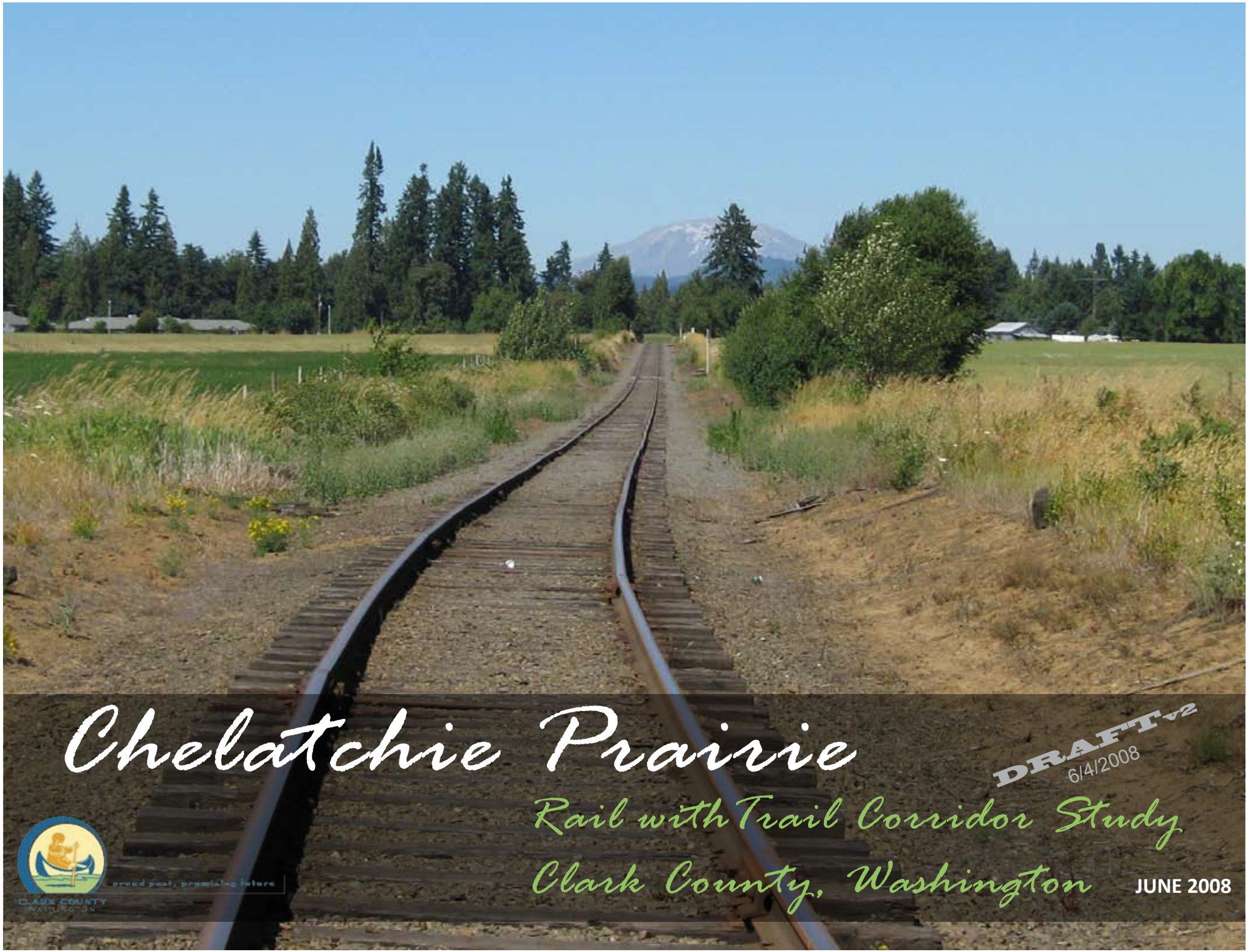

Chelatchie Prairie

DRAFT v2
6/4/2008

Rail with Trail Corridor Study

Clark County, Washington

JUNE 2008

proud past, promising future

CLARK COUNTY
WASHINGTON

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Cover: Mt. St. Helens from the Chelatchie Rail-with-Trail Corridor near Mile Post 9.

Acknowledgements

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The Chelatchie Prairie Railroad corridor near Lucia Falls, MP-24.

Photo: Steve Durrant

Columbia Basin Railroad (CBRR)/Portland Vancouver Junction Railroad (PVJR) locomotive No. 211 at Rye Yard.

Photo: Steve Eshom

BYCX steam locomotive in Yacolt, WA.

Location & History

The Chelatchie Prairie Railroad runs for 33 miles diagonally across Clark County in southwestern Washington. Work began on the Vancouver, Klickitat and Yakima railroad in 1888 with the goal of connecting Vancouver to the transcontinental railroad in Yakima by way of Klickitat Pass. By 1898 the railroad was bringing logs from Brush Prairie to Vancouver. It was completed to Yacolt and regular passenger service began in 1903. The line was never extended beyond Chelatchie Prairie. Thus the dream of connecting to Yakima is yet to be realized.

By the mid-1920's, logging in the area was winding down again. The Northern Pacific continued to operate logging trains on the line to serve the remaining small-scale operations in the area. By the mid-1940's, there was only one train a week to Yacolt. In 1948, the extension to Chelatchie Prairie was completed, opening that area to logging. A huge lumber and plywood plant operated there from 1960 to 1979.

The line changed names in 1981 to the Chelatchie Prairie Railroad and was operated until 1984 when the owners filed for abandonment. Clark County purchased the railroad and currently leases the line to the Portland Vancouver Junction Railroad for commercial operation to north of Battle Ground, and to the Chelatchie Prairie Railroad (BYCX), an historic railroad association operating out of Yacolt (Chelatchie Prairie Railroad Association).

Clark County acquired the corridor to maintain commercial freight and passenger rail service and to establish a non-motorized trail across the county. The Chelatchie Prairie Rail-with-Trail (RWT) is envisioned as a 33-mile multi-use trail within the railroad right-of-way where possible. In some areas the trail alignment will use existing trails, roadways or alignments outside of the right-of-way to meet width or terrain needs.

Purpose

The purpose of the Chelatchie Prairie Rail-with-Trail Corridor Study is two-fold:

- To assess the feasibility of developing a multi-use trail alignment along the Chelatchie Prairie Railroad corridor in Clark County, WA that will link the cities of Vancouver, Brush Prairie, Battle Ground, Yacolt, and neighborhoods in between. The trail will connect major recreational destinations such as Burnt Bridge Creek Greenway, Battle Ground Lake State Park and Moulton Falls Regional Park.
- To recommend an alignment, design guidelines and phasing for implementation of the Chelatchie Prairie RWT, as a "jewel" for Clark County, not only for its recreational and cultural assets but as a primary non-motorized commuter route.

The 33-mile Chelatchie Prairie Rail line traverses Clark County in southwestern Washington.

Background & Approach

Clark County acquired the Chelatchie Prairie railroad right-of-way in 1985 for commercial transportation use and as a trail corridor. The rail is currently owned by Clark County and leased to two rail operators: Columbia Basin Railroad (CBRR) provides industrial rail service from the Burlington Northern mainline to Heisson. The Chelatchie Prairie Railroad (BYCX) provides passenger excursion trips on track from Heisson to the end of the line.

In 2006 Clark County received a Federal Transportation Enhancement Grant to create a comprehensive plan for development of the 33 mile Chelatchie Prairie Rail-with-Trail system. Additional funding for this study was received from Park Regional Real Estate Excise Taxes, and the Clark County Road Fund.

This study defines the overall goals, design guidelines and approach to developing a premiere regional rail-with-trail facility including:

- Project vision and goals.
- Analysis of existing conditions, natural features, historical features and land uses reflected in base mapping and photo documentation of the corridor.
- Review of existing plans and other relevant documents.
- Technical analysis of trail standards, regulations and permitting requirements.
- Analysis of conceptual trail alternatives.
- Public engagement during the study to review trail alignment options and trail design features. Adjacent landowners, agency stakeholders, community organization representatives, and interested citizens provided input at five public open houses.
- A Draft Chelatchie Prairie Rail-with-Trail Corridor Plan.
- Recommendation of a first segment to build.

Phases of the Study

The first phase of the study assessed existing conditions, including identification of existing trails that could connect or link the corridor, existing rail structures and right-of-way width, environmentally sensitive areas, slopes, and safety hazards.

Staff Identified larger citywide and regional connections and potential destinations, along with nearby user groups likely to use the trail. Staff gathered community input on existing conditions at this stage in a series of open houses. See Appendix B - Site Analysis and Appendix C - Public Engagement.

Phase 2 evaluated alignment alternatives. Maps of alignment options were created based on opportunities and constraints within the corridor. The evaluation used criteria such as traffic and rail safety, aesthetic appeal, proximity to desirable destinations, physical constraints, natural resource values, development cost, available right-of-way and property ownership. Community input was obtained during open houses.

This report focuses on design guidelines, a recommended alignment, and a recommended first construction phase.

The rail operators, the rail advisory committee, county planning commission, county commissioners, and agency staff have reviewed the alignment evaluation process, the design guidelines and drafts of this report.

Moulton Falls is a recreational attraction near Mile Post-24.5.

Vision & Goals

Communities interested in improving conditions for bicycling and walking see rail corridors as prime opportunities. "Rail-with-trail" (RWT) describes any shared use path located on or directly adjacent to an *active* railroad corridor. Shared use paths are physically separated from motorized vehicular traffic by an open space or barrier. They may be used by multiple non-motorized users (AASHTO Bike Guide, 1999). The terms "multi-use trail" and "trail" will be used interchangeably with "shared use path" in this report.

The vision for the Chelatchie Prairie RWT is to designate and develop a multi-use trail within the right-of-way that provides a non-motorized travel alternative for Clark County residents. The proposed trail parallels the active rail line for 33-miles from Vancouver to Chelatchie Prairie and protects and enhances the biological, cultural and historic resources within the corridor.

Staff developed goals for the Chelatchie Prairie RWT in consultation with Clark County to guide design and future trail development. They include:

1. Increase the rate of bicycling and walking in Clark County by providing a safe and inviting trail that connects key destinations and communities within the county.
2. Develop trail recommendations in coordination with the county rail authority and the rail operator that are compatible with planned rail improvements and increase in rail traffic.
3. Work with property owners adjacent to the railroad corridor to preserve and enhance the corridor as a recreational and transportation alternative.
4. Develop trail design and development standards that are easy to maintain and access by maintenance, security, and emergency vehicles, and that minimize impact to the environment.
5. Develop and establish a comprehensive wayfinding system that enables people to use the trail efficiently.
6. Develop a trail master plan that will enable project partners to apply for grants to implement the trail.

Mile Post 17, at Crawford Road and NE 249th Avenue. Near Battle Ground Lake State Park.

Context

Population Growth and Development

Clark County ranks 35th out of the 39 Washington counties in terms of overall size. However, it is one of the fastest growing counties in the state. The population of Clark County increased 80-percent from 192,227 people in 1980 to 345,238 in 2000. It is projected to grow another 65-percent by 2030 to an estimated population of 567,982, making it one of the fastest growing counties in the nation. This continued growth increases use of the existing transportation systems and development in the area[1].

The Chelatchie Prairie rail corridor is located within one mile of 20% of the population of Clark County.

Demographics

2000 population within 1 mile of the Chelatchie Prairie Rail corridor:

Families: 17,149
Households: 23,315
Total Population: 64,119

In addition to the economic, transportation and recreational benefits of the proposed RWT, certain demographic groups will benefit enormously from a multi-use non-motorized trail, including children, the elderly and those without vehicles. 9.5% of the population in Clark County are over the age of 65. Children ages five through 14 compose over 16% of the total population.

The proposed Chelatchie Prairie RWT is located less than one mile from more than 23,000 households and 13 schools, providing an excellent opportunity for students to safely walk, bike, rollerblade or skateboard to school.

1. U.S. Census Bureau, 2005 Population Estimates, 2000 Census, 1990 Census.

The East Fork Lewis River Greenway Trail in Moulton Falls Regional Park, Mile Post-23 to Mile Post 24.5.

Demand

Vancouver and Clark County have more than 45 miles of existing and 280 miles of planned shared use paths. Many of these existing and proposed facilities intersect the railroad corridor and could be connected into a network with the development of the Chelatchie Prairie RWT.

Under current conditions, cyclists have to share medium to heavy traffic volume roads with motor vehicles to reach important destinations across the community. Demand for off-road cycling and walking facilities will intensify further throughout the county as Clark County continues to grow. The Chelatchie Prairie RWT will provide an off-street alternative for bicycle commuters and a safe alternative for families and other recreational users.

Major recreational destinations on and near the corridor include Battle Ground Lake State Park, Moulton and Lucia Falls Regional Parks and Mount St. Helens National Volcanic Monument.

Most urban recreational trails nationwide show a higher pedestrian than bicycle usage, typically 2/3 pedestrian, 1/3 bicycle and other (e.g., skateboards, in-line skates). Table 1 shows a comparison of six major recreational trails with similar conditions to the Chelatchie Prairie RWT.

Table 1: Pedestrian and Bicycle Demand on Major Urban Trails

Path Name	Annual use	Peak daily use	Bicyclists	Pedestrians	Other
Hudson River Path, NYC, NY	3,776,275	18,267	50%	45%	5%
Monon Trail, Indianapolis, Indiana	2,115,540	10,233	28%	65%	7%
Terry Hershey Park Trail, Harris County TX	1,451,849	7,023	25%	70%	5%
Monterey Recreational Trail, Monterey, CA	1,514,584	7,326	46%	54%	0%
Bosque Trail, Albuquerque, NM	1,702,101	8,233	20%	73%	7%
Licking County, OH Trails	736,533	3,563	25%	75%	0%
Averages	1,882,814	9,108	32%	64%	4%

Existing Trails & Proposed Transportation Improvements

The proposed Chelatchie Prairie RWT is within close proximity to several existing trails and roads scheduled for improvements. The plan proposes use of the existing infrastructure for efficiency and to avoid conflicts with rail operations where the right-of-way is constrained. Examples include: the Burnt Bridge Creek Trail, Padden Parkway Trail, East Fork Lewis River Greenway Trail, and future improvements to NE 94th Ave, and NE 142nd Ave.

The East Fork Lewis River Greenway Trail, in the northern portion of the county near Moulton Falls Regional Park, is heavily used as a recreational resource. Connecting it to the larger trail network via the Chelatchie Prairie RWT will facilitate its use as a transportation corridor.

