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Holce Trailhead Improvements

Conditional Use Permit / Type II Design Review

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Project Type: Trailhead Improvements

Project Location:

Knott St.

Vernonia, OR

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Land Development Services



Table of Contents

Project Summary.....	3
History.....	3
Project Narrative.....	3
Applicable Review Criteria	3
Section 500: Primary Forest Zone (PF-80).....	3
Section 1170: Riparian Corridors, Wetlands, Water Quality, Fish & Wildlife Habitat Protection Overlay Zone (RP)..	8
Section 1300: Signs (SIGNS)	9
Section 1400: Off-Street Parking and Loading (OP)	11
Section 1450: Transportation Impact Analysis.....	14
Section 1500: Discretionary Permits.....	15
Section 1550: Site Design Review	16
List of Exhibits	18



Project Summary

History

The Crown-Zellerbach (Crown-Z) Trail is a historic logging trail through rural areas of Columbia County that connects to the Banks-Vernonia State Trail in Vernonia. Opened to the public in 2014, it is now a partially paved, partially gravel linear trail for use by walkers, hikers, horseback riders and cyclists.

The existing Holce Trailhead is located just east of the Vernonia City limits, at the furthest west end of the 23-mile Crown-Z Trail. It is accessible via East Knott Street. It is within a 160' x 85' public easement located at the northern edge of a 106-acre parcel of privately owned forestry land. The parcel falls within Columbia County's Primary Forest Zone (PF-80). The trailhead area is a relatively flat site without any major vegetation, and falls outside the 50-foot riparian buffer for nearby Knickerson Creek. Adjacent uses include forestry (Columbia County), residential (City of Vernonia), and light industrial (City of Vernonia).

Project Narrative

Holce Trailhead currently consists of an informal, partially graveled parking area at the eastern end of East Knott Street. The proposed improvements will provide trail users with amenities for comfort and safety and will contribute to the trailhead's appeal as a day-use area from which to embark on recreational and tourist activities in the local community. No development is proposed within the 50-foot riparian buffer around Knickerson Creek, and no artificial lighting is proposed for the site.

Proposed improvements for the 13,600 square-foot easement area include:

- Approximately 7,800 SF of paved area with 15 standard parking spaces and 1 ADA parking space
- 16' x 16' picnic shelter with fixed picnic table and benches
- 9' x 6' vault toilet
- Existing bollards and gate
- Trailhead and historical information signage
- 5 bicycle parking spaces
- Bicycle repair station
- Three fixed benches
- Three vegetated stormwater swales
- Landscaping along perimeter including native trees and shrubs

Applicable Review Criteria

Section 500: Primary Forest Zone (PF-80)

[...]

Section 505: Conditional Uses

The following conditional uses may be allowed subject to the general review standards and process in Sections 1503 and 1603 of the Zoning Ordinance. All authorized uses and permanent structures shall also meet the applicable standards listed in Sections 506, 507, and 508 of the Zoning Ordinance and all other local, state, and federal laws pertaining to these uses.

[...]



14. Public Parks including only those uses specified under OAR 660-034-0035 or OAR 660-034-0040, whichever is applicable, and subject to provisions in Sections 508 through 510, 1503 and 1550.

[...]

Response: Per item (14) above, the project's proposed uses of picnic shelter and trail staging area are allowed as conditional uses in the PF-80 zone as specified by OAR 660-034-0040(2)(b) and (c), excerpted below:

OAR 660-034-0035

(1) All uses allowed under Statewide Planning Goal 3 are allowed on agricultural land within a state park, and all uses allowed under Statewide Planning Goal 4 are allowed on forest land within a state park, provided such uses are also allowed under OAR chapter 736, division 18 and all other applicable laws, goals and rules. Local governments may allow state parks and park uses as provided in OAR chapter 660, division 33, and ORS 215.213 or 215.283 on agricultural lands, regardless of whether such uses are provided for in a state park master plan.

(2) The park uses listed in subsection (a) through (i) of this section are allowed in a state park subject to the requirements of this division, OAR chapter 736, division 18, and other applicable laws. Although some of the uses listed in these subsections are generally not allowed on agricultural lands or forest lands without exceptions to Statewide Planning Goals 3 or 4, a local government is not required to adopt such exceptions in order to allow these uses on agricultural or forest land within a state park provided the uses, alone or in combination, meet all other applicable requirements of statewide goals and are authorized in a state park master plan adopted by OPRD, including a state park master plan adopted by OPRD prior to July 15, 1998:

[...]

(b) Day use areas: picnic shelters, barbecue areas, swimming areas (not swimming pools), open play fields, play structures;

(c) Recreational trails: walking, hiking, biking, horse, or motorized off-road vehicle trails; trail staging areas;

[...]

Section 508: General Review Standards

The Planning Director or hearings body shall determine that a use authorized by Sections 504 and 505 meets all of the following requirements:

1. The proposed use will not force significant change in, or significantly increase the cost of, accepted farming or forest practices on agriculture or forest lands;

Response: The proposed use is located at the periphery of a resource area and allows for continued vehicle access to the privately-owned forest property from E. Knott Street. Thus, the project will not significantly affect the practices or cost of activities on forest lands.

2. The proposed use will not significantly increase fire hazard or significantly increase fire suppression costs or significantly increase risks to fire suppression personnel;

Response: The proposed improvement will comply with relevant fire siting standards (as described in the response to Section 510, below) and will not significantly increase fire hazard or fire suppression costs, thus meeting this criterion. Through a review of the site plan, as well as a site visit, Vernonia Rural Fire Protection District personnel have verified the project meets fire department access and water supply requirements (see **Exhibit E - Fire District Letter**).



3. A waiver of remonstrance shall be recorded with the County Clerk certifying that the owner will not remonstrate against or begin legal action or suit proceeding to cause or persuade the owner or operator of any farm or forest lands to modify the conduct of legal and accepted farm or forest operations; and

Response: Per discussion with County planning staff, in lieu of a waiver of remonstrance the proposed trail signage will include a notice to trail users that Holce Trailhead and the Crown-Z Trail are within a forestry resource area and that trail users should be aware that logging related activities may be occurring in the area (see **Sheet D-3 – Signage Details**). The final wording for signage will be approved by the County prior to posting to ensure it meets the intention of this criterion.

4. The proposed use is consistent with requirements contained in the Comprehensive Plan or implementing ordinances, including, but not limited to, regulations which apply to flood hazard areas, development within the Willamette River Greenway, development in forested areas or development in significant resource areas, such as riparian, wetlands or slide-prone areas.

Response: The proposed use is not within a flood hazard area, the Willamette River Greenway, or any riparian or wetlands areas (see **Exhibit C – Wetlands Determination Report**). It is small in size, located at the periphery of a forested area, and abutting the City of Vernonia urban growth boundary. Thus, it will not limit or impede use of designated resources areas for forestry, as indicated by the Comprehensive Plan and implementing ordinances. The use as a day use area and recreational trail is consistent with the Comprehensive Plan policies and implementing ordinances for forested areas.

Section 509: Standards of Development

1. The minimum average lot or parcel width and minimum average lot or parcel depth shall be 100 feet for all activities except farming or forestry.

Response: The proposed improvements will not modify the dimensions of the parcel on which they will be located, which has a primary use of forestry. Thus, this criterion is not applicable.

2. Access to parcels in this zone shall meet Fire Safety Design Standards for Roads in the County Road Standards and access standards found in Section 510 of the Zoning Ordinance.

Response: Based on review of the site plan and a site visit, Vernonia Rural Fire Protection District personnel concluded that the proposed project meets fire department access and water supply requirements (see **Exhibit E – Fire District Letter**).

3. There shall be no height limitation for forest operation and management-related structures unless otherwise permitted in the Primary Forest Zone. The maximum building height for all non-farm, non-forest structures shall be 50 feet or 2 ½ stories, whichever is less.

Response: Please see **Sheet A-1 – Picnic Shelter** and **Sheet A-2 – Vault Toilet**. The proposed picnic shelter has a height of 13.5 feet and the vault toilet is 9 feet tall. These are both below the maximum building height of 50 feet for all non-farm, non-forest structures. Thus, this requirement is met.

4. The standards and requirements described in Section 1300 of the Zoning Ordinance shall apply to all signs and name plates in the Primary Forest Zone.

Response: Please see **Sheet D-3 – Signage Details**. All signs and name plates will comply with the standards and requirements described in Section 1300.

5. The Oregon Department of Fish & Wildlife shall be notified and provided with the opportunity to comment on any development within major and peripheral Big Game Habitat.



Response: The proposed improvements are not within major or peripheral Big Game Habitat, according to the Upper Nehalem Valley CPAC Wildlife Game Habitat map provided by Columbia County, dated 6/26/95 (see **Exhibit F – Big Game Habitat Map & ODFW Comments**). However, at the request of the City of Vernonia, ODFW has been invited to comment on this project and ODFW has stated that they see no issues or impacts with the proposed site.

6. Setbacks:

A. There shall be a minimum setback of 50' for front, side, and rear yards for all development in the Primary Forest Zone.

Response: See **Sheet G-1 – Cover Sheet – Enlarged Plot Plan**. The proposed picnic shelter will be set back approximately 50 feet from the front property line, 1,710 feet from the rear property line, 733 feet from the western property line, and 1,732 feet from the eastern property line. The proposed vault toilet will be setback approximately 63 feet from the front property line, 1,715 feet from the rear property line, 345 feet from the western property line, and 1,633 feet from the eastern property line. All setbacks exceed the minimum of 50 feet.

B. When this Ordinance or any other ordinance requires a greater or lesser setback than is required by this subsection, the greater setback shall apply.

Response: No other ordinance specifies a different setback standard.

C. All structures are subject to any special setbacks when adjacent to arterial or collector streets designated in the County Transportation Systems Plan.

Response: Knott Street is classified as a Collector in the City of Vernonia TSP (2011). The City's code does not specify any special setbacks for this street classification.

D. No structure or use shall be established in a manner likely to cause contamination of a stream, lake or other body of water. Riparian and natural hazard setbacks set forth in Sections 1170 and 1180 of the Zoning Ordinance shall apply.

Response: Please see **Exhibit C – Wetlands Determination Report**. No structure or use will occur within a riparian or natural hazard setback.

E. When land divisions create parcels of less than 40 acres for uses listed in Subsection 511.2A., provided those uses have been approved pursuant to this Ordinance, required building setbacks for these parcels will be determined on a case-by-case basis by the Director or the hearings body.

Response: No land divisions are proposed. This criterion is not applicable.

F. The owner shall provide and maintain primary fuel-free fire break and secondary fire break areas on land surrounding the dwelling and primary fuel-free break areas surrounding accessory structures in the Primary Forest Zone pursuant to the provisions in Subsections 510.2 and .3.

Response: Please see **Sheet L-1 – Landscaping Plan**. The owner (Columbia County) will provide and maintain a primary fuel-free fire break in the area surrounding the proposed picnic shelter and vaulted toilet per Subsections 510.2 and .3, as described below. A secondary fuel-free fire break is not required as there is no dwelling proposed.

[...]

Section 510: Fire Siting Standards for Dwellings, Structures and Roads

The following fire siting standards or their equivalent shall apply to new dwellings in this zone:

1. If a water supply is available, suitable and acceptable for fire protection by the fire protection district, such as a swimming pool, pond, stream, or lake, then road access to within 15 feet of the water's edge shall be provided for pumping units. The road access to the dwelling and access to the on-site water supply shall accommodate the



turnaround of firefighting equipment during the fire season. The applicant shall provide verification from the Water Resources Department that any permits or registrations required for water diversion or storage have been obtained or that permits or registrations are not required for the use. Permanent signs shall be posted along the access route to indicate the location of the emergency water source.

Response: See **Exhibit E – Fire District Letter**. After reviewing the proposed site plan and conducting a site inspection, the Vernonia Rural Fire Protection District concluded that this project meets the fire department access and water supply requirements referenced in the Oregon Fire Code.

2. The owner of the dwelling shall establish and maintain a primary fuel-free fire break surrounding the dwelling and accessory structure(s) no less than 30 feet wide in accordance with the provisions in "Protecting Your Home From Wildfire" published by the National Fire Protection Association. The owner may be required to increase the primary fuel-free fire break if the dwelling or structure is located on a 10% or greater slope. The primary fuel-free fire break could include a lawn, low ornamental shrubbery less than 24" in height and/or individual or groups of trees separated by a distance equal to the diameter of the crowns adjacent to each other, or 15 feet, whichever is greater. All existing tree limbs shall be pruned from the base to at least eight feet in height. Dead fuels shall also be removed.

Response: Please see **Sheet L-1 – Landscaping Plan**. The owner (Columbia County) will establish and maintain a primary fuel-free fire break of at least 30 feet surrounding the picnic shelter and the vault toilet structure, in accordance with the provisions described above. Vegetation in this area will consist of low ornamental shrubbery less than 24" in height and individual trees separated by the distance equal to the diameter of the crowns adjacent to each other. Existing tree limbs will be pruned from the base to at least eight feet in height, and dead fuels will be removed.

3. A secondary fire break of 100 feet outside the primary fuel-free fire break, or its equivalent allowed by Columbia County Board Order No. 239-97 Firebreak Equivalents, shall also be provided and maintained for the dwelling in accordance with the provisions in "Protecting Your Home from Wildfire" published by the National Fire Protection Association. All existing trees shall be pruned from the base to at least 8 feet in height. Dead fuels shall be removed from the secondary fire break area. If the placement of the proposed dwelling cannot meet the secondary fire break due to physical constraints of the land or parcel size, the applicant may apply to obtain a secondary fire break easement from a neighbor or build the structure to a Class 1 or 2 Ignition Resistance Construction as allowed by Board Order No. 239-97, Firebreak Equivalents.

Response: No secondary fire break is required as no dwelling is proposed.

4. All roads in this zone, except private roads and bridges for commercial forest uses, shall be constructed so as to provide adequate access for firefighting equipment according to the standards provided by the local rural fire protection district, the County Road Department, or the State Department of Forestry.

Response: See **Exhibit E – Fire District Letter**. No new roads are proposed. After reviewing the proposed site plan and doing an on-site inspection, the Vernonia Rural Fire Protection District concluded that the project meets the fire department access and water supply requirements referenced in the Oregon Fire Code.

5. No portion of a tree or any other vegetation shall extend to within 15 feet of the outlet of a stove pipe or chimney.

Response: No stoves or chimney are proposed.

6. A dwelling shall meet all of the following requirements:

- A. The dwelling shall have a fire-retardant roof;**
- B. The dwelling shall not be sited on a slope of greater than 40 percent;**
- C. If the dwelling has a chimney or chimneys, each chimney shall have a spark arrester; and**
- D. The dwelling shall be located upon a parcel within a fire protection district unless the applicant meets the criteria of subsection 510.7.**



Response: As there are no dwellings proposed these requirements are not applicable.

7. If the dwelling is not within a fire protection district, the applicant shall provide written documentation to the County of residential fire protection. The applicant shall provide evidence that the applicant has asked to be included within the nearest such district. If the County determines that inclusion within a fire protection district or contracting for residential fire protection is impracticable, the County and fire protection district may provide an alternative means for protecting the dwelling from fire hazards which may include a fire sprinkling system, onsite equipment and water storage or other methods that are reasonable given the site conditions.

Response: The proposed improvements are within the Vernonia Rural Fire Protection District. Thus, this criterion is not applicable.

[...]

Section 1170: Riparian Corridors, Wetlands, Water Quality, Fish & Wildlife Habitat Protection Overlay Zone (RP)

[Amended by Ordinance No. 2003 - 5, effective December 15, 2003].

[Amended by Ordinance No. 2023-4, effective October 12, 2023]

[...]

Section 1172: Riparian Corridor Standards

A. The inventory of Columbia County streams contained in the Oregon Department of Fish and Wildlife Fish Habitat Distribution Data (published January 13, 2023), specifies which streams and lakes are fish-bearing. Fish-bearing lakes are identified on the map entitled, "Lakes of Columbia County." A copy of the most current Stream Classification Maps is attached to the Comprehensive Plan, Technical Appendix Part XVI, Article X(B) for reference. The map, "Lakes of Columbia County" is attached to the Comprehensive Plan, Technical Appendix Part XVI, Article X(B), and is incorporated therein. Based upon the stream and lake inventories, the following riparian corridor boundaries shall be established:

- 1. Lakes. Along all fish-bearing lakes, the riparian corridor boundary shall be 50-feet from the top-of-bank, except as provided in CCZO Section 1172(A)(5), below.*
- 2. Fish-Bearing Streams, Rivers and Sloughs (Less than 1,000 cfs). Along all fish-bearing streams, rivers, and sloughs with an average annual stream flow of less than 1,000 cubic feet per second (cfs), the riparian corridor boundary shall be 50-feet from the top-of-bank. Average annual stream flow information shall be provided by the Oregon Water Resources Department.*
- 3. Fish-Bearing and Non-Fish-Bearing Streams, Rivers and Sloughs (Greater than 1,000 cfs). Along all streams, rivers, and sloughs with an average annual stream flow greater than 1,000 cubic feet per second (cfs), the riparian corridor boundary shall be 75-feet upland from the top-of-bank. Average annual stream flow information shall be provided by the Oregon Water Resources Department.*

Response: See **Exhibit C – Wetlands Determination Report**. The only riparian area in the vicinity of the project site is Knickerson Creek, which is a fish-bearing stream (less than 1,000 cfs), according to ODFW distribution data. As per item (2) above, the riparian corridor boundary around Knickerson Creek extends 50 feet from the top-of-bank.

B. Distance Measurement.

- 1. The measurement of distance to the riparian corridor boundary shall be from the top-of-bank. In areas where the top-of-bank is not clearly delineated, the riparian corridor boundary shall be measured from the ordinary high-water level, or the line of non-aquatic vegetation, whichever is most landward.*



2. The measurement shall be a slope distance. In areas where the predominant terrain consists of steep cliffs, the distances to the corridor boundary shall be measured as a horizontal distance until the top of the cliff is reached, and as a slope distance on from that point

Response: See **Exhibit C – Wetlands Determination Report** and **Exhibit D – Knickerson Creek Centerline Map**. The southwest corner of the easement (i.e. project area) is 60 feet (slope distance, measured from top-of-bank) away from Knickerson Creek at its nearest point.

Section 1173: Activities Prohibited within the Riparian Corridor Boundary

In addition to the prohibitions in the underlying zone, the following activities are prohibited within a riparian corridor boundary, except as provided for in Sub-sections 1175 and 1176 of this Section:

A. The alteration of a riparian corridor by grading, placement of fill material, and/or impervious surfaces, including paved or gravel parking areas, or paths, and/or the construction of buildings or other structures which require a building permit under the Oregon State Building Code, as amended.

B. The removal of riparian trees or vegetation.

Response: See **Exhibit C – Wetlands Determination Report**. There are no development activities, grading or removal of vegetation proposed within the riparian corridor boundary. The riparian corridor will be protected from adjacent grading activities by appropriate slope stabilization, sediment fencing, and other erosion control measures as appropriate.

Section 1175: Permitted Uses and Activities Subject to Optional Discretionary Review

Notwithstanding the prohibitions set forth in Subsection 1173 above, the following activities are allowed within the riparian corridor boundary if approved by the planning director through an optional discretionary review process:

A. The following riparian vegetation may be removed within the riparian corridor boundary:

[...]

B. The following development may be allowed within the riparian corridor boundary.

[...]

C. Wetland fill and removal within riparian corridors shall be avoided unless there is no reasonable alternative to allow the permitted use. DSL shall be notified of any potential impact from development proposed on wetlands identified in the State Wetlands Inventory pursuant to ORS 215.418.

Response: See **Exhibit C – Wetlands Determination Report**. There are no development activities proposed within the riparian corridor boundary. Thus, these criteria are not applicable.

[...]

Section 1300: Signs (SIGNS)

[...]

Section 1302: General Provisions [Amended by Ordinance 2002-02, eff. 6/12/02]

1. Design Review: In addition to complying with the standards in this Section, the design and color of commercial and industrial signs and supporting structures of signs 100 square feet or larger in size shall be compatible with the architectural design and color of existing and proposed buildings on the site as determined during site design review according to the provisions of Section 1550 of this Ordinance.



2. Setbacks:

A. All signs shall be situated in a manner so as not to adversely affect safety, corner vision, or other similar conditions and shall not overhang or encroach upon public rights of way.

Response: Please see **Sheet C-2 – Proposed Site Plan**. All signage will be situated in a manner that does not adversely affect safety, corner vision, or other similar conditions, and will not overhang or encroach upon public rights of way.

B. Unless otherwise specified, all signs in residential zoning districts shall observe the yard setback requirements of the zoning district in which they are located.

Response: The site is not situated within a residential zone. This criterion is not applicable.

C. No setbacks from property lines shall be required for signs in non-residential zoning districts except that in all zoning districts, setbacks shall be required at corners as may be necessary to provide adequate corner vision or in cases where a sign is placed adjacent to a street, as provided is 1302.2(D), below.

Response: The site is not situated at a corner. This criterion is not applicable.

D. Setbacks shall be required which comply with setback requirements of the abutting residential zoning district when a sign is placed on a parcel abutting a street (except Highway 30), which separates a non-residential parcel from a residential parcel or when a sign is placed on a property line separating a non-residential parcel from a residential parcel.

Response: The site is abutting a street (Knott St.) separating it from a City of Vernonia zoned residential parcel (Zone R). However, there are no setback requirements for signage in the “R” zone per Vernonia’s *Title 9: Land Use and Development Code*. Thus, this criterion is not applicable.

3. Visual Obstructions: No sign shall be situated in a manner which results in the complete visual obstruction of an existing sign.

Response: There are no existing signs that would be visually obstructed by any new proposed signage. Thus, this criterion is not applicable.

4. Illuminated Signs: Artificially illuminated signs, or lights used to indirectly illuminate signs, shall be placed, shielded, or deflected so as not to shine into residential dwelling units or structures. The light intensity of an illuminated sign shall not exceed the following standards:

[...]

Response: Please see **Sheet D-3 – Signage Details**. The proposed signage will not be illuminated. Thus, these criteria do not apply.

5. Non-conforming Signs: Signs and sign structures not conforming to the requirements of this ordinance shall be subject to the provisions of Section 1506, Non-Conforming Uses, except that:

[...]

Response: This project does not include any non-conforming signs. These criteria are not applicable.

6. Sign Clearance: A minimum of 8 feet above sidewalks and 15 feet above driveways shall be provided under free-standing signs.

Response: Please see **Sheet C-2 - Proposed Site Plan**. The proposed signage will not be within any areas above sidewalks or driveways. Thus, this criterion is not applicable.

[...]



Section 1311: Signs for Essential Services and Public Facilities

The following signs shall be permitted in all districts:

- 1. City limits signs and public notice signs.*
- 2. Police, fire, school, and hospital directional signs.*
- 3. Park directional signs.*
- 4. Traffic and safety signs.*
- 5. Transit-related (bus) signs.*

[Amd. Ordinance 2017-2 eff. 10.10.17]

Response: Please see **Sheet D-3 – Signage Details**. The proposed signage consists of directional and public notice signs for public facilities and thus are allowed under all zoning.

[...]

Section 1314: Calculating Sign Area [Amended by Ordinance 2002-02, eff. 6/12/02]

The structure supporting or appearing to support a freestanding sign shall not be included in the area of the sign, unless such structural element is typically used to carry signage. In calculating the square footage of a sign, the width shall be measured at the widest part of the sign, including any cut-outs, and the length shall be measured at the longest part of the sign, including any cut-outs. The maximum square footage limitation of the sign shall be calculated such that no cutouts or other Copy shall be permitted outside of the size limitation.

Response: Please see **Sheet D-3 – Signage Details**. No cutouts or other copy are proposed outside of the size limitation. This criterion is met.

Section 1315: Copy Area [Amended by Ordinance 2002-02, eff. 6/12/02]

Copy is allowed only on the face of the sign. Copy is prohibited in the ledger area of the sign, on the post of the sign, or other structure of the sign, except to the extent that the sign owner's logo or other disclosure is required by law to be placed on the ledger, post or other structure of the sign. For purposes of this Section, "copy" is defined as any text or image.

Response: Please see **Sheet D-3 – Signage Details**. Copy will only be printed on the face of the sign. This criterion is met.

Section 1400: Off-Street Parking and Loading (OP)

[...]

Section 1410: Size

- 1. The standard size of a parking space shall be 9 feet by 18 feet.*
- 2. Handicapped parking spaces shall be 12 feet by 18 feet.*
- 3. Parallel parking, the length of the parking space shall be increased to 22 feet*

Response: Please see **Sheet C-2 – Proposed Site Plan**. 15 of the proposed parking spaces will be 9 feet wide by 18 feet long. The remaining space will meet ODOT standards for accessible spaces with a width of 9 feet and length of 18 feet, and an adjacent aisle with a width of 8 feet and length of 18 feet. Although this differs from the Columbia County code, the ODOT dimensions are utilized as directed by the County's building official.



Section 1411: Aisles

Aisles shall not be less than:

- 1. 25'0" in width for 90-degree parking;*
- 2. 20'0" in width for 60-degree parking;*
- 3. 20'0" in width for 45-degree parking; and*
- 4. 12'0" in width for parallel parking.*

Response: Please see **Sheet C-2 – Proposed Site Plan**. The configuration of the parking area does not include aisles, but the open circulation area is approximately 34 feet across, thus exceeding the aisle width requirement of 25 feet.

Section 1412: Access

There shall be no more than one 45-foot-wide curb cut driveway per 150 feet of street frontage, or fraction thereof, permitted per site.

Response: There is one 24-foot-wide curb cut driveway proposed for the site. The nearest existing curb cut driveway on the same street frontage is over 1,700 feet away. Thus, this criterion is met.

Section 1413: Surfacing and Marking

1. The surfacing of each parking area shall meet minimum County standards to handle the weight of the vehicles which will use the parking area. All areas used for parking and maneuvering of vehicles shall be marked in accordance with the approved plan and such marking shall be continuously maintained. Handicapped parking spaces shall be marked with a wheelchair symbol.

Response: Please see **Sheet C-2 – Proposed Site Plan** and **Sheet D-2 – Civil Details**. The parking area will be surfaced with asphalt meeting minimum County standards. The vehicle parking and maneuvering area will be marked in accordance the parking plan and will be continuously maintained. The accessible parking space will be marked with a wheelchair symbol. Thus, the above criterion is met.

2. The parking and loading areas for commercial, industrial, or apartment uses Shall be paved with concrete, asphaltic concrete, or another comparable surface.

Response: There is no commercial, industrial or apartment use proposed. This criterion is not applicable.

Section 1414: Drainage and Lighting

Adequate drainage shall be provided to dispose of the run-off generated by the impervious surface area to the parking area. The drainage system shall function so it will not adversely affect adjoining property. Artificial lighting shall be provided in such a manner as to ensure the safety of the parking area without interfering with adjoining properties or creating traffic hazards on adjoining streets.

Response: Please see **Sheet C-4 – Grading and Drainage** and **Sheet D-2 – Stormwater Swale Cross Section**. The site will be graded to direct impervious area runoff into vegetated swales. This will prevent adverse effects of stormwater to adjoining areas. No artificial lighting is proposed. These criteria are met.

Section 1415: Parking Areas

1. All parking areas of less than 20 parking spaces shall have one handicapped parking space. Parking areas with more than 20 spaces shall provide one handicapped parking space for every 50 standard parking spaces.



Response: Please see **Sheet C-2 – Proposed Site Plan**. The parking area has less than 20 parking spaces and will include one accessible parking space. Thus, this criterion is met.

2. All parking areas shall be divided into bays of not more than 20 parking spaces. Between, and at the end of each parking bay, there shall be planters which have a minimum width of 5 feet and be at least 17 feet in length. Each planter shall contain one major structural tree and ground cover which has been deemed appropriate by the Director. Truck loading areas need not comply with the preceding requirements.

Response: Please see **Sheet C-2 – Proposed Site Plan**. All parking bays are below the maximum of 20 spaces and have planted areas at their ends.

3. Parking areas shall be separated from the exterior wall of a structure, exclusive of paved pedestrian entranceways, by a 5-foot strip of landscaping.

Response: Please see **Sheet C-2 – Proposed Site Plan**. Both proposed structures are separated from parking areas by at least 5 feet.

[...]

6. Parking areas shall be set back from a lot or parcel line adjoining a street. The setback area shall be landscaped.

Response: Please see **Sheet C-2 – Proposed Site Plan** and **Sheet L-1 – Landscaping Plan**. All parking areas are set back at least 5 feet from the front lot line, which is adjoining East Knott St. The setback areas will be landscaped.

7. All parking area setbacks shall be landscaped with major trees, shrubs, and ground cover as approved by the Director.

Response: Please see **Sheet L-1 – Landscaping Plan**. All parking area setbacks will be landscaped with trees, shrubs and ground cover.

8. A minimum of 10 percent of the parking area shall be landscaped and maintenance of the landscaping shall be the owner's responsibility.

Response: Please see **Sheet L-1 – Landscaping Plan**. A minimum of 1,360 SF of landscaping is required to meet the 10% minimum required for the 13,600 SF lot. The proposed landscaping totals 4,215 SF (31%), meeting this requirement.

9. Internal pedestrian connections shall be provided in parking lots with greater than ten (10) parking spaces. These connections shall be a minimum of five (5) feet wide and distinguished from vehicular areas through changes in elevation or contrasting paving materials (such as light-color concrete inlay between asphalt). Paint or thermo-plastic striping and similar types of non-permanent applications may be approved for crossings of parking lot areas that do not exceed 24 feet in crossing length.

Response: The striped access aisle for the ADA parking space also serves as a pedestrian access connection to the vault toilet.

[...]

Section 1419: Minimum Required Bicycle Parking Spaces

1. All Public and Semi-Public buildings and uses, Retail uses, Apartment Dwelling uses and Commercial Recreation uses where required new vehicle parking areas exceed 10 motor vehicle spaces must include a designated area for bicycle parking within 50 feet of a public entrance.

