File No. EA2020-130

CITY OF RICHLAND
Determination of Non-Significance

Description of Proposal: Excavation and grading of approximately 9,800 cubic in order to prepare the site for the future construction of recreational buildings, swimming pool and parking for a neighborhood recreational center for the Westcliffe Heights subdivision.

Proponent: Pahlisch Homes
Attn: Chad Bettesworth/Justin Evans
210 SW Wilson Ave., Suite 100
Bend, OR 97702

Location of Proposal: The project site is located at 2368 Skyview Loop, Richland, WA 99352.

Lead Agency: City of Richland

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

( ) There is no comment for the DNS.

(**X**) This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for fourteen days from the date of issuance.

( ) This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

Responsible Official: Mike Stevens
Position/Title: Planning Manager
Address: 625 Swift Blvd., MS #35, Richland, WA 99352
Date: November 6, 2020

Signature_____

COMMUNITY DEVELOPMENT DEPARTMENT
625 Swift Blvd, Richland, WA 99352
Phone: 509-942-7794 Fax: 509-942-7764

GRADING PERMITS

Grading permits are regulated by Appendix J of the 2015 IBC. Fees are according to the fee schedule of the 1997 UBC Appendix Chapter 33, Table A-33-A (plan review fee) and Table A-33-B (grading permit).

SUBMITTAL REQUIREMENTS:

1. **Application for Grading Permit**
2. **Affidavit for Grading Operations**
3. **Site Plan -** A site plan showing existing grade and finished grade in contour intervals of sufficient clarity to indicate the nature and extent of the work shall be submitted. The grades must also show in detail that it complies with all the requirements for slopes and setbacks in Appendix J. The site plan must also show the existing grades on adjoining properties in sufficient detail to identify how grade changes will conform to the requirements of Appendix J. The City requires 6 sets of the site plan to be submitted.
4. **Geotechnical Report -** A soils report prepared by a registered design professional shall be provided. It must contain the minimum following information:
   a. Existing soils types and distribution of existing soils.
   b. Conclusions and recommendations for grading procedures, specifically describing that all Appendix J requirements are being met.
   c. Soil design criteria for any structures (walls, etc.) or embankments, required to accomplish the proposed grading.
   d. Slope stability studies and recommendations, specifically describing that all Appendix J requirements are being met, including recommendations and conclusions regarding site geology.
   e. Liquefaction study (required only where mapped maximum earthquake Ss is greater than 0.5g).
5. **SEPA required if more than 500 CY being moved.**

Inspection Process after Permit Issuance

In addition to periodic inspections by the City (pre-fill placement, all buried items—such as filter fabrics, etc.—prior to burial, and at least one inspection of one layer of fill placement during compaction), the owner shall hire either a certified special inspector or a registered design professional to inspect all work in accordance with Section 1705.6 of the 2015 IBC (site preparation, during fill placement, in-place density evaluations). Written field reports and density test reports by either the special inspector or by the registered design professional shall be submitted to the City following each site visit. A final inspection by the City will occur when all the work is done, all written reports have been submitted, AND written final letter from the special inspector or registered design professional is received. Final letter shall document compliance with the Geotechnical Report.

Please read and have your professionals read and apply each section of Appendix J concerning excavations, fills, and especially SETBACKS and drainage, terracing, and erosion. The plans and reports submitted before permit issuance must clearly show how each of these sections is being addressed in your proposal.

CITY OF RICHLAND

www.ci.richland.wa.us

Application for Grading Permit

PROJECT NAME / OWNER NAME Pahlisch Homes, Inc.			
Owner's or Tenant's Mailing Address / City / State / Zip 210 SW Wilson Ave Suite 100, Bend, OR 97702			Phone Number 541.385.6762
Fax Number	Cell Number		EMail
Property Owner (if different from Project Owner)			Phone Number
Property Owner's current Address / City / State / Zip			
Project Contact Name & Company	Contact Number		EMail
ADDRESS OF PROPERTY 2368 Skyview Loop, Richland, WA 99352			
Tax Parcel #	Subdivision Westcliffe Heights	Lot Tract L	Block
Lender Information – required for projects over $5000 in valuation per RCW 19.27.095 If a lender or bond company is not loaning monies on this project, please check here: ☐			
LENDING INSTITUTION – Name/Address			Phone Number
Description of project: (fully describe the type of grading to be done, fill to be used, wetlands, etc.)			
Grading to prepare for future buildings, and pool			
ESTIMATED # OF CUBIC YARDS OF EARTH TO BE MOVED, FILLED, AND/OR GRADED: 6,000 **CUBIC YARDS**			
CONTRACTOR FOR PROJECT (please note that all sub-contractors also must have a City of Richland business license)			
Name Mahaffey Enterprise INc			City Business License **Required prior to permit issuance** ☒ Yes ☐ No
Address/City/State/Zip 1213 S Clodfelter Rd, Kennewick, WA 99338			Phone 509.627.4593
Fax Number	Cell Number		EMail
CIVIL ENGINEER (required for certain grading permits, see Appendix J of the 2015 IBC)			
Name PBS Engineering	St License #	Phone Number 509.942.1600	Fax Number
Address/City/State/Zip 400 Bradley Blvd #106, Richland, WA 99352			EMail
SOILS ENGINEER (required for certain grading permits, see Appendix J of the 2015 IBC)			
Name WhiteShield	St License #	Phone Number 509.547.0100	Fax Number
Address/City/State/Zip 320 N 20th Ave, Pasco, WA 99301			EMail
Billing Account: - check party responsible for fees: ☒ Owner ☐ Contractor ☐ Applicant		**FOR OFFICE USE ONLY** **PERMIT#** **INITIALS**	

☐ I understand that this permit application is valid for 180 days. If the permit is not obtained within 180 days, all submittal documents will be discarded.

Signature of Owner or Authorized Agent — Date: 09/29/2020

COMMUNITY DEVELOPMENT DEPARTMENT
625 Swift Blvd., Richland, WA 99352
Phone: 509-942-7794 Fax: 509-942-7764

AFFIDAVIT FOR GRADING OPERATIONS

REQUIREMENTS FOR CITY INSPECTION OF GRADING

2368 Skyview Loop, Richland, WA 99352

Address or legal description of property where project is being proposed

grading for future buildings, and pool

Description of project (i.e., new commercial building, addition, new residence, etc.)

EXPLANATION OF CITY INSPECTION REQUIREMENTS

In accordance with the Appendix J of the IBC, it is the City's policy that grading operations shall require a permit. "Grading" is the movement of soil in the form of excavation and/or placement of fill. The City recognizes that grading is a necessary and beneficial activity when appropriately managed to reduce harmful effects to the community and the environment. Under an issued grading permit, multiple inspections will be specified. These City inspections are in addition to the required on-site observation and written field reports by the soils engineer AND are in addition to any required soils compaction testing by third-party testing agencies. To verify that you understand the requirements to receive a grading permit and to have the grading work inspected by the City, we are requiring the contractor, owner, or owner's agent who picks up the grading permit to sign this affidavit attesting that they understand the potential penalties allowed by law for failure to call for City inspection of the grading work.

The preliminary meeting noted in item #1 on the "green" permit sign-off card is ***MANDATORY.*** This meeting helps establish with the City inspector what the parameters of the grading operations will be, what kind of inspections will be needed, and how often.

As allowed by law in RMC Title 21 and building code Section 109, failure to call for inspections may result in fines of up to $5000/day and other legal penalties to be levied against the owner of the property, as well as notices to "stop work".

The City does not want to hinder development work, but serious grading problems have occurred because of failure to follow permit requirements. The City does not want to delay your project, so please follow these inspection requirements.

AFFIDAVIT

By signing below, I hereby affirm that I have read and understand the inspection requirements. I further attest and affirm that I understand the legal ramifications, including penalties as noted by law, for failure to call for City inspection of the grading work for which this permit is being issued. My signature below represents a good faith effort to ensure that the grading contractor will call for City inspection of the grading work as noted on the permit sign-off card ("green card"). I will keep this sign-off card and the field set of approved plans on the job site for the City inspector to use during inspections. If a sub-contractor is hired to accomplish the grading work, I hereby affirm that all information relating to City inspections as noted herein and as noted on the permit sign-off card will be given to the sub-contractor. If I am not the owner of the property for which this permit is being issued, then by my signature, I attest that I am an authorized agent of the owner and have authority to sign this affidavit on behalf of the owner.

09/29/2020

Signature of owner (or authorized representative of owner or corporation) Date

www.ci.richland.wa.us

Development Permitting Division
840 Northgate Drive
Richland, WA 99352
Telephone 509-942-7794

SEPA ENVIRONMENTAL CHECKLIST

UPDATED 2014

Purpose of checklist:

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

***Instructions for applicants*:**

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

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

Instructions for Lead Agencies:

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

Use of checklist for nonproject proposals:

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

A. BACKGROUND

1. Name of proposed project, if applicable: Westcliffe Heights Clubhouse

2. Name of applicant: Chad Bettesworth

3. Applicant contact information:
   Address: 210 SW Wilson Avenue; Suite 100
   Bend, OR 97702
   Phone #: 541-280-6242
   email address: chadb@pahlisch.com

4. Date checklist prepared: November 1st, 2020

5. Agency requesting checklist: City of Richland

6. Proposed timing or schedule (including phasing, if applicable):
   Project Begin: November 2020

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
   There are not any plans for future additions or expansions of the clubhouse.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
   The project site was reviewed under SEPA in 2017 with the Westcliffe Heights Subdivision.

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

10. List any government approvals or permits that will be needed for your proposal, if known.
    A grading permit will be needed from City of Richland, building permits for the clubhouse and pool.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)
    None known.
    This proposal is for grading in parcel 134981080002000. This was originally part of the attached City of Richland Notice of Application and SEPA Determination (S2017-101) as well as the Westcliffe Heights Phase 2 Plat, also attached. The project will construct a clubhouse and pool amenity on the lot.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.
    These parcels are located in Westcliffe Heights Phase 2, Tract L. Recorded in Volume 15 of Plats at Page 668. This is north of the I-82, and south of Queensgate Drive. Address 2368 Skyview, Richland, WA. (See attached map)

…location cont'd:

_____

_____

_____

_____

B. ENVIRONMENTAL ELEMENTS

1. Earth

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

b. What is the steepest slope on the site (approximate percent slope)? +/- 85% %

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. The majority of the site is silty soil, while higher elevations contain basalt cobbles and gravel in a silt matrix, per Cut Slope evaluation by Foundation Engineering, Inc.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. There are existing steep slopes onsite that appear to be stable with slight evidence of raveling in some locations.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.
The site will be graded to create a nearly flat building pad. Approximate quantity of soil to be moved is 9,800 cubic yards. All fill will be from material excavated on site.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Potential erosion, both wind blown and runoff, are possible as a result of construction and will be managed with a temporary erosion control plan approved by the City of Richland

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
The completed project will have asphalt parking, buildings and pool. This equates to approximately 30% Imp.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
Dust control with water trucks, soil tackifier, silt fencing and recommendations per the developed erosion control plan

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. During Construction there will be exhaust from construction equipment as well as dust. After construction emissions would be unchanged from prior construction conditions.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. None Known

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
During construction, emissions will be limited to working hours and dust will be controlled by person operated watering devices.

3. Water

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.
No.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.
No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
None.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so,
describe the type of waste and anticipated volume of discharge.
No.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.
No.

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

None proposed.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
Water will be retained on-site and discharged at the pre-developed rate to an existing storm stub that was provided to the site and designed with the Westcliffe Heights subdvision.

2) Could waste materials enter ground or surface waters? If so, generally describe.
Not to the applicant's knowledge.