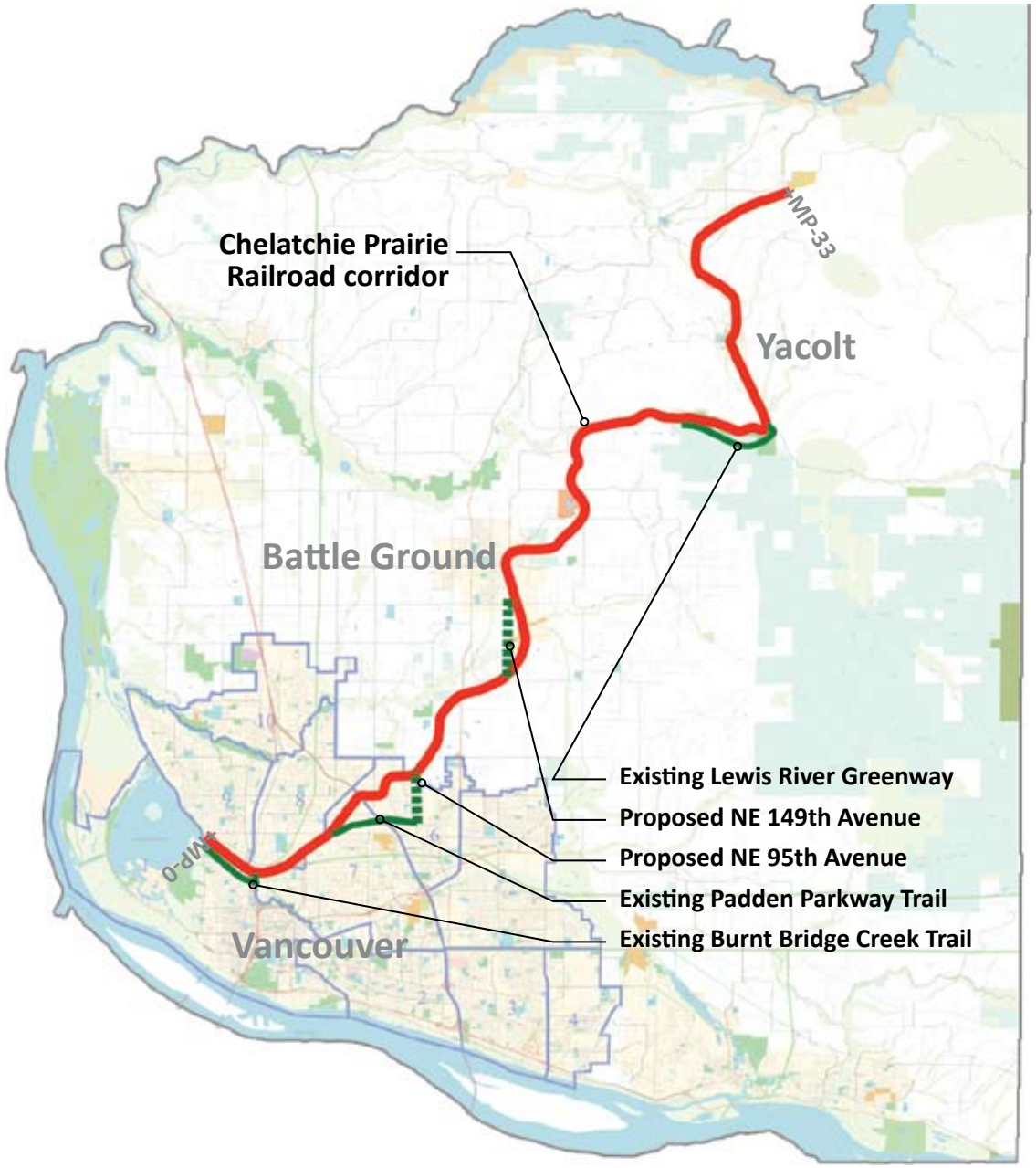
Over the 33 mile length of the rail corridor, the plan proposes using 6.5 miles of existing trail and approximately four miles of future roadway improvements. Approximately 22.5 miles of trail are proposed in the railroad right-of-way.

Hwy 99 Sub-area Plan

The Chelatchie Prairie Rail with Trail skirts the southern portion of the Hwy 99 sub-area plan. The trail alignment has been incorporated into the sub-area plan along with trail connections within the sub-area to the Chelatchie RWT.

Regional Transportation Council High Capacity Rail Study

The Regional Transportation Council study identifies the Chelatchie Prairie Railroad as an option for analysis after 2030 but does not identify it for study at this time. The study recommends that the Chelatchie Rail corridor be preserved for future commuter rail service and states that trail and freight rail use do not preclude such service.



Out of right-of-way trail connections included in the recommended alignment for the Chelatchie Prairie RWT.

Recommended Uses and Alignment

This chapter describes the recommended uses and alignment for the Chelatchie Prairie Rail-with-Trail for the length of the corridor. A more detailed narrative addressing improvements in the right-of-way can be found in Appendix A: Alignment Narrative.

Uses

The recommended alignment generally includes pedestrian and bicycle use of the right of way south of Battle Ground and pedestrian, bicycle and equestrian uses north of Battle Ground to respond to the varying right-of-way widths and conditions along the corridor.

Due to steep terrain along the South Fork Lewis River, the plan proposes a native soil single track trail between Heisson and the Moulton Falls trail at Hantwick Road for equestrian and hiking use.

Specific design characteristics of the various trail types and circumstances are detailed in the Design Guidelines section later in this chapter.

Rails-with-Trails

The design guidelines (beginning on page 27) identify considerations that will help to avoid exposing the users, owner, and operator of the railroad to risks that can reasonably be avoided. A recent national study (Rails-with-Trails: Lessons Learned, USDOT, 2002) of existing trails within active rail corridors did not reveal any documented injuries resulting from the rail with trail interaction. The researchers determined that there is no national consensus on standards for trail setbacks or separation from active rail operations. Therefore, the design guidelines developed specifically for the Chelatchie Prairie Rail-with-Trail corridor reflect the operating characteristics of this railroad and relevant practices nationally.

left: This segment of the Springwater-OMSI Trail on the Willamette River in Portland, OR is a rail with trail. The trail parallels a track used for daily freight and occasional excursion train traffic.

Out of Right-of-Way Segments

Several segments of the recommended alignment run outside of the existing rail right-of-way to take advantage of previously established trails or to bypass narrow right of way. These out of right-of-way alignments were not evaluated for suitability as bicycle, pedestrian, or equestrian routes, and require further study, design and coordination with roadway improvements, zoning and development plans.

Rail Crossings

The trail crosses the railroad 13 times along the 33 mile corridor at existing permitted crossings. There are 10 on-grade railroad crossings south of Main Street in Battle Ground and three on-grade railroad crossings north of Battle Ground. One crossing, near Minnehaha Street, is a private crossing and the remaining are adjacent to public roadways.

Two access trails that cross the rail near Battle Ground Lake State Park are recommended, one in a new crossing near Mile Post-16, and one at the existing NE 249th Street crossing at Mile Post-17.

Roadway Crossings

The Chelatchie Prairie Railroad crosses the vehicle roadway network throughout the length of the corridor at permitted rail crossings or existing road intersections. Most are on-grade crossings with warning signals and gates or, at a minimum, a standard railroad crossbuck sign.

The railroad currently makes four grade-separated (bridge or underpass) roadway crossings. The underpass of Minnehaha Street near MP-3 is the only grade-separated crossing currently recommended for a trail alignment.

Future upgrades in the corridor may include grade separation between rail and roadway and should be designed to accommodate a multi-use trail separated from motorized roadway traffic.

Most of the Chelatchie Rail crossings of roadways have warning signals similar to this one at NE 182nd Avenue.

The recommended alignment crosses roadways at existing crossings like this one on the Springwater in Portland.

The rail passes under Minnehaha Street, the only grade-separated crossing on the recommended trail alignment.

The recommended trail crossings of roadways are generally adjacent to existing rail crossings, at existing intersections, or at intersections recommended for future roadway improvements.

The need for mid-block crossings (i.e. not at a rail or roadway crossing) are not anticipated in this plan.

Implementation

Maps 1 through 14 in this chapter identify the recommended alignment for the RWT including segments that leave the rail ROW to use existing shared-use trails or future trails to be included in roadway improvement projects. As with many long trails, the Chelatchie Prairie RWT will be realized over a period of years, built as funds become available, and in coordination with rail and roadway improvements. Some portions may be built as a result of land development or as other opportunities arise for right-of-way acquisition and trail development. Appendix D - Implementation provides a summary of many of the funding sources available.

The primary purpose for phasing trail development is to break very large projects into smaller, logical segments for more feasible implementation. Individual trail segments must be safe and complete experiences in their own right, with logical termini and good connections within and to the community.

Approaching Crawford Road near Battle Ground Lake State Park at Mile Post 16.5

Candidates for Early Implementation

Several candidate segments were evaluated for early implementation for the Chelatchie Prairie Rail with Trail. The initial criteria for selecting segments for review included:

- logical termini (safe connection to the street grid or existing trails)
- adequate existing right-of-way width
- minimum conflicts with rail operations
- projected construction cost opinion of approximately $1-$3 million

Five candidates were identified and evaluated further, via a more detailed engineering and permitting assessment, review with agencies and the rail operator, and review with the community at the final project open house.

The Battle Ground to Battle Ground Lake State Park segment (see Maps 6 and 7) had consistent support from the community, user groups, rail operator and the agencies and was by far the most popular candidate in the public open houses.

This segment connects Fairground Park in downtown Battle Ground to Battle Ground Lake State Park. It can extend existing equestrian opportunities and make use of existing trailhead facilities and conveniences. It crosses few roads, has very infrequent rail operations, and the right-of-way is relatively wide at 100 feet.

Table 1 - Recommended early implementation

Segment	Mile Post	Length (feet)
NE Fairground Ave to NE 167th	14.4 to 15.8	7,200
NE 167th St to NE 182nd Ave. at Battle Ground Lake State Park (including out of ROW access on NE 167th)	15.8 to 17	6,600 (plus 3500 ft out of ROW)

Candidate for Early Implementation

The recommended segment for early implementation connects Fairground Park in downtown Battle Ground to Battle Ground Lake State Park.

Key Map

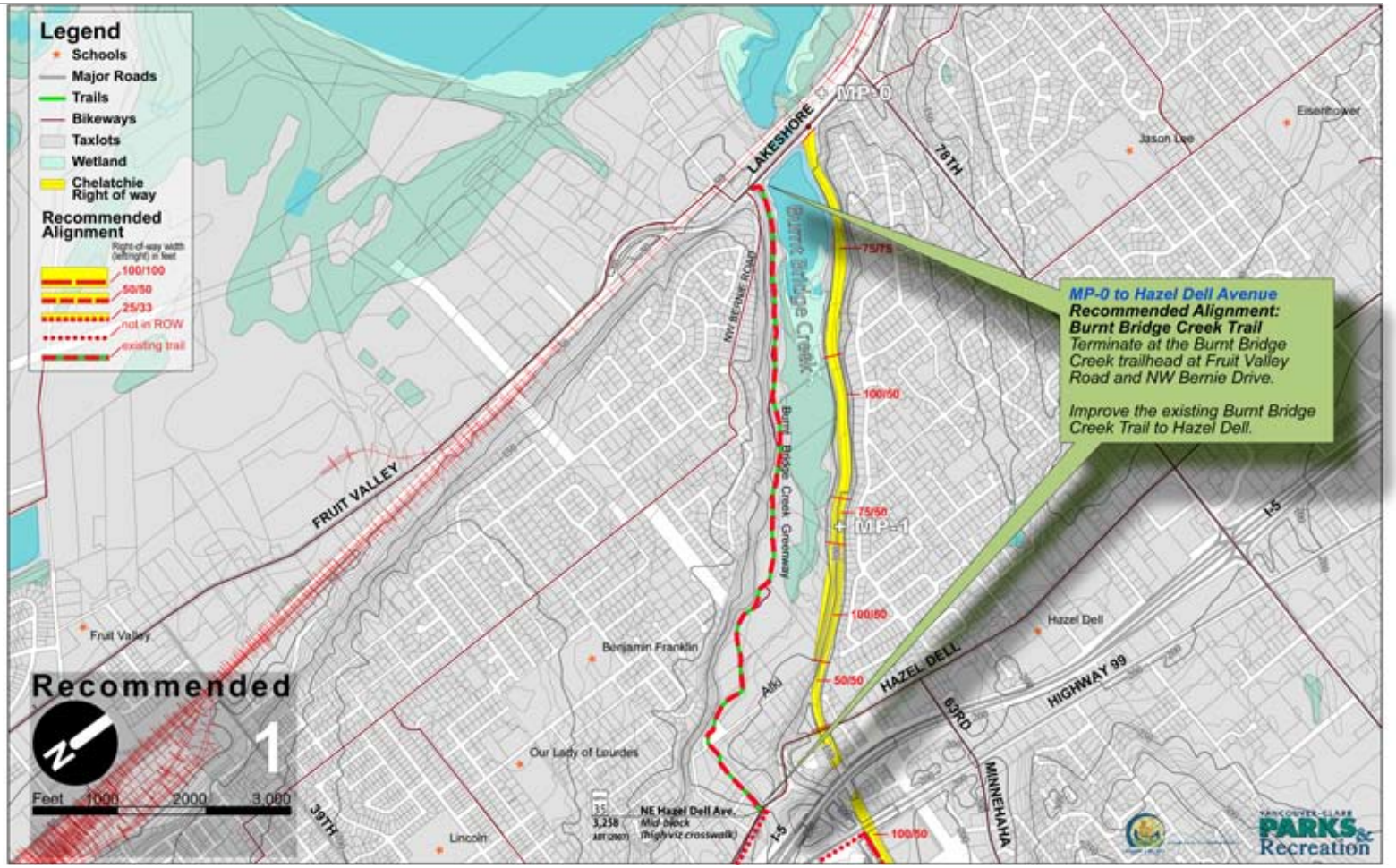
The maps in this section show the recommended alignment and summarize recommended improvements beginning at Mile Post-0 (MP-0) at Fruit Valley Road. References to left and right refer to orientation within the right-of-way while facing the end of the line. Appendix-A contains a narrative description of the improvements

Facing page: Rail right-of-way paralleling Railroad Avenue south of Yacolt near Mile Post-26.

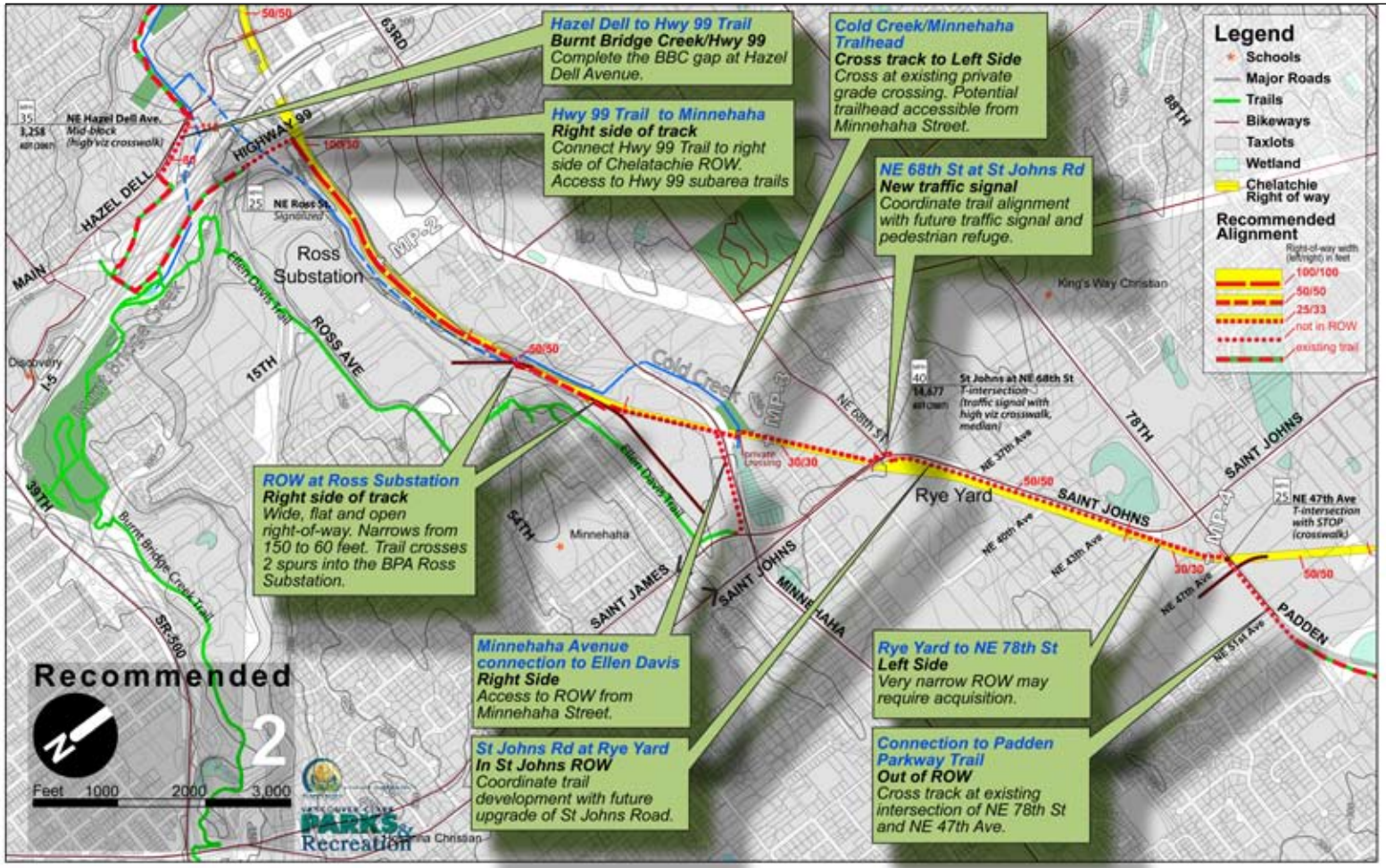
Burnt Bridge Creek Greenway parking at NW Fruit Valley Road.

