

Appendix C

Visual Resources

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Visual Resources Methodology

Terminology

The term *aesthetics* typically refers to the perceived visual impression of an area, such as a scenic view, open space, or architectural interest. The aesthetic value of an area is a measure of its *visual character* and *visual quality* combined with *viewer response* (Federal Highway Administration 1988). This combination may be affected by the components of a project (e.g., transmission towers constructed at a height that obstructs views, hillsides cut and graded, open space changed to a transmission line corridor), as well as changing elements such as light, weather, and the length and frequency of viewer exposure to the setting. Aesthetic impacts are thus defined as changes in viewer response as a result of project construction and operation.

Visual Character

Visual character is the appearance of the physical form of the landscape, composed of natural and human-made elements, including topography, water, vegetation, structures, roads, infrastructure, and utilities; and the relationships of these elements in terms of form, line, color, and texture.

Visual Quality

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity as modified by the visual sensitivity of the viewer.

- *Vividness* is the visual power or memorableness of landscape components as they combine in striking or distinctive visual patterns.
- *Intactness* is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as natural settings.
- *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the artificial landscape (Federal Highway Administration 1988).

High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity.

Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Viewer Response

Viewer response is the psychological reaction of a person to visible changes in the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., roadway or trail) (Federal Highway Administration 1988). The measure of the quality of a view must be tempered with the overall sensitivity of the viewer and viewer response. Viewer sensitivity is dependent on the number and type of viewers and the

frequency (e.g., daily or seasonally) and duration of views (i.e., how long a scene is viewed). Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and the viewing duration.

Visual Assessment Process

The concepts presented above are combined in a visual resource assessment process that involves identification of the following:

- visual character and quality of the project area,
- relevant policies and concerns for protection of visual resources,
- general visibility of the project area and site using descriptions and photographs, and
- viewer response and potential impacts.

Assumptions

Visual resources consist of views of the project area. Therefore, impacts are not limited to the specific alignment corridor as is often the case for other resources such as vegetation, waterways, and soils. Many viewsheds may be affected by any one given alternative, thus affecting a variety of viewer groups.

Topography plays an important role in providing and limiting views within the visual study area. Topography was evaluated using a geographic information system (GIS) viewshed analysis (Appendix A) to identify a preliminary list of vantage points from which the project could be visible. Because the GIS analysis does not include features such as vegetation or structures, it was used as a starting point to help guide the analysis and site visit.

Views of the study area were inventoried during a site visit that took place August 18 through 21, 2009, by identifying the locations and photographing views of and from the surrounding areas. Appendix B includes a map of all locations surveyed during the site visit and the photograph log for these points. Because the study area covers a large area, this analysis focuses on representative vantages from where views of the study area are present. Representative views are views that are representative of other views in the area, able to embody impacts on a given viewer group or number of viewer groups, and illustrative in describing the impact, nonimpact, or range in severity of impact on certain vantages.

Visual Simulation Methodology

General Approach

Visual simulations were prepared by developing a simplified 3D model of the proposed project, then using scenes captured from this model to develop more realistic simulations of the project in photographs taken from selected viewpoints throughout the project area.

Photographs

Photographs of existing conditions were taken at numerous locations throughout the project area to document visual conditions and assess visual impacts. Some photographs were selected for developing simulations that would represent views of project alternatives after construction in typical or sensitive viewsheds.

Modeling in Google Earth

A 3D model of the project was prepared using Google Earth Pro software. Google Earth provides a reasonably accurate digital terrain model draped with aerial and satellite imagery. The locations of proposed towers and access roads were added to Google Earth using georeferenced data imported in KMZ format. Markers were added for the locations of selected simulation viewpoints. View elevations and directions were set to emulate the views captured in the photographs.

Simple, box-like, 3D markers were created in Google SketchUp software for each tower that would be visible in each of the visual simulations. The tower markers were designed to represent the planned height (to the nearest meter) of each tower (both single-circuit and double-circuit options), using tower heights and location coordinates provided by BPA. These markers were imported to Google Earth to complete the schematic model of the project.

Simulations in Photoshop

Series of overlapping photographs had been taken at most of the selected simulation viewpoints. These images were aligned and blended in Adobe Photoshop Extended to prepare panoramic views. Panoramas generally enable better representation of the viewer's experience of the landscape than single-frame views, especially where multiple towers would be visible.

Views from photo locations in the Google Earth model were adjusted to emulate spatial relationships in the photographs as accurately as possible. Screen views were exported from Google Earth and aligned with the photographs in Photoshop to determine the position and height of each tower.

The detailed renderings of the towers used in the simulations were developed as detailed 3D models in Google SketchUp. One model was developed for each of the tower options (single-circuit and double-circuit) based on diagrams and photographs of representative towers provided by BPA. The SketchUp models were either imported to Photoshop and manipulated

there for proper scale and orientation, or were rotated and scaled in SketchUp then exported to Photoshop as 2D images (the later method being easier for the software to process). Minor adjustments of color, contrast, and sharpness were made to the tower images in Photoshop for a more photo-realistic appearance. Cables between the towers were drawn as paths in Photoshop, then stroked (painted) and adjusted to approximate their visibility under conditions represented in the photographs.

Existing towers or poles were removed, as needed, by painting them out with colors and textures sampled from elsewhere in the image.

The locations of proposed new or improved access roads were determined in the same manner as the tower locations, by overlaying Google Earth views on the photographs in Photoshop. Roads were then painted digitally, in some cases using textures sampled from reference photographs of other graded dirt and gravel roads.

The towers, cables, roads, painted-out areas, and reference/positioning images were all placed on separate layers to facilitate adjustments and corrections. Layer masks were used extensively to control screening by foreground objects and to emulate atmospheric (aerial) perspective in more distant views.