2. The following are the required number of bicycle parking spaces:

[...]

B. Parking Lots. All public and commercial parking lots and parking structures shall provide a minimum of one (1) bicycle parking space for every 10 motor vehicle parking spaces.



[...]

Response: Please see **Sheet C-2 – Proposed Site Plan**. There are 5 proposed bicycle parking spaces. With a total of 16 vehicle parking spaces, the minimum required number is 2. Thus, this requirement is met.

Section 1450: Transportation Impact Analysis

Section 1450: Transportation Impact Analysis (TIA)

Transportation Impact Analysis: A Transportation Impact Analysis (TIA) must be submitted with a land use application if the proposal is expected to involve one or more of the conditions in 1450.1 (below) in order to minimize impacts on and protect transportation facilities, consistent with Section 660-012-0045(2)(b) and (e) of the State Transportation Planning Rule.

- 1. Applicability – A TIA shall be required to be submitted to the County with a land use application if the proposal is expected to involve one (1) or more of the following:*
 - A. Changes in land use designation, or zoning designation that will generate more vehicle trip ends.*
 - B. Projected increase in trip generation of 25 or more trips during either the AM or PM peak hour, or more than 400 daily trips.*
 - C. Potential impacts to intersection operations.*
 - D. Potential impacts to residential areas or local roadways, including any non- residential development that will generate traffic through a residential zone.*
 - E. Potential impacts to pedestrian and bicycle routes, including, but not limited to school routes and multimodal roadway improvements identified in the TSP.*
 - F. The location of an existing or proposed access driveway does not meet minimum spacing or sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, thereby creating a safety hazard.*
 - G. A change in internal traffic patterns may cause safety concerns.*
 - H. A TIA is required by ODOT pursuant with OAR 734-051.*
 - I. Projected increase of five trips by vehicles exceeding 26,000-pound gross vehicle weight (13 tons) per day, or an increase in use of adjacent roadways by vehicles exceeding 26,000-pound gross vehicle weight (13 tons) by 10 percent.*

Response: Please see **Exhibit G – Transportation Impact Study**. A Transportation Impact Study (TIS) prepared by Lancaster Mobley found that the proposed project would generate less than 25 peak hour trips, and less than 400 daily trips. The TIS did not find that the proposed project would involve any of the above criteria and found that a Traffic Impact Analysis (TIA) would not be required.

Per the City of Vernonia's additional comments, as noted in the TIS, a sight distance evaluation performed for the nearest intersection to the site, between East Knott Street and Nehalem Highway (OR 47) indicates that the vision clearance does not meet the county standard of 500 feet, but it does meet the minimum required stopping distance per AASHTO requirements for a 45 MPH roadway. Minimal improvements to sight distance could be achieved through tree trimming along Highway 47 but much more drastic measures need to be taken to improve visibility further. However, this location has had no accidents based on crash data analysis.

The City has noted that the traffic analysis does not take into account the Church and all the other traffic generated by all the sources that exist along Knott Street. However, that requirement is far beyond the scope of what is required by a



Transportation Impact Analysis for an individual project. It is only a measure of how an individual project will increase or change traffic demand. What the City is requesting would be an onerous burden to put upon individual applicants. A large-scale traffic study of this nature would normally be reserved for municipalities as part of their long-term traffic master plans or other capital improvement projects.

Furthermore, as the TIS notes, the trailhead is already existing, with no issues, albeit unapproved. The TIS was generated based on worst case values, based on parking count, since the Institute of Transportation Engineers "Trip Generation Manual" does not have figures for hiking trailheads. This number has also been further reduced by the change in parking count due to the smaller site size to accommodate the City's other requests.

[...]

Section 1500: Discretionary Permits

[...]

Section 1503: Conditional Uses

[...]

5. Granting a Permit: The Commission may grant a Conditional Use Permit after conducting a public hearing, provided the applicant provides evidence substantiating that all the requirements of this ordinance relative to the proposed use are satisfied and demonstrates the proposed use also satisfies the following criteria:

A. The use is listed as a Conditional Use in the zone which is currently applied to the site;

Response: Conditional uses in the PF-80 zone include picnic shelters and trail staging areas, as specified by OAR 660-034-0035.

B. The use meets the specific criteria established in the underlying zone;

Response: The proposed use meets the specific criteria for the PF-80 zone, including general standards for development, setback requirements, and fire siting standards.

C. The characteristics of the site are suitable for the proposed use considering size, shape, location, topography, existence of improvements, and natural features;

Response: The site is already used as trail staging area with informal parking. The site is relatively small and flat, adjacent to the Crown-Z trail, and outside of any riparian corridor buffers.

D. The site and proposed development is timely, considering the adequacy of transportation systems, public facilities, and services existing or planned for the area affected by the use;

Response: This project is an improvement to an existing public facility. The extent and timing of any future improvement to the East Knott Street right-of-way will be addressed through coordination between the City of Vernonia and Columbia County. Otherwise, additional infrastructure will not be required to serve this site.

E. The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs, or precludes the use of surrounding properties for the primary uses listed in the underlying district;

Response: The proposed use is an improvement of the existing use and thus will not substantially alter the character of the surrounding area. Considering the site's location at the periphery of a forested area and adjacent to the City of Vernonia Urban Growth Boundary, site improvements will not impair or preclude the continued use of surrounding property for forestry or other primary uses listed in the PF-80 zone.

F. The proposal satisfies the goals and policies of the Comprehensive Plan which apply to the proposed use;



Response: Part IV.(1)(I) of the Columbia County Comprehensive Plan states that it shall be County Policy to conserve forest lands for forest uses, including compatible recreational activities. The project proposal is for improvements to facilitate pedestrian and cyclist use of the Crown-Z Trail, a recreational use that is managed in such a way as to be compatible with forest uses in the PF-80 zone.

G. The proposal will not create any hazardous conditions.

Response: The proposed project will comply with fire siting standards and has been deemed to have adequate water and access by the Vernonia Rural Fire Protection District (see **Exhibit E – Fire District Letter**). There will be no visual obstructions in rights of way or visual clearance areas. Wayfinding signage and compliance with circulation standards will provide for safe vehicle traffic and pedestrian protection. Thus, the proposed project will not create any hazardous conditions.

6. Design Review: The Commission may require the Conditional Use be subject to a site design review by the Design Review Board or Planning Commission.

Section 1550: Site Design Review

[Amended by Ordinance 98-9, eff. 11/25/98; amended by Ordinance No. 2003 - 5, effective December 15, 2003].

The Site Design Review process shall apply to all new development, redevelopment, expansion, or improvement of all community, governmental, institutional, commercial, industrial and multi-family residential (4 or more units) uses in the County.

Section 1551: Types of Site Design Review

Types of Site Design Review:

A. Type 1: Projects, developments and building expansions which meet any of the following criteria:

- 1. are less than 5,000 sq. ft., and are less than 10% of the square footage of an existing structure.*
- 2. Increase the number of dwelling units in a multi-family project.*
- 3. Increase the height of an existing building.*

B. Type 2: Projects, developments and building expansions which meet any of the following criteria:

- 1. have an area of 5,000 sq. ft. or more, or are 10% or more of the square footage of an existing structure.*
- 2. Change the category of use (e.g., commercial to industrial, etc.).*
- 3. New off-site advertising signs or billboards.*
- 4. Any project meeting any of the Type 2 criteria shall be deemed a Type 2 Design Review application*

Response: The proposed development area is 16,000 SF, meeting the criterion B(1) above for projects with an area of 5,000 sq. ft. or more requiring a Type 2 Site Design Review.

[...]

Section 1562: Landscaping, Buffering, Screening and Fencing

A. General Provisions:

- 1. Existing plant materials on a site shall be protected to prevent erosion. Existing trees and shrubs may be used to meet landscaping requirements if no cutting or filling takes place within the dripline of the trees or shrubs.*



2. All wooded areas, significant clumps or groves of trees, and specimen conifers, oaks or other large deciduous trees, shall be preserved or replaced by new plantings of similar size or character.

Response: Please see **Sheet C-1 – Existing Conditions Plan**. A few small fir trees will be impacted by the new site, particularly considering the relocation out of the ROW. These three trees are being replaced by other trees as part of the required landscaping.

B. Buffering Requirements:

- 1. Buffering and/or screening are required to reduce the impacts on adjacent uses which are of a different type. When different uses are separated by a right of way, buffering, but not screening, may be required.**
- 2. A buffer consists of an area within a required setback adjacent to a property line, having a width of up to 10 feet, except where the Planning Commission requires a greater width, and a length equal to the length of the property line adjacent to the abutting use or uses.**
- 3. Buffer areas shall be limited to utilities, screening, pedestrian and bicycle paths, and landscaping. No buildings, roads, or parking areas shall be allowed in a buffer area.**
- 4. The minimum improvements within a buffer area shall include:**
 - a. One row of trees, or groupings of trees equivalent to one row of trees. At the time of planting, these trees shall not be less than 10 feet high for deciduous trees and 5 feet high for evergreen trees, measured from the ground to the top of the tree after planting. Spacing of trees at maturity shall be sufficient to provide a year-round buffer.**
 - b. In addition, at least one 5-gallon shrub shall be planted for each 100 square feet of required buffer area.**
 - c. The remaining area shall be planted in grass or ground cover, or spread with bark mulch or other appropriate ground cover (e.g. round rock). Pedestrian and bicycle paths are permitted in buffer areas.**

Response: Please see **Sheet L-1 – Landscaping Plan**. As the site is separated by a right-of-way from a different land use (residential), buffering but not screening is required. There will be a landscaped buffer area along the full length of the site's Knott Street frontage, except where the access drives connect to the public right-of-way. The buffer area will be planted with a mix of deciduous trees (which will be at least 10 feet tall at planting) and evergreen shrubs to effectively buffer the parking area year-round, with at least one 5-gallon shrub for each 100 square feet of buffer area. There are no buildings, roads or parking spaces in the buffer area.

C. Screening Requirements:

[...]

Response: No screening is required as the site is separated by a right-of-way from a different use (residential). These criteria are not applicable.

[...]

- 3. If four or more off-street parking spaces are required, off-street parking adjacent to a public road shall provide a minimum of four square feet of landscaping for each lineal foot of street frontage. Such landscaping shall consist of landscaped berms or shrubbery at least 4 feet in total height at maturity. Additionally, one tree shall be provided for each 50 lineal feet of street frontage or fraction thereof.**

Response: Please see **Sheet L-1 Landscaping Plan**. The project site has 160 feet of frontage on Knott Street, requiring a minimum 640 square feet of landscaping. There are 1,684 square feet of landscaping in the buffer areas fronting Knott St., exceeding the minimum. This includes 3 trees, which provides approximately one tree per 50 lineal feet of street frontage. Between the trees are planted shrubbery that will reach a height of at least 4 feet at maturity.



[...]

5. Loading areas, outside storage, and service facilities must be screened from adjoining properties.

Response: There are no loading areas, outside storage or service facilities proposed. This criterion is not applicable.

D. Fences and Walls:

[...]

Response: No fences or walls are proposed as part of this project. These criteria are not relevant.

Section 1563: Standards for Approval

The Planning Commission or Director shall make a finding with respect to each of the following criteria when approving, approving with conditions, or denying an application:

A. Flood Hazard Areas: See CCZO §1100, Flood Hazard Overlay Zone. All development in Flood Hazard Areas must comply with State and Federal Guidelines.

Response: The proposed development is not within a Flood Hazard Area. Thus, this criterion is not applicable.

B. Wetlands and Riparian Areas: Alteration of wetlands and riparian areas shall be in compliance with State and Federal laws.

Response: Please see **Exhibit C – Wetlands Determination Report**. The proposed development is not within a wetland or riparian area or buffer and no alteration of wetlands or riparian areas is proposed. Thus, this criterion is not applicable.

C. Natural Areas and Features: To the greatest practical extent possible, natural areas and features of the site shall be preserved.

Response: Please see **Sheet C-1 – Existing Conditions Plan**. There are no significant natural features on the site. If any are identified during the development process, they will be preserved to the greatest practical extent possible.

D. Historic and Cultural sites and structures: All historic and culturally significant sites and structures identified in the 1984 Comprehensive Plan, or identified for inclusion in the County Periodic Review, shall be protected if they still exist.

Response: There are no historic or cultural sites or structures impacted by the proposed development. Thus, this criterion is not applicable.

E. Lighting: All outdoor lights shall be shielded so as to not shine directly on adjacent properties and roads.

Response: No outdoor lighting is proposed. This criterion is not relevant.

[...]

List of Exhibits

Exhibit A Stormwater Report

Exhibit B Geotechnical Report

Exhibit C Wetlands Determination Report

Exhibit D Knickerson Creek Centerline Map

Exhibit E Fire District Letter

Exhibit F Big Game Habitat Map & ODFW Comments



Exhibit G Traffic Impact Analysis

Exhibit H Site Design Review Submittal Checklist

Exhibit I City of Vernonia Approval Email

Exhibit J Drawings

- Sheet G-1 Cover Sheet
- Sheet G-2 General Notes
- Sheet C-1 Existing Conditions Plan
- Sheet C-2 Proposed Site Plan
- Sheet C-3 Erosion and Sediment Control Plan
- Sheet C-4 Grading and Drainage Plan
- Sheet L-1 Landscaping Plan
- Sheet D-1 Erosion and Sediment Control Details
- Sheet D-2 Civil Details
- Sheet D-3 Signage Details
- Sheet A-1 Picnic Shelter
- Sheet A-2 Vault Toilet



Exhibit A

Stormwater Report



Lower Columbia Engineering
58640 McNulty Way
St. Helens, OR 97051
503.366.0399

Project: Holce Trailhead
Type of Project: Improvements
Scappoose, Oregon

Stormwater Report
February 12th, 2025
LCE Project No. 3615



EXPIRES: DECEMBER 31, 2025

The above Seal certifies that Chase A Berg, P.E. has general knowledge of Columbia County Stormwater and Erosion Control Ordinance. The drainage modifications proposed for this site have been designed in general compliance with this ordinance.



Table of Contents

Project Description.....	3
Design Method.....	3
Stormwater Management Design.....	3
Conclusion.....	4
Attachments	
Attachment A – Soil Survey Map.....	5
Attachment B – Stormwater Calculations.....	7

This report pertains to the proposed private improvements described below based on specific requests by our clients. Lower Columbia Engineering is not responsible for complying with any conditions of approval or adjacent storm drainage issues that are outside of the project area. Contact Lower Columbia Engineering with any questions or uncertainties. Maintenance of this system and verification of property line locations are the responsibility of others.



Project Description

The proposed development consists of constructing trailhead improvements at the existing Holce Trailhead in Vernonia, Oregon near the address of 1780 E Knott Street.

The existing lot occupies a total of approximately 13,600 square feet. For the purposes of this stormwater report, the area analyzed consists of approximately 13,200 square feet. Existing conditions of this lot are largely comprised of gravel. After development, approximately 9,400 square feet will be impervious area (asphalt parking lot, drive aisles, sidewalks, picnic area, and vaulted toilet) while the remaining 3,800 square feet will be landscaped, pervious, area.

Design Method

Existing on-site stormwater appears to sheet flow west, and naturally infiltrate into the ground. Proposed stormwater management is targeted to minimize the total amount of runoff produced from the increase in impervious area through the use of Low Impact Design methods. Stormwater detention facilities have been designed to collect stormwater and have adequate capacity to treat the water quality event, and safely detain the 100-year event. Stormwater events for this site were calculated using the SBUH method given a Type IA storm type within the HydroCAD software system. Western Regional Climate Center's Precipitation Frequency Maps were referenced and storm event intensities can be found within table 1. Soil Survey Maps from the NRCS were referenced to determine the site's soil compositions as a majority Udifluvents-Dystrochrepts complex with a hydrologic soil group of A (see attached soil survey).

Table 1. Rainfall Design Events

Design Storm Event	Storm Event Intensity (Inches/24 Hours)
Water Quality	1.00
2-Year	2.00
5-Year	2.50
10-Year	3.00
25-Year	3.50
50-Year	4.00
100-Year	4.50

Stormwater Management Design

Stormwater runoff from the proposed development will be managed by allowing runoff from structure roofs, paved areas, etc. to sheet flow off of impervious surfaces into a series of stormwater swales. The east stormwater swale is designed to treat the collected runoff by detaining stormwater until water reaches a height where it will then pass through a rectangular weir and enter the southwest stormwater swale. This swale works similarly by detaining stormwater until the water level reaches a height where it will then pass through a rectangular weir and discharge adjacent to the subject property where stormwater will continue to naturally infiltrate into the ground.

Stormwater not collected by these series of stormwater swales has been designed to enter the western stormwater swale. This swale has been designed to treat collected runoff by detaining stormwater until



water reaches a height where it will then pass through a rectangular weir and allow stormwater to discharge adjacent to the subject property where it will continue to naturally infiltrate into the ground.

Table 1. Stormwater Swale

Swale	Volume (Cubic Feet)	Depth (Feet)	Interior Slope	Bottom of Swale Elevation (Feet)	Top of Swale Elevation (Feet)
West	245	2	2:1	648.5	650.5
Southwest	465	2	2:1	648	650
East	441	2	2:1	650	652

Table 2. Pre versus post construction runoff rates

Design Storm Event	Pre-Development Peak Flow Rate (CFS)	Post-Development Peak Flow Rate (CFS)
Water Quality	0.00	0.00
2-Year	0.01	0.01
5-Year	0.02	0.01
10-Year	0.04	0.02
25-Year	0.07	0.05
50-Year	0.09	0.12
100-Year	0.12	0.15

Operations and Maintenance Overview

The proper implementation and maintenance of the proposed facilities is the responsibility of Columbia County. It is critical that stormwater infrastructure be kept free of debris in order to facilitate effective conveyance and longevity of the system. Proposed detention swales shall be kept free of debris to make sure that outlets are not plugged and to ensure that sediment does not accumulate within the swale. Vegetation in the swale shall be inspected regularly to ensure plant health; watering may be necessary in the dry season to help establish new plantings. Any plantings that don't take shall be replaced. If excessive planting failures are observed, different plantings may need to be selected to better suit the site conditions. Areas of concern shall be inspected for the first three years to ensure that plantings are healthy and facilities are functioning properly. Beyond this time, the facilities shall continue to be inspected and maintained as needed.

Conclusion

On-site stormwater management will be utilized for the Holce Trailhead through the construction of three detention swales. Low impact design methods have been incorporated to help facilitate a system that detains stormwater up through the 100-year event. This system has been designed to effectively meet Columbia County standards. Responsibility for the proper implementation and maintenance of this facility belongs to Columbia County.

Attachment A – Soil Survey Map





Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
21D	Glohm silt loam, 3 to 30 percent slopes	C	0.3	2.5%
50E	Scaponia-Braun silt loams, 30 to 60 percent south slopes	B	1.7	14.3%
59	Udfluvents-Dystrochrepts complex	A	10.1	83.2%
Totals for Area of Interest			12.1	100.0%

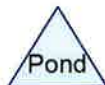


Attachment B – Stormwater Calculations

Existing Conditions



Existing Conditions



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Page 9

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	00 WQ	Type IA 24-hr		Default	24.00	1	1.00	2
2	100YR	Type IA 24-hr		Default	24.00	1	4.50	2

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Page 10

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.302	72	Dirt roads, HSG A (E)
0.302	72	TOTAL AREA

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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 11

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE: Existing Conditions

Runoff Area=0.302 ac 0.00% Impervious Runoff Depth=0.01"

Tc=0.0 min CN=72/0 Runoff=0.00 cfs 0.000 af

Total Runoff Area = 0.302 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.01"

100.00% Pervious = 0.302 ac 0.00% Impervious = 0.000 ac

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Type IA 24-hr 100YR Rainfall=4.50"

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Page 13

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE: Existing Conditions

Runoff Area=0.302 ac 0.00% Impervious Runoff Depth=1.82"

Tc=0.0 min CN=72/0 Runoff=0.12 cfs 0.046 af

Total Runoff Area = 0.302 ac Runoff Volume = 0.046 af Average Runoff Depth = 1.82"

100.00% Pervious = 0.302 ac 0.00% Impervious = 0.000 ac

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Type IA 24-hr 100YR Rainfall=4.50"

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Page 14

Summary for Subcatchment E: Existing Conditions

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

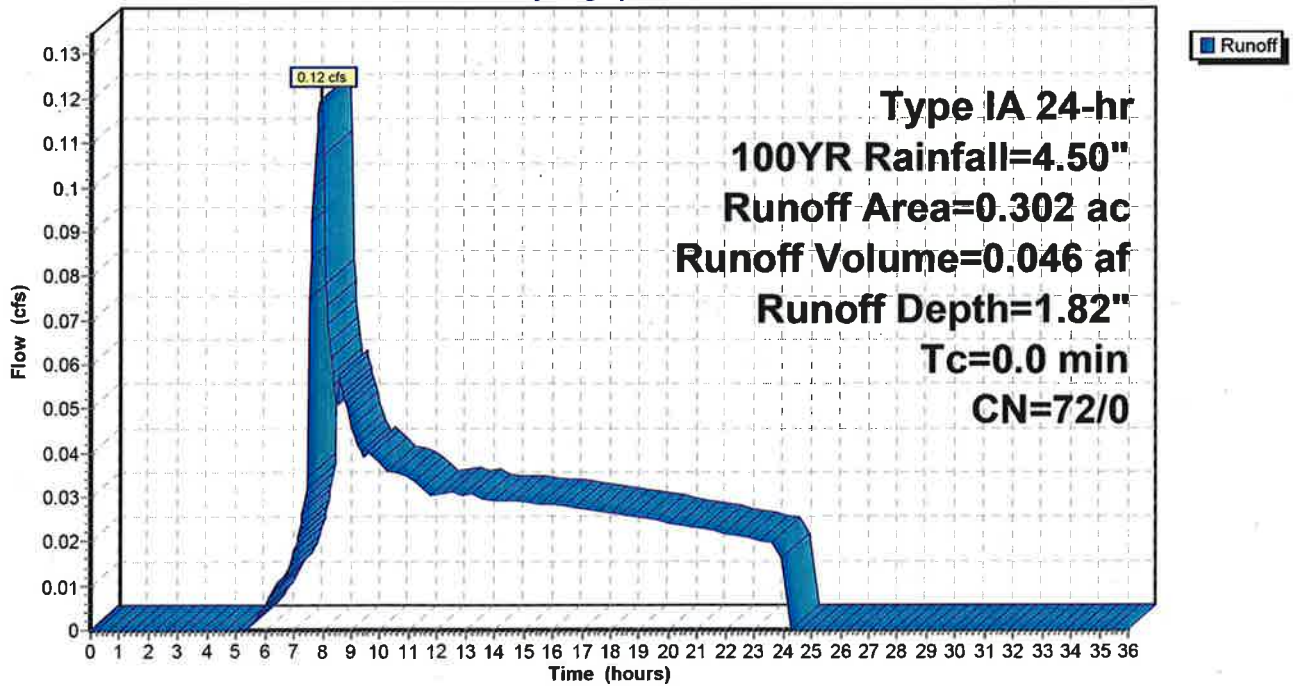
Runoff = 0.12 cfs @ 7.95 hrs, Volume= 0.046 af, Depth= 1.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100YR Rainfall=4.50"

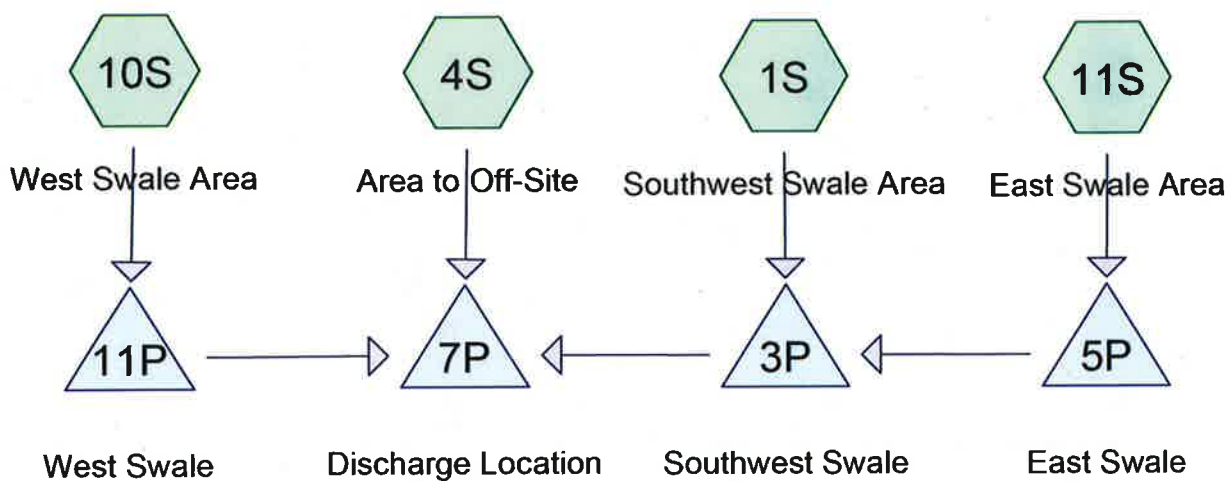
Area (ac)	CN	Description
0.302	72	Dirt roads, HSG A
0.302	72	100.00% Pervious Area

Subcatchment E: Existing Conditions

Hydrograph



Proposed Conditions



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Page 16

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	00 WQ	Type IA 24-hr		Default	24.00	1	1.00	2
2	100YR	Type IA 24-hr		Default	24.00	1	4.50	2

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Page 17

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.087	49	50-75% Grass cover, Fair, HSG A (1S, 4S, 10S, 11S)
0.193	98	Paved parking, HSG A (1S, 10S, 11S)
0.022	98	Roofs, HSG A (4S)
0.302	84	TOTAL AREA

3615 Storm

Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 18

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Southwest Swale Area Runoff Area=5,828 sf 76.24% Impervious Runoff Depth=0.60"
Tc=0.0 min CN=49/98 Runoff=0.02 cfs 0.007 af

Subcatchment 4S: Area to Off-Site Runoff Area=1,320 sf 73.33% Impervious Runoff Depth=0.58"
Tc=0.0 min CN=49/98 Runoff=0.00 cfs 0.001 af

Subcatchment 10S: West Swale Area Runoff Area=2,531 sf 56.58% Impervious Runoff Depth=0.45"
Tc=0.0 min CN=49/98 Runoff=0.01 cfs 0.002 af

Subcatchment 11S: East Swale Area Runoff Area=3,479 sf 72.81% Impervious Runoff Depth=0.58"
Flow Length=74' Slope=0.0500 ' / Tc=5.0 min CN=49/98 Runoff=0.01 cfs 0.004 af

Pond 3P: Southwest Swale Peak Elev=648.45' Storage=45 cf Inflow=0.02 cfs 0.007 af
Discarded=0.01 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Pond 5P: East Swale Peak Elev=650.22' Storage=18 cf Inflow=0.01 cfs 0.004 af
Discarded=0.00 cfs 0.004 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

Pond 7P: Discharge Location Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Pond 11P: West Swale Peak Elev=648.71' Storage=10 cf Inflow=0.01 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Total Runoff Area = 0.302 ac Runoff Volume = 0.014 af Average Runoff Depth = 0.56"
28.74% Pervious = 0.087 ac 71.26% Impervious = 0.215 ac

3615 Storm

Prepared by Lower Columbia Engineering

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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 19

Summary for Subcatchment 1S: Southwest Swale Area

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

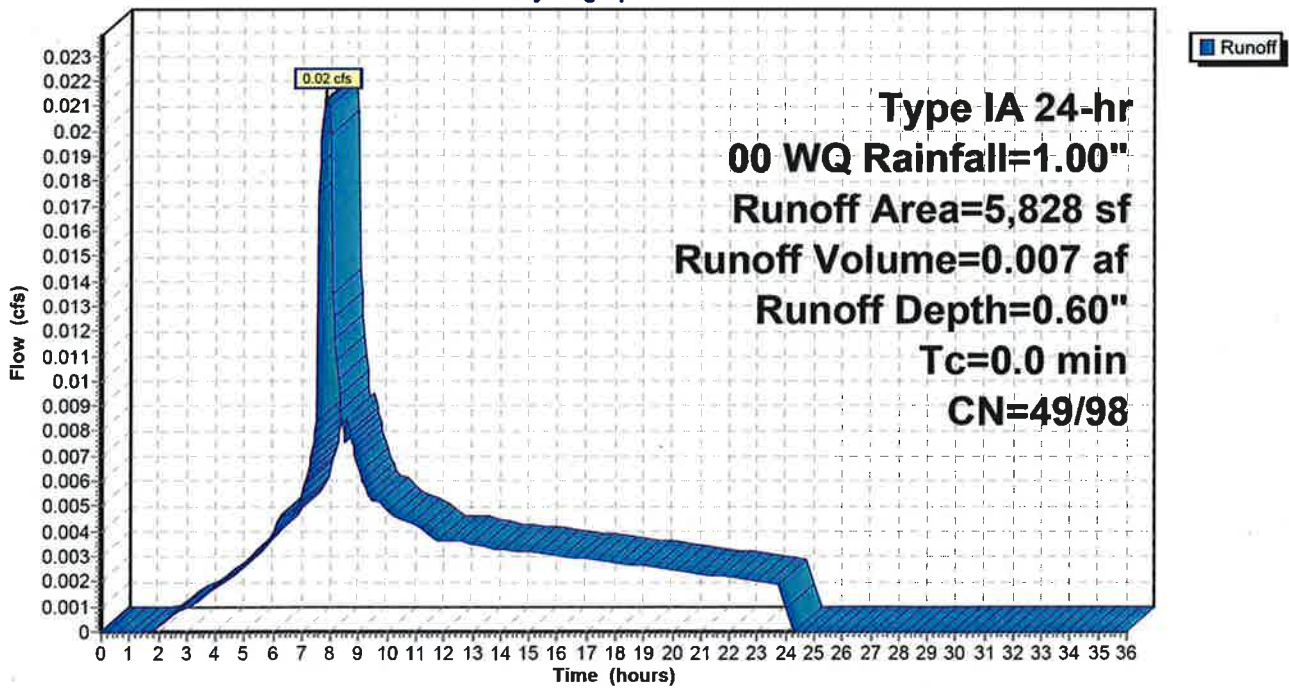
Runoff = 0.02 cfs @ 7.83 hrs, Volume= 0.007 af, Depth= 0.60"
Routed to Pond 3P : Southwest Swale