Start of Burnt Bridge Creek Greenway.

Burnt Bridge Greenway at NE Hazel Dell Ave. requires a crossing treatment and completion of a missing link.



Burnt Bridge Creek near the beginning of the Chelatchie Prairie Railroad.



The end of the Hwy 99 Trail at NE Ross Street.

400 feet north of NE Ross St. The actual rail trail begins up the rail embankment.

Existing permitted crossing at Cold Creek just east of the Minnehaha St overpass.

ROW parallel to NE St Johns Road.

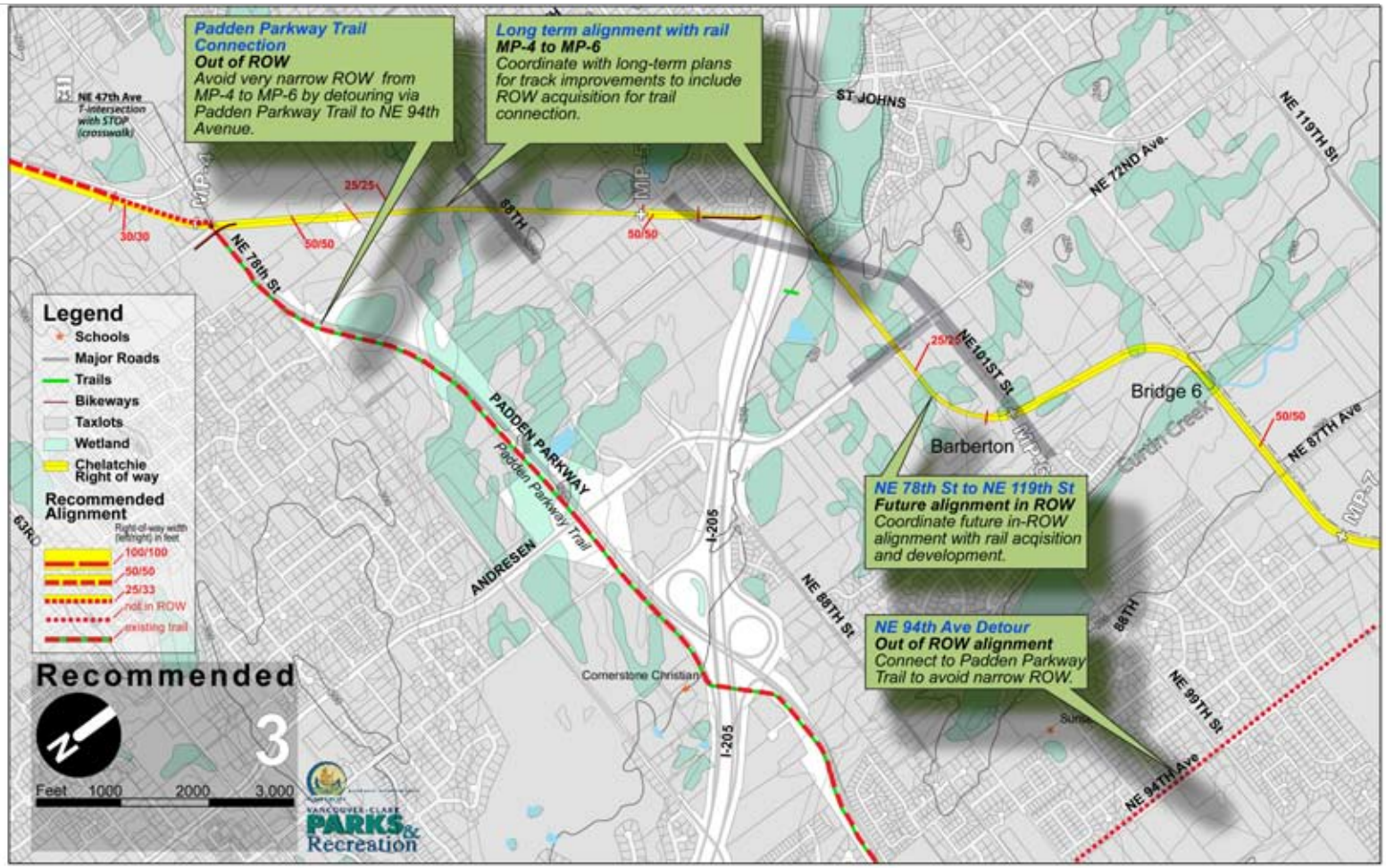
Looking west at T-intersection of NE 78th Street & NE 47th Avenue.

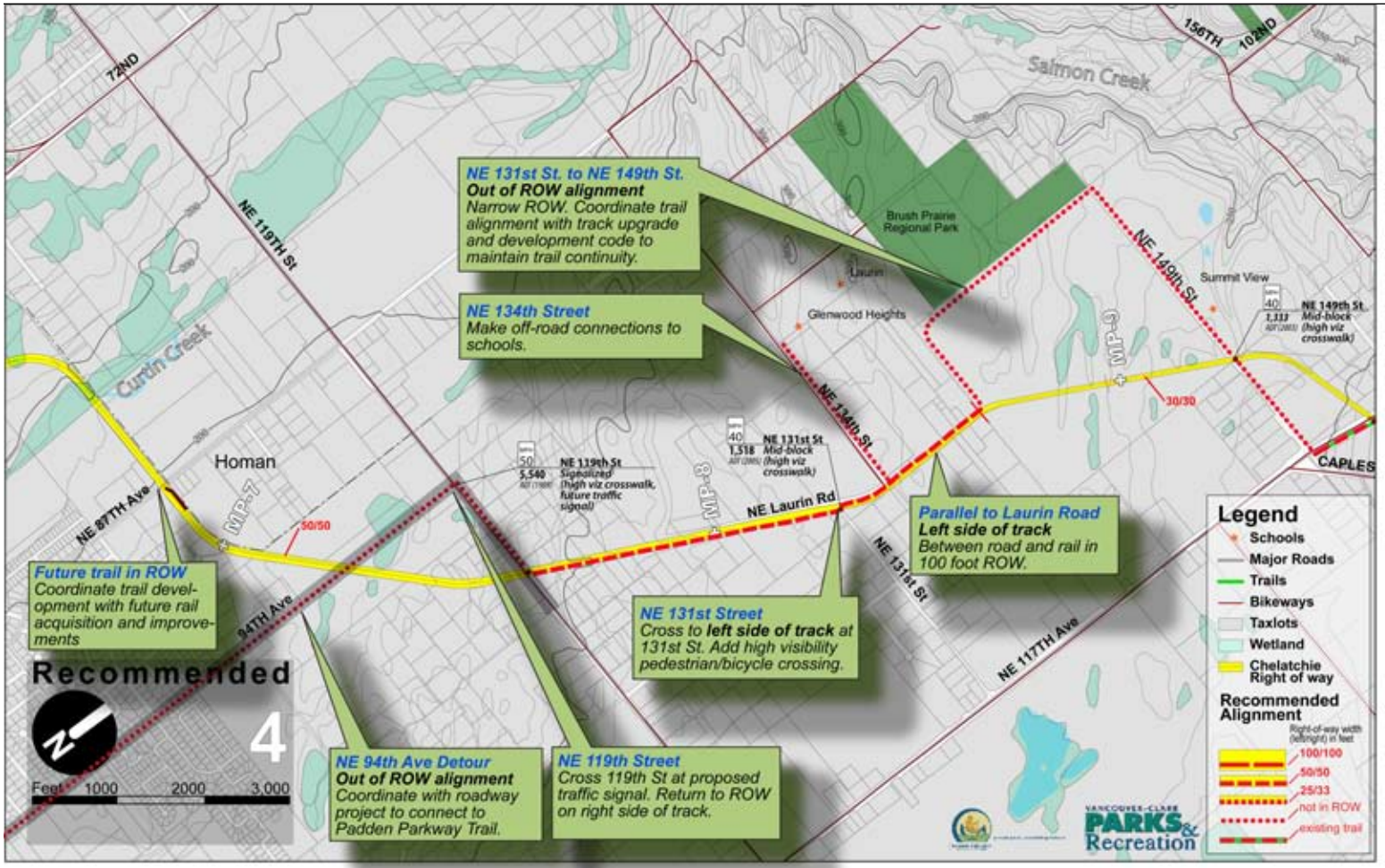
Constrained ROW around industry North of NE 78th Street.

Padden Parkway Trail traversing I-205 via ped/bike bridge.

> A recent wetland mitigation project on Curtin Creek is visible from the rail ROW.

Curtin Creek Bridge at MP-6.5.





The recommended alignment bypasses this narrow ROW near MP-6.75 at NE 87th Avenue in Homan.

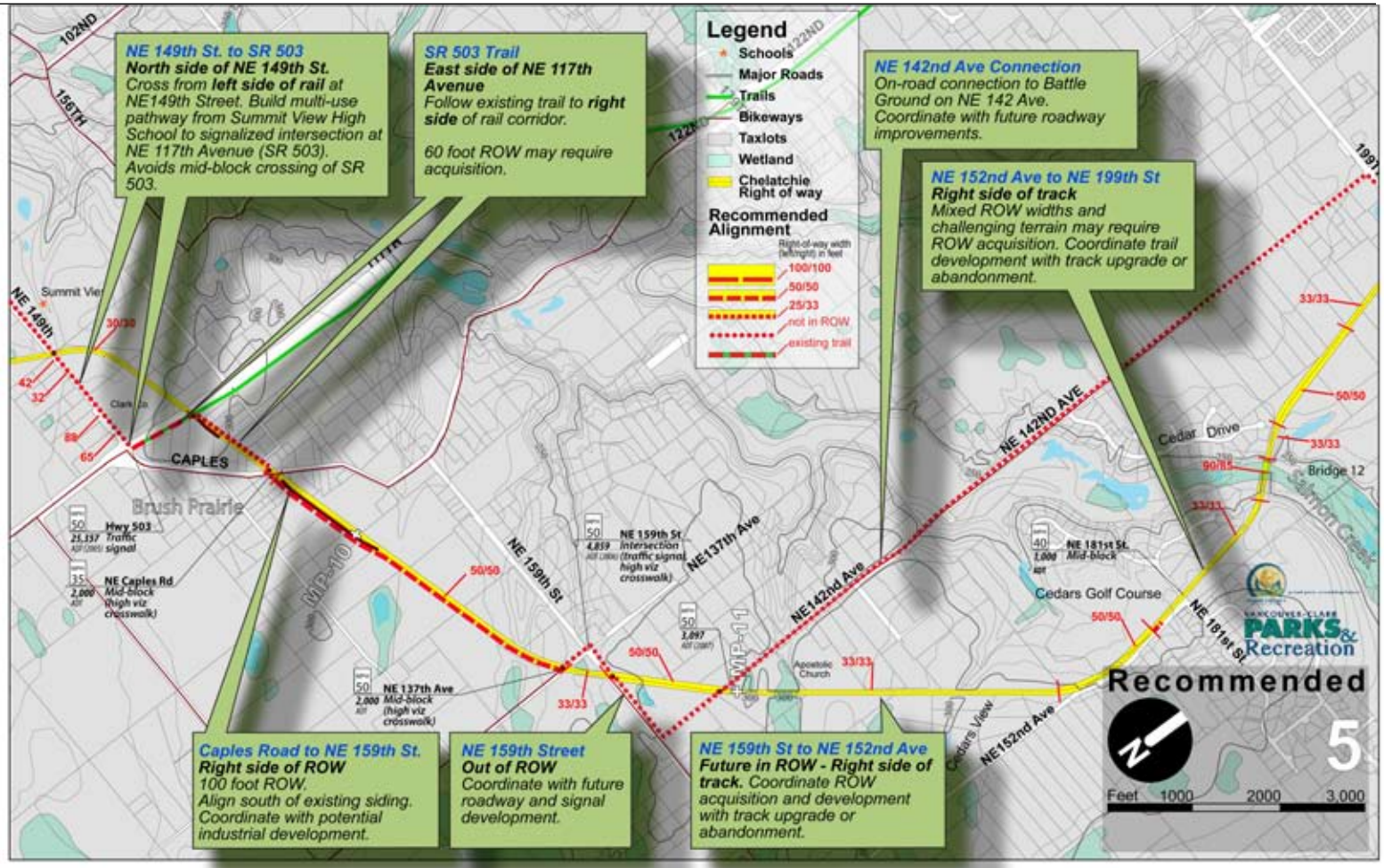
Driveway crossing north of NE Laurin Road near MP-8.5. The recommended alignment is left of track.

View near MP-8.7. Narrow 60' ROW and potential rail operations conflicts in area proposed for rezoning to Railroad Industrial will require coordination of trail alignment with development code and site design to maintain trail continuity.

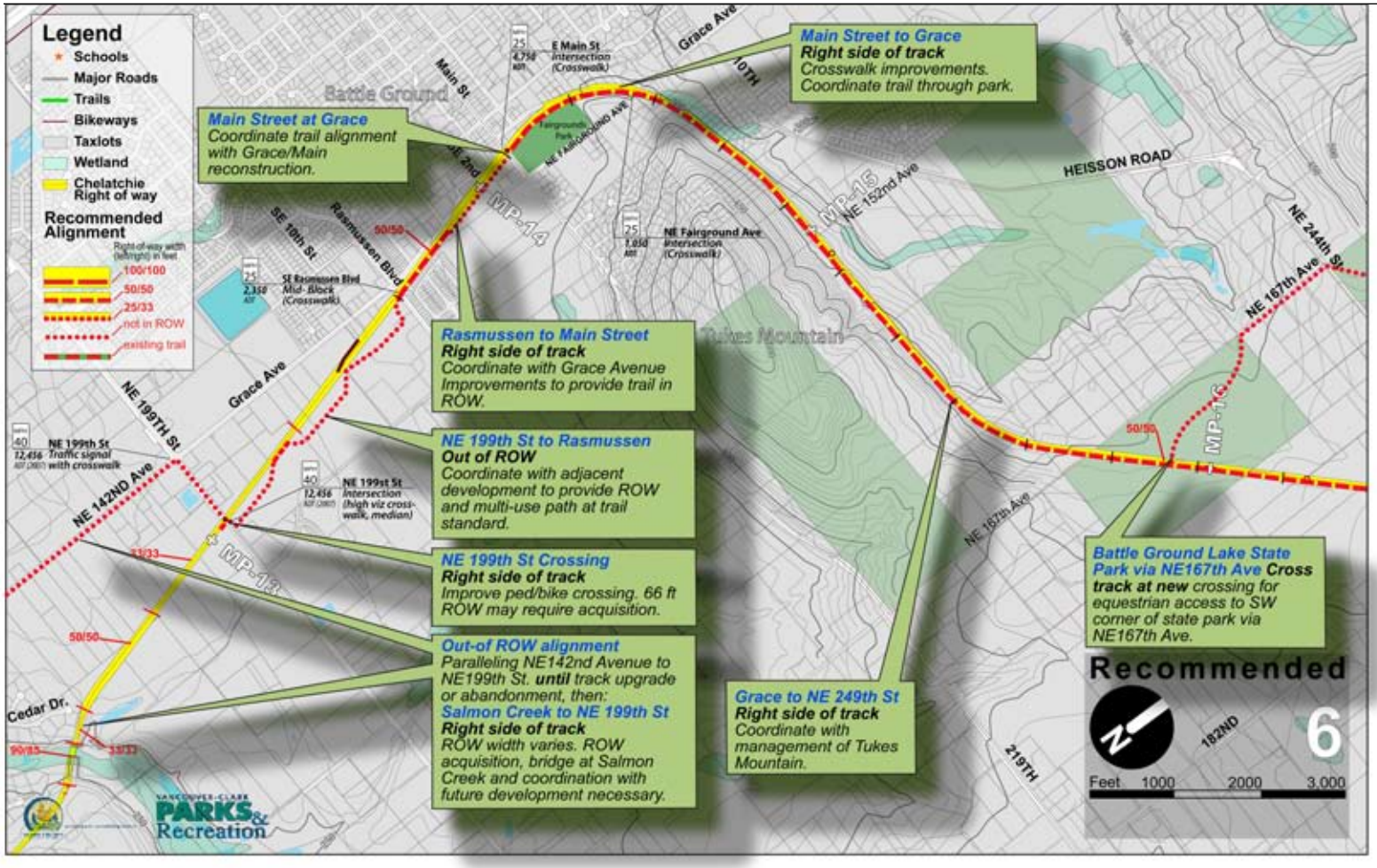
Crossing NE Caples Road at MP-9.8. Alignment crosses from left to right.

