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TECHNICAL MEMORANDUM

January 15, 2025 Project # 27003.038

To: Sandra Hikari, Oregon Department of Transportation
Doug Decker, Oregon Solutions

From: Nick Gross, Cameron Bennett, Max Heller, and Hermanus Steyn, PE; Kittelson and Associates

RE: Mt. Hood Rest Area Relocation Site Selection Evaluation Criteria

Introduction

This Site Selection Evaluation Criteria Memorandum presents a quantifiable approach to identifying suitable locations for the relocation of the Mt. Hood rest area that meet the specific needs identified in the draft Purpose and Needs (Reference 1) and Project Charter (Reference 2).

The application of the site selection criteria described in this memorandum is part of Task 6 Site Criteria & Preliminary Site Screening and Task 7 Most Promising Site Alternatives under the Project Planning phase of the Mt. Hood Rest Area Relocation Project.

Contents

Glossary of Terms

- **Performance Measures** – The site selection criteria used to qualify and prioritize potential rest area relocation sites for selection
- **Qualification Measures** – Phase I Performance Measures, used to identify Potential Opportunity Sites, evaluated on a binary scale
- **Additional Screening Measures** – Phase II Performance Measures, used to identify Most Promising Site Alternatives, evaluation mechanisms to be determined at a later date
- **Initial Screening Area** – The section of the U.S. 26 corridor to be considered for rest area relocation, identified by the Project Management Team and Steering Committee
- **Potential Opportunity Sites** – Sites likely suitable for rest area relocation within the Initial Screening Area selected during Phase I of the process through the use of Qualification Measures
- **Most Promising Site Alternatives** – Preferred sites for rest area relocation, selected from Potential Opportunity Sites through the use of Additional Screening Measures during Phase II of the process

Methodology

GEOGRAPHIC SCOPE

Site selection efforts for the new Mt. Hood Rest Area will be constrained to a predefined Initial Screening Area. The Initial Screening Area extends along the U.S. 26 corridor from Mt. Hood Village (milepost 40) to the northern border of the Warm Springs Reservation (milepost 71). Additional locations along U.S. 26 may be considered as far south as Madras (milepost 116), based on the desire of The Confederated Tribes of the Warm Springs to site a rest area on Tribal land. Tribal consultation is ongoing and being led by the ODOT Tribal Liaison.

Following initial discussions with the PMT and Steering Committee, the segment of OR-35 from the U.S. 26 interchange north to Parkdale has not been included in the Initial Screening Area because traffic traveling between Bend and Portland does not typically access this route, and traffic volumes on this route are significantly lower than on U.S. 26.

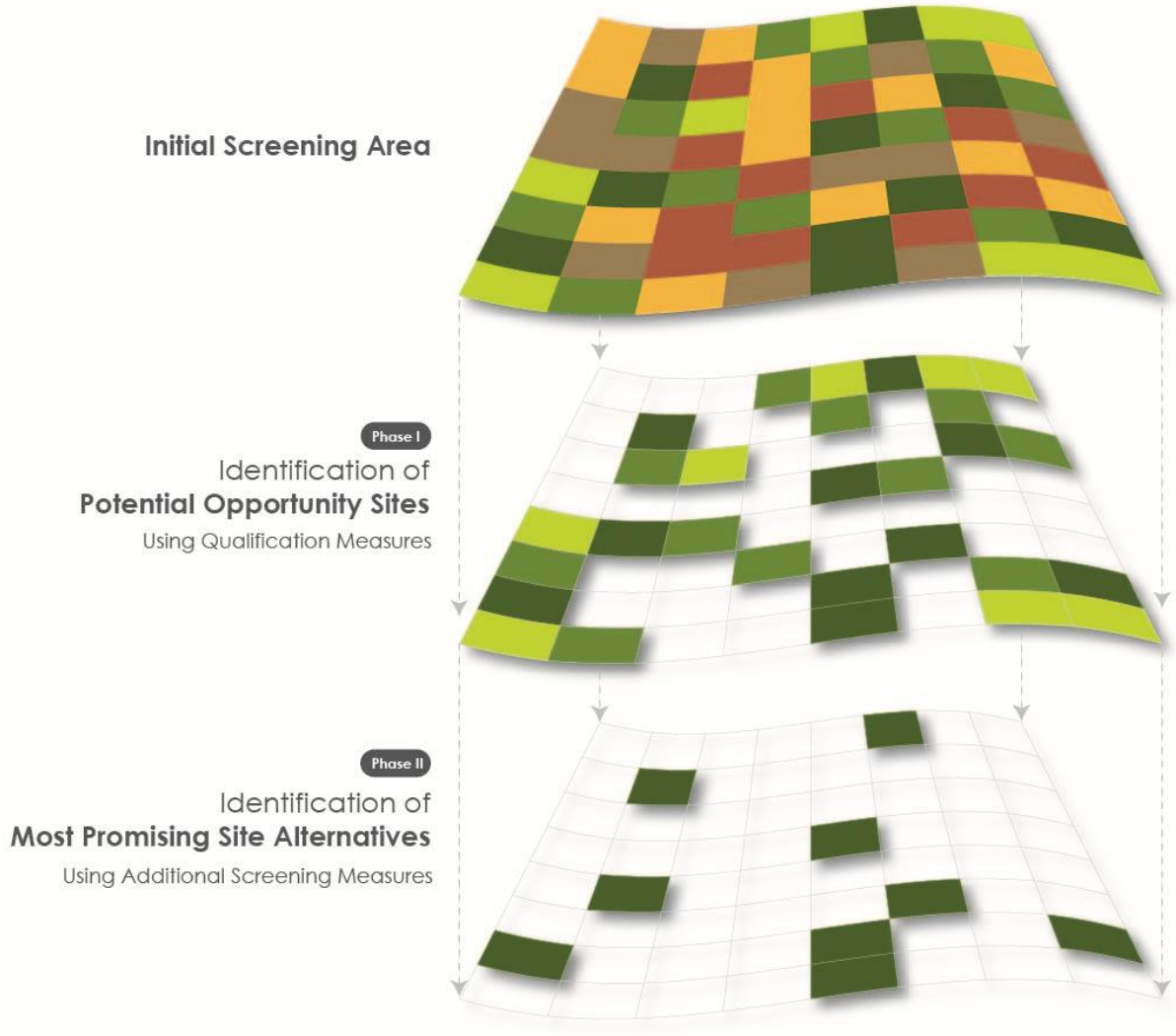
PROCESS OVERVIEW

The site selection process for the Mt. Hood Rest Area Relocation Project will occur in two phases:

- **Phase I:** Application of "Qualification Measures" to identify "Potential Opportunity Sites"
- **Phase II:** Application of "Additional Screening Measures" to identify "Most Promising Site Alternatives"

The process to develop and apply Performance Measures in Phases I and II is further described on the following page. Figure 1 provides a visual representation of this methodology.

Figure 1: Site Selection Methodology



PERFORMANCE MEASURES

The American Association of State Highway and Transportation Officials (AASHTO) *Guide for Development of Rest Areas on Major Arterials and Freeways* (hereafter referred to as the "AASHTO Rest Area Guide", Reference 3) provides guidance and considerations for rest area planning and program development, upgrading existing rest areas, locating new rest areas, site development and design, and maintenance and operations planning.

