



Planned Residential Development Staff Report and Recommendation

Community Development Department, Planning Division

REPORT DATE: July 10, 2023

HEARING DATE: July 17, 2023

LAND USE REQUEST: Planned Residential Development consisting of 65-lots including 59 lots for detached dwellings and 6 lots for attached dwellings

FILE NUMBER: 311-22-000027-PLNG

FILE NAME: Ritchey Ridge Planned Development and Subdivision

PROPERTY LOCATION: 1120 - 1260 Pacific Avenue
Washing County Tax Lots: 1S4010000800, 1S4010001000, 1S04010002800, 1S04010002900

OWNER: Rick and Steve Schmunk
5644 SE McInnis Street
Hillsboro, Oregon 97123

APPLICANT: John DeJong, Tech Engineering
PO Box 80483
Portland, Oregon 97280

APPLICANT'S REPRESENTATIVE: John Dejong, Tech Engineering
PO Box 80483
Portland, Oregon 97123

COMPREHENSIVE PLAN MAP DESIGNATION: A-Medium and B-Standard

ZONING MAP DESIGNATION: Residential R-7 and R-5

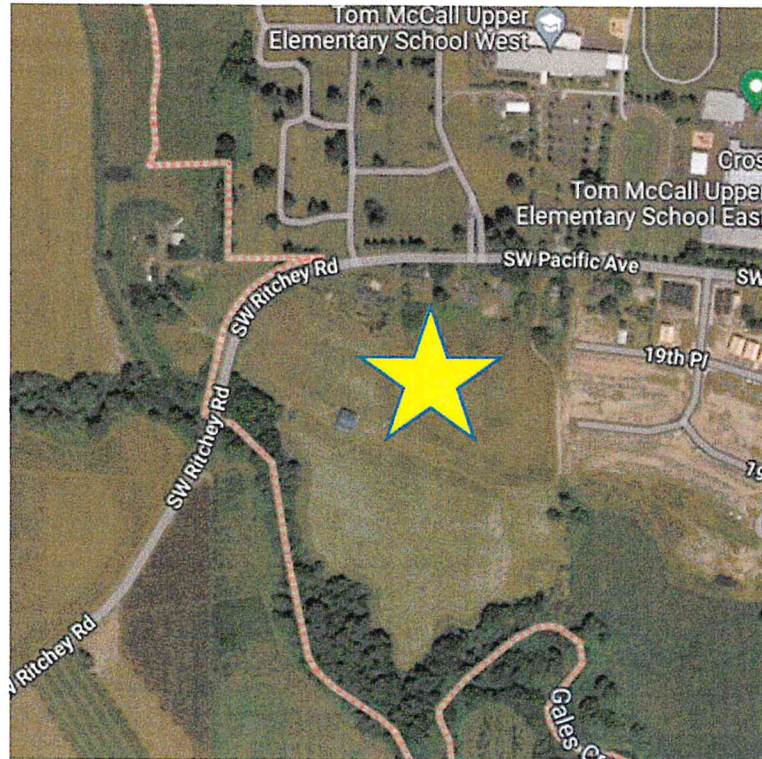
APPLICABLE STANDARDS AND CRITERIA: City of Forest Grove Development Code:
§17.3.100 et. seq. *Residential Zones*
§17.4.200 et. seq. *Planned Developments*
§17.6.095 et. seq. *Subdivisions*
§17.8.600 et. seq. *Public Improvements*
§17.8.900 et. seq. *Land Division Standards*

REVIEWING STAFF: Daniel Riordan, Senior Planner

RECOMMENDATION: Staff recommends approval with conditions

I. LAND USE HISTORY

Ritchey Ridge is a proposed planned residential development and concurrent subdivision on vacant land west of the Gales Creek Terrace development and south of Pacific Avenue. The site, as shown on the image below, has historically been used for agriculture purposes.



Prior to 2014, the property was zoned Residential Multifamily High. As part of the update to the Forest Grove Comprehensive Plan completed in 2014 the property was re-designated single-unit Residential R-7 and R-5. The change in zoning was based in part on the site's location at the periphery of the City's urban area. In addition, the site is not served by transit service which is one location factor for designating land Residential Multifamily High on the Official Zoning Map.

With the adoption of Oregon House Bill 2001 in 2019 and subsequent amendments to the Forest Grove Development Code, the R-7 and R-5 zoning districts now provide the opportunity to construct a variety of housing types including single-unit detached homes, single-unit attached homes, duplexes, triplexes, quadplexes and cottage clusters. Consistent with the intent of House Bill 2001, the proposed development includes 59 single-unit homes and 6 attached townhomes.

II. ANALYSIS

The applicant requests approval of a planned development and concurrent subdivision. Planned developments allow for deviations from certain development standards that would otherwise apply to subdivisions. As stated in Development Code §17.4.215(A): "The development standards of the base zone apply, unless they are superseded by the standards of this section or the PD

approval. Exceptions from the standards of the underlying zoning district must be warranted based on the unique design and amenities incorporated into the development plan, and shall have a beneficial effect which could not be achieved using the standards of the underlying zoning district.” The City Attorney has advised that planned developments cannot be used to achieve waivers or exceptions from other sections of the Development Code.

A. DESCRIPTION OF PROPOSAL:

The applicant proposes a development with a total of 65 lots of which 59 lots are for single-unit detached homes and 6 lots are for attached townhomes. The development site is approximately 10.6 acres in area. The proposed site plan also includes several tracts of land set-aside for open space and water quality purposes. Tracts are dispersed throughout the development sites. The Development Code requires that at least 20% of the buildable portion of a planned development not in streets and driveways must be devoted to open space (DC §17.4.215(K)). The tracts identified for open space comprise 2.3 acres or about 27% of the development not devoted to streets and driveways.

Proposed townhouse lots range in size from 2,252 square feet to 2,402 square feet. The Development Code establishes a minimum lot size of 1,500 square feet in the R-5 and R-7 zones. Lots intended for single-unit detached homes range in size from 3,007 square feet to 6,077 square feet. The standard minimum lot size established by the Development Code is 3,500 square feet in the R-5 and R-7 zone unless smaller lots are approved as part of a planned development. When a proposed planned site includes more than one base zoning district, the uses and residential density may be allocated throughout the site without regard to zoning boundaries (Development Code §17.4.215(D)).

Access to the development will be provided from 19th Place and 19th Avenue which currently terminates at the Gales Creek Terrace development. A new local street intersecting with Pacific Avenue near the western boundary of the development site and new private street intersecting Pacific Avenue serving four lots and a tract near the center of the development site are also proposed.

The proposed right-of-way for the extension of 19th Place is 58 feet consistent with the right-of-way in the Gales Creek Terrace development. The proposed right-of-way for the extension of 19th Avenue is 54 feet consistent with the street cross-section in the Gales Creek Terrace development.

As noted above, a new local street, labeled Schmunk Street on the site plan, near the western boundary of the development is proposed. The proposed right-of-way cross section is 54 feet similar to the 19th Avenue street cross-section. The new local street would end at 19th Place.

The site plan also shows a private street serving lots 16 through 19. The proposed private street is 35 feet in width. Sidewalks are proposed for one side of the street. The City’s minimum standard street width for a local street is 50 feet with sidewalks on both sides of the street. The Development Code grants the City Engineer authority to approve standards for private streets (Development Code §17.8.610(T)(1)). As required by Development Code §17.8.120(D), the private residential access drive shall be maintained in accordance with the provisions of the Uniform Fire Code. This requirement shall be included in the CC&Rs for the development and a private maintenance agreement benefitting Lots 16 through 19 and Tract E shall be recorded.

Nineteenth Avenue is shown to terminate in a cul-de-sac. The sites show a cul-de-sac street approximately 430 feet in length. The cul-de-sac street would serve 20 lots. The Development Code in §17.8.610(K) states a cul-de-sac shall be no more than 200 feet long, shall not provide access to greater than 20 dwelling units, and shall only be used when environmental or topographic constraints, existing development pattern, or strict adherence to other standards in this Code preclude street extension and through circulation. The need for the cul-de-sac is due to the vertical and horizontal curve of Ritchey Road at the western edge of the development site. The curve precludes a safe street intersection with Ritchey Road if 19th Place were extended. In addition, Ritchey Road is a Washington County facility and any access onto Ritchey Road requires Washington County approval which is not guaranteed.

Ritchey Ridge is proposed to be constructed in one phase. Development Code §17.4.220(D) stipulates a time limit for planned developments. The final plat for the final phase must be submitted no more than 4 years from the date of tentative plat approval. If that final plat is not submitted within 4 years, the tentative plat will need to be resubmitted for review against the Development Code criteria in effect at that time.

B. SITE EXAMINATION:

The development site consists of four discrete parcels with a gross land area of approximately 10.6 acres. The site slopes to the south and southwest toward Gales Creek. Gales Creek which is located between 250 to 800 feet south of the southern property boundary. The site's high point is approximately 244 feet near the center of the property and the low elevation is 179 feet at the south end of the site. Grades range from nearly level to a maximum of approximately 15%.

The site contains an abandoned house and barn near Pacific Avenue. The property primarily consists of open grassy land which has historically been used for agricultural purposes. The land was farmed until 2017 or 2018 for growing wheat.

Due to the maximum slope of the property the Oregon Department of Geology and Mineral Industries has designated the site and surrounding area as a moderate landslide hazard area. No landslides have been mapped on the property. Geological assessment will be required for each building lot prior to issuance of building permits.

C. COMPREHENSIVE PLAN DESIGNATION & ZONING OF SITE & AREA:

LOCATION	COMPREHENSIVE PLAN DESIGNATION	ZONE DISTRICT	LAND USE
Project Site	A-Medium B-Standard	R-7 R-5	Mostly fallow
North	Institutional	Institutional	Cemetery School
South	Outside Urban Growth Boundary	Washington County	Floodplain
East	High Density Residential	Residential High (RH)	High Density Residential

		Density	Subdivision
West	Inside Urban Growth Boundary B-Standard	Inside Urban Growth Boundary Washington County FD-10	Low Density Residential

D. DENSITY:

Development density is calculated based on the net land area of a development site. Net land area is the gross area less rights-of-way dedications and tracts set aside for common usage. Given the proposed number of homes (65) and net land area (approximately 8.5 acres) the net density of the proposed development is 7.65 units per acre which falls between the target density for the A-medium and B-Standard Comprehensive Plan designation of 8.71 and 6.22 units per net acre respectively.

E. TRANSPORTATION:

The applicant provided a traffic impact study prepared by a registered engineer. The study is attached with the application materials (Exhibit A). The analysis compares current conditions with traffic potentially generated by the proposed development. The study also addressed potential impact at nearby street intersections including Pacific Avenue and B Street, Pacific Avenue and E Street, and B Street and 19th Avenue.

The traffic analysis indicates studied street intersections will operate acceptably during the afternoon peak hour (worst case scenario) with the proposed development upon completion and at build out. The analysis concludes that no mitigations are necessary or recommended with development of the site. There's no additional information in the record that suggests traffic mitigation is needed.

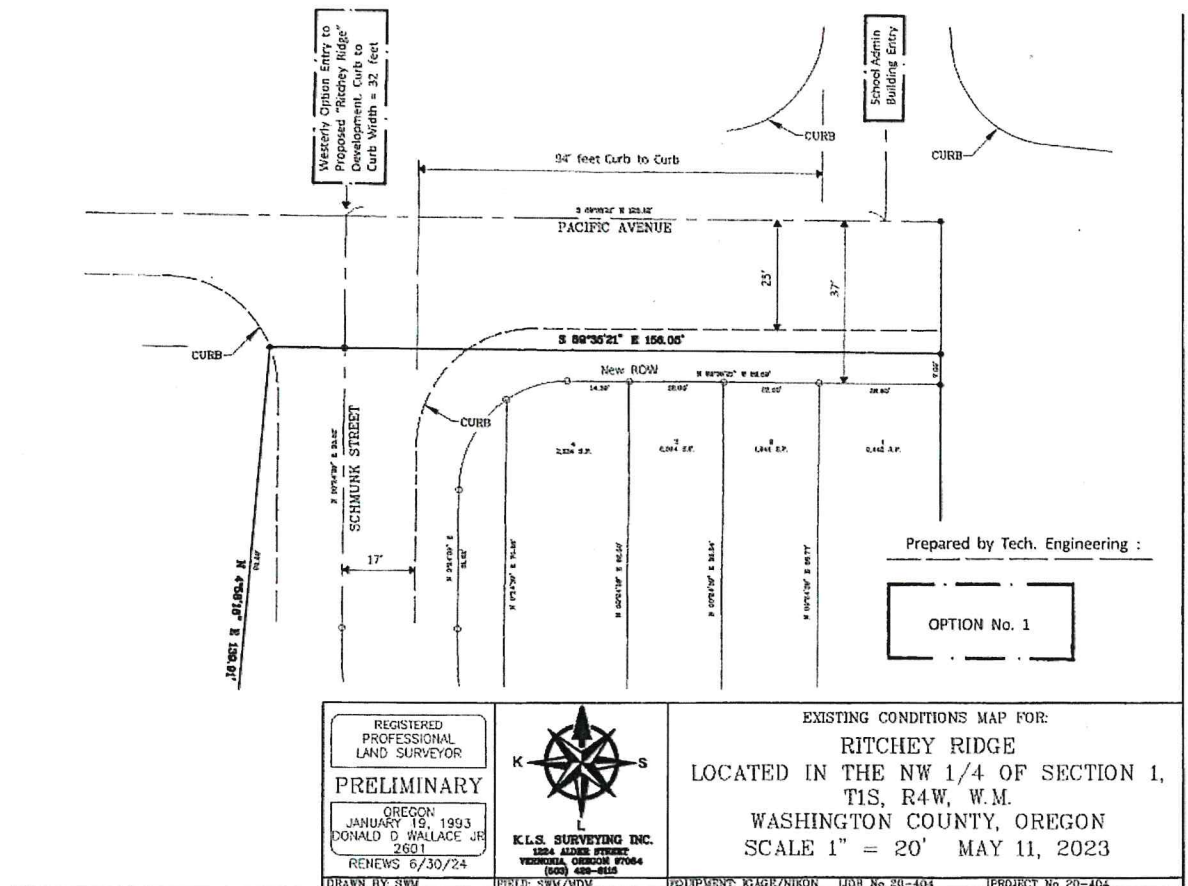
The traffic study recommends the applicant must work with City staff to limit parking along the south frontage of Pacific Avenue at the new access street in order to maintain maximum line of sight in both directions of travel. The study goes on to state any vegetation, landscaping, and sign monument placement must be reviewed and approved by City staff. This is a proposed condition of approval.

The application was provided to Washington County for review since Pacific Avenue in this part of the City and Ritchey Road are Washington County facilities. Washington County provided comments which are attached (Exhibit G). Comments provided by Washington County are provided below.

The applicant has proposed a public street approximately 94 feet from the private access that serves the property directly across Pacific Avenue from the development site (Washington County Tax Lot 1N4360002100). The proposed street connection does not meet Washington County access standards because the proposed use is not permitted direct access to a collector and the public street does not meet 100 feet of spacing from other access points. Pursuant to the Washington County Road Design and Construction Standards, an access that does not meet the access standards shall submit a design exception as required by Section 220. Therefore, the applicant will be required to obtain

design exception approval from the Washington County Engineer as part of the plan review for public improvements on Pacific Avenue.

City staff is supportive of the location and design of the proposed public street connection noted as Option 1 below. This is because the public street connection provides an alternative and direct way in and out of the development without having to travel through the Gales Creek development to access High Street to the east.



In addition to the required design exception, Washington County has requested that the applicant note on the final plan the following:

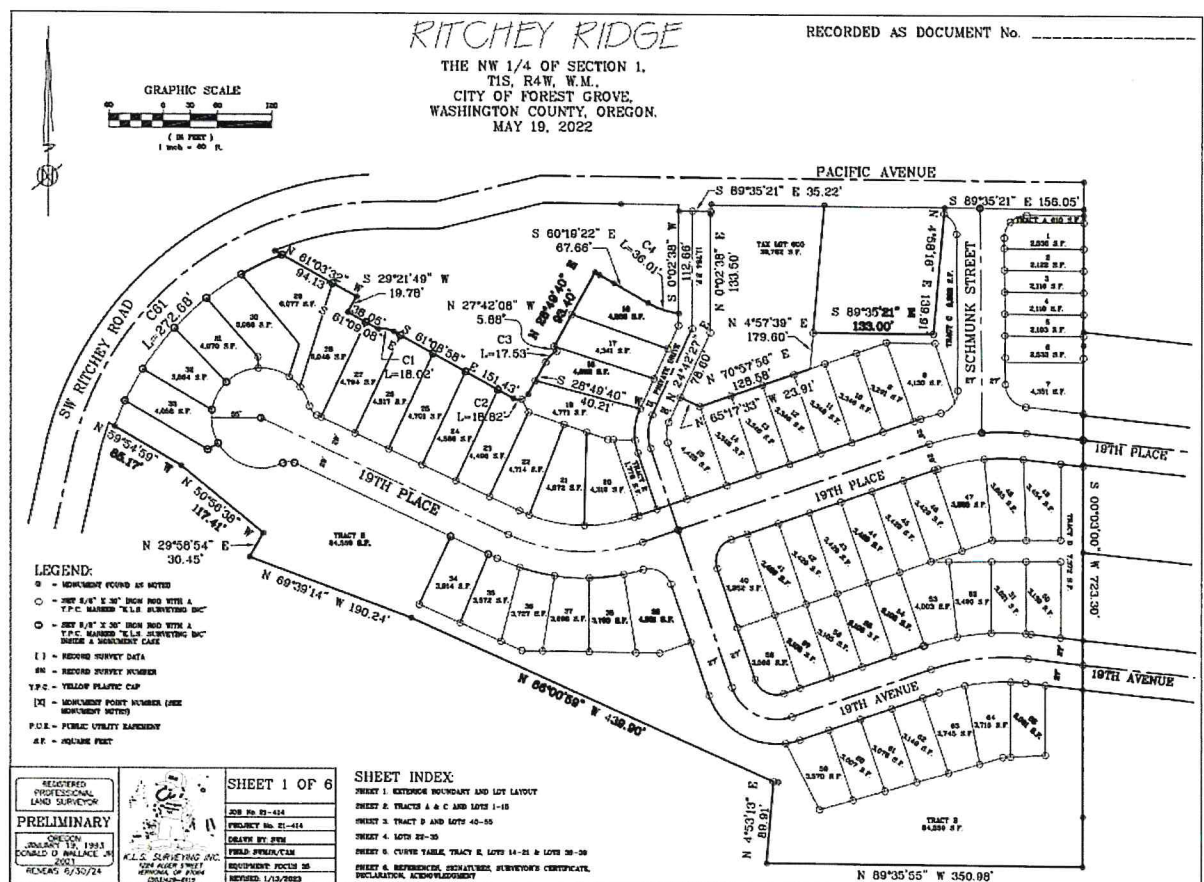
- Obtain a Washington County facility Permit for the public improvements on Ritchey Road and Pacific Avenue;
- Construct a half-street improvement to Washington County collector (3 lanes) standards pre the direction of the County engineer along the frontage of Pacific Avenue and Ritchey Road. The half-street shall include collector pavement width, bike lane, curb/gutter, 5-foot sidewalk, 6-foot planter strip with street trees and conduit per County standards;
- Installation of continuous street lighting along the site's frontage of Ritchey Road and Pacific Avenue to Washington County standards;
- Closure of all existing driveways/access on Ritchey Road and Pacific Avenue;
- Construction of an emergency access on Pacific Avenue per County/Fire District requirements;
- Provide a preliminary sight distance certification for the site's new public street on Pacific Avenue;

- Provision of a non-access restriction along the site's frontage Ritchey Road and Pacific Avenue;
- Dedication of right-of-way to meet 37 feet from the centerline of Ritchey Road and Pacific Avenue and adequate corner radius at the intersection with the new public street/Pacific Avenue; and
- Dedication of an 8-foot public utility easement along the site's frontage of Ritchey Road and Pacific Avenue.

F. SITE DESIGN:

The proposed preliminary lot layout is shown below. Lots intended for attached townhomes are located at the northwest portion of the development site adjacent to Pacific Avenue and Schmunk Street. Several lots in the proposed development are oriented to maximize orientation for solar access. This is achieved when a lot has a north-south dimension of 90 feet or more or the lot has a front lot line that is oriented within 30 degrees of a true east-west axis.

PRELIMINARY LOT LAYOUT



G. SETBACKS:

Detached Homes

Planned development approval is required for reduced building setbacks which the applicant requests. Proposed building setbacks are shown on the preliminary plans submitted with the application and summarized in the table below.

MINIMUM SETBACK	MINIMUM REQUIRED	MINIMUM PROPOSED
Front yard, dwelling	14 feet	14 feet
Front yard, garage	20 feet	20 feet
Rear yard	15 feet	12 feet
Interior side yard	5 feet	3 feet
Corner side yard	14 feet	10 feet

A condition is proposed for corner side yards adjacent to a street. Corner side yards adjacent to a street must be at least 11 feet in width to avoid conflicting with the required 10-foot public utility easements along a lot's street frontage. No encroachments into or over the public utility easement are allowed.

Attached Homes

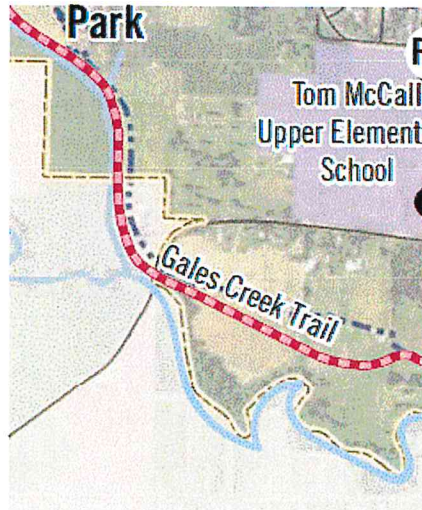
MINIMUM SETBACK	MINIMUM REQUIRED	MINIMUM PROPOSED
Front yard, dwelling	12 feet	14 feet
Front yard, garage	20 feet	20 feet
Rear yard	10 feet when not adjacent to alley	12 feet
Interior side yard	0 feet common wall construction 5 feet exterior wall at end of structure	0 feet common wall construction 3 feet interior lot side yard between Lot 1 and Tract A
Corner side yard	14 feet	14 feet

H. PARKING:

Units will have garages and driveways suitable for parking vehicles. The site plan includes a tract at corner of 19th Place and the proposed private street for additional parking. Consistent with restrictions on locating driveways closer than 20 feet to an intersecting street right-of-way in the Development Code §17.8.130(A), no parking stalls on Tract E shall be closer than 20 feet to the 19th Place right-of-way. Access to Tract E directly from 19th Place shall be prohibited.

I. PUBLIC TRAIL:

The Parks and Recreation Master Plan, adopted by City Council, in 2016 shows a future multi-purpose trail along the urban growth boundary adjacent to the development site. The trail would extend from the Gales Creek Terrace development along the southern periphery of the development site to Ritchey Road. The applicant has agreed to work with the City's Parks and Recreation Department Director on the siting and constructing the trail.



As a condition of approval an easement shall be provided for construction of trail on Tract E. The final plat shall include a note that Tract E is subject to a public access trail easement, over its entirety. The final plat shall include a note that Grant a public access easement over Tract E for future construction of the trail described in the Parks and Recreation Master Plan. The trail easement shall be designed and improved consistent with the requirements of Development Code §17.8.100 (Access and Circulation).

J. FARM ACCESS:

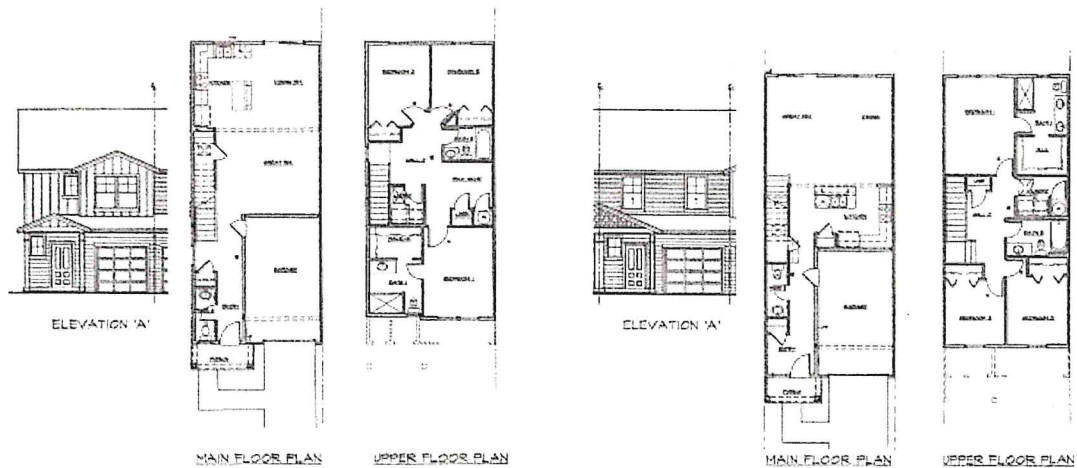
The application indicates there's an existing farm access driveway at the southeast corner of the site which will remain and will be utilized as maintenance access to a water quality facility. As required by the Development Code (§17.8.125(A)(1) service drives for non-residential uses shall be fully improved with hard surface pavement with a minimum width of fifteen feet when accommodating one way traffic.

K. ARCHITECTURE:

An architectural pattern book is required for planned development approval (Development Code §17.4.215(G)). The application includes six prototypical home elevations for single-unit detached homes as shown below.



Elevations and floor plans provided for the attached townhomes are shown below.



Although prototypical home elevations were provided, the applicant did not include the required materials and color palette and fencing plan that addresses the relationship between public and private space and between the planned development site and abutting property. Prior to final plat approval the developer shall submit a materials and color palette and fencing plan for City review and approval.

L. PUBLIC IMPROVEMENTS:

The application includes letters from the Light and Power Department and City Engineering Division certifying the ability to provide electricity, sanitary sewer, stormwater sewer and water to the development site. The developer shall be required to enter into a public improvement agreement with the City Engineering Division.

M. COVENANTS, CONDITIONS AND RESTRICTIONS:

Prior to submittal of the final subdivision plat for approval the developer shall provide the Planning Division with a copy of proposed covenants, conditions and restrictions. The proposed CC&Rs shall not violate any City ordinance requirements unless modified by the land use approval for the proposed project.

The CC&Rs shall include a provision that issuance of building permits on individual lots are subject to the recommendations or requirements from the geotechnical analysis required by the Building Division.

The CC&Rs shall also include provisions for adequately maintaining any common areas including the private access street including identification of the party responsible for maintaining the area and sufficient annual funding to conduct necessary maintenance.

The CC&Rs shall also include a statement that the CC&Rs cannot be changed or deleted without approval by the Community Development Director.

III. REQUIRED APPROVALS AND FINDINGS

As required by the Forest Grove Development Code public notice was mailed to property owners and residents within 300 feet of the site. A copy of the mailing list is on file at the Planning Division office. Notice was also published in the *News Times* on June 27, 2023. In addition, the site was posted with two signs indicating "Proposed Land Use Action Affecting this Property". Staff received one phone call in response to the signs. Notice was also posted at Forest Grove City Hall and the Forest Grove Community Auditorium.

Copies of the application materials were provided to the City's inter-departmental Plans Review Board for review and comment. The Plans Review Board includes staff representing the Building Division, Planning Division, Engineering Division, Fire Department and Light and Power Department. Application materials were also provided to Washington County, since the County has jurisdiction over adjacent portions of Pacific Avenue and Ritchey Road. Conditions of approval proposed by Washington County are attached to this report. Application materials were also provided to the Tualatin Valley Irrigation District.

Development Code §17.4.220(C) *Approval Criteria* authorizes the Planning Commission to approve a Planned Development if it finds that the following approval criteria are met or can be met through conditions of approval as allowed by Development Code §17.1.310.

1. The plan fulfills the purpose for PDs stated in DC §17.4.200 (as follows);

The purpose of the Planned Development (PD) provisions is to provide greater flexibility in the development of land for residential, commercial or industrial purposes than allowed by the conventional standards of the Development Code.

A PD is not intended to be simply a means of avoiding normal Development Code requirements. The PD provisions are intended to:

- A. *Promote flexibility and innovation in site design and permit diversity in the location of structures in order to preserve natural features and view corridors;*

Finding: The application states "As demonstrated with the Preliminary Plans included with this request, the site is designed to have good street connections and traffic flow, open spaces and cohesive layout of the homes to provide a very attractive development. The area is naturally scenic and there is a wetland area to the south".

Finding: The site plan provides diversity in lot sizes including lots accommodating six attached townhouses. Since proposed lots range in size from 2,103 square feet to 6,077 square feet and this range provides diversity in size Criterion A is met.

Finding: The proposal includes an open space tract along the southern edge of the development site adjacent to the urban growth boundary. The open space tract provides a view corridor toward Gales Creek and adjacent agricultural land. In addition, staff recommends a condition that

an easement be provided for future construction of the multi-use public trail that current ends at the Gales Creek Terrace development. The public trail will allow for views to adjacent natural features including lands adjacent to Gales Creek and nearby agricultural land. The open space tract and easement for future construction of the multi-use trail preserves a view corridor consistent with Criterion A.

B. Promote innovative and creative design by providing a variety and mixture of building types and architectural styles;

Finding: The application states "This planned development is proposed for townhouse and detached single family homes".

Finding: The proposal includes lots for single-unit detached homes and lots for six attached townhomes providing a mixture of building types. This meets the intent of providing a variety and mixture of building types since more than one dwelling type is proposed consistent with the intent of Criterion B.

Finding: The proposal includes six prototypical house elevations for the single-unit homes with various front facade styles.

C. Promote efficient use of land and facilitate a more economical arrangement of buildings, circulation systems, land uses, and utilities when compared with conventional development patterns;

Finding: The application states "if the applicant sticks strictly to the requirements of each underlying zones, it would be difficult to create lots that are cohesive, streets that provide vehicle and pedestrian connections and open space. The flexibility allowed by the Planned Development promotes efficient use of the land, preserves, territorial views and a more economical arrangement of future homes".

Finding: The proposed development plan includes a variety of lots sizes including lots for attached homes ranging in size from 2,103 square feet to 2,535 square feet. The average lot size in the proposed development is 3,870 square feet. Lots smaller than the average lot size represents an efficient use of land and provides an economical arrangement of buildings since utilities can be provided in a more cost-effective manner compared to large lots and conventional development patterns.

Finding: The proposed circulation system extends 19th Place and 19th Avenue from the Gales Creek Terrace development into the site. The proposal also includes a new public local street intersecting with Pacific Avenue and new private street also intersecting with Pacific Avenue. The street connections provide multiple ways into and out of the development.

D. Preserve to the greatest extent possible existing landscape features and amenities such as trees, creeks, ponds, floodplains, hills and similar natural assets, and incorporate such features into the design of the PD;

Finding: The application states "This Planned Development allows for a better arrangement of the streets, homes, and open spaces which in turn

allows preservation of views of natural areas and the wetlands to the south".

Finding: The development will not encroach into the Gales Creek floodplain and therefore, preserves to the greatest extent possible existing landscape features such as creeks and floodplains. As such, Criterion D is met.

Finding: The site plan includes an open space tract along the southern edge of the development site. The tract will include an easement for future construction of a public multi-use trail. Since the tract and future trail are at the edge of the development site and provides views to the Gales Creek floodplain and nearby agricultural land the proposed planned development incorporates these natural features into the design of the planned development.

- E. To encourage the provision of open space and recreational facilities in a generally central location and within reasonable walking distance of all living units in residential planned developments;*

Finding: The application states "The Planned Development incorporates open spaces throughout the site. Sidewalks with planter strips and street trees are proposed along all public ways. All open spaces are to be full landscaped with native plants".

Finding: The development plan includes several open space tracts scattered throughout the site. The tract and the southern edge of the development site is the largest and will include an easement for future construction of a public multi-use trail. The trail will be accessible to all residents in the planned development. The trail will be approximately 500- to 600-feet from the northern edge of the development site adjacent site which is about 1/10th of mile. A rule of thumb is reasonable walking distance is ¼ mile or less. Therefore, the location of the trail will be within a reasonable walking distance for future residents consistent with Criterion E.

- F. Combine and coordinate architectural styles, building forms and building relationships within the PD; and*

Finding: The application states "This planned development will provide a variety of home facades and color palates that are coordinated but yet provide diversity. A Home Owner's Association will have architectural control for the PD".

Finding: The application includes six designs for the single-unit homes. The architectural styles appear coordinated in terms of scale, height and common elements including windows, door placement and trim. The multiple designs, consistent scale, and similar structure height demonstrate coordination of architectural styles. Therefore, Criterion F is met.

Finding: The application indicates a homeowner's association will have architectural control for the planned development. This will ensure that Criterion F continues to be met.

G. Provide the applicant with reasonable assurance of ultimate approval before requiring detailed design and engineering, while providing the City with assurances that the project will retain the character envisioned at the time of approval.

Finding: The applicant states "The applicant will provide necessary materials to assure the PC that the Planned Development will be designed and constructed with the overall cohesiveness in mind".

Finding: With Planning Commission approval of this project, the applicant would be provided reasonable assurance of the ultimate approval of detailed designs and engineering. The City would be assured that the project would retain the character envisioned at the time of approval by the Planning Commission's adoption of the conditions listed below.

2. The plan meets the submittal requirements of DC §17.4.220(B) Preliminary Plan Review:

Finding: The application includes most, but not all, submittal requirements including a complete architectural plan book. With a proposed condition of approval that the missing information be provided for City review and approval prior to review and approval of the final planned development plan and final subdivision plat this criterion can be met.

3. Adequate public services exist or can be provided to serve the proposed PD; and

Finding: The application includes letters from the City's Engineering Division and Light and Power Department certifying that adequate public facilities exist or can be provided to serve the proposed planned development. These certifications demonstrate that Criterion 3 is met.

4. Where a tentative subdivision plat is requested, the requirements of DC Article 8 are met.

Finding: The applicant, or subsequent development, will be required to meet all requirements of Development Code Article 8 not otherwise modified by the planned development approval. This includes requirements for access and circulation, landscaping, public improvements, building design, land division standards and covenants, conditions and requirements (CC&Rs). Requested modifications to Development Code Article 8 standards through the requested planned development approval include the design of the private street, and length of the 19th Place cul-de-sac. The Development Conditions of approval are attached (Exhibit C).

IV. SUMMARY

The applicant has requested review of this project as a planned development in order to have flexibility in the application of certain setback standards and to allow a cul-de-sac in excess of 200 feet due to the alignment of Ritchey Road and site topography. In summary, the results of approving the application as submitted would be:

Attributes

- i. Reduced setbacks would allow more efficient use of the land.
- ii. Reduced setbacks would result in smaller lots; thus, the applicant may be able to create more lots out of a given area.
- iii. The proposed development provides more than 20% of the site as open space.
- iv. Attached housing provides an additional housing choice in an area that has otherwise been developed almost exclusively with detached homes.
- v. The development a small area for additional off-street parking at the proposed private road and 19th Place.

Concerns

- i. Reduced setbacks mean houses would be closer together, with smaller side yards, less landscaping, and less privacy.
- ii. The private street provides an additional access point to the development but is narrower than the minimum right-of-way required for a public street.
- iii. The private street provides a sidewalk on only one side of the street which doesn't meet the requirement that would apply if the street were a public street.
- iv. Existing farm access driveway to remain ad should be controlled/restricted.

V. ALTERNATIVES

The Planning Commission has the following alternatives:

1. Approve the PRD as proposed.
2. Approve the PRD with conditions.
3. Deny the application, stating reasons for doing so.
4. Continue the matter to a date certain for further consideration.

VI. RECOMMENDATION

Staff finds that the application has adequately demonstrated compliance with the applicable provisions of the Development Code. Based on the above, staff recommends that the Planning Commission approve the application for the Parkview Terrace Planned Development, subject to the following conditions.

VII. PROPOSED CONDITIONS OF APPROVAL

1. The applicant is bound to the project description and all representations made by the applicant during the application and decision-making proceeding.
2. All plans submitted to date are considered conceptual only. Detailed plans and specifications must be submitted that demonstrate compliance with standards and regulations adopted by the City of Forest Grove and/or all other agencies that have jurisdiction.
3. The applicant shall continue to comply with all applicable City building and development standards, including all dimensional standards and public works specifications.
4. Front yard setbacks shall be a minimum of 14 feet to habitable space and 20 feet to a garage door.

