

Exhibit B to Metro Council Resolution No. 18-4938

Statement of Findings of Fact and Conclusions of Law

Southwest Corridor MAX Light Rail Project

December 13, 2018

1. Introduction

1.1 Nature of the Metro Council's Action

This action adopts a Land Use Final Order (LUFO) for the Southwest Corridor MAX Light Rail Project (“Southwest Corridor Project” or “Project”). The action is taken pursuant to Oregon Laws 2017, Chapter 714 (referred to herein as “House Bill 3202” or “the Act”), which directs the Metro Council (Council) to issue a LUFO establishing the light rail route, stations, park-and-ride lots and maintenance facilities, and any highway improvements for the Project, including their locations.¹

1.2 Relation of Council's Order to Requirements of the National Environmental Policy Act of 1969

Metro Council's adoption of a LUFO for the Project fulfills a requirement of state law only. This 2018 LUFO is adopted solely to implement the provisions in House Bill (HB) 3202 authorizing the Council to make land use decisions on the light rail route, stations, lots and maintenance facilities and the highway improvements for the Project, including their locations. Neither the National Environmental Policy Act of 1969 (NEPA) nor any other federal law requires the Council to take such action.

1.3 Requirements of House Bill 3202

Section 7(2)(a) of HB 3202 requires the Council to “adopt a land use final order establishing the project improvements, including their locations” for the Project. Section 1(15) of the Act defines “project improvements” to mean “the light rail route, stations, lots and maintenance facilities and the highway improvements related to the project as described in the Locally Preferred Alternative Report, as may be amended from time to time by a Draft Statement, Final Statement, Full Funding Grant Agreement or similar document for the Southwest Corridor MAX Light Rail Project.” Section 1(11) defines “locations” as “the boundaries within which the project improvements will be located.”

Section 4(1) of the Act directs the Land Conservation and Development Commission (LCDC) to establish criteria to be used by the Council to make decisions in a LUFO on the Project improvements, including their locations. Section 7(2)(b) directs the Council to “include with the land use final order a statement of findings demonstrating how the

¹ Section 1(14) of House Bill (HB) 3202 defines the “Project” as “the portion of the Southwest Corridor MAX Light Rail Project within Metro’s urban growth boundary.” The Project includes “[a]ll project improvements described in the Locally Preferred Alternative Report, as may be amended from time to time by a Draft Statement, Final Statement, Full Funding Grant Agreement or similar document for the Southwest Corridor MAX Light Rail Project”, and “[a]ll phases and extensions of the Southwest Corridor MAX Light Rail Project as described in a Locally Preferred Alternative Report, Draft Statement, Final Statement, Full Funding Grant Agreement or similar document.”

decisions on the project improvements, including their locations, comply with” LCDC’s adopted land use criteria for the Project. LCDC adopted its criteria for the Project on November 2, 2017.² *These findings serve to demonstrate compliance with LCDC’s criteria for the project improvements and locations selected by the Council.*

Section 3(1) of the Act provides that the procedures and requirements provided for in sections 1 to 12 of HB 3202 “expressly preempt any vote requirements imposed by the charter of a local government and are the only land use procedures and requirements to which land use decisions and land use approvals of any kind related to the construction and operation of the project shall be subject.” Consequently, these findings focus on the matters identified in HB 3202 as land use actions being taken at this time.

The Council finds that HB 3202 is modeled on Senate Bill 573 (Oregon Laws 1991, Chapter 3) and House Bill 3478 (Oregon Laws 1996, Special Session, Chapter 12), which established the land use final order decision-making processes for the Westside and South/North light rail projects respectively. Similar to findings in those Acts, Section 2(1) of HB 3202 provides:

- (1) The Legislative Assembly finds that there is a compelling state interest in obtaining maximum federal funding for the Southwest Corridor MAX Light Rail Project in order to:
 - (a) Enhance the statewide transportation network;
 - (b) Ensure the viability of the transportation system planned for the Portland metropolitan area;
 - (c) Complete construct of the project in a timely and cost-effective manner;
 - (d) Implement a significant portion of the Legislative Assembly’s air quality and energy strategies for the area; and
 - (e) Ensure that affected local governments will be able to implement significant parts of their comprehensive plans.

The Council finds that under Section 2(4) of the Act, the Legislative Assembly deems the procedures and requirements in Sections 1 to 12 of the Act “to be the equivalent in spirit and substance to the land use procedures that otherwise would be applicable. It further finds that under Section 2(5), “Sections 1 to 12 of this 2017 Act shall be liberally construed” to address the findings enumerated in Section 2(1) of the Act.

Finally, the Council finds that HB 3202 authorizes the Council to make land use decisions only with respect to the project improvements and their locations. See Section 6(3). The effect of these decisions is to permit such improvements to be constructed within the location boundaries established in the LUFO. The LUFO does not decide or address the design of these improvements, nor does it decide which mitigation will be provided. Design and mitigation issues are addressed through the federal NEPA process and in local permitting proceedings pursuant to Section 8 of the Act.

² LCDC Order 001887.

2. Establishment of the Light Rail Route, Stations, Lots and Maintenance Facilities, and Highway Improvements for the Project, Including Their Locations.

2.1 Introduction

In accordance with Section 7(2)(a) of HB 3202, the Council has adopted a LUFO establishing the project improvements for the Project, including their locations. The Council finds that its selected light rail route, stations, lots and highway improvements, including their locations, are identical to those for which TriMet requested Council approval in its “TriMet Application for Southwest Corridor Project Land Use Final Order”, dated October 10, 2018 and incorporated herein by this reference. These facilities and improvements are described textually and illustrated on maps in the Council’s adopted LUFO.

For purposes of the LUFO and these findings, the Project is divided into three segments: Inner Southwest Portland, Outer Southwest Portland, and Tigard/Tualatin. **Inner Southwest Portland** extends from the existing light rail station at SW 5th Avenue and SW Jackson Street in downtown Portland to north of the intersection of SW Barbur Boulevard and SW Brier Place. **Outer Southwest Portland** extends from north of the intersection of SW Barbur Boulevard and SW Brier Place to a location south of SW Pacific Highway (99W) and east of SW 68th Parkway. **Tigard/Tualatin** extends from the location south of SW Pacific Highway (99W) and east of SW 68th Parkway to Bridgeport Village.

The selected route and associated light rail facilities and highway improvements are summarized below. More detailed descriptions are provided on a segment-by-segment basis later in these findings.

2.2 Selected Project Improvements

Inner Southwest Portland Segment

- Barbur alignment
- 2 Light Rail Stations along SW Barbur Boulevard: in the vicinity of SW Gibbs Street, and in the vicinity of SW Hamilton Street
- Highway improvements within and along SW Barbur and north of Interstate 405 and connecting Marquam Hill to the SW Gibbs Street Station.

Outer Southwest Portland Segment

- Barbur alignment
- 5 Light Rail Stations along SW Barbur Boulevard: in the vicinity of SW Custer Street; in the vicinity of SW 19th Avenue; in the vicinity of SW 30th Avenue; in the vicinity of the Barbur Transit Center; and in the vicinity of SW 53rd Avenue
- 2 Park-and-Ride Lots: in the vicinity of the Barbur Transit Center and in the vicinity of SW 53rd Avenue Station

- Highway improvements within and along SW Barbur Boulevard, in the vicinity of SW Capitol Highway, and on SW 53rd Avenue between SW Barbur Boulevard and the Portland Community College campus

Tigard/Tualatin Segment

- SW 70th/SW Elmhurst/Union Pacific-Portland and Western Railroad/I-5 alignment
- 6 Light Rail Stations: in the vicinity of SW 68th Avenue; in the vicinity of SW Elmhurst Street; in the vicinity of SW Hall Boulevard; in the vicinity of SW Bonita Road; in the vicinity of SW Upper Boones Ferry Road; and in the vicinity of Bridgeport Village.
- 5 Park-and-Ride Lots: in the vicinity of SW 68th Avenue; in the vicinity of the SW Hall Boulevard; in the vicinity of SW Bonita Road; in the vicinity of SW Upper Boones Ferry Road/SW Carmen Drive; and in the vicinity of Bridgeport Village
- Operation and Maintenance Facility in vicinity of the SW Hall Boulevard Station and Park-and-Ride
- Highway improvements along SW 70th Avenue and on SW Hall Boulevard

2.3 Definitions

HB 3202 requires the Council to adopt the “light rail route”, “stations, lots and maintenance facilities” and “highway improvements” for the Project. Consistent with the Act, the Council interprets these terms to have the following meanings:

“Light rail route” means the light rail alignment within which the light rail tracks will be located. The light rail route will be located on land to be owned by or under the control of TriMet. Overhead wires and support poles are included within the light rail alignment. Train controls and signals, including signal management structures, and traffic signals and crossing protection are included within or in close proximity to the alignment.

“Stations, lots and maintenance facilities” means the light rail stations, light rail park-and-ride lots and light rail vehicle maintenance facilities selected for the Project. **Stations** will be located along the light rail route on land to be owned or controlled by TriMet for purposes of accessing or serving the light rail system. Stations include light rail station platforms up to about 200 feet long; kiss-and-ride areas; bus transfer platforms and transit centers; vendor facilities; and transit operations rooms. Ancillary facilities include shelters, seating areas, lighting, signage, fare collection equipment, bicycle parking, and improvements to access station platforms, such as sidewalks, pedestrian crossings and bicycle lanes. **Lots** are those parking structures or surface parking lots that are associated with a station, owned by or under the operating control of either TriMet or another entity with the concurrence of TriMet, and intended primarily for use by persons riding transit or carpooling. Parking structures may include some retail or office spaces in association with the primary use. Lots include pedestrian connections to stations. **Maintenance facilities** means those facilities to be located on land to be owned or controlled by TriMet for purposes of operating, servicing, repairing or maintaining the light rail transit system, including but not limited to light rail vehicles; service, repair and maintenance shops and equipment; wash bays; office facilities;

locker rooms; control and communications rooms; employee and visitor parking lots; on-site stormwater management facilities; and storage areas for materials and equipment and non-revenue vehicles.

“Highway improvements” include improvements to the highway, street and other ancillary facilities for the Project and improvements related to construction or operation of the Project. Ancillary facilities include retaining walls, bridges, signals, electrical equipment, lighting equipment, staging areas, facilities for bus or rail travel, stormwater facilities, wetland mitigation facilities and facilities designed for vehicle, pedestrian and bicycle traffic.

The Council finds that ancillary facilities generally are required (1) to ensure the safe and proper functioning and operation of the light rail system; (2) to provide project access; (3) to improve traffic flow, circulation or safety in the vicinity of the Project; or (4) to mitigate adverse impacts caused to the adjoining roadway network resulting from the alignment, stations, lots or maintenance facilities.

Overall, the Council finds that only a small number of identified “highway improvements” have independent utility apart from the light rail alignment, stations, lots and maintenance facilities. These include, for example, pedestrian access to Marquam Hill (Oregon Health Sciences University) and a shuttle service to Portland Community College Sylvania Campus. The remainder fall within the definition of “ancillary facilities” – they are necessary to serve one of the four purposes listed above. While the general locations of some of these ancillary facilities is known at this time, for many others it is not. For instance, the locations of staging areas, signals, electrical and lighting equipment, and stormwater and wetland mitigation facilities has not been determined as of the date of this decision. Those determinations must await more detailed environmental or engineering analysis and decision-making through the final NEPA and local government permitting processes.

The Council further finds that approval of many of the ancillary facilities does not require land use decision-making. It finds that LCDC’s Order 001887 expressly recognizes this, noting that many of the items listed in the definition of “ancillary facilities” could be designed and constructed without a land use action by the local government. Hence, LCDC’s Criterion 13, addressing the scope of the LUFO and its supporting findings, requires the Council only to identify the major elements of the Project Improvements, adding that the LUFO need not identify all of the ancillary facilities as defined in HB 3202. LCDC’s findings under Criterion 13 conclude: “The intent of HB 3202 is to provide a regional process for the land use decision on the overall alignment, not to apply land use decision making processes to minor elements that would not otherwise require land use approval.” Minor elements would include, but are not limited to, vehicular, pedestrian and bicycle traffic improvements within existing rights of way and electrical and lighting equipment necessary to operate light rail.

3. Southwest Corridor Project Land Use Final Order Criteria

On November 2, 2017, pursuant to Section 4 of HB 3202, LCDC issued Order 001887 establishing 13 criteria to be used by the Council in making land use decisions establishing or amending the light rail route, stations, lots and maintenance facilities, and the highway improvements related to the Project, including their locations.³ The approved criteria include two procedural, seven substantive and two alignment-specific standards, as well as one criterion addressing future phases or extensions and a criterion addressing the scope of the LUFO and its findings. The criteria are set out as follows:

3.1 Procedural Criteria

- (1) Coordinate with and provide an opportunity for TriMet, the Oregon Department of Transportation and the affected local governments to submit testimony on the light rail route, light rail stations, park-and-ride lots and vehicle maintenance facilities, and the highway improvements, including their locations, proposed to be included in the Southwest Corridor MAX Light Rail Project (Project).
- (2) Hold a public hearing to provide an opportunity for the public to submit testimony on the light rail and highway improvements, including their locations, proposed to be included in the Project.

3.2 Substantive Criteria

- (3) Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial districts, industrial districts, and mixed-use centers. Identify measures that could increase beneficial impacts or reduce adverse impacts, and that could be imposed as conditions of approval during processes required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (NEPA), or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.
 - (A) Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing
 - (1) the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;
 - (2) the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and

³ The definitions in Section 1 of HB 3202 apply within these criteria.

- (3) the need to protect affected neighborhoods, districts, and centers from identified adverse impacts.
- (B) Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.
- (4) Identify adverse noise impacts and identify measures to reduce noise impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.
- (5) Identify Project improvements in areas subject to natural hazards (including landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain) and demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques that could be imposed during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.
- (6) Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland, and park and recreational areas that are protected in acknowledged local comprehensive plans or functional plans and, where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.
- (7) Identify adverse impacts associated with stormwater runoff and demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.
- (8) Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans and, where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.
- (9) Identify general or anticipated impacts on air pollution, greenhouse gas emissions, and energy usage from project improvements that would help meet state, regional and local reduction goals.

3.3 Alignment-Specific Criteria

- (10) Consider a light rail route connecting Portland's Central City with Southwest Portland neighborhoods along or near the Barbur Boulevard corridor.
- (11) Consider a light rail route in Tualatin within an area identified as a Transit Ready Place, and in Tigard within an area identified in Tigard's High Capacity Transit Land Use Plan that maintains downtown Tigard as the city's primary transit center for rail and bus, and that does not cause light rail related park-and-ride activity to dominate the downtown area.

3.4 Criterion Applicable to Future Phases or Extensions

- (12) If future phases or extensions are proposed, then consider light rail routes as identified in applicable plans and policies of affected local governments in effect at that time.

3.5 Criterion Addressing the Scope of the LUFO and LUFO Findings

- (13) Identify the major elements of the Project Improvements; however, the Land Use Final Order and findings addressing these criteria need not identify all of the ancillary facilities as defined in House Bill 3202 enacted by the Oregon State Legislature in 2017.

4. Implementation of a Land Use Final Order

4.1 Overview of Process for Selecting Mitigation Measures

LCDC Criteria 3 through 9 require the Council to identify (1) specified impacts (*e.g.*, impacts to residential neighborhoods and natural resources) that would result as a consequence of its decisions, and (2) "measures" to reduce those impacts that potentially could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local jurisdiction permitting processes. Consideration of appropriate measures is consistent with local comprehensive plan policies and land use regulations which recognize that development can have adverse impacts on persons and property and which seek to reduce those impacts to the extent reasonable and permitted by law.⁴

The Council's decisions establishing the light rail route, stations, lots and maintenance facilities, and the highway improvements for the Project, including their locations, are not the final steps in the process culminating with completion of construction of the Southwest Corridor MAX Light Rail Project. Subsequent to LUFO adoption, a Final Environmental Impact Statement (FEIS) will be prepared by Metro, TriMet and the Federal Transit Administration (FTA). As part of that process, mitigation plans will be developed addressing mitigation of adverse impacts associated with the selected rail and highway improvements for the Project. In each case, following publication of the FEIS, issuance of a Record of Decision by FTA and the signing of a Full Funding Grant Agreement with FTA, the Final Design phase will begin. During Final Design, all necessary federal and state permits for project construction are obtained.

Also during Final Design, the siting of light rail and highway improvements is subject to local permitting processes. Section 8(1)(b) of House Bill 3202 directs the state, Metro, all affected local governments and any affected special districts and political subdivisions to "issue the appropriate development approval, permit, license, certificate or other approval necessary for the construction of the project or project improvements to implement a land use final order as necessary to avoid significantly delaying the completion or implementation of the project." Section 8(1)(b) further allows these affected local governments to attach approval conditions to their development approvals permits, licenses, certificates or other approvals. However, such conditions must be "reasonable and necessary" and "may not, by themselves or cumulatively, prevent implementation of a land use final order."

Section 8(2) of HB 3202 explains what these limitations mean. It states that for the purposes of Section 8(1)(b), an approval condition is not reasonable or necessary, or is considered to prevent implementation of a LUFO, if the approval condition applies to a measure, improvement or development that: (1) is not included in the scope of the Project in the Full Funding Grant Agreement; (2) does not qualify for federal New Starts funding pursuant to

⁴Section 1(12) of HB 3202 defines "measures" to include "any mitigation measures, design features or other amenities or improvements associated with the project."

49 U.S.C. Section 5390; (3) is not physically or functionally necessary for the Project; or (4) is determined by the Steering Committee established under Section 6 of the Act (a) to be infeasible using federal, state and local funds within the Project budget; (b) to significantly delay the completion or otherwise prevent the timely implementation of the Project; or (c) to have a significant negative impact on the operations of the Project.

Section 8(2)(b) of the Act further authorizes TriMet to pursue any remedy available in law or equity where a needed land use approval is delayed, causing significant delay of the completion or implementation of the Project, provided TriMet first provides written notice to the affected local government. Section 8(3) authorizes TriMet to file a writ of mandamus where a permitting entity fails to take final action on an application for development approval as required under Section 8(1)(b).

In summary, Criteria 3 through 9 require the Council to identify measures that potentially "could be imposed" later on in the process as part of an approved mitigation plan under NEPA or through local permitting (if reasonable and necessary). However, the actual determination and imposition of appropriate measures occurs only through these latter federal or local processes, not through this action by the Council. The Council finds this approach to be reasonable and appropriate, particularly given that the LUFO is based on conceptual engineering plans rather than more detailed preliminary or final engineering plans. Through preliminary and final engineering, many impacts identified during conceptual engineering may be avoided, and appropriate mitigation can be better determined.

4.2 Effect of Land Use Final Order on Local Comprehensive Plans and Land Use Regulations

Section 7(5) of HB 3202 states that a LUFO approved under Sections 6 or 7 of the Act "is effective upon adoption." Section 8(1)(a) of the Act requires the state, Metro, all affected local governments and any affected special districts and political subdivisions to amend their comprehensive, functional or regional framework plans, including public facility and transportation system plans, and all applicable land use regulations, as necessary to be consistent with the Council's adopted LUFO. Section 8(5) states that such amendments are not subject to review by any court or agency.

The legal effects of these provisions are (1) to authorize, as permitted uses, the light rail route, stations, lots and maintenance facilities and the highway improvements, including their locations, as identified and approved in the LUFO, and (2) to require appropriate plan and land use regulation amendments so that local land use requirements are consistent with the LUFO. As noted above, the uses approved in the LUFO remain subject to local imposition of reasonable and necessary approval conditions under Section 8(1)(b), but local permitting approvals must be completed in a timely manner.

While approval of the LUFO identifies where rail and highway improvements may go and authorizes their development at these locations subject to reasonable and necessary conditions, it does not concurrently prevent other uses allowed by existing zoning.

Similarly, the LUFO does not require local zoning amendments to allow more intense scales of development. Instead, it requires amendments only as necessary to authorize the approved project elements and ancillary facilities or improvements that may be required to ensure the safe and proper functioning and operation of the light rail system, provide project access, improve traffic flow, circulation or safety in the project vicinity, or to mitigate adverse impacts resulting from the project.

In summary, Council adoption of the LUFO has the effect of authorizing the construction and operation of the approved light rail facilities and highway improvements. It also identifies the affected locations for future public acquisition for rail or highway purposes. However, LUFO adoption in no way prevents or limits currently allowed uses on these properties during the interim period pending ultimate public acquisition, nor does it mandate the rezoning of areas nearby light rail stations to achieve regional growth management objectives.

In 2016, in anticipation of the Southwest Corridor MAX Light Rail Project, Tigard voters considered and approved the siting of a new high-capacity corridor project, including light rail in Tigard, as contemplated by the City of Tigard City Charter. Tigard City Charter Section 53A calls for the City to oppose the construction of a new high-capacity transit corridor unless voter approval is first obtained. Tigard City Charter Section 53C provides that the City may not amend its comprehensive plan or land use regulations to accommodate the siting of a new high-capacity transit corridor project if the project has not first received voter approval.

On June 28, 2016, the Tigard City Council approved Tigard City Council Resolution No. 16-27, which thereby called for an election in the City of Tigard for the purpose of submitting to voters the question of whether or not to enact an ordinance allowing City of Tigard support for extending MAX light rail service to Tigard. Resolution No. 16-27 included a Notice of Measure Election as Exhibit A, an authorizing ordinance as Exhibit B, and a road capacity analysis as Appendix A based on the best available information at that time. On November 8, 2016, Tigard voters considered the issue, and approved City of Tigard Ordinance No. 16-12 authorizing "City of Tigard support for a new high-capacity transit corridor in the City of Tigard."

The Council finds that the city complied with Section 53 of its Charter by pursuing and obtaining voter approval for the Southwest Corridor MAX Light Rail Project through City of Tigard Resolution No. 16-27, and the public vote that approved City of Tigard Ordinance No. 16-12. Regardless, obtaining a public vote is not a requirement of this LUFO process. Section 3(1) of House Bill 3202 provides that the procedures and requirements provided for in sections 1 to 12 of the Act "expressly preempt any vote requirements imposed by the charter of a local government and are the only land use procedures and requirements to which land use decisions and land use approvals of any kind related to the construction and operation of the project shall be subject." Section 2 of House Bill 3202 expresses compelling state interests in siting the Southwest Corridor MAX Light Rail Project through the exclusive processes specified in the Act, including but not limited to the state's interest in

"obtaining the maximum federal funding" for the Project, enhancing "the statewide transportation network," ensuring "the viability of the transportation system planned for the Portland metropolitan area," completing the Project "in a timely and cost-effective manner," and furthering the state's "air quality and energy efficiency standards."

The Council finds that HB 3202 preempts Tigard City Charter Sections 53A and 53C for three independently sufficient reasons. First, Section 53 of the Charter is a "vote requirement" as that phrase is used and expressly preempted in Section 3(1) of HB 3202. Second, Section 53 imposes "land use procedures and requirements" as that phrase is used and expressly preempted in Section 3(1) of HB 3202. Lastly, the text and context of HB 3202 makes it clear that the legislature intended to make HB 3202's procedural and substantive requirements the sole criteria applicable to siting the Project thereby preempting Charter Section 53 and other local rules that cannot operate concurrently with HB 3202 in light of the scope and the valid state objectives of HB 3202 as expressed in Sections 2 and 3 of the Act. Stated another way, LCDC adopted thirteen exclusive criteria applicable to siting the Project under the framework of HB 3202, and the City Charter provisions do not affect whether the Project meets these criteria or the process the Council must follow to adopt a LUFO.

5. Compliance with Procedural Criteria (1-2)

5.1 Criterion 1: Agency Coordination

“Coordinate with and provide an opportunity for TriMet, the Oregon Department of Transportation and the affected local governments to submit testimony on the light rail route, light rail stations, park-and-ride lots and vehicle maintenance facilities, and the highway improvements, including their locations, proposed to be included in the Southwest Corridor MAX Light Rail Project (Project). “

Criterion 1 ensures Metro coordination with the Tri-County Metropolitan Transportation District of Oregon (TriMet), the Oregon Department of Transportation (ODOT), and the cities and counties within the Southwest Corridor that are directly affected by the Project. Criterion 1 further requires Metro to provide these jurisdictions and agencies an opportunity to submit testimony on the light rail and highway facilities and improvements proposed for the Project, including their locations.

Coordination

The origins of the Southwest Corridor Project date back to Metro’s 1982 Light Rail System Plan, which at a conceptual level envisioned possible regional transit extending from downtown Portland to Tigard and Tualatin. In 2009 the Project was highlighted as a “near-term regional priority corridor” in Metro’s Regional High Capacity Transit System Plan, which guided investments in light rail, commuter rail, bus rapid transit and rapid streetcar in the Portland metropolitan area.

The Council finds that there has been substantial coordination with the affected jurisdictions, TriMet and ODOT since the Council adopted its 2009 High Capacity Transit System Plan. Between 2011 and 2016, Metro, its local government partners and affected agencies developed the Southwest Corridor Plan to identify a high capacity transit project and other investment strategies to help improve safety and quality of life, and to support regional and local land use plans and economic development. See Draft Environmental Impact Statement (DEIS), Chapter 2, Section 2.1 and Appendix I.

The Council finds that Metro coordination with TriMet, ODOT, the cities of Portland, Tigard and Tualatin, and Washington and Multnomah Counties has occurred both through their participation on the LUFO Steering Committee to make recommendations to TriMet on the project improvements for this Project, and through invitations to these local governments to submit testimony to the Metro Council on TriMet’s LUFO application. The Council finds that on August 13, 2018, representatives of these agencies and local governments on the LUFO Steering Committee reviewed and made recommendations to TriMet on the proposed Project improvements and their locations as documented in the 2018 LUFO and as provided for in Sections 6(1) and (2) of House Bill 3202.

In addition, the Metro Council finds that notice of its November 15, 2018 public hearing to consider this LUFO was mailed directly to each of the above-identified local governments and agencies, thus providing those local governments and agencies with the opportunity to submit testimony to the Council on the proposed project improvements and their locations at that hearing. Metro staff also provided written notice not only to the affected local governments but also to jurisdictions within a wider corridor, including the cities of Beaverton, Durham, King City, Lake Oswego and Sherwood, and Clackamas County.

In adopting this 2018 LUFO, the Council has carefully considered the recommendations of the LUFO Steering Committee and any comments by each individual agency and local government represented on that committee. The Council's decision is fully consistent with TriMet's application, which in turn is consistent with the recommendations of the LUFO Steering Committee.

For all of these reasons, the Metro Council finds and concludes that Criterion 1 is satisfied.

5.2 Criterion 2: Citizen Participation

"Hold a public hearing to provide an opportunity for the public to submit testimony on the light rail and highway improvements, including their locations, proposed to be included in the Project."

Criterion 2 ensures that the public has an opportunity to submit testimony and be heard in the process leading to the Council's selection of the light rail route, stations, lots and maintenance facilities, and the highway improvements for the Project, including their locations.

On November 15, 2018, consistent with Criterion 2, the Council held a public hearing and accepted public testimony on the proposed Southwest Corridor project improvements and their locations. This followed public notice, which Metro published in *The Oregonian* on Sunday, October 28, 2018, which is more than 14 days prior to its hearing. The Council finds that *The Oregonian* is a newspaper of general circulation within Metro's jurisdictional area and that its publication of notice in this newspaper meets the requirements for notice of its public hearing set out in Section 6(5) of HB 3202.

The Council further finds that in addition to the published newspaper notice, Metro staff provided notice of the public hearing on the Metro Council website, the Southwest Corridor Project website, the Metro Facebook and Twitter sites, and the Metro Newsfeed. Further, on October 26, 2018, Metro staff mailed mailers to all owners of properties within the LUFO boundary as indicated in TriMet's application. On October 29, 2018, Metro also sent emails to approximately 2,000 people who have provided their email addresses to receive Southwest Corridor Project updates. Materials for the November 15, 2018 hearing were available seven days prior to the hearing on November 8, 2018, at Metro offices (as stated in the published and mailed notices) and on Metro's website in accordance with standard Metro policy for all Council meetings and Section 6(6) of HB 3202. The Council finds that

these actions were necessary and sufficient to give notice to persons who might be substantially affected by the Council's decision.

For all of these reasons, the Council finds and concludes that Criterion 2 is satisfied.

6. Compliance with Substantive Criteria (3-9): Long-Term Impacts

6.1 Introduction

The Southwest Corridor Project will provide an approximately 12-mile, double-tracked Metropolitan Area Express (MAX) light rail line extending from SW Lincoln Avenue in the University District in downtown Portland to Tigard and Bridgeport Village in the City of Tualatin. It will directly connect Tualatin, downtown Tigard, southwest Portland and the region's central city with light rail, high quality transit and appropriate community investments in a congested corridor to improve mobility and create the conditions that will allow communities in the Corridor to achieve their land use visions.

The Project includes various elements to support the new light rail line, including transportation investments such as pedestrian, bicycle, roadway and intersection improvements as well as light rail stations, park-and-ride facilities and an operation and maintenance facility.

For the purposes of these findings, the area affected by the Project is divided into three segments as described in Chapter 2, Section 2.3 of the Project Draft Environmental Impact Statement (DEIS). The major project facilities are summarized by segment below. More detailed descriptions are provided in the findings specific to each segment.

Inner Southwest Portland Segment

- Barbur alignment
- 2 Light Rail Stations along SW Barbur Boulevard: in the vicinity of SW Gibbs Street, and in the vicinity of SW Hamilton Street
- Highway improvements within and along SW Barbur and north of Interstate 405 and connecting Marquam Hill to the SW Gibbs Street Station.

Outer Southwest Portland Segment

- Barbur alignment
- 5 Light Rail Stations along SW Barbur Boulevard: in the vicinity of SW Custer Street; in the vicinity of SW 19th Avenue; in the vicinity of SW 30th Avenue; in the vicinity of the Barbur Transit Center; and in the vicinity of SW 53rd Avenue
- 2 Park-and-Ride Lots: in the vicinity of the Barbur Transit Center and in the vicinity of SW 53rd Avenue Station
- Highway improvements within and along SW Barbur Boulevard, in the vicinity of SW Capitol Highway, and on SW 53rd Avenue between SW Barbur Boulevard and the Portland Community College campus

Tigard/Tualatin Segment

- SW 70th/SW Elmhurst/Union Pacific-Portland and Western Railroad/I-5 alignment
- 6 Light Rail Stations: in the vicinity of SW 68th Avenue; in the vicinity of SW Elmhurst Street; in the vicinity of SW Hall Boulevard; in the vicinity of SW Bonita Road; in the vicinity of SW Upper Boones Ferry Road; and in the vicinity of Bridgeport Village.
- 5 Park-and-Ride Lots: in the vicinity of SW 68th Avenue; in the vicinity of the SW Hall Boulevard; in the vicinity of SW Bonita Road; in the vicinity of SW Upper Boones Ferry Road/SW Carmen Drive; and in the vicinity of Bridgeport Village
- Operation and Maintenance Facility in vicinity of the SW Hall Boulevard Station and Park-and-Ride
- Highway improvements along SW 70th Avenue and on SW Hall Boulevard

6.2 Supporting Documentation

In addition to these findings of fact addressing the selected light rail route, stations, lots, maintenance facilities and highway improvements for the Project, including their locations, the Council believes, adopts and incorporates by reference herein the facts set forth in the following documents:

Southwest Corridor Light Rail Project Draft Environmental Impact Statement (June 2018), together with Appendices A-I and Attachments A-E

The DEIS disclosed but did not fully analyze three “design refinements” located within Tigard, so in addition to the analysis in DEIS, Metro commissioned supplemental analysis of these design refinements, which is provided in a memorandum prepared by Parametrix with the subject “Analysis to support LUFO findings,” dated November 5, 2018 (Parametrix memorandum. This analysis is included within the LUFO record and incorporated into these findings.

Additionally, the Council takes official notice of the following documents, and any additional documents and matters that may be referenced to in this LUFO or the DEIS, such as (a) the federal code, executive orders, administrative rules or guidance; (b) state laws, adopted plans, goals, or administrative rules; or (c) local code, adopted plans, or resolutions:

- Metro Regional Framework Plan and appendices (including the 2040 Growth Concept and the 2040 Growth Concept Map)
- Metro Region 2040 Framework Plan
- Metro 2014 Regional Active Transportation Plan (including supplemental reports)
- Metro Climate Smart Strategy

- Metro 1982 Light Rail System Plan
- Metro 2009 High Capacity Transit
- Urban Growth Management Functional Plan (codified in Metro Code)
- Adopted and signed Metro Resolution No. 07-3831B (adopting 2035 Regional Transportation Plan, including Southwest Corridor LRT)
- Adopted and signed Metro Resolution No. 08-3911 (adopting air quality conformity, including Southwest Corridor LRT)
- Metro Regional Freight Strategy
- City of Portland Comprehensive Plan
- Central City 2035 (City of Portland, 2018)
- Barbur Concept Plan (City of Portland)
- City of Portland Climate Action Plan
- City of Portland Stormwater Management Manual (2016)
- Scenic Views, Sites and Drives Inventory (City of Portland, 1989)
- City of Tigard Comprehensive Plan
- Tigard Ordinance No. 16-12
- Tigard Ordinance No. 16-27
- Tigard Triangle Strategic Plan
- Tigard Downtown Vision
- Tigard Resolution 12-32 (adopting Tigard High Capacity Transit Land Use Plan)
- City of Tualatin Comprehensive Plan
- Southwest Corridor Equitable Development Strategy
- Portland/Tigard SW Corridor Equitable Housing Strategy
- Clean Water Services Design and Construction Standards for Sanitary Sewer and Surface Water Management (2017)
- Oregon Freight Plan (ODOT, 2011)

6.3 General Impacts and Mitigation Measures Applicable to All Segments ("General Findings")

This section provides a general overview of LCDC Criteria 3 through 9, summarizes general impacts of the Project, and highlights mitigation measures that are applicable in all three segments. Because individual properties are affected by the Project, the Council finds it is appropriate to adopt both specific findings identifying particular impacts on a segment basis, and general findings addressing impacts applicable to properties throughout the Southwest Corridor. To avoid redundancy, the Council incorporates by reference the general findings in this section into its more site-specific findings for each of the three Project segments.

6.3.1: Criterion 3: Neighborhood Impacts

- (3) Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial districts, industrial districts, and mixed-use centers. Identify measures that could increase beneficial impacts or reduce adverse impacts, and that could be imposed as conditions of approval during**

processes required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (NEPA), or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”

- (A) Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing**
 - (1) the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;**
 - (2) the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and**
 - (3) the need to protect affected neighborhoods, districts, and centers from identified adverse impacts.**
- (B) Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.**

Criterion 3 requires the Council to provide for a light rail route, stations, lots, maintenance facilities and associated highway improvements, “balancing” identified adverse economic, social, urban form, safety and traffic impacts of the Project on affected neighborhoods, districts and centers with the positive benefits provided by light rail proximity and service, including the development of an efficient and compact urban form and improved safety.

Description of affected residential neighborhoods, commercial and industrial districts, and mixed use centers

The neighborhood affected by the Southwest Corridor Project are identified and described in Sections 4.2.1, 4.3.1 and 4.4.1 of the DEIS. These neighborhoods are described in greater particularity in the segment findings that follow these general findings.

Figure 2.6-1 of the DEIS illustrates the light rail corridor. The Corridor includes portions of the Cities of Portland, Tigard and Tualatin. While the Corridor does not pass through the Cities of Lake Oswego or Durham, or unincorporated areas of Clackamas County, portions of these jurisdictions are included in the neighborhood impacts analysis, as described below. The Corridor does pass through Multnomah and Washington Counties, but no unincorporated portions of those counties are impacted.

There are 18 study neighborhoods identified in the DEIS that could potentially be affected by the Project (located within 0.5 miles of the light rail alignment). Most of these neighborhoods align with designated boundaries from local jurisdictions. Certain

neighborhoods were defined to capture areas not covered by the officially designated neighborhood boundaries. The neighborhood impacts study area includes 11 neighborhoods in Portland, three in Tigard, and one in Tualatin. It also includes one neighborhood in Lake Oswego (Lake Forest, which includes areas of unincorporated Clackamas County), one that encompasses the city of Durham, and one that straddles the boundary between Tualatin and Lake Oswego (Lower Boones Ferry). The location of each neighborhood adjacent to the Southwest Corridor Project is shown in Figure 4.4-1 of the DEIS.

Neighborhood level socioeconomic information (2012-2016 American Community Survey Data) is summarized in Table B4.4-2 and illustrated in Figures B4.4-1 through B4.4-7 of the DEIS. The neighborhood-level data focuses on indicators of transit dependent populations (minority, low income, limited English proficiency, older adults, youth, limited vehicle access, and people with disabilities). Table B4.4-2 identifies the minimum and maximum percentage of each transit-dependent population in the U.S. Census tracts or block groups that overlap each study neighborhood. Section 4.3.1 of the DEIS and Tables B4.3-1 through B4.3-4 also identify demographic and economic trends at the regional level. The data includes population and growth projections, total employment, employment by industry, and property tax revenue.

Existing Land Use

Maps within DEIS Appendix B4.2 identify existing land uses at the parcel level and existing comprehensive plan designations. The maps are presented by segment and identify the light rail transit (LRT) alignment and a 0.5-mile radius around each LRT station. The maps illustrate the varied pattern of land uses and plan designations along the Southwest Corridor. Residential neighborhoods are present in all three segments. Commercial areas predominate in the Tigard/Tualatin Segment, which also includes a few industrial areas. Existing land uses in the Corridor are further described below.

The Inner Southwest Portland Segment covers the southern end of downtown Portland, the South Waterfront District, and extends south to the Burlingame and Hillsdale neighborhoods. Inner Southwest Portland Segment land use patterns transition from the larger-scale buildings and multiple uses found in downtown to the older city neighborhoods found along SW Barbur Boulevard and SW Naito Parkway. These areas have a mix of commercial, open space and residential uses, including multifamily housing and commercial and institutional uses, as well as parks, some dating back to the 1800s. South of SW Hamilton Street, the land uses along SW Barbur Boulevard transition to mostly wooded areas, much of which are parklands, with Interstate 5 (I-5) to the east and residential areas to the west. Approaching SW Terwilliger Boulevard, the adjacent uses change to a mix of commercial uses, including auto-oriented services, and largely residential neighborhoods away from the arterials and the transportation corridor defined by I-5 and SW Barbur Boulevard.

The Outer Southwest Portland Segment continues generally along SW Barbur Boulevard and I-5 through an area with rolling topography and a mix of commercial businesses, offices, and some multifamily residential properties. Multnomah Village, Hillsdale, Portland Community College (PCC) Sylvania campus and other neighborhoods connect to SW

Barbur Boulevard. Many of these have a variety of land uses, including low-density commercial development surrounded by residential neighborhoods. The most densely populated commercial centers are near major intersections, including I-5 access ramps. Residential neighborhoods built to typical city standards are also adjacent to each side of SW Barbur Boulevard.

The Tigard/Tualatin Segment includes all of the City of Tigard, the western half of Lake Oswego and the northern end of Tualatin. Tigard is transected by Pacific Highway (99W), Highway 217 and I-5. Many commercial developments are located along the Pacific Highway and Highway 217. Pacific Highway features auto-oriented commercial developments such as strip malls that are set to attract passing drivers. The office commercial and retail developments along parts of Highway 217 and off of I-5 include office parks in the Tigard Triangle and the mixed-use retail developments of Bridgeport Village shopping center and Washington Square Mall. A mix of commercial, office and residential uses are located near the mixed-use central business district of downtown Tigard. Industrial uses are located to the east of Highway 217 and adjacent to I-5.

The Southwest Corridor Project links a number of “mixed use centers” identified in the Region 2040 Growth Concept and its implementing document, the *Region 2040 Framework Plan*. This plan establishes the urban growth boundary (UGB) for the next 20 years and the pattern and density goals for development within the boundary to the year 2040.

A fundamental key to the Region 2040 Growth Concept is the designation of a hierarchy of mixed-use centers. Creating higher density centers of employment and housing with compact development is intended to provide efficient access to goods and services, enhance multi-modal transportation and create vital, attractive neighborhoods and communities. The Growth Concept recognizes Downtown Portland as the “Central City” and reinforces downtown’s role as the high density employment, cultural, tourism and commerce hub of the region. Outside of the Central City market area but along the proposed project alignment, the Growth Concept designates “Town Centers” for West Portland and Tigard. These Town Centers are anticipated over time to become the focus of compact development and redevelopment, with high capacity transit service and multi-modal street networks.

The plan also designates “Station Communities,” which are mixed use areas surrounding light rail stations where development is predominantly oriented toward transit riders and pedestrians. The *Region 2040 Framework Plan* seeks to encourage intensification of land uses in the Central City, Regional Centers, Town Centers and Station Communities, and to a lesser extent along Transit Corridors and Main Streets. The Region 2040 Growth Concept is predicated on the implementation of a southwest transit spine that links and supports the designated mixed-use areas. The Southwest Corridor Project is intended to create the transit spine needed to help implement the Growth Concept and link key mixed-use centers in the Corridor. By accomplishing this objective, the Southwest Corridor Project helps facilitate the movement of people between employment centers and contributes to development of an efficient and compact urban form, consistent with Criterion 3.

It is noted that the Southwest Corridor Project does not, in itself, rezone or convert adjacent or nearby lands to higher densities or more intensive uses. Rather, it serves current and future development in these areas and encourages more efficient levels of development. While the Southwest Corridor Project facilitates an efficient urban form, the Council finds that the implementation of the *Region 2040 Framework Plan* must occur through separate local action taken independently of this land use decision.

Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial and industrial districts, and mixed-use centers.

Extensive information identifying long-term economic, social, urban form, safety and traffic impacts of the Project on affected neighborhoods, districts and centers is included in the DEIS and its appendices and attachments. See especially DEIS Chapter 1; Sections 3.2, 4.1, 4.2, 4.3, 4.4, 4.5, 4.16, 4.17, 4.18, and 5.1; Appendices B4.3 and B4.4; Attachments A, *Transit Impacts and Travel Demand Forecasting* and B, *Transportation Impacts Results Report*, which are incorporated herein by reference.