Narrow ROW approaching Brush Prairie east of Hwy 503.

Trestle across Salmon Creek at MP-12.4.



Railroad corridor adjacent to Cedars Golf Course at MP-12.2.



The interim route following NE 142nd Avenue to NE 199th Street.

Coordinate alignment north of NE 199th Street with adjacent development.

Battle Ground Yard at MP-14 approaching East Main Street in downtown Battle Ground.

left: The steep terrain around Tukes Mountain, between Battle Ground and Battle Ground Lake State Park at MP-14.5.

far left: Crossing NE Fairground Ave.

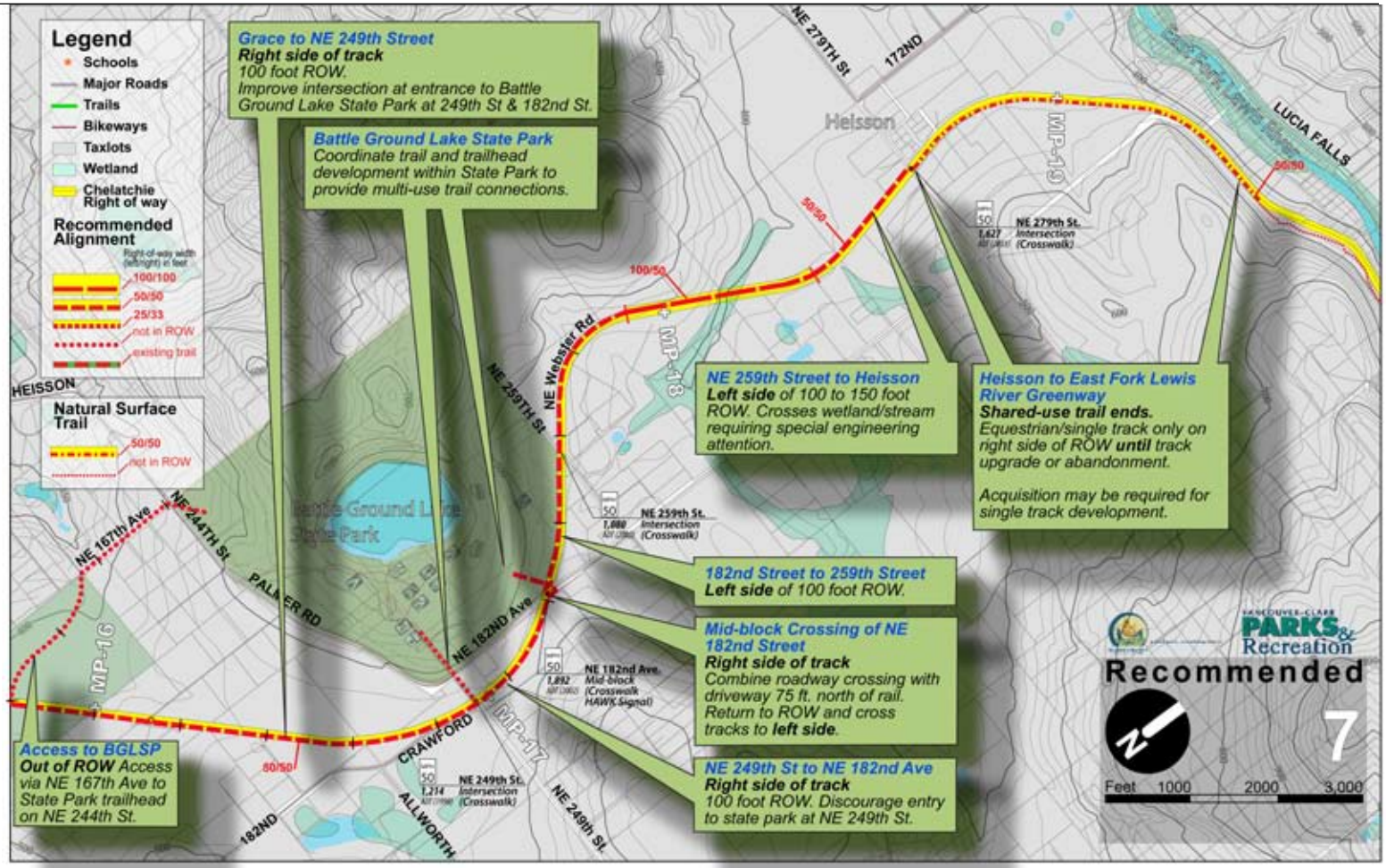
At MP-16.6, approaching NE Crawford Road.

Intersection of NE Crawford Road and NE 249th Street at MP-17.

Limited sight distance and the diagonal crossing at NE 182nd Avenue.

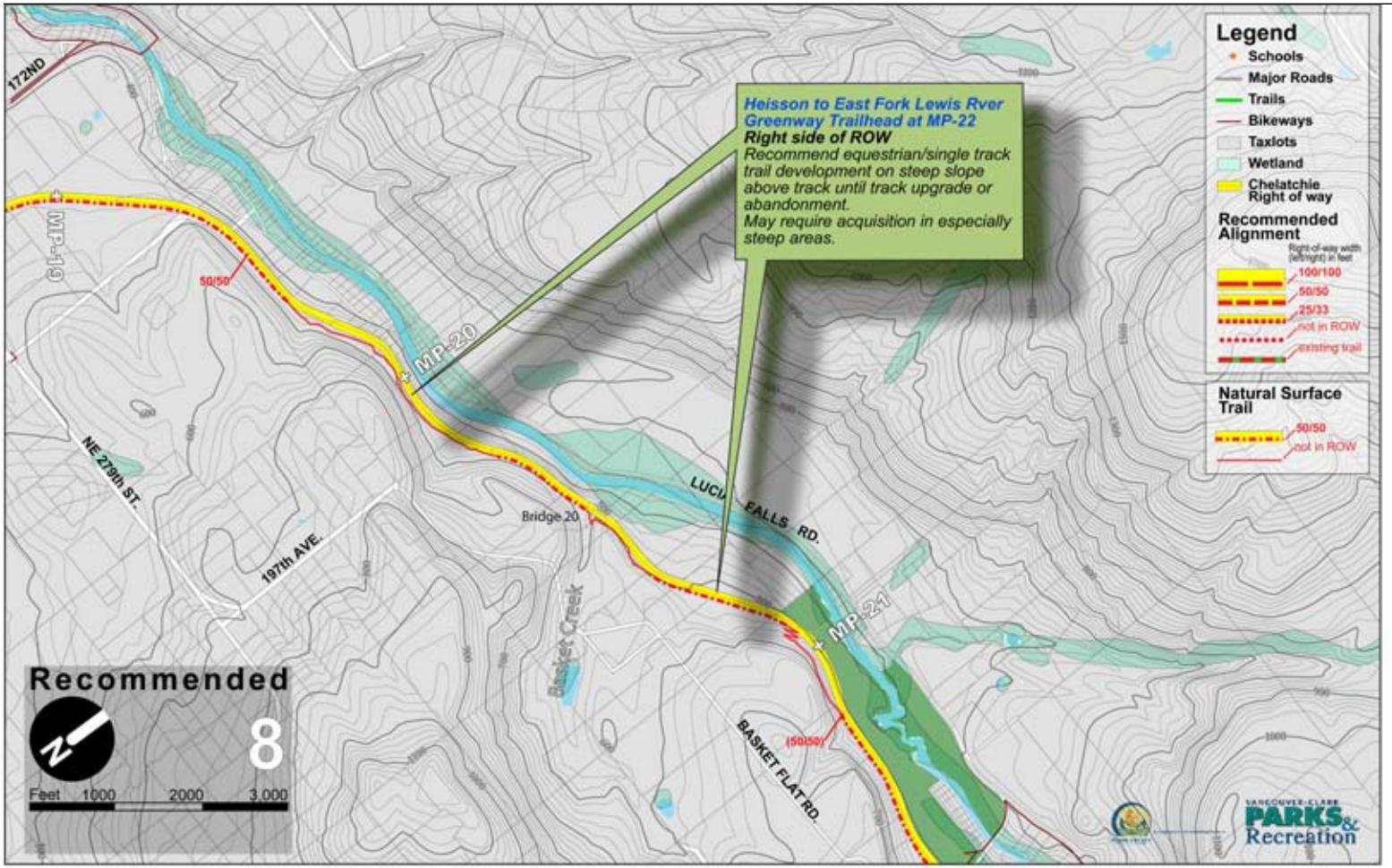
NE 259th crossing looking south.

The Heisson Store on NE 279th Street at MP 18.7.



Trestle at MP-18.1 across a creek and wetlands.

NE 279th Street crossing at Heisson looking east.



At MP-18.8, the terrain gradually becomes steep on both sides of the corridor.

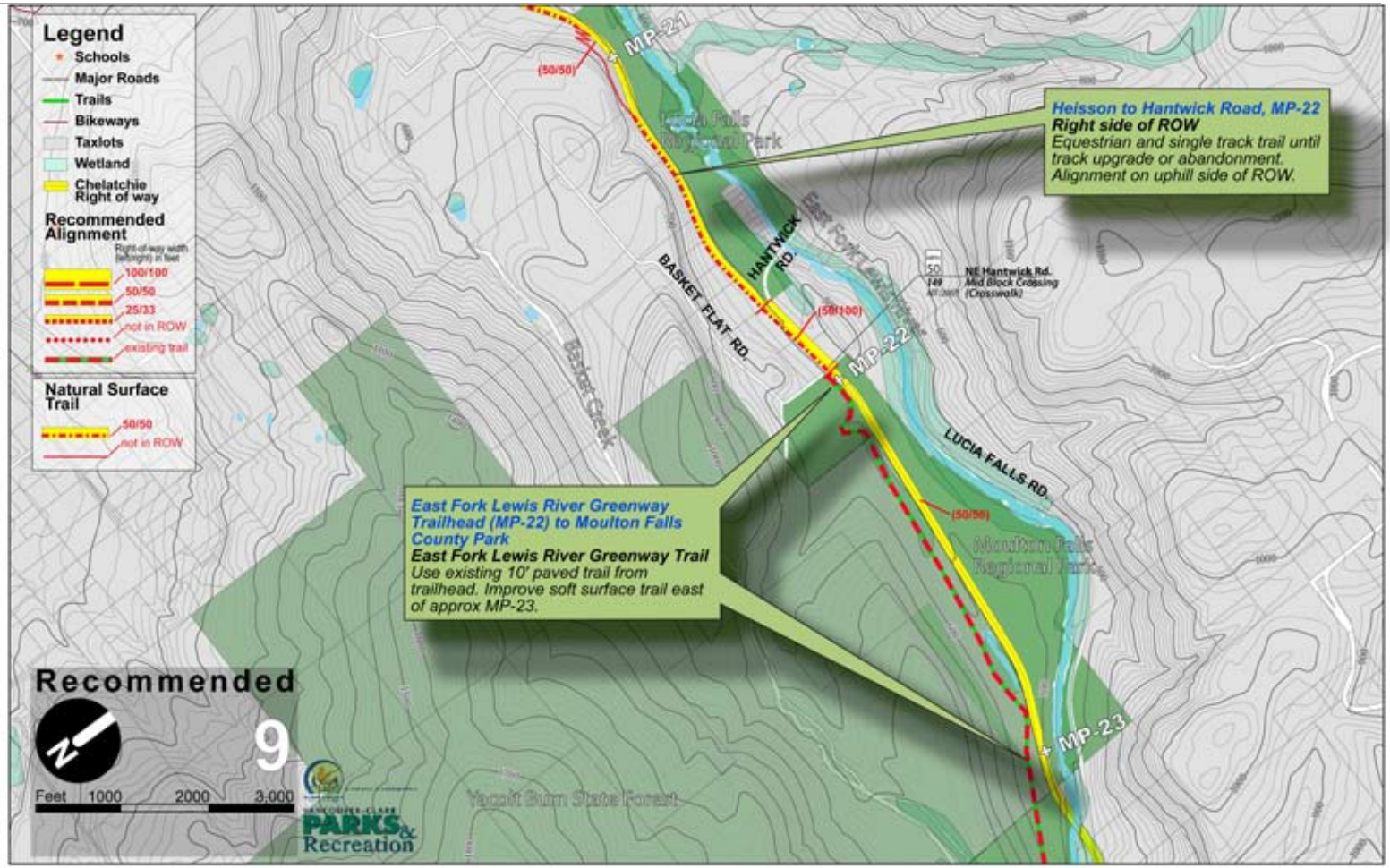
At MP 20.5 Basket Creek passes under Trestle #20 before tumbling down a dramatic waterfall to the East Fork Lewis River.

Primitive road bed above the ROW beginning near MP-19.9.

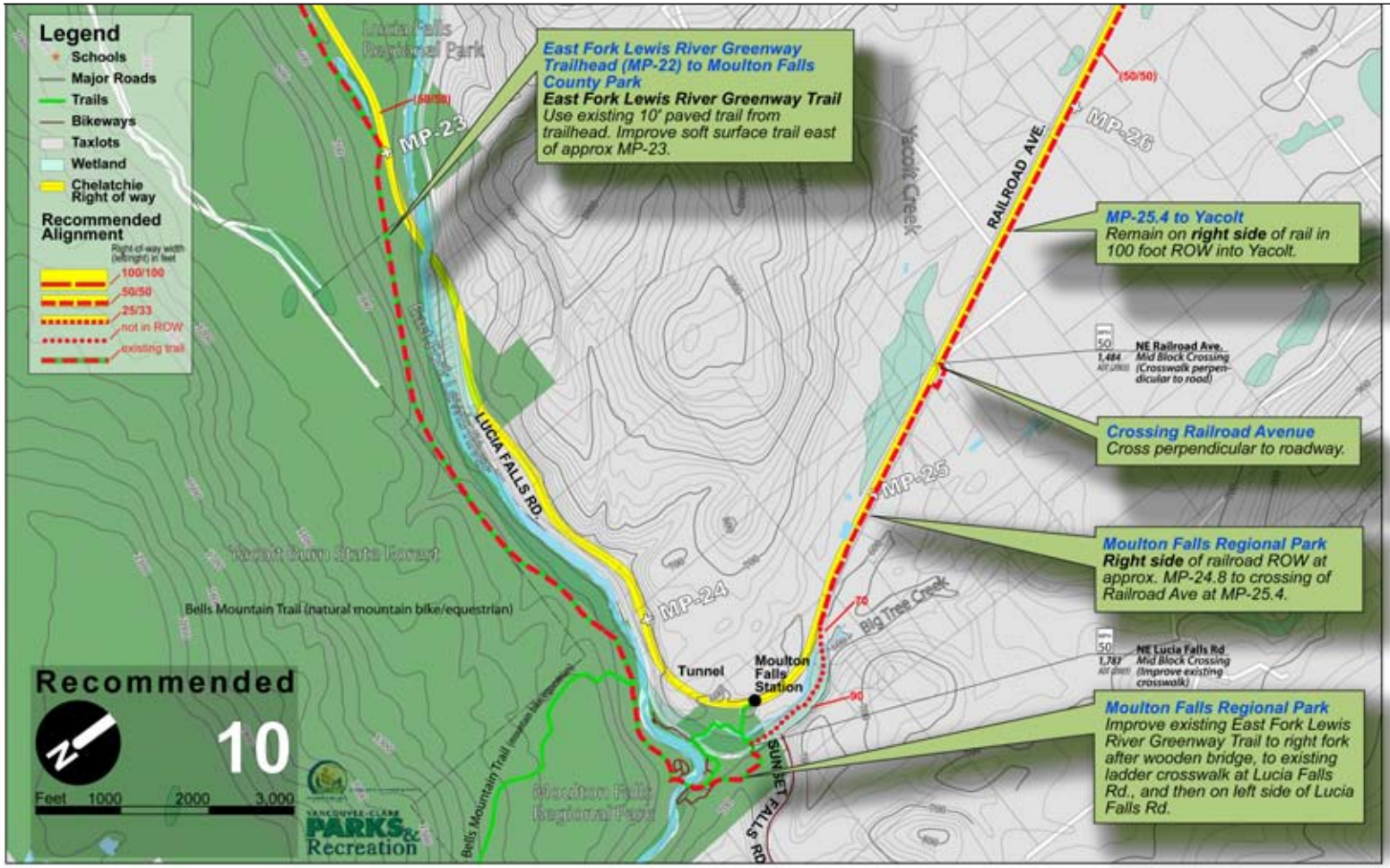
At MP 21.9, the corridor parallels NE Hantwick Road.