View 1. Looking toward Mt. Adams from the Hill Residence

Existing View
2-14-11



Simulated View



View 2. Panoramic View Looking Northwest to North from the Hill Residence

Existing View
2-14-11

Northwest

North



Simulated View

Northwest

North

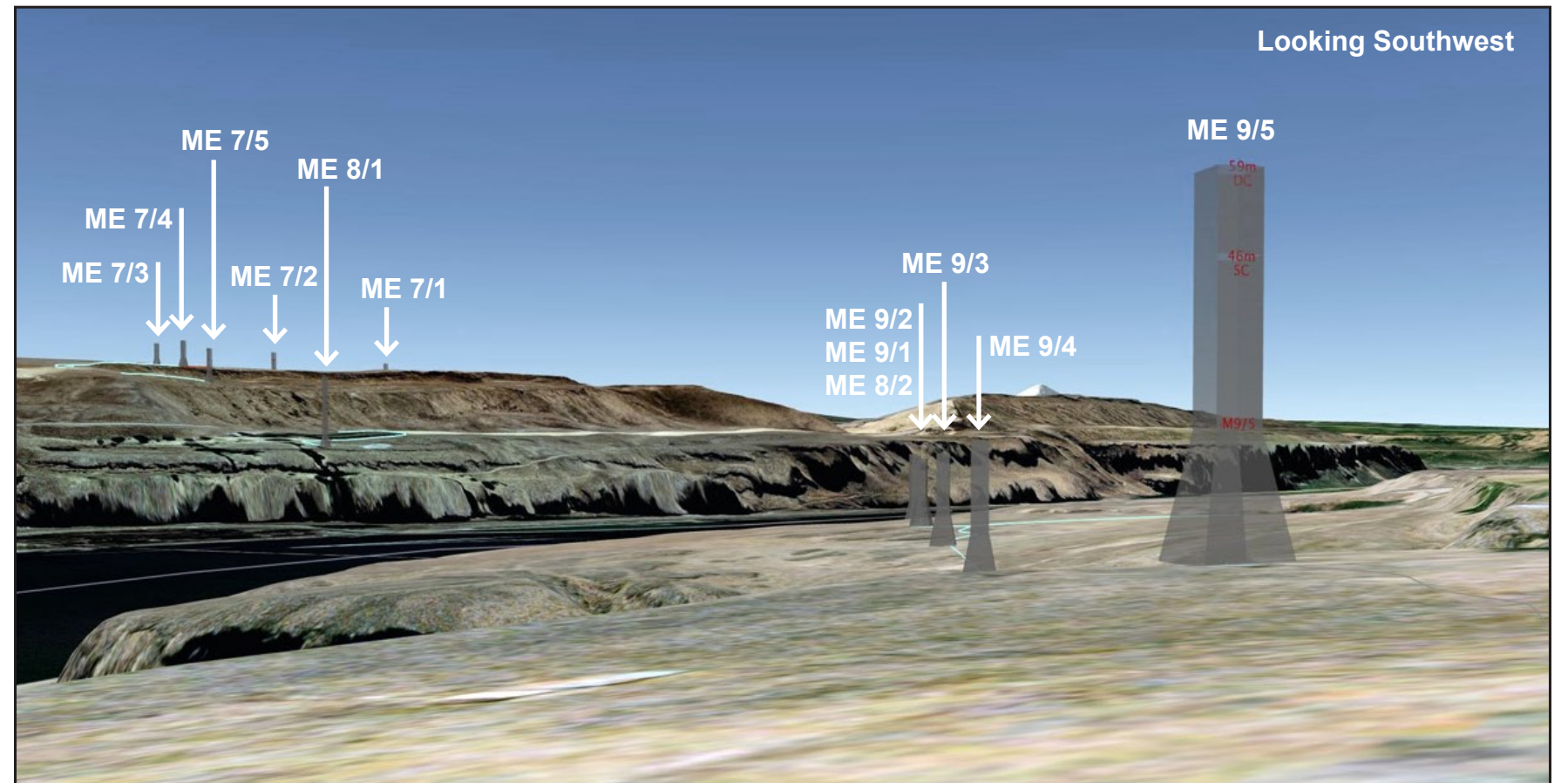
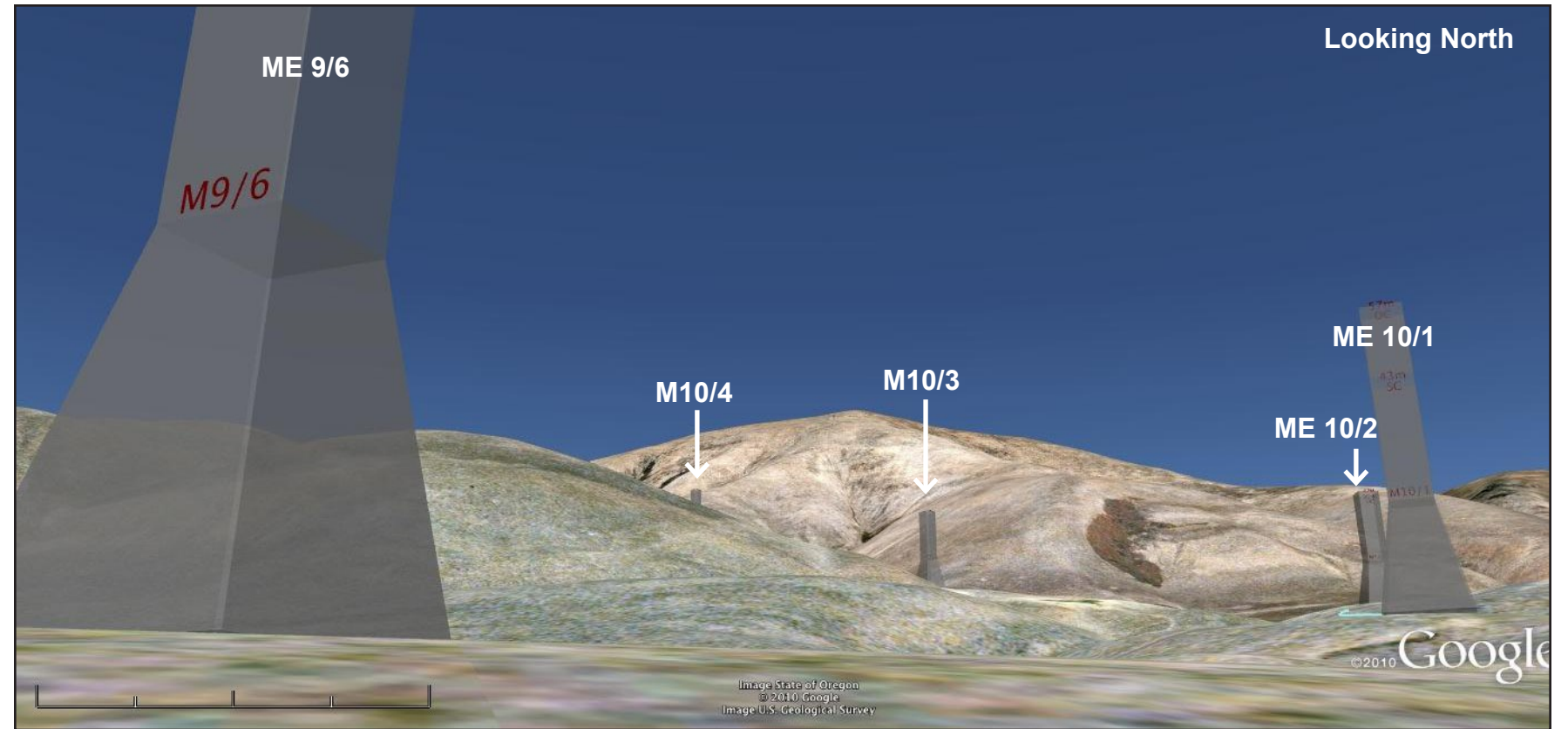


Location: State Route 14 above Wishram, approx. 2,000 feet east of Boulder Drive

Looking north, towers M9/6 and M10/1 (single and double circuit) break the skyline. Looking southwest, M9/5 (single and double circuit) breaks the skyline. Across the river (approximately 2 miles distant) towers M7/1 through M7/5 (single and double circuit) break the skyline, but these are smaller and less visible because of their distance.