For the purpose of these findings, long-term impacts generally are grouped under one of five headings: economic, social, urban form, safety or traffic impacts. The Council recognizes, however, that impacts often can fall under more than one heading. For example, impacts on freight movement may be relevant as economic, safety and traffic impacts. Displacements can have economic, social and urban form impacts. The Council intends these findings to be interpreted broadly to allow overlap among the different categories.

While some of the impacts identified in these findings are adverse, the Council finds that many of the impacts are positive. Indeed, it is the overall positive, beneficial impacts provided by light rail transit that underlie HB 3202. These include impacts on air quality, urban form, transit access and performance, traffic volume, active transportation, health, access to community facilities, neighborhood quality of life, vehicle safety, and pedestrian and bicycle safety.

Although the following list is not exclusive, the Council finds that the economic, social, urban form, safety and traffic impacts associated with the Project fall primarily within the following categories⁵:

Economic Impacts

- Business displacements
- Loss of parking/access
- Tax base
- Freight movement

⁵ Impacts associated with noise, natural resources, water quality and other concerns identified in Criteria 4 through 9 also can fall within these broad categories. In particular, they can have economic and social effects. Because the adopted LCDC criteria require separate findings on these concerns, they are addressed in those separate findings rather than under Criterion 3.

Social Impacts

- Residential displacements
- Social equity
- Access to community facilities
- Barriers to neighborhood interaction
- Visual/aesthetic

Urban form Impacts

- Land Use Patterns

Safety Impacts

- Security Concerns
- Emergency Access
- Health impacts

Traffic Impacts

- Transit
- System-wide and local traffic impacts

Positive and negative impacts are summarized in a general manner for the Project in the following section. Potential mitigation measures to reduce adverse impacts are also highlighted. More detailed information on these and other identified economic, social, urban form, safety and traffic impacts are presented in the segment findings.

Economic Impacts

The overall quality of the transportation system is an important factor in the viability of the local and regional economy. Transit will play an increasing role in maintaining the level of service and operation of the overall transportation system, particularly because the region has made a policy commitment to invest in transit improvements rather than expanded highway capacity.

Over the past decades, traffic in the Southwest Corridor has become increasingly congested. A lack of continuous north/south arterials results in regional as well as local traffic funneling onto Pacific Highway/SW Barbur Boulevard and I-5. All vehicles, including transit operating in mixed traffic, are slowed by congestion, especially at key bottlenecks. Sections of Pacific Highway, which is one of the two major north/south transportation facilities in the Corridor and the major route for transit, are often slowed by congestion and experiences some of the most unreliable travel times in the Corridor. Transit travel times are subject to the same lack of reliability and can be expected to vary significantly from the forecast “average condition” because of unreliable roadways. Corridor residents and employees complain of frustrating travel conditions in the area. Focus groups convened in the Corridor identified congestion and gridlock as their top concern and a threat to the area’s livability, characterizing the roadway network as “congested and dysfunctional.” Travel times between

key destinations in the Corridor are expected to continue to increase and are likely to vary more in the future than today because of increases in congestion and incidents and greater variation in traffic levels.

Deteriorating accessibility could limit development in the Corridor and have adverse economic impacts. The economic and educational opportunities and services in the Corridor need to be connected by improved transit service. The Corridor has about 11 percent of the region's population and 26 percent of the region's employment. The five colleges and universities in the Corridor (OHSU, PSU, National University of Natural Medicine, PCC-Sylvania campus and George Fox University) serve more than 45,000 students. The region's largest shopping destinations (including Bridgeport Village) are located in the Corridor. However, transit service in the Corridor varies in availability and frequency, and it struggles to serve areas due to an incomplete and congested road network. As a result, many of the more heavily traveled areas (such as I-5), major employment centers (such as Kruse Way) and industrial areas (such as the areas south of downtown Tigard) in the Corridor do not have frequent transit service. Taking transit between some of the major destinations in the Corridor can take four to six times as long as driving, and the Corridor generally lacks sidewalk and bicycle connectivity. As a result, driving is the most functional travel option for many people, adding to the traffic congestion in the Corridor and leaving many other people with limited options if they cannot drive or choose not to.

The Council finds that a balanced transportation system, in part achieved through the expansion and improvement of transit service in the Southwest Corridor, will help to assure that the regional and local land use plans are realized. By using the Southwest Corridor as a tool to help shape growth, the regional and local jurisdictions can focus future development around light rail stations with the greatest opportunity for new development and redevelopment, or around stations with the most vacant or redevelopable land. This improved accessibility could lead to higher land values and support more intensive mixed-use development. The result is consistent with the Council's adopted Region 2040 Growth Concept.

For reasons set forth in the segment findings, the Council finds that there are significant commercial and industrial employment centers that should benefit substantially from the Project. These include, but are not limited to, Bridgeport Village, the Tigard Triangle, the Barbur Corridor and the Portland Central Business District. Light rail accessibility should also benefit institutional uses at Portland Community College and Portland State University. In addition, by linking communities along the Southwest Corridor with communities along the Eastside, Westside and South/North Corridors, access is provided to commercial employment centers in Gresham, east Portland, Clackamas Town Center, Airport Way, Milwaukie and the McLoughlin Boulevard Corridor, Beaverton and Hillsboro.

Displacements. In every instance where the Southwest Corridor Project displaces an existing commercial or industrial use, that represents an adverse economic impact. Displacement has an effect on employment, incomes, services and taxes. Even though the adverse economic impacts associated with displacement may not be significant on a region-wide level, the Metro Council recognizes and is sympathetic to the significance of each

displacement at the individual business and neighborhood level. The Council understands and acknowledges that relocations can cause significant anxiety and trauma not only to the company being displaced, but also to the employees who work for the company. It also recognizes that these impacts can be social as well as economic, as they can affect employee's commuting distance and where employees choose to live or work.

Given that the Southwest Corridor Project will serve a largely developed urban area, it is impossible to avoid displacement impacts while still providing transit accessibility. To the extent feasible and practicable, the LRT route is following existing public road and railroad rights-of-way to minimize displacement impacts. Locations for related facilities such as LRT stations, park-and-ride lots and operations & maintenance facilities also have been selected with the objective of balancing displacement and other adverse impacts with the positive benefits of LRT proximity and service.

Indeed, the Council finds that the application before it for review and approval reflects serious and significant efforts by TriMet and the regional partners to reduce and minimize the number of displacements. The Council acknowledges that there is always widespread concern whenever private property is impacted by a project. As such, the Council finds that TriMet's application incorporates many efforts to minimize displacements, including the selection of the alignment alternative that impacts the fewest number of employees through displacement within each segment. To that extent, the Project provides mitigation for adverse impacts identified in the DEIS alternatives.

The methods used to determine displacement impacts are described in DEIS Sections 4.1.2 and 4.3.2. Most of the LRT project would use public streets, highways and railroad rights of way, but additional public and private property would be needed as well. The additional land could be converted to trackway, expanded roadways, sidewalks, bike lanes, stations, traction power substations, noise walls and other project-related facilities, such as operations and maintenance (O&M) facilities, and stormwater facilities. Other street or highway modifications that could be required in order to avoid roadway congestion effects of the Project may also need additional property. Property easements could also be needed, but they would typically not convert the affected property to a transportation use.

There are two types of permanent property acquisitions that could convert property to a transportation use:

- A “partial parcel acquisition” indicates that a portion of a parcel would be acquired, including sliver takes. A partial parcel acquisition generally would not displace all residential or nonresidential uses on the parcel, but the parcel would be impacted by the Project.
- A “full acquisition” indicates that the full parcel would be impacted by the Project and the current use would be displaced. Full acquisitions include parcels that might not be fully needed for the Project but would be affected to the extent that current uses would be substantially impaired (e.g., loss of parking or access).

The DEIS displacement impacts methods assume that only full acquisitions of a given property displace a business or place of employment.

Applying the methods described above, and based on conceptual design, the DEIS estimates that on a project-wide basis, the Southwest Corridor Project could displace approximately 108 commercial and industrial businesses and institutions. With more detailed design and alignment reconfiguration and by using some partial acquisitions instead of full displacements, this number could decrease. Displacement impacts on businesses and institutions are scattered throughout the Corridor, with the highest concentration in the Outer Southwest Portland Segment.

In some instances, there may be opportunities for minor design modifications during Preliminary and Final engineering to avoid or reduce business displacement impacts. Based on the applicant's actions to date, the Council believes that these efforts will be fully explored. Where displacements are unavoidable, relocation assistance will be available to assist displaced businesses. The relocation program will be designed in compliance with the requirements of the *Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs (Title 42 Code of Federal Regulations, Chapter 61)*.

The Project will also comply with TriMet's Acquisition and Relocation Policy, Procedures, and Guidelines, which requires property owners and tenants to be treated uniformly and fairly. Under these regulations, relocation experts would:

- Explain all relocation programs to the affected businesses;
- Assist in preparing and filing reimbursement claims;
- Assist in completing forms required by the lending institutions, the Small Business Administration, and others associated with the lease or purchase of new properties; and
- Help investigate possible locations, including nearby properties, and help solve problems that might occur.

All properties required for the Southwest Corridor Project will be acquired at fair market value for land and improvements. If only a portion of a property is required, the acquisition price will also reflect any measurable loss in value to the remaining property due to the partial acquisition. Generally, the relocation process occurs concurrently with the acquisition of affected properties. Relocation benefits vary between residential and business properties and may include payment for actual reasonable expenses of moving a business or personal property and/or other benefits, such as rent supplements, increased interest costs on replacement dwellings, reasonable search costs for new business sites, and business reestablishment costs. TriMet also uses interpreters to help those with limited English proficiency understand their choices and options. The Council finds that the primary mitigation for acquisitions and displacements would be payment of just compensation and relocation assistance.

Loss of Parking/Access. Parking space supplies and costs vary throughout the Southwest Corridor, including limited supply and relatively high costs in the Portland Central City, large supplies of free off-street parking near Bridgeport Village and on-street parking at relatively low or no cost along SW Barbur Boulevard and in the Tigard Triangle area. In all

three segments, there is limited on-street parking along the streets where LRT would run; street parking spaces are much more prevalent on side streets or in off-street lots. The existing on-street parking supply is provided in Table 3.1-3 of the DEIS.

In locations where the LRT alignment would operate within or adjacent to street rights of way, on-street parking would typically be eliminated. In addition, partial acquisitions may eliminate off-street parking spaces associated with businesses. As discussed above under Displacements, mitigation for these impacts would include payment of just compensation and assistance from TriMet. Loss of off-street parking is covered by the *Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs*. In addition, it may be possible that parking spaces could be reconfigured in places to add more spaces.

The loss of parking or change of access can have adverse economic impacts on businesses. If an existing access must be removed by the Project and cannot be relocated or reconfigured to provide adequate and safe access, the entire business use is assumed to be displaced. Even if alternative access is available, it may not be as convenient as the existing access and could result in some loss of business. Parking impacts are described on a segment basis in Section 3.2.6 of the DEIS and Sections 3.3.8, 4.3.9, and 5.3.9 of the *Transportation Impacts Results Report*. LUFO findings that identify the adverse economic impact associated with loss of parking and/or accesses are provided in the segment findings.

The Council finds that parking mitigation strategies that could be implemented if parking supply were to become over-utilized once the project is in place include replacement of parking, parking management strategies, and/or parking restrictions. TriMet would work with the affected neighborhoods and/or local jurisdiction to determine the appropriate parking mitigation strategy, if needed.

Tax Base. Local jurisdiction tax bases are affected in two ways by the development of large public infrastructure projects such as the Southwest Corridor Light Rail Project. First, and by far the greatest long-term impact, is the development and redevelopment that could occur in conjunction with the Project. As described in DEIS Table 4.18-1, which summarizes indirect impacts, as development occurs, the investments attract new businesses and employment, and would increase tax revenues and property values. The effect of this kind of impact is difficult to estimate because it is dependent upon many independent private decisions that would occur in the future. However, for the reasons set out in Table 4.18-1, the Council finds that redevelopments would have net beneficial indirect economic impacts.

The second type of impact is the direct impact to tax bases that occurs through property acquisition for construction of the Project. Private property is typically acquired by the Project. Through acquisition, this property converts to public property and, as such, is removed from the tax rolls unless resold for private purchase.

The Council finds that tax base revenues are allocated among various entities, including cities, counties, school districts and other districts. Hence, a reduction in the tax base will likely impact all of these entities. While the Project will cause reductions in the tax base, the

overall loss to the budget of each city would be small (less than 0.3 percent). The Council anticipates similar impacts to other taxing entities. The Council finds as well that the loss in value in the tax rolls for each taxing district would be offset over time by the expected greater increase in value added to the tax base due to new development in the Corridor, specifically in station areas.

Freight Movement.

The area encompassed by the Southwest Corridor is of critical importance to the movement of commodities within and through the Portland metropolitan area. The freight movement system in the Corridor is comprised of two primary transportation modes: freight railroads and trucking.

Rail. As indicated by the Oregon Freight Plan (ODOT, 2011), which is cited by the DEIS, rail freight demand in Oregon is expected to increase by 36 percent in terms of weight, and 29 percent in terms of value, between 2010-2035. At the regional scale, freight volumes are expected to nearly double in terms of tonnage by 2040, as indicated by Metro's Regional Freight Strategy (2018). While approximately 75 percent of that increase in freight volume will be dependent on trucks, freight rail transportation is also expected to increase significantly.

The only impacts to freight rail for the Southwest Corridor will occur within the Tigard/Tualatin Segment. As such, the freight rail impacts are discussed in the segment findings.

Truck. Truck traffic relies heavily on the major streets and highways in the Southwest Corridor and the region, including, but not limited to: I-5, Highway 99W and SW Barbur Boulevard. Industrial businesses within the Tigard/Tualatin Segment rely on truck freight for distribution, and nearly all businesses in the Corridor rely on deliveries shipped via truck.

Adverse impacts to truck movements in the Corridor include both potential delays due to increased congestion or out-of-direction travel associated with LRT, the possible loss of on-street loading zones, and altered access for trucks. Localized delays to peak-period truck activity could occur due to increased congestion that would result from LRT park-and-ride lot traffic or to reductions in roadway/intersection capacity associated with LRT operations. SW Barbur Boulevard is expected to be the only major truck route that could be affected. The LRT project would preserve vehicle and freight capacity on I-5 and Highway 99W, with adjacent and overcrossing structures meeting the current design clearance requirements for height and width.

The DEIS identifies potential mitigation strategies for local traffic impacts associated with the Project. For DEIS purposes, local traffic impact mitigation is intended to identify strategies to achieve the level of service associated with the No-Build Alternative, not to resolve existing congestion problems. Implementation of strategies to mitigate adverse traffic impacts, particularly intersection improvements, would also benefit trucking and

freight movement. Regional truck travel would benefit from reduced travel times on regional arterials and highways due to a reduction in congested lane miles and hours of delay associated with LRT.

Mitigation for segment-specific impacts rail and truck freight movement is addressed in the segment findings.

Other. Other economic impacts include the disruption of business during construction, possible loss of property values, possible inability to sell a business or secure loans to pay off mortgages or other business debts due to proximity to the light rail alignment or related light rail facilities, changes in business activity resulting from changes in traffic patterns or access management measures, and utility relocations. Construction impacts are addressed in the Short-Term Impacts portion of these findings. The Council finds that generally there is no required mitigation for temporary economic loss or business interruption during construction of a public project. However, for this specific project, the Council finds that TriMet would be willing to provide staff assistance to impacted property owners in assisting the property owners with their loan refinancing and/or loan application processes.

If redevelopment occurs in station areas and along the Corridor, as discussed above, existing businesses and their associated jobs may need to relocate if underlying properties redevelop. The Council finds that this need to relocate could result in additional business closures or job loss for some parties, although overall economic activity levels would increase over time. The Council finds that no additional long-term impact mitigation would be needed beyond that already identified for the Project's long-term impacts and for the indirect effects of acquisitions and displacements.

The Project will require relocation of certain utility facilities and lines. Most of the utility relocations would be fairly routine, meaning they would be localized, have disruptions of service to few users, or have less potential for relocation out of the existing right of way. However, there are several locations where more complex utility relocations would be required, as discussed in the segment findings. Utility relocations typically are addressed during preliminary engineering and final design. The Council finds that the costs of relocating utilities impacted by the Project are addressed, and can be paid, as provided in existing law.

As explained in the social and safety impacts findings below, the Project may affect localized access to properties by police, fire and ambulance vehicles. However, the Project should not otherwise increase these governmental services. The Council has seen no evidence to this effect, and it finds that any significant increase in police, fire or emergency medical services as a result of the Project is speculative. The Council concludes that no mitigation is necessary in this regard.

Social Impacts

Residential Displacements. As with business displacements, the Council recognizes that in every instance where the Project displaces an existing residential use, that represents an adverse social impact, and the Council is sympathetic to the significance of each residential displacement. It understands and acknowledges that relocations can cause significant anxiety and trauma to families, uprooting them from neighborhoods, schools and friends and imposing change on them.

Given that the Project will serve a largely developed urban area, it is impossible to avoid residential displacement impacts while still providing transit accessibility. To the extent feasible and practicable, the LRT route follows existing public road rights-of-way to minimize displacement impacts. Locations for related facilities such as LRT stations and park-and-ride lots have also been selected with the objective of balancing displacement and other adverse impacts with the positive benefits of LRT proximity and service.

Indeed, the Council finds that the application before it for review and approval reflects serious and significant efforts by TriMet and the regional partners to reduce and minimize the number of displacements. The Council finds that TriMet's application incorporates efforts to minimize displacements, including the selection of design refinements that avoid displacing naturally occurring affordable housing units near downtown Tigard. To that extent, it provides mitigation for adverse impacts identified in the DEIS alternatives.

The methods used to determine displacement impacts are described in DEIS Sections 4.1.2 and are summarized above under the discussion of economic impacts. The same methods applicable to business displacements are relevant to determination of residential displacement impacts and are incorporated herein by reference.

Applying the methods described in Section 4.1.2, the DEIS estimates that on a project-wide basis, the Southwest Corridor Project could displace approximately 86 residential units. The greatest number of residential displacements are expected to occur in the Inner Southwest Portland Segment. As indicated in DEIS Table B4.4-2, neighborhoods in this segment includes higher proportions of minority populations and low-income populations than in some other portions of the Corridor. As such, the Council finds that significant efforts have been and continue to be made, subsequent to release of the DEIS, to reduce displacements in these neighborhoods.

Appendix C of the DEIS summarizes the Southwest Corridor Project's public involvement and decision-making processes in relation to Executive Order 12898 on environmental justice. The "Preliminary Conclusion" in Appendix C, which the Federal Transit Administration has reviewed and accepted, states that while there are mitigation measures that would reduce relocation and related economic impacts, the parties that are affected could still experience personal hardships due to the change of where they live or work. In some cases, there may also be personal or community associations that would be impacted when several blocks of a neighborhood are affected. Because there is relatively little undeveloped land available within the Southwest Corridor, the Council finds that some impacts in these communities are unavoidable. The Council further finds that where residential relocations are unavoidable, they would be mitigated to levels that would be

below high and adverse effects⁶ through TriMet's real property acquisition policy, including its compensation and relocation assistance program. TriMet's experience on other LRT projects has shown that low-income and minority populations receive additional long-term benefits through the relocation policies and federal and state requirements for safe, sanitary and affordable replacement housing.

The Council finds that the Project also has offsetting benefits to all populations, but particularly for those that would be able to take advantage of the mobility benefits and infrastructure investments to be made by the Project. While the Southwest Corridor has a lower proportion of transit-dependent populations than the region overall, minority and low-income populations reside all along the Corridor, and they tend to be most concentrated in the areas directly adjacent to the Project alignments, compared to the mostly single-family neighborhoods in surrounding areas. They would be closest to stations and the higher frequency and extended service hours offered by LRT, compared to bus service with the No-Build Alternative. They would also benefit from the improved lighting, landscaping and controlled intersection improvements the Project would offer. These mobility benefits translate into improved access to regional activity centers, including increased access to education, public service and employment providers. These improvements would particularly benefit transit-dependent persons, and this group statistically correlates more to minority and low-income populations than the general population.

Based on the reasons discussed above and the ability for the Project to further define mitigation and avoidance measures to minimize impacts to affected parties, FTA has preliminarily concluded, and the Council also finds and concludes that the Southwest Corridor Project would not result in disproportionately high and adverse effects on minority and low-income populations.

The Council finds that mitigation of residential displacements could include minor redesign of the Project during Preliminary and final engineering to avoid or reduce displacements. Some displacements could be mitigated by taking only a portion of the property and/or structure and by modifying the remaining property and/or structure to allow continued occupancy. Where displacements are unavoidable, the Project will provide compensation to property owners based on fair market value and a comprehensive relocation program. The compensation/relocation program operates in the same manner as described above for business relocations.

Social Equity. One of the primary objectives identified for the Southwest Corridor Project is to "ensure benefits and impacts promote community equity." Many of the neighborhoods in the Corridor exceed the regional percentage for vulnerable and transit-dependent populations, including minority (6 out of 18 neighborhoods), low-income (9 out of 18), and people with disabilities (9 out of 18). As noted above under Residential Displacements, the Council finds that the Project would provide significant mobility benefits to transit-

⁶ U.S. Department of Transportation policies require the FTA to avoid, minimize and mitigate disproportionately high and adverse effects on minority and low-income populations.

dependent populations along the Corridor. These include more frequent and reliable transit service as well as safer and better-connected routes for walking and biking.

However, the Council also acknowledges that residential and business displacements could disrupt individual social ties, and that the Project could indirectly cause property values to increase through redevelopment around stations. This would have disproportionate impacts on low-income populations. As indicated in DEIS Section 4.18.3, displacements and acquisitions related to other development may be mitigated by ordinance (as in the City of Portland) or as a condition of approval for other projects. Cooperative multiagency programs could also provide assistance or additional relocation options for displaced parties. During final design and construction, TriMet and Metro would coordinate with local partners to develop station area redevelopment plans that include measures to minimize indirect impacts, including advancing programs to increase affordable housing supply in the Corridor.

In addition, Southwest Corridor Plan partners (Metro, TriMet, and local jurisdictions) are developing the *Southwest Corridor Equitable Development Strategy* (SWEDS). As indicated on the Southwest Corridor website, the SWEDS “strives to ensure that individuals and families continue to live, work and thrive in the Southwest Corridor as we invest in such a major transportation project like light rail. This means making sure SW Corridor neighborhoods have:

- different choices for where to live for people of all incomes
- a range of jobs for people of all backgrounds
- learning opportunities that prepare people for those jobs
- wages that support people’s desire to live and work in the Corridor.”

As part of this initiative, a Project Oversight Committee, made up of various public/private/non-profit partners from the Southwest Corridor, provides advice to Metro and project partner staff on implementing the work and allocating resources to future Pilot Projects. The Project Oversight Committee has established the following equitable development goals:

1. Advance economic opportunity & build community capacity for wealth creation
2. Confront residential & business displacement
3. Reduce disparities & improve conditions for affected people
4. Preserve & expand affordable housing
5. Promote transportation mobility & connectivity
6. Develop healthy & safe communities
7. Expand the breadth & depth of influence among affected people

As part of the Strategy development, Equitable Development Pilot Projects are intended to inform this Strategy while supporting community-driven initiatives that prepare communities for the changes and opportunities light rail and other investments would bring to the Southwest Corridor. Funded through a federal grant, pilot projects will target a mix of projects within and across two sub-categories aligned with priorities of the SWEDS advisory groups: Equity & Housing and Business & Workforce. In addition, Metro recently awarded equitable housing grants to the City of Portland, the City of Tigard and Washington County

to help address local affordable housing issues as they relate to the proposed light rail investment. The Equitable Development Strategy will support and be informed by these local efforts. Staff from the City of Portland, the City of Tigard, Washington County and Metro are coordinating between the grants to maximize efficiency and promote a shared understanding of needs within the Corridor.

In addition, and as part of the Equitable Development Strategy, the cities of Portland and Tigard have partnered to craft the *SW Corridor Equitable Housing Strategy*, which is a unified, strategic approach to housing for the entire Southwest Corridor. It sets goals and provides a roadmap to align policies and housing investments to: (1) Prevent displacement of vulnerable households; and (2) Increase housing choices for all people over the next 10 years. The Portland/Tigard housing strategy details potential implementation strategies and recommended actions, most of which are Corridor-wide, but some are specific to Portland. The Council finds that these strategies and actions could be considered mitigation strategies for adverse impacts to neighborhoods associated with increasing property values, rents, and gentrification. As such, the Council adopts the SW Corridor Equitable Housing Strategy herein by reference. Potential mitigation measures include, but are not limited to:

- Explore an employer-assisted housing and corridor employer fund
- Promote existing incentives available to all multi-family development
- Form a community-centered organizational structure to champion and implement the strategy
- Acquire and convert up to ten unregulated affordable multi-family apartment buildings into income/rent restricted buildings
- Strengthen tenant protections
- Develop transit-oriented development (TOD)-scale (100+ homes) affordable multi-family buildings in each of the ten station areas in Portland and Tigard
- Incentivize equitable TOD through zoning

The Council finds that the Southwest Corridor Equitable Development Strategy and Portland/Tigard SW Corridor Equitable Housing Strategy are important tools to help ensure that corridor neighborhoods will experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Access to Community Facilities. The Southwest Corridor Project will increase the number of households with transit access to major activity centers in the region. In the Inner Southwest Portland Segment, the Project will improve transit access to the medical and educational facilities in the Homestead and South Portland neighborhoods, including the Oregon Health & Science University (OHSU), Veteran's Affairs (VA) Portland and the National University of Natural Medicine (NUNM). However, due to necessary property acquisitions, the Project would have adverse impacts on some community facilities in the Inner Southwest Portland Segment, including churches and parks. These impacts are described in the segment findings of Section 6.4.1.2.

In the Outer Southwest Portland Segment, the Project will improve transit access to PCC-Sylvania. Property acquisitions in this segment would also impact a few park and natural areas, which are discussed in the segment findings of Section 6.4.2.2.

In the Tigard/Tualatin Segment, the Project will improve transit access to various City of Tigard facilities, including City Hall, the Police Department office, and the Public Library, as well as two Tualatin Valley Fire & Rescue stations.

In addition, the Council finds that the linkage of the Southwest Corridor light rail with the Eastside, Westside, and North/South MAX light rail will provide access to community facilities in East Portland, North Portland, downtown Gresham, downtown Beaverton and Hillsboro, and downtown Milwaukie, including schools, hospitals, parks, fairgrounds, government centers and other facilities. The Council finds that completion of the Southwest Corridor Project will greatly enhance travel and accessibility throughout the region.

In summary, the Council finds and concludes that the Southwest Corridor Project's beneficial impacts will outweigh adverse impacts on access to community facilities. The Project will provide improved transit access to numerous community facilities along the route and will dramatically expand and link the number of regional facilities accessible by transit. The Council finds that this will particularly benefit transit-dependent populations.

Barriers to Neighborhood Interaction. In general, the Southwest Corridor Project will not result in long-term barriers to social interaction or neighborhood cohesion in the Corridor. For much of its length, the proposed LRT alignment is located within the right of way of an existing highway, SW Barbur Boulevard, which already constitutes an existing barrier or edge to neighborhood boundaries. At its starting terminus in downtown Portland, the existing MAX line has not functioned as a barrier, as frequent intersections provide numerous opportunities for crossing the LRT line. Likewise, the Southwest Corridor MAX line will not function as a barrier. In the Inner Southwest Portland Segment, walking and biking access through the South Portland neighborhood would be maintained or improved. The Project would add an at-grade pedestrian crossing of SW Naito Parkway at SW Gibbs Street, which would slightly reduce the effect of SW Naito Parkway as an existing barrier dividing the South Portland neighborhood.

In the Outer Southwest Portland Segment, LRT would not be a new barrier along SW Barbur Boulevard, but it might be perceived as reinforcing the highway as a barrier. However, new and improved sidewalks, bike lanes and protected crosswalks would provide an offsetting benefit.

In the Tigard/Tualatin Segment, the Project would change circulation in the Tigard Triangle and Downtown Tigard neighborhoods by creating new street rights of way and improving access across Highway 217. The Project would change the character of SW 70th Avenue and SW Elmhurst Street by reconstructing or adding portions of the roadway with LRT and sidewalks. South of downtown Tigard, the trackway would mostly run parallel to the existing barriers of the railroad tracks or I-5.

Visual/Aesthetic. The Southwest Corridor Project will result in impacts to visual and aesthetic resources as a consequence of the following:

- **Light rail guideway.** The LRT guideway would include steel track rails, paved concrete areas, ballast, ties, overhead wires, and support poles. In certain locations, the guideway will be elevated. In some areas, retaining walls will be added. There would also be electrification stations and signal management structures, which are typically small buildings.
- **New/rebuilt roadway.** The roadway material would generally be visually similar to the existing road, with a variety of adjustments, including regrading, new lighting, modified intersections, and added or removed lanes.
- **New connecting infrastructure.** Throughout the Corridor, various pedestrian and bicycle enhancements outside of the LRT alignment are proposed. These include, for example, sidewalks, bicycle lanes, crosswalks and traffic control signals. A distinct connecting infrastructure element is the Marquam Hill Connection, which would include an entryway on SW Barbur Boulevard and a connection to the existing aerial tram near Kohler Pavilion at the top of the hill.
- **Streetscaping.** New streetscape elements would be added, including sidewalks, bicycle lanes, landscape buffers, bioswales, benches, lighting and signage.
- **Stations.** Stations would include platforms, shelters, seating, lights and signage. A few stations would be elevated above existing grade. Some stations in the Outer Southwest Portland and Tigard/Tualatin Segments would include park-and-ride structures or lots and modified transit centers.
- **Vegetation.** Some trees and vegetation along the alignment would require trimming or removal to accommodate LRT.
- **Removed buildings and other structures.**

Photographs of existing conditions and visual simulations of future conditions at selected locations are included in Appendix B4.5 of the DEIS.

The visual and aesthetic resources within the Corridor are elements of the landscape and neighborhood character, and include area features that are visible from scenic viewpoints. DEIS Section 4.5 identifies neighborhood visual impacts on a segment basis. The analysis in Table 4.5-4 of the DEIS addresses the Project's visual impacts to resources adjacent to the LRT alignment on a scale of "high," "moderate" or "low," as determined by the level of visual change and the level of viewer sensitivity. LUFO findings for each segment will describe the key visual impacts.

Given the types of visual impacts identified in the study area and summarized in the DEIS, the Council finds that the following strategies can be used to reduce adverse visual impacts to affected neighborhoods:

- Develop potential alignments, associated facilities and station access improvements to be visually consistent with existing neighborhood pattern and scale. Where appropriate, follow local plans/policies to develop designs visually consistent with outlined future urban form.

- Design associated project structures, such as transit stops and park-and-ride facilities, to integrate with their visual environment, with consideration for local scale and character.
- Use project-related facilities to integrate vacant or underused areas into the neighborhood, or to improve the visual character of neighborhood areas along the Project corridor. Project elements should consider their surroundings and be visually designed to have a relationship with them.
- Where projects elements are added in highly visible or sensitive areas, use high quality design and materials that mitigate the overall impact and blend into the visual environment.
- Where possible, avoid demolition or alteration of contributing historic structures.
- Reduce or buffer the loss of existing visual resources through the addition of new street trees and other landscaping elements.
- Reduce obstructions or limitations to either officially designated or socially recognized views.
- Consider aesthetic treatments for the design of new/replacement bridges, overhead structures or elevated sections of the ballasted trackway to improve compatibility with surrounding areas. If more appropriate, structures should be designed to contrast with their surroundings, so as to create a visual statement.
- Where possible, make location-specific design adjustments to the street cross section (narrower lanes, elimination of a turn lane, narrower sidewalks, etc.) to avoid impacts to existing structures, slopes or vegetation.
- Use elements such as landscaping, streetscaping or fencing to provide an aesthetically pleasing visual buffer between the Project and adjacent high-sensitivity viewers.
- Adopt a strategy of coordinated street furnishing to create a harmonious visual environment. Elements include signage, wayfinding, street furniture, lighting, hardscaping and public art.
- Use terraced vegetated landscaping to minimize the visual impact of large retaining walls where possible.
- Replace/restore removed vegetation and landscaping where possible.
- Consider vegetated trackway or alternatives to concrete trackway where appropriate.
- Where remnant parcels are created that are too small to be developed separately, use them for appropriate productive land use, such as public art, hardscaping, landscaping and/or community amenities, to make them visually appealing.

In each affected neighborhood, the Council recognizes that potential mitigation measures will vary to fit neighborhood scale, character and concerns. In some neighborhoods, potential measures could improve the visual character of impacted areas. In other areas, the Southwest Corridor Project will be a prominent visual feature even with mitigation. The Council finds that measures to reduce adverse visual impacts could be imposed as conditions of approval during final design or, if reasonable and necessary, by the affected local governments during the local permitting process.

Finally, the Council notes and finds that how one responds to a change in visual appearance can be highly subjective. While some may consider Project improvements as having a negative impact, others might like the visual change. The Tilikum Crossing Bridge associated with the Portland to Milwaukie light rail line is a case in point.

Neighborhood Quality of Life. As indicated in Section 4.4.3 of the DEIS, overall, the Southwest Corridor will improve quality of life in surrounding neighborhoods. The Project will generally improve transit access for neighborhoods with more reliable light rail service and improved station access. New or improved pedestrian and bicycle facilities will provide better transportation options. Quality of life could be negatively impacted in limited areas by some shifts in traffic patterns, increased congestion, removal of on-street parking, and the introduction of a new source of noise and vibration along the alignment would also be a negative impact. However, the Council finds that these impacts are outweighed by the benefits to neighborhoods.

Other. Other social impacts include reduction in property values, property acquisitions not requiring displacements, loss of trees along roadsides and in neighborhoods, and perceived reductions in “quality of life” associated with LRT and highway improvements, both during construction and in the long term. Construction impacts are addressed in the Short-Term Impacts portion of these findings. The Council finds that there may be reductions in property values, especially during the construction phase, but it believes that most of these properties will increase in value following completion of construction. The Council also finds that residing immediately next to the alignment or a station may result in some property owners experiencing perceived reductions in quality of life. Others may see a reduction in quality of life associated with increased density that might result from the proximity of rail to an area. These are very subjective matters that can vary from individual to individual. Landscaping and noise barriers where appropriate might help mitigate adverse impacts. Where trees are removed, potential mitigation includes tree replacement.

As mentioned above, indirect impacts to communities could occur as a result of station area developments. Some additional residents and businesses could be displaced by redevelopment or by increasing rents and property taxes. The Council finds that these changes to existing communities could disrupt social ties and impact neighborhood cohesion in areas near the stations. However, the increased supply and range of housing types that could be developed could also offset these impacts.

Other social benefits include improved quality of life from lower and more reliable transit travel times, resulting in more time for people to spend doing things other than commuting.

Urban Form Impacts

As discussed above, and as described in DEIS Chapter 1, to help meet expected levels of growth, Metro’s *2040 Growth Concept* for land use in the region calls for “town center” development in Tigard and West Portland. A town center is intended to provide services to tens of thousands of people within a 2- to 3-mile radius with one- to three-story buildings for

employment and housing, and to be well served by transit. This regional land use strategy is supported by Tigard's adopted *High Capacity Transit Land Use Plan*, which identifies preferred station community concepts. The Tigard Triangle, however, is surrounded by congested regional highways and has only basic transit service. The Council finds that providing light rail transit to this area, which has half the acreage of downtown Portland, would allow for multi-story mixed-use development to accommodate a substantial portion of the growth in population and jobs in locations that can be efficiently serviced. The City of Portland's Barbur Concept Plan also supports this regional strategy. The Council finds that light rail transit is critical to the fulfillment of that plan, including higher intensity infill development.

The *2035 Regional Transportation Plan* identifies the investments in multiple modes of transportation that will help accommodate the location and types of development designated by the *2040 Growth Concept*, noting that "HCT [high capacity transit] investments help the region concentrate development and growth in its centers and corridors." The *Regional Transportation Plan* designates a high capacity transit system interconnecting the central Tigard and west Portland town centers and Portland's city center as a near-term regional priority.

The Council finds that development around light rail stations can also readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. In anticipation of future high capacity transit, jurisdictions in the Southwest Corridor have permitted higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of households that are smaller, have a modest household income or both. The Council finds that these density-enabling land use regulations will allow more homes to be built for the region's growing population, thus expanding the housing supply and meeting the demand for housing that, if not addressed, can cause exceptional appreciation in housing prices.

High capacity transit services also mean that new residential and employment uses can lower the amount of necessary onsite parking—due to easy access to jobs and services via transit, biking or walking—which reduces the cost of new development. The Council finds that such multimodal access is possible as a result of the region's existing high capacity transit network, into which the new line would connect.

In addition, the Council finds that as the region grows, implementation of light rail will be critical to improving transit connections between jobs and residences. Light rail stations that can be accessed by a variety of travel options, including biking, walking or taking local transit, will allow the growing number of people in the Corridor and region to have better mobility while limiting impacts to the environment and to quality of life.

In summary, the Council finds that the Southwest Corridor Project's impacts to urban form will benefit surrounding neighborhoods—as well as the region—by helping to increase the supply of housing, improving mobility and access to services, and improving connections to employment.

Safety Impacts

Security Concerns. The Council is sensitive to the importance of safety and security at stations and in neighborhoods affected by the Southwest Corridor Project. For the Project to succeed, passengers must feel safe using the stations and trains. Based on local data within the TriMet system, as well as on findings at the national level, the Council finds that the introduction of light rail would not cause more crime on a per capita basis. However, park-and-rides can increase property crimes, because large numbers of parked vehicles can be potential targets for criminals. However the Council finds that with appropriate location and design, and with implementation of system-wide transit security measures as described below, most security impacts can be mitigated.

The Council finds that TriMet has a dedicated transit police division of assigned staff from local police agencies, operating out of four transit police precincts. The division works cooperatively with local law enforcement agencies, as well as fire and other emergency responders, to respond to incidents. TriMet also works with the federal Transportation Security Administration for specialized services and support. The Southwest Corridor Project would feature the same safety and security techniques and systems that are applied throughout the regional transit system, which includes the MAX system. TriMet's transit police and contracted security staff patrols and supporting resources, technology, and safety and security systems would be expanded to address the additional facilities developed as part of the Project.

TriMet would continue to apply its established transit rider security program that combines TriMet surveillance and enforcement with public safety resources from other jurisdictions and agencies in the Corridor. TriMet would continue to coordinate with agencies that are part of TriMet's system-wide fire, life and safety program; all of the agencies in the Southwest Corridor already participate in the program.

TriMet's system has other standard safety and security features that would be employed for the Southwest Corridor Project. Security cameras are placed on all vehicles and facilities. This includes trains, buses, transit centers and station platforms. Transit police, fare inspection teams and security patrols would serve the new LRT line. TriMet also employs Crime Prevention through Environmental Design (CPTED), which is a multidisciplinary approach to designing public facilities to help deter criminal activity. One of the primary principles of CPTED is to maximize the visibility of a public facility and avoid creating blind or hidden areas. Open areas that are highly visible to other transit users as well as to transit staff, police and people in surrounding areas are more likely to deter criminals, because there is a greater likelihood that an offender will be detected and apprehended. This strategy combines active surveillance and enforcement by TriMet with what is often called "eyes on the street," or "natural surveillance," by which people perceive they are in a place where they can be seen by others.

The Council finds that for all facilities, final design and operations planning will consider best CPTED practices, including modified siting or layout concepts; the use of lighting, communications, electronic and security/police surveillance; and controlled entry. For

unique facilities such as the Marquam Hill Connection and for park-and-ride facilities, a combination of customized site-specific measures could be necessary, and would be developed in consultation with local agencies, emergency service providers, OHSU and PCC.

TriMet is committed to maintaining a safe and effective transit system. As the project continues into final design, the Council finds that TriMet would continue to develop and refine specific safety and security measures in consultation with the Corridor jurisdictions by doing the following:

- Park-and-rides and station area design will consider site-specific measures to maximize security and discourage criminal activity.
- All Marquam Hill Connection options will consider design features that provide enhanced visibility and lighting along with safety features to monitor potential criminal activity.
- Bicycle and pedestrian facilities will consider design features that enhance visibility and discourage criminal activity.
- During final design, TriMet would form a Project Safety and Security Committee comprising internal operations staff, staff from local jurisdictions, project design staff and maintenance staff. The committee will review CPTED approaches being applied to the project.
- TriMet would prepare a Safety and Security Management Plan addressing potential safety hazards and security vulnerabilities.

The Council also finds that TriMet would form a Fire, Life and Safety Committee for the light rail project composed of police, fire and safety personnel, and other emergency services providers in the Corridor, to advise on design development and operations planning. This committee would review and advise on procedures, staff levels, and safety and security concerns.

Emergency Vehicle Access. In the Inner and Outer Southwest Portland Segments, no police or fire and rescue facilities within the City of Portland would need to be relocated for the Project. Similarly, in the Tigard/Tualatin Segment, neither the Tigard Police Department nor the Tualatin Police Department has facilities that would be directly impacted. A portion of property for the Tualatin Valley Fire and Rescue's Command Center and Station 51 would be acquired in the Tigard/Tualatin Segment. However, the area to be acquired is currently vacant and unused; the center and station would not require relocation and would remain fully operational.

Localized access to properties by fire, police and ambulance vehicles could be affected by changes in local street configurations throughout the Corridor. These alterations would include modifications to fire and emergency medical services response routes. In the Inner and Outer Southwest Portland Segments, LRT would operate in the median of SW Barbur Boulevard for a large portion of the alignment. This operation of LRT in the median would result in changes in access, circulation and response times for law enforcement, fire response and other emergency service providers.

The changes to roadways would include new and modified intersections and traffic signals; the addition of crossing gates in some locations; and new or modified structures in other locations. Portland Fire and Rescue relies on a pre-emption Opticom system maintained by the City of Portland Bureau of Transportation. Portland Fire and Rescue considers development of this system in the Corridor critical for safety and response times. In portions of the alignment where LRT would operate in the median, crossings of the median would be restricted for general traffic and could also be restricted for emergency vehicles. In addition, these modifications to emergency response routes, configurations and facility types will typically require additional training and new procedures for police, fire and emergency response personnel.