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

The proposed does not alter or otherwise affect the drainage patterns in the vicinity of the site.

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

None at this time.

4. Plants

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

____deciduous tree: alder, maple, aspen, other
____evergreen tree: fir, cedar, pine, other
____shrubs
_x_ grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

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

None.

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

None to the applicant's knowledge.

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

None at this time.

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

None to the applicant's knowledge.

5. Animals

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

birds: (hawk,) heron, eagle, (songbirds,) other: _____

mammals: deer, bear, elk, beaver, other: _____

fish: bass, salmon, trout, herring, shellfish, other _____

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

None to the applicant's knowledge.

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

Yes, Richland is within the Pacific Flyway.

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

None at this time.

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

None to the applicant's knowledge.

6. Energy and natural resources

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

Electricity would be needed for the energy needs of the clubhouse and pool amenity.

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

No.

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

None

7. Environmental health

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

No.

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

None to the applicant's knowledge.

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

None to the applicant's knowledge.

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

None.

4) Describe special emergency services that might be required.

None.

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

None at this time.

b. **Noise**

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

None.

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

During construction, there will be construction noise due to equipment. At the completion of this project there is no noise expected in excess of what is currently existing.

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

None at this time.

8. Land and shoreline use

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

Currently the site and adjacent properties are vacant or single family residential subdivision lots. This proposal will not affect current land use nearby.

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

The sites prior use was not for working farm or forest lands.

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

No.

b. Describe any structures on the site.

None

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

No.

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

R-1-10: Single Family Residential

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

Single Family Residential

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

Not Applicable.

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

There are steep slopes throughout the site.

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

None.

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

None.

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

None.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: The site is to be built in accordance with City of Richland residential zoning requirements and was a planned use in the Westcliffe Heights subdivision.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

None

9. Housing

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

None..

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

None

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

None

10. Aesthetics

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

25 feet in height or as allowed by underlying zoning code.

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

None

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

None

11. Light and glare

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

Completed site would have wall mounted lighting on the building structure, for evening use.

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

No.

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

None

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

All lighting would be directed downward.

12. Recreation

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

None.

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

No.

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

The proposed clubhouse and pool would be a recreational amenity added to the Westcliffe Heights subdivsion.

13. Historic and cultural preservation

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

No.

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

Not to the applicant's knowledge.

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

None.

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

None.

14. Transportation

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

Skyview Drive and Legacy Lane boarder the proposed site.

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

No, the closest stop is 3-5 miles away.

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

The project would have 12 parking spaces, it would not eliminate any spaces.

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

None.

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

No

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

Not applicable

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

No

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

None

15. Public services

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

The proposed project would have structures on-site that would need increased fire protection.

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

None

16. Utilities

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

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

The proposed project would extend water, sewer, irrigation, power to the proposed clubhouse structures and pool. These services are available at the property line and were installed with the Westcliffe Heights project.

C. Signature

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

Signature: _____

Name of signee: Justin L. Evans

Position and Agency/Organization: Land Development Manager/Pahlisch Homes

Date Submitted: 10/30/2020

Community & Economic Development Department

This application was reviewed by the Planning Division of the Community & Economic Development Department. Any comments or changes made by the Department are entered in the body of the checklist and contain initials of the reviewer.

_____

Reviewer Signature Date

D. supplemental sheet for nonproject actions

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

   Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

   Proposed measures to protect such resources or to avoid or reduce impacts are:

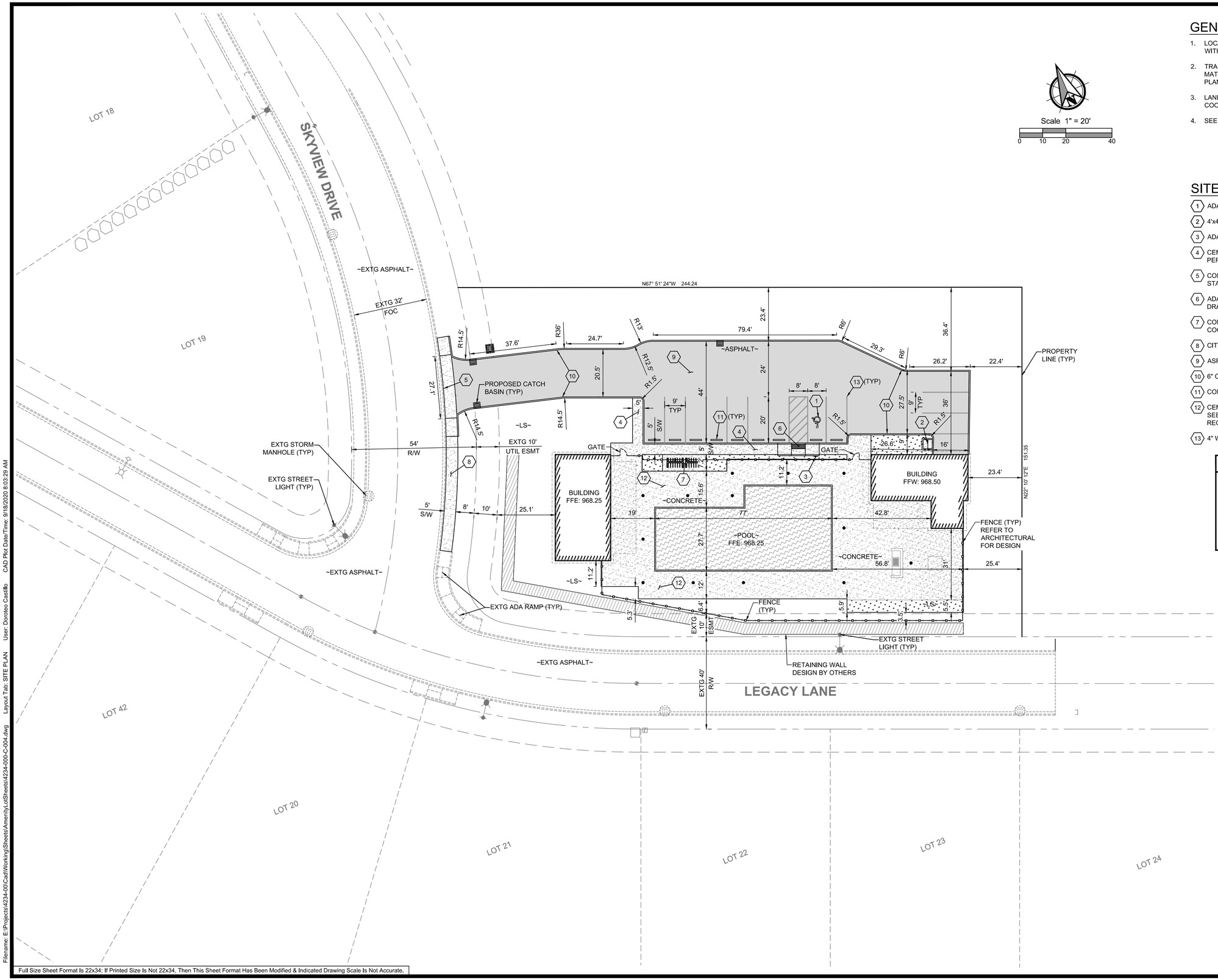
5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.



Scale 1" = 20'

0 10 20 40

GENERAL NOTES:

1. LOCATION AND TYPE OF LUMINAIRE TO BE COORDINATED WITH SITE LIGHTING PLAN
2. TRASH ENCLOSURE AND GATE CONSTRUCTION AND MATERIALS TO BE COORDINATED WITH ARCHITECTURAL PLAN
3. LANDSCAPE CONSTRUCTION AND MATERIALS TO BE COORDINATED WITH LANDSCAPE PLAN
4. SEE SHEET C02 FOR SITE GENERAL NOTES.

SITE KEYED NOTES:

1. ADA PARKING PER DETAIL 3, SHEET C06.
2. 4'x4'x6" TRASH ENCLOSURE PER DETAIL 5, SHEET C06.
3. ADA SIGNAGE PER DETAIL 4, SHEET C06.
4. CEMENT CONCRETE SIDEWALK 4" CONCRETE, 4" CSTC PER, PER DETAIL 10, SHEET C06
5. COMMERCIAL DRIVEWAY PER CITY OF RICHLAND STANDARDS DRAWING ST2A.
6. ADA RAMP TYPE 2A PER CITY OF RICHLAND STANDARDS DRAWING ST5.
7. CONCRETE PAD WITH BIKE RACK FOR (12) BIKES. COORDINATE WITH ARCHITECT ON BIKE RACK TYPE.
8. CITY STANDARD SIDEWALK PER CITY DETAIL ST1.
9. ASPHALT 2" HMA ON 4" CSBC PER DETAIL 11, SHEET C06.
10. 6" CONCRETE BARRIER CURB PER DETAIL 9, SHEET C06.
11. CONCRETE WHEEL STOP PER DETAIL 12, SHEET C06.
12. CEMENT CONCRETE POOL DECK 4" CONCRETE, 4" CSTC, SEE POOL DESIGN FOR BACKFILL AND TIE BACK REQUIREMENTS.
13. 4" WIDE WHITE PAINT STRIPE.

Surfacing Legend

- Asphalt Pavement
- Cement Concrete Sidewalk
- Cement Concrete Pavement Trash Enclosure
- Landscape Area

PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 106
Richland, WA 99352
509.942.1600
pbsusa.com

PBS

SITE PLAN FOR:
WESTCLIFFE HEIGHTS CLUBHOUSE
A SITE LOCATED IN RICHLAND, WA

811 Know what's below. Call before you dig.

JASON L. MATTOX
STATE OF WASHINGTON
21707
REGISTERED PROFESSIONAL ENGINEER
09/18/2020

DESIGNED:	DCC
CHECKED:	JLM
SEPTEMBER 2020	4234.000
SHEET ID	C04
SHEET	4 OF 6

Filename: E:\Projects\4234-00\Cad\WorkingSheets\Amenity\.otSheets\4234-000-C-004.dwg Layout Tab: SITE PLAN User: Dorotea Castillo CAD Plot Date/Time: 9/18/2020 8:03:29 AM

CITY OF RICHLAND NOTICE OF APPLICATION AND SEPA DETERMINATION (S2017-101)

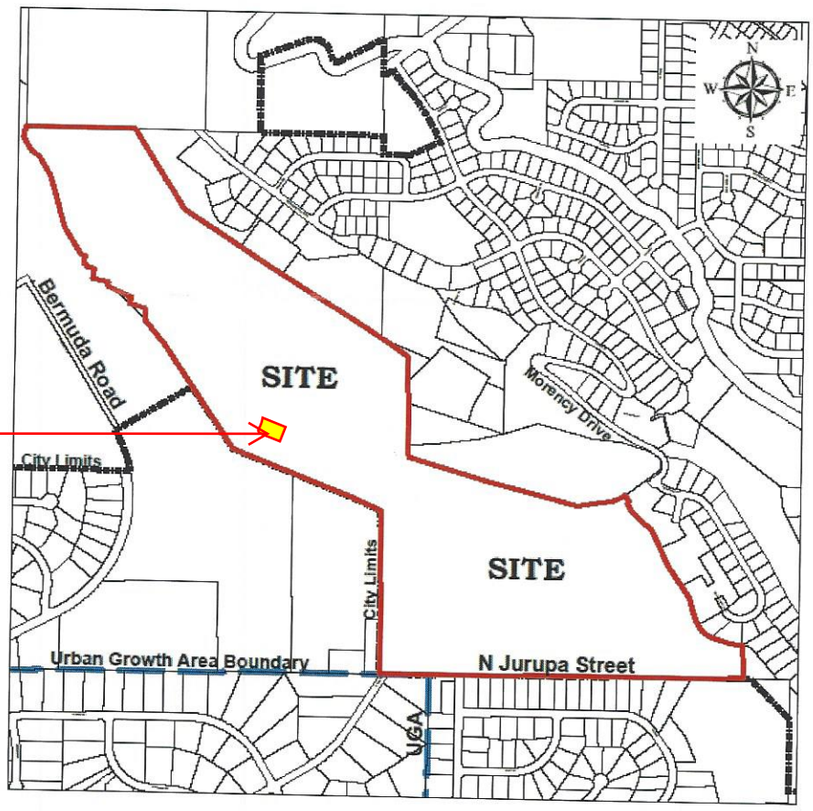
Notice is hereby given that Mark Bauder on February 3, 2017, filed an application for preliminary plat approval to subdivide an approximately 140.3 acre site into 203 single family residential lots (Preliminary Plat of Westcliffe Heights). The proposed plat is located north of N. Jurupa Street and south of Morency Court, in an area locally referred to as Little Badger Mountain. The proposed plat would have an average lot size of 14.557 square feet.