5. Corner side yard setbacks shall be a minimum of 11 feet. No encroachments are allowed into or over any public utility easement along the street frontage
6. Interior side yard setbacks shall be a minimum of 3 feet. Townhouse Lots 1 through 6 shall have a zero-foot interior property line for abutting structures.
7. Rear yard setbacks shall be a minimum of 12 feet
8. Driveway widths shall not exceed 50% of the width of any detached home lot.
9. Combined driveway widths for attached home lots shall not exceed 30 feet.
10. At least 25% of the homes shall be of a distinctly different architecture. These homes shall be scattered throughout the project site. This condition shall be incorporated into the recorded CC&Rs and enforced by the Homeowner's Association.
11. A six-foot-tall wooden privacy or good neighbor fence is required along the Ritchey Road and Pacific Avenue frontages abutting Lots 29 through 33 and Lot 1. The fence shall be installed concurrently with the construction of the Phase 1 public improvements.
12. Sidewalks shall be installed on both sides of all public streets in accordance with Development Code §17.8.610 and §17.8.620.
13. The proposed private street adjacent to Lots 16 through 19 and Tract E shall have a minimum right-of-way of 35 feet and a curb-to-curb street width of at least 24 feet. A concrete sidewalk at least 5 feet in width shall be installed along one side of the proposed private street.
14. "No Parking" signs shall be posted along both sides of the private access road for lots 15 through 19.
15. No parking stalls on Tract E shall be located closer than 20 feet from the 19th Avenue right-of-way.
16. The minimum right-of-way width for 19th Avenue shall be 54 feet and match and continue the 19th Avenue street cross-section established in the Gales Creek Terrace Development.
17. The minimum right-of-way width for 19th Place shall be 58 feet and match the street cross-section for 10th Place established in the Gales Creek Terrace Development
18. A non-access restriction shall be recorded for all lots and tracts along the site's frontage of Ritchey Road and Pacific Avenue.
19. No parking shall be allowed on Pacific Avenue or Ritchey Road.
20. All landscaping and sign monument placement must be reviewed and approved by the Forest Grove Planning Division to ensure compliance with clear vision requirements contained in Development Code §17.8.155.
21. The applicant is required to obtain a Design Exception from Washington County as outlined in Section 220 of the Washington County Road Design & Construction Standards for street intersection Option 1. This shall be done as part of the plan review for the public improvements on Pacific Avenue for the proposed intersecting public street labeled as Schmunk Street.
22. The applicant is required to comply with all Washington County proposed conditions of approval dated June 7, 2023 (Exhibit G).
23. An access to the water quality facility on Tract F, improved to the specifications of the City Engineer, is required. The access shall be maintained in accordance with the provisions of the Uniform Fire Code.
24. CC&Rs shall be provided to the City Planning Division for review prior to or with an application for final plat approval.
25. The CC&Rs shall include provisions for the continued maintenance of the access road serving lots 15 through 19 and Tract E intended for off-street parking.
26. The CC&Rs shall provide adequate provisions including but not limited to funding for the maintenance of the water quality tract. To ensure the funding mechanism is adequate, provide an estimate of the total anticipated

- maintenance expenses for a ten-year period, and describe how those expenses will be met.
27. Prior to final plat approval the applicant shall submit for Planning Division review and approval a materials and color palette and fencing plan.
 28. Prior to final plat approval, submit a tree protection plan prepared by a certified arborist, consistent with the provisions of DC §17.5.115, for all trees proposed to be preserved on-site and trees to remain adjacent to the perimeter of the development site. The tree protection plan must be submitted to the Forest Grove Planning Division prior to final plat approval.
 29. Submit landscape plans for common open areas, the perimeter of the PD, and other landscaped areas consistent with the provisions of DC §17.4.225.C.5.
 30. The developer shall grant a public trail easement over the entirety of Tract F and must construct a public multi-use trail concurrent with development consistent with the 2016 Parks and Recreation Master plan. The final plat shall and shall a note that Tract F is subject to a public trail easement.
 31. A final geotechnical report shall be submitted with final engineering plan review demonstrating compliance with DC §17.8.310 for sloped areas at or above 10%.
 32. The applicant is required to comply with the attached Light & Power Department Standards and Special Conditions (Exhibit E). Prior to an application for final plat approval contact the Light and Power Division on the placement of electrical infrastructure
 33. The applicant is required to comply with the attached Engineering Conditions of Approval (Exhibit F). Prior to final plat approval consultant with the Engineering Division on locations for water, sanitary sewer, and storm drainage infrastructure.
 34. The final plat shall include a note that this subdivision is subject to the conditions of approval imposed by the City of Forest Grove set forth in Case File No. 311-22-00027-PLNG.

VIII. EXHIBITS

The following exhibits were received, marked, and entered into the record as evidence for this application at the time this staff report was written. Exhibits of evidence received after the date of this report will be marked beginning with the next consecutive letter and will be entered into the record at the time the Public Hearing is opened, prior to oral testimony.

- Exhibit A** Application Materials, prepared and submitted by the applicant
- Exhibit B** Correspondence Received
- Exhibit C** Development Code Standards and Specifications
- Exhibit D** Fire Department Standards and Specifications
- Exhibit E** Light and Power Standards and Specifications
- Exhibit F** Engineering Division Standards and Specifications
- Exhibit G** Washington County Conditions of Approval

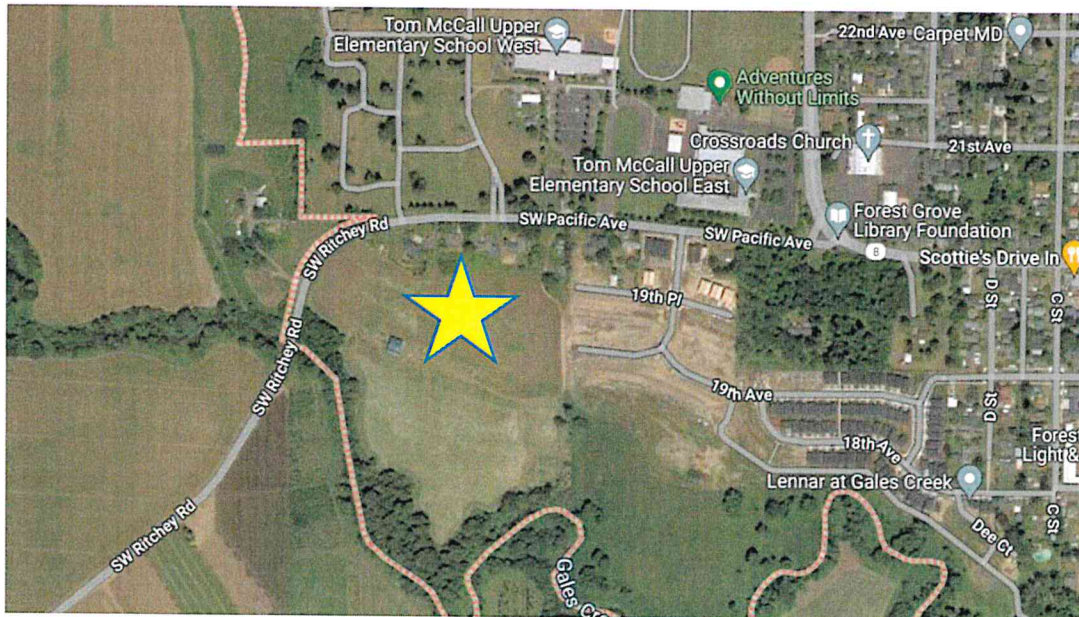
Exhibit A

RITCHEY RIDGE

LAND USE APPLICATION

PRELIMINARY APPROVAL

65 UNIT PLANNED DEVELOPMENT



Submitted to:

CITY OF FOREST GROVE

1924 Council Street, Forest Grove, Oregon 97116

Submitted on Behalf of:

Rick and Steve Schmunk

5644 SE McInnis, Hillsboro, Oregon 97123

Prepared by:

TECH ENGINEERING

PO Box 80483, Portland, Oregon 97280

503.819.6494 / technicalengineering@yahoo.com

DECEMBER 2022

Application Summary

SUBJECT PROPERTY:

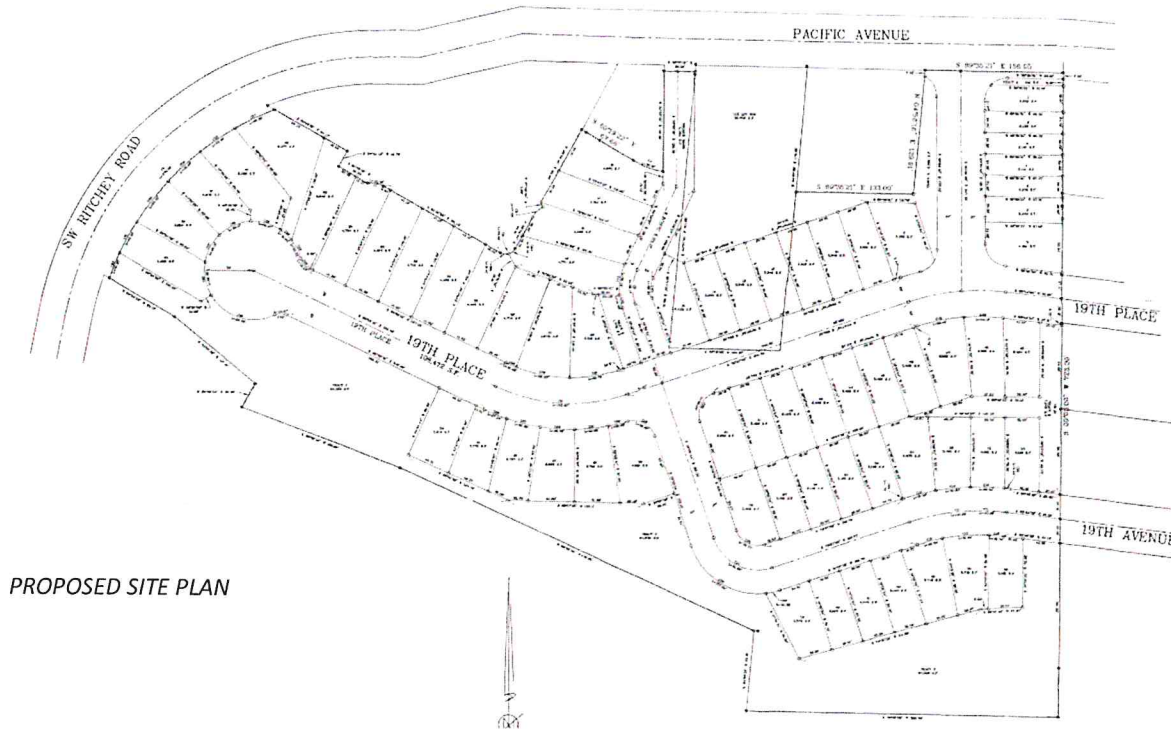
Tax Lots 800, 1000, 2800 & 2900
1S4 01, In the City of Forest Grove,
Washington County, Oregon

SITE SIZE:

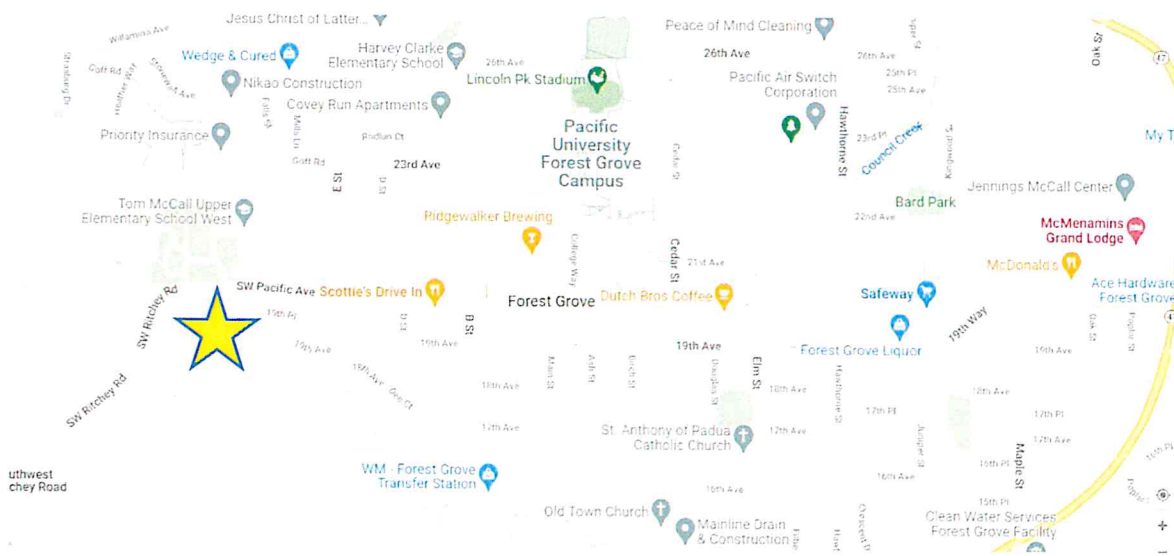
10.60 Acres Total

ZONING:

R-5, R-7 & R-10



PROPOSED SITE PLAN



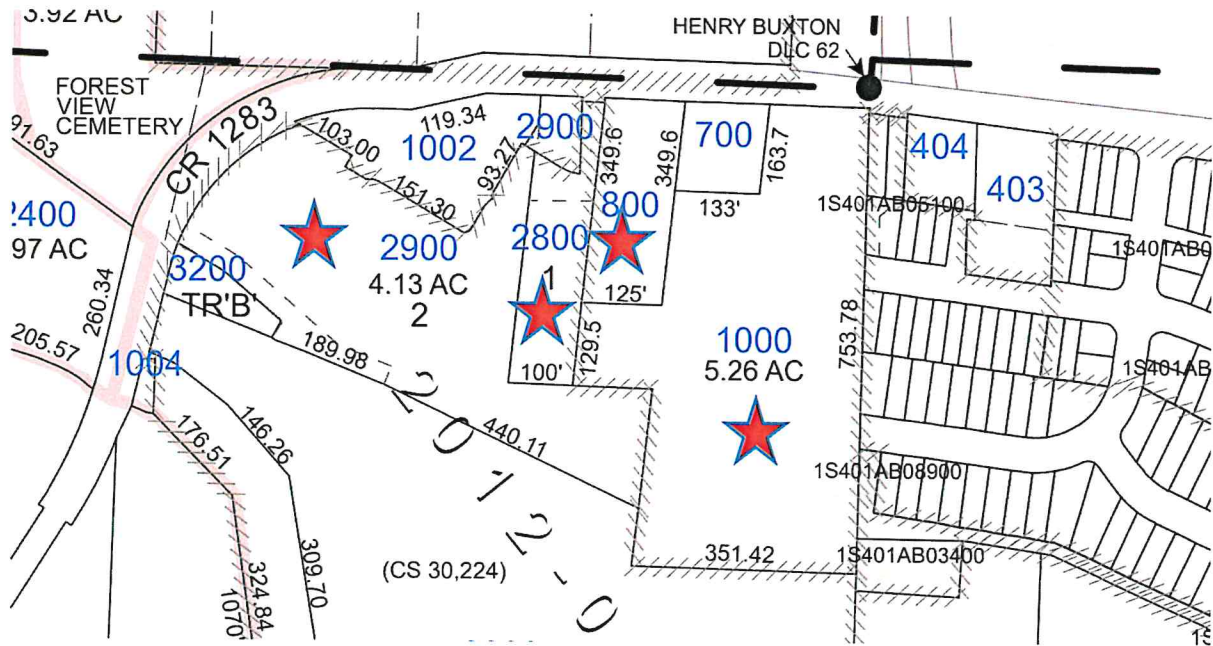
PROJECT VICINITY MAP

RITCHY RIDGE - 65 UNIT PLANNED DEVELOPMENT

Site Description

The project site includes Tax Lots 800, 1000, 28000 and 2900 of Washington County Assessor's Map 1S4 01. The site is located on the south side of Pacific Avenue, east of Ritchey Road.

The site is not addressed.

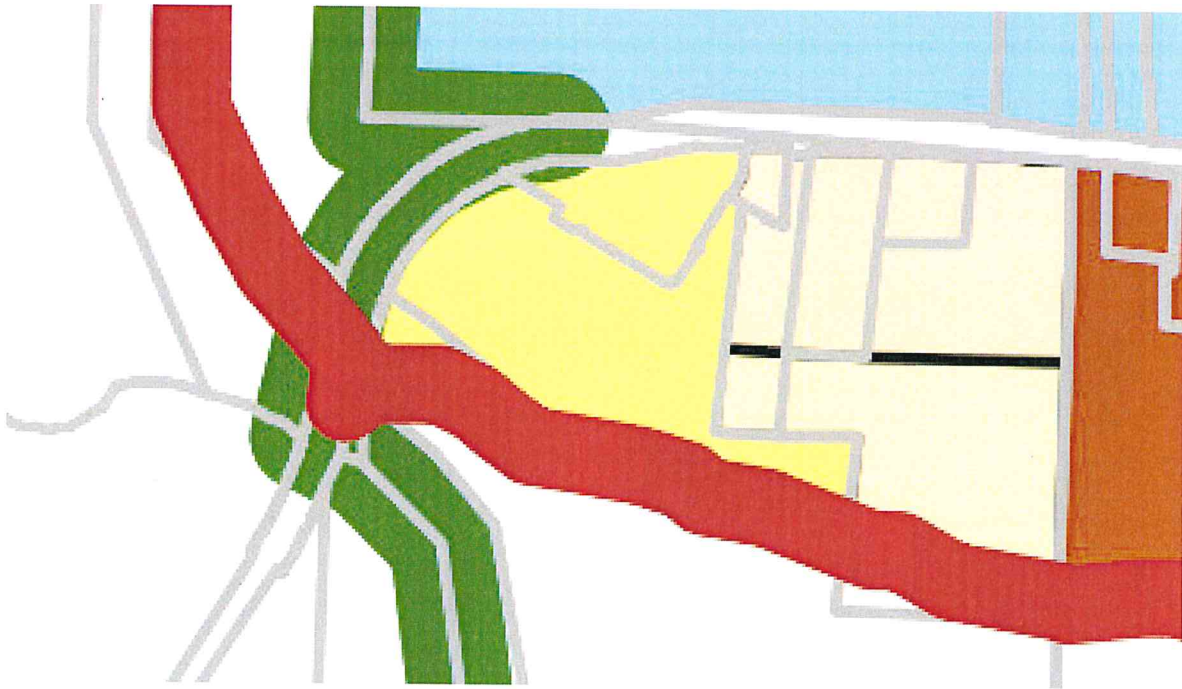


ASSESSOR'S MAP

The site contains approximately 10.60 acres and is zoned R-5, R-7 and R-10 within the city of Forest Grove.

The site is irregular in shape and fronts onto Pacific Avenue on the north side, Ritchey Road on the west side, and the street stubs of 19th Place and 19th Avenue abutting the subject site on the east side. Gales Creek is off-site to the south.

The Existing Conditions Plan on sheet 4 of the Preliminary Plans shows the subject property and surrounding properties, including contour elevations – the site is sloped toward the south and southwest, with a high elevation of approximately 244 feet near the center of the site and a low elevation of approximately 179 at the south end of the site.



Zoning Designations

	Suburban Residential (SR) 1.0 du/ac.		Residential Multifamily Low (RML) 12.0 du/ac.
	Single Family (R-10) 4.35 du/ac.		Residential Multifamily High (RMH) 20.28 du/ac.
	Single Family (R-7) 6.22 du/ac.		Neighborhood Mixed Use (NMU)
	Single Family (R-5) 8.71 du/ac.		Town Center Core (TCC) 40.0 du/ac.
			Town Center Transition (TCT) 40.0 du/ac.
			Community Commercial (CC) 30.0 du/ac.

The subject parcels are zoned R-10, R-7 and R-5; the applicant is resting a Planned Development for this site. The above map shows the multiple zoning districts in this area of town.

Proposed Project

The applicant is requesting approval of a 65-unit residential Planned Development. The proposed development is a mix of home types, with detached and attached homes.

Lots 1 through 6 are townhouse lots ranging in size from 2,252 square feet to 2,402 square feet; the average townhouse lot size is 2,897.33 square feet.

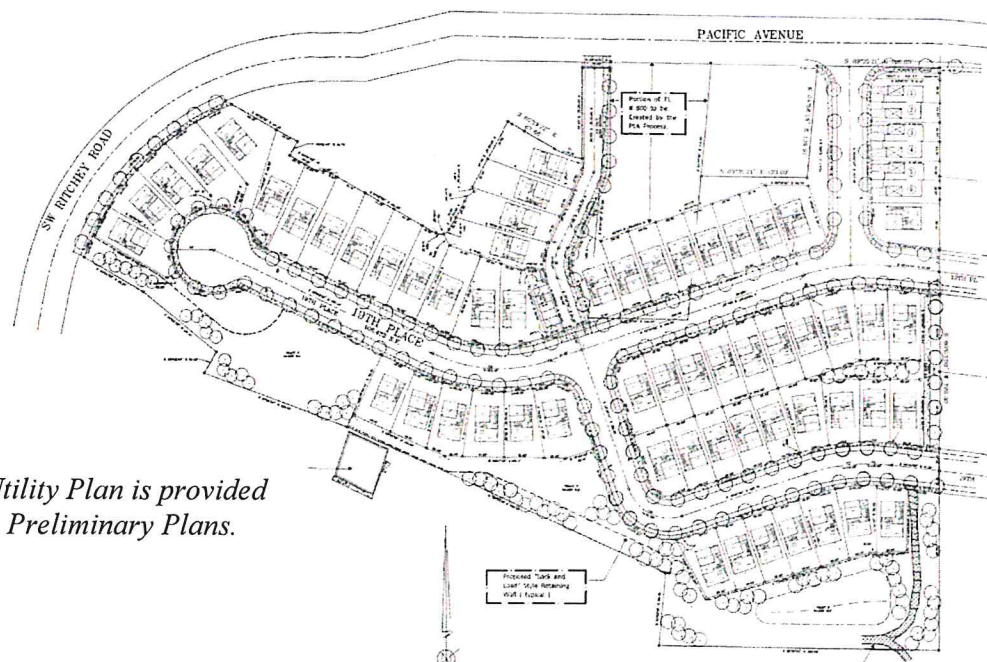
Lots 7 through 65 are proposed for detached single family homes, with lots ranging in size from 3,007 square feet to 6,077 square feet; the average lot size for the single family homes is 3,882.18 square feet.

Tracts A through F are proposed for Open Space areas. The total of the Open Space (Tracts A-F) equals 100,611 square feet or 2.31 acres.

Proposed public streets are designed with right of way widths with from 54 feet to 58 feet. The cul-de-sac will have radius of 55 feet. One private street is proposed to serve as access for Lots 16 through 19, the proposed right of way width is 35 feet with concrete sidewalk on one side. Tract E is abutting the private street and is proposed as open space and an additional five off street parking spaces.

Tract F will contain the water quality facility. There is an existing farm access driveway at the southeast corner of the site which will remain and will be utilized as maintenance access to the water quality facility.

The site will be accessed by a new street connection to Pacific Avenue to the north and also by the street stubs that are abutting the site on the east boundary.



A Preliminary Utility Plan is provided on sheet 8 of the Preliminary Plans.

All services are available to the site within the right of way of Pacific Avenue, 19th Avenue and 19th Place for public water service, public storm and sanitary sewer.

The applicant is proposing development of the site with the required and appropriate utilities in compliance with the requirements of the City of Forest Grove and CWS, which are all available to the site within the public right of ways, as demonstrated on the Preliminary Plans.

Development of the site will be completed in one phase of construction.

The applicant's engineer, Technical Engineering, has provided the Preliminary Plans showing how the site will be served with public services, provided as follows:

- **Public Water:** *A public water line is available within the right of way of Pacific Avenue and within 19th Avenue and 19th Place; the lots will be served by extending a public line through the site. Each home will have an individual meter from the new public line. New fire hydrants will be installed as required.*
- **Sanitary Sewer:** *A public sanitary sewer line is available within the right of way of Pacific Avenue and just south of the street stub of 19th Avenue. As shown on the Preliminary Utility Plan on sheet 8, a new public line will be extended from the existing public sewer main in Pacific Avenue throughout the site and will connect to the existing system.*
- **Storm Drainage:** *Storm drainage is available within the right of way of Pacific Avenue, just north of the subject site. As shown on the Preliminary Utility Plan on sheet 8, storm water will be collected from the site and conveyed underground to a water quality facility within Tract F at the southeast corner of the site. From there the treated water will be directed into the existing system at a pre-development rate.*
- **Fire Protection:** *The site is provided service from city of Forest Grove. New fire hydrants will be installed within the development as required.*

Public easements will be provided where needed to allow access to all public service lines.

ARTICLE 2 LAND USE REVIEWS

LAND USE REVIEWS

17.2.030 CONCURRENT REVIEWS

Applications for more than one land use review on a site may be consolidated into a single application package. If the reviews are not assigned to the same review body, they are assigned in the manner stated below.

- A. When more than one review is requested and the reviews have different procedures, the overall application is processed using the highest procedure and reviewed by the review body assigned to that procedure.
- B. When the requested reviews have the same procedure but are assigned different review bodies, the reviews may be processed simultaneously with a joint hearing before the applicable review bodies. For the purposes of this section, a joint hearing includes either holding a consolidated hearing before all applicable review bodies at the same meeting, or holding consecutive public hearings at the same location. The Director shall determine the manner of processing applications and conducting the hearings.

RESPONSE: The applicant is requesting two concurrent reviews with this request:

- 1) Subdivision***
- 2) Planned Development***

SITE DEVELOPMENT REVIEW

17.2.400 PURPOSE

The purpose of Site Development Review is to promote the general welfare and enhance the appearance and function of the City by careful attention to site planning. While the underlying zoning district determines whether a particular use is permitted, site development review focuses on how a particular use will be developed. Site Development Review will focus primarily on site planning and design elements of a project.

17.2.410 APPLICABILITY

Site development review is required for the following:

- A. All new development of vacant sites (with the exception of the exemptions listed below); or
- B. An expansion of 20% or more of the existing building square footage on the development site;
- C. A new parking lot or 20% expansion of an existing parking lot that is not associated with new commercial or multifamily development; or
- D. Any change of use (according to use table of applicable zoning district).
- E. As part of a Master Plan application (§10.4.100 et. seq).
- F. As part of a Conditional Use permit application (§10.2.200).
- G. As part of a Design Review application (§10.2.300 et. seq).

RESPONSE: The applicant is proposing new development; therefore, these standards apply.

17.2.420 EXEMPTIONS

RESPONSE: No Exceptions are requested.

17.2.430 PROCEDURE

Site development review is categorized as a Type I procedure for one (1) single family detached dwelling on an individual lot; one (1) duplex on an individual lot; one (1) manufactured home on an individual lot. All other site development reviews shall follow the Type II procedure unless exempt.

17.2.440 SUBMITTAL REQUIREMENTS

In addition to the standard submittal requirements for a Type II application, the following plans and information are required for Site Development Review. The Director may waive specific submittal requirements at the pre-application conference, if warranted.

Site Development Plans shall be drawn to scale and fully dimensioned, and shall illustrate the following:

- A. Boundaries of the development site, with lot line dimensions and land area in square feet;
- B. Boundaries of lots adjacent to the development site, with general locations of existing buildings and driveways and description of current land uses;
- C. Existing contours of the development site at two (2) foot intervals for slopes of less than 10% and at ten (10) foot intervals for slopes of more than 10%. Additional contour data may be required by the Director for slopes greater than 20%.
- D. Major existing physical and natural features such as perennial and intermittent streams, wooded areas, marshes, rock outcroppings, and vegetative cover types;
- E. Environmental resource areas subject to the provisions in §10.8.305 and, where applicable, §10.5.005 et. seq. and environmental hazard areas subject to the requirements in §10.8.310.
- F. Individual trees or groves of trees subject to the provisions of §10.5.100 et. seq.
- G. Historic Landmarks subject to the provisions of §10.5.200 et. seq.
- H. Location, dimensions and heights of existing and / or proposed structures, including area in square feet and designation of existing and/or proposed use;
- I. Setback dimensions from buildings to lot lines and lot coverage as a percentage of total lot size;
- J. Location and dimensions of existing and/or proposed streets, driveways, transit facilities, sidewalks, trails, off-street parking and loading space, bicycle parking facilities, landscaped areas, recreation areas, and trash storage areas; K. Location of existing utilities and fire hydrants adjacent to the site, including the size of storm sewer, sanitary sewer and water lines;
- L. Location and names of public street, parks, utility rights-of-way and easements within or adjacent to the site;
- M. Location and types of proposed drainage, water and sewer facilities to serve the development;

- N. Elevation drawings of proposed buildings;
- O. Landscape plan depicting existing and proposed trees, shrubs, groundcover, irrigation and architectural features such as fences or walls. Proposed plantings shall be designated as to species, quantities, and size at time of planting;
- P. Location, character and dimensions of proposed signs and lighting; and
- Q. Locations and dimensions of all existing and proposed outdoor storage areas, including but not limited to trash storage and recycling areas.

RESPONSE: The applicant has provided a full Preliminary Plans set with plans detailing the items required above. There are no drainageways or natural features or resources on the site and there are no historic landmarks on the site.

The location of signage, landscaping, trash and recycling areas, parking, water quality and other features of the Planned Development are included with this request.

17.2.450 REVIEW CRITERIA

The Director shall review and approve, conditionally approve, or deny the site development plan based on the following criteria:

- A. The site development plan complies with all applicable standards of the base zoning district, any overlay district, and the applicable general development standards of Article 8.

RESPONSE: The site design is in compliance with intent of the applicable standards of the residential zones for lot size and dimensions and for residential density, a Planned Development has been requested to allow for flexibility to some of these standards.

The applicant has provided full Preliminary Plans and has also addressed all the requirements of Article 8 to demonstrate how the proposed development can be built in full compliance with the city code and any other jurisdictional or agency requirements.

- B. The site development plan ensures reasonable compatibility with surrounding uses as it relates to the following factors:

- 1. Building mass and scale do not result in substantial visual and privacy impacts to nearby residential properties; and 2. Proposed structures, parking lots, outdoor use areas or other site improvements that could cause substantial off-site impacts such as noise, glare and odors are oriented away from nearby residential uses and/or adequately mitigated through other design techniques.

RESPONSE: The layout and configuration of the lots take the surrounding existing development in the area. It is the intent of the applicant to allow for lots that have variation and can make the new homes fit onto each lot to maximize privacy and visibility of windows to adjacent homes. Full home plans will be submitted for review by the city.

C. The site development plan preserves or adequately mitigates impacts to unique or distinctive natural features including, but not limited to:

1. Significant on-site vegetation and trees;
2. Prominent topographic features; and
3. Sensitive natural resource areas such as wetlands, creek corridors and riparian areas.

RESPONSE: There are no significant trees, topographic features or sensitive areas on the site, this standard does not apply to this request.

D. The site development plan preserves or adequately mitigates impacts to designated historic resources.

RESPONSE: The future new homes will be designed to fit into the neighborhood and also to meet the design requirement of the city code. There is not a design district applicable to the subject property.

E. The site development plan provides adequate right-of-way and improvements to abutting streets to meet the street standards of the City. This may include, but not be limited to, improvements to the right-of-way, sidewalks, bikeways, and other facilities needed because of anticipated vehicular and pedestrian traffic generation.

RESPONSE: The development will dedicate a varying width of right of way to Pacific Avenue as shown on the Preliminary Plat.

F. The site development plan promotes safe, attractive and usable pedestrian facilities that connect building entrances, public sidewalks, bicycle and auto parking spaces, transit facilities, and other parts of a site or abutting properties that may attract pedestrians.

RESPONSE: The design of the site provides sidewalks along the public right of ways of 19th Avenue and Pacific Avenue. Sidewalks and walkways will also be provided interior to the development. All sidewalks will be paved with concrete and will be built to the city and ADA standards.

ARTICLE 3 ZONING DISTRICTS

17.3.010 CLASSIFICATION OF ZONES

All areas within the corporate limits of the City of Forest Grove are divided into the following zones:
Multi-Unit (Low) Residential RML

RESIDENTIAL ZONES

17.3.110 LIST OF RESIDENTIAL ZONES

F. Residential RMH

The RMH zone is intended for development at a target density of 20.28 dwelling units per net acre . Multi-unit residential buildings will be the predominant housing type in this zone. RMH zoning is generally applied near transit streets and adjacent to commercial districts. The RMH zone also allows a limited range of non-residential uses to help provide services for residents and enhance the quality of the higher density neighborhood.

17.3.120 USE REGULATIONS

Refer to Article 12 for information on the characteristics of uses included in each of the Use Categories.

TABLE 3-2 Residential Zones: Use Table: Single Units, Attached & Duplexes - Permitted Use in RMH

RESPONSE: The applicant is proposing single family Attached housing and duplexes, which are uses allowed outright in the R-5, R-7 and R-10 zones.

17.3.130 RESIDENTIAL ZONE DEVELOPMENT STANDARDS

A. Residential Densities

The City of Forest Grove regulates residential development primarily by density rather than minimum lot size. Density is calculated based on net site area. Within the density limits of each of the five residential zones, a variety of housing types and lot sizes are permitted. This approach allows more sites to be developed with the flexibility of a Planned Development.

All residential subdivisions and multi-family developments are required to develop at a minimum of 80% of the targeted density.

TABLE 3-3: Residential Zone Density Standards

Zoning District: R-10 Target: 4.35; Minimum: 3.48; Incentive: 5.22

R-7 Target: 6.22; Minimum: 4.98; Incentive: 7.15

R-5 Target: 8.71; Minimum: 6.97; Incentive: 10.02

B. Calculating Potential Densities

The number of dwelling units allowed on a parcel in any of the five residential zones is calculated using Table 3-3. Density calculations count dwelling units (not structures), i.e., a duplex is counted as two (2) dwelling units. Accessory dwelling units are not counted as dwelling units for the purpose of calculating density.

1. The Target Density is permitted outright.
2. The Minimum Density is required to ensure:
 - a. Land is being used at the appropriate intensity planned for the area;
 - b. Enough dwelling units can be developed to accommodate the projected need for housing; and
 - c. Compliance with the Metro Functional Plan.
3. The Incentive Density provides the opportunity for a density bonus to reward design features, amenities, and/or other improvements which can be shown to increase the value of the residential development for neighborhood residents and the general public and/or provide affordable housing. Incentive Density is only allowed as part of a Planned Development (see Article 4, Section 10.4.200).

RESPONSE: Per Table 3-3: Residential Zone Density Standards, the zoning Districts of R-10, R-7 and R-5 have different density goals. Since the applicant has requested a PD, the Incentive density is applied.

<i>The site contains 10.60 acres or</i>	<i>461,736 sf</i>
<i>water quality facility:</i>	<i>-84,599 sf</i>
<i>ROW dedication:</i>	<i><u>-8,500 sf</u></i>
	<i>368,637 sf or 8.46 acres net</i>

8.46 net acres x 8.71 (R-5 target) = 73.69 units

8.46 net acres x 6.22 (R-7 target) = 52.62 units

8.46 net acres x 4.35 (R-10 target) = 36.80 units

This proposal is for a 65 lot Planned Development for the site, meeting the cumulative density requirement range for the R-5, R-7 and R-10 zones.

- C. Density Reductions Due to Slope
- D. Exemptions from Minimum Density Standard
- E. Incentive Density
- F. Minimum Lot Size and Dimensions (SR, R-10, R-7 and R-5 Zones)

RESPONSE: There are no density reductions due to slope, exemptions from the density standards or incentive densities applied.

- G. Minimum Lot Size and Dimensions (RML and RMH Zones) Varied lot sizes and housing types are permitted and encouraged within the density ranges established for the RML and RMH Zones. However, construction of new single family detached units is restricted to existing lots smaller than 5,000 square feet in the RMH Zone in order to retain land for multi-family housing. The following base minimum lot size and dimensional standards apply after the potential number of units has been determined using Table 3-3.

RESPONSE: The site is within the R-10, R-7 and R-5 zone, G does not apply to this request.

H. Setback Standards

Building setbacks have an important relationship to the character of the street. Because varied lot sizes and housing types are permitted in the residential zones, uniform setbacks are established to provide a consistent streetscape.

RESPONSE: As shown on the included Preliminary Site Plan, all of the new homes will meet the required setbacks. Setbacks are further discussed on page 15.

I. Building Height

Building height standards are used to establish a compatible building scale. This can help to create a harmonious visual setting and helps to bring about a successful mixing of diverse housing types.

1. Buildings in the SR, R-10, R-7, R-5 and RML Zones are limited to a maximum height of two and one half (2 ½) stories or thirty-five (35) feet, whichever is less.
2. Buildings in the RMH Zone are limited to a maximum height of three (3) stories or forty-five (45) feet, whichever is less. A step-down in building heights may be required for multi-family building(s) that abut a lower density residential zone.

The need for a step down in building heights to provide privacy, access to sunlight and a transition between zones shall be evaluated in the Design Review Process.

RESPONSE: The future new homes for each lot will not exceed 2 ½ stories in height; home plans are included within the Preliminary Planset.

3. A chimney, radio or television antenna, or device designed for the collection and/or generation of energy from the sun and/or wind may exceed the building height limit by a maximum of fifteen (15) feet.

RESPONSE: No chimneys or antennas are proposed.

4. Church steeples may exceed 35 feet in height through a Type II process. The maximum height is 15 feet above the building height limit in any location allowed by other requirements of the zone district. Church steeples may go to a maximum total height of 75 feet provided that setbacks of 1 foot for each 1 foot in height from the property line are maintained.

RESPONSE: No steeples are proposed.

17.3.140 RESIDENTIAL DESIGN STANDARDS

All residential development is subject to the design standards found in Section 10.8.880.

RESPONSE: The future homes will meet the design requirements of 10.8.880.

Article 4 – Planned Developments

§ 17.4.120 REVIEW CRITERIA.

The Master Plan shall be approved if findings are made that each of the following criteria are satisfied:

- A. The Master Plan Zone complies with the review criteria for a zone change set forth in § [17.2.770](#);
- B. The master plan provides adequate open space , landscaping, circulation and parking to accommodate the planned uses;
- C. The development and design standards ensure that adverse impacts of the proposed development on the surrounding neighborhood and community are addressed and mitigated;
- D. The master plan ensures that no land will be used for any purpose which creates or causes to created any public nuisance, including but not limited to air, land or water degradation, noise, glare, heat, vibration or other conditions which may be injurious to public health, safety and welfare; and
- E. The master plan complies with the purpose and requirements of the Master Plan Zone.

(Ord. 2009-01, passed 3-9-2009)

§ 17.4.125 PROCEDURE FOR REVIEWING DEVELOPMENT PROJECTS UNDER APPROVED MASTER PLAN.

