The Historic Columbia River Highway

State Trail Guidelines 2011

Nature HISTORY Discovery

OREGON DEPARTMENT OF TRANSPORTATION

"The Columbia River Gorge is an area of worldwide importance... *where scenic qualities and diverse landscapes, together with their natural and cultural components, are paramount, where development and recreation are carefully placed in a manner that protects resources, where human presence is lightly demonstrated, and where the lessons from the past are a constant guide and inspiration for the future."*

–Columbia River Gorge Commission 1988

Dedication

To future designers and builders of the Historic Columbia River Highway State Trail: *May you be inspired by the beauty of the original design and it's lasting legacy and be challenged to create a comparable work of art for future generations.*

Restored hand painted glass slide, Horse Tail Fall, c. 1920's

Acknowledgements

Under the Historic Columbia River Highway Advisory Committee's guidance, these Trail Design Guidelines have been developed to provide a unifying aesthetic for future trail reconnections. It is imperative to the Advisory Committee that the guidelines be inspirational, yet provide design solutions that are constructible, provide continuity, and are compatible with historic elements.

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Jenn Cairo, *Oregon Parks and Recreation*
Crissy Curran, *State Historic Preservation Office*
Jason Tell, *Oregon Department of Transportation*
Scott West, *Travel Oregon*

Restored hand painted glass slide,
Oneonta Gorge, c. 1920's

"All must be adapted to the genius of place, and.... beauties not forced into it, but resulting from it."
— *Alexander Pope*

Trail Design Guidelines Team

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Contents

How to Use These Guidelines

These guidelines are intended as a foundation in creating a special identity for the Historic Columbia River Highway State Trail... *They should be considered a work in progress. Every situation may not be addressed. It is intended that revisions will be made periodically to keep them current and to reflect design issues that arise as construction of the state trail progesses.*

CHAPTER 1. *Introduction*

Section 1A. *Background*

A view of the Columbia River Gorge, a service station and store, once common along the historic highway, is seen here with Vista House in the foreground, c. 1920s.

Constructed between 1913 and 1922, the Historic Columbia River Highway (Historic Highway) was America's first scenic highway. It served thousands of travelers and took full advantage of the Columbia River Gorge's natural beauty, to become known as the "King of Roads". By the late 1940s and early 1950s the initial construction of a water level route that would become Interstate 84 (I-84) obliterated many sections of the highway, leaving behind abandoned and disconnected segments that lay in wait for new life in the Columbia Gorge.

The Historic Highway is one of the most significant historic roads in the nation. The design of the road solved major engineering challenges and was an aesthetic triumph of its time. One of its most important consequences was its influence on the National Parks Service's scenic parkways which were being developed across the country during the same period. Additionally, the Historic Highway is noted for its attention to design details resulting in an iconic style and construction techniques for rustic guard walls, guard stones, bridges, and retaining walls. The overall design of the Historic Highway was as important as the details of its construction. This includes the alignment of the road and its relationship to the geology and geomorphology of the Gorge. The Historic Highway was laid out to be interesting to drive with graceful curves and changes in grade. It unrolled before the driver as a dynamic sequence of views, vistas, and scenic "events" such as waysides, fountains, and waterfalls.

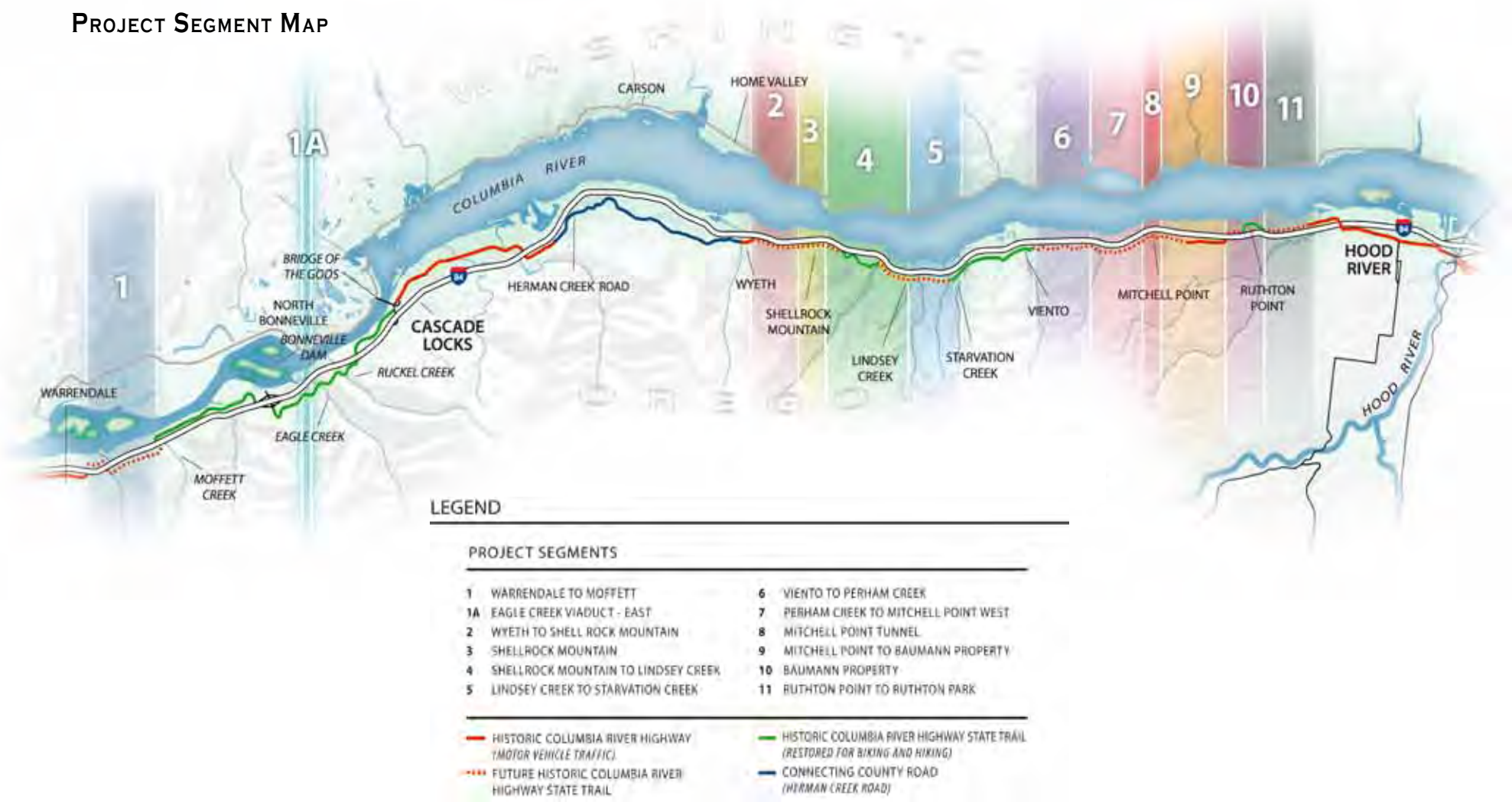
The Columbia River Gorge National Scenic Area Act of 1986 directed the State of Oregon to connect the abandoned highway sections as a pedestrian and cyclist trail. Then, in 1987, the Oregon Legislature directed the Oregon Department of Transportation (ODOT) "to preserve and enhance existing portions of the Historic Highway and plan for reconnection of this scenic route as a State Trail". Since the 1987 legislation, ODOT has been charged with working with the Historic Columbia River Highway Advisory Committee (HCRH AC). Oregon Parks and Recreation Department (OPRD), the State Historic Preservation Office (SHPO) and Travel Oregon to maintain, enhance and restore the Historic Highway. These efforts are ongoing.

Today the remaining segments of the Historic Highway receive over 2 million visitors per year. Its attractions are icons for the Pacific Northwest (Vista House, Multnomah Falls, Rowena Crest). The Highway's restored drivable portions maintain the 1920's appearance. However, numerous sections of the old highway between Wyeth and Hood River remain disconnected.

Vista House

Historic Columbia River Highway State Trail

Project Segment Map



Section 1B. *Guidelines Purpose*

State Trail between Hood River and Mosier

The purpose of this document is to provide a set of design guidelines to inform the design, repair, and maintenance of the Historic Highway State Trail and associated recreational facilities.

This document provides a framework for making design decisions by defining design character, establishing consistency, and ensuring that future development is consistent along the entire 73 miles of the Historic Highway between Troutdale and The Dalles. The guidelines are primarily intended for the proposed trail connections; however, they may help inform restoration work associated with existing recreation sites adjacent to the drivable sections of the Historic Highway.

Past projects completed along the Historic Highway were the result of unique inter-agency cooperation. It is likely that future projects will be developed in the same manner with most of the same agencies, including the Oregon Department of Transportation, Oregon Parks and Recreation Department, United States Forest Service, and Western Federal Lands Highway Division. It is important that past design decisions are formalized to ensure that these decisions are made available to design teams. This will encourage consistency between project segments.

"The intent of these guidelines is to provide the designer with the flexibility to 'fit' the State Trail into the existing setting with as little site disturbance as practical".

Kristen Stallman
ODOT National Scenic Area Coordinator

Eagle Creek Bridge

A Tool not the Rule

This document is intended to serve as "guidelines" rather than specific "standards". Standards set forth specific minimum requirements that must be met in all circumstances. While this may make life easier for reviewers, it can make it difficult to develop designs responding to site conditions.

Often, mediocre designs result when designers are constrained by rigid standards.

Guidelines on the other hand, provide "guidance" to designers who can then use their experience and judgment to determine when it is necessary or appropriate to vary from the information provided in the guidelines. Every site has its "genius loci" or sense of place with unique landscape characteristics, often making it is extremely difficult to develop a complete set of guidelines for every situation.

The Historic Columbia River Highway Advisory Committee will review design proposals for each project to ensure consistency with the guidelines. However weaving a trail through the Columbia River Gorge between the steep cliffs, Interstate highway, railroad and river is not an easy task. The committee recognizes that there may be a need to occasionally deviate from the guidelines presented in this document. The committee will review and recommend approval of proposed variations from the guidelines when appropriate and will ensure that the intent of the guidelines is met.

Restored historic hand painted glass slide. Toothrock Viaduct, c. 1920s.

Section 1C. *Design Philosophy*

A common design philosophy will enhance the design of the State Trail and facilities along the Historic Highway by prompting the designers to consider core concepts that will define future trail reconnections.

New trail development should take Lancaster's words as a starting point. The first project development step should be a site visit by the design team to identify site constraints and opportunities. It is crucial to study the natural environment and identify the elements to which the trail should respond.

Eagle Creek

> "On starting surveys our first business was to find beauty spots, or those points where the most beautiful things along the line might be seen to best advantage, and, if possible, to locate the road in such a way as to reach them."
>
> — *Samuel Lancaster*
> *Historic Highway Engineer*

This will become the basis for developing designs that provide trail continuity and relate the trail to the landscape character.

On starting alignment surveys, a team of landscape architects, planners, engineers, biologists and geotechnical engineers should identify the beauty spots and lay out the trail and associated recreational facilities in such a way as to best take advantage of natural and cultural features.

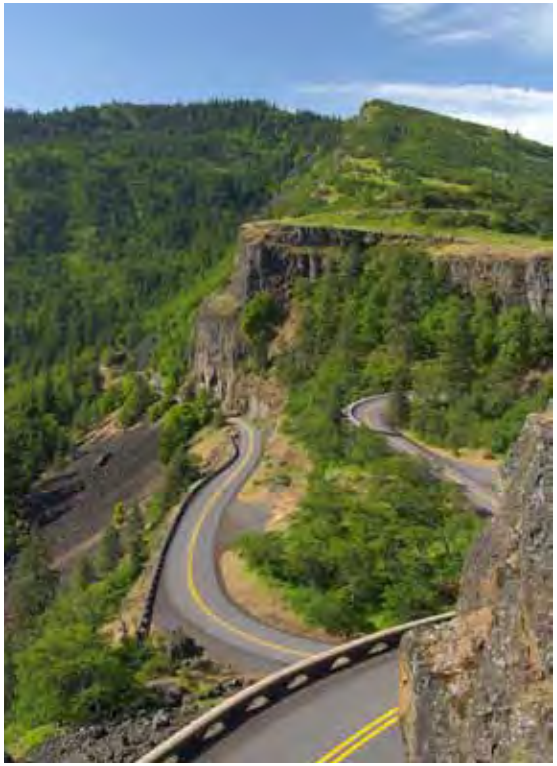
Wahkeena Falls Foot Bridge

Historic Highway Advisory Commitee would often ask rhetorically,
"What Would Lancaster Do?"

RESPECT THE DESIGN OF THE EARLY HIGHWAY DESIGNERS

Building roads in the Columbia River Gorge has always been a challenge. The Historic Highway was an early twentieth century technical and civic achievement, successfully mixing sensitivity to the natural landscape with ambitious engineering.

The route has gained national significance because it represents one of the earliest applications of cliff face road building as applied to modern highway construction, but the foremost reason for its construction was Samuel Hill's and Samuel Lancaster's vision of building a scenic highway above the Columbia River to rival the great roads in Europe.



Rowena Loops

Today as we plan and design the trail alignments described in the Milepost 2016 Reconnection Strategy, it is important to consider how Samuel Lancaster would have approached similar design challenges. During the development of the Milepost 2016 Reconnection Strategy the Historic Highway Advisory Committee would often ask rhetorically, "What would Lancaster do?" This simple question will encourage future designers to respect and interpret the design philosophy of the early highway designers.

- Modifications to sections of original highway should be as minimal as practical. Wherever uncovered pavement is in reasonable condition, it shall not be removed and instead be protected with an asphaltic overlay if needed as part of the State Trail experience.
- Character defining features should reflect the historic period of 1924. The historic condition of the highway in that year should be used as the standard or basis for decision making. Design of new elements should be compatible and harmonious with this period.
- The Secretary of Interior Standards for Historic Preservation should be consulted to guide design decisions.

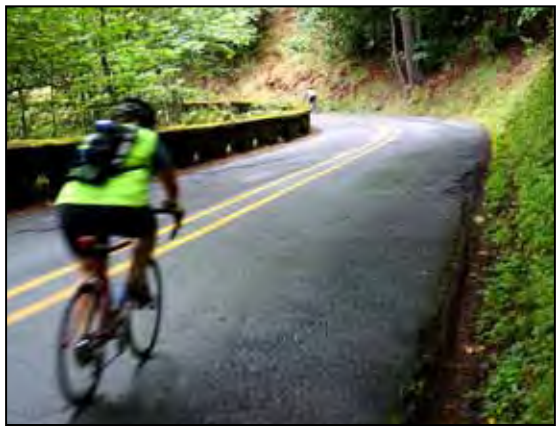
Historic Highway East of Mosier

CONSIDER THE USER'S EXPERIENCE

The Historic Highway State Trail is identified as a multi-use trail attracting cyclists, runners, walkers and hikers. User mix includes everyone: slow moving families to fast, experienced, recreational cyclists and hikers. Maintaining good sightlines, minimizing tight curves, and minimizing long downhill grades (that create significant speed differentials) is necessary to reduce user conflicts. The predominant summer west winds, which are frequently in the 20 – 30 knot range, will increase cyclists' speeds in some areas with strong tailwinds on long descents allowing experienced cyclists to reach high speeds.

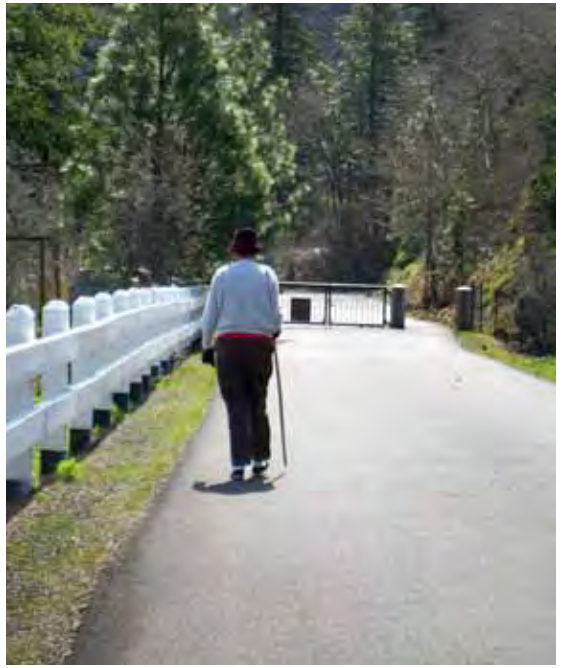
In 1999 the Historic Highway Advisory Committee adopted an Access Policy for the Historic Highway State Trail. One important component relating to trail design explores the applicability of the American's with Disabilities Act (ADA) and the issue of universal access. The policy assumes the wheelchair as the common denominator to achieving barrier free access. Additionally, the Columbia River Gorge National Scenic Area Management Plan states, "barrier free access shall be provided for new trails and improvement to existing trails to the maximum extent practicable."

Mosier Twin Tunnels



Cyclist on Historic Highway

In general, preservation and rehabilitation of historic cultural landscapes should comply with ADA standards but should seek to do so without destroying its historic significance. Where there are compliance requirements for accessible routes, ramps, toilets etc. the ADA standards will vary. The National Park Service recommends "providing barrier free access…while preserving character-defining landscape features, materials and finishes"(NPS Guidelines for Rehabilitating Cultural Landscapes). The main recommendation is to identify what the character defining features are before making alterations to comply with ADA standards. ADA compliance should preserve these features as much as possible, for example by using similar materials. Ramps, for example, should not be placed where they will damage historically significant entry ways or circulation features. Alternative locations should be found. ADA features along the State Trail should be compatible with the character and design principles of the Historic Highway to create a sense of continuity in how accessibility is handled.



Mosier Twin Tunnels

Design *Precedent is Set*

To date, 11 miles of the Historic Highway State Trail have been constructed. Various restored elements are along the drivable segments of the Historic Highway. These completed state trail and restoration projects provide us with a precedent for future work along the Historic Highway. We need to work with managers and designers of past projects to see what was successful and what lessons were learned from these projects and apply this information to our work.

Section 1D. *Planning Context*

Trail and recreational facility design and construction in the Columbia River Gorge is a balancing act. Familiarity and understanding of the planning context will assist designers in the implementation of Historic Highway trail designs. There are many overlapping regulating plans governing the design of new facilities including the following:

Columbia River Highway Historic District, 1983

The nomination of the Historic Highway to the National Register was prepared by the Oregon Department of Transportation in 1983. The Historic Highway Advisory Committee approved the nomination on August 29th, 1983. Appendix A of the nomination includes an Oregon Transportation Commission Policy adopted on May 17, 1983. This policy provides an exemption from current design standards.

"…Whenever restoration of this facility involves rebuilding or major repair, that the action will, to extent practical, result in an appearance approximating the original. In following these principles, it is recognized that the convenience and safety features of this highway may not reflect current design standards."

According to the National Register of Historic Places, the Historic Highway is significant under **Criterion A and Criterion C.**

Criterion A: Association with events that have made a significant contribution to broad patterns of history.

The Historic Highway is the nation's first scenic highway, constructed to provide motorists with the opportunity to see and experience the landscape's natural beauty up-close.

Criterion C: Embodies distinctive characteristics of a type, period or method of construction.

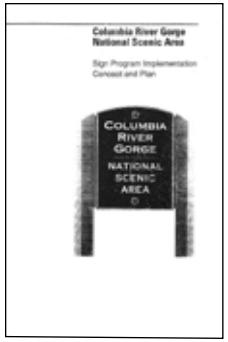
The Historic Highway's engineering was a technical and civic marvel of its time using advanced engineering standards, materials, and structures.

Contributing Features include the following:

- Spatial Organization, topography, and natural systems of the Columbia River Gorge
- Engineered sections; such as, the Rowena Loops, and buildings, and the Vista House
- Structures; meaning, bridges, viaducts, tunnels, masonry walls, and overlooks
- Viewpoints and vistas
- Road alignment to take drivers to beauty spots
- Small scale features, such as the guardrail, curbs, gutters, signs, drinking fountains, etc.
- Surrounding land use
- Craftsmanship and the latest technology
- Materials, including patented Warrenite asphaltic-concrete pavement

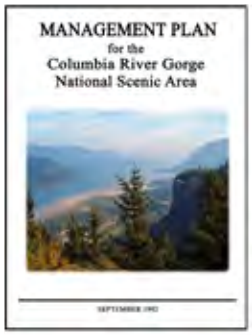
Columbia River Gorge National Scenic Area Corridor Visual Inventory, 1990

This document contains sections describing the Historic Columbia River Highway. It describes the landscape character types along the highway. Twenty six specific sites are included where scenic enhancement or mitigation should occur. Enhancement to scenic resources proposed in the Columbia River Gorge National Scenic Area (CRGNSA) Management Plan include implementation of the Corridor Visual Inventory proposals and efforts towards mitigation. Additional work is needed to develop similar suggested enhancements sites for portions of the Historic Highway State Trail.



