### **Pierce County Parks and Recreation**

# Eatonville to Rimrock Park Trail Phase 1 – Feasibility Study



April 2009

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Prepared for

**Pierce County Parks and Recreation** 

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Prepared by

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### Certification

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned.

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## **Acronyms and Key Terms**

Α

AASHTO American Association of State Highway and Transportation Officials

ADA Americans with Disabilities Act

ANSI American National Standards Institute

ASTM American Society for Testing and Materials

С

CPTED Crime Prevention Through Environmental Design

CRC Cultural Resource Consultants, Inc.

Ε

ECP Eatonville Municipal Code
ESA Environmental Site Assessment

G

GMA Growth Management Act

L

LEED Leadership in Energy and Environmental Design

M

mph miles per hour

MUTCD Manual on Uniform Traffic Control Devices

Ν

NEPA and SEPA National and State Environmental Policy Acts

0

OFM Office of Financial Management

Ρ

PHS Priority habitats and species

R

R10 Rural 10

RCO Recreation and Conservation Office

RPZ Runway Protection Zone

U

USGBC United States Green Building Council

W

WDFW Washington State Department of Fish and Wildlife

### **Chapter 1 Introduction**

#### 1 What is the purpose of this study?

The purpose of this study is to document the feasibility of constructing a 1.5-mile trail segment that will extend from the Town of Eatonville to Pierce County's Rimrock Park. This study is intended to investigate the issues and constraints of the proposed route in regard to ownership, land use, critical areas, and site conditions, and set the stage for development of a Phase II Engineering Plan. This study is also intended to provide the basis for potential future grant applications including grants administered by the Washington State Recreation and Conservation Office (RCO).

The 1.5-mile connection being studied is part of the project identified in the Town of Eatonville's Regional Trail Plan as the Rimrocks to Nisqually Mashel State Park Trail. The 1.5-mile connection contains all of the segment described as segment one, "Rimrocks Pierce County Park to Eatonville Elementary School" and portions of segment two, "Eatonville Elementary through the Aviator Heights Development" as outlined in the Regional Trail Plan. The trail alignment through the Aviator Heights development is not addressed in this study.

**Project Partners** 



Pierce County Parks and Recreation



Town of Eatonville

#### 2 What is the project route?

The route that is the subject of this study generally begins at the future site of Rimrock Park on 129th Avenue East, runs south along 129th Avenue on the east side of the road, and crosses the railroad tracks on the north side of 412th Street East. From this point, the route proceeds south and runs parallel to Lynch Creek Road on the west side of the road, crosses Lynch Creek and continues south to the location where Lynch Creek Road makes a 90-degree turn and proceeds west. At this location, the route crosses Lynch Creek Road and connects to a sidewalk along the south side of the road being constructed by the Eatonville School District as part of the Eatonville Elementary project. From this point, the route follows Town rights-of-way and easements between the east side of the School District properties and the west side of a large parcel of vacant land, to a point to the south where residential development begins. At this location, the route proceeds east to connect to sidewalks within the Aviator Heights development. The proposed trail alignment is illustrated on Exhibit 1-1.

This trail segment is part of the Rimrocks to Nisqually Mashel State Park Trail, which is a small portion of the overall regional trail system envisioned throughout Pierce and neighboring Counties. Within the Town of Eatonville, the planned trail system will link and connect neighborhoods and residential areas to town centers, schools, other communities, parks, campgrounds, day use areas, scenic views, and wildlife areas. Regionally, this trail system will link the Town of Eatonville and Rimrock Park to the communities of Elbe, Ashford, Alder, Orting, Graham, and Yelm; the University of Washington Pack Forest; Northwest Trek Wildlife Park; the future Nisqually River State Park; Alder Lake Campground and Day Use area; Pioneer Farm and the Ohop Valley; Elbe Hills, Ohop Lake; Clear Lake; Lake Kapowsin; Mount Rainier National Park; the Yelm to Tenino Trail; and the Foothills Trail at Orting (Town of Eatonville 2008).

Exhibit 1-1

Overview of Alignment

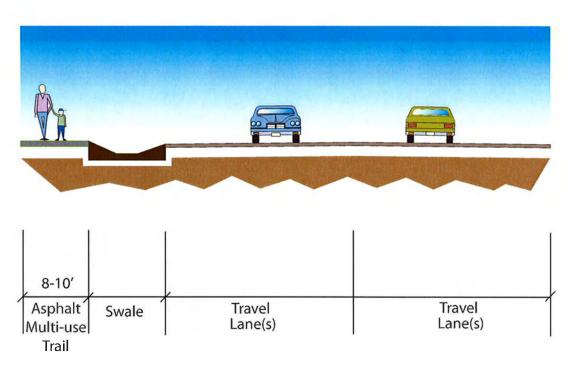


#### 3 What will the trail look like?

The trail sections will vary based on the location within the Eatonville Town limits or unincorporated Pierce County. Within the limits of Eatonville the Town has identified the desire to utilize an 8- to 10-foot trail section surfaced with concrete, which would be separated from the roadway driving surface where possible. In unincorporated Pierce County, the Town has identified the desire to utilize an 8- to 10-foot trail section surfaced with asphalt pavement, which would also be separated from the roadway driving surface where possible. Unique sections may be utilized at points where the route crosses the railroad tracks and where the route crosses Lynch Creek at the Lynch Creek Bridge. Unique sections may also need to be developed for locations at which the trail crosses public roads. The two typical trail sections are illustrated in Exhibit 1-2.

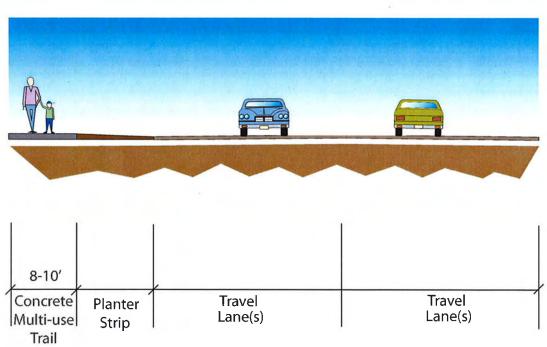
Many funding sources that include federal funding require trails to meet American Association of State Highway and Transportation Officials (AASHTO) standards to qualify for funding.

## Exhibit 1-2: Eatonville To Rimrock Park Typical Trail Section



**Unincorporated Pierce County Section** 

Section 1 - Existing Travel Lanes, Add New Separated Multi-Use Trail



**Incorporated Town Of Eatonville Section** 

Section 2 - Existing Travel Lanes, Add New Separated Multi-Use Trail

Parametrix April 2009

## **Chapter 2 Zoning and Land Use**

## 1 What land uses currently occur along the proposed trail corridor?

Land uses along the proposed trail corridor are generally rural in character. At the north end of the segment (connection to Rimrock Park), land uses are predominantly undeveloped forest land. As the route proceeds south towards the Town of Eatonville, lands along the alignment are characterized by rural, large lot single family residential development, and undeveloped forest lands. As the route reaches the Town it traverses more rural, large lot residential development, some of which is slated to be developed at more urban residential densities (4 units per acre) in the near future. Where Lynch Creek Road proceeds west, the trail route crosses the road and proceeds south between lands developed for educational (school) uses and a large, vacant parcel to the east. At the southern terminus of this segment, the route is bordered to the south by residential at relatively urban densities consisting of a mobile home park and detached, single family dwellings. Current zoning designations are depicted on Exhibit 2-1 (page 2-3).

## 2 What are the properties along the proposed trail corridor currently zoned?

Portions of the proposed trail corridor are located in unincorporated Pierce County, and portions of the corridor fall within the incorporated limits of the Town of Eatonville. Table 2-1 lists the zoning designations of properties the proposed trail route is adjacent to, and indicates if the zoning designation is a Pierce County or Eatonville zoning



Example of Forested Character along Trail Route

#### 2-2 Zoning and Land Use

designation. For a complete description of each zoning designation, please see Appendix A.

Table 2-1

Zoning Designations Adjacent to Trail Corridor

Jurisdiction	Zoning Designation	
Pierce County	R10 (Rural 10)	
	AIR-SA (Small Airport Overlay)	
Town of Eatonville	SF-2 (Single Family Residential, Medium Density)	
	C-2 (General Commercial)	
	AP (Aerospace District)	

## 3 What are the Comprehensive Plan designations of properties along the proposed trail corridor?

Land use can be thought of as the backbone of a Comprehensive Plan; plans for housing, utilities, transportation facilities and parks and open spaces are all driven by land use decisions. Comprehensive Plan land use designations establish the desirable character, quality, and patterns of physical development within a City or Town and its Urban Growth Boundary.

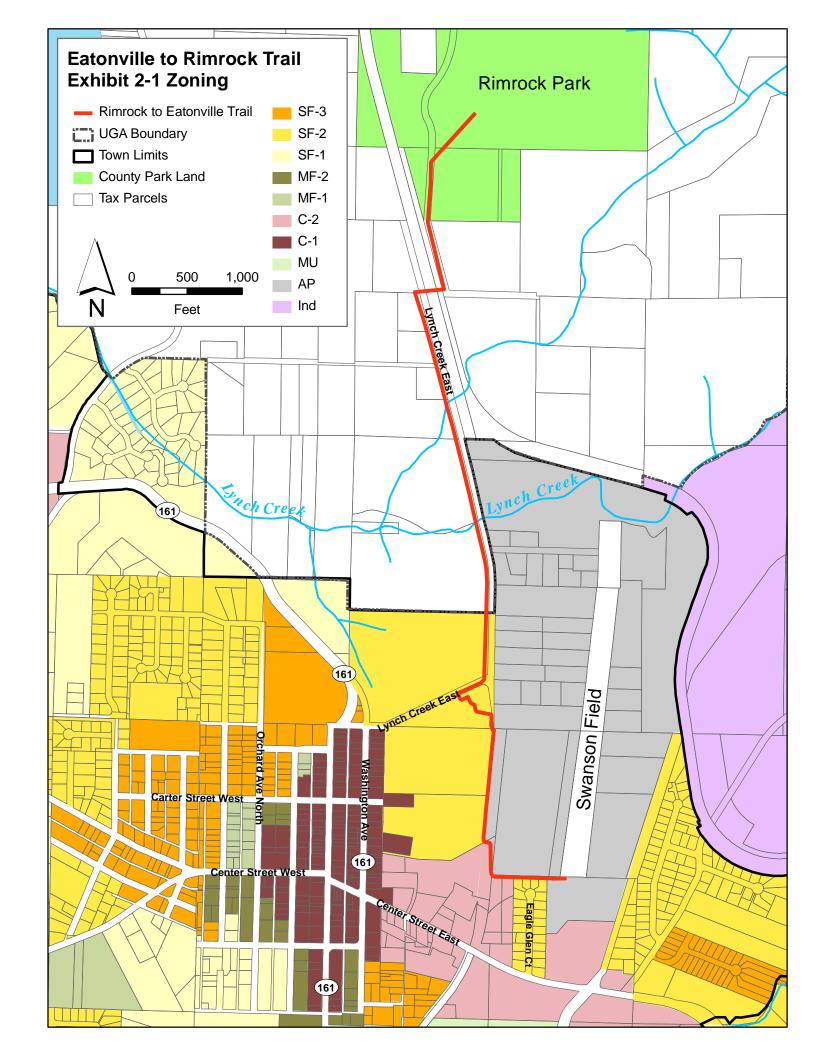
As outlined above, the proposed trail corridor passes through both unincorporated Pierce County and the Town of Eatonville. Table 2-2 lists the Comprehensive Plan land use designations of properties the proposed trail route is adjacent to, and indicates if the zoning designation is a Pierce County or Eatonville designation. The comprehensive plan designations along the trail corridor are depicted on Exhibit 2-2 (page 2-5).

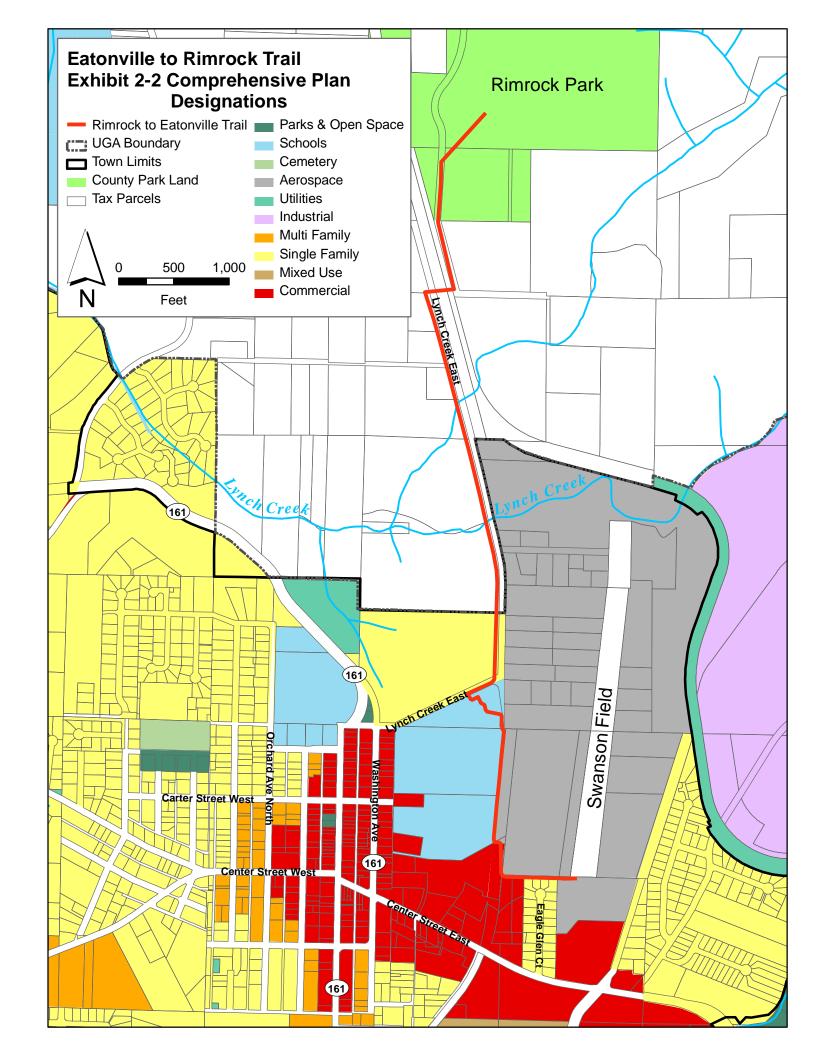
#### What is a comprehensive Plan?

In accordance with the Washington State Growth Management Act (GMA), certain jurisdictions are required to designate Urban Growth Boundaries within which urban growth is to be encouraged and beyond which urban growth is to be discouraged. Governments planning under GMA are required to adopt Comprehensive Plans, which are to provide for 20 years of growth and development needs based on forecasts of the Washington State Office of Financial Management (OFM).

Comprehensive Plan Land Use Designations Adjacent to Trail
Corridor

Jurisdiction	Comprehensive Plan Land Use Designation		
Pierce County	R10 (Rural 10)		
Town of Eatonville	Single Family		
	Schools		
	Commercial		
	Aerospace		





## 4 Do the current zoning designations applying to lands adjacent to the trail corridor allow for or encourage trails?

In Pierce County, zoning designations are grouped into the 'Rural' classification if located outside of an urban growth boundary. The Rural 10 (R10) zone designation, which occurs adjacent to the trail corridor, is intended to provide for rural uses at a rural density and can serve to function as a buffer between urbanized areas and resource land. Rural residential zones also allow for public and commercial recreational and associated uses related to the outdoors, along with rural residential, agricultural, and other resource uses. The AIR-SA zoning designation is an overlay, which provides special zoning considerations based on unique characteristics. This particular overlay zone, which includes those portions of the trail alignment falling in unincorporated Pierce County, is intended to minimize land use incompatibilities around small airports (Pierce County 2008).

In Pierce County, linear trails are considered recreational "level 4" civic uses when publicly owned or operated as non-profit. Level 4 recreational uses are permitted in the R10 zone (Pierce County 2008). In addition, linear trails are exempt from regulation under many County land use codes and design standards when located in existing rights of way. In general, trails are a permitted civic use within the AIR-SA overlay. Restricted civil uses include those that encourage congregations of people such as day care centers, schools, churches, hospitals, and nursing homes. Lighting and structure heights may be limited in the AIR-SA overlay zone (Pierce County 2008).

In the Town of Eatonville, properties along the trail corridor are zoned Single-Family Residential, Medium Density (SF-2), General Commercial (C-2), and Aerospace District (AP). According to the Eatonville Municipal Code, the intent of the SF-2 designation is to stabilize and preserve medium density residential neighborhoods. The intent of the C-2 designation is to recognize the existence of strip commercial development along certain major thoroughfares, provide standards to

### Who are the property owners along the trail corridor?

Property owners along the corridor are identified in Appendix B.

Ownership information is based on Pierce County Assessor's Office records (December 2008).

#### 2-8 Zoning and Land Use

encourage the redevelopment and upgrading of such areas, provide for a range of trade, service, entertainment and recreation land uses adjacent to major arterials and residential uses, and to provide areas for auto-oriented development. The AP zone is intended to allow airport-related activities such as runways, flight operations, aircraft storage, repair, maintenance and modification, and commercial and residential land uses (2008).

In Eatonville, open space uses include parks, playgrounds, golf courses and 'other recreational facilities', which would include trails. Open space uses are classified as "general conditional uses." General conditional uses are allowed in the SF-2 zone through granting of a conditional use permit from the Planning Commission. The purpose of the conditional use permit is to allow proper integration of uses into the community that may be suitable in a zoning district only under certain conditions (2008). General conditional uses are also allowed in the C-2 zone through granting of a conditional use permit from the Planning Commission

Proposed open space and other "general conditional uses" may be permitted through a conditional use permit in the AP zone, upon determination from the board of adjustment that the use is of a compatible nature (Town of Eatonville 2008).

## 5 Do the current comprehensive plan policies applying to lands adjacent to the trail corridor allow for or encourage trails?

The land use element of the Pierce County Comprehensive Plan calls for a network of multi-purpose and linear trails providing for recreational bicyclists, hikers and walkers, joggers, casual strollers, equestrian uses and neighborhood residents. The County desires to link urban neighborhoods to major parks and community facilities, within unincorporated Pierce County as well as within other communities. According to the rural portion of the land use element, outdoor recreation, entertainment and other open space activities are preferable land uses in rural areas. In addition, the transportation element of the Comprehensive Plan encourages transportation

investments that provide alternatives to single occupancy vehicles such as bikeways and pedestrian paths. This element also promotes development of a regionally coordinated network of facilities for pedestrians and bicycles (Pierce County 2004).

The land use element of the Town of Eatonville's Comprehensive Plan aims to promote efficient use of vacant or undeveloped land, reduce sprawl, preserve the existing small town character, and maintain significant open spaces within and around the Town. Land use goals and policies laid out in the plan encourage compatibility between existing and proposed uses and encourage livability through the provision of recreational facilities, protection of historic properties, attractive common areas, and public walkways. A policy specifically relating to residential land use areas encourages residential uses within the Town to provide convenient access, including pedestrian access, to commercial facilities, parks, and other community services. Commercial and Town Center land use policies do not specifically address recreation, open space, or trails. Policies relating to airport and aerospace land uses include reducing hazards that may endanger the lives and property of the public, and protecting the vitality of the airport as a significant economic resource to the Community (Town of Eatonville 2008). Assuming a proposed trail could be designed so as not to represent a hazard to lives or property of the public, and to avoid affecting the vitality of the airport, the Comprehensive Plan does not preclude a trail adjacent to the airport.

### 6 What properties or portions of property may need to be acquired for the trail project to become a reality?

The trail alignment is proposed ultimately to be located within public rights-of-way. The scope of this study did not include the property title research that would necessary to determine if sufficient right of way available along the corridor to accommodate the planned trail. As outlined above it may be necessary to work with property owners along the corridor in the future to obtain any needed rights-of-way or easements.



Example of Steep Slopes Adjacent to Right-of-Way

#### 2-10 Zoning and Land Use

In addition, obtaining slope easements from adjacent property owners may be necessary for construction of the proposed trail. This will likely be needed where the edge of the right-of-way is located at the base of steep slopes in the vicinity of the Lynch Creek Bridge. It is not likely that construction of the trail can occur without temporarily impacting and needing to stabilize the adjacent steep slopes.

## **Chapter 3 Environmentally Sensitive Areas**

#### 1 What are Environmentally Sensitive Areas?

Cities and Counties planning under the Growth Management Act are required to designate and protect critical areas functions and values. The terms critical area and environmentally sensitive area are often used interchangeably. The protection of critical areas is essential to preserving our natural environment and protecting the public's health and safety. Protecting critical areas helps reduce exposure to risks, such as landslides or flooding, and maintains the natural elements of our landscape. Critical areas provide a variety of benefits: clear drinking water, enhanced water quality, wildlife habitat, and managed flood risks, to name a few. Protection of critical areas is necessary to preserve these benefits and to reduce the hazards associated with disturbance of some critical areas. The functions and values of critical areas, once lost, can be costly or even impossible to replace (WA CTED 2003).

The environmentally sensitive areas addressed in this study are listed in the sidebar to the right.

# 2 What are Priority Habitats and Species, and do any occur in the vicinity of the proposed trail corridor?

Priority habitats and species (PHS) data is maintained by the Washington State Department of Fish and Wildlife (WDFW). Priority species require protective measures for their survival due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority

## Which "environmentally sensitive areas" are addressed in this study?

- Washington State Priority Habitats and Species (PHS)
- Wetlands and Water Bodies
- Designated Resource Lands
- Open Space Corridors
- Potential Fish and Wildlife Habitat Conservation Areas
- Cultural and Historic Resources
- Hazardous and Toxic Materials

species include State Endangered, Threatened, Sensitive, and Candidate species; animal aggregations (e.g., heron colonies, bat colonies) considered vulnerable; and species of recreational, commercial, or tribal importance that are vulnerable. Priority habitats are habitat types or elements with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type (e.g., shrub-steppe) or dominant plant species (e.g., juniper savannah), a described successional stage (e.g., old-growth forest), or a specific habitat feature (e.g., cliffs).

There are 20 habitat types, 152 vertebrate species, 41 invertebrate species, and 10 species groups currently in the PHS List. These constitute about 17 percent of Washington's approximately 1,000 vertebrate species and a fraction of the state's invertebrate fauna (WDFW 2008). The 2008 PHS list can be accessed online at <a href="http://wdfw.wa.gov/hab/phs/">http://wdfw.wa.gov/hab/phs/</a> phs\_list\_2008.pdf>.

Landau Associates completed a permitting report for this project in December 2008, which included research into the presence of critical areas and wildlife sensitive areas in the vicinity of the proposed trail. According to Landau's report, local elk populations have been documented in the area per the WDFW PHS data. However, fish species in Lynch Creek and its tributaries are the only endangered species present within the project area (Landau Associates 2008).

## 3 What are wetlands? Do any wetlands or water bodies occur in the vicinity of the proposed trail corridor?

Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin 1979). For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas (US EPA 2008).



Likely Wetlands East of Eatonville Elementary

Based on field work conducted by Landau Associates in December 2008, wetlands are likely present along the corridor in two locations: along the east side of Lynch Creek Road just south of the railroad track crossing, and at the south end of the trail alignment between the school district property and vacant lands adjacent to the airport (Landau Associates 2008). Please see Appendix C for a copy of Landau Associate's complete Critical Areas Permitting report. Pierce County GIS information indicates wetlands associated with Lynch Creek may also occur in the ravine where the creek flows beneath and perpendicular to the alignment.

# 4 What are Fish and Wildlife Habitat Conservation Areas, and do they occur in the vicinity of the proposed trail corridor?

Fish and wildlife habitat conservation areas generally include those areas that support regulated fish and wildlife species. In Pierce County, this includes areas with which a federal or state listed endangered, threatened or candidate species (including state listed monitor species) have a primary association, such as a nest or den. Habitats associated with species of local importance are also included.

In the Town of Eatonville, habitat conservation areas also include areas with which threatened or endangered species have a primary association, state priority habitats as identified in WDFW PHS data, habitat and species of local importance, waters of the State of Washington in addition to lakes, streams and ponds planted with game fish, natural area preserves, areas with rare plant species or high quality ecosystems, and land useful or essential for preserving connections between habitat blocks and open space.



Lynch Creek - North Crossing

#### 3-4 Environmentally Sensitive Areas

As referenced above, fish species in Lynch Creek and its tributaries are the only endangered species in the project area. Lynch Creek represents the only identified potential Fish and Wildlife Habitat Conservation Area within the proposed alignment (Exhibit 3-1). Because Lynch Creek and its tributaries are salmon bearing and because portions of the area where trail construction is proposed are heavily wooded, critical area studies surrounding habitat conservation areas will be necessary for permitting and construction of the proposed trail (Landau Associates 2008).

# 5 What are Designated Agricultural, Forest, and Mineral Resource Lands, and do any occur in the vicinity of the proposed trail corridor?

Agricultural, Forest, and Mineral Resource Lands constitute "natural resource lands" in Pierce County. Natural Resource Lands are of special concern to the people of Pierce County and the State of Washington. The intent of regulations relating to Natural Resource Lands in Pierce County is to protect and conserve these features in order to maintain and enhance resource land-based industries, discourage incompatible land uses, encourage the retention of open space, and protect the environment.

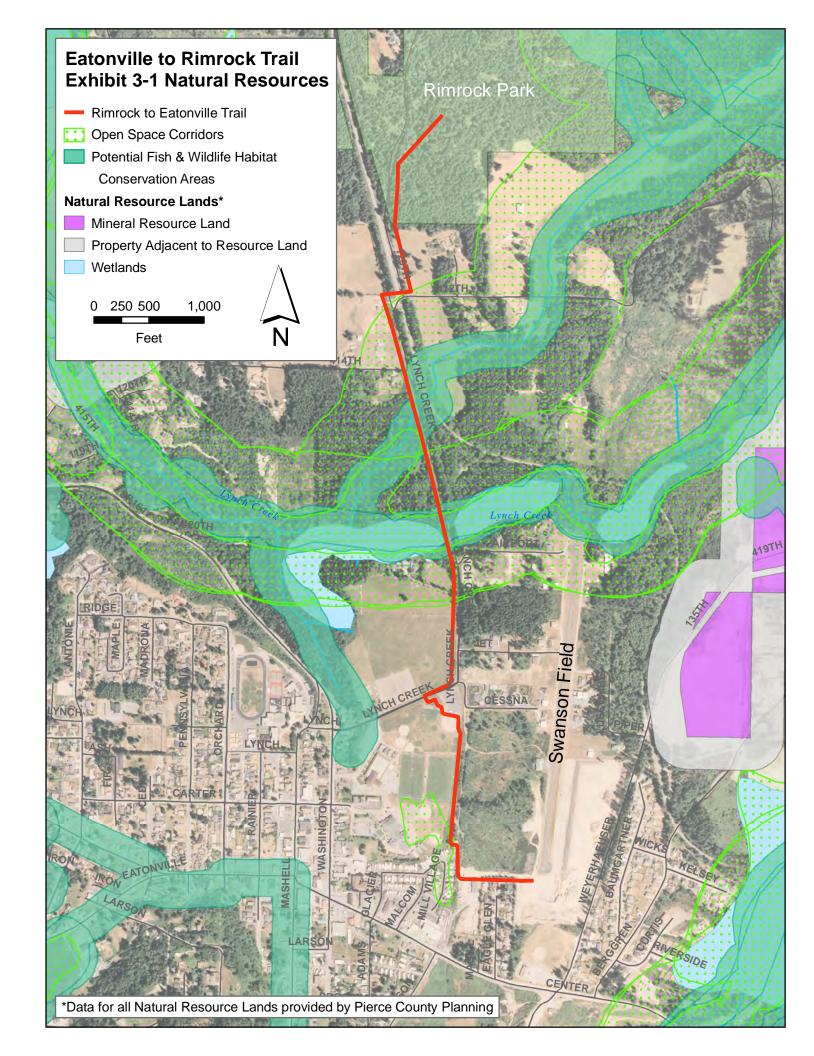
There are no agricultural or forest resource lands identified in the vicinity of the trail alignment. Mineral resource lands are identified east of Rimrock Park and the airport.

## 6 Do any Water Bodies occur in the vicinity of the proposed trail corridor?

Lynch Creek is the only water body present within the proposed trail corridor, and is actually crossed twice by the proposed trail. One crossing is located at the north end of the trail corridor, where the creek passes below Lynch Creek Road in a culvert. The second crossing is further south along the corridor, where the creek is located in a deep ravine beneath the Lynch Creek Road Bridge.



Lynch Creek - South Crossing



## 7 What Cultural or Historic Resources occur in the vicinity of the proposed trail corridor?

The project area is within the traditional territory of the Nisqually people, but people from Puyallup villages in the Carbon River Valley to the north also would have used the Eatonville area for hunting or other resource procurement activities. By the mid 1850s, the smallpox and violence associated with Euro-American settlement in the northwest had drastically impacted Indian people and their traditions; many families were forcibly relocated during this period. Euro-American land use in the Eatonville area initially focused on farming. Later, the logging and milling industries, enabled by construction of railways, played an important role in developing the Town (CRC Inc. 2009).

Cultural Resource Consultants, Inc. (CRC) prepared a cultural resources survey as part of this feasibility study. Their assessment utilized a research design that considered previous studies in the area, the nature of the proposed project, the extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential affects.

As of November 24, 2008, no pre-contact archeological sites have been recorded within a one-mile radius of the proposed project. One pre-contact archaeological site within the greater Eatonville area is about 5 miles from the southwest end of the proposed project. The nearest recorded historic site is the John Galbraith House at 140 Oak Street East in Eatonville. No previously unrecorded cultural resources were identified or recorded as a result of CRC's field investigations.

Please see Appendix D for a copy of CRC's complete Cultural Resources Report.

### 8 Open Space Corridors

Open space corridors in Pierce County are linear stretches of open space which usually connect critical areas and can be useful for wildlife, recreation, and protection of environmentally sensitive areas (Pierce County 2008). Lands surrounding the Lynch Creek corridor in Pierce County are designated open-space corridors.

### 9 What is an Environmental Site Assessment (ESA), and what can the results tell us about hazardous or toxic sites occurring in the vicinity of the proposed trail corridor?

The purpose of an Environmental Site Assessment (ESA) is to assess and document environmental conditions that may pose a potential liability to the proposed project. The goal of the assessment as outlined by the American Society for Testing and Materials (ASTM) process E 1527-05 is to identify recognized environmental conditions, which are defined as "the presence or likely presence of any hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the subject properties or into the ground, groundwater, or surface waters", within the proposed project alignment (Landau Associates 2008).

A corridor-level screening ESA was completed for the trail alignment by Landau Associates in December 2008. Two areas/properties of potential concern were recommended for further study should the proposed trail alignment enter or skirt them: the diesel repair shop in the southern portion of the proposed trail alignment, and the Upper Nisqually Sportsmen's Club next to the north end of the proposed trail alignment (Landau Associates 2008). Please see Appendix E for a copy of Landau Associates' complete ESA report.

#### 10 What will be done with the stormwater from the trail?

Stormwater is rain and snow melt that runs off surfaces such as rooftops, paved streets, highways, and parking lots. As water runs off these surfaces (known as "impervious" surfaces), it can pick up pollution such as oil, fertilizers, pesticides, soil, trash, and animal waste (Ecology 1994–2009). For this reason, State and local regulations generally require that stormwater from new impervious surfaces be collected and treated before being discharged to local waterways or infiltrated back to groundwater.

Various methods of *treating* stormwater have been developed, ranging from approaches that mimic natural systems like grass-lined swales, to engineered approaches like cartridges and vaults. Various methods for *discharging* stormwater have also been developed, all of which strive to re-release the treated water at rates and in locations that are similar to predevelopment conditions.

For this segment of the Rimrock to Nisqually Mashel State Park Trail, the trail surface is proposed to be concrete and asphalt. Water running off of these surfaces, which are considered non-pollution-generating impervious surfaces, are exempt from runoff treatment requirements but will be subject to flow control standards. It is anticipated that stormwater runoff flow mitigation will likely be accomplished for this trail segment by implementing dispersion and/or infiltration BMPs. Comprehensive geotechnical investigation will be required during the design phase of this project to assess the feasibility of implementing in-situ infiltration BMPs. Because of the linear nature of trail corridors, facilities to collect and detain stormwater from these large areas are infeasible and can be prohibitively expensive.

Another option is to utilize pervious concrete or asphalt surfacing for the trail, which is much like traditional concrete or asphalt. However, pervious surfacing materials typically utilize larger aggregate and avoid adding sand to the mix, which leaves voids or pores in the surface through which water can continue to drain. By allowing rainwater or snowmelt to seep into the ground, pervious concrete can be instrumental in recharging groundwater and reducing stormwater runoff. This capability can also reduce or negate the need for stormwater flow mitigation. Pervious pavement integrates hardscape surfaces with stormwater management (Portland Cement Association 2008).

# **Chapter 4 Permitting Discussion**

# 1 What types of permits will be necessary to construct the trail?

Federal, state, and local permits will be necessary to construct the proposed trail. Because the proposed trail is located within both the incorporated limits of the Town of Eatonville and in unincorporated Pierce County, the project would need to comply with the regulations of both of those local agencies. Permits and studies relating to impacts to wetlands and other critical areas, stream crossings or impacts to fish bearing water bodies, local grading and building permits, and review under both the National and State Environmental Policy Acts (NEPA and SEPA, respectively) will also be required for the project. A summary of the anticipated permits and approvals necessary for construction of the subject trail segment are listed in Table 4-1. In many cases, the need for specific permits for a particular project may change as design is underway and when impacts or alignments are determined for certain. For a general discussion regarding permitting for this project, please see Landau Associate's Critical Areas Permitting Report in Appendix C.

Table 4-1

Anticipated Permits or Approvals Required for Trail Construction

Agency (Jurisdiction)	Type of Permit
US Army Corps of Engineers (Federal)	Section 404 Permit: Required for work in waters of the U.S., including wetlands.
	NEPA Compliance: Triggered when federal funding, federal lands, or federal permits are necessary or being used by a project.
	These triggers also initiate review of the project under Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act.

Table 4-1
Anticipated Permits or Approvals Required for Trail Construction

Agency (Jurisdiction)	Type of Permit		
Washington State Department of Ecology (State)	Section 401 Water Quality Certification: Projects receiving a Section 404 permit from the Army Corps are required to obtain this certification. Issuance of a certification means Ecology anticipates the project will comply with state water quality standards and other aquatic resource protection requirements.		
Washington State Department of Fish and Wildlife (State)	Hydraulic Project Approval (HPA): Any construction activity that will use, divert, obstruct, or change the bed or flow of state waters, including construction over water, is required to obtain an HPA.		
Town of Eatonville and/or Pierce County (Local) <sup>a</sup>	Local Critical Area Permits: For work in wetlands, adjacent to streams, and on slopes. Issuance of these permits may require special studies and mitigation.  Local Grading and Building Permits: For preparing the ground for and constructing the trails and their associated appurtenances.		
	SEPA Compliance: Triggered by various levels of construction; in this case, the grading threshold (500 cubic yards) is likely to be exceeded, which would require SEPA review.		

a This assumes that no work will take place within the Lynch Creek floodplain.