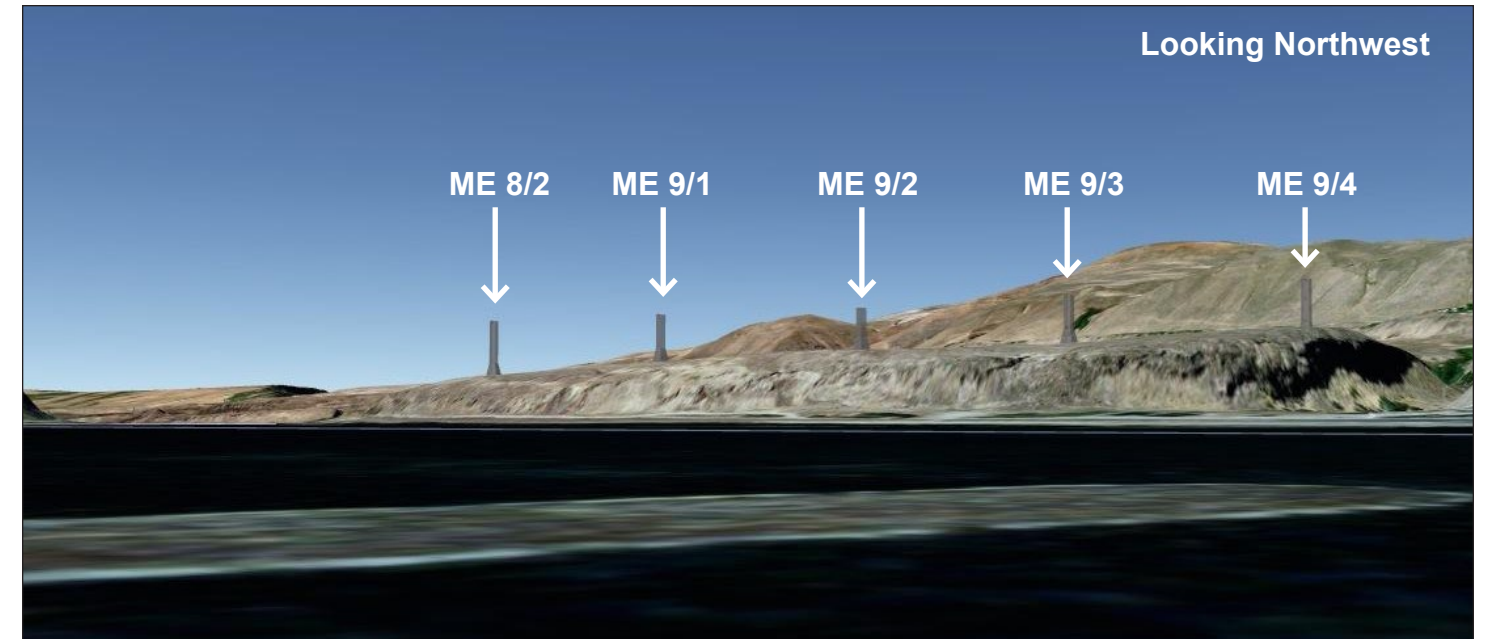
Looking North		
Visible Tower (distance)	Breaks Skyline?	
	Single Circuit	Double Circuit
M/E 9/6 (0.04 mi)	Yes	Yes
M/E 10/1 (0.16 mi)	Yes	Yes
M/E 10/2 (0.35 mi)	No	May touch skyline
M 10/3 (0.59 mi)	No	No
M 10/4 (0.80 mi)	Not visible	No

Looking Southwest		
Visible Tower (distance)	Breaks Skyline?	
	Single Circuit	Double Circuit
M/E 9/5 (0.16 mi)	Yes	Yes
M/E 9/4 (0.41 mi)	No	No
M/E 9/3 (0.55 mi)	No	No
M/E 9/2 (0.70 mi)	No	No
M/E 9/1 (0.87 mi)	No	No
M/E 8/2 (1.04 mi)	No	No
River		
M/E 8/1 (1.75 mi)	No	May touch skyline
M/E 7/5 (2.04 mi)	Yes	Yes
M/E 7/4 (2.13 mi)	Yes	Yes
M/E 7/3 (2.24 mi)	Yes	Yes
M/E 7/2 (2.33 mi)	Yes	Yes
M/E 7/1 (2.44 mi)	Maybe a little	Yes



All images: Google Inc. 2010. Google Earth Pro, Version 5.2. Mountain View, CA. Accessed: September 3, 2010.