Notice is also given that the City of Richland has issued a Mitigated Determination of Non-Significance (MDNS). An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request. This MDNS is issued under WAC 197-11-350; the lead agency will not act on this proposal until **March 22, 2017**.

Further notice will be given establishing the date on which a public hearing will be held before the Hearings Examiner.

Any person desiring to express their views or to be notified of any decisions pertaining to this application should notify Shane O'Neill, Senior Planner, 840 Northgate Drive, Richland, WA 99352. Comments may also be faxed to (509) 942-7587 or emailed to soneill@ci.richland.wa.us.

Location of proposed grading



PLAT OF WESTCLIFFE HEIGHTS PHASE 2

LOCATED IN NE 1/4 AND SE 1/4 OF SECTION 34, TOWNSHIP 9 NORTH, RANGE 28 EAST, W.M.
CITY OF RICHLAND, BENTON COUNTY, WASHINGTON

LEGAL DESCRIPTION

TRACT J, PLAT OF WESTCLIFFE HEIGHTS PHASE 1B, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 15 OF PLATS, PAGE 638, RECORDS OF BENTON COUNTY, WASHINGTON.

CITY OF RICHLAND NOTES:

1. ADDRESSES SHOWN IN [BRACKETS] ARE SUBJECT TO CHANGE BY THE CITY OF RICHLAND, ZIP CODE: 99352.
2. THE NORTHEAST SIDE OF LEGACY LANE IS DESIGNATED NO PARKING THROUGH WESTCLIFFE HEIGHTS PHASE 2. THE NORTHEAST SIDE OF SKYVIEW LOOP IS DESIGNATED "NO PARKING" FROM THE SOUTHERLY MOST CORNER OF LOT 63 SOUTHEASTERLY TO THE POINT WHERE THE RIGHT OF WAY IS 34' WIDE ON THE NORTHEAST SIDE OF CENTERLINE.
3. THE PLAT OF WESTCLIFFE HEIGHTS PHASE 2 LIES WITHIN THE BOUNDARY OF THE SOUTH RICHLAND COLLECTOR STREET FINANCING PLAT (RNC 12.03), AS SUCH, EACH DWELLING UNIT WITHIN THE PLAT SHALL THEREFORE BE SUBJECT TO THE FEES ADMINISTERED BY THE FINANCE PLAN FOR ANY PHASE SUBMITTED FOR APPROVAL.
4. ALL LANDSCAPED AREAS WITHIN THE PLAT THAT ARE IN THE PUBLIC RIGHT OF WAY SHALL BE THE RESPONSIBILITY OF THE HOMEOWNERS TO MAINTAIN.
5. TRACT INFO: TRACTS K & R WILL BE TRANSFERRED TO THE WESTCLIFFE HEIGHTS HOMEOWNERS ASSOCIATION FOR OPEN SPACE & SLOPE PROTECTION. TRACT L WILL BE TRANSFERRED TO THE WESTCLIFFE HEIGHTS HOMEOWNERS ASSOCIATION FOR FUTURE AMENITY DEVELOPMENT. TRACTS N, & O ARE FOR FUTURE DEVELOPMENT BY BAUDER LAND & DEVELOPMENT INC. TRACT P WILL BE CONVEYED TO THE CITY OF RICHLAND FOR OPEN SPACE. TRACT S WILL BE FOR OPEN SPACE. THERE IS NO TRACT M WITHIN THIS PLAT.
6. THE VISION CLEARANCE TRIANGLE ON LOT 78 AND TRACT L, DEPICTED IN DETAIL B HEREON, SHALL CONFORM TO RMC 12.11, INCLUDING FUTURE REVISIONS THEREOF.
7. THE NORTHEASTERLY SIDE OF SKYVIEW LOOP AND THE NORTHEASTERLY SIDE OF LEGACY LANE ARE DESIGNATED "NO VEHICULAR ACCESS" ALONG THE FRONTAGE OF TRACTS Q, P, S, & K AND ALONG THE LEGACY LANE FRONTAGE OF LOT 78, EXCEPT AT THOSE SPECIFIC LOCATIONS SHOWN AS "DESIGNATED ACCESS POINT" HEREON, AND EXCEPT THAT PORTION OF TRACT S WHERE THE RIGHT OF WAY OF SKYVIEW LOOP IS 34' WIDE ON THE NORTHEAST SIDE OF CENTERLINE.

APPROVALS

THIS PLAT IS HEREBY APPROVED BY AND FOR THE CITY OF RICHLAND, CO. OF BENTON, STATE OF WASHINGTON

CITY MANAGER — DATE 1/23/2020

CITY CLERK — DATE 1/23/2020

CITY ENGINEER — DATE 1/23/2020

IRRIGATION APPROVAL

I HEREBY CERTIFY THAT THE PROPERTY DESCRIBED HEREON IS LOCATED WITHIN THE BOUNDARIES OF THE BADGER MOUNTAIN IRRIGATION DISTRICT, AND THAT THE IRRIGATION EASEMENTS SHOWN ON THIS PLAT ARE ADEQUATE TO SERVE ALL LOTS SHOWN HEREON. I FURTHER CERTIFY THAT THOSE LOTS WHICH ARE ENTITLED TO IRRIGATION WATER UNDER OPERATING RULES AND REGULATIONS OF THE DISTRICT HAVE SATISFIED THE REQUIREMENTS OF RCW 58.17.310 AND THAT ALL ASSESSMENTS HAVE BEEN PAID THROUGH THE YEAR 20 20.

BADGER MOUNTAIN IRRIGATION DISTRICT — DATE 1/23/2020

TREASURER'S CERTIFICATE

I HEREBY CERTIFY THAT THE TAXES ON THE LAND DESCRIBED HEREON HAVE BEEN PAID TO AND INCLUDING THE YEAR 2020. PARCEL NUMBER 1-3498-107-0010-000

BENTON COUNTY TREASURER — DATE 1-24-2020

BENTON COUNTY ASSESSOR — DATE 1-24-2020

OWNERS CERTIFICATE

KNOW ALL PERSONS BY THESE PRESENTS THAT WE ARE THE OWNERS OF THE LAND SHOWN ON THE PLAT OF WESTCLIFFE HEIGHTS PHASE 2, HEREBY DECLARE SAID PLAT AND DEDICATE TO THE PUBLIC, FOR THE USE OF THE PUBLIC FOREVER, ALL EASEMENTS AND RIGHT OF WAYS AS SHOWN HEREON.

JESSICA HOLLANDSWORTH
BAUDER LAND & DEVELOPMENT INC.

ACKNOWLEDGMENT

STATE OF WASHINGTON
COUNTY OF Benton) S.S.

I CERTIFY THAT I KNOW OR HAVE SATISFACTORY EVIDENCE THAT JESSICA HOLLANDSWORTH IS THE PERSON WHO APPEARED BEFORE ME, AND SAID PERSON ACKNOWLEDGED THAT SHE SIGNED THIS INSTRUMENT, ON OATH STATED THAT SHE WAS AUTHORIZED TO EXECUTE THE INSTRUMENT AND ACKNOWLEDGED IT AS THE [illegible] OF BAUDER LAND & DEVELOPMENT INC TO BE THE FREE AND VOLUNTARY ACT OF SUCH PARTY FOR THE USES AND PURPOSES MENTIONED IN THE INSTRUMENT.

DATED: 11/14/2020

SIGNATURE: [signature]

TITLE: NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON RESIDING AT: Franklin Co.

MY APPOINTMENT EXPIRES: 11/14/23

NOTARY STAMP (BLACK INK ONLY)

SURVEYOR'S CERTIFICATION

I, DAVID P. BAALMAN, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF WASHINGTON (REGISTRATION NO. 41028) HEREBY CERTIFY THAT THE PLAT OF WESTCLIFFE HEIGHTS PHASE 2, AS SHOWN HEREON IS BASED UPON AN ACTUAL FIELD SURVEY OF THE LAND DESCRIBED AND THAT ALL ANGLES, DISTANCES, AND COURSES ARE CORRECTLY SHOWN AND THAT THE MONUMENTS HAVE BEEN SET AND THE LOT CORNERS STAKED AS SHOWN ON THE PLAT.

DAVID P. BAALMAN — DATE 1-8-2020

SCALE IN FEET (100 50 0 100 200 300)

SURVEYOR'S NOTES:

1. BASIS OF BEARING IS GRID, US STATE PLANE, NAD 83/2011 BASED ON INDEPENDENT GNSS OBSERVATIONS OF EACH MONUMENT SHOWN HEREON.
2. (M) = MEASURED (R) = RECORD (C) = COMPUTED.
3. ○ =DENOTES SET 5/8"x24" REBAR WITH ORANGE PLASTIC CAP STAMPED "RSI DPB 41028".
4. ⊗ =DENOTES SET 3.5" BRASS CAP IN CONCRETE IN MONUMENT CASE STAMPED "41028".
5. ⊕ =DENOTES FOUND 3.5" BRASS CAP IN CONCRETE IN MONUMENT CASE STAMPED "2018 PLS 46318" PER PLAT OF WESTCLIFFE HEIGHTS PHASE 1B (VOL 15 PG 638) OR MONUMENT AS NOTED
6. ● =DENOTES FOUND 5/8" REBAR "MATARAZZO 46318" PER PLAT OF WESTCLIFFE HEIGHTS PHASE 1B (VOL 15 PG 638) OR MONUMENT AS NOTED
7. EQUIPMENT AND PROCEDURES USED: MULTI-FREQUENCY GNSS RECEIVERS USING REAL TIME KINEMATIC METHODS.
8. TRACT Q IS ENCUMBERED BY AN EXISTING ACCESS EASEMENT TO BENEFIT TRACT E, PLAT OF WESTCLIFFE HEIGHTS PHASE 1A PER THE PLAT THEREOF, WHICH IS NOT SHOWN GRAPHICALLY HEREON FOR CLARITY.
9. EXISTING PUBLIC UTILITY, WATER LINE, AND ACCESS EASEMENTS WHICH FALL IN ROAD RIGHTS OF WAY DEDICATED HEREON ARE NOT SHOWN HEREON FOR CLARITY.

AUDITOR'S CERTIFICATE

FILED FOR RECORD AT THE REQUEST OF MARK BAUDER; RECORDED IN VOLUME 15 OF PLATS, PAGE 0668 RECORDS OF BENTON COUNTY, WASHINGTON, AT 23 MINUTES PAST 1 P.M., THIS 27th DAY OF JAN, 20 20 A.D.