In the Tigard/Tualatin Segment, as within the City of Portland, there would be gated intersections, new traffic signals, new median barriers and other obstacles associated with light rail along critical emergency response routes, such as SW Hall Boulevard, which could delay emergency vehicles.

The Council finds that planning and coordination with the service providers before the Project begins operation would mitigate the long-term impacts that the Project would have on the routes and operations of public services. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and emergency services, so that they can safely and effectively respond to emergencies involving light rail. The Council finds that TriMet already has an existing fire, life and safety coordination program with the City of Portland, which would be expanded to include providers in Tigard and Tualatin.

Health Impacts. The primary human health-related impact from the Southwest Corridor Project is related to air quality. As further described in Section 6.3.7 of these findings, the Project will improve air quality in the long term due to reduced criteria pollutants and mobile source air toxics, compared with No-Build conditions. The Council finds that improved air quality will have positive human health benefits for neighborhoods.

Additionally, as indicated in Section 1.2 of the DEIS, one of the goals of the Project is to advance transportation projects that increase active transportation and encourage physical activity. Numerous studies cited by Metro's *Benefits of Active Transportation and Considerations for Implementation* report (a supplemental report of Metro's 2014 *Regional Active Transportation Plan*) indicate that access to active modes of transportation such as walking and bicycling help reduce the risk of life-threatening health conditions. As such, the Council finds that improvements to sidewalks, bicycle facilities, and other active transportation improvements associated with the Southwest Corridor Project are likely to have positive health impacts for surrounding communities.

Finally, the Council believes and finds that traveling by light rail during rush hour will be less stressful than driving in highly congested conditions, and that this will have positive health benefits.

Traffic Impacts

The Southwest Corridor Project will have long-term positive and negative impacts on the regional transit system, the regional highway system, and the local road system. Project impacts to the freight system are described under economic impacts. Detailed information on the transportation impacts of the Project is provided in Chapter 3 and Attachments A and B to the DEIS. Key findings on general impacts are highlighted in this section, with more detailed findings provided on a segment-by-segment basis in Sections 6.4.1.2, 6.4.2.2, and 6.4.3.2 of these findings.

The transportation analysis methods were developed to comply with the National Environmental Policy Act (NEPA); local and state policies, standards, and regulations; and to respond to community concerns raised through environmental scoping, and in consideration of the substantial analysis completed prior to the DEIS, in 2014 and 2016, for the corridor. The methods generally follow prevailing transportation engineering analysis practices, tailored to the needs and expectations of project partner agencies. Draft methods including potential study areas, time periods, and approach were developed and presented to partner agencies at a Transportation Methods Workshop on January 24, 2017. Agencies were provided the opportunity to review and comment on the DEIS, and approximately 200 comments from eight partner agencies were received. Revisions were made to the methods to address agency comments as appropriate and consistent with the project scope, and the methods were finalized upon Federal Transit Administration approval on June 9, 2017. The Council finds that based on the foregoing, the methods used to identify impacts and to conduct transportation analysis were reasonable. The Council also finds that while some traffic impacts have been identified to date, there may be additional traffic impacts (on transit, highway, and streets) that will only be identified after further design, engineering and study conducted as part of the FEIS process.

Transit Impacts. Impacts of the Project on transit service are highlighted below and are generally positive. For comparison purposes, they are measured in some instances against the “No-Build” Alternative described in the DEIS. The analysis indicates transit impacts for the year 2035.

- **Travel Time.** Compared to the No-Build Alternative, light rail would reduce the PM peak-hour in-vehicle transit travel time from Portland State University to Bridgeport Village from 38 minutes (via TriMet bus line 96 Tualatin Express) to 33 minutes. When compared to local bus service, travel time reductions are even greater; light rail would reduce transit travel between PSU and Bridgeport Village by 29 minutes. The improved transit travel time makes it more comparable to auto travel times, although auto travel via I-5 from PSU to Bridgeport Village, is still forecast to be slightly shorter at 29 minutes during the PM peak.
- **Reliability.** Light rail lines in the TriMet system use reserved or exclusive right of way and exhibit greater percentages of on-time arrivals than do buses operating in mixed traffic, which are subject to traffic congestion and delay. The light rail alignment on SW Barbur Boulevard between downtown Portland and the SW Capitol Highway ramps would be paved to accommodate buses as well as light rail.

Use of this shared transitway would allow buses to avoid congestion and improve travel times and reliability as well.

- **Ridership.** With introduction of the Southwest Corridor Project, total transit ridership in the Corridor, including riders on light rail, buses and commuter rail in the Corridor, would be 8 percent greater than with the No-Build Alternative. Total system-wide transit ridership would increase over the No-Build Alternative by 17,800 to 18,600 average weekday trips.

Figure 323-2 of the *Transit Impacts and Travel Demand Forecasting* report also illustrates the supporting bus network for the Southwest Corridor Project, compared to the No-Build Alternative. As indicated in that report, the supporting bus network for the Project includes all the transit network improvements in the No-Build transit network and incorporates light rail from downtown Portland to Bridgeport Village. It includes some adjustments to local service, mainly to eliminate or modify bus routes that would duplicate light rail service, and to adjust bus routes to serve light rail stations or transit centers. It assumes new and expanded park-and-rides at the locations specified for the recommended alignment. TriMet will make final decisions on bus service and routing shortly before the opening of light rail service.

In summary, the Council finds that the impacts of the Southwest Corridor Project on transit service are generally positive.

Highway and Street Impacts. DEIS Section 3.2 and the *Transportation Impacts Results Report* evaluate impacts of the Project on the highway and street network. The system-wide analysis reviews motor vehicle travel patterns, including changes to circulation patterns as well as the potential for traffic to divert to other streets. The analysis considers existing conditions for comparison, but it reflects future travel conditions with and without the project (No-Build Alternative compared to the light rail alternative). Future traffic levels would be higher than today in all segments for the No-Build Alternative as well as for the light rail alternative. However, future traffic levels would generally be lower with the light rail alternative than with the No-Build Alternative.

Transit improvements in the Southwest Corridor could affect traffic congestion in two basic ways. First, these improvements could divert trips from automobiles to transit, resulting in reduced *system-wide* vehicular travel. Second, transit facilities could also affect *localized* traffic operations on highways and streets in the Corridor area. The localized effects are described in detail in the segment findings.

Based on the information in the DEIS and the Transportation Impacts Results Report, the Council finds that the Southwest Corridor Project will not have adverse *system-wide* transportation impacts. Light rail will generally result in lower north-south traffic volumes than the No-Build Alternative. In the Inner Southwest Portland Segment, the Project would result in improved transit access to/from downtown Portland, converting motor vehicle trips to/from downtown into transit trips. Light rail will reduce peak-hour vehicle trip volume on several key streets, such as SW Barbur Boulevard and SW Capitol Highway. The only location where north-south traffic volume is expected to increase (by less than 1 percent) is

in a portion of the Tigard/Tualatin Segment, due to vehicles accessing the park-and-ride lots that are adjacent to I-5. The Council generally finds that the South/North Project will have positive system-wide transportation impacts.

As indicated in DEIS Section 3.1.4, *localized* impacts to motor vehicle operations are identified based on two measures, volume-to-capacity (V/C) ratio at intersections and queuing at intersections. The V/C ratio compares the number of vehicles making various movements at an intersection (e.g., through, right-turn and left-turn movements) with the capacity of the intersection to accommodate those movements. Queuing refers to vehicles lining up and potentially blocking adjacent intersections or stacking up on freeway off-ramps. These impacts could be the result of changes in traffic volumes related to the provision of light rail service (particularly the access to and egress from park-and-ride lots), light rail priority treatments at intersections, modifications to existing roadway cross-sections which reduce roadway capacity, or at-grade street crossings by light rail.

In general, the Council finds that a range of measures is available to mitigate the adverse impacts of the Southwest Corridor Project on the local transportation system. Opportunities for mitigation of long-term impacts are identified in DEIS Table 3.3-1, based on key intersections where the Project would cause the operations to exceed the V/C targets or increase queue lengths in locations where the additional queuing would impact intersection or freeway operations compared to the No-Build Alternative. The Council finds that these measures include physical modification, such as grade separations or added lanes, or operations changes such as adding signals, signal phasing, cycle lengths and coordination, or different LRT preemption strategies. A determination regarding mitigation will be made in consultation with the local jurisdiction or operating agency, based on engineering plans prepared for the final environmental impact statement and construction permits. Specific mitigation strategies that may be available for impacted intersections are addressed in the segment findings. Based on the information in the *Transportation Impacts Results Report* and the DEIS, the Council is confident that mitigation options are available to address adverse local traffic impacts that have been identified at this point and that will be identified through further design and engineering.

Regarding transportation safety impacts, the Project would improve pedestrian and bicycle safety by increasing the number of marked pedestrian crossings of SW Naito Parkway and SW Barbur Boulevard, and providing bicycle lanes along all portions of the alignment where light rail is at-grade in a street. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. In the Outer Southwest Portland Segment, LRT improvements would provide a more substantial median barrier that would help reduce the collision risk at the “Barbur curves” trouble spot, which accounted for 4 out of 10 fatal collisions in the study area between 2011-2015. The Project would introduce at-grade roadway crossings with light rail, which will follow TriMet’s Design Criteria for at-grade crossings. Where shared freight crossings are proposed, TriMet will coordinate during design and comply with regulations related to shared freight rail roadway crossings. This coordination will include the railroad, local roadway authorities, the State Safety Oversight Agent and the Federal Railroad

Administration during design and permitting phases. The Council concludes that these methods and devices provide for a safe multi-modal environment.

Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council's decision to approve the Southwest Corridor Project as applied-for by TriMet provides for a light rail route, light rail stations and lots, and a maintenance facility as identified in the LUFO.

The Council finds as well that this project will achieve the primary project purpose as adopted by the Southwest Corridor Steering Committee⁷: *The purpose of the Southwest Corridor light rail project is to directly connect Tualatin, downtown Tigard, Southwest Portland, and the region's central city with light rail, high quality transit and appropriate community investments in a congested corridor to improve mobility and create the conditions that will allow communities in the corridor to achieve their land use vision* (Metro, 2016). The Steering Committee also adopted the following objectives for the project:

- Provide light rail transit service that is cost-effective to build and operate with limited local resources
- Serve existing transit demand and significant projected growth in ridership resulting from increases in population and employment in the corridor
- Improve transit service reliability, frequency, and travel times, and provide connections to existing and future transit networks including WES commuter rail
- Support adopted regional and local plans including the *2040 Growth Concept*, the *Barbur Concept Plan*, the *Tigard Triangle Strategic Plan* and the *Tigard Downtown Vision* to accommodate projected significant growth in population and employment
- Complete and enhance multimodal transportation networks to provide safe, convenient and secure access to transit and adjacent land uses
- Advance transportation projects that increase active transportation and encourage physical activity
- Provide travel options that reduce overall transportation costs
- Improve multimodal access to existing jobs, housing and educational opportunities and foster opportunities for commercial development and a range of housing types adjacent to transit

⁷This Steering Committee was created by Council in 2011 to identify a high capacity transit strategy for the Southwest Corridor. It differs from the LUFO Steering Committee assembled to comply with House Bill 3202.

- Ensure benefits and impacts promote community equity
- Advance transportation projects that are sensitive to the environment, improve water and air quality, and help achieve the sustainability goals and measures in applicable state, regional, and local plans

The project goal and objectives closely parallel the emphasis of Criterion 3(A) for this Land Use Final Order. The effectiveness evaluation of the Southwest Corridor Project relative to meeting the project purpose is provided in DEIS Section 5.1 and summarized below, as it applies to Criterion 3(A).

Address the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership.

The LRT Project offers high capacity transit service to help meet the projected growth in demand for transit trips in the Corridor while reducing congestion along major arterials within the Project area, including I-5 and SW Barbur Boulevard, as compared to the No-Build alternative. The Project serves major employment centers along the Corridor, including five colleges and universities (OHSU, PSU, National University of Natural Medicine, PCC-Sylvania campus and George Fox University), the region's largest shopping destinations (including Bridgeport Village), the Kruse Way employment area, and industrial areas south of downtown Tigard. These areas are expected to be large sources of future transit ridership. The Council finds that the Project will also facilitate transit service to future mixed-use residential and commercial centers ("town centers"), as called for by Metro's *2040 Growth Concept*, in Tigard and West Portland. The Southwest Corridor Project will provide stations that serve each of these targeted growth areas. Providing light rail transit to these areas would allow for multistory mixed-use development to accommodate a substantial portion of the anticipated growth in population and jobs in locations that can be efficiently serviced. In addition to the employment centers mentioned above, the Project will connect these residential centers to the Central Business District of downtown Portland. The Project will also provide service to several major recreational areas, including Terwilliger Parkway, George Himes Natural Area Park, and the Fields Natural Area. And the Project will conveniently connect the Southwest Corridor area with the other parts of the metropolitan area served by light rail transit.

The Council finds that as a result of providing service to these key residential, employment, and recreational areas, the Project is expected to result in an 8 percent increase in total transit ridership in the Corridor by the year 2035, compared to the No-Build Alternative.

Address the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety.

As discussed above under Urban Form Impacts, the Council finds that light rail transit is critical to achieving compact, efficient development in town centers, as called for by the *2040 Growth Concept*. Development around light rail stations can readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. In anticipation of future high capacity transit, jurisdictions in the

Southwest Corridor have permitted higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of a greater range of household sizes and incomes.

The Council finds that the Project will enhance safety for pedestrians and bicyclists by increasing the number of marked pedestrian crossings of SW Naito Parkway and SW Barbur Boulevard, and providing bicycle lanes along all portions of at-grade light rail. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. In the Outer Southwest Portland Segment, LRT improvements would provide a more substantial median barrier that would help reduce the collision risk at the “Barbur curves” trouble spot, which accounted for 4 out of 10 fatal collisions in the study area between 2011-2015. The Council also finds that the Project will be designed to address security concerns at stations and along the Corridor by employing best CPTED practices, lighting, communications, electronic and security/police surveillance, and controlled entry, and that the Corridor will be patrolled by TriMet’s dedicated transit police.

Address the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council finds that the Project will provide many positive impacts to neighborhoods, and that adverse impacts can be mitigated, as discussed above under Economic and Social Impacts. Positive impacts include improved transit access to local and regional jobs and community facilities, new or improved pedestrian and bicycle facilities, and enhanced health and quality of life. The LRT Project will also help reduce vehicle miles traveled in the region, by offering a viable alternative to travel by automobile or by bus on congested local streets, and will generally result in lower north-south traffic volumes than the No-Build Alternative.

The Council finds adverse traffic impacts can be mitigated to operate within acceptable levels of service. Determinations regarding mitigation will be made in consultation with the local jurisdiction or operating agency. The Council finds that TriMet has made significant attempts to minimize displacement of businesses and residents by the Project. However, where displacements are unavoidable, relocation assistance will be available to assist affected businesses and residents. The relocation program will be designed in compliance with federal requirements and with TriMet’s Acquisition and Relocation Policy, Procedures, and Guidelines, which requires property owners and tenants to be treated uniformly and fairly. Residential displacements affecting minority and low-income populations would be mitigated to levels that would be below high and adverse effects. The Council further finds that the Southwest Corridor Equitable Development Strategy will help mitigate long-term indirect impacts to neighborhoods caused by redevelopment around station areas and rising property values.

Conclusions Regarding Neighborhood Impacts

In summary, the Council finds and concludes that the selection of the light rail route stations, lots and maintenance facilities, including their locations, has included a balancing of:

- the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;
- the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety;
- and the need to protect affected neighborhoods, districts and centers from identified adverse impacts

The Council further finds and concludes that the Southwest Corridor Project will enhance transit service to areas all along the Southwest Corridor and improve connections and mobility throughout the Portland metropolitan region; that the presence of light rail transit within the Southwest Corridor will encourage and support new and efficient development, consistent with Metro's 2040 Growth Concept, that will benefit the affected local communities and the region; and that the improved accessibility provided by the Southwest Corridor Project, and its many benefits, especially when compared with the No-Build Alternative, combined with available measures to mitigate adverse impacts created by the Project, result in a substantial net benefit to the affected local communities, the region and the state.

For the reasons stated herein and in the segment findings, the Council finds that it has considered the adverse economic, social and traffic impacts of the Project and balanced these impacts against the Project's benefits. It finds and concludes that the Southwest Corridor light rail line will make a significant positive contribution to the quality of life in the Portland region, through improved mobility, decreased congestion, improved air quality, reduced energy consumption, and decreased reliance on the automobile, which will benefit Oregonians now and well into the future. It further finds that light rail transit can and will stimulate and enhance development of an efficient and compact urban form in appropriate locations identified for such development. It also finds that with mitigation imposed as part of the NEPA process or during local permitting processes, most of the adverse consequences identified in these findings can be reduced or avoided. Potential mitigation measures are identified in these General Findings and in the segment findings.

Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.

The major highway improvements in the Inner Southwest Portland Segment are as follows:

- Inner Southwest Portland Segment

- A Marquam Hill Connection connecting the SW Gibbs Street Station to the medical and educational facilities on Marquam Hill. The connection will use some combination of elevators, bridges, paths and/or tunnels.
- Reconstruction of the Newbury trestle bridge and Capitol Highway overpass and the Vermont trestle bridge.
- Vehicular, pedestrian and bicycle improvements within and along the alignment north of the I-405 freeway and within and along SW Barbur Boulevard, including sidewalks and bicycle improvements, and minor elements such as signalization, electrification, and retaining walls.
- Outer Southwest Portland Segment
 - Street improvements on SW 53rd Avenue between SW Barbur Boulevard and the Portland Community College (Sylvania) Campus.
 - Vehicular, pedestrian and bicycle improvements within and along SW Barbur Boulevard and in the vicinity of SW Taylors Ferry Road/SW Capitol Highway/SW Barbur Boulevard, including sidewalk and bicycle improvements, and minor elements such as signalization, electrification, and retaining walls.
- Tigard/Tualatin Segment
 - Construction or reconstruction of segments of SW 70th Avenue between SW Baylor Street and SW Elmhurst Street and on SW Elmhurst Street between SW 70th Avenue and SW 72nd Avenue.
 - Street improvements on SW Hall Boulevard between SW Hunziker Road and the WES Commuter Rail/Portland and Western railroad tracks to improve pedestrian and bicycle access to the SW Hall Boulevard (Tigard Transit Center) Station.

The Council finds that most of these highway improvements will have positive impacts on nearby neighborhoods and improve opportunities for pedestrian, bicycle and vehicle circulation in the Corridor. The Marquam Hill Connection will provide enhanced pedestrian access to the medical and educational facilities on Marquam Hill for nearby residents, and for those connecting via light rail. Although there are concerns about impacts to natural resources and park facilities associated with the Marquam Hill Connection, the Council finds that adverse impacts can be adequately mitigated, as discussed in the segment findings below.

Pedestrian and bicycle improvements on SW Barbur Boulevard, SW 53rd Avenue, SW 70th Avenue, SW Elmhurst Street, and SW Hall Boulevard will improve access and safety for neighborhood residents and employees. No adverse impacts are anticipated for these improvements.

The reconstruction of the Newbury trestle bridge and Capitol Highway overpass and the Vermont trestle bridge are necessary to accommodate the LRT alignment and will also accommodate bicycle lanes on the Newbury and Vermont bridges, which is a benefit to bicycle safety and connectivity in the Corridor. Both of these bridges are identified as being

eligible for the National Register of Historic Places; therefore, their removal would be considered an adverse impact to historic and cultural resources. However, as indicated in the segment findings, the Council finds that impacts to affected historic resources can be adequately mitigated.

The Council concludes that the benefits of these highway improvements strongly outweigh the adverse impacts that are associated with them.

6.3.2: Criterion 4: Noise Impacts

Identify adverse noise impacts and identify measures to reduce noise impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.

General Overview of Noise and Vibration Impacts and Mitigation Measures

Noise is a form of vibration that causes pressure variations in elastic media such as air and water. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness, and these differences are measured in decibels, or dBs. Vibrations can also be carried by ground, in which case they are described in terms of vibration velocity levels in dB referenced to one micro-inch per second. As with air or water borne vibrations, ground vibrations have a threshold of human perception. Because air and ground borne vibrations have similar properties and are measured in similar ways, the Council finds that vibration impacts are appropriately considered with noise impacts in these findings.

Noise and vibration impacts are identified, along with corresponding mitigation measures, in Section 4.11 of the Draft Environmental Impact Statement (DEIS). The specific methodology for evaluating noise and vibration impacts is described in the *Noise and Vibration Results Report* (Attachment E of the DEIS). The Council accepts the methodology established in the *Noise and Vibration Results Report*, and it adopts and incorporates by reference herein the facts set forth in that document. Supplemental information is also provided in a memorandum prepared by Parametrix with the subject “Analysis to support LUFO findings,” dated November 5, 2018 (Parametrix memorandum). The Council adopts and incorporates by reference herein the facts set forth in that document.

Generally, acceptable noise and vibration impacts vary according to type of land use; i.e., residential land uses are affected at lower decibel and vibration levels than commercial or industrial land uses. The Federal Transit Administration Noise Impact Criteria groups noise sensitive land uses into the following three categories:

- **Category 1:** Buildings or parks where quiet is an essential element of their purpose.

- **Category 2:** Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and office buildings which depend on quiet as an important part of operations.

The FTA criteria define two levels of impact, *severe impact* and *moderate impact*, as summarized below:

- **Severe:** Severe noise impacts are considered “significant” as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical method of mitigating the noise.
- **Moderate:** In this range, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost effectiveness of mitigating noise to more acceptable levels.

The main goals of noise and vibration criteria as they apply to a new transit facility, or to an extension of existing facilities, are to minimize impacts on the community resulting from transit system construction and operation by controlling transmission of noise and vibration to adjacent properties.

Existing noise and vibration levels were measured at representative locations throughout the Southwest Corridor, as shown in Figures 4.11-2, 4.11-3, and 4.11-4 of the Southwest Corridor DEIS. Tables 5-1, 5-2, and 5-3 in the *Noise and Vibration Results Report* summarize the noise measurement results, indicating the monitoring location and the measured noise levels. Relevant Federal and State noise and vibration impact criteria are listed in Chapter 3 of the *Noise and Vibration Results Report*.

The projected noise and vibration impacts of the Southwest Corridor Project are described in Sections 4.11.3-4.11.5 of the DEIS. The following types of impacts were analyzed: traffic noise from roads and highways that would be modified by the Project; traffic noise at park-and-ride lots and transit centers; LRT operational noise; LRT wheel squeal; noise from LRT ancillary facilities such as operations and maintenance facilities; and LRT ground-borne vibration. The noise and vibration impacts associated with the Southwest Corridor Project are summarized in Tables 4.11-1 and 4.11-3 of the DEIS, and summarized below.

Road Traffic and Bus Noise Impacts and Mitigation. Noise impacts resulting from LRT-induced changes to roads and to motor vehicle (including bus) traffic volumes and patterns are described in Section 4.11.3 of the DEIS and Sections 4.1.4 and 6.5 of the *Noise and Vibration Results Report*. Because the Project is being constructed in a largely built-up, urban environment, existing noise levels in the affected areas are already high in many segments. The potential to create or increase exposure to traffic noise as a result of the

transit project was evaluated qualitatively. As defined in FHWA noise abatement policy (FHWA, 2011), changes in the traffic noise environment could occur if the Project creates new roadways or alters existing roadways in relation to noise-sensitive properties, or changes the pathway for traffic noise by removing or altering barriers (buildings, berms or walls) that currently provide some level of shielding from traffic noise.

More detailed noise modeling will be performed for the light rail alignment and will be included in the FEIS. This detailed modeling will use the FHWA Traffic Noise Model (TNM), and will consider roadway modifications and removal of shielding. Noise mitigation was considered for areas where traffic noise impacts are expected. Most of the receiver sites found to have potential traffic noise impacts also have noise impacts related to light rail operations. Therefore, in many cases, a noise wall proposed for light rail will also provide mitigation for traffic noise. In this case, the design of the light rail walls would be modified to also accommodate traffic noise mitigation. During preparation of the FEIS, noise modeling will determine if walls proposed for the light rail alignment could be modified by increasing wall heights and length to also provide mitigation of traffic noise impacts. Details about potential traffic noise impacts specific to the segments are provided in the segment findings.

Potential noise impacts for the park-and-rides and transit centers along the Southwest Corridor route are summarized in the *Noise and Vibration Results Report*. Expected impacts are addressed by segment in Sections 6.4.1.3, 6.4.2.3, and 6.4.3.3 of these findings. Noise mitigation for park-and-ride facilities includes station design and sound walls. Station design can include designing the parking garages with short noise barriers, and modifying the entrances and exits to place them away from nearby noise-sensitive properties. In addition, noise barriers can be placed between the station and the noise-sensitive properties, reducing noise levels and eliminating noise impacts. Most, if not all, anticipated noise impacts could be mitigated through the use of these kinds of noise mitigation measures.

LRT Operational Noise Impacts and Mitigation. LRT operational noise includes the normal noise from the operation of light rail vehicles and includes noise from steel wheels rolling on steel rails and from propulsion motors, air conditioning, and other auxiliary equipment on the vehicles such as warning bells. Projected LRT operational noise levels have been modeled based on measurements of existing LRT systems, the length and speed of trains, rates of acceleration and deceleration, location of special trackwork, type of track, auxiliary equipment and other factors. Table 4.11-1 of the DEIS summarizes potential operational LRT noise impacts along the Corridor. Specific wayside LRT noise impacts are described on a segment-by-segment basis in Sections 6.4.1.3, 6.4.2.3, and 6.4.3.3 of these findings.

Options generally available to mitigate the operational noise impacts include sound walls and special track work. Special track work includes movable point or spring rail frogs, which eliminate the gap between tracks at crossovers that causes noise and vibration at these locations. Track crossovers are mechanical devices that enable light rail cars to be guided from one track to another at a junction point. Spring-rail frogs and movable-point frogs solve the added noise and vibration problem of standard frogs at crossovers by closing the

gap on the rails. When source mitigation measures or sound walls are infeasible or not entirely effective at reducing noise levels below the FTA impact criteria, residential sound insulation would be evaluated on a case-by-case basis.

LRT Wheel Squeal Impacts and Mitigation. Wheel squeal noise is generated by the train wheels as they traverse a curve. Typical maximum noise levels associated with wheel squeal can range from 75 dBA to 90 dBA at 50 feet. Whether wheel squeal occurs and how loud it is depends on many factors, including the material used to make the rail, the level of wheel/rail contact point lubrication, the sharpness of the curve, train speed and wheel profile. During periods of continuous rain the level of squeal can be dramatically reduced as water can act as a lubricant, allowing the wheels to slip, reducing or eliminating the squeal. There are several locations in the Southwest Corridor where track curvature is acute enough to create wheel squeal impacts.

Wheel squeal impacts are addressed by segment in sections 6.4.1.3, 6.4.2.3, and 6.4.3.3 of these findings. TriMet's primary method of mitigating wheel squeal is through the use of a vegetable-based trackside lubrication system and friction modifiers. The lubricants can be applied by personnel working trackside or by an automated applicator along the tracks or on the trains. For example, applicators for these lubricants could be used in any locations with curves of less than 300 feet near residential areas include lubrications, and site with curves of 400 to 600 should be prepared to accept a lubrication system should squeal occur during pre-revenue testing. TriMet's policy of providing lubrication to mitigate noise from wheel squeal would ensure that all squeal impacts would be mitigated.

Noise from Ancillary Facilities. The impacts associated with operation and maintenance (O&M) facilities are discussed in Section 6.4.3.3 of these findings (Tigard/Tualatin segment noise impacts). Noise from other ancillary facilities would include noise from power substations and general system maintenance. All power substations will be contained in buildings that acoustically shield the noisy equipment from nearby noise-sensitive properties. In addition, general system maintenance will be performed in accordance with the local jurisdiction noise ordinances, and therefore, no noise impacts related to ancillary activities are predicted.

LRT Vibration Impacts and Mitigation. Vibration generated from train operations of the Southwest Corridor Light Rail Project would be transmitted from the tracks through the soil to nearby properties, which is referred to as ground-borne vibration. How well the vibration travels from the source to the receiver is a function of the ground propagation characteristics. Areas with efficient propagation characteristics typically have higher number of vibration impacts. Vibration above certain levels can disrupt sensitive operations and cause annoyance to humans within buildings. It is important to note that transit systems rarely produce vibration with sufficient magnitude to cause any structural damage.

For the Southwest Corridor Project, the majority of the vibration impacts would occur at single-family and multifamily residences, with impacts also occurring at several hotels and one church. No vibration impacts to vibration-sensitive commercial structures were identified.

The Council finds that the primary options available to mitigate vibration impacts include: the use of high compliance direct fixation fasteners, also known as HCDF fasteners, to provide vibration isolation between rails and concrete slabs; installing ballast mats for at-grade segments, where ballast and tie track are used; use of resilient fasteners between rails and the concrete base or ties, in areas with direct fixation track and along elevated trackways; and use of special track work, including movable point or spring rail frogs, which eliminate the gap between tracks at crossovers that causes increased vibration.

The Council further finds that the type of mitigation measures discussed in this section of the findings could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.3.3: Criterion 5: Natural Hazards

Identify Project improvements in areas subject to natural hazards (including landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain) and demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques that could be imposed during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.

Natural hazard impacts for the Southwest Corridor Light Rail Project are addressed in the following section. Natural hazard impacts, and associated mitigation measures, are also described in Section 4.8 of the DEIS. That report is incorporated herein by reference. Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

General Overview of Natural Hazards Impacts and Mitigation Measures

The Southwest Corridor Light Rail Project straddles both the Portland and Tualatin sub-basins, which are largely separated by the Tualatin Mountains and hills and which comprise the northernmost portion of the Willamette Valley. Section 4.8 of the DEIS describes the existing geology, soils and hydrogeological conditions that could affect or be affected by the Southwest Corridor Light Rail Project, including geology, soils, groundwater, and earthquakes and other geologic hazards. Section 4.10 describes existing conditions and potential impacts for surface waters and floodplains.

The DEIS defines the study area for natural hazard impacts as any contiguous set of conditions that are adjacent to the edge of construction. The study area scale differs depending on the resource being discussed. For example, steep slopes are generally right next to where construction occurs, but groundwater can be a large area underneath the Project that could be impacted.

Geology and Soils. The entire region has an underlying mix of volcanic and sedimentary rocks and alluvium (sediments deposited by flowing water). Soils have formed on top of these materials. The slopes south of downtown Portland and along SW Barbur Boulevard contain basalt formations. Mount Sylvania, an extinct volcanic vent, lies within the Corridor.

From downtown Portland and the South Waterfront to Tigard and Tualatin, there are areas underlain by catastrophic flood deposits (alluvium) of the Missoula Floods. Some areas near downtown Portland and along the major highways and roadways have artificial fill sitting on top of the ancient alluvial soils. More recently, smaller streams have created additional alluvial deposits.

Many of the original soils within the study area have been removed or modified by cut, fill and grading associated with land development, and are classified as urban land. Where soils within the study area are undisturbed, they consist of loam to silt clay loam. There are no existing commercial soil, aggregate or rock resources within the study area.

Groundwater. The study area straddles both the Portland and Tualatin sub-basins, which are largely separated by the Tualatin Mountains and hills. Groundwater may be encountered at shallow depths along sections of the Corridor that cross the flood plains of rivers and creeks. Other areas of shallow groundwater levels may exist locally, controlled by local variations in soil type and drainage.

Seismic Hazards. The study area is in a seismically active region, largely related to the North American continental plate converging with the Juan de Fuca oceanic crustal plate approximately 100 miles off the Pacific coast. There are several crustal faults within or near the Project area that are potentially active and could present a seismic hazard. These faults are considered potential sources for an earthquake that could cause severe ground shaking in the Project area.

Landslides and Steep Slopes. Landslide and rock fall hazard areas occur due to slope, local geology and soil conditions; precipitation and groundwater flow; freeze/thaw cycles; seismic events; and human activity. Historic landslides mapped in the study area include the slopes of hills along SW Barbur Boulevard. Marquam Hill and the other west hills of Portland along SW Terwilliger Boulevard and SW Barbur Boulevard comprise the majority of steep slopes (over 25 percent slope) in the study area. Steep slopes are more prone to erosion and have higher landslide and rock fall risks, and require special treatment to stabilize them if they are altered by project activities. Potential mitigation measures for geologic hazard impacts include application of Best Management Practices (BMPs) and geotechnical engineering standards described below.

Hazardous Soil Properties. Corrosive soils and hydric soils can be hazards to development and infrastructure projects. Soils with particular textures, and pH and salt contents can be corrosive to both concrete and uncoated steel. The northern portion of the study area, west of SW Barbur Boulevard, contains some soils that can be corrosive. Hydric soils are soils that have formed in water-saturated conditions and often are located in areas where groundwater is close to the surface. These soils lead to standing water and are generally limiting for

construction purposes. In the study area, hydric soils are found primarily in downtown Tigard and the Tigard Triangle, with discrete zones from Tigard south to Bridgeport Village.

Geologic Hazard Impacts and Mitigation. Much of the overall Southwest Corridor Project alignment and O&M facilities would generally traverse highly urbanized land. Long-term impacts to the geologic environment would be limited. These long-term impacts may include:

- Changes to localized topography and drainage patterns, which could affect existing landslide-prone areas and areas with unstable slopes;
- Minor settlement near surface features; and
- Encountering corrosive soils that could compromise concrete and steel structures.

Section 4.8.4 of the DEIS describes potential measures that could mitigate long-term and short-term geologic and geotechnical impacts. The Council finds that the potential long-term impacts can all be mitigated through design in accordance with engineering standards and applicable regulations. The Southwest Corridor Project already assumes that standard geotechnical engineering practices, which are requirements for natural hazard mitigation, and BMPs, which are above and beyond requirements, would address site-specific geologic conditions and related risks and hazards. According to section 00721 of the TriMet General Provisions, new construction must be designed and constructed in accordance with the standards for seismic safety detailed in the Department of Transportation Seismic Safety Regulations (49 CFR Part 41). Meeting these standards ensures that engineered bridges and structures for both light rail and road facilities will withstand a major seismic event.

Examples of BMPs that could be employed include:

- Avoid areas with unstable soils and/or excavate and replace remaining unstable soils with engineered fill.
- Evaluate the use of stabilizing soils or supporting structures on potentially unstable soils, such as by using mat foundations or other forms of mechanical foundations.
- Use deep foundation systems (such as driven or drilled piles and large diameter drilled shafts) for abutments and bents in areas with unstable soils.
- Use “light fill” structural materials (such as geofoam or low-density cellular concrete) to reduce weight loading of foundations, retaining walls, and slopes in areas with historic landslides or unstable soils and slopes.
- In areas where cut walls are proposed in areas with unstable soils or slopes, use more robust wall support method, such as cantilevered or tie-back soldier pile walls.
- Establish erosion and slope stability controls during construction through the implementation of erosion and sediment control plans (ESCPs) and grading permits that adhere to the Oregon Department of Transportation Construction Project Pollution Control Manual.

TriMet will meet applicable design and construction codes for transportation projects. No additional mitigation measures for long-term impacts are proposed.

Regarding short-term impacts and mitigation, the DEIS states that project-specific mitigation measures will be considered in subsequent geotechnical evaluations for the

Project. In specific cases where geologic hazards are not avoidable in the study area, the impacts of these hazards would be mitigated through the use of appropriate engineering controls and practices. These hazards and potential mitigation measures are described below.

- **Erosion.** Potential erosion by wind and water would be mitigated by minimizing areas cleared of vegetation, providing temporary cover or mulch for exposed soil stockpiles, and using erosion control blankets or mulch on exposed slopes.
- **Slope stability.** In areas of steep slopes and historical landslides or rock falls, affected slopes would be evaluated and designed for adequate stabilization using best management practices, including limited slope inclination, retaining structures and reinforcement, and limitations on loads.
- **Settlement.** In areas where increased loads from new embankments and soil stockpiles might cause settlement, areas of soft soils would be identified and avoided. In areas where dewatering might be necessary, the settlement of associated soils would be mitigated by restricting dewatering to localized areas, using sheet piles to restrict flow and re-injecting groundwater. Surcharging soils could also be considered to mitigate settlement.
- **Groundwater quality.** Best management practices for the protection of water quality in areas of shallow groundwater would include containing and controlling waste and hazardous materials on-site, and confining maintenance and refueling activities to areas where open excavations would not be impacted.

Surface Water and Floodplains. Section 4.10 of the DEIS describes existing conditions and potential impacts for surface waters and floodplains. The surface water in the study area discharges to the Willamette River through tributary streams and conveyance system outfalls. In general, the surrounding urban environment has affected the streams in the study area, and many of the streams have reaches that are channelized or have been piped.

Streams and associated floodplains that would be crossed by the proposed light rail alignment are listed in Table 4.10-1 of the DEIS. Red Rock Creek is the only stream in the study area that has a Federal Emergency Management Agency (FEMA)-mapped floodplain beyond its banks. Executive Order 11988 requires federal agencies to avoid supporting development within floodplains wherever there is a practicable alternative.

Floodplain Hazard Impacts and Mitigation. The DEIS lists a number of potential impacts to water resources associated with the Southwest Corridor Project. Several of these are discussed in other sections of these Findings of Fact—Sections 6.3.4: Natural Resource Impacts and 6.3.5: Stormwater Runoff Impacts. Stormwater runoff is also discussed here in relation to flood hazards, as increased stormwater runoff has the potential to increase flooding risk in the study area. Other project components that can potentially result in floodplain impacts include placement of guideway columns or fill soil within the floodplain boundaries, which can displace the storage volume of the floodplain.

Section 4.10.4 of the DEIS describes potential measures that could mitigate floodplain hazard impacts. The Council finds that potential mitigation measures include: designing the

Project to be more constrained in areas adjacent to or within floodplains; avoiding floodplains wherever possible; and in locations where the Project would encroach upon these areas, implementing required studies and floodplain compensatory storage.

6.3.4: Criterion 6: Natural Resource Impacts

Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland, and park and recreational areas that are protected in acknowledged local comprehensive plans or functional plans and, where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.

Section 4.9 of the DEIS summarizes the existing condition of vegetation, wetland, wildlife and fish resources within the Southwest Corridor Project area. Additional detail is provided in the *Ecosystems Results Report* (Attachment D of the DEIS). Park and recreation areas and open space areas are addressed in Section 4.7 of the DEIS. Impacts to 4(f) resources are addressed in Appendix D of the DEIS. Scenic areas are addressed in Section 4.5 and Appendix B4.5 of the DEIS. These reports are incorporated herein by reference. Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

General Overview of Natural Resource Impacts, Avoidance and Mitigation Measures

As stated in the DEIS, the boundaries of the study area for fish and wildlife, riparian, and wetland resources are 50 feet from the edge of construction. This study area includes rivers, streams, wetlands, floodplains, vegetation and riparian corridor functions that intersect with the study area boundary. An expanded analysis area addresses indirect, downstream impacts to fish related to stormwater quality and hydrologic modifications.

Much of the study area is along existing transportation corridors with adjacent urbanized land uses. These land uses include commercial and residential buildings, schools, roads, sidewalks, railways and other infrastructure. The remainder of the study area consists of forested lands and undeveloped areas adjacent to the northern portion of SW Barbur Boulevard and within road and railway rights of way.

Several natural areas within the Southwest Corridor provide habitat expected to support various types of wildlife.

Fish and Wildlife Habitat. Due to the amount of urbanization in the project area, substantial channelization and piping of natural watercourses has occurred over time. Mapping of the existing streams by multiple agencies sometimes results in an inaccurate count of watercourses along the corridor. The DEIS identified between 24 and 26 stream crossings under the alignments. These were identified through GIS analysis and remote

mapping databases. After further investigations and coordination, it was found that 9 to 10 of the crossed streams within the Inner Southwest Portland Segment are piped into the City of Portland's combined sewer overflow (CSO) system. Therefore, while these 9 to 10 mapped streams could provide riparian habitats uphill of SW Barbur Boulevard, they do not provide passage from downstream as they are piped to the CSO system which leads to the City's Columbia Boulevard Wastewater Treatment Plant in north Portland. The stream locally known as Red Rock Creek is the largest stream that flows mainly on the surface in the study area (in the Tigard/Tualatin Segment).

As indicated in the DEIS, there is a potential presence within the expanded analysis area of eight species of fish listed under the federal or state Endangered Species Act (ESA) or as federal species of concern or state sensitive. Because of fish passage barriers, none of these fish species or other resident or migratory fish is likely to occur in streams within the study area; however, these streams flow into water bodies where there are suitable anadromous and resident fish habitat and occurrence.

As indicated by database searches for threatened, endangered or sensitive terrestrial species, the following potentially occur within or near the study area: 8 species of plants, 14 species of birds, 5 mammals, 2 reptiles, 1 amphibian, 1 insect and 1 mollusk. As with the other database queries, not all of the species identified in the databases are likely to occur within the study area.

As indicated by the *Ecosystems Results Report*, project construction could cause changes in habitat quality within the forest, woodland, shrubland and herbaceous cover types within the Inner and Outer Southwest Portland Segments, and in vegetated corridors within the Tigard/Tualatin Segment. In these cover types, replacement of existing vegetation with project features would represent a loss of structural and biotic diversity associated with the variety of plant and wildlife species previously present in the cleared areas. Construction of project features would have a greater likelihood of reducing the habitat quality of forest and woodland areas than other cover types. Clearing of trees, snags and understory vegetation would cause the loss of nesting and foraging sites for many species of birds, as well as a reduction in the availability of hiding cover for small mammals. The introduction of cleared areas through patches of contiguous forest cover would result in the fragmentation of the forested habitat; fragmentation compounds the effects of habitat loss by reducing the quality of the remaining habitat. Additionally, there is the possibility for invasive plants to colonize construction areas, preventing native species from becoming re-established, and potentially spreading into undisturbed areas where they can affect habitat value on additional lands. Several of the regulatory standards and best management practices that would be implemented during project construction are intended to avoid, reduce and control new infestations of noxious weeds. For example, compliance with ODOT standard specifications and special provisions under 01030.42 Weed Control, 01040.75 Weed Control, and 01040.79 Plant Establishment will help control further infestations and spread of the existing populations. These specifications require the contractor to prepare a weed control work plan, remove and control weeds, and replant with native species. Consistent and successful application of these measures would reduce potential habitat disturbance and improve existing habitats that are already disturbed.