Columbia River Gorge National Scenic Area Sign System Design, 1991

The USDA Forest Service's CRGNSA office developed what is now referred to as the Graphic Signing System. This is a collection of sign types that include thematic site signs, gateway signs and interpretive signs. All these signs have an arched top and a similar edge color combination. It is important to follow the standards for forms, materials, colors and typography as these signs act as an identifier and unifier for the CRGNSA.



Columbia River Gorge National Scenic Area Management Plan, 1991 and updated in 2007

All development in the Gorge is regulated by the CRGNSA Master Plan. The Counties within the Gorge have jurisdiction and regulate through their Zoning and Development Codes. General design standards within the CRGNSA require that new development achieves the following:

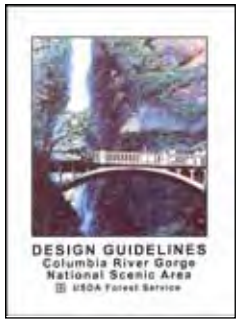
Visual subordinance is required from Key Viewing Areas (KVAs) such as the Historic Highway , Interstate 84 (I-84), and the Columbia River. Additional KVAs may apply depending upon location and visibility of the proposed development. The Historic Highway is a KVA in the CRGNSA Management Plan. With this designation, development proposals need to be evaluated to determine if they are visible from the key viewing areas. If so, the new development needs to be "visually subordinate", or in some cases, "not visually evident." Additional restrictions may apply. Impacts to scenic resources are evaluated in visual resource reports. For example, to be "visually subordinate" a new land use must not noticeably contrast with the surrounding landscape, as viewed from a specific vantage point (generally a key viewing area). However, historic features, such as the white two-rail wooden guardrail, are exempt from this standard.

"In following these principles, it is recognized that the safety features of this highway may not reflect current design standards."

— Oregon Transportaion Commission Policy

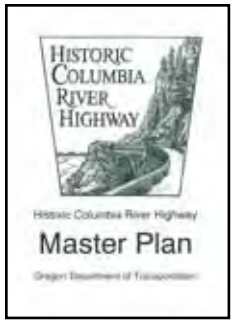
Oregon Parks and Recreation Department's Columbia Gorge Management Unit Master Plan, 1994

This master plan provides a detailed and precise assessment of resources and opportunities on Oregon Parks and Recreation Department (OPRD) lands with a comprehensive, area-wide assessment of recreation demand, supply and needs in the Gorge. This plan provides development concepts for each of the OPRD properties in the Gorge and promotes the recreational development of the abandoned segments of the Historic Highway as a State Trail.



Design Guidelines, Columbia River Gorge National Scenic Area, USDA Forest Service, 1996

This report is intended to provide direction for the design of Forest Service facilities and development in the CRGNSA. Many of the recommendations and guidelines are incorporated into the Historic Highway trail design guidelines.

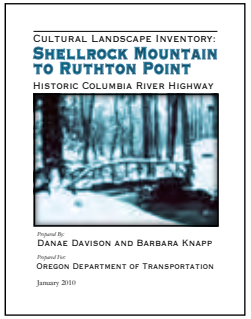


Historic Columbia River Highway Master Plan, 1996 Updated in 2006

This 2006 Master Plan includes policy recommendations, gathers all agreements, design decisions, and background information about the Historic Highway, including a description of activities that occurred between 1996 and 2006. The design recommendations in this Master Plan are included in the Historic Highway trail design guidelines. This includes the Historic Highway Access and Monument Policies.

I-84 Corridor Strategy, 2005

The corridor strategy provides a framework to help the Oregon Department of Transportation (ODOT) manage and improve Interstate 84 facilities within the CRGNSA while meeting public safety and transportation needs and National Scenic Area provisions. The I-84 Corridor Strategy consists of a long-term vision and guides design, construction and management activities. A clear, cohesive framework for managing and approving design in the corridor expedites the implementation of needed improvements or modifications to I-84 facilities in an efficient manner while establishing design continuity for corridor features in the CRGNSA.



HCRH Cultural Landscape Inventory, 2009

This inventory documents important characteristics and features of the abandoned sections of the Historic Highway, and sets up a database and process to support a more comprehensive inventory in the future. These segments of the Historic Highway do not have a large number of intact historic features, in part because they have been fragmented and abandoned for many years, and perhaps in part because the nature of the original construction. As we know from the historic road log, there were more wooden guardrails and fewer stone features on this part of the road. The Cultural Landscape Inventory should be reviewed prior to project development.

Columbia River Gorge National Scenic Area

CHAPTER 2. *Unifying Elements*

Section 2A. *Trail Design Themes*

Introduction

Chapter 2 describes the unifying elements and their recommended use, as design elements and ultimately construction materials. The unifying elements provide three important functions:

Continuity

Create continuity through use, repetition, and functional placement throughout the Historic Highway trail system.

Context

Tie new construction to the landscape character of the general area and consider historic construction techniques and materials.

Consistency

Incorporate unifying elements that are appropriate to the design problem and landscape character by considering an element's form, texture, color, material and scale.

This approach will create a trail system where a user's interpretation of the landscape experience is enhanced and guided by the trail layout, construction materials and landscape character. Avoid materials that are a clear imitation of natural materials, such as plastic made to look like wood or concrete made to look like stone.

Observatory at Rowena Overlook

The National Park Service borrowed from the Historic Highway's aesthetic principle of "lying lightly on the land"

Eagle Creek Overlook

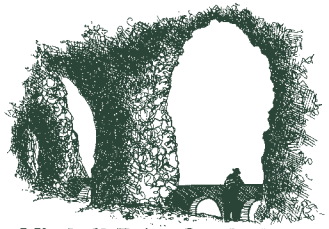
Trail Design Themes

- Implement a rustic style appropriate for a 1920s highway
- Use native and natural materials as practicable
- Minimize use of straight lines
- Minimize disturbance to natural features and vegetation
- Incorporate arch forms when approriate
- Incorporate basalt or other local stone masonry
- Use dark earth tone colors
- Design for the human scale
- Encourage fine craftsmanship

Scenic Inspiration: *Design with a view*

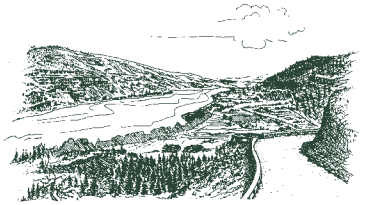
1. View of Vista House from Chanticleer Point

9. Eagle Creek Overlook



10. Mitchell Point Overlook

11. Memaloose Overlook



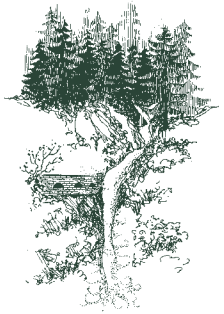
12. Observatory at Rowena Crest

7. Oneonta Gorge

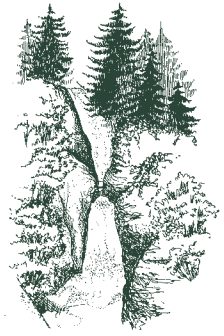
"On starting the surveys, our first business was to find the beauty spots, or those points where the most beautiful things along the line might be seen in the best advantage, and if possible to locate the road in such a way as to reach them. ... There is but one Columbia River Gorge, God put into this comparatively short space, so many beautiful waterfalls, canyons, cliffs and mountain domes that men from all climes will wonder at its wild grandeur when once it is made accessible by this great highway."

Samuel Lancaster
Historic Highway Engineer

2. Latourell Falls

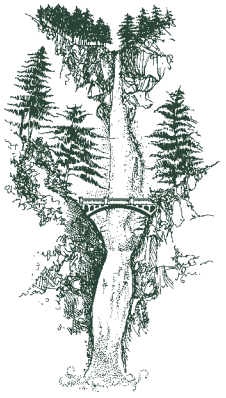


3. Shepperds Dell Falls



4. Bridal Veil Falls

5. Wahkeena Falls



6. Multnomah Falls

8. Horsetail Falls

Excerpt from the Historic American Engineering Record Drawing #OR-36, Sheet 8 of 28: Scenic Inspiration 1995, Delineated by Helen Selph

Section 2B. *Trail Design*

Introduction

The paving and geometry of the historic highway comprise two of its most fundamental, characteristic features. The design of these elements of the State Trail is important for safety and maintenance, and also to the character of the trail and how it reflects the Historic Highway. These elements define important aspects of the relationship of the road to its natural surroundings. This section addresses both safety standards and historic character.

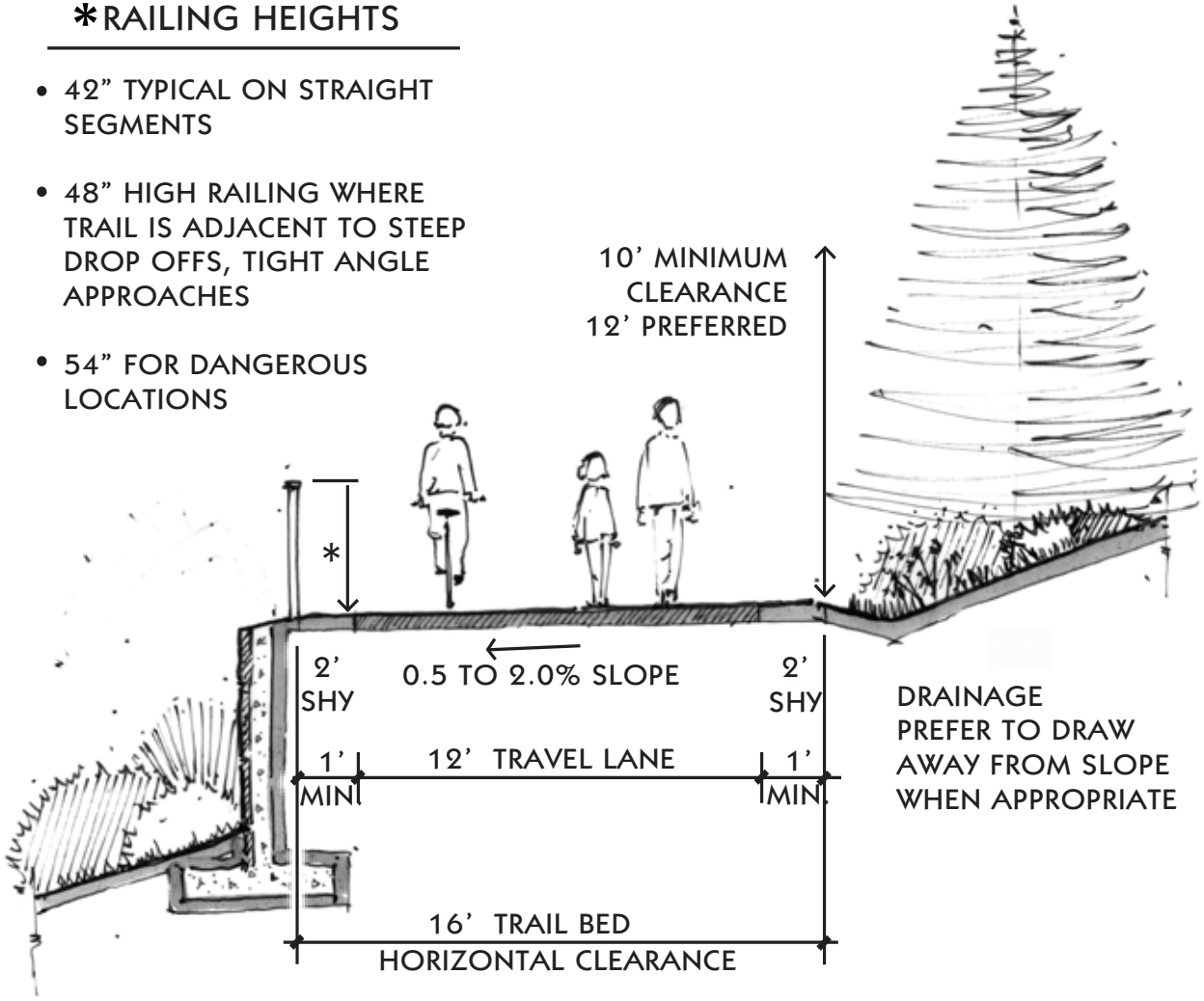
Important Considerations

- The trail shall "lay lightly on the land"
- Avoid straight lines
- Maintain grades less than 5% as practicable
- Avoid natural resource areas (wetlands, large trees, sensitive plants)
- Think about the users. How would the experience feel from the seat of a bike?
- Incorporate views and beauty spots
- Provide for adequate space for safe interactions of multiple user types

Cascade Locks to Eagle Creek

*RAILING HEIGHTS

- 42" TYPICAL ON STRAIGHT SEGMENTS
- 48" HIGH RAILING WHERE TRAIL IS ADJACENT TO STEEP DROP OFFS, TIGHT ANGLE APPROACHES
- 54" FOR DANGEROUS LOCATIONS



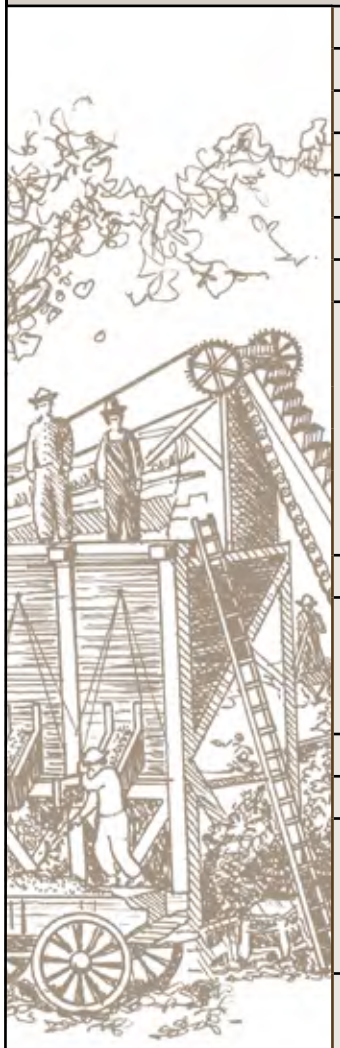
A NOTE ABOUT BARRIER ACCESS

According to the Historic Highway Access Policy, each trail segment must be rated as to expectations of difficulty. Visitors to the Historic Highway State Trail should expect to encounter the natural environment and their expectations should include greater difficulty than would be expected in an urban setting.

Each segment of the State Trail shall be rated for expectations of difficulty. Trail designers are encouraged to meet the "Easy" trail ranking. This will ensure that as many mobility impaired individuals as possible wil be able to use the State Trail.

If it is necessary to include steeper longitudal grades in any portion of a trail segment the following ratings apply:

"Easy"
grades from 0.0% - 5.0%
"Moderate"
grades from 5.1% - 8.0%
"Difficult"
grades from 8.1% - 11.0%



FEATURE / ELEMENT	RECOMMENDATION / REQUIREMENT
Pavement Width	12' preferred, 10' minimum
Horizontal Clearance (each side)	2' preferred (can be paved, gravel or max 6" high ground cover), 1' minimum
Surface	Asphaltic Concrete (maintain historic pavement wherever possible depending upon condition)
Asphaltic Concrete Depth	4" placed in two 2" lifts (one 2" lift over existing pavement)
Base Rock Depth (with root barrier)	6" minimum, 8" preferred (greater depth may be required depending on sub-grade conditions)
Pavement Loading	60,000 lbs.
Grade (preferred)	0.5% to 5.0%
When Grades Greater than 5% are Necessary Note: Provide a 5' landing and rest area (2% grade) within 25' feet of the top and the bottom of each run that exceeds 5%	5.1% to 6.0% grades: limit run to 800' (0.06x800=48' vertical)
	6.1% to 7.0% grades: limit run to 400' (0.07x400=28' vertical)
	7.1% to 8.0% grades: limit run to 300' (0.08x300=24' vertical)
	8.1% to 9.0% grades: limit run to 200' (0.09x200=18' vertical)
	9.1% to 10.0% grades: limit run to 100' (0.1x100=10' vertical)
	10.1% to 11.0% grades: limit run to 50' (0.11x50=5.5' vertical)
Cross Slope	0.5% to 2.0% (2% in direction of land slope typical)
Centerline Radius	200' preferred for long downhill runs 100' acceptable for relatively level areas 42' minimum, provide 2% super elevation
Sight Distance	150' preferred
Vertical Clearance	12' preferred, 10' minimum
Switchbacks Note: Use only where it is not possible to develop a continuous curved route	Limit downgrade approach to a maximum of 5.0%. Provide Minimum 26' width x 36' long landing area (2% grade typical)
Railing Height (when required)	42" typical on straight segments and grades less than 5.0% 48" near tighter curves (less than +/- R=150') and steeper downgrades (>5.0%) 54" in dangerous locations

Views and Vistas

Views and Vistas were an important part of the design of the Historic Highway and should continue to play an important role in trail design. They were the heart of the experience of the road, and important to its alignment and routing. Lancaster wrote of choosing views of the Gorge and vistas of waterfalls as "control points" for the highway.

Views and Vistas

Axial view: Beacon Rock from Moffett Creek Bridge

Moving Views

Often on the descending portions of the road, and along bridges and viaducts, moving views are often framed by filtered vegetation.

Orchards at Ruthton Point , Columbia River Gorge.

Axial Views

Typically framed by the alignment of the road, which carries the viewer into the view along a straight portion of the road.

Moving view: West of Cascade Locks

Panoramic Views

Available at crest locations, often associated with an outward curve around a ridge. The view is revealed at the top of the ascent.

Panoramic view: Columbia River West of Bonneville Dam

Section 2B.2 *Trail Alignment*

A restored historic hand painted glass slide of the historic highway, c. 1920's. The new trail must be developed adhering to the intent of the historic highway's design while utilizing current standards whenever possible.

Introduction

Alignment of the State Trail is an important design element. In fact, it is listed as a contributing feature. As such, designers should pay special attention to how the new trail will "lay lightly on the land". Designers should follow the land contours and minimize cuts and fills. To achieve the best results several site visits should be planned early in the project development phase. A detailed site analysis is required to achieve optimal results. Surveys should include trees with DBH (diameter at breast height) greater than 12". Views and vistas need to be identified during the site assessment phase.

Design Elements

- Trail should provide varying experiences of movement from slow to fast, winding to straighter.
- Alignment designed to maximize views
- Trail grades around a curve should not exceed 5% whenever possible.

Starvation Creek to Viento

Important Considerations

- Alignment and topography work together to orchestrate an experience of interaction with nature
- Alignment should vary the distance from the trail to natural features such as rock outcrops, trees, and water
- Alignment should be oriented where possible to views and vistas
- Road alignment should create a varied experience and minimize disturbance to natural surroundings

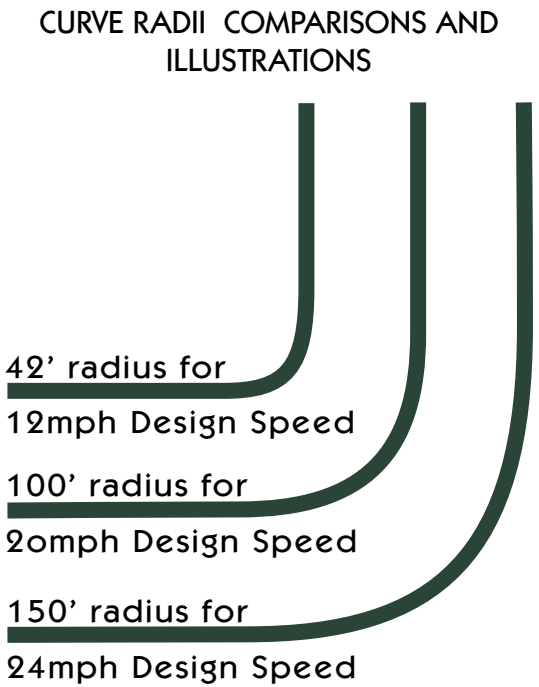
Switchback West of Bonneville Dam

Curve radii are usually determined for bicyclists, who tend to go the fastest.

CURVE RADIUS

Curve radii are usually determined for bicyclists, who tend to go the fastest. Design speed, trail gradient degree of super elevation, lean angle, and surface friction coefficients all need to be taken into account when determining appropriate radii. In practice, most trail design is based on computed tables that reflect desired minimum guidelines which are consistent with AASHTO and other applicable standards to gain assurance that the curves in the trail are reasonable for the design speed and trail gradient.

Increasing trail width by a couple of feet through curves with less than desired radius can help improve safety.



A lean ange of 15 degrees is appropriate for radii calcuations as this is a comfortalbe lean angle for most recreation riders. Based on a 15 degree lean ange, the recommended safe speeds for various radii are as follows:

- 42' for 12 mph (note: this also accommodates service vehicles)
- 100' for 20 mph
- 150' for 24 mph
- 200' for 28 mph

(Note: Radii shown are measured at trail centerline.)

Curves sets up a crossing as the trail approaches Viento Park.