A. *Type I Review.* The Director shall approve a development project through a Type I process if it is found that:

- 1. It is consistent with the approved Master Plan and relevant conditions; and
- 2. The design of public and private streets and utilities is in conformance with specifications of the City Engineer and City Code standards; and

B. *Type II or Type III Review.* Projects not qualified for Type I review (above) shall be reviewed under the Type II process. The Director has the discretion under § [17.1.510](#) to elevate the review of a Master Plan development project from a Type II to a Type III review under and of the following instances:

- 1. The development project involves a land use or activities that were not envisioned as part of the approved Master Plan;
- 2. The development project involves:
 - a. A substantial increase in the nature, function or impact of a project element, including changes in noise, air quality, light, glare, stormwater drainage or the design of the circulation system; or

b. A substantial increase (more than 20%) in the size of a building or building coverage, the number of vehicle trips or required parking, beyond what was proposed when the Master Plan was approved; or

3. Any other changes that, in the judgment of the Director , have a substantial impact on adjacent properties beyond those impacts identified in the approval of the Master Plan; or

4. The project, in the judgment of the Director , has potential for neighborhood or community concern.

(Ord. 2009-01, passed 3-9-2009)

§ 17.4.130 AMENDMENTS TO AN APPROVED MASTER PLAN.

An application for an amendment to an approved Master Plan shall address all of the relevant elements of the submittal requirements as outlined in § [17.4.115](#). The amendment shall be reviewed for consistency for the review criteria under the Type IV procedure. The amendment shall be limited to the area of the proposed amendment and shall not include a reconsideration of the Master Plan Zone as a whole.

(Ord. 2009-01, passed 3-9-2009)

§ 17.4.135 DURATION OF AN APPROVED MASTER PLAN.

An approved Master Plan shall remain in effect until development allowed by the Master Plan has been completed or the approved Master Plan is amended or superseded.

(Ord. 2009-01, passed 3-9-2009)

PLANNED DEVELOPMENTS

§ 17.4.200 PURPOSE.

The purpose of the Planned Development (PD) provisions is to provide greater flexibility in the development of land for residential, commercial or industrial purposes than allowed by the conventional standards of the Development Code. For residential sites over two acres that have an average slope greater than 20%, development is allowed only through approval of a planned development (see § [17.3.130](#), [Table 3-4](#)).

A PD is not intended to be simply a means of avoiding normal Development Code requirements. The PD provisions are intended to:

A. Promote flexibility and innovation in site design and permit diversity in the location of structures in order to preserve natural features and view corridors;

RESPONSE: As demonstrated with the Preliminary Plans included with this request, the site is designed to have good street connections and traffic flow, open spaces and cohesive layout of the homes to provide a very attractive development. The area is naturally scenic and there is a wetland area to the south.

B. Promote innovative and creative design by providing a variety and mixture of building types and architectural styles;

RESPONSE: This Planned Development is proposed for townhouse and detached single family homes.

C. Promote efficient use of land and facilitate a more economical arrangement of buildings , circulation systems, land uses and utilities when compared with conventional development patterns;

RESPONSE: If the applicant sticks strictly to the requirements of each of the underlaying zones, it would be difficult to create lots that are cohesive, streets that provide vehicle and pedestrian connections and open space. The flexibility allowed by the Planned Development promotes efficient use of the land, preserves territorial views and a more economical arrangement of the future homes.

D. Preserve to the greatest extent possible existing landscape features and amenities such as trees , creeks, ponds, floodplains , hills and similar natural assets, and incorporate such features into the design of the PD;

RESPONSE: This Planned Development allows for a better arrangement of the streets, homes and open spaces which in turn allows preservation of views of natural areas and the wetlands to the south.

E. To encourage the provision of open space and recreational facilities in a generally central location and within reasonable walking distance of all living units in residential planned developments ;

RESPONSE: The Planned Development incorporates open spaces throughout the site. Sidewalks with planter strips and street trees are proposed along all public ways. All open spaces are to be full landscaped with native plants.

F. Combine and coordinate architectural styles, building forms and building relationships within the PD; and

RESPONSE: This Planned Development will provide a variety of home facades and color palates that are coordinated but yet provide diversity. A Home Owner's Association will have architectural control for the PD.

G. Provide the applicant with reasonable assurance of ultimate approval before requiring detailed design and engineering, while providing the city with assurances that the project will retain the character envisioned at the time of approval.

RESPONSE: The applicant will provide necessary materials to assure the PC that the Planned Development will be designed and constructed with the overall cohesiveness in mind.

(Ord. 2009-01, passed 3-9-2009; Ord. 2017-12, passed 11-27-2017)

§ 17.4.210 PROFESSIONAL DESIGN TEAM REQUIRED.

The PD applicant must certify, in writing, that a member of each of the following professions will be used in the planning and design process for the proposed PD:

- A. A licensed architect or professional urban designer;
- B. A licensed landscape architect, a certified nurseryman or landscape designer approved by the Director ; and
- C. A registered civil engineer or land surveyor.

One of the above professionals shall be designated by the applicant to act as a liaison between the Community Development Department, the design team, and the applicant during the two-step PD review process. The Planning Commission or City Council may require the expertise of other professionals on the design team if it is determined that the site merits special consideration to unique or adverse features or conditions.

(Ord. 2009-01, passed 3-9-2009; Ord. 2017-12, passed 11-27-2017)

RESPONSE: The applicant has a professional design team. John DeJong of Technical Engineering is the designated liaison for the design team and the applicant to the city.

The applicant will provide all professional expertise as required by Staff and the Planning Commission.

§ 17.4.215 PD DEVELOPMENT STANDARDS.

A. *Base Zone Standards.* The development standards of the base zone apply unless they are superseded by the standards of this section or the PD approval. Exceptions from the standards of the underlying zoning district must be warranted based on the unique design and amenities incorporated into the development plan, and shall have a beneficial effect which could not be achieved using the standards of the underlying zoning district. Exceptions shall be clearly and specifically identified in the application, which shall also include an explanation justifying and substantiating the need for each exception.

RESPONSE: This proposal adheres to the intent of the base zones, which is for residential housing.

B. *Site size.* There are no minimum or maximum size limitations for a PD.

RESPONSE: The site contains approximately 10.60 acres.

C. *Calculation of density.* The number of dwelling units allowed in residential zone PDs shall be calculated on the basis of § [17.3.130A](#). [Table 3-2](#). All residential development shall be at a minimum of 80% of the target density for the parent zone. A request for incentive density may be approved for the PD, based on the criteria in § [17.3.130E](#).

RESPONSE: This proposal meets the target density range for the base zones, further discussed on the following page.

D. *Multiple base zones.* When a proposed PD site includes more than one base zone, the uses and residential density may be allocated throughout the site without regard to zoning boundaries.

RESPONSE: The subject parcels do contain multiple zones, R-5, R-7 and R-10.

E. *Lot sizes.* There are no required minimum lot sizes.

RESPONSE: This proposal has a variety of lot sizes.

F. *Housing types allowed.* Housing types in zones that allow residential uses are not restricted in the PD, except that housing types in the RML and RMH zones shall include a mixture of single-family, duplex or multi-family units.

RESPONSE: The site is not within the RML or RMH zones. Proposed are single family attached and detached housing.

G. *Architectural Pattern Book.* In residential PDs, a variety of architectural styles shall be required. For all PDs, a compendium of architectural elevations, details and colors of each building type shall be submitted. The pattern book shall act as the architectural control for the homeowner's association or the commercial owner. The pattern book shall include the following:

1. An explanation of how the pattern book is organized, and how it is to be used.
2. Definitions of specific standards for architecture, color, texture, materials and other design elements.
3. A checklist system to facilitate review of the development for conformity with the pattern book.
4. Information for each building type including:
 - a. Massing, facades, elevations, roof forms, proportions, materials and color palette.
 - b. Doors, windows and siding, including sash and trim details.
 - c. Porches, chimneys, light fixtures and any other unique details, ornamentation or accents.
 - d. Illustrations of elevations and floor plans.
 - e. A fencing plan with details that addresses the relationship between public and private space, and between the PD site and abutting property.

RESPONSE: The applicant will provide the required Pattern Book with the final plat, along with the HOA and other documents that will provide architectural control for the Planned Development.

H. *Height.* The height limits of the base zone apply.

RESPONSE: The homes will not exceed the maximum of the base zones, 2 ½ stories.

I. *Building setbacks.* Building setbacks are established as part of the preliminary development plans approval. Garage setbacks shall be a minimum of 20 feet. No building projections (roofs or foundations) shall be permitted in the front yard public utility easement required by § [17.8.905](#)E.1.

RESPONSE: The setbacks will be as follows:

Side yards: 3.00 feet

Rear yards: 12.00 feet

Front yards: 12.00 feet

Garage face: 20.00 feet

J. *Peripheral yards* . Along the boundary of any PD, a yard at least as deep as that required in the underlying zone district shall be provided.

RESPONSE: The peripheral yards will be maintained at least the same dimension as the adjoining zone.

K. *Open space* . At least 20% of the buildable portion of the PD not in streets and driveways must be devoted to open space. At least half of the open space in all zones must be in common ownership and at least half of that space must be contained in one tract. The tract's configuration shall be 45% of the site's overall length and width with a minimum dimension of 20 feet. The extent to which any type of open space satisfies the total open space requirement shall be in the sole discretion of the city.

RESPONSE: At least 20% of the site is contained withing Open Space, with Tracts A – F containing 100,611 square feet. The aggregate site contains 10.60 acres or 461,736 square feet; therefore, the Open Space in this development is 21.79% of the total land area.

L. *Parking*. The base zone parking requirements apply. Common parking and maneuvering areas must be set back at least 20 feet from the boundary of the PD.

RESPONSE: The PD provides parking on both sides of most of the streets and within Tract E; Tract E is not within 20 feet of the PD boundary.

M. *Water features*. Water features such as streams or ponds must be left in a natural state unless altered to improve the natural values of the water feature or to improve stormwater drainage. Water features and their edges should be kept in common ownership.

RESPONSE: There are no streams or other water features on the site.

N. *Facilities and services*. It is the responsibility of the applicant to provide all service facilities necessary for the functioning of the PD. Service facilities such as streets, water supply facilities, sanitary sewers and stormwater detention facilities must be dedicated to the public if they are to provide service to any property not included in the PD. However, the review body may approve private service facilities with the consent of the appropriate service provider.

RESPONSE: The development will be providing public facilities and services, including sanitary sewer, public water, storm water management, streets and sidewalks and landscaping necessary for the functioning of the Planned Development. One private street is requested to serve as access for Lots 16 through 20.

O. *Development regulations and design standards not subject to modification*. The PD process cannot be used to vary or take an exception from the Street Standards listed in § [17.8.610](#).

RESPONSE: The development is providing for all needed streets and no exceptions are wanted or expected.

P. *Underground utilities.* All service facilities must be placed underground except those that by their nature must be on or above ground, such as fire hydrants and open watercourses. The applicant is responsible for making the necessary arrangements with utility companies and other appropriate entities when installing all service facilities.

RESPONSE: All services will be placed underground with the site construction.

Q. *Construction to standards.* All service facilities dedicated to the public must be constructed to city standards. All private service facilities must be designed by a qualified civil engineer to city standards or comparable design life as determined by the City Engineer.

RESPONSE: Any service facilities dedicated to the public, including public streets will be constructed to city standards.

R. *Building size standards.* For areas designated as Planned Shopping Center by the Comprehensive Plan, commercial retail is limited to 20,000 square feet and commercial office is limited to 10,000 square feet.

RESPONSE: This request is for residential development; R., above, does not apply.

(Ord. 2009-01, passed 3-9-2009; Ord. 2017-12, passed 11-27-2017)

§ 17.4.220 PRELIMINARY PLAN REVIEW.

A. *Procedure.* Preliminary plan reviews are processed through a Type III procedure.

B. *Submittal requirements.*

Applications for a preliminary plan review must contain the information stated below in addition to that required by § [17.1.225](#).

1. *General statement.* A statement of how the purpose of § [17.4.200](#) will be achieved by the proposed PD. The statement should include sketches or illustrations of the proposed character of the development, a description of how the PD will relate to surrounding land uses and whether other land use reviews are requested.

RESPONSE: The included Preliminary Plans include a block with a general purpose statement; this narrative also provides statements of how the Planned Development achieves the purpose of 17.4.200.

17.4.200 is addressed of page 16.

2. *Summary report.* A summary report identifying the different land uses, including the amount of land for housing, non-residential uses, open areas, streets and parking; the number and type of housing units; the amount and type of commercial or industrial areas, if any; and a statement of how necessary services will be provided and whether the services will be publicly or privately owned and operated.

RESPONSE: A Summary report is included with the application materials for this request.

3. *Drawings of existing site conditions.* A drawing or drawings must be submitted which display and inventory existing site conditions including the items listed below:

- a. Ground elevations shown with contour lines at two-foot intervals or less;
- b. Areas of moderate or severe landslide potential, as identified on city maps or documented by an engineering geologist or geotechnical engineer;
- c. General soil types as identified on city maps or as documented by an engineering geologist of soils engineer;
- d. Existing natural features, including rock outcroppings, trees and tree groves , fish and wildlife habitats, ponds, wetlands and watercourses;
- e. Existing on-site or abutting sanitary sewage, storm drainage and water supply facilities. If such facilities are not on or abutting the site , indicate the direction and distance to the nearest ones;
- f. Width, location and purpose of all existing easements of record on or abutting the site ;
- g. A description of the traffic circulation system on or abutting the site , including street sizes, level of improvements and condition of the streets ;
- h. A description of areas abutting the PD, indicating zoning districts, land uses, densities, circulation systems, public service facilities, natural features and approximate locations of nearby structures ; and
- i. Any additional information about existing site conditions required for a concurrent subdivision application .

RESPONSE: This application package includes the required plans,, including an Existing Conditions Plan on Sheet 4.

4. *PD Site plan* . The site plan must include the information stated below:

- a. Setbacks for houses and the placement and bulk of other buildings ;
- b. The traffic circulation system, including connections to existing public rights-of-way, off-street parking and the ownership of streets and parking areas;
- c. Conceptual plans for pedestrian and bicycle circulation systems;
- d. Conceptual plans for all necessary services, including their location and whether the services will be publicly or privately owned and maintained;
- e. Conceptual plans for all facilities for the control and disposal of stormwater and groundwater;
- f. Conceptual plans for the location and design of public and private open areas or structures ;
- g. Treatment proposed for the periphery of the site , including the approximate amount, location and type of any required landscaping; and
- h. Conceptual guidelines for multi-family and commercial structures , including such things as building heights , sizes, areas, roof shapes, exterior materials and types of parking areas.

RESPONSE: A PD Master Plan is shown on Sheet 3.

5. *Phased PDs.* PDs being developed in phases require a description of each phase, including the size, uses, timing and infrastructure phasing. Any PD which will require more than 24 months to complete shall be constructed in phases. Each phase shall conform to the phasing plan.

RESPONSE: This PD is proposed in one phase.

6. *Drawings.* Drawings showing the existing site conditions and the proposed site plan must be at a reasonable size and scale to clearly show all required information. The drawings must display the following:

- a. Name of the proposed PD;
- b. Date, north arrow and scale of the drawing;
- c. Legal description of the PD sufficient to define its location and boundaries;
- d. Names, addresses and telephone numbers of the owner, applicant and design team; and
- e. Appropriate identification of the drawing as a preliminary plan.

RESPONSE: The Preliminary Plans include plan sheets that contain the information as required by 6.a-e., above.

C. *Approval criteria.* The preliminary plan will be approved if the review body finds that the applicant has shown that all of the following approval criteria are met:

1. The plan fulfills the purpose for PDs stated in § [17.4.200](#);
2. The plan meets the submittal requirements of § [17.4.220B](#).;
3. Adequate public services exist or can be provided to serve the proposed PD; and
4. Where a tentative subdivision plat is requested, the requirements of [Article 8](#) are met.

RESPONSE: The applicant has provided plans and written information to describe how the development fulfills the purpose for Planned Developments and the submittal requirements of this code.

The included Preliminary Plans show the availability of public service and the extension of said services as a part of the proposed development of the site.

D. *Time limit.* Preliminary plan approval – including all phases - is valid for four years and may not be extended. The four-year period will not begin until any appeals beyond the jurisdiction of the city are completed. Within the four-year time period, the applicant must submit a final development plan for the entire site.

(Ord. 2009-01, passed 3-9-2009; Ord. 2017-12, passed 11-27-2017)

Article 5 – SPECIAL PROVISIONS

SOLAR ACCESS

17.5.400 PURPOSE

Solar energy can make a significant long-term contribution to the City's energy supply. The provisions of this section apply to the division of land in single family residential zones to ensure that land is divided with consideration of orientation for solar access.

17.5.405 APPLICABILITY

The solar design standard shall apply to applications for subdivisions in all residential zones, except to the extent the approval authority finds that exemptions or adjustments provided for in Section 10.5.420 are warranted.

17.5.410 PROCEDURE

Compliance with the solar access provisions shall be determined through the Type II review of the tentative subdivision plat.

17.5.415 DESIGN STANDARD

At least 80% of the lots in a development subject to this section shall comply with one or more of the following options:

A. Basic Requirement (See Solar Lot Option 1 below). A lot complies with this section if it:

1. Has a north-south dimension of 90 feet or more; and
2. Has a front lot line that is oriented within thirty (30) degrees of a true east-west axis.

RESPONSE: All lots except 11 (Lots 1 – 7 and Lots 16 – 19) meet the solar access standards, therefore 83% of the lots meet the Basic Requirement.

Article 6 – LAND DIVISIONS

SUBDIVISIONS

17.6.095 PURPOSE

Land division review procedures for subdivision are established for the following purposes:

- A. Ensure building sites are of sufficient size and appropriate design for their intended uses and lots to be created are within density ranges permitted by the Comprehensive Plan;
- B. Minimize negative effects of development upon the natural environment and incorporate natural features into the proposed development where possible;
- C. Ensure economical, safe, and efficient routes for pedestrians, bicycles, and motor vehicles;
- D. Create residential living environments that foster a sense of neighborhood identity and are protected from the adverse effects of heavy traffic and more intensive land uses; and
- E. Promote energy efficiency.

17.6.100 PROCEDURE

Subdivisions are reviewed through a two-step procedure. A tentative plat for a subdivision is reviewed through the Type II procedure primarily for design aspects, connections to existing and future streets, preservation and natural features, drainage and floodplain considerations, and compliance with other requirements of this Code. General compliance with the public improvement standards of Article 8 is assessed at the tentative plat review stage.

The final subdivision plat is reviewed through the Type I procedure for conformance with the approved tentative plat and conditions, and applicable state or county laws or rules. Detailed and specific compliance with the public improvement standards of Article 8 is assessed at the final plat review stage. An Oregon-licensed land surveyor must prepare the tentative and final plats.

Refer to Article 1 for information on Type I and Type II procedures.

RESPONSE: The applicant has applied for this Preliminary PD Plat approval through a Type III procedure. The applicant or assigns will make a new land use application for the Final Plat, under a Type I procedure.

17.6.105 APPLICATION REQUIREMENTS FOR TENTATIVE PLAT REVIEW

A. Application.

Applications shall be made on forms provided by the Director. The person filing the application must be the owner or a person having an interest in the land to be included in the subdivision. If the development is to include a territory with more than one ownership, the application must be submitted jointly and be signed by all of the owners or persons having an interest in each of the separately owned properties to be included.

The application shall be accompanied by the following:

1. One (1) copy of the narrative on 8 ½ x 11 inch sheets;
2. Four (4) sets of full-scaled black line drawings of the tentative plat and any other graphic(s), with a sheet size not to exceed 24 x 36 inches. One set of the graphics shall be reduced to fit on 8 ½ x 11-inch sheets of paper. Graphics and related names/numbers must be legible on this sheet size. When necessary, an overall plan with additional detail sheets may be submitted.

B. Graphics. A tentative subdivision plat application shall include the following information where applicable:

1. Public notice map

RESPONSE: A reduced set of the Preliminary Plans are included with this application package.

2. Existing land use map. Typically an aerial photo that extends at least 500 feet beyond the site boundaries shall be submitted unless the Director accepts a different map type and/or extent. This map includes building footprints and makes a distinction between residential, commercial and industrial land uses, as well as noting other significant features such as roads, drainageways, parks, transit stops and schools.

RESPONSE: The included Preliminary Plans are attached.

3. Tentative subdivision plat and other graphics drawn to scale and containing sheet titles, date, north arrow, and legend placed in the same location on each sheet and containing the following:
 - a. Name and address of owner(s) of record, applicant, and registered land surveyor who prepared the plat;
 - b. Sufficient description to define location and boundaries of the development site;
 - c. Location and use of adjacent structures within 150 feet of the development site;
 - d. Number of lots and their dimensions including frontage, depths, and area in square feet;
 - e. General locations of existing and proposed structures including building types and gross density per acre and proposed use restrictions. An indication of approximate building envelopes may be required where necessary to evaluate building relationships;
 - f. General location and size of areas to be conveyed, dedicated, or reserved as common open spaces, public parks, recreational areas, school sites, and similar public and semipublic uses;
 - g. Existing and proposed general circulation system including bikeways, off-street parking areas, service areas, loading areas, and major points of access to public rights-of-way. Notations of proposed ownership (public or private) should be included where appropriate;
 - h. Existing and proposed general pedestrian circulation system, including its interrelationship with the vehicular circulation system and indicating proposed treatments of points of conflict;

- i. Existing and proposed utility systems including sanitary sewer, storm sewer, drainageways, and water;
- j. Identification of significant natural features including heavily wooded areas and significant trees;
- k. Topographic contours at two (2)-foot intervals for slopes under 20% and at five (5)-foot intervals for slopes at or greater than 20%. Where the grade of any part of the subdivision exceeds 10% or where the subdivision abuts existing developed lots, a conceptual grading plan may be required to show features affect the subdivision and adjacent areas. If a grading plan is required, it shall show how runoff or surface water from individual lots will be managed and ultimate disposal of all subdivision surface waters;
- l. Approximate location of proposed easements and/or dedications for drainage, sewage, or other public utilities;
- m. Location of waterways and drainageways, showing top of existing banks and channel depth, and if requested, a separate sheet showing cross section at fifty (50)-foot intervals of all such watercourses; and
- n. For residential development, identification of which lots are intended to have solar access protection.

RESPONSE: The included Preliminary Plans show the required information for 3.a - l, above.

There are no water courses or significant natural resources on the site and the new.

More than 80% of the lots meet the Solar Standard.

The CWS Service Provider Letter is included within this packet.

- 4. The Director may waive any of the above requirements when determined the information required by this section is unnecessary to properly evaluate the proposed development. The Director may also require additional information, if determined necessary, to adequately evaluate the proposal.

C. Narrative. A written statement shall include:

- 1. Proposed uses and development objectives;
- 2. Statement of on-site and off-site improvements to be constructed or installed, date of their anticipated completion, and availability of off-site rights-of-way and/or easements to the site to allow extension of off-site improvements to the site. Improvements include:
 - a. Domestic water supply;
 - b. Sewage disposal, storm drainage, and flood control;
 - c. Pedestrian, bicycle and vehicular access;

- d. Maintenance of common areas, if proposed; and
- e. Landscaping.

RESPONSE: The site has access to all public facilities as described below and in the “Proposed Project” portion of this narrative and also as shown on the Preliminary Utility Plan on sheet 8 of the Preliminary Plans.

Water is available within the right of way of Pacific Avenue and 19th Avenue and 19th Place and will be extended through the site.

Sanitary sewer is available within Pacific Avenue and 19th Avenue. A public line will be extended through the site to serve the new lots.

Storm sewer is available within Pacific Avenue and 19th Avenue, storm water will be collected from the site and conveyed underground to a Water Quality Facility within Tract F, where it will be treated and detained before being released into the existing system.

Common areas are proposed within open space tracts and will be fully landscaped. Tract F will contain the water quality and will be dedicated to the city with the final subdivision plat.

Landscaping is proposed, including street trees and grass within the planter strips and as required by CWS for all Tracts, as shown on the Preliminary Site Plan and on the included Landscaping Plans.

- 3. General description of intentions concerning timing, installation and maintenance responsibilities, and assurances for all public and non-public improvements and facilities, such as irrigation, private roads and drives, landscape, and open space, water quality and stormwater detention facilities and sensitive land buffers;

RESPONSE: The applicant plans to construct the site improvements as soon as the engineering and construction documents can be submitted and approved by the city. The applicant or his assigns will provide financial assurances for the improvements as a part of the final permitting process for the on-site improvements.

- 4. General data not included on the tentative plat such as:
 - a. Total number and type of dwelling units;
 - b. Lot sizes;
 - c. Proposed lot coverage of buildings and structures where known;
 - d. Densities per net acre;
 - e. Total amount of open space (lands not designated for buildings or vehicle parking and maneuvering areas); and

f. Total amount of nonresidential construction.

RESPONSE: *This proposal is for 65 lots for the use of single family dwelling units and townhouses. Lot sizes are shown on the Preliminary Plat.*

The requirements for the R-5, R-7 and R-10 zones are addressed on page 8 of this narrative, including the number and type of proposed units, lot sizes and density. Open space and non-residential areas are shown on the included plans.

5. Any proposed Conditions, Covenants and Restrictions (CC&Rs)

RESPONSE: *No CC&Rs are proposed at this time. The future builder will likely want CC&Rs for the subdivision, the documents will be submitted with the final plat for city review and approval.*

6. How the proposed project meets each of the approval criteria.

RESPONSE: *How the proposal meets the approval requirements of the city's Development Code is addressed in detail within this narrative and within the included Preliminary Plans.*

D. An application for a subdivision within the City of Forest Grove must include a certification from the City Engineer and Light and Power Director for electricity as follows:

1. Certification from the City Engineer and Light and Power Director on forms provided by the City that the following are available to the site:

- a. Municipal water with legal access to the site and sufficient volume and pressure to serve the proposed development.
- b. Sanitary sewer with legal access to the site and sufficient treatment plant capacity and line capacity to serve the proposed development.
- c. Storm sewer with legal access to the site and sufficient line capacity to adequately provide the necessary drainage.
- d. Road access with available public right-of-way and capacity to serve the proposed development.
- e. Electrical power with legal access to the site and sufficient capacity to serve the development.

RESPONSE: *Included is a statement from the City Engineer noting that the items required by 1,a.-e,above are available to the property.*

10.6.110 TENTATIVE PLAT REVIEW CRITERIA

Type II approval of a tentative subdivision plat will be granted if the Director finds that the applicant has met or can meet all of the following criteria without reliance on other parties not associated with the subject development, unless agreements with such other parties are in place prior to project approval to the satisfaction of the Director:

A. The tentative subdivision plat complies with all applicable requirements for submittal.

B. The subdivision plat complies with all applicable standards and design requirements of this Code.

RESPONSE: As demonstrated in the Preliminary Plans, generated by the applicant's engineer, and within this narrative, along with other support information attached with this request, the subdivision plat complies with all applicable requirements.

C. Any special features of the site (such as topography, floodplains, wetlands, vegetation, historic sites) have been adequately considered and addressed in the design of the tentative plat.

RESPONSE: There are no special features on the site.

D. All lots shall be suitable for their intended use. No parcel shall be of such size or design as to be detrimental to the health, safety, or sanitary needs of the occupants of such lot or subdivision.

RESPONSE: As shown on the Preliminary Site Plan, the lots are all suitable for the intended use, which is for single family attached dwelling and townhouse units. Tract F is intended for the use of open space and water quality and treatment.

E. Development of any remainder of property under the same ownership can be accomplished in accordance with this Code.

RESPONSE: This proposal will fully develop the entire site.

F. Adjoining land can be developed or is provided access that will allow its development in accordance with this Code.

RESPONSE: The adjoining lands have access to 19th Avenue, 19th Place and the new public streets proposed within this Planned Development.

G. The proposed street plan provides safe, convenient and direct options for pedestrian, bicycle and vehicular circulation.

H. Adequate public facilities are available to or within the site, including sufficient legal access, or can be provided by the applicant to serve the proposed subdivision.

RESPONSE: All streets will be designed and constructed to the city's standards. All public facilities will be extended to serve the site, as shown on sheet 8, Preliminary Utility Plan.

I. Protection and assurance of access to incident solar radiation and/or wind as defined by ORS 92.044 for potential electrical generation or mechanical application.

RESPONSE: The future homes can access solar by roof panels if off-grid electrical is desired by future home owners.

Article 8 - GENERAL DEVELOPMENT STANDARDS

ACCESS AND CIRCULATION

17.8.100 PURPOSE

The purpose of this section is to establish standards and regulations for safe and efficient vehicle access and egress on a site and for general circulation within the site, including pedestrian circulation.

17.8.105 APPLICABILITY

- A. When Provisions Apply. The provisions of this article shall apply to all development, including the construction of new structures, and the remodeling or new structures or a change of use which increases the on-site parking or loading requirements or which changes the access requirements.
- B. When Site Plan/Design Review Is Not Required. Where the provisions of site plan review or design review do not apply to the proposed developments, the Director shall approve, approve with conditions, or deny an access plan submitted under the provisions of this Article in conjunction with another permit or land use action.
- C. Conflict with Land Division Requirements. The requirements and standards of this article shall not apply where they conflict with the land division rules and standards of Article 6.

RESPONSE: This proposal is for new development; therefore, these standards apply.

17.8.110 GENERAL PROVISIONS

- A. Continuing Obligation of Property Owner. The provision and maintenance of access and egress stipulated in this section are continuing requirements for the use of any structure or parcel of real property in the City.

RESPONSE: A Maintenance Agreement will be provided to the city for review with the Final Plat application for the subdivision for any shared access.

- B. Access Plan Requirements. No building or other permit shall be issued until a scaled site plan is submitted that shows how access, egress and circulation requirements are to be fulfilled. The Director shall provide the applicant with information about the submittal requirements for an access plan.

RESPONSE: The applicant has included full Preliminary Plans with this request, including a Preliminary Site Plan showing all lots have access.

- C. Joint Access. Owners of two or more uses, structures, or parcels of land may agree to jointly use the same access and egress when the combined access and egress of both uses, structures, or parcels of land satisfies their requirements as designated in this Article, provided:

1. Satisfactory legal evidence shall be presented in the form of deeds, easements, leases or contracts to establish the joint use; and

2. Copies of the deeds, easements, leases or contracts are placed on permanent file with the City.

RESPONSE: A Maintenance Agreement will be provided to the city for review with the Final Plat application for the subdivision and will be recorded with the subdivision plat with the Washington County Recorder.

D. Public Street Access. All vehicular access and egress shall connect directly with a public or private street approved by the City for public use, except where joint access is provided through adjacent or other property which is connected to a street. Vehicular access to a residential use shall be provided within the same lot for single-family and two-family dwellings, and within the same lot or development for multi-family dwellings. Access to multi-family units shall avoid being located through single family residential areas before being connected to a collector or arterial as designated by the City's Transportation Plan.

RESPONSE: As shown, all lots have access to a public street by way of the shared driveways.

E. Transit Agency Referral. The City shall submit all development proposals located along the Pacific Avenue/19th Avenue transit corridor to Tri-Met for review and comment regarding facilities necessary to support transit. The following facilities may be required as a condition of a permit:

1. Walkways to transit stops;
2. Bus stop shelters or waiting areas;
3. Turnouts for buses.

RESPONSE: There is a bus station just west of city hall and east of the subject site about ½ mile away.

F. Where hard surfaces are stipulated by these requirements, pervious surfaces are encouraged to be used. Where improvements are within the public rights-of-way, such surfaces can be used upon approval by the City Engineer.

RESPONSE: The new street improvements will be constructed as required within the City Engineer's Standard Details.

Future driveways will be constructed of either asphalt or concrete and all will be to the standards of the city engineer. Full construction plans will be submitted for review and approval as a part of the development process.

G. Landscaped areas should include water quality features such as bio-swales or wetlands, trees, grass, shrubs, and other plant material when possible so as to cover landscape areas.

RESPONSE: A Landscaping Plan for the water quality area and open space areas is provided with this request.

17.8.115 ON-SITE PEDESTRIAN WALKWAYS

A. Required Walkways. On-site pedestrian walkways are required as follows:

1. Walkways shall extend from the ground floor entrances or from the ground floor landing of stairs, ramps, or elevators of all commercial, institutional, and industrial uses, to the public sidewalk or curb of the public street or streets which provide the required access and egress. Walkways shall provide convenient connections between buildings in multi-building commercial, institutional, and industrial complexes. Walkways shall be constructed between a new development and neighboring developments. If connections aren't currently available, then planned connections shall be designed to provide an opportunity to connect adjoining developments.
2. The maximum distance between a parking space and a walkway shall not exceed forty-five (45) feet. All walkways constructed within parking lots shall be raised to standard sidewalk height. All surface treatment of walkways shall be firm, stable and slip resistant.
3. Required walkways shall be paved with hard-surfaced materials such as concrete, asphalt, stone, brick, etc. Walkways may be required to be lighted and/or signed as needed for safety purposes. Lighting and or signs may be required for walkways for safety purposes.
4. Whenever required walkways cross vehicle access driveways or parking lots, such crossings shall be designed and located for pedestrian safety. Required walkways shall be physically separated from motor vehicle traffic and parking by either a minimum six (6)-inch vertical separation (curbed) or a minimum three (3)-foot horizontal separation, except that pedestrian crossings of traffic aisles are permitted for distances no greater than thirty-six (36) feet if appropriate landscaping, pavement markings, or contrasting pavement materials are used.

Walkways shall be a minimum of four (4) feet in width, exclusive of vehicle overhangs and obstructions such as mailboxes, benches, bicycle racks, and signposts, and shall be in compliance with ADA standards.

RESPONSE: Walkways are proposed through the site and also along the public right of ways as shown on the Preliminary Site Plan. All sidewalks will be 5.00 feet wide and paved with concrete to the city's standards and in compliance with ADA standards. Walkways will have landscaping and pedestrian scale lighting as shown on the included Landscaping Plans.

17.8.120 MINIMUM ACCESS REQUIREMENTS FOR RESIDENTIAL USES

- A. Direct Access to Arterial Streets from a residential dwelling established after the effective date of this Code is prohibited. The City may permit direct access to an arterial for lots of subdivisions approved prior to the effective date of this Code, and for multi-family residential complexes if the access is designed to local residential street standards.
- B. Single-Family Dwellings and Duplexes shall be required to have one driveway, fully improved with hard surface pavement, with a minimum width of 10 feet.

C. Service Drives for Multi-Family Dwellings shall be fully improved with hard surface 1. 12 feet when accommodating one-way traffic, or 2. 20 feet when accommodating two-way traffic. In no case shall the design or said service drive or drives require or facilitate the backward movement or other maneuvering of a vehicle within a street.

D. Private Residential Access Drives shall be provided and maintained in accordance with the provisions of the Uniform Fire Code.

RESPONSE: The lots will have a private residential access driveway for access, these drives will be provided and maintained according to the provisions of the UFC No service drives are proposed.

E. Dead End Access Drives In Excess Of 150 Feet shall be provided with approved provisions for the turning around of fire apparatus by one of the following:

1. A circular, paved surface having a minimum turn radius measured from center point to outside edge of thirty-five (35) feet; or
2. A hammerhead, paved surface with each leg of the hammerhead having a minimum depth of forty (40) feet and a minimum width of twenty (20) feet.
3. The maximum cross slope of a required turnaround is 5%.

RESPONSE: No dead-end access drives exceeding 150 feet are proposed.

F. Driveway Grades shall not exceed a maximum of 20%.

RESPONSE: The areas of driveways will not have grades in excess of 20%.

LANDSCAPING, SCREENING AND BUFFERING

17.8.400 PURPOSE

The purpose of this section is to establish standards for landscaping, buffering, and screening of land use within Forest Grove in order to enhance the aesthetic and environmental quality of the City:

- A. By requiring street trees in new developments;
- B. By using plant materials as a unifying design element;
- C. By using plant materials to define spaces and articulate the uses of specific areas; and
- D. By using trees and other landscape materials to mitigate the effects of noise and lack of privacy and provide buffering and screening.

RESPONSE: The landscaping area for this site will be within the open spaces and planter strip including street trees and a grass and within the water quality facility within Tract F. Detailed landscaping plans are provided with this request.

17.8.405 APPLICABILITY

- A. Applicability. The provisions of this section shall apply to all new development and to a change of use that result in the need for increased on-site parking.
- B. When Site Development/Design Review Does Not Apply. Where the provisions of Site Development Review or Design Review do not apply, the Director shall approve, approve with conditions, or deny a landscape plan submitted under the provisions of this section by means of a Type I procedure.
- C. Landscape Plan. The applicant shall submit a landscape plan. The Director shall provide the applicant with information on the submittal requirements.

RESPONSE: Landscaping Plans are included with this request.

17.8.410 GENERAL PROVISIONS

- A. Obligation to Maintain. It shall be the continuing obligation of the property owner to maintain required landscaped areas in an attractive manner free of weeds and noxious vegetation. In addition, the minimum amount of required living landscape materials shall be maintained.

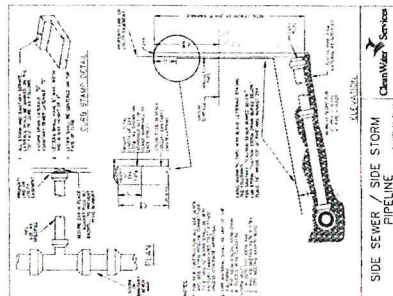
RESPONSE: The landscaped areas in open spaces will be maintenance by an HOA.

The applicant or his assigns will maintain the landscaping within Tracts per the required maintenance agreement with the city that is a part of the permitting and bonding for the construction. After the maintenance period, Tract F will be owned and maintained by the city.

- B. Ground Preparation. The ground in all required landscaped areas should be properly prepared with suitable soil and fertilizer. Specifications shall be submitted with the landscape plans showing that adequate preparation of the top soil and sub-soil will be undertaken prior to planting to support the plantings over a long period of time.
- C. Installation Requirements. The installation of all landscaping shall be as follows:
 - 1. All landscaping shall be installed according to accepted planting procedures and the provisions of this article;
 - 2. The plant materials shall be of high grade, and shall meet the size and grading standards of the American Standards for Nursery Stock;
 - 3. All required landscaped areas must be provided with a piped underground irrigation system unless a licensed landscape architect or certified nurseryman.