# 2 Are there elements of the project that will require specific attention during design to ensure permits can be granted for a trail in the future?

Many times design standards specifically relating to accessibility with recreational and trail projects depend on the funding source. For example, all facilities developed or renovated using RCO funds must be constructed to meet or exceed current barrier-free standards, laws, or building codes. These may include, but are not limited to:

- Washington State Building Code.
- Local Building Codes.
- Americans with Disabilities Act of 1990.
- Section 504 of the Rehabilitation Act of 1973.
- Architectural Barriers Act of 1968.

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Outdoor facilities or elements not specifically addressed in these laws and codes are not necessarily exempt from the need to be designed for barrier-free access. In the absence of any applicable local, state, or federal laws, sponsors should consult the most current federal Access Board report, proposed rule, or final rule. If no specific scoping or technical specifications exists, project sponsors must (to the highest degree reasonable) on a case-by-case basis, make accessibility improvements to facilities or elements. In the case of conflicts between the codes or guidelines, sponsors must follow the one providing the most access. In general:

- Basic services (parking, toilet facilities, drinking water, public telephones, routes of travel, etc.) must be convenient and accessible at any site receiving RCO funding.
- Recreation experiences that are profoundly altered by barrier-free designs may need special provisions. For example, the intended experience for a sand volleyball court may be so radically changed by providing an accessible surface that the change would be unreasonable. In such cases, reasonable access may be limited to route of travel, spectator viewing, or coaching accommodations.
- Environmental factors may also influence barrier-free access. Not all environments are suitable for barrier-free access accommodations. For example, access points into sensitive lands set aside for fish/wildlife habitats may be negatively affected by human intrusion. In these cases, development decisions must be carefully weighed to determine the potential impacts of trails, viewpoints, and boardwalks. Whenever these types of developed facilities are constructed for general public access, they must also be made barrier free.

An at-grade crossing of two sets of railroad tracks will be necessary in the northerly portion of the study alignment. Issues to be considered with trail at-grade crossings of railways include train frequency and speed, location of the crossing, geometrics of the specific crossing site (angle of crossing,

## 4-4 Permitting Discussion

grade at approach and sight distance), crossing surface, nighttime illumination, and types of warning devices (passive or active) (FHWA 2002). Table 4-2 discusses some of these issues in further detail, and generally assesses each for the proposed crossing location. From a design standpoint, trail-roadway intersections are covered in detail by both the AASHTO Bike Guide and the Manual on Uniform Traffic Control Devices (MUTCD).

Table 4-2 **At-Grade Railroad Crossing Issues** 

Issue	Discussion			
Train Frequency, Speed	The railroad right of way in this area is owned by Tacoma Rail. The frequency and speed of trails utilizing these tracks should be obtained from Tacoma Rail to ensure safe crossings are designed.			
Crossing Location	At-grade trail-rail crossings should reduce illegal track crossings by channelizing users to safe crossing areas. Crossings should not be located near where trains regularly stop, to avoid encouraging trail users to cross between or under railroad cars. Road users are currently channelized to one crossing, and trail channelization should encourage crossing at the same location.			
Geometrics of Site	At-grade crossings should ideally be at a right angle to the rails. The proposed crossing location would allow for an approach almost precisely at a right angle to the rails. Additional width can be provided at trail curves to allow faster trail users like cyclists to determine their own angle of approach and route through the crossing (see graphic on page 4-5).			
	The AASHTO Bike Guide and Americans with Disabilities Act (ADA) specify grade requirements for shared use paths. Trail grades over 5 percent are allowed for short distances in specific circumstances. Grades over 5 percent are not recommended for crossing approaches. In general, the approach should be at the same elevation as the track.			
	Adequate sight distance is particularly important at trail-rail intersections without active warning devices. Sight distance can be evaluated in two ways; approach and clearing. Approach sight distance allows a user to determine in advance of the crossing that no train is approaching and it is safe to cross the tracks without stopping. Clearing sight distance requires that a trail user stopped 15 feet short of the nearest rail be able to see far enough up and down the track to ensure they can cross to a point 15 feet past the far rail before the arrival of a train. In this location the tracks are straight and with some brushing sight distance should be adequate. However, there are two tracks that must be crossed at this location; it is important to recognize and warn users that the presence of a train on one track can potentially restrict their view of a second train approaching on the adjacent track.			
Crossing Surface	Sudden bumps and uneven surfaces can cause trail users like bicyclists and inline skaters to lose control and crash. In addition, trails that are designed to meet ADA accessibility design guidelines must maintain a smooth surface. The crossing surface should be of a quality comparable to the approach, so users are not distracted from attention to warning devices or an approaching train while devoting attention to finding the smoothest portion of the crossing. Where the trail crosses the tracks, slip resistant crossing materials such as concrete or rubberized pads should be installed flush with the rail top. Accessible trails should include tactile warning strips prior to atgrade track crossings.			

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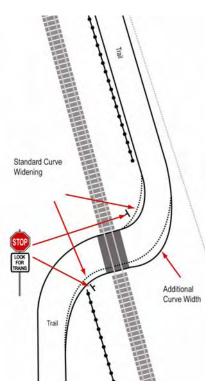
Table 4-2
At-Grade Railroad Crossing Issues

Issue	Discussion
Nighttime Illumination	Lighting should be provided at trail-rail crossings. However, for safety reasons lighting must be shielded from the locomotive engineer's view. American National Standards Institute (ANSI) standards outline the appropriate location of lighting fixtures and recommended lighting levels for rail grade crossings in the <i>American National Standard Practice for Roadway Lighting, ANSI IESNA RP-8</i> .
Warning Devices	Passive warning devices include things like pavement markings and warning signage. Active warning devices include such things as gates, alarms, and flashing lights. Warning devices currently existing where Lynch Creek Road crosses the tracks are passive, and are limited to warning signs and striping.

The proposed trail alignment crosses Lynch Creek Road in the vicinity of Eatonville Elementary. A preliminary engineering sight distance study was completed to determine the safest general location for this crossing, based on road geometry and the speed limit in this vicinity. Stopping sight distance is the distance necessary for a driver going the speed limit to see an object in the road, react, and come to a stop.

Lynch Creek Road is posted for 25 miles per hour (mph) and is on a flat grade. For a 25 mph design speed roadway with a flat grade, the minimum stopping site distance is 155 feet. A visual analysis was conducted to determine the optimum crossing location for driver visibility, which was determined to be the southwest leg of the Lynch Creek Road/Cessna Court intersection. This crossing location meets the stopping sight distance requirement of 155 feet. Significant brushy growth was noted at this intersection, which did not obstruct the view of an object at 2.0 feet above the ground surface but limited visibility of it. It is recommended that this brush be completely cleared away during trail construction. For the complete Sight Distance Study, please see Appendix F (Parametrix 2009).

Trail lighting and illumination, particularly at road crossings and intersections, also needs to be considered. The desire to limit unnatural light levels and potential light pollution should be weighed against and safety concerns when determining where illumination will be installed for the trail.

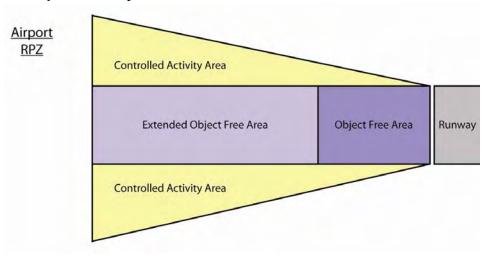


At-Grade Trail-Rail Crossing Source: FHWA

#### 4-6 Permitting Discussion

In the vicinity of the Eatonville airport, there is an area called the Runway Protection Zone (RPZ), which exists at the approach to all airport runways (see Exhibit 4-1). This RPZ is trapezoid shape where land uses are limited in order to keep the approach to an airport runway clear of obstacles. It is typically comprised of an Object Free Area, Extended Object Free Area, and Controlled Activity Areas (WSDOT 2009). The alignment of the trail and land uses/appurtenances associated with the trail will need to be reviewed in accordance with RPZ regulations and requirements to ensure no conflicts are created.

Example Runway Protection Zone – WSDOT 2009



Parametrix investigated three options for adding a sidewalk adjacent to the Lynch Creek Bridge; this bridge is currently very narrow and cannot be restriped to accommodate the sidewalk or trail on the existing bridge deck surface. The existing bridge was designed for H-15 loading, which is considerably less that today's standards. Option 1 entailed providing a sidewalk via hanging a new support beam from two of the existing reinforced concrete T-beams. Option 2 included providing the sidewalk by incorporating a longitudinal beam with diagonal struts at the pier locations to support the transverse sidewalk beams. The transverse sidewalk beams would be connected directly to the existing exterior reinforced concrete T-beam. Option 3 provides sidewalk access by hanging a transverse support beam from the columns of the existing bridge substructure.

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The three options for adding a sidewalk to the bridge all entail simple construction methods and the costs of all three options are fairly similar. However, for planning and budgeting purposes it is recommended that Option 3 be selected because only this option transfers the new sidewalk load directly to the substructure; this option also requires a minimal level of additional engineering on the existing structure. Although all three options were determined to be feasible during this planning-level assessment, it is important to note that an in-depth structural analysis will be required prior to final design of the Lynch Creek Bridge retrofit. For an expanded discussion on the sidewalk/trail options for Lynch Creek Bridge, please see Appendix G (Parametrix 2009).

# Chapter 5 Summary of Challenges and Recommendations/Next Steps

# **SUMMARY**

The purpose of this study was to investigate the issues and constraints of the proposed Eatonville to Rimrock Park trail route in regard to ownership, land use, critical areas, and site conditions, and set the stage for development of a Phase II Engineering Plan. This study also was intended to provide the basis for potential future grant applications.

Based on the current project description and conditions researched and observed in the field, there are no foreseeable constraints with trail development in relationship to property ownership or land use (zoning or comprehensive plan designations). The trail is proposed within existing right-of-way; slope easements may need to be obtained from private property owners adjacent to the trail in order to construct and/or maintain the trail where the route is located at the base of a steep slope.

Constraints related to critical areas are generally limited to potential wetland impacts, and potential stream or riparian area impacts depending upon the final plan for crossing Lynch Creek. Studies and reports will be necessary to document site-specific conditions related to the character of these areas, in relation to proposed impacts associated with the trail project. It will be necessary to show how impacts have been avoided to the extent possible, how impacts have been minimized, and if impacts to critical areas are still necessary, mitigation may be required.

# RECOMMENDATIONS/NEXT STEPS

The single most challenging and potentially costly element of the proposed trail is the Lynch Creek bridge. While this study provides three options that have been studied at a preliminary level, and pros, cons, and costs associated with each option have been identified, an in-depth structural analysis of the bridge will still be necessary to move forward with design and construction of any option.

Right-of-way and property title research will also need to be conducted prior to design to ensure the Town of Eatonville and/or Pierce County have clear title or right to lands within which the trail is proposed to be placed.

When it has been determined that all portions of the trail can be located within an alignment to which the Town and/or County have the right to construct the trail, engineering design can commence. Cost estimates for trail construction can also be prepared during design.

There are two additional planning theories that should be studied for incorporation into design of the trail and its amenities. The first of these theories is CPTED, which is an acronym for "Crime Prevention Through Environmental Design." The original thinking behind CPTED was to place emphasis on design features that support the ability to naturally survey specific points on buildings that would aid in crime prevention, like front doors and windows on homes. The idea was that "natural guardianship" in the environment would discourage crime.

In the built environment, CPTED seeks to dissuade offenders from committing crimes by manipulating the location in which those crimes proceed from or occur. The three most common strategies in the built environment are natural surveillance, natural access control, and natural territorial reinforcement. Natural surveillance and access control strategies limit the opportunity for crime. Territorial reinforcement promotes social control through a variety of measures.

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Natural surveillance increases the threat of apprehension by heightening the perception that people can be seen. Natural surveillance is possible by placing physical features, activities and people in such a way as to maximize visibility and foster positive interaction among legitimate users. Potential offenders feel increased scrutiny. Some ways in which CPTED can be considered when designing a trail include:

- Using passing vehicular traffic as a surveillance asset.
- Creating landscape designs that provide surveillance, especially in proximity to designated points of entry and opportunistic points of entry.
- Using the shortest, least sight-limiting fence appropriate for the situation.
- When creating lighting design, avoid poorly placed lights that create blind spots for potential observers and miss critical areas. Ensure potential problem areas are well lit: pathways, stairs, entrances/exits, parking areas, phone kiosks, dumpster and recycling areas, etc.
- Use shielded or cut-off luminaires to control glare.
- Place lighting along pathways and other pedestrian-use areas at proper heights for lighting the faces of people in the space (to identify the faces of potential offenders).

Natural surveillance measures can be complemented by mechanical and organizational measures. For example, closed-circuit television (CCTV) cameras can be added in areas where personal surveillance is necessary but unavailable or impossible.

Natural access control limits the opportunity for crime by taking steps to clearly differentiate between public space and private space. By selectively placing entrances and exits, fencing, lighting and landscape to limit access or control flow, natural access control occurs.

- Use a single, clearly identifiable, point of entry.
- Use structures to divert persons to "official" access areas.

- 5-4 Summary of Challenges and Recommendations/Next Steps
- Use low, thorny bushes where access is discouraged.
- Use shoulder-level, open-type fencing along residential property where visibility and/or interactions are encouraged.
- Use substantial, high, closed fencing (for example, masonry) between a private and public space, where access is discouraged.

Territorial reinforcement promotes social control by defining "space," in this case a difference between public and private space. When private space is clearly delineated, two things can occur. First, it can create a sense of ownership. Owners have a vested interest and are more likely to challenge intruders or report them to the police. Second, the sense of owned space can create an environment where offenders stand out and are more easily identified. By using buildings, fences, pavement, signs, lighting, and landscape to express ownership and define public, semi-public, and private space, natural territorial reinforcement occurs.

- Provide trees in common areas. Research results indicate that outdoor residential spaces with more trees are seen as significantly more attractive, safer, and more likely to be used than similar spaces without trees.
- Restrict private activities to defined private areas.
- Avoid cyclone fencing and razor-wire fence topping, as it communicates the absence of a physical presence.
- Scheduling activities in common areas increases proper use, attracts more people and increases the perception that these areas are controlled.

Territorial reinforcement measures make the normal user feel safe, and make a potential offender aware of a substantial risk of apprehension or scrutiny (Wikipedia 2009).

The second theory that should be evaluated for the opportunity to implement in design of the trail and its amenities is LEED.

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LEED is an acronym for "Leadership in Energy and Environmental Design", and was developed by the United States Green Building Council (USGBC). LEED is a rating system that provides a suite of standards for environmentally sustainable construction. LEED continues to be refined; currently the rating system addresses six major areas — sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental qualities, and innovation and design process.

LEED-certified buildings use key resources more efficiently when compared to conventional buildings built to code. LEED-certified buildings offer healthier environments, which in the work place contribute to higher productivity and improved employee health and comfort. However, often when LEED certification is pursued, initial design and construction costs will increase for several reasons. Currently, different versions of the rating system are available for various types of projects; new construction, existing buildings, commercial interiors, core and shell building types, homes, schools, and retail. An "ND" version of the rating system is currently being piloted for Neighborhood Development. All of the programs outlined above deal with buildings, with the exception of Neighborhood Development. The LEED for Neighborhood Development rating system integrates the principles of smart growth, urbanism, and green building into the first national system for neighborhood design (USGBC 2009).

While LEED ND has been designed to be applicable to design and development of neighborhoods, the benefits of its policies can also apply to trails and recreational facilities. Some of these policies include encouraging healthy living and increasing transportation choices.

**APPENDIX A** 

**Zoning Designations** 

- d. Village Centers. The Village Center (VC) zone classification provides for a compact mix of commercial, civic, and residential uses connected by pedestrian facilities in areas which experience a tourist population such as communities adjacent to Mount Rainier National Park. The zone classification includes commercial and residential uses that provide commercial services and civic facilities to meet the daily needs of the surrounding rural residents and serve a tourist economy.
- e. **Tourist Commercial.** The Tourist Commercial (TC) zone classification provides limited commercial opportunities that are only oriented to tourism such as restaurants, lodging, and rental of recreational equipment. The zone classification is not intended to provide civic activities or meet the daily shopping needs of residents.
- f. Village Residential. The Village Residential (VR) zone classification allows for low density residential uses located within a reasonable walking distance of commercial amenities found in a Village Center. Typically, the Village Residential zone classification recognizes existing platting patterns.
- g. Essential Public Facility-Rural Airport South and North. The Rural Essential Public Facility-Rural Airport South and North (EPF-RAS and EPF-RAN) zone classifications recognizes existing airports classified as essential public facilities in the rural area of the County. New uses are appropriate when consistent with an applicable community plan.
- h. **Rural Industrial Center.** The Rural Industrial Center (RIC) designation/zone allows light industrial uses that are related to food or agriculture or intermediate manufacturing and final assembly. It does not allow heavier industrial uses that produce substantial waste byproducts or wastewater discharge or noise impacts incompatible with a rural area.

## B. Rural Residential.

- 1. **Purpose.** To provide for rural uses incorporating existing as well as historic patterns of settlement and character. Rural Residential areas function as a buffer between urbanized areas and resource land. They can supply lands that may be added to an urban growth area over time. The Rural Residential zones also allow for commercial and industrial uses related to and dependent upon natural resources and public and commercial recreational and associated uses related to the outdoors, along with rural residential, agricultural, and other resource uses.
- 2. **Description.** Eight Rural Residential zone classifications are recognized: Rural Separator, Rural 10, Rural Reserve 5, Rural 20, Rural 40, Rural Sensitive Resource, Rural Farm, and Park and Recreation.
  - a. **Rural Separator.** The Rural Separator (RSep) zone classification includes rural lands intended as a buffer or separation between urban zone classifications.
  - b. **Rural 10.** The Rural 10 (R10) zone classification is intended to provide for rural uses at a rural density.
  - c. **Rural Reserve 5.** The Rural Reserve 5 (Rsv5) zone classification is intended to provide lands for potential future inclusion in an urban growth area when the need for additional land is identified and a Plan amendment is adopted.
  - d. **Rural 20.** The Rural 20 (R20) zone classification is intended to provide for rural uses at a rural density and includes rural lands between the Rural 10 classification and the Rural 40 or Forest Lands classifications.

- e. **Rural 40.** The Rural 40 (R40) zone classification is intended to provide for rural uses at the lowest rural density.
- f. Rural Sensitive Resource. The Rural Sensitive Resource (RSR) zone classification is intended to provide low density rural residential development in order to protect environmentally sensitive areas such as stream corridors, aquifer recharge areas, and fish and wildlife habitat areas. The RSR classification is applied to parcels that have at least 50 percent of the land area located within a designated open space corridor. Permitted and conditional uses employing low impact development techniques are compatible with the RSR zone. New development within the RSR classification shall utilize low impact development (LID) techniques as outlined in the Pierce County Stormwater Management and Site Development Manual.
- g. **Rural Farm.** The Rural Farm (RF) zone classification is intended to protect agricultural lands that may or may not have soils to qualify as Agricultural Resource Lands (ARL). The Rural Farm classification will reflect the properties that have historically been used for agricultural activities or zoned agriculture that have not been converted to more intensive and incompatible uses or that are currently being used for agricultural activities (which may include noncommercial agricultural or farming activities).
- h. **Park and Recreation.** The Park and Recreation designation is intended to recognize public and private parks, campgrounds, historical sites and other properties improved with park or recreational facilities. Passive or active recreational uses are encouraged. Conversion of lands classified as Park and Recreation to other uses is discouraged.

# C. Resource Lands.

- 1. **Purpose.** To promote long-term commercially significant resource use.
- 2. **Description.** Three categories of Resource Lands are identified. Forest lands and Agricultural Resource Lands are recognized as zone classifications. Mineral Resource lands are recognized by an Overlay (See PCC 18A.33.160 D.).
  - a. **Agricultural Resource Lands.** The Agricultural Resource Lands (ARL) zone classification includes land primarily devoted to the commercial production of agricultural products and is applied to parcels outside of urban growth areas that meet certain criteria.
  - b. **Forest Lands.** The Forest Lands (FL) zone classification includes land primarily useful for growing trees for commercial purposes, and that has long-term commercial significance for growing trees commercially.

# D. Rural Planned Communities.

- 1. **Purpose.** To integrate a mix of housing, jobs, services and recreation.
- 2. **Description.** There are two Rural Planned Community zone classifications: New Fully Contained Communities and Master Planned Resorts.
  - a. **New Fully Contained Communities.** The New Fully Contained Communities (NFCC) zone classification provides for self-contained planned unit developments which integrate a mix of housing, jobs, services and recreation and are proposed through the planned unit development (PUD) permit process. Upon adoption of a Plan Amendment and subsequent approval of the PUD permit, the proposal would be designated within an urban growth area.

- c. Rural 20: R20
- d. Rural Sensitive Resource: RSR
- e. Rural Farm: RF
- f. Rural Activity Center: RAC
- g. Rural Neighborhood Center: RNC
- h. Agricultural Resource Lands: ARL
- i. Forest Land: FL
- 5. Mid-County Community Plan. See the Use Tables in 18A.27.020.
  - a. Rural Separator: RSep
  - b. Rural Neighborhood Center: RNC
  - c. Agricultural Resource Lands: ARL
- 6. Key Peninsula Community Plan. See the Use Tables in 18A.26.020.
  - a. Rural 10: R10
  - b. Rural Sensitive Resource: RSR
  - c. Rural Farm: RF
  - d. Park and Recreation: PR
  - e. Rural Activity Center: RAC
  - f. Rural Neighborhood Center: RNC
  - g. Agricultural Resource Lands: ARL
- 7. Alderton-McMillin Community Plan: See the Use Tables in 18A.18.020.
  - a. Rural Neighborhood Center: RNC
  - b. Rural 10: R10
  - c. Rural 20: R20
  - d. Reserve-5: Rsv5
  - e. Rural Industrial Center: RIC
  - f. Rural Farm: RF
  - g. Agricultural Resource Lands: ARL

(Ord. 2008-39 § 4 (part), 2008; Ord. 2008-26s § 1 (part), 2008; Ord. 2008-15s § 1 (part), 2008;

Ord. 2007-85s § 2 (part), 2007; Ord. 2007-109s § 3 (part), 2007; Ord. 2007-10 § 2 (part), 2007;

Ord. 2006-53s § 1 (part), 2006; Ord. 2006-9s § 1 (part), 2006; Ord. 2005-94s2 § 1 (part), 2005;

Ord. 2004-87s § 6 (part), 2004; Ord. 2004-52s § 3 (part), 2004)

# 18A.33.160 Overlays.

- A. **Purpose.** To provide for special zoning considerations based on unique characteristics of the land, environment, or economy.
- B. **Airport Overlay.** The Airport Overlay (AIR) is intended to minimize land use incompatibilities in Accident Potential Zone (APZ) I for McChord Air Force Base, the Clear Zones for Thun Field, and the Noise Zones for McChord Air Force Base and Thun Field. The Airport Overlay zone classification is divided into levels (See PCC 18A.33.180 for applicable regulation).
- C. **Airport Overlay-Small Airports.** The Airport Overlay-Small Airports (AIR-SA) is intended to minimize land use incompatibilities around small, public use airports (See PCC 18A.33.185 for applicable regulations).
- D. **Mineral Resource Overlay.** The Mineral Resource Overlay (MRO) identifies those lands devoted to the extraction of minerals that have a known or potential long-term commercial significance for the extraction of minerals. The Mineral Resource Overlay zone includes only those lands operating under a valid Washington State Department of Natural Resources (DNR) Surface Mining Permit and a valid Pierce County Unclassified

- 1. Prohibit any new use which involves release of airborne substances, such as steam, dust, and smoke which interfere with aircraft operations;
- 2. Prohibit any new use which emits light, direct or indirect (reflections), which interfere with a pilot's vision;
- 3. Facilities which emit electrical currents shall be installed in a manner that does not interfere with communication systems or navigational equipment;
- 4. Prohibit any new use which attracts concentrations of birds or waterfowl (i.e., mixed solid waste landfill disposal facilities, waste transfer facilities, feeding stations, and the growth of certain vegetation); and
- 5. Prohibit any use which would have structures within 100 feet of aircraft approach-departure or transitional surfaces.
- E. **Intensity of Use Criteria.** The intensity of use criteria shall be used by the Director or Examiner in determining the compatibility of a non-residential use with aircraft operations, as required in Section 18A.33.180 B. Provisions for the intensity of use criteria are as follows:
  - 1. One of the following criteria must be met:
    - a. The building coverage cannot exceed 20 percent; or
    - b. The number of persons on site during any particular hour cannot exceed that permitted by the following formula: an average of 25 persons per hour-per acre in a 24-hour period, provided there shall be no more than 50 persons per acre during any hour of the day.
  - 2. It is the applicant's burden to provide adequate information to indicate that the operation will comply with the formula in 1.b. above. If an applicant can demonstrate that they can comply with the formula, a notice shall be required to be recorded with the County Auditor prior to issuance of Building Permits.
  - 3. Existing developments that exceed the 20 percent building coverage may not expand the building coverage without complying with the limitation on the number of persons on site during any particular hour.
- F. **Divided Properties.** Where the Pierce County 65 Ldn Noise Contour divides a lot of record, the entire lot shall be subject to the noise insulation requirements of Section 18A.33.180 C. The applicant may be exempted from noise insulation requirements on divided lots if an acoustical engineer provides documentation that the portion of the site in question has a noise level below 65 Ldn.

(Ord. 2008-1s § 1 (part), 2008; Ord. 2004-87s § 6 (part), 2004; Ord. 2004-52s § 3 (part), 2004)

# 18A.33.185 Airport Overlay Zone Classification – Small Airports.

- A. **Purpose.** The purpose of the Airport Overlay-Small Airports zone classification, AIR-SA, is to minimize land use incompatibilities for small airports, such as the Shady Acres Airport in Graham/Frederickson and Eatonville Airport (Swanson Field) in Eatonville. Provisions of this Section address reduction of incompatibilities through limitations on usage intensity and other land use characteristics which could affect the severity of an aircraft accident. Mitigation and attenuation features may be appropriate, depending upon the situation.
- B. **Height Standard**. For each airport, any buildings or structures that would penetrate the imaginary airspace surfaces as defined in Title 14 CFR (Code of Federal Regulations) FAR (Federal Aviation Regulations), Section 77.25 "Civil Airport Imaginary Surfaces, Objects affecting navigable airspace," or would otherwise be required to file FAA Form 7460-1 in accordance with Title 14 CFR FAR 77.13 "Construction or alteration

- requiring notice," and are determined by the FAA to both exceed obstruction standards and to pose a hazard to air traffic, shall mitigate the hazard through lighting or other means acceptable to the FAA. Hazards which cannot be mitigated shall be prohibited. These height standards are in addition to other compatibility standards required within the overlay classification.
- C. **Compatibility Standards by Safety Compatibility Zones.** Compatibility standards within the Airport Overlay Small Airports zone classification vary depending on the specific safety compatibility zone (zones 1 through 6) within the overlay and are in addition to and supersede the standards for the underlying zone.
  - 1. Zone 1, Runway protection zone.
    - a. Prohibit new structures, residential or non-residential, unless needed as an accessory to an existing use.
  - 2. Zone 2, Inner approach/departure zone.
    - a. Allow new residential uses at rural densities only. Accessory uses to residential are permitted.
    - b. New nonresidential civic uses where people congregate, such as day care centers, schools and educational facilities,, churches, hospitals and nursing homes:
      - (1) **Shady Acres Airport:** Prohibit these uses unless below the threshold of 40 people per acre for the total acreage of the development site or up to 80 people for any single acre within the development site in the rural zones and 60 people per acre for the total acreage of the development site or up to 120 people for any single acre within the development site in the urban zones.
      - (2) **Eatonville Airport:** These uses are prohibited.
    - c. Allow new nonresidential utility, commercial and industrial uses only at no higher intensity than 60 people per acre for the total acreage of the development site or up to 120 people for any single acre within the development site in the urban non-residential zone classifications.
    - d. Prohibit hazardous material handling and storage, other than incidental small scale uses accessory to primary use, except that underground storage tanks are allowed.
  - 3. Zone 3, Inner turning zone.
    - a. Allow new residential uses at rural densities or as infill up to the average density of surrounding residential area.
    - b. New nonresidential civic uses where people congregate, such as large day care centers, schools and educational facilities, churches, hospitals and nursing homes:
      - (1) **Shady Acres Airport:** Prohibit these uses unless below the threshold of 80 people per acre for the total acreage of the development site or up to 160 people for any single acre within the development site in the rural zones and 100 people per acre for the total acreage of the development site or up to 200 people for any single acre within the development site in the urban zones.
      - (2) **Eatonville Airport:** Same as Shady Acres Airport, except schools and daycare centers are prohibited.
    - c. Allow new nonresidential utility, commercial and industrial uses at no higher intensity than 100 people per acre for the total acreage of the development site or up to 200 people for any single acre within the development site in the urban nonresidential zone classifications.

- d. Allow aboveground hazardous material handling and storage uses that store greater than 6,000 gallons only if no feasible alternative is available and the facility is designed for risk reduction.
- 4. Zone 4, Outer approach/departure zone.
  - a. Allow new residential uses at rural densities or as infill up to the average density of surrounding residential area.
  - b. New nonresidential civic uses where people congregate, such as large day care centers, schools and educational facilities, churches, hospitals and nursing homes:
    - (1) **Shady Acres Airport:** Prohibit these uses unless below the threshold of 80 people per acre for the total acreage of the development site or up to 240 people for any single acre within the development site in the rural zones and 100 people per acre for the total acreage of the development site or up to 300 people for any single acre within the development site in the urban zones.
    - (2) **Eatonville Airport:** Same as Shady Acres Airport, except schools are prohibited.
  - c. Allow new nonresidential utility, commercial and industrial uses at no higher intensity than 100 people per acre for the total acreage of the development site or up to 300 people for any single acre within the development site in the urban nonresidential zone classifications.
- 5. Zone 5, Sideline zone.
  - a. Allow residential uses on properties linked to the airport at rural densities. Other new residential uses are allowed only at rural densities or as infill up to the average density of surrounding residential area.
  - b. Prohibit new nonresidential civic uses where people congregate, such as large day care centers, schools and educational facilities,, churches, hospitals and nursing homes:
  - c. Allow new nonresidential utility, commercial and industrial uses only if they are related to aviation or airport operations, and at no higher intensity than 20 people per acre for the total acreage of the development site or up to 40 people for any single acre within the development site in the urban nonresidential zone classifications.
- 6. Zone 6, Traffic pattern zone.
  - a. Allow residential uses consistent with underlying zone.
  - b. Prohibit new nonresidential civic uses where people congregate, such as large day care centers, schools and educational facilities, churches, hospitals and nursing homes, and stadia unless below the threshold of 150 people per acre for the total acreage of the development site or up to 450 people for any single acre within the development site.
  - c. Allow industrial and commercial uses consistent with the underlying zone.
- D. **Split Parcels**. When the zoning overlay splits a parcel, the overlay restrictions will only apply to those portions of the parcel within the overlay.
- E. **Disclosure**. Prior to issuance of a Building Permit for new construction within the Airport Overlay-Small Airport, the property owner must sign an airport proximity disclosure statement, provided by the Pierce County Department of Planning and Land Services at the time permits are applied for, and record it in the Pierce County Auditor's office. The disclosure statement acknowledges that the property is located within the Airport Overlay for the specific airport and that the property may be impacted by low flying aircraft, noise, vibration, odors, and other associated aviation activities.

- F. **Airport-Related Uses**. On the airport property, airport related uses needed to support aircraft operations are allowed, provided all building, fire, health, and other State and federal regulations are met.
- G. **Lighting.** Lighting, other than that used for marking potential hazards to air navigation, should be directed downward so it does not cause glare for pilots, and should be arranged such that it does not approximate runway lighting.

(Ord. 2008-1s § 1 (part), 2008)

# 18A.33.190 Military Lands.

**Purpose.** To recognize Urban Military Lands (UML) as portions of the Federal and State Military Installations within unincorporated Pierce County Urban Growth Area and to recognize Rural Military Lands (RML) as portions of these Installations within unincorporated Pierce County outside the Urban Growth Area. The autonomy associated with the federal ownership in combination with the unique character of the military operations and support structures is not typical of civilian land uses. Urban Military Lands and Rural Military Lands are designated on the Comprehensive Plan Land Use Designations Map but are not represented in the Use Classification Tables because Pierce County does not govern land uses within these designations. The classifications are a mechanism to recognize the presence of urban and rural areas within the military installations. (Ord. 2004-52s § 3 (part), 2004; Ord. 2002-11s § 1 (part), 2002; Ord. 2000-17 § 1 (part), 2000)

# **Division III. Description of Use Categories**

# 18A.33.200 List of Categories.

Uses shown on the Use Tables are grouped into the eight major categories listed below. Each category includes a number of use types and associated levels. A description of all the use types by use category is provided in Sections 18A.33.210 to 18A.33.280. See Section 18A.33.050 for interpretation of the use categories, types, and levels.

18A.33.210	Residential
18A.33.220	Civic
18A.33.230	Utilities
18A.33.240	<b>Essential Public Facilities</b>
18A.33.250	Office/Business
18A.33.260	Resource
18A.33.270	Commercial
18A.33.280	Industrial
(Ord. 2004-52s § 3 (	(part), 2004)

# 18A.33.210 Residential Use Category – Description of Use Categories.

The Residential Use Category includes permanent or transient living accommodations for individuals, families, or people with special needs. The residential category has been separated into the following types based upon distinguishing features such as: type of structure; number, age and special needs of individuals who reside in the structure; and state and local licensing requirements.

A. **Fraternity and Sorority House.** Fraternity and Sorority House Use Type refers to living accommodations for unrelated individuals belonging to a fraternity or sorority who share a residential structure in affiliation with a school of higher education.

H. Where a district boundary line divides a lot which was in single ownership at the time of passage of the ordinance from which this title is derived, the planning director may permit the extension of the regulation for either portion of the lot not to exceed 50 feet beyond the district line into the remaining portion of the lot. (Ord. 94-06 § 2, 1994).

### **18.03.040** Application of district regulations.

Except as otherwise provided in this title:

- A. No building or part thereof or other structure shall be erected, altered, added to or enlarged, nor shall any land, building, structure or premises be used, designated or intended to be used for any purpose or in any manner other than is included among the uses listed in this title as permitted in the district in which such building, land or premises are located.
- B. No building or part thereof or structure shall be erected, reconstructed or structurally altered to exceed in height the limit designated in this title for the district in which such building is located.
- C. No building or part thereof or structure shall be erected, nor shall any existing building, be altered, enlarged or rebuilt or moved into any district, nor shall any open space be encroached upon or reduced in any manner, except in conformity to the yard, building site area and building location regulations designated in this title for the district in which such building or open space is located.
- D. No yard or other open space provided about any building for the purpose of complying with provisions of this title shall be considered as providing a yard or open space for any other building, and no yard or other open space on one building lot shall be considered as providing a yard or open space for a building on any other building lot. (Ord. 94-06 § 2, 1994).