Curves can be used to slow traffic

Moditfications to sections of original highway should be as minimal as practical. As a first step, clean up of original Historic Highway sections should include removal of downed trees and brush overhanging the pavement, clearing of ditches and culverts, removal of moss and debris on pavement. Once this step is complete, State Trail designers can evaluate pavement, culverts and other conditions to determine whether additional work is needed. In some locations the original pavement may be smooth enough that it can be used as the "trail" surface. In other locations it may be necessary to overlay the original pavement with asphalitic concrete to protect the original pavement and provide a smooth trail surface.

Rockwall at Ruckle Creek before restoriation

Historic Mile Post

Turnouts along historic sections give a sense of the road as an auto route. Restore historic turnouts: consider the form of features like turnouts and turn-around areas along the State Trail.

Restored Rockwalls and viaduct at Ruthton Point

Eagle Creek Overlook Bench

Section 2C. *Retaining Walls*

Introduction

Retaining structures are an important unifying element critical to trail design and construction. Due to the steep landscape and multiple transportation uses in the Columbia Gorge, trail alignment often requires the use of retaining structures and landscape modification. A variety of retaining wall types may be required in order to maintain trail width and grade.

Based on site specific subsurface and topographic conditions, geotechnical engineers will determine the appropriate wall type and work with the design team to best determine its integration and contextual relationship to the project. It is understood that wall height and appearance are important considerations in obtaining approval from the US Forest Service and the appropriate county. Two primary wall types are addressed in this section: cut slope and fill slope retaining walls.

In general, wall placement and design is a primary consideration for trail safety. Due to challenging geologic and topographic conditions along the trail alignment, geotechnical considerations will drive retaining wall design. The main aesthetic objectives are to minimize disturbance and blend into the natural environment through placement, design, and materials.

Important Considerations

Walls will most certainly be required in the Columbia River Gorge. Non-structural solutions should be explored first. However, walls may be required to reduce the project footprint. For ODOT projects, consult the following references:

- ODOT Geotechnical Design Manual
- AASHTO LRFD Bridge Design Specifications
- Oregon Standard Specifications for Construction (OSSC)
- I-84 Corridor Design Guidelines apply when the Historic Highway State Trail is adjacent to I-84

Sample of original rock wall.

Design Elements

- Trail alignment shall be designed to minimize long-term scenic effects by minimizing walls, buttresses, fences, and barriers wherever possible
- New cut slopes, walls and buttresses should mimic and blend with the shapes and textures of the existing landscape
- Minimize both the finished retaining wall footprint and construction impacts
- Minimize disturbance to natural landforms
- Emulate the materials and colors of adjacent landforms
- Minimize exposed wall height
- Use visually inconspicuous materials
- Avoid flat, non-textured surfaces
- Use natural rock and natural rock veneer where practicable
- Reflect rustic style and hand construction typical to the Historic Highway
- Wall ends should return to the adjacent landscape
- For taller walls consider terraces

Historic Rock Retaining wall with guardrocks

Existing recent basalt retaining wall.

Section 2C.1 *Cut Slope Retaining Walls*

Cut slope retaining walls may be required where the trail parallels existing slopes. In these cases, uphill cuts are required in order to maintain trail width. Due to the presence of slopes steeper than 2H:1V, talus slopes, vegetated talus slopes, landslides, and rock falls, minimizing these uphill cuts is preferred. Cut slopes and uphill retaining walls of any height require field reconnaissance and evaluation by an Engineering Geologist, a Landscape Architect, and a Geotechnical Engineer.

Uphill retaining walls are most visible to trail users. In these instances the rock walls present a design opportunity. Special care shall be taken to ensure that these walls reflect the character of the Historic Highway. Rockery walls or rock faced walls are preferred where space allows.

However, construction of rockery facing taller than four feet requires a significant footprint. Where topographically constrained, it may be necessary to use a cast-in-place concrete wall which can be faced with real rock. A good example of this is the rock wall at the overlook along the Twin Tunnels Trail and the building at the West Trailhead in Hood River.

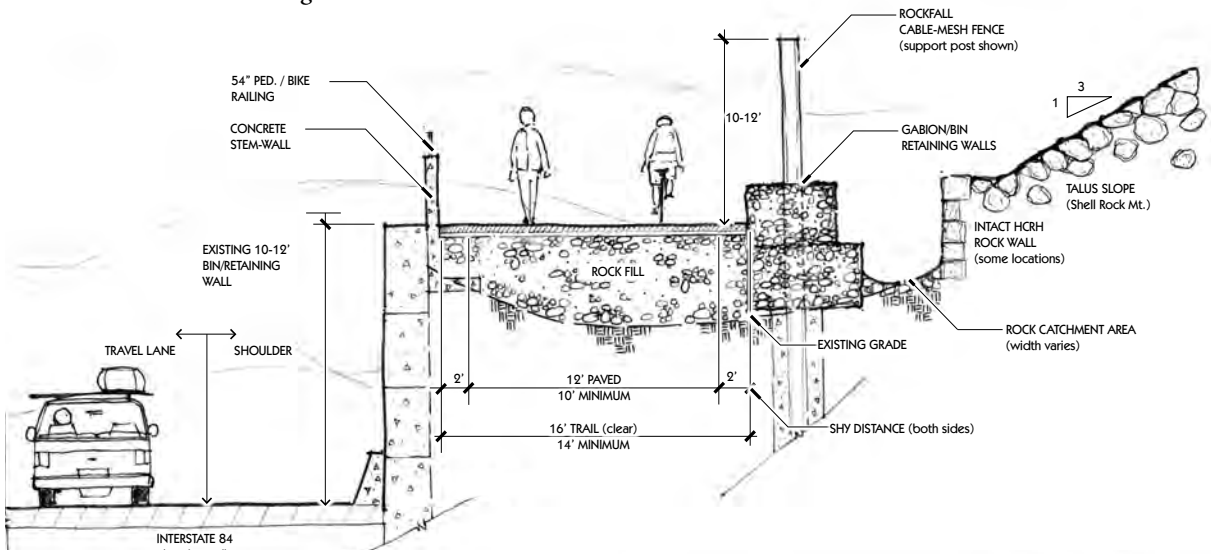
Rockery (Dry Stacked Rock)

Historic rock wall along the Historic Highway

Wall Type	Recommended Application
Rockery (Dry Stacked Rock)	Use where slope stability is not primary design issue
Geoweb Wall	Use where not visible from the trail
Cantilever Soldier Pile / Lagging	Use for slope stabilization
Anchored Soldier Pile / Lagging	Use for landslide mitigation
Micropile	Use for slope stabilization, especially where access is difficult
Concrete Gravity Wall	Slope Stabilization
Cantilever L-Wall	Slope Stabilization

Site Specific Wall Designs

Shellrock Mountain Crossing



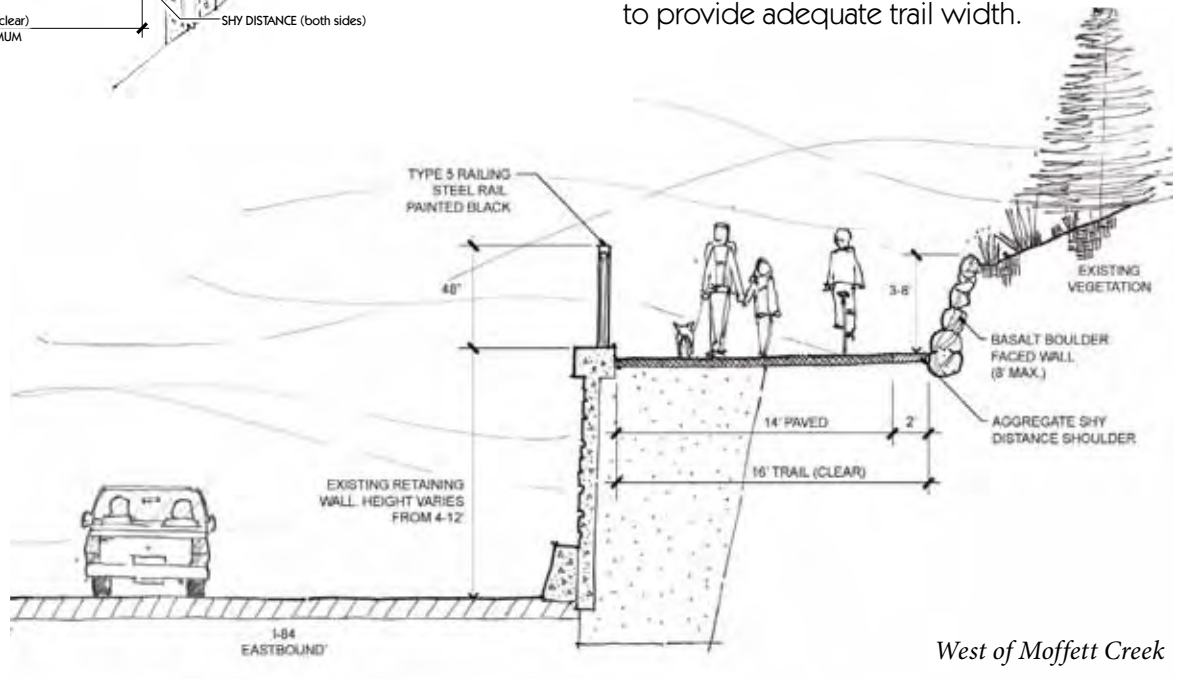
SHELLROCK MOUNTAIN CROSSING

The preliminary illustration above is site specific to the crossing of Shellrock Mountain. This wall design utilizes various wall types and rockfall mitgation designs. This illustration utilizes the existing bin retaining wall and rock catchment. It also makes use of the existing Historic Highway retaining wall. However, geotechnical engineers will need to ensure that the design meets appropriate safety requirements when engineering this segment of trail.

WARRENDALE (JOHN B. YEON STATE PARK) TO MOFFETT CREEK

The preliminary illustration below is specifc for the Warrendale to Moffett Creek segment of the State Trail. This wall design illustrates the Historic Highway State Trail above an existing Soldier Pile Retaining Wall. This is an existing wall that was built by Oregon Bridge Delivery Partners on I-84 eastbound, just west of Moffett Creek Bridge.

As trail users will be traveling above I-84, a pedestrian rail is needed for safety. In addition, an upslope retaining wall is needed on the south side of the State Trail to provide adequate trail width.

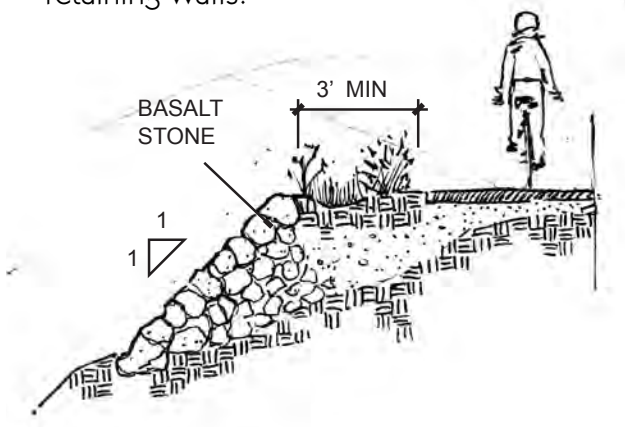


West of Moffett Creek

Section 2C.2 *Fill Slope Retaining Walls*

Fill slope retaining walls may be needed where the trail elevation requires fill placement and/or the trail extends across existing slopes and fill is preferred to minimize uphill cuts and/or balance cut and fill. Fill slope retaining walls are typically located downhill of the trail and are not visible to trail users. Due to the presence of slopes steeper than 2H:1V, talus slopes, vegetated talus slopes, landslides, and rock falls, fill slope retaining walls of any height require field reconnaissance and evaluation by an Engineering Geologist and Geotechnical Engineer.

Depending on the location, fill slope retaining walls may allow greater flexibility in design. In some cases, fill slope retaining walls may require the same aesthetic treatment as cut slope retaining walls.



Geoweb Wall between Eagle Creek and Moffett Creek

Downhill retaining walls, while not visible to trail users, may be visible to other members of the traveling public. Within the Columbia River Gorge National Scenic Area, making walls visually subordinant or not visually evident from key viewing areas (I-84, SR-14, Historic Highway) is a key concern. Here the designers shall consider the distance and vegetative buffers between the State Trail and the Key Viewing Area when choosing the appropriate wall type.

Design considerations should also include drainage, erosion control, minimizing the construction footprint, and minimizing vegetation removal. Where possible, vegetation should be restored during the first planting season following construction. In addition, reinforced slope embankments are encouraged.

Wall Type	Recommended Application
Reinforced Soil Slope	Use where a signifacnt footprint can be vegetated
Geoweb Wall	Can be used in most areas
Gabion	Use where visual subordinance is not high priority Wire meshing should be coated with a dark brown vinyl to achieve visual subordinance
Precast Modular	Use where visual subordinance is not high priority
Hilfiger Wall	Can be sued in most areas Various facing solutions are available
Mechnically Stabilized Earth (MSE)	Can be used in most areas. Various facing solutions are available

Section 2D. *Rockfall Mitigation*

Introduction

Several trail locations require rockfall protection. Each unique location (differing rock conditions, differing fall geometry), requires specific engineering designs. Historically, rock cuts and rock slopes were an important part of the experience of the Hisoric Highway. They were shaped to maximze a sense of intimacy with the landscape. The design of the State Trail should seek opportunities to emulate the historic use of rock cuts to emphasize the topography and geology of the Columbia Gorge through varying rock overhangs, vertical, and battered rock cuts, curving cuts to the horizontal alignment of the trail, including ledges for vegetation and naturalistic rock features.

Due to the presence of exposed rock faces and talus slopes throughout the trail alignment, rock slope design and modification are primary considerations for trail user safety in many locations. Rock slope characteristics vary from rock outcrops to more shallow slopes of eroding soil and rock or talus.

Rock Slope Design

Rock slope design is required where the trail alignment is parallel to or below an existing rock slope. In these cases, it is necessary to evaluate the rock slope hazard and identify the risk to trail safety.

East of Eagle Creek

Due to trail constraints such as topography, right of way and existing infrastructure (utilities, I-84), rock slope stabilization will require a combination of methods.

Design considerations should also include drainage, erosion control, minimizing the construction footprint, and minimizing vegetation removal. Where possible, vegetation should be restored during the first planting season following construction.

Rock slope design methods will require aesthetic treatment to maintain visual subordinance within the National Scenic Area.

Mosier Twin Tunnels Rock Fall Catchment Structure.

Section 2D.1 *Rock Slope / Rock Cliff Work*

Rock Slope Design Elements

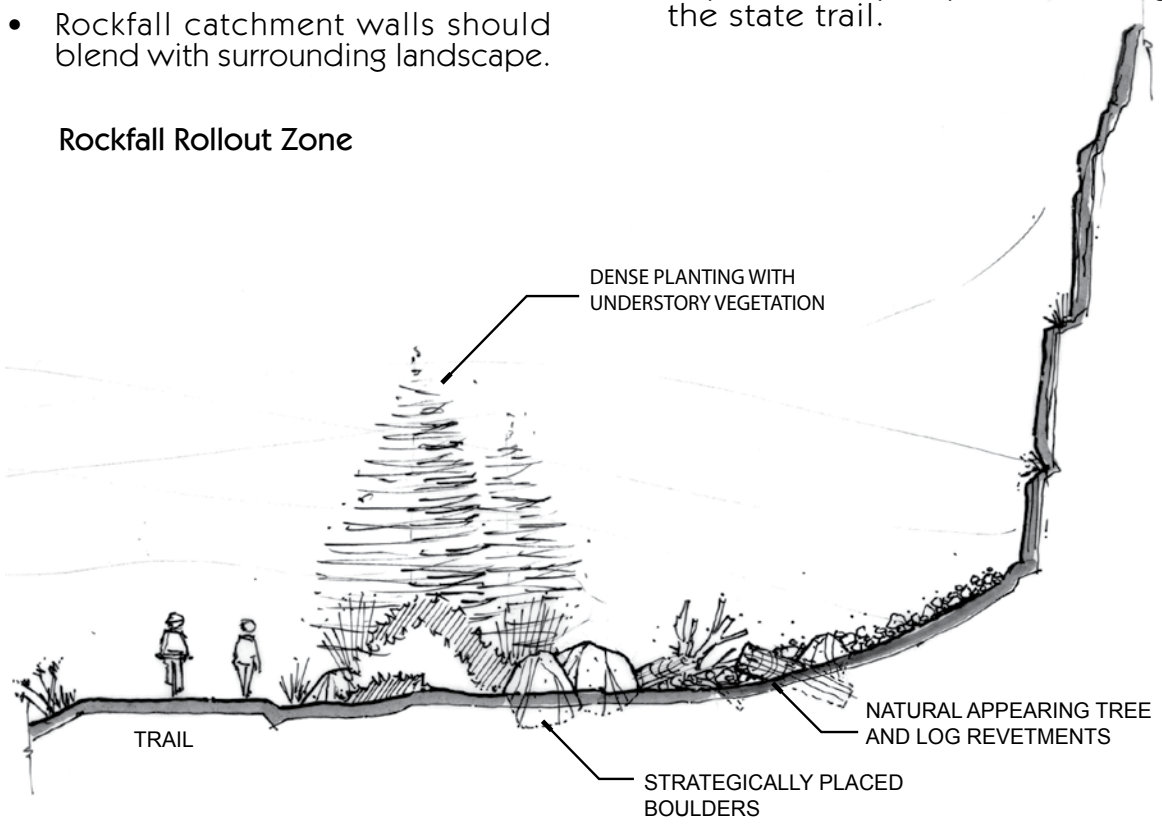
- Drill holes for blasting should not be visible from the trail or I-84 at project completion.
- Treat newly exposed surfaces with a weathering agent to match adjacent undisturbed rock surfaces if needed.
- Where retaining vegetation is not possible, benches and/or revegetation should be incorporated into the slope design.
- Materials used for visible buttressing shall be natural (boulders, rocks or stone face) or natural appearing (textured and colored concrete).
- Recess and plug visible bolts within the view cone of the roadway. Color plugs to match existing or adjacent undisturbed rock.
- Color visible bolts above the view cone to match the existing or adjacent undisturbed rock.
- When approved, color and texture shotcrete to match the adjacent undisturbed rock. Shotcrete may not be used as a continuous feature.

> "All tools to solve rockfall will remain on the table as user safety is paramount along the State Trail."
>
> – ***Tove Peltz, ODOT Geotechnical Engineer***

Rock Catchment Design Elements

- Consider naturally contoured rockfall catchment ditches and berms prior to considering fencing, walls or barriers.
- Rockfall catchment, protection fencing and mesh should only be used when necessetated by site conditions, site, and safety.
- Rockfall catchment walls should blend with surrounding landscape.
- Use of wire mesh should be limited within the I-84 corridor.
- Use vegetation, boulders, downed trees, and logs in catchment area to serve as impact barriers within the rollout zone. Arrange to achieve a natural appearance.
- Ensure Maintenance has access to catchment area for cleanup and on-going maintenance. This is particularly important along the state trail.

Rockfall Rollout Zone

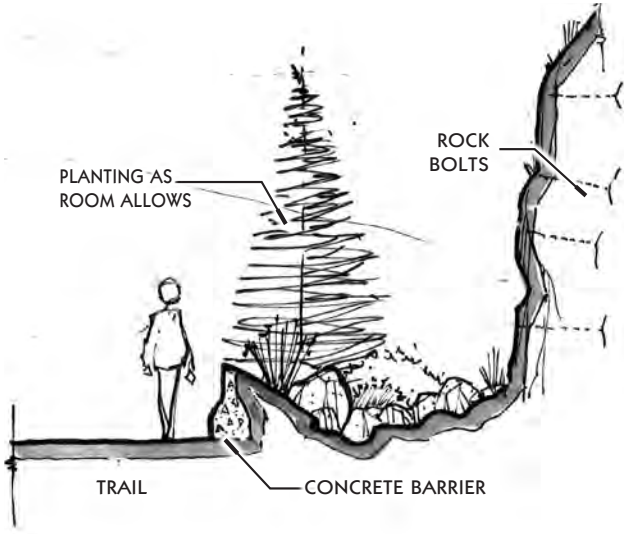


ROCK SLOPE DESIGN

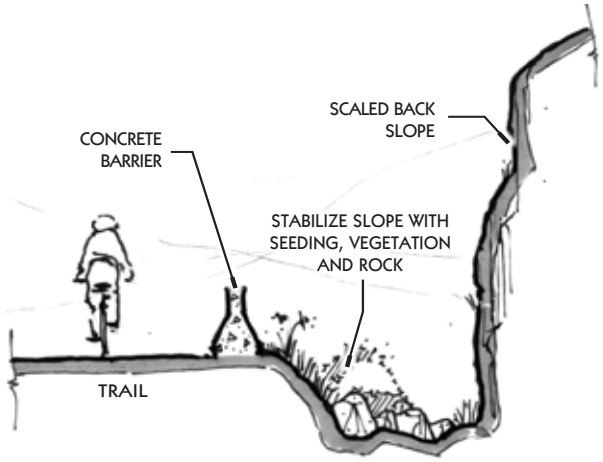
Rock Slope Design is required where the trail alignment is parallel to or below an existing rock slope. In these cases, it is necessary to evaluate the rock slope hazard and identify the risk to trail safety. Due to trail constraints such as topography, right of way and existing infastructure (utilities, I-84), rock slope stabilization may require a combination of methods (See tables this page).