BRENDA CHILTON by Richard Hall (Deputy)
BENTON COUNTY AUDITOR

2020-002770
FEE NUMBER

8. PER WHITEHEAD, INC. GEO-TECH ENG. REPORT FOR WESTCLIFFE HTS. 2 (WSI PROJ NO. 119-089-01) NOV. 7'19, WSI RECOMMENDS THE USE OF SHALLOW INFILTRATION TRENCHES OR SURFACE SWALES FOR THE DISPOSAL AND MANAGEMENT OF STORM WATER AT EACH HOME.

Curve Table

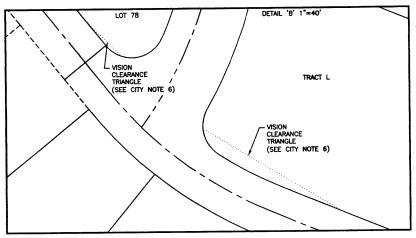
CURVE	LENGTH	RADIUS	DELTA	CH. BRNG.	CHORD
C1	51.31	327.00	8°59'26"	N84°31'59"W	51.26
C2	100.23	327.00	17°33'44"	N71°15'24"W	99.84
C3	97.84	327.00	17°08'38"	N53°54'13"W	97.48
C4	65.11	327.00	11°24'28"	N39°37'40"W	65.00
C5	23.16	273.00	4°51'36"	S86°35'53"E	23.15
C6	111.37	273.00	23°22'26"	S72°28'52"E	110.60
C7	121.24	273.00	25°26'45"	S48°04'17"E	120.25
C8	6.79	273.00	1°25'29"	S34°38'10"E	6.79
C9	107.81	280.00	22°03'40"	S22°53'35"E	107.15
C10	27.66	280.00	5°39'36"	S9°01'57"E	27.65
C11	147.49	280.00	30°10'47"	N8°53'14"E	145.79
C12	51.13	25.00	117°10'30"	N82°33'53"E	42.67
C13	69.39	320.03	12°25'24"	S45°03'13"E	69.26
C14	92.45	320.03	16°33'06"	S59°32'28"E	92.13
C15	92.23	334.00	15°49'15"	N1°42'28"E	91.93
C16	119.20	334.00	20°26'54"	N19°50'33"E	118.57
C17	37.99	25.00	87°04'09"	S13°28'05"E	34.44
C19	29.70	213.50	7°58'11"	N10°11'15"W	29.67
C20	111.16	320.00	19°54'25"	N23°56'13"W	110.62
C21	288.53	300.00	55°06'16"	N51°28'33"W	277.53
C22	145.15	300.00	27°43'16"	N20°03'47"W	143.74
C23	226.00	300.00	43°09'48"	N15°22'45"E	220.70
C24	35.46	300.03	6°46'17"	S42°13'40"E	35.44
C25	116.27	300.03	22°12'13"	S56°42'55"E	115.54
C26	52.85	280.03	10°48'52"	S82°24'36"E	52.78

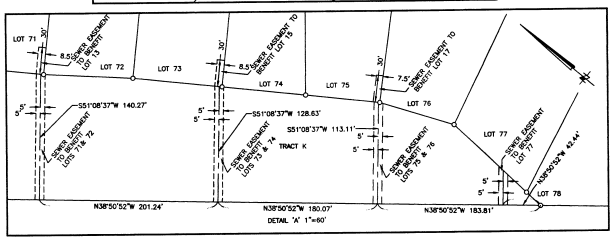
Line Table

LINE	DIRECTION	LENGTH
L1	N33°55'25"W	32.21
L2	N26°50'13"W	14.80
L3	N39°50'13"W	42.13
L4	N88°45'15"W	27.96
L5	S33°55'25"E	32.21
L6	S4°00'39"E	56.74
L7	S33°55'25"E	12.20
L8	S53°50'58"W	33.76
L9	S67°49'01"E	1.83
L10	N6°12'09"W	7.02
L11	N14°10'20"W	22.62
L12	N14°01'00"W	86.59
L13	S6°12'09"E	16.49
L14	S33°55'25"E	23.28
L15	N38°50'31"W	28.66
L16	N38°50'52"W	144.34

Line Table

LINE	DIRECTION	LENGTH
L17	N37°26'21"W	58.34
L18	N5°49'55"E	117.07
L19	S84°10'05"E	41.10
L20	N5°49'55"E	36.21
L21	S40°28'38"E	26.11
L22	S40°28'38"E	62.14
L23	S40°28'38"E	86.66
L24	S40°28'38"E	85.28
L25	S37°32'52"E	16.00
L26	S37°32'52"E	70.01
L27	N40°25'09"W	79.90
L28	S40°30'26"E	70.00
L29	S40°30'12"E	70.07
L30	S40°27'37"E	64.28
L31	N57°58'15"E	10.00





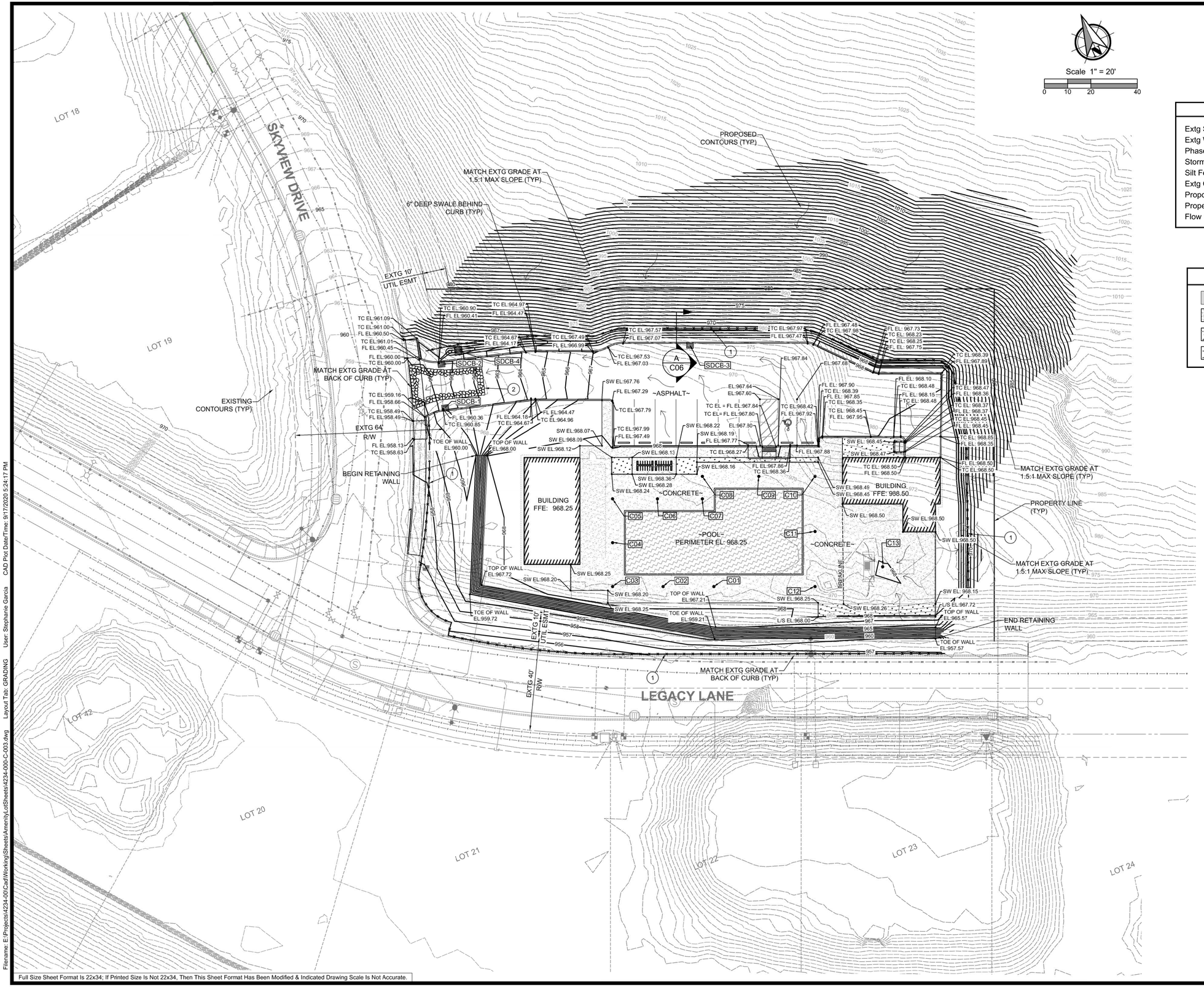
ROGERS SURVEYING INC., P.S.
1455 COLUMBIA PARK TRAIL
RICHLAND, WA. 99352
PHONE (509) 783-4141
FAX: (509) 783-8994
www.rogerssurveying.com

30819-PLAT.DWG 10-3-19 DPB

SHEET 1 OF 1

[redacted]

Location of proposed grading



Scale 1" = 20'

0 10 20 40

T.E.S.C. KEYED NOTES:

1. EROSION CONTROL FENCE (1/C06)
2. STABILIZED CONSTRUCTION ENTRANCE (2/C06)

Linetype Legend

Extg Sanitary Sewer Pipe	SS
Extg Water Pipe	WL
Phase Limits	
Storm Pipe	
Silt Fence	
Extg Contour	700
Proposed Contour	700
Property Line	
Flow Path	

Surfacing Legend

- Asphalt Pavement
- Cement Concrete Sidewalk
- Cement Concrete Pavement Trach Enclosure
- Landscape Area

DRAIN INLET TABLE

NAME	DESCRIPTION	RIM	IE OUT
C01	AREA DRAIN	968.15	965.81
C02	AREA DRAIN	968.15	965.59
C03	AREA DRAIN	968.15	965.37
C04	AREA DRAIN	968.15	965.18
C05	AREA DRAIN	968.15	964.99
C06	AREA DRAIN	968.15	964.80
C07	AREA DRAIN	968.15	964.61
C08	AREA DRAIN	968.15	964.51
C09	AREA DRAIN	968.15	964.75
C10	AREA DRAIN	968.15	964.99
C11	AREA DRAIN	968.15	965.23
C12	AREA DRAIN	968.15	965.47
C13	AREA DRAIN	967.95	965.56
SDCB-1	CATCH BASIN	960.46	957.63
SDCB-2	CATCH BASIN	960.52	958.02
SDCB-3	CATCH BASIN	967.22	963.27
SDCB-4	CATCH BASIN	961.63	958.43

PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 106
Richland, WA 99352
509.942.1600
pbsusa.com

PBS

GRADING AND EROSION PLAN FOR:

WESTCLIFFE HEIGHTS CLUBHOUSE

A SITE LOCATED IN RICHLAND, WA

Know what's below. Call before you dig.

Digitally signed by Jason L. Matox
Date: 2020.09.18 08:50:38 -07'00'

JASON L. MATOX — STATE OF WASHINGTON — 44707 — REGISTERED PROFESSIONAL ENGINEER

09/18/2020

DESIGNED:	DCC
CHECKED:	JLM
SEPTEMBER 2020	4234.000
SHEET ID	C03
SHEET	3 OF 6

PBS | Engineering + Environmental

Geotechnical Engineering Report

Westcliffe Heights
Richland, Washington

Prepared for:
Chad Bettesworth, PE
Pahlisch Homes
1020 N. Center Parkway Suite A
Kennewick, Washington 99336

March 24, 2017
Project No. HDJ4234.000

400 Bradley Boulevard, Suite 300, Richland, WA 99352
509.942.1600 Main
866.727.0140 Fax
www.pbsenv.com

Bend | Boise | Coos Bay | Eugene | Portland | Seattle | Tri-Cities | Vancouver | Walla Walla

March 24, 2017

Geotechnical Engineering Report
Westcliffe Heights
Richland, Washington

Prepared for:
Chad Bettesworth
Pahlisch Homes
1020 N. Center Parkway Suite A
Kennewick, Washington 99336

Prepared by:

03/24/2017

Adam Swenson, PE
Geotechnical Engineer

Reviewed by:

Ryan White, PE, GE (OR)
Geotechnical Discipline Lead

TABLE OF CONTENTS

SUPPORTING DATA

Figures

Appendix A – Field Explorations

Appendix B – Laboratory Testing

1.0 INTRODUCTION

1.1 General

PBS Engineering and Environmental Inc. (PBS) is pleased to present this geotechnical engineering report for the Westcliffe Heights project in Richland, Washington. This report presents the results of our geotechnical explorations, testing, and analyses for the proposed development. The general location of the site is shown on the Vicinity Map, Figure 1. The approximate locations of our explorations in relation to existing site features are shown on the Site Plan, Figure 2.