NE Hantwick Rd. crossing at MP 22 at the E. Fork Lewis River Greenway trailhead.

The E. Fork Lewis River Greenway is paved for about a mile.



The East Fork Lewis River Greenway in Moulton Falls Regional Park includes a paved shared use pathway which becomes a wide, well groomed and graded soft surface trail for another 1.5 miles.



The Bells Mountain Trail intersects the East Fork Lewis River Greenway Trail.

The trail bridge across East Fork Lewis River.

Ladder crosswalk across NE Lucia Falls Rd.

< Moulton Falls at MP 24.4 is a popular recreation destination by excursion train, bicycle, automobile and horseback.

Narrow shoulder north of Moulton Falls crosswalk.

The ROW crosses Yacolt Creek (and beaver ponds) near MP 25.

On grade crossing of NE Railroad Avenue south of Yacolt near MP 25.4.

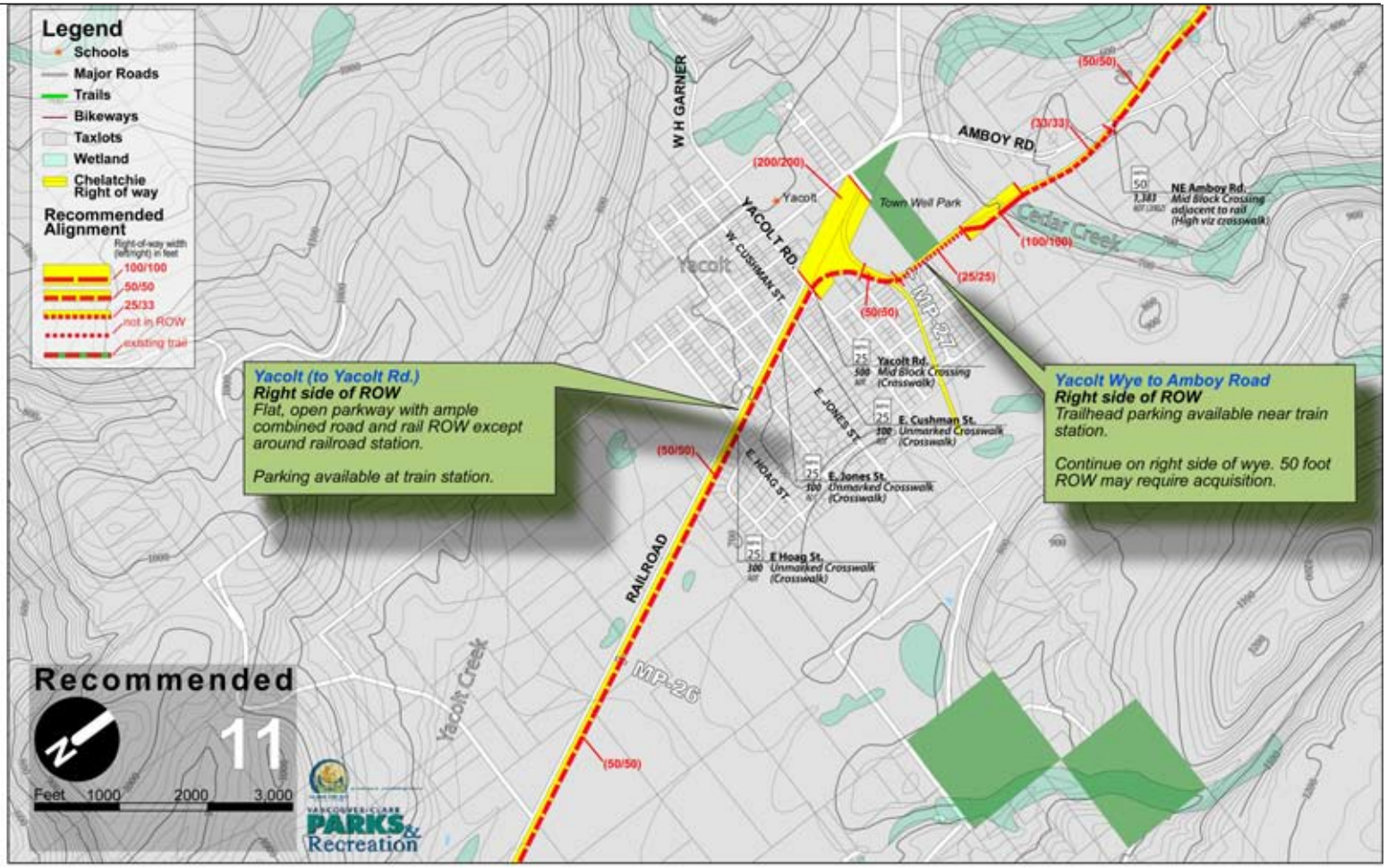
Approaching Yacolt near MP 26.3.

At E. Hoag Street crossing, the start of the parkway-like setting leading into Yacolt.

View south from Yacolt train station (between Yacolt Road and Cushman St).

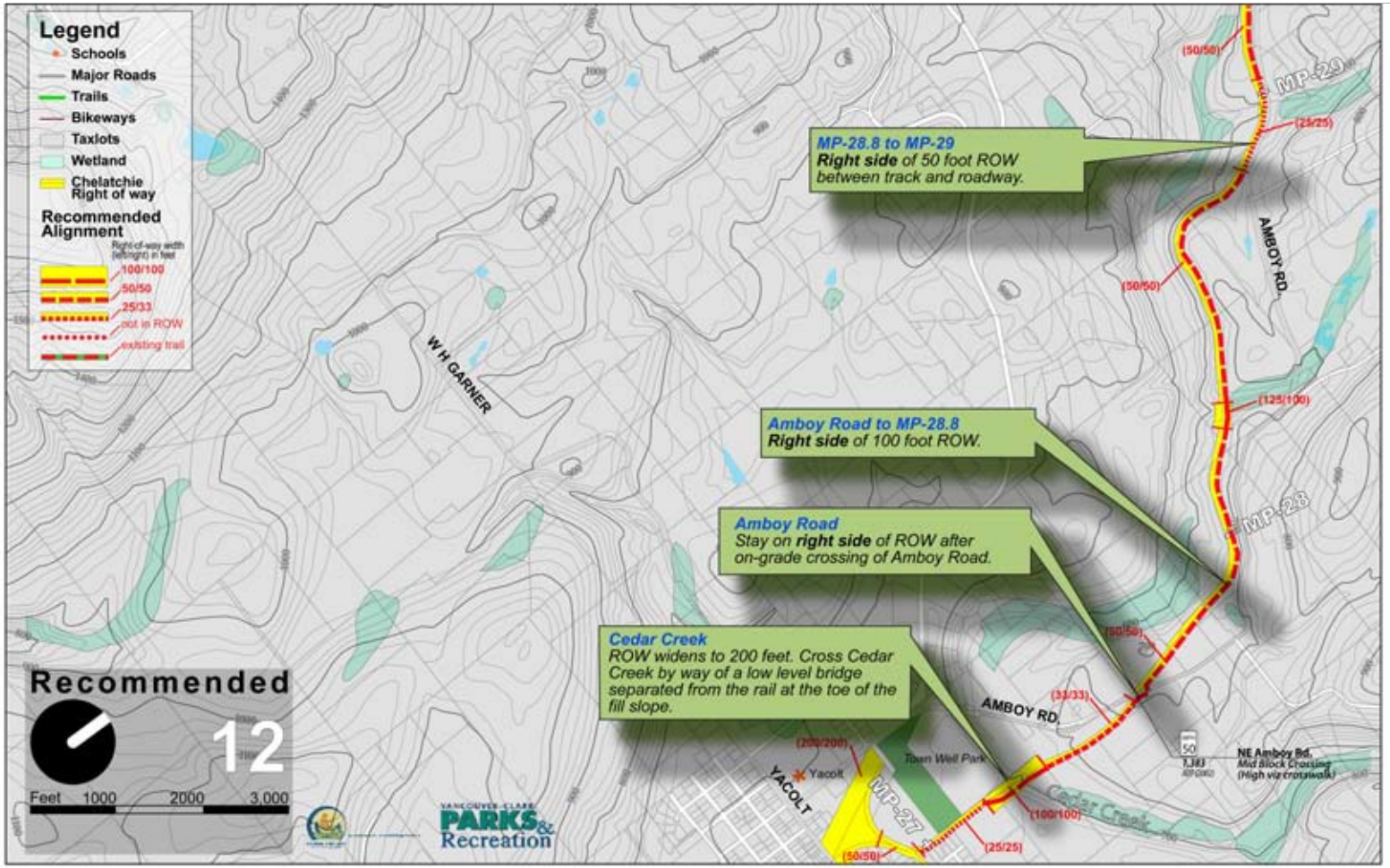
>The Chelatchie Prairie Railroad Association (BYCX) operates excursion trains from Yacolt.

Yacolt Road crossing of the wye.



The eastern spur of the wye approaching Yacolt at MP 26.9.

Tall fill slopes above Cedar Creek at MP 27.2.



Approaching Cedar Creek crossing at MP 27.4.

Diagonal crossing of NE Amboy Road at MP 25.

At MP 28.8, the railroad parallels NE Amboy Road in a 50' ROW.

< Near MP 29.

A private drive crossing in the 50' ROW paralleling NE Amboy Road.

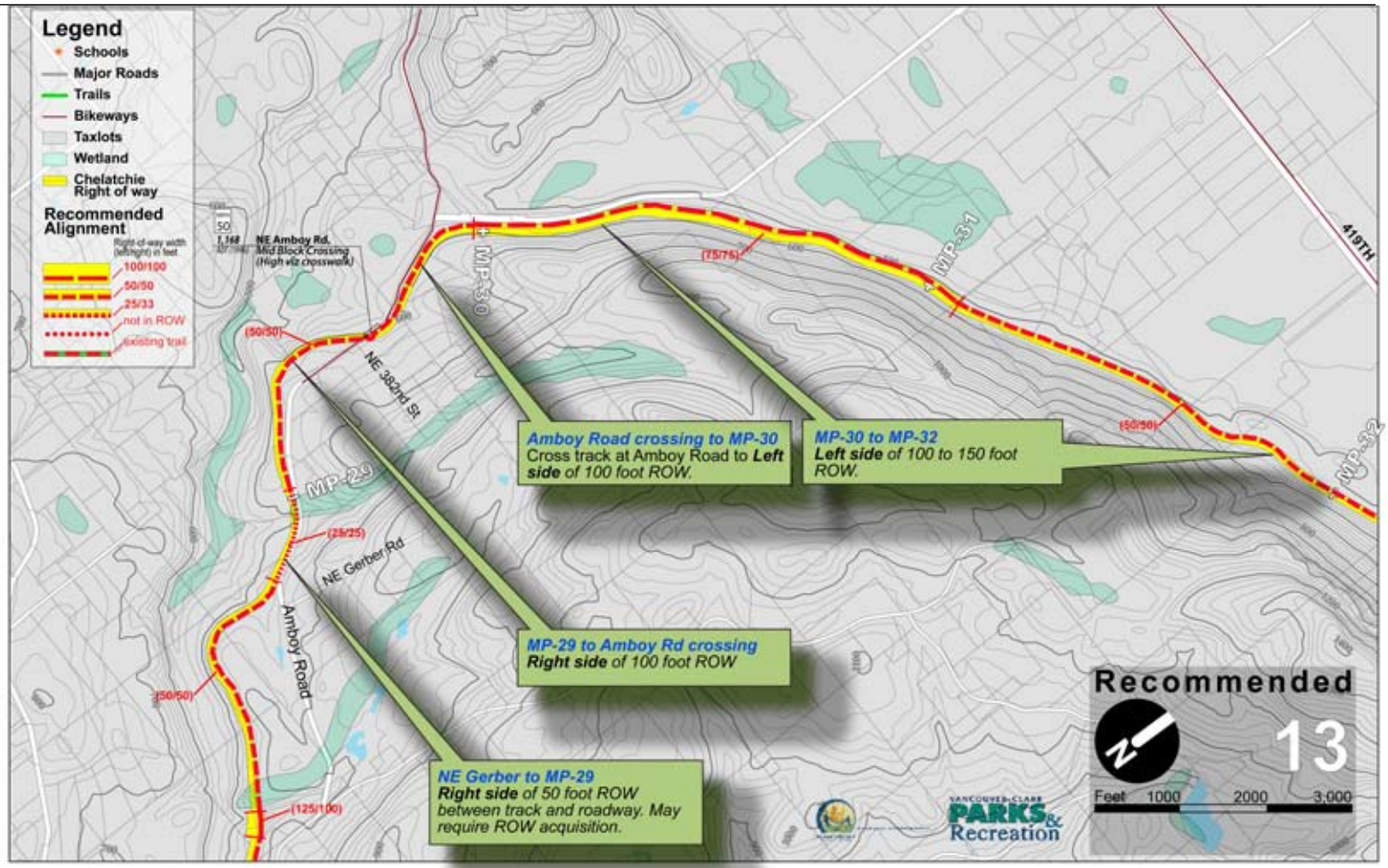
View near MP 29.4.

Crossing NE Amboy at MP 29.6.

NE Courtney Road at MP 29.75.

Steep slopes near MP 30.4. >

View at MP 29.9.



View at MP 30.

Steep slopes on both sides of the corridor near MP 30.2.

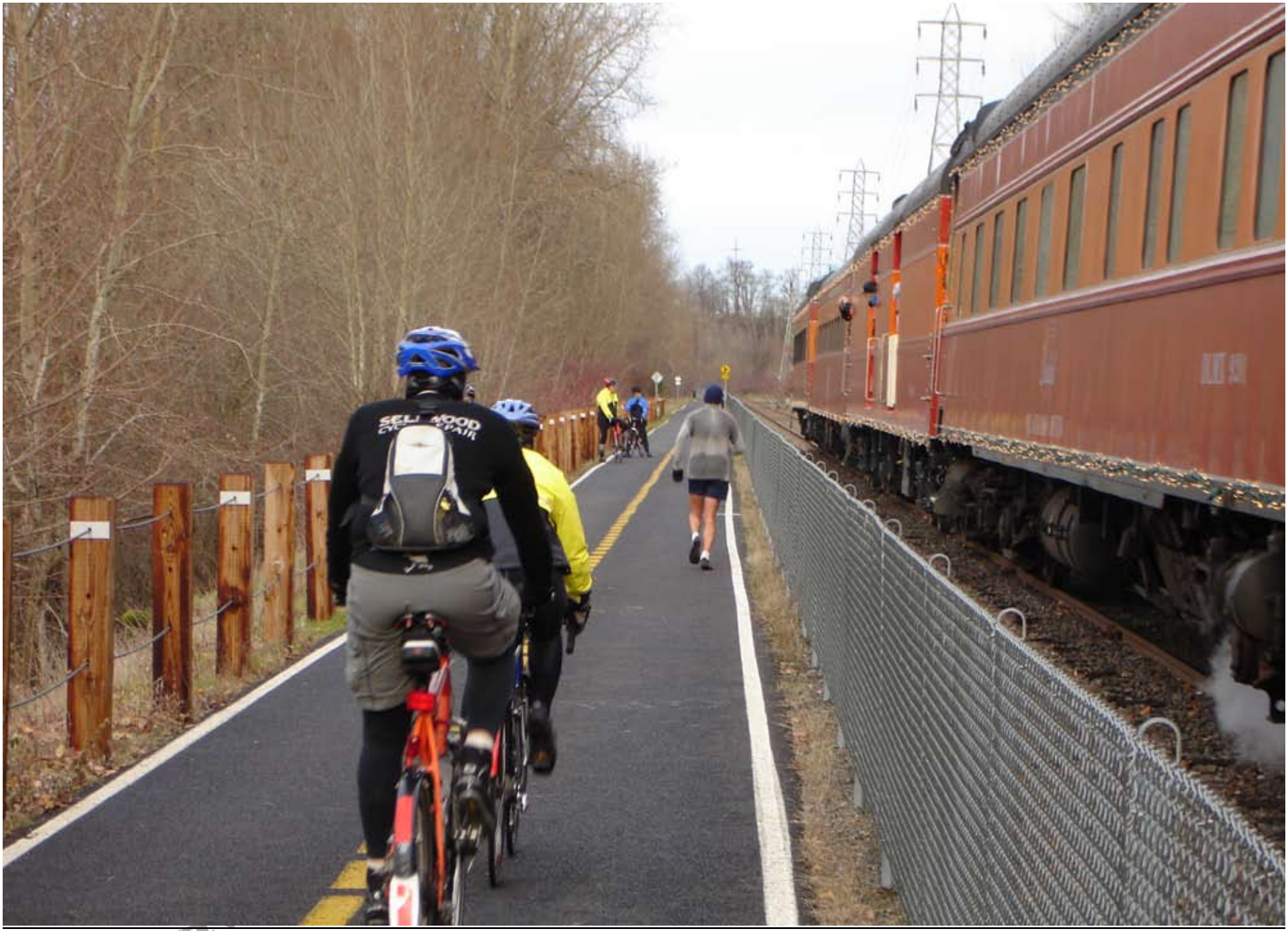
Near MP-32.

