

APPENDIX K

Glossary

This appendix provides informal definitions of various technical terms used in this FEIS. Words or phrases within the definitions shown in **bold** are defined as separate entries.

303(d): Section 303(d) of the federal Clean Water Act requires each state to monitor and regulate the quality of water in its rivers and streams. If a water body does not meet a particular water quality standard, as determined by the state, that water body is “303(d) listed.” *See also* **TMDL**.

Add/drop lane: A dedicated lane between highway interchanges—from one on-ramp to the next off-ramp—that provides motorists with more time and extra room to accelerate or decelerate and merge when entering or exiting a highway. *See also* **auxiliary lanes**.

Absorption: The process by which one material is incorporated into material of a different state; for example, a dry sponge absorbs water.

Adsorption: The process by which one substance adheres to—sticks to—the surface of another. For example, in certain air filtering systems, dust and other particulate matter adsorb to the surface of the filter. When contaminated water infiltrates soil, certain contaminants will adsorb to the soil, polluting the soil and, potentially, future groundwater flows through that soil.

Aerodynamic diameter: In order to study the aerodynamic behavior of an irregular particle moving through a viscous fluid, such as air, it is convenient to treat the particle as if it were a perfect sphere with a given diameter; this assigned diameter is called the *aerodynamic diameter* of the particle. This technique is commonly used to predict where particulate matter is likely to lodge in the respiratory tract when inhaled.

Aggregate (geology): A rock-like mixture of minerals and rock fragments.

Alignment: Alignment is the street corridor that the High Capacity Transit guideway, for either bus rapid transit or light rail, would be located within.

Alternative: For the purposes of the Columbia River Crossing project, an alternative is a specific set of bridge, transit and highway solutions. Example: Supplemental Bridge with Bus Rapid Transit is an alternative that was analyzed as part of the Draft Environmental Impact Statement (EIS) process.

Amended soil: Soil to which various materials have been added to enhance the use of the soil for a particular purpose (e.g., better stormwater infiltration, nutritive value).

Anadromous: Refers to fish species that are hatched in fresh water, enter the ocean for a portion of their life cycle, then return to freshwater to spawn. Common anadromous species include but are not limited to salmon, steelhead, eulachon (smelt), and shad. *See also* **catadromous**.

Aquifer: An underground layer of water or layer of permeable material (gravel, sand, silt, some rock) that holds water, from which water can be extracted, usually by means of a well.

Aquitard: A layer of low-permeability material that retards the flow of groundwater.

Area of potential effect (APE): The study area defined for identifying and assessing historical and archaeological resources. This area may not coincide precisely with the area used to assess project impacts on other resources.

Asbestos: Asbestos was used extensively in building materials in the early and mid-20th century. It is a known carcinogen, and is extremely *friable*—that is, it crumbles easily. Demolition of buildings or other structures that contain asbestos can release small particles of asbestos into the air, and these particles in turn can lodge in the lungs of people who breathe this air. Proper caution and abatement procedures can reduce or eliminate this hazard to human health.

Attainment area: An area that meets and has consistently met a particular air quality standard for a particular pollutant. An area may be considered an attainment area for some pollutants, but a **non-attainment area** for others. *See also maintenance area.*

Auxiliary lanes: Can improve safety and reduce congestion by accommodating cars and trucks entering or exiting the highway or traveling short distances between adjacent interchanges, and reduce conflicting weaving and merging movements. This is especially important at the river crossing, where three large interchanges (Marine Drive, Hayden Island, and SR 14) all have traffic entering and exiting I-5 within a 1.5-mile segment.

Average: The average traffic condition is defined as the vehicle flow on a weekday during the average month for a given time period, usually Tuesday, Wednesday, or Thursday.

A-weighted decibel scale: A scale used to measure loudness of sound that is adjusted to the frequency response of the human ear.

Benthic zone: The ecological zone at the lowest level of a water body. The benthic zone includes surface sediment on the bed or floor of the water body, as well as some sub-surface layers.

Benthic organisms (benthos): In freshwater biology, benthic organisms are those organisms living in the water body's **benthic zone**. Types of benthic organisms found in the project area include some species of snails, shrimp, and crayfish.

Best management practice: A process or activity that is generally acknowledged to be most cost-effective at achieving a given outcome.

Biofiltration swale: A depressed area with mild slopes that treats runoff by filtration and **sorption** as runoff flows through the vegetated surface and, possibly, **amended soils**. These areas are typically dry between storm events and are typically grassed.

Bioslope: Like **filter strips**, a bioslope is a sloped area used to treat runoff from an adjacent roadway surface. Bioslopes are also known as *ecology embankments*. The percolating runoff flows through a special mixture of materials, which slows down the flow of runoff and promotes the **adsorption** of pollutants.

Bioswale: A natural or engineered **swale** with gently sloping sides that is used to remove pollutants and sediment from stormwater or other surface runoff before it infiltrates into the ground or is conveyed to another water body. The swale's horizontal slope is generally shallow to ensure that water spends as much time as possible in the swale. A bioswale generally includes vegetation, riprap, or other material that aids in the removal of sediment and pollutants.