Previous reporting for the site has been submitted by Foundation Engineering, Inc. (FEI, August 2016). The report provided recommendations regarding the excavatability of the site soils and maximum temporary/permanent slope inclinations. Recommendations provided in the FEI report for these components of the project supersede recommendations made in this report.

1.2 Purpose and Scope

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

1.2.1 Geologic Map Review

Geologic maps of the site area were reviewed for information regarding geologic conditions and hazards at or near the site.

1.2.2 Subsurface Exploration

PBS completed eight test pits at the site (designated as TP-1 through TP-8). The test pits were advanced to depths up to 19 feet below the existing ground surface (bgs). The explorations were logged and representative soil samples were collected by a member of the PBS geotechnical engineering staff.

1.2.3 Field Infiltration Testing

PBS completed four infiltration tests within in three test pits, TP-1, TP-3, and TP-6, near areas where the proposed new stormwater systems will be located. Open-hole, falling head, infiltration testing was completed at depths between 8 and 17 feet bgs.

1.2.4 Soils Testing

The samples were returned to our laboratory and classified in general accordance with the Unified Soil Classification, Visual-Manual Procedure. Laboratory tests included grain-size analysis and moisture content.

1.2.5 Geotechnical Engineering Analysis

Data collected during the subsurface exploration, literature research, and laboratory testing was used to develop specific geotechnical design and construction recommendations for the proposed site development.

1.2.6 Report Preparation

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

- Exploration logs and site plan showing approximate exploration locations

- Laboratory test results
- Infiltration test results
- Discussion of subsurface conditions
- Discussion of critical areas indicated at the site as defined by the City of Richland, including steep slopes and erosion
- Earthwork, grading, and fill recommendations:
  - fill slope inclinations
  - structural fill materials and preparation
  - wet/cold weather considerations
  - utility trench excavation and backfill requirements
- Seismic design criteria in accordance with the 2015 International Building Code (IBC) with Washington amendments

1.3 Project Understanding

Current plans include developing the approximately 63-acre site for residential development in Richland, Washington. The site has been unused in recent years, but portions near the bottom of the slope may have been previously used for agricultural purposes.

1.4 Field Exploration

Eight test pits (TP-1 through TP-8) were excavated to depths up to 19 feet bgs by Mahaffey Enterprises, Inc., of Kennewick, Washington, using a Komatsu track-mounted excavator equipped with a 42-inch toothed bucket. The approximate test pit locations are shown on the Site Plan, Figure 2. Interpreted test pit logs and field exploration methods are presented in Appendix A – Field Explorations.

1.5 Laboratory Testing

Soil samples obtained during our explorations were returned to the laboratory to aid in soil classification and to evaluate their general physical properties and engineering characteristics. Laboratory testing included grain-size analysis and moisture contents. Laboratory test results are included on the exploration logs in Appendix A.

2.0 SITE CONDITIONS

2.1 Surface Description

The approximately 140-acre site is long, oriented in the southeast-northwest direction, and is of a non-descript shape. The site is bordered to the north by the north slope of Little Badger Mountain, to the west and south by agricultural land, and to the east by an undeveloped south-facing hillside. The site is generally undeveloped, covered by grasses, weeds, and some native vegetation.

The site generally slopes downward to the south and southwest. The ground surface elevations range from approximately 900 feet above mean sea level (amsl) near the western extent of the site to about 1100 feet amsl near the eastern extent of the site (PBS survey, 2016).

Multiple areas within the proposed development are designated as critical areas due to high erosion potential and/or steep slopes. Steep slopes are defined as slopes exceeding 40 percent (2.5H:1V [horizontal to vertical]). Steep slopes, as defined by the City of Richland,

are present over roughly 15 percent of the site. The inclinations of site slopes are as steep as 75 percent (1.33H:1V), but are generally 20 percent (5H:1V) or flatter.

Preliminary site grading plans generally show fill will be placed in low areas of the site to raise or flatten site grades and facilitate stormwater drainage. Current plans include construction of new roadways, stormwater drainage and infiltration facilities, and installation of utilities.

2.2 Geologic Setting

2.2.1 Regional Geology

The site lies within the Pasco Basin, a structural and topographical low area that lies in the Columbia River Plateau physiographic province in southeast Washington and Northeast Oregon. This province consists of a series of flood basalt flows of the Columbia River Basalt Group (CRBG) of the Miocene Epoch and early Pliocene Epoch (between 17 and 6 million years ago) in age, forming an extensive volcanic plateau. The thick basalt of the CRBG forms the bedrock of the region. Crossing the Columbia Basin is a northwest-trending tectonic feature called the Olympic Wallowa Lineament (OWL). Right-lateral displacement on this transform structure influenced the formation of the Pasco Basin.

The Pasco Basin lies within a tectonic subdivision of the Columbia River physiographic province known as the Yakima Fold Belt (Riedel, et al., 1991). Deformation of the basalt flows has since occurred, generally attributed to regional north-south compression and associated folding, strike-slip faulting, and thrusting. This deformation of the basalt has generally led to a series of east-west trending anticlinal ridges and synclinal valleys that trend from North 50° west to North 50° east. The anticlines often have steeply dipping north flanks and more gently dipping southerly flanks.

2.2.2 Local Geology

Geologic maps show that surficial geology in the vicinity of the site consists of members of the CRBG (Mvsem [Elephant Mountain] and Mvsp [Pomona]), Quaternary flood deposits (Qfs), and wind-deposited loess (Ql). The flood deposits originated during the Pleistocene Period. These deposits formed when the Wallula Gap, located south of the site, temporarily dammed floodwaters catastrophically released from glacial Lake Missoula upon failure of an ice dam. This constriction resulted in the formation of Lake Lewis, which extended eastward from the Gap and into the Pasco Basin area, which was in existence only a few weeks at time. Repeated flooding produced by repeated ice dam failures resulted in layered sediment (Rockwell, 1979).

The southwestern base of Badger Mountain geology is mapped as loess (Ql). The wind-deposited soil consists primarily of silt and fine sand. The loess is shown as Holocene to Pleistocene Epoch in age.

2.3 Subsurface Conditions

2.3.1 Soil and Bedrock

PBS has summarized the subsurface units as follows:

SILT: Homogeneous, non-plastic sandy silt was encountered at the ground surface to between 1 foot and 14.5 feet bgs. Consistency of the observed silt appeared to vary from medium stiff to stiff.

Carbonate cementation of the silt soils was observed in TP-2 and TP-3.

Stiff silt was also encountered at a depth of 6 feet bgs, beneath the gravel in test pit TP-1, and extended to the 12-foot depth explored. The silt contained 29 to 30 percent sand.

GRAVEL Gravel was encountered in TP-1, TP-3, and TP-6 at varying depths. The gravel was encountered as shallow as at the ground surface up to a depth of 6 feet bgs. The coarse subrounded to subangular gravel was often stained with carbonate deposits. The gravel was encountered in a matrix of silt and sand. Based on the excavator's difficulty in excavation, relative density of the gravel was generally dense to very dense.

BASALT Very weak to medium weak (R1 to R3) basalt bedrock was encountered in six test pits, TP-2 and TP-4 through TP-8. Basalt was encountered between the depths of 1 and 14.5 feet bgs up to the maximum depth explored. Large, cobble-sized, carbonate stained pieces of basalt were encountered, as the basalt was often encountered in a highly-fractured state. Less often, the basalt was found in a severely-weathered state (TP-5) at a depth of 2 feet bgs. The rock was discolored and easily broken. Underlying the severely-weathered basalt the excavation encountered very severely weathered basalt resembling clay at a depth of 16 feet bgs.

2.3.2 Groundwater

Groundwater was not encountered to the depths explored during excavation of the test pits. Existing information regarding the groundwater depths in the general project area were obtained from local well logs available on the Washington Department of Ecology well log database website. Groundwater is likely found at a depth below 100 feet bgs.

Perched groundwater may be encountered at the project site due to variations in fill, alluvial deposits, and bedrock contact depths and will fluctuate due to variations in rainfall, irrigation, and the season.

2.3.3 Infiltration Testing

PBS completed four infiltration tests in three separate test pits. One test was conducted in TP-1, two in TP-3, and one in TP-6. Tests were conducted at depths of approximately 12 feet (TP-1), 8 and 17 feet (TP-3), and 10 feet bgs (TP-6). The tests were completed in general accordance with the procedures of open-pit falling head testing summarized in the Stormwater Management Manual for Eastern Washington. The test pits were excavated to the test depth and filled with water to approximately 4.8 feet (TP-1), 4.0 feet and 3.5 feet (TP-3), and 3.2 feet deep (TP-6), saturating the surrounding soils. The water was then allowed to drain and the water depth was recorded at regular, timed intervals using a pressure transducer, data logger, and by manual measurement.

The following Table 1 presents test depth, the measured infiltration rates, and soil classification.

Table 1. Infiltration and Laboratory Test Results

Test Pit	Depth of Infiltration Test (feet bgs)	Infiltration Rate[1] (inches/hour)	Soil Classification
TP-1	12	4.8	Sandy Silt (ML)
TP-3	8	7.0	Sandy Silt (ML)
TP-3	17	4.0	Cemented Silt with Sand (ML)
TP-6	10	1.6	Weathered Fractured Basalt

1. Field-measured infiltration rate.

Design infiltration rates are determined to account for the planned level of pre-treatment, maintenance, vegetation, siltation, etc. Field-measured infiltration rates are typically reduced by a factor of two to four for use in design. Based on the results of field testing and our analyses, we recommend using a factor of 2.5.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Geotechnical Design Considerations

The subsurface conditions at the site consist of loose to medium dense sandy silt. The on-site soils can be reused as structural fill if properly moisture conditioned. Excavation with conventional equipment is feasible throughout the site, though additional work may be required for excavation of cemented soils and fractured bedrock.

Special consideration should be made for clay soils, such as those encountered at depth in TP-5. The FEI report provides recommendations for what to do with the clay soils.

3.2 Critical Areas Review

The site consists of varying topography with a fairly consistent slope trending down to the south and southwest. The City of Richland Code defines steep slopes as slopes inclined at greater than 40 percent (approximately 2.5H:1V slope). Recommendations regarding some of the steep slopes are provided in the FEI report.

Steep slopes can be associated with geologic hazards, such as possible slope instability and soil erosion. Instability of slopes is more likely to occur when soils are wet, while soil erosion is more likely when large amounts of water flow over the ground surface.

Due to the extent of site grading and the proximity of existing structures, it may be necessary to slope and/or temporarily shore excavations during construction. Outside the development area, site slopes show no obvious signs of recent instability such as exposed soil, scarps, seeps, etc.

3.3 Critical Areas Recommendations

Based on our observations, slopes at the site show no signs of recent instability. Erosion of site soils where slopes are steeper can be controlled with site grading, use of erosion control matting, and/or rock blankets. Site grading and drainage design shall control all surface

drainage, including any potential on-site stormwater flow. Mitigation of this geohazard by site grading design will essentially reduce the geohazard to a level that is less than the conditions observed at the time of exploration.