RESPONSE: The applicant will hire landscaping crews to provide the landscaping as a part of the site construction. It is anticipated that the landscaping will be installed under the supervision of the general contractor building the site. Final Landscaping Plans will be submitted for review and approval by the city as a part of the final construction documents.

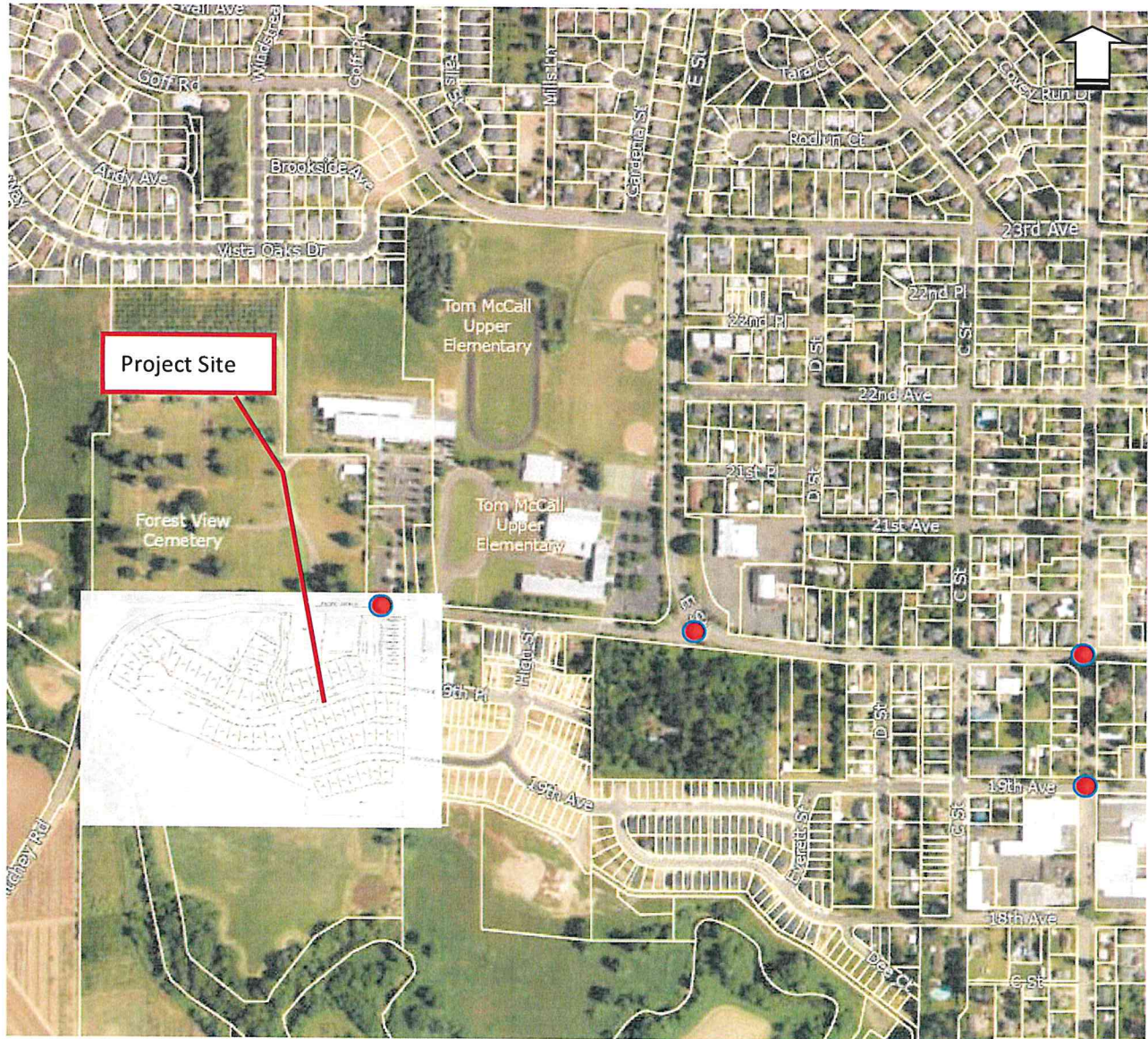
#end#



NOTES and DETAILS

	Drawn By : JDI
	Checked By : TLA
	Date : December, 2022
	Project No. : 2022 - 08
	SHEET 6 of 8

Ritchey Ridge PUD
Pacific Avenue and SW Ritchey Road
Impact Analysis



Prepared by:
ETRC, LLC
14465 SW 161st Avenue
Portland, OR 97224

October 2022



EXP. June 2024

Prepared for: Steve and Rick Schmunk

Ritchey Ridge PUD/Subdivision

Pacific Avenue and SW Ritchey Road
1S401 – 1000,2800,2900,800

65 Lot Subdivision

Forest Grove, OR
Application/Case No.

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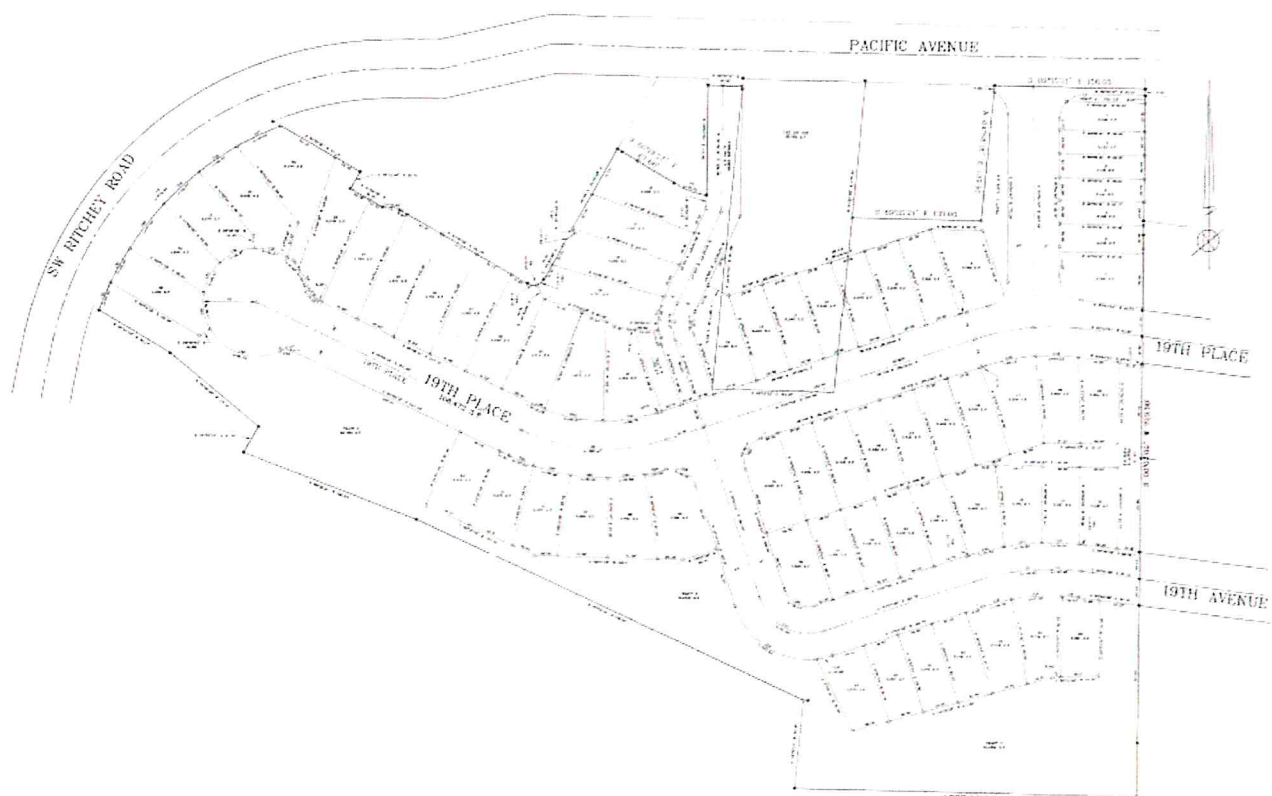
Introduction and Background

This traffic study is presented as part of the development application referred to as Ritchey Ridge Subdivision located along the west end of Pacific Avenue and SW Ritchey Road in Forest Grove, Oregon.

The proposed development plan will add 65 single family housing units on the site which is consistent with designated zoning as well as City of Forest Grove's long-range planning and City Council's goal for affordable housing.

The current site is made up of four vacant parcels, and there are no existing joint access points on the two adjoining parcels. There are two stub streets on the east side of the combined site (19th Pl. and 19th Ave.) which will be utilized as secondary access to the proposed development which will complete the intended future circulation connecting Gales Creek Terrace Subdivision with the proposed Ritchey Ridge Subdivision. Figure 1 shows the site layout and access points to the north (one) as well as east (two) to Pacific Avenue, 19th Pl. and 19th Ave. respectively

Figure 1 – Site Layout and Access



The purpose of this study is to assess the traffic impact of the proposed development on the nearby street system and to recommend any required mitigative measures. The analysis will include level of service calculations delay and delay analysis. Detailed information on traffic counts, trip generation calculations, and level of service calculations are included in the report as well as the appendices.

City of Forest Grove has requested a study of three existing intersections as well as the site access shown in Table 1 reflecting geometry as well as existing traffic control devices.

Table 1 – Study Intersections

Intersection	Type	Control	
Site Access (North to Pacific Avenue	3- Leg	Stop Controlled	On Northbound Approach from Site
E Street and Pacific Avenue	3- Leg	Stop Controlled	On Eastbound from Pacific and Southbound to West (Right)
Pacific Avenue and B St.	4- Leg	Signalized	Pacific One Way Westbound at B St. Yield Right Turn Eastbound
19 th Avenue and B St.	4- Leg	Stop Controlled	Eastbound on 19 th Ave. and Northbound on B St.

Proposed Development

The 65-unit proposed single family project is designed with tree and natural area preservation, access management, emergency access options, intended zoning, circulation, and the existing residents in mind. The proposed site plan shown in Figure 1, provides the best possible option for site layout, least invasive connection to existing stub street and with reasonable access and parking accommodations to all future and existing nearby residents. There is an existing dwelling unit which will be removed.

Vicinity Map

The proposed development is located south of Pacific Avenue, just east of SW Ritchey Road, and west of 19th Place and 19th Avenue within City of Forest Grove boundary. (See Cover Page).

Site Access/Site Plan

As explained in the introduction, the proposed access points to site will be to the north through a new connection of Pacific Avenue and to the east via existing stub streets identified on the site plan as 19th Place and 19th Avenue approximately 235 feet and 490 feet south of Pacific Avenue respectively. All connecting roadways provide sidewalk and standard local street width to accommodate pedestrian, bicycle, and vehicular traffic per City of Forest Grove standards.

The proposed site development plan provides sufficient circulation for pedestrian movements, site traffic as well as emergency response to the area.

Study Roadways and Intersections

Pacific Avenue along the north side of the project side is a two-lane Collector roadway (one lane of travel in each direction), partial sidewalk on the south side and sidewalk on the north side along the school frontage. The posted speed is 25 mph and goes through a school speed 20 zone. Pacific Avenue between E Street and B Street and beyond is a two-lane Arterial with a turn pocket at E Street. The posted speed is 30 mph and there are sidewalks on both north and south side of the street. E Street is an Arterial. The primary direction of travel changes from East/West (Pacific Avenue) to North/South E Street and posted speed changes to 35 mph. B Street is a two-lane Collector north of Pacific Avenue and an Arterial south of Pacific Avenue. There are sidewalks on both sides of B Street. B Street is unposted near the study intersections, but is presumed to be 25 mph. South of 19th Avenue is posted 35 mph.

Study intersections were Site Access at Pacific Avenue, Pacific Avenue at E Street, Pacific Avenue at B Street, B Street, and 19th Avenue.

Existing Traffic Conditions – Year 2022 Background Traffic

The existing study intersections (shown in Table 1, above). turning movement counts were all manually counted mid-week during PM peak hours (Wednesday October 5th, 2022).

The Existing traffic, existing plus site traffic and Future projected traffic analysis including Level of Service, Average Delay, and Intersection Capacity Utilization for all four study intersections (three existing plus site access) are summarized in Table 4.

Site Trip Generation

Estimated average weekday and weekday AM and PM peak hour vehicle trips for the proposed site development are shown in Table 2 which was prepared using the latest edition of Trip Generation Manual (11th), published by the Institute of Transportation Engineers.

Table 2 – Trip Generation

Land Use Type	ITE Code	Dwelling Units	AM Peak 53		PM Peak 70		Daily
			In 26%	Out 74%	In 64%	Out 36%	
Dwelling	210	65	14	39	45	25	679
Existing Dwelling	210	1		1	1		11
Net Change		64	14	38	44	25	668

Trip Distribution

The distribution of site generated trips and direction of anticipated trips are based on the City of Forest Grove and Washington County traffic patterns following arterial directions, employment centers and other destinations and attractions such as shopping centers, schools, etc. as well as best information obtained from the applicant and the market they anticipate serving. It is expected that 95% of the trips travel east on Pacific Avenue and split 25 percent to the north (E St.) and 70 percent to the east (Pacific Avenue). Then 5 percent will travel north on B Street, and 65 percent to the south (B St.). Furthermore, 20 percent will continue south while 45 percent head east on 19th Avenue. The remaining 5 percent are expected to use SW Ritchey Road to connect northwesterly.

Estimated trip distribution is illustrated in Figure 3 which is then used as the basis for assigning trips in and out of the site during PM peak period and study intersections.

Crash History

The most recent five-year crash history was obtained from Oregon Department of Transportation Crash Data Collection Unit and are summarized in Table 3. (See Appendix B).

None of the intersections within the impact area of this development are identified as high crash locations and no existing safety concerns were identified. In addition, all lane configurations, signing and striping, sight distance and traffic control devices are considered adequate and meet or exceed City's transportation standards at present time.

Table 3 – Five Year Crash Data Summary (2017-2021)

Intersection	Property Damage	Non-Fatal	Injured	Fatal	Total Crashes 2017-2021	Average Crashes /Year
Pacific Avenue & E Street	-	2	4	-	2	0.4
Pacific Avenue & B Street	7	2	3	-	9	1.8
19th Avenue & B Street	2	2	3	-	4	0.8

Figure 3 –Trip Distribution

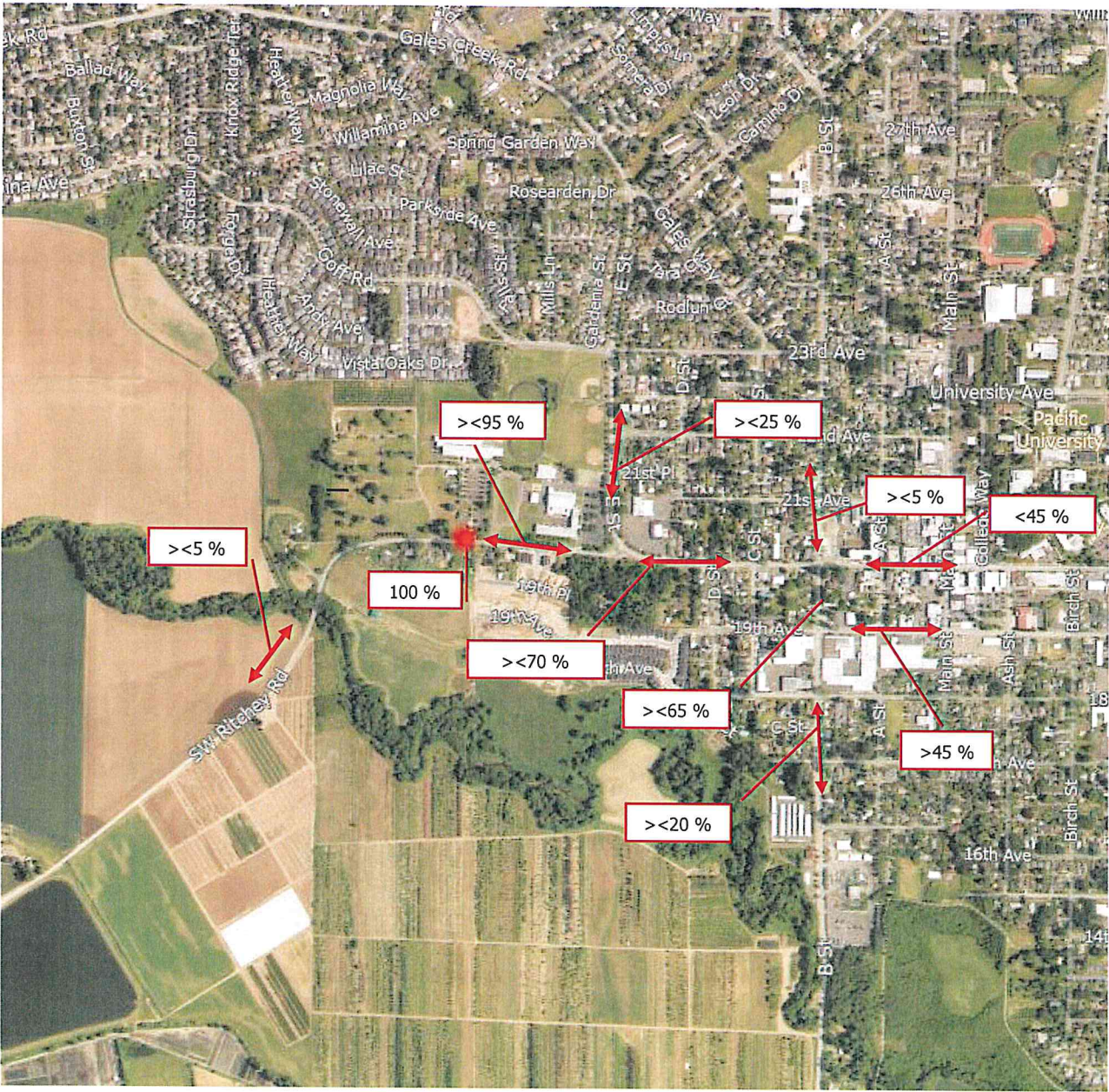


Figure 4 – Existing Volumes – (PM Peak)

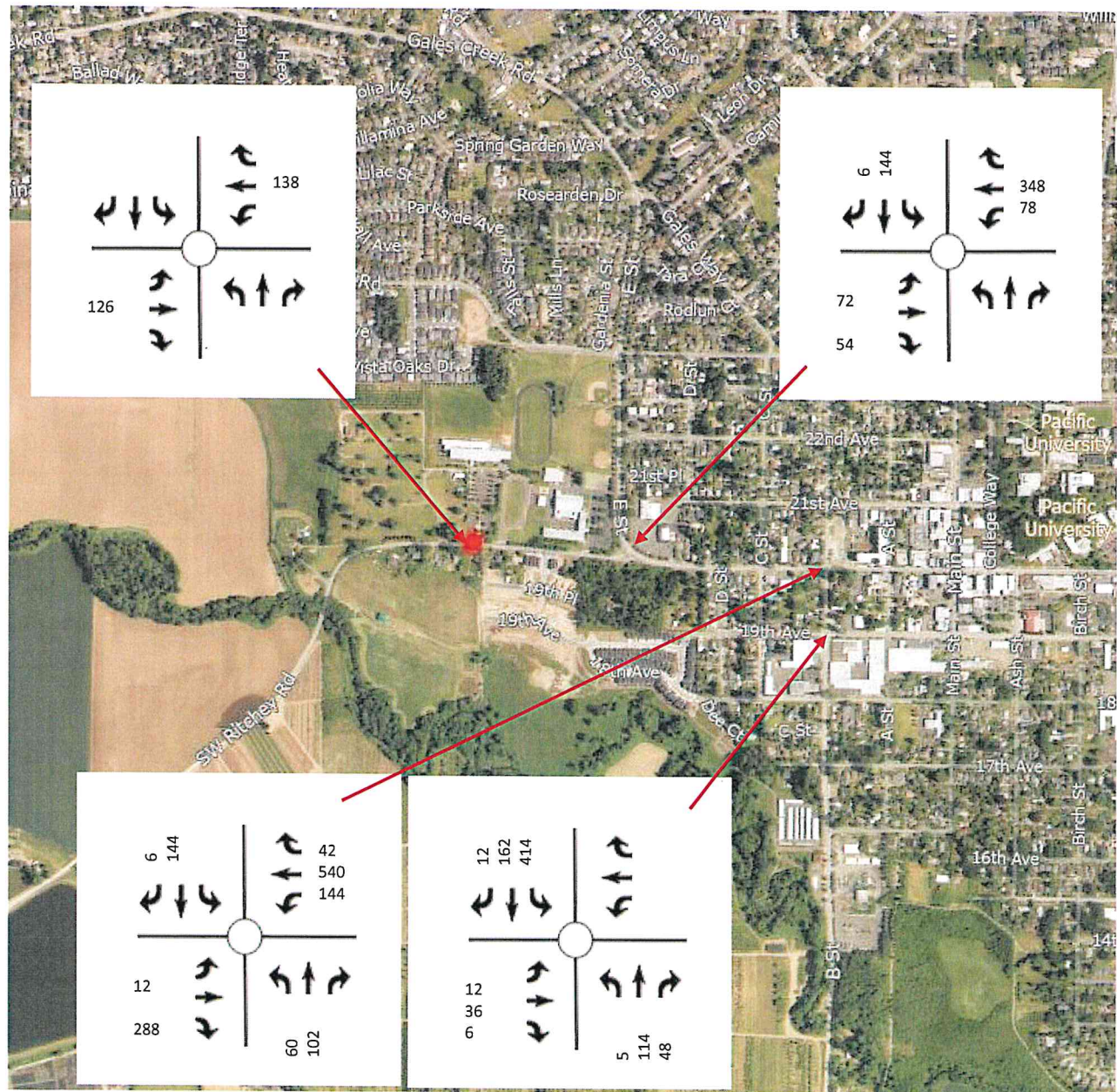


Figure 5 – Site Generated Volumes – (PM Peak)

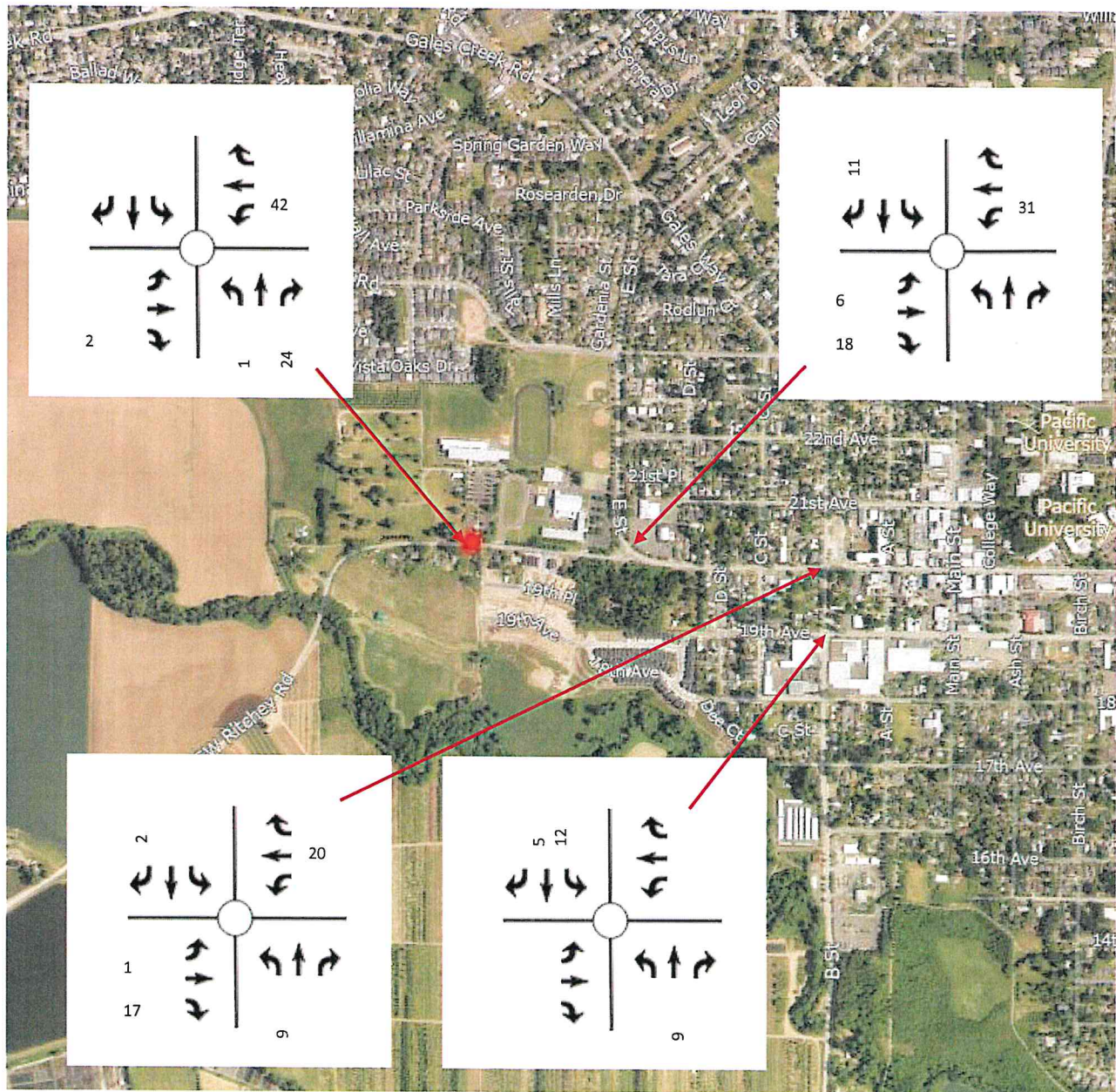


Figure 6 – Site Plus Existing Plus In-Process - Opening Year 2024 (PM Peak)



Traffic Analysis

The intersection Level of Service, Average Delay and Queuing analysis for existing, existing plus site plus in process in the future using ½ percent growth rate for the weekday PM peak hour were conducted using Synchro 11 software. The estimated turning movements are summarized in Figure 4, through Figure 6 and results of the analysis for the four study intersections are summarized in Table 4, and summary and full Synchro runs are included in Appendix B.

To determine the level of service at the study intersections, a capacity analysis was conducted. The analysis was conducted according to the unsignalized intersection analysis methodologies in the 2010 *HIGHWAY CAPACITY MANUAL* (HCM) published by the Transportation Research Board using Synchro 11 software based on HCM 2000 for signalized intersections and HCM 6th Edition for the stop-controlled intersection.

Level of service can range from A, which indicates little or no delay, to F, which indicates a significant amount of congestion and delay. Detailed level of service descriptions is included in the appendix to this report. The summary of results for both study intersections during the critical PM Peak hours are presented in Table 4.

As shown in Table 4, all study intersections currently operate acceptably during PM peak hour (Worst Case Scenario) and will continue to operate acceptably with the proposed development upon completions and build out over a few years.

With less than 2 percent impact, no mitigations at the intersections are necessary or recommended with the development of this site.

Table 4 – Level of Service, Average Delay, Intersection Capacity Utilization AM(PM)

INTERSECTIONS	LOS 2022/ICU	LOS Site + Project + In Process Future
	<i>Average Delay (Sec/Veh)</i>	
	<i>V/C</i>	
Pacific Avenue and B Street (Signalized)	B	B
	12.8	13.1
	0.74	0.76
Site Access (Stop Controlled) – South Leg	-	A / 29.9%
	-	1.7
	-	0.08
Pacific Avenue and E Street (Stop Controlled) – West Leg	C / 32.2%	C / 32.8%
	10.9	11.4
	0.35	0.35
B Street and 19 th Avenue (Stop Controlled) – South Leg, West Leg	A / 54.7%	B / 56.8%
	*	*
	*	*

■ Level of Service
 ■ Approach Delay
 ■ V/C

*- N/A with the existing Traffic Control Configuration

Sight Distance

Sight distance evaluation and assessment were made at the proposed site access through the future South Leg (Unnamed). The level topography of the development site, proposed roadway alignment and connections to existing roadway network pose no challenge or restrictions.

The corner sight distance measurement will be based on an eye height of 3.5 feet and an object height of 3.5 feet above the road; and assumed to be 10 feet from the near edge of pavement to the front of a stopped vehicle, (actual measurement is taken 15 feet from pavement edge) Per AASHTO Standards.

Access Spacing

The closest public street (High Street) is over 500 feet to the east of the main site access. No access spacing requirement apply.

Conclusions and Recommendations

Based on the findings of the transportation impact analysis documented in this report, the proposed development can be developed while maintaining acceptable levels of operation and safety on the surrounding transportation system in general and the study intersections in particular.

The applicant must work with city staff to limit parking along the south frontage of Pacific Avenue at the new access in order to maintain maximum line of sight (in both directions) at the proposed access. Any vegetation, landscaping, and sign monument placement must be reviewed and approved by City of Forest Grove Public Works/Engineering Department.

APPENDIX A –LEVEL OF SERVICE

The Highway Capacity Manual (HCM) defines LOS for signalized and unsignalized intersections as a function of the average vehicle control delay. LOS may be calculated per movement or per approach for any intersection configuration, but LOS for the intersection as a whole is only defined for signalized and all-way stop configurations.

When analyzing unsignalized intersections that are not all-way stop-controlled, each possible movement is considered individually.

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered nonacceptable by most drivers.

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	< 10
B	10-15
C	15-25
D	25-35
E	35-50
F	> 50

APPENDIX B – CRASH SUMMARY

PACIFIC AVE at E ST, City of Forest Grove, Washington County, 01/01/2017 to 12/31/2021

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION RELATED	INTER- SECTION RELATED	OFF- ROAD
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	0	1	1	0	0
YEAR 2021 TOTAL	0	1	0	1	0	1	0	1	0	0	1	1	0	0
YEAR: 2019														
ANGLE	0	1	0	1	0	3	0	1	0	0	1	1	0	0
YEAR 2019 TOTAL	0	1	0	1	0	3	0	1	0	0	1	1	0	0
FINAL TOTAL	0	2	0	2	0	4	0	2	0	0	2	2	0	0

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH STATISTICS BY YEAR BY COLLISION TYPE

19TH AVE at B ST, City of Forest Grove, Washington County, 01/01/2017 to 12/31/2021

COLLISION TYPE	FATAL CRASHES	NON-PROPERTY			TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION RELATED	INTER- SECTION RELATED	OFF- ROAD
		FATAL CRASHES	DAMAGE ONLY	PROPERTY											
YEAR: 2021															
REAR-END	0	1	0	0	1	0	2	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	0	1	0	0	0	1	0	1	0	1	0	0
YEAR 2021 TOTAL	0	1	1	0	2	0	2	0	1	1	2	0	2	0	0
YEAR: 2019															
BACKING	0	0	1	0	1	0	0	0	1	0	0	1	1	0	0
YEAR 2019 TOTAL	0	0	1	0	1	0	0	0	1	0	0	1	1	0	0
FINAL TOTAL	0	1	2	0	3	0	2	0	2	1	2	1	3	0	0

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submission of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE		TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	ERY SURF	WET SURF	DAY	DARK	INTER-SECTION RELATED	INTER-SECTION	OFF-ROAD
			DAMAGE ONLY	CRASHES											
YEAR: 2021															
ANGLE	0	1	0	1	1	0	2	0	0	1	0	1	1	0	0
REAR-END	0	1	0	1	1	0	1	0	0	1	0	1	1	0	0
YEAR 2021 TOTAL	0	2	0	2	2	0	3	0	0	2	0	2	2	0	0
YEAR: 2020															
REAR-END	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0
YEAR 2020 TOTAL	0	0	2	2	2	0	0	0	2	0	2	0	2	0	0
YEAR: 2019															
REAR-END	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0
YEAR 2019 TOTAL	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2018															
TURNING MOVEMENTS	0	0	1	1	1	0	0	0	0	1	0	1	1	0	0
YEAR 2018 TOTAL	0	0	1	1	1	0	0	0	0	1	0	1	1	0	0
YEAR: 2017															
ANGLE	0	0	2	2	2	0	0	0	1	1	1	1	2	0	0
REAR-END	0	0	1	1	1	0	0	0	0	1	1	0	1	0	0
YEAR 2017 TOTAL	0	0	3	3	3	0	0	0	1	2	2	1	3	0	0
FINAL TOTAL	0	2	7	9	9	0	3	0	4	5	5	4	5	0	0

Crash Data: The information contained in this report is compiled from individual driver and police crash report submitted to the Oregon Department of Transportation as required in ORS 810.720. The Crash Analysts and Reporting Unit cannot guarantee the accuracy of the information in this report. The Crash Analyst and Reporting Unit can not guarantee that all qualifying crashes are represented for a given crash year or that a single crash can be assigned to a single vehicle. Note: Legislative changes to DMV's vehicle ownership requirement, effective 01/01/2024, may result in fewer property damages only crashes being eligible for inclusion in the Standard Crash Data file.

APPENDIX C – TRAFFIC ANALYSIS
SYNCHRO 11

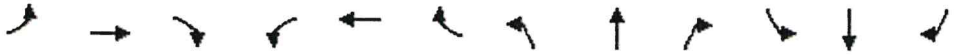
Lanes, Volumes, Timings
11: B St. & 19th Ave

Existing
10/28/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	36	6	0	0	0	5	114	48	414	162	12
Future Volume (vph)	12	36	6	0	0	0	5	114	48	414	162	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984						0.961			0.997	
Frt Protected		0.989						0.999			0.966	
Satd. Flow (prot)	0	1813	0	0	0	0	0	1788	0	0	1794	0
Frt Permitted		0.989						0.999			0.966	
Satd. Flow (perm)	0	1813	0	0	0	0	0	1788	0	0	1794	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			295			295			322	
Travel Time (s)		4.6			8.0			8.0			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	39	7	0	0	0	5	124	52	450	176	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	0	0	0	181	0	0	639	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Free			Stop			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.7%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th Signalized Intersection Summary
9: Pacific Ave & B St.

Existing
10/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	0	288	144	540	42	60	102	0	0	144	6
Future Volume (veh/h)	12	0	288	144	540	42	60	102	0	0	144	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1870	1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h	13	0	0	157	587	46	65	111	0	0	157	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	0	0	2	2
Cap, veh/h	30	0		216	791	62	0	290	0	0	275	12
Arrive On Green	0.02	0.00	0.00	0.12	0.46	0.46	0.00	0.15	0.00	0.00	0.15	0.15
Sat Flow, veh/h	1781	13		1781	1712	134	0	1870	0	0	1777	79
Grp Volume(v), veh/h	13	27.4		157	0	633	0	111	0	0	0	164
Grp Sat Flow(s), veh/h/ln	1781	C		1781	0	1846	0	1870	0	0	0	1856
Q Serve(g_s), s	0.3			3.1	0.0	10.3	0.0	2.0	0.0	0.0	0.0	3.0
Cycle Q Clear(g_c), s	0.3			3.1	0.0	10.3	0.0	2.0	0.0	0.0	0.0	3.0
Prop In Lane	1.00			1.00		0.07	0.00		0.00	0.00		0.04
Lane Grp Cap(c), veh/h	30			216	0	853	0	290	0	0	0	288
W/C Ratio(X)	0.43			0.73	0.00	0.74	0.00	0.38	0.00	0.00	0.00	0.57
Avail Cap(c_a), veh/h	247			2084	0	1679	0	1416	0	0	0	927
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.9			15.6	0.0	8.1	0.0	14.0	0.0	0.0	0.0	14.4
Incr Delay (d2), s/veh	9.5			4.6	0.0	1.3	0.0	0.8	0.0	0.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2			1.4	0.0	3.1	0.0	0.8	0.0	0.0	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.4			20.2	0.0	9.4	0.0	14.8	0.0	0.0	0.0	16.2
LnGrp LOS	C			C	A	A	A	B	A	A	A	B
Approach Vol, veh/h					790			111				164
Approach Delay, s/veh					11.6			14.8				16.2
Approach LOS					B			B				B
Timer - Assigned Phs	2	3		5	6	7	8					
Phs Duration (G+Y+Rc), s	10.2	9.0		0.0	10.2	5.1	21.5					
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5	4.5					
Max Green Setting (Gmax), s	27.9	43.1		5.0	18.4	5.1	33.5					
Max Q Clear Time (g_c+I1), s	4.0	5.1		0.0	5.0	2.3	12.3					
Green Ext Time (p_c), s	0.6	0.5		0.0	0.7	0.0	4.7					
Intersection Summary												
HCM 6th Ctrl Delay			12.8									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM Unsignalized Intersection Capacity Analysis 5: Pacific Ave & E St.

Existing
10/28/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←	↑	↑	↑	←	↑
Traffic Volume (veh/h)	72	54	78	348	144	6
Future Volume (Veh/h)	72	54	78	348	144	6
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	59	85	378	157	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)				2		
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	356	314	314	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356	314	314	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	76	89	84	65	90	
cM capacity (veh/h)	319	543	543	1085	1623	
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	
Volume Total	78	59	463	157	7	
Volume Left	78	0	0	157	0	
Volume Right	0	0	378	0	7	
cSH	319	543	1329	1623	1700	
Volume to Capacity	0.24	0.11	0.35	0.10	0.00	
Queue Length 95th (ft)	24	9	40	8	0	
Control Delay (s)	19.9	12.4	10.6	7.5	0.0	
Lane LOS	C	B	B	A		
Approach Delay (s)	16.7		10.6	7.1		
Approach LOS	C		B			
Intersection Summary						
Average Delay			10.9			
Intersection Capacity Utilization			32.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Future
10/28/2022

[illegible]

HCM 6th Signalized Intersection Summary 9: Pacific Ave & B St.