Braided ramp: An on-/off-ramp design where an on-ramp passes over an off-ramp, or vice versa. Braided ramps separate merging and diverging traffic by creating a bridge for some traffic to cross over and other traffic to cross under. This improves safety by eliminating lane-weaving.

Bridge influence area: The 5-mile segment of I-5 stretching from State Route (SR) 500 in Vancouver to approximately Columbia Boulevard in Portland. This area is also called the project area.

Bus rapid transit (BRT): A type of high-capacity transit that uses large buses and stops less often for fast, frequent service. Buses stop at transit stations or platforms. Reliable travel times are ensured when buses operate in a lane dedicated to bus use. BRT vehicles also have the flexibility to travel in high-occupancy-vehicle lanes, expressways, or on ordinary streets.

Build alternative: A project alternative that includes construction of one or more project elements.

Catadromous: Refers to species of fish that spend most of their lives in fresh water, but that return to salt water to breed. Examples include the American eel. *See also anadromous.*

Cobbles: A geological term referring to pieces of rock between 2.5 and 10 inches in diameter; informally, rock sized between gravel and boulders.

Cofferdam: A temporary, watertight enclosure for excluding water from an area that is normally submerged.

Cofferdams are one method of isolating an area within a water body for construction or other activities.

Collector-distributor: A roadway parallel to a larger capacity roadway that is designed to remove weaving from the main line and to reduce the number of mainline entrances and exits.

Columbia River Datum (CRD): The plane of reference from which river stage is measured on the Columbia River from the lower Columbia River up to Bonneville Dam, and on the Willamette River up to Willamette Falls. Equals 1.82 feet above Mean Sea Level (equivalent to NGVD) at Vancouver, Washington.

Community and Environmental Justice Working Group (CEJG): The 15 members of CEJG come from neighborhoods in the project area and include environmental justice communities (low-income, African American, Latino), and five at-large members.

Community cohesion: Measures how well residents can connect with one another within their community. These connections can occur at gathering places such as schools, community centers, parks, or transit stations. High home ownership rates and active neighborhood associations also contribute to cohesion.

Community resources: Services and gathering places such as educational, religious, health care, cultural, recreational, and/or commercial institutions.

Congestion: Congestion occurs when the demand is greater than the transportation system's capacity. For highways, congestion occurs when the average speed along a section of highway or on a particular facility falls below a specified speed, generally below 30 mph. Recurrent congestion is caused by constant excess volume compared to capacity. Nonrecurring congestion is caused by actions such as special events and/or traffic incidents.

Consulting party: A term used to identify an entity that is involved in determinations of eligibility, findings of effect and any Memorandum during the **Section 106** process. These consulting parties include the State Historic Preservation Offices (SHPOs), federally and non-federally recognized tribes, local government, and other individuals or organizations with a demonstrated interest in the project and its effects on historic properties.

Construction staging: A staging area is a designated area where vehicles, supplies, and construction equipment are positioned for access and use to a construction site.

Constructive use: According to Section 4(f) regulations, a constructive use of a Section 4(f) resource occurs when a portion of the resource is acquired for another use (i.e., converted) or when a project action would substantially impair the activities, features, or attributes of that resource.

Cooperating agency: Any federal agency, other than a lead agency for the proposed project, that has jurisdiction by law or special expertise with respect to any environmental impact involved in the proposed project or project alternative. Upon request of the lead agency, any federal agency with jurisdiction by law shall be a cooperating agency.

Couplet: A fixed method of routing two directions of travel on two adjacent, parallel streets, instead of placing both directions of travel on a single street. For example, the high-capacity transit couplet design Broadway would place northbound transit vehicles on Broadway, and southbound transit vehicles on Washington.

Crash: A term used by traffic analysts to refer to a collision between vehicles. Crashes may be analyzed for a single location such as an intersection, for a specified section of highway, for a particular type of transportation facility (e.g., for interstate highways), or for a specified area such as a region or state. Such analyses help to identify needed safety improvements. Crashes may be analyzed in a number of ways: by frequency, by number of collisions, by number of collisions per mile or per vehicle miles traveled, by severity, and by type (rear-end, turning conflict, etc.).

Crime Prevention Through Environmental Design (CPTED): A multidisciplinary approach to reducing crime through environmental designs that influence potential offenders' behavior before they commit criminal offenses. Particular strategies include, but are not limited to, designing spaces that increase visibility and the perception that people can be seen (e.g., open spaces with overlooking windows, adequate lighting, etc.), that provide natural access control (e.g., low, thorny bushes around and below windows), and that clearly demarcate public from private spaces (e.g., fencing, structures that discourage encroachment on private spaces, etc.).

Criteria pollutants: This is a group of six common air pollutants for which the EPA has set **National Ambient Air Quality Standards (NAAQS):** ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead.

Cultural resources: A term that collectively refers to historical and archaeological resources. Cultural resources are broadly divided into the historic built environment (buildings, structures and objects), archaeological sites, and defined features or areas that are important to maintaining cultural identity.