The AASHTO Rest Area Guide provides specific guidance on site criteria, site-selection process, preliminary design process, and environmental documentation. The guide includes the following as the most important points to be considered by any agency developing a rest area system include:

- Site quality
- Utilities available
- Site spacing
- Corridor geometry
- Potential environmental impacts
- Right-of-way opportunities
- Community acceptance

These seven points have guided the development of Performance Measures which will be used to evaluate the Initial Screening Area for potential and preferable sites for rest area relocation. These Performance Measures have been developed based on discussions with the PMT and Steering Committee and on further guidance and considerations provided in the AASHTO Rest Area Guide.

Two types of Performance Measures will be applied differently in Phases I and II, as described below.

- **Phase I – Qualification Measures**: These measures evaluate site characteristics to eliminate sites that are not suitable for further consideration on the basis of engineering, safety, operational, or geometric restrictions. They will generally be applied in a binary "pass/fail" manner. These metrics will not necessarily yield preferred sites when used alone; instead, they will identify areas within the Initial Screening Area that warrant closer inspection during Phase II.
- **Phase II – Additional Screening Measures**: These measures will screen the areas identified in Phase I based on a range of preferred rest area attributes and conditions. Additional Screening Measures will not disqualify a site from consideration but will help distinguish Most Promising Site Alternatives from other Potential Opportunity Sites. Whereas Qualification Measures will be evaluated using a binary elimination process, the Additional Screening Measures will include an analysis of their respective benefits and tradeoffs.

This memorandum outlines specific procedures that will be used to apply Qualification Measures to the Initial Screening Area—which is defined below. The opportunities and tradeoffs for the Additional Screening Measures are also outlined to support ongoing conversations by the PMT and Steering Committee.

Final selection of a rest area site will likely involve compromises and tradeoffs to best meet needs expressed by the project teams and other interested parties. It is unlikely that the selected site will meet all the Performance Measures identified. Alterations to the Performance Measures described in this memorandum may be made as the purpose and needs are refined and as feedback is received from project teams and other interested parties. Successive deliverables will document any further changes to Performance Measures or their application.

Phase I – Qualification Measures

This section describes the Phase I Qualification Measures, which are summarized in Table 1. For each Qualification Measure, key considerations and due diligence performed to date have been documented, and a course of action has been recommended to evaluate the Measures under a Summary of Analysis Procedures. Phase II Additional Screening Measures that have been identified to date are discussed in the following section.

Table 1: Phase I Qualification Measures

Phase I Qualification Measures		Scoring Scale		Resource(s)[1]
		Pass	Fail	
Site Quality (Features)	Minimum site footprint	Area meeting other Qualification Measures is **larger** than the minimum site footprint	Area meeting other Qualification Measures is **smaller** than the minimum site footprint	– AASHTO design guidance – Aerial survey of existing rest area sites
	Suitable topography for construction	Contiguous area with **an average terrain grade of 3% or less**	**Slopes steeper than 5% grade**	– USGS topographic data
	Suitable soils for construction[2]	No present water body or wetland	Wetland or water body	– NWI, Water bodies data
	Avalanche hazard	**Not** located where avalanches can start, run, or stop	Located where **avalanches** can start, run, or stop	– USGS topographic data, CalTopo
Utilities Available	Water, power, gas, internet, and telephone	Water, electricity, internet, and telephone coverage **provision possible**	**Site location precludes access** to one or more utilities	– Coordination with project teams – OHA water system inventory – PGE, WEC service availability data – FCC broadband availability data
	Wastewater disposal	On-site wastewater disposal or municipal system tie-in is **feasible**	**No feasible option** for wastewater disposal	– Clackamas Water Environmental Services and Government Camp Sanitary District service area maps – USGS topographic and water bodies data
Site Spacing	Spacing to other rest areas and alternative stopping opportunities	**Improves** rest area spacing for travel route(s) that do not meet 60-mile spacing target	**Redundant** rest area or alternative stopping opportunity spacing	– TripCheck Oregon rest areas inventory – Survey of alternative stopping opportunities – ODOT travel data (passenger and truck volumes and routes)
Corridor Geometry	Sight distance	Sight distance to the rest area access point is **1,000 feet or greater** from both directions	Sight distance to the rest area access point is **less than 1,000 feet** from either direction	– ODOT HDM – AASHTO design guidance – ODOT centerlines – Field surveys
	Roadway grade	Average grade is **four percent or less** over a distance of at least 1,000 feet	Average grade is **over four percent**	– ODOT HDM – AASHTO design guidance – ODOT centerlines – USGS topographic data
Potential Environmental Impacts	Wildlife and habitat	**No "Fail" critera issues** related to wildlife and habitat impact and compliance	Sites where development would be illegal, or regulatory compliance would be prohibitively challenging and/or expensive, such as in designated wilderness areas, "Wild" rivers, and/or Priority Wildlife Connectivity Areas	– LWI, NOAA, ODA, ODFW, ORBIC, NWI, NRCS, StreamNet, USFS, USFWS, and Wetlands Conservancy inventories
	Cultural, historical, archeological resources	**No "Fail" criteria issues** related to cultural, historical, archeological resources impact and compliance	**Conflicts** relating to cultural, historical, archeological resources are likely to be prohibitively challenging and/or expensive	– SHPO records – USGS, General Land Office and other historical maps – In-field observations
	Hazardous materials (HazMat)	**No "Fail" criteria issues** related to HazMat mitigation and compliance	**Regulatory compliance** would be prohibitively challenging and/or expensive	– Oregon DEQ Facility Profiler – OHA and DEQ water system inventory
Right-of-Way Opportunities	Approval by landowner/manager	Public land **available** for rest area development or private land with **willing** seller	Landowner/manager **not willing** to allow development	– Clackamas and Wasco County parcel and zoning maps – USFS Forest Plan – Discussion with project partners
Community Acceptance	Planned and in-process development	**No** planned and in-process development	Planned and in-process development **precluding** rest area development	– Planning documents – Discussion with project partners

[1] Acronyms are defined in the Acronyms section of this memorandum, as well as in the discussion of each Performance Measure.
[2] Detailed geotechnical investigation of prospective sites is expected to occur in a later *Preliminary and Intermediate Design* phase of the project.

SITE QUALITY (FEATURES) QUALIFICATION MEASURES

A suitable construction site is a necessary prerequisite for establishing a new rest area. The purpose of the Qualification Measures identified under this category is to identify sites that will provide suitable grounds for construction of the site based on topographic and geotechnical characteristics.

Minimum Site Footprint

The first component of identifying suitable rest area sites is identifying the minimum site footprint.