Future
10/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	308	146	565	43	70	103	0	0	146	8
Future Volume (veh/h)	13	0	308	146	565	43	70	103	0	0	146	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/in	1870	0	1870	1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h	14	0	0	159	614	47	76	112	0	0	159	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	0	0	2	2
Cap, veh/h	32	0		219	812	62	0	290	0	0	272	15
Arrive On Green	0.02	0.00	0.00	0.12	0.47	0.47	0.00	0.16	0.00	0.00	0.16	0.16
Sat Flow, veh/h	1781	14		1781	1715	131	0	1870	0	0	1753	99
Grp Volume(v), veh/h	14	27.5		159	0	661	0	112	0	0	0	168
Grp Sat Flow(s), veh/h/in	1781	C		1781	0	1847	0	1870	0	0	0	1852
Q Serve(q_s), s	0.3			3.3	0.0	11.2	0.0	2.1	0.0	0.0	0.0	3.2
Cycle Q Clear(g_c), s	0.3			3.3	0.0	11.2	0.0	2.1	0.0	0.0	0.0	3.2
Prop In Lane	1.00			1.00		0.07	0.00		0.00	0.00		0.05
Lane Grp Cap(c), veh/h	32			219	0	874	0	290	0	0	0	287
V/C Ratio(X)	0.43			0.73	0.00	0.76	0.00	0.39	0.00	0.00	0.00	0.58
Avail Cap(c_a), veh/h	238			2010	0	1619	0	1366	0	0	0	892
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.6			16.1	0.0	8.2	0.0	14.5	0.0	0.0	0.0	15.0
Incr Delay (d2), s/veh	9.0			4.6	0.0	1.4	0.0	0.8	0.0	0.0	0.0	1.9
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/in	0.2			1.4	0.0	3.4	0.0	0.8	0.0	0.0	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.5			20.7	0.0	9.6	0.0	15.3	0.0	0.0	0.0	16.9
LnGrp LOS	C			C	A	A	A	B	A	A	A	B
Approach Vol, veh/h					820			112			168	
Approach Delay, s/veh					11.8			15.3			16.9	
Approach LOS					B			B			B	
Timer - Assigned Phs	2	3		5	6	7	8					
Phs Duration (G+Y+Rc), s	10.4	9.2		0.0	10.4	5.2	22.6					
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5	4.5					
Max Green Setting (Gmax), s	27.9	43.1		5.0	18.4	5.1	33.5					
Max Q Clear Time (g_c+I1), s	4.1	5.3		0.0	5.2	2.3	13.2					
Green Ext Time (p_c), s	0.6	0.5		0.0	0.7	0.0	4.9					

Intersection Summary

HCM 6th Ctrl Delay 13.1
HCM 6th LOS B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM Unsignalized Intersection Capacity Analysis 5: Pacific Ave & E St.

Future
10/28/2022

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	73	109	352	144	17
Future Volume (Veh/h)	79	73	109	352	144	17
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	79	118	383	157	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)				2		
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	373	314	314	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	373	314	314	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	71	85	78	65	90	
cM capacity (veh/h)	292	543	543	1085	1623	
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	
Volume Total	86	79	501	157	18	
Volume Left	86	0	0	157	0	
Volume Right	0	0	383	0	18	
cSH	292	543	1419	1623	1700	
Volume to Capacity	0.29	0.15	0.35	0.10	0.01	
Queue Length 95th (ft)	30	13	40	8	0	
Control Delay (s)	22.4	12.8	10.9	7.5	0.0	
Lane LOS	C	B	B	A		
Approach Delay (s)	17.8		10.9	6.7		
Approach LOS	C		B			
Intersection Summary						
Average Delay			11.4			
Intersection Capacity Utilization			32.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 7: Site & Pacific Ave

Future
10/28/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	128	2	42	140	1	24
Future Volume (Veh/h)	128	2	42	140	1	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	2	46	152	1	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			141		384	140
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			141		384	140
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	97
cM capacity (veh/h)			1442		599	908
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	141	198	1	26		
Volume Left	0	46	1	0		
Volume Right	2	0	0	26		
cSH	1700	1442	599	908		
Volume to Capacity	0.08	0.03	0.00	0.03		
Queue Length 95th (ft)	0	2	0	2		
Control Delay (s)	0.0	2.0	11.0	9.1		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	2.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			29.9%	ICU Level of Service		A
Analysis Period (min)			15			



Preliminary Geotechnical Engineering Report

Pacific Avenue Subdivision
Property No. R439804, R2179438, R2179439
Forest Grove, Oregon 97116

GeoPacific Engineering, Inc. Job No. 18-5082
November 12, 2018



Real-World Geotechnical Solutions
Investigation • Design • Construction Support

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Real-World Geotechnical Solutions
Investigation • Design • Construction Support

November 12, 2018
Project No. 18-5046

Mr. Evan Scesa
Creekwood Homes
P.O. Box 1785
North Plains, Oregon 97133
Phone: (503) 307-1019
Email: evan@creekwoodhomes.net

**SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PACIFIC AVENUE SUBDIVISION
PROPERTY NO. R439804, R2179438, R2179439
FOREST GROVE, OREGON 97116**

1.0 PROJECT INFORMATION

This report presents the results of a geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site, and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-6774, dated October 29, 2018, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*.

Site Location:	Adjacent to 1140 SW Pacific Avenue Forest Grove, Oregon 97116 Washington County Property No. R439804, R2179438, R2179439 (see Figures 1 and 2)
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Civil Engineer:	AKS Engineering 12965 SW Herman Road #100 Tualatin, Oregon 97062 Phone: (503) 563-6151
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Jurisdictional Agency:	City of Forest Grove, Oregon
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Geotechnical Engineer:	GeoPacific Engineering, Inc 14835 SW 72 nd Avenue Portland, Oregon 97224 Tel (503) 598-8445 Fax (503) 941-9281
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2.0 SITE AND PROJECT DESCRIPTION

The subject site is located southeast of the bend of SW Pacific Avenue and SW Ritchey Road in Forest Grove, Oregon, and is comprised of Washington County Property No. R439804, R2179438, and R2179439, totaling approximately 10.24-acres in size. The site latitude and longitude are 45.519190, -123.127304, and the legal description is a portion of Section 1, T1S, R4W, Willamette Meridian. The regulatory jurisdictional agency is the City of Forest Grove, Oregon. The site is bordered by SW Pacific Avenue and existing residential homes to the north, by SW Ritchey Road to the west, and by existing agricultural properties to the south, and east. Gales Creek is located between 250 to 800 feet south of the southern property boundary. The southern property boundary roughly defines the FEMA 100-Year flood plain on the north side of Gales Creek (See appendix site research section for State of Oregon Effective FEMA Flood Map). Topography at the site is gently to moderately sloping to the south with site elevations ranging from approximately 180 to 240 feet amsl. Gradients range from nearly level to a maximum of approximately 15 percent.

Property No. R439804 contains an abandoned house and barn in the northeastern portion. The bulk of the remaining area comprising the properties primarily consists of open grassy land which has historically been utilized for agricultural purposes. Based on review of available historical aerial photography it appears that the land was farmed until 2017 or 2018, primarily consisting of growing wheat. Currently vegetation primarily consists of grasses and weeds. Seasonal springs appear to be present on the hillside (see Figure 3). The abandoned house and barn in the northeastern portion of the site are overgrown with blackberries. Abandoned vehicles are present near the structures, also partially overgrown.

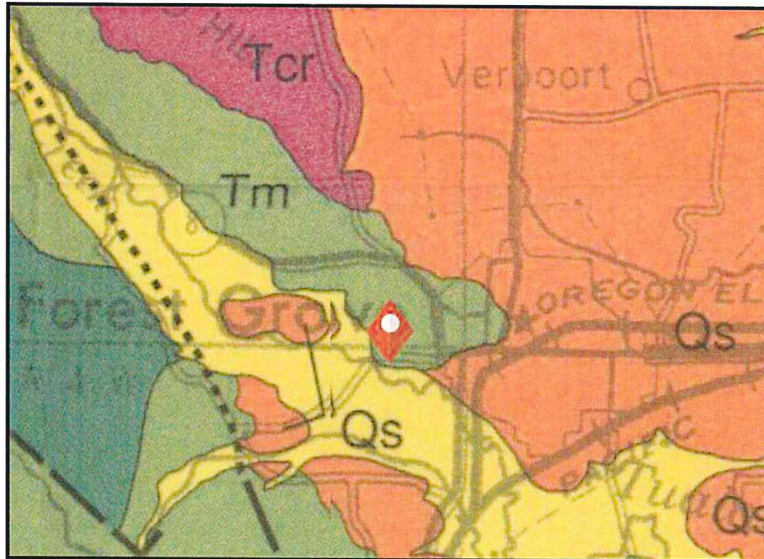
Based upon communication with the client, we understand that project planning is in a feasibility period and is preliminary. Civil engineering plans have not yet been produced, however we understand that the client has engaged AKS Engineering to design a subdivision layout plan for the site which may include construction of up to fifty residential building lots for construction of single-family homes, new public streets, stormwater disposal, and associated underground utility installations. We anticipate that the existing structures will be removed, and that grading of the site may include engineered cuts and fills on the order of five feet.

Based upon our review of State of Oregon geologic hazard mapping, we understand that due to the presence of slope gradients up to 15 percent, the Department of Geology and Mineral Industries (DOGAMI) has designated the site and surrounding area as a *moderate* landslide hazard area. No landslides have been mapped on the property. As part of our preliminary site study, GeoPacific conducted a global slope stability review of the property.

3.0 REGIONAL GEOLOGIC SETTING

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins.

The *Generalized Geologic Map of the Willamette Lowland*, Marshall W. Gannett and Rodney R. Caldwell, (U.S. Department of the Interior, U.S. Geological Survey, 1998), indicates that the site is underlain by lower Miocene to upper Eocene-aged (approximately 34 million to 16 million years ago) marine sedimentary rocks consisting of sandstone, siltstone, shale, and claystone (Tm). The southern portion of the site may contain Holocene-aged (11,000 years ago to present), sand, gravel, and silt deposited by Gales Creek.



Generalized Geologic Map of the Willamette Lowland, 1998. Site Location Indicated with Red Diamond.

The *Web Soil Survey* (United States Department of Agriculture, Natural Resource Conservation Service (USDA NRCS 2018 Website), indicates that near-surface soils primarily consist of the Quatama Loam and Willamette silt loam soils series. Quatama and Willamette series soils generally consist of moderately deep clays and silts formed in silty, glaciolacustrine deposits.

4.0 REGIONAL SEISMIC SETTING

At least three major fault zones capable of generating damaging earthquakes are thought to exist in the vicinity of the subject site. These include the Portland Hills Fault Zone, the Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone.

4.1 Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults reportedly vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills and is located approximately 16.5 miles east of the site. The Oatfield Fault occurs along the western side of the Portland Hills and is located approximately 15 miles east of the site. The East Bank Fault occurs along the eastern margin of the Willamette River, and is located approximately 18.5 miles

east of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000).

According to the USGS Earthquake Hazards Program, the fault was originally mapped as a down-to-the-northeast normal fault but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene Columbia River Basalts, and Miocene to Pliocene sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene aged Missoula flood deposits. No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

4.2 Gales Creek-Newberg-Mt. Angel Structural Zone

The Gales Creek-Newberg-Mt. Angel Structural Zone is a 50-mile-long zone of discontinuous, NW-trending faults that lies about 1.25 miles west of the subject site. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment (Yeats et al., 1996; Werner et al., 1992). A geologic reconnaissance and photogeologic analysis study conducted for the Scoggins Dam site in the Tualatin Basin revealed no evidence of deformed geomorphic surfaces along the structural zone (Unruh et al., 1994). No seismicity has been recorded on the Gales Creek Fault or Newberg Fault (the fault closest to the subject site); however, these faults are considered to be potentially active because they may connect with the seismically active Mount Angel Fault and the rupture plane of the 1993 M5.6 Scotts Mills earthquake (Werner et al. 1992; Geomatrix Consultants, 1995).

According to the USGS Earthquake Hazards Program, the Mount Angel fault is mapped as a high-angle, reverse-oblique fault, which offsets Miocene rocks of the Columbia River Basalts, and Miocene and Pliocene sedimentary rocks. The fault appears to have controlled emplacement of the Frenchman Spring Member of the Wanapum Basalts, and thus must have a history that predates the Miocene age of these rocks. No unequivocal evidence of deformation of Quaternary deposits has been described, but a thick sequence of sediments deposited by the Missoula floods covers much of the southern part of the fault trace.

4.3 Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993;

Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies approximately along the Oregon Coast at depths of between 20 and 40 kilometers below the surface.

5.0 FIELD EXPLORATION AND SUBSURFACE CONDITIONS

Our subsurface explorations for this report were conducted on November 5, 2018. A total of seven exploratory test pits (TP-1 through TP-7) were excavated at the site using a tracked-mounted excavator provided by the client to a maximum depth of approximately 15 feet bgs. Explorations were conducted under the full-time observation of a GeoPacific geologist. During the explorations pertinent information including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence was recorded. Soils were classified in accordance with the Unified Soil Classification System (USCS). Soil samples obtained from the explorations were placed in relatively air-tight plastic bags. At the completion of each test, the test pits were loosely backfilled with onsite soils. The approximate locations of the explorations are indicated on Figure 2. It should be noted that exploration locations were located in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate. Summary exploration logs are attached. The stratigraphic contacts shown on the individual test pit logs represent the approximate boundaries between soil types. The actual transitions may be more gradual. The soil and groundwater conditions depicted are only for the specific dates and locations reported, and therefore, are not necessarily representative of other locations and times. Soil and groundwater conditions encountered in the explorations are summarized below.

5.1 Soil Descriptions

Topsoil: The topsoil horizon at the site was observed to generally consist of 8 to 12 inches of dark brown, moderately organic Lean CLAY (OL-CL), or moderately organic Fat CLAY (OL-CH), containing fine grass roots. The site was historically farmed, and the upper 12 inches appeared to be a disturbed till zone. It is possible that areas exist where tilling extended deeper.

Lean CLAY: Underlying the topsoil at the locations of test pits TP-1 through TP-3, and TP-5 through TP-7 soils were observed to consist primarily of brown, very stiff to hard, damp to moist, low to moderately plastic, Lean CLAY (CL). The soil type was observed to extend to the maximum depth of exploration within test pits TP-1, TP-2, TP-6, and TP-7. The soil type was observed to extend to a depth of approximately 12 feet bgs within test pit TP-3, and to a depth of approximately 3 feet bgs within test pit TP-5. Due to the dry time of year, the soil strength was likely measured at its peak. Pocket penetrometer measurements conducted in the upper four feet of the ground surface indicated unconfined compressive strengths ranging from approximately 3.0 to 4.5 tons/ft² (tsf). Laboratory soils analysis has not been conducted on collected samples at this time.

Fat CLAY: Underlying the topsoil at the location of test pit TP-4, at a depth of 12 feet bgs within test pit TP-3, and at a depth of 3 feet bgs within test pit TP-5, soils were observed to consist of banded brown, orange, gray, and black, stiff to very stiff, very moist, highly plastic, Fat CLAY (CL). The soil type was observed to extend to the maximum depth of exploration where encountered. The soil displayed near pottery clay consistency. Pocket penetrometer measurements conducted in the upper four feet of the ground surface at the location of test pit TP-4 indicated unconfined compressive strengths ranging from approximately 3.5 to 4.5 tons/ft² (tsf). Laboratory soils

analysis has not been conducted on collected samples at this time. Fat Clay soils are potentially expansive depending on the mineralogy of the clay particles. The soil type may or may not have a high potential for soil expansion. Expansion index potential is determined by soils laboratory testing conducted in accordance with ASTM D4829. If the soil type is expansive, footings constructed on the soil type will require over-excavation and replacement with non-expansive soil types or crushed aggregate pads to reduce the potential for damage to foundations from shrink swell. Additional discussion and recommendation regarding construction of foundations on potentially expansive soil is presented below.

5.2 Shrink-Swell Potential

Lean CLAY soils present at the site displayed low to moderate plasticity characteristics. Fat CLAY soils present at the site displayed high plasticity characteristics. Fat Clay soils are potentially expansive depending on the mineralogy of the clay particles. The soil type may or may not have a high potential for soil expansion. Expansion index potential is determined by soils laboratory testing conducted in accordance with ASTM D4829. If the soil type is expansive, footings constructed on the soil type will require over-excavation and replacement with non-expansive soil types or crushed aggregate pads to reduce the potential for damage to foundations from shrink swell. Additional discussion and recommendation regarding construction of foundations on potentially expansive soil is presented below. In addition, the soil type is moisture sensitive, and will be difficult to work with during periods of wet weather.

5.3 Groundwater and Soil Moisture

On November 5, 2018, observed soil moisture conditions were generally damp to very moist. Groundwater seepage was not observed within our explorations which extended to a maximum depth of 15 feet bgs, however mottling and banding was observed in the lower portions of some of the test pits indicating seasonal groundwater. Figure 3 indicates the areas where we believe it is possible seeps and springs may be present at the site, based upon soil conditions encountered within test pits, and our review of historical aerial photography taken during dry summer months. Review of available well logs from the State of Oregon Water Resources Department well log query indicates that groundwater is commonly encountered at depths of 10 feet or less in the vicinity of the subject site. During periods of wet weather, perched groundwater seepage may be encountered in localized areas. Seeps and springs may exist in areas not explored and may become evident during site grading.

6.0 LANDSLIDE HAZARD AND GLOBAL SLOPE STABILITY STUDY

Based upon our review of State of Oregon geologic hazard mapping, we understand that due to the presence of slope gradients up to 15 percent, the Department of Geology and Mineral Industries (DOGAMI) has designated the site and surrounding area as a *moderate* landslide hazard area. No landslides have been identified or mapped on the property. As part of our site study, GeoPacific conducted a preliminary global slope stability review of the property.

For the purpose of evaluating slope stability at the subject site we: (1) conducted a review of available literature and published geologic mapping; (2) performed field reconnaissance and slope measurements, (3) conducted subsurface exploration at the property, and (4) reviewed available LiDAR and landslide inventory mapping.

6.1 Literature Review

Topography at the site is gently to moderately sloping to the south with site elevations ranging from approximately 180 to 240 feet amsl. Gradients range from nearly level to a maximum of approximately 15 percent.

The subject site is located in an area mapped as being at *moderate* risk for landsliding by the *Oregon Department of Geology and Mineral Industries (DOGAMI)*, though no landslides have been identified to be present within the site boundaries. *The DOGAMI Oregon HazVu: Statewide Geohazards Viewer* indicates that the subject site is located in an area considered at risk for *very strong* ground shaking during an earthquake. *The DOGAMI Oregon HazVu: Statewide Geohazards Viewer* indicates that the site is at *moderate* risk for soil liquefaction during an earthquake.

Published regional geologic mapping and the Oregon Department of Geology and Mineral Industries online landslide database show no mapped landslides at the subject site (Madin, 1990; Burns et al., 2011; DOGAMI SLIDO database, 2017), however some areas of localized landsliding have been identified along the banks of Gales Creek to the southeast of the site.

The *Generalized Geologic Map of the Willamette Lowland*, Marshall W. Gannett and Rodney R. Caldwell, (U.S. Department of the Interior, U.S. Geological Survey, 1998), indicates that the site is underlain by lower Miocene to upper Eocene-aged (approximately 34 million to 16 million years ago) marine sedimentary rocks consisting of sandstone, siltstone, shale, and claystone (Tm). The southern portion of the site may contain Holocene-aged (11,000 years ago to present), sand, gravel, and silt deposited by Gales Creek. Landslides are common along the interface of fine-grained soil deposits overlying the marine sedimentary siltstones and shales.

We reviewed available LiDAR imagery of the site (Figure 4). The LiDAR imagery indicates that the subject site is located in an area which generally displays smooth, planar geomorphology. No landslides, head scarps, or hummocky terrain are visible within the property boundaries. Based on our review, the LiDAR imagery does not indicate the presence of landslides on the property, or the properties adjacent to the property. It is possible increased slide potential exists along the banks of Gales Creek. Gales Creek is located between 250 to 800 feet south of the southern property boundary.

6.2 Field Reconnaissance Subsurface Exploration

The site contains gradients ranging from nearly level to a maximum of 15 percent, generally sloping to the south. We conducted field reconnaissance and subsurface soil exploration at the site to observe geomorphic features and assess the site for evidence of potential slope instability.

The sloping hillside typically displayed smooth, planar geomorphology. We did not observe geomorphic evidence of recent slope instability such as exposed terrace scarps, or areas of erosion. No tension cracks, slumping, or areas of recent landsliding were observed. Grass vegetation appeared to be undisturbed on the hillside. In general, the sloping areas appeared to be relatively stable at the time of this report.

We conducted subsurface exploration at the site consisting of seven excavator test pits (TP-1 through TP-7) to maximum depths of 15 feet deep. Soils encountered within our subsurface explorations consisted of stiff to very stiff, damp to moist, Lean CLAY, which displayed low to moderate plasticity; and stiff, very moist, Fat CLAY, which displayed high plasticity. The sedimentary siltstone or shale mapped as underlying the site (Tm), was not encountered within the test pit explorations.

No evidence of slip planes or bedding planes was detected or observed during subsurface exploration of the upper 15 feet. Groundwater seepage was not observed, though seasonal seeps and springs appear to occur at the site. In general, the results of our field reconnaissance and subsurface exploration indicated stiff, stable soil conditions within the proposed development area.

6.3 Global Slope Stability Conclusions

Our global slope stability study indicates that no areas of recent or active landsliding are present at the subject site. Subsurface soils consist of low to highly plastic clays which displayed moderate to high shear strength and unconfined compressive strength. Site gradients are relatively gently to moderate. No evidence of active or past landsliding or earth movement was observed at the site. It is our opinion that the risk of slope instability at the subject site is low provided that the recommendations of this report are incorporated into the design and construction phases of the project.

7.0 PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Our preliminary site investigation indicates that the proposed construction appears to be geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. The primary geotechnical concerns associated with development at the site are:

- The apparent presence of springs and seeps on the hillside;
- The presence of pockets of potentially expansive soils where foundations are proposed – recommend expansive index testing in accordance with ASTM D4829 to determine expansive index;
- Potential for shallow groundwater during wet periods;
- Native soils are considered moisture-sensitive and will be difficult to handle in wet weather

7.1 Site Preparation Recommendations

Areas of proposed construction and areas to receive fill should be cleared of any organic and inorganic debris, and loose stockpiled soils. Inorganic debris and organic materials from clearing should be removed from the site. Organic-rich soils and root zones should then be stripped from construction areas of the site or where engineered fill is to be placed. Depth of stripping of existing topsoil is estimated to range from approximately 8 to 12 inches across the majority of the site, however depth of organic soil layers may increase in areas where trees are present. The final depth of soil removal will be determined during site inspection after the stripping/excavation has been performed. Stripped topsoil should be removed from areas proposed for placement of engineered fill. Any remaining topsoil should be stockpiled only in designated areas and stripping

operations should be observed and documented by the geotechnical engineer or his representative.

Where encountered, undocumented fills and any subsurface structures (dry wells, basements, driveway and landscaping fill, old utility lines, septic leach fields, etc.) should be completely removed and the excavations backfilled with engineered fill.

We recommend that areas proposed for placement of engineered fill are scarified and recompacted prior to placement of structural fill. The areas should be prepared by removing highly organic soil layers which contain abundant root concentration, or organic content in excess of approximately 4 to 5 percent by weight. Prior to placement of engineered fill, the underlying soils be over-excavated, ripped, aerated to optimum moisture content, and recompacted to project specifications for engineered fill as determined by the Standard Proctor (ASTM D698).

Fat CLAY soils present in portions of the site displayed high plasticity characteristics. Atterberg Limit testing should be conducted on representative samples. Fat Clay soils are potentially expansive depending on the mineralogy of the clay particles. The soil type may or may not have a high potential for soil expansion. Expansion index potential is determined by soils laboratory testing conducted on a representative sample of the soil type in accordance with ASTM D4829. If the soil type is expansive, footings constructed on the soil type will require over-excavation and replacement with non-expansive soil types or crushed aggregate pads to reduce the potential for damage to foundations from shrink swell. Additional discussion and recommendation regarding construction of foundations on potentially expansive soil is presented below. Additional discussion and recommendation regarding construction of foundations on potentially expansive soil is presented below in Section 7.7, *Spread Foundations*.

Areas proposed to be left at grade may require additional over-excavation of foundation areas in order to reach soils which will provide adequate bearing support for the proposed foundations. Site earthwork may be impacted by shallow groundwater. Stabilization of subgrade soils will require aeration and re-compaction. If subgrade soils are found to be difficult to stabilize, over-excavation, placement of granular soils, or cement treatment of subgrade soils may be feasible options. GeoPacific should be onsite to observe preparation of subgrade soil conditions prior to placement of engineered fill.

7.2 Keyways, Benching, and Subdrains for Fill Slopes

Keying and benching will be required on this project where engineered fills are proposed on hillsides. Engineered fill placed on existing sloped areas inclining at, or steeper than an approximately fifteen percent grade should be constructed on a keyway and benches in accordance with the typical designs shown in the attached Fill Slope Detail (Figure 5). Keyways should have a minimum depth of three feet on the downhill side, and a minimum width of ten feet. Keyways should be excavated at the toe of the fill slope and extend perpendicular to the downslope direction. Additional removal of weakened or soft soils may be required depending on the conditions observed during construction. Benches and keyways should be roughly horizontal in the down slope direction, but may slope up to a 10 percent grade along a topographic contour. Keyways sloping more than a fifteen percent grade along a topographic contour should be benched or configured as approved by the geotechnical engineer or his designated representative.

Actual determination and dimensions of keyways should be decided once final planning is complete, and under the direction of the geotechnical engineer.

If groundwater seepage is observed during excavation, keyways should include a subdrain consisting of a minimum 4-inch-diameter, ADS Heavy Duty Grade (or equivalent), perforated plastic pipe enveloped in a minimum of 4 cubic feet per lineal foot of 2"- 1/2", open-graded gravel drain rock wrapped with geotextile filter fabric (Mirafi 140N or equivalent). A minimum 0.5 percent gradient should be maintained throughout all subdrain pipes and outlets. GeoPacific should inspect keyways, subdrains and benching prior to fill placement. Subdrains may be eliminated at the discretion of the geotechnical engineer.

7.3 Engineered Fill

All grading for the proposed construction should be performed as engineered grading in accordance with the applicable building code at the time of construction with the exceptions and additions noted herein. Site grading should be conducted in accordance with the requirements outlined in the 2015 International Building Code (IBC), Chapter 18 and Appendix J. Areas proposed for fill placement should be prepared as described in Section 7.1 *Site Preparation Recommendations*. Surface soils should then be scarified and recompacted prior to placement of structural fill. Site preparation, soil stripping, and grading activities should be observed and documented by a geotechnical engineer or his representative. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill.

Onsite native soils consisting of Lean CLAY appeared suitable for use as engineered fill. Onsite native soils consisting of Fat CLAY displayed near pottery clay consistency and appeared to be unsuitable for use as engineered fill. The soil types are both moisture-sensitive and will be difficult to utilize and handle during periods of wet weather. Soils containing greater than 5 percent organic content should not be used as structural fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 12 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 95 percent of the maximum dry density determined by ASTM D698 (Standard Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd³, whichever requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Site earthwork may be impacted by shallow groundwater, soil moisture and wet weather conditions. Earthwork in wet weather would likely require extensive use of additional crushed aggregate, cement or lime treatment, or other special measures, at considerable additional cost compared to earthwork performed under dry-weather conditions.

7.4 Excavating Conditions and Utility Trench Backfill

We anticipate that onsite soils can generally be excavated using conventional heavy equipment. Bedrock was not encountered within our subsurface explorations which extended to a maximum depth of 15 feet bgs. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926) or be shored. The existing native soils classify as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. These cut slope inclinations are applicable to excavations above the water table only.

Shallow, perched groundwater may be encountered at the site and should be anticipated in excavations and utility trenches. Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

Underground utility pipes should be installed in accordance with the procedures specified in ASTM D2321 and City of Forest Grove/Washington County standards. We recommend that structural trench backfill be compacted to at least 95 percent of the maximum dry density obtained by the Standard Proctor (ASTM D698) or equivalent. Initial backfill lift thicknesses for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, at least one density test is taken for every 4 vertical feet of backfill on each 100-lineal-foot section of trench.

7.5 Erosion Control Considerations

During our field exploration program, we did not observe soil conditions that may be considered highly susceptible to erosion. In our opinion, the primary concern regarding erosion potential will occur during construction in areas that have been stripped of vegetation. Erosion at the site during construction can be minimized by implementing the project erosion control plan, which should include judicious use of straw wattles, fiber rolls, silt fences, and other typical measures. If used, these erosion control devices should remain in place throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control

netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture.

7.6 Wet Weather Earthwork

Soils underlying the site are likely to be moisture sensitive and will be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will require expensive measures such as cement treatment or imported granular material to compact areas where fill may be proposed to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, the following recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean engineered fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic;
- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water;
- Material used as engineered fill should consist of clean, granular soil containing less than 5 percent passing the No. 200 sieve. The fines should be non-plastic. Alternatively, cement treatment of on-site soils may be performed to facilitate wet weather placement;
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller, or equivalent, and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials;
- Excavation and placement of fill should be observed by the geotechnical engineer to verify that all unsuitable materials are removed and suitable compaction and site drainage is achieved; and
- Geotextile silt fences, straw wattles, and fiber rolls should be strategically located to control erosion.

If cement or lime treatment is used to facilitate wet weather construction, GeoPacific should be contacted to provide additional recommendations and field monitoring.

7.7 Spread Foundations

Based upon communication with the client, we understand that project planning is in a feasibility period and is preliminary. Civil engineering plans have not yet been produced, however we understand that the client has engaged AKS Engineering to design a subdivision layout plan for the site which may include construction of up to fifty residential building lots for construction of single-family homes. We anticipate that the existing structures will be removed, and that grading of the site may include engineered cuts and fills on the order of five feet. The homes will likely be one to

two-stories, constructed on typical spread foundations with square column footings, continuous strip footings, and crawl spaces. We anticipate wood-framed construction above the foundations with maximum structural loading on column footings and continuous strip footings on the order of 10 to 35 kips, and 2 to 4 kips/ft respectively.

As noted above, potentially expansive soils were encountered in portions of the site. Expansion index potential is determined by soils laboratory testing conducted in accordance with ASTM D4829. If the soil type is expansive, footings constructed on the soil type will require over-excavation and replacement with non-expansive soil types or crushed aggregate pads to reduce the potential for damage to foundations from shrink swell. Over-excavation and replacement with up to 48 inches of non-expansive soil or 1.5"-0 crushed aggregate compacted to at least 95 percent of the maximum dry density determined by ASTM D1557 (Modified Proctor) or equivalent may be needed. Additional steel reinforcement such as extra No. 4 bars may be needed. We recommend that expansion index testing be conducted prior to construction so that final recommendations regarding footing construction may be determined by the geotechnical engineer. Following obtaining the results of expansion index testing, this report may be updated with conclusive recommendations for construction of foundations.

If the native soils classify as low potential for soil expansion, the anticipated allowable soil bearing pressure is 1,500 lbs/ft² for footings bearing on competent, native soil and/or engineered fill. If over-excavated crushed aggregate pads are constructed underneath the footings, the anticipated allowable soil bearing pressure is 2,500 lbs/ft² for footings bearing on 1.5"-0 crushed aggregate compacted to at least 95 percent of the maximum dry density determined by ASTM D1557 (Modified Proctor). The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For loads heavier than 35 kips, the geotechnical engineer should be consulted. If heavier loads than described above are proposed, it may be necessary to over-excavate point load areas and replace with additional compacted crushed aggregate. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.42, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and 3/4 inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any disturbed soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require over-excavation of footings and backfill with compacted, crushed aggregate.

Our recommendations are for residential construction incorporating raised wood floors and conventional spread footing foundations. After site development, a Final Soil Engineer's Report should either confirm or modify the above recommendations.

7.8 Concrete Slabs-on-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in Section 7.1, *Site Preparation Recommendations* section, Section 6.3, *Engineered Fill*, and Section 7.7, *Spread Foundations*. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within about 3 percent of optimum moisture content and compacted to engineered fill specifications. Alternatively, disturbed soils may be removed and the removal zone backfilled with additional crushed rock.

For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 150 kcf (87 pci) should be assumed for the medium stiff, fine-grained soils anticipated to be present at foundation subgrade elevation following adequate site preparation as described above. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of 8 inches of 1½"-0 crushed aggregate beneath the slab. Additional crushed aggregate may be required if Expansion Index testing indicates a high potential for soil expansion. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557 (Modified Proctor) or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. A commonly applied vapor barrier system consists of a 10-mil polyethylene vapor barrier placed directly over the capillary break material. Other damp/vapor barrier systems may also be feasible. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

7.9 Footing and Roof Drains

Construction should include typical measures for controlling subsurface water beneath the structure, including positive crawlspace drainage to an adequate low-point drain exiting the foundation, visqueen covering the expose ground in the crawlspace, and crawlspace ventilation (foundation vents). The client should be informed and educated that some slow flowing water in the crawlspaces is considered normal and not necessarily detrimental to the home given these other design elements incorporated into its construction. Appropriate design professionals should be consulting regarding crawlspace ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Down spouts and roof drains should collect roof water in a system separate from the footing drains to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point and storm system well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

Perimeter footing drains may be eliminated at the discretion of the geotechnical engineer based on soil conditions encountered at the site and experience with standard local construction practices. Where it is desired to reduce the potential for moist crawl spaces, footing drains may be installed. If concrete slab-on-grade floors are used, perimeter footing drains should be installed as recommended below.

Where deemed necessary, perimeter footing drains should consist of 3 or 4-inch diameter, perforated plastic pipe embedded in a minimum of 1 ft³ per lineal foot of clean, free-draining drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Figure 6 presents a typical perimeter footing drain detail. In our opinion, footing drains may outlet at the curb, or on the back sides of lots where sufficient fall is not available to allow drainage to meet the street.

7.10 Permanent Below-Grade Walls

Lateral earth pressures against below-grade retaining walls will depend upon the inclination of any adjacent slopes, type of backfill, degree of wall restraint, method of backfill placement, degree of backfill compaction, drainage provisions, and magnitude and location of any adjacent surcharge loads. At-rest soil pressure is exerted on a retaining wall when it is restrained against rotation. In contrast, active soil pressure will be exerted on a wall if its top is allowed to rotate or yield a distance of roughly 0.001 times its height or greater.

If the subject retaining walls will be free to rotate at the top, they should be designed for an active earth pressure equivalent to that generated by a fluid weighing 35 pcf for level backfill against the wall. For restrained wall, an at-rest equivalent fluid pressure of 55 pcf should be used in design, again assuming level backfill against the wall. These values assume that the recommended drainage provisions are incorporated, and hydrostatic pressures are not allowed to develop against the wall.

During a seismic event, lateral earth pressures acting on below-grade structural walls will increase by an incremental amount that corresponds to the earthquake loading. Based on the Mononobe-Okabe equation and peak horizontal accelerations appropriate for the site location, seismic loading should be modeled using the active or at-rest earth pressures recommended above, plus an incremental rectangular-shaped seismic load of magnitude 6.5H, where H is the total height of the wall.

We assume relatively level ground surface below the base of the walls. As such, we recommend passive earth pressure of 300 pcf for use in design, assuming wall footings are cast against competent native soils or engineered fill. If the ground surface slopes down and away from the base of any of the walls, a lower passive earth pressure should be used and GeoPacific should be contacted for additional recommendations.

A coefficient of friction of 0.42 may be assumed along the interface between the base of the wall footing and subgrade soils. The recommended coefficient of friction and passive earth pressure values do not include a safety factor, and an appropriate safety factor should be included in design.

The upper 12 inches of soil should be neglected in passive pressure computations unless it is protected by pavement or slabs on grade.

The above recommendations for lateral earth pressures assume that the backfill behind the subsurface walls will consist of properly compacted structural fill, and no adjacent surcharge loading. If the walls will be subjected to the influence of surcharge loading within a horizontal distance equal to or less than the height of the wall, the walls should be designed for the additional horizontal pressure. For uniform surcharge pressures, a uniformly distributed lateral pressure of 0.3 times the surcharge pressure should be added. Traffic surcharges may be estimated using an additional vertical load of 250 psf (2 feet of additional fill), in accordance with local practice.

The recommended equivalent fluid densities assume a free-draining condition behind the walls so that hydrostatic pressures do not build-up. This can be accomplished by placing a 12 to 18-inch wide zone of sand and gravel containing less than 5 percent passing the No. 200 sieve against the walls. A 3-inch minimum diameter perforated, plastic drain pipe should be installed at the base of the walls and connected to a suitable discharge point to remove water in this zone of sand and gravel. The drain pipe should be wrapped in filter fabric (Mirafi 140N or other as approved by the geotechnical engineer) to minimize clogging.

Wall drains are recommended to prevent detrimental effects of surface water runoff on foundations – not to dewater groundwater. Drains should not be expected to eliminate all potential sources of water entering a basement or beneath a slab-on-grade. An adequate grade to a low point outlet drain in the crawlspace is required by code. Underslab drains are sometimes added beneath the slab when placed over soils of low permeability and shallow, perched groundwater.

Water collected from the wall drains should be directed into the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Down spouts and roof drains should not be connected to the wall drains in order to reduce the potential for clogging. The drains should include clean-outs to allow periodic maintenance and inspection. Grades around the proposed structure should be sloped such that surface water drains away from the building.

GeoPacific should be contacted during construction to verify subgrade strength in wall keyway excavations, to verify that backslope soils are in accordance with our assumptions, and to take density tests on the wall backfill materials.