Method	Recommended Application
Scaling	Limited removal of undermined high hazard rock and vegetation by professional contractor
Controlled Blasting using presplit and trim techniques	Large volume rock removal, to build stable slope, increase catchment area
Catchment Area	Where space allows, to separate trail from rock fallout area
Rock Bolts	Mechanically stabilize large blocks
High Energy Rock Barrier Fence	Where space is limited, to protect trail from rock fall
Wire or Cable Mesh	Where space is limited, to protect trail from rock fall.

Method	Recommended Application
Treatment of fresh rock face with weathering agent or stain	To blend in with adjacent rock surfaces
Treat mesh a dark earth tone	Visually subordinate
Cut and splice mesh around remaining trees	Visually subordinate
Paint or coat all metal components a dark earth tone color	Visually subordinate
In-set rock bolts and cap with stained grout	To blend in with adjacent rock surfaces
Hide or mitigate drill holes	To blend in with adjacent rock surfaces



Ditch Catchment with Concrete Barrier and planting as room allows



Ditch Catchment with Concrete Barrier

Section 2E. *Barriers*

Introduction

Barriers are used to keep visitors on designated pedestrian pathways and trails and away from sensitive plant communities and habitats. In some instances barriers, such as the rock parapet walls iconic to the Historic Columbia River Highway, provide a design theme and an opportunity to provide consistency along the trail.

Several other types of safety and control barriers will be needed at various locations along the State Trail to keep users on trail and away from steep dropoffs. These include guardrails, rock fall zone protection, fences, bollards, vertical obstructions and gates.

West of Cascade Locks

Important Considerations

- Barriers should not obstruct views from either side of trail.
- Use should be minimized. Do not use a barrier if it is not needed.
- I-84 Corridor Strategy Design Guidelines should be consulted for barriers adjacent to I-84.

Cascade Locks to Eagle Creek

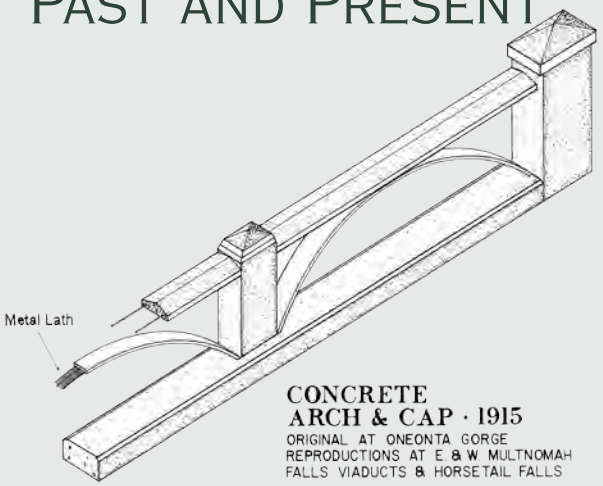
Design Elements

- Barriers should fit the landscape character and are a primary safety consideration.
- Variation in barrier types creates interest along the road, for example by alternating guard fence, guard stones, and masonry parapet. Long stretches of one type of barrier should be avoided.
- Masonry walls historically varied in construction, showing the individual design and style of the different stonemasons. Variation in stone size, placement, and jointing are all possible ways of creating variety in stone walls. Stone barriers should generally be placed where stone in the landscape creates a context for them. Rock outcrops, talus slopes, and rocky draws provide such context.

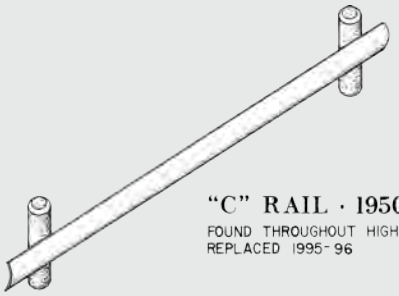
Mosier Twin Tunnels

Historic Columbia River Highway *Shoulder Barriers*

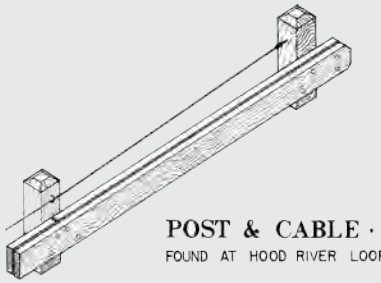
Past and Present



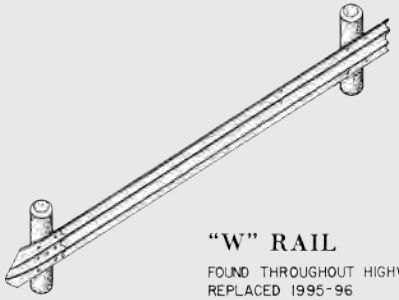
CONCRETE ARCH & CAP · 1915
ORIGINAL AT ONEONTA GORGE
REPRODUCTIONS AT E. & W. MULTNOMAH FALLS VIADUCTS & HORSETAIL FALLS



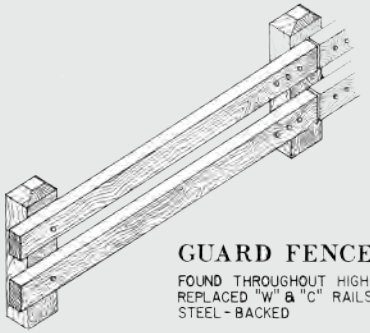
"C" RAIL · 1950s
FOUND THROUGHOUT HIGHWAY
REPLACED 1995-96



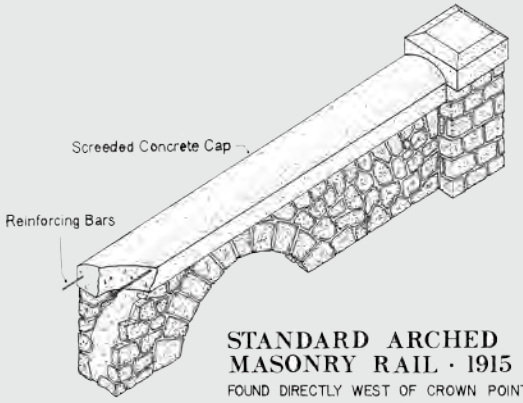
POST & CABLE · 1930s
FOUND AT HOOD RIVER LOOPS



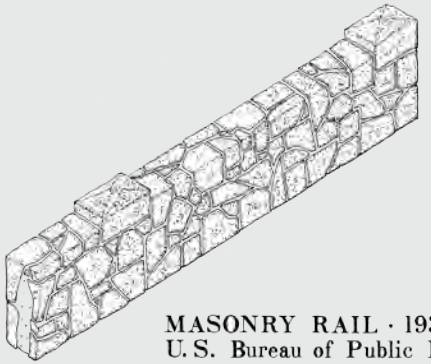
"W" RAIL
FOUND THROUGHOUT HIGHWAY
REPLACED 1995-96



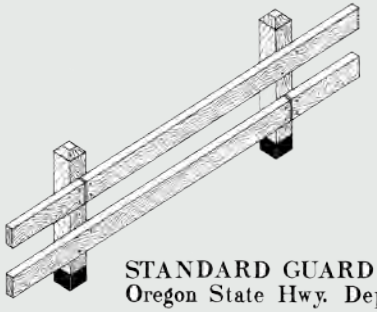
GUARD FENCE · 1987
FOUND THROUGHOUT HIGHWAY
REPLACED "W" & "C" RAILS
STEEL-BACKED



STANDARD ARCHED MASONRY RAIL · 1915
FOUND DIRECTLY WEST OF CROWN POINT
(GROUT CORE)



MASONRY RAIL · 1930s
U.S. Bureau of Public Roads
FOUND AT SANDY RIVER (STARK ST.) BRIDGE
(SOLID STONE)



STANDARD GUARD FENCE
Oregon State Hwy. Dept. · 1915 *ca*
ORIGINALLY FOUND THROUGHOUT HIGHWAY
NO LONGER EXISTS
(NO STEEL)

Section 2E.1 *Shoulder Barrier*

Introduction

Shoulder barriers should be used when the trail is adjacent to I-84 and separation from the traffic lanes is needed. Since the barrier will be placed along I-84, it is required to be consistent with the I-84 Corridor Strategy Design Guidelines (CST). Therefore the shoulder barrier needs to be stained according to the I-84 CST. The I-84 Design Guidelines do not specify the color of shoulder barrier only median barrier. However it is assumed that color of the shoulder barrier should be the same as the median barrier (0192 Dapper/Miller Paint). The color is consistent with the corten guardrail standard.

East of Eagle Creek

West of Cascade Locks; the barrier and pedestrian railing colors are simulated in this photograph.

Important Considerations

Historic Highway State Trail projects should use the standard 32" shoulder barrier with a 22" pedestrian rail on top. The current design standards as per the trail geometry section do not call for a 54" pedestrian rail. However, due to the proximity of fast moving traffic, it is strongly recommended the designer continue to use this design detail with modification to the color of the barrier to ensure consistency with the I-84 CST.

Design Elements

- 32" tall barrier with 22" pedestrian railing
- Painted brown (0192 Dapper/ Miller Paint) with a pedestrian rail that is either weatherized steel or a dark earth tone color.
- Have top railing
- Do not have to be cast in place
- Have scuppers to accommodate drainage
- Consider sand removal during the winter and spring

NOTE: *Examples shown here were completed prior to the development of the Corridor Strategy Guidelines and these trail design guidelines.*

Section 2E.2 *Gates*

Mosier Twin Tunnels West Trailhead

Introduction

Gates control access as well as exclude vehicular traffic in heavily used recreational areas. Gates are also used to limit access from the trail to service roads or access roads. The standard OPRD gates are available through Inside Oregon, Parks and Prisons program. The USFS Forest Service uses an ornamental wooden gate. Additionally ODOT has recently developed a new standard for access control gates along the interstate.

Important Considerations

Access control gates at trailhead parking lots need to be constructed out of weatherized steel or painted a dark brown.

I-84 access control gates define ODOT Right of Way and restrict illegal parking. These gates must comply with the I-84 CST.

Decorative gates used along the historic highway alignment need to be designed on a site specific basis.

OPRD Access Gate — I-84 Access Control East of Moffett Creek

Design Elements

All gates should be painted dark brown to blend in with the surrounding landscape.

If within the view of I-84, the gate needs to comply with the I-84 Corridor Strategy Design Guidelines.

Service road gates (such as BPA power line access roads) along the trail should be OPRD's standard Gate (available through Inside Oregon).

Decorative gates (similar to the gate at west end of the Historic Highway at the West Trailhead in Hood River – photo above) should be used to restrict vehicular access when the drivable sections of Historic Highway transitions to a State Trail segment. Gates across historic sections of the road should be used minimally because a gate disrupts the corridor and feel of the road as a transportation corridor.

Forest Service Gate

Section 2E.3 *Two Rail White Wooden Guardrail*

Introduction

The two-rail white guardrail is an iconic feature of the Historic Highway and allows trail users to idenitfy that they are travelling along the Historic Highway corridor. While along the drivable section of the Historic Highway the wooden guardrail has been reinforced with steel, this is unnecessary along the State Trail. Instead, along the State Trail, designers should use the original standard design ("standard guard fence") for the Historic Highway. These specifications call for wood, painted white with black footings on the posts. As the State Trail white guardrail has black footings, it is approrpiate to use in non-historic locations, as it does not provide a false sense of history.

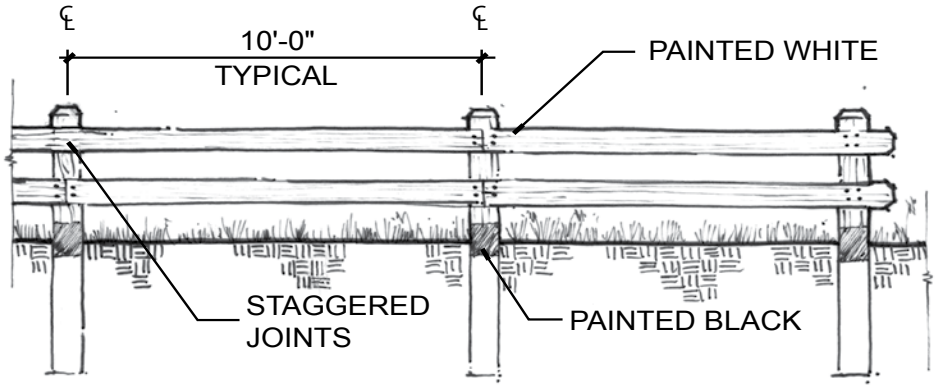
Design Elements

- Use Standard ODOT Drawings for plan sheets
- Footings should be black along the Historic Highway State Trail.
- 42" height

Important Considerations

The white two rail guardrail is an important component to the Historic Highway. It is iconic and helps users associate the trail with its historic origin. However, it is important that the white guardrail is used appropriately. It is allowed because it meets section I-1-36 of the Columbia River Gorge National Scenic Area Management Plan. This exempts the white guardrail from the visual standards because it is considered a contributing resource to the Columbia River Highway National Register Historic District as per the following language:

"Rehabilitation or modification of historic structures on or eligible for the National Register of Historic Places may be exempt from the above policies if such modification is in compliance with the National Register of Historic Places guidelines."



Jogger enjoys the guardrail along Mosier Twin Tunnels Trail

Section 2E.4 *Pedestrian Rail*

Introduction

The pedestrian rail is to be used where safety is a primary concern. A trail next to a steep vertical drop off may require a pedestrian rail to prevent people from climbing or falling. Specific field studies are needed to determine where risk exists and what type of barrier will achieve the necessary level of safety. However, safety standards intended for urban areas are not necessary, and urban style design should be avoided.

Design Elements

- **42" height** typical on straight segments
- **48" height** near tighter curves (less than +/- R=150') and steeper downgrades (>5.0%)
- **54" height** adjacent to dangerous locations
- **6" minimum** spacing between pickets

Pedestrian rail underneath the I-84 Tanner Creek Bridge

Important Considerations

As per 11.3.7 of the Oregon Highway Design Manual the need for a rail along the trail depends on the combination of several factors. This rail should only be used when necessary, otherwise it can be an obstruction. No one factor alone can trigger a need, and mitigating for one factor may remove the need for the rail. Consider the combined effect of the following when determining the need for a rail:

- **Height** – a vertical drop of 2.5 ft. or more
- **Steepness of the slope** – a slope steeper than 2h:1V
- **Material of slope** – rip rap or other hard and sharp material
- **Shy distance** – shy distance of two feet or greater may be sufficient to mitigate the need for a rail
- **Hazard at the bottom of the slope** – moving traffic, deep or fast running water
- **Users** – a preponderance of elderly, disabled or young users
- **Speed**

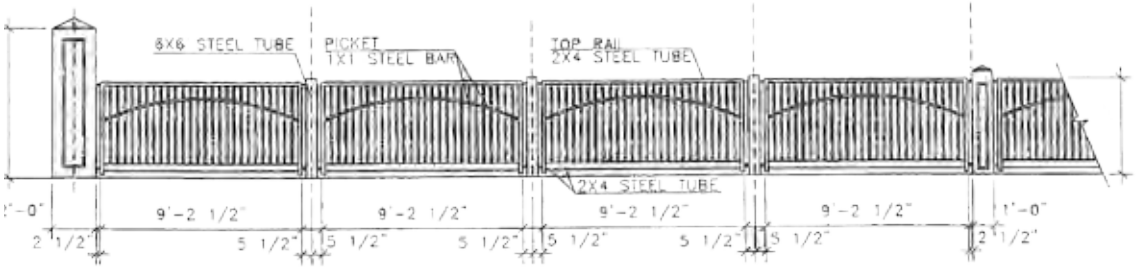
In Some Historic Highway State Trail applications, it may be appropriate to use this fence (see wooden post and mesh fence to the right) when a pedestrian rail is required. This fence type is cost effective. Though this rail uses chain link, when painted dark brown it disapears into the landscape. Consider v-mesh or welded wire mesh instead of chain link.

Past Historic Highway State Trail projects have used the black steel fence with pickets for the pedestrian rail (see photo below). This presents a very urban feel. In future applications, this rail is only recommended in high risk or hazardous areas.

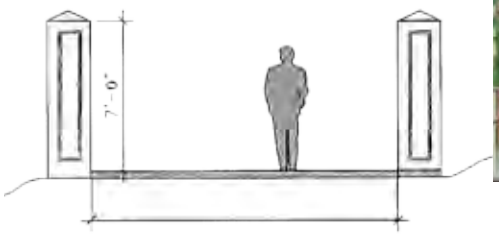
A concept for a more ornate pedestrian rail was developed by the Historic Highway Advisory Committee (see illustration at right). This rail may be appropriate for a bridge and in a developed area such as a trailhead.

Not recommended pedestrian rail previously used along the State Trail.

Elevation View



Cross–Section



Elevation View

Section 2E.5 *Fences*

Introduction

Fences are necessary along some trail segments to control access and to protect sensitive habitat and cultural resource sites. There are several types of fences that can be used along the trail. Each fence type should be used appropriately.

Four strand access control fence along I-84 is used to delineate ODOT right of way.

NOTE: *Fencing wire and post shall be weatherized steel or a non-reflective dark brown color.*

Important Considerations

- Must comply with I-84 Corridor Strategy Design Guidelines when adjacent to I-84. This includes V-Mesh and the 4 strand wire fencing.
- Fences can be an obstruction and should only be used where necessary for safety or to protect resources.
- Fence should be placed as far from the trail as practical to limit visability.

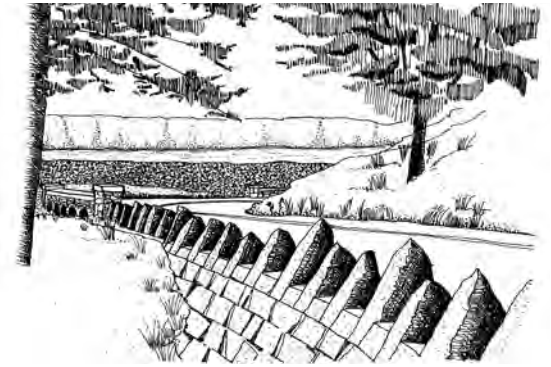
V-mesh fencing is not climbable and is used as pedestrian access control for sensitive habitat and sites. Views of fence should be limited.

Design Elements:

- A split rail fence may be useful in defining use areas.
- Access control fences are necessary to control access onto I-84. Where the trail is close to I-84 the V-Mesh fence type is required.
- In order to control access along the Trail, the wood fence with a metal mesh is most appropriate - Mesh needs to be brown in color

Wooden post and mesh is used both for access control as well as defining space. This is the preferred fence to use along the trail.

Section 2E.6 *Boulders*



Where desirable, consider incorporating this historic feature into the trail design.

Introduction

Large boulders at trailheads and adjacent to parking lots may be used to deter vehicle access. Boulders may also be placed at locations for informal seating and to guide trail users.

Important Considerations

Guard rocks were used historically along the Historic Highway and may have appropriate application along future trail sections.

Design Elements

- Angular and same color as surrounding native rock
- Bury 1/3 of boulder
- Boulder mass and size should be appropriate scale to the site, often stone that is too small is selected.
- Do not place boulders on top of finished grade.
- Natural spacing.

Boulders appear more naturally occuring when partially embedded.

Large boulders at trailheads and adjacent to parking lots may be used to deter vehicle access.

In lieu of using the standard concrete curbing; partially embedded boulders serve as an aestetic alternative at the West Trailhead in Hood River.

Section 2E.7 *Bollards*

Introduction

In general, bollards should only be used where necessary to prevent vehicle access, and to define original historic highway sections. Bollards should be clearly visible to trail users. Bollards shall be removable to allow for maintenance vehicles and emergency access.

Important Considerations

When the bollards are removed it is important that the base lies flush to the pavement as to not present a tripping hazard.

