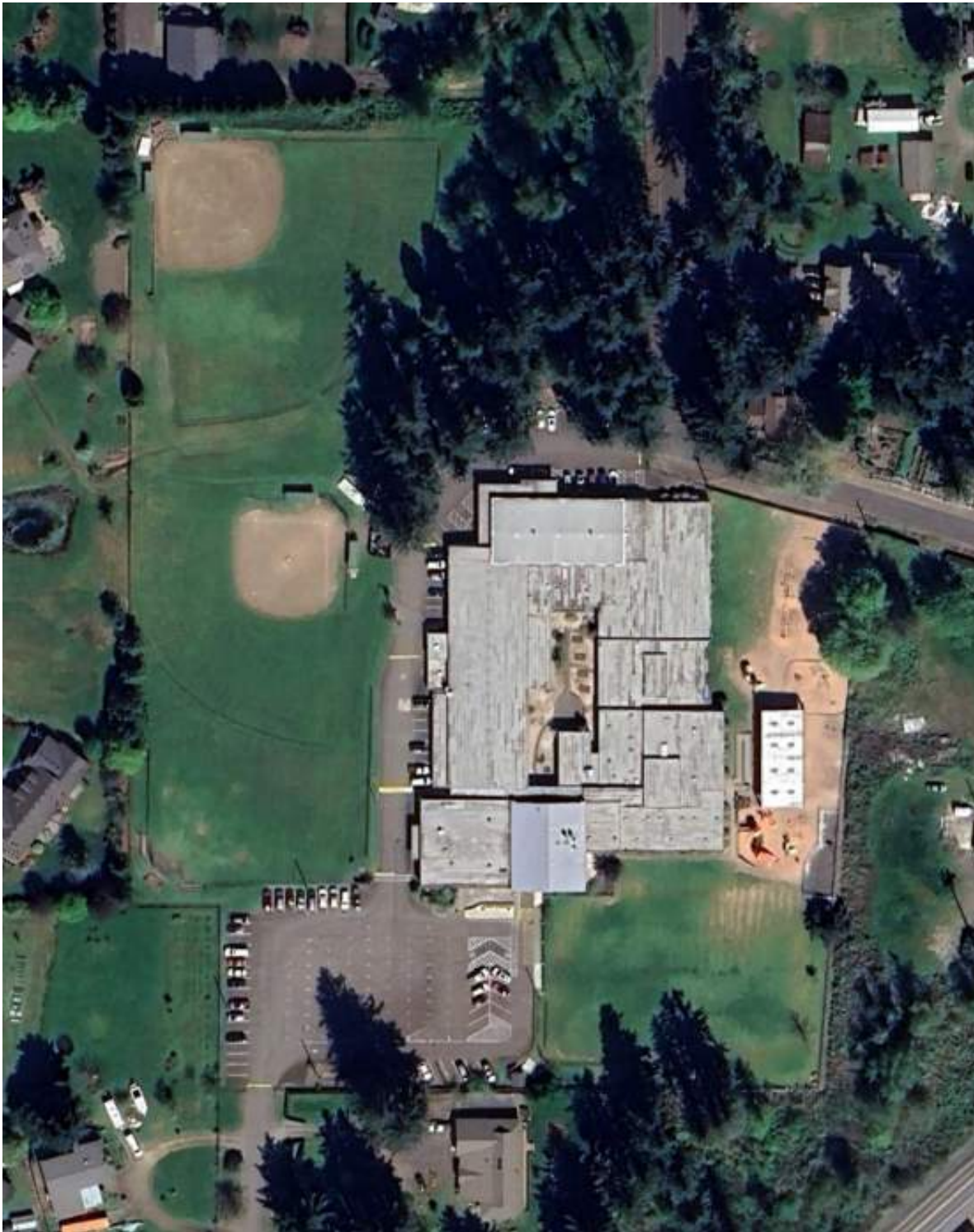
Aerial Image #8 - July 2022



Aerial Image #9 - September 2023



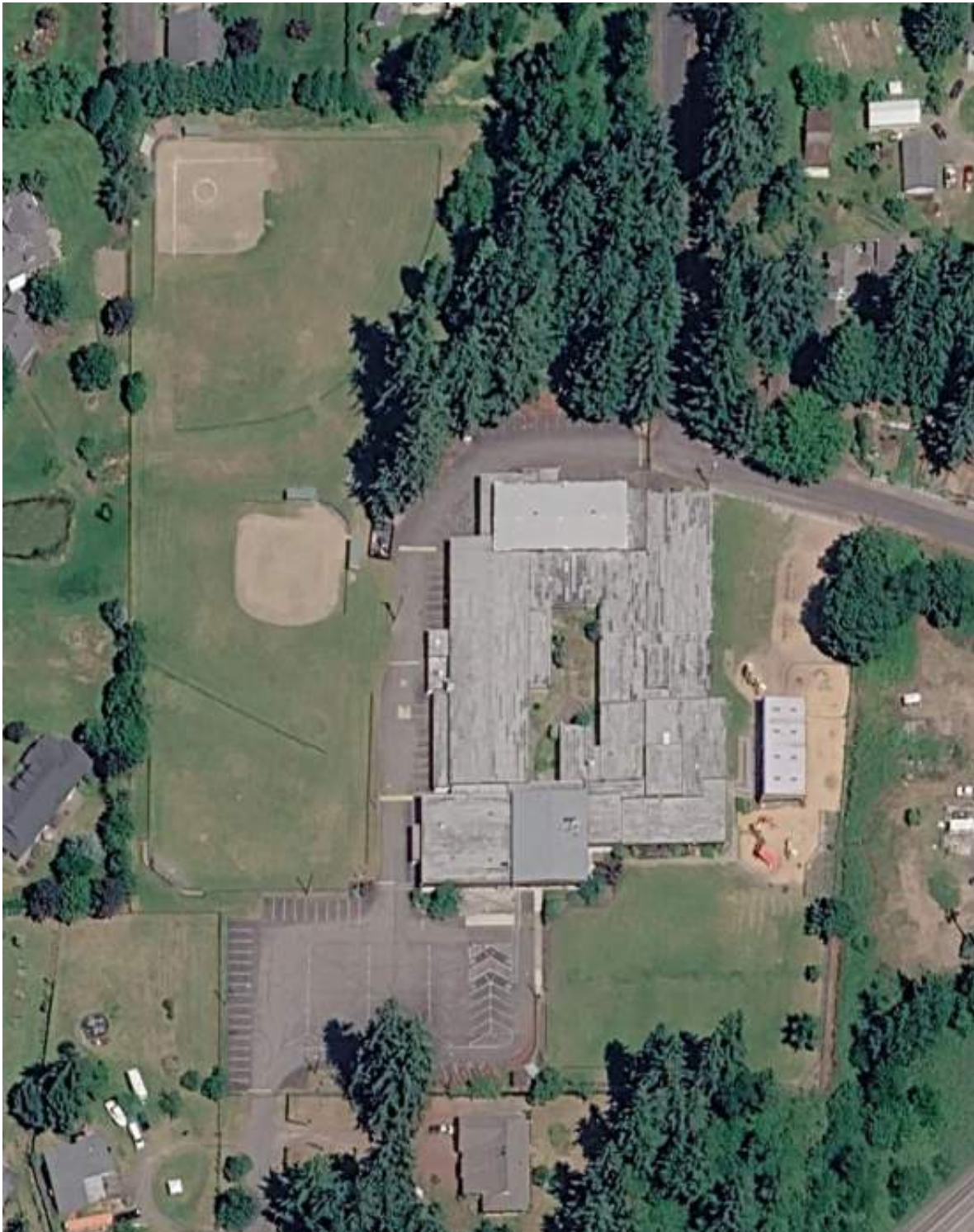
Aerial Image #10 - April 2024



Aerial Image #11 - March 2025



Aerial Image #12 - June 2026





Planning and Zoning

Development Services Building

Mike McCallister, Manager

150 Beavercreek Road, Oregon City, OR 97045

Phone: (503) 742-4500 fax: (503) 742-4550

e-mail: zoninginfo@clackamas.us

Web:

<http://www.clackamas.us/transportation/planning/>

NOTICE OF LAND USE DECISION

This document represents the Planning and Zoning Staff findings and conditions of approval for a Land Use Application, File No. Z0383-16-E, as cited below. It contains three parts:

Section 1 – Summary, Section 2 – Conditions of Approval and Section 3 – Findings.