Near MP-32.

An abandoned siding near MP-32.5.

< Rail yard and engine barn at the end of line, MP-33.

A vintage rail car awaiting restoration near the Chelatchie Prairie wye, MP-32.8.



Chelatchie Prairie Rail-with-Trail Design Guidelines

The design guidelines incorporated into this Chelatchie Prairie Rail-with-Trail Corridor Feasibility Study need to be flexible and guiding rather than prescriptive. However, these design guidelines also define considerations that will help to avoid exposing the users, owner, and operator of the railroad to risks that can reasonably be avoided.

A recent national study (Rails-with-Trails: Lessons Learned, USDOT, 2002) of existing trails within rail corridors determined that there is no national consensus on standards for trail setbacks and separation from active rail operations, therefore, the Chelatchie Prairie Rail-with-Trail design guidelines were developed specifically for the Chelatchie Prairie Rail corridor to reflect the operating characteristics of this railroad and relevant practices nationally.

There are apparent risks when designing a trail within the right of way of an active railroad. Planning a trail in a location that is in close proximity to a rail line requires prudent design that thoughtfully balances risk and mitigation. Each segment of the proposed trail will be reviewed on its own merit.

Typical Trail Cross Section

The recommended width for a shared use trail is 12 to 14 feet (AASHTO Guide for the Development of Bicycle Facilities, 1999, and WSDOT Bicycle Facility Design Guidance) in areas expected to accommodate cyclists and pedestrians. Wider cross-sections and sometimes separation of users or directional traffic are recommended where higher user numbers and speeds are anticipated. Narrower widths, but no less than 10 feet, are acceptable where very small volumes are expected or extreme physical constraints are encountered. A two-foot graded shoulder should be provided, and a clear zone of three feet from the edge of pavement maintained to reduce hazards.

Horizontal alignment (curvature of the trail) and vertical alignment (slope) will be dictated in many areas by the railroad alignment and will fall well within the design guidelines for shared-use pathway design. In some areas however, the trail will diverge from the rail line and AASHTO guidance for horizontal and vertical alignment should be observed (AASHTO-1999).

Two-foot wide natural surface shoulders should be provided on both sides of the trail. This provides a setback or "shy distance" from fixed objects along the trail edge and also serves as a tactile warning device for anyone inadvertently straying off the trail. ¾-inch minus crushed aggregate is a suitable material for the trail shoulders. Vertical clearance along the trail should be a minimum of 10 feet and horizontal clearance should extend two feet beyond the trail shoulders. Note that the segments of the trail that may include equestrian users should have a wider shoulder on the side away from the railroad.

Chelatchie RWT Design Recommendations

Width	12 feet
Surface	Porous Asphalt
Soft Shoulder	3/4" minus crushed aggregate
Vertical Clearance	10 feet (12 feet for equestrians)
Horizontal Clearance	2 feet
Maximum Slope	5%
Cross Slope	2%

Though not a RWT, the Stafford Basin Multi-Use Trail in Lake Oswego, Oregon, is comparable in many ways to the Chelatchie Prairie Rail-with-Trail.

Grades

The recommended maximum trail gradient is 5%. Steeper grades (8%) can be tolerated for short distances (up to about 500 feet). The corridor is nearly flat for most of the alignment and 5% is likely achievable for the entire alignment where the trail can be accommodated within the right-of-way.

Structural Section and Surface

Trail construction will be conducted in a manner similar to roadway construction. Sub-base thickness will be determined by soil conditions. Expansive soil types require special structural sections. Use of geotextiles should be encouraged (depending on subsurface soil type and drainage) to provide stability and aid drainage to subsurface soils. Required pavement and subbase thicknesses will be determined by a geotechnical engineer in the preliminary design phase of implementation. 4" of porous pavement over 4" to 6" of porous foundation subbase is typical for similar installations.

The trail should have a cross-slope of at least 2% to direct water to subdrainage or swale for infiltration or pretreatment before discharge to surface waters.

Some trail sections may require retaining walls or more complex structural designs to accommodate grades adjacent to the corridor. In some areas boardwalks or bridges will be necessary to cross wetlands or streams. Equestrian users need to be considered in boardwalk and bridge design, signing and trail etiquette.

The 14 foot wide, synthetic boardwalk on the Stafford Basin Trail at Luscher Farm in Lake Oswego, Oregon traverses a wetland and stream. It is designed to accommodate horses as well as cyclists and pedestrians.

Soft Surface Trail

In certain confined areas, where the corridor encounters very steep side slopes, development of a multi-use trail may not be feasible without dramatic construction measures and significant right-of-way acquisition. This plan recommends the development of a soft surface trail which can accommodate hiking, mountain biking or equestrian use. These areas include the segment between NE 279th St. at Heisson (MP-18.7) to NE Hant-

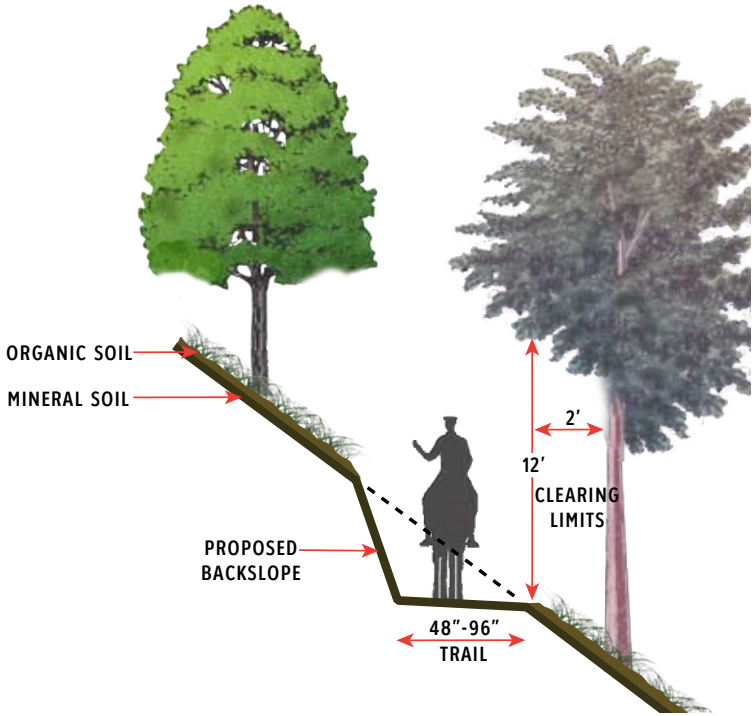


Figure 1: Typical soft surface trail cross-section and equestrian clearances.

wick Rd. (MP-22) and possibly from MP-30 to MP-32 near the end of the line (see Maps 7, 8, 9, 13 and 14).

Soft surface trail width should vary with the cross-slope of the terrain to provide a comfortable user experience. On flatter terrain (less than 20% cross slope) the trail should be approximately 48" wide and on steeper terrain (more than 70% cross-slope) the trail should be approximately 96" wide, with trail width varying proportionally for other cross slopes (Figure 1).

The preferred trail grade for soft surface trails, not intended to be ADA accessible, is less than 10%. Grades should not exceed 20%.

The entire trail tread should be fully excavated to the mineral soil surface, with the spoils broadcast. A cut and fill technique can be utilized to create the trail tread.

Retaining walls on the uphill and/or downhill side of the trail may be installed in unstable soils.

Equestrian Trail

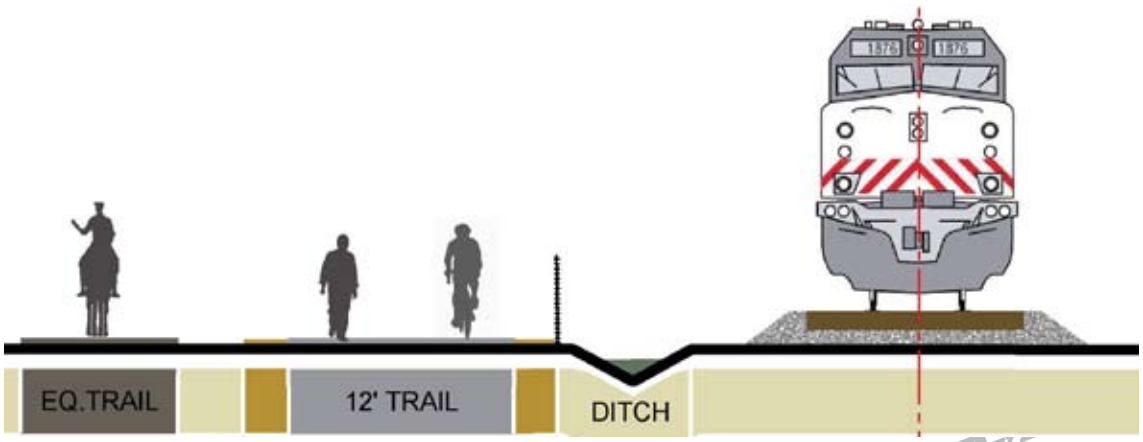
The Chelatchie Prairie Rail-with-Trail may also include equestrian uses in the segments north of Battle Ground. The Clark County equestrian community, one of the largest in the state, has expressed great interest in the corridor as an extension of the existing equestrian resources in the county (especially trails in Battle Ground Lake State Park), as an important connector between equestrian destinations, and as a destination itself.

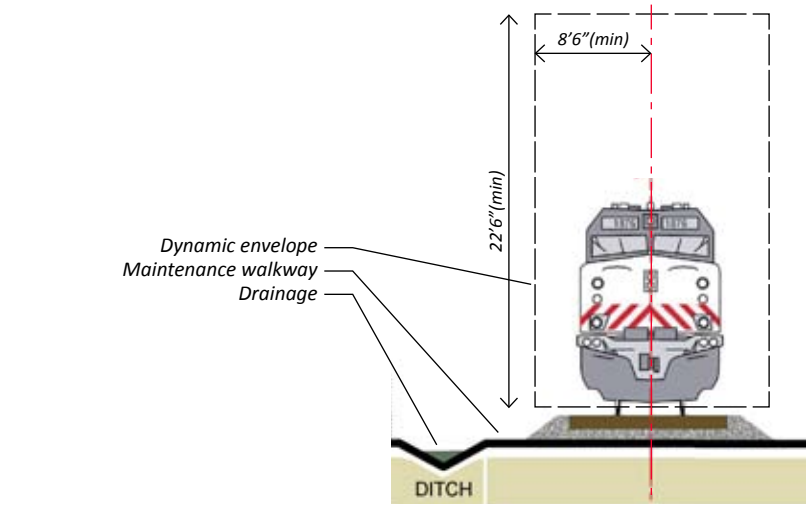
For aesthetic and safety reasons, the equestrian trail alignment should be distinct from the bicycle and pedestrian pathway wherever possible. Equestrian users prefer an unpaved surface, require greater physical space and may need room to control less experienced and predictable riders and horses in the presence of other horses, cyclists, dogs, motor vehicles and train equipment.

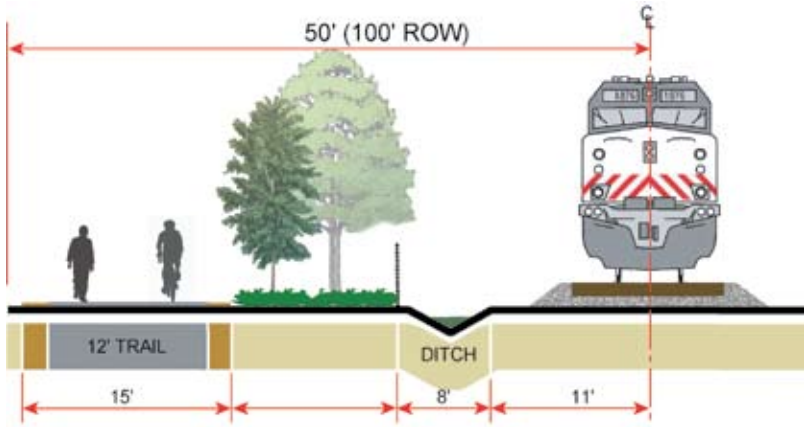
Where right-of-way width and conditions allow, the equestrian trail on the Chelatchie Prairie Rail-with-Trail will be a six foot wide natural surface trail (four foot minimum) with a clear zone as shown in Figure 1.

The alignment will run independent from the paved trail where space allows (Figure 2) and in some places directly adjacent. Where necessary, the shoulder of the shared-use trail will be widened to accommodate equestrian users.

Figure 2: Equestrian trail within the right-of-way







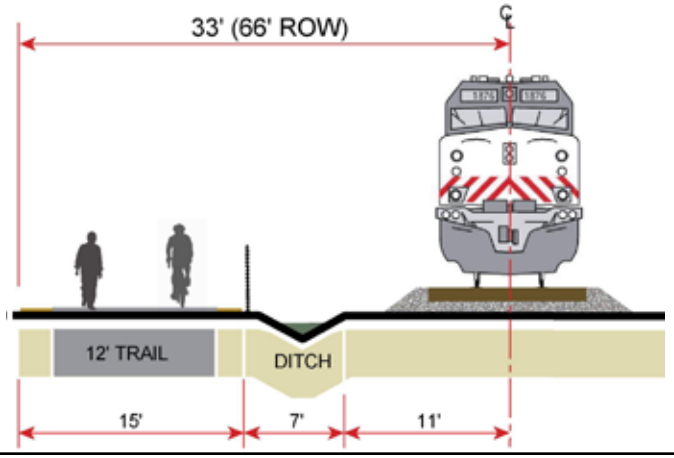


Figure 3 (top): Dynamic envelope.

Figure 4 (middle): Desirable corridor cross-section. The edge of trail is located near the edge of the right-of-way.

Figure 5 (bottom): In narrow right-of-way, the trail may be located closer. to the track and may require a fence.

Rails-with-Trails

This section explains the underlying railroad operating and engineering principles that influence the formulation of rail-with-trail guidelines. For safety reasons, and the convenience of the operators, the general public is typically excluded from rail rights-of-way through physical barriers, such as fencing, or legally through trespass laws and right-of-way signing. In rail-with-trail situations, public access to the right-of-way is allowed with the development of special design features and management and operational practices to maintain a safe operating environment. Each segment of these shared corridors must be planned and designed in detail to anticipate the specific operational and safety requirements of each situation encountered.

In 2002, Alta Planning + Design, produced a study for the Federal Highway Administration (FHWA) titled: "Rails-with-Trails: Lessons Learned." The report found that the range of minimum setbacks between track and trail RWTs varies from less than 2.1 m (7 ft) to as high as 30 m (100 ft). The average setback was almost 10 m (33 ft) from the centerline of the nearest track to the edge of trail. A comparison of RWT setback distances to train speed and frequency reveals little correlation; over half (33 of 61) of the existing RWTs have 7.6 m (25 ft) or less setback, even alongside high-speed trains. Many of the trails with little setback have been established for many years. The trail managers for these well-established trails report few problems. However, interviews with train engineers in several areas indicate that they observe trespassing in areas with little setback and no physical separation.