We recommend that mass grading activities associated with the critical areas be executed in accordance with the civil engineering design plans. Mitigation of the erosion hazard at this site will be addressed by the civil engineering plans for the site, which will include site grading and stormwater management plans.

3.4 Site Stormwater Management

The stormwater management for the site shall comply with the Eastern Washington Stormwater Management Manual (Ecology, 2004). Stormwater disposal/infiltration devices require registration with the Washington State Department of Ecology as Underground Injection and Control (UIC) facilities. Stormwater disposal systems shall be designed per area requirements.

The perimeter ground surface and hard-scaping should be sloped to drain away from all structures. Gutters should be tight-lined to a suitable discharge and maintained as free flowing. Cut or fill slopes shall be prepared and maintained to control erosion in accordance with area requirements.

3.5 Seismic Design Criteria

The seismic design parameters, in accordance with the 2015 IBC, are summarized in Table 2.

Table 2. IBC Seismic Design Parameters

Parameter	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	S_s = 0.43 g	S_1 = 0.16 g
Site Class	D	
Site Coefficient	F_a = 1.46	F_v = 2.15
Adjusted Spectral Acceleration	S_{MS} = 0.62 g	S_{M1} = 0.35 g
Design Spectral Response Acceleration Parameters	S_{DS} = 0.41 g	S_{D1} = 0.23 g
Design Spectral Peak Ground Acceleration	**0.17 g**	

g – acceleration due to gravity

4.0 CONSTRUCTION RECOMMENDATIONS

4.1 Site Preparation

Construction of the proposed development will require removal of loose silt for mass grading activities or in-place compaction during the dry season. In general, this material can be reused as structural fill by placing and compacting it in lifts as structural fill during dry conditions. Once any loose soils are removed, the exposed subgrade should be moisture conditioned and compacted using a large, smooth-drum, vibratory roller making a minimum of four to six overlapping passes until the subgrade is relatively dense and well-keyed. The near-surface soils should then be replaced in lifts of up to 12 inches (uncompacted thickness) and compacted as structural fill. Due to the variability of the near-surface soils

present at the site, the subgrade should be evaluated by PBS personnel by observing proofrolls (described in the following section of this report) of the structural fill as it is prepared. Specific recommendations for preparation of structural fill are included in the following sections of this report.

Based on the results of our geotechnical exploration and analyses, we believe the near-surface silt soils may be reused as structural fill. However, this will require the removal of any organic material. The use of native soil also depends on the contractor's ability to moisture condition the soil to within a few percent of the optimum moisture content, as well as apply the required energy using adequately sized compaction equipment during site grading.

4.1.1 Proofrolling/Subgrade Verification

Following site preparation and prior to placing aggregate base for the foundations, building pad, or pavement section, 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 occur during wet conditions, or if proofrolling the subgrades will result in disturbance, they should be evaluated by qualified PBS personnel using a steel foundation probe. We recommend that PBS be retained to observe the proofrolling and perform the subgrade verifications. Unsuitable areas identified during the field evaluation should be recompacted or excavated to firm ground and replaced with structural fill.

4.1.2 Wet/Freezing Weather and Wet Soil Conditions

Surficial soils at the site consist primarily of silt with sand, which may be recompacted during wet conditions. Areas containing variable amounts of silt could possibly be encountered during construction. During wet conditions, these areas may require over-excavation and replacement. Site earthwork and subgrade preparation should not be completed during freezing conditions.

Protection of the subgrade is the responsibility of the contractor. Soils that have been disturbed during site preparation activities, or soft or loose zones identified during proofrolling or probing, should be removed and replaced with compacted structural fill.

4.2 Excavation

All excavations should be made in accordance with applicable OSHA and state regulations. The contractor is responsible for adherence to the Occupational Safety and Health Administration (OSHA) requirements. Near-surface soils encountered at the site consist of loose to medium dense sandy silt; some sloughing and caving should be anticipated.

Trench cuts may 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. The trench walls should be flattened if sloughing occurs or seepage is present. If shallow groundwater is observed during construction, use of a trench shield or other approved temporary shoring is recommended for cuts that extend below groundwater seepage, or if vertical walls are desired for cuts deeper than 4 feet bgs.

4.3 Structural Fill

Structural fills should be placed over subgrade that has been prepared in accordance with the Site Preparation and Wet/Freezing Weather and Wet Soil Conditions sections of this report. A wide range of material may be used as structural fill; however, all material used should be free of organic matter or other unsuitable materials and should meet the specifications provided in the 2016 Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT, SS 2016), depending on the application. A brief characterization of some of the acceptable materials and our recommendations for their use as structural fill is provided as follows.

4.3.1 Near-Surface Soils

Based on our geotechnical exploration, loose to medium dense silt with sand and the weathered fractured basalt encountered at the site may be suitable for mass grading applications during the dry season provided any encountered debris is removed. If the onsite soils are used as fill for mass grading, the silt and the fractured basalt materials should be worked together to create a stable fill material. Additionally, the fill should be free of any organic or deleterious material with grain-size typically less than 6 inches in diameter. Cobbles measuring more than 6 inches in diameter shall make up no more than five percent of the fill by weight. The material should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557 (modified Proctor), with a maximum uncompacted lift thickness of 12 inches. Due to the rocky nature of the native fill material, visual inspection of the material and methods of processing and compaction by a member of the PBS geotechnical engineering staff is recommended.

4.3.2 Imported Granular Materials

Imported granular material used during periods of wet weather or for haul roads, building pad subgrades, staging areas, etc., should be pit or quarry run rock, crushed rock, or crushed gravel and sand, and should meet the specifications provided in WSDOT SS 9-03.14(2) – Select Borrow. In addition, the imported granular material should be well graded between coarse and fine and of the fraction passing the US Standard No. 4 Sieve, less than 5 percent by dry weight should pass the US Standard No. 200 Sieve.

Imported granular material should be placed in lifts with a maximum uncompacted thickness of 9 inches, and be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D 1557.

During wet conditions, where imported granular material is placed over potentially soft-soil subgrades, we recommend a geotextile be placed between the subgrade and imported granular material. Depending on site conditions, the geotextile should meet WSDOT SS 9-33.2 – Geosynthetic Properties for soil separation or stabilization. The geotextile should be installed in conformance with WSDOT SS 2-12.3 – Construction Geosynthetic (Construction Requirements) and, as applicable, WSDOT SS 2-12.3(2) – Separation or WSDOT SS 2-12.3(3) – Stabilization. As an alternative to the use of the geotextile, the use of cobbles measuring 3 to 6 inches may be used for soil stabilization or as deemed suitable by the geotechnical engineer of record.

4.3.3 Base Aggregate

Base aggregate for floor slabs should be clean, crushed rock or crushed gravel. The base aggregate should contain no deleterious materials, meet specifications provided in WSDOT SS 9-03.12(1)A – Gravel Backfill for Foundations (Class A), and have less than

5 percent (by dry weight) passing the US Standard No. 200 Sieve. The imported granular material should be placed in one lift and compacted to at least 95 percent of the maximum dry density, as determined by ASTM D 1557.

4.3.4 Foundation Base Aggregates

Imported granular material placed at the base of excavations for spread footings, slabs-on-grade, and other below-grade structures should be clean, crushed rock or crushed gravel, and sand that is well graded between coarse and fine. The granular materials should contain no deleterious materials, have a maximum particle size of 1½-inch, and meet WSDOT SS 9-03.12(1)A – Gravel Backfill for Foundations (Class A). The imported granular material should be placed in one lift and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D 1557.

4.3.5 Trench Backfill

Trench backfill placed beneath, adjacent to, and for at least 2 feet above utility lines (i.e., the pipe zone) should consist of well-graded granular material with a maximum particle size of 1 inch and less than 10 percent by dry weight passing the US Standard No. 200 Sieve. The pipe bedding should also meet the standards prescribed by City of Richland specifications, where WSDOT SS 9-03.12(3) – Gravel Backfill for Pipe Zone Bedding applies. The pipe zone backfill should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department.

Within pavement areas or beneath building pads, the remainder of the trench backfill should consist of well-graded granular material with a maximum particle size of 3 inches, less than 10 percent by dry weight passing the US Standard No. 200 Sieve, and should meet standards prescribed by WSDOT SS 9-03.19 – Bank Run Gravel for Trench Backfill. This material should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department. The upper 2 feet of the trench backfill should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM D 1557.

Outside of structural improvement areas (e.g., roadway alignments or building pads), trench backfill placed above the pipe zone should consist of excavated material free of wood waste, debris, clods, or rocks greater than 6 inches in diameter and meet WSDOT SS 9-03.14 – Borrow and WSDOT SS 9-03.15 – Native Material for Trench Backfill. This general trench backfill should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department.

5.0 ADDITIONAL SERVICES AND CONSTRUCTION OBSERVATIONS

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

PBS 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 PBS be retained to observe general excavation, stripping, and fill placement and compaction. 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.

6.0 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 PBS. 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 PBS is notified immediately so that we may reevaluate the recommendations of this report.

Unanticipated soil and rock conditions and seasonal soil moisture and groundwater variations are commonly encountered and cannot be fully determined by merely taking soil samples in test pits. 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 services 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.

7.0 REFERENCES

International Building Code. (IBC). (2015). International Building Code. Country Club Hills, IL: International Code Council, Inc. Washington State Amendments to the International Building Code 2009 Edition, Effective July 1, 2010.

Riedel, Stephen, et al. (1991). Field Trip Guide to the Geology of the Pasco Basin and Surrounding Area, South-Central Washington, Washington State University.

Rockwell International. (1979). Compilation Geologic Map of the Pasco Basin, South Central Washington. RHO-BWI-ST-4, Rockwell Hanford Operations Energy Systems Group.

Washington State Department of Ecology. (2004). Stormwater Management Manual for Eastern Washington, publication number 04-10-076.

Washington State Department of Transportation (WSDOT SS). (2016). Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10, Olympia, Washington.

FIGURES

SOURCE: © 2016 GOOGLE EARTH PRO.

WASHINGTON

0' 1,000' 2,500' 5,000'

SCALE: 1" = 2,500'

PREPARED FOR: PAHLISCH HOMES

PBS	PROJECT # HDJ4234.000 DATE MAR 2017	VICINITY MAP WESTCLIFFE HEIGHTS RICHLAND, WASHINGTON	FIGURE 1

E:\Projects\4234-00\Geotechnical\GeoDWG\HDJ4234.000_FIG1-2.dwg Mar 23, 2017 03:17pm brandonw

SOURCE: © 2016 GOOGLE EARTH PRO.

LEGEND

TP-1 TEST PIT NUMBER AND APPROXIMATE LOCATION

0' 250' 500' 1,000'

SCALE: 1" = 500'

PREPARED FOR: PAHLISCH HOMES

PBS	PROJECT # HDJ4234.000 DATE MAR 2017	SITE PLAN WESTCLIFFE HEIGHTS RICHLAND, WASHINGTON	FIGURE 2

\\phsenv.lan\li\Projects_HDJ Pasco Projects\Projects\4234-000\Geotechnical\GeoDWG\HDJ4234.000_FIG1-2.dwg Mar 17, 2017 04:12pm jimb

APPENDIX A

Field Explorations

APPENDIX A – FIELD EXPLORATIONS

A1.0 GENERAL

PBS explored subsurface conditions at the project site by excavating eight test pits on August 10, 2016. The approximate locations of the explorations, designated TP-1 through TP-8, are shown on Figure 2. The procedures and techniques used to excavate the test pits, collect samples, and other field techniques are described in detail in the following paragraphs. Unless otherwise noted, all soil sampling and classification procedures were performed in general accordance with applicable ASTM standards. "General accordance" means that certain local and common drilling and descriptive practices may have been followed.