Sections 6.4.1.5, 6.4.2.5, and 6.4.3.5 of these findings describe wildlife and plant species and habitat conditions for each corridor segment.

Scenic and Open Space Areas. Impacts to designated scenic resources in the Southwest Corridor are described in Section 4.5.3 of the DEIS. Changes to scenic resources along the Southwest Corridor, and changes to area landscape patterns, features and views, could result from new light rail facilities. Photographs and visual simulations of existing and future conditions within the Corridor are located in Appendix B4.5 of the DEIS. Specific long-term impacts to scenic resources are discussed by segment in Sections 6.4.1.5, 6.4.2.5, and 6.4.3.5 of these findings.

Riparian Areas. As described under “Fish and Wildlife Habitat” above, only four streams in the study area flow on the surface and the rest are underground. Lands adjacent to these streams (riparian areas) are considered for how they may be impacted by the Southwest Corridor Project. As indicated in the *Ecosystems Results Report*, in general, riparian habitat could experience permanent impacts where guideways span areas of riparian vegetation. Construction of elevated guideways above vegetation would reduce the amount of water the vegetation receives from precipitation. In some areas, vegetation cleared from beneath elevated guideways might not grow back. Because elevated guideway structures would be relatively narrow, shading impacts on riparian vegetation would be limited in most areas, although some impacts would result from shading and water interception. Herbaceous plants and shrubs are generally able to grow beneath narrow guideways that are at least 15 feet above the ground. Based on the nature and location of construction buffer impacts, as well as the current condition of the Corridor itself, no substantial degradation of riparian functions (e.g., fish and wildlife habitat, food chain support or water temperature maintenance) or processes would likely result from project-related clearing. Long-term impacts to riparian areas are discussed by segment in Sections 6.4.1.5, 6.4.2.5, and 6.4.3.5 of these findings.

Wetland Areas. Several wetlands are located within the study area, particularly in the Tigard/Tualatin Segment. Potential impacts to wetland areas are discussed by segment in Sections 6.4.1.5, 6.4.2.5, and 6.4.3.5 of these findings.

Park and Recreational Areas. As indicated in Table 4.7-1 of the DEIS, thirteen existing publicly owned parks, greenspaces, recreation areas, trails, natural areas, and wildlife lands are located within the potentially affected area of the Southwest Corridor Project. The location of each resource is shown in Figures 4.7-1, 4.7-2, and 4.7-3 of the DEIS. As indicated in the DEIS, long-term impacts are only expected for six of these resources for the recommended alignment. Specific long-term impacts to parks and recreation areas are discussed by segment in Sections 6.4.1.5, 6.4.2.5, and 6.4.3.5 of these findings. Appendix D of the DEIS summarizes the Southwest Corridor Project impacts on each 4(f) resource.

Criterion 6 requires identification of adverse impacts only on *significant* resources (fish and wildlife, scenic and open space, riparian, wetland and park and recreational areas) that are *protected* in acknowledged local comprehensive plans. Oregon planning under Statewide

Goal 5 calls for inventories and protection of significant natural resources including fish and wildlife habitat, wetlands, and scenic and open space areas. Goal 5 is implemented by local jurisdictions through the City of Portland's Environmental Zone, the City of Tigard's Sensitive Lands regulations, and the City of Tualatin's Natural Resource Protection Overlay District.

The scope of natural resources identified as significant and protected in the acknowledged local comprehensive plans is much narrower than the scope of natural resources addressed in the DEIS for the Southwest Corridor Project.

Throughout earlier phases of the Southwest Corridor Project, alternatives and options have been developed, evaluated, narrowed and refined. A significant objective in the narrowing and refinement of alternatives and options has been to avoid where practicable, or to minimize where avoidance is impracticable, potential impacts to significant natural resources. Through this process, the number and level of impacts to resources affected by the Southwest Corridor Project has been reduced.

General Discussion of Natural Resource Mitigation Measures

The Council finds that general measures available to mitigate natural resource impacts that cannot be avoided include the following.

1. In accordance with state and federal regulations and Executive Order 11990, the Project would avoid and minimize impacts to ecosystem resources, including *wetlands*, *waters* and *vegetation*, to the extent practicable during the construction of the Project. Mitigation measures for *fish and wildlife* and *riparian* resource impacts will largely involve application of best management practices (BMPs) associated with existing construction specifications and standard natural resources protection measures associated with local, state, and federal regulation approvals. The following TriMet standard construction specifications are likely to be incorporated into the construction contracts.
 - 01-74-19 Construction Waste Management and Disposal
 - 31-11-00 Clearing and Grubbing
 - 31-22-16.10 Floodplain Grading
 - 31-37-00 Riprap
 - 32-90-00 Planting
 - 35-43-00 Waterway Scour Protection

However, the TriMet specifications would likely not encompass all the necessary natural resources protections. Additional special provisions would likely come from the Oregon Department of Transportation construction specifications. For example, compliance with ODOT standard specifications and special provisions under 01030.42 Weed Control, 01040.75 Weed Control, and 01040.79 Plant Establishment will help control further infestations and spread of the existing populations. These specifications require the contractor to prepare a weed control work plan, remove and control weeds, and replant with native species. Other specifications require

contractors to prepare plans and comply with contract language to protect water quality and natural resources, and limit exposure to hazardous materials.

The following specifications sections would likely be incorporated into contract documents:

- 00280 Erosion and Sediment Control,
- 00290 Environmental Protection,
- 01010 Stormwater Control,
- 01030 Seeding
- 01030.42 Weed Control
- 01040 Planting
- 01040.75 Weed Control
- 01040.79 Plant Establishment

In addition, special provisions for construction would be tailored to the project to accommodate permit and approval requirements from the City of Portland, City of Tigard, Clean Water Services (CWS), National Marine Fisheries Service, US Fish and Wildlife Service, Oregon Department of Fish and Wildlife, among others.

2. *Wildlife corridors* are protected under the existing local land use codes associated with City of Portland e-zones, CWS vegetated corridors, and City of Tigard natural resource protection zones. Any impacts to wildlife corridors will be minimized and mitigated for in accordance with City of Portland Title 33, CWS Design Standards, and City of Tigard CDC 18.510, as well as through standard BMPs and permit terms and conditions.

Much of the habitat used by wildlife is currently within e-zones and vegetated corridors that are already identified for protection and enhancement through removal of non-native vegetation and planting of native shrubs and trees. In areas not contained within these regulated areas, the local jurisdictions' tree removal, replacement, and protection codes would mandate that native trees be protected or replaced. Applicable City of Portland regulations are listed in the mitigation measures of Sections 6.4.1.5 and 6.4.2.5 of these findings, and applicable City of Tigard and CWS regulations are listed in Section 6.4.3.5. Tree and shrub removal would only take place during non-nesting seasons to minimize potential impacts to nesting birds.

3. Similar to wildlife corridors, *riparian corridors* are protected under the existing land use codes associated with City of Portland e-zones and CWS vegetated corridors. Any impacts to riparian corridors will be minimized and mitigated for in accordance with City of Portland Title 33, CWS Design Standards 3.02, and City of Tigard CDC 18.510.

These regulations mandate impact avoidance or minimization measures, and mitigation through removal of non-native species and planting of native shrubs and trees. Additional impact avoidance and minimization measures would likely include

the identification and demarcating of no-work zones, installation of erosion and sediment control measures, and keeping potential construction footprints to the smallest extent practicable. In coordination with local agencies, planting and in-stream flow detention could be implemented to increase habitat functions within Stephens Creek and Red Rock Creek and their associated riparian areas.

Mitigation, where required, would likely consist of removal of non-native vegetation and planting of native shrubs and trees. It is possible that through additional coordination with regulatory agencies that additional mitigation measures could be implemented, including wildlife fences to direct wildlife away from collision hotspots, additional signing for motorists to be cautious of wildlife crossing the corridor, and selected habitat enhancement projects to provide targeted species with increased habitat functions. The latter method could include retaining snags for use by insectivorous and cavity-nesting birds, planting native fruit- and seed-bearing trees for use by birds and mammals, and placing downed logs for use by salamanders and frogs.

4. Impacts to *wetlands* are regulated by Oregon Department of State Lands and the US Army Corps of Engineers. Compensatory mitigation for impacts to wetlands and jurisdictional waters would be required for the Southwest Corridor project and would include on-site or off-site mitigation via creation, enhancement, or restoration, or the payment into an established mitigation bank, if available.
5. Potential mitigation measures for long-term *scenic impacts* include, but are not limited to, the following:
 - Use high quality design and materials that mitigate the overall impact and blend into the visual environment
 - Where possible, avoid demolition or alteration of contributing historic structures
 - Reduce or buffer impacts to existing scenic resources through the addition of new street trees and other landscaping elements
 - Consider aesthetic treatments for the design of new/replacement bridges, overhead structures or elevated sections of the ballasted trackway to improve compatibility with surrounding areas. If more appropriate, structures should be designed to contrast with their surroundings, so as to create a visual statement.
 - Use elements such as landscaping, streetscaping or fencing to provide an aesthetically pleasing visual buffer between the Project and adjacent high-sensitivity viewers.
 - Adopt a strategy of coordinated street furnishing to create a harmonious visual environment. Elements include signage, way finding, street furniture, lighting, hardscaping and public art.
 - Use terraced vegetated landscaping to minimize the visual impact of large retaining walls where possible.
 - Replace/restore removed vegetation and landscaping where possible.

- Consider vegetated trackway or alternatives to concrete trackway where appropriate.
6. TriMet and Metro are coordinating with Portland Parks and Recreation and the City of Tigard for project features and appropriate mitigation measures to reduce impacts to the *parks and recreation* properties. Where long-term impacts to parks or recreational lands are unavoidable, TriMet would work with the park owner to determine appropriate compensation or other agreements needed to allow use of the land for the Project. Removal of mature trees and shrubs would be quantified at the time of development permit review, and appropriate mitigation would be provided. Potential mitigation measures for impacts to parks and recreation resources include, but are not limited to, enhancement of existing park features, such as replacement of fencing, improvement of park paths and access, and planting trees and shrubs to replace impacted vegetation.
 7. Specific Federal regulations are applicable to 4(f) *resources* potentially affected by the Southwest Corridor Project. The U.S. Department of Transportation Act of 1966, Section 4(f) (49 United States Code [USC] 303) requires that Federal Transit Administration analyze the potential for transit projects to impact a significant publicly-owned park (e.g., Terwilliger Parkway), recreation area or wildlife and waterfowl refuge or any significant historic site (e.g., Southwest Portland Historic District). The preliminary 4(f) Evaluation in the DEIS (summarized in Appendix D) was based on several alternatives. The 4(f) analysis in the FEIS will evaluate impacts to 4(f) resources for the Project and have a final determination from FTA that includes commitments to mitigate unavoidable impacts.

The 4(f) analysis includes evaluating:

- Feasible and prudent avoidance alternatives that avoid impacts to all 4(f) resources
- Least overall harm alternatives and measures that minimize the overall impacts to 4(f) resources

TriMet and Metro will coordinate with the “official with jurisdiction,” the managing entity or owner, to evaluate impacts and determine mitigation for impacts to 4(f) resources, including the Oregon State Historic Preservation Office for significant historic sites and the City of Portland for significant parks and recreation resources. An impact that is minor in nature, referred to as a *de minimis* impact determination, requires formal agreement from the official with jurisdiction.

Public outreach and education is a critical component of understanding the 4(f) resource significance, level of impacts and determining mitigation for impacts. TriMet and Metro will develop a public engagement program that provides information about the process and resources, and specifically encourage input on any *de minimis* determinations. Additionally, TriMet and Metro will develop a separate, focused public process for selecting the Marquam Hill Connection option that will be analyzed in the FEIS.

The Council finds that these types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process.

Applicable Federal Permit Terms and Conditions. In addition to the potential mitigation measures discussed above, the Southwest Corridor Project will require approval from several federal natural resources agencies, including the National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (USFWS), and the US Army Corps of Engineers (USACE). NMFS and USFWS conditions for the project will be confirmed during the required Endangered Species Act consultation process that will occur in 2019 and be part of the FEIS process. Likely terms and conditions will be the same as or similar to those in recent programmatic biological opinions such as Strategic Local Operating Procedures for Endangered Species for Stormwater, Transportation, and Utilities (SLOPES V – STU) and the Federal Aid Highway Project programmatic biological opinion (FAHP). Each provides detailed terms and conditions on site isolation, in-water work, stormwater management, and site restoration. Each permit or approval will contain conditions that the project will follow during construction. These conditions will be finalized during the permitting processes in 2019 or 2020.

Permitting for impacts to the wetlands and other resources occur after the Record of Decision. USACE terms and conditions for impacts to wetland and waterways will be formalized during the permitting process. Examples of terms and conditions that may be included are:

- Minimize and avoid impacts to migratory birds
- Permanent and temporary crossings of waterbodies will be culverted, bridge or others designed to and constructed to maintain low flows to sustain the movement of aquatic species
- Fills within floodplains shall comply with applicable FEMA-approved state or local floodplain management requirements
- Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date

6.3.5: Criterion 7: Stormwater Runoff Impacts

Identify adverse impacts associated with stormwater runoff and demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.

General stormwater runoff impacts for the Southwest Corridor Project are addressed in the following section. Stormwater impacts and mitigation measures are also described in Section 4.10 of the DEIS.

General Overview of Stormwater Runoff Impacts

The surface water in the Project area discharges to the Willamette River through tributary streams and conveyance system outfalls. In general, the streams in the Project area have been affected by the surrounding urban environment, and many of the streams have reaches that are channelized or have been piped. Streams and associated Federal Emergency Management Agency (FEMA) floodplains that would be crossed by the Southwest Corridor LRT alignment are listed in Table 4.10-1 of the DEIS.

Much of the Project area has been developed, and stormwater runoff is collected by piped or ditched municipal systems that discharge to tributary streams. In the first few (northernmost) miles of the Inner Southwest Portland Segment, stormwater runoff is collected by the City of Portland combined sewer system (City of Portland, 2010). This system collects stormwater and municipal sewage, and conveys the mixture to a treatment plant before discharge to the Willamette River. In many combined sewer systems such as this one, heavy rains can increase the risk that the untreated stormwater/sewage mixture will overflow to surface waters before treatment. In the remainder of the Project area, stormwater runoff is collected by municipal storm drainage systems that are separated from sewage systems and conveyed to local streams.

The DEIS evaluates several potential impacts associated with stormwater runoff. These impacts include increases in stream flow that can lead to scour and sedimentation, contamination of runoff that can impact water quality, changes to stream geometry at a crossing that can pinch flows and cause flooding and scour, and changes to floodplain storage that can push floodwaters to adjacent properties. Following are project components that can potentially result in these types of impacts:

- **Land conversion.** When impervious areas or track sections with ballast permanently replace vegetation, it can affect water quality as well as stormwater runoff and infiltration levels in a basin. Typical issues associated with increased runoff volumes from impervious areas include increased flow rates and flooding frequencies, stream erosion and aquatic habitat degradation, and increased pollution from road area contaminants. Throughout all of the segments, conversion of land would trigger stormwater management requirements. Applicable flow control and water quality facilities would be incorporated into the Project design, as discussed below under “Stormwater Mitigation Measures.”
- **Operations and Maintenance (O&M) facilities.** Activities at O&M facilities, where light rail vehicles are stored and maintained, use hazardous materials like petroleum products and metals in areas that can come into contact with rainfall or stormwater runoff. This potential transport of hazardous materials by stormwater runoff can impact stormwater quality. Such facilities are subject to stormwater

management requirements. Operations would follow procedures to protect water quality, and the facilities would be designed with appropriate stormwater facilities, as discussed in the findings specific to the Tigard/Tualatin Segment (Section 6.4.3.6 of these findings).

- **New stream crossings.** Adding new guideways and columns in and over streams and buffers, as part of project construction, can reduce buffer quality. General findings related to riparian area impacts are presented in Section 6.3.4 of these findings.
- **Replacement of existing stream crossings.** When an existing stream crossing—either a culvert or bridge over an open stream, or an underground segment of a piped stream—is replaced, there is an opportunity to improve the crossing by making it larger, resulting in a benefit to the stream compared to the existing condition.
- **Floodplain and floodway encroachment.** Light rail projects that cross floodplains can necessitate placement of guideway columns within the floodplain boundaries. In addition, stations, O&M facilities, and other non-linear components of a light rail project might place fill soil in the floodplain. The columns or fill soil can displace the storage volume of the floodplain, which would then require the Project to conduct an engineering study and provide compensatory storage. Typically, no type of structure or fill is allowed to be placed in the floodway. In some cases, development in the floodway will be allowed with a detailed engineering analysis and zero-rise certification.

Throughout the Project area, the rebuilding of roadway, as well as conversion of other land by the Project, would trigger the latest stormwater management requirements. Applicable flow control and water quality facilities would be incorporated into the Project design to prevent impacts to water resources, as discussed under “Stormwater Mitigation Measures” below. All of the streams that have existing crossings along the proposed alignments would have the crossings replaced. These crossing replacements are expected to result in either no impact to the streams or a beneficial effect from the widening of the crossings and improved stormwater management facilities.

A range of federal laws, state statutes, and local and regional ordinances address water quantity impacts from development. State and local regulations typically establish standards for controlling the peak rate of stormwater runoff. Regional standards, contained in Title 3 of Metro's Urban Growth Management Functional Plan, more broadly address flood mitigation, erosion and sediment control, and the protection of long term regional continuity and integrity of water quality and flood management areas. Federal National Flood Insurance Program criteria and Executive Order 11988 regulate development in flood-prone and floodplain areas. In general, post-development runoff rates are required to be improved over existing runoff rates.

General Discussion of Stormwater Mitigation Measures

Section 4.10.4 of the DEIS lists potential mitigation measures associated with stormwater management for the Southwest Corridor Project. The Project would be designed to comply with all federal, state and local regulations, which would prevent or minimize potential impacts to water resources. Through project planning, design and the application of required best management practices (BMPs), the Project would provide water quality treatment and flow control to prevent impacts to water resources, including mitigating flow changes to combined sewer systems.

In general, the Council finds that water quantity and quality impacts created by the operation of the Southwest Corridor Project can be substantially mitigated through BMPs designed to comply with guidance outlined in the applicable stormwater design manuals (i.e., *City of Portland Stormwater Management Manual*, *Clean Water Services Design and Construction Standards for Sanitary Sewer and Surface Water Management*). Water quality treatment BMPs might include settling ponds, filter strips, sand filters, bio-infiltration swales, or mechanical treatment. Flow control BMPs might include vegetated detention or retention ponds or vaults. Required stormwater management facilities would likely be larger in areas where more vegetation is converted to new impervious surfaces. Stormwater management will address specific pollutants of concern, including dissolved metals and temperature.

Also, project design would be more constrained in areas adjacent to or within stream buffers or floodplains. The Project would be designed to avoid stream buffers and floodplains wherever possible, and in locations where the Project would encroach upon these areas, the Project would implement required studies, stream buffer replacement and floodplain compensatory storage. Habitat restoration requirements will also focus on restoration of riparian corridors with trees and other vegetation designed to cool urban streams.

These types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process. The Council finds that a range of mitigation measures are available and site-specific mitigation for stormwater quantity and quality impacts will be refined and selected during the Final Design and local permitting processes.

6.3.6: Criterion 8: Historic and Cultural Resource Impacts

Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans and, where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.

General historic and cultural resource impacts for the Southwest Corridor Project are addressed in the following Section. Historic and cultural resource impacts and mitigation measures are also described in Section 4.6 of the DEIS and in *Cultural Resource Survey for the Southwest Corridor Light Rail Project, Multnomah and Washington Counties, Oregon* (Attachment C of the DEIS). These reports are incorporated herein by reference.

Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

General Overview of Historic and Cultural Resource Impacts

Section 106 of the National Historic Preservation Act of 1966, as amended requires that a federal agency consider the effect of a federally assisted project on historic properties. A significant historic property is a prehistoric or historic district, site, building, structure or object that is listed in or eligible for the National Register of Historic Places (NRHP). Archaeological sites are historic properties where evidence of past human lives and activities remain. Cultural properties are buildings, sites or objects that carry traditional religious or cultural significance to past lives and peoples.

Throughout earlier phases of the Southwest Corridor Project, alternatives and options have been developed, evaluated, narrowed and refined. A significant objective in the narrowing and refinement of alternatives and options has been to avoid where practicable, or to minimize where avoidance is impracticable, potential impacts to historic and cultural resources. Through this process, the number and level of impacts to resources affected by the Southwest Corridor Project has been reduced.

During the preparation of the Project's FEIS and preliminary and final engineering, further design work will be completed that would further attempt to avoid, minimize and/or mitigate adverse impacts to historic and cultural resources. Under federal procedures, the resulting impact analyses and commitment to feasible mitigation measures will be completed in coordination with the Oregon State Historic Preservation Officer (SHPO) and with the following interested parties:

- Advisory Council for Historic Preservation (ACHP)
- Confederated Tribes of the Grand Ronde Community of Oregon
- Confederated Tribes of Siletz Indians of Oregon
- Confederated Tribes of the Warm Springs Reservation of Oregon
- Cowlitz Indian Tribe
- Cities of Portland, Tigard and Tualatin
- Multnomah County and Washington County
- Oregon Department of Transportation (ODOT)
- Restore Oregon

Project staff consulted with the interested parties listed above in identifying the “area of potential effect” for the Southwest Corridor Project. The area of potential effect is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties” (36 Code of Federal Regulations [CFR] Part 800.16). Through that consultation, it was determined that the initial area of potential effect for the Southwest Corridor Project is the area within 50 feet of the anticipated construction footprint for the alignment alternatives, stations, station access improvements, and operations and maintenance (O&M) facilities options identified in the DEIS (see Figure 4.6-1). The Council accepts these determinations as to the area of potential

effect, and it adopts them as appropriate for purposes of determining compliance with Criterion 8.

The area of potential effect will be revised prior to publication of the FEIS/ Record of Decision (ROD). This updated area of potential effect will include areas needed to accommodate the selected Design Refinements, station access improvements, known locations of proposed mitigation (e.g., stormwater, wetlands), and locations where impacts adversely affect the context or setting of historic resources (such as visual quality or noise and vibrations). The updated area of potential effect will include a tighter archaeological boundary where design has advanced and there is now a better understanding of the limits of direct construction activities. This updated area of potential effect will also be sent to SHPO for concurrence and to tribes and consulting parties for comment prior to publication of the FEIS/ROD.

The criteria of effect and criteria of adverse effect as set forth in the National Historic Preservation Act are highlighted below. Again, the Council agrees with and adopts these criteria for purposes of measuring compliance with Criterion 8.

An undertaking has an *effect* on an historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the *National Register*. For the purpose of determining effect, alteration to features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.

An undertaking is considered to have an *adverse effect* when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Adverse effects on historic properties include, but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease or sale of the property.

The *Cultural Resource Survey for the Southwest Corridor Light Rail Project, Multnomah and Washington Counties, Oregon (Cultural Resource Survey)* includes an analysis of 584 historic built environment resources within the Southwest Corridor to determine the NRHP status. As described in the Parametrix memorandum, historic buildings, sites, structures and objects that were built in 1970 or before were reviewed and documented. The use of 1970 is based on an expected 2020 start to property acquisitions for the proposed light rail transit project. All of these resources were reviewed for potential eligibility to be listed on the National Register of Historic Places (NRHP) and documented in the *Cultural Resources*

Survey. Of these resources, 144 historic resources are either listed in or are considered potentially eligible for listing in the NRHP, and these are considered significant historic properties under Section 106 and for the DEIS. This does not necessarily mean, however, that they are deemed significant and protected in acknowledged local comprehensive plans. Additional properties from between 1970 and 1975 will be evaluated to capture any properties that will become potentially eligible for listing on the NRHP before the end of major project construction. Short and long-term impacts of the Southwest Corridor Project on historic, cultural and archeological resources are assessed in the *Cultural Resources Survey* based on criteria developed by the Advisory Council for Historic Preservation.

For archaeological resources, field studies were conducted within the area of potential effect to identify potential archaeological resources not previously included in local inventories, and to review locations and conditions of resources listed on inventories or eligible for, or in, the National Register. Archaeologists also reviewed a variety of sources to predict the probability of encountering undiscovered archaeological resources.

The approach taken by the *Cultural Resources Survey* in identifying and assessing historic, cultural, and archaeological resources has also been accepted by SHPO, as indicated in a letter to Metro dated March 2, 2018. The Council accepts the methodology for determining “adverse effect” established in the *Cultural Resources Survey*, and it adopts and incorporates by reference herein the facts and conclusions set forth in that document.

Local jurisdictions within the Southwest Corridor have completed cultural resource inventories and designated significant resource sites in their respective comprehensive plans. Some resources, which are inventoried in the local comprehensive plans under LCDC Goal 5, are not necessarily defined as “significant” through the NEPA process. Conversely, the DEIS includes discussion of some resources which are not inventoried or protected in the local comprehensive plans. Criterion 8 only requires identification of adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans.

As supported by SHPO in its letter to Metro, much of the data regarding adverse effects will be fleshed out once an intensive level survey can be completed. Historic archaeological and built environment resources that would be impacted by the Project will be formally documented using the Determination of Eligibility forms. FTA will formally submit the Determination of Eligibility forms combined with a revised area of potential effect, and a proposed Finding of Effect to SHPO for concurrence with a 30-day review period during FEIS development. Oregon SHPO also recommended a programmatic agreement and detailed inadvertent discovery plan for artifacts uncovered during construction. Focused shovel tests may be undertaken in areas where there is a high probability for discovering artifacts through ground disturbing construction activities. The FEIS/Record of Decision (ROD) will include identification of resources that would be impacted by the Preferred Alternative, consistent with SHPO concurrence. The FEIS/ROD will include Findings of Effect on resources that are listed or eligible for listing on the National Register, consistent with SHPO concurrence.

A signed Memorandum of Agreement (MOA) with the inadvertent discovery plan will also be included in the FEIS/ROD. All historic properties that would be impacted by the Project will be included in the MOA, which will be signed by FTA, TriMet and the Oregon SHPO. All consulting parties, such as the tribes, City of Portland, Restore Oregon and Multnomah County, will have an opportunity to provide input on the MOA. The MOA will include the detailed inadvertent discovery plan for archeological resources. It will also include all mitigation measures that are agreed to between the parties and will be completed prior to the FEIS publication.

As indicated by SHPO in its letter to Metro, the Project will most likely have an adverse effect, but the number of resources impacted and the level of mitigation will become clearer as the project progresses with final design.

Impacts to specific historic and cultural resources are addressed by segment in Sections 6.4.1.7, 6.4.2.7, and 6.4.3.7 of these findings.

General Discussion of Historic and Cultural Resource Mitigation Measures

Section 4.6.5 of the DEIS outlines general mitigation measures for long-term impacts to historic and cultural resources. For unavoidable adverse impacts on historic properties, FTA will develop mitigation plans in consultation with SHPO and other consulting parties. The Council finds the following to be examples of mitigation options:

- Move rather than demolish historic buildings.
- Provide assistance/funds for rehabilitation and adaptive reuse efforts.
- Provide financial assistance for restoration efforts that will contribute to the preservation of cultural heritage in an affected community.
- Develop and support interpretative public history exhibits or on-site kiosks that highlight information gained about cultural resources.
- Develop online history articles.
- Rehabilitate historic properties affected by construction to their original condition.
- Install residential sound insulation to mitigate project-related noise impacts on historic properties.
- Support updates to local government historic resource inventories to capture property information for significant historic resources.
- Construct sound walls to mitigate project-related noise impacts in a manner sensitive to the historic character of the building, if the building is considered a noise-sensitive property.
- Minimize visual impacts on historic resources (i.e., from transit stations near resources) through site-specific, culturally appropriate and historically appropriate design or visual buffers.

- Minimize parking and access impacts to businesses in historic buildings with signs to direct traffic and pedestrians to the businesses and services, and provide alternative access and parking during construction.
- Develop a monitoring and inadvertent discovery plan to provide procedures for the identification and documentation of archaeological resources encountered during project construction.

In addition, procedures for evaluating and mitigating impacts to 4(f) historic resources through the FEIS process are discussed in the general findings of Section 6.3.4.

The Council finds that the discussion of general mitigation measures included within the DEIS provides a good base for more detailed mitigation commitments in the FEIS.

Federal, State and Local Review Processes to Reduce Resource Impacts

Federal and State Processes. Section 106 of the National Historic Preservation Act of 1966, described above, defines the federal review process designed to ensure that historic properties are considered during federal project planning and execution. The process is administered by the ACHP and coordinated at the state level by the SHPO. An agency must afford the ACHP a reasonable opportunity to comment on the agency's project. Section 106 requires that every federal agency take into account how each of its undertakings could affect historic properties.

For the purposes of Section 106, any property listed in or eligible for listing in the National Register of Historic Places is considered historic. Compliance with Section 106 is generally done in parallel with preparation of the EIS and informs the local political process for selecting project improvements. The process has five steps as follows: 1) identify and evaluate historic properties; 2) assess effects of the Project on historic properties; 3) if an adverse effect would occur, then consultation with the SHPO and other interested parties would occur, and if necessary, a Memorandum of Agreement would be developed which defines what will be done to reduce, avoid or mitigate the adverse effects; 4) ACHP comment; and 5) proceed with the Project, incorporating the mitigation in the Memorandum of Agreement. Section 106 consultation was initiated by FTA in spring 2017. Interested parties and Native American tribal groups were invited to participate in the environmental review and Section 106 processes, and to review and comment on the area of potential effects (APE) for the project. The Section 106 process, including signing of a Memorandum of Agreement for resolution of any adverse effects, will conclude prior to publication of the FEIS and Record of Decision (ROD).

At the state level, the historic preservation process is defined in ORS Chapter 358 and in the Land Conservation and Development Commission's Goal 5. The state process is implemented by the local jurisdictions through the adoption of historic preservation identification and protection plans in their individual comprehensive plans. The state process limits local preservation options. Under current law, local protection of historic properties

requires owner consent. However, local governments must preserve properties listed on the National Register. Demolition must be reviewed and may be denied.

State law in ORS Chapter 358 and LCDC's Goal 5 rule, OAR 660-023-0200, encourage the preservation, management, and enhancement of structures of historic significance. It authorizes local governments to adopt or amend lists of significant historic resource sites. However, owners of inventoried historic resources must be notified and may refuse local historic resource designation at any time prior to adoption of the designation. No property may be included on the local list of significant historic resources where the owner objects. Moreover, a property owner may remove from the property a local historic property designation that was imposed by the local government.

OAR 660-023-0200(7) encourages local governments to adopt historic preservation regulations regarding the demolition, removal or major exterior alteration of all designated historic resources. It encourages consistency of such regulations with the standards and guidelines recommended in the Standards and Guidelines for Archaeology and Historic Preservation published by the US Secretary of the Interior. Further, OAR 660-023-0200(9) prohibits local governments from issuing permits for demolition or modification of an inventoried significant historic resource for at least 120 days from the date a property owner requests removal of historic resource designation from the property. It requires that local governments protect properties that are listed on the National Register, including demolition review and design review.

Local Processes. The jurisdictions of Portland, Tigard, and Tualatin all have local processes in place to address alteration or demolition of historic and cultural resources that are identified as significant and protected in local comprehensive plans. The Council finds that these processes could be applied to address and to reduce adverse impacts to the affected historic and cultural resources.

The City of Tigard protects historic resources through implementation of an Historic Overlay Zone, as governed by Tigard Community Development Code Chapter 18.750. As of 2018, the Historic Overlay Zone protects only 10 historic and cultural resources, and the Southwest Corridor Light Rail Project will affect none of these resources. Likewise, the City of Tualatin has procedures to designate local historic landmarks (per Tualatin Development Code Chapter 68), but none of the resources on the City's Landmarks Inventory will be affected by the Project. Accordingly, the Council finds that it is unnecessary, for purposes of Criterion 8, to identify processes that would otherwise be available in those jurisdictions to reduce adverse impacts to historic and cultural resources.

However, in the City of Portland, certain protected historic resources would be adversely affected, as identified in the Segment findings of Sections 6.4.1.7 and 6.4.2.7. City review processes to address and to reduce adverse impacts to such resources are provided in the City's Zoning Code at Chapter 33.445, Historic Resources Protection Overlay Zone, and Chapter 33.846, Historic Resource Reviews.

Under these chapters, several levels of historic resource designation are created: Historic Landmarks, Conservation Landmarks, Contributing Resources to an Historic or Conservation District, and sites ranked in the Historic Resources Inventory. The Historic Landmark designation offers the highest level of protection for resources of citywide significance. Both Historic and Conservation Landmarks have access to incentives for historic preservation, including transfer of development rights and the right to a more flexible range of uses (such as multi-family use in single-family zones, or non-residential use in multi-dwelling zones), exemption from minimum density, and streamlined review procedures. Contributing resources to an Historic or Conservation District also have access to some of the incentives available to landmarks. However, owners doing projects that utilize incentives must consent to designation and agree not to demolish or modify the building without City approval.

The City has the option to deny demolition only for those designated resources that are listed on the National Register or whose owners have covenants with the City stating that City review is required for demolition or relocation. Also, demolition delays of 120 days are instituted for all levels of historic resources, including ranked sites in the Historic Resources Inventory. The delay period starts the day an application for demolition is received by the City.

6.3.7: Criterion 9: Air Quality and Energy Impacts

Identify general or anticipated impacts on air pollution, greenhouse gas emissions, and energy usage from project improvements that would help meet state, regional and local reduction goals.

General air quality and energy impacts for the Southwest Corridor Project are addressed in the following section. Air quality and energy impacts and mitigation measures are also described in Sections 4.12 and 4.13 of the DEIS.

General Overview of Air Quality and Energy Impacts

Air Pollution and Greenhouse Gas Emissions. Section 4.12 of the DEIS reviews potential effects on air quality and greenhouse gases (GHGs) from the Project. The federal government has established National Ambient Air Quality Standards (NAAQS) for six pollutants known as “criteria pollutants.” These include carbon monoxide, lead, ozone, nitrogen dioxide, sulfur dioxide, and particulate matter. Oregon also has State Ambient Air Quality Standards (SAAQS), which are at least as stringent as the NAAQS. The U.S. Environmental Protection Agency (EPA) has delegated the implementation of the air quality program to the Oregon Department of Environmental Quality.

Nonattainment areas are geographical regions where air pollutant concentrations exceed the NAAQS for a pollutant. Air quality maintenance areas are regions that have historically been in nonattainment for an air quality standard but have achieved compliance through improved planning and control measures. As of October 2017, the Portland area

maintenance period ended, and transportation conformity no longer applies for carbon monoxide NAAQs. However, the terms of the maintenance plan remain in effect. For example, the region must comply with transportation control measures and all measures and requirements contained in the plan until the state submits a revision to the plan and it is approved by the EPA. The region is in compliance for all other criteria pollutants.

Executive Order 13783 (March 28, 2017) required federal agencies to revise or rescind climate change rules and policies; therefore, there is currently no federal guidance on how to address greenhouse gas (GHG) emissions in environmental documents for transportation projects. As a result, the DEIS assesses GHG emissions in a manner consistent with the Council on Environmental Quality guidance from August 2, 2016.

Oregon Administrative Rule Chapter 660, Division 44 establishes Metropolitan Greenhouse Gas Reduction Targets for emissions from light vehicle travel in metropolitan areas. The state's GHG reduction target for the Portland Metropolitan Area is a 20 percent reduction in the year 2035. In 2014 Metro adopted its *Climate Smart Strategy*, in response to this state mandate to develop and implement a strategy to reduce per capita GHG emissions from cars and small trucks by 2035. The *Climate Smart Strategy* established a higher target than required by OAR 660-044, setting its goal as achieving a 29 percent reduction in per capita GHG emissions by 2035. Metro's *Climate Smart Strategy* also supports the plans and visions that have already been adopted by communities and the region. The City of Portland and Multnomah County have partnered to establish strategies to address GHG emissions and climate change through a joint *Climate Action Plan*. Through adoption of the 2009 plan, the City and County established a goal of reducing local carbon emissions 80 percent from 1990 levels by 2050, with an interim goal of 40 percent by 2030. These goals were maintained in the 2015 update of the Portland/Multnomah County *Climate Action Plan*. The City of Tigard does not have such specific reduction goals, but its Comprehensive Plan does include a goal titled "Energy Conservation" (Goal 13). One policy for reducing energy consumption (13.1.1.B) states that the "City shall promote reducing energy consumption associated with vehicle miles traveled" through measures including "public transit that is reliable, connected, and efficient." The City of Tualatin's Comprehensive Plan does not include goals or policies specifically related to GHG emissions or energy conservation.

The Project's regional impacts for air quality and GHG emissions were estimated using vehicle activity data generated by the regional transportation model and local emissions rates produced by the current version of the EPA's emissions model (MOVES 2014a). For carbon monoxide and GHGs, the estimates represent average weekday conditions in July, the time of year with the greatest impact of these pollutants due to weather conditions and seasonal traffic patterns. Estimates include emissions associated with passenger and freight vehicles, and correspond to the entirety of the four counties present in the regional transportation model network: Clackamas, Multnomah and Washington counties in Oregon and Clark County in Washington. Given that the analysis region contains vehicles subject to multiple inspection and maintenance regimes, separate sets of emissions rates were produced for the following fleets: (1) Oregon-inspected vehicles, (2) Washington-inspected vehicles and (3) non-inspected vehicles. GHG emissions are reported in terms of carbon dioxide (CO₂) equivalent, which includes the three primary GHGs (CO₂, methane [CH₄]

and nitrous oxide [N₂O]). The idea is to express the impact of each different GHG in terms of the amount of CO₂ that would create the same amount of potential global warming. In this way, GHGs can be expressed as a single number.

Based on expected growth for the region and Southwest Corridor over the next 20 years, the DEIS summarizes the difference in daily emissions between Existing Conditions (2015), the No-Build Alternative (2035), and the Light Rail Alternative (2035). As indicated in Table 4.12-1 of the DEIS, despite the growth in population and households that would result in more people driving, vehicle emissions are projected to be much lower in 2035 than today for both the Light Rail Alternative and the No-Build Alternative. The 2035 No-Build Alternative condition reduces GHGs by 8,304,725 pounds of GHGs compared to Existing Conditions. The 2035 Light Rail Alternative condition does even better, reducing GHGs by 8,347,111 pounds. Both alternatives result in GHG reductions of approximately 19% and carbon monoxide reductions of approximately 65%. The reductions in emissions are primarily a result of improvements in technology and more stringent vehicle inspection and maintenance programs.

The DEIS analysis also referenced the FTA-issued *Greenhouse Gas Emissions from Transit Projects: Programmatic Assessment* (January 2017) and the *Greenhouse Gas Emissions Estimator Tool* (November 2016) developed to estimate GHG emissions of the light rail alternatives for construction and ongoing operations and maintenance. Consistent with the regional transportation model, the programmatic assessment and estimator tool indicate a reduction in GHG emissions with construction, maintenance and operation of the Project.

Energy. Section 4.13 of the DEIS summarizes transportation energy consumption and evaluates the impacts to energy demand on utilities in the Portland metropolitan area for the Southwest Corridor Light Rail Project. This section of the findings focuses on energy consumption impacts during maintenance and operation of the Project. Construction impacts are addressed in Section 7.8 of these findings.

The DEIS defined the study area for the energy impacts analysis as the entirety of Clackamas, Multnomah and Washington counties in Oregon, and Clark County in Washington. Transportation energy consumption for the base year (2015) in this area is composed of energy used for passenger vehicles, heavy-duty trucks and transit, which includes buses, streetcar, light rail and commuter rail. Table 4.13-1 of the DEIS summarizes daily energy consumption for each vehicle type based on daily vehicle miles traveled (VMT) and assumed energy consumption factors (fuel use) for each. In 2015, total daily transportation energy consumption in the Portland metropolitan area is estimated at 251,723 million British thermal units (Btu) per day (Btu/day).

Operation of the light rail system is powered by electricity. Renewable energy sources, such as hydroelectric power and wind, contribute to more than half of the net electricity generated in Oregon. The State of Oregon's Renewable Portfolio Standard requires, by 2040, that 50 percent of the electricity Oregonians use come from renewables.

The long-term direct energy impacts of the LRT project are based on projected year 2035 regional traffic volumes and daily VMT consistent with Metro data and the transit modeling performed as part of the transportation analysis for the Project. The anticipated energy required to operate the Project was estimated using the daily VMT estimates for what is referred to in this section as the Light Rail Alternative, which looks at future conditions with the maximum build-out of the Southwest Corridor Project compared to the No-Build Alternative.

As indicated in Table 4.13-2 of the DEIS, compared to the No-Build Alternative, the Light Rail Alternative would result in a reduction of passenger vehicle and transit bus VMT as people shift their demand to the light rail system. Expanding the light rail system would place increased demand on the local electricity utilities, but there is no shortage of power in the Portland region that would indicate the utilities could not handle the increased demand. Overall daily energy use during project operation is expected to result in approximately 0.07 to 0.08 percent less energy use than the No-Build Alternative.

General Discussion of Air Quality and Energy Mitigation Measures

Section 4.12.4 of the DEIS lists potential mitigation measures associated with construction impacts on air quality and energy for the Southwest Corridor Project. Construction impacts are addressed in Section 7.8 of these findings. As described below, no long-term impacts are identified, and no long-term mitigation is required.