There is no consensus on either appropriate setback requirements or a method of determining the requirement. Some trail planners some consider it analogous use the AASHTO Bike Guide for guidance: bicycle lanes are set back 1.5 to 2.1 m (5 to 7 ft) from the centerline of the outside travel lane of even the busiest roadway. Others use their state public utilities commission's minimum setback standards (also known as 'clearance standards') for adjacent walkways (for railroad switchmen). Because of the lack of consensus on acceptable setback distances,

the appropriate distance must be determined on a case-by-case basis. Trail planners should incorporate into the feasibility study an analysis of technical factors, including:

- type, speed, and frequency of trains in the corridor,
- separation technique,
- topography,
- sight distance,
- maintenance requirements, and
- historical problems.

Setback

The minimum distance between the operating railroad and obstructions such as utility and signal poles, bridges, retaining wall structures and fences, is governed by the dynamic envelope of rail operations (Figure 3) and measured in feet from the centerline of the track. These dimensions are recognized nationally to provide consistent clearances and to facilitate safe operation of trains throughout the interconnected rail network. However, minimum obstruction setbacks do not provide for easy maintenance of the rail infrastructure and, while acceptable from a safety perspective, may increase maintenance costs or cause unacceptable delays or closures of the rail or the trail when maintenance activities are required.

Trails parallel to the rail mainlines, sidings, switches, curves, marshalling yards, roadway crossings, freight loading areas, bridges and cut or fill sections of the line will each have different considerations.

Separation

The desirable separation between trail and the rail are shown in Figure 4. To provide separation and discourage trespassing and undesired informal paths from forming, trails within the right of way and less than 40’ from the main or primary auxiliary track centerline may require fencing (the type and height of fencing

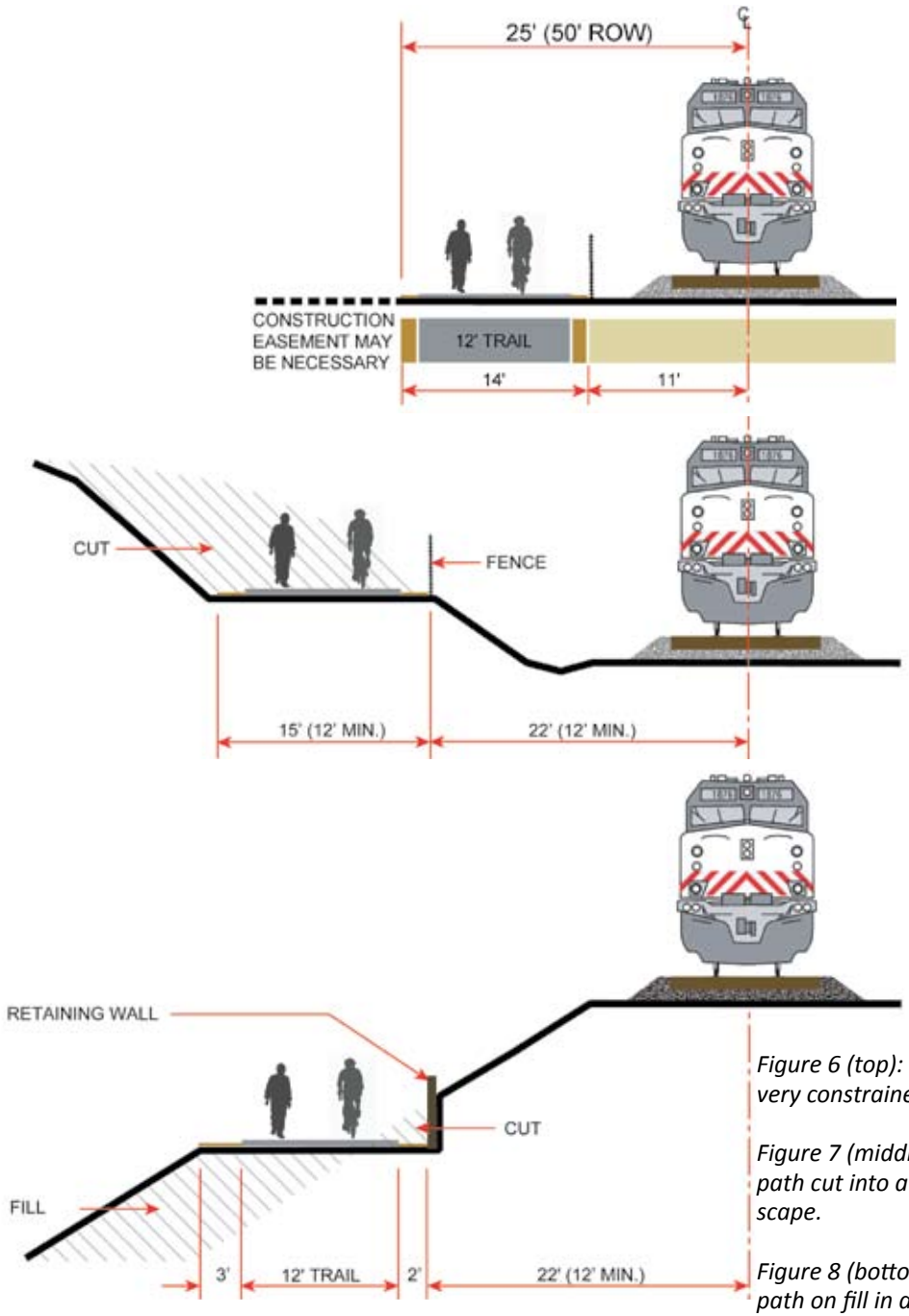


Figure 6 (top): Cross-section in very constrained circumstances.

Figure 7 (middle): Shared-use path cut into a sloping landscape.

Figure 8 (bottom): Shared-use path on fill in a sloping landscape.

will be approved by the owner and operator). A fence may not be required if the trail is below the railroad and a retaining structure of 3' or greater in height is provided between the trail and the track (Figure 8). Fencing along approaches to tunnels, overpasses, underpasses and other interfaces should be provided to prevent trespassing.

The desirable Chelatchie Rail-with-Trail cross-section (Figure 4) shows the generally accepted practice for aligning trails within active rail corridors and includes accommodation for maintenance access and drainage of the right-of-way. Variance from the standard to accommodate narrow right-of-way or obstructions (Figures 5 and 6) will require the development of special designs and approval by the owner(s) and operator, and may require approval by regulatory agencies (Washington State Utilities and Transportation Commission (WUTC), and the Federal Railroad Administration (FRA)).

In Figure 4, the desirable cross-section:

- The near edge of trail tread is more than 22' from the centerline of the track.
- Trails will not be built so that the cut or fill slopes of the railroad are pushed outside of the existing right of way, unless real estate agreements with adjacent land owners can be reached.
- Trails will be built so that a standard railroad drainage section can be built and maintained.
- Trails should not be placed between tracks unless the track centers are 48' or greater.
- Track relocations to accommodate the trail can be considered with the approval of the track owner and operator. A complete assessment of fixed points (structures, etc), utilities and right of way must be included as part of a proposed design. A new alignment should include provisions for improvements to alignment, profile, materials, and drainage. The track should be designed in accordance with a minimum standard such as Burlington Northern Santa Fe (BSNF) Design Guidelines for Industrial Track Projects (BNSF DGFITP) and in accordance with current American Railway Engineering and Maintenance-of-Way Association (AREMA) standards.

Crossing the Rail

In Washington, trail crossings of railroads are addressed as public crossings and must be authorized through the petition process by the Washington Utilities and Transportation Commission (WUTC). Railroads and rail authorities often strive to reduce the number of on-grade crossings to improve safety and operational efficiencies. Permits for new on-grade crossings are often difficult to obtain. The rail operator could deny the petition for a new trail crossing. The petition for a new crossing may then go before an administrative law judge.

In general, the recommended alignment for the Chelatchie Prairie Rail-with-Trail does not cross railroad main track or primary parallel auxiliary tracks except as part of an existing public crossing. New crossings of the mainline are proposed as noted in the trail description.

Crossing Industrial Spurs

The recommended alignment does show the trail crossing existing spur tracks, and future rail improvements may require the creation of trail crossings of new spur tracks. In general, trails may cross industrial spurs if they are acceptable to the track owner, which may be the rail operator, the rail owner (Clark County) or an adjacent industrial property owner, and approved by the operator and regulatory agencies.

Placing cars at industries requires the full attention of the crew to perform the work safely and it is not desirable to put the train crew into the position of being a lookout for the public where it is preventable. The public may be tempted to go over, through, or under a train that has hesitated in the course of performing routine switching. To address these concerns, trail crossing gates on industrial spur crossings may be desirable at higher traffic spurs to protect the public and relieve train crews from taking on the full responsibility of the crossing.

Bridges

Trails may cross under existing railroad structures if railroad and permitting authorities approve the proposed configuration. Rail bridges over a trail may require modifications to prevent ballast and debris from falling onto the trail. Trail bridges above tracks may be required to be entirely fenced over the railroad. Minimum vertical clearance of 22'-6" from top of rail to bottom of bridge structure (per Washington Administrative Code 480-60-040).

Provide clearance of 25' horizontally from centerline of track to structural members of overpasses whenever possible. If less clearance is required, then the structure must provide "crash walls" in accordance with AREMA standards. Horizontal clearances must not be less that 15' at structural members. Horizontal clearance of 12.5' is acceptable on industrial spur tracks only. Accommodation for future track(s) may also be required at owner's discretion.

Most rail bridges in the corridor were constructed from several decades ago to nearly a century ago. They were not designed to support a significant cantilevered structure, such as a pedestrian walkway, off to one side. An inherent danger exists in hanging pedestrian walkways off of rail bridges where adjacent trail bridge surfaces are placed at the same or lower elevation in relation to the track. Some railcar loads pose a risk to objects close to the track. Shifted loads, misplaced tonnage, and defective load securing materials (such as steel banding) are all potential risks. The more likely scenario would be to place a new trail span parallel to existing railroad bridges.

Table 2: Rail Crossings

Location	Main-line or Spur	Existing Permitted Crossing	Recommended Treatment
MP-2.3 @ Ross/BPA Substation	Spur	No	Signing, property access gate
MP-2.6 @ Ross/BPA Substation	Spur	No	Signing, property access gate
MP-2.9 b/t NE 65th St. & NE Minnehaha St. overpass	Mainline	Private with Crossbuck	Signing, new concrete plank with rubber flange filler
MP-4 @ NE 47th Ave./NE 78th St.	Mainline	Lights & Gates	Signing
MP-7.25 @ NE 94th Ave.	Mainline	Lights & Gates	Signing
MP-7.6 @ NE 119th St.	Mainline	Lights & Gates	Signing
MP-8.2 @ NE 131st St.	Mainline	Crossbuck	Signing
MP-9.2 @ NE 149th St.	Mainline	Crossbuck	Signing
MP-9.5 @ Hwy 503	Mainline	Lights & Gates	Signing
MP-9.8 @ NE Caples Rd.	Mainline	Lights & Gates	Signing
MP-10.6 @NE 137th Ave.	Mainline	Lights & Gates	Signing
MP-10.75 @ NE 159th St.	Mainline	Lights & Gates	Signing
MP- 11 @ NE 142nd Ave.	Mainline	Crossbuck	Signing
MP- 13 @ NE 199th St.	Mainline	Crossbuck	Signing
MP-17.3 @NE 182nd Ave.	Mainline	Lights & Gates	Signing
MP-18.7 @ NE 279th St.	Mainline	Lights & Gates	Signing

The design and condition of the existing Chelatchie Prairie Rail bridges make them unsuitable for the adding trail uses in combination with active rail operations. Bridge 18 south of Heisson.

Roadway Crossings

The Chelatchie corridor crosses several roadways over the 33 mile length of the rail line. Most crossings are on-grade, many have warning lights and/or crossing arms. There are two rail bridges over roadways (Interstate 5 and Highway 99) and three roadway underpasses (Hazel Dell Avenue, Minnehaha Street and Interstate 205). The recommended trail alignment bypasses each of these grade separated roadway crossings except Minnehaha.

Roadway crossings represent one of the key challenges to trail safety as motorists often do not expect to see bicyclists and pedestrians at rail crossings. Most of the roadway crossings have light to moderate traffic volumes, have good visibility on the approaches, both from the trail user's and the motorist's points of view. In addition, most of the trail/roadway intersections can be designed to allow the trail to cross at a 90 degree angle, minimizing crossing distances and making the appropriate design treatments simple to implement.

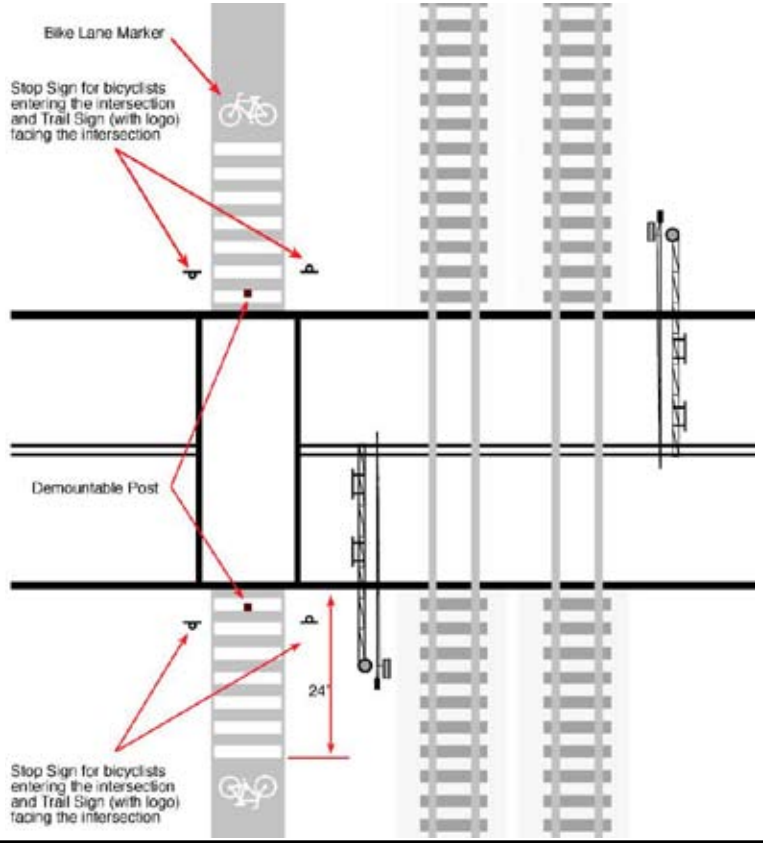


Figure 9: Typical trail/roadway crossing treatment.

The crossing treatments recommended in this report are based on an evaluation of vehicular traffic patterns as well as trail user characteristics. This includes traffic speeds, street width, traffic volumes (average daily traffic), line of sight, and trail user profile (age distribution, destinations).

A traffic safety study should be completed for roadway crossings as part of the preliminary design phase for each segment as it moves toward implementation to determine the most appropriate design features. This will identify the most appropriate crossing options given current information, which must be verified and/or refined during the design and construction document stage of the process.

The proposed crossing treatments are based on established standards, preliminary evaluation of the available data, and experience on similar existing facilities. Trail crossing types fall into three basic categories, described below.

Trail-Roadway Crossings

Type I - uncontrolled crossings (unsignalized, but possibly with other traffic control devices) are recommended for streets where vehicles travel at speeds of less than 45 mph and are used by fewer than 10,000 vehicles per day. Other devices may include high visibility crosswalks, signing, curb extensions and pedestrian refuges.

Type II - signalized crossings (no Type II crossings are anticipated in this plan) are recommended for crossings more than 250 feet from an existing signalized intersection, where 85th percentile travel speeds are 40 mi/h and above, and/or ADT exceeds 15,000 vehicles where it is recommended that trails receive a high level of crossing protection. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Trail signals are normally activated by push buttons, but also may be triggered by motion or loop detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. The signals may rest in the off position or on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs.

Type III - grade-separated crossings (no new Type III crossings are anticipated in this plan) may be needed where ADT exceeds 25,000 vehicles, and 85th percentile speeds exceed 45 mi/h. Personal safety may be concern with overcrossings and undercrossings when trail users may be temporarily out of sight from public view and may have poor visibility themselves.

Design and operation measures are available which can address trail user safety concerns. For example, an undercrossing can be designed to be spacious and well-lit, equipped with emergency phones at each end, and completely visible for its entire length prior to entering.

Type I crossings are used on lower speed, lower volume roadways. Type I do not have traffic signals, but should include other traffic control devices such as a clearly marked crosswalk (ladder style is most visible), warning signs, and possibly curb extensions and pedestrian refuges. The Springwater Trail in Portland, OR.