Design Elements

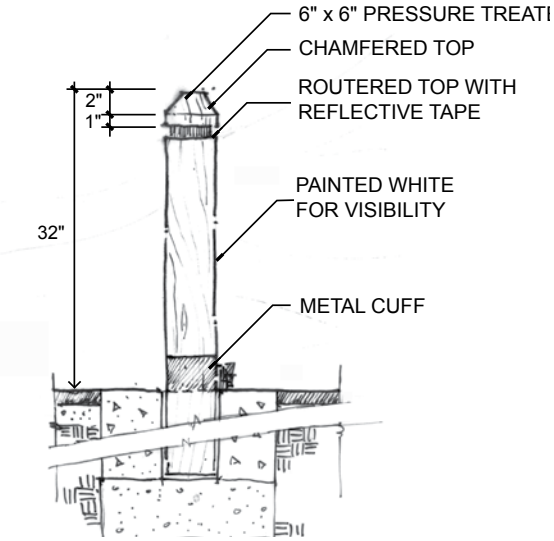
Wooden Bollard

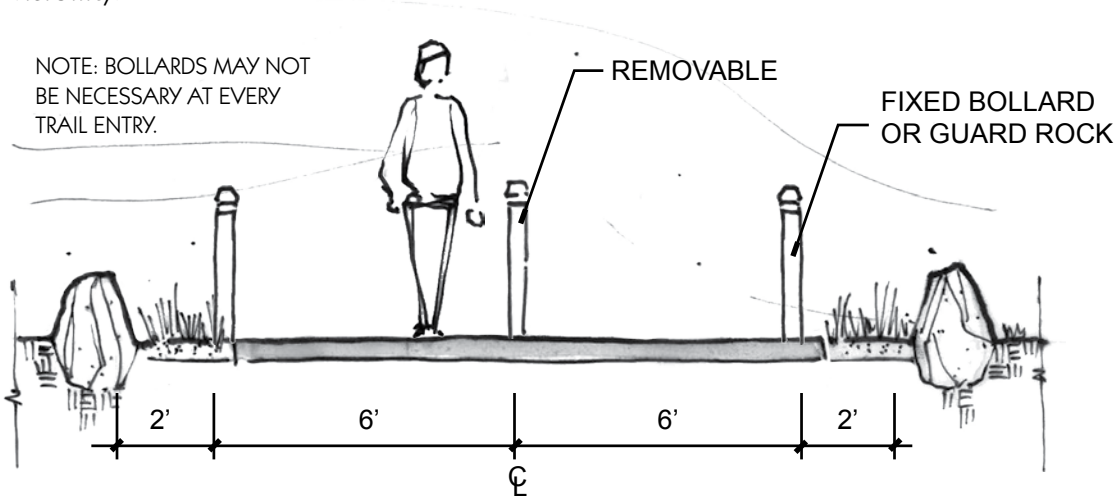
- Angular and appropriate to natural surroundings.
- Bollards should be painted white with a black footing. This improves their visibility.
- Removable for maintenance and emergency vehicles.
- Square wooden post similar to the wooden two rail guardrail.
- Include reflective tape around the top.
- This bollard is available through Inside Oregon (Parks and Prisons Program)

Concrete Bollard

- Use where we want a more formal entry. Typically part of a gate.
- Smooth concrete on border and recessed exposed aggregate panel.
- Be non-removable with permanent base.

Note: This bollard type is heavy and very difficult to remove. The hcrh advisory commitee and the oprd staff are investigating alternatives.





Section 2E.8 *Masonry Parapet Walls*

Introduction

Stone walls are highly encouraged along the trail and should be used frequently. Stone walls provide a cohesive design element as well as reflect the historic nature of the Historic Highway. Arched stone walls are preferred and can be used at view points, along the trail and around parking lots. Stone pillars with concrete caps at the end of stone walls and bridges are also a unique design element and are encouraged. These distinctive designs will unify trail segments. Stone walls also provide an opportunity to support the historic art of stone masonry.

Important Considerations

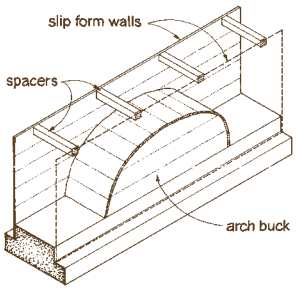
Walls along the historic sections of the State Trail will need to comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties. To avoid a false sense of history, new walls need to be compatible with existing walls but recognizable as new construction by a small construction plaque or other method. Along portions of the State Trail that do not follow the Historic Highway Alignment this is less of an issue. The stone walls that frame the Angels Rest parking area provide a cost saving design that uses a concrete core and a real rock facing. Rocks should be applied randomly with offset joints and a deep rake finish.

Historically, the standard arched masonry wall had mortared rubble facing around a grout core, with a concrete cap. The design incorporated an elliptical arch for drainage. Italian stone masons reportedly supervised the building of these walls.

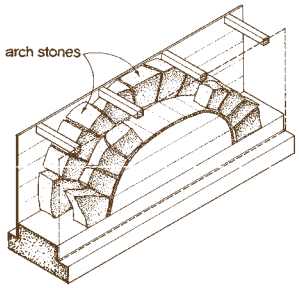
Design Elements

- Stone shall match nearest color and character of rock formations, talus slope, or boulders.
- Rock shall not come from site unless it is a construction activity byproduct.
- Large stones shall serve as foundation stones. Round river rock is not appropriate. Rock size should diminish in size at the upper part of walls.
- Mortar joints should be random or semi-random with deep rake.

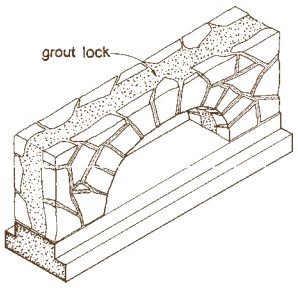
Historic Construction Method



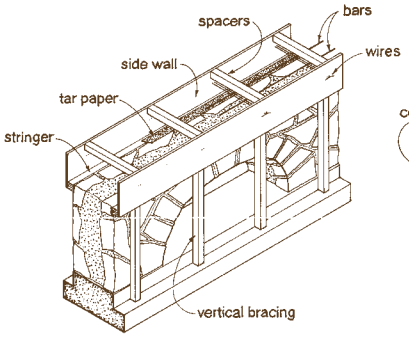
1. Set up the form
This is done on top of a stable surface, like a retaining wall or a concrete foundation.



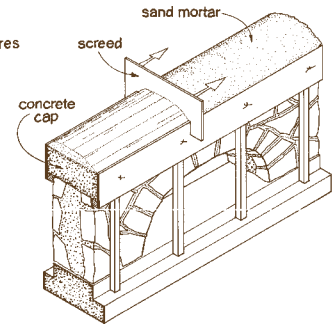
2. Lay the rock
Arch stones are grouted in first and then the remaining stones are laid and grouted until "laid up to height."



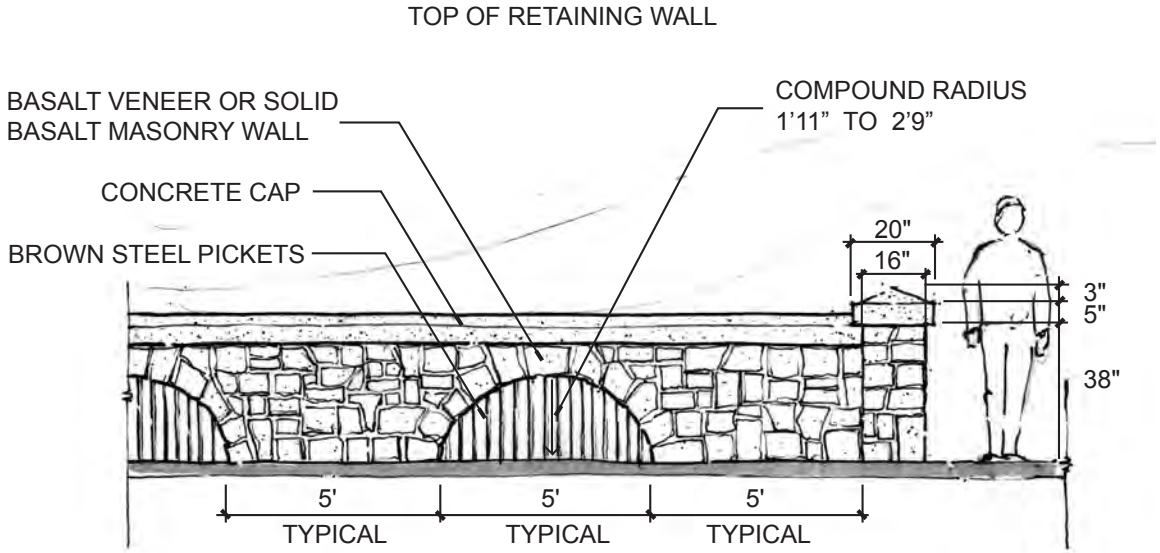
3. Strip the forms & finish the joints
(see Mortar joints above)



4. Build the cap form
Set up vertical bracing, stringers, side walls.
Tie wires, lay bars and insert spacers.
Line the bottom joints with tar paper.



5. Pour & finish the cap
Pour the concrete and screed flush.
Apply sand mortar and screed to shape.
Cut wires and remove forms when set.



"The craft of Masonry should be evident in new wall construction along the Historic Columbia River Highway."

—Mark Davison
OPRD Master Planning Coordinator

Section 2F. *Bridges and Culverts*

Introduction

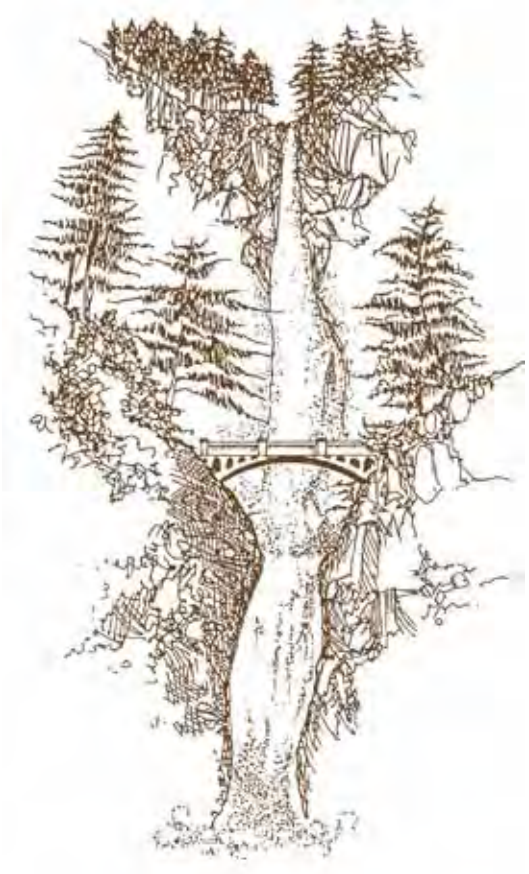
Both bridges and culverts were important design elements of the Historic Highway. Bridges responded to the topography and geology of the streams they crossed, and were built from concrete and/or native stone to blend in and enhance the natural forms surrounding them. They often were associated with creek access, turnouts or waysides, and viewpoints.

Historically, culverts that could be seen from the road or from side trails often incorporated stone masonry or detailing. Both bridges and culverts can be important character defining elements along the trail.

"Consider bridges as a design opportunity along the Historic Highway State Trail."

— Christine Plourdes
USFS Columbia River Gorge
National Scenic Area

Constructing Multnomah Creek Bridge



Multnomah Falls

Section 2F.1 *Bridges*

Introduction

Bridge design should draw from historic bridges forms located along the Historic Highway. Arched designs have pleasing lines and are encouraged for major stream crossings and other longer spans. Simple concrete beam bridges are appropriate for shorter spans. Other historical design elements to consider are viewpoints located along the bridge or at bridge ends to allow the trail user a view of the landscape and water source. Bridges should optimally be constructed of unpainted concrete and incorporate rock faced abutments where appropriate to the bridge style.

Important Considerations

- The historic bridges in Hood River County were simple concrete bridges. New bridges along the corridor should reflect this simplicity.
- Consider bridges as view points. Placement of the bridges should take advantage of views.
- Current standards for railing height (42") are taller than the historic railing height. Modify historic designs to relate to the modern standard.
- Bridges should be concrete. Historically the bridges were concrete and unstained.
- Use signs to inform trail users of water source name.
- Bridge ends may provide an opportunity for seating.
- Incorporate trails or walkways where appropriate (see Shepperd's Dell, Oneonta, Latourell, etc.) to water's edge.

At Left: A delineation of the Latourell Bridge from the Historic American Engineering Record.

Top left: Dry Canyon Bridge at Rowena.

At Right: Benson Foot Bridge photo center, Multnomah Creek Bridge foreground center and Railroad Bridge foreground right.

Design Elements

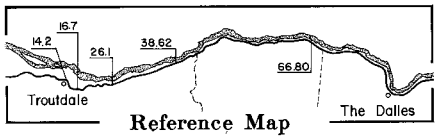
- Abutments should be reflective of bridge architecture.
- Borrow from the designs of the bridges that were constructed along a given section of the Historic Highway.
- Railings should be concrete.
- Place bridge piers above high watermark.
- Bridges should be designed to minimize impact to the riparian area

SPANS OVER 250'

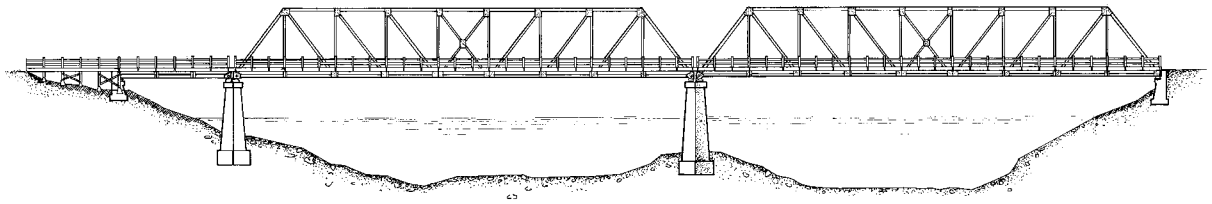
0 15 20 30 40 50
FEET 1"=20'
0 5 10 15
METERS 1:240

Drawings based on original design documents located in the Oregon Department of Transportation and photographs.

HISTORIC COLUMBIA RIVER HIGHWAY

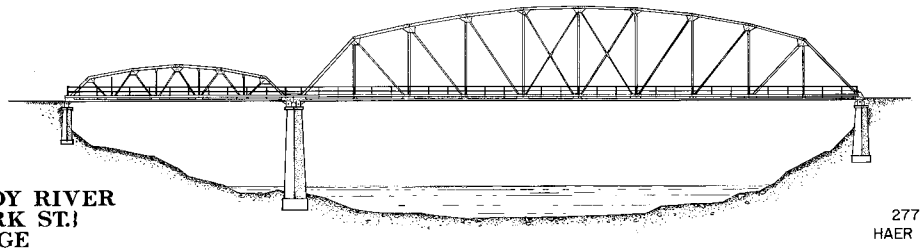


Reference Map



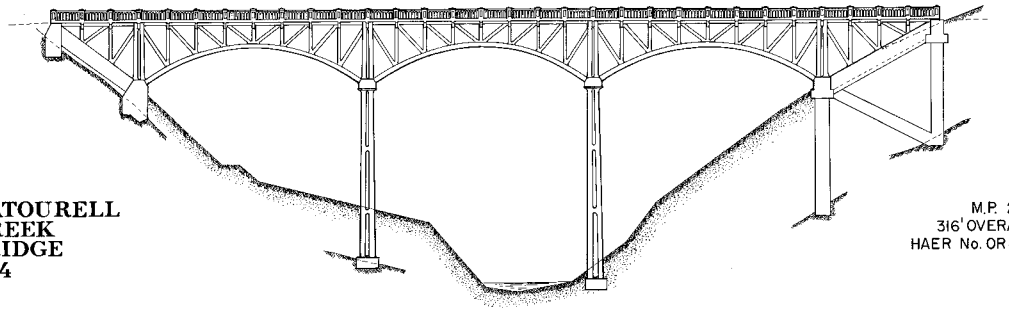
SANDY RIVER BRIDGE at TROUTDALE 1912

M.P. 14.2
364' OVERALL
HAER No. OR-36-A



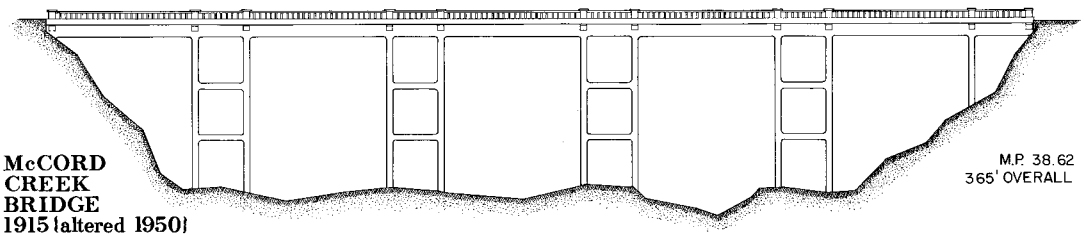
SANDY RIVER (STARK ST.) BRIDGE 1914

M.P. 16.7
277' OVERALL
HAER No. OR-36-B



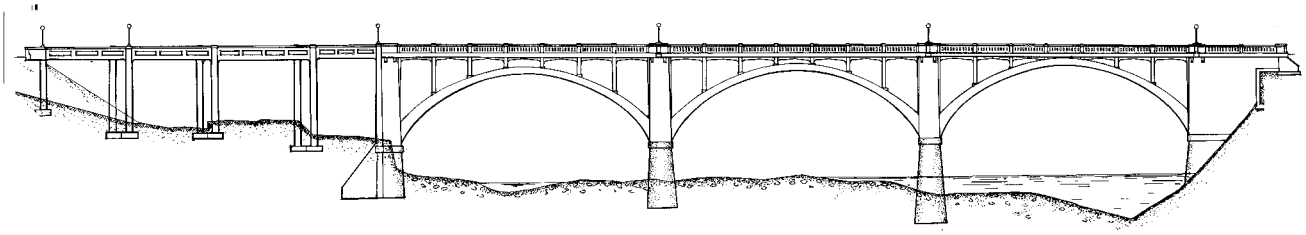
LATOURELL CREEK BRIDGE 1914

M.P. 26.1
316' OVERALL
HAER No. OR-24



McCORD CREEK BRIDGE 1915 (altered 1950)

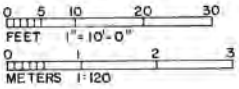
M.P. 38.62
365' OVERALL



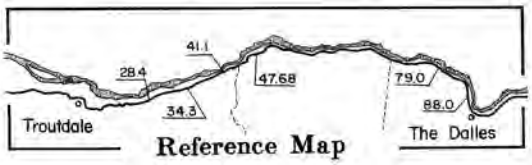
HOOD RIVER BRIDGE 1918 - 1982

M.P. 66.8 404' OVERALL HAER No. OR-36-S

GIRDER SPANS

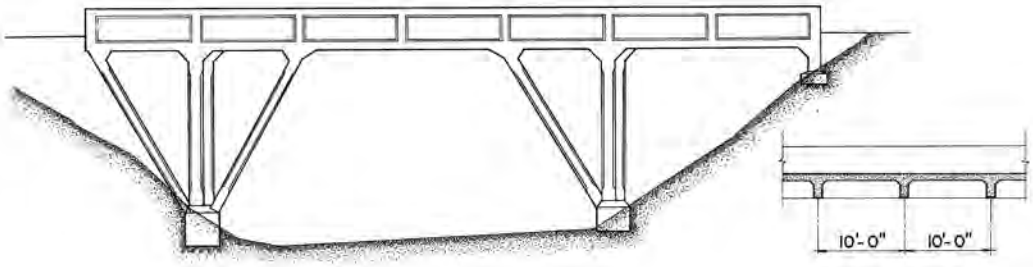


Drawings based on original design documents located in the Oregon Department of Transportation and photographs.



BRIDAL VEIL FALLS BRIDGE 1914

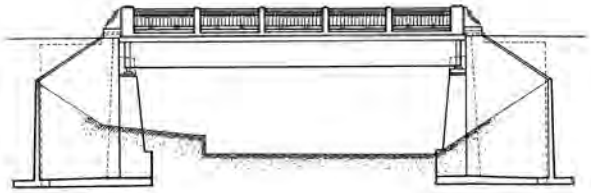
M.P. 28.4
110' OVERALL
HAER No. OR-36-E

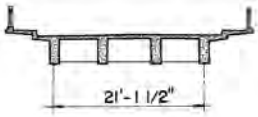


PARTIAL LONGITUDINAL SECTION

ONEONTA GORGE BRIDGE 1948

M.P. 34.3
48' OVERALL

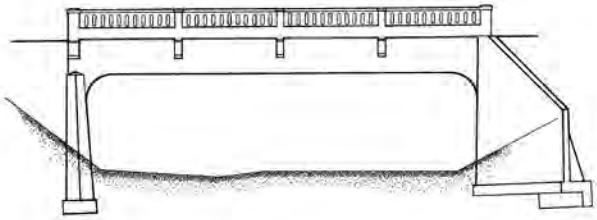


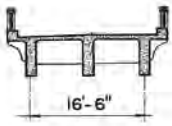


CROSS SECTION

TANNER CREEK BRIDGE 1915

M.P. 41.1
60' OVERALL

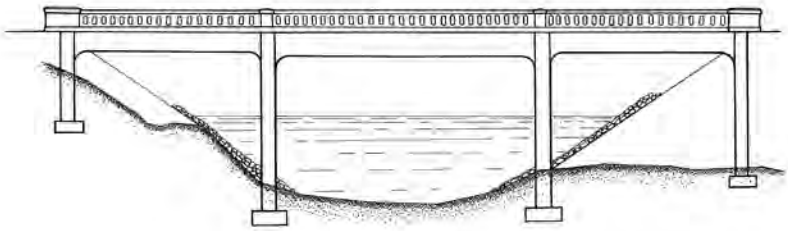


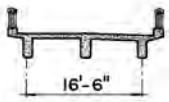


CROSS SECTION

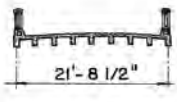
HERMAN CREEK BRIDGE 1918-1979

M.P. 47.68
100' OVERALL





CROSS SECTION



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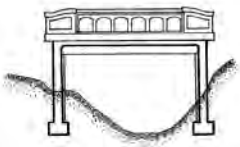
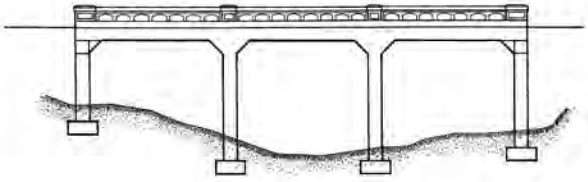
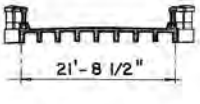


ROWENA DELL BRIDGE 1920

M.P. 79.0 20' OVERALL





CROSS SECTION

CHENOWETH CREEK BRIDGE 1920

M.P. 88.0 60' OVERALL

Section 2F.2 *Culverts*

Introduction

Culverts are essential to accommodate drainage, movement of debris and maintain aquatic habitat continuity. The restoration of drainage structures, including culverts, along historic highway segments can contribute to these goals. Consideration of drainage along new trail segments will be important to minimize maintenance cost, by reducing damage to paving and increasing the stability of retaining walls, rock slopes, and cut and fill areas.