Structures should be located a horizontal distance of at least $1.5H$ away from the back of the retaining wall, where H is the total height of the wall. GeoPacific should be contacted for additional foundation recommendations where structures are located closer than $1.5H$ to the top of any wall.

8.0 SEISMIC DESIGN

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2018 Statewide GeoHazards Viewer indicates that the site is in an area where *very strong* ground shaking is anticipated during an earthquake. Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2015 International Building Code (IBC) with applicable Oregon Structural Specialty Code (OSSC) revisions (current 2014). We recommend Site Class D be used for design per the OSSC, Table 1613.5.2 and as defined in ASCE 7, Chapter 20, Table 20.3-1. Design values determined for the site using the USGS (United States Geological Survey) 2018 Seismic Design Maps Summary Report are summarized in Table 1 and are based upon existing soil conditions observed within our subsurface explorations.

Table 1 - Recommended Earthquake Ground Motion Parameters (USGS 2018)

Parameter	Value
Location (Lat, Long), degrees	45.519, -123.127
Probabilistic Ground Motion Values, 2% Probability of Exceedance in 50 yrs	
Peak Ground Acceleration PGA_M	0.478 g
Short Period, S_s	1.014 g
1.0 Sec Period, S_1	0.470 g
Soil Factors for Site Class D:	
F_a	1.094
F_v	1.530
$SD_s = 2/3 \times F_a \times S_s$	0.740 g
$SD_1 = 2/3 \times F_v \times S_1$	0.479 g
Seismic Design Category	D

8.1 Soil Liquefaction

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2018 Statewide GeoHazards Viewer indicates that the site is in an area considered to be at *moderate* risk for soil liquefaction during an earthquake. Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to ground shaking caused by strong earthquakes. Soil liquefaction is generally limited to loose sands and granular soils located below the water table, and fine-grained soils with a plasticity index less than 15. The upper 15 feet of the site was observed to be underlain by stiff, low to highly plastic fine-grained soils. Groundwater seepage was not observed within our explorations which extended to a maximum depth of 15 feet bgs, however indication of seasonal seeps and springs was observed. Review of available well logs from the State of Oregon Water Resources Department well log query indicates that groundwater is commonly encountered at depths of 10 feet or less in the vicinity of the subject site. Based upon the results of our study, primarily the presence of fine-grained soils displaying moderate to high plasticity, it is our opinion that the risk of soil liquefaction in the upper fifteen feet of the ground surface during a seismic event at the subject site should be considered to be low.

9.0 UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. The checklist attached to this report outlines recommended geotechnical observations and testing for the project. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.



Benjamin L. Cook, R.G.
Senior Geologist



EXPIRES: 06/30/2019

James D. Imbrie, G.E., C.E.G.
Principal Geotechnical Engineer

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CHECKLIST OF RECOMMENDED GEOTECHNICAL TESTING AND OBSERVATION

Item No.	Procedure	Timing	By Whom	Done
1	Preconstruction meeting	Prior to beginning site work	Contractor, Developer, Civil and Geotechnical Engineers	
2	Fill removal from site or sorting and stockpiling	Prior to mass stripping	Soil Technician/ Geotechnical Engineer	
3	Stripping, aeration, and root-picking operations	During stripping	Soil Technician	
4	Compaction testing of engineered fill (95% of Standard Proctor)	During filling, tested every 2 vertical feet	Soil Technician	
5	Foundation Subgrade Compaction (95% of Standard Proctor)	During Foundation Preparation, Prior to Placement of Reinforcing Steel	Soil Technician/ Geotechnical Engineer	
6	Compaction testing of trench backfill (95% of Standard Proctor)	During backfilling, tested every 4 vertical feet for every 200 linear feet	Soil Technician	
7	Street Subgrade Inspection (95% of Standard Proctor)	Prior to placing base course	Soil Technician	
8	Base course compaction (95% of Modified Proctor)	Prior to paving, tested every 200 linear feet	Soil Technician	
9	Asphalt Compaction (92% Rice Value)	During paving, tested every 100 linear feet	Soil Technician	
10	Final Geotechnical Engineer's Report	Completion of project	Geotechnical Engineer	



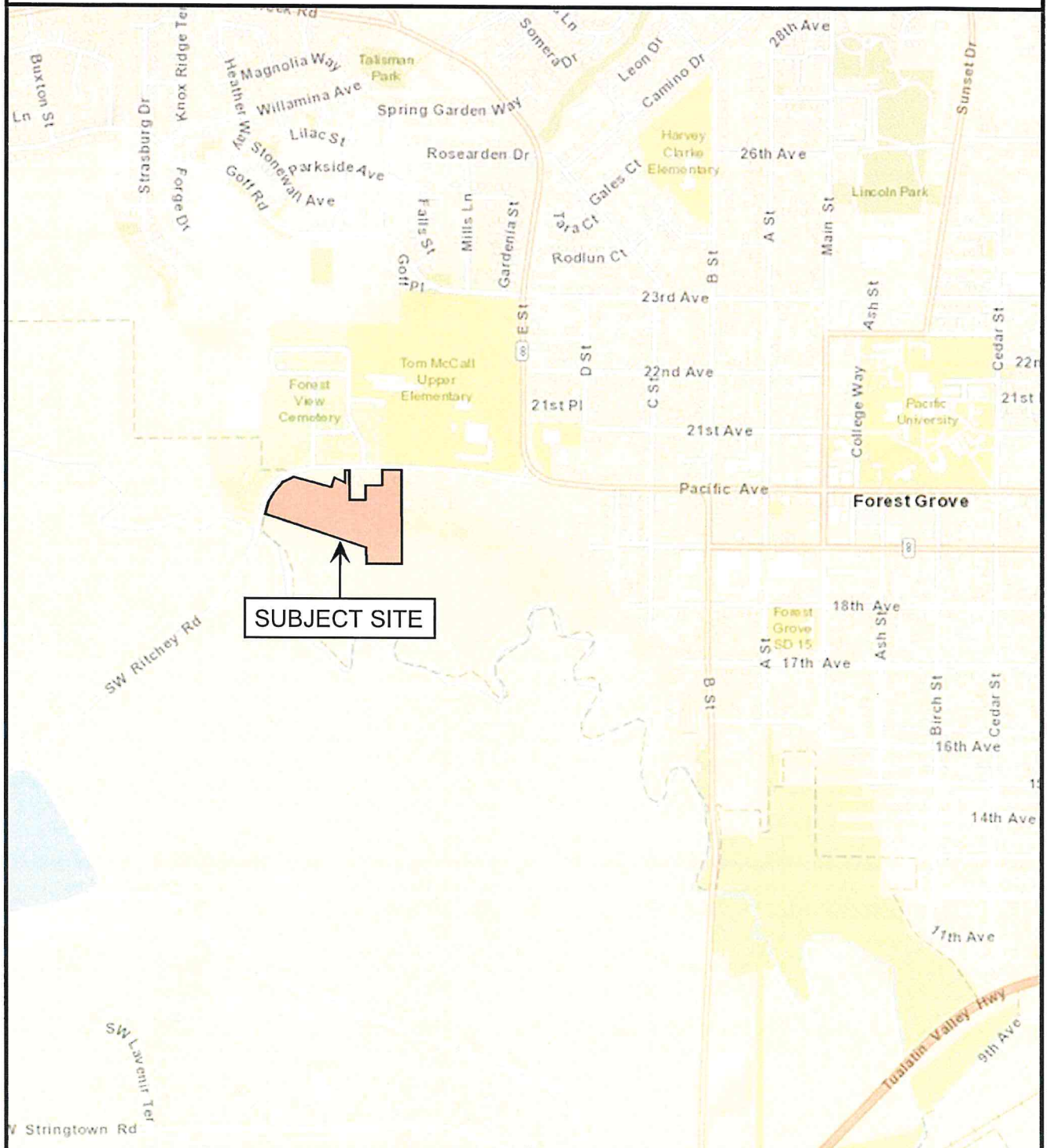
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FIGURES



14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

SITE VICINITY MAP



Base Map: DOGAMI HAZVU Maps 2018
Date: 11/8/2018
Drawn by: BLC



Project: Pacific Avenue Subdivision
Forest Grove, Oregon
Parcels R439804, R2179438, R2179439

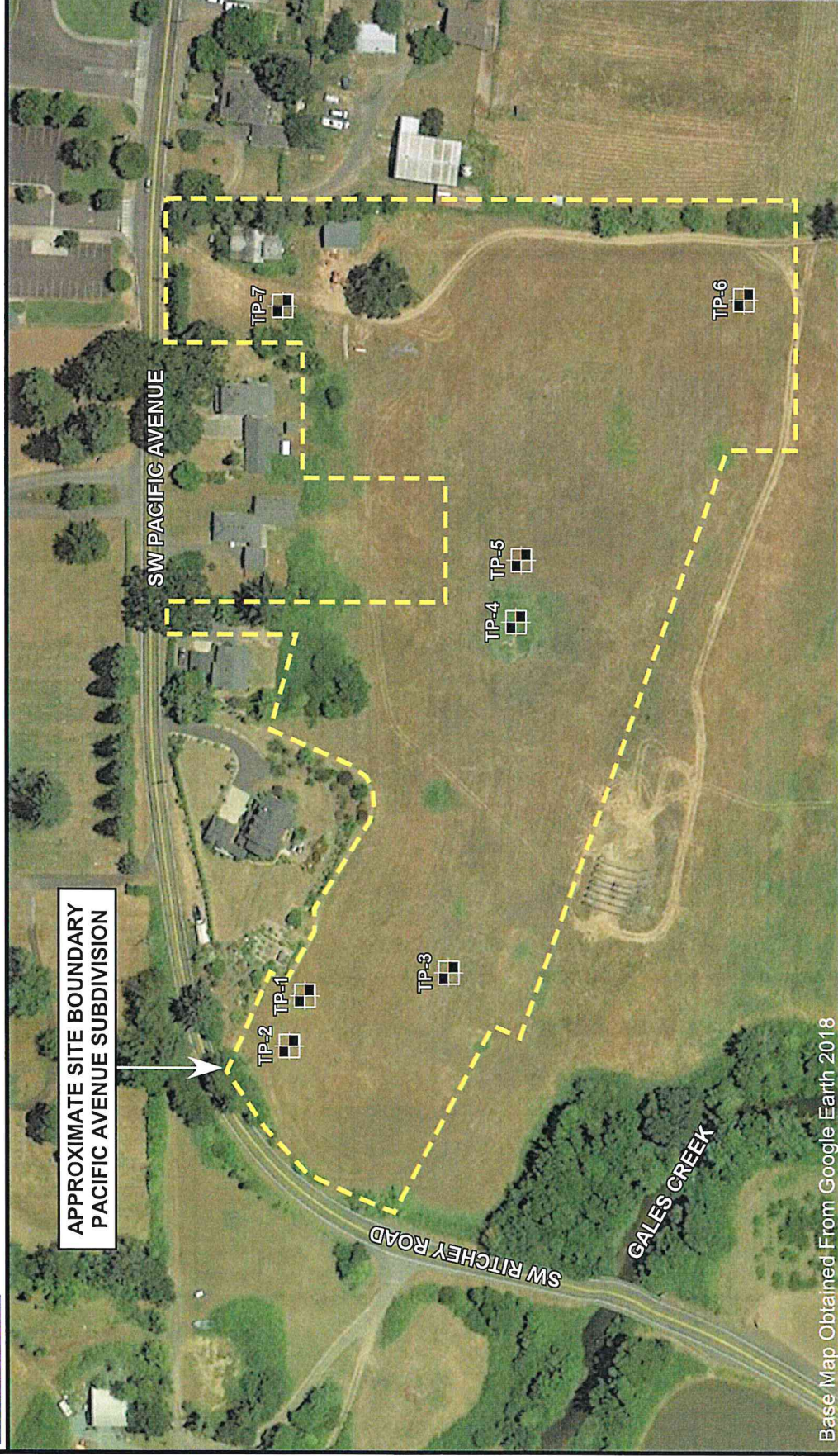
Project No. 18-5082

FIGURE 1



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SITE AERIAL AND EXPLORATION LOCATIONS



Legend:

- TP-1
Test Pit Exploration Designation
and Approximate Location

APPROXIMATE SCALE
(FEET)



Drawn by: BLC
Date: 11/8/2018

Project: Pacific Avenue Subdivision
Forest Grove, Oregon
Parcels R439804, R2179438, R2179439

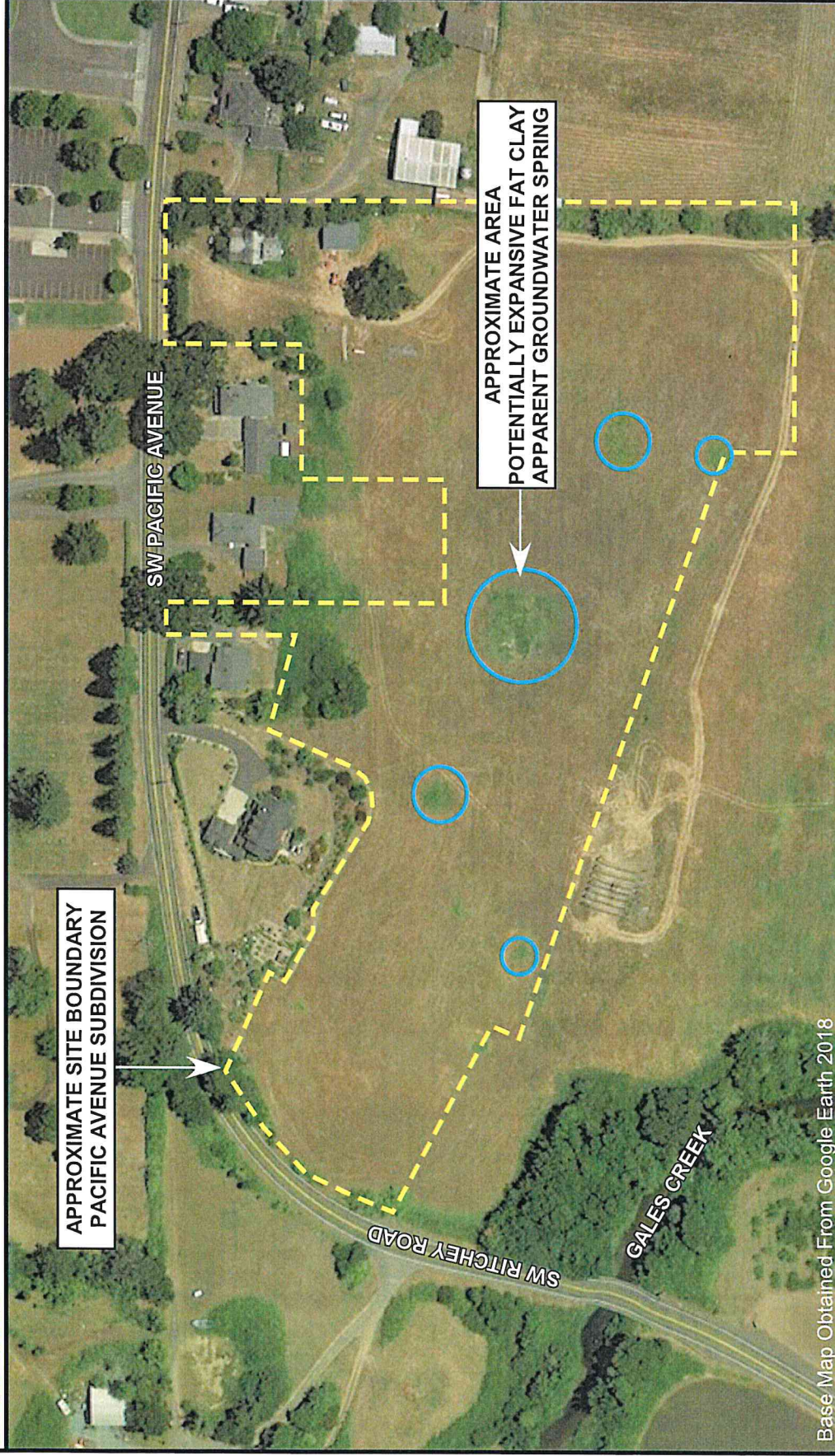
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FIGURE 2



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SITE AERIAL AND APPARENT GROUNDWATER SEEPS AND SPRING LOCATIONS



Base Map Obtained From Google Earth 2018

Legend:

● Apparent Locations of Seasonal Groundwater Seeps and Springs

APPROXIMATE SCALE
(FEET)



Drawn by: BLC
Date: 11/8/2018

Project No. 18-5082

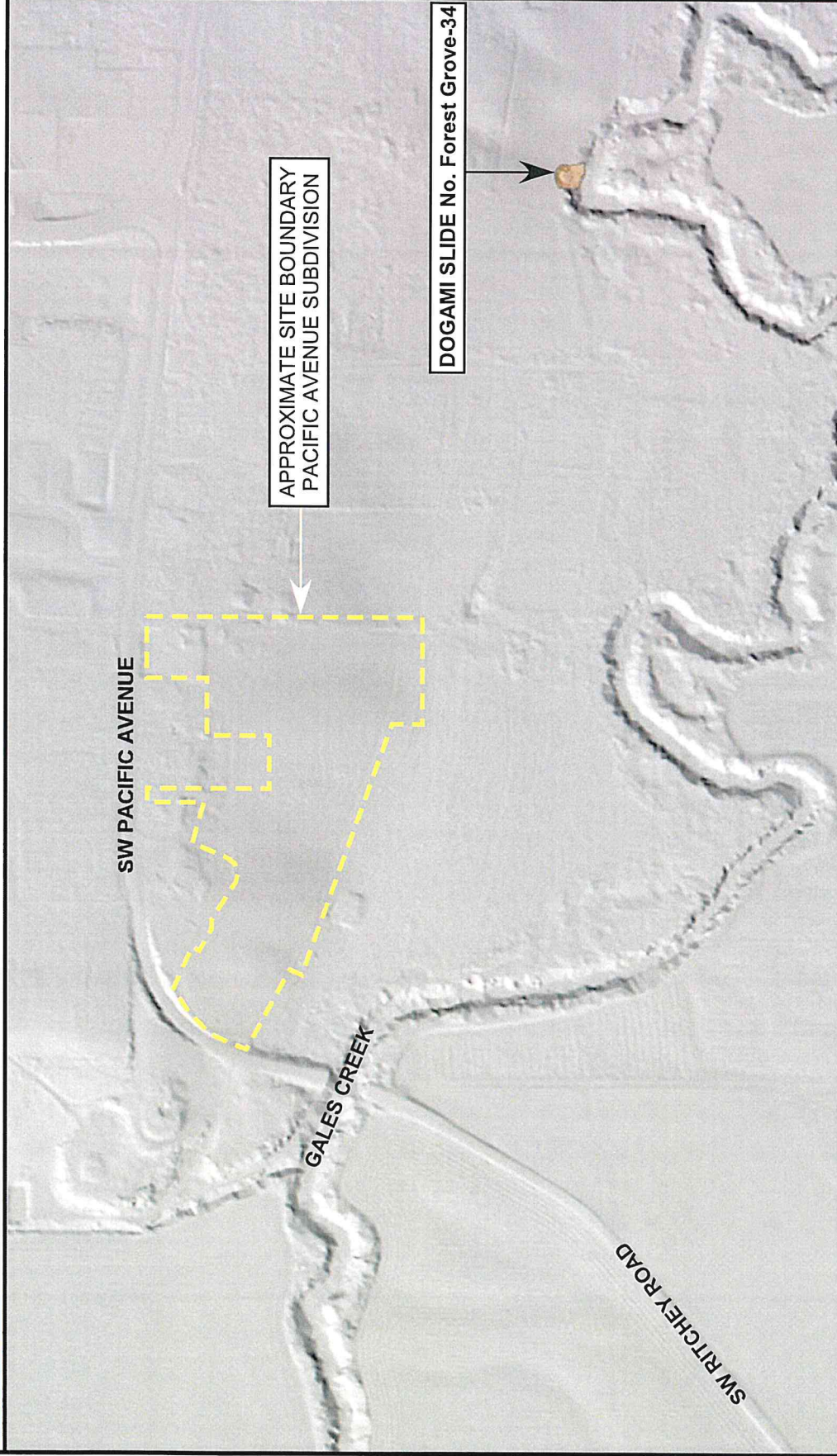
Project: Pacific Avenue Subdivision
Forest Grove, Oregon
Parcels R439804, R2179438, R2179439

FIGURE 3



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LIDAR IMAGERY & LANDSLIDE INVENTORY



Legend:



Mapped Landslide

Map Source: Oregon Department of Geology and Mineral Industries
HAZVU: Statewide Landslide Information 2018 Website

APPROXIMATE SCALE
(FEET)



Drawn By: BLC
Date: 11/8/2018

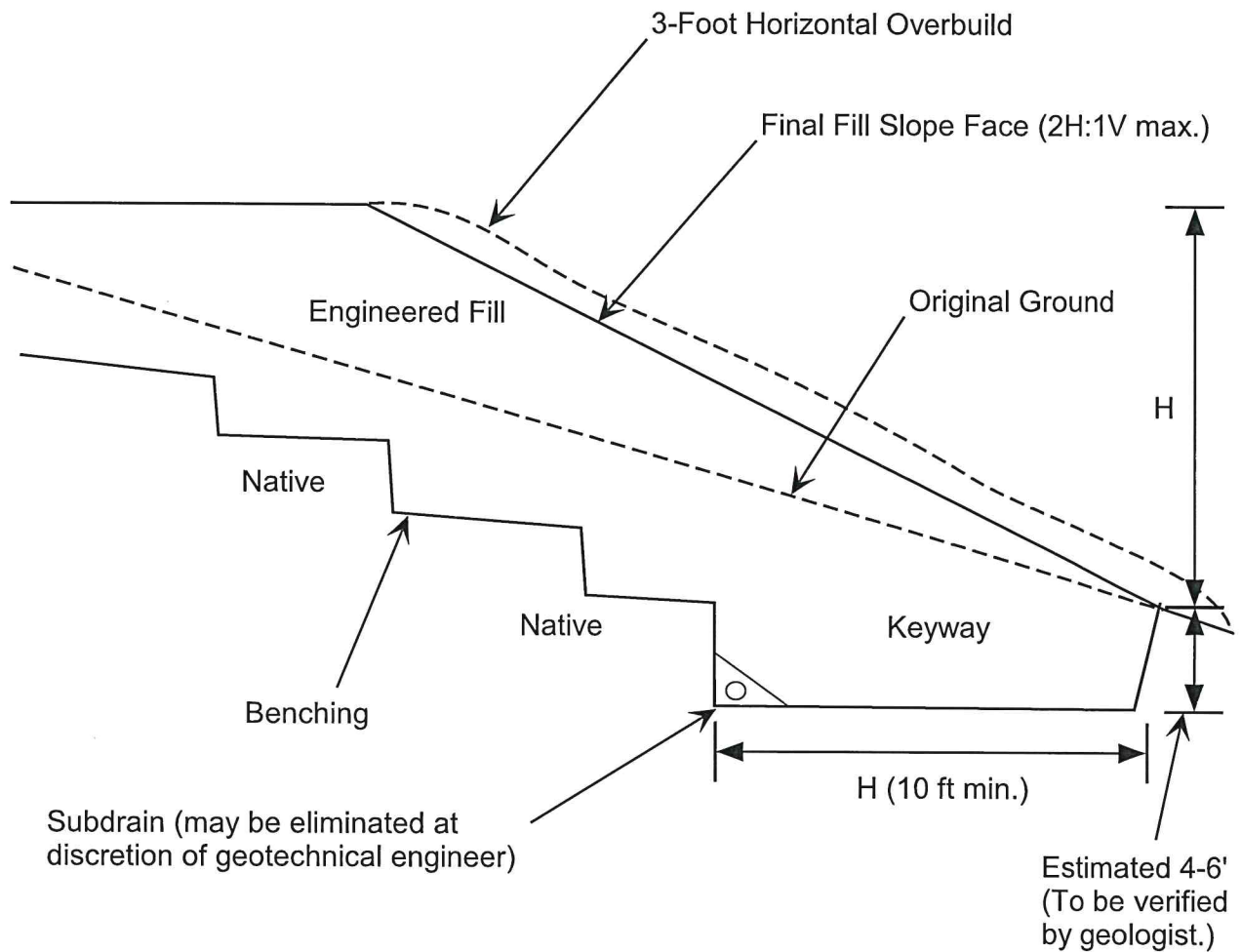


Project: Pacific Avenue Subdivision
Forest Grove, Oregon
Parcels R439804, R2179438, R2179439

Project No. 18-5082

FIGURE 4

TYPICAL KEYWAY, BENCHING & FILL SLOPE DETAIL

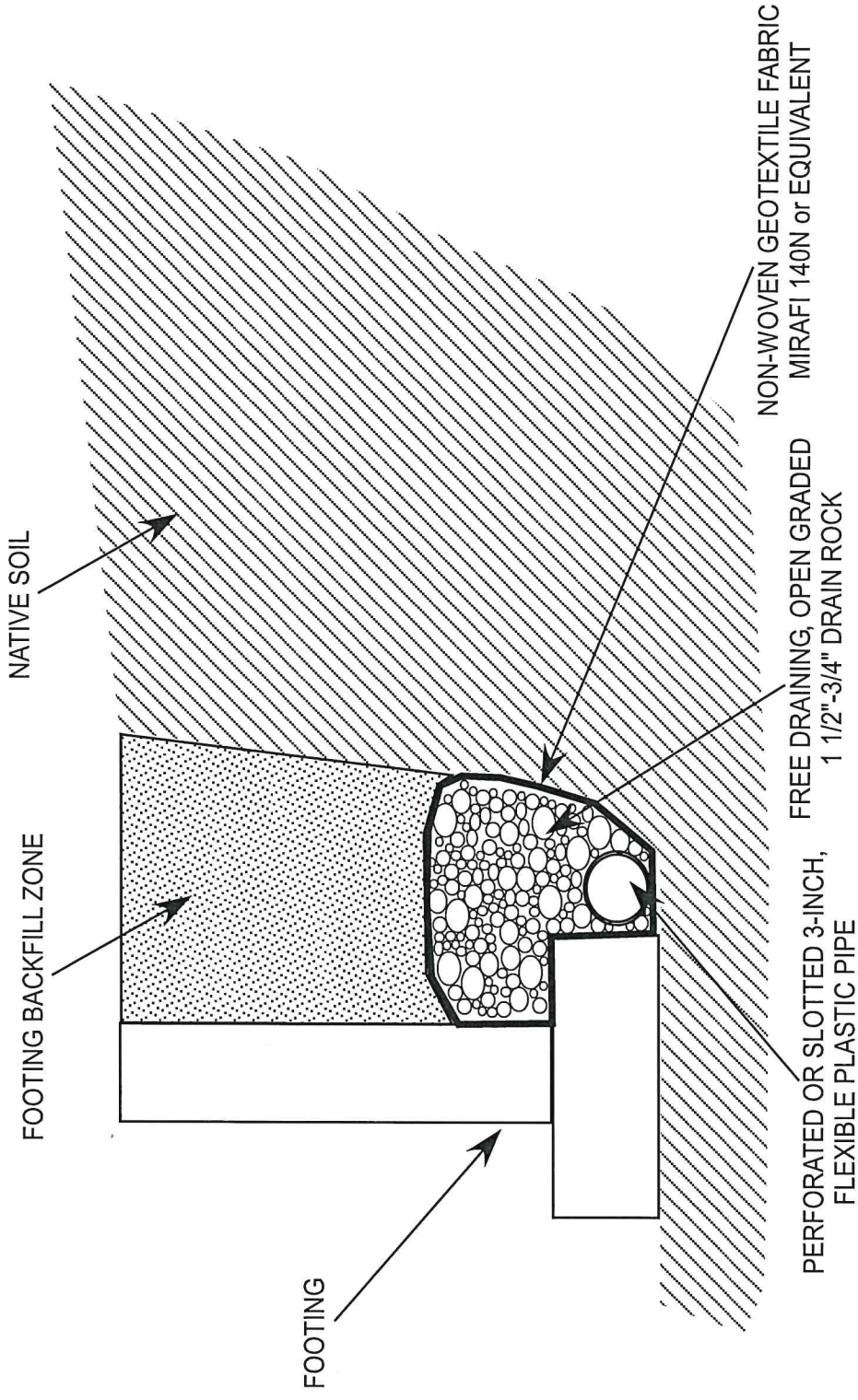


Recommended subdrain is minimum 3-inch-diameter ADS Heavy Duty grade (or equivalent), perforated plastic pipe enveloped in a minimum of 3 cubic feet per lineal foot of 2" to 1/2" open-graded gravel drain rock wrapped with geotextile filter fabric (Mirafi 140N or equivalent).



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TYPICAL PERIMETER FOOTING DRAIN DETAIL



Notes:

- 1) Drain rock should contain no more than 5 percent fines passing the U.S. No. 200 Sieve.
- 2) Trench bottom and drain pipe should be sloped to drain to approved discharge location.

Date: 11/9/2018
Drawn by: BLC

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

FIGURE 6



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EXPLORATION LOGS



14835 SW 72nd Avenue
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TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-1**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1						TOPSOIL. Grass field. Moderately organic Lean CLAY (OL-CL), dark brown, damp, containing fine grass roots to approximately 12 inches bgs. Till Zone
2						Lean CLAY (CL), brown, damp to moist, stiff to hard, low to moderate plasticity.
3						6-inch metal pipe encountered. Test pit terminated and moved to the west.
4						Test pit terminated at 3 feet. No seepage or groundwater encountered.
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 229 feet amsl



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Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					TOPSOIL. Grass field. Moderately organic Lean CLAY (OL-CL), dark brown, damp, containing fine grass roots to approximately 12 inches bgs. Till Zone
2	3.0					Lean CLAY (CL), brown, damp to moist, stiff to hard, low to moderate plasticity.
3	4.0					
4	>4.5					Lean CLAY (CL), brown, very stiff, damp to moist, faint mottling observed, pinhole structure.
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						Test pit terminated at 15 feet. No seepage or groundwater encountered.
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 228 feet amsl



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TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.5					TOPSOIL. Grass field. Moderately organic Lean CLAY (OL-CL), dark brown, damp, containing fine grass roots to approximately 10 inches bgs. Till Zone
2	3.0					Lean CLAY (CL), brown, damp to moist, stiff to hard, low to moderate plasticity.
3	4.0					
4	>4.5					Lean CLAY (CL), brown, very stiff, damp to moist, faint mottling observed, pinhole structure.
5						
6						
7						
8						
9						
10						
11						
12						
13						Fat CLAY (CH), blue gray, very stiff, very moist, high plasticity.
14						
15						Test pit terminated at 15 feet. No seepage or groundwater encountered.
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 210 feet amsl



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TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					TOPSOIL. Grass field. Moderately organic Fat CLAY (OL-CL), dark brown, damp, containing fine grass roots to approximately 10 inches bgs. Till Zone
2	3.5					Fat CLAY (CH), brown, orange, gray, black layering and mottling, hydric soils, stiff to very stiff, very moist, high plasticity, potentially expansive soil.
3	4.0					
4	4.0					
5						Fat CLAY (CH), gray with orange mottles, hydric soils, stiff to very stiff, very moist, high plasticity, potentially expansive soil.
6						
7						
8						
9						Fat CLAY (CH), light brown with orange and gray mottles, hydric soils, stiff to very stiff, very moist, high plasticity, potentially expansive soil.
10						
11						
12						
13						
14						
15						Test pit terminated at 15 feet. No seepage or groundwater encountered.
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 204 feet amsl



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TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-5**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					TOPSOIL. Grass field. Moderately organic Fat CLAY (OL-CL), dark brown, damp, containing fine grass roots to approximately 8 inches bgs. Till Zone
2	3.0					Lean CLAY (CL), brown, damp to moist, stiff to hard, low to moderate plasticity.
3	3.0					
4	4.0					Fat CLAY (CH), gray with orange mottles, hydric soils, stiff to very stiff, very moist, high plasticity, potentially expansive soil.
5						
6						
7						
8						
9						Fat CLAY (CH), light brown with orange and gray mottles, hydric soils, stiff to very stiff, very moist, high plasticity, potentially expansive soil.
10						
11						
12						
13						Fat CLAY (CH), gray, hydric soils, stiff to very stiff, very moist, high plasticity, potentially expansive soil.
14						
15						Test pit terminated at 15 feet. No seepage or groundwater encountered.
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 206 feet amsl



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TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-6**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1						TOPSOIL. Grass field. Moderately organic Lean CLAY (OL-CL), dark brown, damp, containing fine grass roots to approximately 8 inches bgs. Till Zone
2						Lean CLAY (CL), brown, damp to moist, stiff to hard, low to moderate plasticity.
3						
4						Lean CLAY (CL), brown, very stiff, damp to moist, faint mottling observed, pinhole structure.
5						
6						
7						
8						
9						
10						
11						
12						
13						Lean CLAY (CL), brown with orange and gray mottling, very stiff, moist.
14						
15						Test pit terminated at 15 feet. No seepage or groundwater encountered.
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 182 feet amsl



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TEST PIT LOG

Project: Pacific Avenue Subdivision
Forest Grove, Oregon

Project No. 18-5082

Test Pit No. **TP-7**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	% Passing U.S. No 200 Sieve	Moisture Content (%)	Water Bearing Zone	Material Description
1						TOPSOIL. Grass field. Moderately organic Lean CLAY (OL-CL), dark brown, damp, containing fine grass roots and minor tree roots to approximately 8 inches.
2						Lean CLAY (CL), brown, damp to moist, medium stiff, low to moderate plasticity.
3						
4						Lean CLAY (CL), brown, very stiff, damp to moist, faint mottling observed, pinhole structure.
5						
6						
7						
8						
9						
10						Test pit terminated at 10 feet. No seepage or groundwater encountered.
11						
12						
13						
14						
15						
16						
17						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5/2018

Logged By: BLC

Surface Elevation: 240 feet amsl

SOIL DESCRIPTION AND CLASSIFICATION GUIDELINES

Particle-Size Classification

COMPONENT	ASTM/USCS		AASHTO	
	size range	sieve size range	size range	sieve size range
Cobbles	> 75 mm	greater than 3 inches	> 75 mm	greater than 3 inches
Gravel	75 mm – 4.75 mm	3 inches to No. 4 sieve	75 mm – 2.00 mm	3 inches to No. 10 sieve
Coarse	75 mm – 19.0 mm	3 inches to 3/4-inch sieve	-	-
Fine	19.0 mm – 4.75 mm	3/4-inch to No. 4 sieve	-	-
Sand	4.75 mm – 0.075 mm	No. 4 to No. 200 sieve	2.00 mm – 0.075 mm	No. 10 to No. 200 sieve
Coarse	4.75 mm – 2.00 mm	No. 4 to No. 10 sieve	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve
Medium	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve	-	-
Fine	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve
Fines (Silt and Clay)	< 0.075 mm	Passing No. 200 sieve	< 0.075 mm	Passing No. 200 sieve

Consistency for Cohesive Soil

CONSISTENCY	SPT N-VALUE (BLOWS PER FOOT)	POCKET PENETROMETER (UNCONFINED COMPRESSIVE STRENGTH, tsf)
Very Soft	2	less than 0.25
Soft	2 to 4	0.25 to 0.50
Medium Stiff	4 to 8	0.50 to 1.0
Stiff	8 to 15	1.0 to 2.0
Very Stiff	15 to 30	2.0 to 4.0
Hard	30 to 60	greater than 4.0
Very Hard	greater than 60	-

Relative Density for Granular Soil

RELATIVE DENSITY	SPT N-VALUE (BLOWS PER FOOT)
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	more than 50

Moisture Designations

TERM	FIELD IDENTIFICATION
Dry	No moisture. Dusty or dry.
Damp	Some moisture. Cohesive soils are usually below plastic limit and are moldable.
Moist	Grains appear darkened, but no visible water is present. Cohesive soils will clump. Sand will bulk. Soils are often at or near plastic limit.
Wet	Visible water on larger grains. Sand and silt exhibit dilatancy. Cohesive soil can be readily remolded. Soil leaves wetness on the hand when squeezed. Soil is much wetter than optimum moisture content and is above plastic limit.