Cumulative effect (impact): An impact from a project that is created when impacts from other past, present, and reasonably foreseeable future actions are added together. Cumulative effects can result from individually minor but collectively substantial actions that take place over a period of time.

De minimis impact: A *de minimis* impact on a parkland is defined as an impact that will not adversely affect the features, attributes or activities qualifying the property for protection under Section 4(f). A *de minimis* impact on a historic resource is defined as a determination of either “no adverse effect” or “no historic properties affected” (no effect) in compliance with Section 106 of the National Historic Preservation Act.

Decibel (dB): A measure of the energy level or sound pressure of a sound wave or signal and thus, indirectly, of the loudness of the sound as perceived by the human ear. The decibel scale of measurement is *logarithmic*: an increase in sound pressure of 10 dB is generally perceived as a sound that is approximately twice as loud. Decibels are also used to measure the intensity of vibration; in that context, decibels are referred to as VdB. *See also* **A-weighted decibel scale**.

Demand: The total number of users attempting to access the transportation system, including those caught in congestion.

Diamond interchange: A common type of interchange used where a highway crosses a minor road. The highway is grade-separated from the minor road, and off-ramps diverge gently from the main highway, intersect directly with the minor road, and beyond the minor road continue as a gently merging on-ramp. The name “diamond” is used because, seen from the air, the pattern of major highway, minor road, and associated on- and off-ramps form a rough diamond shape.

Direct effects: Effects that are caused by a project action and that occur at the same time and place as the action.

Distinct population segment (DPS): The smallest division of a species that is allowed protection under the Endangered Species Act.

Drilled shafts: Drilled shafts are a type of deep foundation used to support structures such as bridges. Drilled shafts are installed by boring deep holes that are then filled with reinforcing cage made of rebar and concrete. Drilled shafts differ from driven **piles**, which are forced into the substrate using a large hammer or pile driver.

Due diligence: Due diligence means taking appropriate precautions before a property is acquired to determine the presence or potential presence of environmental hazards associated with that property. Due diligence is important, as the purchaser of a property may be exposed to liability for environmental hazards associated with the property, liability that can adversely impact a project’s cost and budget. The laws affecting legal liability for the purchasers of contaminated property differ from state to state.

Easement: The legal right to use property belonging to another person for a stated purpose. An easement may grant the right to use the property surface, the property’s subsurface for a given depth range below the surface, or the airspace above the property surface for a given range of elevations.

Ecosystem: A portion of the physical environment that includes both biological and nonbiological elements working together as a stable system. Ecosystems can be defined to be quite small (e.g., a single wetland) or quite large (e.g., an entire forest).

Endangered species: A species (population of organisms) that is in danger of becoming extinct. Causes of endangerment can include population size, excessive predation, or loss of supporting habitat.

Environmental justice population: Refers collectively to the low-income and minority populations in a given area.

Eutrophication: An increase in the concentration of chemical nutrients in an ecosystem to a degree that the primary productivity of the ecosystem is affected. Effects of eutrophication can be beneficial to some species, but harmful to others; for example, one chemical nutrient may nourish one species, but in high concentrations may be toxic to other species. In the Pacific Northwest, for example, certain algal blooms—so-called red tides—can cause chemicals harmful to humans to accumulate in shellfish.

Evolutionarily Significant unit (ESU): A population of organisms that is considered distinct from similar organisms for purposes of conservation. In the Pacific Northwest, several species of salmonids (salmon, steelhead) are divided into ESUs for purposes of study and species management and recovery.

Express bus: Operates point-to-point service, generally during peak times, typically connecting outlying points to business cores without intermediate stops.

Filter strip: Also called strip of land between a potential source of polluted runoff, such as a highway, and a receiving water body. The filter strip is planted with vegetation that slows the runoff and aids in removing sediment or other pollutants before the runoff enters the receiving water body.

Floodplain: A flat or nearly flat area adjacent to a stream or river that is subject to periodic flooding during high stream/river flows.

Federal Transit Administration cost-effectiveness index: Measures the incremental transit cost per incremental transit passenger over the No-Build Alternative.

Flyover ramp: A ramp that crosses over (above) another ramp or portion of a highway.

Geographic information system (GIS): An electronic (computer) system that stores and displays information linked to location.

Glide: A section of river or stream with little or no turbulence.

Greenhouse gases (GHG): Greenhouse gases are gases that, when released into the atmosphere, contribute to global warming. They generally include six specific gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). NOTE that greenhouse gases are not the only air pollutants of concern; others include **ozone** and **particulate matter**, which can affect human health.

Ground-penetrating radar (GPR): A method that uses radar signals to produce images of the ground's subsurface. Like sonar in water, GPR sends radar signals into the ground, then detects signals that are reflected from beneath the ground surface. When captured and analyzed, these signals can identify features beneath the ground surface.

Guideway: A transit right-of-way separated from general purpose vehicle transit. A guideway may have train tracks or separated bus lanes.

Headway: Scheduled time between two transit vehicles passing the same point traveling in the same direction on a given route.

Hot-spot analysis: An analysis of a specific location (often an intersection) that performs or is expected to perform below one or more accepted standards, generally for traffic congestion or air pollution.