Historic stone culvert, c. 1920's

Important Considerations

- In the National Scenic Area only bottomless culverts may be used over stream crossings.
- Adequately sized culverts should comply with the most current edition of the ODOT hydraulics manual.
- Use drainage paths, dispersal, detention, and landscape treatments to strategically provide water quality treatment prior to discharge into the Columbia River .
- Culverts need to meet or exceed environmental standards using best management practices.
- Consider extending existing culverts where appropriate rather than constructing new ones.
- Consider the use of open culverts.
- Culvert maintenance is a critical activity to protect the trail. Careful design consideration of long term maintenance access is necessary.

Design Elements

- Use stone faced headwalls where visible from Key Viewing Areas (KVA).
- When culverts are not visible from KVA, concrete maybe used.
- Provide a curved top appearance whenever practicable
- Protect or restore native vegetation to the area surrounding the culvert.
- Use dark earth tone colors to comply with NSA standards.
- Stone shall match color and character of nearby rock formations, talus slopes, or boulders.

- Rock shall not come from site unless it is a construction activity byproduct.
- Large stones shall serve as foundation stones. Round river rocks are not appropriate.
- Rock size should diminish at the upper part of walls.
- Mortar joints should be random with deep rake.

Basalt Veneer or Dry Stack when visible from key viewing areas. Stone to match native material.

Section 2G. *Trail Amenities*

Introduction

Important site elements such as benches, picnic tables/sites, bicycle racks, drinking fountains, restrooms, parking lots, trailheads, trail side resting areas, and structured overlooks are all part of a trail user's experience. These elements will be included in each construction documents package as appropriate. The style and materials selected for these elements should maintain design continuity with other elements.

Bikes at Mosier Twin Tunnels

The National Park Service was instrumental in creating an architectural vernacular design, often referred to as the "Rustic Style" that flourished between 1916 and 1942. The style philosophy was expressed by building structures in harmony with the landscape and each other, and emphasis was placed on building with stone and timber, materials indigenous to the area.

During the 1920s and 1930s, the National Park Service recognized the importance of small buildings and related landscape elements. Standard designs were developed and included in portfolios circulated throughout the National Park Service as well as state parks. In 1935, a compilation of illustrated examples from national and state parks was published in an influential book by Albert Good, entitled, "Park and Recreation Structures." This publication continues as a useful reference.

Rustic Style Unifying Design Concepts

- Reflect natural surroundings
- Moderately to steeply pitched hipped and gable end roofs
- Exterior materials to compliment the landscape setting
- Asymmetrical composition
- Recessed or covered entryways
- No large areas of uninterrupted windows: small paned windows preferred
- Exposed structure and decking
- Indigenous building materials, often stone and timber

Section 2G.1 *Seating*

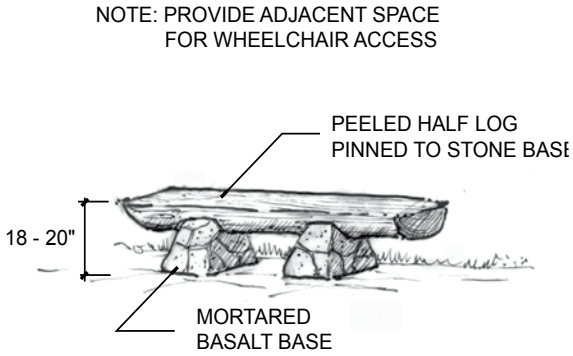
Introduction

Seating structures are trail amenities that allow trail users a chance to rest and provide an opportunity to reflect on their surroundings. Seating should complement view points along the route, allowing trail users to recover physically while also taking in the scenic beauty of the Historic Highway. Well designed seating will help enhance the design of the State Trail by encorporating historic elements and appropriate architectural features.

Taking a rest on a seat wall near Cascade Locks

Important Considerations

- Should be strategically placed to complement view points and allow visitors to pause along the route.
- Should be integrated into rock walls along view points or bridges when appropriate
- May be stand-alone elements at appropriate junctures, especially at the top and bottom of grades for resting.
- Ideally should be provided at locations with good scenery, especially places with either foreground or distant views.
- Sited at the side or edge of a space with something to act as a backdrop behind the seating.
- Located sufficiently off the trail to avoid user conflicts.



Design Elements

- Should be made of rock, heavy timber or concrete and should reflect the design of nearby structures.
- Local found materials, such as rocks and felled trees, may be strategically placed as an invitation to rest, sit and take in the landscape.
- Wood should not be varnished or painted, but may be treated with a penetrating sealant or stain.

Section 2G.2 *Picnic Tables and Waysides*

Enjoying a picnic at Starvation Creek

Introduction

Picnic tables and waysides provide trail users a place to rest and enjoy a refreshing beverage or meal. The Historic Highway provided multiple roadside stops for travelers including gas stations, tourist lodgings and restaurants that offered country dinners. This allowed travelers to linger and fully experience the Highway instead of simply using the roadway as a through route. Picnic tables and waysides provide similar services for trail users and create opportunities for people to take their time on the trail and establish memories and favorite locations along this scenic corridor.

Important Considerations

Picnic tables should be used in large open areas, away from I-84, to encourage trail users to sit and enjoy their surroundings while relaxing or eating.

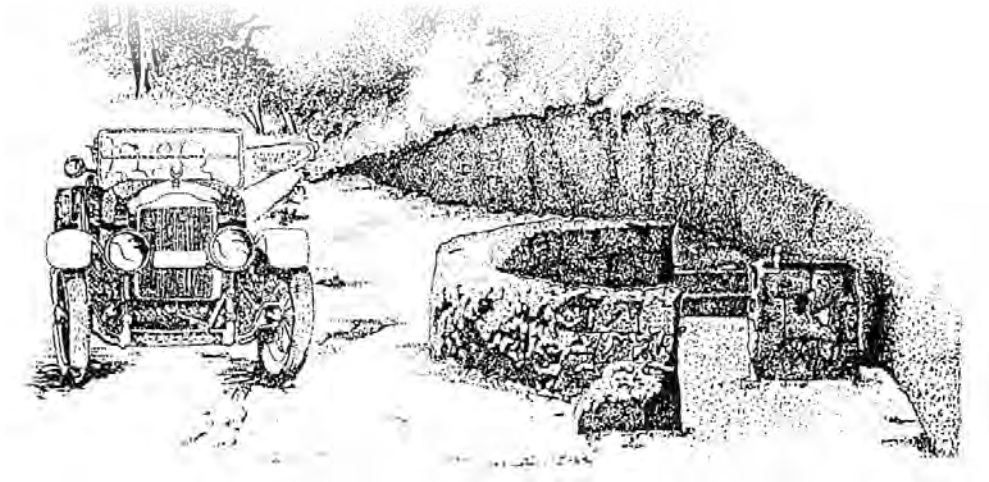
- They should not be placed directly in front of view points.
- Picnic tables may also be located near trailheads and parking areas as a rest stop for the driving public.
- Picnic tables should be wood topped and be sturdy to withstand heavy use and to prevent theft.
- Use of heavy Douglas fir or cedar timbers relatively free of knots and treated to prevent splitting and deterioration is encouraged.
- Picnic sites can also be informal with bench/seating arranged to accommodate eating.
- Some picnic tables should be placed out of direct sunlight to provide shade for trail users.

Picnic Table at Starvation Creek Trailhead

Design Elements

- Reflect natural surroundings
- Picnic benches should be constructed from indigenous building materials, often stone and timber.
- Simple but artful configuration and placement of boulders, logs, or low (18-20" high) stone walls may serve as seating for picnicking.
- Half-round logs with a stone base may be appropriate for both seating and table construction.
- Picnic table siting should consider circulation, accessibillity, and easy access to and from the trail.
- Wood should not be varnished.

Section 2G.3 *Drinking Fountains*



Introduction

Fountains were gathering places and hubs of activity when the Historic Highway was at its prime and often became a point of social interaction. Drinking fountains and water will be an important part of today's trail too. Fountains should be designed to reflect the historic design of the highway. ADA accessibility is a key consideration in designing new drinking fountains. Stone is the preferred building material for fountains.

Important Considerations

- Availability of potable water source is necessary
- ADA accessibility must be provided
- Frost free operation is essential for year round use
- Standard water fountains should be used near restrooms
- Consider recreational users' needs when designing fountains

Historic Highway water fountain at Viento
Photo source: Darlene Stiles

Design Elements

- Natural stone use is encouraged
- Design should reflect the surrounding environment
- Aggregate concrete is preferred over a brushed or sack concrete finish

Section 2G.4 *Bicycle Racks*

Introduction

Bicycle racks should be available at all trailheads, picnic areas, restrooms, and interpretive facilities. Bicycle racks should be on their own pad off the trail, easily identifiable, and able to accommodate up to five bicycles.

Design Elements

- Bike racks should be placed at key locations along the trail where users are encouraged to park their bikes and hike out to view points.
- Siting of bike racks should make users should feel comfortable leaving their bicycles and they should be visible to other trail users to discourage theft.
- Bike racks should not draw attention. Limit cute designs – no words or shapes.

Important Considerations

- Design bike racks to accommodate modern bicycle needs.
- Racks should be designed to allow cyclists to lean their bicycle frame (rather than wheel) against the rack, providing better security and accomodating a greater variety of bicycle styles and sizes.
- Painted black or dark brown.
- Simple forms are encouraged.
- Ensure bike rack are visible to users to eliminate need for signs (no bike parking signs).

A "U-rack" near Mosier Twin Tunnels accomodates a larger variety of bike styles

Section 2G.5 *Structures*

Structure at Wakeena Falls

Introduction

Structures along the Historic Highway and State Trail should reflect the rustic style as the historic aesthetic of the highway as well as integrating with the natural setting. The conformity to the rustic style will also ensure continuity of facilities along the Historic Highway. Structures are a primary component of trailheads and will help users identify that they are on the Historic Highway.

Picnic shelter at Eagle Creek

Important Considerations

- Structures offer a design opportunity to create identity along the Historic Highway. Structures should be thoughtfully placed and designed to reflect the setting
- Buildings must be designed to be easily maintained
- Consider making key features, such as restroom doors, out of natural materials
- Do not use form liner to simulate rock work. Instead, use horizontal lap siding or board and batten forms
- Placement of structures should be carefully considered, and restroom doors should not face parking stalls

Design Elements

- Low ground-hugging profile.
- Moderate to steeply pitched hipped and gable end roofs
- Exterior materials to complement landscape.
- Asymmetrical composition.
- Recessed or covered entryways.
- No large areas of uninterrupted windows; small paned windows preferred.

Eagle Creek Overlook

Restrooms at Denali National Park feature wooden doors on prefab bathrooms

Section 2G.6 *Trailheads*

Introduction

Trailhead elements vary depending on function, location, and anticipated visitor use. Each trailhead has some common elements such as signage, bollards, and parking.

The guidelines distinguish between small, medium and large trailheads. These trailhead types tend to differ hierarchically in their size, user characteristics, and type of services provided.

Identifying access to the trail and providing the appropriate level of services are important functions of a trailhead. The elements included in a trailhead and their arrangement differ between the types of trailhead.

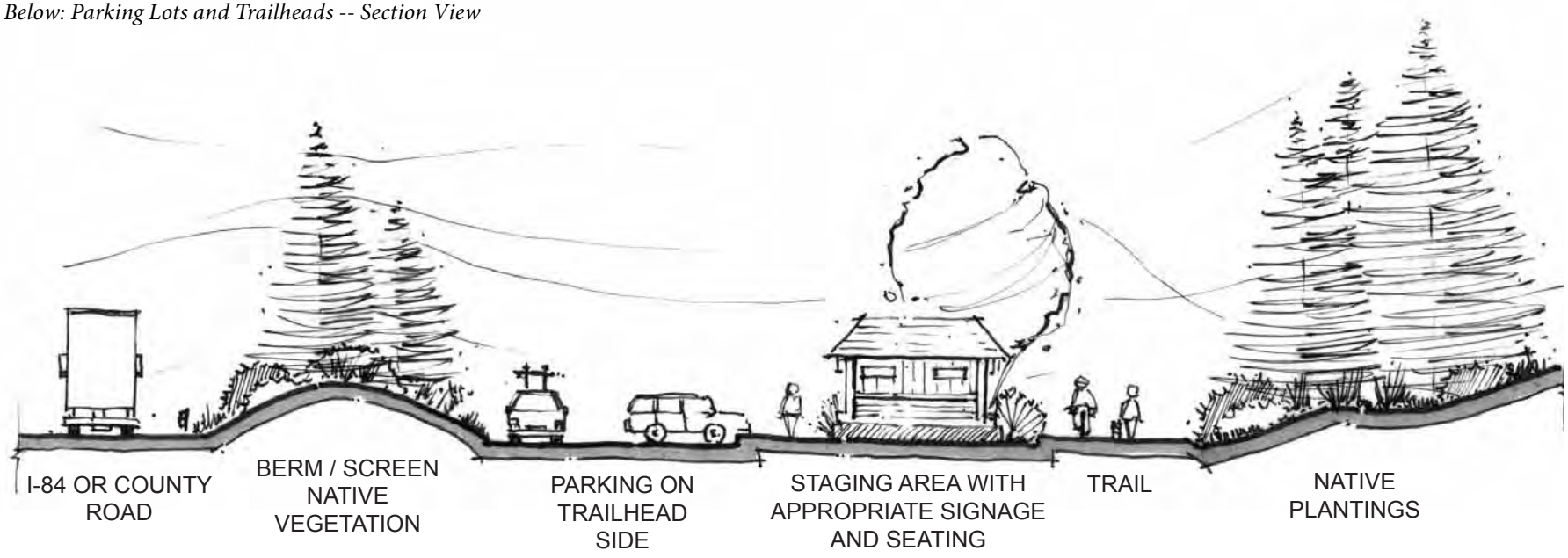
Important Considerations

- Signage should be consistent with appropriate standards – NSA, USFS, OPRD
- All trailheads, regardless of service level, should comply with ADA standards

Design Elements

- Rustic design of structures and elements
- Staging area appropriate to level of service
- Use of native plants and stone
- Entry to trail signaled by design elements
- Degree of trail difficulty and destination(s) identified by signage
- Parking appropriate to trailhead size
- Services such as location maps, trash and recycling, water, restrooms, picnic tables, bike racks.

Below: Parking Lots and Trailheads -- Section View



Medium-Use Trailhead

Introduction

Medium trailheads are located at access points to the State Trail. A medium trailhead may be appropriate at short but popular scenic side trails.

Design Elements

- Parking for up to 25 cars and 10 bikes; stone curbs probably appropriate
- One or more ADA accessible parking spaces
- Adequate staging area
- Seating (includes more formal benches or seat walls)
- May incorporate a built view point
- Restroom (typically the pre-manufactured type)
- Clusterboard sign with a detailed map and interpretive information
- Trail entry signaled by rustic structural elements as well as native plantings or boulders
- Native planting areas as appropriate
- Drinking fountain if potable water is available
- Small informal picnic site or picnic tables
- Trash and recycling receptables

Toothrock Trailhead – Medium-Use Trailhead

John B. Yeon - Elowah Falls Trailhead – Medium-Use Trailhead

Heavy Use Trailhead

Mark O. Hatfield Trailhead and Visitor's Center is located west of the Mosier Twin Tunnels.

Introduction

Large trailheads are located at popular access points. To encourage economic development in cities along the State Trail, large trailheads are proposed in or near Troutdale, Cascade Locks, Hood River, Mosier, and The Dalles.

Design Elements

- Parking lot with concrete or stone curbs. (On-street parking may also be appropriate in urban areas).
- An appropiate number of ADA accessible spaces
- Parking lot design should incorporate planting islands or peninsulas to minimize visual size of lot and screen cars from trail and roads.
- Restrooms design fwith flush toilets.
- Trail entry signaled by staging area that may include benches, seat walls, and a drinking fountain.
- Interpretive signs, trail maps and other materials
- Paved areas with appropriate stone surface and more formal native planting design
- Picnic tables and/or picnic shelter on site as appropriate
- Trash and recycling receptacles
- Special drinking fountain recalling historic highway fountains may be appropriate
- May incorporate built view points
- Bike racks for 10 or more bikes
- Clusterboard or a sign kiosk

Starvation Creek Trailhead

Section 2G.7 *Parking Lots*

Introduction

Parking lots should be easy to navigate and safe for pedestrian and cyclist movement. Parking lot layout should allow for easy visitor orientation to trailhead and supporting amenities. Parking lot design deserves specific attention and careful analysis, whether it is a new or reconfigured existing facility. Drainage, circulation, storm water management and resource protection provide opportunities for the parking lot and trailhead to offer a unique and meaningful introduction to the trail segment that awaits the visitor.

Toothrock Tunnel Parking Lot Trailhead

Design Elements

- Should be screened as much as possible from the State Trail and other Key Viewing Areas such as I-84. When appropriate use berms and landforms to visually seperate the trail from the parking lot area.
- Incorporate natural features such as boulders and large trees where feasible, to help break up the size of the parking area and visually bufferthe parking area from the Historic Highway State Trail.
- Grading and paving should not extend within the drip line of trees to be saved.
- Align parking rows along land contours.
- Configure parking access lanes to avoid the sight of long rows of vehicles. Incorporate existing vegetation and provide areas for new planting.
- Integrate pedestrian ways in parking areas to maximize pedestrian safety and provide for logical and convenient routes to vehicular free zones.
- Provide interpretive displays and directional signs where appropriate along paths of concentrated pedestrian traffic leading from parking areas to pedestrian activity centers.
- Enhance and and consider the state trail to be of primary importance when designing parking lots.
- Integrate storm water management with parking lot design to allow for biological plant and soil based run-off management and treatment.
- Provide parking and adequate turning radii for large vehicles such as busses and RVs (45 ft radius minimum) when designing a heavy-use trailhead.