AASHTO SOIL CLASSIFICATION SYSTEM

TABLE 1. Classification of Soils and Soil-Aggregate Mixtures

General Classification	Granular Materials (35 Percent or Less Passing .075 mm)				Silt-Clay Materials (More than 35 Percent Passing 0.075)		
	A-1	A-3	A-2	A-4	A-5	A-6	A-7
Sieve analysis, percent passing:							
2.00 mm (No. 10)	-	-	-	-	-	-	-
0.425 mm (No. 40)	50 max	51 min	-	-	-	-	-
0.075 mm (No. 200)	25 max	10 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)							
Liquid limit				40 max	41 min	40 max	41 min
Plasticity index		N.P.		10 max	10 max	11 min	11 min
General ratings as subgrade	6 max	Excellent to good					Fair to poor

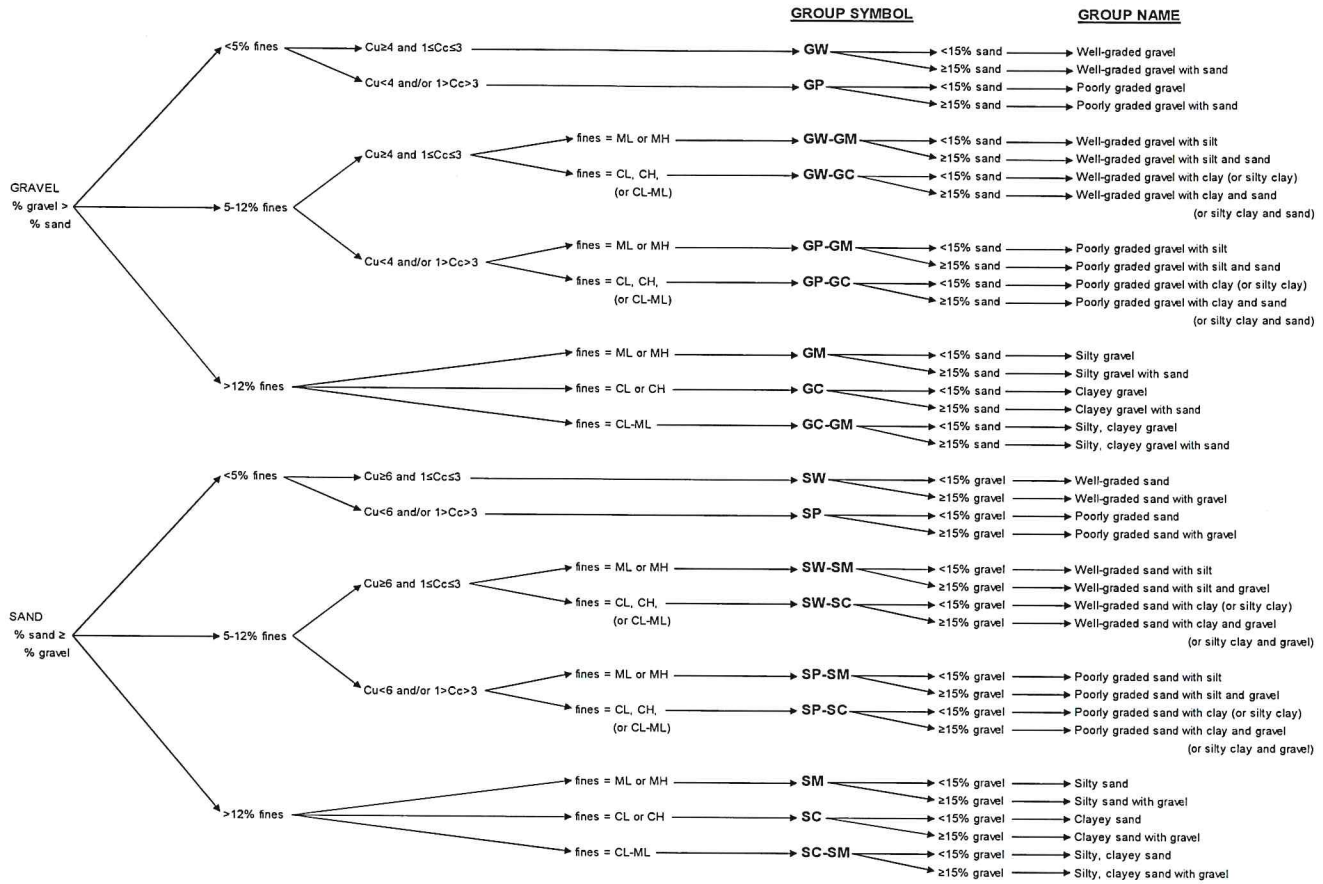
Note: The placing of A-3 before A-2 is necessary in the "left to right elimination process" and does not indicate superiority of A-3 over A-2.

TABLE 2. Classification of Soils and Soil-Aggregate Mixtures

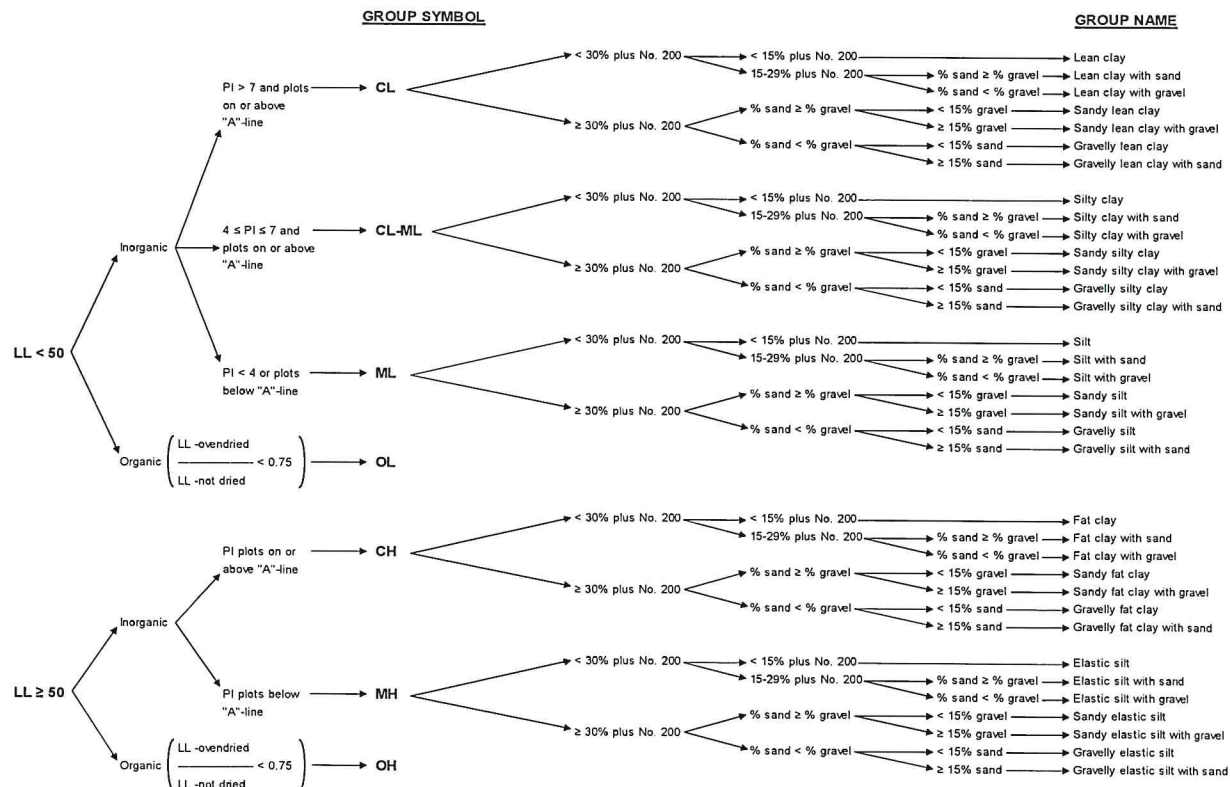
General Classification	Granular Materials (35 Percent or Less Passing 0.075 mm)							Silt-Clay Materials (More than 35 Percent Passing 0.075 mm)		
	A-1							A-2		
Group Classification	A-1-a	A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6
Sieve analysis, percent passing:										
2.00 mm (No. 10)	50 max	-	-	-	-	-	-	-	-	-
0.425 mm (No. 40)	30 max	50 max	51 min	-	-	-	-	-	-	-
0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)										
Liquid limit				40 max	41 min	40 max	41 min	40 max	41 min	40 max
Plasticity index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min
Usual types of significant constituent materials	Stone fragments, gravel and sand		Fine sand					Silty or clayey gravel and sand	Silty soils	Clayey soils
General ratings as subgrade	Excellent to Good							Fair to poor		

Note: Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30 (see Figure 2).

AASHTO = American Association of State Highway and Transportation Officials



Flow Chart for Classifying Coarse-Grained Soils (More Than 50% Retained on No. 200 Sieve)



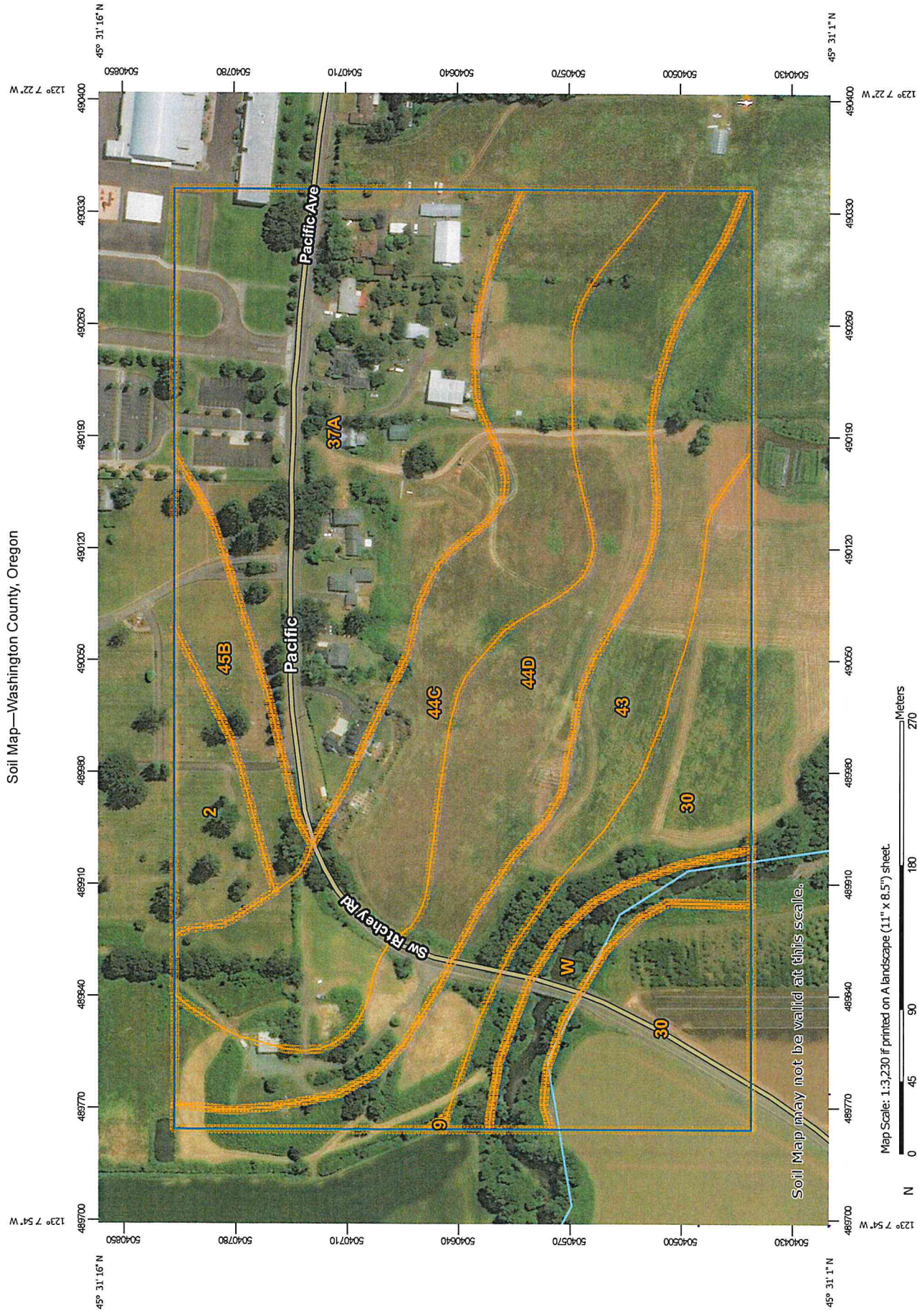
Flow Chart for Classifying Fine-Grained Soil (50% or More Passes No. 200 Sieve)



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Investigation • Design • Construction Support

SITE RESEARCH

Soil Map—Washington County, Oregon



MAP LEGEND

Area of Interest (AOI)		Area of Interest (AOI)		Spoil Area
Soils		Soil Map Unit Polygons		Stony Spot
		Soil Map Unit Lines		Very Stony Spot
		Soil Map Unit Points		Wet Spot
Special Point Features		Special Line Features		Other
	Blowout	Water Features		Special Line Features
	Borrow Pit		Streams and Canals	
	Clay Spot	Transportation		
	Closed Depression		Rails	
	Gravel Pit		Interstate Highways	
	Gravelly Spot		US Routes	
	Landfill		Major Roads	
	Lava Flow		Local Roads	
	Marsh or swamp	Background		Aerial Photography
	Mine or Quarry			
	Miscellaneous Water			
	Perennial Water			
	Rock Outcrop			
	Saline Spot			
	Sandy Spot			
	Severely Eroded Spot			
	Sinkhole			
	Slide or Slip			
	Sodic Spot			

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Washington County, Oregon
Survey Area Data: Version 16, Sep 18, 2018

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

Date(s) aerial images were photographed: Apr 16, 2015—Feb 12, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Amity silt loam	1.7	3.3%
9	Chehalis silty clay loam, occasional overflow	0.0	0.0%
30	McBee silty clay loam	8.0	15.2%
37A	Quatama loam, 0 to 3 percent slopes	14.2	26.8%
43	Wapato silty clay loam	6.8	12.9%
44C	Willamette silt loam, 7 to 12 percent slopes	9.7	18.4%
44D	Willamette silt loam, 12 to 20 percent slopes	8.7	16.4%
45B	Woodburn silt loam, 3 to 7 percent slopes	2.0	3.7%
W	Water	1.7	3.3%
Totals for Area of Interest		52.9	100.0%

Design Maps Summary Report

User-Specified Input

Report Title 18-5082, Pacific Avenue Subdivision

Thu November 8, 2018 19:07:10 UTC

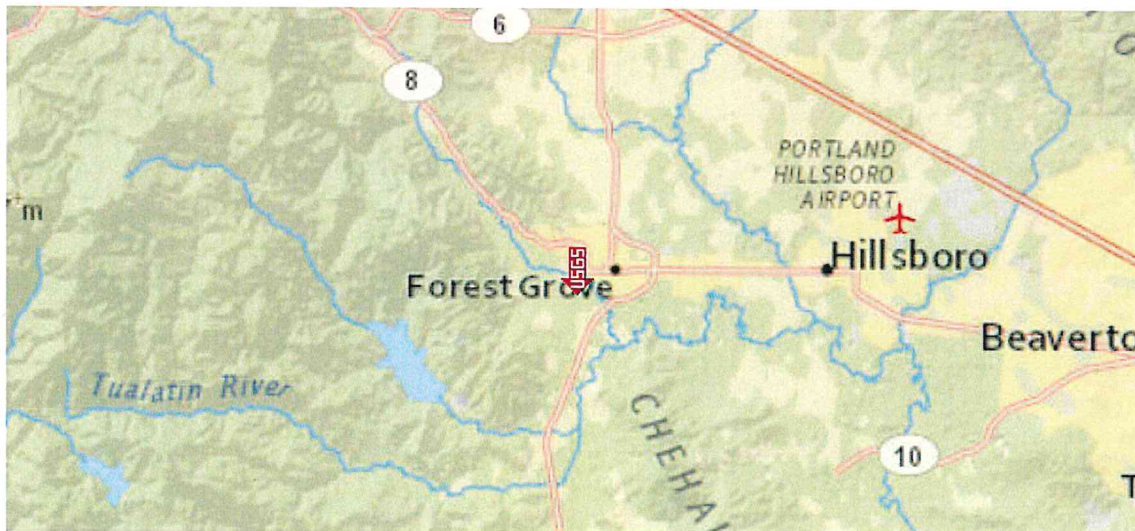
Building Code Reference Document ASCE 7-10 Standard

(which utilizes USGS hazard data available in 2008)

Site Coordinates 45.51901°N, 123.12705°W

Site Soil Classification Site Class D – “Stiff Soil”

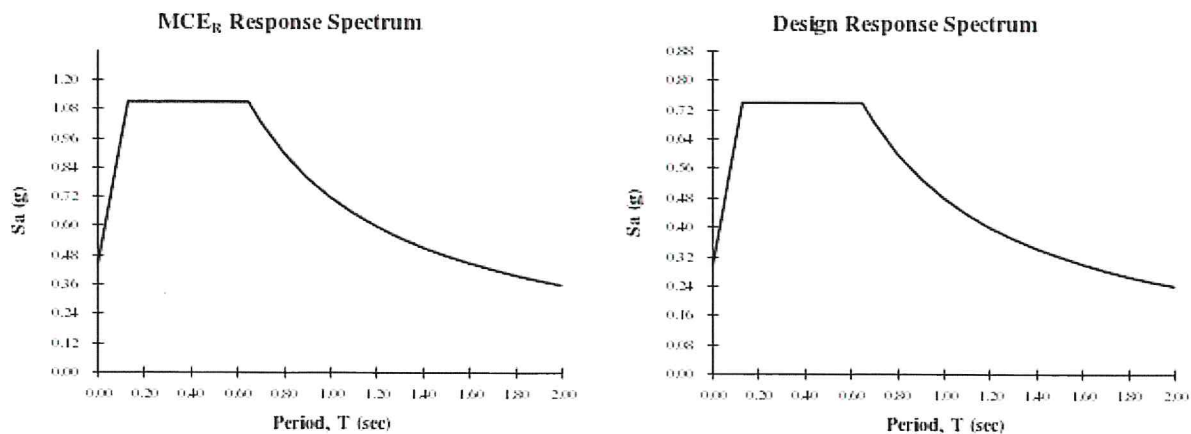
Risk Category I/II/III



USGS-Provided Output

$S_s = 1.014 \text{ g}$	$S_{MS} = 1.110 \text{ g}$	$S_{DS} = 0.740 \text{ g}$
$S_1 = 0.470 \text{ g}$	$S_{M1} = 0.719 \text{ g}$	$S_{D1} = 0.479 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the “2009 NEHRP” building code reference document.



For PGA_{HR} , T_L , C_{RS} , and C_{R1} values, please [view the detailed report](#).

Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.



Design Maps Detailed Report

ASCE 7-10 Standard (45.51901°N, 123.12705°W)

Site Class D – “Stiff Soil”, Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From **Figure 22-1** ^[1]

$$S_s = 1.014 \text{ g}$$

From **Figure 22-2** ^[2]

$$S_1 = 0.470 \text{ g}$$

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
Any profile with more than 10 ft of soil having the characteristics:			
• Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf			
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_s \leq 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_s

For Site Class = D and $S_s = 1.014$ g, $F_a = 1.094$

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.470$ g, $F_v = 1.530$

Equation (11.4-1):

$$S_{MS} = F_a S_s = 1.094 \times 1.014 = 1.110 \text{ g}$$

Equation (11.4-2):

$$S_{M1} = F_v S_1 = 1.530 \times 0.470 = 0.719 \text{ g}$$

Section 11.4.4 — Design Spectral Acceleration Parameters

Equation (11.4-3):

$$S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.110 = 0.740 \text{ g}$$

Equation (11.4-4):

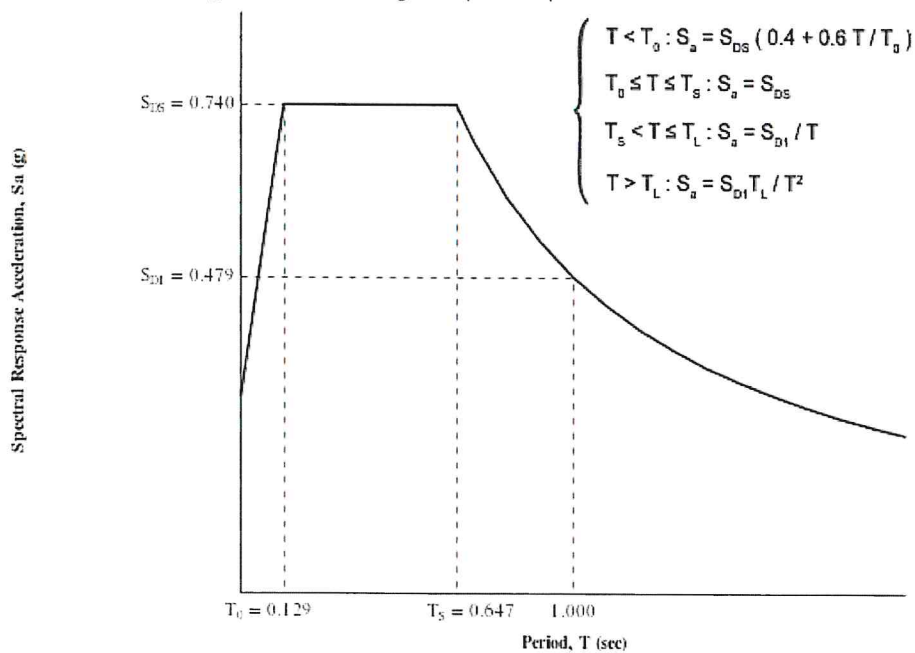
$$S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.719 = 0.479 \text{ g}$$

Section 11.4.5 — Design Response Spectrum

From **Figure 22-12** ^[3]

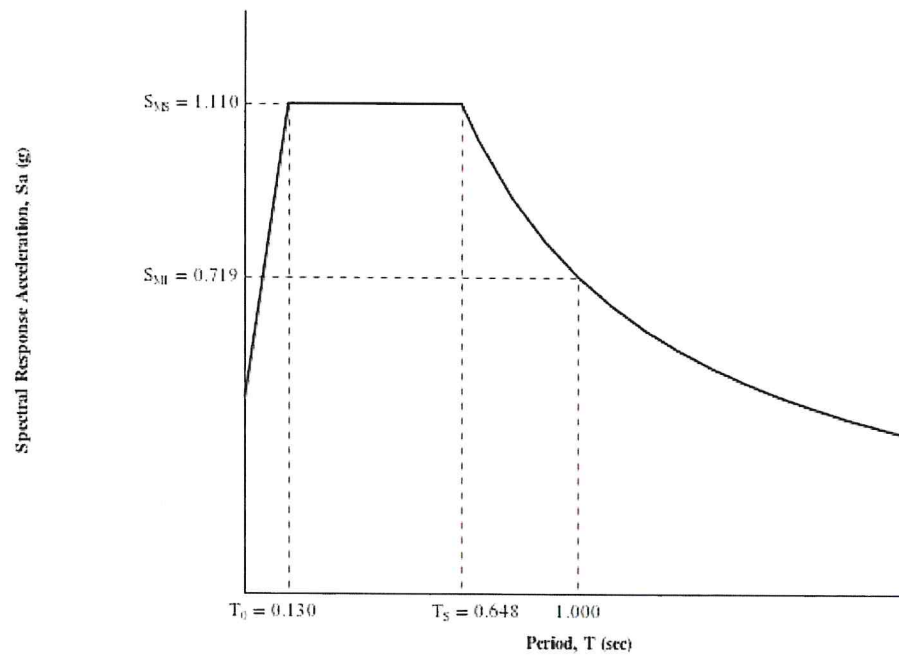
$$T_L = 16 \text{ seconds}$$

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From **Figure 22-7** ^[4]

$$PGA = 0.459$$

Equation (11.8-1):

$$PGA_M = F_{PGA} PGA = 1.041 \times 0.459 = 0.478 \text{ g}$$

Table 11.8-1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.459 g, $F_{PGA} = 1.041$

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From **Figure 22-17** ^[5]

$$C_{RS} = 0.886$$

From **Figure 22-18** ^[6]

$$C_{R1} = 0.858$$

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50g \leq S_{DS}$	D	D	D

For Risk Category = I and $S_{DS} = 0.740g$, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

For Risk Category = I and $S_{D1} = 0.479g$, Seismic Design Category = D

Note: When S_1 is greater than or equal to $0.75g$, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category $\equiv$ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. Figure 22-1: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. Figure 22-2: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. Figure 22-12: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. Figure 22-7: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. Figure 22-17: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. Figure 22-18: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

Pacific Avenue Subdivision, FEMA 100-Year Flood Zone



November 8, 2018

Type and Source of Flood Data

 Effective FEMA 100 yr Flood

 Preliminary FEMA 100 yr Flood

 State Digitized Flood Data

 Q3 FEMA Flood Data

1:4,800

0 0.03 0.06 0.11 mi

0 0.04 0.09 0.18 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

RECEIVED

WASH 56846

STATE OF OREGON
GEOTECHNICAL HOLE REPORT

(as required by OAR 690-240-035)

WATER RESOURCES DEPT

SALEM, OREGON

(1) OWNER/PROJECT:

Hole Number

B-1

Name Sam Kula, Richard Bregank, & Ed LeshardAddress 10 NE AlderCity Tasaguan State WA Zip 98037

(2) TYPE OF WORK

☒ New ☐ Deepening ☐ Alteration (repair/recondition) ☒ Abandonment

(3) CONSTRUCTION:

☐ Rotary Air ☐ Hand Auger ☐ Hollow Stem Auger
☐ Rotary Mud ☐ Cable Tool ☒ Push Probe ☐ Other

(4) TYPE OF HOLE:

☒ Uncased Temporary ☐ Cased Permanent
☐ Uncased Permanent ☐ Slope Stability ☐ Other

(5) USE OF HOLE:

soil & water samples

(6) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Hole 24 ft.

HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or pounds
2	0	24				

Backfill placed from _____ ft. to _____ ft. Material _____

Filter Pack placed from _____ ft. to _____ ft. Size of pack _____

(7) CASING/SCREEN:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Screen:					☐	☐	☐	☐
					☐	☐	☐	☐
Slot size								

(8) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability _____ Yield _____ GPM _____

Conductivity _____ PH _____

Temperature of water 57 °F/C Depth artesian flow found _____ ft.

Was water analysis done? ☒ Yes ☐ No

By whom? _____

Depth of strata analyzed. From _____ ft. to _____ ft.

Remarks: _____

(9) LOCATION OF HOLE by legal description:

County Wash Latitude _____ Longitude _____

Township _____ N or S Range 4 E or W WM. _____

Section 1 NE 1/4 NE 1/4

Tax Lot _____ Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address)

B St & 16th Ave, Forest Grove

Map with location identified must be attached

(10) STATIC WATER LEVEL:

11.9 ft. below land surface. Date 12/28/00

Artesian pressure _____ lb. per square inch. Date _____

(11) SUBSURFACE LOG:

Ground Elevation _____

Material Description	From	To	SWL
<u>Silt</u>	<u>0</u>	<u>24</u>	<u>11.9</u>

Date Started _____ Date Completed _____

(12) ABANDONMENT LOG:

Material Description	From	To	Sacks or Pounds
<u>Bent</u>	<u>0</u>	<u>24</u>	<u>37 lbs</u>

Date started 12/18/00 Date Completed 12/18/00

Professional Certification

(to be signed by a licensed water supply or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon's geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

Signed C. Sanchez License or Registration Number 10495

Date 12-28-00

Affiliation _____

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER



Real-World Geotechnical Solutions
Investigation • Design • Construction Support

PHOTOGRAPHIC LOG



Real-World Geotechnical Solutions
Investigation • Design • Construction Support

PACIFIC AVENUE SUBDIVISION GEOTECHNICAL SITE INVESTIGATION PHOTOGRAPHIC LOG



View of Property Facing West



View of Property Facing East

PACIFIC AVENUE SUBDIVISION GEOTECHNICAL SITE INVESTIGATION PHOTOGRAPHIC LOG



Test Pit TP-2



Test Pit TP-4, Spring Area

PACIFIC AVENUE SUBDIVISION GEOTECHNICAL SITE INVESTIGATION PHOTOGRAPHIC LOG



Hydric Soils in Test Pit TP-4, Groundwater Spring, Potentially Expansive Soils



Fat CLAY Soils from Test Pit TP-4

PACIFIC AVENUE SUBDIVISION GEOTECHNICAL SITE INVESTIGATION PHOTOGRAPHIC LOG



Test Pit TP-4, Hydric Soils



Test Pit TP-6

PACIFIC AVENUE SUBDIVISION GEOTECHNICAL SITE INVESTIGATION PHOTOGRAPHIC LOG



Test Pit TP-6



Test Pit TP-6

PACIFIC AVENUE SUBDIVISION GEOTECHNICAL SITE INVESTIGATION PHOTOGRAPHIC LOG



Test Pit TP-7



Test Pit TP-7

Exhibit B

Amy Kreimeier

From: John DeJong <technicalengineeringinc@yahoo.com>
Sent: Friday, December 16, 2022 1:42 PM
To: Amy Kreimeier; Daniel Riordan
Subject: Fw: Feedback on Ritchey Ridge

Amy,
Attached is comments from a neighbor, her contact info is attached in her email.

John

----- Forwarded Message -----

From: Tammi McLaughlin <tspm@hotmail.com>
To: "technicalengineeringinc@yahoo.com" <technicalengineeringinc@yahoo.com>
Cc: Eric McLaughlin <eric.a.mclaughlin@intel.com>
Sent: Sunday, July 17, 2022 at 03:32:26 PM PDT
Subject: Feedback on Ritchey Ridge

Hi John,

It was fun to see you again and say hello today. Thank you for stopping by with the drawings for Ritchey Ridge.

Eric and I both looked at the plans and we do have a few comments, questions, and concerns.

1. Street width. It appears that 19th Ave and 19th place will be the same width as the same named streets coming out of the new Gales Creek Terrace. We have noticed that many of those home owners park their cars in the street, on both sides of the road, as well as in their short driveways. It is almost impossible for two cars to pass through those narrow roads when cars are parked on both sides of the road. It's also just really unattractive. Perhaps consider allowing parking on only one side of the road to help with that issue?

2. Fence. Will the developers plan to build a fence along our back and side property lines, between us and the new home lots? If so, what type of fence material is planned? May we have input?

3. Townhomes, triplex and duplexes. Will these be sold to individuals or rented in the same manner as those in the Gales Creek Terrace development? Also, please consider providing ample off street parking in this area.

4. Landscaping. First of all, thank you so much for planning to landscape with street trees and open space landscaping. It makes a huge difference to the livability/desirability to have nicely planned and executed landscaping. I love the choices of Styrax street trees, and particularly with the Ribes sanguineum in mass plantings. I'm also pleased with the unusual choice of a Liriodendron near the catch basin, next to lot 20. I do have a concern with the choice of Zelkova trees as the street tree chosen for the south side of 19th place. My understanding is that Zelkova trees can grow to be 60' tall. Considering that the north side of 19th Pl street tree choice of Amelanchier grows to be about 20' tall, this is an odd pairing. As a home owner with a view, I also would prefer not to see street trees grow to be 60' tall. Perhaps the more modest in height Styrax or even more Amelanchier trees could be continued along 19th place instead of Zelkova trees?

5. Drainage. There is a natural spring that is likely located in about the same area as your planned catch basin, by lot 20. Is that why the catch basin is located in that spot?

Also, we can see decent water run off in the rainy season that comes off of our lowest SW property point. I'm sure your drainage plans will work with these issues. I just mention it to make sure it's accounted for.

6. Existing mature oak trees. We noticed that 19th Place coming out of Gales Creek Terrace looks like it may be planned to go right where there is an existing mature oak tree. Perhaps your primary entrance road will interfere with that oak tree as well.

It also appears that the service access road, planned next to the Plusus's property, may also interfere with a mature oak tree.

If at all possible, we would really love to see those oak trees preserved. If the roads can avoid them at all, we would be very happy to see those mature trees stay in place to continue give beauty and character to the neighborhood.

Thank you for your time and care in seeking our feedback.

Sincerely,
Tammi and Eric McLaughlin
1140 SW Pacific Ave
Forest Grove
503-475-2683

Sent from my iPhone

Amy Kreimeier

From: John DeJong <technicalengineeringinc@yahoo.com>
Sent: Friday, December 16, 2022 2:06 PM
To: Amy Kreimeier; Daniel Riordan
Subject: Fw: Feedback on Ritchey Ridge

Amy,
Attached are my responses to comments from Tami McLoughlin (neighbor)

John

----- Forwarded Message -----

From: John DeJong <technicalengineeringinc@yahoo.com>
To: Tammi McLaughlin <tspm@hotmail.com>
Sent: Monday, July 18, 2022 at 05:18:56 PM PDT
Subject: Re: Feedback on Ritchey Ridge

Tammi,
Most feedback now that I have a few minutes.

Item #1:

19th Avenue will be the same width as the adjoining subdivision, however the entire length of 19th Place will be 4.00' wider, it will have a 58' wide ROW, versus a 54' wide ROW in "Gales Creek"

Item #2:

At this stage, not yet established to where the fences will be.

Item #3 :

Yes, intent is individual ownership of all townhouses, and all single family. That said, probably hard to police if someone buys a townhouse of single family house, and choose to rent it out.

Item #4 :

I forwarded your landscaping comments to my landscape architect, she indicated she was at the coast for a few days, but would review your comments.

Item #5 :

All lots will be served by a storm sewer lateral, if we encounter a spring during the construction process, those are all connected to our storm system. We will also be installing a storm system in Ritchey Road, so if a low point occurs at your SW corner, they can be easily connected to our Ritchey Road storm system.

Item #6 :

Yes, the adjoining subdivision aimed their street directly at the oak tree, so no way to save it, the oak tree at the north end of the private drive is in our frontage, if there is a way to save it after an arborist determines the root system, we will definitely attempt to preserve it.

I've also been in contact with Kendall (1216 Pacific), I'm working with her to potentially put the street along her property, rather than having lots backing to her house/yard, I believe that will work, so contacting the City and making those changes.

Again, thanks for your input.

John

On Sunday, July 17, 2022 at 03:32:26 PM PDT, Tammi McLaughlin <tspm@hotmail.com> wrote:

Hi John,

It was fun to see you again and say hello today. Thank you for stopping by with the drawings for Ritchey Ridge.

Eric and I both looked at the plans and we do have a few comments, questions, and concerns.

1. Street width. It appears that 19th Ave and 19th place will be the same width as the same named streets coming out of the new Gales Creek Terrace. We have noticed that many of those home owners park their cars in the street, on both sides of the road, as well as in their short driveways. It is almost impossible for two cars to pass through those narrow roads when cars are parked on both sides of the road. It's also just really unattractive. Perhaps consider allowing parking on only one side of the road to help with that issue?

2. Fence. Will the developers plan to build a fence along our back and side property lines, between us and the new home lots? If so, what type of fence material is planned? May we have input?

3. Townhomes, triplex and duplexes. Will these be sold to individuals or rented in the same manner as those in the Gales Creek Terrace development? Also, please consider providing ample off street parking in this area.

4. Landscaping. First of all, thank you so much for planning to landscape with street trees and open space landscaping. It makes a huge difference to the livability/desirability to have nicely planned and executed landscaping. I love the choices of *Styrax* street trees, and particularly with the *Ribes sanguineum* in mass plantings. I'm also pleased with the unusual choice of a *Liriodendron* near the catch basin, next to lot 20. I do have a concern with the choice of *Zelkova* trees as the street tree chosen for the south side of 19th place. My understanding is that *Zelkova* trees can grow to be 60' tall. Considering that the north side of 19th Pl street tree choice of *Amelanchier* grows to be about 20' tall, this is an odd pairing. As a home owner with a view, I also would prefer not to see street trees grow to be 60' tall. Perhaps the more modest in height *Styrax* or even more *Amelanchier* trees could be continued along 19th place instead of *Zelkova* trees?

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Also, we can see decent water run off in the rainy season that comes off of our lowest SW property point. I'm sure your drainage plans will work with these issues. I just mention it to make sure it's accounted for.

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It also appears that the service access road, planned next to the Pluus's property, may also interfere with a mature oak tree.

If at all possible, we would really love to see those oak trees preserved. If the roads can avoid them at all, we would be very happy to see those mature trees stay in place to continue give beauty and character to the neighborhood.

Thank you for your time and care in seeking our feedback.

Sincerely,
Tammi and Eric McLaughlin
1140 SW Pacific Ave
Forest Grove
503-475-2683

Sent from my iPhone



A place where families and businesses thrive.

January 05, 2023

To whom it may concern:

The City of Forest Grove Light & Power has the ability and substation capacity to provide electric power to the proposed 65-lot Ritchey Ridge Subdivision. (311-22-000027-PLNG)

Please let us know if you need any additional information.

Sincerely,

Jason O'Dell
City of Forest Grove Light and Power
Journeyman Lineman Estimator



A place where families and businesses thrive.

July 5, 2022

John DeJong
Tech. Engineering
P.O. Box 80483
Portland, OR 97280

RE: Proposed Ritchey Ridge Subdivision – Certification of the Availability of Sufficient Services

John,

This letter is in regards to available public facilities to serve the proposed Ridge Subdivision, Map and Tax Lot Identification as follows: Map 1S401, Tax Lots 800, 1000, 2800, 2900, located in Forest Grove, Washington County, Oregon. In accordance with City of Forest Grove Development Code section 17.6.105(D), there appear to be public facilities to serve the proposed Ritchey Ridge Subdivision, though some of the facilities will require extension and/or improvements. The following is the City's assessment of the available public facilities to the site.

Sanitary Sewer Service

There is existing 8-inch sanitary sewer lines extended to the east side of Tax Lot 1000 located in public right-of-way at 19th Place and 19th Avenue which may be extended to serve portions of the development. There is also a 10-inch line stubbed to the southeast corner of Tax Lot 1000 that can be used to serve the development. Applicant must verify the capacity and size of the new lines needed to serve the Ritchey Ridge Subdivision and all future sanitary sewer flows from buildout of uphill and adjacent properties. The sanitary sewer system shall also be sized to include the sanitary sewer flows from existing properties currently being served by septic systems along Ritchey Road/Pacific Avenue that at some point may need to connect to the sanitary sewer lines in Ritchey Ridge Subdivision. Applicant needs to show on the development plans all the future extension locations and the required right-of-way to ensure all adjacent uphill parcels to be served by the public systems.

Water Service

There are 8-inch water lines available at the east line of Tax Lot 1000 in public right of way at 19th Place and 19th Avenue that can be extended through the development. There is also an 8-inch waterline available along the Ritchey Road/Pacific Avenue frontage of Tax Lot 1000. To ensure adequate looping of City water system these connections should be extended (if necessary) and connected into the proposed development. Also, applicant needs to show on the development plans all the future extension locations and the required right-of-way to ensure all adjacent uphill parcels to be served and looped by the public systems. Applicant shall verify that there is sufficient system pressure for the development.

Storm Sewer Services

There is currently no storm sewer available to serve these parcels. Developer will need to install storm sewer piping within the development and discharge to the Gales Creek drainage way. There is a 15-foot easement along the east lines of Tax Lots 3000 and 3100, Map 1S401 Washington County, Oregon that may be utilized for this purpose.

Applicant needs to show on the development plans all the future extension locations and the required right-of-way to ensure all adjacent uphill parcels to be served by the public systems.