Hydrology: The flow of water in and through a given area; includes the volume of water, where it drains, and how quickly the flow rate changes in a storm.

Indirect effects: Effects that are caused by an action but that are later in time or farther removed in distance, but that are still reasonably foreseeable effects of the action. Indirect effects may include induced growth; changes in land use or population patterns; and effects on air, water, and ecosystems.

Induced growth/development: Population growth or development that results from one or more project actions. For example, building or improving a highway may result in easier access to the area, which may in turn lead to the growth of business or residential uses near the highway.

Interchange Area Management Plan (IAMP): A joint ODOT and local government long-term land use and transportation plan designed to balance and manage transportation and land use decisions in areas planned for future use as a highway interchange. An IAMP helps to ensure that local land use plans and actions are and remain compatible with the eventual use of the land for transportation purposes.

Invasive plant species: A species of plant that is not native to a region and that, over time, comes to dominate a region, displacing native species or adversely affecting their habitat. Invasive species may grow and reproduce more quickly or more effectively than native species, but their success may be due to more complex factors.

Jurisdictional waters: Waters under the jurisdiction of the U.S. Army Corps of Engineers, as granted by the federal Clean Water Act. Although specific determinations must be made, jurisdictional waters typically include waterways and their associated **wetlands**.

Lahar: A flow of volcanic material (such as rock debris and gases) and water that travels quickly and can cover great distances. Lahars typically flow downstream of a volcano within a river valley.

Landscape unit: A portion of a given landscape considered separately from the entire landscape for purposes of analysis and comparison.

Level-of-service (LOS): A qualitative measure of the effectiveness of one or more elements of transportation infrastructure. LOS is most commonly used to describe roadway performance, but can also be applied to transit, intersections, or other infrastructure elements. The American Association of State Highway and Transportation Officials defines the following levels-of-service: A= Free flow; B=Reasonably free flow; C=Stable flow; D=Approaching unstable flow; E=Unstable flow; and F=Forced or breakdown flow.

Lid: A structure over a highway that helps to maintain or improve connectivity between the two sides of a highway, that improves visual and cultural landscape connectivity, and/or that mitigates for visual impacts of new highway construction. For the CRC project, the proposed Community Connector will connect downtown Vancouver and the Vancouver National Historic Reserve.

Limited bus: Operates only during the peak period on weekdays and has a stop spacing of one-half to one mile.

Liquefaction: A phenomenon associated with earthquakes in which sandy to silty, water-saturated soils behave like fluids. As seismic waves pass through saturated soil, the structure of the soil distorts, and spaces between soil particles collapse, causing ground failure. In general, young, loose sediment and areas with high water tables are the most vulnerable to liquefaction.

Local bus: Operates throughout the day and week with frequent stop spacing.

Locally preferred alternative (LPA): The project alternative chosen by local and regional supporting agencies as the best overall alternative to meet the project's purpose and need. The FTA- and FHWA-preferred alternative is the same as the LPA. Once chosen, the LPA is advanced for further, more detailed study. Selection of the LPA does not constitute selection or approval by the project's lead agency(ies) or any commitment of funding for the project. The decision whether to construct the project and the precise alternative to be constructed are documented in the Record of Decision (ROD), after the Final EIS is approved.

Maintenance area: An area that has a history as a non-attainment area for a particular air pollutant—i.e., of failing to meet the **National Ambient Air Quality Standards (NAAQS)** for that pollutant—but is now meeting the NAAQS and that has a maintenance plan for monitoring levels of that pollutant and ensuring continued conformity to the appropriate NAAQS.

Mitigation: Actions taken to minimize or compensate for negative or undesirable effects of an action. In a project such as the CRC project, mitigation

may be required by law for unavoidable effects to the environment or to members of the public who are displaced or disadvantaged by project actions. Environmental mitigation may be done at the site of impact or, increasingly, at a different site in the general area of the project. Some forms of mitigation (notably, wetlands mitigation) may in some cases consist of contributing to a geographically separate effort to maintain, restore, or enhance a similar environmental feature.

Mitigation to impact ratio: In some cases, the project may be required to provide compensate for impacts to a greater degree than the impact itself. The ratio of required mitigation to original impact is called the mitigation to impact ratio. For example, a project that impacts 1 acre of wetland may be required to provide mitigation for 1.5, 2, or more acres of wetland.

Mobile source air toxics (MSATs): The Clean Air Act identifies 188 air toxics, of which MSATs are the subset emitted by mobile sources. Although MSATs pose potential public health concerns, there are no established regulatory limits for relevant MSAT pollutants.

Mode: A singular, well-defined method or form of transportation. The most common modes are car, truck, bus, light rail, bicycle, and pedestrian.

Mode split: The percentage travel by different forms of transportation, typically single-occupant vehicles, high-occupancy vehicles (two or more persons in a car), transit, walk, and bicycle.

Moment magnitude scale (MMS): A scale that represents the amount of energy released by an earthquake. Among seismologists, the MMS has replaced the use of the Richter scale because it measures a wider range of energies. Like the Richter scale, the MMS is a *logarithmic* scale; units are represented as M_w . An increase of 1.0 on the MMS represents roughly a 32 times increase in the amount of energy released. MMS values are similar to but not precisely equal to Richter scale values.