Air Quality. The Council finds that the region is in attainment for criteria pollutants, so no long-term mitigation for criteria pollutants is proposed. Because the Southwest Corridor Project is expected to reduce GHG emissions, the Council finds that no long-term mitigation for GHG emissions is required. Moreover, the Council finds and concludes that the significant reductions in GHG emissions and carbon monoxide associated with the Project constitute an important step forward in meeting longer-term clean air goals.

Energy. The Council finds that operation of the Project would not affect the regional power supply and would reduce overall energy consumption for the total transportation system compared to the No-Build Alternative.

The Council finds and concludes that by reducing GHG emissions and energy usage and by improving air quality, the proposed Southwest Corridor Project is consistent with the climate and energy goals established by the State of Oregon, Metro, the City of Portland, Multnomah County, and the City of Tigard, as it is expected to reduce GHG emissions within the region.

6.4 Segment-Specific Findings and Mitigation Measures

6.4.1: Inner Southwest Portland Segment

6.4.1.1: Description of Light Rail and Highway Improvements

The Inner Southwest Portland Segment of the Southwest Corridor MAX Light Rail Project includes the following LRT-related facilities and highway improvements:

- An alignment that extends from the existing light rail station at SW 5th Avenue and SW Jackson Street in downtown Portland to north of the intersection of SW Barbur Boulevard and SW Brier Place
- Two light rail stations, one in the vicinity of SW Barbur Boulevard and SW Gibbs Avenue, and one in the vicinity of SW Barbur Boulevard and SW Hamilton Street.
- Highway improvements within and along SW Barbur and north of Interstate 405 and connecting Marquam Hill to the SW Gibbs Street Station.

See Figures 1.1 to 1.4 of the LUFO for LUFO boundaries for the Inner Southwest Portland Segment.

Light Rail Alignment

From the existing light rail station at approximately SW Jackson Street and 5th Avenue, the alignment extends southward over Interstate 405 (I-405) on a new structure parallel to SW 4th Avenue to SW Sheridan Street, then continues southward at grade along the east side of SW Barbur Boulevard before shifting to the center of SW Barbur Boulevard at approximately SW Hooker Street. The alignment continues southward at grade along SW Barbur Boulevard to a station in the vicinity of SW Gibbs Street. It then remains at grade down the center of SW Barbur Boulevard to a station in the vicinity of SW Hamilton Street, where it curves westward, then back southward along the boulevard. Buses would operate on the light rail trackway from just south of SW Hamilton to approximately SW Sheridan Street.

Light Rail Stations

Two light rail stations are provided in the Inner Southwest Portland Segment.

SW Gibbs Street Station. The SW Gibbs Street Station is located along SW Barbur Boulevard in the vicinity of SW Gibbs Street. This station provides access to the South Portland and Homestead neighborhoods, Marquam Hill (Oregon Health Sciences University), National University of Natural Medicine and the South Waterfront.

SW Hamilton Street Station. The SW Hamilton Street Station is located along SW Barbur Boulevard in the vicinity of SW Hamilton Street. This station provides access to the South Portland and Homestead neighborhoods.

Park-and-Ride Lots

There are no park-and-ride lots in the Inner Southwest Portland Segment.

Operations and Maintenance Facilities

There are no operations and maintenance facilities in the Inner Southwest Portland Segment.

Highway Improvements

The major highway improvements in the Inner Southwest Portland Segment are as follows:

- A Marquam Hill Connection connecting the SW Gibbs Street Station to the medical and educational facilities on Marquam Hill. The connection will use some combination of elevators, bridges, paths and/or tunnels.
- Reconstruction of the Newbury trestle bridge and Capitol Highway overpass and the Vermont trestle bridge.
- Vehicular, pedestrian and bicycle improvements within and along the alignment north of the I-405 freeway and within and along SW Barbur Boulevard, including sidewalks and bicycle improvements, and minor elements such as signalization, electrification, and retaining walls.

Additionally, there would be mitigation measures and minor improvements along the alignment and within and along Barbur Boulevard and some adjoining roadways, including road realignments, sidewalk improvements, signalization, electrification, and sound walls.

6.4.1.2: Criterion 3: Neighborhood Impacts

- (3) **Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial districts, industrial districts, and mixed-use centers. Identify measures that could increase beneficial impacts or reduce adverse impacts, and that could be imposed as conditions of approval during processes required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (NEPA), or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”**
 - (A) **Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing**
 - (1) **the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;**
 - (2) **the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and**

- (3) the need to protect affected neighborhoods, districts, and centers from identified adverse impacts.**

Description of affected residential neighborhoods, commercial and industrial districts, and mixed use centers in the Inner Southwest Portland Segment

Extending approximately from SW Jackson Street on the north to just south of SW Parkhill Drive on the south, the Inner Southwest Portland Segment affects four neighborhoods within the City of Portland: Downtown Portland, South Portland, Homestead, and Hillsdale. A brief description of each neighborhood is presented below. More detailed neighborhood information is included in DEIS Appendix B4.4.

The **Downtown Portland** neighborhood is the region's central business district and contains the city's largest concentration of large office, retail, apartment, condominium and mixed-use buildings, as well as Portland State University (PSU), numerous parks of various sizes and other public facilities. It is the largest employment center in the region. Downtown office and commercial buildings are usually characterized by ground-level retail uses with office space above. Housing in Downtown Portland is found almost exclusively in large apartment or condominium buildings. Housing is located primarily within the southwest corner of downtown, adjacent to PSU and the Park Blocks, and between SW 11th Avenue and Interstate 405 (I-405).

Downtown Portland contains areas that have a higher proportion of several transit-dependent populations than the region overall. The neighborhood includes U.S. Census tracts or block groups with up to 92 percent low-income population, 79 percent households with limited vehicle access and 41 percent people with disabilities. The neighborhood generally has a lower concentration of youth than the overall region, with the exception of areas around PSU.

South Portland is bounded by I-405 to the north, the Willamette River to the east, SW 6th Avenue and SW Barbur Boulevard to the west, and the Sellwood Bridge to the south. South Portland contains smaller areas with distinct characteristics, including South Waterfront, Lair Hill, Corbett and John's Landing. Both Interstate 5 (I-5) and SW Naito Parkway act as barriers that divide the neighborhood as a result of the limited auto, bicycle and pedestrian access across the roadways.

The portion of South Portland east of I-5 and north of SW Hamilton Court is known as the South Waterfront district. The South Waterfront was historically an industrial area, but has redeveloped into a predominantly residential and institutional high-density area, including high-rise condominiums and Oregon Health & Science University (OHSU) facilities. The

South Portland neighborhood is one of the oldest neighborhoods in Portland, and includes the South Portland Historic District.

South Portland contains areas that have a higher proportion of several transit-dependent populations than the region overall. The neighborhood includes U.S. Census tracts or block groups with up to 78 percent low-income population and up to 47 percent households with limited vehicle access. The neighborhood generally matches the overall region in limited English proficiency. The youth population in this neighborhood is higher than in the region, including areas with up to 42 percent of the population age 21 or younger. The neighborhood contains areas with a concentration of older adults of more than double that of the overall region (up to 25 percent).

The **Homestead** neighborhood is located west of SW Barbur Boulevard. Homestead is primarily residential and institutional. Residences are located in three distinct areas: around SW Fairmont Drive, the Terraces Area between SW Terwilliger Parkway and SW Barbur Boulevard, and the Marquam Hill Village Area west of OHSU. This neighborhood contains a large amount of undeveloped open space, and the neighborhood association is active in preserving its forest and natural park, Marquam Nature Park. Circulation is considerably limited, particularly between SW Terwilliger Boulevard and SW Barbur Boulevard.

This neighborhood's steep topography has created unique conditions for infrastructure and transportation. This steep terrain is the primary reason behind the slow rate of development. Within the Homestead neighborhood boundaries, there are two regionally important medical complexes: the OHSU main campus and the Veteran Affairs (VA) Portland Health Care System sit atop Marquam Hill. The aerial tram connects these two centers to the South Waterfront OHSU campus.

Homestead contains areas that have a higher proportion of transit-dependent populations than the overall region. This neighborhood includes U.S. Census tracts or block groups with up to 47 percent minority populations, 41 percent low-income population, 24 percent households with limited vehicle access and 22 percent older adults. This neighborhood generally has a lower percentage of people with limited English proficiency than the region overall.

The **Hillsdale** neighborhood is bounded by the Southwest Hills, South Portland, South Burlingame and Multnomah neighborhoods. The dominating land use in Hillsdale is single-family residences. Concentrations of commercial use occur along SW Barbur Boulevard and SW Beaverton-Hillsdale Highway. A small amount of multifamily housing is located around these commercial areas along SW Barbur Boulevard and SW Bertha Boulevard. Located at the eastern neighborhood boundary, next to SW Barbur Boulevard, is the historic George Himes Natural Area Park, a 32-acre natural area with trails.

Hillsdale contains areas that have a higher proportion of transit-dependent populations than the overall region. The neighborhood includes U.S. Census tracts and block groups with concentrations of low-income population, households with limited vehicle access and older adult populations that are higher than the regional percentages. The neighborhood's

population includes lower percentages of minorities, people with disabilities and people with limited English proficiency than the region overall.

Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial and industrial districts, and mixed-use centers.

Economic Impacts

Economic impacts include business displacements, loss of parking or access, impacts to the local tax base, and impacts to efficient freight movement.

Displacements. In every instance where the Southwest Corridor Project displaces an existing commercial or industrial use, that represents an adverse economic impact. Even though the adverse impacts associated with displacement may not be significant on a regional or city-wide level, the Council recognizes and is sympathetic to the significance of each displacement at the individual business and neighborhood level. Adverse economic impacts associated with displacements include the loss of employment and payroll, loss of retail services, and loss of assessed value and tax base associated with the business.

Section 4.1.2 of the DEIS presents the likely property acquisitions in the Inner Southwest Portland Segment based on the current conceptual designs, and Section 4.3.2 identifies estimated impacts to businesses and employment. It is important to note that the list of acquisitions should not be interpreted as the final determination regarding property acquisition and the list could be updated as the Project design is further refined.

As indicated in DEIS Table 4.3-1, the light rail alignment, stations, and Marquam Hill Connection options would displace 16 to 17 businesses or institutions in the Inner Southwest Portland Segment. This does not include partial acquisitions, which are assumed not to displace a business or place of employment. As indicated in Table 4.1-1, partial acquisitions would affect an additional 19 commercial or industrial properties.

Adverse economic impacts associated with the displacements include the loss of employment and payroll, loss of retail services, and loss of assessed value and tax base associated with the business. The LRT alignment, stations, and Marquam Hill Connection will be in public ownership and off the tax rolls.

Among the alignment alternatives analyzed in the DEIS, the recommended alignment for the Inner Southwest Portland Segment (A1) would cause the fewest displacements to businesses or institutions and would affect the fewest number of employees. The Council finds that the selection of alternative alignment A1 is, in itself, indicative of efforts to minimize and mitigate adverse impacts.

In terms of mitigation, displaced commercial uses will be acquired at fair market value, and relocation benefits will be provided to business owners and tenants as required by law (and as described in Section 6.3.1 of the LUFO General Findings). During the preliminary and

final engineering processes, staff will try to minimize displacement impacts to the extent practicable through design refinements. In addition, the increased accessibility provided to people and places by LRT will likely result in increased sales and property values to remaining businesses that could mitigate or even reverse any overall business losses directly due to construction of the light rail system. At the same time, if properties redevelop due to increased property values, existing businesses and their associated jobs may need to relocate. This need to relocate could result in additional business closures or job loss for some parties, although overall economic activity levels would increase. The Council finds that application of Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy—as discussed in the Social Equity portion of the General Findings for Criterion 3—could help mitigate indirect adverse impacts to businesses.

Loss of Parking/Access. The loss of parking, and the loss or change of access, can have adverse economic impacts on businesses. If an existing access must be removed by the Project and cannot be relocated or reconfigured to provide adequate and safe access, the entire business use is assumed to be displaced. Even if alternative access is available, it may not be as convenient as the existing access and could result in some loss of business. As indicated in DEIS Section 3.2.6, in the Inner Southwest Portland Segment the Project would eliminate 16 two-hour limited spaces adjacent to Duniway Park. As indicated in a parking utilization survey, the spaces are typically lightly used on weekdays; however, it is likely that they would be more heavily used on weekends and during park events. Eliminating the spaces would increase demand for remaining on-street spaces on nearby streets. However, the Council finds that the combination of improved transit and improved bicycle and pedestrian facilities could help offset the impact.

In addition, partial property acquisitions may eliminate off-street parking spaces associated with businesses. As discussed above under Displacements, mitigation for these impacts would include payment of just compensation and assistance from TriMet. In addition, it may be possible that parking spaces could be reconfigured in places to add more spaces.

The Council finds that parking mitigation strategies that could be implemented if parking supply were to become over-utilized once the project is in place include replacement of parking, parking management strategies, and/or parking restrictions. TriMet would work with the affected neighborhoods and/or local jurisdiction to determine the appropriate parking mitigation strategy, if needed.

Tax Base. Local jurisdiction tax bases are affected in two ways by the development of large public infrastructure projects such as the Southwest Corridor MAX Light Rail Project. First, and by far the greatest long-term impact, is the development and redevelopment that could occur in conjunction with the Project. As described in DEIS Table 4.18-1, which summarizes indirect impacts, as development occurs, the investments attract new businesses and employment, and would increase tax revenues and property values. The effect of this kind of impact is difficult to estimate because it is dependent upon many independent private decisions that would occur in the future. However, for the reasons set out in Table

4.18-1, the Council finds that redevelopments would have net beneficial indirect economic impacts.

The second type of impact is the direct impact to tax bases that occurs through property acquisition for construction of the Project. Through acquisition, private property converts to public property and, as such, is removed from the tax rolls unless resold for private purchase. As indicated in DEIS Table 4.3-2, the LRT route in the Inner Southwest Portland Segment and Marquam Hill Connection would result in an estimated \$55,671 in annual property tax loss for the City of Portland. The Council finds that between the Inner and Outer Southwest Portland Segments, the property tax revenue loss would be negligible (less than 0.1 percent) to the City's budget.

The Council also finds that properties near light rail stations in the Inner Southwest Portland Segment will likely experience an increase in value when the Project is completed, thereby increasing property tax revenue in the long term to balance short-term adverse impacts.

Freight Movement. Efficient movement of freight and goods throughout the Southwest Corridor is critical to the economic vitality of the region. As there is no railroad within the Inner Southwest Portland Segment, the only type of freight with potential impacts is truck freight. As indicated in Section 3.3.7 of the *Transportation Impacts Results Report*, the light rail design would maintain vehicle lanes wide enough to accommodate typical trucks throughout the Corridor. Access impacts along the light rail alignment would be typically to small parcels without frequent access by large trucks. No significant impacts to freight trucks are anticipated in this Segment.

Conclusions. The Council finds that, on balance, the Southwest Corridor Project will result in positive economic consequences in the Downtown Portland, South Portland, Homestead, and Hillsdale neighborhoods in the Inner Southwest Portland Segment, particularly because improved transit capacity and new transit connections will be available to support existing and planned development in these areas consistent with local plans. Residents and businesses in the affected neighborhoods will have improved access to the regional rail transit system, which offers convenient travel and connections to regional centers offering employment, education, entertainment, recreation and public services.

The improved access, along with higher levels of activity in station areas, could support and encourage new development along SW Barbur Boulevard, consistent with the vision articulated in the *Barbur Concept Plan*.

Based on the information contained in the DEIS and supporting documents, the Council concludes that the LRT improvements in the Inner Southwest Portland Segment can be designed to mitigate adverse impacts associated with the displacement of up to 17 businesses, and minor impacts on parking and freight movement.

Social Impacts

Various sections of the DEIS evaluate the potential effects of the Southwest Corridor Project on neighborhoods and communities in the Corridor. The analysis of adverse social impacts for the Inner Southwest Portland Segment includes consideration of residential displacements, social equity, access to community facilities, barriers to neighborhood interaction, and visual/aesthetic impacts.

Residential Displacements. As with business displacements, the Council recognizes that in every instance where the Southwest Corridor Project displaces an existing household, that represents an adverse social impact, and the Council is sympathetic to the significance of each residential displacement. It understands and acknowledges that relocations can cause significant anxiety and trauma to families, uprooting them from neighborhoods, schools and friends and imposing change on them.

As indicated in DEIS Table 4.1-1, in the Inner Southwest Portland Segment, the LRT improvements and Marquam Hill Connection options could displace up to 46 residential units. This includes an estimated eight full acquisitions of single-family to fourplex properties, and two multifamily residential properties. The recommended alignment alternative (A1) would displace the fewest residential units among the three alternatives analyzed in the DEIS.

It may be possible in some instances to reduce some residential displacements by taking only a portion of a property and/or structure and by modifying the remaining property and/or structure to allow continued occupancy. Where displacements are unavoidable, the Project will provide compensation for real property and relocation benefits to property owners and tenants based on fair market value and a comprehensive relocation program as required by law.

Social Equity. As indicated in DEIS Table B4.4-2, some of the neighborhoods in this Segment exceed the regional percentage for vulnerable and transit-dependent populations, including minority, low income, older adults, those with limited English proficiency, and people with disabilities. The Council finds that the Project would provide significant mobility benefits to transit-dependent populations in this Segment. These include more frequent and reliable transit service as well as safer and better-connected routes for walking and biking.

However, the Council also acknowledges that residential and business displacements could disrupt individual social ties, and that the Project could indirectly cause property values to increase through redevelopment around stations. Resulting potential displacements would have disproportionate impacts on low-income populations. As indicated in DEIS Section 4.18.3, displacements and acquisitions related to other development may be mitigated by ordinance or as a condition of approval for other projects. Cooperative multiagency programs could also provide assistance or additional relocation options for displaced parties. During final design and construction, TriMet and Metro would coordinate with local partners to develop station area redevelopment plans that include measures to minimize indirect impacts, including advancing programs to increase affordable housing supply in the Corridor.

The Council also finds that Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy (described in Section 6.3.1 of these findings) will be important tools to help ensure that Corridor neighborhoods will experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Access to Community Facilities. The Council finds that the Southwest Corridor Project will provide improved transit access to community facilities within the Inner Southwest Portland Segment and in the larger region. The Project would improve transit access to several medical and educational facilities, including Portland State University, Oregon Health & Science University, Veterans Affairs Portland Health Care System, and the National University of Natural Medicine. The Project would also improve transit access to park facilities including Lair Hill Park, Terwilliger Parkway, and George Himes Natural Area Park. The Project would necessitate acquisitions of portions of each of these park facilities; however, as indicated in Section 6.4.1.5 of these findings, impacts to the parks' recreation functions would be negligible.

The Project will also have a few adverse impacts on religious facilities in the Inner Southwest Portland Segment, including acquiring parcels that are used as parking for the Tabernacle Seventh-Day Adventist Church, and acquiring the Congregation Ahavath Achim property.

The Council finds that improved transit accessibility to community facilities will outweigh any adverse impacts of property acquisitions. The Council further finds that improved transit access to community facilities within the affected neighborhoods and in the larger region is especially important to those with limited vehicle access residing in neighborhoods in the Inner Southwest Portland Segment.

Barriers to Neighborhood Interaction. The Council finds that the LRT alignment and highway improvements will not result in barriers to neighborhood interaction in the Inner Southwest Portland Segment. The light rail trackway would run along SW Barbur Boulevard, which generally follows the boundary between the South Portland and Homestead neighborhoods. The Project would also add an at-grade pedestrian crossing of SW Naito Parkway at SW Gibbs Street, which would slightly reduce the effect of SW Naito Parkway as a barrier dividing the South Portland neighborhood. Additionally, other pedestrian improvements in the vicinity of LRT stations will improve neighborhood access to transit facilities in these neighborhoods and reduce barriers to neighborhood interaction.

Visual/Aesthetic. DEIS Table 4.5-3 provides a summary of visual impacts associated with LRT improvements in the Inner Southwest Portland Segment. The DEIS evaluates impacts to visual quality by landscape unit, which are general geographic areas with similar visual conditions (as illustrated in DEIS Figure 4.5-1). The following landscape units are present in the Inner Southwest Portland Segment:

- **South Portland Landscape Unit** varies in character, from highly urbanized in the eastern segment to forested hillsides to the west. Prominent features include Marquam

Hill, Oregon Health & Science University (OHSU), Veterans Affairs (VA) Portland Health Care System and the South Portland Historic District. Residential areas range in character from mid to low density. I-5, SW Naito Parkway, SW Barbur Boulevard, and the Portland Aerial Tram transect the area.

- **Barbur Woods Landscape Unit** is a mid- to low-density residential part of Inner Southwest Portland, characterized by a variety of housing types secluded within verdant landscapes. It has large forested spaces, both inside the formal park boundaries of SW Terwilliger Boulevard Parkway and George Himes Park, and outside the park in semi-managed open spaces.

Long-term impacts to each landscape unit are described below.

For the South Portland Landscape Unit, the addition of light rail within the median on SW Barbur Boulevard would widen the right of way, modify grades, add retaining walls, remove buildings and clear vegetation. Vegetation would be removed beside Lair Hill Park. Other changes include the development of a new station at SW Barbur Boulevard and SW Gibbs Street as well as new stairs to connect several places along SW Barbur Boulevard to the Lair Hill neighborhood. Overall visual impacts are considered moderate.

For the Barbur Woods Landscape Unit, adding light rail to the median of SW Barbur Boulevard would expand the roadway and remove vegetation in wooded sections along Terwilliger Boulevard Parkway, including George Himes Park. New retaining walls would be a prominent feature. A new station at SW Barbur Boulevard and SW Hamilton Street would also widen that intersection, remove buildings and add retaining walls. As indicated by DEIS Table 4.5-3, overall visual impacts to the South Portland and Barbur Woods Landscape Units are considered moderate.

For the Marquam Hill Connection options, visual impacts would vary based on which option is selected, as summarized in Table 4.5-6. Each option would remove trees and other vegetation. The Elevator/Bridge and Path (1A) and Elevator/Bridge and Recessed Path (1B) options would include an elevator tower at the base of the hill, which would be visually prominent. These two options would have overall high visual impact. All four options include an upper elevator tower, which would be visually similar to existing structures at OHSU. Overall visual impacts associated with the Elevator/Bridge and Tunnel (1C) and Full Tunnel (2) options are considered moderate.

As indicated in DEIS Table 4.5-8, sidewalk improvements in this Segment might remove strips of vegetation, but frequently would add more visual continuity and could also incorporate other landscaping elements such as street trees or plantings. New bikeways could cause minor changes to visual features and could remove strips of vegetation, but these improvements would maintain or improve the visual character of adjacent streets. These visual impacts are considered low.

The Council finds that long-term mitigation options applicable to all segments, as described in Section 6.3.1 of these findings, could be applied in the Inner Southwest Portland Segment to mitigate the identified visual impacts.

Neighborhood Quality of Life. As indicated in DEIS Table 4.4-2, overall, the project would improve quality of life in the surrounding neighborhoods of the Inner Southwest Portland Segment. The Project would improve transit access for the South Portland and Homestead neighborhoods, which would be served by the Gibbs and Hamilton stations. Although local bus service would be reduced, light rail would provide faster and more reliable transit service. The shared transitway would improve bus travel times and reliability between the Downtown Portland and Hillsdale neighborhoods. The Project would leave existing traffic patterns in South Portland largely unchanged, including regional through traffic that routes on local residential streets, but would not preclude future changes. The Project would shift some traffic from SW Barbur Boulevard to SW Corbett Avenue between SW Bancroft Street and SW Hamilton Street. Traffic impacts and mitigation are further described under the Traffic section, below. An additional adverse impact would be the introduction of a new source of noise and vibration along the LRT alignment; however, most long-term noise and vibration impacts can be mitigated, as discussed under Section 6.4.1.3 of these findings. The Council finds that adverse impacts can largely be mitigated and are far outweighed by the quality of life benefits to neighborhoods.

Conclusions. The Council finds that the social impacts of the Southwest Corridor Project are generally positive in the affected Downtown Portland, South Portland, Homestead, and Hillsdale neighborhoods in the Inner Southwest Portland Segment. Efforts have been taken to minimize displacements and the LRT improvements will be integrated with the built and planned urban environment. Residents and businesses in the Segment neighborhoods will have important new transit connections to a range of important destinations throughout the region, including the Airport, Convention Center, Rose Quarter, Expo Center, OMSI, Zoo, OHSU, Portland State University, and PCC-Sylvania.

Relative to visual impacts, the Council finds that adverse visual effects can be mitigated through careful coordination with the affected neighborhoods and jurisdictions through the FEIS process.

Improved transit access to employment centers and services would especially benefit residents with limited alternatives to driving, who are more dependent on availability of transit to access employment centers, services, and community facilities.

Availability of light rail to the Inner Southwest Portland Segment would provide an alternative mode to automobile travel on the often-congested SW Barbur Boulevard. The improved transit access, along with higher levels of activity in station areas, could encourage redevelopment and new services, and potentially increase property values. The Council finds that overall, these improvements would maintain or enhance the viability of neighborhoods in the Segment. However, the Council also acknowledges that potential displacements resulting from increased property values, rent, and redevelopment would have disproportionate impacts on low-income and other vulnerable or transit-dependent populations. The Council finds that Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy are important to

ensure that Corridor neighborhoods will experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Urban Form Impacts

The Council finds that light rail transit is critical to achieving compact, efficient development around light rail stations and along the LRT alignment in the Inner Southwest Portland Segment, as called for by the Metro 2040 Growth Concept and Barbur Concept Plan. Light rail transit can also readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. City of Portland zoning along the Corridor in the Inner Southwest Portland Segment supports higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of households that are smaller, have a modest household income or both. The Council finds that these density-enabling land use regulations will allow more homes to be built for the region's growing population, thus expanding the housing supply and meeting the demand for needed housing.

High capacity transit services also mean that new residential and employment uses can lower the amount of necessary onsite parking—due to easy access to jobs and services via transit, biking or walking. The Council finds that such multimodal access is possible as a result of the region's existing high capacity transit network, into which the Southwest Corridor LRT would connect.

In addition, the Council finds that as the region grows, implementation of light rail will be critical to improving transit connections between jobs and residences. Mixed-use transit-oriented development may allow some residents to live and work within the same station area. Light rail stations that can be accessed by a variety of travel options, including biking, walking or taking local transit, will also allow the growing number of people in the Corridor and region to have better mobility while limiting impacts to the environment and to quality of life.

Safety

Security Concerns. The Council is sensitive to the importance of safety and security at stations and in neighborhoods affected by the Southwest Corridor Project. For the Project to succeed, passengers must feel safe using the stations and trains.

As indicated in DEIS Section 4.17.2, the LRT alignment and associated stations in the Inner Southwest Portland Segment would not be in areas with high incidences of crime, particularly crimes against persons. The stations would be street-oriented stations along busy arterials, and would be in areas with high activity levels, good visibility and no unique safety concerns.

For the Marquam Hill Connection, all of the connection options would have an east entrance near the station at SW Gibbs Street but off of SW Barbur Boulevard. The relative isolation and low visibility of the entrance, away from other active uses, could make it more difficult

to provide a secure environment for patrons, particularly outside of daylight hours and in off-peak periods. Some patrons could perceive a lack of security and be reluctant to use the facilities.

Connections 1A, 1B and 1C have elevator and path systems connecting from SW Barbur Boulevard to SW Campus Drive or Oregon Health & Science University's (OHSU's) Kohler Pavilion. The paths traverse hillside areas that are wooded and would have low visibility to passersby on SW Terwilliger Parkway. The elevator, while equipped with surveillance cameras, would be difficult to secure due to its limited visibility from surrounding areas and its isolation. The isolated and confined environment of the paths and the elevators would also limit a patron's ability to avoid a potential safety threat if one were present. Connection 2: Full Tunnel would include a 453-foot-long tunnel extending from a portal off of SW Barbur Boulevard, and extending under SW Terwilliger Boulevard to an elevator and bridge connecting to the seventh floor of Kohler Pavilion. The long pedestrian tunnel leading to an elevator also would create safety and security concerns because of the confined spaces and isolation.

As indicated in the General Findings of Section 6.3.1, the Council finds that TriMet's dedicated transit police division would continue to work cooperatively with Portland law enforcement, as well as fire and other emergency responders, to respond to incidents. The Southwest Corridor Project would feature the same safety and security techniques and systems that are applied throughout the regional transit system. TriMet's transit police and contracted security staff patrols and supporting resources, technology, and safety and security systems would be expanded to address the additional facilities developed as part of the Project.

The Council finds that for all facilities, final design and operations planning will consider best Crime Prevention Through Environmental Design practices, including modified siting or layout concepts; the use of lighting, communications, electronic and security/police surveillance; and controlled entry. For unique facilities such as the Marquam Hill Connection, a combination of customized site-specific measures could be necessary, and would be developed in consultation with local agencies, emergency service providers, and OHSU.

TriMet is committed to maintaining a safe and effective transit system. As the project continues into final design, the Council finds that TriMet would continue to develop and refine specific safety and security measures in consultation with the City of Portland and other corridor jurisdictions by doing the following:

- Park-and-rides and station area design will consider site-specific measures to maximize security and discourage criminal activity.
- All Marquam Hill Connection options will consider design features that provide enhanced visibility and lighting along with safety features to monitor potential criminal activity.
- Bicycle and pedestrian facilities will consider design features that enhance visibility and discourage criminal activity.

- During final design, TriMet would form a Project Safety and Security Committee comprising internal operations staff, staff from local jurisdictions, project design staff and maintenance staff. The committee will review CPTED approaches being applied to the project.
- TriMet would prepare a Safety and Security Management Plan addressing potential safety hazards and security vulnerabilities.

The Council also finds that TriMet would form a Fire, Life and Safety Committee for the light rail project composed of police, fire and safety personnel, and other emergency services providers in the Corridor, to advise on design development and operations planning. This committee would review and advise on procedures, staff levels, and safety and security concerns.

Emergency Vehicle Access. As indicated in DEIS Section 4.16.2, in the Inner Southwest Portland Segment, no police or fire and rescue facilities would need to be relocated for the Project. However, localized access to properties by fire, police and ambulance vehicles could be affected by changes in local street configurations in this Segment. Along SW Barbur Boulevard, light rail would operate in the median for a large portion of all the alignment alternatives. This operation of light rail in the median would result in changes in access, circulation and response times for law enforcement, fire response and other emergency service providers.

The changes to roadways would include new and modified intersections and traffic signals; the addition of crossing gates in some locations; and new or modified structures in other locations. Portland Fire and Rescue relies on a pre-emption Opticam system maintained by the City of Portland Bureau of Transportation. Portland Fire and Rescue considers development of this system in the Corridor critical for safety and response times. In portions of the alignment where light rail would operate in the median, crossings of the median would be restricted for general traffic and could also be restricted for emergency vehicles. In addition, these modifications to emergency response routes, configurations and facility types will typically require additional training and new procedures for police, fire and emergency response personnel.

The Council finds that planning and coordination with the service providers before the Project begins operation would mitigate the long-term impacts that the Project would have on the routes and operations of emergency vehicle services. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and emergency services, so that they can safely and effectively respond to emergencies involving light rail. The Council finds that TriMet already has an existing fire, life and safety coordination program with the City of Portland.

Health Impacts. The primary human health-related impact from the Southwest Corridor Project is related to air quality. As further described in Section 6.3.7 of these findings, the Project will improve air quality in the long term due to reduced criteria pollutants and mobile source air toxics, compared with No-Build conditions. The Council finds that improved air quality will have positive human health benefits for neighborhoods.

Additionally, as indicated in Section 1.2 of the DEIS, one of the goals of the Project is to advance transportation projects that increase active transportation and encourage physical activity. Numerous studies cited by Metro's *Benefits of Active Transportation and Considerations for Implementation* report (a supplemental report of Metro's 2014 *Regional Active Transportation Plan*) indicate that access to active modes of transportation such as walking and bicycling help reduce the risk of life-threatening health conditions. As such, the Council finds that improvements to sidewalks, bicycle facilities, and other active transportation improvements in the Inner Southwest Portland Segment neighborhoods could have positive health impacts for surrounding communities.

Finally, the Council believes and finds that traveling by light rail during rush hour will be less stressful than driving in highly congested conditions, and that this will have positive health benefits.

Conclusions. Relative to safety and security impacts, the Council acknowledges and supports TriMet's continuing efforts to ensure passenger and community safety throughout its service area. The Council finds that with appropriate location and design; continued development and refinement of specific safety and security measures during final design; coordination with police, fire and safety personnel, and other emergency services providers in the Corridor; and with implementation of system-wide transit security measures as described above, most security impacts can be mitigated.

Relative to emergency vehicle access, the Council finds that the long-term impacts that the Project would have on the routes and operations of emergency vehicle services would be mitigated by planning and coordination with the service providers before the Project begins operation. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and emergency services, so that they can safely and effectively respond to emergencies involving light rail.

Relative to health impacts, the Council finds that the Project would improve air quality throughout the Southwest Corridor, which will have positive human health benefits for neighborhoods in the Inner Southwest Portland Segment. In addition, improvements to active transportation facilities in the Segment, and reduced stress for those using light rail rather than driving, could have positive health impacts for surrounding communities.

Traffic Impacts

Transit. As indicated in the General Findings of Section 6.3.1, impacts of the Southwest Corridor Project on transit service are generally positive. The General Findings indicate transit impacts using three measures: travel time, reliability, and ridership. As indicated in Section 3.2.2 of the DEIS, the LRT Project would reduce peak-hour transit travel times in the Corridor, making it more comparable to auto travel times. The Project would improve transit reliability, due to the use of reserved or exclusive right of way, compared to buses operating in mixed traffic, which are subject to traffic congestion and delay. Use of the

shared transitway on SW Barbur Boulevard between downtown Portland and the SW Capitol Highway ramps would also allow buses to avoid congestion and improve travel times and reliability as well. With introduction of the Southwest Corridor Project, total transit ridership in the Corridor, including riders on light rail, buses and commuter rail in the Corridor, would be 8 percent greater than with the No-Build Alternative. Though the DEIS does not break out transit impacts by Segment, the Council finds that the Project's positive impacts to transit travel times, reliability, and ridership would also benefit communities in the Inner Southwest Portland Segment.

Highway and Street Impacts. DEIS Section 3.2 and the *Transportation Impacts Results Report* evaluate impacts of the Project on the highway and street network.

Major roadways within the Inner Southwest Portland Segment include I-5, SW Barbur Boulevard, and SW Naito Parkway.

The *system-wide* analysis reviews motor vehicle travel patterns, including changes to circulation patterns as well as the potential for traffic to divert to other streets. In the Inner Southwest Portland Segment, the Project includes revisions to lane configurations to accommodate the light rail transitway, and the conversion of ramps to signalized intersections. The Project also provides for reconstruction of the Newbury and Vermont trestle bridges, which do not meet current code and are not wide or structurally sufficient enough to accommodate light rail transit.

The Project would result in a reduction in total north-south motor vehicle volume of between 0.9 percent and 1.4 percent in this Segment, as well as a reduction in north-south motor vehicle volume accessing downtown Portland of between 1.7 percent and 4.8 percent. The Project would result in improved transit access to/from downtown, converting motor vehicle trips to/from downtown into transit trips.

There is one street in the Inner Southwest Portland Segment where light rail would substantially increase traffic compared to the No-Build Alternative: SW Corbett Avenue. The Project would increase traffic on SW Corbett Avenue between SW Bancroft Street and SW Hamilton Street by up to 70 percent, because all of the Project would relocate the southbound left turn on SW Barbur Boulevard from SW Hamilton Street to SW Bancroft Street, and those trips turning left from SW Barbur Boulevard traveling south on SW Corbett Avenue would add traffic for this one block segment. This increase would be accompanied by a corresponding reduction on SW Barbur Boulevard of up to 15 percent.

As indicated in DEIS Section 3.1.4, the analysis of motor vehicle operations focuses on intersections. It combines regional travel forecasts and traffic analysis and simulation models to predict future conditions in the year 2035 (and 2045 for freeway ramps) for the No-Build Alternative and for the light rail alternatives. The *Transportation Impacts Results Report* provides more detail on the types of models that were used and the technical results. Mobility targets are determined by the operating jurisdiction or agency. Impacts to motor vehicle operations at intersections are identified based on two measures: volume-to-capacity (V/C) ratio and queuing.

Related to *localized* traffic impacts, as indicated in DEIS Table 3.2-5, the recommended light rail alternative in this Segment would have four locations where intersections would not meet operating targets in 2035, compared to five locations for the No-Build Alternative. In some cases, the LRT Project would improve the intersection operations, and in others the intersection operations would be similar or slightly worse than with the No-Build Alternative. When intersections are operating below targets, delays increase as cars wait through several signal cycles to pass through an intersection.

In some cases, the Project would change specific travel patterns in the Inner Southwest Portland Segment, but would not increase the total volume of travel in the Segment. The Project would provide a new traffic signal with a southbound left-turn lane from southbound SW Barbur Boulevard to SW Bancroft Street, closing the southbound left turn at SW Hamilton Street. Modifications to street classifications in the City of Portland Transportation System Plan may be required for SW Corbett Avenue and SW Bancroft Street.

Related to queuing, the DEIS identified one location in the Inner Southwest Portland Segment where queuing impacts would be more adverse compared to the No-Build Alternative. The southbound left-turn PM peak-hour queues on SW Barbur Boulevard at SW Bancroft Street would overflow the 500-foot left-turn storage included in the project plan sheets.

There are two locations in the Segment where the analysis identified improved queuing for the LRT Project compared to the No-Build Alternative:

- At the intersection of SW Hamilton Street and SW Corbett Avenue in the PM peak hour, overall traffic input would improve due to the change from a four-way stop to a full traffic signal.
- At the intersection of SW Hamilton Street and SW Barbur Boulevard in the PM peak hour, northbound queues would be reduced due to relocating the southbound left-turn signal from SW Hamilton Street to SW Bancroft Street.

The intersections at the I-405 ramp terminals at SW 4th Avenue and SW 6th Avenue were analyzed with a 2045 forecast year to be consistent with FHWA and ODOT requirements to analyze 20 years from the date of project opening. The 2045 ramp terminal analysis showed no significant differences between the No-Build Alternative and the light rail alternatives.

DEIS Table 3.3-1 provides potential mitigation strategies for the intersections where the LRT Project would cause the operations to exceed the V/C targets or increase queue lengths in locations where the additional queuing would impact intersection or freeway operations compared to the No-Build Alternative. Proposed mitigations will be evaluated and likely refined before the completion of the FEIS, in consideration of the final route selected and its associated impacts. A determination regarding mitigation will be made in consultation with the local jurisdiction or operating agency. The Council finds that the following potential strategies can mitigate adverse *localized* traffic impacts in the Inner Southwest Portland Segment:

- SW Barbur Boulevard at SW Bancroft Street: Modify signal to two-stage pedestrian crossing. Increase eastbound right-turn radius speed, or grade separate the left turn.
- SW Bancroft Street at SW Corbett Avenue: Add a traffic signal.
- SW Hamilton Street at SW Corbett Street: Add a traffic signal.
- SW Barbur Boulevard and SW Hamilton Street: Modify signal timing, extend third northbound lane on SW Barbur Boulevard as it approaches SW Hamilton Street.
- SW 4th Avenue at SW Lincoln Street/I-405 northbound off-ramp: Reconfigure off-ramp to single northbound through lane and right-turn-only lane. Hold right-turn lane during protected bike/ped phase.

Additional information on *neighborhood circulation* impacts is provided in the supplemental Parametrix memorandum dated November 5, 2018. As indicated in that report, the Project would operate light rail down the center of SW Barbur Boulevard between SW Hooker Street and the vicinity of the Barbur Transit Center (BTC). (Note that the impacts discussed in the following paragraphs are applicable to both the Inner and Outer Southwest Portland Segments, and were not separated by Segment in the Parametrix analysis.) Operating LRT in the center of SW Barbur Boulevard would include new traffic signals at nine unsignalized, local street intersections with SW Barbur Boulevard (between Hooker and BTC) and other local street intersections would be limited to right-in/right-out movements. In some locations (SW Bancroft, SW 2nd Avenue, SW 13th and SW Multnomah), these existing unsignalized local street intersections only allow right turns. A traffic signal at these locations would improve the available turning options and increase safety for vehicles turning from local streets onto SW Barbur Boulevard. At other locations, where both left and right turns are permitted from a stop-controlled local street, the new traffic signals would improve safety for vehicles turning from local streets onto SW Barbur Boulevard.

A few stop-controlled side streets would lose the ability to make a left turn onto SW Barbur Boulevard. These vehicles could choose to turn right onto SW Barbur Boulevard and make a U-turn at the next signalized intersection or change their route on local streets within the neighborhood to access SW Barbur Boulevard at a traffic signal. These movements through the neighborhood would increase traffic on local streets. A more detailed analysis of the potential increase in local street traffic will be conducted during the FEIS process and additional traffic mitigation will be proposed to discourage cut through traffic on local streets.

This mix of new signalized intersections and limiting some existing intersections to right-in, right-out movements would likely modify traffic patterns within neighborhoods adjacent to SW Barbur Boulevard. The magnitude of circulation changes can be addressed by conducting a circulation study at locations where these movements may increase. Potential mitigation measures to reduce increased neighborhood cut through traffic include directional signage, speed humps, traffic diverters, road closures, traffic circles, and potentially providing a monitoring program to understand before and after volumes or parking caused by light rail transit.

Specific concerns about neighborhood circulation impacts have been raised in the Lair Hill neighborhood and the Fulton Park neighborhood. Results from any circulation studies and additional traffic analysis will be presented in the FEIS.

Regarding *transportation safety* impacts, the Project would improve pedestrian and bicycle safety by increasing the number of marked pedestrian crossings of SW Naito Parkway and SW Barbur Boulevard, and providing bicycle lanes along all portions of the alignment where light rail is at-grade in a street. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. The Project would introduce at-grade roadway crossings with light rail, which will follow TriMet's Design Criteria for at-grade crossings. The Council concludes that these methods and devices provide for a safe multi-modal environment.

Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council's decision to approve the Southwest Corridor Project as applied-for by TriMet provides for a light rail route, light rail stations and lots in the Inner Southwest Portland Segment, as identified in the LUFO.