Street Access

19th Place and 19th Avenue to the east of the development can provide legal access to the property. Ritchey Road/Pacific Avenue can provide legal access to the development but is under the jurisdiction of Washington County and will require their approval.

For the above reasons, the proposed project is certified for the purposes of submitting a development application with the City of Forest Grove.

Thank you and please contact me if you have any questions.

Sincerely,

CITY OF FOREST GROVE



Richard Blackmun
Engineering Division and Project Manager

CC: City Community Development Department (email)
Greg Robertson, City Engineer/Public Works Director (email)

Enclosures: (0)

Exhibit C

EXHIBIT C – DEVELOPMENT CODE STANDARDS AND SPECIFICATIONS

GENERAL

1. The applicant is bound to the project description and all representations made by the applicant during the application and decision-making proceeding.
2. The applicant must comply with all applicable City and CWS building and development standards, including all dimensional standards and public works specifications (DC §17.8.000 and §17.8.005).
3. Preliminary plan approval – including all phases - is valid for 4 years and may not be extended. Within the 4-year time period, the applicant must submit a final development plan for the entire site (DC §17.4.220.D).
4. PDs being developed in phases require a description of each phase, including the size, uses, timing and infrastructure phasing. Any PD which will require more than 24 months to complete shall be constructed in phases. Each phase shall conform to the phasing plan. (DC §17.4.220.B.5).
5. Tentative subdivision plat approval shall be valid for a period of two years from the effective approval date. If the applicant has not submitted a final subdivision plat within two years (with appropriate assurances for improvements, if applicable), the approval shall expire. Upon satisfactory completion, a Mylar copy of the recorded plat shall be provided to the Community Development Department (DC §17.6.115).
6. For all trees proposed to be preserved, the applicant shall submit a protection plan consistent with the provisions of DC §17.5.120. Protected trees shall be identified on landscape plans. (DC §17.5.130.C.3).
7. A landscaping plan for common open areas, the perimeter of the PD, and other landscaped areas is required.
 - a. The plan must show areas that the applicant proposes to retain in natural vegetation. The plan must show the areas, sizes, numbers and types of plant and other materials to be used for all landscaped areas.
 - b. The plan must address the revegetation of common open areas and perimeter areas disturbed during construction.
 - c. The plan must include a proposed schedule for required perimeter landscaping. A performance guarantee is required if the landscaping cannot be completed prior to the occupancy of buildings, or cannot be completed when required by the conditions of approval (DC §17.4.225.C.5 and DC §17.6.105.C.2.d).
8. For development sites having slopes of 10% or more, the following requirements shall be met. To ensure compliance with the provisions of this Code, prior to the issuance of a building permit for the construction of any new building (as defined by DC §17.12.210.B.8) within the city, and prior to any grading, excavation or filling or other site modification within areas having a slope of 10% or greater, there shall be submitted to the Community Development Department for review and approval, or approval with modifications:
 - a. A site plan (showing any grading, excavating or filling) drawn to scale of the entire property developed and of the proposed construction; and
 - b. The submission of a geological assessment and geotechnical report prepared and stamped by a Certified Engineering Geologist who is a registered geologist certified in the specialty of Engineering Geology under provisions of O.R.S. 672.505 to 672.705 and a Geotechnical Engineer under provisions of O.R.S. 672.002 to 672.325. The

assessment and report shall address the entire site and meet the following requirements:

- i. The geological and engineering assessment shall include information and data regarding the nature, distribution of underlying geology, and the physical and chemical properties of existing soils; an opinion as to stability of the site, and conclusions regarding the effect of geo-logic conditions on the proposed development.
- ii. The geotechnical report shall include a comprehensive description of the site topography and geology; an opinion as to the adequacy of the proposed development from an engineering standpoint; and opinion as to the extent that instability on adjacent properties may adversely affect the project; a description of the field investigation and findings; conclusions regarding the effect of geologic conditions on the proposed development; and specific requirements for plan modification, corrective grading and special techniques and systems to facilitate a safe and stable development. The report shall provide other recommendations as necessary, commensurate with the project grading and development.
- iii. Address the requirements of DC §17.8.310.B. (DC §17.8.310.A.2)

RESIDENTIAL DEVELOPMENT

9. The Single-Family and Duplex Development Review Standards of DC §17.8.710.F shall apply to all homes constructed in this project.
10. In residential PDs, a variety of architectural styles shall be required. For all PDs, a compendium of architectural elevations, details and colors of each building type shall be submitted. The pattern book shall act as the architectural control for the homeowner's association or the commercial owner. The pattern book shall include the following:
 - a. An explanation of how the pattern book is organized, and how it is to be used.
 - b. Definitions of specific standards for architecture, color, texture, materials and other design elements.
 - c. A checklist system to facilitate review of the development for conformity with the pattern book.
 - d. Information for each building type including:
 - i. Massing, facades, elevations, roof forms, proportions, materials and color palette.
 - ii. Doors, windows and siding, including sash and trim details.
 - iii. Porches, chimneys, light fixtures and any other unique details, ornamentation or accents.
 - iv. Illustrations of elevations and floor plans.
 - v. A fencing plan with details that addresses the relationship between public and private space, and between the PD site and abutting property. (DC §17.4.215.G)
11. Minimum setback requirements shall be:
 - a. Front: 14 feet to living area or porch; and 20 feet to the garage.

- b. Rear: 15 feet.
- c. Interior Lot Side: 5 feet.
- d. Corner Lot Side: 11 feet. No building projections (roofs or foundations) are permitted in the front yard public utility easement required by DC §17.8.905.E.1.

STREETS & SIDEWALKS

- 12. Sidewalks shall be constructed, replaced or repaired to city design standards as set forth in the standard specifications manual and located as follows:
 - a. On both sides of arterial and collector streets to be built at the time of street construction;
 - b. On both sides of all other streets and in pedestrian easements and rights-of-way, except as provided further in this section, to be constructed along all portions of the property designated for pedestrian ways in conjunction with development of the property. (DC §17.8.620.A)
- 13. Off-street pedestrian ways shall be connected to the street network and used to provide pedestrian and bicycle access in situations where a street is not feasible. In cases where a street connection is feasible, off-street pedestrian ways shall not be permitted in lieu of a traditional street with sidewalks (DC §17.8.905.D).
- 14. When block lengths exceed 500 feet, a pedestrian way of not less than ten feet in width shall be dedicated to provide pedestrian access thorough the block, or to provide access to schools, parks, designated open areas or other public areas. Such pedestrian ways shall be improved with hard surface material with an appropriate base to a minimum width of five feet prior to issuance of any building permit for construction within the subdivision (DC §17.8.905.D).
- 15. Sidewalks and/or pedestrian ways shall be designed according to city standards or specifications on file at the city (DC §17.8.905.D).
- 16. If a cul-de-sac is more than 300 feet long, a lighted direct pathway to an adjacent street may be required to be provided and dedicated to the city (DC §17.8.610.K).
- 17. Where a development abuts or is traversed by an existing or proposed arterial or major collector street, the development design shall provide adequate protection for residential properties and shall separate residential access and through traffic, or if separation is not feasible, the design shall minimize the traffic conflicts. The design shall include any of the following:
 - a. A parallel access street along the arterial or major collector;
 - b. Lots of suitable depth abutting the arterial or major collector to provide adequate buffering with frontage along another street;
 - c. Screen planting at the rear or side property line to be contained in a non-access reservation along the arterial or major collector; or
 - d. Other treatment suitable to meet the objectives of this subsection;
 - e. If a lot has access to two streets with different classifications, primary access should be from the lower classification street. (DC §17.8.610.Q).

UTILITIES & EASEMENTS

18. All service facilities must be placed underground except those that by their nature must be on or above ground, such as fire hydrants and open watercourses. The applicant is responsible for making the necessary arrangements with utility companies and other appropriate entities when installing all service facilities (DC §17.4.215.P and §17.8.645.A. Under-ground Utilities).
19. Through lots and parcels are prohibited, except where they are necessary to provide separation of development from arterial streets or adjacent incompatible activities or developments. In such cases, the Director may require that evergreen screening, a masonry wall, a landscaped earth berm and/or a non-access easement be provided along the line of lots or parcels abutting such an arterial street or other incompatible uses (DC §17.8.905.F.3).
20. Direct access to arterial streets from a residential dwelling established after the effective date of the Development Code is prohibited (DC §17.8.120.A).
21. The approval authority may approve an access easement established by deed without full compliance with Title XVII: Development Code provided such an easement is the only reasonable method by which a lot large enough to develop can be created:
 - a. Access easements shall be provided and maintained in accordance with the Uniform Fire Code; and
 - b. Access shall be in accordance with §17.8.100 et seq. (DC §17.8.610.C)
22. Easements for sewers, drainage, water mains, electric lines or other public utilities shall be either dedicated or provided for in the deed restrictions, and where a development traversed by a watercourse, or drainage way, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of the watercourse (DC §17.8.615.A).
23. A property owner proposing a development shall make arrangements with the city, the applicable district and each utility franchise for the provision and dedication of utility easements necessary to provide full services to the development. The city's standard width for public main line utility easements shall be 15 feet unless otherwise specified by the utility company, applicable district, or City Engineer (DC §17.8.615.B).
24. Easements of ten feet in width shall be provided along the front lines of all lots or parcels for public utilities and sidewalks. Larger easements may be required where necessary. The city or other appropriate public agency shall be empowered to enter upon such easement for construction or maintenance of public utilities, and to remove, if necessary, any fence, tree, shrubbery or other obstruction, which may have been located within the easement (DC §17.8.905.E.1).
25. Where a land division contains a watercourse or area serving for the accumulation or retention of surface water, easements shall be provided for such watercourses or retention area to ensure that no building or structure shall be erected therein (DC §17.8.905.E.2).

COVENANTS, CONDITIONS, and RESTRICTIONS (CC&Rs)

26. The CC&Rs shall not violate any city ordinance requirements unless modified by city approval of the project and shall include at a minimum:
 - a. Where applicable, summary of any hazard analysis performed as part of the project approval pursuant to DC §17.8.300 et seq. and any recommendations or requirements from that analysis to obtain a building permit;

- b. Provisions to adequately maintain any common area including but not necessarily limited to identification of the party responsible for maintaining the area and sufficient annual funding to conduct necessary maintenance;
 - c. Any other provisions required by conditions of approval; and
 - d. A section that states those provisions in the CC&Rs required by the city can't be changed or deleted without approval by the Community Development Director (DC §17.8.1000).
27. The city shall require legal assurances for the continued maintenance of private streets, such as a recorded maintenance agreement (DC §17.8.610.T).

Exhibit D

EXHIBIT D – FIRE DEPARTMENT STANDARDS AND SPECIFICATIONS

1. Building addresses shall be identified with digits at least 4 inches tall that contrast with their background (FGC §150.098).
2. Fire hydrants shall be installed as per City requirements and shall be equipped with two, 2 ½-inch ports and on 4-inch Storz fitting with a cap on the steamer port. Locations shall be identified with blue reflective pavement markers at the street centerline (FGC §153.07). Location of the fire hydrants is subject to the review and approval of the Fire Department.
3. Developments of one- and two-family dwellings, where the number of dwelling units exceeds 30, shall be provided with separate and approved fire apparatus access roads and shall meet the requirements of Oregon Fire Code Section D104.3. Exception: Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2, or 903.3.1.3 of the International Fire Code, access from two directions shall not be required. (OFC D107)

Exhibit E

1. A CAD file of the site Plan, which shows all wet utilities, and placement of street lights, is required to start an electrical design.
2. A 10-foot public utility easement is required along all exterior property lines. Additional utility easements may be necessary depending on the final electrical design.
3. The developer shall provide a photometric plan utilizing FGL&P-approved lights and poles for the placement of street lights within the subdivision.
4. The developer will provide and install all vaults, street light bases, conduits & secondary pedestals/junction boxes. (See responsibility list for details)
5. The developer will be responsible for any costs related to changes to the existing electrical infrastructure along Pacific Avenue or Ritchey Road caused by road improvements or additional infrastructure necessary to provide power to the Ritchey Ridge Subdivision.
6. A surcharge for material costs will be added to the per lot charge of \$2050 and will be determined after receiving material quotes based on the completed electrical design. All materials must be prepaid before ordering.
7. FGL&P is experiencing extremely long lead times on transformers and other necessary electrical equipment; contact Jason O'Dell to discuss how this might impact the project.
8. The below paragraph or similar wording shall be added to the CC&R's to ensure clearance from any electric meter.

Electric Meters. To ensure public safety and public utility access to each Owner's electric meter, no Owner of any Lot that is receiving metered electric service from a public utility may construct, install, or allow any obstruction to the electric meter that is both (a) in front of the rear plane of the electric meter (the plane of the wall or surface on which the meter is mounted), and (b) within three feet of any portion of the electric meter. Notwithstanding any conflicting provision in these CC&Rs, the covenant in this Section A.11 shall run with the land bind and inure to the benefit of the Declarant, the Owners, and their successors, heirs, and assigns.

Signature: Jason O'Dell

Department: L&P

Date Returned to CD: 01/05/23

Total # of hours for review 1.5

Subdivision Responsibilities

Provided by Contractor –

- 1). All Vaults, Vault Lids, St. Light Bases.
- 2). All Conduits.
- 3). All Flush-mount Secondary Junction Boxes & Above-Grade Secondary Pedestals.
- 4). All 36", 90 Degree, PVC sweeps from pedestals for individual services
- 5). 8ft. Ground Rods for each vault, pedestal & junction box location.
- 6). Red Tracer Wire for all Stubbed-Out conduit runs.
- 7). #4 Solid Soft Drawn Copper for grounds at each vault location.

Installed by Contractor –

- 1). All Vaults & Vault Lids (Centered on property line, front of vault 1.5 ft. behind property pin)
 - A). Install ground rod at each vault location with 12' – 15' hand coil of #4 bare copper installed with duct through knock-out before grouting vaults.
 - B). Vaults to be free of debris and grouted around conduits prior to final inspection.
 - C). Vaults to have a 6" minimum base consisting of ¾" minus crushed rock.
 - D). Vaults to be installed where top of lids are approx. 1" above grade of landscaping.
- 2). All Conduit Runs (Must be installed within Public-Utility-Easement or Right-of-Way)
 - A). Primary or (Primary & Secondary) runs installed at 48" minimum (42" to top of duct). All bends to be Fiberglass or Rigid Galvanized Steel.
 - B). Secondary only runs installed at 36" minimum.
 - C). All duct runs to have pull string (150lb Polyline minimum)
 - D). Stubbed out ducts to have red tracer wire installed within duct attached to Red Fink-Site. (Fink-Sites provided by FGL&P)
- 3). All Secondary Pedestals & Junction Boxes.
 - A). To be centered on property line and pedestals installed with 6" - 8" of cover above bottom lip. Flush-mount junction boxes to be installed flush with final grade of sidewalk or road. (If installed in landscaped area flush-mount junction box should be installed no more than 1" above finished grade of landscaping)
 - B). Install 90 degree, 36", Sch. 40 PVC sweeps w/ 5ft. of Sch. 40 PVC duct for each house service from pedestal toward garage side of lot.

C). Install ground rod at each pedestal location.

D). Conduits to be cut off 3" above the bottom of flush-mount junction boxes.

Provided by Forest Grove Light & Power

- 1). All Transformers & Sectionalizing Cabinets
- 2). Street Light Poles & Fixtures
- 3). All Primary & Secondary Conductors
- 4). All Red Fink-Sites for stubbed out conduits

Installed by Forest Grove Light & Power

- 1). All Transformers & Sectionalizing Cabinets
- 2). All Primary & Secondary Conductors
- 3). All Light Poles & Fixtures
- 4). Attachment point for any conduit riser at pole.

Important Note:

-Light and Power will plumb all conduits into energized vaults.

-Light & Power to inspect all conduit runs before back-filling.

Contact Jason O'Dell @ (503) 992-3294 for conduit inspections

Exhibit F

City of Forest Grove Engineering Conditions of Approval – General (Kingwood Commons)

Applicant/representative shall sign below and return to City Engineering. Applicant/representative has read the conditional approval form and understands the conditions of approval outlined to this project. Not meeting these conditions may result in withdrawal of engineering approval to project.

GENERAL

1. All plans submitted to date are considered preliminary only. Upon completion of land use application approval, detailed construction plans and specifications must be submitted to engineering that demonstrate compliance with standards and regulations adopted by the City of Forest Grove and/or all other agencies that have jurisdiction including Clean Water Services, Washington County, Oregon Department of Transportation, and the conditions of approval as passed by the City Planning Commission for Land Use Approval. Contact engineering for questions on detail construction plan check process and the required number of construction plan sets/specification required for the detailed review.
2. All detailed construction plans submitted shall be stamped by an Oregon registered professional engineer.
3. All information related to vertical and horizontal location including in documents containing legal description, Draft Development Plan, Final Development Plan, Final Plat, Right-of-Way Deed, or Easement, and Record Drawings must be on the City of Forest Grove current City Datum. Narrative of City Datum including Bench Mark information is available through City Engineering Department.
4. Prior to issuance of Building Permit, Applicant will enter into an agreement with the City of Forest Grove for the construction of public facilities. City will prepare Agreement Allowing Developer to Construct Public facilities. The Agreement document shall be fully executed by City and Developer prior to start of construction.
5. Public improvements shall be in place and accepted by the City Engineer prior to issuance of building permits for new lots of record.
6. Final Development Plans and Specifications containing design for construction of public facilities shall receive approvals (as applicable) from City of Forest Grove, Clean Water Services, and other affected jurisdictional agencies. Developer is responsible for all submittals, approvals and permit acquisitions, unless advised otherwise by the City. Permits, if required, shall be secured by developer or authorized representative prior to start of construction (e.g. both on-site and off-site construction).
7. It is the responsibility of the Applicant to ensure that the project contractor is aware of, and abides by, all conditions of approval. Prior approval from engineering must be received before any changes are constituted in site design, grading, building design, building colors or materials, etc.
8. Applicant shall, at applicant's expense, and under City's direction, provide for traffic control,

- during construction, so as to minimize the impact on residents surrounding or adjacent to the Project. Applicant agrees that, during any construction within or as a part of the overall Project, all existing roadways as of the date of approval of this project, at all times, remain passable to a minimum of two lanes of traffic, one in each direction, or an acceptable detour approved by City. Applicant further agrees that if, at any time, City shall determine that there are not sufficient acceptable traffic lanes or acceptable detours which are passable, that all construction by applicant shall immediately cease upon written demand therefore, by City.
9. Applicant shall replace, or have replaced, or repair or have repaired, as the case may be, all existing infrastructure which have been destroyed or damaged, and applicant shall replace or have replaced, repair, or have repaired, as the case may be, or pay to the owner, the entire cost of replacement by reason of any work done hereunder, whether such property be owned by the City or any agency thereof, by any private, or by any person whomsoever, or by any combination of such owners. Any such repair or replacement shall be to the satisfaction and subject to the approval of the City Engineer.
 10. Prior to commencement of project work the project Applicant shall provide proposed trucking routes for all equipment and material deliveries as may be required by the City Engineer. The City shall, at Applicant expense, video the routes to establish preconstruction conditions. Damage to any public improvements, on or off site caused by construction operations, during construction on the subject property shall be repaired to the satisfaction of the City Engineer at full expense to the Applicant. This shall include slurry seal, overlay, or street reconstruction if deemed warranted by the City Engineer.
 11. Project Applicant shall obtain, at Project Applicants sole expense, any and all easements or real property which may be required for the development of the Project, and which may be necessary and required in order for Project Applicant to comply with these Conditions of Approval, and the applicable ordinances and resolutions of the City.
 12. All engineering design, including, but not limited to, storm sewers and appurtenances, sanitary sewers and appurtenances, streets including, but not limited to, geometrics, sight distances, lighting and sound walls, water systems and appurtenances, signing and striping, landscaping and appurtenances, shall be supported by applicable engineering studies/calculations, as required by the City Engineer.
 13. Project applicant shall design/install all improvements and perform all work required for this project in accordance with established City Standards or as approved by the City Engineer and Public Works. Plans for all improvements, including, but not limited to, storm drainage, water and sewer main sizes, either on-site or off-site, shall be in accordance with City Specifications and shall be approved by the City Engineer.
 14. The Project Applicant shall be responsible for all work performed by any and all contractors and subcontractors.

15. Detailed plans reflecting the design and construction of all public infrastructure improvements for street, sewer, water, fiber optics and storm drain, both on- and off-site, shall be as directed by the City Engineer. Developer shall have written approval from the City Engineer for any variations from the City's master plans or standards prior to any final approval.
16. The applicant, in order to reduce the tracking of mud throughout the City, shall design/install standard construction entrances, and shall be responsible for cleaning up (or any expenses incurred by the City for cleaning up) mud, debris, etc. from City streets that is attributed to his project during construction.
17. As-built work in the public right of way are to be submitted to the engineering department on CD ROM or DVD computer disk in a format approved by engineering. Digitized information shall be submitted before requesting a final inspection and should reflect as-built status and information as approved by engineering. CAD drawings shall be georeferenced (refer to the City's electronic submittal requirements).
18. Public facilities serving the proposed development, including but not limited to, sanitary sewers, water, streets, storm sewers, electrical power facilities, parks, public safety and schools shall be adequate and meet current City standards; or it is guaranteed that inadequate or nonexistent public facilities will be upgraded or constructed by the applicant prior to occupancy of the project.
19. Except as provided otherwise, in the City's conditions of approval or special specifications for construction of public improvements, the Design and Construction Standards for Sanitary Sewer and Surface Water Management by Clean Water Services shall apply in all matters concerning sanitary sewers and the management of storm and surface water runoff.
20. The recommendations of the traffic study, geotechnical report, and drainage report shall be incorporated into the detailed construction plans and specification review.
21. Unless approved otherwise applicant shall extend utilities and roadways through the project to site boundaries for purposes of future development.
22. Identify in plans and profile, any potential vertical conflict points between utilities. Show provisions necessary to accommodate any such questionable or otherwise close conditions.

DEDICATIONS

23. The Applicant shall provide all necessary easements for streets, alleys, sewer, and water

facilities, irrigation, fiber optics, district facilities, and other facilities as may be required by the City. Utility easements shall be at a minimum a clear fifteen feet (15') for one utility and a clear twenty feet (20') for two or more utilities. Easements shall not be split between property lines or as otherwise determined by the City Engineer. The easement widths identified are minimums and in certain circumstances, additional easement widths may be required as determined by the City Engineer.

GRADING/DRAINAGE

24. It is the responsibility of the Applicant to meet all Clean Water Service Standard. City engineering will coordinate and submit a set of completed detailed construction plans (completed City engineering review process) for Clean Water Services review.
25. Regarding drainage, the applicant must identify if the project will impact existing surrounding uses including but not limited to agricultural uses. The applicant shall submit a drainage plan showing enough detail to address the mitigation of impacts on these existing surrounding uses or to conclusively show that there will be no impacts to the satisfaction of the City Engineer. The mitigation of these impacts is the financial responsibility of the Applicant until the City formally accepts the mitigation. Additionally, the Applicant shall bear the financial responsibility of, and shall dedicate to the City, runoff control easements, as needed.
26. The applicant must identify issues where the finished grade of the property is higher or lower than the abutting property or adjacent lots, and a suitable solution acceptable to City Engineering shall be required. Solutions including retaining walls shall be shown on grading plans. Retaining walls shall be structurally engineered if over four (4) feet in height, including surcharge, and will require a separate building permit. Applicant shall ensure proper setback requirement on these measures for mitigating grade differences, including building code requirement of two foot setback from toe of slopes.
27. A geotechnical report shall be prepared and submitted by a geotechnical engineer who will be retained by the Applicant to observe, test, and certify that all recommendations outlined in the Report are fulfilled during construction. The reports shall be less than one year old. The reports shall include information on the nature, distribution, physical, and engineering properties of the soils onsite and/or soils to be used as fill, and include recommendations on grading procedures.
28. Prepare and submit hydrology/hydraulic calculations for sizing of all proposed drainage devices. The analysis shall also determine if changes in the post-development versus pre-development conditions have occurred. The analysis shall be stamped and signed by an Oregon Civil Engineer and prepared per area standard, including Clean Water Services requirements. Local regulations requires certain new development and redevelopment projects/activities to incorporate post construction Best Management Practices (BMPs) into the grading/drainage plans to control pollutants. Please refer to the Clean Water Service guidelines for specific comments and requirements.
29. The applicant shall take every step necessary to contain all dirt, construction materials, and

construction run-off on site. No grading or construction-related debris, either directly or indirectly carried by water, will be permitted to leave the construction site.

30. All grading projects require an Erosion Control Plan as part of the grading plans. Grading permits will not be issued until an Erosion Control Plan is approved. Please refer to Clean Water Services requirements.
31. The project shall incorporate site design measures for reducing water quality impacts of the project, in compliance with Clean Water Services requirements. Where feasible, parking lots and other impervious areas shall be designed to drain stormwater runoff to, private water quality facilities, vegetated drainage swales, filter strips, and/or other treatment devices that can be integrated into required landscaping areas and traffic islands prior to discharge into storm drain systems. The use of permeable paving for parking and driveway surfaces is encouraged, to reduce runoff from the site. Such paving should meet fire department requirements and be structurally appropriate for the location. Such water quality mitigations should plan to meet manufacture required maintenance provision.
32. All new private water quality facilities will be required to sign a Private Water Quality Facility Maintenance Agreement and provide information for City master storm water connection report prior to receiving building permit.
33. Project applicant shall, at Project Applicant expense, shall prepare and submit a Dust Emission Control Plan for Project Grading. The Plan shall require that contractor work specifications shall include provisions for adequate water to be applied during construction in order to control dust disturbance resulting from grading operations. The Plan and related contractor work specifications shall be reviewed and approved by the
34. Prior to City issuance of a grading permit, dust control measures shall be applied in accordance with all ordinances, rules and regulations of the City, including regarding use of water for compaction or dust control purposes.
35. The Applicant shall submit a grading plan to the City Engineer for approval which reflects the recommendations of a final Geologic and Geotechnical study, including construction procedures and/or design criteria. Construction plans submitted to the City Engineering shall conform to the City Engineering Design Standards and include specifications necessary to minimize potential impacts resulting from soil conditions on the project site. The City Engineer or his representative shall verify in the field that all conditions have been satisfied.
36. The project plans shall include erosion control measures to prevent soil, dirt and debris from entering the storm drain system, in accordance with Clean Water Service standards. Drainage from parking lots and private streets to the public right-of-way will be filtered through a City approved systems. The system shall be located on the development property and maintained by the property owner.
37. Pre-development flow from adjacent properties onto the project site shall be maintained or accounted for in the final design.

38. The on-site drainage system must be properly designed to maximize infiltration of roof and/or surface runoff into the underlying soil before discharging into public storm drain, street or alley. Also, the storm drainage from project site can not become a nuisance to surrounding property.
39. Storm pipe video inspection shall be provided to the Engineering Division prior to final approval.

RIGHT OF WAY IMPROVEMENTS

40. Any existing damage or damage incurred during construction to the approaches, curb, gutter and/or sidewalk shall be repaired and/or replaced to the approval of the City Engineer.
41. A State or County permit shall be secured prior to the construction of improvements on State or County Facilities.
42. All street improvements shall conform with the requirements of the Americans with Disabilities Act, including the placement of sidewalk at the rear of the driveway at all driveway locations and adjacent to the back of curb at all non-driveway locations.
43. All proposed streets shall be fully improved in conformance with the City standards to the width required by the City. The Project shall install normal and necessary public improvements along the property street frontages to the satisfaction of the City Engineer.
44. These improvements may include, but are not necessarily limited to, grading, curb and gutter, sidewalk, paving, make-up paving and wheel chair ramps, along with construction of all standard utilities necessary including water facilities, sanitary sewer, and storm drainage systems, street lighting, underground utilities, traffic control devices, landscaping, and automatic irrigation systems. All approved driveway locations shall be constructed to City standards.
45. Public sidewalk location shall be shown on the approved plans. Sidewalks (parallel with public streets) shall be located near property/R.O.W. line unless approved otherwise by the City Engineer. Unless designated otherwise on the approved plans, sidewalks shall be installed concurrent with development of lot(s) of record. Wheel chair ramps at street intersections will be installed as part of the right of way improvements.

TRAFFIC & LIGHTING

46. Arrange for relocation of all utilities, poles, signals, street lights, etc.
47. Developer shall provide and install the following : (1) all signing including, but not limited to, street names, speed, warning, no parking, vehicular and pedestrian traffic protection and direction, for public rights-of-way and easements; and (2) pavement striping, marking and reflective pavement markers. All such signing, striping and marking shall be shown on the approved plans.

48. All signing shall conform to the City Sign Ordinance in regards to size, design, and location. All signs shall be reviewed, approved, and a sign permit obtained prior to installation.
49. Prior to acceptance of improvements by the City, the developer shall perform roadway surface improvements, such as slurry seal or overlay as required by the City Engineer, and shall install any additional traffic signs, striping and pavement markings determined necessary by the City's Traffic Engineer, after inspection of the final physical improvement, to insure safe operation of all intersections and segments of streets before any building can be occupied.
50. Establishment of new pedestrian crossings at uncontrolled intersections or at mid-block locations on roadways under control of the City shall be based upon an engineering study by applicant, and reviewed and approved by the City Engineer according to evaluation process set by Washington County.

STORM AND SANITARY SEWER IMPROVEMENTS

51. Sewer pipe video inspection shall be provided to the Engineering Division prior to final approval.
52. Regarding septic systems, the applicant must identify if the project will impact existing surrounding systems. The applicant shall submit a plan showing enough detail to address the mitigation of impacts on these existing surrounding uses or to conclusively show that there will be no impacts to the satisfaction of the City Engineer. The mitigation of these impacts is the financial responsibility of the Applicant until the City formally accepts the mitigation. Additionally, the Applicant shall bear the financial responsibility of, and shall dedicate to the City, runoff control easements, as needed. County standards on setbacks to existing system shall be followed.
53. Public Storm Drain and Sewer pipe materials shall be in accordance with the latest Clean Water Services design and construction standards.
54. Location of sewer and storm mains shall follow City standards or approved otherwise by the City Engineer.
55. Submit Drainage Report. Include (therein) data relevant to treatment and detention of storm and surface water runoff.

EXCAVATION, PAVING, and GRADING

56. Paving shall be per City Standards.
57. Limits of Paving Restoration shall be determined by the City Engineer or Public Works Inspector.
58. All site grading and public improvement work shall conform with the City of Forest Grove Municipal Code, development Conditions of Approval, City of Forest Grove Standard

Specifications, Uniform Building Code Appendix Chapter 33-Excavation and Grading, and, if applicable, the Agreement Allowing Developer to Construct Public Improvements.

WATER

59. Water facilities must comply with plumbing cross-connection control standards as required by City Ordinance and State law for the protection of water supplies. Information on acceptable back-flow assemblies is available from the City Water Division.
60. The size and location of all water meters shall be determined by the Engineer/Architect or authorized representative. All water meters will be furnished and installed by the Water Division at the expense of the Applicant.
61. All public water system components must be constructed within public right-of-way or public easements.
62. All water connections to the City Water Distribution system shall be shown on the construction plan submittal review. This includes irrigation water meters for general open areas in a development project. Water irrigation meters and related impact fees will be paid before the Civil/Grading plans are approved and will be based on the City current meter fee schedules.
63. Municipal Code requires that water systems shall be designed to flow a minimum 2000 gpm (medium density) with 20 psi residual pressure at all new fire hydrants. New public water mains shall be sized 8-inch minimum dia. and be D.I.P. unless approved otherwise by the City Engineer.
64. Standard location for public water mains is on the West and/or South side of the public street R.O.W. and additionally, West and/or South of public storm drains unless approved otherwise by the City Engineer.
65. Public Fire Hydrant spacing and location shall conform to City Code and as otherwise required by the City Fire Marshal.
66. All new Fire Hydrants shall conform to current City Standards. City Standards require that all hydrants be equipped with a 4-inch Storz fitting. Where possible, each hydrant location shall be identified with installation of blue reflective pavement marker, adjacent to hydrant, near centerline of street or as determined otherwise by the City Fire Marshal. Hydrants situated outside of public street R.O.W. shall be clearly marked and protected from damage as deemed necessary by the City Fire Marshall.
67. Size of the new water meter service shall be shown on the plans and shall be installed by the Applicant at his/her expense per City Standard Specifications.
68. Domestic and fire backflow-prevention devices, designed to protect the public water supply, shall be approved by the City Engineer in addition to the City Building & Plumbing Official.

69. Water used in conjunction with construction of the project shall be obtained only from pre-approved sources. A permit to take City water for this purpose shall be secured by applicant or representative prior to start of construction activity.

SPECIAL CONDITIONS:

- All required permits shall be secured by developer prior to start of construction (e.g. both on-site and off-site construction permits)
- Required public facilities shall be in place and accepted by the City Engineer prior to developer's receipt of final building approvals and/or certificate of occupancy for development.

If you've any questions about any of the above items, please contact me at nkelsay@forestgrove-or.gov or (503) 992-3230.

Project Engineer:

Nick Kelsay

Applicant: Print Name: _____

Signature _____ Date _____

Exhibit G



WASHINGTON COUNTY OREGON

June 7, 2023

To: Daniel Riordan - Senior Planner

From: Naomi Vogel - Associate Planner

RE: Ritchey Ridge Subdivision PUD

City File Number: 311-22-000027-PLNG

County File Number: CP23-904

Tax Map and Lot Number: 1S40100 – 800/1000/2800/2900

Location: Pacific Avenue / SW Ritchey Road

Washington County Department of Land Use and Transportation has reviewed the above noted development application for a 65-lot subdivision/PUD for mixed housing units and a new public street that will access Pacific Avenue, a County-maintained Collector. Access to all lots and tracts will be from the new public street and existing city streets constructed as part of Gales Creek Subdivision.

The applicant has proposed a public street approximately 94 feet from the private access that serves Tax Lot 02100 (Tax Map 1N43600). The proposed street connection to Pacific Avenue does not meet County access standards because the proposed use is not permitted direct access to a Collector and the public street does not meet 100 feet of spacing from other accesses. Pursuant to the County Road Design & Construction standards, an access that does not meet the access standards shall submit a Design Exception as outlined in Section 220 of the Road Standards. The applicant will be required to obtain a Design Exception approval from the County Engineer as part of the plan review for the public improvements on Pacific Avenue. City staff is supportive of the location and design of the proposed public street connection noted as Option 1 of the submitted plans.

**Department of Land Use & Transportation
Operations and Maintenance**

1400 SW Walnut Street, MS 51, Hillsboro, OR 97123-5625
phone: 503-846-7623 • fax: 503-846-7620

www.co.washington.or.us/lut • lutops@co.washington.or.us

CONDITIONS OF APPROVAL

I. PRIOR TO ISSUANCE OF A SITE DEVELOPMENT – GRADING PERMIT BY THE CITY OF FOREST GROVE:

A. Obtain a Washington County Facility Permit for the following public improvements on SW Ritchey Road and Pacific Avenue.

1. Submit to Washington County Public Assurance Staff: A completed "Design Option" form (original copy), City's Notice of Decision (NOD) and County's Letter dated June 7, 2023.
2. **\$20,000.00** Administration Deposit.

NOTE: The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and permit processing.

The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is running low, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.

3. Electronic submittal of engineering plans, geotech/pavement report, engineer's estimate and the "Engineer's Checklist" (Appendix 'E' of County Road Standards) for construction of the following public improvements:

Note: Improvements within the ROW may be required to be relocated or modified to permit the construction of public improvements. All public improvements and modifications shall meet current County and ADA standards. Public improvements that do not meet County standards shall submit a design exception to the County Engineer for approval.

- a. Construction of a half-street improvement to County Collector standard (3 lanes) per the direction of the County engineer along the site's frontage of Pacific Avenue and SW Ritchey Road. The half-street shall include collector pavement width, bike lane, curb/gutter, 5-foot sidewalk, 6-foot planter strip with street trees and conduit per County standards. Note: Existing public/private improvements will be required to be relocated to allow for the half-street improvement.
- b. Installation of continuous street lighting along the site's frontage of SW Ritchey Road and Pacific Avenue to County standards.

- c. Closure of all existing driveways/access on SW Ritchey Road and Pacific Avenue.
- d. Construction of a public street connection to Pacific Avenue. Location of the public street shall be per County Engineer approval (pending review of a Design Exception).
- e. Construction access and traffic circulation plan (if proposed on County-maintained streets).
- f. Construction of an emergency access on Pacific Avenue per County/Fire District requirements.
- g. Preliminary Sight Distance Certification for the site's new public street on Pacific Avenue.

II. PRIOR TO APPROVAL OF THE SUBDIVISION PLAT BY THE CITY OF FOREST GROVE AND WASHINGTON COUNTY:

- A. The following shall be noted on the plat and recorded with Washington County Survey Division (Survey Division 503.846.8723):
 - 1. Provision of a non-access restriction along the site's frontage of SW Ritchey Road and Pacific Avenue.
 - 2. Dedication of right-of-way to meet 37 feet from the centerline of SW Ritchey Road and Pacific Avenue and adequate corner radius at the intersection with the new public street/Pacific Avenue.
 - 3. Dedication of an 8 foot PUE along the site's frontage of SW Ritchey Road and Pacific Avenue.

III. PRIOR TO OCCUPANCY BY THE CITY OF BEAVERTON:

- A. The road improvements required in condition **I.A.3.** above shall be completed and accepted by Washington County, including Final Sight Distance Certification for the intersection of Pacific Avenue/public street.

If you have any questions, please contact me at 503-846-7639.

Cc: Road Engineering Services

Ritchey Ridge Subdivision - PUD
City Casefile: 311-22-000027-PLNG
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Traffic Engineering Services
Assurances Section
Transportation File