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 00 WQ Rainfall=1.00"

Area (sf)	CN	Description
4,443	98	Paved parking, HSG A
1,385	49	50-75% Grass cover, Fair, HSG A
5,828	86	Weighted Average
1,385	49	23.76% Pervious Area
4,443	98	76.24% Impervious Area

Subcatchment 1S: Southwest Swale Area

Hydrograph



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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 20

Summary for Subcatchment 4S: Area to Off-Site

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

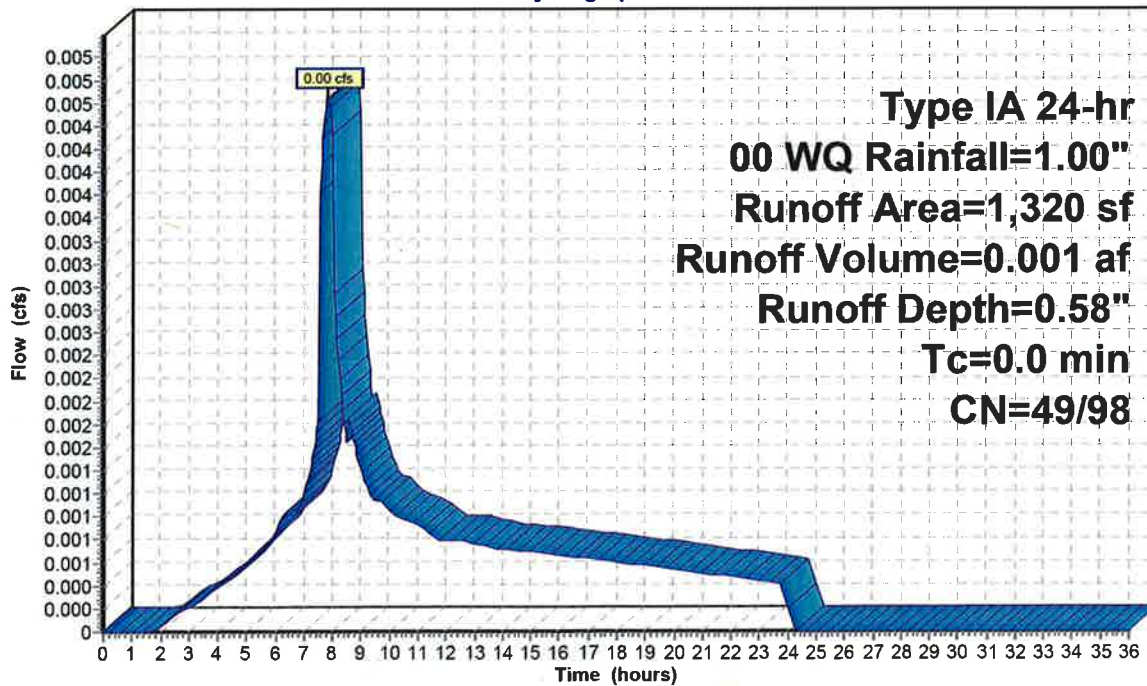
Runoff = 0.00 cfs @ 7.83 hrs, Volume= 0.001 af, Depth= 0.58"
Routed to Pond 7P : Discharge Location

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 00 WQ Rainfall=1.00"

Area (sf)	CN	Description
968	98	Roofs, HSG A
352	49	50-75% Grass cover, Fair, HSG A
1,320	85	Weighted Average
352	49	26.67% Pervious Area
968	98	73.33% Impervious Area

Subcatchment 4S: Area to Off-Site

Hydrograph



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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 21

Summary for Subcatchment 10S: West Swale Area

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

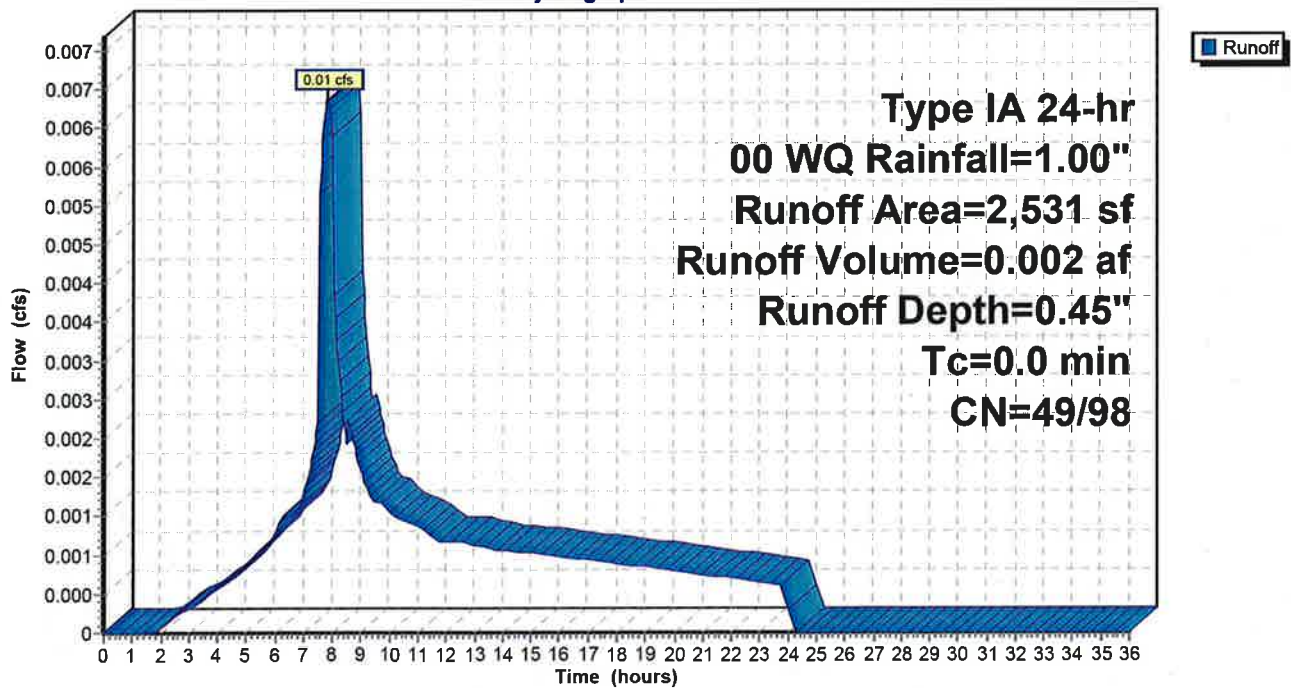
Runoff = 0.01 cfs @ 7.83 hrs, Volume= 0.002 af, Depth= 0.45"
Routed to Pond 11P : West Swale

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 00 WQ Rainfall=1.00"

Area (sf)	CN	Description
1,432	98	Paved parking, HSG A
1,099	49	50-75% Grass cover, Fair, HSG A
2,531	77	Weighted Average
1,099	49	43.42% Pervious Area
1,432	98	56.58% Impervious Area

Subcatchment 10S: West Swale Area

Hydrograph



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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 22

Summary for Subcatchment 11S: East Swale Area

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.01 cfs @ 7.92 hrs, Volume= 0.004 af, Depth= 0.58"
 Routed to Pond 5P : East Swale

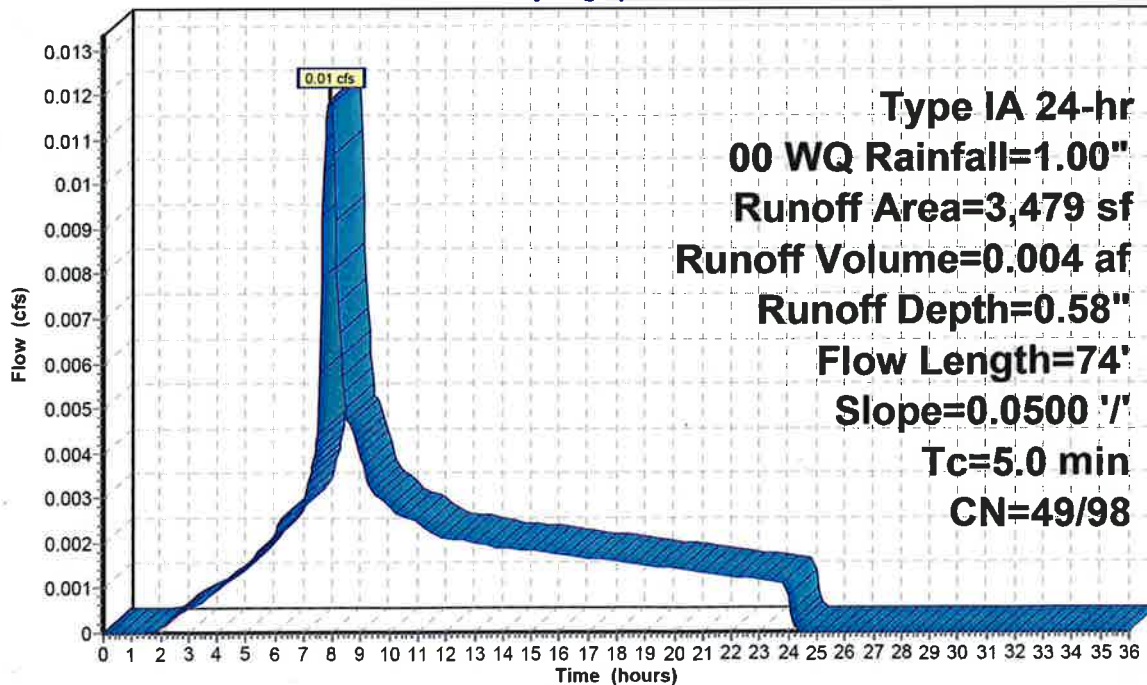
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, $dt= 0.05$ hrs
 Type IA 24-hr 00 WQ Rainfall=1.00"

Area (sf)	CN	Description
2,533	98	Paved parking, HSG A
946	49	50-75% Grass cover, Fair, HSG A
3,479	85	Weighted Average
946	49	27.19% Pervious Area
2,533	98	72.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	74	0.0500	0.61		Sheet Flow, Rock Channel n= 0.033 P2= 2.00"
2.0	74	Total, Increased to minimum $T_c = 5.0$ min			

Subcatchment 11S: East Swale Area

Hydrograph



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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 23

Summary for Pond 3P: Southwest Swale

Inflow Area = 0.214 ac, 74.95% Impervious, Inflow Depth = 0.38" for 00 WQ event
 Inflow = 0.02 cfs @ 7.83 hrs, Volume= 0.007 af
 Outflow = 0.01 cfs @ 8.91 hrs, Volume= 0.007 af, Atten= 68%, Lag= 64.8 min
 Discarded = 0.01 cfs @ 8.91 hrs, Volume= 0.007 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routed to Pond 7P : Discharge Location

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 648.45' @ 8.91 hrs Surf.Area= 131 sf Storage= 45 cf

Plug-Flow detention time= 50.6 min calculated for 0.007 af (100% of inflow)
 Center-of-Mass det. time= 50.5 min (759.4 - 708.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	648.00'	465 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
648.00	71	74.3	0	0	71	
649.00	232	86.8	144	144	250	
650.00	419	99.4	321	465	459	

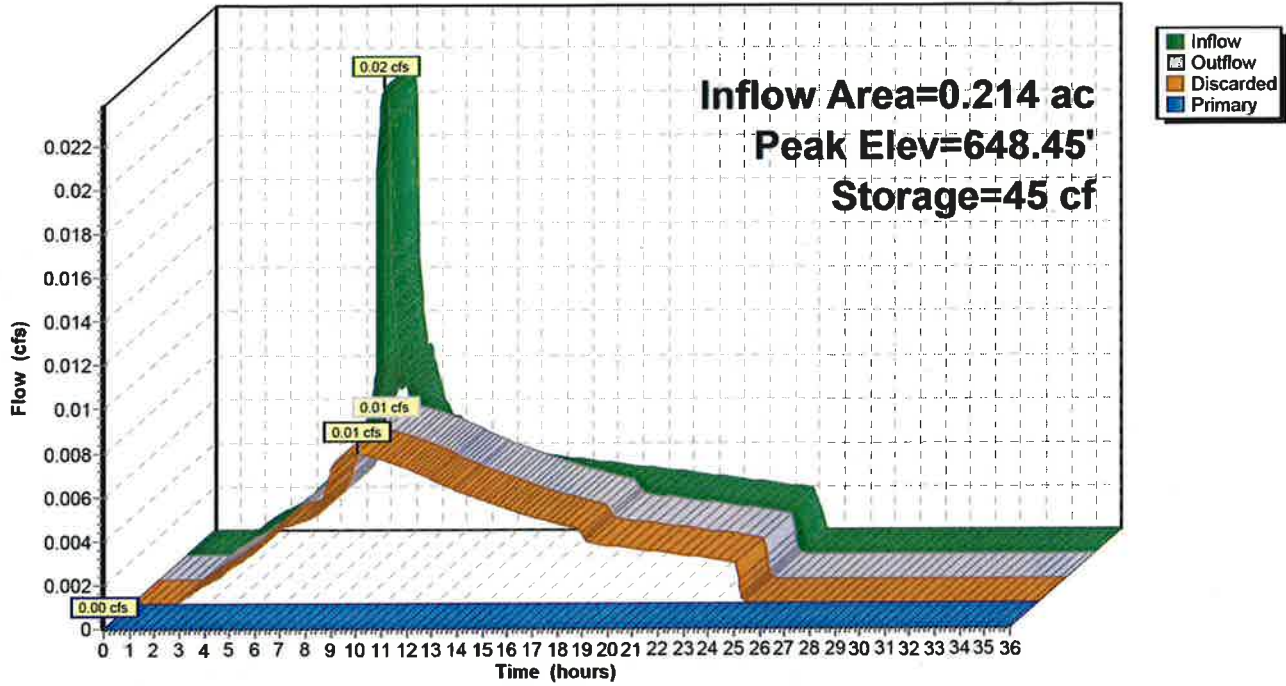
Device	Routing	Invert	Outlet Devices				
#1	Discarded	648.00'	2.000 in/hr Exfiltration over Wetted area				
#2	Primary	649.50'	2.0' long + 2.0 ' SideZ x 0.5' breadth Broad-Crested Rectangular Weir				
			Head (feet) 0.20 0.40 0.60 0.80 1.00				
			Coef. (English) 2.80 2.92 3.08 3.30 3.32				

Discarded OutFlow Max=0.01 cfs @ 8.91 hrs HW=648.45' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=648.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: Southwest Swale

Hydrograph



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Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 25

Summary for Pond 5P: East Swale

Inflow Area = 0.080 ac, 72.81% Impervious, Inflow Depth = 0.58" for 00 WQ event
 Inflow = 0.01 cfs @ 7.92 hrs, Volume= 0.004 af
 Outflow = 0.00 cfs @ 8.51 hrs, Volume= 0.004 af, Atten= 60%, Lag= 35.4 min
 Discarded = 0.00 cfs @ 8.51 hrs, Volume= 0.004 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 3P : Southwest Swale

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 650.22' @ 8.51 hrs Surf.Area= 93 sf Storage= 18 cf

Plug-Flow detention time= 22.1 min calculated for 0.004 af (100% of inflow)
 Center-of-Mass det. time= 22.1 min (736.0 - 713.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	650.00'	441 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
650.00	67	70.3	0	0	67	
651.00	220	82.8	136	136	237	
652.00	399	95.4	305	441	437	

Device	Routing	Invert	Outlet Devices						
#1	Discarded	650.00'	2.000 in/hr Exfiltration over Wetted area						
#2	Primary	651.50'	2.0' long + 2.0 ' SideZ x 0.5' breadth Broad-Crested Rectangular Weir						
			Head (feet) 0.20 0.40 0.60 0.80 1.00						
			Coef. (English) 2.80 2.92 3.08 3.30 3.32						

Discarded OutFlow Max=0.00 cfs @ 8.51 hrs HW=650.22' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=650.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

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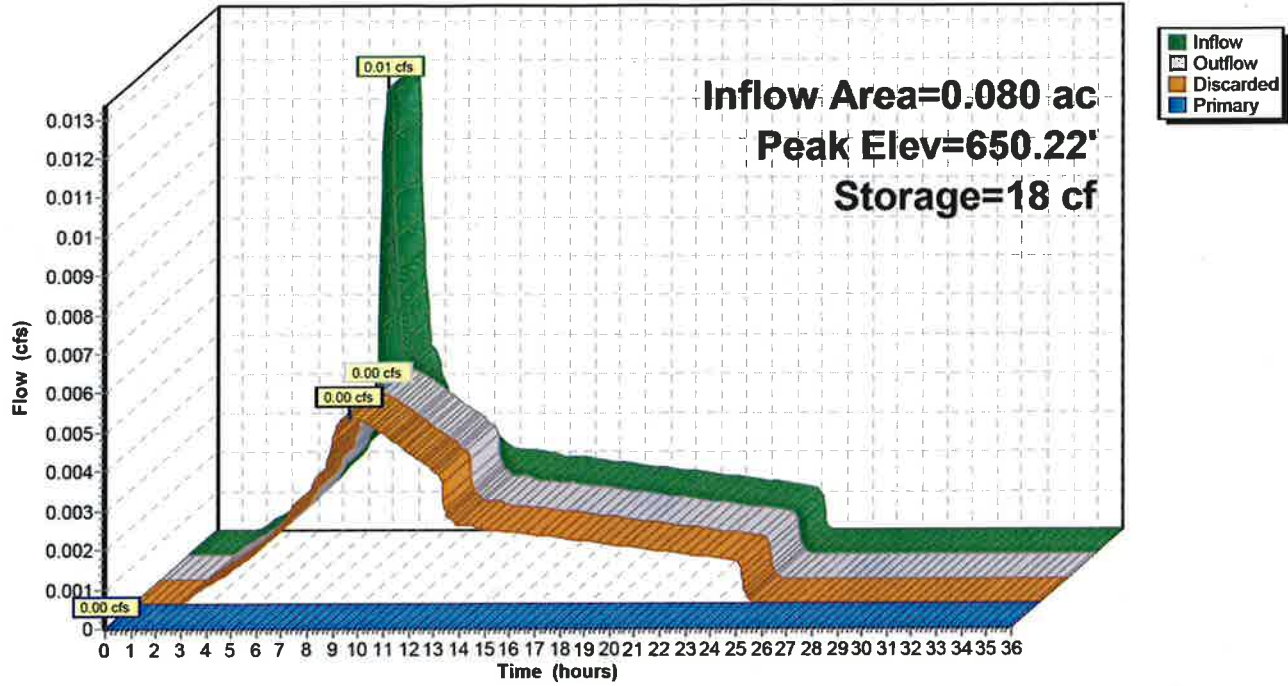
Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 26

Pond 5P: East Swale

Hydrograph



Summary for Pond 7P: Discharge Location

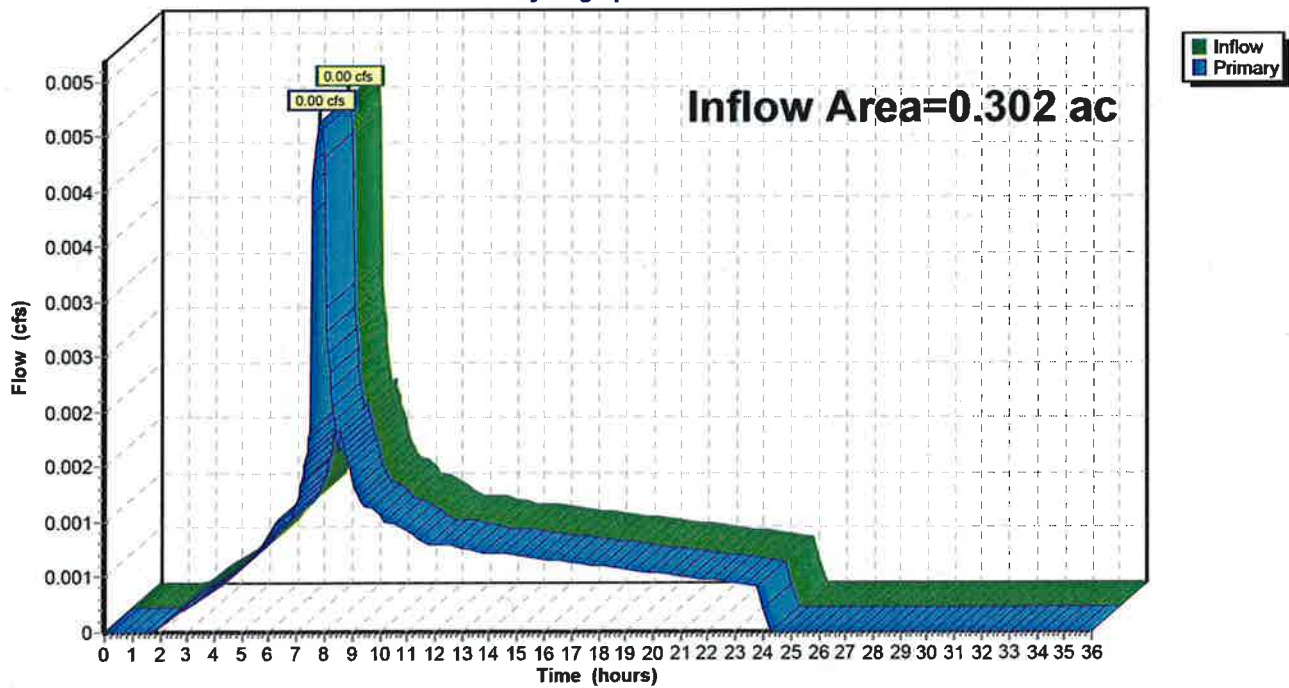
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.302 ac, 71.26% Impervious, Inflow Depth = 0.06" for 00 WQ event
Inflow = 0.00 cfs @ 7.83 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 7.83 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond 7P: Discharge Location

Hydrograph



3615 Storm

Type IA 24-hr 00 WQ Rainfall=1.00"

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Page 28

Summary for Pond 11P: West Swale

Inflow Area = 0.058 ac, 56.58% Impervious, Inflow Depth = 0.45" for 00 WQ event
 Inflow = 0.01 cfs @ 7.83 hrs, Volume= 0.002 af
 Outflow = 0.00 cfs @ 8.42 hrs, Volume= 0.002 af, Atten= 61%, Lag= 35.0 min
 Discarded = 0.00 cfs @ 8.42 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 7P : Discharge Location

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 648.71' @ 8.42 hrs Surf.Area= 54 sf Storage= 10 cf

Plug-Flow detention time= 21.9 min calculated for 0.002 af (100% of inflow)
 Center-of-Mass det. time= 21.9 min (730.7 - 708.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	648.50'	245 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
648.50	41	32.7	0	0	41
649.50	119	45.3	77	77	128
650.50	223	57.8	168	245	243

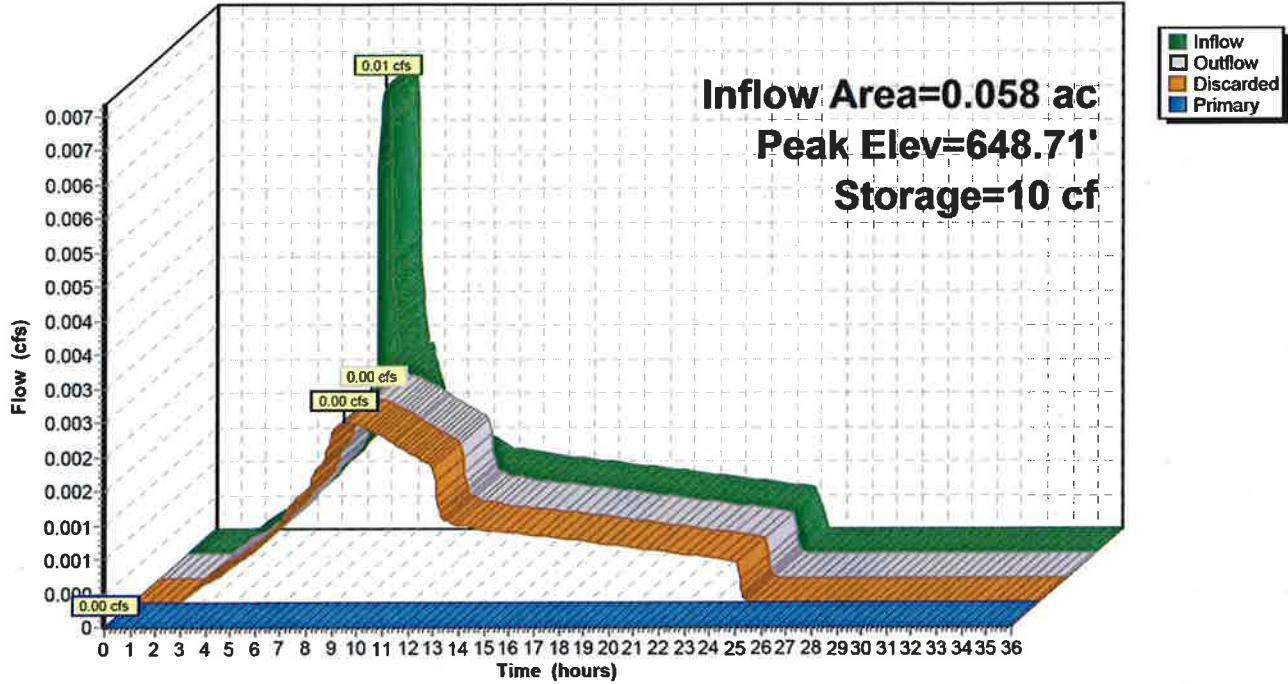
Device	Routing	Invert	Outlet Devices
#1	Discarded	648.50'	2.000 in/hr Exfiltration over Wetted area
#2	Primary	649.50'	2.0' long + 2.0 ' SideZ x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.00 cfs @ 8.42 hrs HW=648.71' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=648.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 11P: West Swale

Hydrograph



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Type IA 24-hr 100YR Rainfall=4.50"

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Page 30

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Southwest Swale Area Runoff Area=5,828 sf 76.24% Impervious Runoff Depth=3.36"
Tc=0.0 min CN=49/98 Runoff=0.11 cfs 0.037 af

Subcatchment 4S: Area to Off-Site Runoff Area=1,320 sf 73.33% Impervious Runoff Depth=3.25"
Tc=0.0 min CN=49/98 Runoff=0.02 cfs 0.008 af

Subcatchment 10S: West Swale Area Runoff Area=2,531 sf 56.58% Impervious Runoff Depth=2.61"
Tc=0.0 min CN=49/98 Runoff=0.04 cfs 0.013 af

Subcatchment 11S: East Swale Area Runoff Area=3,479 sf 72.81% Impervious Runoff Depth=3.23"
Flow Length=74' Slope=0.0500 '/' Tc=5.0 min CN=49/98 Runoff=0.06 cfs 0.021 af

Pond 3P: Southwest Swale Peak Elev=649.56' Storage=301 cf Inflow=0.11 cfs 0.037 af
Discarded=0.02 cfs 0.031 af Primary=0.09 cfs 0.007 af Outflow=0.11 cfs 0.037 af

Pond 5P: East Swale Peak Elev=651.41' Storage=240 cf Inflow=0.06 cfs 0.021 af
Discarded=0.01 cfs 0.021 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.021 af

Pond 7P: Discharge Location Inflow=0.15 cfs 0.017 af
Primary=0.15 cfs 0.017 af

Pond 11P: West Swale Peak Elev=649.53' Storage=80 cf Inflow=0.04 cfs 0.013 af
Discarded=0.01 cfs 0.011 af Primary=0.03 cfs 0.002 af Outflow=0.04 cfs 0.013 af

Total Runoff Area = 0.302 ac Runoff Volume = 0.080 af Average Runoff Depth = 3.17"
28.74% Pervious = 0.087 ac 71.26% Impervious = 0.215 ac

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Type IA 24-hr 100YR Rainfall=4.50"

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Page 31

Summary for Subcatchment 1S: Southwest Swale Area

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

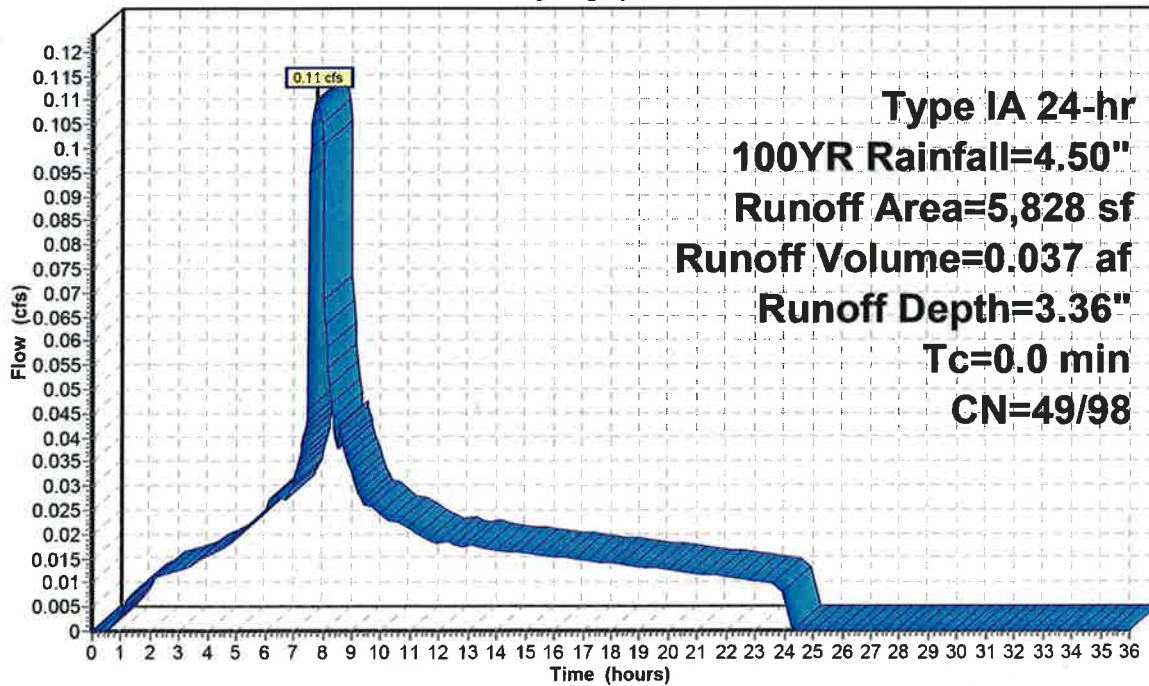
Runoff = 0.11 cfs @ 7.80 hrs, Volume= 0.037 af, Depth= 3.36"
Routed to Pond 3P : Southwest Swale