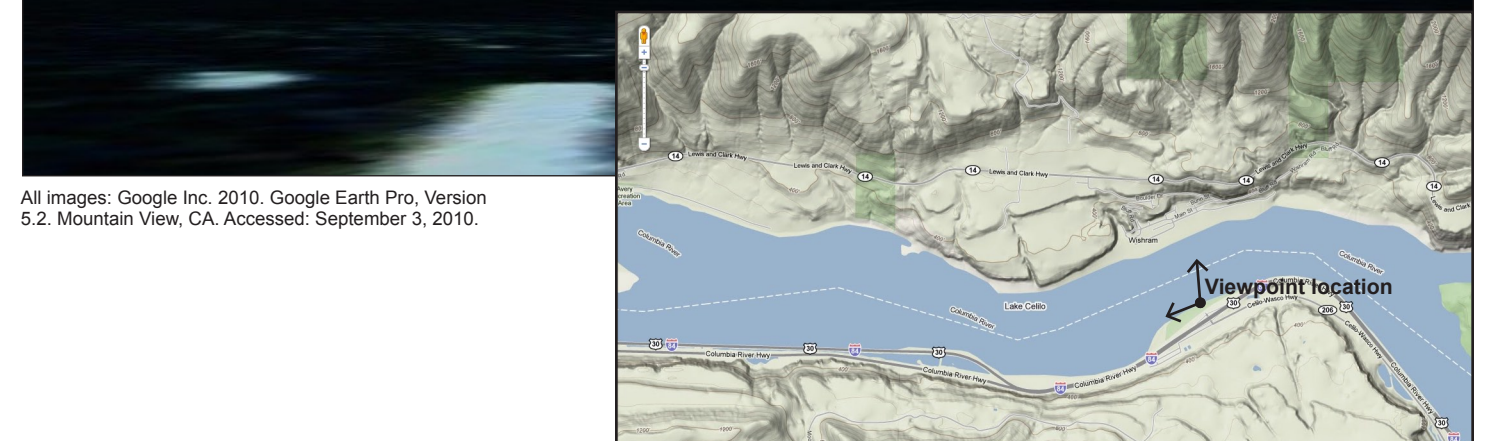
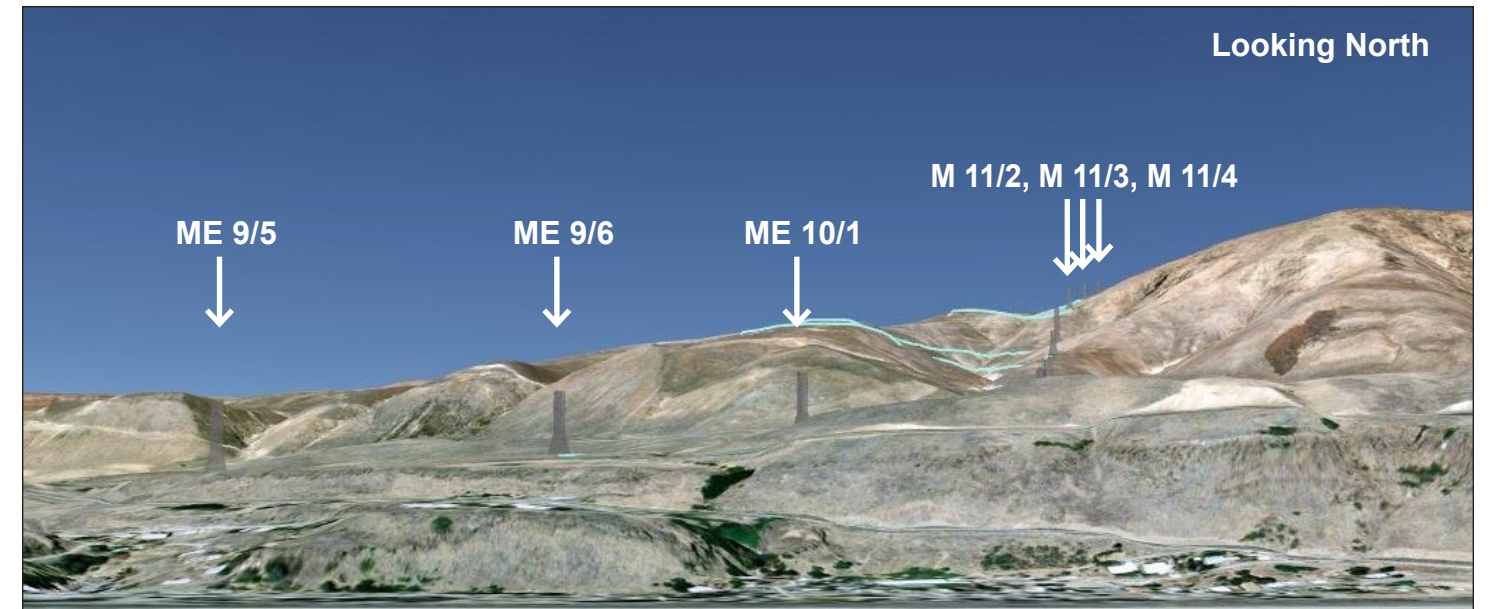
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Location: Columbia River at Celilo Park Boat Ramp

Looking west, towers M7/3, M7/4, M7/5, and M8/1 (single and double circuit) break the skyline on the south side of the river. M8/2 and M9/1 (single and double circuit) and M9/2 (double circuit only) break the skyline on the north side of the river. Looking north, only towers M11/2, M11/3, and M11/4 near the top of the ridge break the skyline.

Looking West to North		
Visible Tower (distance)	Breaks Skyline?	
	Single Circuit	Double Circuit
M/E 7/3 (1.90 mi)	Yes	Yes
M/E 7/4 (1.81 mi)	Yes	Yes
M/E 7/5 (1.72 mi)	Yes	Yes
M/E 8/1 (1.52 mi)	May touch skyline	Yes
River		
M/E 8/2 (1.27 mi)	Yes	Yes
M/E 9/1 (1.14 mi)	Yes	Yes
M/E 9/2 (1.05 mi)	No	Yes
M/E 9/3 (0.96 mi)	No	No
M/E 9/4 (0.91 mi)	No	No
M/E 9/5 (0.88 mi)	No	No
M/E 9/6 (0.90 mi)	No	No
M/E 10/1 (0.94 mi)	No	No
M/E 10/2 (1.06 mi)	Not Visible	No
M 10/3 (1.29 mi)	No	No
M 10/4 (1.56 mi)	No	No
M 11/1 (1.84 mi)	No	May touch skyline
M 11/2 (2.09 mi)	Yes	Yes
M 11/3 (2.22 mi)	Yes	Yes
M 11/4 (2.36 mi)	Yes	Yes



All images: Google Inc. 2010. Google Earth Pro, Version 5.2. Mountain View, CA. Accessed: September 3, 2010.