# 18.03.050 Minimum requirements.

In their interpretation and application, the provisions of this title shall be held to be minimum requirements. Where this title imposes a greater restriction than is imposed or required by other rules or regulations or ordinances, the provisions of this title shall control. (Ord. 94-06 § 2, 1994).

## Chapter 18.04

#### DISTRICT REGULATIONS

#### Sections:

- 18.04.010 SF-1 Single-family residential district, low density.
- 18.04.020 SF-2 Single-family residential district, medium density.
- 18.04.025 SF-3 Single-family residential district, high density.
- 18.04.030 MF-1 Multifamily residential district, medium density.
- 18.04.040 MF-2 Multifamily residential district, high density.
- 18.04.110 C-1 Downtown commercial district.
- 18.04.140 C-2 General commercial district.
- 18.04.145 Curb cuts.
- 18.04.150 MU Mixed use district.
- 18.04.180 I Industrial district.
- 18.04.185 AP Aerospace district.
- 18.04.187 Airport overlay zone.
- 18.04.190 Planned unit development PUD.

# 18.04.010 SF-1 – Single-family residential district, low density.

It is the purpose of the single-family residential district to stabilize and preserve low density, single-family residential neighborhoods.

- A. Lot Area. Minimum lot area is 9,600 square feet.
- B. Minimum Zoning. Minimum zoning area is 28,800 square feet (three lots).
- C. Principally Permitted Uses. Principally permitted uses are as follows:
  - 1. One single-family dwelling per lot;
  - 2. Crop and tree farming;
  - 3. Group homes class I-A.
- D. Special Permit Uses. The following uses are permitted provided they conform to the development standards listed in EMC 18.08.020:
  - 1. Churches;
  - 2. Nursery schools and day care centers.
- E. Accessory Uses. Permitted accessory uses are as follows:
- 1. Accessory uses and buildings customarily appurtenant to a permitted use, such as garages, carports and minor structures for storage of personal property;
- 2. Rooming and boarding of not more than three persons;
- 3. Customary incidental home occupations subject to the provisions of EMC 18.04.040;
- 4. A single accessory dwelling unit subject to the provisions of EMC 18.08.045.

- F. Conditional Uses. Conditional uses are as follows: General conditional uses as listed in EMC 18.08.030.
  - 1. Duplexes. One duplex per lot.
  - G. Development Standards.
    - 1. Minimum lot area is 9,600 square feet.
    - 2. Minimum lot width is 70 feet.
    - 3. Maximum site coverage is 30 percent.
    - 4. Minimum yard requirements:
      - a. Front Yard. Minimum front yard is 25

feet.

- b. Side Yard. Minimum side yard is eight feet.
- c. Rear Yard. Minimum rear yard is eight feet, provided that the minimum rear yard set back for property with a rear yard abutting on an alley shall be the greater of two feet, or 12 feet from the alley center line.
- d. Side Yard on Flanking Street of Corner Lot. Minimum side yard on the flanking street of a corner lot is 15 feet.
- 5. Height Limitation. Height limitation is two and one-half stories, not exceeding 28 feet.
- 6. Interior Yards. Interior yards shall not be computed as part of the site coverage.
- 7. Additional Standards. See EMC 18.08.030 and 18.08.160 pertaining to general and supplementary provisions, for requirements concerning accessory buildings and additional standards.
- H. Signs. The sign regulations of Chapter 18.06 EMC shall apply.
- I. Off-Street Parking. The off-street parking regulations of Chapter 18.05 EMC shall apply. (Ord. 99-23 § 6, 1999; Ord. 98-02 § 1, 1998; Ord. 94-06 § 2, 1994).

# 18.04.020 SF-2 – Single-family residential district, medium density.

It is the purpose of the SF-2 single-family residential district to stabilize and preserve medium density residential neighborhoods.

- A. Lot Area. Minimum lot area is 8,400 square feet.
- B. Minimum Zoning. Minimum zoning area is 15,000 square feet (three lots).
- C. Principally Permitted Uses. Principally permitted uses are as follows:
  - 1. One single-family dwelling per lot;
  - 2. Crop and tree farming;
  - 3. Group homes class I-A and I-B.
- D. Special Permit Uses. The following uses are permitted provided they conform to the development standards listed in EMC 18.08.020:

- 1. Churches;
- 2. Nursery schools and day care centers.
- E. Accessory Uses. Permitted accessory uses are as follows:
- 1. Accessory uses and buildings customarily appurtenant to a permitted use, such as garages, carports and minor structures for storage of personal property;
- 2. Rooming and boarding of not more than three persons;
- 3. Customary incidental home occupations subject to the provisions of EMC 18.04.040;
- 4. A single accessory dwelling unit subject to the provisions of EMC 18.08.045.
- F. Conditional Uses. Conditional uses are as follows: General conditional uses as listed in EMC 18.08.030.
- 1. Duplexes. One duplex per 9,000 square foot lot.
  - G. Development Standards.
    - 1. Minimum lot area is 8,400 square feet.
    - 2. Minimum lot width is 60 feet.
    - 3. Maximum site coverage is 40 percent.
    - 4. Minimum yard requirements:
      - a. Front Yard. Minimum front yard is 25

feet.

- b. Side Yard. Minimum side yard is eight feet.
- c. Rear Yard. Minimum rear yard is eight feet, provided that the minimum rear yard set back for property with a rear yard abutting on an alley shall be the greater of two feet, or 12 feet from the alley center line.
- d. Side Yard on Flanking Street of Corner Lot. Minimum side yard on the flanking street of a corner lot is 15 feet.
- 5. Height Limitation. The height of structures shall not exceed 28 feet.
- 6. Interior Yards. Interior yards shall not be computed as part of the site coverage.
- 7. Additional Standards. See Chapter 18.08 EMC, pertaining to general and supplementary provisions, for requirements concerning accessory buildings and additional standards.
- H. Signs. The sign regulations of Chapter 18.06 EMC shall apply.
- I. Off-Street Parking. The off-street parking regulations of Chapter 18.05 EMC shall apply. (Ord. 99-23 § 7, 1999; Ord. 98-02 § 1, 1998; Ord. 96-11 § 3, 1996; Ord. 94-06 § 2, 1994).

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- 15. Any other use that is determined by the planning director to be of the same general character as the above-permitted uses and in accordance with the stated purpose of the district;
  - 16. Single-family residential uses;
  - 17. Automobile sales;
  - 18. Automobile repair;
  - 19. Automobile dealership;
- 20. Woodworking shops with four or less personnel on the premises, including but not limited to employees, owners, proprietors, managers and sales agents.
- B. Special Permit Uses. The following uses are permitted; provided, that they conform to the development standards listed in EMC 18.08.020:
- 1. Day care centers with no more than 12 children and no on-site parking;
  - 2. Formula take-out food restaurants.
- C. Accessory Uses. Permitted accessory uses are as follows:
- 1. Accessory uses and buildings customarily appurtenant to a permitted use, such as incidental storage facilities, which must be enclosed, and loading and unloading areas;
- 2. For permitted uses, hazardous substance land uses, including on-site hazardous waste treatment and/or storage facilities which do not accumulate more than 5,000 pounds of hazardous substances or wastes or any combination thereof at any one time on site, subject to the provisions of EMC 18.08.050(D)(9), except off-site hazardous waste treatment and/or storage facilities which are not permitted in this district.
- D. Conditional Uses. Conditional uses are as follows:
  - 1. Commercial parking lots or structures;
  - 2. Railway and bus depots, taxi stands;
- 3. Group homes class II-A, II-B, II-C and III;
- 4. General conditional uses as listed in EMC 18.08.030;
- 5. Woodworking shops with five or more personnel on the premises, including, but not limited to, employees, owners, proprietors, managers and sales agents. Conditions for woodworking shops appear in EMC 18.08.030.
- E. Development Standards. The development standards are as follows:
- 1. Minimum Lot. Minimum lot of record or 5,000 square feet, whichever is less;
- 2. Maximum Site Coverage. One hundred percent;

- 3. Setbacks. None except as required by landscaping, or if off-street parking is provided onsite:
- 4. Height Limitation. Three stories or 40 feet;
- 5. Landscaping. The landscaping requirements of Chapter 18.07 EMC shall apply;
- 6. Building construction shall conform to the following criteria:
- a. Visible walls shall be of lap siding, brick, stone, or stucco with no more than 50 percent glazing of any wall and glazing area calculated to include all mullions and jambs;
- b. Roofs of buildings less than 25 feet tall shall be no flatter than four feet horizontal to one foot vertical and shall be finished with dark earth-toned flat tiles, shakes, textured shingles, or metal panels.
- F. Signs. The sign requirements of Chapter 18.06 EMC shall apply.
- G. Off-Street Parking. The off-street parking requirements of Chapter 18.05 EMC shall apply. (Ord. 2007-17, 2007; Ord. 99-11 §§ 4, 5, 1999; Ord. 99-06 § 6, 1999; Ord. 94-06 § 2, 1994).

#### 18.04.140 C-2 – General commercial district.

The purpose and intent of the general commercial district is to recognize the existence of commercial areas developed in strips along certain major thoroughfares; to provide use incentives and development standards which will encourage the redevelopment and upgrading of such areas; to provide for a range of trade, service, entertainment and recreation land uses which occur adjacent to major traffic arterials and residential uses; and to provide areas for development which are automobile-oriented and designed for convenience, safety and the reduction of the visual blight of uncontrolled advertising signs, traffic control devices and utility equipment.

- A. Principally Permitted Uses. Principally permitted uses are as follows:
  - 1. Trade.
    - a. Wholesale. Bakery.
    - b. Retail General Merchandise.
      - i. Department stores;
      - ii. Dry goods and general merchan-

dise;

- iii. Electrical supplies;
- iv. Farm equipment;
- v. Hardware:
- vi. Heating and plumbing equipment;
- vii. Lumberyards;
- viii. Mail order houses;

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- ix. Merchandise vending machine operators;
  - x. Paint, glass and wallpaper;
  - xi. Variety stores.
  - c. Retail Food.
    - i. Bakeries, with accessory manufac-

turing;

- ii. Candy, nut and confectionery, with accessory manufacturing;
  - iii. Dairy products;
  - iv. Fruits and vegetables;
  - v. Groceries:
  - vi. Meat, fish and poultry;
- d. Retail Automotive, Marine Craft, Aircraft and Accessories.
  - i. Aircraft and accessories:
  - ii. Marine craft and accessories:
- iii. Motor vehicles (new or used cars and recreation vehicles);
  - iv. Tires, batteries and accessories:
  - v. Gasoline service stations.
- e. Retail Apparel and Accessories. New or used apparel and accessories.
- f. Retail Furniture, Home Furnishings and Equipment. New or used and finished or unfinished furniture, home furnishings and equipment.
- g. Retail Eating and Drinking Establishments.
- i. Drinking establishments (taverns and cocktail lounges);
- ii. Eating establishments (restaurants, including formula take-out food restaurants).
  - h. Retail Other.
    - i. Antiques;
    - ii. Bicycles;
    - iii. Books;
    - iv. Bottled gas;
    - v. Cameras and photographic sup-

plies;

- vi. Cigars and cigarettes;
- vii. Computers and software;
- viii. Drug and proprietary items;
- ix. Florists:
- x. Fuel and ice dealers:
- xi. Fuel oil:
- xii. Gifts, novelties and souvenirs;
- xiii. Hay, grains and feeds;
- xiv. Jewelry;
- xv. Liquor;
- xvi. Newspapers;
- xvii. Optical goods;
- xviii. Pets and pet supplies;
- xix. Secondhand merchandise:
- xx. Sporting goods;

- xxi. Stationery;
- xxii. Videocassette sales and rentals.
- 2. Services.
- a. Finance, Insurance and Real Estate Services.
  - i. Banking and related services;
- ii. Commodity brokers, dealers and related services;
  - iii. Housing and investment services;
- iv. Insurance brokers, agents and related services:
  - v. Insurance carriers;
- vi. Real estate agents, brokers and related services;
- vii. Real estate operators, lessors and management services;
- viii. Real estate subdividing and developing services;
- ix. Security brokers and dealers and related services;
- x. Title abstracting and insurance services.
  - b. Personal Services.
    - i. Beauty and barber services;
    - ii. Diaper services;
    - iii. Funeral and crematory services;
- iv. Laundering and dry cleaning (self services);
- v. Laundering, dry cleaning and dyeing services;
- vi. Linen supply and industrial laundry services;
  - vii. Photographic services;
- viii. Pressing, alteration and garment repair;
  - ix. Rug cleaning and repair services;
- x. Shoe repair, shoe shining and hat cleaning services.
  - c. Business Services.
    - i. Advertising services;
    - ii. Automobile and truck rental;
- iii. Blueprinting and photocopying services:
- iv. Business and management consulting services; adjustment and collection services;
- v. Consumer and mercantile credit reporting services; adjustment and collection services;
  - vi. Detective and protective services;
- vii. Disinfecting and exterminating services;
  - viii. Employment services;

- ix. Equipment rental and leasing services;
- x. Food lockers without food preparation facilities;
- xi. Motion picture distribution and services;
  - xii. News syndicate services;
- xiii. Other dwelling and business services:
  - xiv. Outdoor advertising services;
  - xv. Photo finishing services;
- xvi. Research, development and testing services;
- xvii. Stenographic services and other duplicating and mailing services;
  - xviii. Trading stamp services;
  - xix. Window cleaning services.
  - d. Repair Services.
    - i. Armature rewinding services;
    - ii. Automobile repair services;
    - iii. Automobile wash services:
    - iv. Electrical repair services;
    - v. Fleet vehicle maintenance;
    - vi. Radio and television repair ser-

vices;

- vii. Reupholster and furniture repair
- services;
- viii. Small engine repair;
- xix. Truck repair;
- x. Watch, clock and jewelry repair

services.

- e. Professional Services.
- i. Accounting, auditing and book-keeping services;
- ii. Educational and scientific research services;
  - iii. Engineering and architectural ser-

vices;

- iv. Hospital services;
- v. Legal services;
- vi. Medical and dental laboratory ser-

vices;

- vii. Medical and dental services;
- viii. Medical clinic, outpatient ser-

vices;

- ix. Sanitarium, convalescent and rest home services;
  - x. Urban planning services.
  - f. Contract Construction Services.
- i. Building construction, general contractor services:
- ii. Carpentering, wood flooring, and woodworking shops;
  - iii. Concrete services;

- iv. Electrical services:
- v. Masonry stonework, tile setting and plastering services;
- vi. Painting, paper hanging and decorating services;
- vii. Plumbing, heating and air conditioning services;
- viii. Roofing and sheet metal services:
  - ix. Water well drilling services.
  - g. Educational Services.
    - i. Art and music schools;
    - ii. Barber and beauty schools;
    - iii. Business and stenographic

schools;

- iv. Correspondence schools;
- v. Dancing schools;
- vi. Driving schools, auto;
- vii. Driving schools, truck;
- viii. Vocational or trade schools.
- h. Miscellaneous Services.
  - i. Animal grooming parlors;
  - ii. Business associations and organi-

zations;

iii. Civic, social and fraternal associ-

ations;

- iv. Labor unions and similar labor organizations;
- v. Veterinary clinics and animal hospital services when located no closer than 150 feet to any residential use, providing the animals are housed indoors, with no outside runs, and the building is soundproofed. Soundproofing must be designed by competent acoustical engineers;
  - vi. Welfare and charitable services.
  - 3. Residential.
    - a. Lodgings:
      - i. Hotels:
      - ii. Motels.
- b. Existing dwellings may be rebuilt, repaired and otherwise changed for human occupancy. Accessory uses for existing dwellings may be constructed. Such uses are garages, carports, storage sheds and fences.
- c. Transitional housing facilities, limited to a maximum of 20 residents at any one time and four resident staff.
  - d. Housing:
    - i. Single-family residential uses;
    - ii. Multifamily residential uses.

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- 4. Cultural, Entertainment and Recreational.
- a. Cultural Activities and Nature Exhibitions.
  - i. Art galleries;
  - ii. Historic and monument sites.
  - b. Public Assembly.
    - i. Amphitheaters;
    - ii. Arenas and field houses:
    - iii. Auditoriums:
    - iv. Drive-in movies;
    - v. Exhibition halls;
    - vi. Legitimate theaters (live);
    - vii. Motion picture theaters;
    - viii. Stadiums.
  - c. Amusements and Recreation.
    - i. Amusement parks;
    - ii. Athletic clubs;
    - iii. Bowling;
    - iv. Fairgrounds;
    - v. Go-cart tracks:
    - vi. Golf driving ranges;
    - vii. Miniature golf;
    - viii. Skating (roller or ice);
    - ix. Tennis;
    - x. Video arcades.
  - Other Uses.
- a. Other retail trade, service or entertainment or recreational uses that are of the same general character as those listed in this subsection, which are deemed compatible with other permitted uses in this district and which operate in accordance with the stated purpose of this district.
  - b. Municipal uses and buildings.
- B. Special Permit Uses. The following uses are permitted:
  - 1. Nursery schools and day care centers;
  - 2. Churches:
  - 3. Drive-in restaurants.
- C. Accessory Uses. Permitted accessory uses are as follows:
- 1. Accessory uses and buildings customarily appurtenant to a permitted use, such as incidental storage facilities;
- 2. For permitted uses, hazardous substance land uses, including on-site hazardous waste treatment or storage facilities which do not accumulate more than 10,000 pounds of hazardous substances or wastes or any combination thereof at any one time on the site, subject to the provisions of EMC 18.08.050(D)(9), except off-site hazardous waste treatment or storage facilities, which are not permitted in this district.

- D. Conditional Uses. Conditional uses are as follows:
- 1. Printing and publishing establishments, and accessory uses and buildings customarily appurtenant to such use;
- 2. Mini warehouses and self-service storage;
- 3. General conditional uses as listed in EMC 18.08.030, except for transitional housing with a maximum of 20 residents and four staff;
  - 4. Kennels:
- 5. For permitted uses, accessory hazardous substance land uses which are not subject to cleanup requirements which accumulate more than 10,000 pounds of hazardous substances or wastes or any combination thereof at any one time on the site in any 30-day period of time, subject to the provisions of EMC 18.08.050(D)(9), except off-site hazardous waste treatment or storage facilities, which are not permitted in this district;
- 6. Group homes class I-A, I-B, I-C, II-A, II-B, II-C and III;
  - 7. Recreational vehicle parks.
  - E. Development Standards.
- 1. Minimum Lot. Minimum lot area is 10,000 square feet.
- 2. Maximum Site Coverage. Maximum site coverage is 40 percent.
- 3. Front Yard. There shall be a front yard of at least 25 feet in depth.
- 4. Side Yard. No side yard is required, except when a side yard abuts a residential district, and then a 20-foot side yard shall be required.
- 5. Rear Yard. No rear yard is required, except when a rear yard abuts a residential district, and then a 20-foot rear yard shall be required.
- 6. Height Limitations. The height limitation is 40 feet, three stories.
- 7. Landscaping. The landscaping requirements of Chapter 18.07 EMC shall apply.
- 8. Outdoor Storage. Outdoor storage areas shall be fenced for security and public safety by a sight-obscuring fence unless it is determined through the development plan review that a sight-obscuring fence is not necessary.
- 9. Building construction shall conform to the following criteria:
- a. Visible walls shall be of lap siding, brick, stone, or stucco with no more than 50 percent glazing of any wall and glazing area calculated to include all mullions and jambs;
- b. Roofs of buildings less than 25 feet tall shall be no flatter than four feet horizontal to one foot vertical and shall be finished with dark

earth-toned flat tiles, shakes, textured shingles, or metal panels.

- F. Signs. The sign regulations of Chapter 18.06 EMC shall apply.
  - G. Off-Street Parking.
- 1. The off-street parking requirements of Chapter 18.05 EMC shall apply.
- 2. Off-street parking may be located in required yards, except in areas required to be land-scaped. (Ord. 2007-17, 2007; Ord. 99-11 §§ 6, 7, 1999; Ord. 94-06 § 2, 1994).

#### 18.04.145 Curb cuts.

When prohibited in SF-1, SF-2, SF-3, MF-1, MF-2, MU and C-1 zones:

Front yard curb cuts in the SF-1, SF-2, SF-3, MF-1, MF-2, MU and C-1 zones are hereby restricted as follows:

No driveway or curb cut shall be installed onto a named street for any development for which access can be provided from an existing alley, unless:

- A. At least 50 percent of the existing house lots or commercial structure on the same block as the proposed development have existing curb cuts, and provision is made for on-site turn around of parked vehicles, such that neither entering nor existing vehicles must back over the sidewalk to exit the premises; or
- B. The public works director determines that the curb cut will have no significant adverse effect on vehicles or pedestrian traffic; or
- C. A street or pedestrian plan adopted by the town shows that no provision for pedestrian access is to be made on this street in question. (Ord. 2006-04 § 1, 2006; Ord. 98-02 § 2, 1998. Formerly 18.04.050).

# **18.04.150 MU – Mixed use district.**

The purpose of the MU district is to implement the policies adopted in the land use element of the comprehensive plan. This zone district is intended to provide a high level of diversity in housing types, including townhouses and flats ranging from two to three stories. In addition, ground floor neighborhood-scale commercial and/or office uses are encouraged to create a cohesive pedestrian-oriented community. These uses are designed to complement and support the downtown commercial development.

- A. Principal Uses. Principal uses are:
- 1. Multifamily dwellings (i.e., apartments, townhouses, condominiums, and duplexes);

- 2. Single-family detached and attached dwellings; and
- 3. Nursing homes, retirement homes, convalescent centers, and congregate care residential facilities.
  - B. Secondary Uses. Secondary uses are:
- 1. For projects that include frontage on an arterial or collector street, neighborhood-scale commercial and/or office uses (consistent with the commercial uses permitted in EMC 18.04.140, C-2 General commercial district) are permitted on the ground floor of buildings. The neighborhood-scale commercial and office uses shall front on the arterial and collector streets and associated street intersections.
- 2. Home occupations in accordance with EMC 18.08.040.
- 3. Accessory buildings that are subordinate to the principal building and are incidental to the use of the principal building on the same lot.
- C. Conditional Uses. Conditional uses shall be processed in accordance with EMC 18.09.030. Conditional uses are:
  - 1. Day care centers;
  - 2. Adult family home or day care;
- 3. Public facilities and utilities and essential public facilities;
- 4. Wireless and cellular communication facilities:
  - 5. Religious facilities; and
  - 6. Schools.
- D. Review Requirements. All development in this district shall be processed as a planned unit development (PUD), EMC 18.04.190.
- E. Density. The minimum density is six housing units per net acre with a maximum density of 15 housing units per net acre. Up to 23 housing units per net acre are permitted within developments that incorporate commercial and/or office uses on the ground floor.

To qualify for the density bonus, in mixed use projects the equivalent of 30 percent of the ground floor area (building footprint/gross area) of those structures fronting an arterial or a collector street shall be developed with retail or commercial uses.

- F. Maximum Lot Coverage. The maximum lot coverage shall be:
  - 1. Forty percent; or
- 2. Fifty percent if a development incorporates retail uses on the first floor.
- G. Maximum Height. The maximum height shall be 40 feet or three stories.

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access surface street on which the housing does not face. When transitional conditions exist as defined in this subsection (E)(4), a yard of not less than 50 feet shall be provided.

- 5. Height Limitation. The height limitation is two stories or 35 feet. Beyond this height, to a height not greater than either four stories or 60 feet, there shall be added one additional foot of yard for each one foot of additional building height. The planning director shall be authorized to approve one additional story, provided such height does not detract from the continuity of the industrial area, and may propose such conditions as may be necessary to reduce any incompatibility with surrounding uses. Any additional height increases may be granted by the board of adjustment.
- 6. Landscaping. The landscaping requirements of Chapter 18.07 EMC shall apply.
- 7. Outside Storage. Outside storage or operations yards shall be confined to the area to the rear of a line which is an extension of the front wall of the principal building, and shall be reasonably screened from view from any street by appropriate walls, fencing, earth mounds or landscaping.
  - 8. Loading Areas.
- a. Loading areas must be located in such a manner that no loading, unloading or maneuvering of trucks associated therewith takes place on public rights-of-way.
- b. Earth berms and landscaping shall be provided along street frontages as necessary to screen dock-high loading areas from public rights-of-way. Berms shall be a minimum of 30 inches in height. Landscaping located on the berm shall conform to type III landscaping described in EMC 18.07.050(C) pertaining to visual buffers.
- 9. Multitenant Buildings. Multitenant buildings shall be permitted.
- 10. Improvement and Maintenance of Yards and Open Spaces. All required yards, parking areas, storage areas, operations yards and other open uses on the site shall be improved as required by this title and shall be maintained in a neat and orderly manner appropriate for the district at all times. The planning director shall be authorized to reasonably pursue the enforcement of this subsection (E)(10) where a use is in violation, and to notify the owner or operator of the use in writing of such noncompliance. The property owner or operator of the use shall be given a reasonable length of time to correct the condition.
- F. Signs. The sign regulations of Chapter 18.06 EMC shall apply.

- G. Off-Street Parking.
- 1. The off-street parking requirements of Chapter 18.05 EMC shall apply.
- 2. Those areas not required to be landscaped may be used for off-street parking.
- H. Performance Standards. The performance standards as provided in EMC 18.08.050 shall apply. (Ord. 94-06 § 2, 1994).

## 18.04.185 AP – Aerospace district.

This district is intended to allow airport related activities such as runway, flight operations, aircraft storage, aircraft repair and maintenance, aircraft modification, commercial land uses, industrial land uses, and residential land uses.

- A. Permitted Uses. The following uses are permitted, provided they do not violate the restrictions identified and listed in EMC 18.04.187.
- 1. Airport, heliport and aircraft tie-down areas:
- 2. Hangars, fuel depots, aircraft sales and repair facilities, and similar facilities pertaining to aircraft:
- 3. Single-family residential use as permitted in EMC 18.04.010;
- 4. Commercial uses as permitted in EMC 18.04.140;
- 5. Industrial uses as permitted in EMC 18.04.180:
- 6. Any structure customarily accessory to the above uses shall be permitted;
  - 7. Flight instruction;
  - 8. Aircraft rental:
  - 9. Air taxi service; and
  - 10. Aircraft and parts manufacturing.
- B. Conditional Use. Other uses as determined by the board of adjustment to be of a similar and compatible nature are permitted upon application and approval of a conditional use permit. In reviewing and granting a conditional use permit, the board of adjustment shall follow the conditional use permit procedures outlined in EMC 18.09.030.
- C. Variances. The board of adjustment may grant a variance upon application and approval of a variance permit; provided, that the granted variance does not significantly endanger the operation of an aircraft and the lives and property in the aerospace district and its surrounding area. In reviewing and granting a variance, the board of adjustment shall follow the variance procedures outlined in EMC 18.04.187 and 18.09.040.
- D. Restrictions. It is found that airport operations create a hazard that endangers the lives and

property of users of the airport and of occupants of land or property in its vicinity. Therefore, it is necessary in the interest of the public health, public safety and general welfare that the creation or establishment of airport hazards be prevented by overlaying certain restrictions on development as specified below and further specified in EMC 18.04.187, Airport overlay zone.

- 1. No use may be made of land within the aerospace district in such manner as to create electrical interference with radio communication between the aircraft and the airport and air traffic control, making it difficult for fliers using the airport, impair visibility in the vicinity thereof, or otherwise endanger the landing, taking off or maneuvering of aircraft.
- 2. The planning commission may attach any reasonable restrictions and requirements to any parcel of land within the aerospace district and any parcel of land adjacent or in the vicinity of the aerospace district as the planning commission deems necessary to protect the public health, safety and general welfare and to mitigate any adverse effects of proposed development that in the judgment of the planning commission is incompatible with the operation of the airport.
- 3. Any commercial use within the aerospace district shall provide for a six-foot-wide buffer on each side of the commercial use when it abuts residential property. If the adjacent residential properties are not as yet developed, the planning director may require, as a condition of issuing a building permit, a landscaping plan to be completed at a future date set by the planning commission. The planning commission shall have the authority to require a bond to secure performance of the future landscaping requirement.
- 4. No landscaping higher than one foot above ground shall be permitted in an area extending from the edge of the runway to a distance of 100 feet. Landscaping along streets and taxiways shall not exceed two feet in height in order to allow unobstructed taxiing of aircraft. Light poles and street signs are not permitted. Any lighting along streets and taxiways shall be at ground level, not exceeding one foot in height.
- 5. No building or structure in the aerospace district shall have a height greater than 28 feet for a residential structure and 38 feet for a commercial or industrial structure. No building or structure in the aerospace district is permitted to penetrate the height limitation set forth in EMC 18.04.187 without a board of adjustment approved variance as specified in EMC 18.04.187.

- E. Minimum Lot Size. No lot within the aerospace district shall be less than 21,500 square feet. The minimum lot width shall be 100 feet. All lots in this district shall abut a dedicated public street or shall have such other access as held suitable by the planning commission, meeting required road standards for private roads, or, if applicable, subdivisions.
- F. Setback Requirements. Every front yard shall have a minimum setback requirement of 25 feet, and a minimum side yard setback of eight feet except for corner lots which shall have minimum side yard setback of 25 feet for the side yard facing another street. There shall be a minimum 25-foot setback from the rear property line. An accessory building which is detached and located within 10 feet of a rear or side property line provided said property line does not front on a street. All attached accessory structures shall comply with the setback requirements for the main structure.
- G. Parking. All lots shall provide parking spaces in accordance with lot usage as set forth in Chapter 18.05 EMC. Hangars do not qualify as required parking spaces for automobiles.
- H. Signs. No sign erected in the aerospace district shall exceed two feet in height, measured from ground level. (Ord. 2007-05 § 1, 2007; Ord. 2006-06 § 1, 2006).

#### 18.04.187 Airport overlay zone.

- A. Purpose and Intent. The purpose and intent of this section is to establish an airport overlay zoning district on properties located on, adjacent to, and in the vicinity of Eatonville Airport (Swanson Field), Washington, in order to protect the health, welfare, safety, and quality of life of the general public, property owners, airport operators, and aviation community; and also to ensure compatible land uses in the vicinity of the affected environments of the airport overlay zoning district.
- B. Statutory Authority. This section is adopted pursuant to RCW 36.70A.547 and 36.70A.200 which require a county, city or town to enact development regulations, to discourage the siting of incompatible land uses adjacent to general aviation airports.

The incompatible land use regulations presented in this section differ from the state of Washington Department of Transportation, Aviation Division, planning guidelines that identify a set of suggested incompatible land uses adjacent to general aviation airports. The departure, however insignificant, is necessitated by the fact that Eatonville Airport (Swanson Field) was built and later expanded

# **APPENDIX B**

Property Owners Along Proposed Trail Corridor

Tax Parcel Number	Property Owner of Record	Property Owner Mailing Address
0416114000	Pierce County	9112 Lakewood Drive SW Lakewood WA 98499-5925
0416114020	Gail and Marguerite Bloom	12915 412th St E Eatonville WA 98328-9543
0416114704	Gail and Marguerite Bloom	12915 412th St E Eatonville WA 98328-9543
0416114026	Marguerite Bloom	12915 412th St E Eatonville WA 98328-9543
0416114019	Tacoma City Light c/o Property Management	PO Box 11007 Tacoma WA 98411-0007
0416114014	Gail and Marguerite Bloom	12915 412th St E Eatonville WA 98328-9543
0416114017	Enayatollah and Judy Sobhani	PO Box 340 Eatonville WA 98328-0340
0416118001	Walter and Rebecca Anderson	12615 414th St E Eatonville WA 98328-9478
0416118002	William Druce	41202 Lynch Creek Rd Eatonville WA 98328-9405
0416118003	Dale Mierke	PO Box 1028 Eatonville WA 98328-1028
0416114030	Elsie Van Eaton, Trustee	PO Box 745 Eatonville WA 98328-0745
0416114700	Elsie Van Eaton, Trustee	PO Box 745 Eatonville WA 98328-0745
0417354004	City of Tacoma Public Works	747 Market Street Room 737 Tacoma WA 98402-3701
0416141054	Walter and Madeline Malmgren	10424 25th Ave E Tacoma WA 98445-5304
0416141055	Harold Burlingame Et Al	PO Box 820 Eatonville WA 98328-0820
0416141056	Harold Burlingame Et Al	PO Box 820 Eatonville WA 98328-0820
0416141057	Harold Burlingame Et Al	PO Box 820 Eatonville WA 98328-0820
0416141002	Terrance Van Eaton	41918 Lynch Creek Rd Eatonville WA 98328-9402
0416141009	Terrance Van Eaton	41918 Lynch Creek Rd Eatonville WA 98328-9402
0416141004	Donald and Mercedes Baublits, Trustee	333 N Washington Ave Eatonville WA 98328
0416141008	Eatonville School District 404	PO Box 698 Eatonville WA 98328-0698
0416145024	West Coast Bank	665 Woodland Square Lp Lacey WA 98503-1009
0416141031	Carl and Lee Ann Lucas	PO Box 1352 Eatonville WA 98328-1352
0416145025	West Coast Bank	665 Woodland Square Lp Lacey WA 98503-1009
0416141044	Elsie Van Eaton, Trustee	PO Box 745 Eatonville WA 98328-0745
0416145008	Edward and Valerie Tilton	PO Box 955 Graham WA 98338-0955
0416145009	Edward and Valerie Tilton	PO Box 955 Graham WA 98338-0955
0416145004	Bryan and Linda Workman	421 Jet Ct E Eatonville WA 98328-7450
0416145026	James and Shaun Mettler	16510 NE 66th Way Vancouver WA 98682-3706
0416145027	James and Shaun Mettler	16510 NE 66th Way Vancouver WA 98682-3706
0416145016	Robert and Gail Schaub	PO Box 28 Eatonville WA 98328-0028
0416145013	M & S Real Property Development Inc	PO Box 434 Eatonville WA 98328-0434
0416144001	Eatonville School District 404	PO Box 698 Eatonville WA 98328-0698
0416144002	Eatonville School District 404	PO Box 698 Eatonville WA 98328-0698
0416144136	William Christian/Christian Development	PO Box 0 Morton WA 98356
0416148010	James and Jean Miller	PO Box 334 Eatonville WA 98328-0334

Tax Parcel Number	Property Owner of Record	Property Owner Mailing Address
0416144152	Donald and Karen Painter	PO Box 477 Eatonville WA 98328-0477
0416144153	Rock City LLC	PO Box 477 Eatonville WA 98328-0477
3581000100	Jeremy and Brown Spring Burtchett	118 Eagle Glen Court Eatonville WA 98328-9424
3581000090	Peggy Irwin	PO Box 53 Eatonville WA 98328-0053
3581000110	Robert and Helen Banks	PO Box 1424 Eatonville WA 98328-1424
3581000120	Joel Aiken	123 Eagle Glen Court Eatonville WA 98328-9425
3581000130	Richard and Marjorie Duckett	PO Box 1418 Eatonville WA 98328-1418
3581000140	Brian Abbott	119 Eagle Glen Court Eatonville WA 98328
0416144158	DN Properties I LLC	10618 SE Kent Kangley Rd Ste 104 Kent WA 98030-9048
0416144157	DN Properties I LLC	10618 SE Kent Kangley Rd Ste 104 Kent WA 98030-9048
0416144156	DN Properties I LLC	10618 SE Kent Kangley Rd Ste 104 Kent WA 98030-9048
0416144131	Harold Burlingame	PO Box 820 Eatonville WA 98328-0820
0416144130	Harrison and Sandra Christian/Christian Development	PO Box 0 Morton WA 98356
0416144126	William Christian/Christian Development	PO Box 0 Morton WA 98356

# **APPENDIX C**

**Critical Areas Permitting Report Prepared by Landau Associates** 

# Permitting Report Rimrock Trail Alignment Eatonville, Washington

December 24, 2008

Prepared for

Parametrix, Inc.