SECTION 1 – SUMMARY

DATE: September 13, 2016

APPEAL DEADLINE: September 26, 2016

CASE FILE NO.: Z0383-16-E

STAFF CONTACT: Rick McIntire, (503)742-4516, rickmci@clackamas.us

LOCATION: 18131 S. Redland Rd., Oregon City, OR (Redland unincorporated community)

REFERENCE PARCEL NUMBER: T3S R3E Section 06B, Tax Lot(s) 800 & 970

APPLICANT: BBL Architects, c/o Ronald Lee, 200 North State St., Lake Oswego, OR 97034

OWNER: Redland School District #116

TOTAL AREA: Approximately 9.35 acres

ZONING: Rural Area Residential, RA-1

CITIZENS PLANNING ORGANIZATION: Redland-Viola-Fischers Mill CPO, c/o Daniel Dunn, 503-631-2592, 17443 S. Potter Rd., Oregon City, OR 97045

PROPOSAL: An Alteration of a Nonconforming Use, the Redland Elementary School facility, to place an eight-foot by 40-foot shipping container for storage uses on the subject property. No operational changes are proposed to the use as a public elementary school. The proposed location of the storage container is along the southerly boundary of the site, adjacent to existing parking area south of the school building where a prior storage building has been (or will be) removed.

NOTICE TO MORTGAGEE, LIENHOLDER, VENDOR OR SELLER: ORS Chapter 215 requires that if you receive this notice, you must promptly forward it to the purchaser.

OPPORTUNITY TO REVIEW THE RECORD: A copy of the Planning and Zoning staff decision and all evidence submitted with this application is available for inspection, at no cost, at the Planning and Zoning Division office during normal business hours. Copies of all documents may be purchased at the rate of 11-cents per page. The decision contains the findings and conclusions upon which the decision is based along with any conditions of approval.

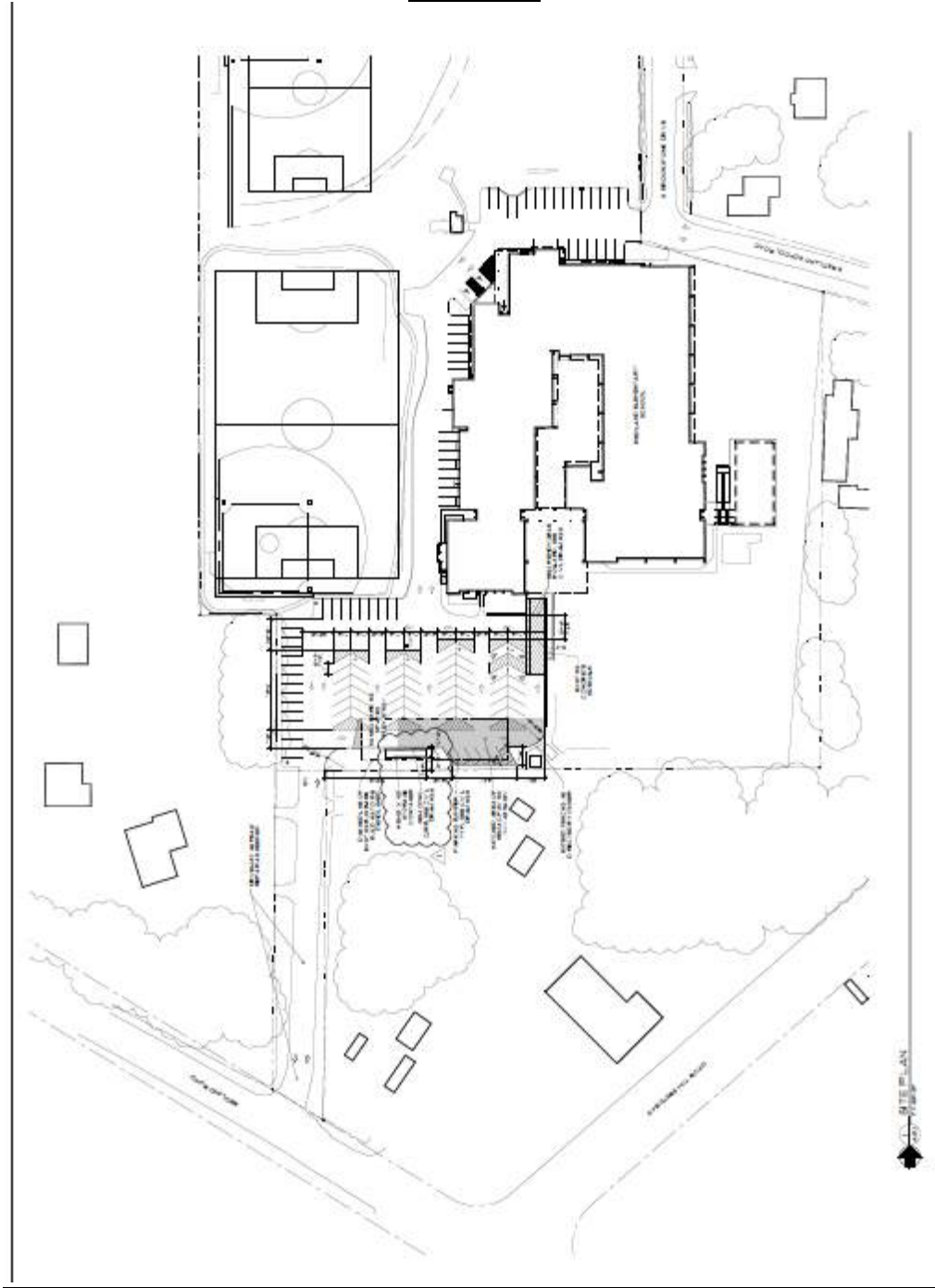
APPEAL RIGHTS: Any party disagreeing with this decision or the conditions of approval, may appeal this decision to the Clackamas County Land Use Hearings Officer. The cost of the appeal is \$250.00. An appeal must be received by the Planning and Zoning Division by 4:00 p.m. on the last day to appeal which is **September 2, 2016**. This decision will not be effective until the day after the appeal deadline provided an appeal is not filed prior. Unless an appeal is received by the appeal deadline, this decision will be final and no additional written confirmation will be sent. Any party or parties appealing this decision may withdraw their appeal at any time prior to the hearing or final decision by the Hearings Officer. A party wishing to maintain individual appeal rights may wish to file an individual appeal and pay the \$250.00 fee, even if an appeal by another party or parties has been filed.