The ultimate determination of the shape and size of the rest area's footprint will be dependent on many factors, including:

- Required parking and throughput capacity for passenger, freight, and transit vehicles;
  - Equations 1-4 of the AASHTO Rest Area Guide may be used to estimate the number of car and truck parking spaces that should be provided. These recommended values will vary based on the location of the rest area along the U.S. 26 corridor—segments with higher traffic volumes and higher proportions of freight vehicles will be expected to accommodate larger volumes of rest area users.
- Configuration of parking and circulation routes;
  - The layout of the rest area will be identified later in the Project Planning Phase as Most Promising Site Alternatives are identified and concept designs are developed. Concepts will likely utilize different rest area configurations to accommodate supported uses of the site and local conditions.
- Services and amenities provided to support allowed use(s) of the rest area; and,
  - Figure 13 of the AASHTO Rest Area Guide provides equations to estimate the number of restroom stalls, water usage, picnic tables, and waste receptacles.
  - Many other potential rest area amenities are discussed in this memorandum as Additional Screening Measures.
- Proximity to other rest areas and other alternative stopping opportunities (including public restrooms, truck-accessible pull-offs, commercial areas, and chain-up areas)
  - If alternative stopping opportunities are available nearby, the demand for the rest area and the services it provides will diminish, reducing the required site capacity and necessary amenities.

For the Phase I identification of Potential Opportunity Sites, a minimum footprint of 12 acres will be used. This value is derived from general, non-formulaic guidance in the AASHTO Rest Area Guide.

Summary of Analysis Procedures

- A hexagonal grid where the area of each hexagon is 12 acres will be overlayed on a map of the other Qualification Measures to provide a visual reference for the required site size.
- Potential Opportunity sites must meet Qualification Measures over an area greater than or equal to the minimum rest area footprint (12 acres).

Suitable Topography for Construction

The topography surrounding the Initial Screening Area is highly variable and many areas feature steep drainages, ridges, and other terrain features. Finding a site that is both large enough to accommodate the minimum rest area footprint and relatively level over this entire area will greatly reduce the engineering and construction costs for the future rest area.

Summary of Analysis Procedures

- Topographic data will be mapped showing slope angle to allow analysts to visually determine locations along the Initial Screening Area where topography would likely be suitable for rest area construction
- Potential Opportunity Sites will have an average terrain grade of less than or equal to three percent with grades not exceeding five percent over a 10,000 square foot area (symbolized in a 100 by 100 foot grid).

Suitable Soils for Construction

Site construction will require suitable soil. While modern construction techniques allow for construction on a wide variety of surfaces, some soil compositions will minimize complexity and cost for the project. The water table at the site must not be so high as to make construction difficult or impossible. Site construction and modification to the landscape should not create undue erosion control concerns.

As discussed under the Utilities Qualification Measures, soils present at the site will also likely need to be suitable for the installation of a septic wastewater disposal system.

Consideration of these factors will be preliminary in this phase of the project. This Qualification Measure will only consider whether the site is located on a wetland or body of water which would require significant engineering and environmental impact to construct upon. A full geotechnical investigation of prospective sites is expected to occur in a later Preliminary and Intermediate Design phase of the project.

Summary of Analysis Procedures

- Geospatial data will be used to assess areas where wetlands and water bodies are present. These areas will be excluded from consideration as Potential Opportunity Sites.

UTILITIES QUALIFICATION MEASURES

In order to provide the general functions of a rest area—public restrooms, information, and an opportunity to rest and prepare to continue traveling—basic utilities must be provided, including potable water, electrical power, gas, internet, and telephone service. Wastewater disposal is required to accommodate restroom operations.

Water, Power, Gas, Internet

Certain utilities are required to operate a rest area; it will be required that these are readily provided at any perspective site.

- **Potable water**: Access to plentiful potable fresh water is necessary to plumb water fountains, sinks, toilets, hoses, and recreational vehicle (RV) dump stations. This access may be accomplished through a variety of mechanisms, including municipal water systems and private wells.
  - Oregon Health Authority (OHA) data[3] indicates that the majority of water systems in the Initial Screening Area are groundwater-sourced. This will be the likely mechanism providing potable water to the relocated rest area.
- **Electrical power**: Electricity is required to provide on-site lighting and to power vending machines and other amenities. Depending on the availability of other utilities, it may also be used to provide indoor heating and cooling, and to support on-site water systems through pumping and protection from freezing.
  - Portland General Electric (PGE) and Wasco Electric Cooperative (WEC) are the electric power utilities for the Initial Screening Area.
- **Gas**: Natural gas may be used to provide heating and reduce the risk of freezing plumbing in cold environments.
  - No natural gas utility is available within the Initial Screening Area. The functions of a natural gas system will need to be fulfilled through the provision of an alternate system, such as propane, oil, or geothermal energy. Each of these is likely to be feasible for any site selected in the Initial Screening Area. As a result, suitability for natural gas connections will not be considered in this Performance Measure.
- **Internet and telephone**: Rest areas provide important opportunities for travelers to use their mobile devices and access public telephones. Cellular service, internet, and landline service—while not absolutely necessary—are key attributes of a rest area with modern capabilities. Internet may also enable remote video surveillance systems to monitor the rest area for criminal activity or noncompliance with use or stay time regulations.
  - The Federal Communications Commission (FCC) benchmark for high-speed fixed broadband is download speeds of 100 megabits per second and upload speeds of 20 megabits per second. A rest area may wish to provide higher bandwidths where many users might be expected to

[3] https://geo.maps.arcgis.com/apps/webappviewer/index.html?id=86938c6844be48b0b75a9326f500a748

access the connection simultaneously, such as in areas where cellular internet connection is not available.
- Initial investigation indicates that mobile broadband is available for the entire Initial Screening Area, while fixed broadband may not be available south of milepost 62, near Frog Creek Pond. Multiple fixed broadband providers service the areas north and west of that point[4].

Summary of Analysis Procedures

- **Potable water**
  - Existing water systems in the Initial Screening Area will be reviewed to determine opportunities to tie into existing systems.
  - The Mt. Hood National Forest will be consulted to determine recommended procedures for procuring fresh water outside of these areas, and necessary characteristics of sites to do so.
  - Areas where existing water system connections are possible, or where on-site freshwater procurement is feasible will be included for consideration as Potential Opportunity Sites.
- **Electrical power**
  - If available, public data will be reviewed to determine areas where providing electric grid connections is feasible. In the case that such data is not available, direct contact with the PGE and WEC will be initiated.
  - In the case that grid tie-in is not feasible, alternate electrical power sources, including on-site generators, solar power, and geothermal energy will be explored for their feasibility and required site characteristics.
  - Areas where electrical grid connections are possible or where on-site electrical generation is feasible will be included for consideration as Potential Opportunity Sites.
- **Internet and telephone**
  - Areas where fixed broadband connections are available will be included for further investigation as Potential Opportunity Sites.
  - The feasibility of wireless broadband and satellite internet for rest area applications will be further investigated. Additional areas will be included in the search for Potential Opportunity Sites where such options are feasible.

[4] https://broadbandmap.fcc.gov/home; https://broadbandnow.com/research/national-broadband-map

Wastewater Disposal

Because a primary service provided by a rest area is a public restroom, a significant volume of wastewater is expected to be produced. The Clackamas Water Environmental Services (WES) sewer system Hoodland service area only covers areas within Mt. Hood Village, and the Government Camp Sanitary District provides service only to the village of Government Camp. Therefore, an on-site wastewater disposal system—like a septic system—will be a requirement in the majority of the Initial Screening Area. Site characteristics likely to impact the potential for use of a septic system include topography, soils present, and environmental impact concerns.