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100YR Rainfall=4.50"

Area (sf)	CN	Description
4,443	98	Paved parking, HSG A
1,385	49	50-75% Grass cover, Fair, HSG A
5,828	86	Weighted Average
1,385	49	23.76% Pervious Area
4,443	98	76.24% Impervious Area

Subcatchment 1S: Southwest Swale Area

Hydrograph



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Type IA 24-hr 100YR Rainfall=4.50"

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Page 32

Summary for Subcatchment 4S: Area to Off-Site

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

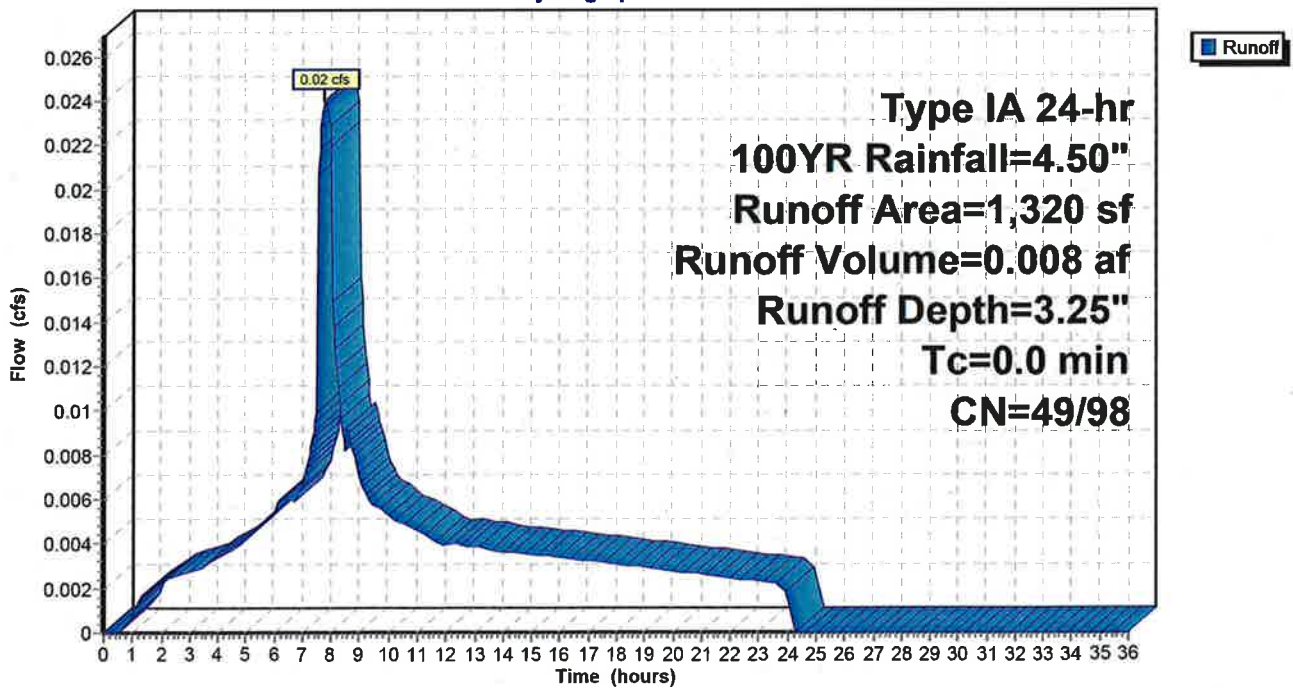
Runoff = 0.02 cfs @ 7.80 hrs, Volume= 0.008 af, Depth= 3.25"
Routed to Pond 7P : Discharge Location

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100YR Rainfall=4.50"

Area (sf)	CN	Description
968	98	Roofs, HSG A
352	49	50-75% Grass cover, Fair, HSG A
1,320	85	Weighted Average
352	49	26.67% Pervious Area
968	98	73.33% Impervious Area

Subcatchment 4S: Area to Off-Site

Hydrograph



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Type IA 24-hr 100YR Rainfall=4.50"

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Page 33

Summary for Subcatchment 10S: West Swale Area

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

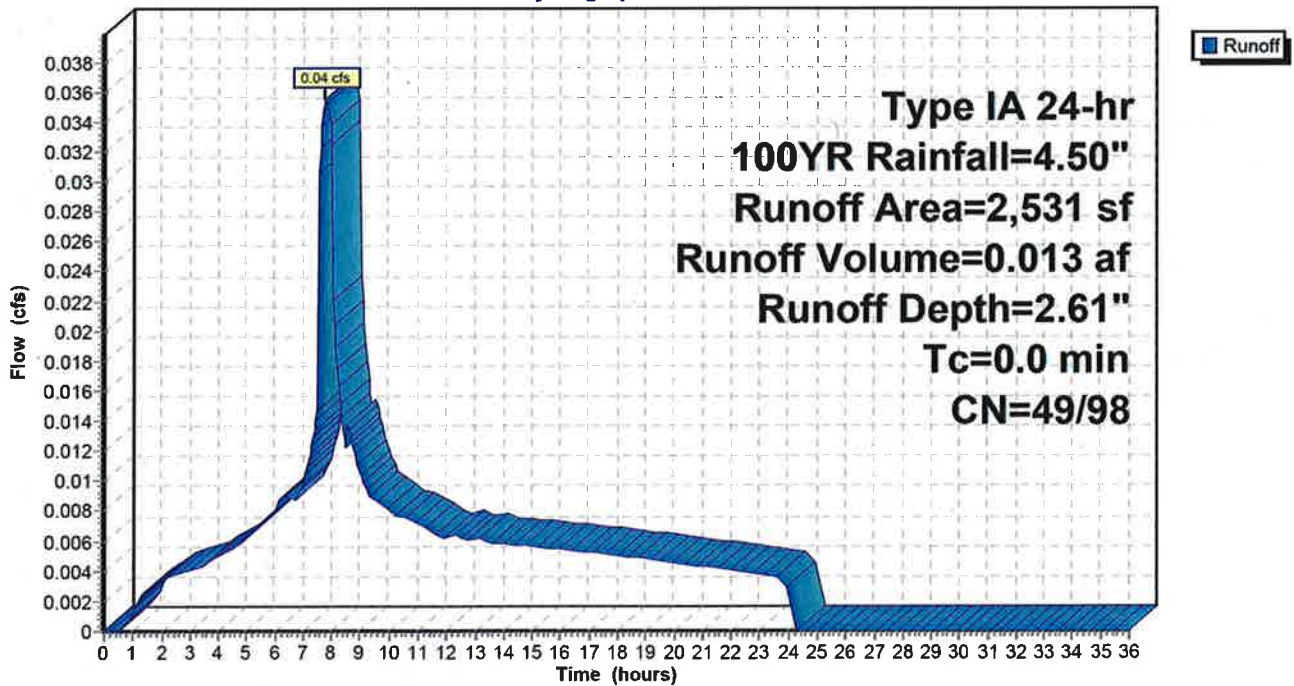
Runoff = 0.04 cfs @ 7.80 hrs, Volume= 0.013 af, Depth= 2.61"
Routed to Pond 11P : West Swale

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100YR Rainfall=4.50"

Area (sf)	CN	Description
1,432	98	Paved parking, HSG A
1,099	49	50-75% Grass cover, Fair, HSG A
2,531	77	Weighted Average
1,099	49	43.42% Pervious Area
1,432	98	56.58% Impervious Area

Subcatchment 10S: West Swale Area

Hydrograph



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Type IA 24-hr 100YR Rainfall=4.50"

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Page 34

Summary for Subcatchment 11S: East Swale Area

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.06 cfs @ 7.90 hrs, Volume= 0.021 af, Depth= 3.23"
 Routed to Pond 5P : East Swale

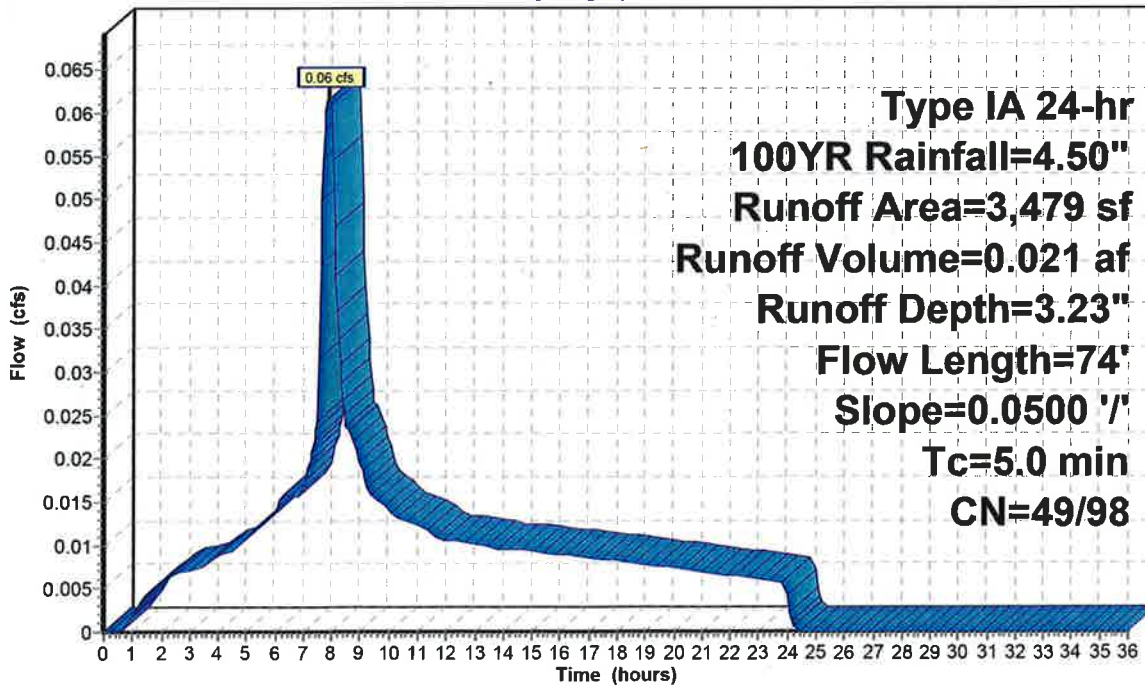
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100YR Rainfall=4.50"

Area (sf)	CN	Description
2,533	98	Paved parking, HSG A
946	49	50-75% Grass cover, Fair, HSG A
3,479	85	Weighted Average
946	49	27.19% Pervious Area
2,533	98	72.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	74	0.0500	0.61		Sheet Flow, Rock Channel n= 0.033 P2= 2.00"
2.0	74	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11S: East Swale Area

Hydrograph



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Type IA 24-hr 100YR Rainfall=4.50"

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Page 35

Summary for Pond 3P: Southwest Swale

Inflow Area = 0.214 ac, 74.95% Impervious, Inflow Depth = 2.10" for 100YR event
 Inflow = 0.11 cfs @ 7.80 hrs, Volume= 0.037 af
 Outflow = 0.11 cfs @ 7.89 hrs, Volume= 0.037 af, Atten= 1%, Lag= 5.1 min
 Discarded = 0.02 cfs @ 7.89 hrs, Volume= 0.031 af
 Primary = 0.09 cfs @ 7.89 hrs, Volume= 0.007 af
 Routed to Pond 7P : Discharge Location

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 649.56' @ 7.89 hrs Surf.Area= 330 sf Storage= 301 cf

Plug-Flow detention time= 200.9 min calculated for 0.037 af (100% of inflow)
 Center-of-Mass det. time= 201.2 min (865.9 - 664.7)

Volume	Invert	Avail.Storage	Storage Description			
#1	648.00'	465 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
648.00	71	74.3	0	0	71	
649.00	232	86.8	144	144	250	
650.00	419	99.4	321	465	459	

Device	Routing	Invert	Outlet Devices						
#1	Discarded	648.00'	2.000 in/hr Exfiltration over Wetted area						
#2	Primary	649.50'	2.0' long + 2.0 ' SideZ x 0.5' breadth Broad-Crested Rectangular Weir						
			Head (feet) 0.20 0.40 0.60 0.80 1.00						
			Coef. (English) 2.80 2.92 3.08 3.30 3.32						

Discarded OutFlow Max=0.02 cfs @ 7.89 hrs HW=649.56' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.09 cfs @ 7.89 hrs HW=649.56' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.09 cfs @ 0.69 fps)

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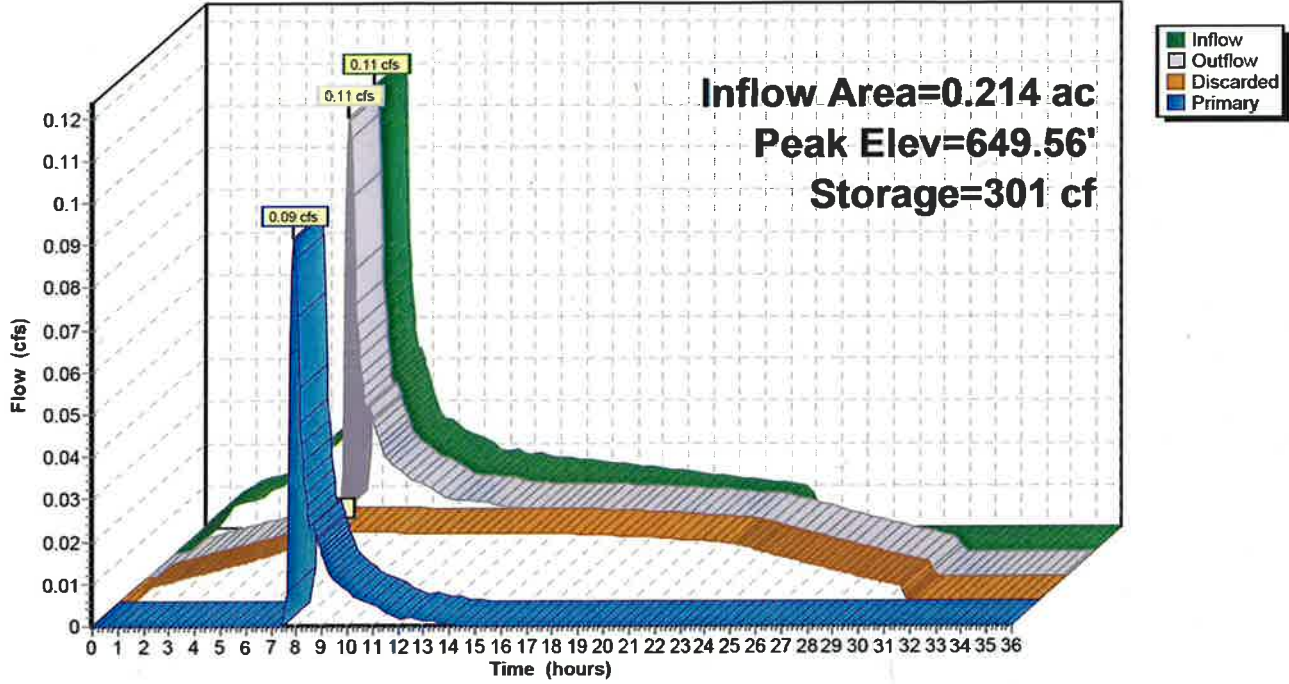
Type IA 24-hr 100YR Rainfall=4.50"

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Page 36

Pond 3P: Southwest Swale

Hydrograph



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Type IA 24-hr 100YR Rainfall=4.50"

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Page 37

Summary for Pond 5P: East Swale

Inflow Area = 0.080 ac, 72.81% Impervious, Inflow Depth = 3.23" for 100YR event
 Inflow = 0.06 cfs @ 7.90 hrs, Volume= 0.021 af
 Outflow = 0.01 cfs @ 9.85 hrs, Volume= 0.021 af, Atten= 76%, Lag= 117.3 min
 Discarded = 0.01 cfs @ 9.85 hrs, Volume= 0.021 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 3P : Southwest Swale

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 651.41' @ 9.85 hrs Surf.Area= 287 sf Storage= 240 cf

Plug-Flow detention time= 201.7 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 201.7 min (873.6 - 671.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	650.00'	441 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
650.00	67	70.3	0	0	67
651.00	220	82.8	136	136	237
652.00	399	95.4	305	441	437

Device	Routing	Invert	Outlet Devices
#1	Discarded	650.00'	2.000 in/hr Exfiltration over Wetted area
#2	Primary	651.50'	2.0' long + 2.0 ' SideZ x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 9.85 hrs HW=651.41' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=650.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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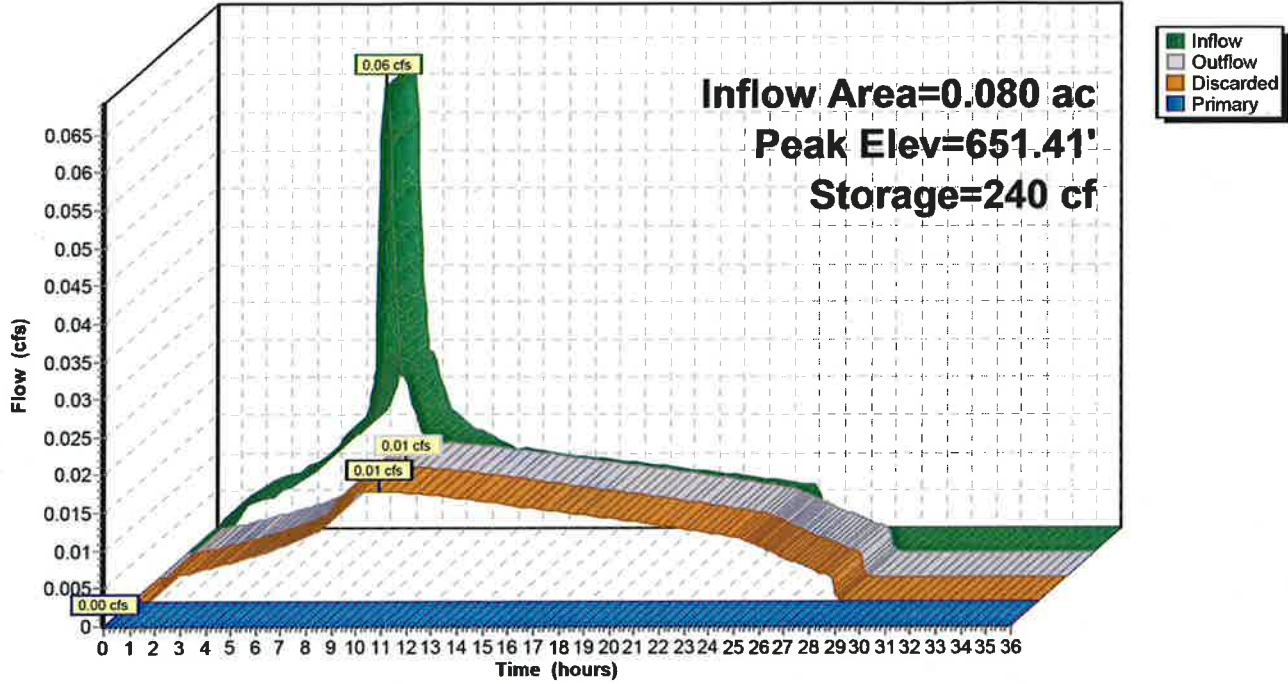
Type IA 24-hr 100YR Rainfall=4.50"

Printed 2/13/2025

Page 38

Pond 5P: East Swale

Hydrograph



3615 Storm

Prepared by Lower Columbia Engineering
HydroCAD® 10.20-4c s/n 07313 © 2024 HydroCAD Software Solutions LLC

Type IA 24-hr 100YR Rainfall=4.50"

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Page 39

Summary for Pond 7P: Discharge Location

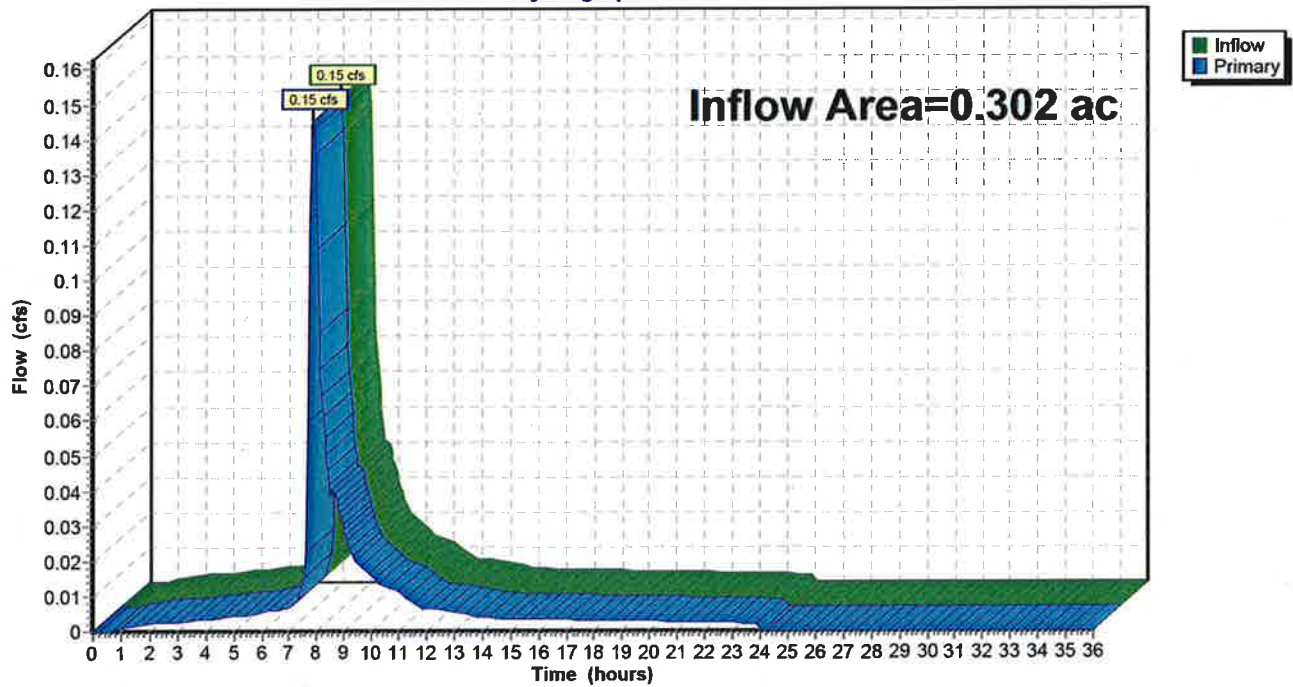
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.302 ac, 71.26% Impervious, Inflow Depth = 0.67" for 100YR event
Inflow = 0.15 cfs @ 7.87 hrs, Volume= 0.017 af
Primary = 0.15 cfs @ 7.87 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond 7P: Discharge Location

Hydrograph



3615 Storm

Type IA 24-hr 100YR Rainfall=4.50"

Prepared by Lower Columbia Engineering

Printed 2/13/2025

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Page 40

Summary for Pond 11P: West Swale

Inflow Area = 0.058 ac, 56.58% Impervious, Inflow Depth = 2.61" for 100YR event
 Inflow = 0.04 cfs @ 7.80 hrs, Volume= 0.013 af
 Outflow = 0.04 cfs @ 7.75 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 7.75 hrs, Volume= 0.011 af
 Primary = 0.03 cfs @ 7.75 hrs, Volume= 0.002 af

Routed to Pond 7P : Discharge Location

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 649.53' @ 7.75 hrs Surf.Area= 122 sf Storage= 80 cf

Plug-Flow detention time= 151.1 min calculated for 0.013 af (100% of inflow)
 Center-of-Mass det. time= 151.2 min (831.6 - 680.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	648.50'	245 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
648.50	41	32.7	0	0	41
649.50	119	45.3	77	77	128
650.50	223	57.8	168	245	243

Device	Routing	Invert	Outlet Devices
#1	Discarded	648.50'	2.000 in/hr Exfiltration over Wetted area
#2	Primary	649.50'	2.0' long + 2.0 ' SideZ x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 7.75 hrs HW=649.53' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 7.75 hrs HW=649.53' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.03 cfs @ 0.47 fps)

Pond 11P: West Swale

Hydrograph

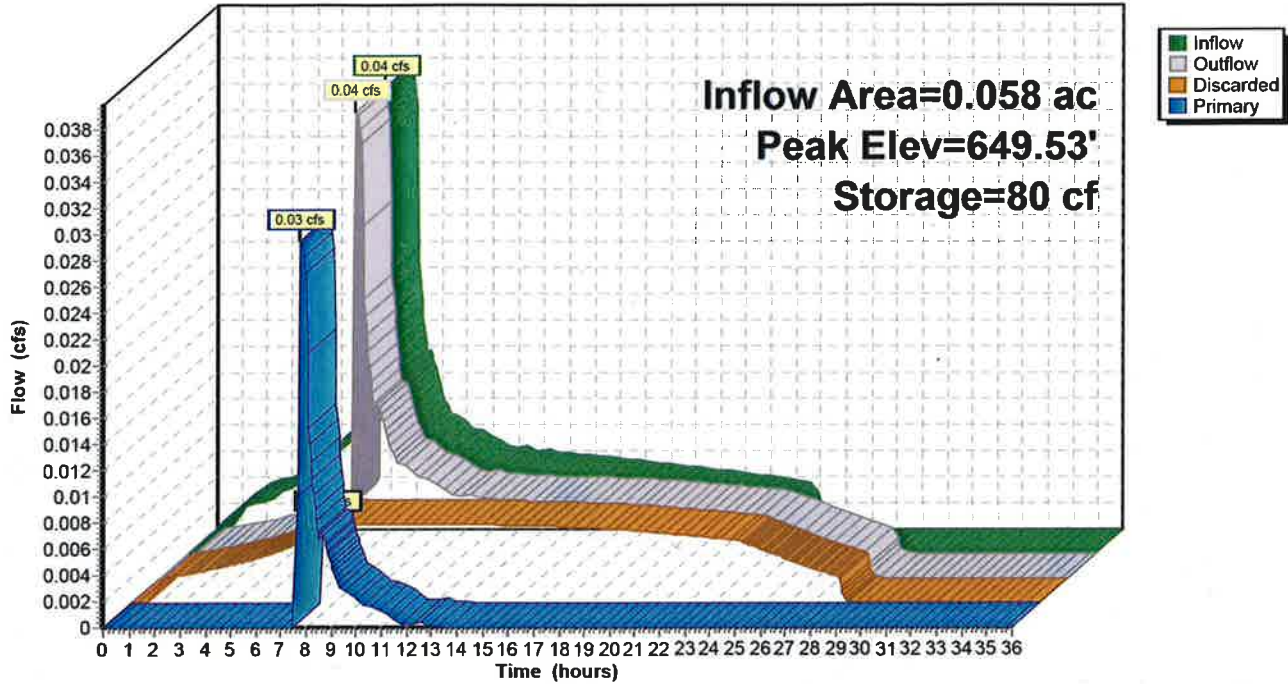




Exhibit B

Geotechnical Report

GEOTECHNICAL REPORT

**Holce Trailead
LCE Job 2615
Vernonia, OR**

For

**Columbia County
30 July 2024**



**EXPIRES:
12/31/2024**



3915 SW Plum Street
Portland, OR 97219
503-816-3689

1- INTRODUCTION

Rapid Soil Solutions Inc (RSS) has prepared this geotechnical report, as requested, for the proposed 16,000 square-foot Holce Trailhead improvements at the eastern end of E. Knott Street within the Columbia County parcel adjacent to the City of Vernonia in the Primary Forest Zone. The site is currently vacant with a gravel portion within the site. The site is approximately 0.37-acre parcel, is accessible via E. Knott Street, and is not currently assigned a street address. RSS understands that the proposed improvements will be positioned within the entire parcel.

This report is based on visual observations of the subject site, three shallow hand auger borings, and a review of available literature as referenced at the end of this report. Slopes and disturbance envelopes discussed in this report are approximate, primary based on on-site observations by RSS staff. RSS conducted site investigations on July 18th, 2024; RSS visited the site unaccompanied.

2- SITE DESCRIPTION

2.1 Location

The subject site is located in Columbia County within the city of Vernonia, Oregon. It is not currently assigned a street address. It is positioned 0.6 miles east of Highway 47, 0.7 miles east of the Nehalem River, 200 feet northeast of Knickerson Creek, and 2.5 miles east of the community of Vernonia, Oregon. It is situated on E. Knott Street about 0.7 miles east of its intersection with Highway 47. The 0.37-acre parcel is a roughly 160' by 130' rectangle, connected to E. Knott Street and slopes gently to the west. There are no adjacent parcels with the exception of the parcel across the road, 1780 E. Knott Street (north).