APPLICABLE APPROVAL CRITERIA: This application is subject to Sections(s) 202, 316, 1206 and 1307 of the Clackamas County Zoning and Development Ordinance (ZDO).

Vicinity Map



Site Plan



[illegible]

SECTION 2 – CONDITIONS OF APPROVAL:

The Clackamas County Planning and Zoning Division staff grants APPROVAL of this application for an Alteration of a Nonconforming Use subject to compliance with the following conditions:

I. General and Advisory Conditions:

- 1) This application is approved for and limited to the alteration of the nonconforming use as described and depicted in the application materials, the Findings discussed above and subject to the conditions of approval contained herein. Any additional alterations or changes in the nonconforming use shall be reviewed under separate application by the Planning and Zoning Div.
- 2) The applicant shall obtain any building, electrical, or other specialty code permits deemed necessary by the County Building Codes Division prior to installation.
- 3) Pursuant to Section 1206.07(A)(1) of the ZDO, the proposed alteration shall be implemented within four (4) years of the date of this decision. See Section 1206.07(A)(1) for the definition of “implemented”.
- 4) Compliance with these conditions of approval is mandatory and non-compliance may be cause for revocation of this permit.

SECTION 3 – FINDINGS

This application is subject to the relevant provisions of Section(s) 202, 316, 1206 and 1307 of the Clackamas County Zoning and Development Ordinance (ZDO). The Clackamas County Planning and Zoning Staff have reviewed these Sections of the ZDO in conjunction with this proposal and make the following findings and conclusions:

1. The applicant is requesting approval of an Alteration of a Nonconforming Use, the Redland Elementary School facility, to place an eight-foot by 40-foot shipping container for storage uses on the subject property. No operational changes are proposed to the use as a public elementary school. The proposed location of the storage container is along the southerly boundary of the site, adjacent to existing parking area south of the school building where a prior storage building has been (or will be) removed. (See site plans above).
2. The subject property is approximately 9.35 acres in size, is located north of Redland Rd. and west of Fischers Mill Rd. and Hattan Rd. in the Redland unincorporated community center. The site is developed with the existing Redland School building, on-site circulation drives, parking areas and play fields.
3. Pursuant to subsection 1206.05B(2) of the ZDO, the applicant must first verify that the existing use(s), structure(s) and/or other physical improvements were established as a

protected nonconforming use as defined in Sec. 202 of the ZDO. Sec. 202 of the ZDO defines a “Nonconforming Use” as:

“A use of any building, structure or land allowed by right when established or that obtained a required land use approval when established but, due to a change in the zone or zoning regulations, is now prohibited in the zone.”