A2.0 TEST PITS

A2.1 Excavation and Sampling

The test pits were excavated using a track-mounted excavator, equipped with a 42-inch toothed-bucket, provided and operated by Mahaffey Industries Inc. of Kennewick, Washington, and were advanced to depths up to approximately 19 feet bgs. The test pits were observed by a member of the PBS geotechnical engineering staff who located the general areas for exploration and maintained a detailed log of the subsurface conditions and materials encountered during the course of the work. Representative disturbed samples were taken at selected depths in the test pits for classification and for physical testing in the PBS laboratory. The disturbed samples were sealed in plastic bags.

A2.2 Test Pit Logs

Test pit logs describe the subsurface conditions and types of materials encountered in the test pits and the depths where the materials or conditions changed, although the changes may be gradual. Each test pit log shows the depths of the samples obtained.

A3.0 MATERIAL DESCRIPTION

Initially, soil 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 PBS 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 the attached Table A-1, Terminology Used to Describe Soil and Rock.

PBS

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 percent 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 use of modifier words in general accordance with the ASTM D2488-06 Visual-Manual Procedure. "General Accordance" means that certain local and common descriptive practices may have been followed. In accordance with ASTM D2488-06, 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 describes the use of soil names and modifying terms used to describe fine- and coarse-grained soils.

Fine-Grained Soils (50% or greater fines passing 0.075 mm, No. 200 sieve)
The primary soil type, i.e., SILT or CLAY is designated through visual-manual procedures to evaluate soil toughness, dilatency, dry strength, and plasticity. The following outlines the terminology used to describe fine-grained soils, and varies 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 percent 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 ≥ 7). Descriptive terms are based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84, 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 D2488-06 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 percent. 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.

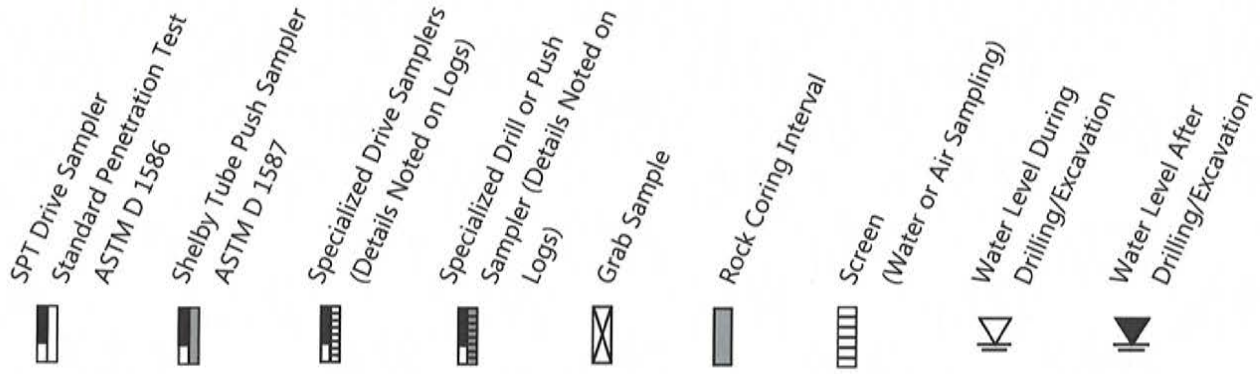
Cobble and boulder deposits may include a description of the matrix soils, as defined above.

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 D1586-84.

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

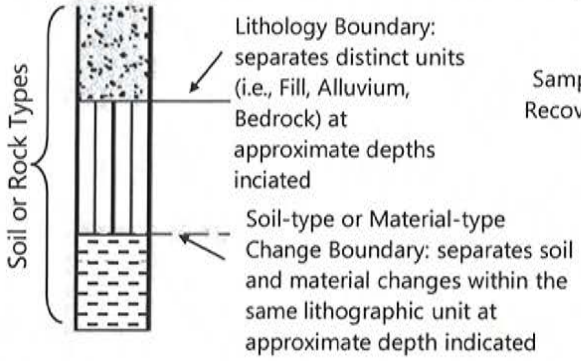
Table A-2
Key To Test Pit and Boring Log Symbols

SAMPLING DESCRIPTIONS

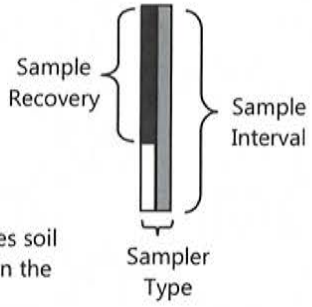


LOG GRAPHICS

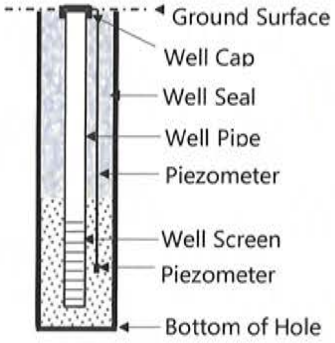
Soil and Rock



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	MSL	Mean Sea Level
CON	Consolidation	HCL	Hydrochloric Acid
UC	Unconfined Compressive Strength		

Details of soil and rock classification systems are available on request.

PBS

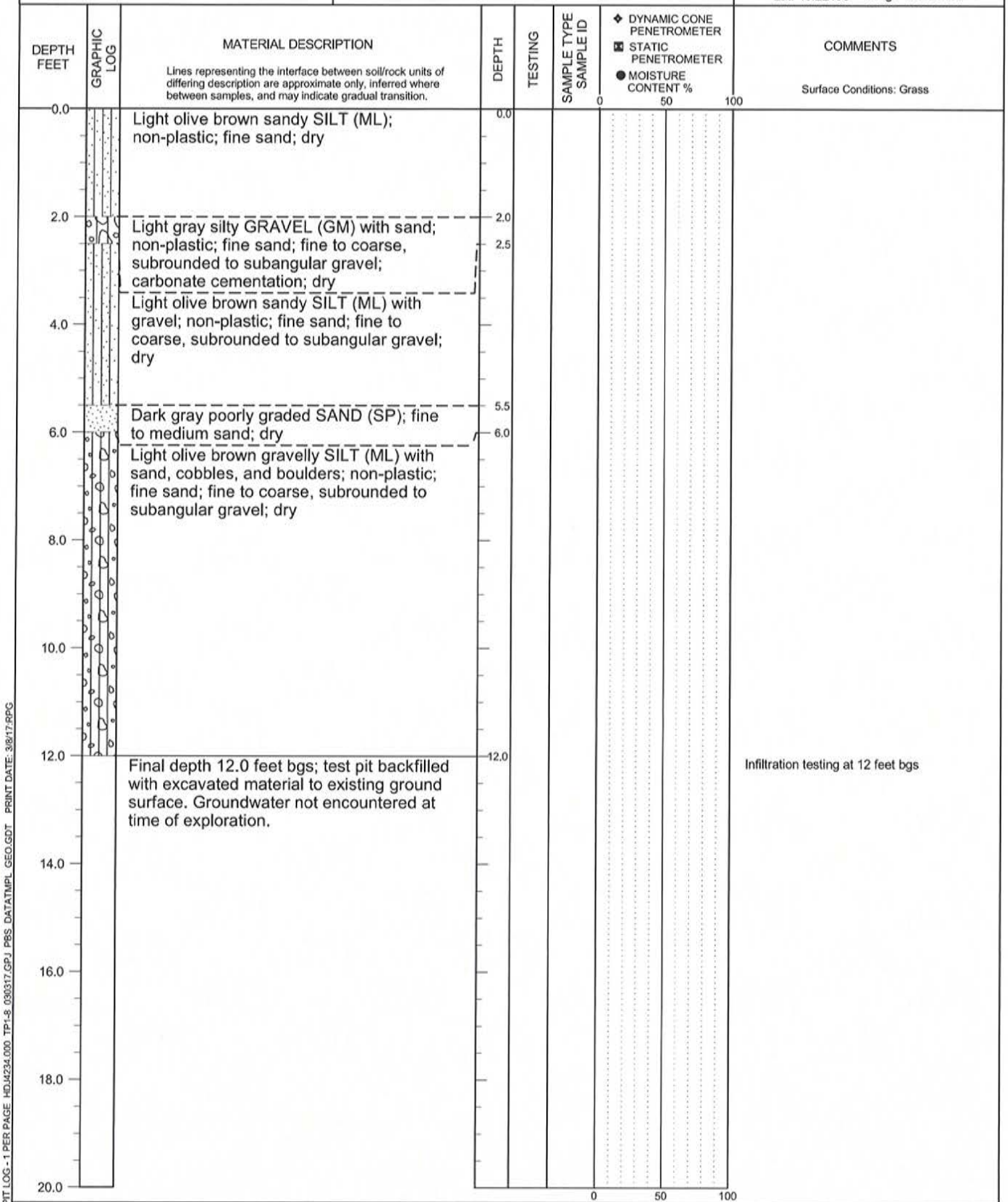
WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

PBS PROJECT NUMBER:
HDJ4234.000

TEST PIT TP-1

APPROX. TEST PIT TP-1 LOCATION:
(See Site Plan)

Lat: 46.22193 Long: -119.29499



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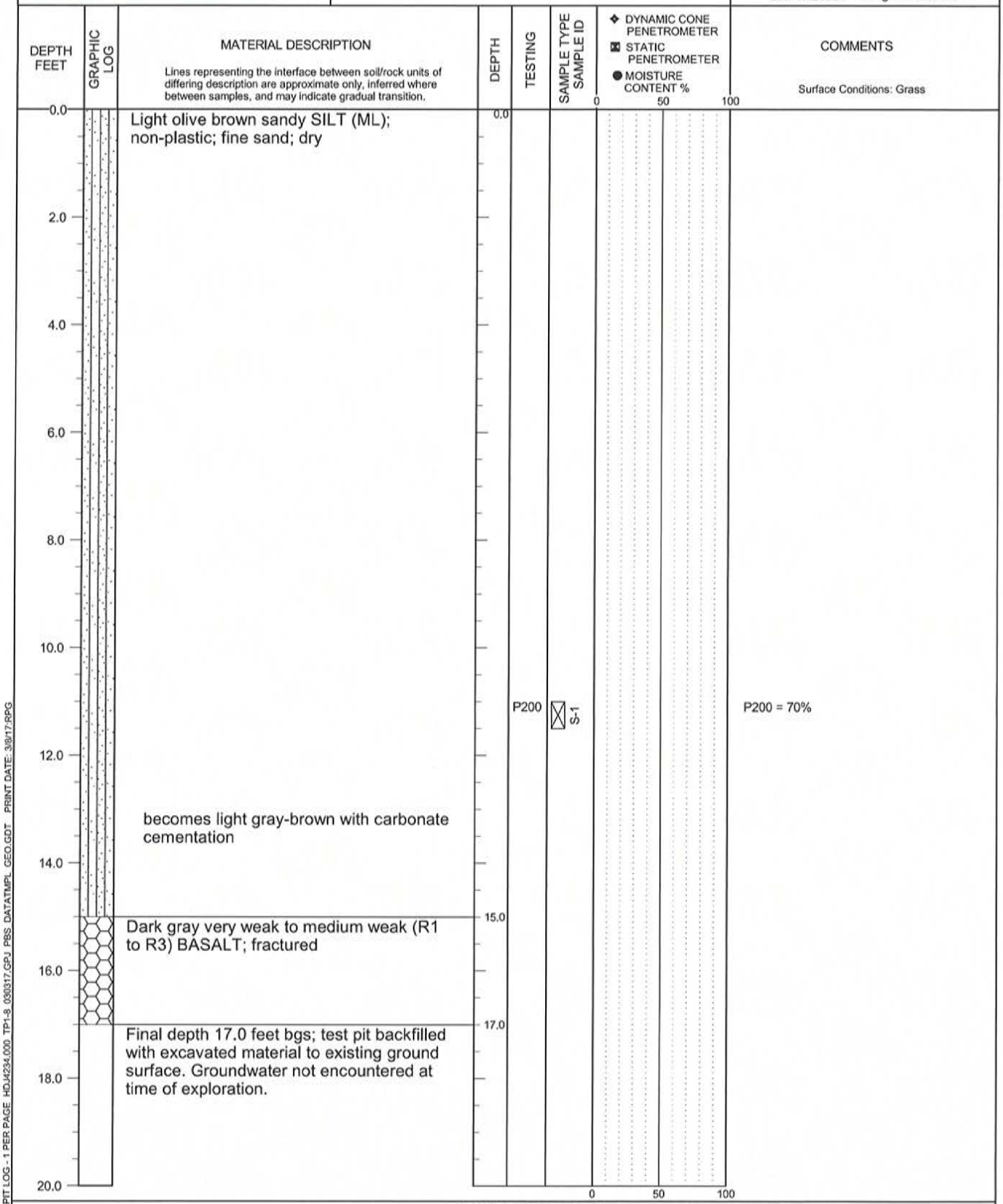
COMPLETED: 8/10/16