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# INTRODUCTION

The permitting process is a critical component to the successful construction of any trail project. The permitting process is designed to protect natural and cultural resources (federal, state and local regulations), provide access (Shoreline Management Act and Americans with Disability Act), ensure public safety (building codes), and provide compatible uses within the existing community (Growth Management Act, local plans and zoning).

The Town of Eatonville and Pierce County are proposing construction of a trail beginning at northern end of 129<sup>th</sup> Ave E in Rimrock County Park, running south to Lynch Creek Road E, and ending in the Town of Eatonville near the south end of the runway at Swanson Airfield (Figure 1). Land use in the project area consists of single family dwellings, commercial properties, county parks, vacant and undeveloped land, and Swanson Field a private airport. Figure 1 presents a vicinity map of the project area. Figure 2 shows the proposed trail alignment. A review of this alignment was conducted to provide a permitting scenario for this proposed trail alignment.

Federal, state, and local permits will be required to construct the trail along this alignment and since the proposed alignment is in both unincorporated Pierce County and the Town of Eatonville Limits, the project needs to comply with regulations of both of these local agencies. To provide information on the potential permitting, Landau Associates conducted a site walk, reviewed the Town of Eatonville Municipal Code (EMC), reviewed Pierce County Development Regulations, and reviewed information on endangered plant and animal species in the project area. The project is located in Water Resource Inventory Area (WRIA) 11 and includes tributaries to the Nisqually and Mashel Rivers, both these rivers support endangered fish species, including salmonids, therefore federal and state permits will require compliance with the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act. Federal and state review will be required under the Clean Water Act (CWA) and State Hydraulic Code. The project will require review under local Critical Areas Codes.

# PERMITTING REQUIREMENTS

Federal permits will be issued by the Army Corps of Engineers under Section 404 of the CWA. Recent decisions at the federal level will impact this project, specifically; the most recent guidance (USACE 2008) from the US Army Corps of Engineers and the Environmental Protection Agency (EPA) on the "Rapanos" decision. The issued guidance considers roadside ditches that flow for at least three months out of the year as "tributaries", this includes manmade roadside ditches. These ditches are now regulated by the Corps of Engineers under the Section 404 Clean Water.

Federal permits will also be required based on the decisions from FEMA/NMFS, the September 22, 2008 Biological Opinion from the National Marine Fisheries Service regarding ESA and Magnuson-Stevens Act consultation of the National Flood Insurance Program in the Puget Sound Area (NMFS Tracking No. 2006/00472) states that "...jurisdictions with permitting authority must demonstrate to FEMA that any proposed development in the FEMA designated floodway, the CMZ plus 50 feet...and the riparian buffer zone...does not adversely affect water quality, water quantity, flood volumes, flood velocities, spawning substrate, and/or floodplain refugia for listed salmonids" (FEMA 2008). The Biological Opinion also includes that "If development within the 100 year floodplain but outside the RBZ, is permitted, any loss of floodplain storage shall be avoided, rectified or compensated for...Additionally, indirect adverse effects of development in the floodplain...must also be mitigated such that equivalent or better salmon habitat protection is provided." Furthermore, development permitted within the floodplain shall use Low Impact Development methods to minimize or avoid stormwater effects. The Communities adopting these criteria must report to FEMA on the effectiveness of mitigation, who then reports to NMFS. NMFS evaluates effectiveness of the mitigation and they direct FEMA to provide further mitigation if necessary.

Stormwater run off has additional permitting requirements. Recent decisions (PCHB 2008a, b) by the State of Washington Pollution Control Hearings Board requires "All Known Available and Reasonable Methods of Treatment (AKART)" be used in development projects. As specified in the hearing board order AKART includes using low impact development techniques, such as pervious pavement, rain gardens and other low impact stormwater treatments to prevent pollution.

Projects requiring federal permits or projects with federal funding require review under the ESA and require a biological assessment. This is to ensure construction in marine waters, wetlands, lakes, and streams (including tributaries) is not detrimental to fish and is not detrimental to designated fish critical habitat, including Essential Fish Habitat. Although Pierce County has several endangered species in addition to fish, according to data obtained on the project area listed fish species are the only endangered species in the project area. Bald Eagles were delisted as an endangered species however, the 1940's Bald and Golden Eagle Preservation Act remains in effect and the area eagle populations will need to be considered.

State permits will be issued by the State Department of Ecology (Ecology) and Washington Department of Fish and Wildlife (WDFW) with Ecology reviews for Section 401 of the CWA and Wetland impacts. WDFW review will be required for a Hydraulic Project Approval (HPA) for work in, on, over or adjacent to a Water of the State.

Archeological reviews are required at the federal and state jurisdictional levels. In November 2005 the State of Washington Executive Order 05-05 (Gregoire 2005) was established to protect the rich

archeological and historical sites in the state. As part of protecting that heritage, work that requires excavation and is not subject to federal regulations requires cultural and historical assessments at the state level if state funds are used. This includes minor excavation for trails.

In general the state and federal agencies will review this project under the following regulations:

- Endangered Species Act and Magnuson-Stevens Act
- Bald and Golden Eagle Protection Act
- Cultural and Historical preservation Act (Section 106 or EO 05-05)
- Clean Water Act. (USACE 2008)

The local permitting scenario is more complex, due to the following factors:

- Alignment passing through two local jurisdictions with different regulatory requirements
- Right-of-way or easement on the east side of Eatonville Middle School
- Presence of streams, regulated ditches, and wetlands
- Presence of threatened and endangered species
- Location of portions of this project in a regulated flood plain.

Review of the Pierce County Development Regulations (Pierce County 2006) and Eatonville Municipal Code (Eatonville 2006) shows the project will require different reports for these two agencies. In order to obtain any of the permits mitigation will be required.

In general the local agencies will review this project under the following regulations:

- State Environmental Policy Act (SEPA)
- If no state or federal archeological assessment Pierce County requires an archeological assessment
- Critical Area code review (both Pierce County and Town of Eatonville)
  - Flood Plains
  - Wetlands and Streams
  - Wildlife Habitat
- ADA compliance.

The following information provides the anticipated trail permitting pieces for the alignment along the sewer easement (east of the school), along Lynch Creek Road, across the Tacoma Rail Tracks and along 129<sup>th</sup> Avenue East to Rimrock Park. This information was determined by reviewing local codes, reviewing wildlife and habitat information, reviewing recent guidance issued by the Army Corps of Engineers, reviewing recent state decisions and walking proposed trail alignment on December 4, 2008. According to *Pierce County Development Regulation 20.18.640* (Pierce County 1988), Lynch Creek is a regulated shoreline downstream of the project area therefore the project is outside of the regulated shoreline district. No shoreline permits should be required for this project. Typically permit applications can be submitted at 30% design. Any missing portions of the permit process can create expensive delays for the project.

### TRIBAL AREAS

Much of Pierce County is home to several native tribes including the Muckleshoot, the Nisqually, the Steilacoom and the Puyallup Tribes. As stated previously, if the trail project has federal funding review will be required under Section 106 of the Historic Preservation Act. If there is state funding and no federal funding, project review will be required under Executive Order 05-05. Both of these regulations require a cultural and historical resource assessment. Even if there is no federal or state archeological assessment for this project, Pierce County regulations require a cultural resource assessment for work involving excavation including trails.

### RIGHT-OF-WAY

Right-of-way and easements will need to be determined. If additional right-of-way is needed, securing the necessary right-of-way or easements for this trail segment may take time and may need to be phased. If property is purchased for the trail, then additional research in the form of a Phase 1 Environmental Site Assessment for each separate parcel purchased is required. The alignment of the trail east of the school on the existing sewer easement needs to be investigated by a title company to ensure the Town of Eatonville can use this easement for a trail. The 1969 aerial photo shows a rail line on the portion of this easement abutting the school.

# **EXISTING USES**

Land use in the vicinity of the proposed trail is a mix of single-family residential, sports fields, school, and commercial uses with the dominant use being single-family residential. There is a small private airport runway bordering the project area. The proposed trail appears to be compatible with

existing uses within the area. A trail would not only provide access to Rimrock Park but also a safe route to school for students that live on Lynch Creek Road. Currently the road is a narrow two-lane road. There are areas where there are steep slopes on either side of the road and other areas with roadside ditches. These features are obstacles to safe travel for pedestrians and bicyclists, therefore providing a trail will improve safety for pedestrians and bicyclists.

### ZONING

Public trails are typically compatible with most zoning regulations and provide a benefit to the surrounding community. The trail alignment is within both the Town of Eatonville and in unincorporated Pierce County. Therefore, the regulations for trail development will be different since there will be two local permitting jurisdictions with different zoning regulations. In some instances even though trails are permitted, a trail head constitutes a park and depending on the zoning regulations could require a conditional use permit.

### **SEPA**

Since the project area is in two jurisdictions and SEPA will be required, a recommendation is to have either Eatonville or Pierce County take the lead agency status for the SEPA determination. This will streamline the State Environmental Policy Act (SEPA) process, since it will only require one SEPA checklist and determination. This is allowed under the SEPA regulations (WAC 197-11- 926) and is typically done through a memorandum of agreement between the two agencies.

## **CRITICAL AREAS**

Critical areas include wetlands, streams, wildlife habitat, flood plains, steep slopes, landslide hazards, seismic hazards, aquifer recharge areas, volcanic hazards, and well head protection areas. Federal, state and local regulations protect these areas to protect property, resources, and water quality. For example, locating a trail within a flood plain area may require providing additional flood storage. Both the Town of Eatonville and Pierce County have critical area regulations. The following are the anticipated regulated critical areas in the project area.

## **Critical Area - Wetlands**

The Town of Eatonville's Critical Area regulations (Eatonville Municipal Code [EMC] 15.16.107) allows passive uses within wetland buffers, this includes trails provided they do not degrade the critical area. This is important to note since this would apply to the alignment east of the school. This

area has an existing gravel road easement which is within a wetland buffer. If the trail is constructed with a pervious surface this will not degrade the wetland buffer and is allowable under the EMC code, however depending on temporary construction impacts, mitigation by providing appropriate native plantings in the wetland buffer could be required.

In the Pierce County portion along Lynch Creek Road, just south of 414<sup>th</sup> Street East, there is possibly a wetland on the east side of Lynch Creek Road and the roadside ditches along the road drain into a fish-bearing tributary of Lynch Creek. The creek flows through a large unrestrictive culvert under the road. The ditches along side of the road, which also connect to the potential wetland on the east side of the road, drain directly into this creek at the culvert location. Pierce County regulations will require at a minimum wetland and stream delineation for the trail.

#### Critical Area – Wildlife and Sensitive Areas

The proposed section of the alignment that is within Pierce County is in a forested area that also has wetlands, ditches, Lynch Creek and its tributaries. The proposed trail alignment crosses the bridge over Lynch Creek, a fish-bearing waterway (WDFW 2008). Pierce County will require preparing a wildlife and sensitive areas report since the area is heavily wooded and since Lynch Creek and its tributaries are salmon-bearing streams. Mitigation will be required for impacts to the roadside ditches. Pin pile construction might be appropriate along this portion of Lynch Creek Road which will minimize impacts. Pierce County regulations require assessment for other wildlife, including local elk populations which are documented as being in the area according to the WDFW Priority Habitat and Species Data.

#### **Critical Area – Other Considerations**

Pierce County regulations will require information based upon a portion of the trail being within a flood plain, compensatory storage will be required as mitigation for impacting the flood plain plus demonstration that endangered fish species are not harmed by the construction. Pierce County regulations may also require a landslide hazard report since the project area includes steep slopes. The proposed trail alignment crosses the bridge over Lynch Creek, a fish-bearing waterway. The steep ravine and Lynch Creek below pose challenges for developing an alternative crossing. Other reports that could be required based on Pierce County regulations include a landslide hazard report, and volcanic hazard report.

### **PERMITTING**

As discussed above, there are many regulated critical areas along the proposed trail alignment. The proposed trail alignment is occurring on areas that include a stream, stream buffer, wetland, or

wetland buffer requiring stream and wetland permits; a wildlife and sensitive areas report will be required for this project; federal and state permits include review under the Clean Water Act (CWA), Hydraulic Project Approvals (HPA), and the Endangered Species Act (ESA).

Funding sources also dictate the type of permit review required for projects. Federal funding, including grant funding can require additional permit review and requires full review under the National Environmental Policy Act (NEPA), a biological assessment, and review under section 106 for archeological and historic resources. If there is no federal funding and there is state funding, including state public works trust fund monies, this will require additional review under EO 05-05 for archeological and historical resources.

The recent decisions by Federal Emergency Management Act (FEMA) and National Marine Fisheries Service will need to be addressed in the trail project. As discussed earlier, mitigation will be required for flood plain impacts.

Regulatory permitting is constantly changing. Currently, new regulations are being developed for reduction of Green House Gas (GHG) emissions but nothing has been finalized in Pierce County. Mitigation for GHG emissions is anticipated and non motorized facilities, including trails, could provide mitigation for GHG emissions. Unfortunately, there are challenges to constructing trails. Given the current regulatory environment, challenges for trail projects include the amount of time required for permit review. Many federal, state, and local agencies have heavy workloads/under staffed and permitting review can range from six to eight months.

### **OTHER CONSIDERATIONS**

The Americans with Disability Act (ADA) requires that reasonable accommodations be made for people with disabilities. In some instances the ADA section of the trail may be shorter than the main trail. The ADA trail may be short due to steep slopes or other obstacles that prohibit the ability to make the main trail completely ADA accessible. Another consideration is the one-percent for arts program administered in Pierce County. Pierce County public projects that cost over \$100,000 are required to allocate one-percent for art work.

# **SUMMARY AND NEXT STEPS**

Project funding and environmental impact determines which of the following permits/approvals will be required for this project it is anticipated the following permits will be required:

- Section 404 Permit from the USACE under the CWA
- Review for Floodplain impacts

- Section 401 Permit from Ecology under the CWA
- WDFW HPA for work over, under, adjacent to waters of the state
- Review under Critical Area regulations
  - Habitat Assessment
  - Biological Assessment
  - Wetland and stream delineations and mitigation
- Cultural and Historical Assessment
- If federal funding is used, review under the National Environmental Policy Act (NEPA)
- State Environmental Policy Act (SEPA).

Work requiring permit reviews should take into consideration the amount of time required for those reviews. Trail proponents should be aware that obtaining many of these permits, especially for wetlands, mitigation is required. Once the final alignment is selected and the environmental permitting is completed, building permits will be required.

### NEXT STEPS

The recommended next steps of the process include:

- Providing a preliminary trail design to determine where additional property is needed
- Researching right-of-way/easements, especially the area along the east edge of the school
- Obtaining Phase 1 ESA if new right-of-way is acquired
- Quantifying alignment impacts
- Conducting critical area studies
- Determining options for crossing Lynch Creek
- Meeting with public and interested outdoor groups
- Estimating costs of the project
- Researching funding opportunities for the project
- Preparing necessary reports for the trail construction

From the above information, it is evident that creating this trail is a task requiring additional review of the area and planning based on several factors. There are always challenges to constructing trails, but trails provide many community benefits. This initial study provides a planning framework, assisting with developing the next phase of this project if the desire is to move forward with this particular alignment.

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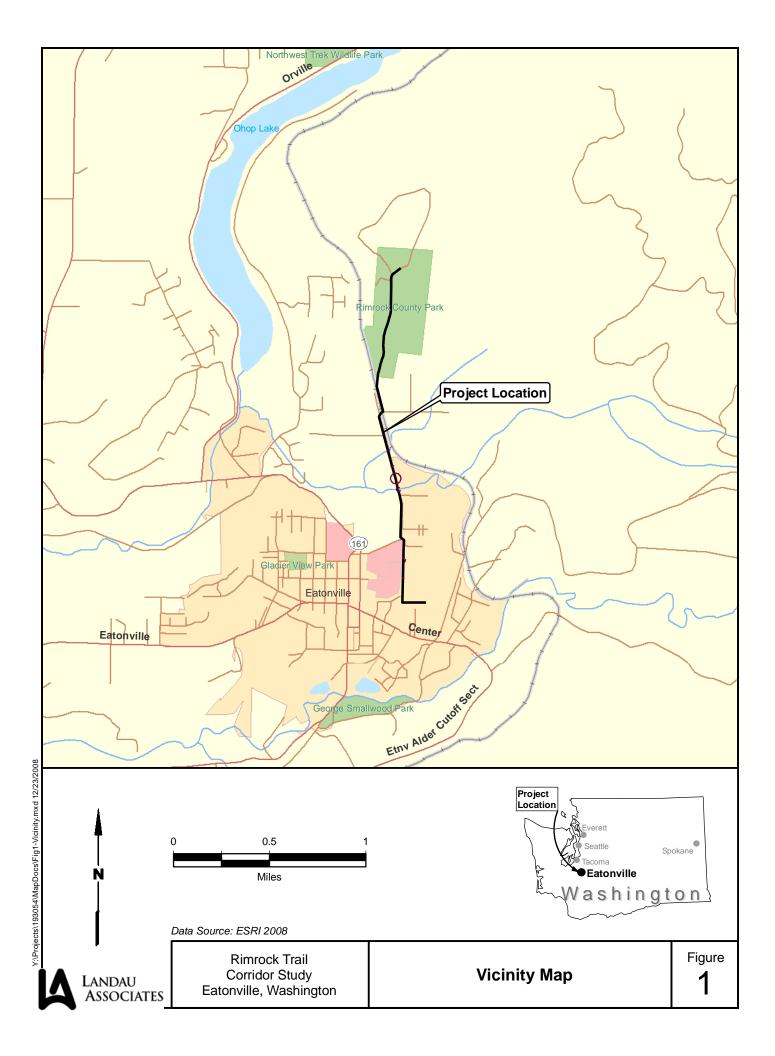
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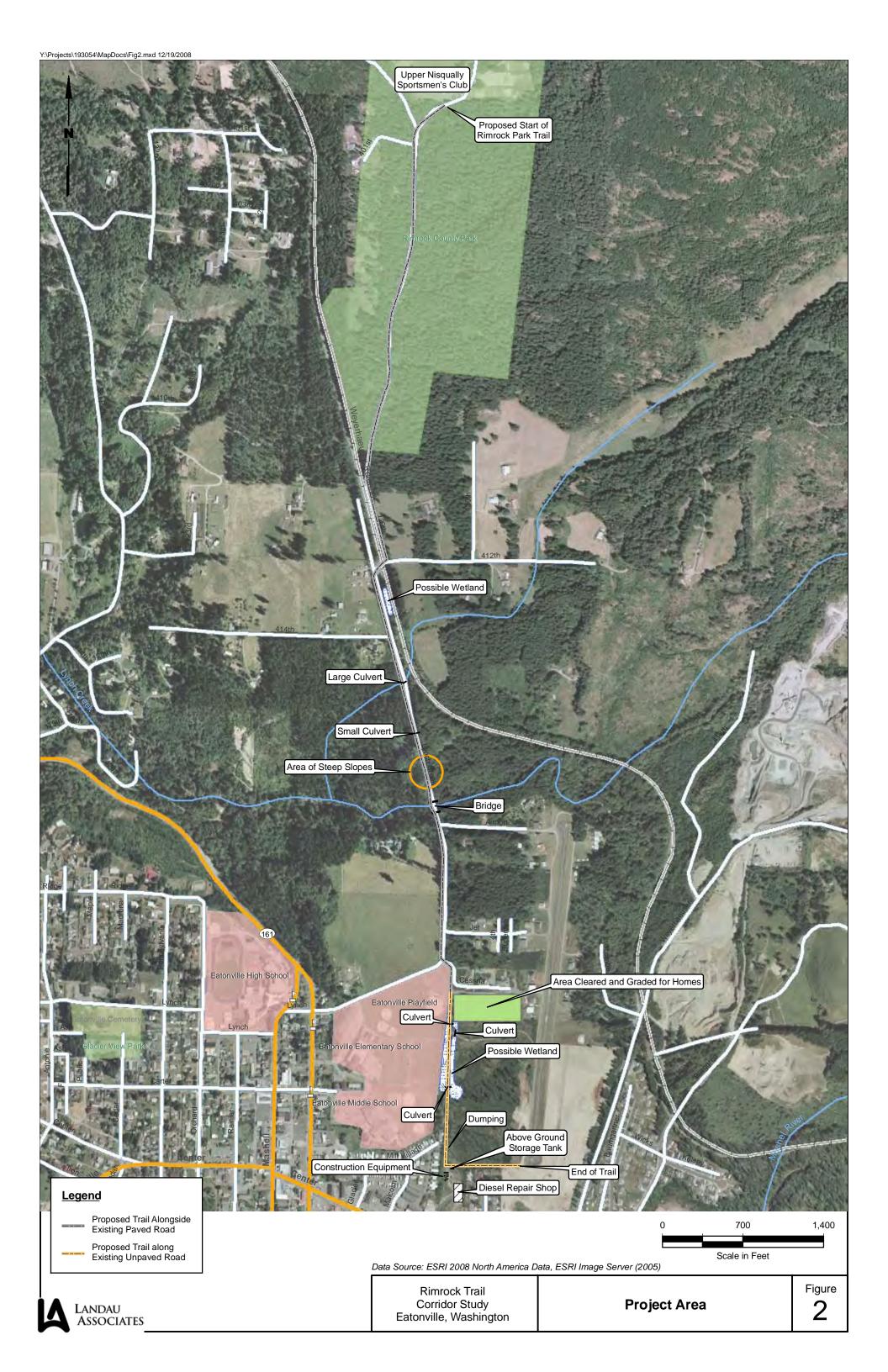
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#### Permitting

	Special Areas:	
Grant Funding:		Project Cost:
Federal Grants (including NPS grants and some RCO grants) - Require review under NEPA, State Grants (including some RCO Grants) - Require review under SEPA, Executive Order 05		Public projects costing over \$100,000 require a contribution of 1% for arts
	Floodplains	
Federal	State	Local
May require creating compensatory flood plain storage, demonstration that fills in floodplains		
do not impact endangered fish species	New state regulations may include the floodplain adjacent to rivers as part of the shoreline area	SEPA, regulated by the Critical Area Regulations
	Wetlands	
Federal	State	Local
If water of the US and work is in-water Section 404 permit; Section 106 and Biological Assessment	If Section 404 then Section 401 if not, RCW 90.48; MAY require HPA from WDFW	SEPA; Wetland Report and Fish and Wildlife Habitat Assessment; Cultural Assessment
	Wetlands connected to fish bearing streams	
Federal	State	Local
If navigable Section 10 and possibly Section 404, non navigable Section 404, Biological Assessment; Section 106	If Section 404 then Section 401 if not, RCW 90.48; HPA from WDFW; if state funded EO 05-05 review	SEPA; Cultural Assessment; Wetland Report, Fish and Wildlife Habitat Assessment, possibly Shoreline Report
	Lakes	
Federal	State	Local
If navigable Section 10 and possibly Section 404, non navigable Section 404, Biological Assessment; Section 106	If Section 404 then Section 401 if not, RCW 90.48; HPA from WDFW; if state funded EO 05-05 review	SEPA; Cultural Assessment; Wetland Report, Fish and Wildlife Habitat Assessment, possibly Shoreline Report
	Nonfish Bearing Streams	
Federal	State	Local
If navigable Section 10 and possibly Section 404, non navigable Section 404, Section 106	If Section 404 then Section 401 if not, RCW 90.48; Possibly an HPA from WDFW; if state funded EO 05-05 review	SEPA; Cultural Assessment; Wetland Report, Fish and Wildlife Habitat Assessment, possibly Shoreline Report, possibly shoreline erosion hazard report and landslide hazard report
	Fish Bearing Streams	
Federal	State	Local
If navigable Section 10 and possibly Section 404, non navigable Section 404, Biological Assessment; Section 106	Section 401 from Ecology, HPA from WDFW; if state funded EO 05-05 review	SEPA; Cultural Assessment; Wetland Report, Fish and Wildlife Habitat Assessment, possibly Shoreline Report, possibly shoreline erosion hazard report and landslide hazard report.
	Tribal Areas	
Federal	State	Local
All federal permits are applicable (e.g. if in water work an Army Corps permit is required).	Sovereign Nation, not regulated by the State	Sovereign Nation, not regulated by County
*All Pierce County Projects must comply with Pierce County Stormwater development regulati	ons including work in special areas.	

At a minimum an abbreviated engineered site plan will be required for all trail projects and Low Impact Development techniques for treating storm water should be incorporated into trail work. Regulatory Definitions:

Section 10 Rivers and Harbors Act - required for work in Navigable Waterways as determined by the Army Corps of Engineers, Application is by submitting a

a Joint Aquatics Resource Permit Application (JARPA).

Water of the US - includes wetlands that are connected to streams and SOME isolated wetlands. Does not include Prior Converted Croplands (PCC).

Section 404 Clean Water Act (CWA) - required for all work in waters of the US, including wetlands. Administered by the Army Corps of Engineers, application is by submitting a

Joint Aquatics Resource Permit Application, if work is done where there are endangered fish a Biological Assessment/evaluation will be needed.

Biological Assessment/Evaluation (BA/BE) - A document that evaluates the project activities and how those activities will effect federally listed endangered species.

Section 401 Clean Water Act - If the project requires Army Corps review under Section 404 of the CWA, it may also require review and approval under Section 401, Ecology will review

or the tribe if the work is on tribal land/waters. The Section 401 CWA review (if needed) is completed after the Section 404 CWA approval. RCW 90.48 - An Administrative Order issued by Ecology to allow work in wetlands when there is no Section 404/401 requirement.

Hydraulic Project Approval (HPA) - Washington State Fish and Wildlife issues an HPA for work in waters of the state under RCW 77.55.

NEPA National Environmental Policy Act - If a project has federal funding a NEPA exclusion, Environmental Assessment or Environmental Impact Statement is required

Section 106 - If federal funding or a federal permit, review under Section 106 of the historic preservation act applies to ensure protection of tribal, archeological and historical resources.

Executive Order 05-05 - If NEPA and Section 106 are not applicable, the State under Executive Order 05-05 requires review to ensure no tribal cultural or archeological sites are effected.

Wetland Report - Required by Pierce County for work in or around wetlands, report will include mitigation if any wetlands are affected by the project.

SEPA - State Environmental Policy Act required for most trails unless the project is repair and maintenance or on existing right of way.

Shoreline Report SMA/SMP -Shoreline Master Program, work within 200 feet of shorelines requires local review under the Shoreline Master Program, including trails.

Shoreline Erosion Hazard -required by Pierce County for shoreline areas

Landslide Erosion Hazard - required by Pierce County for areas prone to Landslides, Pierce County Atlas provides information

Fish and Wildlife Habitat Assessment - review of areas that support various species including ESÁ listed species, elk habitat, oak prairies, etc.

Cultural Assessment - Pierce County any area requiring excavation needs to provide assessment for cultural and historical resources

# **APPENDIX D**

Cultural Resources Report Prepared by Cultural Resource Consultants, Inc.



TECHNICAL MEMO 0810Q-1

DATE:

January 19, 2009

TO:

Chrissy Bailey

Parametrix

FROM:

Margaret, Project Archaeologist

Glenn Hartmann, Principal Investigator

RE:

Cultural Resources Assessment for the Eatonville to Rimrock Park Trail Connector

Project, Pierce County, WA

The attached short report form constitutes our final report for the above referenced project. No recorded cultural resources are present within the proposed project, and no previously unrecorded cultural resources were identified or recorded as a result of field investigations. Please contact me should you have any questions about our findings and/or recommendations.

**Management Summary** 

Cultural Resource Consultants, Inc. (CRC) prepared this cultural resources assessment for a proposed 1.5-mile long Pierce County-funded trail project in Eatonville, Pierce County, Washington. The project is undergoing a feasibility study and specific project actions have not yet been proposed, but the project is anticipated to be funded, in part, through grants from the Washington Recreation and Conservation Office. The survey did not result in the identification of any potentially significant cultural resources in the project. No further cultural resources work is recommended for the project.

## 1. Administrative Data

Report Title: Cultural Resources Assessment for the Eatonville to Rimrock Park Trail Connector Project, Pierce County, WA

Author (s): Margaret Berger

Report Date: January 19, 2009

<u>Location:</u> The project extends along an alignment northwards from the town of Eatonville, Washington, to Pierce County's Rimrock Park in Pierce County, Washington.

<u>Legal Description:</u> The project is located in the SE¼ Sec. 11 and E½ Sec. 14, T. 16 N., R. 4 E., Willamette Meridian (Figure 1).

USGS 7.5' Topographic Map (s): Eatonville, WA (1990)

<u>Total Area Involved:</u> This project is a 1.5-mile long linear trail corridor comprising approximately 10 acres.

Objective (Research Design): This preliminary assessment was conducted as a component of preconstruction environmental review in accordance with the National Environmental Policy Act (NEPA) and Washington Governor's Executive Order 05-05 (EO 05-05). NEPA requires federal agencies to consider the effects of their proposed actions before proceeding with the actions. Under EO 05-05, construction and land acquisition projects using capital funds, not otherwise subject to review under Section 106 of the National Historic Preservation Act (NHPA), are required to undergo cultural resources review. This assessment utilized a research design that considered previous studies, the magnitude and nature of the undertaking, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential effects, as well as other applicable laws, standards, and guidelines (per 36CFR800.4 (b)(1)). Background research and field investigations were conducted to identify archaeological or historic sites in the proposed project location, and to evaluate the potential for asyet unknown cultural resources to be present.

Recorded Cultural Resources Present: Yes [] No [x]
No archaeological or historic sites are recorded within the proposed project.

Previously Unrecorded Cultural Resources Identified and Recorded: Yes [ ] No [x] No previously unrecorded archaeological or historic sites were identified in the proposed project.

Project Background: Parametrix has requested this assessment for the Phase I Feasibility Study of the Eatonville to Rimrock Park Trail Connector. This is a proposed 1.5 mile connector trail that extends from the Town of Eatonville to Pierce County's Rimrock Park. The proposed trail route traverses several land ownerships that include Tacoma Public Utilities Light Division, Tacoma Public Works, Pierce County road right-of-way, Eatonville School District, and Town utility rightof-way. Beginning on the north end at Rimrock County Park, the alignment generally follows the east side of 129th Avenue south to the railroad tracks. The trail would cross the tracks along the north side of 129th Avenue, then turn south and follow Lynch Creek Road into town on the west side of the road, to the corner where Lynch Creek Road turns west. From this point, the alignment will cross Lynch Creek Road and head south along the east side of the Eatonville School District property towards residential developments to the south. When the corridor reaches the north side of residential properties at the northeast end of Mill Village Street East, it turns east and connects with the Aviator Heights portion of the trail network at the west edge of the airport (Figure 2).

Within the Town of Eatonville, the trail would consist of an 8-ft wide concrete sidewalk; outside city limits, the trail surface would be asphalt. There is an existing sewer line along the west side of Lynch Creek Road. The trail would cross the North Fork and South Fork of Lynch Creek but design for these crossings has yet to be determined. Lynch Creek Road currently crosses the North Fork over a culvert. There is a two-lane bridge over the South Fork, which would either need to be widened or supplemented with a separate bridge to accommodate the proposed trail. The Phase I document will provide the basis for potential Recreation Conservation-Office (RCO) grant applications and will set the stage for developing a Phase II preliminary engineering plan. Since the project may receive state and/or federal funding from RCO or other agencies, the project is subject to review for potential impacts to cultural resources under NEPA and EO 05-05. Since the current project consists of the feasibility study only, no ground disturbance or other construction activities have been proposed at this time. The area under consideration for potential effects to cultural resources consists of the proposed trail alignment as described above (see Figures 1 and 2).

#### 2. **Background Research**

Background research was conducted in November and December 2008.

Archival Sources Checked:

**DAHP GIS Database** 

Soil Survey

There are no recorded sites in the proposed project.

Soils mapped within the project are Barneston gravelly coarse sandy loam, 0 to 6 percent slopes, Barneston gravelly coarse sandy loam, 6 to 15 percent slopes, and Barneston gravelly coarse sandy loam, 30

to 45 percent slopes (USDA NRCS 2008).

Archival Data:

**DAHP** 

[x] CRC reviewed recorded sites at DAHP on November 24, 2008.

Library [x] Various historical references (e.g., 1894 GLO map) were consulted.

<u>Context Overview:</u> Literature review for this project included environmental information, local ethnographies and histories, historical maps and aerial photographs, and regional archaeological literature pertinent to the project area.

The potential distribution of cultural resources in the project area, and the identification of conditions that may have affected contemporaneous preservation of these resources, are informed by an understanding of changes to the local environment over time. The contemporary topography and surficial geology of the project area is largely a result of multiple glaciations that occurred during the Pleistocene. The Eatonville area would have been deglaciated by approximately 16,500 years ago (Porter and Swanson 1998). As the glaciers retreated, a series of proglacial lakes such as Glacial Lake Puyallup formed near the southern edge of the glacier. The Ohop Valley, just west of the project area, was a spillway for Glacial Lake Puyallup, through which large volumes of water drained towards the Chehalis River (Thorson 1981:17), depositing recessional outwash in the Eatonville area. These outwash sediments formed the parent material for soils in the project location, which are Barneston gravelly coarse sandy loam, 0 to 6 percent slopes, Barneston gravelly coarse sandy loam, 6 to 15 percent slopes, and Barneston gravelly coarse sandy loam, 30 to 45 percent slopes (USDA NRCS 2008). These formed on terraces and escarpments in volcanic ash over glacial outwash parent material. The typical profile in each of these soils is composed of 13 inches of gravelly coarse sandy loam underlain by very gravelly sand to depths of at least 60 inches below surface (Zulauf 1979). During deglaciation, isostatic rebound also occurred, allowing the landscape to lift as the weight of the ice decreased (Thorson 1980, 1981). These functions of glacial retreat and landmass rebound contributed to the present landforms and elevation of the project area.

From about 13,000 to 7,000 years before present (BP), temperatures increased dramatically (Leopold et al. 1982). Climate conditions were initially cooler than present and supported a sparse vegetal environment of subalpine grasses and sedges. As temperatures rose, the glacier retreated rapidly to the north and left the regional landscape ice-free and suitable for inhabitants by approximately 11,000 years ago (Kruckeberg 1991:22). After 7000 BP, climate became cooler and wetter, and grassland, Douglas fir, western cedar, and western hemlock communities colonized the landscape by 5000 BP (Leopold et al. 1982; Suttles 1990). In the early Holocene, forests were more open than present (Barnosky et al. 1987:314). Aside from minor fluctuations, due largely to extensive land clearing in the nineteenth and twentieth centuries, ecological landscapes have remained relatively stable for the past 5000 years (Barnosky et al. 1987; Leopold et al. 1982). The project area is located within the Tsuga heterophylla vegetation zone of the Puget Lowland physiographic province (Franklin and Dyrness 1973). Before extensive historical logging of the regional area, the project area would have been forested with stands of western red cedar and Douglas fir. Today, the vegetation in the contemporary project area includes managed lawns and streetscapes, as well as managed second- and third-growth stands of cedar, fir, and other Tsuga heterophylla zone species.