Multimodal: Refers to a transportation system, in whole or in part, that provides for more than one mode of transportation. For example, the project's **locally preferred alternative (LPA)** would provide for automobile, truck, light rail, bicycle, and pedestrian modes to cross the Columbia River.

Multi-use path: A path that accommodates more than one mode of travel or type of use. In this study, a multi-use path is typically a path that accommodates both bicyclists and pedestrians.

National Ambient Air Quality Standards (NAAQS):

Also referred to simply as federal standards, these are a set of standards for maximum safe concentration and exposure levels for six “criteria pollutants”: carbon monoxide, **particulate matter** (PM_{2.5} and PM₁₀), **ozone**, nitrogen dioxide, sulfur dioxide, and lead. Washington and Oregon also have **State Ambient Air Quality Standards (SAAQS)** for these pollutants.

National Register of Historic Places (National Register):

This official list of historic places worthy of preservation is part of the National Park Service’s program to coordinate and support public and private efforts to identify, evaluate, and protect America’s historic and archaeological resources as part of our national heritage. The National Register and the efforts of the National Park Service to develop and maintain the Register are authorized by the National Historic Preservation Act of 1966.

Neighborhood cohesion: Neighborhood cohesion describes the livability of a neighborhood, and more specifically, the opportunities for residents to connect to one another within the neighborhood. These connections can occur at gathering places such as schools, community centers, parks, or transit stations. High home ownership rates and active neighborhood associations also contribute to cohesion.

National Environmental Policy Act (NEPA):

Enacted in 1970, the National Environmental Policy Act requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, federal agencies prepare a detailed statement known as an Environmental Impact Statement (EIS). The U.S. Environmental Protection Agency (EPA) reviews and comments on EISs prepared by other federal agencies, maintains a national filing system for all EISs, and assures that its own actions comply with NEPA.

No-Build Alternative: The alternative under which the proposed project will *not* be built. The No-Build Alternative is carried through the NEPA process and analyzed for effects as a way to formally compare the effects of the proposed project’s build alternatives with what is likely to happen if none of these project alternatives is constructed. *Note* that “no-build” does *not* mean “do nothing.” The No-Build Alternative analysis takes into account other projects that are already planned and that are reasonably certain to be constructed.

No-Build conditions: Conditions that are predicted to occur if none of the proposed project alternatives are constructed. No-Build conditions and conditions

predicted to occur under the project’s build alternative(s) are generally compared for a specific time in the future; for the CRC project, this is the year 2030.

Non-attainment area: An area that fails to meet air quality standards for one or more pollutants. An area may be a non-attainment area for, say, **ozone**, but an **attainment area** for carbon monoxide. See also **maintenance area**.

Non-revenue hours: Hours of transit service that are unavailable to paying riders.

Noxious weeds: Noxious weeds are **invasive plant species** that have been designated by county, state or provincial, or national agricultural authorities as one that is injurious to agricultural and/or horticultural crops, natural habitats and/or ecosystems, and/or humans or livestock.

Nuisance species: Generally refers to aquatic species that threaten the diversity or abundance of native species, or that causes adverse effects to human health or use of the environment.

Ordinary high water (OHW): The highest water level that a water body has reached and maintained long enough to leave visible evidence on the landscape.

Ozone: Also known as trioxygen (with chemical formula O₃), ozone in the upper atmosphere (the ozone layer) helps prevent potentially harmful ultraviolet radiation from reaching the earth’s surface. However, in the lower atmosphere, ozone is harmful to the respiratory systems of animals and can damage certain plants.

Participating agency: Under **SAFETEA-LU** Section 6002, a “participating agency” is any federal or non-federal agency (federal, state, tribal, regional, or local government agency) that may have an interest in the project. This provides a method for agencies that do not have permitting or approval authority over any portion of the project to have a more formal role in the environmental review and comment process. Nongovernmental organizations and private entities cannot serve as participating agencies.

Particulate matter (PM): A mixture of extremely small particles and liquid droplets suspended in the air. PM components can include acids (e.g., sulfates and nitrates), organic chemicals, metals, and soil or dust particles. PM is classified according to particle size (see **aerodynamic diameter**): PM_{2.5} consists of particles 2.5 μm (micrometers, or 1x10⁻⁶ meter) or less in diameter; PM₁₀ consists of particles 10 μm or less in diameter. PM is one of the EPA’s six **criteria pollutants**, that is, pollutants for which the EPA has

established threshold levels for impacts to human health and/or the environment.

Peak oil: Peak oil refers to the time frame in which the maximum global petroleum production rate is reached, after which the rate of production enters a terminal decline. Peak oil and its relevance to the CRC project is discussed in the Cumulative Impacts section of this FEIS.

Peak period: Informally known as “rush hour,” this term refers to the time of the day when traffic volumes in an urban area are greatest and when travel patterns generate the most traffic, especially in a certain direction. The a.m. peak is from 6 to 10 a.m. The p.m. peak is from 3 to 7 p.m.