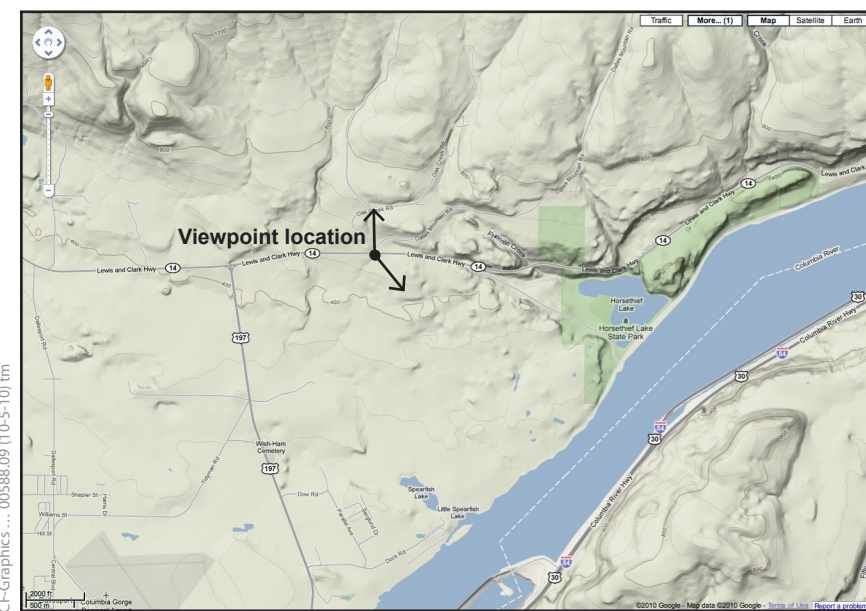
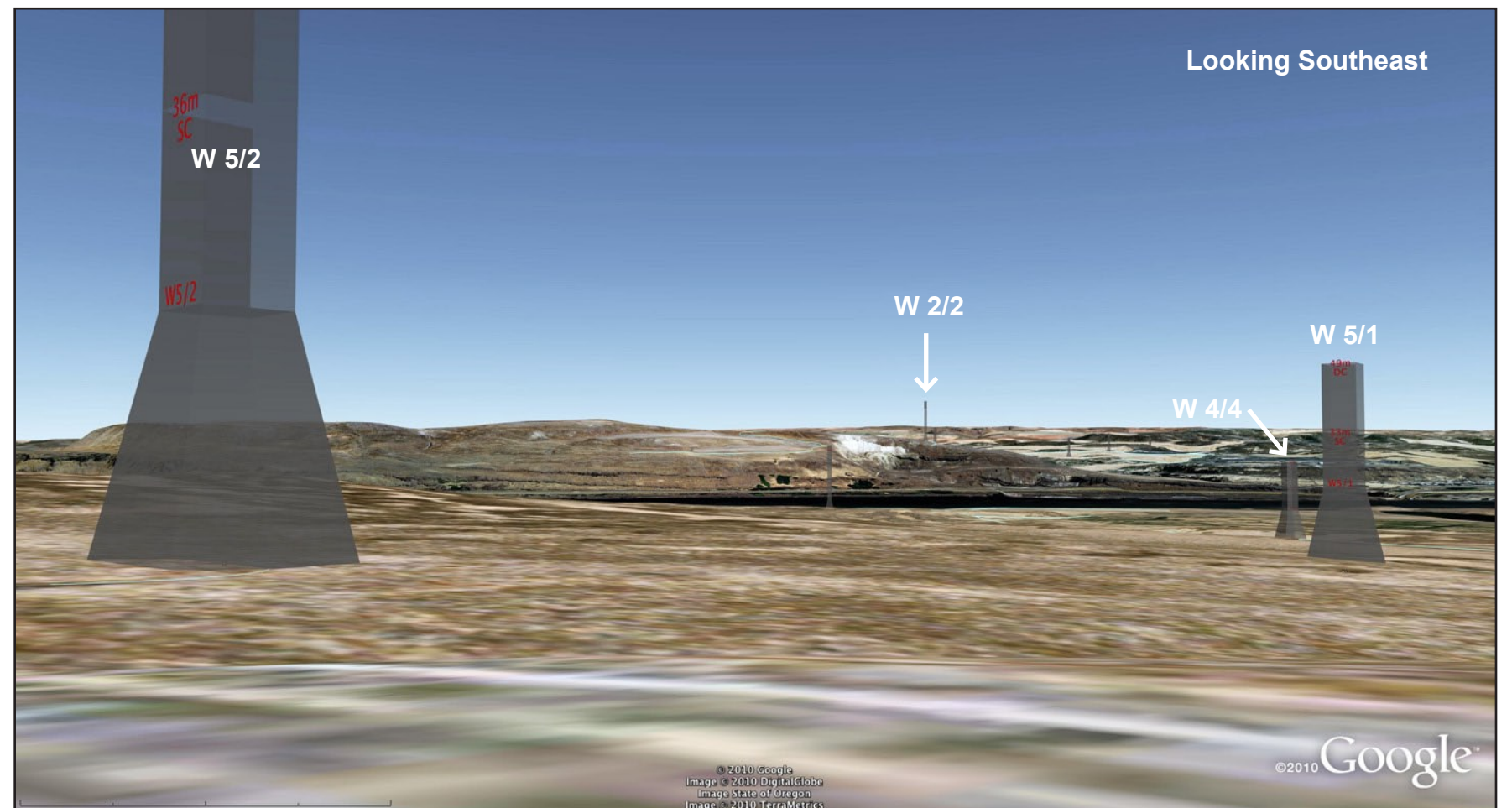
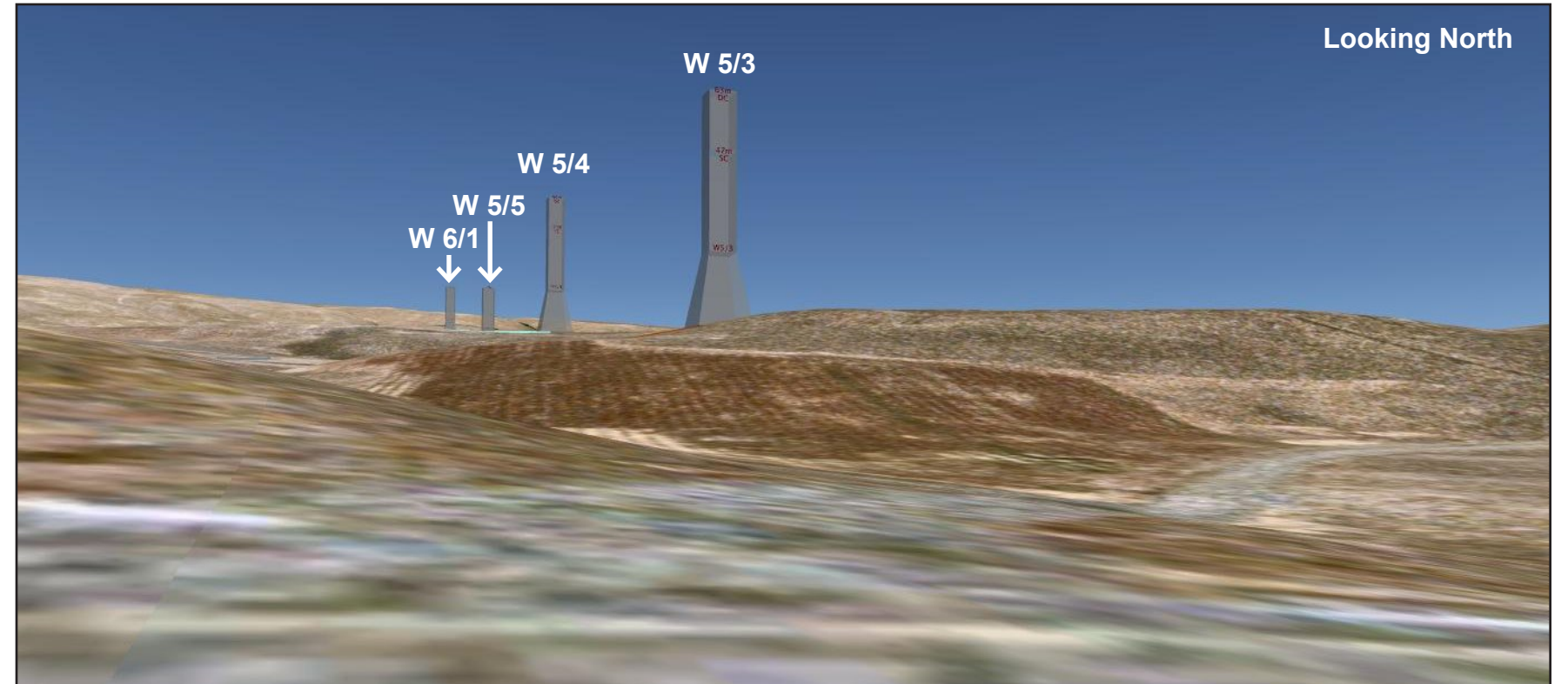
ICF-Graphics... 00588.09 (10-5-10).tm

Location: State Route 14 at intersection with Dalles Mountain Road

Looking north, towers W5/3, W5/4, W5/5, and W6/1 (single and double circuit) break the skyline. Looking south to southeast, tower W5/2 (single and double circuit) and W5/1(double circuit only) break the skyline.