Archaeologists have identified broad similarities in site and lithic assemblages dated to between 9000-5000 years before present (BP). This period is characterized by occupation sites located on

uplands or atop upper river terraces, lithic workshops, and temporary hunting camps that contain a wide variety of flaked stone tools and laurel-leaf-shaped bifaces suggestive of large game hunting, butchering and processing (e.g., Gallison 1994; Morgan 1999). Patterns of seasonal residence and logistical mobility characterizing the ethnographic pattern in the Puget Sound region find their foundation from about 3000 BP. Sites dating from this period in the Puget Lowlands represent seasonal specialized spring and summer fishing and root gathering campsites and winter village locations.

The project area is within the traditional territory of the Nisqually people (Ruby and Brown 1992; Smith 1940:13), but people from Puyallup villages in the Carbon River valley to the north also would have used the Eatonville area for hunting or other resource procurement activities (Haeberlin and Gunther 1930:9; Smith 1940:24). Native Americans by the early historic period practiced a seasonal subsistence economy that consisted of spring, summer and fall migrations to areas for hunting, fishing, gathering of berries and roots, and procurement of shellfish followed by a more sedentary lifestyle as they returned to longhouse villages as winter approached. Although salmon and other fish were a primary food source, the complexity of the Puget Lowland environment provided a rich subsistence base. Villages were typically adjacent to or near river or marine transportation routes, including the Nisqually River at its confluences with smaller tributaries such as Clear Creek and the Mashel River (Smith 1940). Prairies, such as those in the Mashel River area south of Eatonville, were often selectively burned to encourage cultivation of plants such as camas and other root crops, berries, and pasture grasses supporting wild game and horses. The nearest Nisqually village, bacálabc, was located on the Mashel River on a highland below present-day town of Eatonville. This village had strong ties to Sahaptin-speaking groups on the east side of the Cascade Mountains (Duwamish et al. 1927; Smith 1940). Smith (1940:31) grouped the Nisqually of the Mashel River area in the "prairie" cultural grouping, reflecting a dependence on prairie resources for subsistence, including increased reliance on hunting land game relative to "river" or "saltwater" groups. "Prairie" groups also had territorial hunting boundaries and horse herds, which helped enlarge their hunting areas. South of Eatonville, there was a trail that followed the Nisqually and Mashel river valleys and over Cowlitz Pass, connecting southern Puget Sound peoples with groups east of the Cascades (Haeberlin and Gunther 1930:9).

By the mid-1850s, the smallpox and violence associated with Euro-American settlement in the Northwest had drastically impacted Indian people and their traditions; many families were forcibly relocated and interned during this period. In 1854, following negotiations between Puyallup, Nisqually, and Squaxin Island people and the United States government, the Treaty of Medicine Creek led to the abandonment of most southern Puget Sound villages and compelled Nisqually people to relocate to one of three reservations, including that established near the mouth of Shenahnam Creek (Ruby and Brown 1992). This treaty dissolved Indian title to their traditional lands, and by 1855-56 the federal government used military force to contain Nisqually and other Indian people dissatisfied with the poor quality of reservation lands.

Euro-American land use in the Eatonville area initially focused on farming. Norwegian settlers arrived in the Ohop Valley in 1888 and established farms, growing oats, barley, and other crops, and raising cattle. In 1889, Thomas van Eaton established a trading post at Eatonville (Kirk and Alexander 1990:305). According to an online search of General Land Office (GLO) land patents on file at the Bureau of Land Management (http://www.glorecords.blm.gov/PatentSearch, accessed

19 December 2008), portions of the project in Section 11 were part of a much larger (215,921 acres) acquisition by the Northern Pacific Railroad Company (Accession No. WAORAA 064800, Issue Date: 12/13/1894). Portions of the project in Section 14 were claimed by individuals under the Homestead Entry Act, including Thomas van Eaton in the W½ of the SE¼ (Accession No. WAOAA 071274, Issue Date 5/13/1896). The GLO surveyed the township containing the project in 1893 but did not map any buildings or settlements in the proposed trail alignment (USSG 1894) (Figure 3).

Later, the logging and milling industries, enabled by the construction of railways, played an important role in development of the town. The Tacoma Eastern Railroad reached from Tacoma to Eatonville in 1903, and the Eatonville Lumber Company mill opened in 1907 (Holter and McAbee 2005:61; Kirk and Alexander 1990:306; Warren and Warren 1978). In addition to transporting logs, lumber, and coal from eastern Pierce County towns to Tacoma, the Tacoma Eastern also carried passengers to Mount Rainier National Park from 1905 to 1932 (Miller 2003). Passengers also road the Tacoma Eastern to other tourist destinations closer to Eatonville, such as Mashel Falls (Holter and McAbee 2005:63). In 1909, the Chicago, Milwaukee & St. Paul Railroad changed its name to Chicago, Milwaukee, St. Paul & Pacific, and made arrangements to lease the Tacoma Eastern. The Milwaukee Road acquired the Tacoma Eastern in 1919. The railroad was later purchased by Weyerhaeuser Timber Company, which owned large timber tracts in the vicinity of the project (Figure 4) and used the railroad to haul lumber until the mid-1980s (Metsker 1960; Sullivan 1999:6-7, in Iversen et al. 2000). The railroad is now a part of the Tacoma Rail Mountain Division. The proposed project would cross the railroad in the vicinity of the 129<sup>th</sup> Avenue crossing.

The Eatonville Lumber Company dominated the town until the early 1950s, by which time all the timber on its lands had been cut (Kirk and Alexander 1990:306). Until 1941, the company had logged its own timber, maintained railroad tracks, locomotives and cars, and operated a logging camp. However, production declined and the mill closed in 1953 (Warren and Warren 1978). Development of the town of Eatonville since then has been primarily residential supported by local timber and mining industries, and the town still serves as a gateway to recreational areas such as Mount Rainier National Park.

As of November 24, 2008, no pre-contact archaeological sites have been recorded within a one-mile radius of the proposed project. Pre-contact archaeological sites within the greater Eatonville area include the Mashel River Site (45PI288) about 5 miles (8 km) southwest of the south end of the proposed project (Avey and Starwich 1985). This site is located on a terrace west of the confluence of the Mashel and Nisqually rivers and was identified in survey of a plowed field as shell, fire-cracked rock, stone flakes, and historic glass fragments. The historic site recorded nearest to the project is the John Galbraith House at 140 Oak St E in Eatonville, which is approximately 0.4 miles (0.64 km) southwest of the proposed project (Warren and Warren 1978). This site was listed on the National Register of Historic Places (NRHP) in 1982 (NPS 2008). The John Galbraith House is a large Colonial Revival residence built in 1925 by the owner of the Eatonville Lumber Company near the now-defunct mill (Warren and Warren 1978). Galbraith also served as Eatonville's mayor.

Very few cultural resources surveys have been conducted in the Eatonville area. Within a one-mile radius of the proposed project, only two assessments are recorded at DAHP. Masten (1983) surveyed a proposed power line corridor for archaeological resources near the north end of the current project; no archaeological sites were found. Iversen et al. (2000) conducted background research, field reconnaissance, and subsurface testing for proposed expansion of a mine approximately one mile north of the proposed project. No previously unrecorded archaeological sites or historic sites were found in that assessment.

Based on existing archaeological data for this area, the types of pre-contact cultural materials that might be expected here could include the remains of habitation or burial sites, lithic scatters, or similar pre-contact features, which could represent a range of domestic, subsistence, and ceremonial activities. Ethno-historic sites could potentially include similar features, including culturally modified trees. Historic-period archaeological deposits would likely be related to domestic or agricultural activities, the railroad, and logging and mill operations.

## 3. Fieldwork

Field observations were conducted by the author and CRC field archaeologist Chris Yamamoto. Notes, photographs, and shovel test logs are on file at CRC. Survey included pedestrian surface survey, examination of exposed soil profiles, and excavation of shovel test probes.

The goal of pedestrian survey was to examine any aboveground cultural materials (Figures 5-9). The two archaeologists each walked one meandering transect on either side of the proposed trail alignment. Spacing between transects varied from 10 meters to 1 meter depending on access to private property in the trail corridor. The proposed alignment passes through second- or thirdgrowth forest in Rimrock Park, where stumps and previously cleared areas indicate logging took place. Stumps were inspected for springboard notches or other indications of historical logging techniques; no such indications were found. South of Rimrock Park, the trail would be between existing roads and private property including maintained landscaped yards and wooded areas. The northern creek crossing contains a culvert and eroding creek banks. The South Fork of Lynch Creek flows through a steep-walled ravine with rock outcrops. Terrain in these locations did not appear to be level enough for habitation. An existing sewer line was present along the west side of Lynch Creek Road and along the east side of the school property. The southernmost segment of the proposed trail passes through a cleared area disturbed by recent construction. The archaeologists examined the ground surface in the proposed trail alignment for artifacts, structural remains, or other cultural materials. No buildings or other historic sites were identified in the alignment. Survey did not identify any aboveground cultural resources that would be impacted by the project.

Exposed soil profiles were examined wherever possible to characterize subsurface conditions along the proposed alignment, and to assess the potential for intact, buried cultural deposits to be present (Figures 10-12). Sediments observed in roadcuts along Lynch Creek Road and 129<sup>th</sup> Avenue, and along the steep banks of both forks of Lynch Creek were composed of forest duff over a thin layer (ca. 10-20 centimeters (cm) thick) of brown gravelly soil, underlain by light brown and grayish-brown gravelly sandy loam with numerous cobbles. These resemble the glacial deposits and soils described and mapped in the local soil survey (USDA NRCS 2008; Zulauf

1979). No evidence of subsurface cultural materials, such as artifacts, anthropogenic soils, or archaeological features were seen in any of the profiles examined.

Shovel testing was implemented in the portion of the project within Rimrock Park, where buried utilities were not present and exposed soils were scarcer due to dense vegetation (Figure 13). Probes measured approximately 40 cm across and reached an average depth of 47 cm below ground surface. Excavated sediments were passed through ¼-in hardware mesh to screen for any cultural contents (Figure 14). Sediments encountered in the probes consisted of forest duff overlying a relatively thin (10-17 cm) layer of brown soil over rocky glacial outwash material. No artifacts, features, or other indications of buried archaeological sites were found in the probes. Following inspection, probes were immediately backfilled.

<u>Total Area Examined:</u> ca. 10 acres (the entire proposed trail alignment).

Areas not examined: None.

Date(s) of Survey: January 14-15, 2009

<u>Weather and Surface Visibility:</u> Weather conditions were cool and ranged from clear to overcast. Surface visibility of mineral soils was considered to be excellent in exposed soil profiles adjacent to 129<sup>th</sup> Avenue and Lynch Creek Road and sporadically in other locations covering about half of the area of the project. Vegetation and gravel or other impervious surfaces obscured visibility in the remaining 50 percent of the project.

#### 4. Results

Cultural Resources Identified: None.

Project Conclusions, Findings and Recommendations: CRC's investigations did not locate any recorded or previously unrecorded archaeological or historic sites within the proposed trail alignment. Results of background research suggest a relatively low potential for pre-contact archaeological resources to be present. Evidence of prior ground disturbance due to logging, road construction, and utility installation were encountered throughout the project. Survey and subsurface testing in the proposed alignment did not identify any potentially significant cultural resources. Subsurface conditions observed in the shovel probes and exposed profiles suggest that archaeological materials, if present, would be found relatively near the ground surface. Further investigations are not recommended.

In the unlikely event that ground disturbing or other activities do result in the inadvertent discovery of archaeological deposits, work should be halted in the immediate area and contact made with the State Department of Archaeology and Historic Preservation (DAHP) in Olympia. Work should be halted until such time as further investigation and appropriate consultation is concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, DAHP and authorized representatives of the concerned Indian Tribes.

# Attachments:

Figures [x] Photographs [x]

Other [x] Table listing results of shovel testing.

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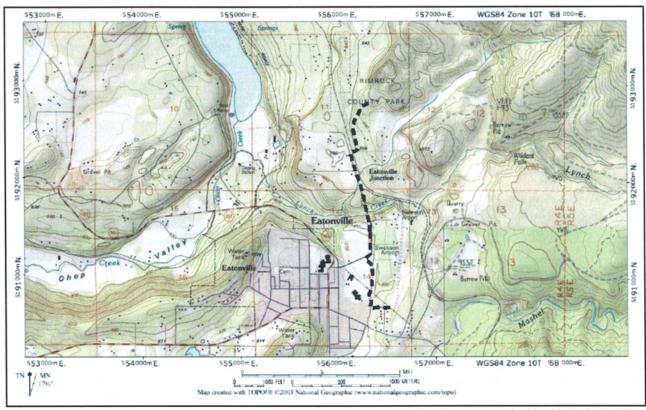
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# 6. Limitations of this Assessment

No cultural resources study can wholly eliminate uncertainty regarding the potential for prehistoric sites, historic properties or traditional cultural properties to be associated with a project. The information presented in this report is based on professional opinions derived from our analysis and interpretation of available documents, records, literature, and information identified in this report, and on our field investigation and observations as described herein. Conclusions and recommendations presented apply to project conditions existing at the time of our study and those reasonably foreseeable. The data, conclusions, and interpretations in this report should not be

-5	Site changes o	r windir circ	is not ave	are una mas n	ot had the o	pportunity to ev	araa.

# 7. Figures



**Figure 1.** The area under consideration in this assessment is the proposed trail alignment, marked by black dashed line on a portion of the USGS (1990) Eatonville, WA 7.5-minute quadrangle.

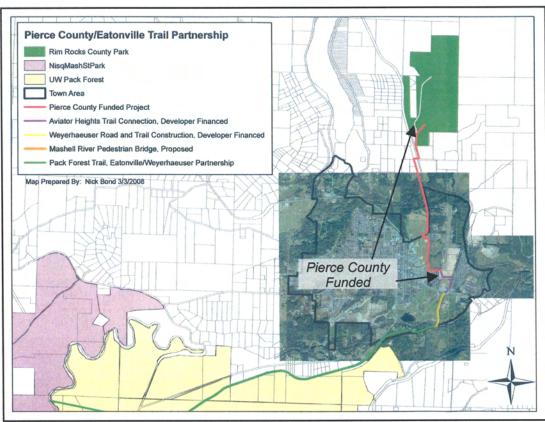


Figure 2. Aerial imagery highlighting the proposed trail alignment. The segment labeled "Pierce County Funded" is the area under consideration in this report.

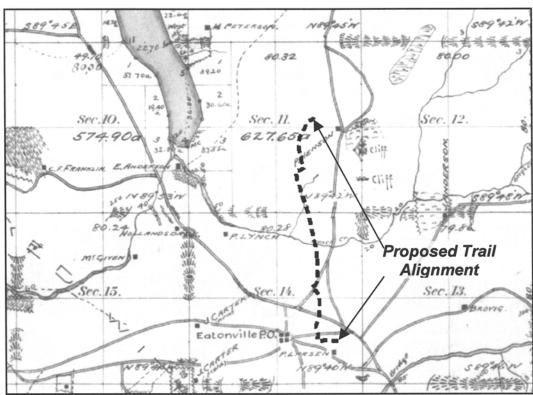


Figure 3. Proposed trail alignment marked on portion of GLO map of the area (USSG 1894). The proposed trail crosses two forks of Lynch Creek, as well as three roads.

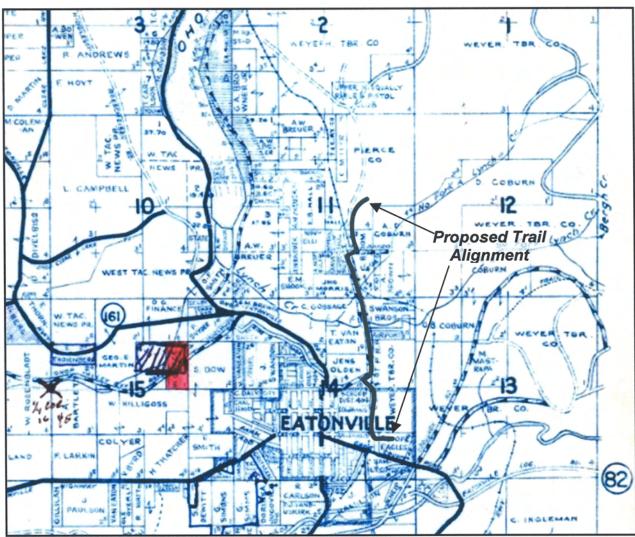


Figure 4. Proposed trail alignment marked on portion of mid-twentieth century map of the area (Metsker 1960).



Figure 5. Typical conditions in the proposed trail corridor in Rimrock Park. Photograph faces west-northwest towards 129th Avenue.



Figure 6. Proposed trail alignment east of 129th Avenue, viewed from 412th Street. Photograph faces north.



Figure 7. Typical conditions along west side of Lynch Creek Road. Photograph faces south from south of 412th Street.



Figure 8. Typical conditions in the proposed corridor along the east side of the school property. Photograph views south from the northeast corner of the school property.



Figure 9. Typical conditions in the southernmost segment of the trail corridor. Photograph faces east towards the airport.



Figure 10. Eroding bank of the north fork of Lynch Creek on the west side of Lynch Creek Road. Photograph faces west-northwest.



Figure 11. Typical conditions along the west side of Lynch Creek Road between the two forks of Lynch Creek.

Photograph faces north.



Figure 12. Conditions in proposed trail corridor at South Fork Lynch Creek crossing. Photograph faces west from Lynch Creek Road.



Figure 13. Aerial imagery, courtesy of Landau Associates, marked with locations of shovel probes and survey transects. No cultural resources were identified in the proposed corridor.



Figure 14. Excavation of shovel probe number 1.

Table 1. Results of subsurface testing of the proposed trail alignment.

Shovel Probe No.	Stratigraphic Description (depths are in centimeters below ground surface)	Cultural Resources Found
1	0-17: brown gravelly clay loam; 17-30: light brown gravelly sandy loam with many cobbles, partially consolidated at base of probe.	None.
2	0-14: brown gravelly clay loam; 14-73: light brown very gravelly sandy loam.	None.
3	0-10: brown gravelly clay loam; 10-30: light brown gravelly sandy loam with many cobbles, very compact at base of probe.	None.
4	0-12: brown gravelly clay loam; 12-54: light brown gravelly sandy loam with many cobbles, partially consolidated at base of probe.	None.

# **APPENDIX E**

**ESA Report Prepared by Landau Associates** 

# Corridor-Wide Screening Level Environmental Site Assessment Rimrock Trail Corridor Study Eatonville, Washington

December 23, 2008

Prepared for

Parametrix, Inc.

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D	Selected Site Photographs
E	Qualifications of Environmental Professionals

### 1.0 INTRODUCTION

This report presents the results of a Corridor-Wide Screening Level Environmental Site Assessment (ESA) conducted for Parametrix Inc. and the Town of Eatonville (Town) for the proposed construction of a trail connecting Rimrock Park to Swanson Airport. The general project location is within the Town of Eatonville in Township 16 N, Range 04 E, Sections 11 and 14.

The purpose of the ESA was to assess and document environmental conditions that may pose a potential liability to the construction of the trail through public right-of-ways. The scope of services performed, as established and referenced in our contract, dated December 2, 2008, consisted of a review of the project area history, a site reconnaissance, a review of agency information, interviews with local regulatory and government officials, and observations of current land use activities and environmental conditions.

The proposed trail alignment runs roughly north to south for two miles, starting near the northern end of 129<sup>th</sup> Avenue East in the Rimrock County Park, running south to Lynch Creek Road E, and ending near the south end of the runway at Swanson Airfield. The project area includes the trail alignment and those properties abutting the project alignment where additional right-of-way (ROW) is needed to accommodate the project. Land use in the project area consists of single-family dwellings, schools, commercial properties, county parks, vacant and undeveloped land, and aircraft transportation. Figure 1 presents a vicinity map of the project area. Figure 2 shows the proposed trail alignment.

The goal of the assessment process outlined in ASTM E 1527-05 is to identify recognized environmental conditions, which are defined as the presence or likely presence of any hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the subject property or into the ground, groundwater, or surface water of the proposed trail alignment. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of the appropriate governmental agencies.

The specific elements of the ASTM process are summarized in Table 1 along with a summary of where the information can be found in our report or, if an element has not been addressed due to limitations/constraints imposed by project-specific conditions. Elements not included in ASTM E 1527-05 (e.g., identification, sampling, and analysis of asbestos, radon, lead paint, lead in drinking water, and/or wetlands; regulatory compliance; cultural and historic resources; indoor air quality and vapor intrusion, including the potential presence of mold or other biological contaminants; industrial

hygiene; health and safety; ecological resources; and endangered species) were not included in our scope of services for the subject property. Additionally because this is a corridor level study, several elements such as interviews with individual property owners were not included. A site visit of the trail corridor was conducted; however, detailed inspection of individual properties was not included.

The Corridor-Wide Screening Level Environmental Site Assessment (ESA) process is not a means of "finding everything there is to know about the corridor." Rather, it is an effort to evaluate the environmental liabilities associated with the proposed alignment based on reasonably available documentation (both oral and written) within the budget, schedule, and project-specific limitations. Sections 2.0 through 8.0 present the information collected during this assessment.

### 2.0 SCOPE OF SERVICES

Landau Associates conducted this Corridor-Wide Screening Level Environmental Site Assessment (ESA) for Parametrix. Authorization for these services was provided by Parametrix on December 1, 2008. The scope of services performed, as established in our contract dated December 2, 2008, consisted of the following specific tasks:

- Complete a screening level ESA of the proposed trail alignment. Specific tasks were conducted in general accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, E1527-05, as applied in Washington State, including:
  - conducted a visual reconnaissance along the proposed trail alignment to assess current land use activities and environmental conditions
  - reviewed historical sources of information including historic topographic maps and aerial photographs to assess past land uses and activities in the project area and the surrounding area
  - contacted local agencies regarding reports of hazardous materials/releases at or in the vicinity of the project area
  - obtained from Environmental Data Resources, Inc. (EDR), listings of confirmed and suspected contaminated sites abstracted from U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) environmental databases as prescribed by ASTM
  - prepared and submitted this report summarizing our findings and conclusions related to environmental conditions in the project area.

### 3.0 SITE DESCRIPTION AND SETTING

The description of the existing conditions of the project area was developed from aerial photographs, 15 and 7.5 minute USGS topographic maps, (geology and hydrogeology resource), and a visual reconnaissance of the proposed trail alignment. Ohop Lake is located approximately 0.75 miles west of the project area, and the Swanson Airfield runway is located at the southern end of the project area. The Mashel River is located south of the Town of Eatonville and the project area.

### 3.1 CORRIDOR DESCRIPTION

As observed during our December 4, 2008 site reconnaissance, the proposed trail alignment is within the ROW of existing paved and un-paved roads within the Town. The paved and unpaved roads within the proposed trail alignment currently do not have sidewalks or adjacent trails. The northern end of the proposed trail alignment is located in Rimrock County Park on 129<sup>th</sup> Avenue East near the Upper Nisqually Sportsmen's Club. The proposed trail alignment will follow 129<sup>th</sup> Avenue East going south for 0.8 miles through primarily undeveloped forested areas to the railroad crossing at 412<sup>th</sup> Street E. At this location it will cross the tracks and follow Lynch Creek East Road for 0.7 miles going south through undeveloped forested and grassy areas with few single-family residences into the Town. The proposed trail alignment will then follow Cessna Court East for 0.1 miles through a private residential area to an existing unpaved road surrounded by sports fields, undeveloped land, commercial and single-family homes for 0.4 miles ending at the Swanson Airport runway.

### 3.2 TOPOGRAPHY

The project area is mostly flat with ground surface elevations between 800 and 850 ft. The terrain becomes very hilly with steep rock slopes to the east and south of the project area and the Town. Topography to the north and west remains relatively flat. Lynch Creek runs through a steep, narrow ravine from east to west through the project area just north of Airport Road. An unnamed tributary to Lynch Creek crosses under the project area just south of 414<sup>th</sup> Street.

### 3.3 GEOLOGY

The project area is located along the western margin of the foothills of the Cascade Mountains. In the project area, the mapped near-surface geology (Schasse 1987) is relatively complex and consists of Vashon-age glacial deposits overlying Tertiary-age sedimentary and volcanic rocks with Tertiary-age

sedimentary and volcanic rocks outcropping to the east and west of the trail alignment. Alluvium is mapped present along the Mashel River south and east of Eatonville.

In the southern third of the trail alignment, Tertiary-age sedimentary rocks of the Mashel Formation, consisting of unconsolidated fluvial and lacustrine sediments, are expected to be present. Undifferentiated Vashon glacial drift, consisting chiefly of recessional and proglacial sand and gravel containing lacustrine and ice contact deposits, may locally overlie the Tertiary-age sedimentary rocks. In the northern two-thirds of the trail alignment, undifferentiated Vashon outwash, consisting of recessional and proglacial sand and gravel, is expected to be present.

### 3.4 GROUNDWATER

Groundwater within the project area is likely complex and influenced by several surface water bodies in the vicinity. No groundwater studies of the project vicinity were readily available at the time of this study. Shallow groundwater is likely influenced by Lynch Creek which crosses the project area just north of Airport Road and a small unnamed creek that crosses the project area just south of 414<sup>th</sup> Street. Regional groundwater is likely influenced by larger surface water bodies in the project vicinity including Ohop Lake to the northwest and the Mashel River to the south. Geologic logs for wells located within the project area were reviewed to determine the approximate depth to groundwater near the proposed trail alignment (Ecology, 2008). Within the Town, near the Swanson Airport, the static water level from wells in the area varied between 39 and 50 ft below-ground surface. Further north along 129<sup>th</sup> Avenue East the depth to water varied from 60 to 79 ft below-ground surface. Groundwater encountered in the well borings likely represents the regional aquifer. The groundwater flow direction(s) could not be determined from the information provided in the well logs and does not necessarily follow the topography because of the influence of surface water bodies in the vicinity as described above. Groundwater conditions will vary depending on local subsurface conditions.

### 3.4.1 FLOOD PLAIN

FEMA flood insurance rate maps (FIRM) provide information on flood risk for 100- and 500-year flood events. The FIRM maps show that the proposed trail alignment is not located within a 100- or 500-year flood plain. North of the Town limits, 100- to 500-year flood plains are located along Lynch Creek and the unnamed tributary to Lynch Creek. Both flood zones are 1000 ft or more from the proposed project alignment. Within the Town limits just west of the airport, the proposed trail alignment passes in-

between two areas that are 100- to 500-year flood plains (FEMA 2008). In this area the mapped flood areas are within approximately 200 ft of the proposed trail alignment.

### 4.0 HISTORICAL INFORMATION

A variety of resources were reviewed to develop the history of the project area and adjacent properties in order to assess the potential for site contamination. These resources included the following:

- Aerial photographs (Aero-Metric 1969, 1979, 1996, 2000) (ESRI 2005)
- Topographic maps (USGS 1946, 1949, 1959, 1968, 1973, 1990)
- Fire insurance maps (no coverage is available for the subject property area)

### 4.1 HISTORY OF PROPOSED TRAIL ALIGNMENT AND VICINITY

The table below presents a summary of the operational history of the project area, to include the proposed trail alignment, from the historical information presented in the sections below. The oldest historical records for the surrounding properties date back to 1946.

Summary of Project Area							
Dates	Past Use(s)						
1946-1959	The only available historical information for this period is from topographic maps which provide limited information on specific land use activities. The project area consists of undeveloped forested areas to the north and the Town of Eatonville to the south. A railroad runs north and south through the entire project area, it connects with a railroad from the east at Eatonville Junction located near the present intersection of 414 <sup>th</sup> Street and Lynch Creek Road East north of the Town. The north-south section of the railroad appears to be a spur connecting the saw mill in the Town of Eatonville to Eatonville Junction.						
1959-1968	A shooting range is located on the northern end of the proposed trail alignment. Swanson Airfield was constructed east of the Town during this period.						
1968- present	The northern section of the project area remains primarily as undeveloped forested land with several additional single-family homes, ranches and farms. The railroad south of Eatonville Junction was removed during this period along with the saw mill.						

The table below presents a summary of the operational history of the surrounding properties developed from the historical information presented in the sections below.

### 4.2 AERIAL PHOTOGRAPHS

Landau Associates reviewed aerial photographs of the project vicinity provided by Aero-Metric of Tukwila, Washington, and ESRI Image Server. Aerial photographs from 1969, 1979, 1996, 2000 and 2005 were reviewed. Photos for 1979, 1996 and 2000 only show the southernmost 0.35 miles of the

proposed trail alignment within the most developed section of the project area within the Town of Eatonville. Aerial photographs from 1969 and 2005 show the entire trail alignment. Copies of the aerial photographs are presented in Appendix A, the 2005 aerial photograph can be seen on Figure 2. A summary of aerial photograph review is described below for the proposed trail alignment and adjacent properties within the Town of Eatonville.

	Summary of Aerial Photographs						
Year	Proposed Trail Alignment/Vicinity Use in the Town of Eatonville						
1969	Proposed Trail Alignment – The proposed alignment runs north and south along a railroad that parallels Lynch Creek Road East, and then continues straight to Center Street East.						
	Adjacent Properties – The adjacent properties consists of undeveloped forested land to the east and cleared undeveloped land to the west with the railroad running in-between. The Town is primarily comprised of single-family homes and commercial buildings. What appears to be a large lumber mill is located in the south east corner of the photograph, south of the rail road tracks and the proposed project alignment.						
1979	Proposed Trail Alignment – The railroad tracks appear to have been removed, leaving an unpaved road in its location.						
	Adjacent Properties – The area is very similar to the 1996 aerial photograph. There is additional clearing and development at the southern end of the proposed trail alignment. An elementary school is present in the cleared undeveloped land to the west of the proposed alignment.						
1996	Proposed Trail Alignment – The unpaved road where the railroad tracks were previously located has become less distinct, with increased vegetation coverage.						
	Adjacent Properties – The eastern side of the proposed trail alignment remains undeveloped forested land; however, it now has a road going east through it. The western side contains sport fields with a secondary school located south of the elementary school. A mobile home park and small warehouse is adjacent to the southern end of the proposed trail alignment.						
2000	Proposed Trail Alignment - No change from the 1996 aerial photograph.						
	Adjacent Properties – Very similar to the 1996 aerial photograph. The undeveloped forested land to the east of the proposed trail alignment has been logged and has an additional small dirt road going east through it. The lumber mill identified in the 1969 photograph has been removed, leaving a large vacant area.						
2005	Proposed Trail Alignment - No change from the previous aerial photograph.						
	Adjacent Properties – Several single-family homes are located along Cessna Court East Overall, the Town's footprint in this location has changed little since 1969.						

The entire trail alignment is described below for the proposed trail alignment and adjacent properties.

	Summary of Aerial Photographs									
Year	Proposed Trail Alignment/Vicinity Use Entire Trail									
1969	Proposed Trail Alignment – A shooting range is located at the northern end of the proposed trail alignment. The proposed alignment continues south along 129 <sup>th</sup> Avenue East, an unpaved road, and connects to Lynch Creek Road East. This paved road continues south, running parallel to a railroad to the Town limits and then turns west. The Swanson Airport is seen as a large unpaved airstrip. The lower end of the airfield and the location where the proposed trail turns east to the airfield is densely forested.									
	Adjacent Properties – The northern project area surrounding 129 <sup>th</sup> Avenue East is undeveloped forest with the exception of the shooting range. Along Lynch Creek Road East the forest areas have been cleared for farms and ranches with several single-family homes. This pattern of low density residential and rural farms continues down to the Town limits.									
2005	Proposed Trail Alignment – The shooting range is still located at the northern end of the proposed trail alignment. 129 <sup>th</sup> Avenue East, is now a paved road, and connects to Lynch Creek Road East. Lynch Creek Road East runs parallel to a railroad for a short distance, and then the railroad turns to the east. The proposed trail alignment follows Lynch Creek Road East into the Town, it then turns onto Cessna Court East, and then onto an unpaved road (a remnant of the original railroad). It then turns east onto an unpaved road to the southern end of Swanson Airport.									
	Adjacent Properties – In addition to the shooting range, the northern project area surrounding 129 <sup>th</sup> Avenue East shows several horse ranches and a few private residences. The properties adjacent to Lynch Creek Road East have remained relatively unchanged down to the Town limits. The railroad paralleling Lynch Creek Road East south from 414 <sup>th</sup> Street E has been removed, leaving no visible remnant of the railroad grade. Swanson Airport has a longer paved runway and additional homes have been constructed between the airport and Lynch Creek Road East.									

### 4.3 TOPOGRAPHIC MAPS

Landau Associates reviewed the U.S. Geological Survey (USGS) 15-minute series Ohop Valley, Washington Quadrangle topographic maps for the year 1946 and 1949 and the 7.5-minute series Eatonville and Tanwax Lake, Washington Quadrangle topographic maps for the years 1949, 1959, 1968, 1973, and 1990. The historic topographic maps were obtained from EDR. The findings of the map review are discussed below. Copies of the topographic maps are provided in Appendix B.

Year	Scale	Project Area
1946	1:50,000	Project Area – Light duty or unimproved roads run north to south adjacent to or on the project area. The scale of the map makes it difficult to distinguish details of the surrounding development; however, there are 3 or 4 structures either on or adjacent to the project area. Ohop Lake is visible to the west of the north half of the project area. There also appears to be a railroad track that runs north to south, on or adjacent to the project area.
1949	1:62,500	Project Area – No changes are evident from the 1946 map.
1959	1:24,000	Project Area – The 1959 maps appear very similar to the 1946 and 1949 maps; however it appears a structure is present on or adjacent to the southernmost point of the project area. In addition, there appears to be a "Skeet Range" and a structure adjacent to the northwest of the northernmost portion of the project area and a "Rifle Range" that extends into the northern portion of the project area.
1968	1:24,000	Project Area - No changes are evident from the 1959 map.
1973	1:24,000	Project Area – No changes are evident from the 1959 map.
1990	1:24,000	Project Area – No changes are evident from the 1959 map; with the exception that additional structures are visible adjacent to the west side of the project area and two additional structures are present adjacent to the project area to the northwest of the northern project area, near the "Firing Ranges."

### 4.4 FIRE INSURANCE MAPS

Landau Associates requested a search for Sanborn Fire Insurance maps of the project area through Environmental Data Resources, Inc. (EDR). The EDR Sanborn Map Report stated that there is no fire insurance map coverage for the subject area.

### 4.5 SUMMARY OF HISTORICAL INFORMATION

The review of historical information revealed that a shooting or firing range is located adjacent to the northern end of the trail alignment. Topographic maps show that historically the range may have been more extensive and may have covered part of the trail alignment. Shooting ranges often have metals contamination in soil associated with shooting activities and the former use of lead shot. The presence of the shooting range on or adjacent to the project area is considered a *recognized environmental condition*.