EXCAVATED BY: Mahaffey Enterprises, Inc.
EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A1
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

PBS	WESTCLIFFE HEIGHTS RICHLAND, WASHINGTON	**TEST PIT TP-2**
	PBS PROJECT NUMBER: HDJ4234.000	APPROX. TEST PIT TP-2 LOCATION: (See Site Plan) Lat: 46.21884 Long: -119.29145



TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

LOGGED BY: A. Swenson
COMPLETED: 8/10/16

EXCAVATED BY: Mahaffey Enterprises, Inc.
EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A2
Page 1 of 1

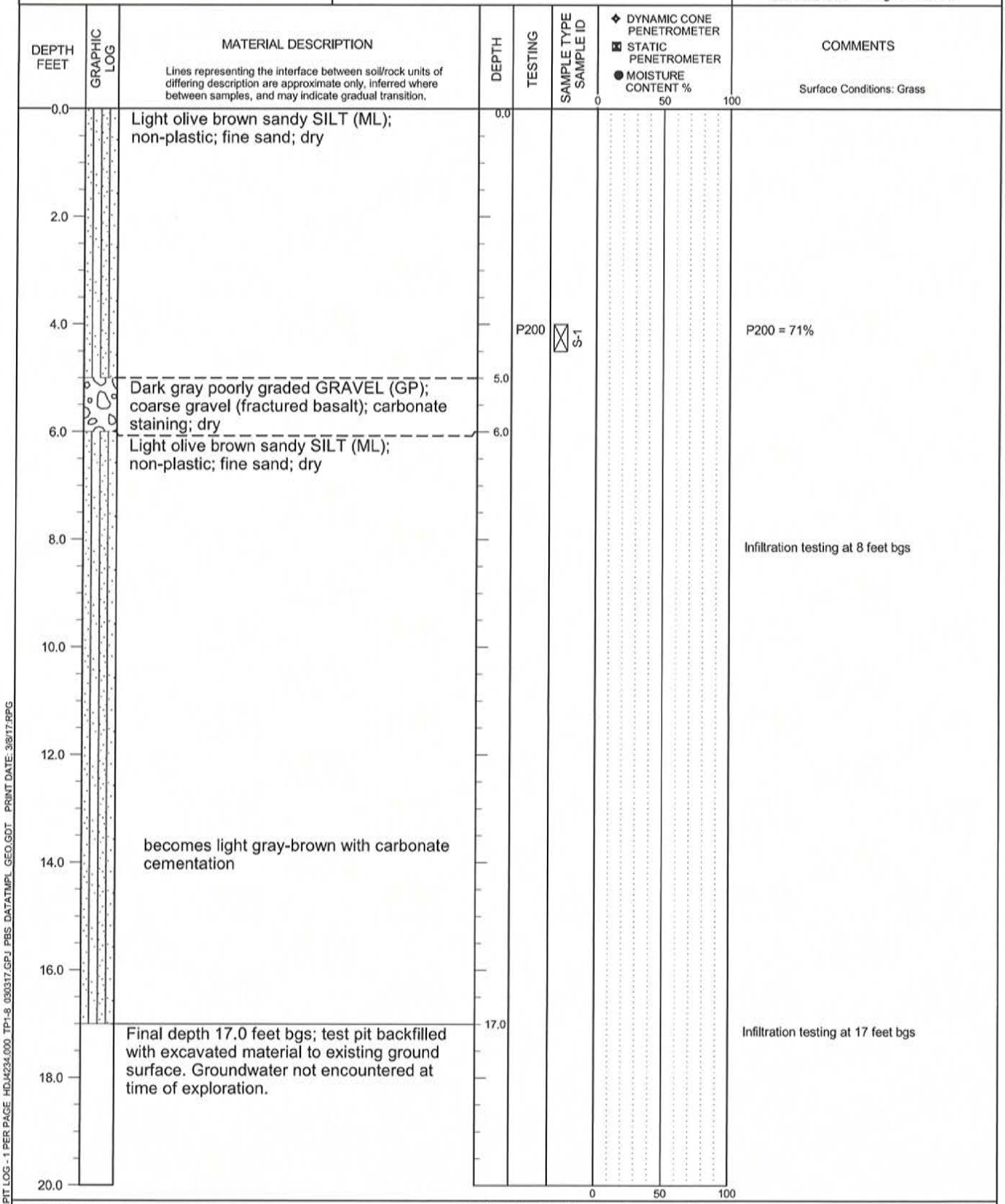
PBS

WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

TEST PIT TP-3

PBS PROJECT NUMBER:
HDJ4234.000

APPROX. TEST PIT TP-3 LOCATION:
(See Site Plan)
Lat: 46.21954 Long: -119.29194



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COMPLETED: 8/10/16

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EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A3
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

PBS

WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

TEST PIT TP-4

PBS PROJECT NUMBER:
HDJ4234.000

APPROX. TEST PIT TP-4 LOCATION:
(See Site Plan)

Lat: 46.21995 Long: -119.29119

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Light olive brown sandy SILT (ML); non-plastic; fine sand; dry	0.0				Surface Conditions: Grass
2.0		Moderately weathered very weak to medium weak (R1 to R3) BASALT; fractured; carbonate stained; dry	2.0				
4.0		becomes slightly weathered					
6.0		Final depth 6.0 feet bgs due to refusal in basalt; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	6.0				
8.0							
10.0							
12.0							
14.0							
16.0							
18.0							
20.0							

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COMPLETED: 8/10/16

EXCAVATED BY: Mahaffey Enterprises, Inc.
EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A4
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

PBS

WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

PBS PROJECT NUMBER:
HDJ4234.000

TEST PIT TP-5

APPROX. TEST PIT TP-5 LOCATION:
(See Site Plan)

Lat: 46.22100 Long: -119.29128

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE / SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Olive brown sandy SILT (ML) with gravel; non-plastic; fine sand; coarse, subangular to angular gravel; dry	0.0				Surface Conditions: Grass
3.0		Dark gray with orange mottles very weak (R1) BASALT; carbonate stained; mostly decomposed	3.0				
16.0		Yellow-brown Fat CLAY (CH); medium plasticity; severely weathered rock; moist	16.0		S-1		
19.0		Final depth 19.0 feet bgs; test pit backfilled with excavated material to existing round surface. Groundwater not encountered at time of exploration.	19.0				

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COMPLETED: 8/10/16

EXCAVATED BY: Mahaffey Enterprises, Inc.
EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A5
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

PBS

WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

TEST PIT TP-6

PBS PROJECT NUMBER:
HDJ4234.000

APPROX. TEST PIT TP-6 LOCATION:
(See Site Plan)

Lat: 46.22069 Long: -119.29153

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.				0 50 100	Surface Conditions: Grass
		Light olive brown silty GRAVEL (GM) with sand and cobbles; non-plastic; fine sand; fine to coarse, subrounded to subangular gravel; dry	0.0				
2.0		becomes light brown-gray; carbonate stained					
		becomes light olive brown					
4.0		becomes brown with fine to medium sand					
6.0		Dark gray slightly weathered very weak to medium weak (R1 to R3) BASALT; fractured; carbonate stained; dry	6.0				
8.0							
10.0		Final depth 10.0 feet bgs due to refusal in basalt; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				Infiltration testing at 10 feet bgs
12.0							
14.0							
16.0							
18.0							
20.0						0 50 100	

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EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A6
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

PBS

WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

TEST PIT TP-7

PBS PROJECT NUMBER:
HDJ4234.000

APPROX. TEST PIT TP-7 LOCATION:
(See Site Plan)

Lat: 46.21931 Long: -119.29022

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE / SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 – 50 – 100)	COMMENTS
0.0		Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.					Surface Conditions: Grass
0.0		Light olive brown sandy SILT (ML); non-plastic; fine sand; dry	0.0				
3.0		Light gray-brown to dark gray slightly weathered very weak to medium weak (R1 to R3) BASALT; fractured; carbonate stained	3.0				
9.0		Final depth 9.0 feet bgs due to refusal in basalt; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	9.0				

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COMPLETED: 8/10/16

EXCAVATED BY: Mahaffey Enterprises, Inc.
EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A7
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 3/6/17 RPG

PBS

WESTCLIFFE HEIGHTS
RICHLAND, WASHINGTON

TEST PIT TP-8

PBS PROJECT NUMBER:
HDJ4234.000

APPROX. TEST PIT TP-8 LOCATION:
(See Site Plan)

Lat: 46.21866 Long: -119.28811

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Light olive brown sandy SILT (ML); non-plastic; fine sand; dry	0.0				Surface Conditions: Grass
		Light gray-brown slightly weathered very weak to medium weak (R1 to R3) BASALT; fractured; carbonate stained	1.0				
2.0							
4.0							
6.0							
8.0							
10.0							
12.0							
		Final depth 13.0 feet bgs due to refusal in basalt; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	13.0				
14.0							
16.0							
18.0							
20.0							

0 50 100

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COMPLETED: 8/10/16

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EXCAVATION METHOD: Komatsu 400 LC with 42" Bucket

FIGURE A8
Page 1 of 1

TEST PIT LOG - 1 PER PAGE HDJ4234.000 TP1-8 030317.GPJ PBS_DATATMPL GEO.GDT PRINT DATE: 3/8/17 RPG

APPENDIX B

Laboratory Testing

APPENDIX B – LABORATORY TESTING

B1.0 GENERAL

Samples obtained during the field explorations were examined in the PBS laboratory. The physical characteristics of the samples were noted and the field classifications were modified where necessary. During the course of examination, representative samples were selected for further testing. The testing program on the soil samples included standard classification tests, which consisted of visual examination, moisture contents, and grain-size analyses. The classification tests yield certain index properties of the soils important to an evaluation of soil behavior. The testing procedures are described in the following paragraphs. Unless otherwise noted, all soil testing and classification procedures followed applicable ASTM standards.

B2.0 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 which best described the major portion of the sample was used. Modifying terminology to further describe the samples is defined in Terminology Used to Describe Soil and Rock 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 test pits logs in Appendix A.

B2.3 Grain-Size Analyses

Wash analyses (P200s) were completed on samples to determine the portion of soil samples passing the No. 200 Sieve (i.e., silt and clay). The results of the P200 testing are presented on the test pit logs in Appendix A.