Looking North		
Visible Tower (distance)	Breaks Skyline?	
	Single Circuit	Double Circuit
W 5/3 (0.21 mi)	Yes	Yes
W 5/4 (0.39 mi)	Yes	Yes
W 5/5 (0.56 mi)	Yes	Yes
W 6/1 (0.75 mi)	Yes	Yes

Looking Southeast		
Visible Tower (near to far)	Breaks Skyline?	
	Single Circuit	Double Circuit
W 5/2 (0.07 mi)	Yes	Yes
W 5/1 (0.20 mi)	May touch skyline	Yes
W 4/5 (0.41 mi)	No	No
W 4/4 (0.58 mi)	No	No
Others approaching river	No	No
W 2/2 (2.65 mi) (across river)	Yes	Yes



All images: Google Inc. 2010. Google Earth Pro, Version 5.2. Mountain View, CA. Accessed: September 3, 2010.

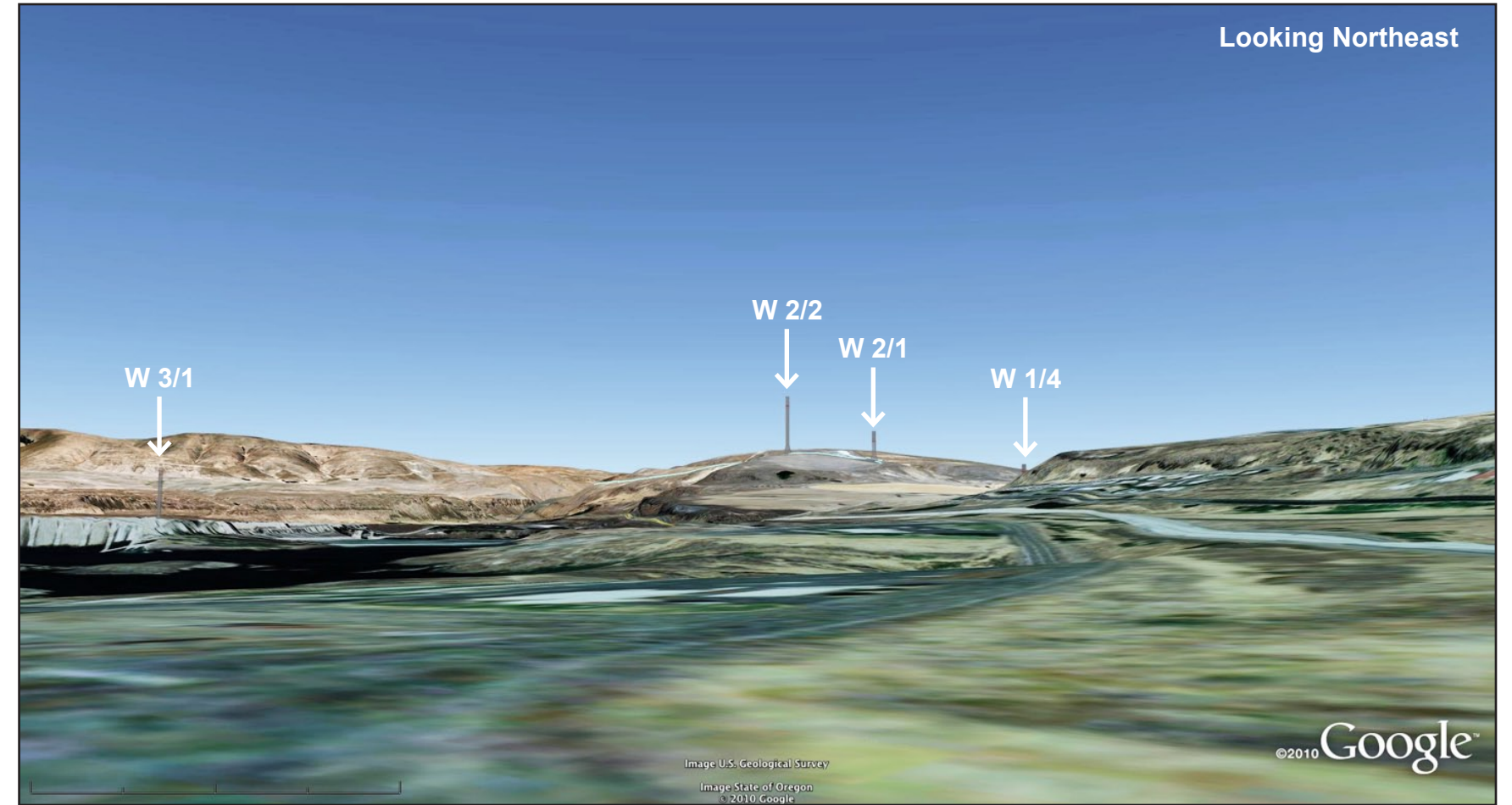
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Location: US Highway 197 at Interstate 84

Looking northeast, towers W1/4 (double circuit only), W2/1, and W2/2 (single and double circuit) break the skyline.

Towers W1/1, W1/2, and W1/3 are hidden by terrain. Other existing towers at the substation south of Columbia View Drive are visible.