The Council finds as well that this project will achieve the primary purposes that were adopted by the Southwest Corridor Steering Committee, which are identified in the General Findings for Criterion 3 (Section 6.3.1). The project purpose and objectives closely parallel the emphasis of Criterion 3(A) for this Land Use Final Order. The effectiveness evaluation of the Southwest Corridor Project relative to meeting the project purpose is provided in DEIS Section 5.1 and summarized below, as it applies to Criterion 3(A) for the Inner Southwest Portland Segment.

Address the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership.

The LRT Project offers high capacity transit service to help meet the projected growth in demand for transit trips in the Corridor while reducing congestion along major arterials within the Project area, including I-5 and SW Barbur Boulevard, as compared to the No-Build alternative. The Inner Southwest Portland Segment serves major employment centers—including OHSU, Portland State University, and Portland's Central Business District—which are expected to be large sources of future transit ridership. The Council finds that the Project will also facilitate transit service to existing and future residential and mixed-use areas in the transit corridor and around stations, as called for by Metro's *2040 Growth Concept*. Providing light rail transit to these areas would allow for new development that helps accommodate anticipated growth in population and jobs in locations that can be efficiently serviced by transit. The Project will also provide service to several major

recreational areas in the Segment, including Terwilliger Parkway and George Himes Natural Area Park. And the Project will conveniently connect residents of Inner Southwest Portland neighborhoods with the other parts of the metropolitan area served by light rail transit.

The Council finds that as a result of providing service to these key residential, employment, and recreational areas, the Project is expected to result in an 8 percent increase in total transit ridership in the full Corridor by the year 2035, compared to the No-Build Alternative.

Address the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety.

As discussed above under Urban Form Impacts, the Council finds that light rail transit is critical to achieving compact, efficient development along the transit corridor and station areas, as called for by the *2040 Growth Concept*. Development around light rail stations can readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. City of Portland zoning along the Inner Southwest Portland Segment supports higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of a greater range of household sizes and incomes.

The Council finds that the Project will enhance safety for pedestrians and bicyclists by increasing the number of marked pedestrian crossings of SW Naito Parkway and SW Barbur Boulevard, and providing bicycle lanes along all portions of the alignment where light rail is at-grade in a street. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. The Council also finds that the Project will be designed to address security concerns at stations and along the Corridor by employing best CPTED practices, lighting, communications, electronic and security/police surveillance, and controlled entry, and that the Corridor will be patrolled by TriMet's dedicated transit police.

Address the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council finds that the Project will provide many positive impacts to neighborhoods in the Inner Southwest Portland Segment, and that adverse impacts can be mitigated, as discussed above under Economic and Social Impacts. Positive impacts include improved transit access to local and regional jobs and community facilities, new or improved pedestrian and bicycle facilities, and enhanced health and quality of life. The Project will also help reduce vehicle miles traveled. The Project would result in a reduction in total north-south motor vehicle volume within the Segment by providing an efficient and reliable alternative to vehicle travel, particularly for trips to and from downtown Portland.

The Council is aware that light rail transit facilities within the Inner Southwest Portland Segment will have some adverse impacts, particularly in the form of business and residential displacements, shifting traffic patterns, intersection operations, visual changes, and safety and security concerns. However, these impacts can be minimized during preliminary

engineering, and mitigation measures can and will be taken to reduce adverse community impacts. Overall, for the reasons stated above, the Council concludes that the identified benefits of light rail transit to the affected Downtown Portland, South Portland, Homestead, and Hillsdale neighborhoods in the Inner Southwest Portland Segment outweigh the adverse impacts. From an economic, social, urban form, safety, and traffic standpoint, the affected neighborhoods should benefit substantially from the proximity and availability of light rail transit.

Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.

The major highway improvements in the Inner Southwest Portland Segment are as follows:

- A Marquam Hill Connection connecting the SW Gibbs Street Station to the medical and educational facilities on Marquam Hill. The connection will use some combination of elevators, bridges, paths and/or tunnels. The four connection options are described in detail in DEIS Appendix A.
- Reconstruction of the Newbury trestle bridge and Capitol Highway overpass and the Vermont trestle bridge.
- Vehicular, pedestrian and bicycle improvements within and along the alignment north of the I-405 freeway and within and along SW Barbur Boulevard, including sidewalks and bicycle improvements, and minor elements such as signalization, electrification, and retaining walls.

Additionally, there would be mitigation measures and minor improvements along the alignment and within and along Barbur Boulevard and some adjoining roadways, including road realignments, sidewalk improvements, signalization, electrification, and sound walls.

The Council finds that the highway improvements in the Inner Southwest Portland Segment will have mostly positive impacts on neighborhoods and improve opportunities for pedestrian, bicycle and vehicle circulation. The Marquam Hill Connection will provide enhanced pedestrian access to the medical and educational facilities on Marquam Hill for nearby residents and for those connecting via light rail. Each of the connection options would comply with the Americans with Disabilities Act (ADA) by providing ramps and/or moderate grades along pedestrian paths. Although there are concerns about impacts to natural resources and park facilities associated with the Marquam Hill Connection, the Council finds that adverse impacts can be adequately mitigated, as discussed in the findings for Criterion 6.

Pedestrian and bicycle improvements on SW Barbur Boulevard and north of the I-405 freeway will improve access and safety for neighborhood residents and employees. No adverse impacts are anticipated for these improvements.

The reconstruction of the Newbury trestle bridge and Capitol Highway overpass and the Vermont trestle bridge are necessary to accommodate the LRT alignment and will also accommodate bicycle lanes on the reconstructed bridges, which is a benefit to bicycle safety

and connectivity in the Corridor. Both of these bridges are identified as being eligible for the National Register of Historic Places; therefore, their removal would be considered an adverse impact to historic and cultural resources. However, as indicated in the segment findings, the Council finds that impacts to affected historic resources can be adequately mitigated.

The Council concludes that the benefits of these highway improvements strongly outweigh any adverse impacts that may be associated with them.

6.4.1.3: Criterion 4: Noise Impacts

“Identify adverse noise impacts and identify measures to reduce noise impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”

Noise and vibration impacts specific to the Inner Southwest Portland Segment are addressed in the following section. Noise and vibration impacts common to all segments are discussed in Section 6.3.2. An overview of noise and vibration measurements and identification of potential noise mitigation by noise type are included in the DEIS and in the *Noise and Vibration Results Report* (Attachment E of the DEIS). Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Noise and Vibration Impacts in the Inner Southwest Portland Segment

The Inner Southwest Portland Segment connects downtown Portland to outer Southwest Portland. The Segment includes a mix of residential, commercial, open space, and institutional uses. The noise environment in this Segment is dominated by automobile and truck traffic on I-5 and nearby major arterial roadways.

FTA Noise Impact Criteria groups noise-sensitive land uses into the following three categories:

- **Category 1:** Buildings or parks where quiet is an essential element of their purpose.
- **Category 2:** Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and office buildings which depend on quiet as an important part of operations.

Land use in this Segment consists of single-family and multifamily residences and two hotels (FTA Category 2); the Cedarwood Waldorf School, the Tabernacle Seventh-day

Adventist Church, and multiple parks and open spaces (FTA Category 3); and commercial uses and undeveloped lands that are not considered noise-sensitive under FTA criteria. The Segment also includes the Congregation Ahavath Achim Synagogue (Category 3), but it would be displaced by the light rail alignment. No Category 1 land uses are identified in the Inner Southwest Portland Segment.

As shown on Figure 5-1 and Table 5-1 of the *Noise and Vibration Results Report*, there were eleven noise monitoring sites in the Inner Southwest Portland Segment. The ambient noise levels (Ldn) at the noise monitoring locations adjacent to the Project alignment ranged from 59 dBA to 70 dBA, with the highest levels near I-5/I-405 and adjacent to SW Barbur Boulevard.

LRT Operational Noise Impacts. In the northern end of the alignment, moderate noise impacts occur along the entire segment from the downtown connection to the connection to the Outer Southwest Portland Segment. Impacts were identified at several rooms at the University Place Hotel & Conference Center because of a nearby crossover. Impacts were also identified along both side of SW Barbur Boulevard from the crossing of I-405 continuing to SW Hamilton Street. South of SW Hamilton Street, moderate impacts occur at several multifamily units and a group of single-family residences located at the connection to the Outer Southeast Portland Segment along SW 2nd Avenue. Severe noise impacts in this Segment include four units near SW Condor Avenue and SW Pennoyer Street. An additional severe impact was also identified on SW Hamilton Street at SW Barbur Boulevard. All other noise impacts were in the moderate category.

All noise-producing sources associated with elevator systems, including drive motors and ancillary operating equipment, are required to meet the City of Portland Noise Control Ordinance, which is more stringent than the FTA noise criteria. Therefore, none of the Marquam Hill Connection options are predicted to have any long-term noise impacts.

LRT Wheel Squeal Impacts. Table 4.11-2 of the DEIS and the Parametrix memorandum summarize anticipated wheel squeal impacts by segment. These sources identify one curve with a radius of less than 400 feet in the Inner Southwest Portland Segment at SW Lincoln St and SW 4th Avenue. This curve will be reviewed for lubrication if squeal is identified during initial system testing.

Road Traffic and Bus Noise Impacts. The potential to create or increase exposure to traffic noise as a result of the LRT project was evaluated qualitatively. In the Inner Southwest Portland Segment, these types of noise impacts would occur at some locations along SW Barbur Boulevard and SW Naito Parkway. The realignments of SW Barbur Boulevard at SW Bancroft Street and SW Hamilton Street include the removal of several structures, thereby requiring a traffic noise study. Based on this analysis, there are four sites on SW Barbur Boulevard near SW Bancroft Street and SW Hamilton Street where removal of existing structures could expose second line receivers to increased traffic noise. There are no transit centers or park-and-rides in this Segment, so no associated noise impacts were identified.

Noise from Ancillary Facilities. No ancillary noise impacts specific to the Inner Southwest Portland Segment were identified.

LRT Vibration Impacts. FTA provides criteria for acceptable levels of ground-borne vibration. The FTA criteria for ground-borne vibration are 72 VdB for Category 2 (residential) structures and 75 VdB for Category 3 (institutional) structures.

The existing vibration environment in the Inner Southwest Portland Segment is dominated primarily by heavy truck traffic on public roadways. Typical vibration levels for these vehicles range from 45 VdB for smooth roadways to 65 VdB for rough roadways or roads with large potholes. There is one location in this Segment where rail traffic is likely the dominant vibration source. Along SW Lincoln Street, the existing light rail would be a major source of vibration; however, testing has shown that vibration levels in nearby residences are below the 72 VdB criterion.

Table 7-2 of the *Noise and Vibration Results Report* summarizes the predicted vibration impacts for the Inner Southwest Portland Segment, and identified 76 total impacts. The northernmost impact is at the University Place Hotel Conference Center because of a nearby crossover. Additional vibration impacts were identified along both sides of SW Barbur Boulevard, with the southernmost impacts occurring at a group of single-family residences located at the connection of the Inner Southwest Portland and Outer Southwest Portland Segments, along SW 2nd Avenue. There are no anticipated vibration impacts related to the Marquam Hill Connection options.

Mitigation Options for Noise and Vibration Impacts in the Inner Southwest Portland Segment

Potential mitigation for noise and vibration impacts are provided for the Southwest Corridor Light Rail project as a whole (as discussed in Section 6.3.2 of these findings), rather than for individual segments. The Council finds that the type of mitigation measures discussed in that section of the findings could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.1.4: Criterion 5: Natural Hazard Impacts

“Identify Project improvements in areas subject to natural hazards (including landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain) and demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques that could be imposed during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Natural hazard impacts specific to the Inner Southwest Portland Segment are addressed in the following section. Natural hazard impacts common to all segments are discussed in Section 6.3.3. Natural hazard impacts, and associated mitigation measures, also are described in Section 4.8 of the DEIS. Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Natural Hazard Impacts and Mitigation in the Inner Southwest Portland Segment

The types of potential natural hazards that are applicable to the Inner Southwest Portland Segment include seismic hazards, landslides and rock fall hazards, and corrosive and hydric soils. These potential hazards are discussed in detail in Section 6.3.3 of these findings. Long-term impacts to the geologic environment are likely to be limited, but could include:

- Changes to localized topography and drainage patterns, which could affect existing landslide-prone areas and areas with unstable slopes;
- Minor settlement near surface features; and
- Encountering corrosive soils that could compromise concrete and steel structures.

The Council finds that the potential long-term impacts in the Inner Southwest Portland Segment can all be mitigated through design in accordance with standard geotechnical engineering practices, applicable regulations, and application of management practices (BMPs). According to section 00721 of the TriMet General Provisions, new construction must be designed and constructed in accordance with the standards for seismic safety detailed in the Department of Transportation Seismic Safety Regulations (49 CFR Part 41). Meeting these standards ensures that engineered bridges and structures for both light rail and road facilities will withstand a major seismic event. Examples of BMPs and standard geotechnical engineering practices are provided in the general findings of Section 6.3.3.

The DEIS does not identify potential natural hazard areas specific to the Inner Southwest Portland Segment. However, all of the hazard types identified in Section 6.3.3, except for flood hazards, could be present in this Segment.

Marquam Hill Connection Options. The Marquam Hill Connection will include some combination of elevators, bridges, paths and/or tunnels to connect the SW Gibbs Street Station to the medical and educational facilities on Marquam Hill. The connection will traverse Terwilliger Parkway, which is a linear park along SW Terwilliger Boulevard. Areas in the vicinity of the Marquam Hill Connection options and Terwilliger Parkway may be particularly susceptible to erosion, landslide, and rockfall hazards due to steep slopes (over 25 percent slope) in these areas. Steep slopes require special treatment to stabilize them if they are altered by project activities. Potential mitigation measures for geologic hazard impacts associated with the Marquam Hill Connections include application of BMPs and geotechnical engineering standards, which are listed above.

6.4.1.5: Criterion 6: Natural Resource Impacts

“Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland, and park and recreational areas that are protected in acknowledged local comprehensive plans or functional plans and, where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Natural resource impacts specific to the Inner Southwest Portland Segment are addressed in the following section. Natural resource impacts common to all segments are discussed in Section 6.3.4. Natural resource impacts, along with associated mitigation measures, also are described in Sections 4.5, 4.7, 4.9 and Appendices B.4.5 and D of the DEIS, and in the *Ecosystems Results Report* (Attachment D of the DEIS), incorporated herein by this reference.

Identification of Impacts to Significant Natural Resources in the Inner Southwest Portland Segment

The Portland Comprehensive Plan includes policies and objectives to address conservation of a range of natural resources identified in Statewide Goal 5 – including wetlands, riparian areas and water bodies, fish and wildlife habitat, scenic routes and viewpoints, and significant upland areas. The City has completed an inventory and analysis of natural resource sites, identified the significance of each site and provided varying levels of protection to specific sites through the application of Environmental Overlay Zones (E-zones). The E-zones are classified as either Conservation or Protection zones depending on the level of protection provided in the City development code.

Portland’s E-zone locations for the Inner Southwest Portland Segment are depicted in Figure 4.9-1 of the DEIS. The E-zones are mainly located within forested areas along SW Barbur Boulevard and within adjacent parks and natural areas, including the site of the Marquam Hill Connection. The LRT alignment runs through areas designated as both conservation (c – lower protections) and protection (p – higher protections).

The station access improvement options generally involve localized improvements such as new sidewalks and bicycle lanes and crossings that are primarily adjacent to roadways. Impacts from the station access improvements to contiguous, high-quality natural resources are expected to be relatively few. Upgraded facilities that would be part of these improvements could include stormwater runoff treatment and management, which could provide a net benefit to ecosystems.

Fish and Wildlife Habitat. Direct impacts to fish are not anticipated within this Segment, because there are no streams that contain fish within this Segment. Direct impacts to streams would likely be insignificant, because most of the streams currently traverse the alignment through pipes or culverts that have not been proposed for replacement. Indirect impacts

could occur as a result of changes to hydrology and riparian buffers. Other aquatic species, such as amphibians and invertebrates, might be affected in those streams that still contain surface connections to other streams.

Implications of project construction for forest, woodland, shrubland, and vegetated corridor habitats are addressed in Sections 6.3.4 and 7.5 of these findings. In the Inner Southwest Portland Segment, E-zoned forest habitat occurs on slopes adjacent to SW Barbur Boulevard in the southern half of the Segment, as well as in the area of the Marquam Hill Connection options. Along the LRT alignment in this Segment, impacts to E-zone conservation areas are approximately 31 acres; impacts to E-zone protection areas are approximately 2.5 acres. For the Marquam Hill Connection options, impacts to E-zones would total between 2.7 and 3.1 acres of conservation E-zone and 0.1 and 0.9 acre of protection E-zone. The forest vegetation class would be the only class to be impacted in the Marquam Hill area.

The presence of threatened or endangered wildlife or plant species in this Segment is not likely. Sensitive bird and mammal species, however, including pileated woodpecker and Townsend's big-eared bat, likely inhabit the forested areas along SW Barbur Boulevard. Removal of trees, including white oaks,⁸ would have a negative impact on these species, but the impact would be minimal in the context of the remaining habitat in the area. Overall, impacts to vegetation and wildlife species for the Inner Southwest Portland alignment and Marquam Hill Connection options would be noticeable but minimal.

Scenic and Open Space Areas. In the Inner Southwest Portland Segment, designated scenic viewpoints, drives and overlay zones (Figure 4.5-1 of the DEIS) near the alignment were analyzed, considering *Scenic Views, Sites and Drives Inventory* (1989); *Central City 2035 Volume 3A* (2018); and City of Portland Zoning Code 33.420 *Design Overlay Zone* and 33.480 *Scenic Overlay Zone*. Broadly, the light rail elements of the Project would be visible in the foreground and middle ground of these views but would not obscure the primary focal points of the views. The Marquam Hill Connection would be more visible than the light rail elements and would occur in visually protected areas. Table 4.5-9 of the DEIS, incorporated herein by this reference, identifies the impacts for each view site more fully. On this topic, the Council notes and finds that how one responds to a change in visual appearance can be highly subjective. While some may consider Project improvements as having a negative impact, others might like the visual change. The Tilikum Crossing Bridge associated with the Portland to Milwaukie light rail line is a case in point.

Riparian Areas. As stated under "Wetland Areas" below, a few unmapped riverine wetlands can likely be found along small, unnamed tributaries leading from forested slopes west of the LRT alignment in the Inner Southwest Portland Segment. As discussed in Section 6.3.4, riparian habitat could experience permanent impacts where guideways span areas of riparian vegetation. As impacts to wetlands in this Segment are expected to be limited to 0.1 acre, impacts to associated riparian areas would also be minimal.

⁸ White oaks are a "special status habitat" in the Portland terrestrial ecology enhancement strategy.

Wetland Areas. This Segment contains few mapped wetland resources, with a total of just 0.23 acre within the Segment. Approximately 0.1 acre of impacts to mapped wetland areas could occur in this Segment. Unmapped, small riverine wetlands are likely found along small, unnamed tributaries that lead from forested slopes west of the LRT alignment, and if they are present, they could slightly increase total wetland impacts. For the Marquam Hill Connection options, no wetlands are mapped within the footprint of the connection. Impacts to smaller undiscovered wetlands are possible but would be limited. Overall, the level of potential impacts to wetlands in this Segment including the Marquam Hill Connection is considered minor (likely less than 0.2 acre).

Park and Recreational Areas. As described in Section 4.7.2 of the DEIS, there are potential long-term impacts to four parks and recreation areas within the Inner Southwest Portland Segment. These potential impacts are summarized below.

- **Duniway Park** is a 14-acre park owned and maintained by the City of Portland, located on the west side of SW Barbur Boulevard, south of SW Sixth Avenue. It currently includes amenities such as a lilac garden, a newly updated synthetic surface soccer field, a horseshoe pit, paved and unpaved paths, picnic tables and a newly resurfaced exercise track. The northeast corner and eastern edge of the Duniway Park property would have minor direct long-term impacts associated with the Southwest Corridor Project. None of the impacts would permanently change the recreation uses offered by the park. Widening of, and improvements to, SW Barbur Boulevard could necessitate removal of small trees and vegetation.
- **Lair Hill Park** is a 3.3-acre neighborhood park, bordered by SW Barbur Boulevard and SW Woods Street, that is owned and maintained by the City of Portland. The park features mature trees, lawns, structures and recreation amenities that include a tennis court, tennis backboard, public art, picnic tables, playgrounds and paved paths. The Project would widen SW Barbur Boulevard along Lair Hill Park, which would require a partial acquisition of a narrow strip of land along its western boundary. Impacts are likely to include changes to the entrance path, removal of mature trees, reconstruction of the existing retaining wall, and changes to the sidewalks along SW Barbur Boulevard and the streets north and south of the park. These impacts would not affect activities involving passive park use or playground use.
- **Terwilliger Parkway** is a 99-acre linear parkway along SW Terwilliger Boulevard between SW Sam Jackson Park Road and SW Capitol Highway. It is part of the regional 40-Mile Loop Trail system and provides paved walking paths, picnic tables, viewpoints, hiking trails, bicycle paths and one playground. One parcel (R991161410) adjacent to the Project was purchased using Land and Water Conservation Fund (LWCF) grant funds; it is forested and does not have developed trails or other recreation amenities. One open space parcel that is connected to Terwilliger Parkway and that appears to be managed as part of it would have a partial acquisition of approximately 0.06 acre along SW Barbur Boulevard to accommodate widening. The parcel consists of compacted gravel in the area of

acquisition, so no long-term vegetation removal or removal of recreation resources would occur.

All four Marquam Hill Connection Options would have impacts to both undeveloped park areas and active recreation facilities. Impacts to undeveloped park areas vary, depending on the connection option. Connections 1A and 1B would impact between 0.68 and 0.88 acres of Terwilliger Parkway land area and would have permanent above ground infrastructure through the park. Replanting temporarily disturbed areas with native plants is required by the City of Portland for the removal of native forested habitat that characterizes the Terwilliger Parkway.

Connection Options 1C and 2 would each impact a larger area totaling 1.19 acres, but they would both incorporate a tunnel through the park, so permanent above ground features will be less visible than the above ground infrastructure in Connection Options 1A and 1B. As noted, mitigation for removal of native forested habitat will be required by the City of Portland.

Temporary construction impacts to the Terwilliger Parkway Trail are discussed in Section 7.5 of these findings. Specific potential mitigation measures for long-term impacts to Terwilliger Parkway are discussed below.

- **George Himes Natural Area Park** includes 32.4 acres of steeply sloping forested natural area, located generally between SW Capitol Highway, SW Terwilliger Boulevard and SW Barbur Boulevard. It includes paved and unpaved paths, picnic tables and hiking trails. One of the hiking trails (SW Trail #3) connects Terwilliger Parkway with the John's Landing neighborhood via SW View Point Terrace by passing under SW Barbur Boulevard and Interstate 5 (I-5). This recreation trail from the neighborhoods west of I-5 connects to John's Landing, the Willamette River and Willamette Park. The Project would impact a strip along two parcels that make up the park because of the need to widen beyond the existing edge of SW Barbur Boulevard and to replace the Newbury trestle bridge. The road widening might also remove trees and vegetation in the vicinity of the roadway.

Mitigation Options for Natural Resource Impacts in the Inner Southwest Portland Segment

The Council finds that measures available to mitigate natural resource impacts that cannot be avoided include the following.

1. During construction, the Project will employ BMPs to avoid impacts to *wetlands and waters* from erosion, spills, *damage to vegetation* or *disruption of hydrology*, and to mitigate impacts to *fish and wildlife* and *riparian resources*. Standard specifications and special provisions would direct contractors to avoid and minimize impacts. BMPs associated with existing construction specifications and standard natural resources protection measures are described in the general findings of Section 6.3.4.

2. Regarding mitigation for *tree removal*, tree removal on properties within a City of Portland environmental conservation or protection overlay zone (e-zone) is regulated under Title 33.430. This requires replacement of trees and other vegetation as follows:
 - All vegetation planted in a resource area is native and listed on the Portland Plant List.
 - Plants listed on the Nuisance Plants List are prohibited.
 - Tree replacement to occur as shown in Table 430-3 of COP Title 33.430

Tree removal on properties not within a City of Portland e-zone is subject to standards in the City's Title 11 Tree Code. The Tree Code has different sections for tree preservation and tree density associated with development. These sections are listed below:

- Title 11.50.040 – Tree Preservation Standards
- Title 11.50.050 – Tree Density Standards
- Table 50-3 of COP Title 11.50 defines the number of required trees for mitigation.

Therefore, future design plans for the project would include locations for trees and plants that will provide the required coverage and number of trees to comply with City of Portland's tree code.

3. Compensatory mitigation for direct *wetland impacts* is regulated by federal, state and local jurisdictions, and would typically require restoring or enhancing degraded wetland areas or establishing new wetlands nearby to compensate for functions lost or degraded by those impacts. Within this Segment, potential compensatory mitigation for wetland impacts could include on-site or off-site enhancement or restoration of existing wetlands, or creation of new wetlands. The selection of mitigation sites would depend on the area needed for mitigation, current and future ownership of potential mitigation sites, and site characteristics. Mitigation sites would be selected based on soil types and topographic position that would increase the likelihood of successful restoration or establishment of wetland conditions. Additionally, mitigation could include daylighting some piped streams if deemed beneficial through the permitting process.
4. Potential mitigation measures for long-term *scenic impacts* include, but are not limited to, the following:
 - Use high quality design and materials that mitigate the overall impact and blend into the visual environment
 - Where possible, avoid demolition or alteration of contributing historic structures
 - Reduce or buffer impacts to existing scenic resources through the addition of new street trees and other landscaping elements
 - Consider aesthetic treatments for the design of new/replacement bridges, overhead structures or elevated sections of the ballasted trackway to improve

compatibility with surrounding areas. If more appropriate, structures should be designed to contrast with their surroundings, so as to create a visual statement.

- Use elements such as landscaping, streetscaping or fencing to provide an aesthetically pleasing visual buffer between the Project and adjacent high-sensitivity viewers.
 - Adopt a strategy of coordinated street furnishing to create a harmonious visual environment. Elements include signage, way-finding, street furniture, lighting, hardscaping and public art.
 - Use terraced vegetated landscaping to minimize the visual impact of large retaining walls where possible.
 - Replace/restore removed vegetation and landscaping where possible.
 - Consider vegetated trackway or alternatives to concrete trackway where appropriate.
5. TriMet and Metro are coordinating with Portland Parks and Recreation and the City of Tigard for project features and appropriate mitigation measures to reduce impacts to the *parks and recreation* properties. Where long-term impacts to parks or recreation lands are unavoidable, TriMet would work with the park owner to determine appropriate compensation or other agreements needed to allow use of the land for the Project. Removal of mature trees and shrubs would be quantified at the time of development permit review, and appropriate mitigation would be provided. Potential mitigation measures for impacts to parks and recreation resources include, but are not limited to, enhancement of existing park features, such as replacement of fencing, improvement of park paths and access, and planting trees and shrubs to replace impacted vegetation.

For specific long-term impacts to Terwilliger Parkway from the Marquam Hill Connection options, in addition to reforestation of disturbed areas, additional mitigation could enhance the natural setting, such as interpretive signage identifying the native flora and/or the history of Terwilliger Parkway, or through designing and planting focused areas that highlight the native forest.

Additionally, replanting temporarily disturbed areas with native plants is required by the City of Portland for the removal of native forested habitat that characterizes the Terwilliger Parkway. In concert with replanting with native vegetation, removal of invasive vegetation would likely increase suitability of the habitat for native wildlife.

Final mitigation commitments will be developed in coordination with the City of Portland and Oregon State Historic Preservation Office. Additionally, TriMet and Metro may coordinate with additional interested parties, such as Friends of Terwilliger, to determine mitigation. Additionally, public participation is required to help define impacts and develop mitigation.

The Council further finds that the type of mitigation measures discussed above could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.1.6: Criterion 7: Stormwater Runoff Impacts

“Identify adverse impacts associated with stormwater runoff and demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Stormwater runoff impacts specific to the Inner Southwest Portland Segment are addressed in the following section. Stormwater runoff impacts common to all segments are discussed in Section 6.3.5. Stormwater impacts and mitigation measures are also described in Section 4.10 of the DEIS.

Identification of Stormwater Impacts in the Inner Southwest Portland Segment

The existing land use affected by the Project in the Inner Southwest Portland Segment is primarily roadway, with bordering areas that include vegetated shoulders as well as mixed-use commercial (mostly impervious surface with some vegetation) and residential uses (a mix of impervious surface and vegetation). The LRT project would replace the existing roadway with expansion into either vegetated borders or adjacent commercial and residential properties.

As shown in Table 4.10-3 of the DEIS, an estimated 32 acres of vegetation would be converted to impervious area in the Inner Southwest Portland Segment. General stormwater runoff impacts associated with conversion of land are discussed in Section 6.3.5 of these findings. In the Inner Southwest Portland Segment, conversion of land would generally occur through widening of the existing SW Barbur Boulevard. Much of the widening would be accomplished by converting existing impervious two-way center turn lanes and on-street parking to new paved light rail tracks shared with buses, and wider and continuous bicycle lanes and sidewalks. The remainder of the widening would be accomplished by converting some of the vegetated right of way to new impervious surface. Conversion of land in the Inner Southwest Portland Segment could potentially increase stormwater runoff to the City of Portland combined sewer system. During very heavy rainstorms, higher stormwater volumes interacting with other components of the combined sewer system can exacerbate the possibility of the discharge of an untreated stormwater-sewage mix, known as a combined sewer overflow (CSO). Through application of best management practices (BMPs) required by the *City of Portland Stormwater Management Manual*, the LRT project would provide water quality treatment and flow control to prevent impacts to water resources, including mitigating flow changes to the combined sewer system.

No floodplain impacts are anticipated for the Inner Southwest Portland Segment.

Marquam Hill Connection Options. Stormwater impacts associated with the Marquam Hill Connection depend on which option is selected. The tunnel options would result in less vegetation being converted to impervious area than would the elevator/bridge and path options. The latter would result in forested vegetation being converted to impervious pedestrian pathways. With regard to stormwater impacts in the area adjacent to and downhill from the Marquam Hill Connection, although the severity of impacts varies depending on which connection option is selected, the mitigation options will be similar. Potential mitigation for stormwater impacts is provided below.

Mitigation Options for Stormwater Impacts in the Inner Southwest Portland Segment

The Council finds that water quantity and quality impacts in the Inner Southwest Portland Segment, including the area of the Marquam Hill Connection, can be substantially mitigated through BMPs designed to comply with guidance outlined in the *City of Portland Stormwater Management Manual*. Water quality treatment BMPs might include settling ponds, filter strips, sand filters, bio-infiltration swales, or mechanical treatment. Flow control BMPs might include vegetated detention or retention ponds or vaults. Required stormwater management facilities would likely be larger in areas where more vegetation is converted to new impervious surfaces. Stormwater management will address specific pollutants of concern, including dissolved metals and temperature.

Project design would be more constrained in areas adjacent to or within stream buffers. The Project would be designed to avoid stream buffers wherever possible, but in locations where the Project would encroach upon these areas, the Project would implement required studies and stream buffer replacement. Habitat restoration requirements will also focus on restoration of riparian corridors with trees and other vegetation designed to cool urban streams.

The Council finds that BMP and other water quality and quantity control measures are mandated by local, state and federal regulations. Site-specific mitigation for stormwater quantity and quality impacts will be refined and selected during the FEIS design and local permitting process.

6.4.1.7: Criterion 8: Historic and Cultural Resource Impacts

“Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans and, where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.”

Historic and cultural resource impacts specific to the Inner Southwest Portland Segment are addressed in the following Section. Historic and cultural resource impacts common to all segments are discussed in Section 6.3.6. Historic and cultural resource impacts and mitigation measures are also described in Section 4.6 of the DEIS and in the *Cultural*

Identified Significant and Protected Historic and Cultural Resources in the Inner Southwest Portland Segment

As listed in Table 5 of the *Cultural Resources Survey*, there are 18 listed, eligible, or potentially eligible historic resources in the area of potential effect for the Inner Southwest Portland Segment, including the South Portland Historic District. The resources are described in the *Cultural Resources Survey*.

The LRT alignment will require full and partial acquisitions of land from nearby buildings and structures in this Segment. The Project will also require temporary construction easements from adjacent landowners to construct the Project. If these land acquisitions and easements overlap the locations of historic properties, there is potential that the Project will adversely affect those historic properties. Full acquisitions are direct effects that are most likely to result in adverse effects; partial acquisitions are less likely to be adverse; and temporary construction easements are the least likely to be adverse. Indirect effects (i.e. those effects that the action caused, but are later in time or farther removed in distance) could also occur as a result of project construction, but are less likely to result in adverse effects.

The Inner Southwest Portland Segment will present the greatest number of direct impacts on historic properties in the area of potential effect because of the segment's high concentration of NRHP-listed and NRHP-eligible historic resources. All four NRHP-listed properties in the area of potential effect are situated within this segment, including the South Portland Historic District. In total, 75 properties that contribute to the significance of this historic district overlap the area of potential effect in this Segment. As indicated in Table 7 of the *Cultural Resources Survey*, the recommended alignment in this Segment (excluding the Marquam Hill Connection) will necessitate five full and 18 partial acquisitions, and 10 easements. It should be noted that the selected LRT alignment (Alternative A in the DEIS) includes the fewest adverse impacts to historic resources of all the studied alternatives.

As indicated in Table 8 of the *Cultural Resources Survey*, full and partial acquisitions in the Inner Southwest Portland Segment are listed below. Also indicated are whether properties are located within the South Portland Historic District (SPHD), the City of Portland's landmark status or Historic Resources Inventory (HRI) Rank, and whether properties are either listed in the NRHP or have eligible/contributing or eligible/significant status. (Impacts from the Marquam Hill Connection options are not included in this list, but are discussed separately, below.)

Full acquisitions (having presumed adverse effect):

1. Tartarimi, Gaetano & Victoria, House #1, 338 SW Meade Street [SPHD, eligible/contributing]

2. Fiebigger, Victoria, House, 3124 SW Barbur Boulevard [SPHD, eligible/contributing]
3. House at 5910 SW Ralston Drive [eligible/contributing]
4. Bridge #01983; SW Newbury St Viaduct, Hwy 1W [eligible/contributing]
5. Bridge #01984; SW Vermont St Viaduct, Hwy 1W [eligible/contributing]

Partial acquisitions (having potential adverse effect):

1. Farley Building; Duniway Plaza, 2400 SW 4th Ave [eligible/contributing]
2. Marquam Plaza, 2525 SW 3rd Ave [eligible/contributing]
3. South Portland Historic District [Portland historic district, NRHP listed]
4. Multnomah County Hospital Nurses' Quarters; Lair Hill Park; South Portland (Carnegie) Library, 3037 SW 2nd Ave [SPHD, Rank III (Nurses' Quarters)/Rank II (Library), eligible/contributing]
5. Long, H. R. and S. E., House, 3405 SW NAITO PKWY [SPHD, eligible/contributing]
6. Foulkes, Robert, House, 3417 SW Naito Pkwy [SPHD, eligible/contributing]
7. Duniway Park [eligible/contributing]
8. Congregation Ahavath Achim Synagogue, 3225 SW Barbur Blvd [Rank III, eligible/contributing]
9. House at 3811 SW Barbur Blvd [eligible/contributing]
10. Jewish Shelter Home, 4133 SW Corbett Ave [Portland Historic Landmark, NRHP listed]
11. House at 4145 SW Corbett Ave [Rank III, eligible/contributing]
12. House at 4205 SW Corbett Ave [eligible/contributing]
13. House at 4215-4217 SW Corbett Ave [eligible/contributing]
14. Building at 4231-4237 SW Corbett Ave [eligible/contributing]
15. House at 218-220 SW Hamilton St [eligible/contributing]
16. Building at 4820 SW Hamilton St [eligible/contributing]
17. Rasmussen Village, 4950 SW Barbur Blvd [eligible/contributing]
18. Fulton Park; George Himes Park [Rank II (Fulton Park School), eligible/significant]

As indicated in Table 4.6-1 of the DEIS, only five of the 18 partial acquisitions associated with the recommended LRT alignment are likely to have a potential adverse effect; the remaining 13 are likely not to have adverse effects. Easements are not likely to have adverse effects.

Marquam Hill Options. Pedestrian improvement options for a Marquam Hill Connection are included in the “area of potential effect.” Two historic properties would be affected by the Marquam Hill Connection options: Terwilliger Parkway [Rank I, eligible/significant] and the Congregation Ahavath Achim Synagogue at 3225 SW Barbur Boulevard [Rank III, eligible/contributing]. All four Marquam Hill options would require a full acquisition of the

Congregation Ahavath Achim Synagogue, which TriMet has now acquired at the request of the property owner (TriMet Res. No. 18-03-28). All four Marquam Hill Connection options also would require a partial acquisition at Terwilliger Parkway. As indicated in the Section 4(f) Evaluation provided in Appendix D of the DEIS, the Marquam Hill Connection would constitute a potential permanent use of Terwilliger Parkway. The impacts to Terwilliger Parkway from the vegetation removal and ground disturbance will be long lasting and will result in a severe visual change to this park. These impacts cannot be mitigated down to *de minimis*, and the Marquam Hill Connection is therefore assumed to be a permanent use regardless of the option selected. Potential impacts to the recreational functions of Terwilliger Parkway are discussed in Section 6.4.1.5 of these findings.

As indicated in the lists of acquisitions above and the discussion of Marquam Hill Connection options, only two resources affected by partial acquisitions are listed as local Historic Landmarks or Districts (South Portland Historic District and Jewish Shelter Home). These same two resources are the only affected resources listed in the NRHP. An additional six resources affected by partial acquisitions are listed in Portland's Historic Resources Inventory.

It should be noted that because the level of design at the time the DEIS was prepared was preliminary, the adverse effects resulting from partial parcel acquisitions were estimated based on Geographic Information Systems analysis, and temporary construction easements will be identified in the FEIS. A more detailed consideration of easements and partial parcel acquisitions will be presented in the FEIS.

Archaeological Resources. There are no known archaeological resource sites within the area of potential effect in the Inner Southwest Portland Segment. However, there are areas along the Corridor that have the potential to contain significant archaeological resources. As indicated in the *Cultural Resources Survey*, LRT construction for the recommended alignment in this Segment could result in impacts to four Archaeological High Probability Areas (HPAs), of which one (1) is eligible for listing in the NRHP and three (3) are unevaluated for eligibility. Further, the Marquam Hill Connection Options would each result in impacts to two (2) or three (3) NRHP-eligible and unevaluated archaeological sites. The HPAs indicate locations that would likely need further detailed preconstruction surveys or archaeological monitoring during construction to discover whether or not an archaeological site exists and to reduce the potential for impacts. Consultation with the tribes has identified no known Traditional Cultural Properties that could be affected by the Project.

Mitigation Options for Identified Historic and Cultural Resource Impacts in the Inner Southwest Portland Segment

The Council finds that the LRT improvements in the Inner Southwest Portland Segment may have adverse effects on the five historic resources that will be affected by full acquisitions listed above. The LRT improvements may also have adverse effects on the 19 resources that will be affected by partial acquisitions listed above (including Terwilliger Parkway, which would be affected by the Marquam Hill Connection). The Council finds that specific impacts and mitigation commitments will be addressed in a formal Memorandum of

Agreement (MOA) with the SHPO and executed for inclusion in the FEIS. The Council finds the following to be examples of mitigation options:

- Move rather than demolish historic buildings.
- Provide assistance/funds for rehabilitation and adaptive reuse efforts.
- Provide financial assistance for restoration efforts that will contribute to the preservation of cultural heritage in an affected community.
- Develop and support interpretative public history exhibits or on-site kiosks that highlight information gained about cultural resources.
- Develop online history articles.
- Rehabilitate historic properties affected by construction to their original condition.
- Install residential sound insulation to mitigate project-related noise impacts on historic properties.
- Support updates to local government historic resource inventories to capture property information for significant historic resources.
- Construct sound walls to mitigate project-related noise impacts in a manner sensitive to the historic character of the building, if the building is considered a noise-sensitive property.
- Minimize visual impacts on historic resources (i.e., from transit stations near resources) through site-specific, culturally appropriate and historically appropriate design or visual buffers.
- Minimize parking and access impacts to businesses in historic buildings with signs to direct traffic and pedestrians to the businesses and services, and provide alternative access and parking during construction.
- Develop a monitoring and inadvertent discovery plan to provide procedures for the identification and documentation of archaeological resources encountered during project construction.

In addition, procedures for evaluating and mitigating impacts to 4(f) historic resources (such as Terwilliger Parkway) through the FEIS process are discussed in the general findings of Section 6.3.4.

The Council further finds that the type of mitigation measures listed above could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.1.8: Criterion 9: Air Quality and Energy Impacts

Identify general or anticipated impacts on air pollution, greenhouse gas emissions, and energy usage from project improvements that would help meet state, regional and local reduction goals.

As indicated in Sections 4.12 and 4.13 of the DEIS, no segment-specific air quality or energy impacts are anticipated for the Southwest Corridor Project. Discussion of general air quality and energy impacts for the Project is found in Section 6.3.7 if these findings. As stated in that section, the Portland region is in attainment for criteria air pollutants, and that the Southwest Corridor Project is expected to create a benefit to greenhouse gas (GHG) emissions. Further, the operation of the Project would not affect the regional power supply and would reduce overall energy consumption for the total transportation system compared to the No-Build Alternative. From this, the Council concludes that the Project will have a positive impact in meeting state, regional and local reduction goals.

6.4.2: Outer Southwest Portland Segment

6.4.2.1: Description of Light Rail and Highway Improvements

The Outer Southwest Portland Segment of the Southwest Corridor MAX Light Rail Project includes the following LRT-related facilities and highway improvements:

- Barbur alignment
- 5 Light Rail Stations along SW Barbur Boulevard: in the vicinity of SW Custer Street; in the vicinity of SW 19th Avenue; in the vicinity of SW 30th Avenue; in the vicinity of the Barbur Transit Center; and in the vicinity of SW 53rd Avenue.
- 2 Park-and-Ride Lots: in the vicinity of the Barbur Transit Center and in the vicinity of SW 53rd Avenue.
- Highway improvements within and along SW Barbur Boulevard, in the vicinity of SW Capitol Highway, and on SW 53rd Avenue between SW Barbur Boulevard and the Portland Community College campus

See Figures 1.5 to 1.10 of the LUFO for LUFO boundaries for the Outer Southwest Portland Segment.