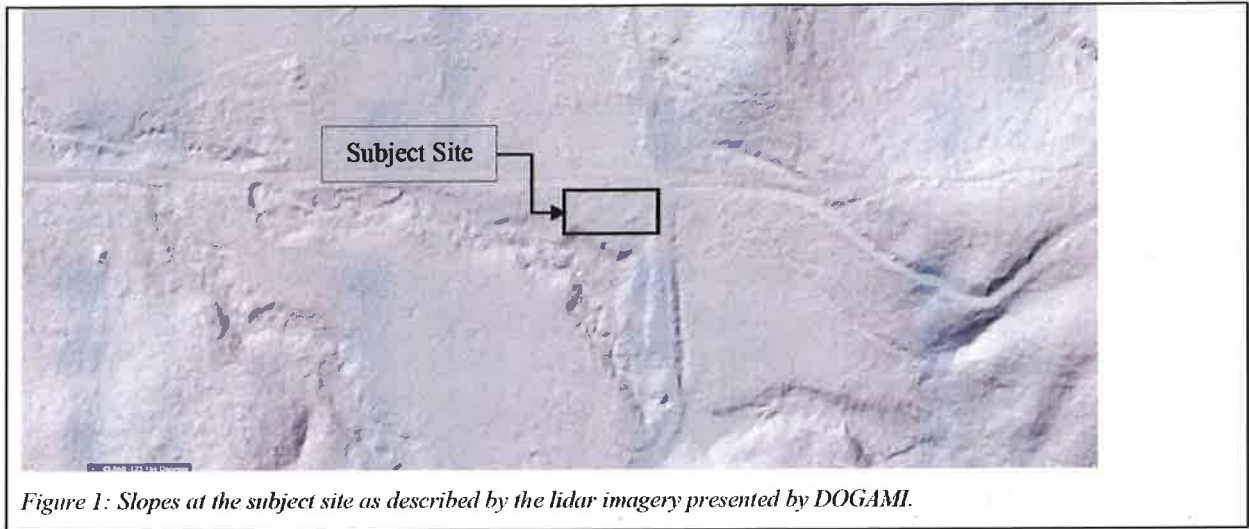
The site can be found in the southwestern quarter of the northeastern quarter of Section 3, Township 4-North, Range 4-West (W.M.) in Columbia County. The latitude and longitude of the site are 45.866761 and -123.160926 (45°52'00"N, 123°09'39"W). The site can be found in the northeastern portion of the Vernonia 7.5-minute quadrangle.

The property is situated at the base of rural slopes. The region is dominated by farmland, with a small collection of rural residential parcels nearby along E. Knott Street.

2.2 Slopes

The subject site is situated within irregular slopes of the Oregon Coast Range Mountains. The local uplands contain rolling slopes underlain by igneous sheet flows of the Columbia River Basalt Group. Twenty-foot contours presented by Columbia County Maps Online indicate that the subject property ranges from an elevation of 660 feet above mean sea level to 6500 feet above mean sea level.

At the southwest corner of the property, there is a 50' riparian boundary and Knickerson Creek. Lidar imagery suggest that the northern portions of the drainage gully contain a narrow channel, most likely containing flowing water for some portion of the year. These streams have very little sinuosity as they descend. Imagery of the subject site and surrounding slopes depict a smooth morphology with gradual transitions in grade.



2.3 Built/ Historical Conditions

The subject site is vacant and undeveloped. The proposed subject site is currently occupied by a native grass field and an unmarked gravel parking area.

Historic aerial imagery dating to 1984 was referenced as part of this investigation. This imagery indicates that the proposed area has been un occupied since at least 1984.

3- GEOLOGY

3.1 Regional Geology

The geologic and structural setting of the Pacific Northwest is dominated by its proximity to the active, oblique subduction of the oceanic Farallon (Juan de Fuca) plate beneath the North

American continental plate margin. The subject site is situated within the Oregon Coast Range mountains, an uplifted belt of land extending roughly 200 miles and is comprised of moderately high mountains (averaging 1,500' in elevation with a maximum of 4,097') with a width of roughly 30- to 40-miles. Over tens of millions of years materials built up on the ocean floor, influenced by sea level fluctuations, birth and eventual erosion of nearby volcanoes, and the ongoing sediment supply from the adjacent continent. This mountain range is primarily comprised of accreted oceanic sediments and synchronously deposited igneous rocks (where the sediments overlay, underlay and are intruded by the volcanic flows). The compressional forces of the subduction zone uplifted the Oregon Coast Range to its modern height.

Flows of the Columbia River Basalt Group have capped the uplands in the eastern flanks of this mountain range. These flood basalts were emplaced roughly 15 to 16 million years ago. The hot, fluid lava was produced by dozens of fissure eruptions in eastern Oregon and Washington. It flowed across much of the eastern half of both Oregon and Washington, eventually reaching the Pacific Ocean. The physical properties of these flows are very similar, often making it difficult to distinguish between individual flows. The flood basalts were originally emplaced as flat sheets, but prolonged faulting and folding as created the modern structural environment. Local bedrock generally dips towards the east and south.

3.2 Site Geology

As a group the Columbia River Basalts are generally described as basaltic lava flows with interflow zones of breccia, ash and baked soil. Unweathered flows are generally comprised of blue-black, dense and finely crystalline basalt that often forms well-developed columns. Weathered flows are reddish-brown to gray-brown, crumbly to medium dense basalt. Structural deformation has creating abundant faulting in the local uplifted ridges, creating a variable degree of fracturing. The upper 100 to 200 feet of the unit can be deeply weathered to decomposed. Around the local region, the thickness of the unit ranges dramatically. The edges of the unit often pinch out or are featheredged. Internally, some sections can contain thickness exceeding 900 feet.

3.3 Geologic Hazard Document Review

The Oregon HazVu: Statewide Geohazard Viewer was reviewed on July 23rd, 2024 to investigate mapped geological hazards.

This review indicates that the subject site is outside the 100-year floodplain, as mapped by FEMA.

The expected earthquake-shaking hazard is classified as severe (VIII on the instrumental intensity map). The probability of damage from shaking is classified as 10-20%. The site has no mapped liquefaction susceptibility, crystalline bedrock is not susceptible to liquefaction during severe shaking events.

Numerous faults are mapped cross-cutting the local bedrock, the majority of these faults are not classified as active. The nearest fault mapped as active by DOGAMI is located over 13 miles from the site.

Landslide mapping indicates that there are no landslides on or adjacent to the proposed site. Slide areas are mapped southwest of the proposed site, southwest of Knickerson Creek. Regional landslide susceptibility models indicate that the proposed area has a moderate susceptibility to landsliding.

4- GEOTECHNICAL INVESTIGATION

A geotechnical investigation was conducted 18 July, 2024. Three shallow hand auger borings were conducted to characterize subsurface soil and collected samples for laboratory analysis. RSS additionally conducted a visual geologic hazard reconnaissance.

4.1 Field Exploration Program

The field exploration program for the Site included three shallow hand auger borings advanced to a depth of 4 feet below the ground surface. These borings provide the means to characterize subsurface soils and collected soil samples for laboratory analysis. The locations of the borings are noted in the appendix.

A Geologist in Training (GIT) observed the borings and logged the subsurface materials. The soil descriptions were reviewed by a professional engineer. The logs were created using the Unified Soil Classification and Visual Manual Procedure (ASTM-D 2488). Boring logs are included in the Appendix. Results of the field explorations are discussed in the Section 5.2.

4.2 Laboratory Testing Program

Three soil samples were collected for laboratory analysis. All three samples were analyzed for soil moisture content. One sample was analyzed with an Atterberg limit test.

Samples collected for laboratory analysis were transported to the lab in sealed plastic bags.

5.0 RESULTS OF INVESTIGATION

5.1 Site Observations/ Conditions

RSS traversed the fielded portion of the parcel. RSS noted the following characteristics about the Site:

- Grade changes across the site were observed to be gradual and smooth.
- No standing or flowing water was observed at the subject site at the time of the site visit.

5.2 Subsurface Conditions

Soil units encountered in the borings are summarized in the following Table 1. The locations are shown in the Appendix.

Table 1: Soil Units Encountered

Soil Units		Soil Unit Depths (ft)		
Description	USCS	HA#1	HA#2	HA#3
Medium stiff silts with fine organics and grass roots, found at the surface across the site. Soils are medium brown in color and generally dry to damp. Gravel at the surface at HA-3	TP	0-0.5	0-0.5	0-1
<u>Low Plasticity Silty-CLAY to clayey-SILT.</u> Damp to moist, medium gray brown, some gravel and fine-grained sand, low plasticity clayey-SILT. The soil appearance and texture are consistent with soils developed at the weathering upper edges of Columbia River Basalt Group flows.	CL-ML	0.5-2	0.5-2	1-2
<u>Silty-CLAY to clayey-SILT:</u> Medium dark gray brown colored, stiff silts. Slightly increasing moisture with depth in HA#1 and HA#2.	CL-ML	2-4	2-4	

Note: np not present, USCS Unified Soil Classification System Group Symbol (from ASTM D 2487) based on visual observation

5.3 Groundwater

No surface water was observed at the subject site. Perched groundwater is pervasive across the local region. No groundwater or seeps were observed during subsurface investigations.

5.4 Laboratory Tests

Three samples were collected for moisture content. Moisture content ranged from 18% to 23.6%. One Atterberg limit test was conducted, RSS found a liquid limit of 29.3% and a plasticity index of 6.9% (CL-ML).

6- GEOTECHNICAL DESIGN AND RECOMMENDATIONS

6.1 Foundation Design

The building foundations may be installed on either engineered fill or firm native sub-grade that is found at a depth of about 0.5- 1ft. This depth may be locally variable and should be confirmed by a geotechnical engineer or their representative at the time of construction. ***Please allow 48hours notice to call for foundation inspections.***

Continuous wall and isolated spread footings should be at least 16 and 24 inches wide, respectively. The bottom of exterior footings should be at least 16 inches below the lowest adjacent exterior grade. The bottom of interior footings should be at least 12 inches below the base of the floor slab.

Footings placed on engineered fill or firm native sub-grade should be designed for an allowable bearing capacity is 2,000 pounds per square foot (psf). The recommended allowable bearing

pressure can be increased by 1/3 for short-term loads such as those resulting from wind or seismic forces.

Based on our analysis the total post-construction settlement is calculated to be less than 1 inch, with differential settlement of less than 0.5 inch over a 50-foot span for maximum column, perimeter footing loads of less than 100 kips and 6.0 kips per linear foot.

Lateral loads on footings can be resisted by passive earth pressure on the sides of the structures and by friction at the base of the footings. An allowable lateral bearing pressure of 150 *pounds per cubic foot (psf/f)* below grade may be used. Adjacent floor slabs, pavements or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

Engineering values summary

Bearing capacity soil:	2,000psf
Coefficient of friction soil:	0.32
Active pressure	40pcf
Passive pressure	300pcf

6.2 Seismic Design Criteria

The seismic design criteria for this project found herein is based on the ASCE 7-16. A summary of IBC seismic design criterion is below it is generated from the USGS web site for earthquake hazards using a latitude of 45.866761 and a longitude -123.160926, soil site class D, Null = see section 11.4.8

	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	S _s = 0.925 g	S ₁ = 0.471 g
Adjusted Spectral Acceleration	S _{MS} = 1.045 g	S _{M1} = null
Design Spectral Response Acceleration Perimeters	S _{DS} = 0.697 g	S _{D1} = null

6.3 Parking lot cross section

The required section for field department loading is 8in of total rock, which is broken up as 6in of 1 1/2" minus and 2" of 3/4" minus. This supports a 75,000lb truck. RSS will write a field report at that time of the driveway being ready for rock. A proof roll is required with either a loaded dump truck or water truck. If grading takes place in the winter time than geo-textile fabric is required before rock is placed.

6.4 Excavations

The initial site preparation will consist of topsoil stripping, and the removal of trees, where applicable. Removal of trees should include removal of the root ball, and any roots greater than 1/2-inch in diameter. *Please allow 48hour notice for subgrade inspections.*

Excavations can be accomplished with conventional excavating equipment. All excavations for footings and subgrades in the coarse-grained sand should be performed by an excavator or backhoe equipped with a bucket with teeth.

Because of safety considerations and the nature of temporary excavations, the Contractor should be made responsible for maintaining safe temporary cut slopes and supports for utility trenches, etc. We recommend that the Contractor incorporate all pertinent safety codes during construction, including the latest OSHA revised excavation requirements, and based on soil conditions and groundwater evidenced in cuts made during construction.

6.5 Groundwater Management

The Contractor should be made responsible for temporary drainage of surface water and groundwater as necessary to prevent standing water and/or erosion at the working surface.

The ground surface around the structure should be sloped to create a minimum gradient of 2% away from the building foundations for a distance of at least 5 feet. Surface water should be directed away from all buildings into drainage swales or into a storm drainage system. "Trapped" planting areas should not be created next to any buildings without providing means for drainage. Foundation house drains are required.

6.6 Construction Observation

Prior to pouring any foundation the excavation shall be observed by the Geotechnical Engineer to ensure that the above items have been properly removed. ***Please allow 48-hour notice to call for subgrade inspections.*** Failure to do so can lead to foundation issues with the house. For placement of any backfilling RSS shall be called to provide compaction testing or probing of the fills

6.7 Conclusions

There are no issues with the development of the lot and the parking area.

7.0 Limitations

This report has been prepared for the exclusive use of the addressee, and their architects and engineers for aiding in the design and construction of the proposed development. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials and contractors to ensure correct implementation of the recommendations.

The opinions, comments and conclusions presented in this report were based upon information derived from our literature review, field investigation and laboratory testing. Conditions between, or beyond, my exploratory test pits may vary from those encountered. Unanticipated soil conditions and seasonal soil moisture variations are commonly encountered and cannot be fully determined by merely taking soil samples. Such variations may result in changes to our recommendations and may require that additional expenditures be made to attain a properly

constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

If there is more than 2 years time between the submission of this report and the start of work at the site; if conditions have changed due to natural causes or construction operations at, or adjacent to, the site; or, if the basic project scheme is significantly modified from that assumed, it is recommended this report be reviewed to determine the applicability of the conclusions and recommendations. The work has been conducted in general conformance with the standard of care in the field of geotechnical engineering currently in practice in the Pacific Northwest for projects of this nature and magnitude. No warranty, express or implied, exists on the information presented in this report. By utilizing the design recommendations within this report, the addressee acknowledges and accepts the risks and limitations of development at the site, as outlined within the report.

8.0 REFERENCES

- Columbia County Web Maps (<http://webmap.co.columbia.or.us/geomoose2/>)
DOGMAI Geologic Map of Oregon (<https://gis.dogami.oregon.gov/maps/geologicmap/>)
DOGAMI Oregon HazVu: Statewide Geohazards Viewer (<https://www.oregongeology.org/hazvu/>)
DOGMAI & Oregon Lidar Consortium, Lidar Viewer. (<https://gis.dogami.oregon.gov/maps/lidarviewer/>)
DOGAMI SLIDO: Statewide Landslide Information Layer for Oregon.
(<https://gis.dogami.oregon.gov/maps/slido/>)
Google Earth
Google Maps (<https://www.google.com/maps/>)
Metromap (<https://gis.oregonmetro.gov/metromap/>)
United States Department of Agriculture Natural Resources Conservation Service: Web Soil Survey.
(<http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>)
USGS topographic map viewer (<https://ngmdb.usgs.gov/topoview/viewer/>)
USGS Earth Explorer (earthexplorer.usgs.gov/)
Newton, V.C., Jr., and Van Atta, R.O., 1976, Prospects for natural gas production and underground storage of pipe-line gas in the Upper Nehalem basin, Columbia-Clatsop Counties: Oregon Department of Geology and Mineral Industries, Oil and Gas Investigations 5, scale 1:75,000.
Walsh, T.J., 1987, Geologic map of the Astoria and Ilwaco quadrangles, Washington and Oregon: Washington Division of Geology and Earth Resources, Open File Report 87-2, scale 1:100,000.
Warren, W.C., Norbistrath, Hans, and Grivetti, R.M., 1945, Geology of northwestern Oregon west of Willamette River and north of latitude 45 degrees and 15 minutes: U.S. Geological Survey, Oil and Gas Investigations Map OM-42, scale 1:145,728.
Wells, R.E., and Sawlan, M.G., 2014, Preliminary geologic map of the eastern Willapa Hills, Cowlitz, Lewis, and Wahkiakum Counties, Washington: U.S. Geological Survey, Open-File Report OF-2014-1063, scale 1:50,000.

Appendix

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

VERNONIA QUADRANGLE
OREGON
7.5-MINUTE SERIES

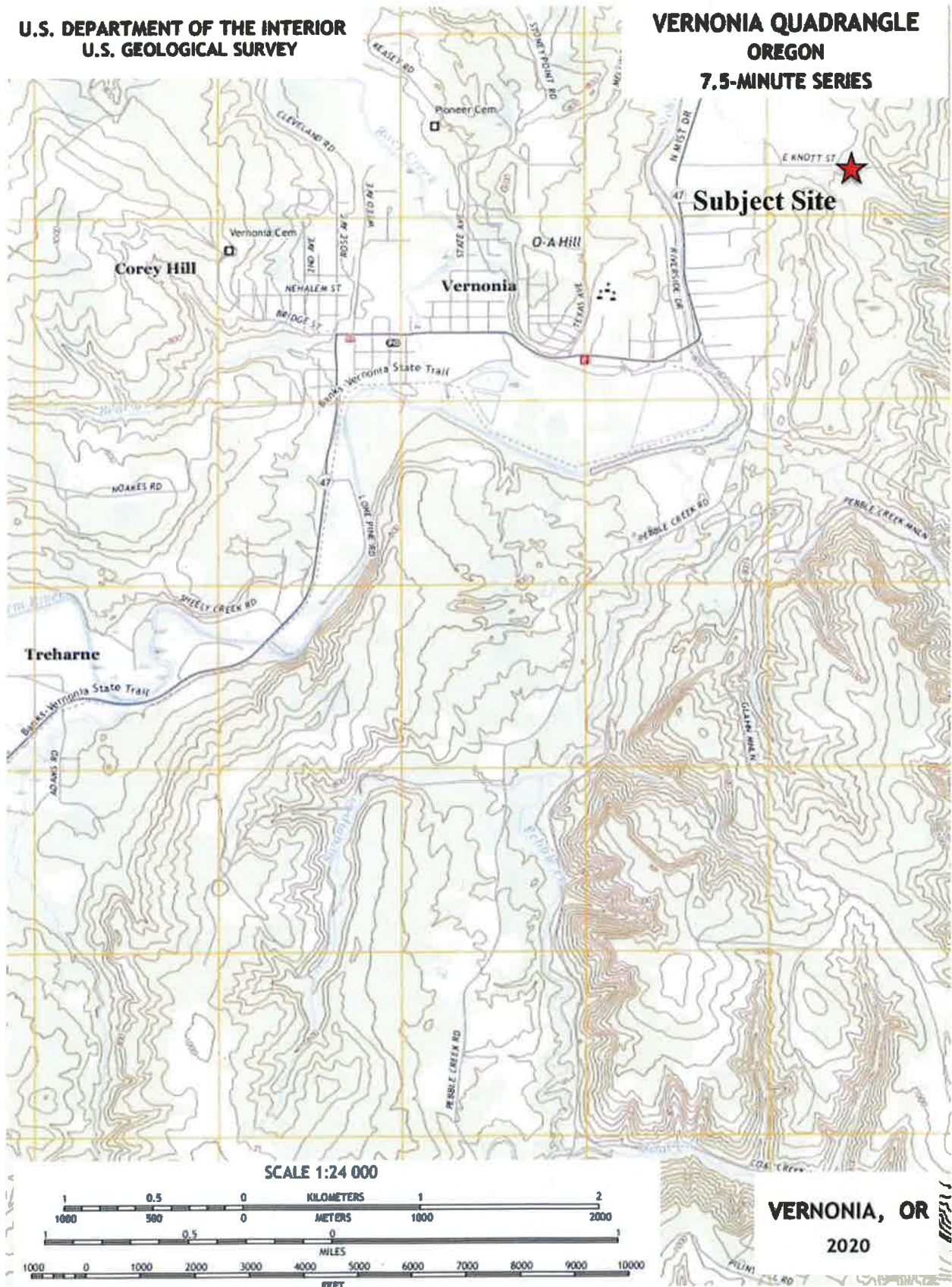


Figure 1: Subject site location on the NW quarter of the Vernonia Quadrangle

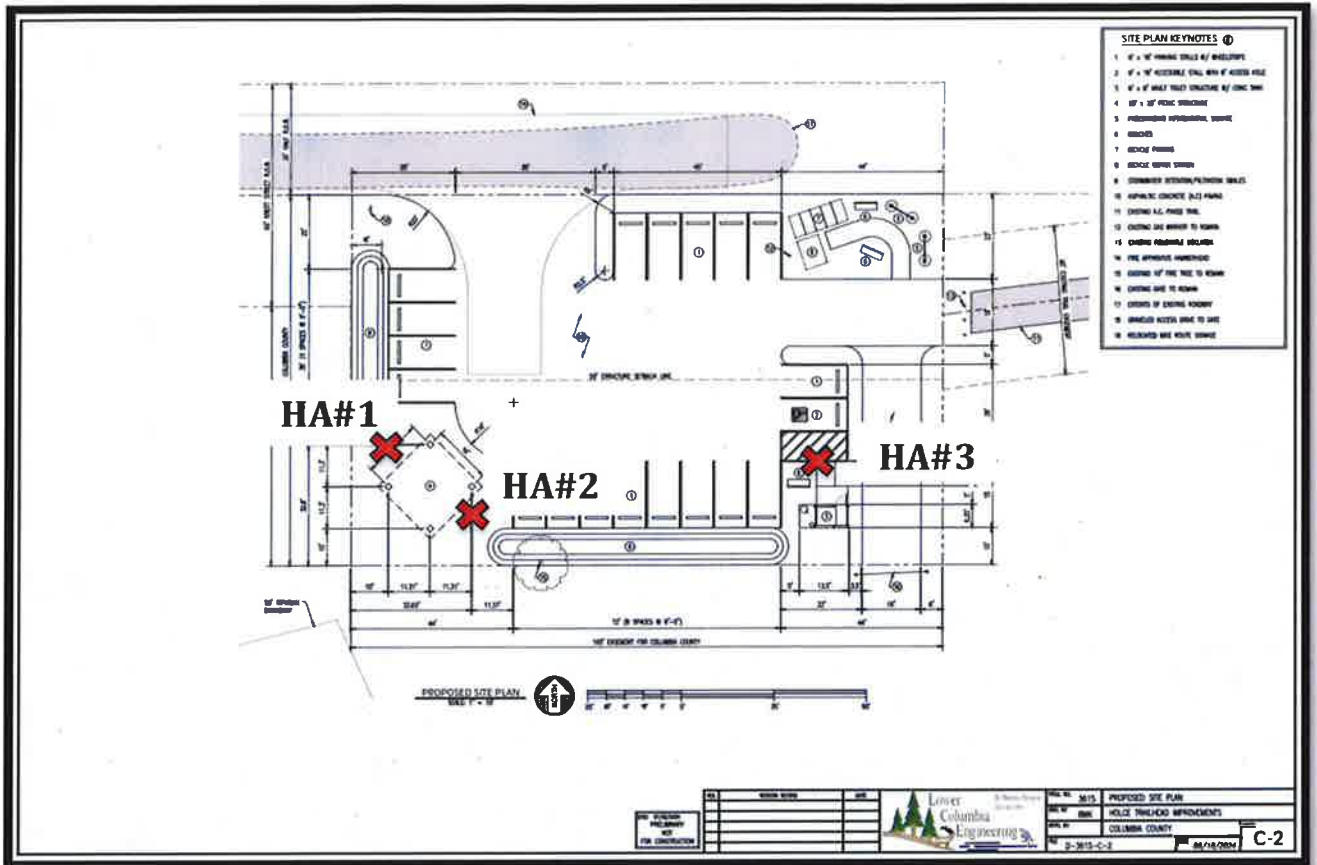


Figure 2: Approximate boring locations on a provided site plan.

Moisture

Sample number	HA-1	HA-1	HA-2	HA-3
1 Date and time in oven	07/19/2024 - 12:52PM	07/19/2024 - 12:52PM	07/19/2024 - 12:52PM	07/19/2024 - 12:52PM
2 Date and time out of oven	07/20/2024 - 06:00PM	07/20/2024 - 06:00PM	07/20/2024 - 06:00PM	07/20/2024 - 06:00PM
3 Depth (ft)	2	4	4	2
4 Tare No.	4	5	6	7
5 Tare Mass	232	234	234	232
6 Tare plus sample moist	579	829	883	945
7 Tare plus sample dry	526	717	759	829
8 Mass of water (g)	53	112	124	116
9 Mass of soil (g)	294	483	525	597
10 Water Content (%)	18.0	23.2	23.6	19.4

Atterberg Limit Test

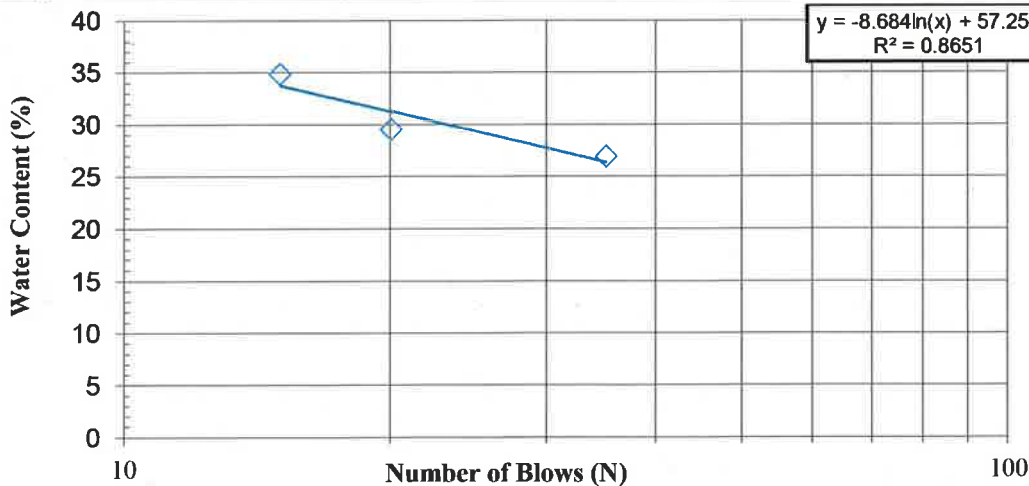
Sample Number: HA-1

Depth: 2-ft

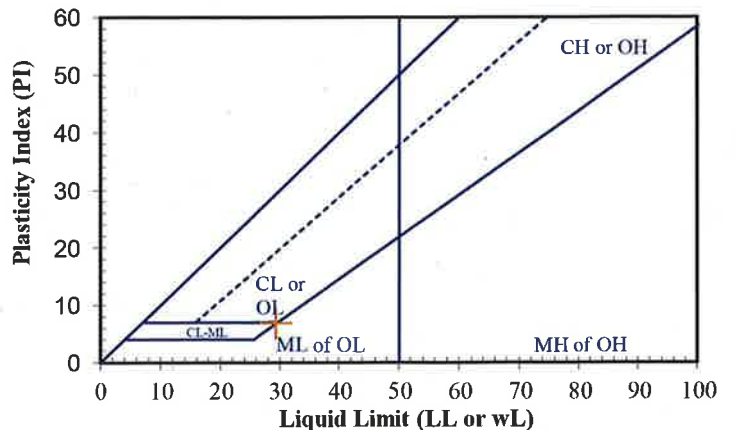
Liquid Limit

Plastic Limit

	d2.3	d3.1	d3.2	d3.3	d4.1
1 Tare No.					
2 Tare Mass (g)	39.92	39.67	39.85	40.74	40.61
3 Tare Plus Wet Soil (g)	97.95	104.88	111.90	42.64	43.65
4 Tare Plus Dry Soil (g)	85.63	90.00	93.28	42.30	43.08
5 Mass of Water (g)	12.32	14.88	18.62	0.34	0.57
6 Mass of Soil (g)	45.71	50.33	53.43	1.56	2.47
7 Water Content (%)	26.95	29.56	34.85	21.79	23.08
8 No. Blows	35	20	15		



Liquid Limit (%) 29.3
 Plastic Limit (%) 22.4
 Plasticity Index (%) 6.9
 USCS Classification of fines: CL- ML



HA-1

Surface Elevation:
 Boring Date: 18 July 2024
 Boring Location: Knott Street
 Drilling Method: Hand Auger

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					TP	Topsoil
0.5					CL-ML	Dry to damp, medium brown, fine grained, slightly stiff, some rootlets, clayey-SILT
2.0	LL=29.3, PF=6.9	18.0			CL-ML	Damp to moist, medium gray brown, trace of fine grained sand, silty-CLAY to clayey-SILT
4.0		23.2				Boring completed at a depth of 4'

SuperLog CivilTech Software, USA www.civiltech.com
 File: C:\Users\Owner\Desktop\HA LOGS\HA-1 - KNOTT ST - VERNONIA.log Date: 7/28/2024

LOG OF BORING

HA-2

Surface Elevation:
 Boring Date: 18 July 2024
 Boring Location: Knott Street
 Drilling Method: Hand Auger

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					TP	Topsoil
0.5					CL-ML	Dry to damp, medium brown, fine grained, slightly stiff, some rootlets, clayey-SILT
2.0					CL-ML	Damp to moist, medium gray brown, trace of fine grained sand, silty-CLAY to clayey-SILT
4.0	23.6					
7.0						

LOG OF BORING

SuperLog CivilTech Software, USA www.civiltech.com
 File: C:\Users\Owner\OneDrive\Projects\HA-2\LOGS\HA-2-KNOTT-ST-VERNONIA.log Date: 7/26/2024

HA-3

Surface Elevation:
 Boring Date: 18 July 2024
 Boring Location: Knott Street
 Drilling Method: Hand Auger

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0						
0 - 0.5					TP	Topsoil and parking area gravel
0.5 - 1.0					CL-ML	Dry to damp, dark brown, trace roots and fine gravels, medium stiff, silty-CLAY to clayey-SILT
1.0 - 2.0	19.4					Boring completed at a depth of 2'
2.0 - 3.0						
3.0 - 4.0						
4.0 - 5.0						
5.0 - 6.0						
6.0 - 7.0						

LOG OF BORING

RAPID SOIL SOLUTIONS

Knott Street
 Vernonia, OR

Plate 3

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Users\Owen\Desktop\LOGS\HA-3 - KNOTT ST - VERNONIA.log Date: 7/26/2024



Exhibit C

Wetlands Determination Report

OFFSITE WETLAND DETERMINATION REPORT
OREGON DEPARTMENT OF STATE LANDS
775 Summer Street NE, Suite 100, Salem OR 97301-1279 Phone: (503) 986-5200

BATCH
WD#: 2022-0141

At your request, an offsite wetland determination has been conducted on the property described below.