4. In order to demonstrate the establishment of a nonconforming use, the applicant must demonstrate the following: (1) that the use(s) and structure(s) were established prior to the effective date of the initial zoning of the property; **or** (2) that the use(s) and structure(s) were allowed by right under the zoning applicable at the time of establishment; **or** (3) that a required land use permit; e.g. conditional use permit, was obtained from the County to establish the use(s) and structure(s) prior to a change in zoning regulations pursuant to subsection 1206.06B of the ZDO.
 - A. The subject property is currently zoned Rural Area Residential, RA-1. This zoning designation generally permits single family residential uses. This designation was adopted on October 31, 1969 as the first application of zoning regulations . The use and development of properties within the RA-1 zoning district is subject to the provisions of Sec. 316 of the ZDO. Schools are listed as a use that may be permitted subject to County Conditional Use Permit approval.
 - B. Prior to the adoption of the RA-1 zoning designation in 1969, the property was unzoned and not subject to any restrictive zoning regulations.
 - C. The existing elementary school was established shortly after the property was purchased by the Redland School District in 1965. The Planning staff has found a conditional use permit, file no. CU-58-71 authorizing an addition to the existing school. That request was filed in November of 1971 and approved in December of that year.
 - D. In 2001, the County approved an Alteration of a Nonconforming Use application, file no. Z0308-01-E, permitting the construction of a 50-foot by 70-foot play area cover. In that application, the County determined that the existing school facility was a lawfully established nonconforming use.
 - E. The applicant has obtained various building, septic and other County permits over the years for improvements to the school facilities. The records available indicate that the original school facility was established prior to the adoption of zoning regulations on October 31, 1969. The applicant has demonstrated sufficiently that the existing elementary school facility is a lawfully established nonconforming use.
 - F. **Conclusion:** Based upon the zoning and land use permitting history of the subject property discussed above, the staff finds that the use of the property for a public elementary school was established as a nonconforming use as defined in Sec. 202 of the ZDO when the RA-1 zoning was adopted on October 31, 1969. **This criterion is satisfied.**
5. If the applicant proves that nonconforming use status has been established, the nonconforming use may be continued pursuant to subsec. 1206.01 of the ZDO even

though the use no longer conforms to the zoning regulations applicable to the subject property for establishment of new uses. Subsec. 1206.01 of the ZDO states:

“A nonconforming use may be continued although not in conformity with the regulations for the zone in which the use is located.”

6. If the applicant has demonstrated that a nonconforming use has been lawfully established, the applicant must also provide evidence as to the nature, extent, existence and continuity of the nonconforming use and that the nonconforming use has not been discontinued for any period exceeding twelve (12) consecutive months during the 20-year period immediately preceding the date of the application for verification pursuant to subsec. 1206.02 of the ZDO and ORS 215.130(11). Subsec. 1206.02 of the ZDO states:

“If a nonconforming use is discontinued for a period of more than twelve (12) consecutive months, the use shall not be resumed unless the resumed use conforms with the requirements of the Ordinance and other regulations applicable at the time of the proposed resumption.”

- A. Based upon the information submitted by the applicant, county permitting records and aerial photo documentation, the Planning and Zoning Div. staff finds that the nonconforming use has not been discontinued, interrupted or abandoned for any period in excess of twelve (12) consecutive months for the 20-year period preceding the filing of this application on June 30, 2016.
7. Pursuant to subsection 1206.05B(1) of the ZDO, in order to approve this request, the proposed alteration of the nonconforming use, structure and/or other physical improvements shall have no greater adverse impact upon the neighborhood than the existing use, structure(s) and/or physical improvements. The Planning Director, or designate, may impose conditions designed to mitigate any potential additional adverse impacts pursuant to subsection 1206.05B(3) of the ZDO.
 - A. This standard does not strictly require that the proposed use be compatible in all respects with surrounding development, only that the proposed alteration of the existing nonconforming use will not cause greater adverse impacts to the surrounding neighborhood when compared with the existing (prior) nonconforming use. In addition, the Planning Division must consider whether any potential additional adverse impacts that are identified can be mitigated. Potential mitigation measures could include a number of things, including limitations on days and hours of operations, requiring additional landscaping and other buffering and aesthetic improvements, limitations on building and site lighting, signing and building colors, limitations on access points to adjacent streets, etc.
 - B. The subject property is located in an area that is predominantly developed for single family residential uses, however, it is in close proximity to the Redland rural center that contains a number of commercial uses at the intersection of Redland Rd. and Fischers Mill Rd.
 - C. The proposed alteration of the nonconforming use, the placement of a 40-foot long shipping container for storage use, will be located in the same location as a structure