Additionally, the trail alignment appears to be on or adjacent to a historical railroad grade. Railroad grades while not necessarily a source of contamination, have the potential for the presence of petroleum products and metals that are often associated with railroad tracks. However, the presence of railroad tracks is not considered a recognized environmental condition unless there is the obvious or known presence of contamination.

### 5.0 AGENCY AND CITY RECORDS REVIEW

Landau Associates reviewed information from publicly available environmental databases and contacted the Tacoma-Pierce County Health Department, Eatonville Fire Department, and the Town of Eatonville Planning Department for information regarding potential environmental conditions at the proposed trail alignment or the adjacent properties. Information collected during the review of agency records is summarized below.

### 5.1 ENVIRONMENTAL DATA RESOURCES, INC.

EDR was subcontracted to conduct a search (as prescribed by ASTM) of EPA and Ecology environmental databases that contain information regarding environmental conditions at and near the subject property. The search focused on information in the various lists maintained by the agencies of sites with known and potential environmental conditions that may represent a threat to human health and the environment. EDR conducted its search of listed information (which is keyed to a geographic mapping system) using the location of the subject property, and identified sites listed in the databases that are located within up to a 1-mile radius of the subject property boundaries. EDR then compiled the information into a summary report that identifies sites of potential environmental concern within the prescribed radii. The complete EDR report is provided in Appendix C.

Due to the nature of contaminant migration in groundwater, typically only sites located hydraulically upgradient of the project corridor or sites that are higher than or at the same elevation as the project corridor with activities that may affect groundwater are assumed to have the potential to environmentally impact the subject property. Since the groundwater gradient in the project area is unknown any sites located within ¼ mile that had groundwater contaminant issues were considered potentially upgradient of the project corridor.

The focus of this section is to identify the sites that are listed in the EDR report that have the potential to environmentally impact the project corridor. Since none of the sites listed in the EDR report are adjacent to the project corridor, the most direct pathway is via groundwater. The potential for groundwater contaminants from a neighboring site to migrate to the project corridor is greatly affected by the distance between the site and the project corridor, and the hydrogeological conditions in the immediate area of the site. The likelihood of groundwater contamination at the project corridor originating from a site more than ¼ mile away from the property is considered to be very low.

Eight listings were identified in the EDR database search. Of the eight identified sites, five are located more than ¼ mile from the subject property; therefore, these sites are considered to have very low potential to impact the subject property. The remaining three sites are discussed below:

- Mill Town Grocery, located at 360 Center Street East, is approximately 700 ft southwest of the project corridor. The site is listed in the Underground Storage Tank (UST) database as having four USTs onsite that are operational; all are listed as having a capacity of 5,000 to 9,999 gallons. In addition, the site has one UST that is listed as having been removed, with a "Tank System Status Change Date" of February 4, 2000. No leaks or spills were reported; therefore, this site is considered to have a low potential to impact the subject property.
- Mashell Warehouse and Garage, located at 215 Eatonville Highway, is approximately 1,100 ft southwest of the project corridor. The site is listed in the Facility Index System/ Facility Registry System (FINDS); the Resource Conservation and Recovery Act (RCRA) database as a Conditionally Exempt Small Quantity Generator (CESQG) with no violations found and a compliance assistance visit on September 27, 1994; and the UST database as having one UST removed, with a "Tank System Status Change Date" of August 26, 1996. No leaks or spills were reported; therefore, this site is considered to have a low potential to impact the subject property.
- Associated Petroleum Eatonville, located at 713 Washington Avenue, is approximately 1,200 ft southwest of the project corridor. The site is listed in the FINDS database and the UST database as having one UST removed, with a "Tank System Status Change Date" of August 26, 1996. No leaks or spills were reported; therefore, this site is considered to have a low potential to impact the subject property.

As is common to database searches keyed into a geographic mapping system, EDR reported that a number of sites were not mappable (in this case, 23) due to incomplete addresses or other identifying information. Based on Landau Associates' review of the EDR report, fourteen of the unmapped sites were found to be located outside the respective search radii and, therefore, are not considered to have the potential to impact the subject property. Of the remaining nine sites, two (Eatonville Collection Event and Eatonville STP) were not found and had no listed address. The remaining seven sites, which are listed at five addresses are discussed below:

• Eatonville Air Force Association, located at Swanson Field, is approximately 800 ft east of the project corridor. The site is listed in the Facility Index System/ Facility Registry System (FINDS) and the Underground Storage Tank (UST) database as having two USTs removed from the site with no releases reported. Therefore, the site is considered to have a low potential to impact the project area.

- Associated Petroleum Pro Eatonville, located at 117 Washington Avenue, is approximately 800 ft west of the project corridor. The site is listed in the FINDS; the Confirmed and Suspected Contaminated Site List (CSCSL) as having confirmed soil and groundwater contamination by non-halogenated solvents and Polynuclear Aromatic Hydrocarbons (PAHs); and the Voluntary Cleanup Program (VCP) as having an "Ecology Status" of "Remedial Action in progress." The elevation of the site is approximately 20 ft below the project area. Therefore, the site is considered to have a low potential to impact the project area.
- Venture Bank, located at 121 Washington Avenue, is approximately 900 ft from the project corridor. The site is listed in the Facility Index System/ Facility Registry System (FINDS) and the Underground Storage Tank (UST) database as having previously had one UST removed from the site with a "Tank System Status Change Date" of June 17, 2004. In addition, the site is listed in the Leaking Underground Storage Tank (LUST) database as having reported a release to soil and groundwater on June 17, 2004, with a "Facility Status" of "awaiting cleanup." The elevation of this site is also approximately 20 ft below the project area. Therefore, the site is considered to have a low potential to impact the project area.
- The Wood Box, located at 100 Washington Avenue, is approximately 1,200 ft southwest of the project corridor. The site is listed in the Independent Cleanup Report (ICR) as having Interim Cleanup Reports reviewed by the Washington State Department of Ecology in 1993, 1994, and 1995 for soil and groundwater contamination by petroleum products. The elevation of this site is also approximately 20 ft below the project area. Therefore, the site is considered to have a low potential to impact the project area.

### 5.2 TOWN OF EATONVILLE PLANNING DEPARTMENT

Landau Associates contacted the Town of Eatonville Planning Department for information regarding hazardous materials, underground storage tanks (USTs), and aboveground storage tanks (ASTs) adjacent to the proposed trail alignment. In a telephone conversation on December 15, 2008, Nick Bond, the Town Planner for the Town of Eatonville indicated that there are no records indicating any hazardous materials storage or incidents adjacent to the proposed trail alignment. Mr. Bond did indicate that a "Diesel Repair Shop" has been operating on parcel number 0416144153 (adjacent to the alignment,

photos 15 and 16) for the last three years and that it is likely that oil is stored somewhere onsite in barrels; however, he is not aware of any AST on the property (Bond, N. 2008, personal communication).

### 5.3 TACOMA-PIERCE COUNTY HEALTH DEPARTMENT

Landau Associates contacted Tacoma-Pierce County Health Department regarding solid waste, hazardous materials incidences, chemical storage, and/or USTs in properties adjacent to the alignment which contain a diesel repair shop. In an email received from Brad Costello on December 15, 2008, Mr. Costello indicated that no records were found for adjacent properties 0416144152, 0416144153, 0416144154, or 0416144155 that are associated with the diesel repair shop (Costello, B., 2008, personal communication).

Address	Parcel Number	Findings
410 Center Street E	0416144152	No record
Mill Village	0416144153	No record
Magill Road	0416144154	No record
Magill Road	0416144155	No record

### 5.4 FIRE DEPARTMENT

The Eatonville Fire Department was contacted regarding potential environmental conditions at the proposed trail alignment or the adjacent properties. There was no information on fire department responses to storage or handling of hazardous material within the subject area.

### 6.0 SITE RECONNAISSANCE

Representatives of Landau Associates conducted a site reconnaissance on December 4, 2008 to observe conditions in the proposed trail alignment (and to the extent possible at adjacent properties), and assess land uses in the project vicinity and confirm the location of sites identified in the EDR report. The nature of the project is different from a typical Phase I ESA because multiple properties are involved and the properties were only being observed from the public ROW. Thus, a modified site reconnaissance checklist was created to increase efficiency during the site reconnaissance. Observations made during the site reconnaissance were recorded on the checklists and photographed. Landau Associates used the following methodology to observe the proposed trail alignment:

- Walked the proposed trail alignment using existing roads, easements, and ROW
- Observed adjacent properties from existing roads.

Landau Associates did not attempt to access heavily vegetated or steep slope areas due to safety concerns.

### 6.1.1 GENERAL ENVIRONMENTAL CONDITIONS

The majority of the proposed trail alignment goes through rural, undeveloped, forested land. This area primarily consists of Rim Rock Park and includes the Upper Nisqually Sportsmen's (UNS) Club near the northern end of the proposed trail alignment (photos 1 and 2). The alignment follows 129<sup>th</sup> Avenue East and then Lynch Creek Road East going south. A railroad track parallels both roads for a short distance and crosses at their intersection (photos 3 and 4). Both roads are unmarked two lane roads with no sidewalks or shoulders. Developed areas along this route primarily consist of single-family dwellings. Lynch Creek Road East crosses two fish-bearing streams; an unnamed tributary to Lynch Creek and Lynch Creek. The unnamed tributary runs under the road through a large culvert (photo 5). Lynch Creek crosses under a narrow two lane bridge on Lynch Creek Road East (photos 6, 7 and 8). Ditches along both sides of Lynch Creek Road East drain directly into these creeks.

The proposed trail alignment follows the ROW of Lynch Creek Road East into the Town of Eatonville. The alignment crosses over to Cessna Court East, where it borders several single-family homes, and then follows the ROW of an unpaved road. To the west, the unpaved road is bordered by elementary and secondary school sports fields, and to the east it is bordered by undeveloped properties (photo 9). Both sides of the unpaved road through this area contain potential wetlands connected by culverts (photos 11 and 12). Going south, the unpaved road then becomes bordered by a mobile home park to the west and undeveloped scrub-shrub properties to the east. Small amounts of household

garbage, bags of trash, cans, and cardboard were dumped in this area (photo 10). The unpaved road and proposed trail alignment then turn east towards the Swanson Airfield. At this location is a recently constructed diesel repair shop with stored construction equipment and an above-ground storage tank that did not appear to be in use (photos 13 and 14). This unpaved road is then bordered to the south by three properties with single-family dwellings. The proposed trail alignment ends at the southern end of Swanson Airfield.

No evidence of hazardous contamination or spillage was discovered along the two mile proposed trail alignment. This includes, observed hazardous materials, hazardous waste, soil or pavement stains, corrosion, odors, PCB containing equipment such as transformers, or pools of unknown liquids.

The proposed trail alignment follows several utilities within the public ROWs. A buried sewer line runs between the school sports fields and the unpaved road up to Lynch Creek Road East on the west side of the road. A buried cable runs along the west side of Lynch Creek Road East and 129<sup>th</sup> Avenue East within the public ROW.

### 6.2 ADJACENT PROPERTIES

Landau Associates observed adjacent and nearby properties from the proposed trail alignment within the public ROWs. Two *recognized environmental conditions* or other conditions of environmental concern were observed on adjacent properties during the site reconnaissance.

- The Upper Nisqually Sportsmen's (UNS) Club located at 39919 129<sup>th</sup> Avenue East, Eatonville, next to the northern end of the proposed trail alignment. Shooting ranges are known sources of lead contamination.
- The recently constructed diesel repair shop located at 410 Center Street E, Eatonville, adjacent to the proposed trail alignment. Engine repairs shops are known generators of hazardous materials. This site also stores heavy construction equipment on site and contains an above-ground storage tank. The above-ground storage tank did not appear to be in use and there was no evidence of spillage. There is also no record with the Town of Eatonville Planning, Tacoma-Pierce County Health Department, or the EDR that an above-ground storage tank is in use on the property.

### 6.3 ADDITIONAL OBSERVATIONS

Additional observations that may present obstacles or liability regarding the proposed trail alignment are listed below:

 The proposed trail alignment along 412 th Street East intersects the railroad crossing near 129th Avenue East and 412th Street E.

- On Lynch Creek Road East Road, just south of 414<sup>th</sup> Street East, there is a potential wetland on the east side of Lynch Creek Road East and roadside ditches on both sides drain into a fish-bearing creek (photos 5 and 6). The creek flows through a large unrestrictive culvert under the road (photo 7). The ditches along side of the road, which also connect to the potential wetland on the east side of the road, drain directly into the creek at the culvert location.
- On the crest of a hill above Lynch Creek, the Lynch Creek Road East's sides are very steep and a roadside ditch is present on both sides that drains water down to Lynch Creek (photo 8).
- A bridge crossing over Lynch Creek creates an obstacle for the proposed trail alignment (photos 9 and 10) because the bridge is narrow and consists of two lanes with no shoulder or pedestrian sidewalks. Lynch Creek runs through a narrow, densely wooded canyon at this location.
- The proposed trail alignment connects from Lynch Creek Road East to Cessna Court East and then to a unpaved road between undeveloped properties to the east and sports field to the west (photo 11). Ditches run along either side of the unpaved road which is connected by two separate culverts under the dirt trail and to a culvert under Cessna Court East (photo 12). Potential wetlands are located within and surrounding the ditches paralleling both sides of the road (photos 13 and 14).

# 7.0 INTERVIEWS

	As	outlined	in our	scope o	of work,	no	property	owners	or	private	individuals	were	interv	riewed	l for
this rep	ort.														

### 8.0 SUMMARY

Landau Associates has performed this corridor-wide screening level ESA of the project area located along 129<sup>th</sup> Avenue East, Lynch Creek East, Cessna Court East, and unpaved roads within Eatonville, Washington, in conformance with our contract dated December 2, 2008. This assessment has revealed two *recognized environmental conditions*, as defined by ASTM, in connection with the subject property. The locations within the proposed trail alignment and adjacent properties that warrant further investigation are as follows:

- A diesel repair shop has recently been operating on a property adjacent to the southern edge of the proposed trail alignment. The site is also currently being used for equipment storage. Although there is no record with the Town Planning Department, the Tacoma-Pierce County Health Department, or listing in the EDR report, an above-ground storage take was observed on the property. Engine repair shops are known users and generators of potentially hazardous materials including petroleum products and solvents.
- The Upper Nisqually Sportsmen's (UNS) Club is located next to the northern end of the proposed trail alignment. Although the proposed trail alignment does not enter club property, shooting ranges commonly have lead contamination in soil due to use of lead shot. Based on available historical information, the previous extent of the shooting range is not known and may have included portions of the project area. Additionally, the orientation of the shooting ranges could pose a safety hazard to pedestrians along the proposed trail alignment.

Other significant findings of our investigations include:

- The unpaved road running adjacent to school sports fields is bordered on either side by potential wetlands. These potential wetlands are within a series of ditches, extend into adjacent undeveloped properties, and are connected by two separate culverts under the road.
- Household garbage has been illegally dumped along the proposed trail alignment near the mobile home park in the Town. While none of the debris appears to be hazardous, additional debris could be hidden in the dense vegetation.
- The proposed trail alignment crosses the bridge over Lynch Creek, a fish-bearing waterway. The bridge consists of two narrow unmarked lanes with no pedestrian walkways or shoulders. The steep ravine and Lynch Creek below currently prevent alternative crossing.
- A fish bearing tributary to Lynch Creek runs through a culvert under the proposed trail alignment on Lynch Creek Road East. Ditches on either side of Lynch Creek Road East are connected directly to this tributary and to a potential wetland on the east side of the road.
- The proposed trail alignment crosses a railroad at the intersection of Lynch Creek Road East and 129<sup>th</sup> Avenue East. There is no marked pedestrian crossing at this location. While no incidents of releases were recorded, it should be noted that there is the possibility of the presence of petroleum products and metals that are often associated with railroad tracks.

### 8.1 DATA GAPS

The data gaps identified during our assessment and their potential impact on our findings are as follows:

- Limited Aerial Photograph Availability. No aerial photographs were available prior to 1969. Due to the large size of the project area, coverage of the northern, rural sections of the project area was only reviewed for 1969 and 2005.
- Limited Access and View of Adjacent Properties. The site reconnaissance was restricted to the proposed trail alignment on the existing ROW. Adjacent properties were investigated only to the extent they could be viewed from the existing ROW. Dense forested vegetation prevented direct observation of most of these adjacent properties, primarily in the northern area of the proposed trail alignment. Given the available historical information and that most of this area is undeveloped, it is unlikely that adjacent property inspections would alter the current findings of this assessment except in the case of the diesel repair shop. Therefore, this data gap is considered significant only for the diesel repair shop property
- **Personal Interviews.** Interviews with property owners and operators were not conducted for this investigation. If the Town intends to purchase any easements or ROW, interviews with the property owners are recommended.
- Historical Property Use. The EDR Sanborn Map Report stated that there is no fire insurance map coverage for the subject area. Due to adequate information from other historical sources, this is not considered a significant data gap.

### 8.2 RECOMMENDATIONS FOR ADDITIONAL ACTION

Several potential areas and properties of concern were identified in this investigation. The following should be considered and further investigated should the proposed trail alignment go through these ROW areas.

- The diesel repair shop adjacent to the southern area of the proposed trail alignment should be investigated further to determine the status of the above-ground storage tank and the type and quantities of potentially hazardous materials stored at the site. Additionally, the stored construction equipment is located on either side of the proposed trail alignment on designated Town ROW. Coordination with the property owners needs to occur to address these issues.
- The Upper Nisqually Sportsmen's Club is located next to the northern end of the proposed trail alignment. Shooting ranges have been documented on this site as early as 1959, and due to changes in the range orientation and locations over the years, lead accumulation in soil may not be isolated to its current location. The proposed trail alignment runs directly along the club's edge, further subsurface investigation should occur to determine the soil quality within the trail alignment. Additionally, coordination with the range should occur to address pedestrian safety issues.

### 9.0 USE OF THIS REPORT

This report was prepared for the exclusive use of Parametrix (authorized users) for specific application to the project area. It is intended to provide the authorized users with an understanding of the potential environmental liabilities associated with the property evaluated in this report. Reliance on this report by third parties or others who do not have a contractual relationship with Landau Associates on this project is at the sole risk of the third parties or others unless a reliance letter is provided by Landau Associates.

In evaluating the site, Landau Associates has relied in good faith on representations and information abstracted from sources noted in this report to the extent they have not been contradicted by observations during the property reconnaissance or data obtained from other sources. Accordingly, Landau Associates accepts no responsibility for any deficiency, misstatements, omissions, or misrepresentations in the information provided to us.

Determining whether environmental conditions defined in this report indicate the presence of contamination at levels of concern is a matter of judgment. Liabilities associated with contaminated sites are defined in part by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and, for property located in Washington State, by the Model Toxics Control Act (MTCA). The MTCA cleanup regulation, WAC 173-340, defines the administrative process for identification, investigation, and cleanup of hazardous waste sites. The findings and conclusions of this report are based on our evaluation of information obtained and reviewed for this project and reflect our professional judgment with respect to that information.

Landau Associates has performed the services and made the findings in accordance with generally accepted practices for screening level ESAs in effect in Washington at the time the services were performed. This warranty stands in lieu of all other warranties, express or implied. While this report can be used as a guide, it is neither a rejection nor an endorsement of the property. It must also be understood that changing circumstances in the environment and use of the property can alter the conclusions and findings contained in this report.

### 9.1 ENVIRONMENTAL PROFESSIONAL STATEMENT

We declare that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in § 312.10 of 40 CFR 312, and we have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed all appropriate inquires in general conformance with the standards and practices set forth in 40 CFR Part 312 and ASTM E 1527-05.

Qualifications of the environmental professionals responsible for the site reconnaissance and generation of this report are provided in Appendix E.

LANDAU ASSOCIATES, INC.

Jennifer W. Wynkoop

Senior Scientist

In addition, the following staff contributed to preparation of this report:

Jessica Stone

Senior Staff Scientist

Mark W. Brunner

Staff Environmental Planner

JWW/JCS/MWB/jas

### 10.0 REFERENCES

Bond, N. 2008. Personal communication (telephone conversation with Mr. Mark Brunner, Landau Associates). Mr. Nick Bond, Town Planner, Town of Eatonville Planning Department. Re: *Hazardous materials storage or incidents; or aboveground or belowground storage tanks adjacent to project alignment*. December 15.

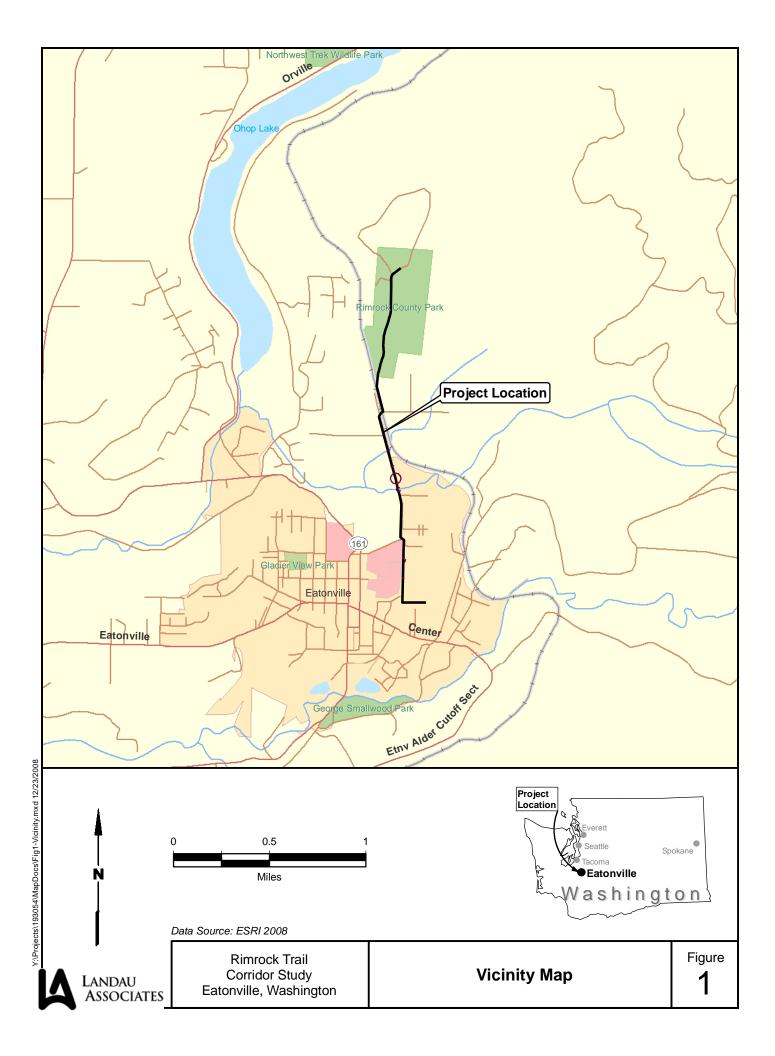
Costello, B. 2008. Personal communication (Email correspondence with Mrs. Jessica Stone, Landau Associates). Mr. Brad Costello, Technical Assistant II, Tacoma-Pierce County Health Department. Re: *Health Department Record Check*. December 5.

Ecology website. 2008. Washington State Well Log Viewer. <a href="http://apps.ecy.wa.gov/welllog/">http://apps.ecy.wa.gov/welllog/</a> Washington State Department of Ecology. Accessed December 19.

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http://msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10001&storeId=10001&categoryId=12001&langId=-1&userType=G&type=1. Accessed December 2.

Schasse, H.W. 1987. Geologic Map of the Centralia Quadrangle, Washington. Washington Division of Geology and Earth Resources. Open File Report 87-11.





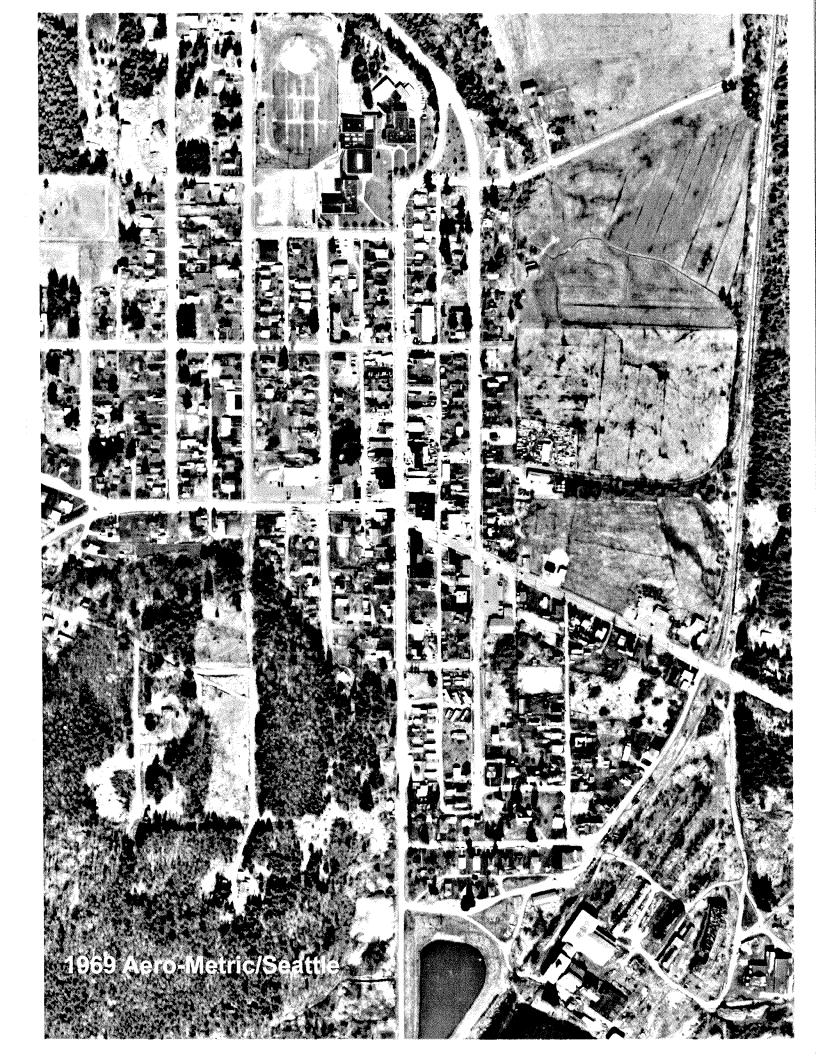
# TABLE 1 SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT ELEMENTS RIMROCK TRAIL CORRIDOR STUDY EATONVILLE, WASHINGTON

onmental Professional  Section 9.1  In Section 6.0  Section 6.0  Section 6.0  Not conducted  Not conducted  Not conducted  Not conducted  Not conducted  Not conducted  Section 5.3  In jurisdiction over environmental matters  Section 5.3  Section 5.3  Section 5.3  Section 5.3  Section 5.3  Section 4.2  Section 4.4  Not conducted  Not conducted  Not conducted  Not conducted  Section 5.4  Section 5.3  Section 4.2  Section 4.4  Not conducted			
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t owners  weres  the manager  the manager  the cocupants/operators  to cocupants/operators  Not conducted  Not conducted  Not conducted  Not conducted  Section 5.4  Section 5.3  Section 5.3  Section 5.3  Section 5.3  Section 5.2  Source Review (first developed use or 1940, 5-year intervals)  Short operators  Section 4.2  Section 4.4  Iv tax files  Not conducted  Not conducted  Not conducted  Not conducted  Not conducted  Not conducted  Section 4.3  Section 4.4  Not conducted  Not conducted  Not conducted  Not conducted  Not conducted  Not conducted	Adjacent properties	Section 6.0	Visual inspection conducted from public rights-of-way.
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Section 5.4 Section 5.3 Section 5.2 Section 4.2 Section 4.4 Not conducted Not conducted Section 4.3 Not conducted Not conducted	Neighboring property owners (in the case of abandoned properties)	Not conducted	By client request no interviews conducted
Section 5.3 Section 5.2 Section 4.2 Section 4.4 Not conducted Not conducted Section 4.3 Not conducted Not conducted	Local fire department	Section 5.4	Eatonville Fire Department - no records regarding the subject property.
Section 5.2 Section 4.2 Section 4.2 Section 4.4 Not conducted Section 4.3 Not conducted Not conducted	Local health department	Section 5.3	Tacoma-Pierce County Public Health Department
Section 5.2  Section 4.2  Section 4.4  Not conducted  Not conducted  Section 4.3  Not conducted  Not conducted	State or local agency with jurisdiction over environmental matters	Section 5.3	Tacoma-Pierce County Public Health Department
Section 4.2 Section 4.4 Not conducted Not conducted Section 4.3 Not conducted Not conducted	Local agency responsible for building permits and groundwater use permits	Section 5.2	City of Eatonville Planning Department
Section 4.2 Section 4.4 Not conducted Not conducted Section 4.3 Not conducted Not conducted	listorical Source Review (first developed use or 1940, 5-year interval	(8)	
Section 4.4  Not conducted  Not conducted  Section 4.3  Not conducted  Not conducted	Aerial photographs	Section 4.2	The state of the s
Not conducted Not conducted Section 4.3 Not conducted Not conducted	Fire insurance maps	Section 4.4	No map coverage for project area
Section 4.3  Not conducted  Not conducted  Not conducted	Property tax files	Not conducted	Project in public right-of-ways
graphic maps Section 4.3  Not conducted  Not conducted	Land title records	Not conducted	Project in public right-of-ways
Not conducted Not conducted	U.S. Geological Survey topographic maps	Section 4.3	
Not conducted	Local street directories	Not conducted	Project in public right-of-ways
	Building department records	Not conducted	Project in public right-of-ways
Not conducted	Zoning/land use records	Not conducted	Project in public right-of-ways
Other historical sources Other historical sources	Other historical sources	Not conducted	Sufficient information
Government Record Review Federal sites, including institutional controls and engineering Section 5.1 EDR Report	sovernment Record Review Federal sites, including institutional controls and engineering	Section 5.1	EDR Report

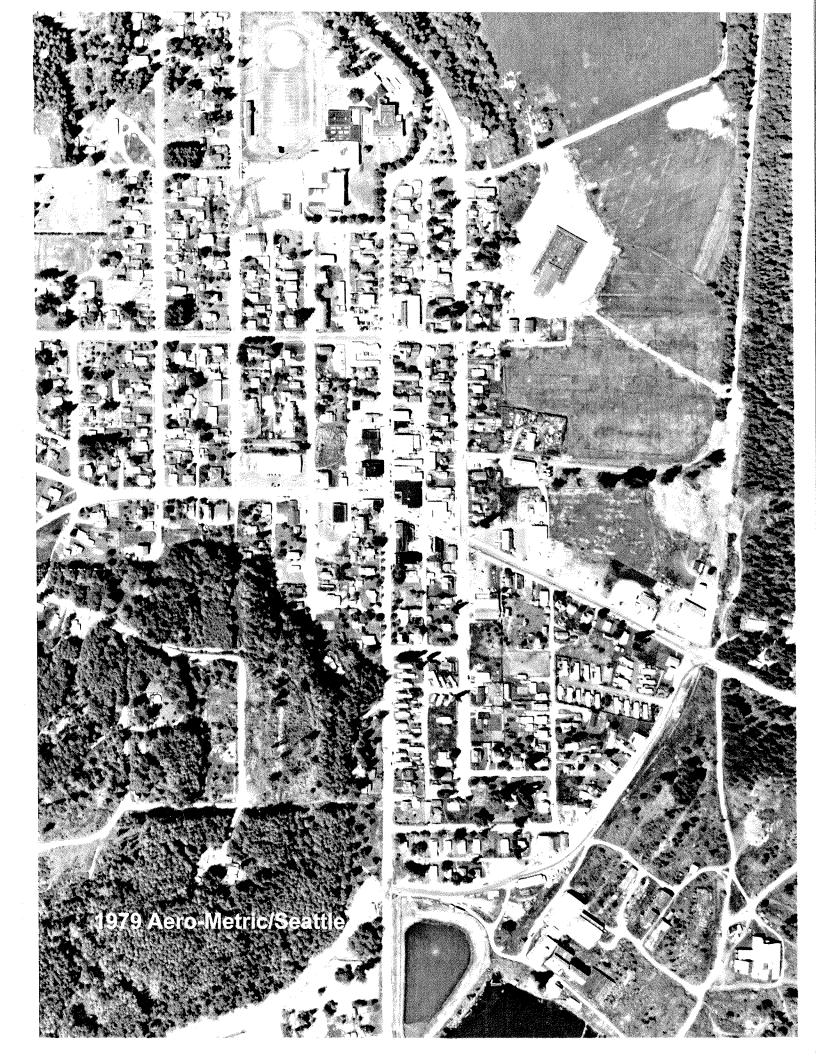
# SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT ELEMENTS RIMROCK TRAIL CORRIDOR STUDY **EATONVILLE, WASHINGTON** TABLE 1

Phase I ESA Element per ASTM E 1527-05 (Including Elements of All Appropriate Inquiry Rule)	Report Section in Phase I ESA Where Element is Addressed	Comment
State sites, including institutional controls and engineering controls registries	Section 5.1	EDR Report
Tribal sites, including institutional controls and engineering controls registries	Section 5.1	EDR Report
Local sites	Sections 5.3 & 5.2	
Report Preparation		+ * * * * * * * * * * * * * * * * * * *
Scope of services	Section 2.0	
Documentation of findings	Sections 3, 4, 5, 6, 7, 8	
Opinion regarding recognized environmental conditions at the subject property	Section 8.0	
Opinion regarding requirement for additional investigation at the subject property	Section 8.2	
Data gaps assessment/attempts to fill them	Section 8.1	
Conclusions	Section 8.2	
Detail of deviations from the ASTM standard	Section 2.0 and Table 1	
References	Section 10	
Signature	Section 9.1	
Environmental professional statement	Section 9.1	
Appendices including supporting documentation and qualifications of environmental professional	A-D	
Review of User-Provided Information Conducted by Environmental Professional	rofessional	
Environmental cleanup lien search	Not Conducted	No user-provide information from City
Specialized and actual knowledge	Not Conducted	No user-provide information from City
Consider purchase price to fair market value	Not Conducted	No user-provide information from City
Consider commonly known information	Not Conducted	No user-provide information from City
Consider degree of obviousness of contamination	Not Conducted	No user-provide information from City