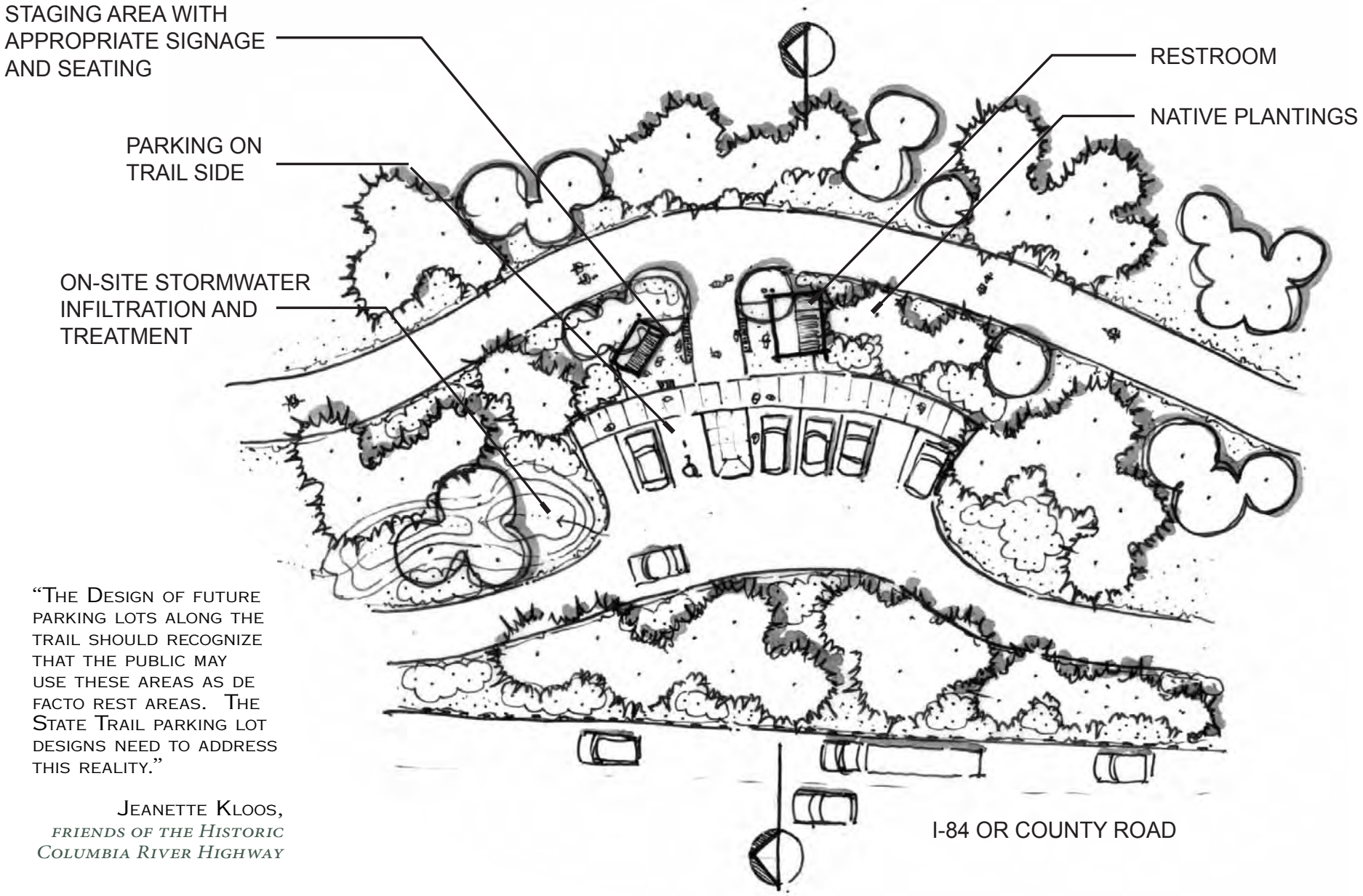
Cascade Locks Trailhead

Important Considerations

- Parking should be developed where it will be most effectively used with the least impact to the land.
- Coordinate with ODOT when appropriate to assure safe access to I-84 on and off ramps.
- Due to the proximity to I-84, parking lots and trailheads may be used as rest areas. The design should not only accommodate trail users but expect added use by the traveling public.
- Limit access for overnight truck parking.
- Be visible to discourage car prowls.
- Except in urban areas, lighting is discouraged.

Parking Lot and Trailhead

Plan View



"The Design of future parking lots along the trail should recognize that the public may use these areas as de facto rest areas. The State Trail parking lot designs need to address this reality."

Jeanette Kloos,
friends of the Historic Columbia River Highway

Section 2G.8 *Pavements and Wearing Surfaces*

Oneonta Trailhead - Flag Stone

Oneonta Trailhead - Flag Stone set on edge to create a border pattern.

Multnomah Falls Plaza - exposed aggregate concerete.

Introduction

The Historic Highway State Trail should be paved with asphalt, maximizing accessibility and making for a good cycling surface. The original Warrenite pavement should be retained if it is in reasonable condition and can comply with trail safety conditions. However, if the original pavement presents a danger or is in a state of disrepair it should be paved over and not removed.

Important Considerations

- Consistent trail width is preferred. On historic highway segments pave 12' down the center of the roadway leaving the historic pavement exposed along the shoulders of the trail. Be careful that the edge has a smooth tapered transition to the original pavmement to avoid an abrupt dropoff.

Design Elements

- Trail shoulders may be surfaced with the following appropriate materials: crushed basalt or gravel, asphalt and ground covers not exceeding six inches in height.
- Appropriate surfacing materials for side trails and view points are crushed basalt or gravel, asphalt, flag stone, pavers, and exposed aggregate concrete.
- See trail geometry for specific details.

Section 2G.9 *Curbing*

Introduction

Curbing is an important component of roadway design. Historically the curb was poured concrete. Basalt curbs have been used in more recent years in the Columbia River Gorge National Scenic Area.

Important Considerations

- Concrete curbing is appropriate in areas with heavy automobile use
- ADA ramps should be incorporated into the curbs as appropriate.
- Ensure transitions from curb to sidewalk is smooth – avoid abrupt transitions
- Basalt curbs could be incorporated into overlooks and viewpoints to delineate use areas

Design Elements

- Use quarried curb stone with natural color matching surrounding rock formations and design elements.
- Curb stone should vary in length and be set to correct curb dimensions and constructed to withstand vehicle impacts.

Section 2G.10 *Overlooks and Viewpoints*

Introduction

Rock wall use is mandatory at designated primary view points. It is necessary to integrate the structure with the environment in order to evoke a sense of history and complement the site's natural beauty. At view points, users create memories both in their minds and through photos, developing a lasting impression of their experience along the Historic Highway. Thus, it is critical to pay close attention to the site design around the view point and utilize cohesive elements and the design team's collective skill set.

Important Considerations

- Incorporate seating into overlooks and viewpoints (see Eagle Creek Overlook at right)
- Protect or restore native vegetation in the area surrounding overlooks and viewpoints.
- Rock shall not come from site unless it is a construction activity byproduct.
- Mount interpretive signs so as not to block views
- Set viewpoints back from the edges of steep drop offs

County Line Overlook near east end of the Hood River to Mosier Twin Tunnels Trail.

Design Guidelines

- Provide a curved top appearance whenever practicable.
- Use dark earth tone colors to comply with the NSA standards.
- Stone shall match color and character of nearby rock formations, talus slope, or boulders.
- Large stones shall serve as foundation stones. Round river rock is not appropriate.
- Rock size should diminish in size at the upper part of walls.
- Mortar joints should be random with deep rake.
- Surface can be crushed ¼" minus basalt, exposed aggregate concrete, asphalt, or random stone meeting ADA universal access requirements.
- Consider steel fencing to provide better views, if appropriate.



At view points, users create memories both in their minds and through photos, developing a lasting impression of their experience along the Historic Highway.

Section 2H. *Earthwork*

Introduction

Reshaping the existing landform to thread the Historic Highway State Trail through the Gorge has the greatest potential impact on the existing landscape character. This work requires sensitivity and creative solutions often involving retaining wall use as earlier discussed. When looking at potential impacts the designer must consider the ecological, aesthetic and functional trade offs necessary to grade a trail segment. It is important that the trail and structures are graded gently into the landscape, giving the appearance of belonging.

Important Considerations

- Grading plans should be developed for all sections of the trail.
- Minimize landform modification to the greatest extent possible
- Embankments should mimic adjacent slope topography and materials unless in highly constrained slope or resource areas.
- Maintain natural slope profile when possible
- When possible, avoid excavation or fill within drip lines of trees to be saved

Design Elements

- Design should not rely solely on cross sections. Lay out contours in plan view to confirm revised landform shaping.
- Blend new grades into existing grades as soon as practical
- Minimize cuts and fills
- Balance cut and fill when possible
- Tie new embankments to existing by backfilling to the existing slope
- When creating fills, match existing fill slopes as possible
- Redistribute and spread rainfall run-off from new impervious surfaces and minimize erosion
- Avoid creating non-natural appearing landforms
- Mimic natural drainage patterns and topography

Section 21. *Signs*

Introduction

A comprehensive sign system is needed to provide information to trail users. This system should be used to show visitors where they are on the trail and identify distances to attractions along the trail. Additionally this sign system could clue users to what to expect such as longitudinal grades and difficulty of the trail. Another important feature that needs to be included is a way to identify when one is on and off the original highway alignment. These signs provide "you are here" information important for way finding.

Design Elements

- 4' minimum height – 6' maximum height
- 5' maximum offset from trail edge
- 3' minimum offset from trail edge
- Warning signs are recommended when trail grades exceed 5%
- Do not overuse signage

Interpretive Sign along Cascade Locks to Toothrock Tunnel Trail.

Important Considerations

- Signs must comply with the NSA Graphic Sign System. Signs should be set on wood posts with wood sign faces, routed borders and lettering and appropriate colors (see appendix)
- Information is needed regarding trail difficulty and other pertinent information for mobility impaired users.
- At trailheads, information regarding park management, rules, and hours should be located on cluster boards instead of individual posts.
- Limit traffic control signs along the Historic Highway State Trail to warning signs that alert trail users to a changed condition or steep grade. Such signs convey important messages and should be consistent with uniform standards.
- Generally, limit the use of signs. Excess signing detracts from the trail experience.


Historic Columbia
River Highway
State Trail


Cascade Locks
Trail Head
Historic Columbia River
Highway State Trail


Cascade Locks to
Eagle Creek


Starvation
Creek
State Park


Share
The Path
Keep Right
Warn When
Approaching
Control
Your Pet


Historic Columbia
River Highway
State Trail
Restrooms
Trail Access
To Mt. Defiance Trail

Section 21.1 *Interpretive Signs*

Introduction

Interpretation enhances the user experience. Interpretive design is both an art and a science. The placement and themes need to be carefully considered prior to installation. Not every aspect of the setting needs to be interpreted.

Interpretation in the Gorge needs to be consistent with the Interpretive Strategy for the Columbia River Gorge National Scenic Area (1991). This will ensure a coordinated approach to interpretation in the Gorge which will increase awareness, understanding and appreciation of the surrounding resources.

Use interpretive signage to emphasize the visual quality of the experience, match interpretive signs to the landscape setting, and ensure that interpretive messages are presented in a manner that will appeal to a variety of users and show a commitment to thematic interpretation.

Above: Interpretive sign at Eagle Creek Trailhead.
At right: Interpretive Sign west of Cascade Locks

Above and at Right: Mitchell Point Interpretive Sign located west of Mitchell Point.

Important Considerations

- Consider making an additional set of signs during the initial production. The second set can be used for replacement.

Design Elements

- New interpretive panels should be of the same design as existing interpretive signs along the Historic Highway.
- These signs incorporate the gentle arch shape of the Graphic Sign System and the five-sided column exposed aggregate concrete post.
- Displays should use appropriate type styles and color schemes for text and graphics.
- Phenolic resin polymer is now the recommended material. This is a change from the older porcelain enamel signs. The new material will stand up better to the elements and will be more cost effective to replace.

Section 21.2 *Cluster Boards*

Introduction

Cluster boards are appropriate in all landscape settings. Color schemes should comply with the Graphic Sign System colors. Cluster boards should be located at trailheads and are preferred over individual sign posts. Cluster boards should reflect the rustic style of architecture used along the Historic Highway and have stone bases.

Important Considerations

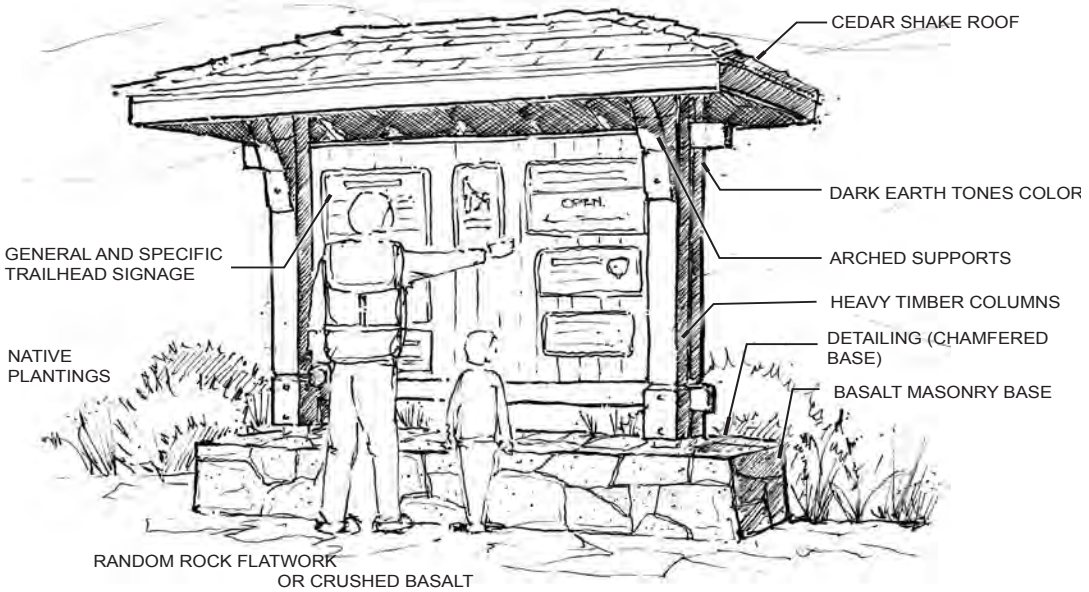
Minimize individual signs and display pertinant information only. Use the Cluster Board to relay information in a concise and effective manner.

- Work with OPRD to design the layout of the board to ensure trail information as well as park rules and regulations are displayed.
- Include maps of recreation opportunities in the surrounding vicinity (i.e. secondary trails and destinations).
- Mapping needs to be developed for the recreational opportunities found along the Historic Highway. This will be essential in enhancing user experiences and assisting in wayfinding.
- Cluster boards may also be used to display interpretive panels.

Design Elements

- Reflect the Columbia River Gorge Naitonal Scenic Area Standard.
- Cluster boards should be considered part of the trailhead design in order to determine the size and style of the board.
- Stone bases are preferred to reflect historic rock work. However, wooden bases are acceptable at small to medium trailheads.
- Encourage the use of a roof to protect both users and park information during inclement weather – particularly on sites west of Hood River.

Clusterboard at John Yeon Trailhead



Section 21.3 *Mileposts*

Historic Mile Marker 58 west of Viento Trailhead.

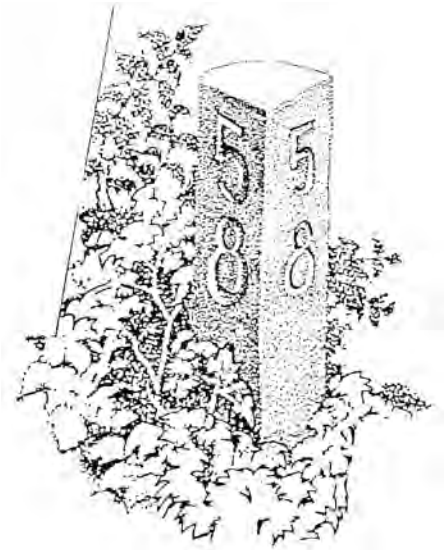
Introduction

Where the State Trail is on the original alignment of the Historic Highway, a milepost shall be installed at its original location. Do not place mileposts along the State Trail where the alignment varies from the original alignment. Refer to the 1924 Historic Road log for proper milepost locations. The concrete mileposts shall be created using the ODOT historic milepost fiberglass mold. The mileposts shall be located at the outer edge of the trail shy distance.

The last remaining original milepost is milepost 58, which can be found about one-fourth mile west of the Viento Trailhead (See picture left).

Important Considerations

- Place mileposts only in their historic locations (found in the 1924 roadlog)



Mile Post 58 was delineated as part of the Historic American Engineering Record for the Library of Congress.

Design Elements

- The milepost form is located at the ODOT maintenance (2C) yard in Cascade Locks.
- Mileposts should be constructed out of unpainted concrete.

Replicated mile marker at Ruthon Point

Section 2J. *Vegetation Management*

Introduction

Vegetation management is important to the user's experience, for safety and maintenance on the trail, to manage invasive species and habitat, and to create or preserve the historic character of the highway and trail. The protection of plant communities and specimen trees during construction, the management of vegetation to create and preserve views and vistas, and planting design at trailheads, parking lots, and view points are essential elements in vegetation management. For purposes of this guideline, the Gorge is divided into two distinct plant communities; Western Gorge (Troutdale to Mitchell Point) and the Eastern Gorge (Mitchell Point to The Dalles).

Important Considerations

- A list of approved and commercially available plants can be found in Appendix A of these guidelines.
- Development and maintenance of safe sight distances for trail users may require some thinning and/or pruning in areas with vertical and/or horizontal curves. Viewpoints, overlooks, and other significant trail junctures may also require view clearing.
- Vegetation clearing and management requires coordination and approval by permitting agencies and should not occur without their concurrence.
- Design and construction of the trail should minimize opportunities for the spread of invasive species. Trail construction should avoid creating corridors connecting non-natives found on old highway segments with new trail segment areas.
- All areas disturbed by construction need to be re-graded and vegetated as part of The construction project.
- This work shall be designed by a registered landscape architect and coordinated with other trail elements; especially retaining walls, overlooks, grading and erosion control.
- Avoid removing existing vegetation to equal distances on each side of the roadway centerline. Vary the line created by vegetation removal to create an undulating edge when viewed from the trail, and flush cut all visible stumps.

Vegetation management is important

Design Elements

- Native vegetation should be encouraged where restoration is needed or desired, and to provide screening and buffering from the Interstate.
- When clearing, trimming or thinning for safety and viewshed maintenance or creation, careful consideration is necessary to sustain the natural form and character of the trees or vegetation.
- Use of root barriers is encouraged, and impartant to mitigate potentialy expensive maintenance in the future.

Hazard Trees

A tree adjacent to the roadway is a safety issue.

Introduction

Removing hazard trees along the Historic Highway State Trail is a life and safety issue that should be addressed immediately. Hazard tree removal should be seen as "maintenance" in the Columbia River Gorge National Scenic Area and should not require a Scenic Area Review.

Important Considerations

Establish land ownership and ensure appropriate agencies and landowners are contacted prior to removal.

- Utilizing a flush cut near the ground to remove stumps is preferred.
- Consider impacts to structures and walls before tree removal.
- High use areas should be the first priority for hazard tree removal.
- Stump faces should be treated with a dark brown stain so they are not visible from KVAs.
- Hazard tree removal may have a positive impact on the viewsheds and enhance the experience for trail users.

"Maintenance includes, but is not limited to, controlling vegetation, removing trees and other roadside hazards within rights-of-way."
—(CRGNSA Chapter 38)

Hazard Tree - "A tree with a structural defect that will predictably result in whole or partial failure within 1.5 tree lengths of a road or maintained development. A defective tree is hazardous only when its failure could result in danger to people or damage to structures, vehicles, or other property."
—(CRGNSA Chapter 38)

Vista Management & Enhancement

Introduction

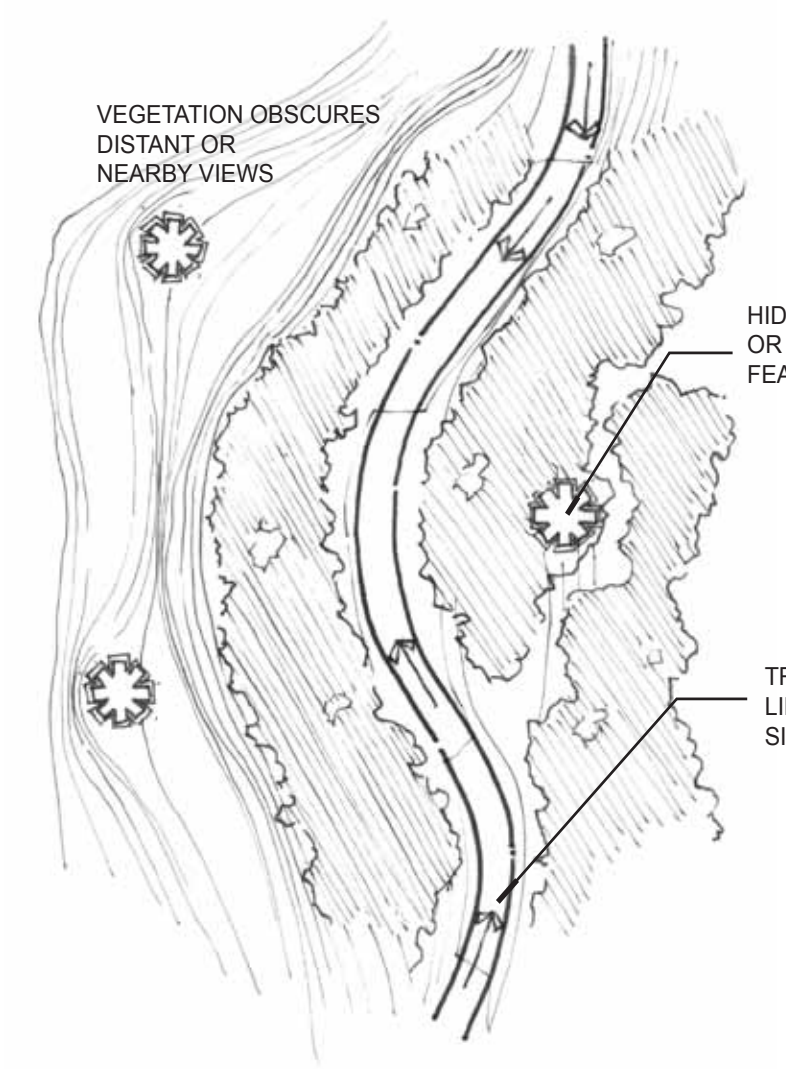
Vista Enhancement is a secondary priority as time and funding allows. In some cases, vista enhancement will overlap with hazard tree removal. However, hazard tree removal will always take precedent over vista management and enhancement projects.