Performance standards: Local traffic impacts are measured by impacts to intersection LOS, delay, and queuing. WSDOT, ODOT, the City of Vancouver, and the City of Portland all have definable standards for intersections. Further description of these standards can be found in the Traffic Technical Report.

Piles: Large-diameter steel pipes hammered or drilled into the soil until they reach dense soil or bedrock. The piles provide support to hold the weight of the bridge and traffic. Piles also provide stability in the event of an earthquake.

Platform hours: Elapsed time from when a transit bus or train pulls out of a garage into service to when it returns to the garage after completing its service.

Pleistocene age: One of the earth’s “ice ages” during which ice and glaciers advanced and retreated over a significant portion of the earth’s surface. The Pleistocene age extended from approximately 1.6 million to approximately 11,000 years BP (before present).

Pollutant-generating impervious surface (PGIS): These are surfaces that do not absorb water and to which contaminants may adhere, so that when stormwater strikes the surface, it runs off to a nearby surface, carrying some of these contaminants with it. If the water runs off to soil, these contaminants can enter the soil, causing harmful effects. In addition, PGIS are often warmer than the surrounding surfaces, and runoff from these surfaces that enters nearby rivers or lakes can raise water temperatures, causing harmful effects. Examples of PGIS include highways, parking lots, and sidewalks. For example, brake pad wear from highway traffic can deposit copper, known to have harmful effects on fish, on the road surface.

Pool: A deep, slow moving portion of a stream or river, with a smooth water surface.

Pre-contact: Refers to the time before interactions between Native American peoples and Euro-American settlers, for this FEIS, in the Pacific Northwest.

Pre-stressed (concrete): Pre-stressed concrete is reinforced with steel bars or strands. These steel bars or strands are stretched before concrete is poured around them (pretensioned) to form structural elements. When the concrete has been poured and allowed to cure, the bars or strands are cut (detensioned). As the steel members attempt to return to their original, untensioned length, they bond with the concrete, increasing the load-carrying capacity of the entire structural element.

Precast (concrete): A concrete structure that is cast into shape before being moved into place as a complete unit or as part of a larger structure.

Prudent and feasible alternatives: For Section 4(f) compliance, the U.S. Supreme Court has stated that a historic site may be used for transportation purposes only if “there [are] truly unusual factors present in [the] case,” if “feasible alternative routes involve uniquely difficult problems,” or if “the cost or community disruption resulting from alternative routes” would be of “extraordinary magnitude.” A “feasible alternative” is one that can be accomplished as a matter of sound engineering. “Prudent” carries the typical meaning here.

Purpose and Need: A formal statement of the objective(s) of the proposed project (Purpose) and the problem(s) that construction of the project is intended to solve (Need). The Purpose and Need Statement is developed early in the project planning stage, and serves as a guideline for future project efforts. For example, in evaluating alternatives, any alternative that does not meet the project’s purpose and need will be dropped from consideration.

Queuing: A line of waiting vehicles. Examples of common locations for queues to form include at a ramp meter, a traffic signal, or waiting to turn from a left turn lane.

Ramp meter: A signaling device at a highway on-ramp, usually a red-green stoplight, that regulates the flow of traffic entering the highway. The signaling device is connected to a traffic sensor that registers the volume of traffic on the highway and adjusts the signal timing to allow smooth entry and merging of vehicles onto the highway.

Recognized Environmental Condition (REC): Defined by ASTM E-1527 as “...the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat

of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater or surface water of the property.”

Record of Decision (ROD): For the FHWA and FTA, this is a formal, public document issued by the regulating agency(ies) that constitutes federal approval of an environmental impact statement or environmental assessment for a proposed highway and/or transit project under NEPA. The ROD is the document that authorizes the relevant state transportation department(s), local jurisdiction(s), and/or transit agency(ies) to proceed with the design, property (i.e., right-of-way) acquisition, and construction, and transit operation (if applicable) of the project, based on the availability of funding.

Reliability: When referring to transportation or transit, the ability of users to predict the travel times required for particular trips.

Revenue hours: Hours of transit service available for carrying paying riders.

Riffle: A shallow, fast-moving stream section with water broken by rocks and boulders.

Riparian: The word *riparian* (from the Latin *ripa*, meaning river bank) refers to the interface between a stream or river and the adjoining land. A *riparian zone* or *riparian area* refers to the land immediately adjacent to the river. *Riparian habitat* provides important ecological functions for water, plants, and animals. A *riparian corridor* is a connected strip of riparian habitat; riparian corridors may be defined in terms of width for purposes of ecological assessment, regulation, and permitting.

River mile (RM): The measure, in miles, of the distance from the mouth of a river or stream, following the course of the river or stream. The mouth of the river or stream is RM 0.

Rotosonic drilling: A method of drilling that uses a combination of rotary power, hydraulic pressure, and mechanical oscillations to advance a dual line of pipe (an inner pipe and an outer pipe) for the purpose of collecting core samples. This method is versatile and reliable, and allows collection of undisturbed continuous soil samples that are difficult to collect with other rotary drilling methods.