County: Columbia

City: Vernonia

Other Name & Address: Casey Garrett, Columbia County, 230 Strand St., St. Helens, OR 97051

Township: 4N Range: 4W Section: 3 Q/Q: Tax Lot(s): 100

Project Name: Crown Zellerbach Trail- Holce Trailhead

Site Address/Location: East end of Knott St

- The National Wetlands Inventory or Local Wetlands Inventory shows a wetland on the property.
- The county soil survey shows hydric (wet) soils on the property. Hydric soils indicate that there may be wetlands.
- It is unlikely that there are jurisdictional wetlands or waterways on the property based upon a review of wetlands maps, the county soil survey and other information. An onsite investigation by a qualified professional is the only way to be certain that there are no wetlands.
- There may be wetlands/waterways on the property that are subject to the state Removal-Fill Law.
 - A state permit is required for ≥ 50 cubic yards of fill, removal, or ground alteration in the wetlands or waterways.
 - A state permit may be required for any amount of fill, removal, or other ground alteration in the Essential Salmonid Habitat and hydrologically associated wetlands.
- A state permit will be required for the project if impacts
- The proposed parcel division may create a lot that is largely wetland and thus create future development problems.
- A wetland delineation by a qualified wetland consultant is recommended prior to site development. The wetland delineation report should be submitted to DSL for review and approval.
- A permit may be required by the Army Corps of Engineers: (503) 808-4373

Note: This report is for the state Removal-Fill Law only. City or County permits may be required for the proposed activity.

Comments: Based on a review of the available information, construction of the Holce Trailhead, as indicated on the attached map, appears to avoid impacts to onsite waters and possible wetlands.

Determination by:  Chris Stevenson _____ Date: 3/21/2022

This jurisdictional determination is valid for five years from the above date, unless new information necessitates a revision. Circumstances under which the Department may change a determination and procedures for renewal of an expired determination are found in OAR 141-090-0045 (available on our web site or upon request). The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months from the above date.

This is a preliminary jurisdictional determination and is advisory only.

Copy To: Casey Garrett casey.garrett@columbiacountyor.gov Enclosures: Project Map
 City of Vernonia
 Riley Baker, Columbia County riley.baker@columbiacountyor.gov

FOR OFFICE USE ONLY

Entire Lot(s) Checked? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waters Present <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	Request Received: 03/11/2022
LWI Area: N/A LWI Code: N/A	Latitude: 45.866773 Longitude: -123.159367	Related DSL File # N/A
Has Wetlands? <input type="checkbox"/> Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Unk	ESH? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	Wild & Scenic? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N
	State Scenic? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	Coast Zone? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Unk
Adjacent Waterbody: <u>Knickerson Creek</u> NWI Quad: Vernonia <input type="checkbox"/> Scanned <input type="checkbox"/> Mailings Completed <input type="checkbox"/> Data Entry Completed		



INTERGOVERNMENTAL CONSULTATION FORM

STATE AGENCY REVIEW

A REVIEW OF A PROPOSED OUTDOOR RECREATION PROJECT FOR WHICH STATE GRANT ASSISTANCE HAS BEEN REQUESTED.

Project Name: Holce Trailhead Improvements
Applicant Agency: Columbia County
Requested Return Date: 4/1/2022

To Agency Addressed: If you intend to comment, but cannot respond by the return date, please notify us immediately. If no response is received by the due date, it will be assumed that you have no comment and the file will be closed.

STATE AGENCY REVIEW AND COMMENT

We have reviewed the project notice and have reached the following conclusions on its relationship to our plans and programs:

- [x] It has no effect.
[] We have no comment.
[] Effects, although measurable, would be acceptable.
[] It has adverse effects. (Explain in Remarks Section.)
[] We are interested, but require more information to evaluate the proposal. (Explain in Remarks Section.)
[] Additional comments for project improvement. (Attach if necessary).

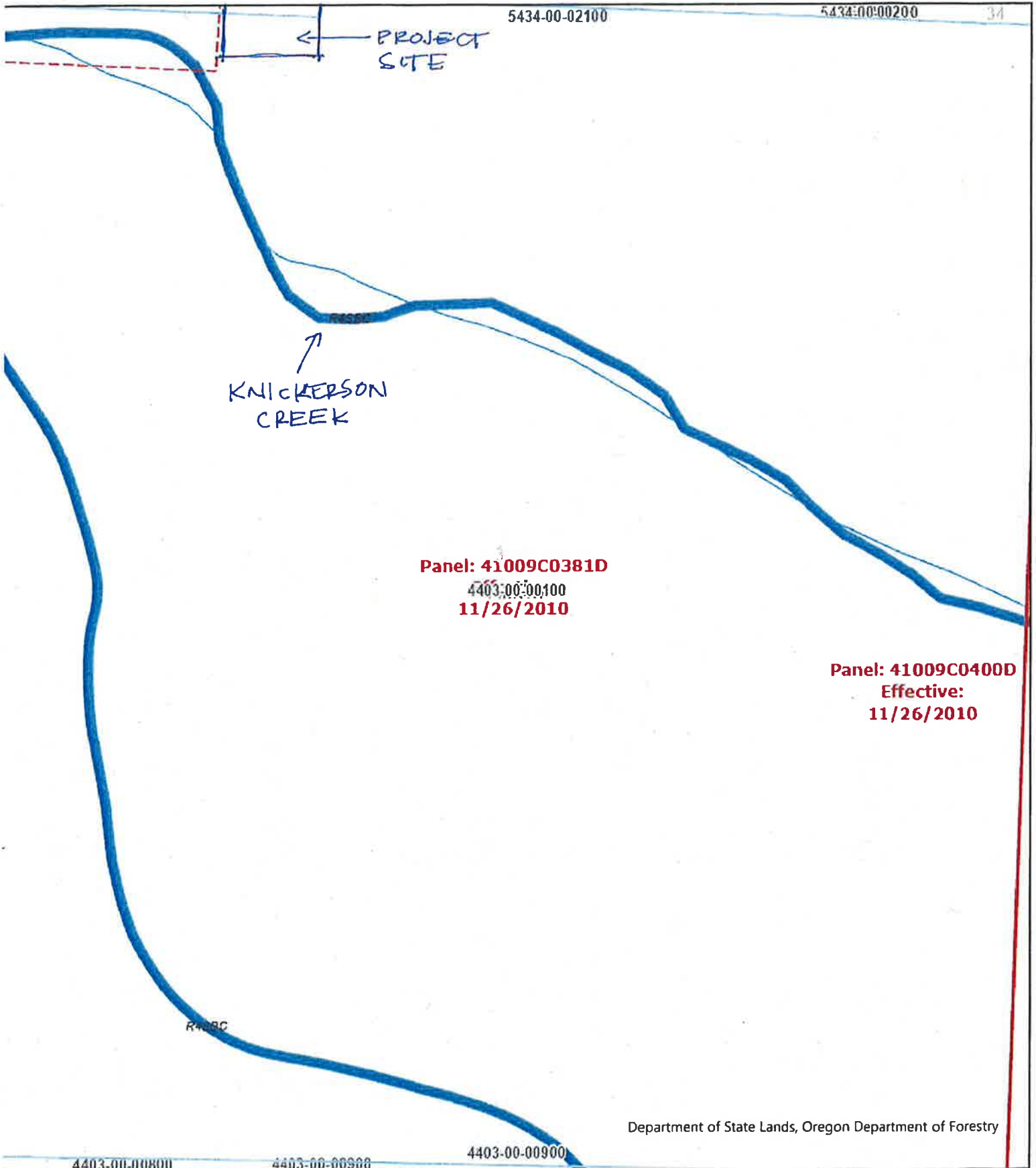
REVIEW AGENCY REMARKS:

Please see attached Offsite Wetland Determination.

Agency: Oregon Department of State Lands
Reviewed By: Chris Stevenson Title: Jurisdictional Coordinator
Email address: chris.stevenson@dsl.oregon.gov Phone: (503) 798-7622

Return to: (GRANT APPLICANT - INSERT NAME AND ADDRESS HERE)

Columbia County Web Map



Department of State Lands, Oregon Department of Forestry

6/10/2024 3:13 PM



Exhibit D

Knickerson Creek Centerline Map

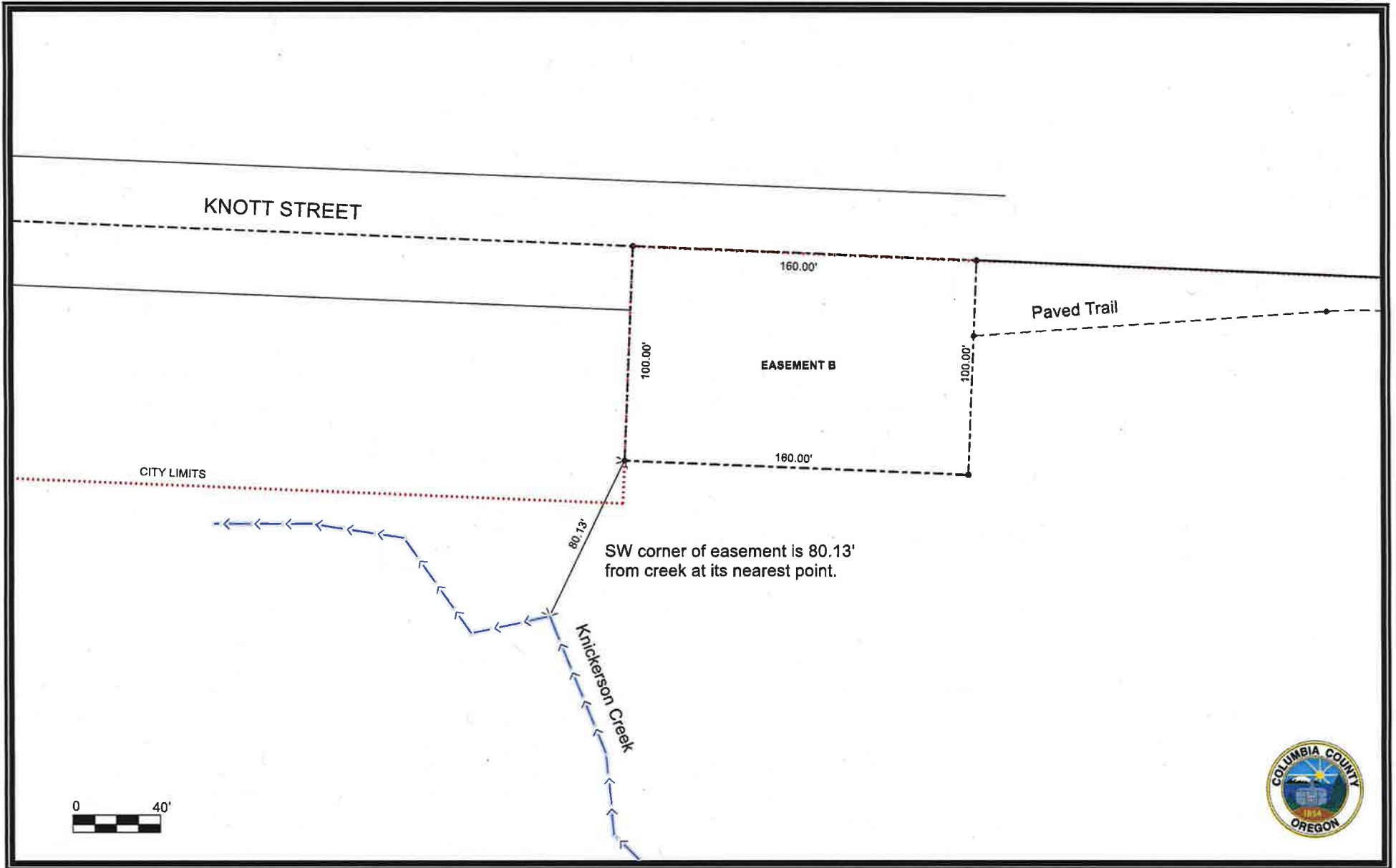




Exhibit E

Fire District Letter



Vernonia Rural Fire Protection District

555 E Bridge St Vernonia OR, 97064

"To Better Serve Our Community Through Preparation, Awareness, and Perseverance"

July 10, 2024

LOWER COLUMBIA ENGINEERING, LLC

58640 McNulty Way

St. Helens, Oregon 97051

Erica@lowercolumbiaengr.com

RE: Holce Trailhead Project

Dear Ms. Smith,

I am writing to inform you that we have received and reviewed your site plan for the Holce Trailhead project in Vernonia, Oregon. After reviewing your site plan as well as doing an on-site inspection, VRFPD has concluded that it does meet the fire department access and water supply requirements referenced in the Oregon Fire Code. As for the secondary fire break easement you will need to contact either the City of Vernonia, or Columbia County Building Department, as fire departments only have jurisdiction over access and water supply.

If you have any questions please contact me at the phone number, or email address, listed below.

Thank you,

Brandon Carr
Lieutenant/EMT/Life Safety Specialist
Vernonia Rural Fire Protection District
503-429-8252

bcarr@vernoniarfpd.us











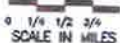


Exhibit F

Big Game Habitat Map & ODFW Comments

UPPER NEHALEM VALLEY C.P.A.C. WILDLIFE GAME HABITAT

LEGEND

	BIG GAME HABITAT		COLLIERSON WHITE-TAILED DEER - HANSEN REFUGE CORE HABITAT		UPLAND GAME AREAS
	PERIPHERAL BIG GAME HABITAT		COLLIERSON WHITE-TAILED DEER - OTHER CORE HABITAT		
	MAJOR INTERM. HABITAT		COLLIERSON WHITE-TAILED DEER - IMPROVED HABITAT		0 1/4 1/2 3/4 MILES

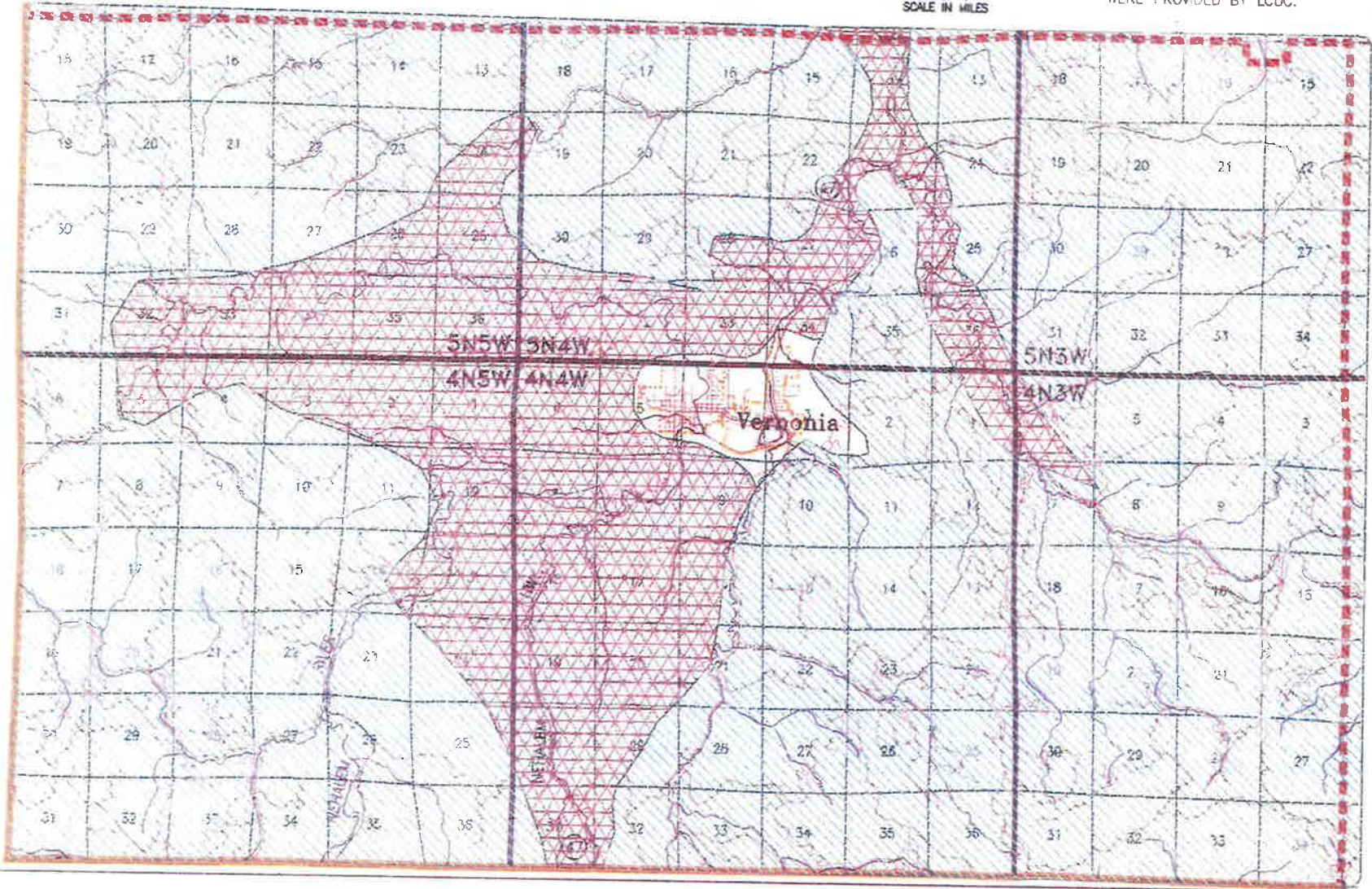
Columbia County

Prepared by: **book** book consultants incorporated

DATE: 6/26/95 PROJ. NO. 73824

FUNDS FOR THIS MAP WERE PROVIDED BY LCDC.

UPPN2.dwg



From: [CATE Benjamin R * ODFW](#)
To: [Brett Kahr](#)
Subject: RE: Review set for Holce Trailhead Project
Date: Wednesday, February 12, 2025 3:02:39 PM
Attachments: [image001.png](#)

Hey Brett,

Thanks for sending this along for our input. I don't see any issues with the project as described. Looks like you've accounted for riparian buffer, setbacks, and planning to control runoff with a silt fence, etc. Given the footprint of the new parking lot is basically the same as the paved area, I don't see any net loss of wildlife habitat.

Feel free to reach out if you have any questions.

Best,

Benjamin Cate (he/him)

District Wildlife Biologist, North Willamette Watershed District – Coast Unit

[Oregon Department of Fish and Wildlife](#)

18330 NW Sauvie Island Rd, Portland OR 97231

503-621-3488 ext. 5

Benjamin.r.cate@odfw.oregon.gov



From: Brett Kahr <brett@lowercolumbiaengr.com>
Sent: Friday, February 7, 2025 12:45 PM
To: CATE Benjamin R * ODFW <benjamin.r.cate@odfw.oregon.gov>
Subject: Review set for Holce Trailhead Project

You don't often get email from brett@lowercolumbiaengr.com. [Learn why this is important](#)

Good afternoon Ben –

As discussed, here is a partial drawing package for the proposed Holce Trailhead out in Vernonia. This should be enough to get you oriented to where we are in the world and the scope of work. As I mentioned, the County is just requesting input from ODFW on this location due to the proximity to big game habitat as well as being close to the Knickerson riparian corridor.

If you have any questions or need any additional information, please let me know. We'd like to have a response sometime early next week, if possible, to turn in to the County along with the rest of the land use package.

Thanks and have a great weekend!

Brett Kahr
Project Manager

LOWER COLUMBIA ENGINEERING, LLC

58640 McNulty Way

St. Helens, Oregon 97051

OFFICE **503.366.0399**

MOBILE **503.750.2349**

WEB www.lowercolumbiaengr.com

EMAIL brett@lowercolumbiaengr.com



Exhibit G

Traffic Impact Study

Memorandum

To: Riley Baker, General Services Director, Columbia County

From: Jennifer Danziger, PE
Ken Kim, PE

Date: September 12, 2024

Subject: Holce Trailhead for Crown Zellerbach Trail
Trip Generation and Sight Distance Evaluation



EXPIRES: 06/30/2025

Introduction

This memorandum estimates trip generation for the proposed Holce Trailhead improvements for the Crown Zellerbach Trail in Columbia County, Oregon. It also summarizes the preliminary sight distance evaluation at E Knott Street along Nehalem Highway (OR 47).

Project Description & Location

The proposed project site is located on Tax Lot 4403-00-00100 in Columbia County, Oregon. The proposed development includes upgrading the existing gravel parking area serving the trailhead with paved parking and site amenities. Access to the parking lot will be provided via a proposed driveway along E Knott Street. Figure 1 presents an aerial image of the nearby vicinity with the project site outlined in yellow. A site plan is attached.

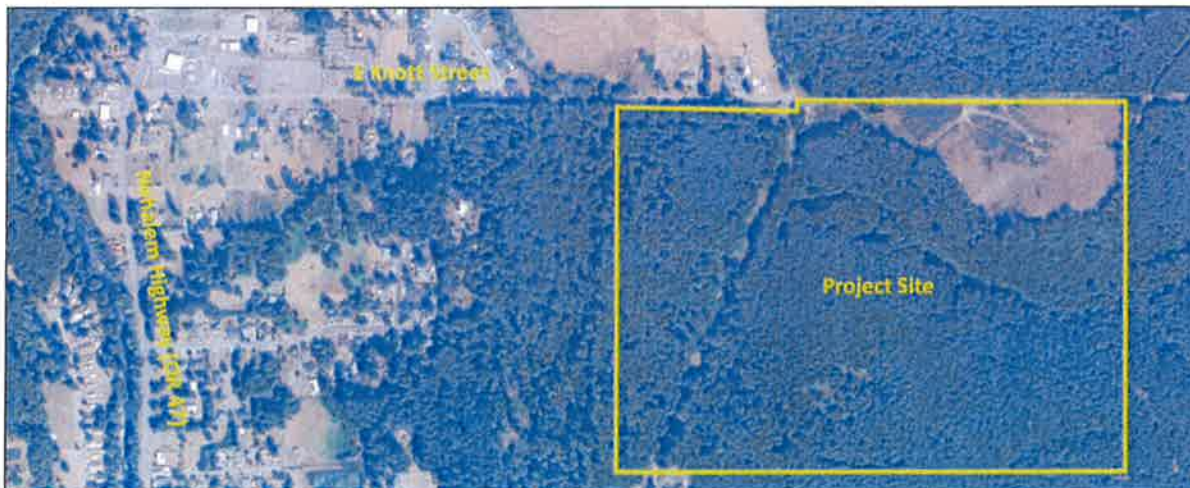


Figure 1: Project Location (image from Google Earth)

Trip Generation

No comparable land use code is available in the *Trip Generation Manual* for a trail or trailhead; therefore, an alternative approach to estimate the potential number of trips is proposed. Table 1 presents a matrix of scenarios based on the parking lot size, occupancy, and turnover rates were used to estimate a possible range of site trip generation.

Table 1: Potential Peak Hour Trip Generation for Trailhead & Parking Lot

Assumed Parking Occupancy	Potential Occupied Spaces	Average Trail Trip Duration	Parking Lot Hourly Turnover Rate	Potential Trips In/Out/Total
50%	10	60 minutes	100%	10/10/20
		90 minutes	67%	7/7/14
		120 minutes	50%	5/5/10
75%	15	60 minutes	100%	15/15/30
		90 minutes	67%	10/10/20
		120 minutes	50%	7/8/15
100%	19	60 minutes	100%	19/19/38
		90 minutes	67%	12/13/25
		120 minutes	50%	9/10/19

As shown in Table 1, depending on how full the parking lot is and how long each visitor stays, hourly trip rates range from as few as 10 trips to as many as 38 trips. Table 2 presents reasonable assumptions for average activity on a typical weekday and weekend day.

Table 2: Trip Generation Estimates for Trailhead & Parking Lot

Period	Assumed Parking Occupancy	Potential Occupied Spaces	Average Trail Trip Duration	Potential Trips In/Out/Total
Average Weekday Peak Hour				
Peak Hour	75%	15	60-90 minutes	12/13/25
Daily (Assuming daily is ~8 times peak hour)				100/100/200
Average Weekend Peak Hour				
Peak Hour	100%	19	90 minutes	12/13/25
Daily (Assuming daily is ~10 times peak hour)				125/125/250

Although trail trip duration may vary, it is reasonable to assume that the average will be in the 60-to-90-minute range for a typical weekday and that the parking lot will be no more than 75 percent occupied. Thus, the average potential peak hour trip generation is approximately 25 trips. Assuming the daily trip generation is 8 times the peak hour (assuming some low usage throughout the day and 3 to 4 hours of peak usage in the evenings) yields a daily trip rate of approximately 200 trips.



Trail trip duration is likely to be longer on weekends than weekdays; therefore, the average durations is assumed to be 90 minutes and the parking lot is assumed to be fully utilized. Thus, the average potential weekend peak hour trip generation is also approximately 25 trips. Assuming the daily trip generation is 10 times the peak hour (assuming fairly consistent usage over 10 to 12 hours of the day) yields a daily trip rate of approximately 370 trips.

Finally, it is important to remember that this trailhead already exists but is currently served by a gravel parking lot. Many of the trips in the estimates discussed above are not new trips; the trailhead already has existing usage. Therefore, these trip estimates reflect total usage not net new trips.

County Standard for Traffic Analysis

Per the Columbia County Zoning Ordinance, Section 1450, a traffic analysis is required when a proposed development will generate 25 or more trips during either the AM or PM peak hour, or more than 400 daily tips.

Based on the standard in the County Zoning Ordinance, the weekday trip generation results for the proposed development will fall below the threshold. Therefore, a TIA is not required.

Transportation System Safety Analysis

Crash Data Analysis

Using data obtained from ODOT's Crash Data System, a review of five years of the most recent available crash history (January 2018 through December 2022) was performed for the intersection of Nehalem Highway (OR 47) at E Knott Street. The crash data was evaluated based on the number of crashes, the type of collisions, and the severity of the collisions.

With regard to crash severity, ODOT classifies crashes into the following categories:

- *PDO* – Property Damage Only
- *Injury C* – Possible Injury
- *Injury B* – Suspected Minor Injury
- *Injury A* – Suspected Serious Injury
- *Fatality*

Three (3) crashes were reported near the intersection of Nehalem Highway (OR 47) at E Knott Street during the five-year analysis period. Two of the crashes were a fixed object or animal crash and One (1) crash was a rear-end crash. According to ODOT's crash reports, none of these crashes were related to the study intersection.

Based on the most recent five years of available crash data, no significant trends or crash patterns were identified at the study intersection that were indicative of safety concerns. Accordingly, no safety mitigation is recommended.



Sight Distance Evaluation

According to *Columbia County Roadway Standards*, the driver's eye is assumed to be 10 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye-height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement. The minimum sight distance requirement is 10 times the 85th percentile speed to be measured 10 feet. Nehalem Highway (OR 47) has a posted speed 45 mph; therefore, a design speed 50 (5 mph over the posted speed, 45 mph) was used for the sight distance calculations for E Knott Street along Nehalem Highway (OR 47). At 50 mph, the minimum sight distance requirements are 500 feet looking to both north and south of E Knott Street.

Stopping Sight distance (SSD) was also measured and evaluated in accordance with standards established in *A Policy of Geometric Design of Highways and Streets*¹. SSD is considered the minimum requirement to ensure safe operation at the intersection. This distance allows the driver of a vehicle traveling on the major street to react to a turning vehicle or other object in the roadway and come to a complete stop to avoid a collision. To ensure safe operation of a driveway, the available sight distance must at least equal the minimum required stopping sight distance. At a design speed of 50 mph, the SSD is 425 feet.

The available sight distance along Nehalem Highway (OR 47) was measured to be greater than 1,000 feet to the north of E Knott Street (i.e., looking right), which is greater than the County's minimum sight distance requirement (500 feet). The available sight distance along Nehalem Highway (OR 47) was measured to be 320 feet to the south of E Knott Street (i.e., looking left), which is less than the County's minimum sight distance requirement (500 feet), due to the existing trees on the south properties (Tax Lots: 4403-BB-00202 & 00200).

The available stopping sight distance for traffic approaching from the south was measured to be 380 feet. This length is slightly greater than the required AASHTO stopping sight distance (360 feet) at 45 mph, which is the posted speed for the roadway.

With some trimming of trees along the south properties, it may be possible to increase the sight lines for improved stopping sight distance but it may be difficult to achieve the 500-foot intersection sight distance in the Columbia County standards without tree removal.

Conclusions

Key findings of this study include:

- Based on the Trip Generation Analysis, the trip generation for the proposed development will fall below the threshold. Therefore, a TIA is not required. In addition, it is important to remember that this trailhead already exists but is currently served by a gravel parking lot. Many of the trips in the calculation are not new trips; the trailhead already has existing usage. Therefore, these trip estimates reflect total usage not net new trips.

¹ American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2018.



- Based on the crash data analysis, no significant trends or crash patterns were identified at the study intersection that were indicative of safety concerns. Accordingly, no safety mitigation is recommended.
- Based on the sight distance analysis, adequate intersection sight distance is available to the north. While sight lines do not meet the County's intersection sight distance standards, the national standard for stopping sight distance on the highway is met for the posted speed. With some trimming of trees along the south properties, it may be possible to increase the sight lines for improved stopping sight distance but it may be difficult to achieve the 500-foot intersection sight distance in the Columbia County standards without tree removal.