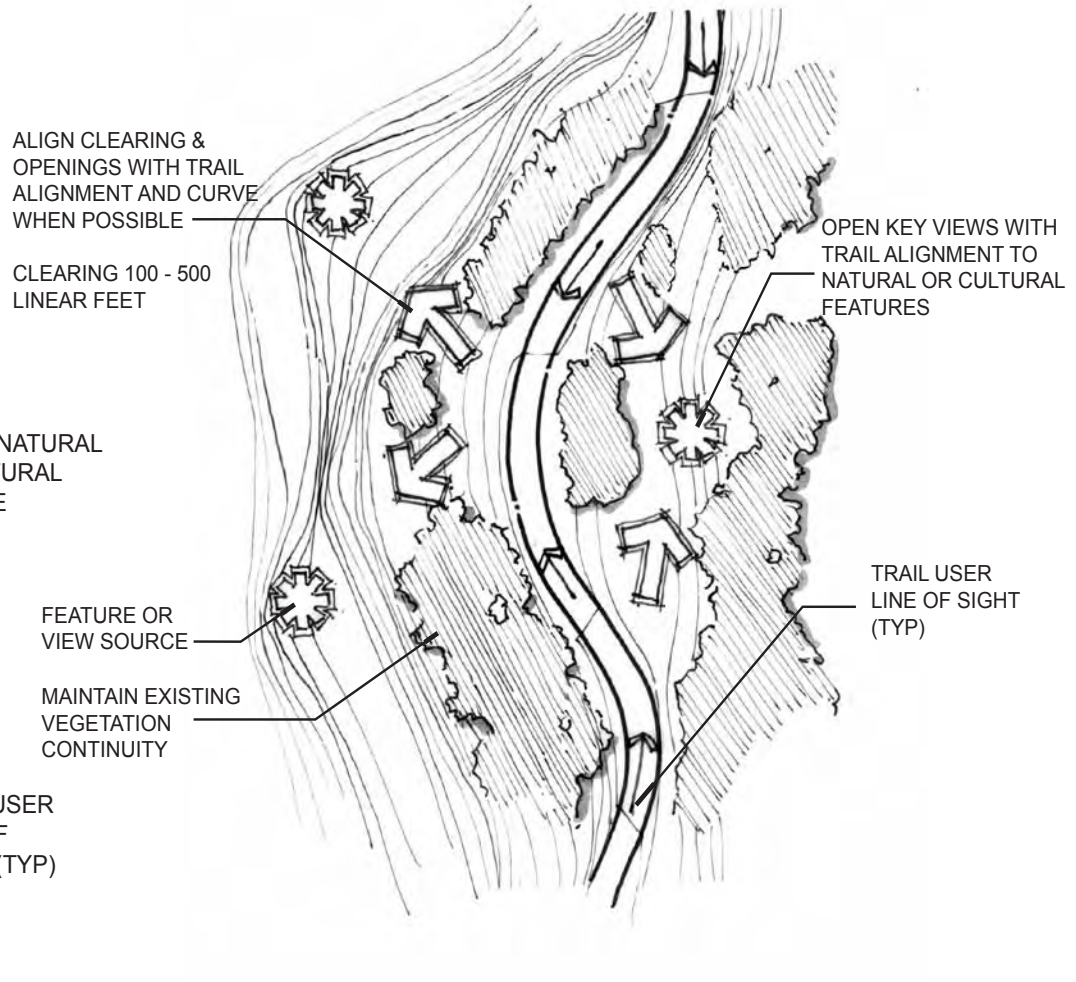
Important Considerations

- Maintenance of existing views and vistas should be a priority.
- Agencies should identify areas where the view can easily be maintained and record location for future management and enhancement projects.
- Utilize a Cultural Landscape Inventory of the Historic Highway to open up historic vistas as appropriate.
- As these projects are not considered "maintenance projects" they will need to pass through the Scenic Area Review process.
- CRGNSA will require an evaluation of potential visual impacts of the proposed project as seen from any key viewing area.
- CRGNSA will require an inventory of any rare plants, sensitive wildlife habitat, wetlands or riparian area on the project site.

Landscape and Vegetation Management *Plan Views*

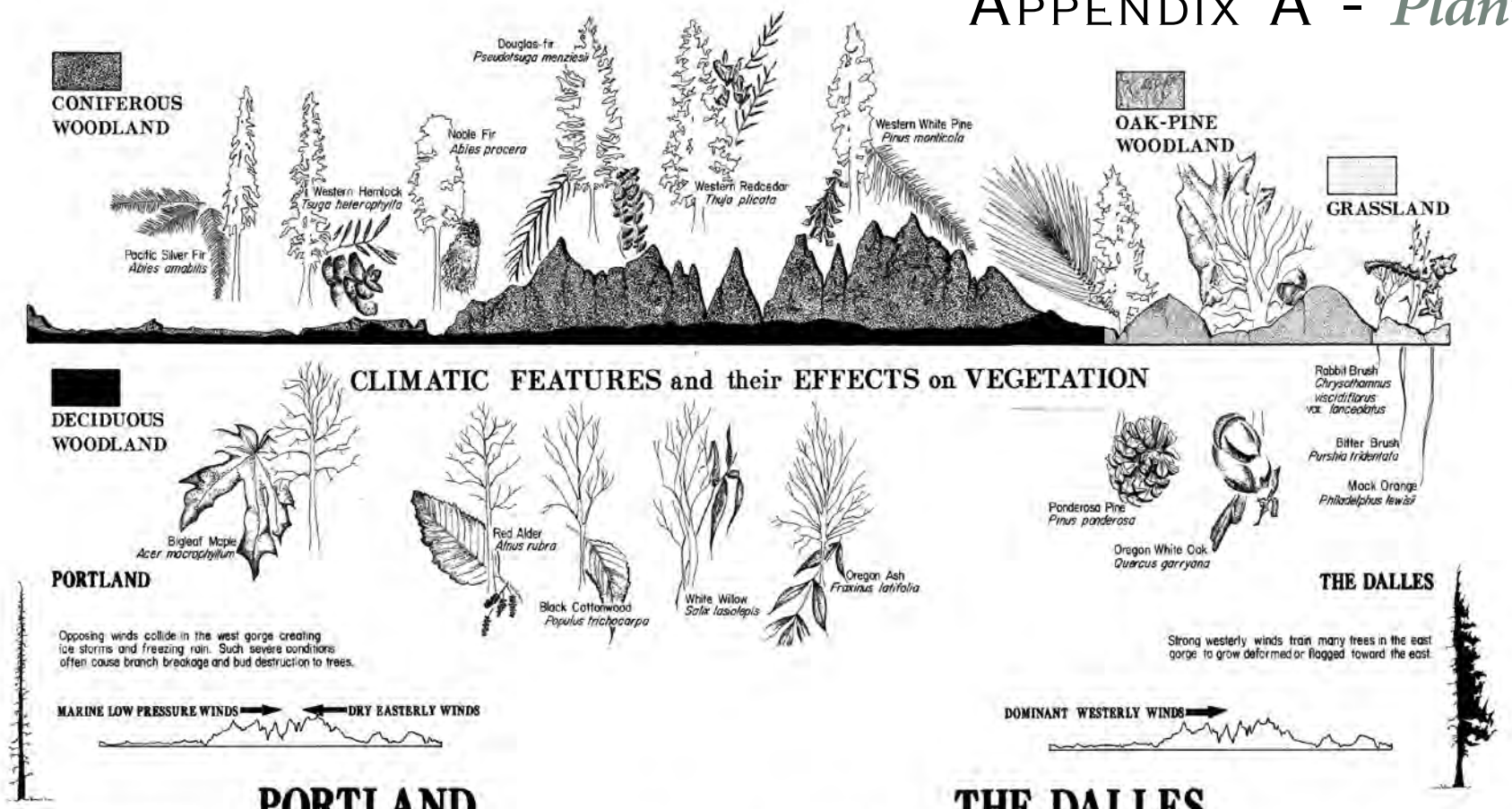
Not Preferred





Preferred Alignment

APPENDICES



PORTLAND

ELEVATION	29.7 ft.
LATITUDE	45° 32'
LONGITUDE	122° 40'
AVERAGE ANNUAL TEMPERATURE	54.7° F
AVERAGE JANUARY TEMPERATURE	40.3° F
AVERAGE JULY TEMPERATURE	68.5° F
AVERAGE ANNUAL PRECIPITATION	36.5 in.
AVERAGE ANNUAL SNOWFALL	5.6 in.

THE DALLES

ELEVATION	102.3 ft.
LATITUDE	45° 36'
LONGITUDE	121° 12'
AVERAGE ANNUAL TEMPERATURE	53.2° F
AVERAGE JANUARY TEMPERATURE	32.2° F
AVERAGE JULY TEMPERATURE	72.9° F
AVERAGE ANNUAL PRECIPITATION	13.9 in.
AVERAGE ANNUAL SNOWFALL	11.9 in.

HISTORIC AMERICAN ENGINEERING RECORD OR - 36

DELINEATED BY: Jodi Zeller 1995

Appendix A - *Plants*

Use of Plants - *Native Plants*

The following are lists of native species suggested for each of the landscape settings described. This list is meant to be a guide for the designer and not an exhaustive inventory of all acceptable plants. Consider choosing species adapted to the moisture, temperature and elevation requirements of the site. Reference the Forest Service plant association guides for more detailed information on suitable plants.

Oak – Pine Woodlands

Oak-Pine Woodland	
Trees	
Big leaf maple.....	Acer macrophyllum
Ponderosa pine.....	Pinus ponderosa
Douglas fir.....	Psuedotsuga menziesii
Oregon white oak.....	Quercus garryana
Shrubs	
Serviceberry.....	Amelanchier alnifolia
Pine-mat Manzanita...	Arctostaphylos nevadensis
Greenleaf Manzanita..	Arctostaphylos patula
Ceanothus.....	Ceanothus spp.
Mock orange.....	Philadelphus lewisii
Bitterbrush.....	Purshia tridentata
Red flowering currant.	Ribes sanguineum
Snowberry.....	Symphoricarpos albus

Oak-Pine Woodland.....continued	
Herbs	
Balsam root.....	Balsamorhiza spp.
Buckwheat.....	Erigonium spp.
Prairie star.....	Lithophragma spp.
Gray's lomatium.....	Lomatium grayii
Lupine spp.....	Lupinus latifolius
	Var. thompsananos
American vetch.....	Vicia Americana var. truncata
Grasses	
Bluebunch wheatgrass.....	Agrophyron spicatum
Idahoe fescue.....	Festuca idahoensis
June grass.....	Koeleria cristata
Sitanion (Bottle-brush Squirrel-tail).....	
Sitanion hystrix	

Coniferous Woodlands

Coniferous Woodland	
Trees	
Grand fir.....	Abies grandis
Pacific silver fir.....	Abies amabilis
Big leaf maple.....	Acer macrophyllum
Red alder.....	Alnus rubra
Ponderosa pine.....	Pinus ponderosa
Western white pine.....	Pinus monticola
Douglas fir.....	Psuedotsuga menziesii
White oak.....	Quercus garryana
Willow.....	Salix sp.
Western red cedar.....	Thuja plicata
Western hemlock.....	Tsuga heterophylla
Herbs	
Vine maple.....	Acer cercinatum
Serviceberry.....	Amelanchier alnifolia
Oregon grape.....	Berberis nervosa
California hazel.....	Corylus comuta
Pacific dogwood.....	Comus nuttallii
Salal.....	Gaultheria shallon
Ocean spray.....	Holodiscus discolor
Red flowering currant...	Ribes sanguineum
Rhododendron.....	Rhododendron macroph
Snowberry.....	Symphoricarpos albus
Big huckleberry.....	Vacinium membranace

Appendix A - *Plants*

Coniferous Woodland.....Continued	
Herbs	
Vanilla leaf.....	Achlys triphylla
Mountain amica.....	Amica latifolia
Aster.....	Aster spp.
Oregon bedstraw.....	Galium oregana
Twinflower.....	Linnaea borealis
Lupine spp.....	Lupinus latifolius
	Var. thompsonanos
Mountain sweet-cicely..	Osamorhiza chilensis
Swordfern.....	Polystichum munitum
Western salmon plume...	Smilacina racemosa
Inside-out flower.....	Vancouveria hexandra
Redwoods violet.....	Viola sempervirens
Grasses	
Blue bunch	Acer cercinatum
Wheatgrass.....	Agropyron spicatum
Columbia Brome.....	Bromus vulgaris
Idahoe fesue.....	Festuca idahoensis
Bearded fescue.....	Festuca subulata
Big huckleberry.....	Vacinium membranace

River Bottomland

This landscape setting traverses the entire length of the Gorge from Sandy River Delta to Miller Island. Choose species adapted to moisture, elevation and temperature requirements of the specific site. See key below.

River Bottom	
Trees	
Grand fir	Abies grandis
Red alder	Alnus rubra.....E,M,W
Oregon ash.....	Fraxinus oregona....M,W
Cottonwood.....	Populus trichocarpa....E,M,W
Douglas fir.....	Psuedotsuga menziesii....M,W
Oregon white oak.....	Quercus garryana....M,W
Willow.....	Salix spp.....E,M,W
Western red cedar.....	Thuja plicata
Willow.....	Salix sp.
Western red cedar.....	Thuja plicata
Western hemlock.....	Tsuga heterophylla

RIVER BOTTOM.....CONTINUED	
Shrubs	
Sagebrush.....	Artemisia tridentate.....E
Rabbitbrush.....	Chrysothamnus nauseosis....E,M
Oceanspray.....	Holodiscus discolor.....E,M,W
Indian plum.....	Oemleria cerasiformis (west end)....M,W
Mock orange.....	Philadelphus lewisii....E,M
Bitterbrush.....	Purshia tridentata...E,M
Golden current.....	Ribes aureum (east end).....E,M
Red flowering currant....	Ribes sanguineum.....M,W
Wildrose.....	Rosa gymnocarpa (west end)...M, W
Big huckleberry.....	Vacinium membranace
Herbs	
Aster.....	Aster spp.....E,M.W
Balsam root.....	Balsamorhiza spp....E,M
Fireweed.....	Epilobium angustifolium...M,W
Buckwheat.....	Erigonium spp.....E,M
California poppy.....	Eschscholzia californica (e.e.l.e.)*...E,M
Oregon bedstraw.....	Galium oregana....M,W
Prairie star.....	Lithophragma spp.....E,M,W
Gray's lomatium.....	Lomatium grayii...E,M
Lupine spp.....	Lupinus latifolius...E,M,W
	var. thompsananos
Knotweed.....	Polygonum spp.....E,M,W
American vetch.....	Vicia Americana....E,M,W
*(East end low elevation.)	Var. truncata

RIVER BOTTOM.....CONTINUED	
Grasses	
Bluebunch wheatfrass...	Agropyron spicatum...E,M
Columbia brome.....	Bromus vulgaris....E,M,W
Idahoe fescue.....	Festuca idahoensis....E,M,W
Western Fescue.....	Festuca occidentalis...M,W
June grass	Koeleria cristata...E,M
Sitanion(Bottle-brush Squirrel-tail).....	Sitanion hystrix...E,M,W
Big head clover.....	Trifolium macrocephalum (east end).....E,M
Red flowering currant....	Ribes sanguineum.....M,W
Wildrose.....	Rosa gymnocarpa (west end)...M, W
Big huckleberry.....	Vacinium membranace

PASTORAL

All Coniferous Woodland and Oak-Pine Woodland species including poplars, and orchard species are appropriate in this setting.

Appendix B - *Colors*

Introduction

Colors to be used in the Columbia River Gorge National Scenic Area have been determined by various entities including the Gorge Commission, OPRD and USFS. The two most common color charts that will be used along the HCRH are for signage and structures that are visible from I-84.

I-84 Corridor Colors

The colors below were developed for the I-84 Corridor Strategy Design Guidelines and represent specific colors that meet the definition of "dark, earth tone" colors for the Columbia River Gorge NSA. These colors must be used when trail elements, such as retaining walls, bridges or backs of signs, are visually evident to Interstate 84. Each color corresponds to the list of features that will receive that corresponding color treatment.

Sherwin Williams "Otter"

- Steel portion of bridge rail (paint)
- Bridge girders (corten or stain if concrete)
- Back of signs (paint)
- Eastern stone façade (stain)
- Eastern retaining walls (stain)

Sherwin Williams "Black Fox"

- Western stone façade (stain)
- Western retaining walls (stain)
- Miller "Alpha Male"
- Fences (weathering steel)
- Sign posts (paint)

Miller "Dapper"

- Median barrier (paint)
- Bridge rail base (paint)
- Abutment wall and pier trim for bridges and culverts (stain)

Sign Colors

- CRGNSA Signs

Paint

- Oil Based Alkalied Wood primer
- Acrylic Enamel (Satin) (Green, Brown, and Cream)
- One Shot Lettering (Two Coats)

Powell Paint Center
5205 SE Powell Boulevard
Portland, Or (503)775-3642

These paints were custom mixed:

- Cream - PP 80348, Pratt and Lambert, Accolade Exterior, Eggshell
- Green - PP 80349, Pratt and Lambert, Accolade Exterior, Eggshell
- Brown - PP 80350, Pratt and Lambert, Accolade Exterior, Eggshell
- White - One Shot Lettering Enamel

PP = Powell Paint

Appendix C - *Adverse Effects Primer*

The following process should be used when considering impacts to the HCRH. No adverse effects are allowed in the National Scenic Area. Before considering adverse effects, we must first define the historic significance of the HCRH

Part 1: What makes the HCRH historically significant?

3 things to consider:

I. National Register Criteria for Evaluation of Significance of the HCRH

According to the National Register of Historic Places, the HCRH is significant under Criterion A and Criterion C.

Criterion A: Association with events that have made a significant contribution to broad patterns of history

HCRH is the nation's first scenic highway, constructed to provide motorists with the opportunity to see and experience the landscape's natural beauty up-close.

Samuel Lancaster's design philosophy of capturing beauty spots without marring the landscape became the model for the National Park Service's *"Lying Lightly on the Land"* concept

Criterion C: Embodies distinctive characteristics of a type, period or method of construction

The HCRH's engineering was a technical and civic marvel of its time using advanced engineering standards, materials, and structures.

II. Contributing Features on the HCRH *(contribute to HCRH's historic significance as defined above)*

- **Organization**; topography, and natural systems of the Columbia River Gorge
- **Engineered Sections**; such as, the Rowena Loops
- **Buildings**; such as, the Vista House
- **Structures**; such as, bridges, viaducts, tunnels, masonry walls, and overlooks
- **Viewpoints and Vistas**
- **Road Alignment** to take drivers to beauty spots
- **Small scale features**; such as, the guard rail, curbs and gutters, plaques, signs, drinking fountains, and guard rocks
- **Surrounding land use**
- **Craftsmanship** (Old World craftsmanship and latest technology)
- **Materials**; including, patented Warrenite asphaltic-concrete pavement

III. Integrity of the HCRH

Integrity is the ability of a property to convey its significance. In other words, how intact are the contributing features that make the HCRH significant?

7 aspects of integrity to consider:

1) Location: place where historic property was constructed

Is it a historic alignment of the HCRH?

2) Design: combination of elements that create the form, plan, space, structure, and style of historic property

What aspects of original design, including structures, engineered sections, alignment, and planned views and vistas, are present?

3) Setting: character of the physical environment of historic property

Lancaster planned the alignment carefully to create a particular setting that captured the natural beauty without marring the landscape.

Has the original setting, including surrounding land use, views, topography, and natural systems, changed?

4) Materials: physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property

Are the materials original? What is their condition?

5) Workmanship: physical evidence of the crafts of a particular culture or people

Has the feature been reconstructed, repaired, or altered?

6) Feeling: property's expression of aesthetic or historic sense of particular period of time

Does a particular highway segment convey historic character?

7) Association: direct link between an important historic event or person and historic property

Is a particular highway segment sufficiently intact to convey relationship between physical evidence and historic events?

[Note: Because feeling and association are subjective and depend entirely on individual perception, they can not be used alone to establish integrity of a historic property.]

Part 2: What constitutes an adverse effect on the HCRH?

An adverse effect is any action that adversely alters the integrity of contributing features ("An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." (36 CFR § 800.5(a)(1)))

Examples of adverse effects on the HCRH and its contributing features include:

- Physical destruction or damage
- Any alteration that is not consistent with the Secretary of the Interior's guidelines (including restoration, repair, maintenance, etc.)
- Removal from historic location
- Change in the character of use or physical features
- Introduction of visual, atmospheric or audible elements
- Neglect that causes deterioration

"Adverse effects on historic properties" includes, but are not limited to:

1. Physical destruction of or damage to all or part of the property;
2. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;
3. Removal of the property from its historic location;
4. Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
5. Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
6. Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
7. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance." (36 CFR § 800.5 (a)(2) Bold added for emphasis)