- recently demolished previously used as a bus barn. That structure was significantly larger than the proposed structure. The proposed structure will be used for storage purposes rather than an active use, and will not result in any operational changes to the school use.
- D. Given the location of the structure and size in comparison to the prior structure in the same location and the intended usage, the staff finds that the placement of the container for storage purposes will not any noticeable additional adverse impacts to adjoining properties used for residential uses.
 - E. The Planning and Zoning Division has not received any negative comments about this proposal during the public comment period.
 - F. **Conclusion:** The staff finds that the proposal will not, on balance, result in any identifiable additional adverse impacts to the surrounding neighborhood when compared to the existing use.
8. **DECISION:** Based upon the findings and conclusions herein, the proposed Alteration of a Nonconforming Use is hereby **APPROVED** and is subject to the conditions of approval found in Section 2.

FEATURES

- Available in two sizes and four outputs up to 9,000 lumens
- A specially designed vandal resistant polycarbonate lens provides ultimate glare control which "softens" the light for no pixilation and unprecedented visual comfort
- Seamless retrofit solution for traditional HID sources up to 250W
- Wireless control, motion sensor, photocontrol and emergency battery back-up capability
- Available in 3000K, 4000K and 5000K nominal CCT



SPECIFICATIONS

CONSTRUCTION

- Rugged die-cast aluminum housing with corrosion resistant powder coat finish both protects and provides architectural appearance
- Heat dissipating fins provide superior thermal performance extending the life of the electronic components

OPTICS

- 3000K, 4000K and 5000K CCT nominal with 70 CRI
- Impact resistant polycarbonate diffuser
- Low luminance soft glow lens provides blended
- Non pixilated light for unprecedented visual comfort

INSTALLATION

- Mounts to 4" junction box and includes a gasket to seal electrical connections
- Mounting plate and hook on fixture allow easy 4 step installation and wiring
- Four ½" threaded conduit hubs for surface conduit provided

ELECTRICAL

- 20–277V, 50/60Hz electronic drivers
- 347V and 480V available in larger LSQ2 housing
- 10kA surge protection available as an option

CONTROLS

- Button photocontrol for dusk to dawn energy savings
- Stock versions include 120V–277V PC with a cover which provides a choice to engage photocontrol or not PC is installed in top hub
- Occupancy sensor available for on/off and dimming control in larger LSQ1 and LSQ2 housing
- Battery backup options available in larger LSQ2 housing rated for either 0°C or -30°C
- Performance exceeds NEC requirement providing 1 fc minimum over 10'x10' at 11' mounting height
- Battery backup units consume 6 watts when charging a dead battery and 2 watts during maintenance charging.
- EH (units with a heater) consume up to an additional 8 watts when charging if the battery temp is lower than 10°C

CERTIFICATIONS

- DLC® (DesignLights Consortium Qualified), with some Premium Qualified configurations. Not all product variations listed in this document are DLC® qualified. Refer to <http://www.designlights.org> for the most up-to-date list.

CERTIFICATIONS (CONTINUED)

- This product meets federal procurement law requirements under the Buy American Act (FAR 52.225-9) and Trade Agreements Act (FAR 52.225-11). See Buy America(n) Solutions (<https://www.currentlighting.com/resources/americasolutions>)
- Listed to UL1598 for use in wet location, listed for -40°C to 40°C applications
- Non-IC rated
- IP65

WARRANTY

- 5 year warranty

KEY DATA	
Lumen Range	3055–9431
Wattage Range	24–74
Efficacy Range (LPW)	117–133
Fixture Projected Life (Hours)	L70>185K
Weights lbs. (kg)	13.5–24 (6.1–10.9)



LSQ SERIES

LUMASQUARE

DATE:	LOCATION:
TYPE:	PROJECT:
CATALOG #:	