Summary of Analysis Procedures

- The extents of WES and Government Camp Sanitary District wastewater service areas will be confirmed with each utility provider.
- The viability of an on-site wastewater disposal system—like a septic system—on National Forest lands will be confirmed with Mt. Hood National Forest representatives.
- Areas where system connections are possible, or where the physical and environmental requirements for installation and maintenance of an on-site disposal system are met will be included for consideration as Potential Opportunity Sites.

SITE SPACING QUALIFICATION MEASURES

Proper rest area spacing is not only important for ensuring driver comfort, but also addresses driver fatigue, a leading cause of roadway crashes. U.S. 26 is a designated freight route with many motorists travelling long distances through undeveloped areas. As such, the appropriate spacing of rest area facilities is a necessary consideration for the site selection process.

The AASHTO Rest Area Guide recommends rest stop spacing of no more than or 60 miles (an approximately one-hour drive); however, development of a consistent approach to spacing rest areas is challenging, particularly when other constraints are involved. According to AASHTO, exceptions to this spacing guidance may be made "near large cities, where sites may not be available, costs of acquiring property prohibitive, and where motorist services are readily available."

The few rest area facilities located within 70 miles of the Initial Screening Area are unlikely to be on typical routes for motorists travelling along U.S. 26. No formal rest area facilities currently exist within 60 miles of the Initial Screening Area along U.S. 26.

Given the location of existing rest areas, the 60 mile rest area spacing target will not be met for many travel routes, no matter where the relocated site is placed within the Initial Screening Area. As such, Additional Screening Measures relating to the spacing of rest area and alternative stopping opportunities will be considered in Phase II of the site selection process. Alternative stopping opportunities that will be considered include existing public restrooms, truck-accessible pull-offs, commercial areas, and chain-up areas. Avoidance of redundant motorist facilities and stopping opportunities will be prioritized. While proximity to such opportunities may somewhat negate the need for a rest area, selecting locations nearer to other developed areas can help with concerns relating to rest area security and policing.

Summary of Analysis Procedures

- In coordination with the Oregon Department of Transportation (ODOT), data on traffic volumes and trip characteristics will be assessed along U.S. 26 within the Initial Screening Area, as available. Applicable rest areas and alternative stopping opportunities will be mapped along this route.
- Where rest area spacing recommendations are not met for a given route, areas will be identified where rest area facilities might synergize with existing motorist stopping opportunities. These areas will be included for consideration as Potential Opportunity Sites.

CORRIDOR GEOMETRY QUALIFICATION MEASURES

Providing safe access to the future rest area site requires careful assessment of the adjacent roadway segments to ensure motorists have ample time to anticipate the rest area entrance, decelerate, and safely navigate into the site ingress, as well as safely accelerate and reenter the flow of traffic. Qualification Measures relating to sight distance and roadway grade are discussed below.

The ODOT Highway Design Manual (HDM, Reference 4) provides guidance for the geometric design of roadways under state jurisdiction in Oregon, including concerns related to sight distance and grade. Guidance is organized by design speed, which is determined using the functional classification of the roadway and the project type. For *Reconstruction, Resurfacing, Restoration, Rehabilitation* (4R) projects on facilities with the classification *Rural Principal Arterial-Other*, the HDM indicates that "a 60 mph design speed works well for most of Oregon's rural two-lane highways" (p. 200-61). The posted speed of U.S. 26 east of Rhododendron is 55 mph. Using this guidance, 60 mph will be used as the design speed for corridor geometry assessment in the project planning phase. The final assessment of the design speed for this project will take place in subsequent phases and will be determined by the Region Roadway Manager and the Region Traffic Manager in cooperation with Technical Services Roadway Staff, in accordance with the HDM (p. 200-42).

For the purposes of assessing corridor geometry requirements, the rest area site access is presumed to be an at-grade intersection with stop control on the minor approach and deceleration/turning lanes on both of the major approaches. As shown in Table 3, Figure 2, and Figure 3 in the *Turn Lane Criteria* attachment at the end of this memorandum, ODOT Analysis Procedure Manual (Reference 5) left- and right-turn lane criteria are likely to be met for all possible site locations between Rhododendron and the Warm Springs Reservation. Interchange (ramped) access designs may be considered if this is determined to be the preferred alternative by ODOT and FHWA, particularly if paired rest area facility design is considered.

Sight Distance

Motorists' ability to see and react to oncoming roadway conditions is of paramount importance. Ensuring sufficient sight distance along the roadway ensures motorists can safely respond to hazards and changes in the roadway and have sufficient time to make decisions at interchanges and junctions. Ensuring approaching motorists have ample time to assess conditions the rest area entrance and departing motorists can safely merge into traffic will be essential for the development of safe site access.

The HDM states that "for intersections at grade, a vehicle entering the highway from a side street or access must be able to clearly see a vehicle throughout the sight triangle based on minimum stopping sight distance and preferably intersection sight distance for the design speed" (p. 200-64).

Stopping sight distance (SSD) is a metric used to determine the minimum length of roadway needed for a driver to come to a full stop. It considers the reaction time of the driver and the distance needed to decelerate after the brake is initially applied. For a 60 mph design speed on level ground, the ODOT HDM recommends an SSD of 570 feet, based on guidance from AASHTO's *A Policy on Geometric Design of Highways and Streets* (hereafter referred to as "AASHTO's *Green Book*" or "the *Green Book*", Reference 6).

While SSD captures the distance that allows drivers to come to a rapid stop under standard conditions, the *Green Book* states that, "greater distances may be needed where drivers must make complex or instantaneous decisions" (p. 3-7). This distance is referred to as decision sight distance (DSD) and includes additional time for drivers to interpret roadway conditions and adjust their speed, path, and direction accordingly. The HDM indicates that "when possible, [designers should] endeavor to provide decision sight distance at locations where multiple information processing, decision making, and corrective actions are needed" (p. 200-66). The *Green Book* provides DSD tables (p. 3-8) for several common avoidance maneuvers, including factors like speed, path, and direction changes. For a rural highway with a 60 mile per hour (mph) design speed, it is recommended that motorists have 990 feet of decision sight distance to effectively merge into the appropriate lane for access to the rest area and then come to a safe speed to turn into the facility.

Intersection sight distance (ISD) is another important consideration to ensure safe egress from the rest area, if a single access point is provided. Adequate ISD ensures that vehicles making turning maneuvers from the site access have adequate time to get up to speed when maneuvering into or across lanes of traffic. The HDM refers to the *Green Book* for ISD evaluation. For intersections with stop control on minor roads and design speeds of 60 mph, the *Green Book* recommends ISDs of 1,015 feet for left turning combination trucks, and 930 feet for right turning combination trucks making maneuvers onto flat (<3% grade) two-lanes highways without medians (p. 9-47, 9-48). The *Green Book* indicates that "no adjustment of the recommended sight distance values for the major-road grade is generally needed because both the major- and minor-road vehicle will be on the same grade when departing the intersection" (p. 9-45).

Sight distances of 1,000 feet for both approaches will be used for initial screening. As the design for the rest is refined, the horizontal and vertical curvature of the roadway will need to be assessed to determine the sight distance at site approaches, as roadside objects and tight curves and crests in the roadway can restrict sight distances. The exact sight distance requirements will be subject to engineering judgment. The requirements for sight distance are distinct, however, from those pertaining to roadway grade, as discussed in the next section.