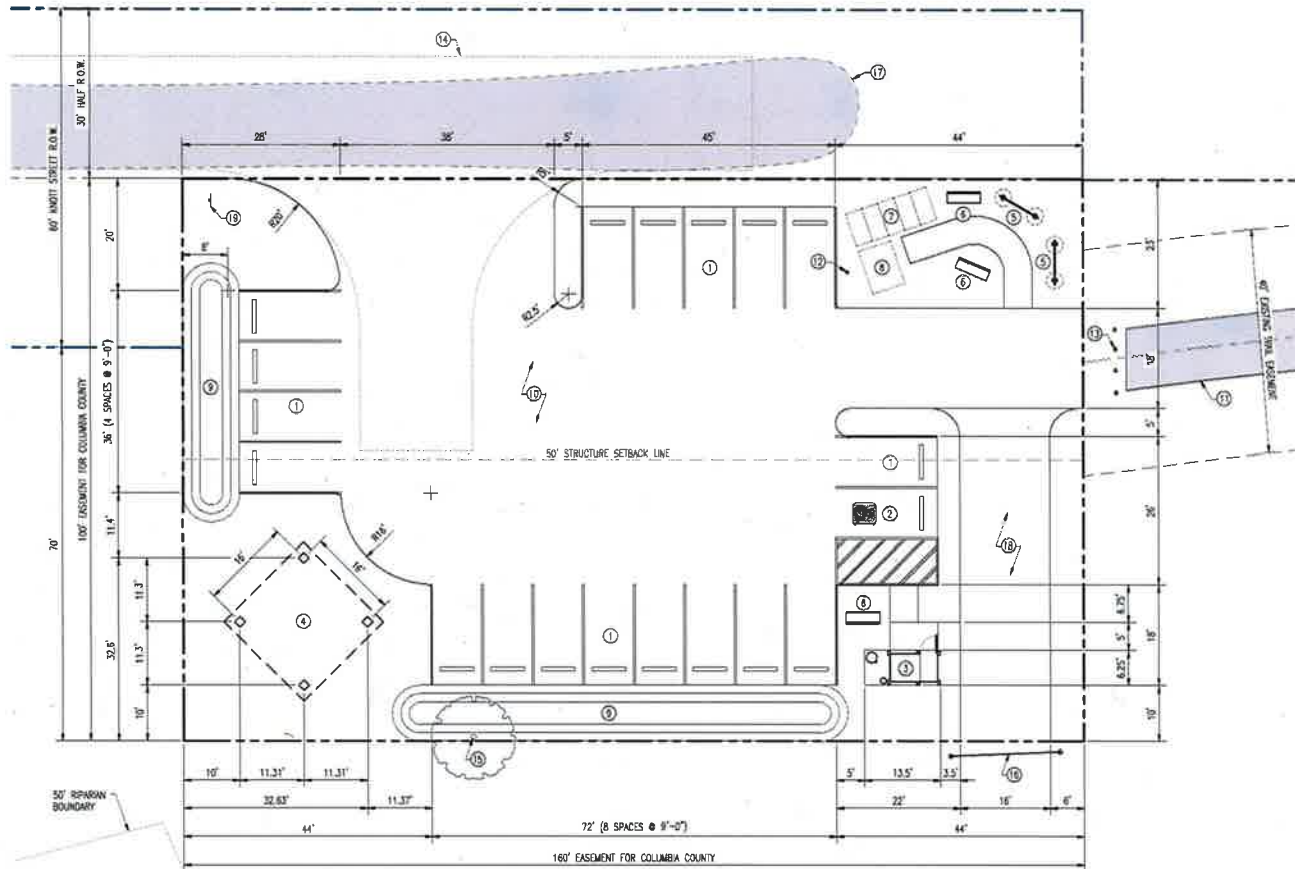
If you have any questions or concerns regarding this analysis or need further assistance, please don't hesitate to contact us.



Appendix

1. Site Plan
2. Crash History Data
3. Sight Distance Photos





- SITE PLAN KEYNOTES ①**
- 1 9' x 18' PARKING STALLS W/ WHEELSTOPS
 - 2 9' x 18' ACCESSIBLE STALL WITH 8' ACCESS AISLE
 - 3 9' x 6' VAULT TOILET STRUCTURE W/ CONG TANK
 - 4 20' x 20' PICNIC STRUCTURE
 - 5 FREESTANDING INFORMATIONAL SIGNAGE
 - 6 BENCHES
 - 7 BICYCLE PARKING
 - 8 BICYCLE REPAIR STATION
 - 9 STORMWATER DETENTION/FILTRATION SWALES
 - 10 ASPHALTIC CONCRETE (A.C) PAVING
 - 11 EXISTING A.C. PAVED TRAIL
 - 12 EXISTING GAS MARKER TO REMAIN
 - 13 EXISTING REMOVABLE BOLLARDS
 - 14 FIRE APPARATUS HAMMERHEAD
 - 15 EXISTING 10" FIRE TREE TO REMAIN
 - 16 EXISTING GATE TO REMAIN
 - 17 EXTENTS OF EXISTING ROADWAY
 - 18 GRAVELLED ACCESS DRIVE TO GATE
 - 19 RELOCATED BIKE ROUTE SIGNAGE

PROPOSED SITE PLAN
SCALE: 1" = 10'



DATE: 07/05/2024
PRELIMINARY
NOT
FOR CONSTRUCTION

REV.	REVISION/RECORD	DATE



PROJ. NO:	3615	PROPOSED SITE PLAN
DRG. BY:	BMK	HOLCE TRAILHEAD IMPROVEMENTS
APPR. BY:		COLUMBIA COUNTY
FILE:	D-3615-C-2	DATE: 06/10/2024

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING
Highway 102 ALL ROAD TYPES, MP 60.55 to 60.75 01/01/2018 to 12/31/2022, Both Add and Non-Add mileage

102: NEHALEM

1 - 3 of 3 Crash records shown.

SER#	P	R	J	S	W	DATE	COUNTY	RD#	PC	CONM#	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	A	S	PED	ERROR	ACT	EVENT	CAUSE				
INVEST	E	A	U	I	C	O	CITY	COMPNT	FIRST STREET	DIRECT	(MEDIAN)	LEGS	TRAF-	RMDST	SURF	COLL	OWNER	TRLR QTY	FROM	G	E	LICNS	LOC	ERROR	ACT	EVENT	CAUSE		
RD DPT	E	L	G	N	H	R	URBAN AREA	MLG TYP	SECOND STREET	LOCTN	(#LANES)	CONTL	DRVMY	LIGHT	SVRTY	V#	TYPE	TO	PH	TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT	EVENT	CAUSE
UNLOC?	D	C	S	V	L	K	LONG	MILEPNT	LRS																				
00369	N	N	N	N		11/14/2019	COLUMBIA	1	06		STRGHT	N	N	POG	ANIMAL	01	NONE	0	STRGHT							035	10		
NONE						TH	VERNONIA	MN	0	MIST DR	N	(NONE)	UNKNOWN	N	DRY	OTH	N/A	S - N							000	00			
N						3A		60.58		KNOTT ST	03			N	DARK	PDO	PSNGR CAR				01	DRVR	NONE	00	Unk	UNK	000	000	00
N						45 52 4.52	-123 10 23.23			010200100800		(02)																	
00285	Y	N	N	N		09/03/2020	COLUMBIA	1	06		STRGHT	N	N	UNK	S-STRGHT	01	NONE	0	STRGHT							000	00		
NO RPT						TH	VERNONIA	MN	0	MIST DR	N	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	S - N							000	00			
N						8P		60.63		KNOTT ST	04			N	DUSK	INJ	PSNGR CAR				01	DRVR	INJC	18	M	OR-Y	047,042	088	01
N						45 52 1.92	-123 10 24.37			010200100800		(02)																	
N						45 52 1.92	-123 10 24.37			010200100800		(02)																	
00081	N	N	N	N		03/13/2021	COLUMBIA	1	06		STRGHT	N	Y	CLR	PIX	OBJ	01	NONE	9	STRGHT						093,100	32,27		
NO RPT						SA	VERNONIA	MN	0	MIST DR	S	(NONE)	UNKNOWN	N	DRY	PIX	N/A	N - S							000	00			
Y						9P		60.66		KNOTT ST	01			N	DARK	PDO	PSNGR CAR				01	DRVR	NONE	00	Unk	UNK	000	000	00
N						45 52 .52	-123 10 24.97			010200100800		(02)																	

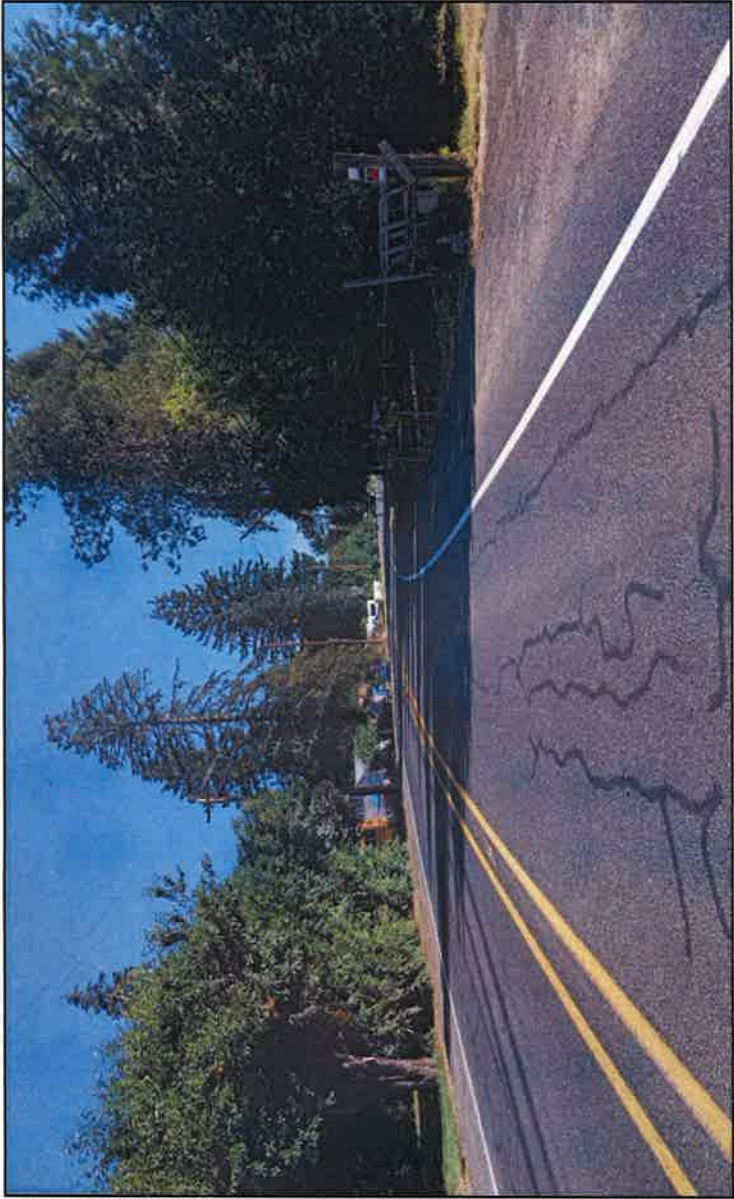
Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. 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 requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

E Knott Street Looking Left (South) along Nehalem Highway (OR 47) - Available Sight Distance, 320 ft

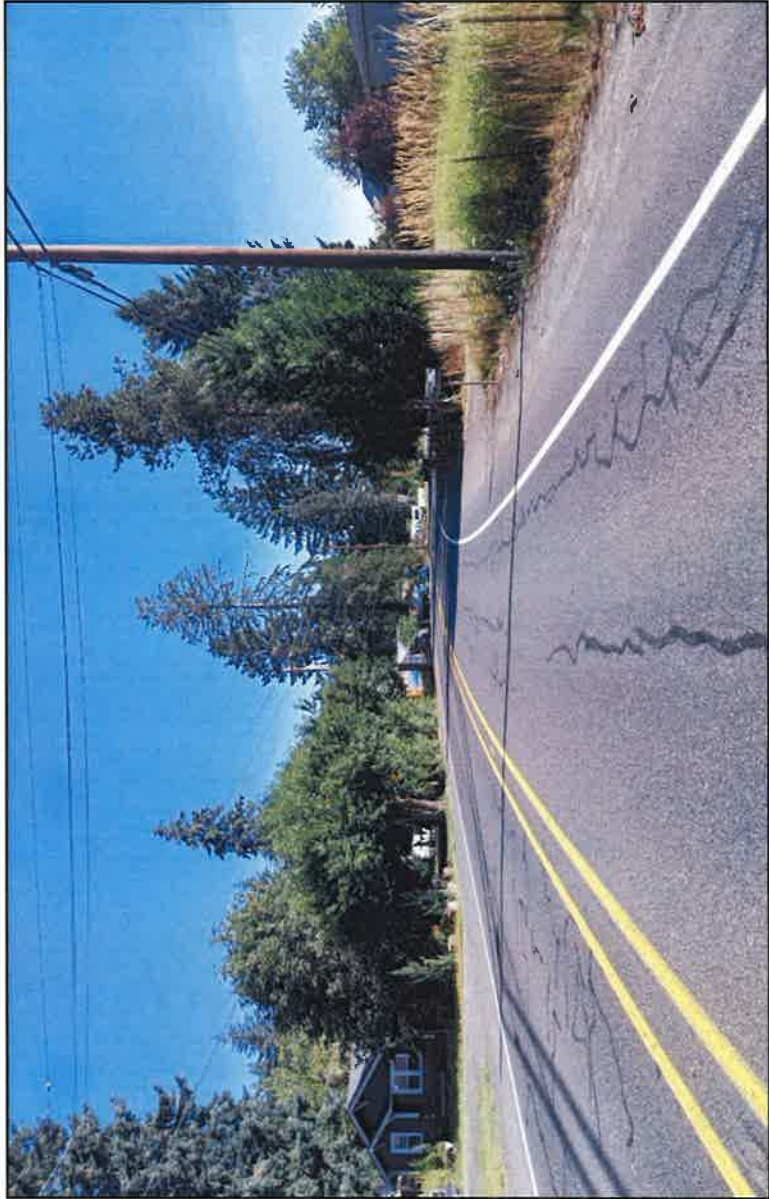


E Knott Street Looking Right (North) along Nehalem Highway (OR 47) - 1,000 ft < ISD





Looking E Knott Street from 320 ft on Nehalem Highway (OR 47) Northbound



Looking E Knott Street from 380 ft on Nehalem Highway (OR 47) Northbound



Exhibit H

Site Design Review Submittal Checklist



PRE-APPLICATION CONFERENCE

Wednesday March 27, 2024 11:00 a.m. Microsoft Teams

Proposed Trail Staging Area/Trailhead for CZ Recreational Trail in PF-80 Zone

- FILE NUMBER:** PRE 24-03
- OWNERS** Holce Logging Co. Inc., 1780 E. Knott Street, Vernonia, OR
- APPLICANT:** Melissa Enright and Riley Baker, Columbia County Parks & Recreation, 230 Strand St. St. Helens
- LOCATION:** The subject property is located at 1780 E. Knott St
- MAP ID #:** 160' by 100' (16,000 sq. ft) Easement in the NW portion of 4403-00-00100
- TAX ACCT #:** 22285
- ZONING:** Primary Forest (PF-80)
- SITE SIZE:** ~16,000 sq ft Easement on an ~100-acre property
- REQUEST:** A pre-application meeting to establishing a new tailhead for the CZ Recreational Trail with parking spaces, vault toilet, covered picnic area for hikers' day use.

REVIEW CRITERIA

Oregon Administrative Rules (OAR)

Chapter 660 Division 34 Section 035 Park Uses on Agricultural and Forest Land

Columbia County Zoning Ordinance (CCZO)

- Section 500 – Primary Forest Zone
- Section 1170 – Riparian, Wetlands.... Overlay Zone
- Section 1300 – Signs
- Section 1400 – Off Street Parking and Loading
- Section 1450 – Traffic Impact Analysis

Section 1503 – Conditional Uses
Section 1550 – Site Design Review

REQUEUSTED PROPOSAL:

Columbia County Parks & Recreation have submitted a request to conduct a pre-application meeting to discuss establishing a new day-use trailhead staging area for the CZ Recreational Trail at the end of E. Knott Street near Vernonia.

The proposed facilities included in the Pre-Application Proposal includes the following:

- A 160' by 100' (16,000 sq ft) Area portion if a 100-acre property
- 6' concrete walkway that is ADA accessible
- Vault Toilet Structure
- 12' by 1750' (21,000 sq ft) pavement through Easement Area
- Existing Bollards and Gate
- Tailhead and Historical Information Kiosk/Signage
- Fixed bench
- 2 bike rack/repair stations
- 20' by 20' picnic shelter with table and benches
- Proposed landscaping along perimeter including native trees and shrubs as ground covers
- 11 Standard Parking Spaces and 1 ADA Parking Space

The aerial views and submitted documentation confirm that this use has informally been established and will be officially established with the county's review and approval of the new use for compliance with the applicable regulatory requirements of the County Zoning Ordinance.

Summary of Requirements:

The proposal will require both a Type 2 Site Design Permit as well as a Conditional Use Permit that will be reviewed and approved by the County Planning Commission at a public hearing pursuant to the provisions in Sections 500, 1170, 1503 and 1550 of the Zoning Ordinance. Type 2 Design Review and Conditional Use applications require fees as applicable in the attached fee schedule.

The OR Department of Forestry Stream Classification Maps of Vernonia also verify Knickerson Creek that runs through the proposed Easement area is a fish-bearing stream. These are shown in the Aerial Maps on Page 2. Consequently, all activities within fish-bearing stream's 50' protected riparian corridor must be consistent with the authorized and prohibited activities identified in Section 1173, 1174 & 1175 pf the Zoning Ordinance. There are no Flood Hazard Areas associated with Knickerson Creek

Beginning with the Columbia County Zoning Ordinance (CCZO):

Section 500 Primary Forest Zone

505 **Conditional Uses.** The following conditional uses may be allowed subject to the general review standards and process in Sections 1503 and 1603 of the Zoning Ordinance. All authorized uses and permanent structures shall also meet the applicable standards listed in Sections 506, 507, and 508 of the Zoning Ordinance and all other local, state, and federal laws pertaining to these uses.

.14 Public Parks including only those uses specified under OAR 660-034-0035 or OAR 660-034-0040, whichever is applicable, and subject to provisions in Sections 508 through 510, 1503 and 1550.

660-034-0035

Park Uses On Agricultural and Forest Land

(1) All uses allowed under Statewide Planning Goal 3 are allowed on agricultural land within a state park, and all uses allowed under Statewide Planning Goal 4 are allowed on forest land within a state park, provided such uses are also allowed under OAR chapter 736, division 18 and all other applicable laws, goals, and rules. Local governments may allow state parks and park uses as provided in OAR chapter 660, division 33, and ORS 215.213 or 215.283 on agricultural lands, or as provided in OAR 660-006-0025(4) on forest lands, regardless of whether such uses are provided for in a state park master plan.

(2) The park uses listed in subsection (a) through (i) of this section are allowed in a state park subject to the requirements of this division, OAR chapter 736, division 18, and other applicable laws. Although some of the uses listed in these subsections are generally not allowed on agricultural lands or forest lands without exceptions to Statewide Planning Goals 3 or 4, a local government is not required to adopt such exceptions in order to allow these uses on agricultural or forest land within a state park provided the uses, alone or in combination, meet all other applicable requirements of statewide goals and are authorized in a state park master plan adopted by OPRD, including a state park master plan adopted by OPRD prior to July 15, 1998:

(b) Day use areas: picnic shelters, barbecue areas, swimming areas (not swimming pools), open play fields, play structures;

(c) Recreational trails: walking, hiking, biking, horse, or motorized off-road vehicle trails; trail staging areas;

Pertinent Issues: This proposal and related site development presented for the new Holce Trailhead are authorized uses in the PF-80 zone and identified in Section 505.14 and OAR 660-034-0035 (2) (b & c). This use can be approved through Site Design Review and Conditional Use Permits which are quasi-judicial reviews that must be reviewed and approved by the County Planning Commission at a public hearing.

508 **General Review Standards** The Planning Director or hearings body shall determine that a use authorized by Sections 504 and 505 meets all of the following requirements:

.1 The proposed use will not force significant change in, or significantly increase the cost of, accepted farming or forest practices on agriculture or forest lands;

- .2 The proposed use will not significantly increase fire hazard or significantly increase fire suppression costs or significantly increase risks to fire suppression personnel;
- .3 A waiver of remonstrance shall be recorded with the County Clerk certifying that the owner will not remonstrate against or begin legal action or suit proceeding to cause or persuade the owner or operator of any farm or forest lands to modify the conduct of legal and accepted farm or forest operations; and
- .4 The proposed use is consistent with requirements contained in the Comprehensive Plan or implementing ordinances, including, but not limited to, regulations which apply to flood hazard areas, development within the Willamette River Greenway, development in forested areas or development in significant resource areas, such as riparian, wetlands or slide-prone areas.

Pertinent Issues: The DR and CU applications submitted must include supporting documentation that show

- How the new trailhead will not force significant changes in or increase cost of accepted farm/forest practices OR increase fire hazards or increase fire suppression costs or personnel.
- A recorded Waiver of Remonstrance certifying that the owner/trailhead user will not remonstrate against or take legal action against legal and accepted farm or forest operations occurring nearby.
- Showing how Knickerson Creek's 50' Riparian Corridor will not be compromised with the installation of new site improvements.

509 Standards of Development

- .1 The minimum average lot or parcel width and minimum average lot or parcel depth shall be 100 feet for all activities except farming or forestry.
- .2 Access to parcels in this zone shall meet Fire Safety Design Standards for Roads in the County Road Standards and access standards found in Section 510 of the Zoning Ordinance.
- .3 There shall be no height limitation for forest operation and management-related structures unless otherwise permitted in the Primary Forest Zone. The maximum building height for all non-farm, non-forest structures shall be 50 feet or 2 ½ stories, whichever is less.
- .4 The standards and requirements described in Section 1300 of the Zoning Ordinance shall apply to all signs and name plates in the Primary Forest Zone.
- .5 The Oregon Department of Fish & Wildlife shall be notified and provided with the opportunity to comment on any development within major and peripheral Big Game Habitat.

.6 Setbacks:

- A. There shall be a minimum setback of 50' for front, side, and rear yards for all development in the Primary Forest Zone.
- B. When this Ordinance or any other ordinance requires a greater or lesser setback than is required by this subsection, the greater setback shall apply.
- C. All structures are subject to any special setbacks when adjacent to arterial or collector streets designated in the County Transportation Systems Plan.
- D. No structure or use shall be established in a manner likely to cause contamination of a stream, lake or other body of water. Riparian and natural hazard setbacks set forth in Sections 1170 and 1180 of the Zoning Ordinance shall apply.
- E. When land divisions create parcels of less than 40 acres for uses listed in Subsection 511.2A., provided those uses have been approved pursuant to this Ordinance, required building setbacks for these parcels will be determined on a case-by-case basis by the Director or the hearings body.
- F. The owner shall provide and maintain primary fuel-free fire break and secondary fire break areas on land surrounding the dwelling and primary fuel-free break areas surrounding accessory structures in the Primary Forest Zone pursuant to the provisions in Subsections 510.2 and .3.

- .7 Approval Period for Use Permits. For all uses approved under sections 504 and 505, the approval period shall be valid for four (4) years. At a minimum, a development construction permit must be issued by the Land Development Services within the approval period. If a construction permit is not issued within the approval period, the land use permit expires. An extension of two years on the approval period may be granted by the Director if a written request is received prior to its expiration and the reason for the delay is beyond the control of the owner.

Pertinent Issues: All site development proposed shall comply with the minimum string requirements for all structure and road in Sections 508 and 509. Specifically the documentation must show adherence to these specifications:

- Access to parcels in this zone shall meet **Fire Safety Design Standards for Roads in the County Road Standards**
- The standards and requirements described in Section 1300 of the Zoning Ordinance shall apply to all signs and name plates in the Primary Forest Zone
- **Provide and maintain primary fuel-free fire break areas surrounding accessory structures** in the Primary Forest Zone pursuant to the provisions in Subsections 510.2 and .3.
- **Riparian Corridor activities –surveyed 50' from top of bank on both sides**
- 4 Year approval period to satisfy all conditions of approval and apply for all necessary

building permits.

510 Fire Siting Standards for Dwellings, Structures and Roads:

The following fire siting standards or their equivalent shall apply to new dwellings in this zone:

- .1 If a water supply is available, suitable and acceptable for fire protection by the fire protection district, such as a swimming pool, pond, stream, or lake, then road access to within 15 feet of the water's edge shall be provided for pumping units. The road access to the dwelling and access to the on-site water supply shall accommodate the turnaround of fire fighting equipment during the fire season. The applicant shall provide verification from the Water Resources Department that any permits or registrations required for water diversion or storage have been obtained or that permits or registrations are not required for the use. Permanent signs shall be posted along the access route to indicate the location of the emergency water source.
- .2 The owner of the dwelling shall establish and maintain a primary fuel-free fire break surrounding the dwelling and accessory structure(s) no less than 30 feet wide in accordance with the provisions in "Protecting Your Home From Wildfire" published by the National Fire Protection Association. The owner may be required to increase the primary fuel-free fire break if the dwelling or structure is located on a 10% or greater slope. The primary fuel-free fire break could include a lawn, low ornamental shrubbery less than 24" in height and/or individual or groups of trees separated by a distance equal to the diameter of the crowns adjacent to each other, or 15 feet, whichever is greater. All existing tree limbs shall be pruned from the base to at least eight feet in height. Dead fuels shall also be removed.
- .4 All roads in this zone, except private roads and bridges for commercial forest uses, shall be constructed so as to provide adequate access for firefighting equipment according to the standards provided by the local rural fire protection district, the County Road Department, or the State Department of Forestry.

Pertinent Issues: The **Site Plan** and submitted documentation needs to include 30' primary fuel-free areas surrounding the easement area and all vegetation in compliance with the minimum height and separation requirements in 510..

The Tailhead's Site Plan shall include proposed access and vehicle circulation map that demonstrates compliance with the minimum access requirements of the County Road Standards Ordinance enforced by the Vernonia Fire District. If the Vernonia Fire District determines Knickerson Creek is acceptable for fire prevention, the Site Plan shall also include the proposed access to within 15 feet of the water's edge for pumping units.

Section 1170 RIPARIAN CORRIDORS, WETLANDS, WATER QUALITY, AND FISH AND WILDLIFE HABITAT PROTECTION OVERLAY ZONE

1171 Purpose.

A. The purpose of this Section is to protect and restore water bodies and their associated riparian corridors, thereby protecting and restoring the hydrological, ecological and land conservation function these areas provide. Specifically, this Section is intended to protect habitat for fish and other aquatic life, protect habitat for wildlife, protect water quality for human uses and for aquatic life, control erosion and limit sedimentation, prevent property damage during floods and storms, protect native plant species, and conserve the scenic and recreational values of riparian areas.

B. This Section meets the above purpose by prohibiting structures and other development from riparian areas around fish-bearing lakes, rivers, streams and associated wetlands, and by prohibiting vegetation removal and/or other vegetative alterations in riparian corridors. In cases of hardship, the Section provides a procedure to reduce the riparian corridor boundary. Alteration of the riparian corridor boundary in such cases shall be offset by appropriate restoration or mitigation, as stipulated in this Section.

C. For the purposes of this Section, “development” includes buildings and/or structures which require a building permit under the Oregon State Building Code, as amended, or any alteration in the riparian corridor by grading, placement of fill material, construction of an impervious surface, including paved or gravel parking areas or paths, and any land clearing activity such as removal of trees or other vegetation.

1172 Riparian Corridor Standards:

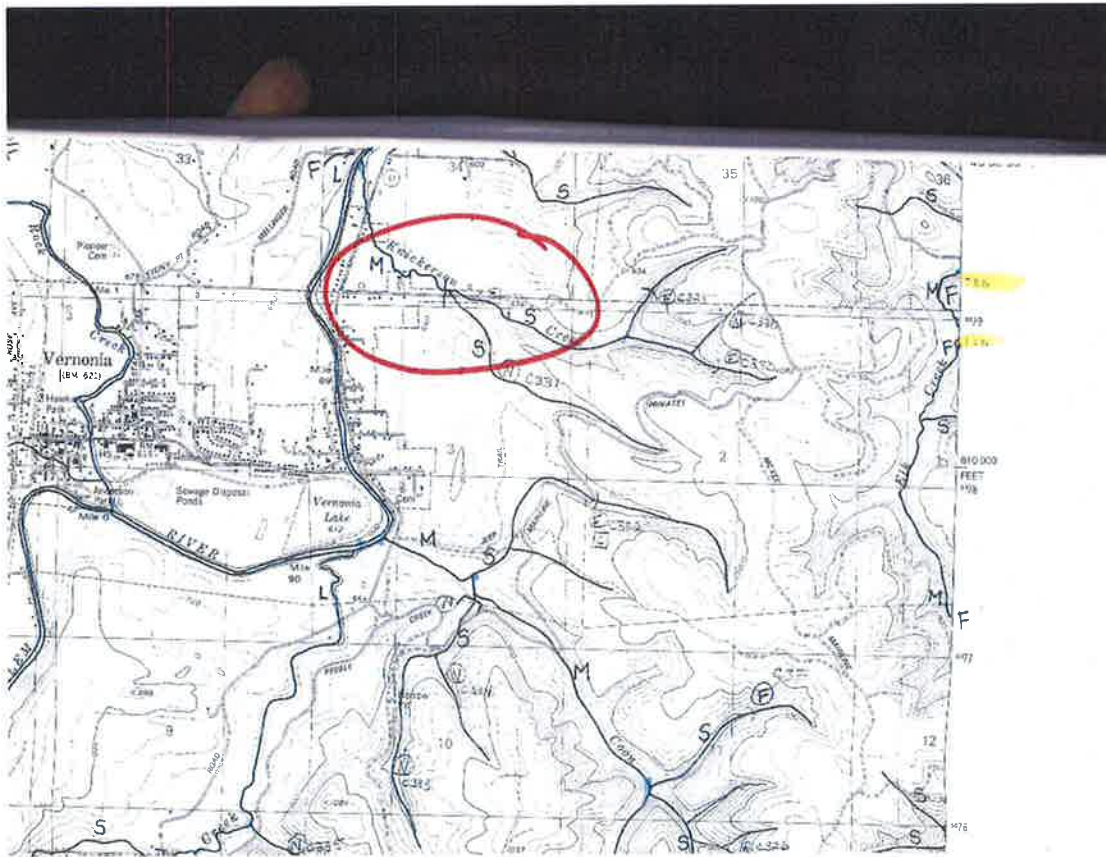
A. The inventory of Columbia County streams contained in the Oregon Department of Fish and Wildlife Fish Habitat Distribution Data (published January 13, 2023), specifies which streams and lakes are fish-bearing. Fish-bearing lakes are identified on the map entitled, “Lakes of Columbia County.” A copy of the most current Stream Classification Maps is attached to the Comprehensive Plan, Technical Appendix Part XVI, Article X(B) for reference. The map, “Lakes of Columbia County” is attached to the Comprehensive Plan, Technical Appendix Part XVI, Article X(B), and is incorporated therein. Based upon the stream and lake inventories, the following riparian corridor boundaries shall be established:

2. **Fish-Bearing Streams, Rivers and Sloughs (Less than 1,000 cfs).** Along all fish-bearing streams, rivers, and sloughs with an average annual stream flow of less than 1,000 cubic feet per second (cfs), the riparian corridor boundary shall be 50-feet from the top-of-bank. Average annual stream flow information shall be provided by the Oregon Water Resources Department.