Type II crossings are recommended on higher speed/higher volume roadways. They are signalized and may include other traffic control devices such as a clearly marked crosswalk (ladder style is most visible), warning signs, and possibly curb extensions and pedestrian refuges. The Springwater Trail in Portland, OR.

Type III crossings are grade separated, over or under the roadway, and segregate trail users from motorized traffic completely. Type III are recommended on higher speed/higher volume roadways. Davis, CA.

Table 3: Roadway Crossing Recommendations

Road	ADT/Posted Speed	Intersection Type	Recommended Roadway Crossing Treatment
NE Hazel Dell Ave.	3,258 (2007) 35 MPH	Midblock	Type I: Create new at-grade ladder crosswalk on Burnt Bridge Creek Trail
NE Ross St.	25MPH	Signalized	Type I: Restripe existing ladder crosswalk
NE St. Johns Rd. at NE 68th Street.	14,677 (2007) 40MPH	Signalized intersection	Type II: Coordinate with proposed traffic signal. Include ladder crosswalk, pedestrian/bicycle activated crossing signal, center median pedestrian refuge.
NE 47th Ave.	25MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE 87th Ave.	1,739 (2001) 40MPH	Intersection	Type I: Create new at-grade ladder crosswalk
NE 119th St.	5,540 (1989) 50MPH	Signalized	Type II: Coordinate with future traffic signal
NE 131st St.	1,518 (2005) 40MPH	Intersection	Type I: Create new at-grade ladder crosswalk
NE 149th St.	1,333 (2003) 40MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
Hwy. 503	25,357 (2005) 50MPH	Signalized Intersection	Type II: Improve existing ladder crosswalks and pedestrian/bicycle activated signals
NE Caples Rd.	2,000 35MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
NE 159th St. at NE 137th Ave	4,859 (2006) 50MPH	Signalized intersection	Type II: Coordinate with future traffic signal
NE 142nd Ave.	3,097 (2007) 50MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
NE 181st St.	1,000 40MPH	Intersection	Type I: Create new at-grade ladder crosswalk
NE 199th St.	12,456(2007) 40MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
SE Rasmussen Blvd	2,350 (2007)25MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
E Main St. at Grace	4.750 (2007) 25MPH	Signalized intersection	Type II: Coordinate with Grace/Main intersection improvements
NE Fairground Ave	1,050 (2007) 25MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
NE 249th St.	1,214 (1998) 50MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE 182nd Ave.	1,892 (2002) 50MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
NE 259th St.	1,080 (2002) 50MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE 279th St.	1,892 (2002) 50MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE Hantwick Rd.	149 (2007) 50MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE Lucia Falls Rd.	1,781 (2003) 50MPH	Midblock	Type I: Create new at-grade ladder crosswalk
NE Raillroad Ave.	1,484 (2003) 50MPH	Midblock at rail	Type I: Create new at-grade ladder crosswalk
E. Hoag St.	300/25MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
E. Jones St.	300/25MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
E. Cushman St.	300/25MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
E. Yacolt Rd.	500/25MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE Amboy Rd.	1,383(2002) 50MPH	T Intersection	Type I: Create new at-grade ladder crosswalk
NE Amboy Rd.	1,168(1996)50MPH	T Intersection	Type I: Create new at-grade ladder crosswalk

Trail-Roadway Crossing Recommendations

Type I crossings are suitable for most of the roadway crossings on the Chelatchie Prairie Rail-with-Trail not already served by a signalized intersection. The recommended alignment Maps 1 through 14 note the specific recommended treatments at each intersections. Table 3 - Roadway Crossing Recommendations presents a summary of trail–roadway intersections in the corridor and their recommended treatments.

Trail Access

The Chelatchie RWT is a multi-use trail that will be used by pedestrians, bicyclists (both recreational and commuters), in-line skaters, and other non-motorized uses including equestrians in some segments. The trail will be accessible to people in wheelchairs and senior citizens with walking aids who require a smooth surface. Good access to the trail for all users is a key element to its future success. Simply put, if people cannot get to a trail easily, they will not use it.

Neighborhood access will be provided from all local streets crossing the trail. The trail should be identified at each street crossing and directional signing should be placed at street intersections, identifying destinations and distances along the trail and within the surrounding community.

Trailheads

Trailheads (formalized parking areas) serve all trail users. They provide information about the trail such as maps, points of interest, rules and etiquette, and may have trail user facilities like restrooms, trash receptacles, information kiosks, and benches. Trailhead locations should ideally be located every two to three miles along the trail.

Some trailheads north of Battle Ground may be expected to accommodate equestrian users and should include special information regarding the frequency of train operations and the potential for unpredictable behavior of horses (Figure 10). Equestrian trailheads should include adequate space for vehicles with

trailers, hitching posts, restrooms, manure bins, potable water and opportunities to separate horses from other trail users.

Trailheads will be placed along the corridor for user's transition from their vehicle to the RWT. Because the trailhead will usually shape user's first impression of the trail, function and appearance will be key. The typical trailhead design will focus on:

- Maneuvering room for vehicles, pedestrians and horses (if appropriate).
- Parking stalls for automobiles and (if appropriate) trucks with trailers for bikes and horses.
- Information kiosks, signs, litter receptacles, fencing, restroom facilities, potable water and landscaping.
- Connector trails to the main RWT.
- Security fencing, lighting and barrier systems such as bollards to prevent motor vehicle access to the RWT.

There are existing trailheads at the western end of the Burnt Bridge Creek Greenway at the intersection of NW Bernie Drive and NW Fruit Valley Road (scheduled for improvements in 2008) and at the western end of the East Fork Lewis River Greenway Trail on NE Hantwick Road.

Existing parks or other public facilities with restrooms, water and/or parking on and near the corridor include:

- Ross Park & Ride
- Future Padden Parkway Park & Ride
- Fairground Park in Battle Ground
- Battle Ground Lake State Park
- Moulton Falls Regional Park parking area at NE Sunset Falls Road and NE Railroad Avenue.
- Town Well Park in Yacolt
- USFS Ranger Station - Mt. St. Helens National Volcanic Monument at Chelatchie Prairie

Other potential trailhead locations are found at:

- NE Highway 99 adjacent to BPA Ross Substation .
- At intersection of NE 78th Street and NE 47th Avenue - to link users to the nearby Padden Parkway Trail.
- At intersection with Highway 503 Trail and the rail corridor near Caples (off of Highway 503).
- At crossing of NE 249th Street (by Battle Ground Lake State Park).
- At crossing of NE 279th Street adjacent to Heisson Store.

Each intersection with the street network provides an access point for users and convenient connections to other destinations.

Trail Amenities

In order for the Chealtchie Prairie Rail-with-Trail to be a successful community destination and resource, the trail should appeal to a wide variety of users with trail amenities such as:

- **Benches**: Utilize wood seating surfaces with metal structure and detailing.
- **Covered bench areas**: Structures that evoke the organic forms of the corridor and the history of the area should be designed.
- **Bike racks**: Designs compatible with state and local recommendations.
- **Mile post markers**: Trail mileage marking should be incorporated into pavement markings, signing and fixed bollards. Mile posts are a longstanding railroad tradition used extensively in rail design and maintenance. Mile posts for trails greatly increase use by runners and cyclists looking for set workout distances, and improve emergency response. However, coordinating the rail mile posts with the trail mileage will be complicated by the out of right of way segments.

- **Restrooms**: Restrooms should be provided at new trailheads. Signing should be provided to indicate these facilities.
- **Litter Receptacles**: Litter is an often reported concern of neighbors to a proposed trail and a new maintenance responsibility of trail providers. The incidence of littering often declines in new trail corridors as they become popular with users that displace scofflaws. The trail should adopt the wildland ethic of "pack it in, pack it out" and encourage users and volunteers to adopt trail segments for litter removal. However, garbage cans may be provided at appropriate locations.
- **Dog Waste Pickup Stations**: Dog waste bag dispensers should be placed at trailheads and key neighborhood access points along the route. Signs should be placed along the trail notifying dog owners of the health and environmental benefits and local ordinances requiring dog owners to pick up after their dogs.
- **Information Kiosks**: In addition to orientation, destinations, events, etiquette and rules, trailhead information stations should provide trail users with information about the ecology and history of the corridor. Educating the public about the Chelatchie corridor and surrounding resources will help reduce dumping, littering, and other abuses. Involving school children, university students and civic organizations in the research, design, and construction of these kiosks would be an excellent community activity.

Materials used for amenities should receive approval from the future trail managing authority and the local jurisdictions.

Figure 10: Warning and etiquette signing for equestrian segments.

Signing

As a general rule, caution should be exercised to not over sign the trail. Incorporation of signs into planned trailside vertical elements such as bollards should be encouraged. This will avoid the visual clutter of too many signs along the trail and an excessive number of sign poles.

Shared-use pathway signing should follow standards established in this plan and supported by standards from the AASHTO Guide to Bicycle Facilities and the Manual on Uniform Traffic Control Devices (MUTCD).

Implementing a well-planned and attractive system of signing can greatly enhance bikeway facilities by signaling their presence and location to both motorists and existing and potential bicycle users. By leading people to community destinations they provide benefits to local residents and visitors.

In general, the sizes of signs used on bicycle paths are smaller than those used on roadways. Table 9B-1 of the MUTCD lists minimum sign sizes for both bicycle facilities. If the sign applies to drivers and bicyclists, then the larger size used for conventional roads shall apply.

Innovative signing is often developed to increase bicycle awareness and improve visibility. Signs to be installed on public roadways must be approved by the state Traffic Control Devices Committee. New designs can be utilized on an experimental basis with WSDOT approval.

Trailhead Access Signing

Since trailheads will serve as access points for people that may not be as familiar with the trail, information signs should be provided that include a "You Are Here" map, distances to destinations along the trail, and trail rules and etiquette signs. These should be placed on an information kiosk, designed to be reflective of the corridor or adjacent surroundings. Kiosks must be ADA compliant.

Trail Etiquette Signing

The trail etiquette sign will clearly spell out proper rules and behavior for trail users, including rules related to equestrians, yielding right-of-way to more vulnerable trial users and safety around trains and equipment. Sign messages and design will be based on national standards and locally accepted trail practices.

Directional Signs

Directional signs provide orientation to the trail user and emphasize the continuity of the trail. Street names, mile posts, and place names are key elements that should be called out along the trail. Street names should be called out at all trail intersections with roadways. Mileage markers should be placed at quarter-mile increments as bollards or pavement markings. Directional signs should be used to call out key destinations along the trail route and accessible from the trail via other non-motorized connections.

Interpretive Signing

Interpretive signs enrich the trail user experience, strengthen the identity of the local community, and provide educational opportunities. Key interpretive opportunities for the Chelatchie corridor include environmental education (stream ecology, water quality, conservation, native plants, riparian corridors and Mt St Helens), and cultural resources (historic sites, the railroad, the Hudsons Bay Company).

Public Art

Public art along a trail provides an opportunity to add interest to the trail experience and, depending on the scale and form, can become an "event" in itself and serve as a public draw. Public art can be aesthetic or functional, doubling as sitting or congregation areas. Local artists should be encouraged to produce artwork in a variety of materials for sites along the corridor.

Bollards

Bollards are stout posts sometimes used at roadway/trail intersections and trail entrances to prevent motor vehicles from entering the trail. When bollards are placed within the trail surface they should be designed to be visible to bicyclists and other trail users, especially at night, with reflective materials and appropriate striping. Placement should not block trail travel lanes.

- Fixed bollards: Bollards should be metal or heavy timber structures located on the trail centerline or outside of the trail tread.
- Removable bollards: Install removable bollards on the trail centerline or outside of the trail tread at intersections where emergency and maintenance access is required. Removable bollards can be keyed and locked to allow maintenance and emergency service vehicle access to the trail.

Alternatives to bollards, such as a median in the trail approaching an intersection, should be considered where space allows.

Properly located bollards approaching a Type II roadway crossing. Note the tall equestrian push button at right. Springwater Trail, Portland, OR.

Vegetative Buffers

When possible, landscaping is the first choice for creating separation between the trail and adjacent properties. Vegetative buffers have the dual purpose of creating a natural privacy screen, providing habitat and stabilizing erodible soils. Landscaping can also be an effective barrier to unwanted access where needed.

Fencing

As mentioned in the standard cross-section section, fencing may be necessary, at the discretion of the owner and operator, to indicate separation between active rail operations and trail user when the edge of trail is less than 40 feet from the center of the track, and to discourage informal access trails from developing across the tracks. Fencing in portions of the trail anticipated to include equestrian uses should consider visibility (Figure 11). Wildlife passage and safety for trail users are important additional factors. Detail design of the rail-with-trail fence will be developed, in cooperation with the owner and operator, in the

Simple wire fencing on a trail adjacent to high speed light rail. Hiawatha LRT Trail, Minneapolis, MN.

preliminary design phase as each trail segment progresses to construction.

As a general policy, fencing at the edge of the right-of-way should be the responsibility of the adjacent land owners. Although the public often perceives fencing as a means of providing safety by prevention of unwanted access, too much fencing can have the opposite effect by impairing informal trail surveillance. Inappropriate fencing can also degrade the experience of trail users, obscure views, and create a "tunnel" effect that makes users feel trapped. Fencing of four feet or less can provide a barrier sufficient to denote property boundaries or to deter most access.

Should adjacent property owners choose to build fences, a variety of fencing applications can be considered. Solid fencing that does not allow any visual access to the trail should be discouraged. Fencing that allows a balance between adjacent residents' privacy and informal surveillance of the trail should be encouraged. If separation is desired purely for privacy reasons, vegetative buffers are recommended.

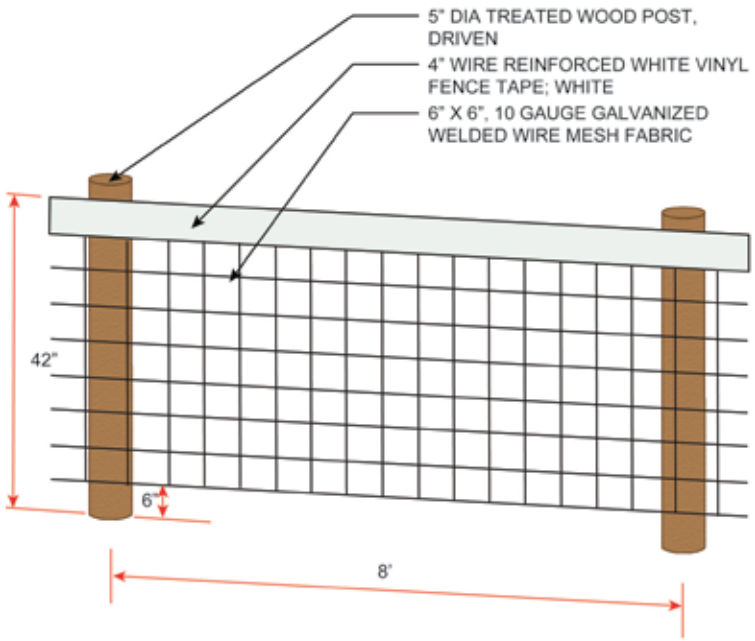


Figure 11: Fencing provides separation between the trail and the rail operations. The wide white vinyl top rail is visible to horses, and increases visibility of the fence in twilight hours.

NATIONAL AND STATE GUIDELINES

The following is a list of references and sources utilized to develop design guidelines for the Chelatchie Prairie Rail-with-Trail. Many of these documents are available online and provide a wealth of information and resources to the public.

AASHTO Guide
Guide for the Development of Bicycle Facilities, 1999.
American Association of State Highway and Transportation Officials, Washington, DC.
www.transportation.org

MUTCD
Manual on Uniform Traffic Control Devices, 2003.
Federal Highway Administration, Washington, DC.
http://mutcd.fhwa.dot.gov

PBIC / APBP
Bicycle Facility Selection: A Comparison of Approaches
Michael King, for the Pedestrian and Bicycle Information Center
Highway Safety Research Center, University of North Carolina

Washington Department of Transportation Design Guide
Bicycle and Pedestrian Design Guidelines
http://www.wsdot.wa.gov–

The majority of funding for trail implementation is acquired through state, local and federal transportation and recreation funding. Additional sources may include contributions from citizens and corporations.

Back cover photo: A Christmas season excursion train leaving Yacolt Station.
Photo credit: Chelatchie Prairie Railroad Association.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