Summary of Analysis Procedures

- The Initial Screening Area will be screened to eliminate roadway segments where sight distance falls below 1,000 feet on either approach to the potential rest area access point. Adequate sight distance will be confirmed using in-person field surveys.

Roadway Grade

When turning off a high-speed roadway, motorists need ample room to decelerate in order to safely reach a low speed to make a sharp turn off the roadway or come to a stop in order to yield to oncoming traffic in the case of a left-hand turn off the roadway. On flat ground, vehicles can slow down in a shorter distance than on a downgrade, where vehicles will need additional room to decelerate. Given the varying grade of U.S. 26, ensuring vehicles in both directions have sufficient room to slow down and turn safely into the rest area facility is essential. U.S. 26 is identified as a Freight Route in the Oregon Highway Plan (Reference 7); selected roadway grades near the site access will need to consider the specific needs of heavy vehicles.

SEGMENT GRADE REQUIREMENTS

The ODOT HDM indicates that the maximum grades for rural arterials with a 60 mph design speed is 6% in mountainous terrain, and 4% in rolling terrain. AASHTO's *Green Book* provides further guidance relating to the design of deceleration lanes and ramps, which is summarized below.

The *Green Book* states that "downgrades should desirably be limited to three or four percent on ramps with sharp horizontal curvature and significant heavy truck or bus traffic" (p. 10-109). Given that the Mt. Hood rest area will cater to significant volumes of truck traffic, the maximum roadway segment grade at access for Potential Opportunity Sites should not exceed four percent.

SEGMENT LENGTH REQUIREMENTS

The second step is to assess how much roadway length is necessary to enable safe deceleration of all vehicles into the rest area access point. AASHTO's *Green Book* provides tables showing the deceleration lane length necessary to bring vehicles travelling at a given initial speed down to a desired final speed (p. 10-138). Because the rest area access will likely be an at-grade intersection, vehicles will potentially need to come to a stop before turning into the rest area. The *Green Book* recommends a deceleration lane length of 530 feet on a flat roadway (<3% grade) with a design speed of 60 mph. Assuming traffic travelling in both directions will need 530 feet to decelerate, sites on flat (<3%) roadway segments will need 1,060 total feet of deceleration lane length.

The *Green Book* provides "lane adjustment factors" which account for the effects of upgrades and downgrades on deceleration (p. 10-133). AASHTO recommends adjusting deceleration lane lengths by a factor of 1.2 when on a downgrade of three to four percent by a factor of 0.9 when on an upgrade of three to four percent, as compared to deceleration lanes on flat ground. This means that deceleration lanes for uphill traffic along U.S. 26 need to be at least 477 feet in length and deceleration lanes for downhill traffic need to be at least 636 feet in length. If a rest area is located on a roadway segment with a grade between three and four percent, the necessary total deceleration lane length will be 1,113 feet. Based on these findings, this site selection process will aim to identify roadway segments approximately 1,200 feet in length with an average grade of no more than four percent. The 1,200-foot roadway criterion is a conservative estimate, given that right-turning traffic will not need to come to a full stop before entering the rest area.

Summary of Analysis Procedures

- Roadway segments with an average grade of more than four percent over a distance of 1,200 feet will be eliminated from consideration as Potential Opportunity Sites.

ENVIRONMENTAL IMPACTS QUALIFICATION MEASURES

The Mt. Hood area consists of thousands of acres of natural spaces, hundreds of streams and tributaries, and numerous species of plants and wildlife. These resources have intrinsic, ecological, environmental, recreational, and economic value and are accordingly protected by Federal and State law. The site selection process must consider potential environmental impacts to ensure that impacts are minimized and that the project is completed in compliance with regulations.

Wildlife and Habitat

Federal and State law regulates the impacts on protected wildlife and habitat associated with the construction and operation of public facilities. Selecting a site where adverse environmental impacts are anticipated can lead to costly environmental permitting, mitigation, and/or remediation requirements. While it will be impossible to select a site, complete construction, and operate a rest area without creating any environmental impacts, proper advance screening can help select a project site where impacts to environmental resources are mitigated.

The following natural resource data will be examined to best understand the scale and magnitude of potential impact to the environmental resources present:

- Protected Species
  - United States Fish and Wildlife Service (USFWS) Critical Habitat (USFWS 2024a)
  - National Oceanic and Atmospheric Administration (NOAA) Critical Habitat (NOAA 2024)
  - Oregon Biodiversity Information Center (ORBIC) records of rare, threatened, and endangered species (ORBIC 2024)
  - StreamNet Fish Distribution – All Species Combined (StreamNet 2019)
  - Oregon Department of Agriculture (ODA) Listed Plants by County (ODA 2024)
- Wetlands
  - USFWS National Wetlands Inventory (NWI) polygons (USFWS 2024b)
  - Local Wetlands Inventory (LWI) for the City of Sandy (SRI/SHAPIRO/AGCO, Inc. 1997)
  - Natural Resources Conservation Service (NRCS) soils data (NRCS 2024)
  - United States Forest Service (USFS) Soil Resource Inventory (SRI) for the Mt Hood National Forest (USFS 2024)
  - Oregon Wetland Soils (Wetlands Conservancy 2023)
- Waters
  - United States Geological Survey (USGS) National Hydrography Dataset (NHD) flowlines (USGS 2024)
  - Oregon Department of Forestry (ODF) Hydrography Flow Line dataset (ODF 2024)
  - Local Wetlands Inventory (LWI) Streams for the City of Sandy (SRI/SHAPIRO/AGCO, Inc. 1997)

Using the above data, the relative prevalence of environmental resources should be assessed for each site. Sites with less anticipated environmental impact will be preferred to sites where the anticipated environmental impact will be greater.

In addition to the general environmental impact considerations noted above, specific assets with protected status will be considered as disqualifying criteria for consideration as Potential Opportunity Sites. These include:

- USFS wilderness areas
- National Wild and Scenic River System rivers with "wild" classification.
- Oregon Department of Fish and Wildlife (ODFW) Priority Wildlife Connectivity Areas

Summary of Analysis Procedures

- The presence of environmental resources such as protected species and habitat will be quantitatively assessed for the Initial Screening Area. Sites with a high relative prevalence of such environmental resources will be deprioritized for consideration as Potential Opportunity Sites.
- Wilderness areas, "wild" rivers, and Priority Wildlife Connectivity Areas will be excluded from consideration as Potential Opportunity Sites.

Cultural, Historical, and Archeological Resources

Mt. Hood is home to many cultural, historical, and archeological resources. The development of the relocated rest area should seek to minimize impact to these resources.

Summary of Analysis Procedures

- A review of cultural resource survey data and records—including these on file with the State Historic Preservation Office (SHPO) and documents in Project Files database, including survey reports, historical maps (early USGS, regional, etc.), and General Land Office maps—will be used to develop an inventory of known resources.
- Reconnaissance will be performed by vehicle to assess the existing conditions for the sites under consideration, and to determine if previously recorded resources may have been removed by developments over the past few years.
- For areas that have not been surveyed for archaeological or historic resources, an estimate of the probability of encountering a significant resource will be conducted using the research described above.
- The culmination of these efforts will result in a map of higher-risk locations, at which impacts relating to cultural resources are more likely. These risks will be noted for each Potential Opportunity Site.