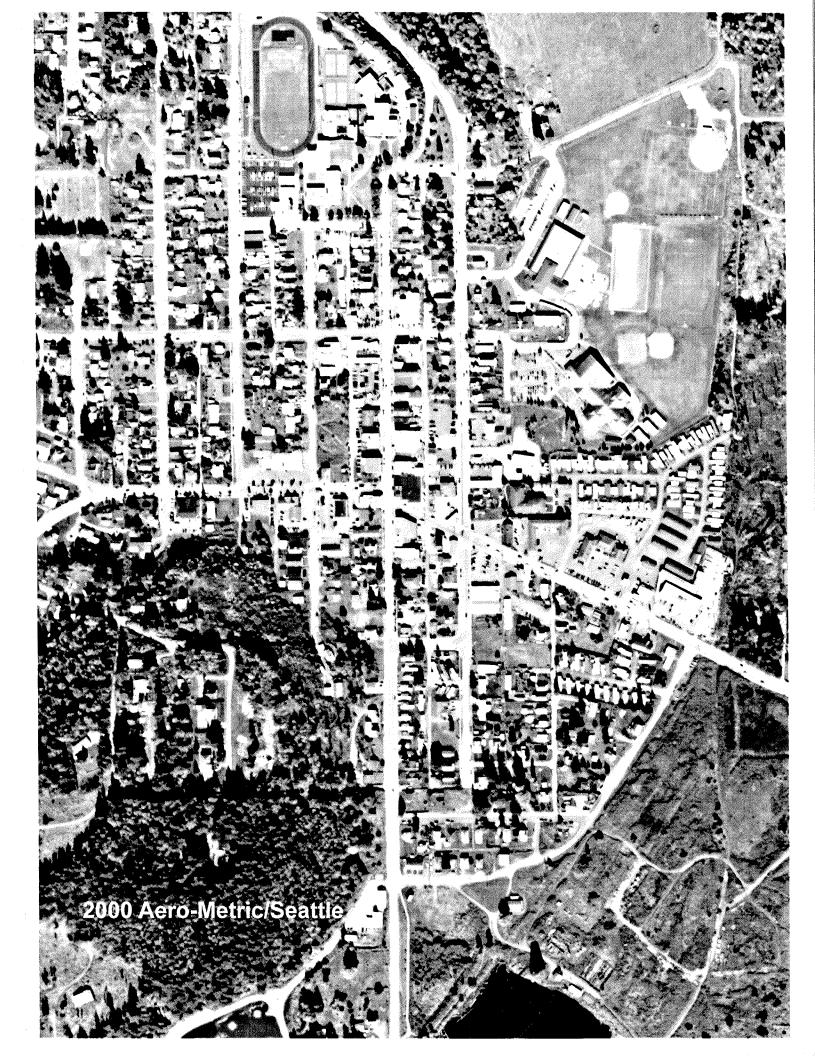
# **Aerial Photographs**











# **Eatonville Trail**

Lynch Creek E/Airport Rd E Eatonville, WA 98328

Inquiry Number: 2375425.4

December 05, 2008

# The EDR Historical Topographic Map Report



# **EDR Historical Topographic Map Report**

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

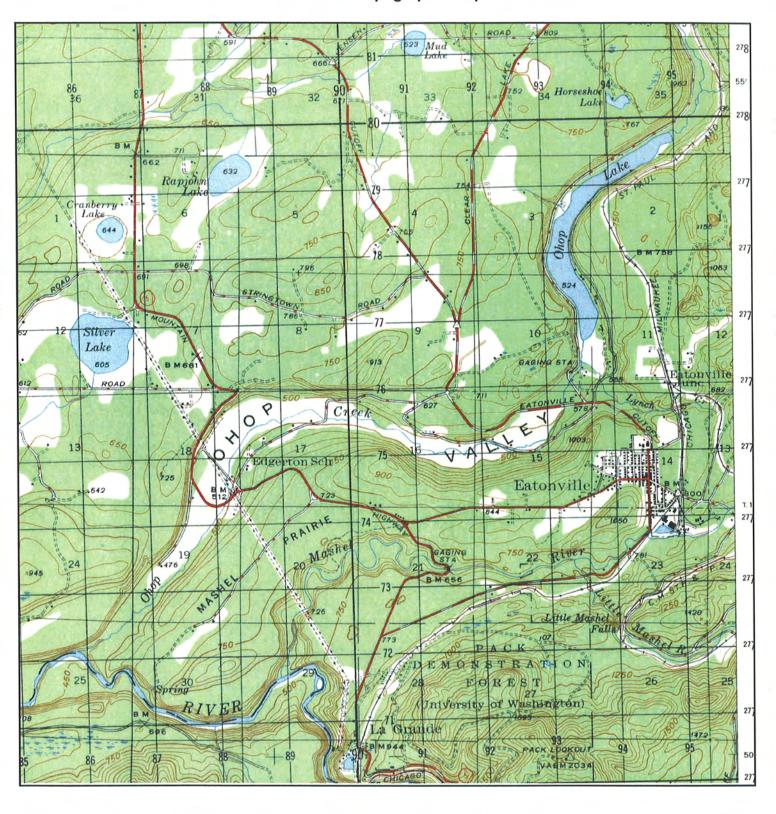
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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N ↑ TARGET QUAD

NAME: Ohop Valley, WA

MAP YEAR: 1946

SERIES: 15

SCALE: 1:50,000

SITE NAME: Eatonville Trail

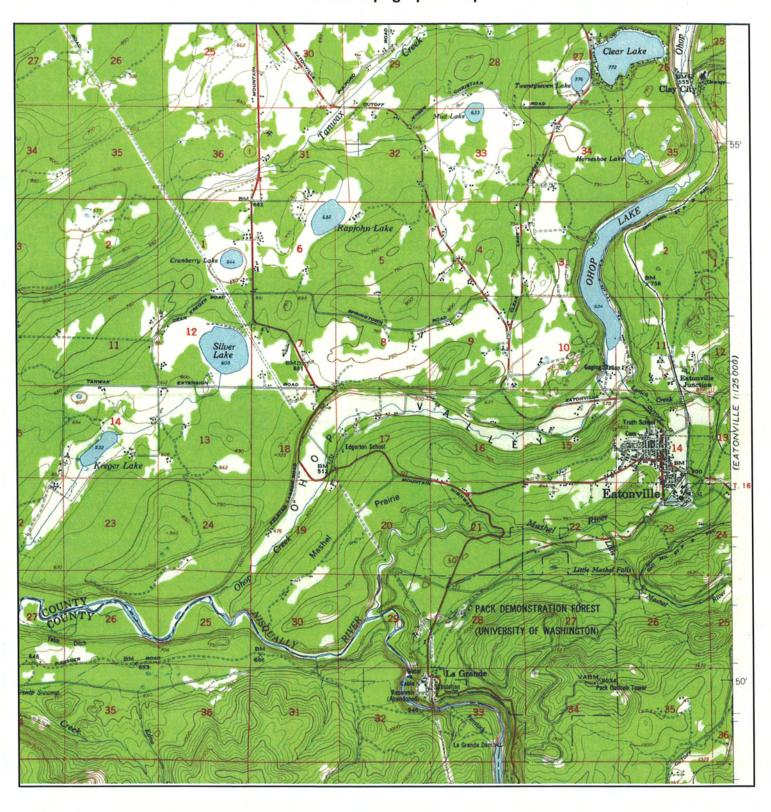
ADDRESS: Lynch Creek E/Airport Rd E

Eatonville, WA 98328

LAT/LONG: 46.8757 / 122.261

CLIENT: Landau Associates Inc

CONTACT: Jessica Stone INQUIRY#: 2375425.4 RESEARCH DATE: 12/05/2008



N

**TARGET QUAD** 

NAME: Ohop Valley, WA

MAP YEAR: 1949

SERIES: 15

SCALE: 1:62,500

SITE NAME: Eatonville Trail

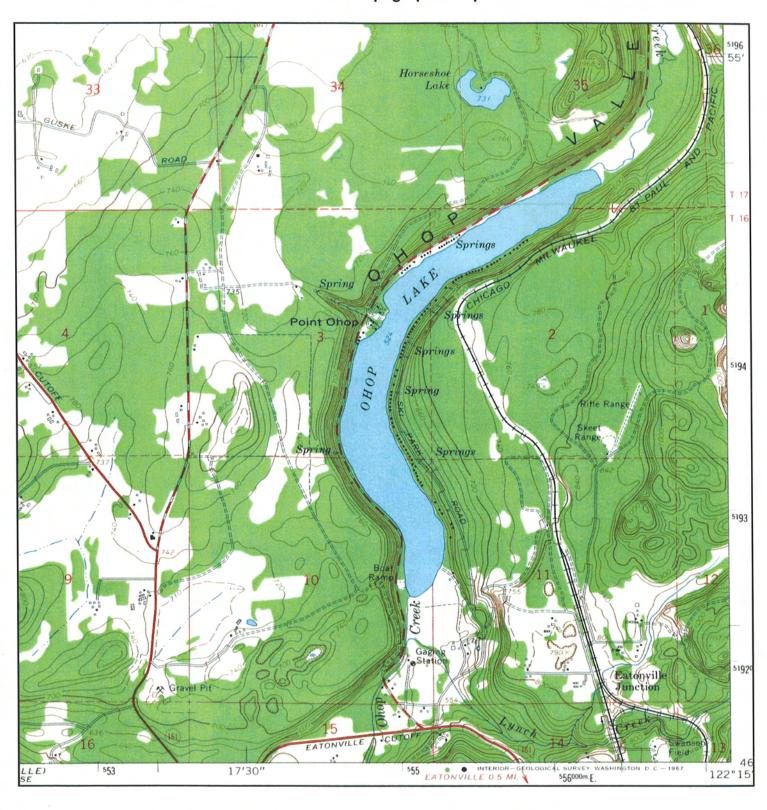
ADDRESS: Lynch Creek E/Airport Rd E

Eatonville, WA 98328

LAT/LONG: 46.8757 / 122.261

CLIENT: Landau Associates Inc

CONTACT: Jessica Stone INQUIRY#: 2375425.4





TARGET QUAD

NAME: Tanwax Lake, WA

MAP YEAR: 1959

SERIES: 7.5

SCALE: 1:24,000

SITE NAME: Eatonville Trail

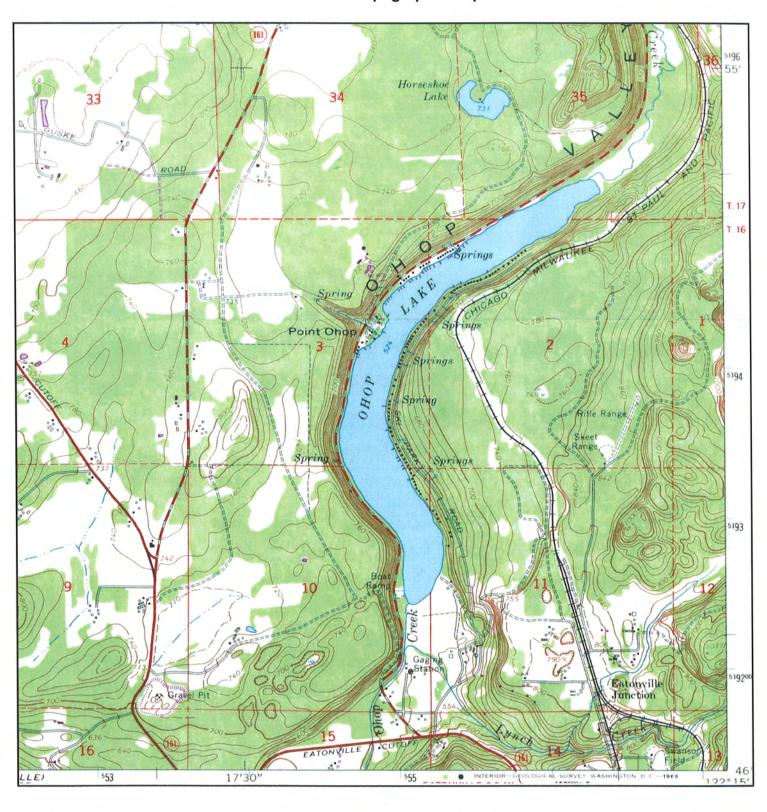
ADDRESS: Lynch Creek E/Airport Rd E

Eatonville, WA 98328

LAT/LONG: 46.8757 / 122.261

CLIENT: Landau Associates Inc

CONTACT: Jessica Stone INQUIRY#: 2375425.4



TARGET QUAD

NAME: Tanwax Lake, WA

MAP YEAR: 1968

PHOTOREVISED FROM:1959 7.5

SERIES:

SCALE: 1:24,000 SITE NAME: Eatonville Trail

ADDRESS: Lynch Creek E/Airport Rd E

Eatonville, WA 98328

LAT/LONG: 46.8757 / 122.261 CLIENT:

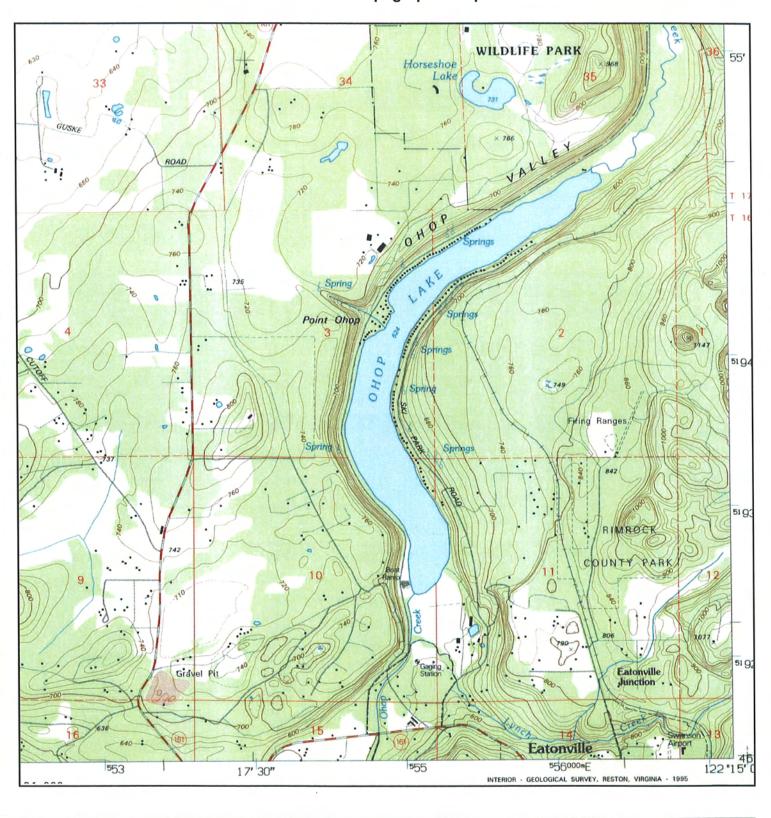
Landau Associates Inc

CONTACT:

Jessica Stone

INQUIRY#:

2375425.4



TARGET QUAD

NAME: Tanwax Lake, WA

MAP YEAR: 1990

SERIES: 7.5 SCALE: 1:24,000 SITE NAME: Eatonville Trail

ADDRESS: Lynch Creek E/Airport Rd E

Eatonville, WA 98328

LAT/LONG: 46.8757 / 122.261 CLIENT: Landau Associates Inc

CONTACT: Jessica Stone INQUIRY#: 2375425.4

Environmental Data Resources Radius Map with GeoCheck® Report

# **Eatonville Trail**

Lynch Creek E/Airport Rd E Eatonville, WA 98328

Inquiry Number: 2375425.3

December 04, 2008

# **Certified Sanborn® Map Report**



# Certified Sanborn® Map Report

12/04/08

Site Name:

**Client Name:** 

Eatonville Trail Lynch Creek E/Airport Rd E

Landau Associates Inc 950 Pacific Ave

Eatonville, WA 98328

Tacoma, WA 98402

EDR Inquiry # 2375425.3

Contact: Jessica Stone



The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Landau Associates Inc were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

## Certified Sanborn Results:

Site Name:

Eatonville Trail

Address:

Lynch Creek E/Airport Rd E

City, State, Zip:

Eatonville, WA 98328

**Cross Street:** 

P.O. # Project: 0193054.010.010 Eatonville Trai

Certification #

54E7-49F4-B483



Sanborn® Library search results Certification # 54E7-49F4-B483

### UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

Library of Congress

University Publications of America

✓ EDR Private Collection

Total Maps:

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# **Selected Site Photographs**



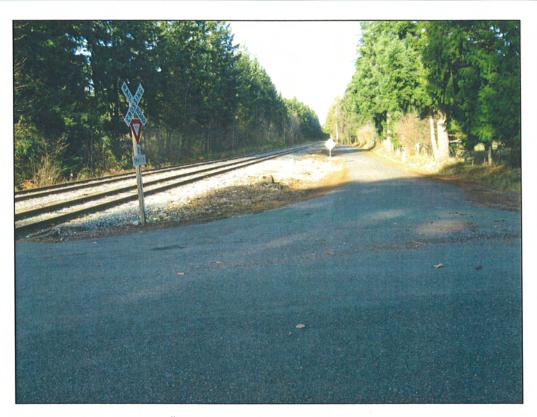


1. Looking east into Rimrock Park next to UNS club at the northern end of proposed trail.



2. Looking northwest at the UNS club near the northern end of the proposed trail.





3. Looking north at 129<sup>th</sup> Avenue East and the railroad.



4. Looking west at 129<sup>th</sup> Avenue East intersection with the railroad.

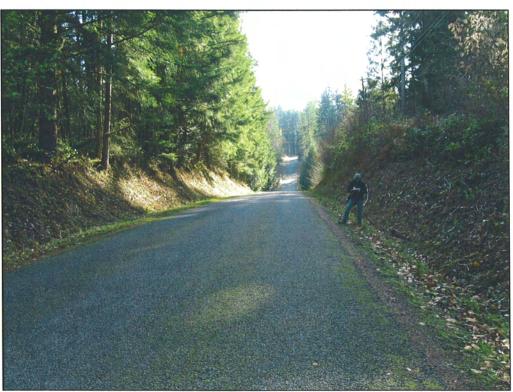


Rimrock Trail Corridor Study Eatonville, Washington

**Selected Site Photographs** 

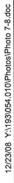
Figure

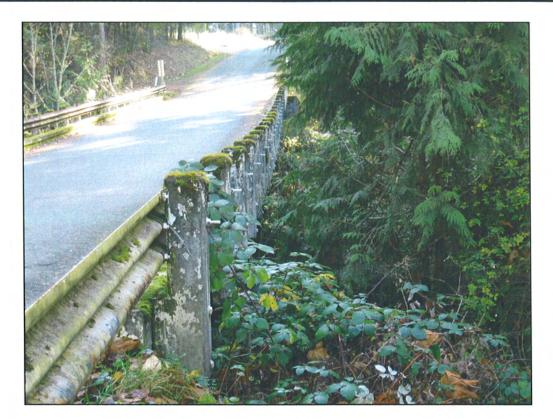




6. Looking south at steep sloping sides and down to Lynch Creek Bridge.







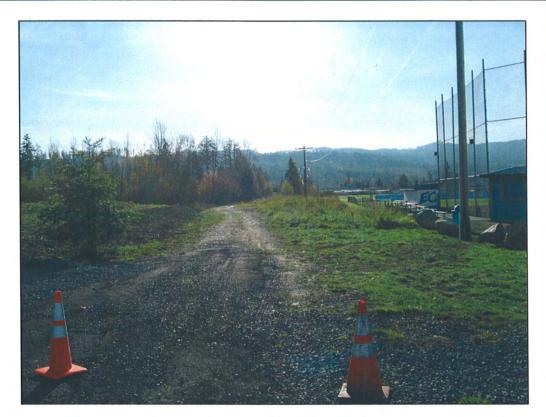
7. Looking south at Lynch Creek Bridge.



8. Bridge supports.







9. Looking south of Cessna Court East at unpaved road behind sports fields.



10. Dumping of household garbage along the unpaved road.







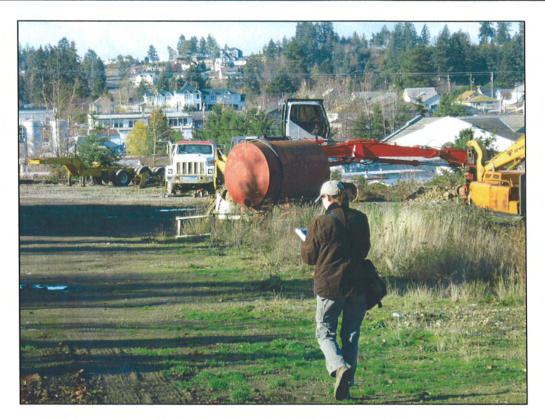
11. Potential wetland west side of trail.



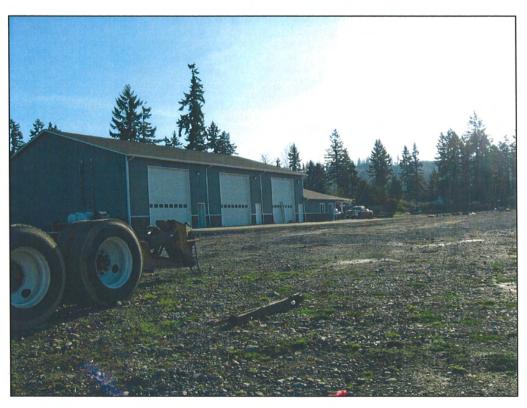
12. Potential wetland east side of trail.







13. Looking west at above-ground storage tank and construction equipment.



14. Looking south at diesel repair shop next to proposed trail.



# **Qualifications of Environmental Professionals**

# Jennifer Wynkoop

Senior Project Scientist

### **Expertise**

Environmental Site
Assessment
Site Monitoring & Cleanup
Site Characterization and
Remediation

Jennifer is a senior project environmental scientist at Landau Associates with 6 years of experience in the environmental field. Her professional experience includes Phase I and Phase II environmental site assessment, environmental remediation projects at hazardous sites, demolition monitoring and documentation at industrial properties with hazardous waste, due diligence documentation for hazardous sites, and cleanup of contaminated sites. She is also experienced in soil and groundwater contamination investigation and groundwater monitoring.

City of Tacoma Phase I/II ESA; Tacoma, WA. Conducted an expanded phase I and phase II environmental site assessment at an industrial property adjacent to the former Tacoma Tar Pits superfund site for the City of Tacoma Science and Engineering Division. Phase I activities included in depth research on an adjacent historic coal gasification plant and on hazardous materials spills at adjacent industrial properties. Phase II activities included excavation of 9 test pits and conducting soil and groundwater sampling. Results were documented in a final Phase I/Phase II ESA report.

**City of Tacoma Environmental Investigation Services; Tacoma, WA.** In addition to the projects listed above, conducted and managed environmental investigation projects for the City of Tacoma Public Works Department including:

- D Street storm sewer investigation. Completed an emergency project to investigate the source and extent of heavy oil-range petroleum hydrocarbon intrusion into a City stormwater pipe.
- Broadway LID utility upgrade project. Managed a project to investigate potential
  petroleum hydrocarbon and volatile organic compound contamination within the
  Broadway LID prior to a major utility upgrade project.

112<sup>th</sup> Street Corridor Phase I and Phase II ESA; Puyallup, WA. Conducted a corridor level Phase I ESA and subsequent Phase II investigation to characterize the extent of impacts from three historic leaking underground gasoline storage tanks. The tanks had been removed but residual soil contamination remained within and downgradient of the tank nest. A direct push probe was used as a cost effective drilling method to investigate the extent of the contamination.

Meridian Campus, MTCA Cleanup; Lacey, WA. Phase II project manager responsible for managing remedial actions associated with arsenic and lead soil contamination at this 1,540-acre mixed-use development. Conducting sampling and compiling a report for each development phase as final grading is completed. Reports are submitted to Ecology under the VCP program with a request for a No Further Action (NFA) determination. Have currently received NFA determinations from Ecology for four of the eleven development phases.

### R.W. Rhine Phase I/II ESA, Parkland, WA

Responsible for conducting a phase I and phase II environmental site assessment at a facility used as an auto wrecking yard since the 1940s. Phase II assessment activities included surface and subsurface soil sampling and groundwater sampling for environmental contaminants characteristic of auto wrecking facilities.



Boeing Auburn Fabrication Facility RCRA Corrective Action; Auburn, WA. Task manager for implementing projects related to corrective action requirements and emergency cleanup actions. RCRA corrective action oversight is being conducted by Washington Department of Ecology (Ecology) using Model Toxics Control Act (MTCA) regulations. This multifaceted project includes implementation of a facility-wide remedial investigation (RI) and feasibility study (FS) of soil and groundwater contamination pursuant to an Agreed Order with Ecology. Constituents of concern include chlorinated solvents, metals, total petroleum hydrocarbons (TPH), PCBs, and carcinogenic polynuclear aromatic hydrocarbons (cPAHs). Specific projects include:

- Building 17-10 TPH contaminated soil removal. Contaminated soil was discovered under the building slab during construction activities. Sampling and soil removal was conducted within 24 hours of notification.
- Building 17-05 building demolition monitoring and TPH soil and groundwater cleanup. TPH contaminated soil was discovered below an underground hydraulic racking system associated with an old autoclave. Contamination extended to the groundwater interface zone. Contaminated soil was removed and the groundwater interface zone was treated with oxygen release compound (ORC).
- Chromium waste line characterization and removal. Completed characterization
  of pipe material and residual liquids and sediments in two abandoned chromium
  waste lines. Provided oversight and sampling during excavation and removal of
  the lines.
- Area 1 property transfer. Managed the collection and recording of materials and
  documents related to hazardous substances and remediation activities during the
  due diligence process for the Area 1 property transfer. Collected, organized, and
  cataloged nearly 300 documents related to environmental conditions and
  hazardous substances at the property.
- Area 1 Remediation. Conducted groundwater monitoring and groundwater injection for accelerated biodegradation of thrichloroethene. Monitored for parent compound, daughter compounds and a tracer compound to determine groundwater flow patterns and rates.

Tacoma Smelter Plume Area-wide Soil Contamination Investigation, Pierce County, WA

Team member for design of a study to investigate arsenic and lead contaminated soils over more than 200 square miles in Pierce County. The source of contaminants was airborne emissions from the former Asarco smelter, which settled out onto the soil in the surrounding area during its 96 years of operation. Conducted soil sampling on over 400 sites within the project area. Oversaw data quality, collection, and management.

Education

B.S., Biology, Pacific Lutheran University, 1999



### **APPENDIX F**

Sight Distance Study Prepared by Parametrix, Inc.

ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

1231 FRYAR AVENUE, PO BOX 460 SUMNER, WASHINGTON 98390-1516 T. 253 . 863 . 5128 F. 253 . 863 . 0946 www.parametrix.com

Date:

April 28, 2009

To:

**Chrissy Bailey** 

From:

Cindy Clark, PE

Subject:

Lynch Creek Road Trail Crossing - Sight Distance Study

CC:

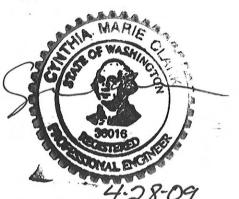
Nate Mozer, PE

Morgan Stumpf, EIT

Project Number: 214-1588-068

Project Name:

**Eatonville to Rimrock Trail** 



#### Introduction

As part of the construction of the Eatonville to Rimrock Trail, a trail crossing is planned at Lynch Creek Road in the vicinity of Cessna Court. The purpose of this memorandum is to determine if this proposed crossing meets the stopping sight distance criteria.

#### Analysis Method

Our method of analysis was based on the criteria set forth in Chapter 3 of the publication A Policy on Geometric Design of Highways and Streets, 2004 edition, prepared by the American Association of State Highway and Transportation Officials (AASHTO). This publication is commonly referred to as the "Green Book". In the Green Book, stopping sight distance requirements are based on design speed, using a driver's eye height of 3.5 feet and an object height of 2.0 feet. Excerpts from the Green Book are included at the end of this memorandum.

Lynch Creek Road is signed for 25 miles per hour (mph) and is on a flat grade. Within the vicinity of Cessna Court intersection, Lynch Creek Road makes a 90-degree bend, such that west of the intersection it is an east-west roadway and north of the intersection it is a north-south roadway. For a 25mph design speed roadway with a flat grade, the minimum stopping sight distance is 155 feet. Figure 1 shows the intersection configuration.

#### Site Visit

On Monday, April 20<sup>th</sup>, 2009, Morgan Stumpf and I visited the site to conduct the site distance study. Morgan held a 2-foot high object at the location of the proposed crossing of Lynch Creek Road, just southwest of its intersection with Cessna Court. I then took visual measurements at a 3.5-foot height within the approach lane of Lynch Creek Road (where the driver of an approach vehicle would be located) at various distances away. I recorded the moment when Morgan's object was obstructed from my view, either by horizontal or vertical curvature. We conducted this exercise for both directions (eastbound and southbound as vehicles approached the crossing) on Lynch Creek Road.

In addition, we conducted a visual analysis to determine if the proposed crossing on the southwest leg of the Lynch Creek Road/Cessna Court intersection was the optimum location for driver visibility.

#### Results

The results of our field measurements are included in Table 1.

Table 1 - Stopping Sight Distance (SSD) results for Lynch Creek Road at Proposed Crossing

Approach	Minimum SSD (1)	Measured Horizontal SSD	Measured Vertical SSD	Meets SSD requirement?
South to West bound	155 feet	400 feet	>500 feet	Yes
East to North bound	155 feet	>500 feet	>500 feet	Yes

(1) Per 2004 AASHTO Green Book, Chapter 3, using a driver's eye height of 3.5 feet and an object height of 2.0 feet.

The proposed crossing location meets the minimum stopping sight distance criteria. However, we noted significant brush which, although didn't block the view of the 2.0-foot object, certainly affected the visibility of it. See the photo below which shows the brushy growth. This should be cleared completely away during the construction of the trail. This will help immensely with improving sight distance.



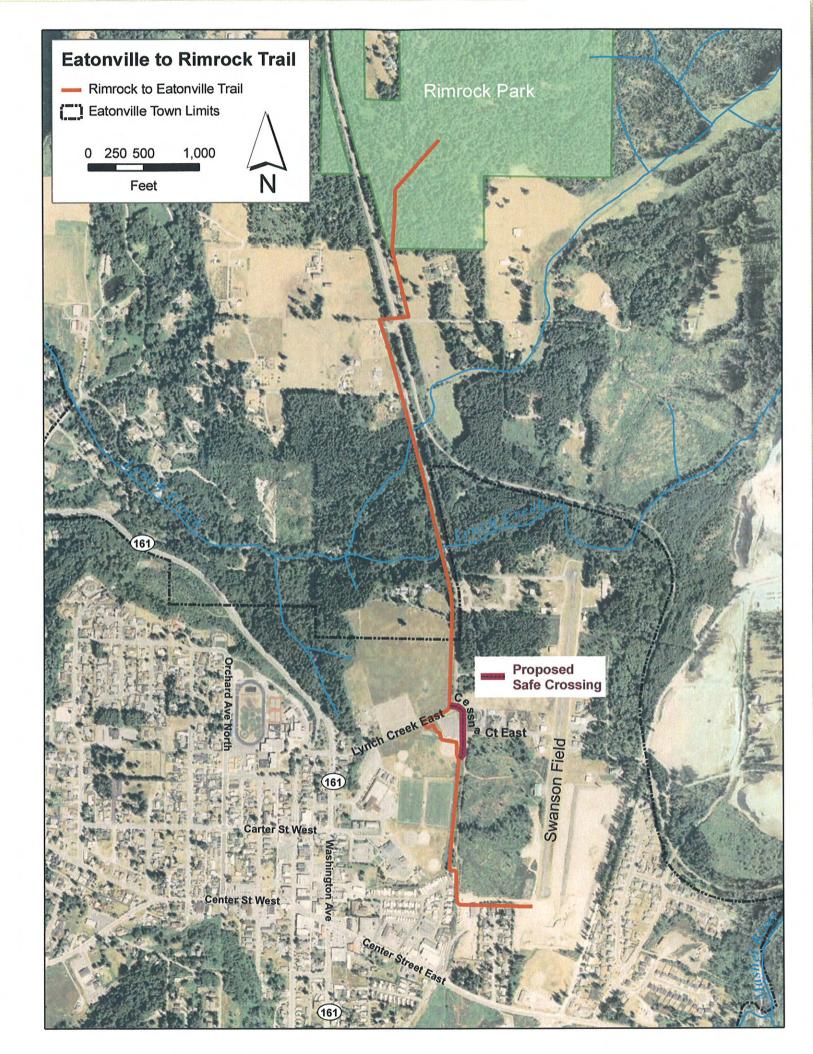
This photo was taken at 300 feet away from the proposed crossing. Note that even though Morgan and the 2.0 foot object are technically visible, the brush obstructs the visibility significantly.

Regarding the location of the crossing, we determined that moving the crossing any further to the west was NOT recommended due to the lack of visibility of the crossing for drivers travelling southbound. However, moving the crossing to the northeast leg of the intersection also meets sight distance requirements and would improve the visibility of the crossing for southbound vehicles, with some decrease in visibility for eastbound vehicles.

#### Conclusion

The proposed trail crossing of Lynch Creek Road just on the southwest leg of its intersection with Cessna Court meets the AASHTO Green Book criteria for stopping sight distance. However, we recommend the brushy growth be completely cleared away to improve visibility for vehicles driving from the north.

Another possible location for the crossing is on the northeast leg of the intersection, which would also meet sight distance criteria. However, moving the crossing any further to the west is not recommended due to inadequate sight distance for southbound vehicles.



# From 2003 AASHTO

### **Criteria for Measuring Sight Distance**

Sight distance is the distance along a roadway throughout which an object of specified height is continuously visible to the driver. This distance is dependent on the height of the driver's eye above the road surface, the specified object height above the road surface, and the height and lateral position of sight obstructions within the driver's line of sight.

#### Height of Driver's Eye

For sight distance calculations for passenger vehicles, the height of the driver's eye is considered to be 1 080 mm [3.5 ft] above the road surface. This value is based on a study (4) found that average vehicle heights have decreased to 1 300 mm [4.25 ft] with a comparable decrease in average eye heights to 1 080 mm [3.5 ft]. Because of various factors that appear to place practical limits on further decreases in passenger car heights and the relatively small increases in the lengths of vertical curves that would result from further changes that do occur, 1 080 mm [3.5 ft] is considered to be the appropriate height of driver's eye for measuring both stopping and passing sight distances. For large trucks, the driver eye height ranges from 1 800 to 2 400 mm [5.9 to 7.9 ft]. The recommended value of truck driver eye height for design is 2 330 mm [7.6 ft] above the roadway surface.

#### **Height of Object**

For stopping sight distance calculations, the height of object is considered to be 600 mm [2.0 ft] above the road surface. For passing sight distance calculations, the height of object is considered to be 1 080 mm [3.5 ft] above the road surface.

Stopping sight distance object. The basis for selection of a 600-mm [2.0-ft] object height was largely an arbitrary rationalization of the size of object that might potentially be encountered in the road and of a driver's ability to perceive and react to such situations. It is considered that an object 600 mm [2.0 ft] high is representative of an object that involves risk to drivers and can be recognized by a driver in time to stop before reaching it. Using object heights of less than 600 mm [2.0 ft] for stopping sight distance calculations would result in longer crest vertical curves without documented safety benefits (4). Object height of less than 600 mm [2.0 ft] could substantially increase construction costs because additional excavation would be needed to provide the longer crest vertical curves. It is also doubtful that the driver's ability to perceive situations involving risk of collisions would be increased because recommended stopping sight distances for high-speed design are beyond most drivers' capabilities to detect small objects (4).