ORDERING GUIDE

Example: LSQ1-25-4K7-UNV-DBT-PCU

CATALOG #

Family	CCT/CRI	Voltage	Color/Finish	Control Options	Options
LSQ1-25 Size 1, 25w / 3,000lm	3K7 3000K, 70CRI	UNV 120V-277V	BLT Black Matte Textured	PCU Button Photocontrol (120-277V)	E Battery Backup Unit (0°C) ^{1,5}
LSQ1-40 Size 1, 40w / 4,500lm	4K7 4000K, 70CRI	120 120V	BLS Black Gloss Smooth	SCP Sensor Control, Programmable (Dim) ^{2,3}	EH Battery Backup Unit (-30°C) ^{1,5}
LSQ2-55 Size 2, 55w / 7,000lm	5K7 5000K, 70CRI	208 208V	DBT Dark Bronze Matte Textured	Specify MTG HT for SCP	F Fusing (voltage specific) ⁴
LSQ2-70 Size 2, 75w / 9,000lm		240 240V	DBS Dark Brone Gloss Smooth	8F Up to 8ft mounting height	2DR Dual Drivers ¹
		277 277V	GTT Graphite Matte Textured	20F Up to 20ft mounting height	2PF Dual Power Feed ^{1,4}
		UHV 347/480	LGS Light Grey Gloss Smooth		SPC Polycarbonate Vandal Shield
			PSS Platinum Silver Smooth		SP 10 kA Surge Protection
			WHT White Matte Textured		
			WHS White Gloss Smooth		
			VGTT Verde Green Textured		
			Color Option		
			CC Custom Color		

- Notes:
- 1 Available in LSQ2-55 and LSQ2-70 only
 - 2 Available in 120V-277V only
 - 3 Must order minimum of one remote control (SCP-REMOTE) to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings (120-277V only)
 - 4 Comes with Dual Driver (2DR) option
 - 5 Must specify voltage, 120 or 277V only

ACCESSORIES

Catalog Number	Description
☐ SCP-REMOTE	Remote control for SCP option. Order a minimum of one per project to program and control fixtures

PERFORMANCE DATA

					5K (5000K nominal, 70 CRI)					4K (4000K nominal, 70 CRI)					3K (3000K nominal, 80 CRI)				
Catalog number	# of LEDs	Drive Current	System Watts	Distribution	Lumens	LPW ¹	B	U	G	Lumens	LPW ¹	B	U	G	Lumens	LPW ¹	B	U	G
LSQ1	176	43mA	24.3	V	3181	131	2	3	2	3170	131	2	3	2	3055	126	2	3	2
		65mA	38.1	V	4626	121	2	3	2	4610	121	2	3	2	4443	117	2	3	2
LSQ2	352	43mA	54.6	V	7246	133	2	3	2	7221	132	2	3	2	6959	127	2	3	2
		65mA	73.5	V	9431	128	2	3	2	9398	128	2	3	2	9057	123	2	3	2

1 Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

ELECTRICAL DATA

Catalog number	# of Drivers	Input Voltage	Current (Amps)	System Power
LSQ1-25	1	120	0.21	25.7
		277	0.09	
LSQ1-40		120	0.31	
	1	277	0.13	37.0
LSQ2-55		120	0.43	
		277	0.19	
LSQ2-70	1	120	0.60	71.8
		277	0.26	

PROJECTED LUMEN MAINTENANCE

Ambient Temp.	OPERATING HOURS					L70 (hours)
	0	25,000	TM-21-11 36,000	50,000	100,000	
25°C / 77°F	1.00	0.95	0.93	0.91	0.83	>185,000
40°C / 104°F	0.97	0.92	0.90	0.88	0.80	>170,000

Projected per IESNA TM-21-11 * (Nichia 219B, 700mA, 85°C Ts, 10,000hrs) Data references the extrapolated performance projections for the LNC-12LU-5K base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

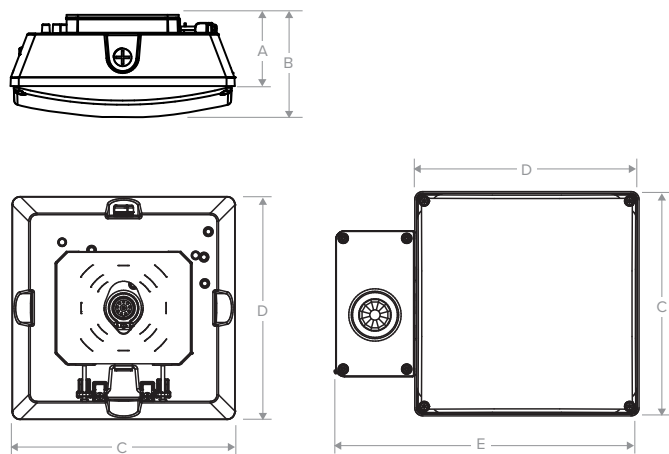
LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