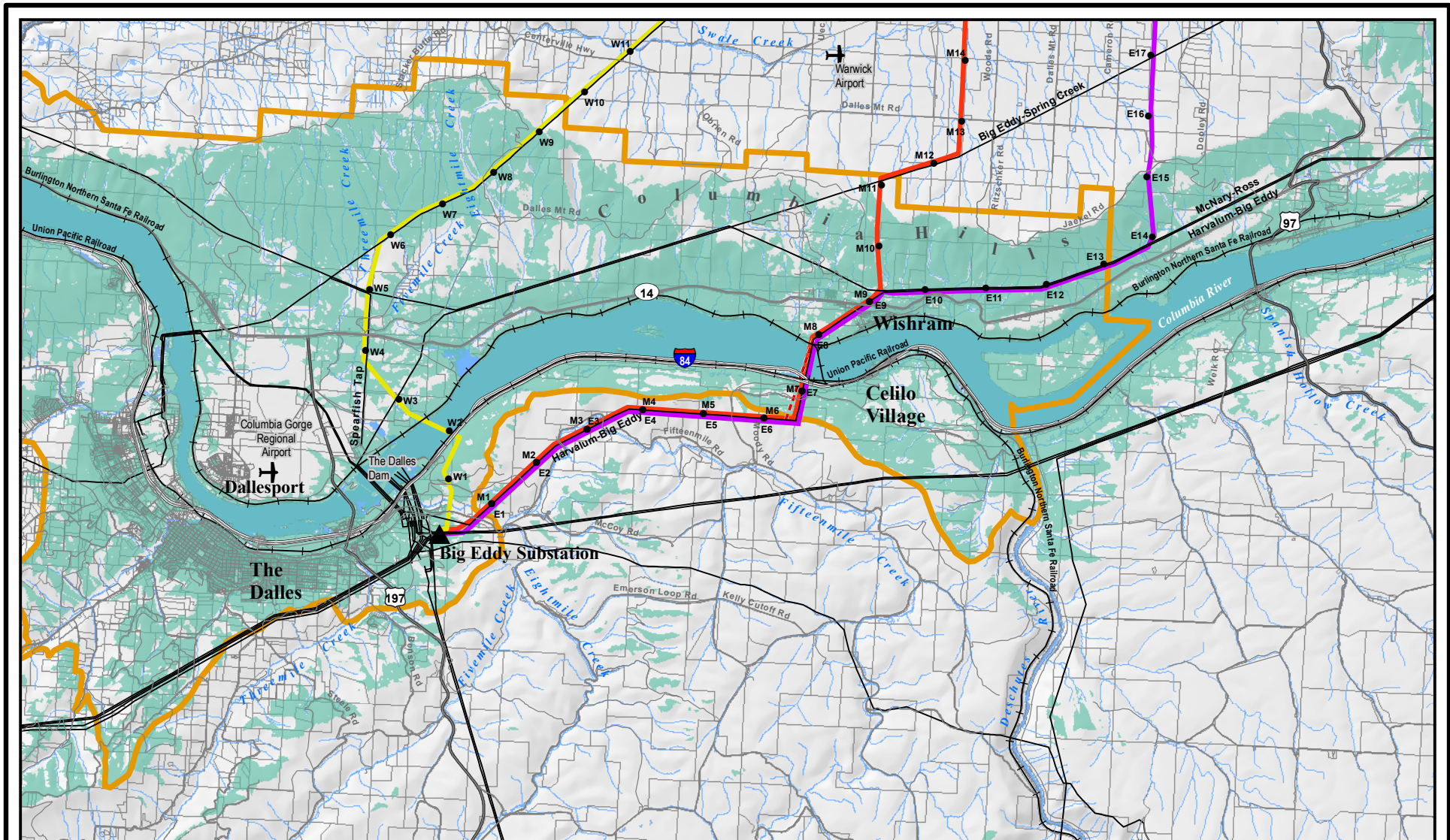
Looking East		
Visible Tower (distance)	Breaks Skyline?	
	Single Circuit	Double Circuit
W 1/4 (1.81 mi)	No	Yes
W 2/1 (1.82 mi)	Yes	Yes
W 2/2 (1.83 mi)	Yes	Yes
W 3/1 (2.18 mi)	No	No



All images: Google Inc. 2010. Google Earth Pro, Version 5.2. Mountain View, CA. Accessed: September 3, 2010.



ICF-Graphics ... 00588.09 (10-5-10) tm



Existing Facilities

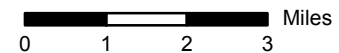
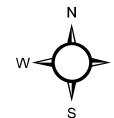
- ▲ BPA Substation
- BPA Transmission Lines
- Railroads

Proposed Facilities

- West Alternative
- Middle Alternative
- East Alternative
- - - Potential Route Adjustment
- Line Mile Markers

Area Visible from Columbia River

Columbia River Gorge National Scenic Area



Map C-1. Columbia River Viewshed



Existing Facilities

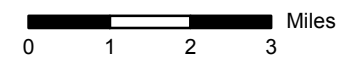
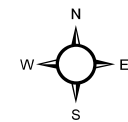
- ▲ BPA Substation
- BPA Transmission Lines
- Railroads

Proposed Facilities

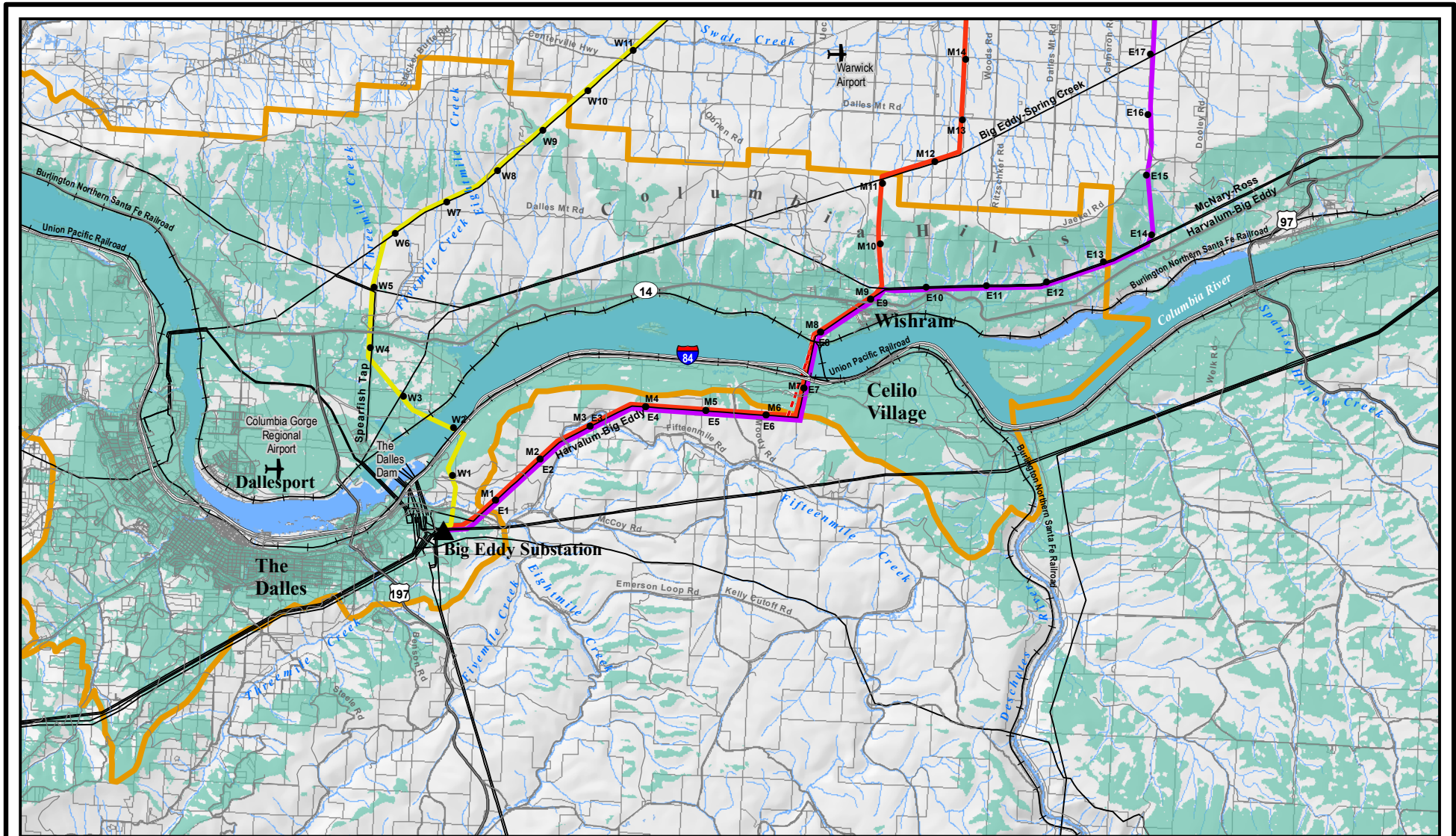
- West Alternative
- Middle Alternative
- East Alternative
- - - Potential Route Adjustment
- Line Mile Markers