Passing sight distance object. An object height of 1 080 mm [3.5 ft] is adopted for passing sight distance. This object height is based on a vehicle height of 1 330 mm [4.35 ft], which represents the 15th percentile of vehicle heights in the current passenger car population, less an allowance of 250 mm [0.82 ft], which represents a near-maximum value for the portion of the vehicle height that needs to be visible for another driver to recognize a vehicle as such (15). Passing sight distances calculated on this basis are also considered adequate for night conditions

because headlight beams of an opposing vehicle generally can be seen from a greater distance than a vehicle can be recognized in the daytime. The choice of an object height equal to the driver eye height makes passing sight distance design reciprocal (i.e., when the driver of the passing vehicle can see the opposing vehicle, the driver of the opposing vehicle can also see the passing vehicle).

#### **Sight Obstructions**

On a tangent roadway, the obstruction that limits the driver's sight distance is the road surface at some point on a crest vertical curve. On horizontal curves, the obstruction that limits the driver's sight distance may be the road surface at some point on a crest vertical curve, or it may be some physical feature outside of the traveled way, such as a longitudinal barrier, a bridge-approach fill slope, a tree, foliage, or the backslope of a cut section. Accordingly, all highway construction plans should be checked in both the vertical and horizontal plane for sight distance obstructions.

#### Measuring and Recording Sight Distance on Plans

The design of horizontal alignment and vertical profile using sight distance and other criteria is addressed later in this chapter, including the detailed design of horizontal and vertical curves. Sight distance should be considered in the preliminary stages of design when both the horizontal and vertical alignment are still subject to adjustment. By determining the available sight distances graphically on the plans and recording them at frequent intervals, the designer can appraise the overall layout and effect a more balanced design by minor adjustments in the plan or profile. Methods for scaling sight distances on plans are demonstrated in Exhibit 3-8, which also shows a typical sight distance record that would be shown on the final plans.

Because the view of the highway ahead may change rapidly in a short distance, it is desirable to measure and record sight distance for both directions of travel at each station. Both horizontal and vertical sight distances should be measured and the shorter lengths recorded. In the case of a two-lane highway, passing sight distance should be measured and recorded in addition to stopping sight distance.

Sight distance information, such as that presented in Exhibits 3-70 and 3-73, may be used to establish minimum lengths of vertical curves. Charts similar to Exhibit 3-53 are useful for determining the radius of horizontal curve or the lateral offset from the traveled way needed to provide the design sight distance. Once the horizontal and vertical alignments are tentatively established, the most practical means of examining sight distances along the proposed highway is by direct scaling on the plans.

Horizontal sight distance on the inside of a curve is limited by obstructions such as buildings, hedges, wooded areas, high ground, or other topographic features. These are generally plotted on the plans. Horizontal sight is measured with a straightedge, as indicated in the upper left portion of Exhibit 3-8. The cut slope obstruction is shown on the worksheets by a line

		Metric				n	US Customary	ry	
	Brake	Braking	Stopping sight distance	t distance		Brake	Braking	Stopping sight distance	it distance
Design	reaction	distance			Design	reaction	distance		
peeds	distance	on level	Calculated	Design	sbeed	distance	on level	Calculated	Design
(km/h)	(m)	(m)	(m)	E)	(mph)	(#)	(ft)	( <del>L</del> )	(#)
20	13.9	46	18.5	20	15	55.1	21.6	7.97	80
3 6	20.9	10.3	31.2	35	20	73.5	38.4	111.9	115
40	27.8	18.4	46.2	20	25	91.9	0.09	151.9	155
50	34.8	28.7	63.5	65	30	110.3	86.4	196.7	200
09	41.7	413	83.0	85	35	128.6	117.6	246.2	250
202	48.7	56.2	104.9	105	40	147.0	153.6	300.6	305
2 8	55.6	73.4	129.0	130	45	165.4	194.4	359.8	360
806	62.6	92.9	155.5	160	20	183.8	240.0	423.8	425
35	69.5	114.7	184.2	185	. 55	202.1	290.3	492.4	495
110	76.5	138.8	215.3	220	09	220.5	345.5	566.0	920
120	83.4	165.2	248.6	250	65	238.9	405.5	644.4	645
130	90.4	193.8	284.2	285	70	257.3	470.3	727.6	730
2	;				75	275.6	539.9	815.5	820
					80	294.0	614.3	908.3	910
Note: Brake reaction calculated sight distal		tance predic	distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s <sup>2</sup> [11.2 ft/s <sup>2</sup> ] used to determine nce.	of 2.5 s; dec	seleration rat	te of 3.4 m/s²	[11.2 ft/s <sup>2</sup> ] ue	sed to determine	(D)

Exhibit 3-1. Stopping Sight Distance

### **APPENDIX G**

Sidewalk Options, Lynch Creek Bridge Planning Level Structural Assessment Prepared by Parametrix

1231 FRYAR AVENUE SUMNER, WA 98390-1516 T. 253.863.5128 F. 253.863.0946 www.parametrix.com

### **TECHNICAL MEMORANDUM**

4/28/09

Date:

April 28, 2009

To:

Nate Mozer, Parametrix

From:

Bob Murray, Parametrix

Subject:

Sidewalk Addition – Rimrock Park Trail

cc:

Project Number:

214-1588-068

Project Name:

Eatonville to Rimrock Park



Parametrix investigated three options for adding a sidewalk adjacent to the Lynch Creek Bridge for access to the Rimrock Park Trail in Pierce County. The existing structure is a 170-foot bridge with four reinforced concrete T-beams supported by two-column piers and founded on spread footings. The main span is 50 feet in length, with adjacent 30-foot approach spans. The original bridge was designed for H-15 loading, considerably less than today's current standards. A load rating performed in 1996 indicates that the structure is currently not posted, with 1.20 for the lowest rating factor. A description and cost estimate for each sidewalk addition option is provided, closing with a summary of the preferred option.

#### Option 1 – See Figure 1

The layout for Option 1 provides sidewalk access by hanging a transverse support beam from two of the existing reinforced concrete T-beams. Pedestrian grating will span between the transverse beams, which are spaced at approximately 5 feet 0 inches. For safety, a pedestrian railing will be used on the west side of the sidewalk and a pedestrian fence will be used on the east side of the sidewalk. This option provides the most aesthetic approach to adding the sidewalk, and this layout is the second least expensive option. However, attaching the transverse beam to the existing beams will present multiple drawbacks. Because the existing beams have different depths between the spans, the connection would have to provide for this variable depth and would require a more complicated connection where the transverse beams hang from the shallower sections.

Our preliminary investigation indicates that the capacity of the beams and the pier caps may be significantly reduced. If this option is selected, an in-depth analysis of the structure will need to be performed. If the additional analysis confirms the premise that the capacities of the beams and caps are significantly reduced, the existing structure may need to be strengthened or posted. If strengthening is required, the cost for the sidewalk addition will increase dramatically.

#### Option 2 – See Figure 2

The layout for Option 2 provides sidewalk access by incorporating a longitudinal beam with diagonal struts at the pier locations to support the transverse sidewalk beams. The transverse sidewalk beams are connected directly to the existing exterior reinforced concrete T-beam. Pedestrian grating will span between the transverse beams, which are spaced at approximately 5 feet 0 inches. A pedestrian railing will be used on the west side of the sidewalk for a safety barrier, and the existing barrier will provide safety restraint on the east side of the sidewalk. This alternative is the least expensive option. Similar to Option 1, this layout will also require an in-depth analysis to determine if any additional strengthening or posting may be required. However, we do believe that this option is the least aesthetic of the three options.

#### Option 3 – See Figure 3

The layout for Option 3 provides sidewalk access by hanging a transverse support beam from the columns of the substructure. Pedestrian grating will span between the longitudinal beams, which are spaced at approximately 6 feet 0 inches. For safety, a pedestrian railing will be used on the west side of the sidewalk and a pedestrian fence will be used on the east side of the sidewalk. This option provides the least structural impact on the existing structure since the support system is loaded directly onto the substructure. With this option, the amount of additional analysis to confirm the structural feasibility will be greatly reduced compared to Options 1 and 2. However, this layout is the most expensive alternative.

#### **Summary**

The three layouts presented for adding a sidewalk to the bridge have simple construction methods and the costs of the three options are fairly close in range. All of the alternatives appear to be feasible but an in-depth structural analysis will be required prior to the final selection process for all of the options discussed. For planning and budgeting purposes, it is recommended that Option 3 be selected because only this option transfers the load directly to the substructure and will require a minimum level of additional engineering on the existing structure.

	PLANNING LEVEL CONSTRUCTIO	N COST	ESTIMAT	E- OPTION	1
	W. 1			CLIENT	
	RIMROCK PARK TRAIL, LYNCH CREEK E	RIDGE		PIERCI	E COUNTY
KEY NUMBER	KIND OF WORK		DATE	Prepared by:	
	SIDEWALK ADDITION: OPTION 1		4/24/09	Par	ametrix
ITEM NUMBER	ITEM DESCRIPTION.	UNIT	AMOUNT	UNIT COST	TOTAL
	PEDESTRIAN GRATE (T1215)	SF	1020	\$ 22.00	\$ 22,440.00
4286	STRUCTURAL STEEL - W12X22	LB	11968	\$ 4.00	\$ 47,872.00
	STRUCTURAL STEEL BRACKETS AND ATTACHMENTS	LS	1	\$ 4,787.20	\$ 4,787.20
	TEMPORARY SCAFFOLDING AND SHORING	LS	1	\$ 5,000.00	\$ 5,000.00
	LABOR TO INSTALL BEAMS	LS	1	\$ 23,760	\$ 23,760.00
	LABOR TO INSTALL GRATING	LS	1	\$ 4,320	\$ 4,320.00
	LABOR TO INSTALL HANDRAIL AND FENCING	LS	1	\$ 6,480	\$ 6,480.00
4410	BRIDGE RAILING TYPE - PEDESTRIAN RAILING	LF	170	\$ 130.00	\$ 22,100.00
4357	PEDESTRIAN FENCE	LF	170	\$ 50.00	\$ 8,500.00
	EQUIPMENT ALLOWANCE	LS	1	\$ 5,000.00	\$ 5,000.00
	TRAFFIC CONTROL	LS	1	\$ 5,000.00	\$ 5,000.00
SUBTOTAL, Co	onstruction Items				\$ 155,259.20
	Construction Items				\$ 155,259.20
	Mobilization			10.00%	\$ 15,525.92
	Subtotal with Mobilization				\$ 170,785.12
	Contingencies			30.00%	\$ 51,235.54

\$222,020.66

TOTAL SIDEWALK CONSTRUCTION COST INCL MOB

	PLANNING LEVEL CONSTRUCTION				
	RIMROCK PARK TRAIL, LYNCH CREEK BRI	DGE		CLIENT PIERCE	COUNTY
KEY NUMBER	KIND OF WORK		DATE	Prepared by:	
	SIDEWALK ADDITION: OPTION 2		4/24/09	Para	ametrix
ITEM NUMBER	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
					3.80
	PEDESTRIAN GRATE (T1215)	SF	1020	\$ 22.00	\$ 22,440.00
4286	STRUCTURAL STEEL - W12X40, W8X18, HSS 7.5X0.25	LB	13863	\$ 4.00	\$ 55,452.00
	STRUCTURAL STEEL BRACKETS AND ATTACHMENTS	LS	1	\$ 2,772.60	\$ 2,772.60
	TEMPORARY SCAFFOLDING AND SHORING	LS	1	\$ 5,000.00	\$ 5,000.00
	LABOR TO INSTALL BEAM, DIAGONAL AND 6 EA. STRINGERS (FRAME)	LS	1	\$ 12,960	\$ 12,960.00
	LABOR TO INSTALL BEAM AND 28 EA. W6 STRINGERS	LS	1	\$ 10,800	\$ 10,800.00
	LABOR TO INSTALL GRATING	LS	1	\$ 4,320	\$ 4,320.0
	LABOR TO INSTALL HANDRAIL AND FENCING	LS	1	\$ 6,480	\$ 6,480.0
4410	BRIDGE RAILING TYPE - PEDESTRIAN RAILING	LF	170	\$ 130.00	\$ 22,100.0
4357	PEDESTRIAN FENCE	LF	0	\$ 50.00	\$ -
	EQUIPMENT ALLOWANCE	LS	1	\$ 5,000.00	\$ 5,000.0
	TRAFFIC CONTROL	LS	1	\$ 5,000.00	\$ 5,000.0
SUBTOTAL. Co	onstruction items			No.	\$ 152,324.6
	Construction Items with Stage Construction				\$ 152,324.6
	Mobilization			10.00%	\$ 15,232.4
	Subtotal with Mobilization				\$ 167,557.0
	Contingencies			30.00%	\$ 50,267.1

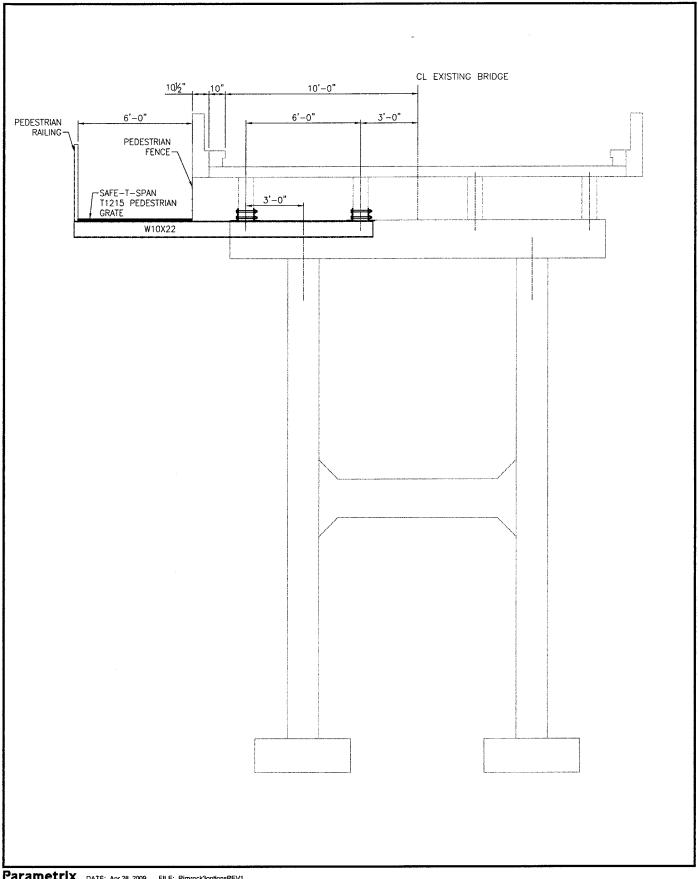
\$217,824.18

TOTAL SIDEWALK CONSTRUCTION COST INCL MOB

p1.5	PLANNING LEVEL CONSTRUCTION			6.07	
	RIMROCK PARK TRAIL, LYNCH CREEK BF	RIDGE		CLIENT PIFRCI	E COUNTY
KEY NUMBER	KIND OF WORK	T	DATE	Prepared by:	
	SIDEWALK ADDITION: OPTION 3		4/24/09	Para	ametrix
ITEM NUMBER	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
137			100 A		
	PEDESTRIAN GRATE (T3320)	SF	1020	\$ 30.00	\$ 30,600.00
4286	STRUCTURAL STEEL - W12X26, C15X33.9	LB	15349	\$ 4.00	\$ 61,396.00
	STRUCTURAL STEEL BRACKETS AND ATTACHMENTS	LS	1	\$ 3,069.80	\$ 3,069.80
-	TEMPORARY SCAFFOLDING AND SHORING	LS	1	\$ 5,000.00	\$ 5,000.00
	LABOR TO INSTALL CHANNELS AND COLUMN BRACKETS	LS	1	\$ 12,960	\$ 12,960.00
	LABOR TO INSTALL BEAMS	LS	1	\$ 6,480	\$ 6,480.00
	LABOR TO INSTALL GRATING	LS	1.	\$ 4,320	\$ 4,320.00
	LABOR TO INSTALL HANDRAIL AND FENCING	LS	1	\$ 6,480	\$ 6,480.00
4410	BRIDGE RAILING TYPE - PEDESTRIAN RAILING	LF	170	\$ 130.00	\$ 22,100.00
4357	PEDESTRIAN FENCE	LF	170	\$ 50.00	\$ 8,500.00
	EQUIPMENT ALLOWANCE	LS	1	\$ 5,000.00	\$ 5,000.00
	TRAFFIC CONTROL	LS	1	\$ 5,000.00	\$ 5,000.00
SUBTOTAL, Co	onstruction Items		22.11		\$ 170,905.80
	Construction Items				\$ 170,905.80
	Mobilization			10.00%	\$ 17,090.58
	Subtotal with Mobilization				\$ 187,996.38
	Contingencies			30.00%	\$ 56,398.9

\$244,395.29

TOTAL SIDEWALK CONSTRUCTION COST INCL MOB



Parametrix DATE: Apr 28, 2009 FILE: Rimrock3optionsREV1



Figure 1 **RIMROCK PARK TRAIL** SIDEWALK ADDITION **OPTION 1** 

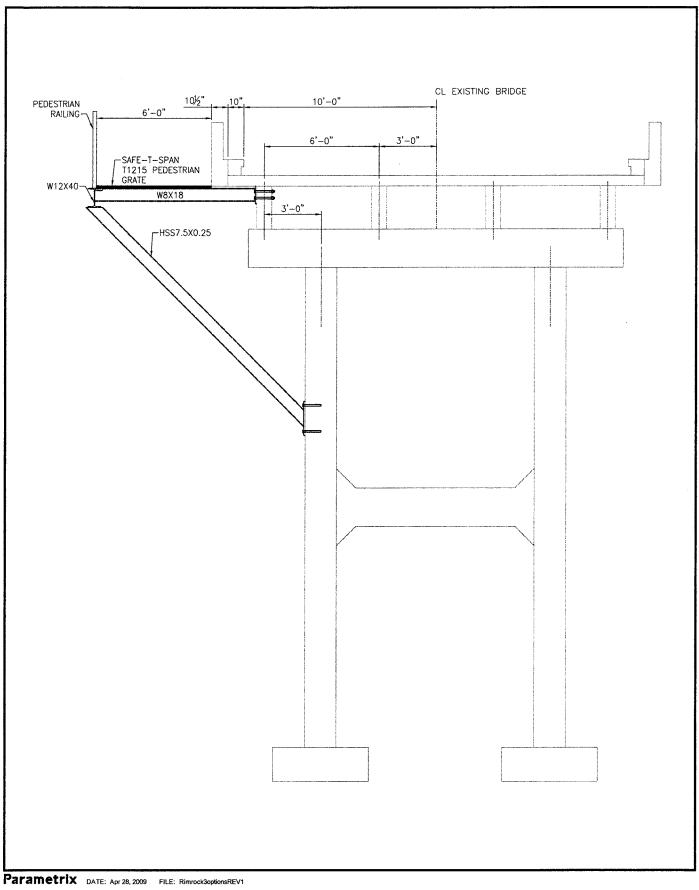
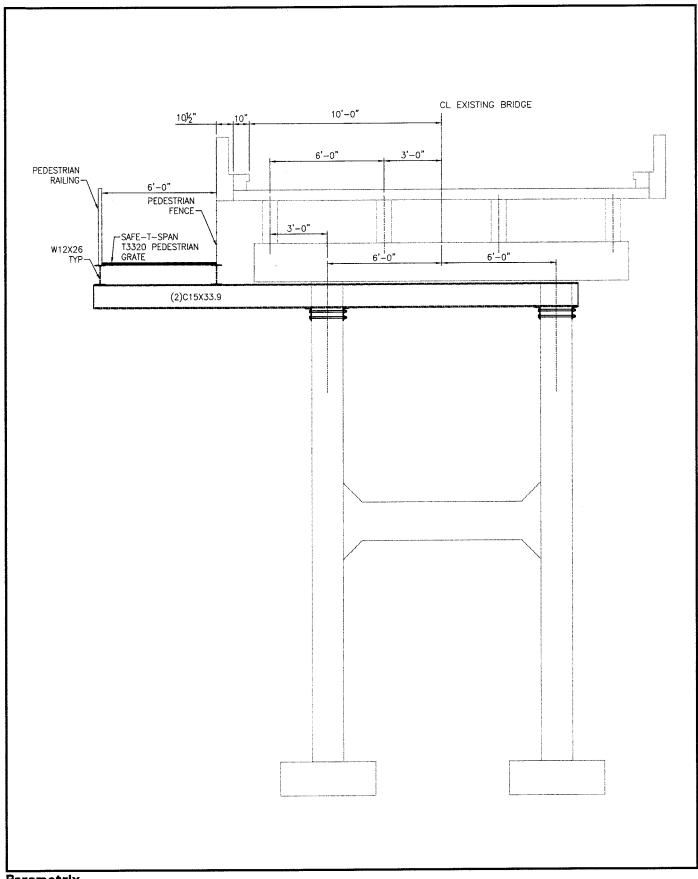




Figure 2 **RIMROCK PARK TRAIL** SIDEWALK ADDITION **OPTION 2** 



Parametrix DATE: Apr 28, 2009 FILE: Rimrock3optionsREV1



Figure 3 RIMROCK PARK TRAIL SIDEWALK ADDITION OPTION 3

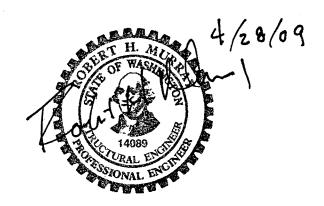
## RIMROCK PARK TRAIL LYNCH CREEK BRIDGE SIDEWALK ADDITION

## **Planning Level Structural Calculations**

Client: Pierce County

Project Number: 214-1588-068

Date: April 28, 2009



Para... Consulting

ROJECT	FIMROCK	PARK TR	<u> 41L</u>			SHEET_	OF
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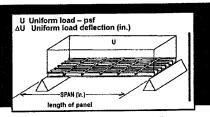
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		M= 5.94(5')	+ 4.6 4(51)+3.3		1-0.7 46	
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			7×12 = 31	,9 in <sup>3</sup>	S=8	40 51.9in <sup>3</sup>
	/F Continuou	S-31.91.3×0.8 W12×26 S=33,			a ta faran ayan ay a san a san an a	

## **Industrial Uniform Load Chart**



LEAR SPAN		50 50	SERIES SAF		(psf) 300	500	1,000	2,000	MAXIMUM RECOMMENDED	ULTIMATE CAPACITY (ps
(in)	STYLE			<.01	<.01	0.01	0.02	0.04	3570	7140
	16010 16015	<.01 <.01	<.01 <.01	<.01	<.01	<.01	0.01	0.02	7620	15240
	15010	<.01	<.01	<.01	<.01	<.01	0.01	0.03	4460	8920
40	15015	<.01	<.01	<.01	<.01	<.01	<.01	0.01	9520 7560	19050 15120
12	T5020	<.01	<.01	<.01 <.01	< 01 < 01	<.01 <.01	<.01 0.01	0.01	5350	10700
	14010 14015	<.01 <.01	<.01 <.01	<.01	<.01	<.01	<.01	0.01	11430	22860
	T3320	<.01	<.01	<.01	<.01	<.01	<.01	0.01	10080	20160
	16010	<.01	0.01	0.02	0.02	0.04	0.08	0.16	2260	4520 9820
	16015	<.01	<.01	< 01	0.01	0.02 0.03	0.03 0.06	0.06 0.12	4910 2820	5650
	15010	<.01	<.01 <.01	0.01 <.01	0.01 <.01	0.03	0.02	0.04	6130	12270
18	15015 T5020	<.01	<.01	<.01	<.01	0.01	0.02	0.05	5040	10080
	14010	<.01	<.01	0.01	0.02	0.03	0.05	0.11	3390	6780
	14015	<.01	<.01	<.01	<.01	0.01	0.02	0.04	7370 6720	14740 13440
	T3320	<.01	<.01	< 01	0.07	0.01	0.02	0.04	1690	3380
	16010 16015	0.01 <.01	0.02	0.05	0.07	0.04	0.09	0.17	3190	6380
	15010	<.01	0.01	0.04	0.05	0.09	0.19		2110	4220
	15015	<.01	<.01	0.01	0.02	0.03	0.07	0.13	3980	7970 5940
24	T5020	<.01	<.01	<.01	0.02	0.03	0.05 0.16	0.11	2970 2540	5940
	14010	0.01	0.02 < 01	0.03	0.05 0.02	0.08	0.16	0.31	4790	9580
ŀ	14015 T3320	< 01 < 01	<.01	<.01	0.01	0.02	0.04	0.08	3960	7920
	16010	0.03	0.05	0.11	0.16	0.27	1		1370	2740
	16015	0.01	0.02	0.04	0.06	0.10	0.20	0.41	2950 1710	5900 3420
30	15010	0.02	0.04	0.08	0.12	0.21	0.44	0.32	3680	7370
	15015	< .01 < .01	0.01	0.03	0.04	0.08	0.13	0.25	2590	5180
	T5020 14010	0.02	0.04	0.07	0.11	0.18	0.36	_	2060	4120
	14015	<.01	0.01	0.03	0.04	0.07	0.14	0.27	4420	8840
	T3320	<.01	0.01	0.02	0.03	0.05	0.09	0.19	3460 1180	6920 2360
	[6010	0.05	0.10	0.21	0.31	0.19	0.38		2460	4920
	16015 15010	0.02	0.04	0.16	0.11		-		1470	2950
	15015	0.01	0.03	0.06	0.08	0.15	0.30		3070	6150
36	T5020	0.01	0.02	0.05	0.07	0.12	0.23	0.47	2160 1760	4320 3520
	14010	0.03	0.07	0.14	0.21	0.35	0,25	0.50	3690	7380
	14015 T3320	0.01	0.03	0.05	0.05	0.09	0.18	0.35	2880	5760
	16010	0.09	0.19	0.37				_	950	1900
	16015	0.04	0.07	0.14	0.21	0.35			1840	3680 2370
	15010	0.07	0.15	0.29	0.44	0.28		<u> </u>	1180 2300	4600
42	15015	0.03	0.05	0.11	0.16	0.23	0.45	_	1850	3700
72	T5020 14010	0.02	0.03	0.25	0.37	<u> </u>			1430	2860
	14015	0.02	0.05	0.09	0.14	0.23	0.47		2760	5520
	T3320	0.02	0.03	0.07	0.10	0.17	0.34	-	2470 720	4940 1440
	16010	0.14	0.29	0.22	0.34				1410	2820
	16015 15010	0.06	0.11	0.23 0.45	- 0.34				900	1800
	15015	0.04	0.08	0.18	0.27	0.45			1760	3520
48	T5020	0.04	0.07	0.14	0.21	0.36	=		1620	3240
	14010	0.10	0.19	0.38		0.20			1080 2110	2160 4220
	14015	0.04	0.08	0.15	0.23 0.16	0.38		· · · · · · · · · · · · · · · · · · ·	2160	4320
	T3320 16010	0.03	0.05		- J. 16	<u>,,,,,</u>			570	1140
	16015	0.10	0.19	0.39		Nation - 1991		_	1110	2220
	15010	0.20	0.40	_				-	710 1380	1420 2770
EA .	15015	0.08	0.15	0,31	0.46			<del>                                     </del>	1380 1280	2560
54 '	T5020	0.06	0.12	0.24	0.36	<del></del>			850	1700
	14010 14015	0.17 0.06	0.34	0.26	0.39			_	1670	3340
	T3320	0.04	0.09	0.18	0.27	0.45		3444 <u> </u>	1680	3360
	16010	0.42							460 900	920 1800
	16015	0.15	0.31	_					900 570	1150
	15010	0.33 0.12	0.24	0.49	- 1.00			<b>- 1</b>	1120	2250
60	15015 T5020	0.12	0.18	0.36					1040	2080
	14010	0.28					- X <u>- </u> :		690	1380
	14015	0.10	0.21	0.41					1350 1360	2700 2720
	T3320	0.07	0.14	0.27	0.41				630	1260
	16015	0.34		==				_ w	780	1570
	15015 T5020	0.27	0.35	<del>                                     </del>	t		_		720	1440
72									940	1880

IMPORTANT: Load information is different for Phenolic resin gratings. Please contact Fibergrate for Phenolic load information.

NOTES:

1. The design of cold not exceed the MAX, RECOMMENDED LOAD at any given span. MAX RECOMMENDED LOAD represents a 2.1 factor of safety on ULTIMATE CAPACITY.

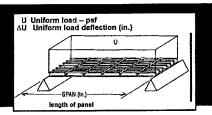
2. ULTIMATE CAPACITY represents a complete and total clause of the grainy, Values are provided to illustrate the reserve strength of the grainy at a given span and are NOT to be used for design. Functionally of graing is limited to MAX RECOMMENDED LOAD.

2. ULTIMATE CAPACITY represents a complete and total clause of the grainy. Values are provided to illustrate the reserve strength of the grainy at a given span and are NOT to be used for design. Functionally of graing is limited to MAX RECOMMENDED LOAD.

3. Waking loads, typically 50-65 PSF maximum are recommended for peaks that indice the grain of the loads for inpact of years to confidence should be a maximum of LORE-HAY if he release shown, Long term loads will result in added detection due to dreap in the material and will also require injuries safety factors to ensure acceptable performance for a policition at devoked temperatures, consult actory. The designer is further referenced to the ASCE Shoutura Plastics Design Manual.

5. All graings were lessed in accordance with the proposed standard of the Providess Graing Manufacturers Council of the American Composites Manufacturers Association (ACMA).

## **Pedestrian Uniform Load Chart**



	EDESTR	IAN SEN	<u>(IES SAF</u>			<u> JKM LOA</u>	AD IABL	<u>E - DEF</u>	ECTIONS IN MAXIMUM	INCUES
CLEAR	LOAD (psf)									ULTIMATE CAPACITY
SPAN (in)	STYLE	50	100	200	300	500	1,000	2,000	RECOMMENDED LOAD	(psf)
<u> </u>	T3810	<.01	<.01	<.01	<.01	0.01	0.03	0.06	2730	5460
	T3815	<.01	<.01	<.01	<.01	0.01	0.01	0.03	4220	8440
12	T2510	<.01	<.01	<.01	<.01	0.01	0.02	0.05	3280	6560
12	T2515	<.01	<.01	<.01	<.01	0.01	0.01	0.02	5060	10120
-	T1210	<.01	<.01	<.01	<.01	0.01	0.02	0.04	4590	9180
	T1215	<.01	<.01	<.01	<.01	0.01	0.01	0.02	5060	10120
	T3810	<.01	0.01	0.02	0.04	0.06	0.12		1820	3640
	T3815	<.01	<.01	0.01	0.01	0.02	0.05	0.10	2810	5620
18	T2510	<,01	0.01	0.02	0.03	0.05	0.10	0.20	2180	4360
10.	T2515	<.01	<.01	0.01	0.01	0.02	0.04	0.08	3380	6760
- 1	T1210	<.01	<.01	0.01	0.03	0.04	0.09	0.18	3060	6120
	T1215	<.01	<.01	0.01	0.01	0.02	0.04	0.07	3940	7880
ŀ	T3810	0.02	0.03	0.07	0.10	0.17	034		1370	2740
	T3815	0.01	0.01	0.02	0.04	0.06	0.12	0.24	2110	4220
24	T2510	0.01	0.03	0,06	0.08	0.14	0.28		1640	3280
44	T2515	<.01	0.01	0.02	0.03	0.05	0.10	0.20	2530	5060
	T1210	0.01	0.02	0.05	0.07	0.12	0.24	0.48	2290	4580
	T1215	<.01	0.01	0.02	0.03	0.04	0.09	0.17	2950	5900
30	T3810	0.04	0.08	0.16	0.24	0.40			1090	2180
	T3815	0.01	0.03	0.06	0.08	0.14	0.28		1690	3380
	T2510	0.03	0.07	0.13	0.20	0.33		~ -	1310	2620
	T2515	0.01	0.02	0.05	0.07	0.12	0.23	0.47	2030	4060
	T1210	0.03	0.06	0.11	0.17	0.29			1840	3680
	T1215	0.01	0.02	0.04	0.06	0.10	0.20	0.40	2360	4720
	T3810	0.08	0.16	0.32	0.49				860	1720
	T3815	0.03	0.06	0.11	0.17	0.28			1410	2820
36	T2510	0.07	0.14	0.27	0.41				1040	2080
30	T2515	0.02	0.05	0.09	0.14	0.23	046		1690	3380
	T1210	0.06	0.11	0.23	0.35	<del></del>			1450	2900
	T1215	0.02	0.04	0.08	0.12	0.20	0.40		1970	3940
	T3810	0.15	0.30			<u> </u>			630	1260
	T3815	0.05	0.10	0.20	0.30				1100	2200
42	T2510	0,12	0.25	0.50					760	1520 2640
72	T2515	0.04	0.08	0.17	0.25	0.41			1320	
	T1210	0.11	0.21	0.43					1060	2120
	T1215	0.04	0.07	0.14	0.21	0.36			1540	3080 980
	T3810	0.25	0.50	0.00		<u> </u>			490	1680
	T3815	0.08	0.17	0.33		<del> </del>			840 590	1160
48	T2510	0.21	0.42			ļ — <del> </del>	_=_		580	2020
70	T2515	0.07	0.14	0.28	0.42				1010 820	1640
ļ	T1210	0.18	0.36		-	ļ <del></del>				2360
	T1215	0.06	0.12	0.24	0.36				1180 670	1340
_,	13815	0.13	0.26			<u> </u>				1600
54	T2515	0.11	0.22	0.44					800	1860
	T1215	0.09	0.19	0.38					930 540	1080
	T3815	0.20	0.40	14 () <del></del> ( 4 1)					V-70	1300
60	T2515	0.16	0.33	ļ <del></del>		<u> </u>			650	1520
	T1215	0.14	0.28			=_			7 <u>60</u>	
	T3815	0.29							450	900
66	T2515	0.24	0.48						540 620	1080
	T1215	0.21	0.41			<u> </u>			620	1240
	T3815	0.41		_					370	740
72	T2515	0.34		I —	ı	. —	_		450	900

IMPORTANT: Installation should provide for fully supported abutements of grating panels. Otherwise higher deflection values may be experienced, and tripping hazards may occur.

Stub bars should not be less than 1 in clip attachment areas. Safe-T-Span pedestrian grating load bars at platorm edges should be full supported.

NOTES

1. The designer should not exceed the MAX.RECOMMENDED LOAD at any given span. MAX.RECOMMENDED LOAD represents a 21 factor of safety on ULTIMATE CAPACITY.

2. ULTIMATE CAPACITY represents a complete and total fallure of the grafing. Values are provided to illustrate the resone strength of the grafing at a given span and are NOT to be used for design. Fundamentally of grafing's imited to MAX.RECOMMENDED LOAD.

3. Walking bods, lypically 90-66 PSF maximum are recommended for protestian trade. Defections for worker comflort are lypically timed to the lesser of 38° or CLEAR SPAN divided by 125, for a timer feel, limit defection to the lesser of 14° or CLEAR SPAN divided by 200.

4. The advantile loads in this total ear for STATIC LOAD CONDITIONS at arrition the proposed standament temperatures only Albuvatile bads for impact or dynamic comflicions should be a maximum of CME-HALF for values shown Long termbods will result in added defection due to one pin fine material and will also require higher soldy about the service acceptable performance for constitutions. For exceptable performance for constitutions of the sold accountance with the proposed standard of the Phendard Composites Manufacturers Association (ACMA).