SAFETEA-LU: The Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, signed into law in 2005, provided guaranteed funding for highways, highway safety, and public transportation totaling \$244.1 billion.

Safety Priority Index System (SPIS): A method used by the Oregon Department of Transportation (ODOT) to identify highway locations that are especially prone to accidents (crashes). SPIS factors in the crash frequency, crash rate, and crash severity over a given time period (generally 3 years) to assign a numerical score that serves as a way to rank sites (locations or highway segments) in terms of their accident risk.

Section 106: Section 106 of the National Historic Preservation Act of 1966 requires that federal agencies consider the effects of their undertakings on historic resources. This includes identifying any such resources—historic properties, buildings, structures, etc.—that could be affected by the project, assessing the possible adverse effects of the project on these resources, and finding ways to avoid, minimize, or mitigate these adverse effects.

Section 4(f): Section 4(f) of the U.S. Department of Transportation Act (49 USC 303) concerns transportation projects that would use or impact any significant public park, recreation area, wildlife or waterfowl refuge, or historic site. Section 4(f) applies to impacts caused by programs and policies undertaken by the USDOT.

Section 6(f): Section 6(f) of the Land and Water Conservation Fund Act is similar to Section 4(f) but concerns only those parks and recreational facilities that have received funding through this act. While Section 4(f) applies only to USDOT actions, Section 6(f) applies to impacts caused by programs and policies of any federal agency.

Sensitive species: A species that can survive only within a specific, narrow range of environmental conditions; the decline or disappearance of a sensitive species may signal increases in pollution or other environmental changes within that habitat. Sensitive species and/or their habitat may be especially sensitive to development.

Single-point urban interchange (SPUI): Also called a single-point diamond interchange, this type of highway interchange is similar to a **diamond interchange**, but allows left turns to proceed simultaneously by compressing the two “diamond” intersections into a single intersection over or under the free-flowing road. The term “single-point” refers to the fact that all through traffic on the minor road and left-turning traffic is to be controlled by a single set of traffic signals.

Signal priority: For this project, signal priority refers to a scheme of traffic signal timing that adjusts red and green lights to give preference to transit vehicles such as

buses or light rail trains and to provide preferential green lights for emergency response vehicles.

Soil-amended filter strip: Intended to treat sheet runoff from an adjacent roadway surface. Similar to grass swales, filter strips treat runoff by filtration and sorption as runoff flows through the vegetated surface and amended soils.

Sole source aquifer: An underground water supply designated by EPA as the sole or principal source of drinking water for an area.

Sorption: This term refers generally to the processes of **absorption** and **adsorption**, generally as occurring together. For example, when polluted stormwater runoff infiltrates into the ground, pollutants can adsorb to (i.e., stick to) soil, while the water is absorbed by the soil.

Species of Concern: An informal term referring to species that are considered at risk by agencies concerned with their conservation or survival.

Stacked transit/highway bridge design: A bridge design that places highway traffic on one deck of the bridge and transit traffic on another deck of the bridge; for the CRC project, the traffic deck would be the upper deck, and the transit deck would be the lower deck.

Staging: *See* construction staging.

State Ambient Air Quality Standards (SAAQS): These are standards, similar to the **National Ambient Air Quality Standards (NAAQS)**, that set maximum safe concentration and exposure levels for six “criteria pollutants”: carbon monoxide, **particulate matter** (PM_{2.5} and PM₁₀), **ozone**, nitrogen dioxide, sulfur dioxide, and lead. SAAQS may also set standards for other pollutants that are not currently addressed by NAAQS.

Stormwater: Flowing surface water that results from precipitation events (i.e., rain, snow) or from snowmelt. Stormwater management is a concern of transportation projects and of municipal water systems, as untreated stormwater that flows off of highways, parking lots, or other impervious surfaces can carry pollutants into soils or groundwater.

Stormwater infiltration: The process by which stormwater sinks into the soil, becoming groundwater that, in turn, feeds rivers and streams, lakes, and underground water sources such as **aquifers**.

Swale: A low tract marshy or moist land; a shallow, narrow trough-like depression that carries stormwater runoff or snow melt.

Tactile pavers: Textured surfaces placed at crosswalks and other locations to provide a safety warning to visually impaired persons using the intersection or facility.

Tephra: Fragmented material produced by a volcanic eruption.

Threatened species: Any species that is vulnerable to extinction in the near future.

Throughput: The number of users being served at any time by the transportation system.

Total maximum daily load (TMDL): Under the U.S. Clean Water Act, the maximum amount of a given pollutant that a body of water can receive and still meet published water quality standards.

Tolling: The practice of charging a fee for use of a transportation facility such as a highway. There are several types of tolling: charging a fixed fee; charging a variable fee based on the type of vehicle, time of day, or volume of traffic; tolling a section of highway; and so-called *cordon* pricing which charges a fee to enter a particular area such as a metropolitan area. Tolling is generally used to help meet the cost of constructing or operating the facility, but also as a **transportation demand management** tool.

Transect: A path along which one records and counts occurrences of the phenomena of study (e.g., plants noting each instance). It requires an observer to move along a fixed path and to count occurrences along the path and, at the same time, obtain the distance of the object from the path.