Hazardous Materials

Avoiding sites with hazardous materials (HazMat) is important to ensuring the Mt. Hood Rest Area Relocation Project remains on budget and on time. If pre-existing HazMat are found at the project site, Federal and State laws regulating the handling and disposal of hazardous waste will apply to construction proceedings. Compliance with these regulations is costly and can potentially extend the project's timeline. Avoiding sites where there is a potential for HazMat to be present will ensure that unforeseen costs and requirements do not arise during the construction phase of the project.

Several parameters can be assessed to determine if HazMat regulations might apply to a given project site. The Oregon Department of Environmental Quality's (DEQ's) Facility Profiler on-line database provides information on the following indicators of HazMat presence:

- Drywells (also called UICs)
- Cleanup sites (i.e., Environmental Cleanup Site Information [ECSI])
- Leaking Tank Sites (i.e., LUST)
- Hazardous Waste Generators
- Solid Waste Facilities
- Air Permitees
- Underground Storage Tanks (USTs)
- Water Quality information

An additional factor to consider is past HazMat spills. For example, if an oil tanker leaks along U.S. 26, that site might require soil treatment and/or proper transport and disposal of contaminated soil. The presence of these HazMat conditions will be used during the site selection process to rule out sites that are not feasible for construction of a new rest area.

Lastly, it is prudent to identify drinking water source areas for communities. Identification and avoidance of these drinking water sources and their two-year times recharge areas can help mitigate risks associated any potential HazMat releases at the rest area during construction and operation. While proximity to a drinking water source and its 2-year travel time area is not a "fail" criteria for rest area siting, it may warrant additional permitting and/or mitigation, as well as further consultation with Oregon DEQ and/or the Oregon Water Resources Department (OWRD).

Summary of Analysis Procedures

- Areas within the Initial Screening Area where regulatory compliance related to HazMat would be prohibitively challenging and/or expensive will be excluded from consideration as Potential Opportunity Sites.

RIGHT-OF-WAY OPPORTUNITIES QUALIFICATION MEASURES

At a minimum, the land selected for development into a rest area will need to be made available for development by the current landowner or manager through sale, memorandum of understanding, or otherwise. Existing land use plans and zoning codes will also affect where rest area development is possible.

Approval of Landowner/Manager

The U.S. Forest Service (USFS) manages most of the land within the Initial Screening Area. The management approach for National Forests in the Pacific Northwest, including Mt. Hood National Forest (MHNF) is outlined in the USFS Northwest Forest Plan (NW Forest Plan). The plan includes Land Use Allocations for parcels within MHNF; these classifications describe acceptable uses of USFS land. Land Use Allocations will be reviewed when identifying Potential Opportunity Sites. In addition to these Land Use Allocations, zoning regulations for Clackamas and Wasco counties will also be considered in the site selection process.

Beyond alignment with relevant land use and zoning plans and regulations, any Potential Opportunity Site for the Mt. Hood rest area will need to be met with approval from the landowner/manager. While the USFS is the primary landowner within the Initial Screening Area, there is land in use by private parties in a number of locations, including within the communities of Rhododendron (milepost 44-48) and Government Camp (milepost 53-54), and near the Chevron Government Camp (milepost 60). It is helpful to note that there are no significant areas of state-owned land in the Initial Screening Area[5].

The Confederated Tribes of the Warm Springs manage the land south of milepost 71. This area is not included in the Initial Screening Area but may be considered pending further conversations with the Confederated Tribes of the Warm Springs.

Conversations to date have already indicated specific sites that will not be approved by the landowner/manager. ODOT has indicated that the maintenance yards located near Government Camp (milepost 54), the U.S. 26/OR-35 interchange (milepost 57), and the U.S. 26/OR-216 interchange (milepost 71) will not be made available for redevelopment.

Summary of Analysis Procedures

- Coordination with USFS, ODOT, and private landowners will inform an understanding of public land available for rest area development and private landowners who may be willing to sell property. This will be a required criteria to consider an area eligible as a Potential Opportunity Site.
- Areas that are not eligible for development as described in the NW Forest Plan and county-level zoning codes will be removed from consideration as Potential Opportunity Sites.

[5] https://maps.dsl.state.or.us/slis/

COMMUNITY ACCEPTANCE QUALIFICATION MEASURES

Acceptance of the selected site by interested parties is crucial to meeting the project's Purpose and Needs while minimizing the timeline, budget, and social capital required to deliver a relocated rest area. In addition to many considerations described in the Additional Screening Measures section of this memorandum, coordination with planned and in-process developments will be important to ensure support from the Mt. Hood area community.

Planned and In-Process Development

A number of planned developments within the Initial Screening Area have been identified:

- The Timberline 2022 Master Development Plan (Reference 7) describes the planned installation of a gondola to provide lift connection between the Summit Pass ski resort and the upper portion of Timberline. This development is described as "the cornerstone of Timberline's Upgrade Plan". Specifically, the plan states that the installation of the gondola will require development to reconfigure the Summit Pass base to improve the arrival sequence to the gondola and provide shuttle/passenger drop off and parking. The gondola is planned to have 65 ten-passenger cabins providing a total capacity of 1,800 passengers per hour. Construction of this project will not be possible without relocation of the existing rest area.
- Previous planning efforts (Reference 8) indicate that the area around the current Government Camp rest area is being considered for possible transit hub development, and for a pedestrian-friendly expansion of the Government Camp business district.

Summary of Analysis Procedures

- Developing parties will be contacted for sites included in currently-planned and in-process developments. If confirmed that these sites will be developed for other uses, they will be excluded from consideration to be Potential Opportunity Sites.

Phase II – Draft Additional Screening Measures

After the application of Phase I Qualification Measures to locate Potential Opportunity Sites, Phase II Additional Screening Measures will be used to identify Most Promising Site Alternatives. The tradeoffs associated with many possible Additional Screening Measures are outlined in Table 2.

No formal decisions have been made by the PMT or Steering Committee regarding Additional Screening Measures, to-date. Discussions with PMT, Steering Committee, and other project teams and interested parties will guide the final selection of Measures to be incorporated into the process to select Most Promising Site Alternatives. The information provided here is meant to reflect questions and concerns voiced to date, illuminate additional opportunities identified by the consultant team, and provide starting ground for future discussions.