Area Visible from I-84

Columbia River Gorge National Scenic Area



Map C-2. Interstate 84 Viewshed



Existing Facilities

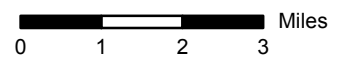
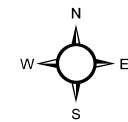
- ▲ BPA Substation
- BPA Transmission Lines
- + Railroads

Proposed Facilities

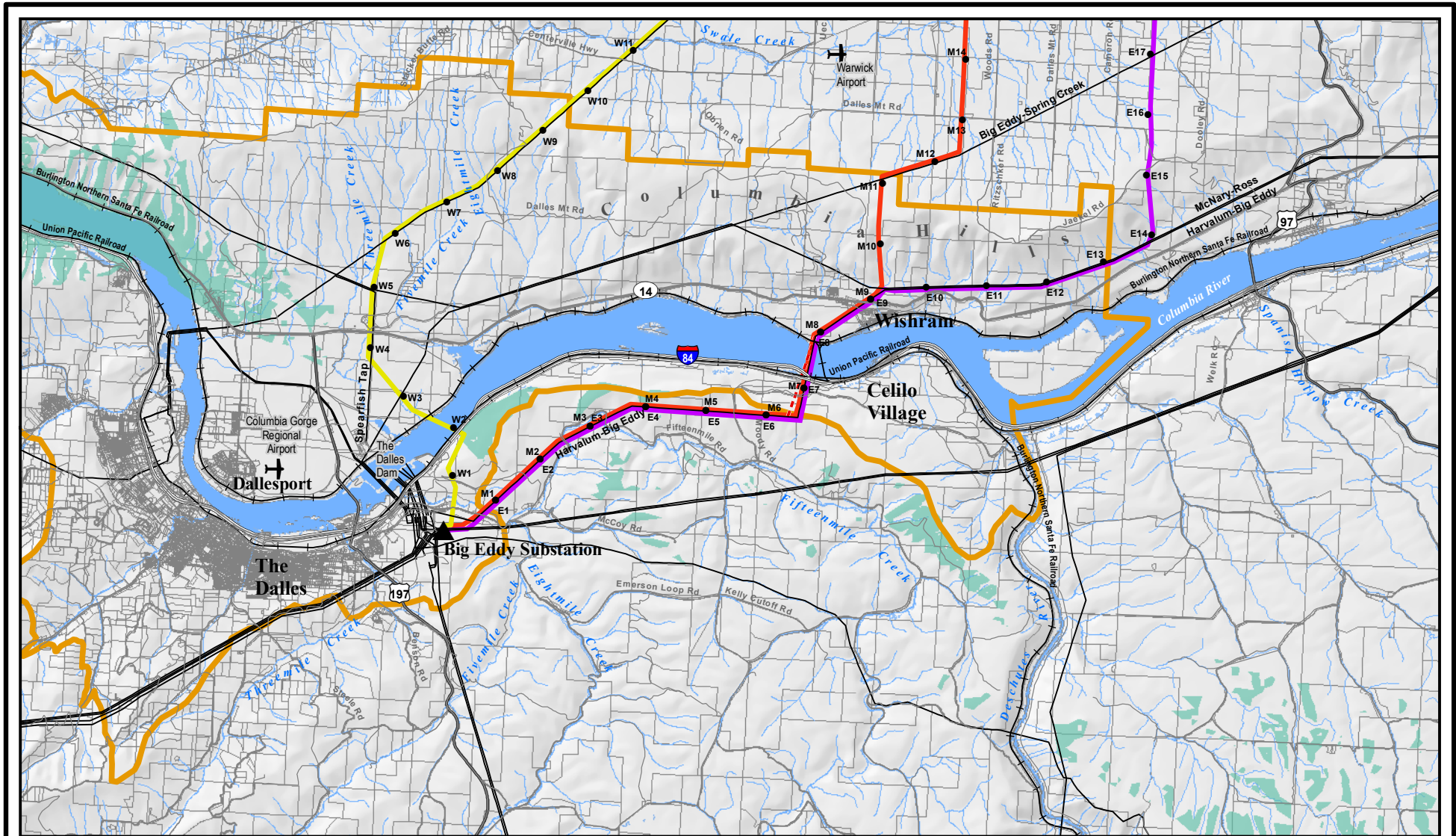
- West Alternative
- Middle Alternative
- East Alternative
- - - Potential Route Adjustment
- Line Mile Markers

Area Visible from SR-14

Columbia River Gorge National Scenic Area



Map C-3. Washington State Route 14 Viewshed



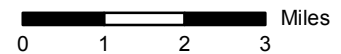
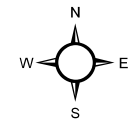
Existing Facilities

- ▲ BPA Substation
- BPA Transmission Lines
- Railroads

Proposed Facilities

- West Alternative
- Middle Alternative
- East Alternative
- - - Potential Route Adjustment
- Line Mile Markers

- Area Visible from Rowena Plateau
- Columbia River Gorge National Scenic Area



Map C-4. Rowena Plateau Viewshed