Light Rail Alignment

From north of the intersection of SW Barbur Boulevard and SW Brier Place, the alignment shifts westward at grade and in the center of SW Barbur Boulevard, crossing SW Terwilliger Boulevard and SW Bertha Boulevard. It then continues southwestward at grade to the Barbur Transit Center and Park-and-Ride. Along the way, the alignment passes stations in the vicinity of SW Custer Street, SW 19th Avenue and SW 30th Avenue. From the Barbur Transit Center, the alignment shifts adjacent to I-5 and crosses over on an aerial structure over I-5, SW Capital Highway and SW Barbur Boulevard landing east of I-5. The alignment

then moves southwestward along the east side of I-5 to a station and park-and-ride in the vicinity of SW 53rd Avenue between I-5 and SW Barbur Boulevard. From here, the alignment continues west along the north side of SW Barbur Boulevard, then travels west across I-5 on a new aerial guideway structure that then descends into the space between the southbound I-5 Pacific Highway off-ramp and southbound SW Barbur Boulevard. The alignment then crosses under SW Barbur Boulevard at approximately 64th Avenue to the south side of SW Barbur Boulevard/Pacific Highway (Highway 99W) towards a station and park-and-ride in the vicinity of SW 68th Parkway.

Light Rail Stations

Five light rail stations are provided in the Outer Southwest Portland Segment.

SW Custer Station. The SW Custer Station is located in the vicinity of SW Barbur Boulevard and SW Custer Street. This station provides access to the South Burlingame and Hillsdale neighborhoods.

SW 19th Avenue Station. The SW 19th Avenue Station is located in the vicinity of SW Barbur Boulevard and SW 19th Avenue. This station provides access to the South Burlingame, Hillsdale, Multnomah and Markham neighborhoods.

SW 30th Avenue Station. The SW 30th Avenue Station is located in the vicinity of SW Barbur Boulevard and SW 30th Avenue. This station provides access to the Multnomah and Markham neighborhoods.

Barbur Transit Center Station. The Barbur Transit Center Station is located in the vicinity of SW Barbur Boulevard and the Barbur Transit Center. This station provides access to the Multnomah, West Portland Park, Crestwood and Ash Creek neighborhoods.

SW 53rd Avenue Station. The SW 53rd Avenue Station is located in the vicinity of SW Barbur Boulevard and SW 53rd Avenue. This station provides access to the West Portland Park neighborhood and Portland Community College, Sylvania Campus.

Park-and-Ride Lots

There are two park-and-ride lots in the Outer Southwest Portland Segment. The Barbur Transit Center Park-and-Ride will provide up to 825 parking spaces in a maximum three-story structure. The SW 53rd Avenue Station Park-and-Ride will provide up to 950 parking spaces in a maximum three-story structure.

Operations and Maintenance Facilities

There are no operations and maintenance facilities in the Outer Southwest Portland Segment.

Highway Improvements

The major highway improvements in the Outer Southwest Portland Segment are as follows:

- Street improvements on SW 53rd Avenue between SW Barbur Boulevard and the Portland Community College (Sylvania) campus.
- Vehicular, pedestrian and bicycle improvements within and along SW Barbur Boulevard and in the vicinity of SW Capitol Highway/SW Barbur Boulevard, including sidewalk and bicycle improvements, and minor elements such as signalization, electrification, and retaining walls.

Additionally, there would be mitigation measures and minor improvements along the alignment and within and along Barbur Boulevard and some adjoining roadways, including road realignments, sidewalk improvements, signalization, electrification, and sound walls.

6.4.2.2: Criterion 3: Neighborhood Impacts

- (3) **Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial districts, industrial districts, and mixed-use centers. Identify measures that could increase beneficial impacts or reduce adverse impacts, and that could be imposed as conditions of approval during processes required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (NEPA), or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”**
- (A) **Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing**
- (1) **the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;**
 - (2) **the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and**
 - (3) **the need to protect affected neighborhoods, districts, and centers from identified adverse impacts.**
- (B) **Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.**

Description of affected residential neighborhoods, commercial and industrial districts, and mixed use centers in the Outer Southwest Portland Segment

Extending from north of the intersection of SW Barbur Boulevard and SW Brier Place on the north and to the jurisdictional boundary between Portland and Tigard in the vicinity of SW 68th Parkway on the south, the Outer Southwest Portland Segment affects eight neighborhoods within the City of Portland: Hillsdale, South Burlingame, Multnomah, Markham, Crestwood, West Portland Park, Ashcreek, and Far Southwest. A brief description of each neighborhood is presented below. More detailed neighborhood information is included in DEIS Appendix B4.4.

The **Hillsdale** neighborhood is affected by both the Inner and Outer Southwest Portland Segments. The neighborhood is bounded by the Southwest Hills, South Portland, South Burlingame and Multnomah neighborhoods. The dominating land use in Hillsdale is single-family residences. Concentrations of commercial use occur along SW Barbur Boulevard and SW Beaverton-Hillsdale Highway. A small amount of multifamily housing is located around these commercial areas along SW Barbur Boulevard and SW Bertha Boulevard. Located at the eastern neighborhood boundary, next to SW Barbur Boulevard, is the historic George Himes Natural Area Park, a 32-acre natural area with trails.

Hillsdale contains areas that have a higher proportion of transit-dependent populations than the overall region. The neighborhood includes U.S. Census tracts and block groups with concentrations of low-income population, households with limited vehicle access, and older adult populations that are higher than the regional percentages. The neighborhood's population includes lower percentages of minorities, people with disabilities and people with limited English proficiency than the region overall.

The **South Burlingame** neighborhood is located south of SW Barbur Boulevard, with I-5 cutting through the north of the neighborhood and separating Fulton Park from the rest of South Burlingame. The neighborhood is described as a suburban urban neighborhood, and is composed of primarily single-family housing. The Riverview Cemetery bounds the neighborhood at the east and separates South Burlingame from the Willamette River and Sellwood Bridge. There is a small business area located at the intersection of SW Terwilliger Boulevard and SW Taylors Ferry Road.

South Burlingame has lower percentages of transit-dependent populations than the region overall. It includes percentages of minorities, people with limited English proficiency and people with disabilities and youth that are lower than those of the region. The percentages of households with limited vehicle access and low-income population within South Burlingame are similar to those of the region overall.

The **Multnomah** neighborhood is situated between SW 45th Avenue to the west, SW Capitol Hill Road to the east, SW Vermont Street to the north and I-5 to the south. This neighborhood was originally developed around an Oregon Electric Railway depot, and has become known for its charming qualities and its annual Multnomah Days parade and celebration. The neighborhood is primarily single-family residences and is centered around the Multnomah Village Business District, which runs along SW Capitol Hill Road. The neighborhood has 101 acres of parks and open space.

The Multnomah neighborhood has a high proportion of transit-dependent populations. The neighborhood includes U.S. Census tracts and block groups that have higher percentages of minorities, low-income population and older adults than the overall region. The Multnomah neighborhood includes percentages of people with limited English proficiency, households with limited vehicle access and people with disabilities that match or are slightly above those of the overall region.

The **Markham** neighborhood is bounded by I-5 and the Multnomah and South Burlingame neighborhoods to the north, Marshall Park to the east, Arnold Creek to the south and West Portland Park to the west. This neighborhood prides itself on its green open spaces and suburban feel. The neighborhood is made up of primarily single-family housing. There are also some commercial uses and multifamily housing scattered along I-5.

The Markham neighborhood has a lower proportion of transit-dependent populations than the region overall. The neighborhood includes percentages of low-income population, households with limited vehicle access and people with disabilities that are below those of the overall region. The percentages of minorities, youth and people with limited English proficiency are similar to those of the region overall. The only transit-dependent population in this neighborhood that is at a percentage notably above that of the overall region is older adults, at 16 percent.

The **Crestwood** neighborhood is bounded by SW Capitol Highway, SW Taylors Ferry Road, the western Portland City Limits and Interstate-5. It is bounded by the Multnomah, Ashcreek, West Portland Park and Far Southwest neighborhoods. The dominant land use in this neighborhood is single-family housing, and there are two large areas designated for parks and open space.

Crestwood has concentrations of transit-dependent populations that are greater than the regional concentrations. The neighborhood includes U.S. Census tracts and block groups that have percentages of minority, low-income and older adult populations that are significantly above those of the overall region. Crestwood's percentages of people with disabilities and people with limited English proficiency are similar to those of the overall region.

The **West Portland Park** neighborhood is generally bounded by I-5 to the northwest, SW 35th Avenue to the east, SW Stephenson Street to the south, and SW 49th Avenue and SW Pomona Street to the southwest. The major auto circulation through the neighborhood occurs on SW Barbur Boulevard and SW Capitol Highway. West Portland Park contains a variety of land uses. The properties along SW Barbur Boulevard and SW Capitol Highway are primarily commercial and multifamily residential. Areas between and east of these two major roads are primarily single-family residential interspersed with undeveloped forested areas.

West Portland Park has concentrations of several transit-dependent populations that surpass those of the region overall. The neighborhood includes U.S. Census tracts and block groups

with higher percentages of low-income population, minorities, people with limited English proficiency, older adults and youth than the region. The percentages of people with disabilities and households with limited vehicle access in West Portland Park are slightly lower than those of the region.

The **Ashcreek** neighborhood is located north of I-5 and SW Barbur Boulevard, and is bounded by SW Multnomah Boulevard on its northern edge, the Multnomah and Crestwood neighborhoods to the east, the Far Southwest neighborhood on the southern end, and the City of Tigard to the west. The neighborhood is made up of primarily single-family residential, with a small section of commercial land use occurring at the northwestern edge of the neighborhood along SW Oleson Road and multifamily unit housing at the southern end of the neighborhood along SW Barbur Boulevard. Within the neighborhood boundaries in the northeast sits an abandoned elementary school, Smith School, which was closed down in 2006 because of lack of enrollment and funding.

The Ashcreek neighborhood has relatively low concentrations of transit-dependent populations compared to the overall region. The neighborhood includes U.S. Census tracts and block groups that have higher percentages of youth and older adult populations than the overall region. The percentages of minorities, low-income population, people with disabilities, people with limited English proficiency and households with limited vehicle access in the neighborhood are all lower than those of the region.

The **Far Southwest** neighborhood is located south of SW Barbur Boulevard and I-5, adjacent to the Tigard Triangle. This area is a residential neighborhood in southwest Portland that includes the Portland Community College (PCC) Sylvania campus and Lesser Park Natural Area. As you approach PCC-Sylvania, residential streets become narrow and sidewalks are infrequent.

Most of the Far Southwest neighborhood contains lower concentrations of transit-dependent populations than the region overall. However, a portion of the neighborhood shares a U.S. Census block group with the adjacent West Portland Park neighborhood that has relatively high percentages of several transit-dependent populations. This block group, which is bounded by SW Barbur Boulevard, SW Capitol Highway, SW 53rd Avenue and SW Vacuna Street, has higher percentages of minorities, low income population, people with limited English proficiency and youth than the region overall. In the remaining area of the Far Southwest neighborhood, only the percentage of older adults exceeds that of the region overall.

Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial and industrial districts, and mixed-use centers.

Economic Impacts

Economic impacts include business displacements, loss of parking or access, impacts to the local tax base, and impacts to efficient freight movement.

Displacements. In every instance where the Southwest Corridor Project displaces an existing commercial or industrial use, that represents an adverse economic impact. Even though the adverse impacts associated with displacement may not be significant on a regional or city-wide level, the Council recognizes and is sympathetic to the significance of each displacement at the individual business and neighborhood level. Adverse economic impacts associated with displacements include the loss of employment and payroll, loss of retail services, and loss of assessed value and tax base associated with the business.

Section 4.1.2 of the DEIS presents the likely property acquisitions in the Outer Southwest Portland Segment based on the current conceptual designs, and Section 4.3.2 identifies estimated impacts to businesses and employment. It is important to note that the list of acquisitions should not be interpreted as the final determination regarding property acquisition and the list could be updated as the Project design is further refined.

As indicated in DEIS Table 4.3-1, the light rail alignment, stations, and park-and-ride lots would displace 61 businesses or institutions in the Outer Southwest Portland Segment. This does not include partial acquisitions, which are assumed not to displace a business or place of employment. As indicated in Table 4.1-1, partial acquisitions would affect an additional 63 commercial or industrial properties.

Adverse economic impacts associated with the displacements include the loss of employment and payroll, loss of retail services, and loss of assessed value and tax base associated with the business. The LRT alignment, stations, and park-and-ride lots will be in public ownership and off the tax rolls.

Among the alignment alternatives analyzed in the DEIS, the recommended alignment for the Outer Southwest Portland Segment (B2) would cause the second-fewest displacements to businesses or institutions and would affect the fewest number of employees.

In terms of mitigation, displaced commercial uses will be acquired at fair market value, and relocation benefits will be provided to business owners and tenants as required by law (and as described in Section 6.3.1 of the LUFO General Findings). During the preliminary and final engineering processes, staff will try to minimize displacement impacts to the extent practicable through design refinements. In addition, the increased accessibility provided to people and places by LRT will likely result in increased sales and property values to remaining businesses which could mitigate or even reverse any overall business losses directly due to construction of the light rail system. At the same time, if properties redevelop due to increased property values, existing businesses and their associated jobs may need to relocate. This need to relocate could result in additional business closures or job loss for some parties, although overall economic activity levels would increase. The Council finds that application of Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy—as discussed in the Social Equity portion of the General Findings for Criterion 3—could help mitigate indirect adverse impacts to businesses.

Loss of Parking/Access. The loss of parking, and the loss or change of access, can have adverse economic impacts on businesses. If an existing access must be removed by the Project and cannot be relocated or reconfigured to provide adequate and safe access, the entire business use is assumed to be displaced. Even if alternative access is available, it may not be as convenient as the existing access and could result in some loss of business. As indicated in DEIS Section 3.2.6, in the Outer Southwest Portland Segment, the Project would eliminate 36 on-street parking spaces on SW Barbur Boulevard between SW 13th Avenue and SW 60th Avenue. As indicated by a parking utilization survey, the spaces are typically lightly used and adjacent to businesses with off-street parking available. As indicated in DEIS Table 4.4-3, these spaces' low usage suggests that there would be little resulting impact to neighborhood quality of life.

In addition, partial acquisitions may eliminate off-street parking spaces associated with businesses. As discussed above under Displacements, mitigation for these impacts would include payment of just compensation and assistance from TriMet. In addition, it may be possible that parking spaces could be reconfigured in places to add more spaces.

The Council finds that parking mitigation strategies that could be implemented if parking supply were to become over-utilized once the project is in place include replacement of parking, parking management strategies, and/or parking restrictions. TriMet would work with the affected neighborhoods and/or local jurisdiction to determine the appropriate parking mitigation strategy, if needed.

Tax Base. Local jurisdiction tax bases are affected in two ways by the development of large public infrastructure projects such as the Southwest Corridor MAX Light Rail Project. First, and by far the greatest long-term impact, is the development and redevelopment that could occur in conjunction with the Project. As described in DEIS Table 4.18-1, which summarizes indirect impacts, as development occurs, the investments attract new businesses and employment, and would increase tax revenues and property values. The effect of this kind of impact is difficult to estimate because it is dependent upon many independent private decisions that would occur in the future. However, for the reasons set out in Table 4.18-1, the Council finds that redevelopments would have net beneficial indirect economic impacts.

The second type of impact is the direct impact to tax bases that occurs through property acquisition for construction of the Project. Through acquisition, private property converts to public property and, as such, is removed from the tax rolls unless resold for private purchase. As indicated in DEIS Table 4.3-2, the LRT route in the Outer Southwest Portland Segment would result in an estimated \$182,277 in annual property tax loss for the City of Portland. The Council finds that between the Inner and Outer Southwest Portland Segments, the property tax revenue loss would be negligible (less than 0.1 percent) to the City's budget.

The Council also finds that properties near light rail stations in the Outer Southwest Portland Segment will likely experience an increase in value when the Project is completed, thereby increasing property tax revenue in the long term to balance short-term adverse impacts.

Freight Movement. Efficient movement of freight and goods throughout the Southwest Corridor is critical to the economic vitality of the region. As there is no railroad within the Outer Southwest Portland Segment, the only type of freight with potential impacts is truck freight. As indicated in DEIS Section 3.2.7, the LRT Project would alter the streetscape and close and relocate truck accesses in this Segment. The Project would alter but maintain truck access to two gas stations, and would alter truck access to the Fred Meyer grocery store at SW Barbur Boulevard and SW Bertha Boulevard. Access modifications and changes to internal site circulation or revisions to the light rail design would be required at the Fred Meyer store to accommodate freight deliveries to the existing loading docks. The Council finds that mitigation for freight impacts at the Fred Meyer site include developing design refinements to facilitate truck access to the existing loading dock, as well as general site circulation and parking.

Conclusions. The Council finds that, on balance, the Southwest Corridor Project will result in positive economic consequences in the Hillsdale, South Burlingame, Multnomah, Markham, Crestwood, West Portland Park, Ashcreek, and Far Southwest neighborhoods in the Outer Southwest Portland Segment, particularly because improved transit capacity and new transit connections will be available to support existing and planned development in these areas consistent with local plans. Residents and businesses in the affected neighborhoods will have improved access to the regional rail transit system, which offers convenient travel and connections to regional centers offering employment, education, entertainment, recreation and public services.

The improved access, along with higher levels of activity in station areas, could support and encourage new development along SW Barbur Boulevard, consistent with the vision articulated in the *Barbur Concept Plan*.

Based on the information contained in the DEIS and supporting documents, the Council concludes that the LRT improvements in the Outer Southwest Portland Segment can be designed to mitigate adverse impacts associated with the displacement of up to 61 businesses, as well as impacts on parking and freight movement.

Social Impacts

Various sections of the DEIS evaluate the potential effects of the Southwest Corridor Project on neighborhoods and communities in the corridor. The analysis of adverse social impacts for the Outer Southwest Portland Segment includes consideration of residential displacements, social equity, access to community facilities, barriers to neighborhood interaction, and visual/aesthetic impacts.

Residential Displacements. As with business displacements, the Council recognizes that in every instance where the Southwest Corridor Project displaces an existing household, that represents an adverse social impact, and the Council is sympathetic to the significance of each residential displacement. It understands and acknowledges that relocations can cause

significant anxiety and trauma to families, uprooting them from neighborhoods, schools and friends and imposing change on them.

As indicated in DEIS Table 4.1-1, the LRT Project could displace up to 32 residential units in the Outer Southwest Portland Segment. This includes an estimated 15 full acquisitions of single-family to fourplex properties, and two multifamily residential properties. The recommended alignment alternative (B2) would displace the fewest residential units among the four alternatives analyzed in the DEIS (the same number as B1).

It may be possible in some instances to reduce some residential displacements by taking only a portion of a property and/or structure and by modifying the remaining property and/or structure to allow continued occupancy. Where displacements are unavoidable, the Project will provide compensation for real property and relocation benefits to property owners and tenants based on fair market value and a comprehensive relocation program as required by law.

Social Equity. As indicated in DEIS Table B4.4-2, the neighborhoods in this Segment generally fall below the regional percentage for vulnerable and transit-dependent populations, except for older adults and youth. Still, the Council finds that the Project would provide significant mobility benefits to transit-dependent populations in this Segment. These include more frequent and reliable transit service as well as safer and better-connected routes for walking and biking.

However, the Council also acknowledges that residential and business displacements could disrupt individual social ties, and that the Project could indirectly cause property values to increase through redevelopment around stations. Resulting potential displacements would have disproportionate impacts on low-income populations. As indicated in DEIS Section 4.18.3, displacements and acquisitions related to other development may be mitigated by ordinance or as a condition of approval for other projects. Cooperative multiagency programs could also provide assistance or additional relocation options for displaced parties. During final design and construction, TriMet and Metro would coordinate with local partners to develop station area redevelopment plans that include measures to minimize indirect impacts, including advancing programs to increase affordable housing supply in the corridor.

The Council also finds that Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy (described in Section 6.3.1 of these findings) are important tools to help ensure that Corridor neighborhoods will experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Access to Community Facilities. The Council finds that the Southwest Corridor Project will provide improved transit access to community facilities within the Outer Southwest Portland Segment and in the larger region. The Project would improve transit access to PCC-Sylvania, as well as to park facilities including Fulton Park, Community Garden and Community Center, and Woods Memorial Natural Area. The light rail connection would

also provide neighborhoods in this Segment access to other facilities along the corridor, including PSU, OHSU, and VA Portland, among others.

The Project would have a few adverse impacts to community facilities in this Segment. The Project would acquire a portion of Fulton Park, which would result in the removal of mature trees along SW Barbur Boulevard and the loss of up to four plots in the community garden. The Project would also pave and add sidewalks to SW 53rd Avenue adjacent to Sylvania Natural Area Park, which would not affect the park property itself. The road improvements will provide a separated sidewalk for users of SW Trail #7, which uses the SW 53rd Avenue right of way from SW Buddington Street to SW Vacuna Street. Mitigation measures for parks and recreational impacts in the Outer Southwest Portland Segment are discussed in Section 6.4.2.5 of these findings.

The Council finds that improved transit accessibility to community facilities will outweigh any adverse impacts of property acquisitions. The Council further finds that improved transit access to community facilities within the affected neighborhoods and in the larger region is especially important to those with limited vehicle access residing in neighborhoods in the Outer Southwest Portland Segment.

Barriers to Neighborhood Interaction. The Council finds that the LRT alignment and highway improvements will not result in barriers to neighborhood interaction in the Outer Southwest Portland Segment. No new barriers would be created within neighborhoods, because the alignment would run within or parallel to existing major roadways along the boundaries between neighborhoods. Light rail might be perceived as reinforcing SW Barbur Boulevard as a barrier, although new and improved sidewalks, bike lanes and protected crosswalks would provide an offsetting benefit. Other pedestrian improvements in the vicinity of LRT stations will improve neighborhood access to transit facilities in these neighborhoods and reduce barriers to neighborhood interaction.

Regarding the PCC-Sylvania Shuttle Options, the Barbur TC-Baylor Shuttle would not adversely affect cohesion within the surrounding neighborhoods, because it would operate on roadways used by existing TriMet bus routes. The 53rd Shuttle would travel on a local residential street through the Far Southwest neighborhood. The Project would change the character of this street by paving it and adding sidewalks. The shuttle would add small van-sized vehicles to this reconstructed roadway while PCC-Sylvania classes are in session.

Visual/Aesthetic. DEIS Table 4.5-4 provides a summary of visual impacts associated with LRT improvements in the Outer Southwest Portland Segment. The DEIS evaluates impacts to visual quality by landscape unit, which are general geographic areas with similar visual conditions (as illustrated in DEIS Figure 4.5-1). The following landscape units are present in the Outer Southwest Portland Segment:

- **Barbur Historic Highway Landscape Unit** is a mixed suburban commercial corridor. Developments are primarily large- and medium-format retail and mid-rise office buildings that are set near the road and have minimal landscaping. Areas of both multifamily and single-family residential uses are adjacent to this segment of SW Barbur Boulevard.

- **Far Southwest Portland Landscape Unit** has a suburban/rural character. Commercial uses are small-scale and somewhat dispersed compared to the South Portland Landscape Unit, with few residential units close to the road. Open spaces include landscaped areas of commercial lots and several stretches of non-managed vegetation adjacent to the roadway.

Long-term impacts to each landscape unit are described below.

For the Barbur Historic Highway Landscape Unit, the addition of light rail within the median along SW Barbur Boulevard would alter the streetscape to become more urbanized, with landscaping, wider sidewalks and bicycle lanes. Widening would be required, including some building removals and the replacement of several existing overpass bridges. Several new stations would be present, with platforms in the median of SW Barbur Boulevard. The Barbur Transit Center would be rebuilt as a three-level parking garage with ground floor retail close to the street, making it more prominent than the existing facility. A prominent new light rail overpass (Crossroads Bridge - where SW Capitol Highway and SW Barbur Boulevard cross over I-5) would cross over I-5, with a potential maximum height of 140 feet above the ground in some areas. As indicated by DEIS Table 4.5-4, overall visual impacts to the Barbur Historic Highway Landscape Unit are considered low.

For the Far Southwest Portland Landscape Unit, similar to Barbur Historic Highway, the addition of light rail within the median on SW Barbur Boulevard would expand the existing right of way, removing vegetation in areas with nearby residences but also creating a more visually consistent roadway. The improvements would include rebuilt intersections and street sections with lighting, sidewalks and bicycle lanes. A new bridge over I-5 at SW 60th Avenue and would be visually similar to a nearby Pacific Highway overpass. A new station and a three-story parking structure would be constructed at SW 53rd Avenue, and would require removal of several structures and vegetation. This area would be most visible to travelers on SW Barbur Boulevard, and would be less visible from most area residences, where it would be in mid-range to long-range views. As indicated by DEIS Table 4.5-4, overall visual impacts to the Far Southwest Portland Landscape Unit are considered moderate.

For the PCC-Sylvania Shuttle Options, the 53rd Shuttle would include improvements to SW 53rd Avenue, including widening, repaving, lighting, and adding bicycle and pedestrian facilities. These improvements would remove a strip of vegetation and make the roadway's visual character more urban and active, but the wooded character of bordering areas would remain. The Barbur TC-Baylor Shuttle would add shuttle buses to existing roads along with the minor additions of new signage and shelters. These buses would result in few changes to visual character.

As indicated in DEIS Table 4.5-8, sidewalk improvements in the Outer Southwest Portland Segment might remove strips of vegetation, but frequently would add more visual continuity and could also incorporate other landscaping elements such as street trees or plantings. New bikeways could cause minor changes to visual features and could remove strips of vegetation, but these improvements would maintain or improve the visual character of

adjacent streets. Pedestrian overpasses are visually prominent due to their height. However, their location spanning over existing major roadways with other bridges and overpasses would be consistent with the existing visual environment. While the visual impacts associated with pedestrian overpasses in this Segment are considered moderate, the sidewalk and bicycle impacts are considered low.

The Council finds that long-term mitigation options applicable to all segments, as described in Section 6.3.1 of these findings, could be applied in the Outer Southwest Portland Segment to mitigate the identified visual impacts.

Neighborhood Quality of Life. As indicated in DEIS Table 4.4-3, overall, the project would improve quality of life in the surrounding neighborhoods of the Outer Southwest Portland Segment. The Project would improve transit access for the neighborhoods bordering SW Barbur Boulevard. Although local bus service on SW Barbur Boulevard would be reduced, light rail would provide faster and more reliable service. The Project would change the character of SW 53rd Avenue to a more urban form with complete sidewalks. The project would also reduce auto volumes on SW Capitol Highway in the West Portland Park neighborhood and on SW Taylors Ferry Road in the Markham neighborhood. Regarding the PCC-Sylvania Shuttle Options, for the 53rd Shuttle, the addition of small van-sized shuttle buses to SW 53rd Avenue could reduce quality of life for adjacent residents, but this impact could be offset by a reduction in automobiles using the street to commute to PCC and by the addition of sidewalks and street lighting. An additional adverse impact would be the introduction of a new source of noise and vibration along the LRT alignment; mitigation for noise and vibration impacts is addressed under Section 6.4.2.3 of these findings. The Council finds that adverse impacts are far outweighed by the quality of life benefits to neighborhoods.

Conclusions. The Council finds that the social impacts of the Southwest Corridor Project are generally positive in the affected Hillsdale, South Burlingame, Multnomah, Markham, Crestwood, West Portland Park, Ashcreek, and Far Southwest neighborhoods in the Outer Southwest Portland Segment. Efforts have been taken to minimize displacements and the LRT improvements will be integrated with the built and planned urban environment. Residents and businesses in the Segment neighborhoods will have important new transit connections to a range of important destinations throughout the region, including the Airport, Convention Center, Rose Quarter, Expo Center, OMSI, Zoo, OHSU, Portland State University, and PCC-Sylvania.

Relative to visual impacts, the Council finds that adverse visual effects can be mitigated through careful coordination with the affected neighborhoods and jurisdictions through the FEIS process.

Improved transit access to employment centers and services would especially benefit residents with limited alternatives to driving, who are more dependent on availability of transit to access employment centers, services, and community facilities.

Availability of light rail to the Outer Southwest Portland Segment would provide an alternative mode to automobile travel on the often-congested SW Barbur Boulevard. The improved transit access, along with higher levels of activity in station areas, could encourage redevelopment and new services, and potentially increase property values. The Council finds that overall, these improvements, together with pedestrian and bicycle improvements along SW Barbur Boulevard, would maintain or enhance the viability of neighborhoods in the Segment. However, the Council also acknowledges that potential displacements resulting from increased property values, rent, and redevelopment would have disproportionate impacts on low-income and other vulnerable or transit-dependent populations. The Council finds that Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy will be important to ensuring that Corridor neighborhoods will experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Urban Form Impacts

The Council finds that light rail transit is critical to achieving compact, efficient development in designated town centers and around light rail stations in the Outer Southwest Portland Segment, as called for by the Metro 2040 Growth Concept and Barbur Concept Plan. The Growth Concept identifies West Portland—centered around the Crossroads and Barbur Transit Center—as a town center, which is anticipated over time to become the focus of compact development and redevelopment, with high capacity transit service and multi-modal street networks.

Light rail transit can also readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. City of Portland zoning along the corridor in the Outer Southwest Portland Segment supports higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of households that are smaller, have a modest household income or both. The Council finds that these density-enabling land use regulations will allow more homes to be built for the region's growing population, thus expanding the housing supply and meeting the demand for needed housing.

High capacity transit services also mean that new residential and employment uses can lower the amount of necessary onsite parking—due to easy access to jobs and services via transit, biking or walking. The Council finds that such multimodal access is possible as a result of the region's existing high capacity transit network, into which the Southwest Corridor LRT would connect.

In addition, the Council finds that as the region grows, implementation of light rail will be critical to improving transit connections between jobs and residences. Mixed-use transit-oriented development may allow some residents to live and work within the same station area. Light rail stations that can be accessed by a variety of travel options, including biking, walking or taking local transit, will also allow the growing number of people in the corridor and region to have better mobility while limiting impacts to the environment and to quality of life.

Safety

Security Concerns. The Council is sensitive to the importance of safety and security at stations and in neighborhoods affected by the Southwest Corridor Project. For the Project to succeed, passengers must feel safe using the stations and trains.

As indicated in DEIS Section 4.17.2, the stations near SW Custer Street, SW 19th Street and SW 30th Street in the Outer Southwest Portland Segment would be street-oriented along a busy arterial, offering good visibility from the street and from retail businesses and other developments. There would be no unique safety or security concerns at these stations.

The Barbur Transit Center's combined station, transit center, and park-and-ride adjacent to a busy arterial and near other businesses offers generally good visibility and fairly high activity levels, which would tend to deter criminal activity. However, the multiple structures on the site, including a large park-and-ride, could obscure some sight lines. Standard security features, such as the security cameras, surveillance and patrols, along with the presence of transit staff and patrons from connecting bus and paratransit activity at the transit center, would be deterrents for criminals.

The station at SW 53rd Avenue and its adjacent park-and-ride structure would be along a part of SW Barbur Boulevard where there are few adjacent businesses or other developments, thus reducing their visibility from nearby land uses. The station can be designed to maximize visibility into and out of the station area and include appropriate lighting and security measures to ensure the safety of transit users.

For the PCC-Sylvania Shuttle Options, the Barbur Transit Center and Baylor Shuttle would have standard TriMet bus operations, and the same safety and security as any TriMet bus; therefore, it would not pose any unique safety concerns. Similarly, the 53rd Shuttle would operate along an improved SW 53rd Avenue between the station at SW 53rd Avenue and a stop on the PCC-Sylvania campus. Either the 53rd Shuttle would operate like a typical TriMet bus, with no unique safety concerns, or it could be a driverless system, which would require specialized security measures that will be addressed when more is known about the feasibility of this option. TriMet and PCC would coordinate on security procedures for the shuttle terminus, which would be in a less active part of the campus.

As indicated in the General Findings of Section 6.3.1, the Council finds that TriMet's dedicated transit police division would continue to work cooperatively with Portland law enforcement, as well as fire and other emergency responders, to respond to incidents. The Southwest Corridor Project would feature the same safety and security techniques and systems that are applied throughout the regional transit system. TriMet's transit police and contracted security staff patrols and supporting resources, technology, and safety and security systems would be expanded to address the additional facilities developed as part of the Project.

The Council finds that for all facilities, final design and operations planning will consider best Crime Prevention Through Environmental Design practices, including modified siting or layout concepts; the use of lighting, communications, electronic and security/police surveillance; and controlled entry. For unique facilities such as the PCC-Sylvania shuttle, and for park-and-ride facilities, a combination of customized site-specific measures could be necessary, and would be developed in consultation with local agencies, emergency service providers, and PCC.

TriMet is committed to maintaining a safe and effective transit system. As the project continues into final design, the Council finds that TriMet would continue to develop and refine specific safety and security measures in consultation with the City of Portland and other corridor jurisdictions by doing the following:

- Park-and-rides and station area design will consider site-specific measures to maximize security and discourage criminal activity.
- Bicycle and pedestrian facilities will consider design features that enhance visibility and discourage criminal activity.
- During final design, TriMet would form a Project Safety and Security Committee comprising internal operations staff, staff from local jurisdictions, project design staff and maintenance staff. The committee will review CPTED approaches being applied to the project.
- TriMet would prepare a Safety and Security Management Plan addressing potential safety hazards and security vulnerabilities.

The Council also finds that TriMet would form a Fire, Life and Safety Committee for the light rail project composed of police, fire and safety personnel, and other emergency services providers in the corridor, to advise on design development and operations planning. This committee would review and advise on procedures, staff levels, and safety and security concerns.

Emergency Vehicle Access. As indicated in DEIS Section 4.16.2, in the Outer Southwest Portland Segment, no police or fire and rescue facilities would need to be relocated for the Project. However, localized access to properties by fire, police and ambulance vehicles could be affected by changes in local street configurations in this Segment. Along SW Barbur Boulevard, light rail would operate in the median for a large portion of the alignment. This operation of light rail in the median would result in changes in access, circulation and response times for law enforcement, fire response and other emergency service providers.

The changes to roadways would include new and modified intersections and traffic signals; the addition of crossing gates in some locations; and new or modified structures in other locations. Portland Fire and Rescue relies on a pre-emption Opticom system maintained by the City of Portland Bureau of Transportation. Portland Fire and Rescue considers development of this system in the corridor critical for safety and response times. In portions of the alignment where light rail would operate in the median, crossings of the median would be restricted for general traffic and could also be restricted for emergency vehicles. In

addition, these modifications to emergency response routes, configurations and facility types will typically require additional training and new procedures for police, fire and emergency response personnel.

The Council finds that planning and coordination with the service providers before the Project begins operation would mitigate the long-term impacts that the Project would have on the routes and operations of emergency vehicle services. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and emergency services, so that they can safely and effectively respond to emergencies involving light rail. The Council finds that TriMet already has an existing fire, life and safety coordination program with the City of Portland.

Health Impacts. The primary human health-related impact from the Southwest Corridor Project is related to air quality. As further described in Section 6.3.7 of these findings, the Project will improve air quality in the long term due to reduced criteria pollutants and mobile source air toxics, compared with No-Build conditions. The Council finds that improved air quality will have positive human health benefits for neighborhoods.

Additionally, as indicated in Section 1.2 of the DEIS, one of the goals of the Project is to advance transportation projects that increase active transportation and encourage physical activity. Numerous studies cited by Metro's *Benefits of Active Transportation and Considerations for Implementation* report (a supplemental report of Metro's 2014 *Regional Active Transportation Plan*) indicate that access to active modes of transportation such as walking and bicycling help reduce the risk of life-threatening health conditions. As such, the Council finds that improvements to sidewalks, bicycle facilities, and other active transportation improvements in the Outer Southwest Portland Segment neighborhoods could have positive health impacts for surrounding communities.

Finally, the Council believes and finds that traveling by light rail during rush hour will be less stressful than driving in highly congested conditions, and that this will have positive health benefits.

Conclusions. Relative to safety and security impacts, the Council acknowledges and supports TriMet's continuing efforts to ensure passenger and community safety throughout its service area. The Council finds that with appropriate location and design; continued development and refinement of specific safety and security measures during final design; coordination with police, fire and safety personnel, and other emergency services providers in the corridor; and with implementation of system-wide transit security measures as described above, most security impacts can be mitigated.

Relative to emergency vehicle access, the Council finds that the long-term impacts that the Project would have on the routes and operations of emergency vehicle services would be mitigated by planning and coordination with the service providers before the Project begins operation. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and

emergency services, so that they can safely and effectively respond to emergencies involving light rail.

Relative to health impacts, the Council finds that the Project would improve air quality throughout the Southwest Corridor, which will have positive human health benefits for neighborhoods in the Outer Southwest Portland Segment. In addition, improvements to active transportation facilities in the Segment, and reduced stress for those using light rail rather than driving, could have positive health impacts for surrounding communities.

Traffic Impacts

Transit. As indicated in the General Findings of Section 6.3.1, impacts of the Southwest Corridor Project on transit service are generally positive. The General Findings indicate transit impacts using three measures: travel time, reliability, and ridership. As indicated in Section 3.2.2 of the DEIS, the LRT Project would reduce peak-hour transit travel times in the corridor, making it more comparable to auto travel times. The Project would improve transit reliability, due to the use of reserved or exclusive right of way, compared to buses operating in mixed traffic, which are subject to traffic congestion and delay. Use of the shared transitway on SW Barbur Boulevard between downtown Portland and the SW Capitol Highway ramps would also allow buses to avoid congestion and improve travel times and reliability as well. With introduction of the Southwest Corridor Project, total transit ridership in the corridor, including riders on light rail, buses and commuter rail in the corridor, would be 8 percent greater than with the No-Build Alternative. Though the DEIS does not break out transit impacts by Segment, the Council finds that the Project's positive impacts to transit travel times, reliability, and ridership would also benefit communities in the Outer Southwest Portland Segment.

Highway and Street Impacts. DEIS Section 3.2 and the *Transportation Impacts Results Report* evaluate impacts of the Project on the highway and street network.

Major roadways within the Outer Southwest Portland Segment include I-5, SW Barbur Boulevard, and SW Capitol Highway.

The *system-wide* analysis reviews motor vehicle travel patterns, including changes to circulation patterns as well as the potential for traffic to divert to other streets. In the Outer Southwest Portland Segment, the Project would result in minor changes to the roadway network and maintain roadway capacity and motor vehicle traffic patterns.

North/south traffic volumes on streets crossing a SW Vermont Street/SW Sunset Boulevard screenline and a SW Taylors Ferry Road screenline (depicted in Figure 4.3-1 of the *Transportation Impacts Results Report*) would be about 1 percent less with light rail than with the No-Build Alternative. Two streets would have up to 9 percent lower traffic than the No Build Alternative: SW Capitol Highway (AM peak hour) and SW Taylors Ferry Road (PM peak hour).

With relation to *localized* traffic impacts, as indicated in DEIS Section 3.1.4, the analysis of motor vehicle operations focuses on intersections. It combines regional travel forecasts and traffic analysis and simulation models to predict future conditions in the year 2035 (and 2045 for freeway ramps) for the No-Build Alternative and for the light rail alternatives. The *Transportation Impacts Results Report* provides more detail on the types of models that were used and the technical results. Mobility targets are determined by the operating jurisdiction or agency. Impacts to motor vehicle operations at intersections are identified based on two measures: volume-to-capacity (V/C) ratio and queuing.

As indicated in DEIS Table 3.2-6, the recommended light rail alternative in this Segment would have nine locations where intersections would not meet operating targets in 2035, compared to 10 locations for the No-Build Alternative. When intersections are operating below targets, delays increase as cars wait through several signal cycles to pass through an intersection. The V/C ratio at some of the intersections would improve compared to the No-Build Alternative due in part to providing new signals at several intersections.

There are four intersections where the No-Build Alternative would meet operating targets and the LRT Project would not meet operating targets, or where the No-Build Alternative would not meet operating targets and where the LRT Project would worsen the operations:

- SW Barbur Boulevard and SW 24th Avenue/I-5 southbound ramp (AM)
- SW Barbur Boulevard and SW Taylors Ferry Road/Barbur Transit Center Park-and-ride access (PM)
- SW Taylors Ferry Road and I-5 southbound off-ramp (PM)
- SW Barbur Boulevard and SW 53rd Avenue/53rd Park-and-ride access (AM and PM)

The impact at SW Barbur Boulevard and SW 24th Avenue would be a result of modifying the signal phasing to include a protected left-turn phase. The impacts at the SW Barbur Boulevard intersections with SW Taylors Ferry Road and SW 53rd Avenue and at SW Taylors Ferry Road and the I-5 southbound off-ramp would be due to traffic accessing and leaving the park-and-ride lots.

Related to queuing, the DEIS's assessment for the Outer Southwest Portland Segment focused on the freeway ramps in the vicinity of SW Barbur Boulevard and SW Terwilliger Boulevard and the freeway ramps in the vicinity of SW Barbur Boulevard and SW Capitol Highway (the Crossroads area). No other queuing impacts in this Segment were identified. At the southbound off-ramp from I-5 at the Terwilliger exit, the LRT Project involves removing the northbound auxiliary lane on SW Barbur Boulevard between SW Bertha Boulevard and SW Terwilliger Boulevard. As a result, vehicles exiting the freeway that are bound for southbound SW Terwilliger Boulevard would no longer have a free right turn onto SW Barbur Boulevard and would have to make a 90-degree turn at the intersection. The loss of this free right turn would result in longer queues than with the No-Build Alternative on the I-5 southbound off-ramp, which would occasionally extend off-ramp queues back toward the freeway travel lanes.