AMBIENT TEMPERATURE		LUMEN MULTIPLIER
0° C	32° F	1.03
10° C	50° F	1.02
20° C	68° F	1.01
25° C	77° F	1.00
30° C	86° F	0.99
40° C	104° F	0.97
50° C	122° F	0.96

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

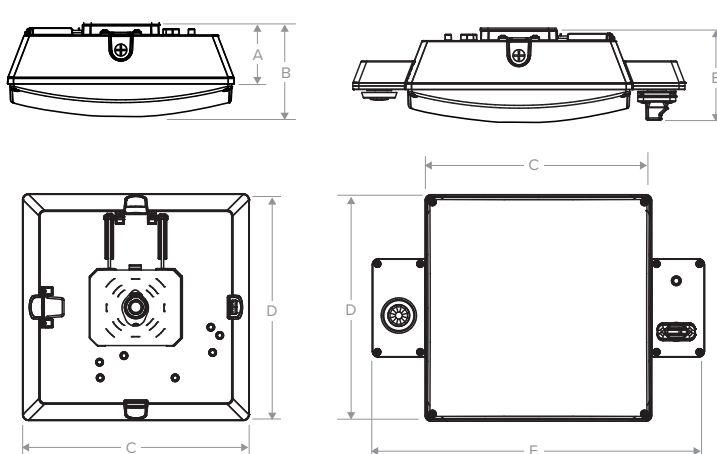
DIMENSIONS

LSQ1



A	B	C	D	E	Weight
3.0"	4.0"	10.0"	10.0"	13.5"	10 lbs.
76.2 mm	101.6 mm	254 mm	254 mm	343 mm	4.5 kg

LSQ2

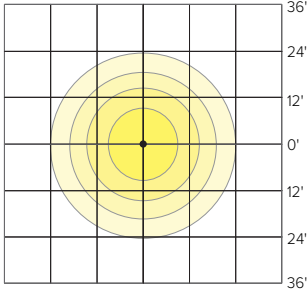


A	B	C	D	E	Weight
4.0"	6.0"	14.8"	14.8"	21.9"	15.5 lbs.
101.6 mm	152.4 mm	375 mm	375 mm	556 mm	7.0 kg

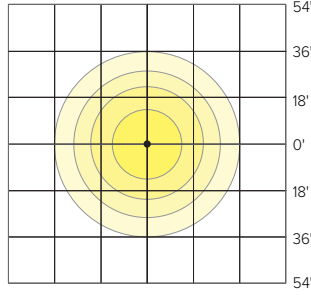
PHOTOMETRY

The following diagrams represent the general distribution options offered for this product. For detailed information on specific product configurations, see website photometric test reports.

LSQ1 – Mounting Height: 12ft



LSQ2 – Mounting Height: 18ft



ADDITIONAL INFORMATION

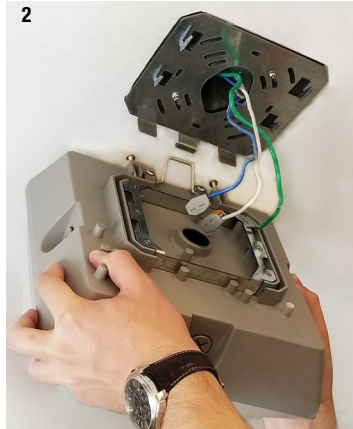
SHIPPING INFORMATION

Catalog Number	G.W(kg)/CTN	Carton Dimensions			Carton Qty. per Master Pack
		Length Inch (cm)	Width Inch (cm)	Height Inch (cm)	
LSQ1	10lbs (4.5 kg)	9.5 (24)	8.25 (21)	5.25 (13.32)	6
LSQ2	15.5lbs (7 kg)	14 (35.5)	11.5 (29.2)	8 (20.3)	2

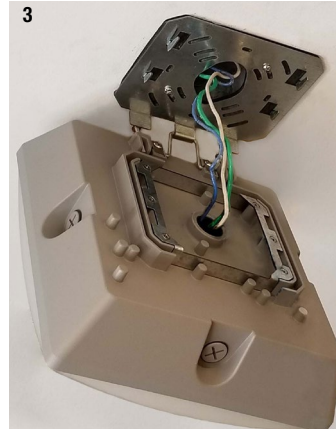
INSTALLATION



Mount plate to junction box.



Hang fixture on mounting plate with provided integral hook.



Complete wiring connections.



Two mounting screws close and secure fixture to the mounting bracket.