Knickeron Creek within in close proximity to Holce Trailhead Easement Area



Knickeron Creek Fish-bearing Stream per OR Dept of Forestry Map



Pertinent Issues: As shown on the ODF and County GIS Maps above, Knickerson Creek is identified as a fish-bearing stream and the proposed development for Holce Trailhead meets the Zoning Ordinance's definition of development in Section 1171.B & 1171.C and 1172. The best way to identify this 50' protected area would be for it to be accurately surveyed by a licensed surveyor per the definition in Section 1172.A (2)

1175 Permitted Uses and Activities Subject to Optional Discretionary Review.

Notwithstanding the prohibitions set forth in Subsection 1173 above, the following activities are allowed within the riparian corridor boundary if approved by the planning director through an optional discretionary review process:

A. The following riparian vegetation may be removed within the riparian corridor boundary:

1. Non-native vegetation, invasive species, and noxious weeds if replaced with native plant species. The replacement vegetation shall cover, at a minimum, the area from which vegetation was removed, and shall provide for maximum soil retention and shade cover. Replacement vegetation shall, upon maturity, maintain 75%-100% canopy and ground cover.
2. Vegetation which is necessarily removed for the development of approved water-related or water dependent uses. Vegetation removal shall be kept to the minimum necessary to allow the water-dependent and water-related use.
3. Trees and vegetation in danger of falling and/or posing a hazard to life or property. If no hazard will be created, such trees or other vegetation, once felled, shall be left in place in the riparian area.

B. The following development may be allowed within the riparian corridor boundary.

1. **Streets, roads, and driveways, if:**
 - a. If it is not possible to locate the street, road or driveway outside of the riparian corridor boundary; and
 - b. The street, road or driveway is designed to minimize intrusion into the riparian corridor boundary.
2. **Pedestrian walkways, paths and trails.**
3. **Fencing and signs, not including billboards.**
4. **Drainage facilities, utilities and irrigation pumps.**
5. **Water-related and water-dependent uses.**
6. **New or expanded shoreline stabilization and flood control grading and structures.**
7. **Portable furniture, and other portable outdoor equipment for the private use of the property owner/resident. For purposes of this subsection, "portable" shall mean**

that the item is not affixed to the ground, other than with a chain or other lock which is capable of being removed at any time.

- C. Wetland fill and removal within riparian corridors shall be avoided unless there is no reasonable alternative to allow the permitted use. DSL shall be notified of any potential impact from development proposed on wetlands identified in the State Wetlands Inventory pursuant to ORS 215.418.

Pertinent Issues: The Site Plan submitted for this Pre-App meeting appears to indicate that all of the 16,000 sq ft Easement/Trailhead site development will need to comply with all of these allowed features. It will be up to the County Building Official to ensure all furniture and outdoor equipment meets the definitions in Section 1175.3(B).

Pertinent Issues: If the Building Official determines that the furniture and outdoor equipment is permanent, not portable, perhaps an option would be to relocate the Easement Area so that no portion of it is located within the surveyed 50' protected riparian corridor. The **Site Plan** submitted with the CU and DR must accurately identify the location of the Easement and all structures in relation to the surveyed 50' Riparian Corridor.

Section 1300 Signs

1301 Use: No sign may be established, altered, or expanded hereafter in any district in Columbia County, except in accordance with the provisions outlined in this Section. The sign provisions apply to signs established in conjunction with any use in the county. [Amended by Ordinance 2002-02, eff. 6/12/02].

1302 General Provisions:

.1 Design Review: In addition to complying with the standards in this Section, the design and color of commercial and industrial signs and supporting structures of signs 100 square feet or larger in size shall be compatible with the architectural design and color of existing and proposed buildings on the site as determined during site design review according to the provisions of Section 1550 of this Ordinance.

.2 Setbacks:

- A. All signs shall be situated in a manner so as not to adversely affect safety, corner vision, or other similar conditions and shall not overhang or encroach upon public rights of way.
- B. Unless otherwise specified, all signs in residential zoning districts shall observe the yard setback requirements of the zoning district in which they are located.
- C. No setbacks from property lines shall be required for signs in non-residential zoning districts except that in all zoning districts, setbacks shall be required at corners as may be necessary to provide adequate corner vision or in cases where a sign is placed adjacent to a street, as provided is 1302.2(D), below.

D. Setbacks shall be required which comply with setback requirements of the abutting residential zoning district when a sign is placed on a parcel abutting a street (except Highway 30), which separates a non-residential parcel from a residential parcel or when a sign is placed on a property line separating a non-residential parcel from a residential parcel.

1302.6 Sign Clearance: A minimum of 8 feet above sidewalks and 15 feet above driveways shall be provided under free-standing signs

1311 Signs for Essential Services and Public Facilities: The following signs shall be permitted in all districts:

- .1 City limits signs and public notice signs.
- .2 Police, fire, school, and hospital directional signs.
- .3 Park directional signs.
- .4 Traffic and safety signs.
- .5 Transit-related (bus) signs.

Site is adjacent to City of Vernonia's residential zoned property to the North



Pertinent Issues: All signage shall comply with the City of Vernonia's residential setbacks since the property abuts residential zoned property to the north. The submitted Signage shown on the submitted Site Plan shall comply with the City of Vernonia's setback requirements as well as the county's requirements in Section 1302 and 1311 of the Zoning Ordinance.

Section 1400 Off-Street Parking & Loading

1405 Plans Required: A plot plan shall be submitted in duplicate to the Director with each application for a building permit or for a change of classification to OP. The plot plan shall include the following information:

- .1 Dimensions of the parking lot.
- .2 Access to streets and location of curb cuts.
- .3 Location of individual parking spaces.
- .4 Circulation pattern.
- .5 Grade and drainage.
- .6 Abutting property.
- .7 A landscaping plan which shall include the location and names of all vegetation, and the location and size of fencing or other screening material. This plan shall be approved by the Director.

1410 Size:

- .1 The standard size of a parking space shall be 9 feet by 18 feet.
- .2 Handicapped parking spaces shall be 12 feet by 18 feet.
- .3 Parallel parking, the length of the parking space shall be increased to 22 feet.

1411 Aisles: Aisles shall not be less than:

- .1 25'0" in width for 90 degree parking;
- .2 20'0" in width for 60 degree parking;
- .3 20'0" in width for 45 degree parking; and
- .4 12'0" in width for parallel parking.

1412 Access: There shall be no more than one 45-foot-wide curb cut driveway per 150 feet of street frontage, or fraction thereof, permitted per site.

1413 Surfacing and Marking:

- .1 The surfacing of each parking area shall meet minimum County standards to handle the weight of the vehicles which will use the parking area. All areas used

for parking and maneuvering of vehicles shall be marked in accordance with the approved plan and such marking shall be continuously maintained. Handicapped parking spaces shall be marked with a wheelchair symbol.

- .2 The parking and loading areas for commercial, industrial, or apartment uses shall be paved with concrete, asphaltic concrete, or another comparable surface.

1414

Drainage and Lighting: Adequate drainage shall be provided to dispose of the run-off generated by the impervious surface area to the parking area. The drainage system shall function so it will not adversely affect adjoining property. Artificial lighting shall be provided in such a manner as to ensure the safety of the parking area without interfering with adjoining properties or creating traffic hazards on adjoining streets.

1415

Parking Areas: All parking areas, excluding one and two-family dwellings, shall meet the following requirements:

- .1 All parking areas of less than 20 parking spaces shall have one handicapped parking space. Parking areas with more than 20 spaces shall provide one handicapped parking space for every 50 standard parking spaces.
- .3 Parking areas shall be separated from the exterior wall of a structure, exclusive of paved pedestrian entranceways, by a 5 foot strip of landscaping.
- .4 Industrial or commercial parking areas, which abut a residential or apartment district, shall meet the building setback of the most restrictive adjoining residential or apartment district.
- .5 When industrial or commercial parking areas adjoin a residential or apartment district, there shall be a sight obscuring planting, which is at least 80 percent opaque and when viewed horizontally from between 2 and 8 feet above ground level. This planting shall be composed of materials which are an adequate size so as to achieve the required degree of screening within 12 months after installation.
- .6 Parking areas shall be set back from a lot or parcel line adjoining a street. The setback area shall be landscaped.
- .7 All parking area setbacks shall be landscaped with major trees, shrubs, and ground cover as approved by the Director.
- .8 A minimum of 10 percent of the parking area shall be landscaped and maintenance of the landscaping shall be the owner's responsibility.
- .9 Internal pedestrian connections shall be provided in parking lots with greater than ten (10) parking spaces. These connections shall be a minimum of five (5) feet wide and distinguished from vehicular areas through changes in elevation or contrasting paving materials (such as light-color concrete inlay between asphalt). Paint or thermo-plastic

striping and similar types of non-permanent applications may be approved for crossings of parking lot areas that do not exceed 24 feet in crossing length.

- .11 A portion of existing parking areas may be redeveloped for transit-oriented improvements, such as a bus stops and pullouts, bus shelters, park and ride stations, transit-oriented developments, and similar facilities, where identified in or consistent with an adopted County transit plan. Subject sites incorporating transit improvements as part of a development proposal are eligible for up to a 10% reduction in required vehicular parking spaces.

Pertinent Issues The CU & DR submitted **Site Plan's** parking design layout shall comply with the minimum requirements in Section 1400.

Section 1450 TRANSPORTATION IMPACT ANALYSIS

1450 Transportation Impact Analysis: A Transportation Impact Analysis (TIA) must be submitted with a land use application if the proposal is expected to involve one or more of the conditions in 1450.1 (below) in order to minimize impacts on and protect transportation facilities, consistent with Section 660-012-0045(2)(b) and (e) of the State Transportation Planning Rule.

- .1 Applicability – A TIA shall be required to be submitted to the County with a land use application if the proposal is expected to involve one (1) or more of the following:
 - A. Changes in land use designation, or zoning designation that will generate more vehicle trip ends.
 - B. Projected increase in trip generation of 25 or more trips during either the AM or PM peak hour, or more than 400 daily trips.
 - C. Potential impacts to intersection operations.
 - D. Potential impacts to residential areas or local roadways, including any non- residential development that will generate traffic through a residential zone.
- .2 Consistent with the County's Guidelines for Transportation Impact Analysis (TIA), a landowner or developer seeking to develop/redevelop property shall contact the County at the project's outset. The County will review existing transportation data to establish whether a TIA is required. It is the responsibility of the applicant to provide enough detailed information for the County to make a determination. An applicant should have the following prepared, preferably in writing:

- A. Type of uses within the development
- B. The size of the development
- C. The location of the development
- D. Proposed new accesses or roadways
- E. Estimated trip generation and source of data
- F. Proposed study area

If the County cannot properly evaluate a proposed development's impacts without a more detailed study, a TIA will be required. The County will provide a scoping summary detailing the study area and any special parameters or requirements, beyond the requirements set forth in the County's Guidelines for Transportation Impact Analysis, when preparing the TIA.

.3 Approval Criteria. When a TIA is required, a proposal is subject to the following criteria:

- A. The TIA addresses the applicable elements identified by the County Public Works Director and the County's Guidelines for Transportation Impact Analysis;
- B. The TIA demonstrates that adequate transportation facilities exist to serve the proposed development or, identifies mitigation measures that resolve identified traffic safety problems in a manner that is satisfactory to the County Public Works Director and, when state highway facilities are affected, to ODOT;
- C. For affected non-highway facilities, the TIA establishes that mobility standards adopted by the County have been met; and
- D. Proposed public improvements are designed and will be constructed consistent with County Road Standards and access spacing standards in the Transportation System Plan.

.4 Conditions of Approval.

- A. The County may deny, approve, or approve a proposal with conditions

necessary to meet operational and safety standards; provide the necessary right-of-way for improvements; and to require construction of improvements to ensure consistency with the future planned transportation system.

- B. Construction of off-site improvements may be required to mitigate impacts resulting from development that relate to capacity deficiencies and public safety; and/or to upgrade or construct public facilities to County Standards.
- C. Improvements required as a condition of development approval, when not voluntarily provided by the applicant, shall be roughly proportional to the impact of the development on transportation facilities. Findings in the development approval shall indicate how the required improvements directly relate to and are roughly proportional to the impact of development.

Pertinent Issues: Land Development Services encourages property owners/developers to consult with representatives from the County Department of Public Works and discuss whether or not the existing transportation network in this area can adequately support the new trailhead. This discussion will determine if a Traffic Impact Analysis will be required to be included with the Conditional Use and Site Design Review Applications. It is the responsibility of the applicant to provide enough detailed information for the County to make a determination. Scott Toenjes and Mike Russell from Public Works have been invited to the Pre Application Meeting but you may wish to contact them prior to the meeting next week.

Section 1503 Conditional Uses

- 1. Status: Approval of a conditional use shall not constitute a change of zoning classification and shall be granted only for the specific use requested; subject to such reasonable modifications, conditions, and restrictions as may be deemed appropriate by the Commission, or as specifically provided herein.
- 2. Conditions: The Commission may attach conditions and restrictions to any conditional use approved. The setbacks and limitations of the underlying district shall be applied to the conditional use. Conditions and restrictions may include a specific limitation of uses, landscaping requirements, off-street parking, performance standards, performance bonds, and other reasonable conditions, restrictions, or safeguards that would uphold the intent of the Comprehensive Plan and mitigate any adverse effect upon the adjoining properties which may result by reason of the conditional use being allowed.
- 3. Conditional Use Permit: A Conditional Use Permit shall be obtained for each conditional use before development of the use. The permit shall stipulate any modifications, conditions, and restrictions imposed by the Commission, in addition to those specifically set forth in this ordinance. On its own motion, or pursuant to a formal written complaint filed with the Planning Department, upon proper notice and hearing as provided by Sections 1603 and 1608 of this ordinance, the Commission, (or Board on appeal) may, but is not required to, amend, add to or delete some or all of the conditions applied to Conditional Use Permits issued by the Planning Commission or Board of Commissioners. The power granted by this subsection may only be exercised upon a finding such

amendment, addition or deletion is reasonably necessary to satisfy the criteria established by Section 1503.5 below.

- .4 Suspension or Revocation of a Permit: A Conditional Use Permit may be suspended or revoked by the Commission when any conditions or restrictions imposed are not satisfied.
 - A. A Conditional Use Permit shall be suspended only after a hearing before the Commission. Written notice of the hearing shall be given to the property owner at least 10 days prior to the hearing.
 - B. A suspended permit may be reinstated, if in the judgment of the Commission, the conditions or restrictions imposed in the approval have been satisfied.
 - C. A revoked permit may not be reinstated. A new application must be made to the Commission.

- .5 Granting a Permit: The Commission may grant a Conditional Use Permit after conducting a public hearing, provided the applicant provides evidence substantiating that all the requirements of this ordinance relative to the proposed use are satisfied and demonstrates the proposed use also satisfies the following criteria:
 - A. The use is listed as a Conditional Use in the zone which is currently applied to the site;
 - B. The use meets the specific criteria established in the underlying zone;
 - C. The characteristics of the site are suitable for the proposed use considering size, shape, location, topography, existence of improvements, and natural features;
 - D. The site and proposed development is timely, considering the adequacy of transportation systems, public facilities, and services existing or planned for the area affected by the use;
 - E. The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs, or precludes the use of surrounding properties for the primary uses listed in the underlying district;
 - F. The proposal satisfies the goals and policies of the Comprehensive Plan which apply to the proposed use;
 - G. The proposal will not create any hazardous conditions.

- .6 Design Review: The Commission may require the Conditional Use be subject to a site design review by the Design Review Board or Planning Commission

Finding 4: All Conditional Use Permit Applications must submit evidence showing how the new use will satisfy all of the criteria in Section 1503.5 The submitted Site Plan and related documentation needs to show that the site is suitable, timely, meets the minimum setback and development siting standards for PF-80 zoned properties that contain at least one 50' Riparian Corridor for a fish-bearing creek. The criteria of 1503.5 should specifically be addressed in the application relating to the subject site's suitability for the proposal, impact to surrounding area, and any potential hazards. Because the development of a Trailhead is a change in use of the property from Forest to recreation, the proposals must be reviewed as a Conditionally Permitted Type 2 Site Design Review that is approved by the Planning Commission at a public hearing.

Section 1550 Site Design

The Site Design Review process shall apply to all new development, redevelopment, expansion, or improvement of all community, governmental, institutional, commercial, industrial and multi-family residential (4 or more units) uses in the County.

1551. Types of Site Design Review:

A. Type 1: Projects, developments and building expansions which meet any of the following criteria:

1. are less than 5,000 sq.ft., and are less than 10% of the square footage of an existing structure.
2. Increase the number of dwelling units in a multi-family project.
3. Increase the height of an existing building.

B. **Type 2: Projects, developments and building expansions which meet any of the following criteria:**

1. have an area of 5,000 sq.ft. or more, or are 10% or more of the square footage of an existing structure.
2. **Change the category of use (e.g., commercial to industrial, etc.).**
3. New off-site advertising signs or billboards.
4. Any project meeting any of the Type 2 criteria shall be deemed a Type 2 Design Review application.

1553 Pre-application Conference: A pre-application conference is required for all projects applying for a Site Design Review, unless the Director or his/her designate determines it is unnecessary. The submittal requirements for each application are as defined in this section and the standards of the applicable zone, and will be determined and explained to the applicant at the pre-application conference.

Pertinent Issues: The proposal presented for the Holce Trailhead meets the definition of a Type 2 Site Design Review since the use of the property is changing from forestry use to recreational use. This pre-application conference on March 27, 2024 satisfies the requirements in Section 1553.

1555 Submittal documents: The following documents, when applicable, are required for a Site Design Review. The scope of the drawings and documents to be included will be determined at the pre-application conference by the Pre-application Conference Committee, and a Site Design Review Submittal Checklist will be given to the applicant, documenting which items are deemed not applicable or not necessary to determine compliance with County and State standards, with a short explanation given for each item so determined.

- A. History.
- B. Project narrative.
- C. Existing site plan.
- D. Proposed site plan.
- E. Grading plan.
- F. Drainage plan.
- G. Wetland mitigation plan. Goal 5 Resource Protection Plans (fish-bearing streams, wetlands, riparian areas, natural areas, fish and wildlife habitat).
- H. Landscaping plan.
- I. Architectural plans.
- J. Sign drawings.
- K. Access, parking and circulation plan.
- L. Impact assessment.
- M. Site Design Review Submittal Checklist.

1560 Existing Site Plan: The degree of detail in the existing site plan shall be appropriate to the scale of the proposal, or to special site features requiring careful design. An existing site plan shall include the following, unless it is determined by the Planning Director that the information is not applicable or is not necessary to determine compliance with County and State standards, and a short explanation will be given for each item so determined:

- A. A vicinity map showing location of the property in relation to adjacent properties, roads, pedestrianways and bikeways, and utility access. Site features, manmade or natural, which cross property boundaries are to be shown.
- B. A site description map at a suitable scale (i.e. 1"=100'; 1"=50'; or 1"=20') showing parcel boundaries and gross area, including the following elements, when applicable:
 - 1. Contour lines at the following minimum intervals:
 - a. 2 foot intervals for slopes 0-20%;
 - b. 5 or 10 foot intervals for slopes exceeding 20%;
 - c. Identification of areas exceeding 35% slope;

2. In special areas, a detailed slope analysis may be required. Sources for slope analysis include maps located at the U.S. Natural Resources Conservation Service office.
3. Potential natural hazard areas, including potential flood or high ground water, landslide, erosion, and drainage ways. An engineering geologic study may be required.
4. Wetland areas, springs, wildlife habitat areas, wooded areas, and surface features such as mounds and large rock outcroppings.
5. **Streams and stream corridors.**
6. **Location, species and size of existing trees proposed to be removed.**
7. **Significant noise sources.**
8. **Existing structures, improvements, utilities, easements and other development.**
9. **Adjacent property structures and/or uses.**

1561 Proposed Site Plan: A complete application for design review shall be submitted, including the following plans, which may be combined, as appropriate, onto one or more drawings, unless it is determined by the Planning Director that the information is not applicable or is not necessary to determine compliance with County and State standards, and a short explanation will be given for each item so determined:

- A. **Site Plan: The site plan shall be drawn at a suitable scale (i.e. 1"=100', 1"=50', or 1"=20') and shall include the following:**
 1. The applicant's entire property and the surrounding area to a distance sufficient to determine the relationships between the applicant's property and proposed development and adjacent properties and developments.
 2. Boundary lines and dimensions of the property and all proposed property lines. Future buildings in phased development shall be indicated.
 3. Identification information, including names and addresses of project designers.
 4. Natural features which will be utilized in the site plan.
 5. Location, dimensions and names of all existing or platted roads or other public ways, easements, and railroad rights-of-way on or adjacent to the property, city limits, section lines and corners, and monuments.
 6. Location and dimensions of all existing structures, improvements, or utilities to remain, and structures to be removed, all drawn to scale.
 7. Historic structures, as designated in the Comprehensive Plan.

8. Approximate location and size of storm water retention or detention facilities and storm drains.
9. Location and exterior dimensions of all proposed structures and impervious surfaces.
10. Location and dimension of parking and loading areas, pedestrian and bicycle circulation, and related access ways. Individual parking spaces shall be shown.
11. Orientation of structures, showing entrances and exits.
12. All exterior lighting, showing type, height, wattage, and hours of use.
13. Drainage, Stormwater and Erosion Control, including possible adverse effects on adjacent lands.
14. Service areas for waste disposal and recycling.
15. Noise sources, with estimated hours of operation and decibel levels at the property boundaries.
16. **Goal 5 Resource Protection Plans.** Indicate how project will protect streams, wetlands, riparian areas, natural areas, and fish and wildlife habitat from negative impacts.
17. A landscaping plan which includes, if applicable:
 - a. Location and height of fences, buffers, and screening;
 - b. Location of terraces, decks, shelters, play areas, and common open spaces;
 - c. Location, type, size, and species of existing and proposed shrubs and trees; and
 - d. A narrative which addresses soil conditions and erosion control measures.
- B. Grading Plans:** A preliminary grading plan indicating where and to what extent grading will take place, including general contour lines, slope ratios, slope stabilization proposals, and natural resource protection proposals.
- C. Architectural Drawings:**
 1. Building elevations and sections;
 2. Building materials (color and type);
 3. Floor plan.
- D. Signs: (see also Zoning Ordinance Section 1300)**
 1. Freestanding sign:

- a. Location of sign on site plan;
 - b. Elevation of sign (indicate size, total height, height between bottom of sign and ground, color, materials, and means of illumination).
2. On-Building Sign:
- a. Building elevation with location of sign (indicate size, color, materials and means of illumination);
 - b. Plot plan showing location of signs on building in relation to adjoining property.

1562 Landscaping: Buffering, Screening and Fencing:

A. General Provisions:

- 1. Existing plant materials on a site shall be protected to prevent erosion. Existing trees and shrubs may be used to meet landscaping requirements if no cutting or filling takes place within the dripline of the trees or shrubs.
- 2. All wooded areas, significant clumps or groves of trees, and specimen conifers, oaks or other large deciduous trees, shall be preserved or replaced by new plantings of similar size or character.

B. Buffering Requirements:

- 1. Buffering and/or screening are required to reduce the impacts on adjacent uses which are of a different type. When different uses are separated by a right of way, buffering, but not screening, may be required.
- 2. A buffer consists of an area within a required setback adjacent to a property line, having a width of up to 10 feet, except where the Planning Commission requires a greater width, and a length equal to the length of the property line adjacent to the abutting use or uses.
- 3. Buffer areas shall be limited to utilities, screening, pedestrian and bicycle paths, and landscaping. No buildings, roads, or parking areas shall be allowed in a buffer area.
- 4. The minimum improvements within a buffer area shall include:
 - a. One row of trees, or groupings of trees equivalent to one row of trees. At the time of planting, these trees shall not be less than 10 feet high for deciduous trees and 5 feet high for evergreen trees, measured from the ground to the top of the tree after planting. Spacing of trees at maturity shall be sufficient to provide a year-round buffer.
 - b. In addition, at least one 5-gallon shrub shall be planted for each 100 square feet of required buffer area.

- c. The remaining area shall be planted in grass or ground cover, or spread with bark mulch or other appropriate ground cover (e.g. round rock). Pedestrian and bicycle paths are permitted in buffer areas.

1564 Final Site Plan Approval:

If the Planning Director or Planning Commission approves a preliminary site plan, the applicant shall finalize all the site drawings and submit them to the Director for review. If the Director finds the final site plan conforms with the preliminary site plan, as approved by the Director or Planning Commission, the Director shall give approval to the final site plan. Minor differences between the preliminary site plan and the final site plan may be approved by the Director. These plans shall be attached to the building permit application and shall become a part of that permit.

Pertinent Issues: The Site Plan and Supporting Documentation submitted with the Site Design Review Application must include all of the above items that apply to the establishment of the Holce Trailhead.

Plan on submitting both the Conditional Use Permit and the Site Design Review Permit at the same time that will allow the Planning Manager to deem them complete and allow the county to begin processing these permits. The Planning Commission hearing will be scheduled after both applications are deemed complete. The County is typically able to place both Permits on the regularly scheduled Planning Commission within 4-6 weeks of deeming both applications complete. The fees for both Permits are listed below and must be submitted when the applications are submitted:

Permit	Fee
Type 2 Site Design Review < \$100,000 valuation	\$2,263
Conditional Use Permit	\$2730
County Sanitarian Review	\$89
County Building Official Review	\$89
Technology Fee	3%

Columbia County Land Development Services Website:

<https://www.columbiacountyor.gov/departments/LandDevelopment/Planning>

The Columbia County Zoning Ordinance be accessed via the link under **Codes, Ordinances, and Other Relevant Land Use Documents**

The Application for a Site Design and Conditional Use Permits (attached) can also be accessed via the link to **Planning Applications and Guides**.

Attachments:

- Site Design Review and Conditional Use Applications



RECEIVED
FEB 18 2025
Land Development Services

Exhibit I

City of Vernonia Approval Email

From: [Josette Mitchell](#)
To: [Brett Kahr](#)
Cc: [Robert Besler](#)
Subject: RE: Reconfigured design for Holce Trailhead
Date: Friday, January 31, 2025 10:16:04 AM
Attachments: [image001.png](#)



Brett,

Thank you for all your work on addressing our concerns. The City of Vernonia appreciates the County and LCE moving the design out of the platted Public Right of Way. The new design has addressed our stated issues with the project.

Respectfully,

Josette Mitchell

City Administrator

1001 Bridge Street
Vernonia, Oregon 97064
(503) 429-5291 x106
jmitchell@vernonia-or.gov
www.vernonia-or.gov



From: Brett Kahr <brett@lowercolumbiaengr.com>
Sent: Thursday, January 30, 2025 3:44 PM
To: Josette Mitchell <jmitchell@vernonia-or.gov>
Cc: Robert Besler <robert@lowercolumbiaengr.com>
Subject: Reconfigured design for Holce Trailhead

Good afternoon Josette

Please see attached the proposed configuration for the Holce Trailhead site. We're proposing a design that reduces the depth of the site as well as moving the site to the south to get it out of the ROW while also not encroaching into the Knickerson Creek riparian setback. Please bear in mind that this drawing does not show screening vegetation, erosion control measures, or grading. Those are dealt with on other drawings that will be updated from a finalized design. We just wanted to get your thoughts on this version based on your feedback from the last design. I spoke with Robert a little bit about how to address connecting our site to the existing roadway. I felt that providing a 24 foot wide paved roadway (the same as the rest of the Knott Street improvements), centered in the ROW and long enough to accommodate a fire-truck hammerhead would be a good starting point.

Please let me know if you have any thoughts or questions on this configuration.

Thanks!

Brett Kahr
Project Manager

LOWER COLUMBIA ENGINEERING, LLC

58640 McNulty Way

St. Helens, Oregon 97051

OFFICE **503.366.0399**

MOBILE **503.750.2349**

WEB www.lowercolumbiaengr.com

EMAIL brett@lowercolumbiaengr.com



REVISION

Holce Trailhead

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Exhibit J

Drawings