Transfers: Funds from local or regional sources are transfers, meaning money spent on the project that would otherwise be spent by residents and businesses on other economic activities within the region.

Transit-oriented development (TOD): Urban development that is designed to provide access to and encourage the use of public transit such as buses or light rail trains.

Transportation demand management (TDM): Measures that seek to reduce the number of vehicles using the road system, especially single-occupancy vehicles, while providing alternative options to auto travel.

Transportation system management (TSM): Measures that attempt to improve the efficiency of existing roadways. These include a variety of techniques

focused on keeping drivers informed and moving as safely, efficiently, and reliably as possible.

Travelshed: The area that includes all typical trip origins and destinations for traffic in and through a given area or segment of roadway. Similar to the concept of a visual **viewshed**, but applied to trip origins and destinations.

Troutdale Aquifer: An **aquifer** that underlies a portion of the city of Vancouver and Clark County, Washington. The Troutdale Aquifer is a critical water resource for this area, and according to EPA, provides approximately 99% of the available drinking water to people in this area. This resource has been designated by the EPA as a **sole source aquifer** for Clark County. Considered as a geologic feature, this is referred to as the *Troutdale Formation*.

Turn pocket: A short lane that provides space for turning vehicles to leave the main flow of traffic. Turn pockets increase throughput of the main traffic lanes, and reduce the likelihood of rear-end crashes.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) (Uniform Act): This act provides protections and assistance for people whose real property is acquired or who must move as a result of projects receiving federal funds. The act requires that such people be treated fairly and equitably, and that they receive assistance in moving from the property they occupy.

Units for electric and magnetic fields: Voltage is like the “electrical pressure” in an electrical line. It is measured in volts (V) or kilovolts (kV). This pressure produces an electrical field that extends out from the line and is measured in volts per meter (V/m). Current in an active electrical line also produces a magnetic field around the line. Magnetic fields are measured in units of gauss (G). Since most magnetic field exposures involve very low levels, they are typically measured in milligauss (mG or 1/1,000th of a gauss). Electrical systems can be either direct current (DC) or alternating current (AC). The electricity in wall sockets and power lines is alternating current. Direct current powers the MAX light rail system in Portland. The frequency of alternating current is measured in Hertz (Hz).

Vehicle hours of delay: Cumulative delay experienced by transit vehicles during high traffic periods.

Vehicle miles traveled (VMT): The total number of miles that residential vehicles are driven in a specified period of time for a given area or transportation facility.

Viewer sensitivity: Viewer sensitivity considers the combined effect of the activities a viewer is engaged in, the visual context, and the values, expectations, and interests of the viewer.

Viewshed: The portion of the landscape that can be seen from within the project area and that has views of the project area. The boundaries of a viewshed are determined by the surrounding topography, vegetation, and built environment.

Visual quality: The subjective value of a viewer’s visual experience of the landscape from a specific viewing point or area. Visual quality is composed of *vividness* – the memorability or distinctiveness of the landscape, *unity* – the degree to which the landscape is a harmonious mix of elements, and *intactness* – the degree to which the landscape is free of eyesores or elements that do not fit with the overall landscape.

Volatile organic compound (VOC): Organic (i.e., carbon-based) compounds that are easily volatilized and that can affect human health and/or the environment.

Volume/capacity (V/C) ratio: The ratio of the traffic *demand* at a given intersection – that is, the number of vehicles attempting to pass through the intersection in an hour, under prevailing conditions – to the number of vehicles that can actually pass through that intersection in an hour. With a V/C ratio of < 0.85, vehicles can generally pass through the intersection without significant delays or queues. But as the V/C ratio nears 1.0, traffic flow slows, and with a V/C ratio > 1.0, traffic flow becomes unstable and vehicles can expect to wait at least one signal cycle to pass through the intersection.

Water column: A conceptual column of water from the surface to the bottom of the water body. This concept is useful in analyzing the thermal or chemical strata and mixing in a water body.

Water quality: Refers to the characteristics of the water—for example, its temperature and oxygen levels, how clear it is, and whether it contains pollutants.

Waters of the State/U.S.: These are waters which are protected under the Clean Water Act and by state statute. They generally include all waters that are used or have been used for commerce, as well as associated waters such as adjacent wetlands or impounded waters. Any project activities that would impact such waters require permitting by the appropriate agency(ies).

Watershed: An area of land from which all water under or on that area drains to the same place, generally the same water body. Watersheds vary in shape and size as

determined by topography and geology, and can cross county, state, or even national boundaries.

Wetland: An area of land whose soil is either permanently or seasonally flooded or saturated with moisture. Wetlands include such areas as marshes, bogs, and swamps, and provide important ecological functions such as groundwater recharge.

Wetland buffer: An area adjacent to a wetland that can reduce adverse impacts to the wetland's ecological functions and values from development or construction activities. Wetland buffers can also provide support functions for species that live in and around wetlands, and reduce the impacts of human disturbance on the wetland.

Wildlife corridor: An area of habitat that connects wildlife populations separated by human activities or structures.