Table 2: Additional Screening Measures

Screening Measure: Will the rest area…?	**Benefits**	**Tradeoffs**	**Potential Impacts to Site Footprint**
Be comprised of **paired facilities** on each side of the highway	– Safety benefits from eliminating left turn conflicts – Opportunity to site appropriately for each direction of travel; potentially providing dedicated space for freight vehicle brake cooling	– Greater costs associated with more complex site(s) – Need to provide utilities to duplicate facilities – Need to grant multiple accesses	Large
Incorporate a set of **typical rest area amenities**, such as electric vehicle (EV) chargers, public hoses, recreational vehicle (RV) dump stations, picnic tables and shelters, pet areas, sleeping areas, vending machines, and public electrical outlets	– Improved experience for rest stop users – Added utility for a larger group of the traveling public	– Greater costs associated with more complex site(s) – Need to provide utilities to support each amenity – Increased maintenance and enforcement needs	Large
Support use as a **brake cooling area**	– Offset the use of shoulders, chain areas, local streets, and other off-highway areas for brake cooling – Increase the accessibility of the corridor for freight use	– Restrictive siting requirements (at the bottom of steep grades) – Need for more freight parking capacity – Reduced air quality at site due to idling freight vehicles	Large
Act as a **recreational trailhead and/or Sno-Park access point**	– Support growing demand for recreational access on the mountain, particularly in the winter	– Need to provide additional parking and site amenities – Need for additional enforcement and maintenance	Large
Be located below the typical **snow line**	– Less likely use of the site as a winter recreation destination – Reduced maintenance needs (plowing, facilities, etc.) – No need for chain up areas, plow circulation clearance or snow piling areas – Reduced safety risks due to ingress/egress	– Restrictive siting requirements, far from existing rest area	Moderate
If located above snow line, **discourage winter recreation use** through site design and/or enforcement	– Increase parking turnover, minimizing required capacity – Prioritize use of rest area services and resources by the traveling public	– Additional enforcement costs – Restrictive siting needs to minimize attractiveness as a recreational destination (not near sledding areas, open spaces, trailheads, our other outdoor destinations)	Moderate
Operate as a **public transportation stopover and/or transfer point**	– Continue role of existing rest area as a restroom stopover for Central Oregon Breeze – Support growing transit service opportunities in the Mt. Hood vicinity	– Increased circulation, parking, and capacity needs – Increased site furniture and amenities needs – Need to support longer-term stays for people waiting for transfers	Moderate
Incorporate unique cultural, historical, topographic, architectural, and/or informational features, **reflecting the unique location on Mt. Hood**	– Opportunity for added value to the traveling public through educational materials, scenic elements, and other placemaking	– Increased architectural and design costs – Increased circulation, parking, and capacity needs due to slower turnover	Minimal
Provide **environmental and topographic shelter from wind and weather**	– Improved experience for rest stop users	– Potentially restrictive siting and layout requirements	Minimal
Incorporate **travel information center components** (e.g. additional wayfinding, and informational components; additional indoor public spaces and amenities)	– Additional value to the traveling public accessing the rest area – Shelter from adverse weather – Opportunity for ODOT and OTIC to communicate with the traveling public, provide programming, etc.	– Increased maintenance and security costs from introduction of indoor public spaces	Minimal
Minimize tree removal from development	– Minimize environmental impacts – Opportunity to incorporate existing trees into site design	– Potentially restrictive siting – Potential need for creative site layout	Minimal
Include **facilities for law enforcement, ODOT, custodial, or other official use**	– More consistent enforcement presence, enhancing security and compliance – Fill an outpost need for partner agencies in an area with little built environment	– Requires separate parking, office, and restroom facilities	Minimal
Be located away from existing alternate stopping opportunities	– Avoid creating redundant services for the traveling public	– Additional challenges with maintenance and policing due to distance from other developed areas	Minimal
Prioritize already-developed opportunity sites for re-development into a rest area site	– Minimize impacts to environmental and cultural resources	– Potential impacts to historic resources – Higher potential for HazMat mitigation needs – Potential challenges with right-of-way acquisition	None
Be located as near as possible to the **Warm Springs Reservation**	– Mitigate current pattern of dispersed restroom activity on Tribal lands	– Lowest traffic volume location in the Initial Screening Area	None
Have **access(es) spaced** in accordance with ODOT HDM and AASHTO guidance	– Safety and operational benefits	– Potential need to relocate existing accesses	None

Next Steps

The draft Site Selection Evaluation Criteria Memorandum was submitted to the PMT and Steering Committee for review and comment. ODOT consolidated all PMT and Steering Committee comments and delivered them to the Consultant. The Consultant addressed and incorporated PMT and Steering Committee comments and provided revisions. The consultant tracked all comments received and how they were addressed in a comment log for each set of reviews, and will deliver the final Site Selection Evaluation Criteria Memorandum with the comment log to the PMT for approval.

The Site Selection Evaluation Criteria Memorandum will then be used to identify Potential Opportunity Sites. A future memorandum will delve into Phase II of the site selection process. As shown in Table 2, many of the Additional Screening Measures within Phase II come with benefits and tradeoffs. It is important to consider these Performance Measures as the Phase I process is completed, as many of these Phase II Additional Screening Measures will potentially affect Phase I Qualification Measures, such as site footprint.

References

1. Mt. Hood Rest Area Relocation Project *Draft Purpose and Need Statement*
2. Mt. Hood Rest Area Relocation Project *Project Charter*
3. American Association of State Highway and Transportation Officials (AASHTO) *Guide for Development of Rest Areas on Major Arterials and Freeways*
4. Oregon Department of Transportation *Highway Design Manual* (2025)
5. Oregon Department of Transportation *Analysis Procedure Manual* (2024)
6. AASHTO *A Policy on Geometric Design of Highways and Streets* (2018)
7. Oregon Department of Transportation *Oregon Highway Plan* (1999)
8. R.L.K. and Company *Timberline 2022 Master Development Plan*
9. Oregon Solutions *Government Camp Summit Rest Area Redevelopment Assessment Report* (2021)

Acronyms

AASHTO	—	American Association of State Highway and Transportation Officials
DEQ	—	Department of Environmental Quality
DSD	—	Decision Sight Distance
ECSI	—	Environmental Cleanup Site Information
FCC	—	Federal Communications Commission
HDM	—	Highway Design Manual (from ODOT)
ISD	—	Intersection Sight Distance
LWI	—	Local Wetlands Inventory
mph	—	Miles per hour
NHD	—	National Hydrography Dataset
NOAA	—	National Oceanic and Atmospheric Administration
NRCS	—	Natural Resources Conservation Service
NWI	—	National Wetlands Inventory (from the USFWS)
ODA	—	Oregon Department of Agriculture
ODF	—	Oregon Department of Forestry
ODOT	—	Oregon Department of Transportation
OHA	—	Oregon Health Authority
ORBIC	—	Oregon Biodiversity Information Center
PGE	—	Portland General Electric
PMT	—	Mt. Hood Rest Area Relocation Project Project Management Team
SHPO	—	State Historic Preservation Office
SSD	—	Stopping Sight Distance
USFS	—	United States Forest Service
USFWS	—	United States Fish and Wildlife Service
USGS	—	United States Geological Survey
UST	—	Underground Storage Tanks
WEC	—	Wasco Electric Cooperative
WES	—	Clackamas Water Environmental Services

Attachment — Turn Lane Criteria

This section documents projected traffic volumes at the site access in order to determine whether turn lanes will need to be provided based on the ODOT APM turn lane criteria.

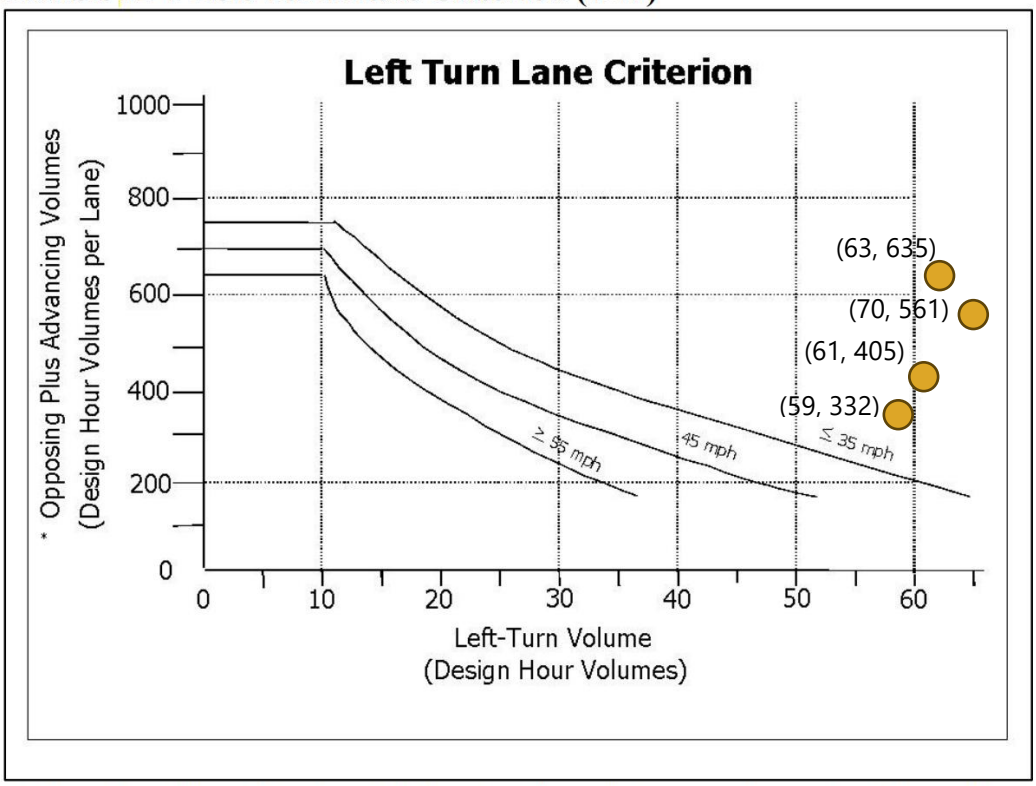
Table 3: Turn Lane Criteria Calculations

Segment	Rhododendron to Govt. Camp	Govt. Camp to OR 35	OR 35 to Warm Springs (high)	OR 35 to Warm Springs (low)	Source
Two-way design ADT	9,300	8,400	6,200	5,200	ODOT traffic counts
DHV to ADT	0.15	0.15	0.15	0.15	AASHTO Rest Area Guide, Figure 13
Design hourly volume	1,395	1,260	930	780	
% stopping	9%	11%	13%	15%	AASHTO Rest Area Guide, Figure 13
Design hourly volume, entering site	126	139	121	117	
Design hourly volume, through	1,269	1,121	809	663	
Left turn lane criterion met [1]	Yes	Yes	Yes	Yes	ODOT Analysis Procedure Manual, Exhibit 12-1
Right turn lane criterion met [1]	Yes	Yes	Yes	Yes	ODOT Analysis Procedure Manual, Exhibit 12-2

[1] Assumes one through lane in each direction and 50% of entering traffic approaching from each direction.

Figure 2: ODOT APM Left Turn Lane Criterion

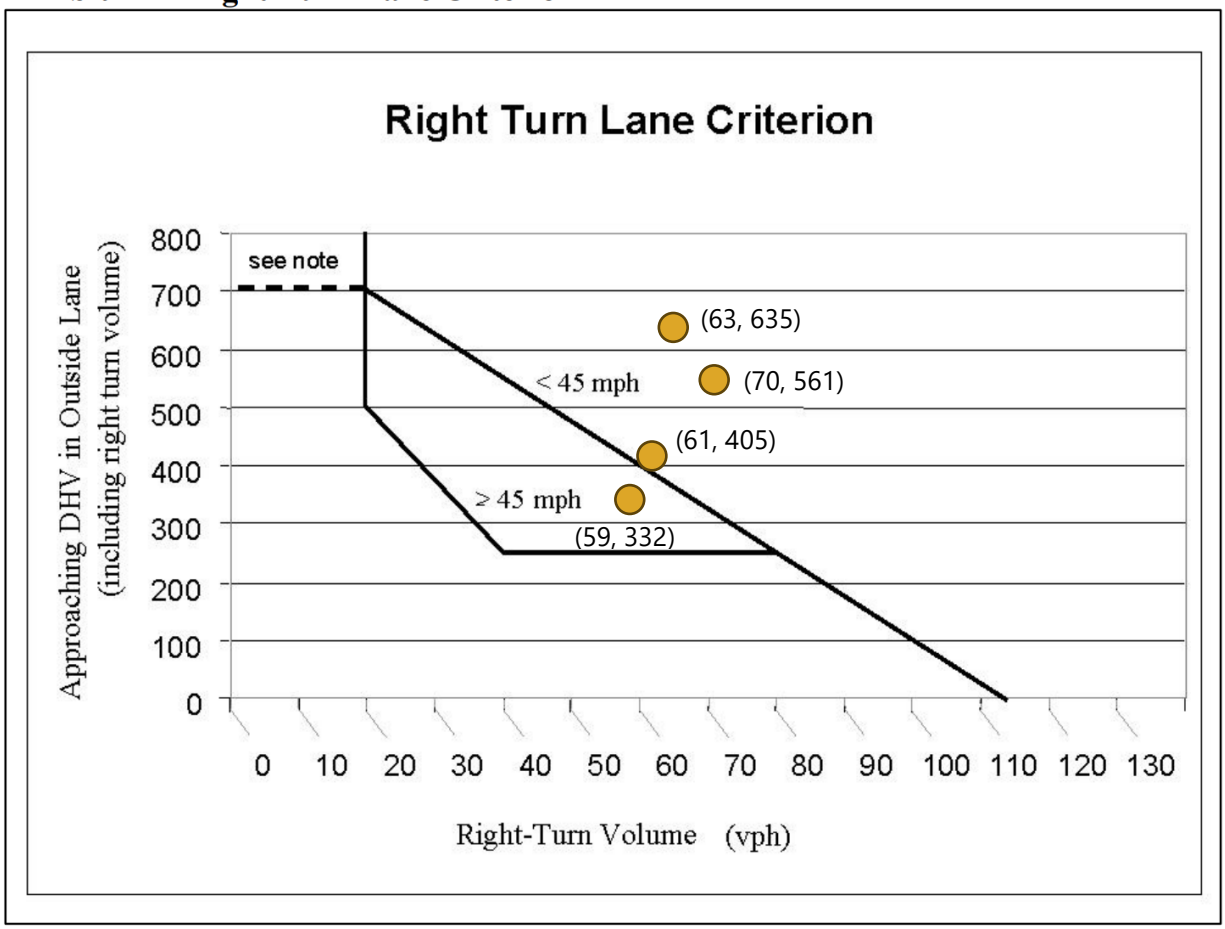
Exhibit 12-1 Left Turn Lane Criterion (TTI)



*(Advancing Volume/Number of Advancing Through Lanes) + (Opposing Volume/Number of Opposing Through Lanes)
Opposing left turns are not counted as opposing volumes

Figure 3: ODOT APM Left Turn Lane Criterion

Exhibit 12-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.