The DEIS also measured queuing in the Crossroads area (vicinity of SW Barbur Boulevard and SW Capitol Highway and the I-5 ramps). This analysis found a high level of queuing

and delay in 2045 on the I-5 southbound off-ramp to SW Taylors Ferry Road with the No-Build Alternative. Queuing with the LRT Project would be similar to or slightly worse than queuing with the No-Build Alternative.

DEIS Table 3.3-1 provides potential mitigation strategies for the intersections where the LRT Project would cause the operations to exceed the V/C targets or increase queue lengths in locations where the additional queuing would impact intersection or freeway operations compared to the No-Build Alternative. Proposed mitigations will be evaluated and likely refined before the completion of the FEIS, in consideration of the final route selected and its associated impacts. A determination regarding mitigation will be made in consultation with the local jurisdiction or operating agency. The Council finds that the following potential strategies can mitigate adverse *localized* traffic impacts in the Outer Southwest Portland Segment:

- SW Barbur Boulevard at SW Terwilliger Boulevard and SW Bertha Boulevard: Provide queue detection to flush the off-ramp signal phase and/or add a northbound auxiliary lane between the off-ramp intersection with SW Barbur Boulevard and SW Terwilliger Boulevard (similar to existing operation).
- SW Barbur Boulevard at SW 24th Avenue/I-5 southbound off-ramp: Prohibit the left turn from northbound SW Barbur Boulevard during the AM peak hour.
- Barbur Transit Center access road at SW Barbur Boulevard/SW Taylors Ferry Road: Modify circulation to operate one-way within Barbur TC Park-and-ride and/or reduce the size of the park-and-ride lot. Add a southbound right-turn lane to SW Barbur Boulevard
- SW Taylors Ferry Road at I-5 southbound off-ramp: Add a traffic signal.
- SW 53rd Avenue at SW Barbur Boulevard and park-and-ride access: Move park-and-ride access to a new intersection located west of SW 53rd Avenue. Add a second northbound lane to SW 53rd Avenue approaching SW Barbur Boulevard.

Additional information on *neighborhood circulation* impacts is provided in the supplemental Parametrix memorandum dated November 5, 2018. As indicated in that report, the Project would operate light rail down the center of SW Barbur Boulevard between SW Hooker Street and the vicinity of the Barbur Transit Center (BTC). Operating light rail transit in the center of SW Barbur Boulevard would include new traffic signals at nine unsignalized, local street intersections with SW Barbur Boulevard (between Hooker and BTC) and other local street intersections would be limited to right-in/right-out movements. In some locations in the two southwest Portland segments (SW Bancroft, SW 2nd Avenue, SW 13th and SW Multnomah), these existing unsignalized local street intersections only allow right turns. A traffic signal at these locations would improve the available turning options and increase safety for vehicles turning from local streets onto SW Barbur Boulevard. At other locations, where both left and right turns are permitted from a stop-controlled local street, the new traffic signals would improve safety for vehicles turning from local streets onto SW Barbur Boulevard.

A few stop-controlled side streets would lose the ability to make a left turn onto SW Barbur Boulevard. These vehicles could choose to turn right onto SW Barbur Boulevard and make a U-turn at the next signalized intersection or change their route on local streets within the neighborhood to access SW Barbur Boulevard at a traffic signal. These movements through the neighborhood would increase traffic on local streets. A more detailed analysis of the potential increase in local street traffic will be conducted and additional traffic mitigation will be proposed to discourage cut through traffic on local streets.

This mix of new signalized intersections and limiting some existing intersections to right-in, right-out movements would likely modify traffic patterns within neighborhoods adjacent to SW Barbur Boulevard. The magnitude of circulation changes can be addressed by conducting a circulation study at locations where these movements may increase. Potential mitigation measures to reduce increased neighborhood cut through traffic include directional signage, speed humps, traffic diverters, road closures, traffic circles, and potentially providing a monitoring program to understand before and after volumes or parking caused by the LRT.

Specific concerns about neighborhood circulation impacts have been raised in the Lair Hill neighborhood and the Fulton Park neighborhood. Results from any circulation studies and additional traffic analysis will be presented in the FEIS.

Regarding *transportation safety* impacts, the Project would improve pedestrian and bicycle safety by increasing the number of marked pedestrian crossings of SW Barbur Boulevard, and providing bicycle lanes along all portions of the alignment where light rail is at-grade in a street. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. In the Outer Southwest Portland Segment, LRT improvements would provide a more substantial median barrier that would help reduce the collision risk at the “Barbur curves” trouble spot, which accounted for 4 out of 10 fatal collisions in the study area between 2011-2015. The Project would introduce at-grade roadway crossings with light rail, which will follow TriMet’s Design Criteria for at-grade crossings. The Council concludes that these methods and devices provide for a safe multi-modal environment.

Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council’s decision to approve the Southwest Corridor Project as applied-for by TriMet provides for a light rail route, light rail stations and lots in the Outer Southwest Portland Segment, as identified in the LUFO.

The Council finds as well that this project will achieve the primary purposes that were adopted by the Southwest Corridor Steering Committee, which are identified in the General Findings for Criterion 3 (Section 6.3.1). The project purpose and objectives closely parallel the emphasis of Criterion 3(A) for this Land Use Final Order. The effectiveness evaluation of the Southwest Corridor Project relative to meeting the project purpose is provided in DEIS Section 5.1 and summarized below, as it applies to Criterion 3(A) for the Outer Southwest Portland Segment.

Address the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership.

The LRT Project offers high capacity transit service to help meet the projected growth in demand for transit trips in the corridor, while reducing congestion along major arterials within the Project area, including I-5 and SW Barbur Boulevard, as compared to the No-Build alternative. The Project will connect residents of Outer Southwest Portland neighborhoods with major employment centers in the corridor, including several colleges and universities, industrial areas, shopping destinations, and Portland's Central Business District—which are expected to be large sources of future transit ridership. The Council finds that the Project will also facilitate transit service to existing and future residential and mixed-use areas in the transit corridor and around stations, as called for by Metro's *2040 Growth Concept*. Providing light rail transit to these areas would allow for new development that helps accommodate anticipated growth in population and jobs in locations that can be efficiently serviced by transit. The Project will also provide service to several major recreational areas in the corridor, including Terwilliger Parkway and George Himes Natural Area Park. And the Project will conveniently connect residents of Outer Southwest Portland neighborhoods with the other parts of the metropolitan area served by light rail transit.

The Council finds that as a result of providing service to these key residential, employment, and recreational areas, the Project is expected to result in an 8 percent increase in total transit ridership in the full Corridor by the year 2035, compared to the No-Build Alternative.

Address the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety.

As discussed above under Urban Form Impacts, the Council finds that light rail transit is critical to achieving compact, efficient development along the transit corridor and station areas, as called for by the *2040 Growth Concept*. Development around light rail stations can readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. City of Portland zoning along the Outer Southwest Portland Segment supports higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of a greater range of household sizes and incomes.

The Council finds that the Project will enhance safety for pedestrians and bicyclists by increasing the number of marked pedestrian crossings of SW Barbur Boulevard, and providing bicycle lanes along all portions of the alignment where light rail is at-grade in a

street. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. The Council also finds that the Project will be designed to address security concerns at stations and along the corridor by employing best CPTED practices, lighting, communications, electronic and security/police surveillance, and controlled entry, and that the corridor will be patrolled by TriMet's dedicated transit police.

Address the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council finds that the Project will provide many positive impacts to neighborhoods in the Outer Southwest Portland Segment, and that adverse impacts can be mitigated, as discussed above under Economic and Social Impacts. Positive impacts include improved transit access to local and regional jobs and community facilities, new or improved pedestrian and bicycle facilities, and enhanced health and quality of life. The LRT Project will also help reduce vehicle miles traveled. The Project would result in a reduction in total north-south motor vehicle volume within the Segment, by providing an efficient and reliable alternative to vehicle travel, particularly for trips to and from downtown Portland.

The Council is aware that LRT facilities within the Outer Southwest Portland Segment will have some adverse impacts, particularly in the form of business and residential displacements, shifting traffic patterns, intersection operations, visual changes, and safety and security concerns. However, these impacts can be minimized during preliminary engineering, and mitigation measures can and will be taken to reduce adverse community impacts. Overall, for the reasons stated above, the Council concludes that the identified benefits of LRT to the affected Hillsdale, South Burlingame, Multnomah, Markham, Crestwood, West Portland Park, Ashcreek, and Far Southwest neighborhoods in the Outer Southwest Portland Segment outweigh the adverse impacts. From an economic, social, urban form, safety, and traffic standpoint, the affected neighborhoods should benefit substantially from the proximity and availability of light rail transit.

Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.

The major highway improvements in the Outer Southwest Portland Segment are as follows:

- Street improvements on SW 53rd Avenue between SW Barbur Boulevard and the PCC-Sylvania campus. Improvements would include pavement, sidewalks and lighting.
- Vehicular, pedestrian and bicycle improvements within and along SW Barbur Boulevard and in the vicinity of SW Taylors Ferry Road/SW Capitol Highway/SW Barbur Boulevard, including sidewalk and bicycle improvements, and minor elements such as signalization, electrification, and retaining walls.

Additionally, there would be mitigation measures and minor improvements along the alignment and within and along SW Barbur Boulevard and some adjoining roadways,

including road realignments, sidewalk improvements, signalization, electrification, and sound walls.

The Council finds that the highway improvements in the Outer Southwest Portland Segment will have mostly positive impacts on neighborhoods and improve opportunities for pedestrian, bicycle and vehicle circulation. The improvements on SW 53rd Avenue will provide enhanced pedestrian access to the educational facilities at PCC-Sylvania for students and employees.

Highway improvements on SW Barbur Boulevard and in the Crossroads area in the vicinity of SW Taylors Ferry Road/SW Capitol Highway/SW Barbur Boulevard will improve pedestrian and bicycle access and safety for neighborhood residents and employees. However, adverse impacts to vehicle operations associated with traffic accessing and leaving the park-and-ride lot in this location include intersection operations that do not meet performance targets and increased queueing lengths. The Council finds that these impacts can be mitigated through the mitigation measures identified above, under Traffic Impacts.

The Council concludes that the benefits of these highway improvements strongly outweigh any adverse impacts that may be associated with them.

6.4.2.3: Criterion 4: Noise Impacts

“Identify adverse noise impacts and identify measures to reduce noise impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”

Noise and vibration impacts specific to the Outer Southwest Portland Segment are addressed in the following section. Noise and vibration impacts common to all segments are discussed in Section 6.3.2. An overview of noise and vibration measurements and identification of potential noise mitigation by noise type are included in the DEIS and in the *Noise and Vibration Results Report* (Attachment E of the DEIS). Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Noise and Vibration Impacts in the Outer Southwest Portland Segment

The Outer Southwest Portland Segment connects Southwest Portland with Northeast Tigard. The Segment includes a mix of residential, commercial, open space, and institutional uses. The noise environment in this Segment is dominated by automobile and truck traffic on I-5 and SW Barbur Boulevard.

FTA Noise Impact Criteria groups noise-sensitive land uses into the following three categories:

- **Category 1:** Buildings or parks where quiet is an essential element of their purpose.
- **Category 2:** Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and office buildings which depend on quiet as an important part of operations.

Land use in this Segment consists of single-family and multifamily residences, a nursing home, and several hotels (FTA Category 2); Capitol Hill Elementary School, Sumner College, Little Lambs Preschool/Daycare, Good Shepherd Lutheran Church, PDX Church, and multiple park facilities (FTA Category 3); and commercial uses and undeveloped lands that are not considered noise-sensitive under FTA criteria. As indicated in the *Noise and Vibration Results Report*, no Category 1 land uses were identified in the Outer Southwest Portland Segment.

As shown on Figure 5-1 and Table 5-2 of the *Noise and Vibration Results Report*, there were sixteen noise monitoring sites in the Outer Southwest Portland Segment. The ambient noise levels (Ldn) at the noise monitoring locations ranged from 61 dBA to 82 dBA, with the highest levels near I-5 and adjacent to SW Barbur Boulevard.

LRT Operational Noise Impacts. Moderate noise impacts were identified starting at the connection to the Inner Southwest Portland Segment to just south of SW Terwilliger Boulevard. There are only a few additional impacts at multifamily units south of SW Terwilliger Boulevard and north of the Barbur Transit Center. South of the Barbur Transit Center, where the alignment crosses over I-5 on an elevated structure, there are several moderate impacts at homes located along SW Wilbur Street, east of I-5.

The Barbur Boulevard Transit Center is located south and across from SW Barbur Boulevard from the nearest sensitive properties. Given the distance between the receivers and the transit center and the existing noise levels in this area, impacts related to the planned improvements were not anticipated. To verify this assumption, the closest residences to the park-and-ride were evaluated for total transit noise impacts, which include noise from light rail operations, bus activity and station parking. Two multi-family structures just north of the existing transit center were evaluated and it was found that the total noise at the nearest sensitive receivers was predicted to increase by 1 to 3 dBA over the existing levels. An increase of 1 to 3 dB is typically not perceptible or barely perceptible to the majority of people. In addition, the total transit noise levels at the seven modeling sites, representing multiple apartments at different distances from the transit center, range from 53 to 57 dBA Ldn and all receivers are at least 7 dBA below the FTA moderate impact criteria.

Noise impacts also occur at the residences located along SW Palatine Street, adjacent to the off ramp from I-5. Vibration impacts may also occur at residences located along SW Palatine Street. All other land uses in this Segment south of the Barbur Transit Center are commercial or undeveloped and would not be considered noise sensitive under FTA criteria.

LRT Wheel Squeal Impacts. Table 4.11-2 of the DEIS and the Parametrix memorandum summarize anticipated wheel squeal impacts by segment. The memo identifies two curves with a radius of 400 feet or less with the potential for wheel squeal in the Outer Southwest Portland Segment: Barbur Center (i.e., center of SW Barbur Boulevard) to Barbur Transit Center, and entering Barbur Transit Center. As described in Section 6.3.2, mitigation for wheel squeal includes non-oil-based lubricants and friction modifiers. These curves will be reviewed for lubrication if squeal is identified during initial system testing.

Road Traffic and Bus Noise Impacts. The potential to create or increase exposure to traffic noise as a result of the Project was evaluated qualitatively. In the Outer Southwest Portland Segment, most anticipated traffic noise related issues are due to removal of acoustical shielding and roadway realignment. North of Terwilliger Blvd there are several displaced structures in areas where light rail noise impacts would also occur. South of Terwilliger Blvd, traffic noise impacts are also possible at several multi-family units and some single-family residences due to the removal of shielding and roadway realignment to accommodate stations and turn lanes. There are no major roadway realignments that would trigger a traffic noise study in this Segment.

Like the Barbur Transit Center, all noise sensitive receivers in the vicinity of the SW 53rd Avenue park-and-ride are located across SW Barbur Boulevard. The analysis for the two nearest receivers, located just south and east of the station, show that while there are increases of 2 to 3 dB in the total Ldn, which is barely perceptible, the total combined noise levels of 55 to 58 dBA Ldn are still well below the FTA impact criteria of 63 dBA Ldn for this area. Further analysis is needed once more design information is made available on facility layout, and could result in slight changes in the number and location of impacts. However, any impacts in this area could be mitigated using the same mitigation methods as described in the DEIS.

Although the planned improvements to SW 53rd Avenue for shuttle service to and from PCC would not meet the requirements for an FHWA traffic noise study, the new bus route will be analyzed in the FEIS using the FTA methods to assure compliance. It is possible that noise impacts related to bus operation may occur if there are notable nighttime operations (between 10 PM and 7 AM). Noise impacts are much less likely if the bus schedule consists of primarily daytime operations. If noise impacts are identified in relation to this new route, mitigation may be difficult as noise walls are not feasible in this location.

Noise from Ancillary Facilities. No ancillary noise impacts specific to the Outer Southwest Portland Segment were identified.

LRT Vibration Impacts. FTA provides criteria for acceptable levels of ground-borne vibration. As stated in the *Noise and Vibration Results Report*, the FTA criteria for ground-borne vibration are 72 VdB for Category 2 (residential) structures and 75 VdB for Category 3 (institutional) structures.

The existing vibration environment in the Outer Southwest Portland Segment is dominated primarily by heavy truck traffic on public roadways. Typical vibration levels for these vehicles range from 45 VdB for smooth roadways to 65 VdB for rough roadways or roads with large potholes.

Table 7-3 of the *Noise and Vibration Results Report* summarizes the predicted vibration impacts for the Outer Southwest Portland Segment and identifies 26 total impacts. This Segment has vibration impacts at several structures located adjacent to the alignment along SW Barbur Boulevard. Three of the vibration impacts between SW Terwilliger Boulevard and the Barbur Transit Center are because of the proximity to a crossover. South of the Barbur Transit Center, there are several vibration impacts along I-5 and also at the south end of the alignment east of I-5, just before the elevated structure. Vibration impacts may also occur at residences located along SW Palatine Street. An additional vibration impact was also identified west of I-5 along SW 64th Avenue, where the alignment transitions back to an at-grade alignment.

Mitigation Options for Noise and Vibration Impacts in the Outer Southwest Portland Segment

Potential mitigation for noise and vibration impacts are provided for the Southwest Corridor Light Rail project as a whole (as discussed in Section 6.3.2 of these findings), rather than for individual segments. The Council finds that the type of mitigation measures discussed in that section of the findings could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.2.4: Criterion 5: Natural Hazard Impacts

“Identify Project improvements in areas subject to natural hazards (including landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain) and demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques that could be imposed during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Natural hazard impacts specific to the Outer Southwest Portland Segment are addressed in the following section. Natural hazard impacts common to all segments are discussed in Section 6.3.3. Natural hazard impacts, and associated mitigation measures, also are described in Section 4.8 of the DEIS. Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Natural Hazard Impacts and Mitigation in the Outer Southwest Portland Segment

The types of potential natural hazards that are applicable to the Outer Southwest Portland Segment, include seismic hazards, landslides and rock fall hazards, and corrosive and hydric soils. These potential hazards are discussed in detail in Section 6.3.3 of these findings.

Long-term impacts to the geologic environment are likely to be limited, but could include:

- Changes to localized topography and drainage patterns, which could affect existing landslide-prone areas and areas with unstable slopes;
- Minor settlement near surface features; and
- Encountering corrosive soils that could compromise concrete and steel structures.

The Council finds that the potential long-term impacts in the Outer Southwest Portland Segment can all be mitigated through design in accordance with standard geotechnical engineering practices, applicable regulations, and application of management practices (BMPs). According to section 00721 of the TriMet General Provisions, new construction must be designed and constructed in accordance with the standards for seismic safety detailed in the Department of Transportation Seismic Safety Regulations (49 CFR Part 41). Meeting these standards ensures that engineered bridges and structures for both light rail and road facilities will withstand a major seismic event. Examples of BMPs and standard geotechnical engineering practices are provided in the general findings of Section 6.3.3.

The DEIS does not identify potential natural hazard areas specific to the Outer Southwest Portland Segment. However, all of the hazard types identified in Section 6.3.3, except for flood hazards, could be present in this Segment.

6.4.2.5: Criterion 6: Natural Resource Impacts

“Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland, and park and recreational areas that are protected in acknowledged local comprehensive plans or functional plans and, where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Natural resource impacts specific to the Outer Southwest Portland Segment are addressed in the following section. Natural resource impacts common to all segments are discussed in Section 6.3.4. Natural resource impacts, along with associated mitigation measures, also are described in Sections 4.5, 4.7, 4.9 and Appendices B.4.5 and D of the DEIS, and in the *Ecosystems Results Report* (Attachment D of the DEIS).

Identification of Impacts to Significant Natural Resources in the Outer Southwest Portland Segment

The Portland Comprehensive Plan includes policies and objectives to address conservation of a range of natural resources identified in Statewide Goal 5 – including wetlands, riparian areas and water bodies, fish and wildlife habitat, scenic routes and viewpoints, and significant upland areas. The City has completed an inventory and analysis of natural resource sites, identified the significance of each site and provided varying levels of protection to specific sites through the application of Environmental Overlay Zones (E-zones). The E-zones are classified as either conservation or protection zones depending on the level of protection provided in the City development code.

Portland's E-zone locations for the Outer Southwest Portland Segment are depicted in Figure 4.9-2 of the DEIS. The only location where the LRT alignment will intersect E-zone designation is a small area just to the west of the Barbur Transit Center. This area includes designations of both conservation (c – lower protections) and protection (p – higher protections).

The station access improvement options generally involve localized improvements such as new sidewalks and bicycle lanes and crossings that are primarily adjacent to roadways. Impacts from the station access improvements to contiguous, high-quality natural resources are expected to be relatively few. Upgraded facilities that would be part of these improvements could include stormwater runoff treatment and management, which could provide a net benefit to ecosystems.

Fish and Wildlife Habitat. Direct impacts to fish are not anticipated within this Segment, because there are no streams that contain fish within this Segment. Direct impacts to streams would likely be insignificant, because most of the 11 streams currently traverse the alternative alignments through pipes or culverts that have not been proposed for replacement as part of the Project. Indirect impacts could occur as a result of changes to hydrology and riparian buffers. Other aquatic species, such as amphibians and invertebrates, might be affected in those streams that still contain surface connections to other streams.

E-zoned habitat occurs in forested areas along SW Barbur Boulevard. The DEIS indicated that E-zone conservation area impacts within the Project area total 1.5 acres, and impacts to E-zone protection areas are approximately 1.4 acres. Supplemental information provided by Parametrix about impacts associated with Project Design Refinements indicates that in this Segment, impacts associated with Design Refinement (DR) 4 encompass approximately 0.03 acre of conservation zone. The potential impacts from a 50-foot construction buffer for DR 4 encompasses approximately 0.59 acre of conservation zone and 0.09 acre of protection zone. The presence of threatened or endangered wildlife or plant species this Segment is not likely. Sensitive bird and mammal species, however, including pileated woodpecker and Townsend's big-eared bat, likely inhabit the forested areas along SW Barbur Boulevard. Removal of trees would have a negative impact on these sensitive species, but the impact would be minimal in the context of the remaining habitat in the area. Overall, impacts to vegetation and wildlife species within this Segment would be minimal.

Scenic and Open Space Areas. In the Outer Southwest Portland Segment, designated scenic viewpoints, drives and overlay zones (Figure 4.5-1 of the DEIS) near the alignment were analyzed, considering *Scenic Views, Sites and Drives Inventory* (1989); *Central City 2035 Volume 3A* (2018); and City of Portland Zoning Code 33.420 *Design Overlay Zone* and 33.480 *Scenic Overlay Zone*. Broadly, the light rail elements of the Project would be visible in the foreground and middle ground of these views but would not obscure the primary focal points of the views. Table 4.5-9 of the DEIS, incorporated herein by this reference, identifies the impacts for each view site more fully.

Riparian Areas. As stated under “Wetland Areas” below, a few unmapped riverine wetlands can likely be found along small unnamed tributaries leading from forested slopes west of the LRT alignment in the Outer Southwest Portland Segment. As discussed in Section 6.3.4, riparian habitat could experience permanent impacts where guideways span areas of riparian vegetation. As impacts to wetlands in this Segment are expected to be limited to 0.1 acre, impacts to associated riparian areas would also be minimal.

Wetland Areas. This Segment contains few mapped wetland resources, with a total of 0.12 acre within the Segment. It is possible that negligible impacts to mapped wetland areas could occur in this Segment, but there are limited amounts of wetlands mapped in this mostly developed Segment. A few unmapped, riverine wetlands can likely be found along small unnamed tributaries that lead from forested slopes west of the LRT alignment, and if they are present, they could slightly increase the impacts to wetlands in the Segment, but such impacts would be minor (likely less than 0.1 acre).

Park and Recreational Areas. As described in Section 4.7.2 of the DEIS, there are potential long-term impacts to two parks and recreation areas within the Outer Southwest Portland Segment. These potential impacts are summarized below.

- **Fulton Park, Community Garden and Community Center** is an 8.2-acre park owned and maintained by the City of Portland, located on the south side of SW Barbur Boulevard at SW Miles Street. The park provides multiple recreation amenities, including a large community garden area (1.8 acres), the Metro Home Composting Demonstration Garden, a basketball court, unpaved walking paths, picnic tables, a playground and a soccer field. The widening of SW Barbur Boulevard at the western end of the park would impact the community garden, because the northern 15 feet of the property all along the northern boundary would be incorporated into the widened facility. This would eliminate parts of four garden plots and remove mature trees along the sidewalk, which provide buffering between the garden and the roadway.
- **Sylvania Natural Area Park** is a 2.7-acre forested park located on the south side of SW Capitol Highway, west of SW 53rd Avenue. The park is owned and operated by the City of Portland and it contains two paths that provide access to the park from all four of the adjoining streets. The walking and biking improvements to SW 53rd Avenue would remove a narrow strip of vegetation, potentially including mature

trees, along the western edge of Sylvania Natural Area Park. This vegetation, though not within park property, functions as the edge of the park. The roadway improvements would create a more formal edge to the park, but would still be within the existing street right of way and would not impact park property. SW Trail #7 uses the SW 53rd Avenue right of way from SW Buddington Street to SW Vacuna Street; after completion of the Project, the trail would be on an improved roadway.

Mitigation Options for Natural Resource Impacts in the Outer Southwest Portland Segment

The Council finds that measures available to mitigate natural resource impacts that cannot be avoided include the following.

1. During construction, the Project will employ BMPs to avoid impacts to *wetlands and waters* from erosion, spills, *damage to vegetation* or *disruption of hydrology*, and to mitigate impacts to *fish and wildlife* and *riparian resources*. Standard specifications and special provisions would direct contractors to avoid and minimize impacts. BMPs associated with existing construction specifications and standard natural resources protection measures are described in the general findings of Section 6.3.4.
2. Regarding mitigation for *tree removal*, tree removal on properties within a City of Portland environmental conservation or protection overlay zone (e-zone) is regulated under Title 33.430. This requires replacement of trees and other vegetation as follows:
 - All vegetation planted in a resource area is native and listed on the Portland Plant List.
 - Plants listed on the Nuisance Plants List are prohibited.
 - Tree replacement to occur as shown in Table 430-3 of COP Title 33.430

Tree removal on properties not within a City of Portland e-zone are subject to standards in the City's Title 11 Tree Code. The Tree Code has different sections for tree preservation and tree density associated with development. These sections are listed below:

- Title 11.50.040 – Tree Preservation Standards
- Title 11.50.050 – Tree Density Standards
- Table 50-3 of COP Title 11.50 defines the number of required trees for mitigation.

Therefore, future design plans for the project would include locations for trees and plants that will provide the required coverage and number of trees to comply with City of Portland's tree code.

3. Compensatory mitigation for direct *wetland* impacts is regulated by federal, state and local jurisdictions, and would typically require restoring or enhancing degraded wetland areas or establishing new wetlands nearby to compensate for functions lost or degraded by those impacts. Within this Segment, potential compensatory

mitigation for wetland impacts could include on-site or off-site enhancement or restoration of existing wetlands, or creation of new wetlands. The selection of mitigation sites would depend on the area needed for mitigation, current and future ownership of potential mitigation sites, and site characteristics. Mitigation sites would be selected based on soil types and topographic position that would increase the likelihood of successful restoration or establishment of wetland conditions. Additionally, mitigation could include daylighting some piped streams if deemed beneficial through the permitting process.

4. Potential mitigation measures for long-term *scenic impacts* include, but are not limited to, the following:
 - Develop facilities that are visually consistent with existing neighborhood pattern, character, and scale
 - Use high quality design and materials that mitigate the overall impact and blend into the visual environment
 - Where possible, avoid demolition or alteration of contributing historic structures
 - Reduce or buffer the loss of existing visual resources through the addition of new street trees and other landscaping elements
 - Consider aesthetic treatments for the design of new/replacement bridges, overhead structures or elevated sections of the ballasted trackway to improve compatibility with surrounding areas. If more appropriate, structures should be designed to contrast with their surroundings, so as to create a visual statement.
 - Use elements such as landscaping, streetscaping or fencing to provide an aesthetically pleasing visual buffer between the Project and adjacent high-sensitivity viewers.
 - Adopt a strategy of coordinated street furnishing to create a harmonious visual environment. Elements include signage, wayfinding, street furniture, lighting, hardscaping and public art.
 - Use terraced vegetated landscaping to minimize the visual impact of large retaining walls where possible.
 - Replace/restore removed vegetation and landscaping where possible.
 - Consider vegetated trackway or alternatives to concrete trackway where appropriate.
5. TriMet and Metro are coordinating with Portland Parks and Recreation and the City of Tigard for project features and appropriate mitigation measures to reduce impacts to the *parks and recreation* properties. Where long-term impacts to parks or recreation lands are unavoidable, TriMet would work with the park owner to determine appropriate compensation or other agreements needed to allow use of the land for the Project. Removal of mature trees and shrubs would be quantified at the time of development permit review, and appropriate mitigation would be provided. Potential mitigation measures for impacts to parks and recreation resources include, but are not limited to, enhancement of existing park features, such as replacement of

fencing, improvement of park paths and access, and planting trees and shrubs to replace impacted vegetation.

The Council finds that the type of mitigation measures discussed above could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.2.6: Criterion 7: Stormwater Runoff Impacts

“Identify adverse impacts associated with stormwater runoff and demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Stormwater runoff impacts specific to the Outer Southwest Portland Segment are addressed in the following section. Stormwater runoff impacts common to all segments are discussed in Section 6.3.5. Stormwater impacts and mitigation measures are also described in Section 4.10 of the DEIS.

Identification of Stormwater Impacts in the Outer Southwest Portland Segment

As shown in Table 4.10-3 of the DEIS, an estimated 34 acres of vegetation would be converted to impervious area in the Outer Southwest Portland Segment. General stormwater runoff impacts associated with conversion of land are discussed in Section 6.3.5 of these findings.

Conversion of land throughout the Outer Southwest Portland Segment would generally fall into two categories:

1. **Existing Roadway.** The Project would be added to the existing SW Barbur Boulevard. Much of the widening would be accomplished by converting existing impervious two-way center turn lanes and on-street parking to new permeable tie-and-ballast light rail tracks (except on structures and at-grade road crossings where the trackway would be paved) and new or widened impervious bicycle lanes and sidewalks. The remainder of the widening would be accomplished by converting some of the vegetated right of way to new impervious surface.
2. **Interstate 5 (I-5) Right of Way.** The Project would be constructed by converting vegetated I-5 right of way to new impervious surface.

The LRT alignment in this Segment is planned to include two park-and-rides located at the stations near the Barbur Transit Center and SW 53rd Avenue, each of which would consist of a three-level structured park-and-ride.

- **Barbur Transit Center (TC) Park-and-ride.** The existing land cover at the transit center is impervious parking. Conversion to new impervious parking would trigger stormwater management requirements, with either no impact or a benefit to water resources through additional flow control and water quality treatment. No additional adverse impacts are anticipated.
- **53rd Park-and-ride.** The existing land cover at the 53rd Park-and-ride location is light commercial, with a mix of about 50 percent impervious and 50 percent vegetated land cover. Conversion to new impervious parking would result in vegetation removal. Stormwater management requirements would be triggered; therefore, the land conversion at the 53rd Park-and-ride is not expected to result in impacts to water resources.

No floodplain impacts are anticipated for the Outer Southwest Portland Segment.

Portland Community College (PCC) Sylvania Campus (PCC-Sylvania) Shuttle Options

- **Barbur Transit Center (TC) and Baylor Shuttle.** This shuttle would be a new service operating on existing roadways. No changes to existing land covers or land uses are expected, resulting in no impacts to water resources.
- **53rd Shuttle.** This PCC-Sylvania shuttle option would include rebuilding a portion of the currently paved SW 53rd Avenue with new pavement, sidewalks and stormwater controls, which would benefit water resources.

Mitigation Options for Stormwater Impacts in the Outer Southwest Portland Segment

The Council finds that water quantity and quality impacts in the Outer Southwest Portland Segment can be substantially mitigated through BMPs designed to comply with guidance outlined in the *City of Portland Stormwater Management Manual*. Water quality treatment BMPs might include settling ponds, filter strips, sand filters, bio-infiltration swales, or mechanical treatment. Flow control BMPs might include vegetated detention or retention ponds or vaults. Required stormwater management facilities would likely be larger in areas where more vegetation is converted to new impervious surfaces. Stormwater management will address specific pollutants of concern, including dissolved metals and temperature.

Project design would be more constrained in areas adjacent to or within riparian buffers. The Project would be designed to avoid riparian buffers wherever possible, but in locations where the Project would encroach upon these areas, the Project would implement required studies and stream buffer replacement. Habitat restoration requirements will also focus on restoration of riparian corridors with trees and other vegetation designed to cool urban streams.

The Council finds that BMP and other water quality and quantity control measures are mandated by local, state and federal regulations. Site-specific mitigation for stormwater

quantity and quality impacts will be refined and selected during the FEIS design and local permitting process.

6.4.2.7: Criterion 8: Historic and Cultural Resource Impacts

“Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans and, where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.”

Historic and cultural resource impacts specific to the Outer Southwest Portland Segment are addressed in the following Section. Historic and cultural resource impacts common to all segments are discussed in Section 6.3.6. Historic and cultural resource impacts and mitigation measures are also described in Section 4.6 of the DEIS and in the *Cultural Resource Survey for the Southwest Corridor Light Rail Project, Multnomah and Washington Counties, Oregon (Cultural Resource Survey)*.

Identified Significant and Protected Historic and Cultural Resources in the Outer Southwest Portland Segment

As listed in Table 5 of the *Cultural Resources Survey*, there are 18 listed, eligible, or potentially eligible historic resources in the area of potential effect for the Outer Southwest Portland Segment. The resources are described in the *Cultural Resources Survey*.

The LRT alignment will require full and partial acquisitions of land from nearby buildings and structures in this Segment. The Project will also require temporary construction easements from adjacent landowners to construct the Project. If these land acquisitions and easements overlap the locations of historic properties, there is potential that the Project will adversely affect those historic properties. Full acquisitions are direct effects that are most likely to result in adverse effects; partial acquisitions are less likely to be adverse; and temporary construction easements are the least likely to be adverse. Indirect effects (i.e. those effects that the action caused, but are later in time or farther removed in distance) could also occur as a result of project construction, but are less likely to result in adverse effects.

As indicated in Table 7 of the *Cultural Resources Survey*, the recommended alignment in the Outer Southwest Portland Segment will necessitate four full and three partial acquisitions, and one easement.

As indicated in Table 8 of the *Cultural Resources Survey*, full and partial acquisitions in the Outer Southwest Portland Segment are listed below. Also indicated are the City of Portland’s landmark status or Historic Resources Inventory (HRI) Rank, and whether properties are either listed in the NRHP or have eligible/contributing or eligible/significant status.

Full acquisitions (having presumed adverse effect):

1. House at 5350 SW Pasadena St [eligible/contributing]
2. Building at 11125 SW Barbur Blvd [eligible/contributing]
3. Bridge #02010; Oregon Electric Railway Overcrossing; Hwy 99W over SW Multnomah Blvd [eligible/contributing]
4. Capitol Hill Motel, 9110 SW Barbur Blvd [eligible/contributing]

Partial acquisitions (having potential adverse effect):

1. Fulton Park [Rank II (Fulton Park School), eligible/ contributing]
2. House at 1801 SW Evans St [eligible/contributing]
3. Pancake House; Original Pancake House, 8601 SW 24th Ave [eligible/contributing]

As indicated in the lists above, no resources affected by acquisitions are listed as local Historic Landmarks or Districts. Only one resource affected by a partial acquisition is listed in Portland's Historic Resources Inventory (Fulton Park School).

As indicated in Table 4.6-1 of the DEIS, only one of the three partial acquisitions associated with the recommended LRT alignment is likely to have a potential adverse effect; the remaining two partial acquisitions are likely not to have an adverse effect. Easements are not likely to have adverse effects.

As indicated in the Parametrix memorandum dated November 5, 2018, the Project would result in encroachment of a parking lot at the PCC-Sylvania campus. This campus was first constructed in 1968 and it has not yet been determined if it is potentially an NRHP-eligible historic district. Based on a recent evaluation, it was found that while some of the 1968 buildings may be individually eligible for listing in the NRHP, the campus has limited potential to represent a significant historic district. Even were it determined to be a historic district in the future, it is unlikely that this parking lot would be considered a contributing element. Therefore, because the Project would not affect these structures, it is not considered likely that there would be impacts to a historic resource at PCC Sylvania Campus.

Additionally, questions were raised by the City of Portland regarding the Barbur Transit Center and its status on the City of Portland's Historic Resources Inventory (HRI). An important clarification is that buildings in the HRI are not automatically considered potentially eligible for listing in the National Register for Historic Places (NHRP). The HRI inventory was done almost 35 years ago and has likely not been updated since that time. Evaluation of a building's historical significance needs to be updated every 5 to 10 years to bring it in line with its current context and integrity. The HRI should be seen as a guide to start a survey because it pinpoints what surveyors evaluated over 30 years ago. Checking the HRI and other previous documentation was one of the first steps for the project. The Barbur Transit Center (circa 1976) and the Under Armor building (1977) were less than 10 years old when the HRI was done. It is unclear why these buildings were included because buildings must usually be 50 years in age or older to be historically significant. Consequently, these buildings were not included in the project survey because they did not meet the age threshold (constructed in or before 1970) and were not otherwise of merit. It is

unlikely that either building will meet minimum qualifications to be considered eligible for listing in the NRHP.

It should be noted that because the level of design at the time the DEIS was prepared was preliminary, the adverse effects resulting from partial parcel acquisitions were estimated based on Geographic Information Systems analysis, and temporary construction easements will be identified in the FEIS. A more detailed consideration of easements and partial parcel acquisitions will be presented in the FEIS.

Archaeological Resources. There are no known archaeological resource sites within the area of potential effect in the Outer Southwest Portland Segment. However, there are areas along the Corridor that have the potential to contain significant archaeological resources. As indicated in the *Cultural Resources Survey*, LRT construction for the recommended alignment in this Segment could result in impacts to eight Archaeological High Probability Areas (HPAs). None of these are potentially NRHP-eligible. The HPAs indicate locations that would likely need further detailed preconstruction surveys or archaeological monitoring during construction to discover whether or not an archaeological site exists and to reduce the potential for impacts. Consultation with the tribes has identified no known Traditional Cultural Properties that could be affected by the Project.

Mitigation Options for Identified Historic and Cultural Resource Impacts in the Outer Southwest Portland Segment

The Council finds that the LRT improvements in the Outer Southwest Portland Segment may have adverse effects on the three historic resources that will be affected by full acquisitions, and on the four resources that will be affected by partial acquisitions listed above. The Council finds that specific impacts and mitigation commitments will be addressed in a formal Memorandum of Agreement (MOA) with the SHPO and executed for inclusion in the FEIS. The Council finds the following to be examples of mitigation options:

- Move rather than demolish historic buildings.
- Provide assistance/funds for rehabilitation and adaptive reuse efforts.
- Provide financial assistance for restoration efforts that will contribute to the preservation of cultural heritage in an affected community.
- Develop and support interpretative public history exhibits or on-site kiosks that highlight information gained about cultural resources.
- Develop online history articles.
- Rehabilitate historic properties affected by construction to their original condition.
- Install residential sound insulation to mitigate project-related noise impacts on historic properties.
- Support updates to local government historic resource inventories to capture property information for significant historic resources.

- Construct sound walls to mitigate project-related noise impacts in a manner sensitive to the historic character of the building, if the building is considered a noise-sensitive property.
- Minimize visual impacts on historic resources (i.e., from transit stations near resources) through site-specific, culturally appropriate and historically appropriate design or visual buffers.
- Minimize parking and access impacts to businesses in historic buildings with signs to direct traffic and pedestrians to the businesses and services, and provide alternative access and parking during construction.
- Develop a monitoring and inadvertent discovery plan to provide procedures for the identification and documentation of archaeological resources encountered during project construction.

The Council further finds that the type of mitigation measures listed above could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.2.8: Criterion 9: Air Quality and Energy Impacts

Identify general or anticipated impacts on air pollution, greenhouse gas emissions, and energy usage from project improvements that would help meet state, regional and local reduction goals.

As indicated in Sections 4.12 and 4.13 of the DEIS, no segment-specific air quality or energy impacts are anticipated for the Southwest Corridor Project. Discussion of general air quality and energy impacts for the Project is found in Section 6.3.7 of these findings. As stated in that section, the Portland region is in attainment for criteria air pollutants, and that the Southwest Corridor Project is expected to create a benefit to greenhouse gas (GHG) emissions. Further, the operation of the Project would not affect the regional power supply and would reduce overall energy consumption for the total transportation system compared to the No-Build Alternative. From this, the Council concludes that the Project will have a positive impact in meeting state, regional and local reduction goals.

6.4.3: Tigard/Tualatin Segment

6.4.3.1: Description of Light Rail and Highway Improvements

The Tigard/Tualatin Segment of the Southwest Corridor MAX Light Rail Project includes the following LRT-related facilities and highway improvements:

- SW 70th/SW Elmhurst/Union Pacific-Portland and Western Railroad/I-5 alignment
- 6 Light Rail Stations: in the vicinity of SW 68th Parkway; in the vicinity of SW Elmhurst Street; in the vicinity of SW Hall Boulevard; in the vicinity of SW Bonita

Road; in the vicinity of SW Upper Boones Ferry Road; and in the vicinity of Bridgeport Village.

- 5 Park-and-Ride Lots: in the vicinity of SW 68th parkway; in the vicinity of SW Hall Boulevard; in the vicinity of SW Bonita Road; in the vicinity of SW Upper Boones Ferry Road; and in the vicinity of Bridgeport Village.
- Operation and Maintenance Facility in vicinity of the SW Hall Boulevard Station and Park-and-Ride.
- Highway improvements along SW 70th Avenue and on SW Hall Boulevard.

See **Figures 1.10 to 1.15** of the LUFO for LUFO boundaries for the Tigard/Tualatin Segment.

Light Rail Alignment

Beginning east of the station and park-and-ride in the vicinity of SW 68th Parkway, the alignment turns south on an aerial guideway over Red Rock Creek to connect at grade onto SW 70th Avenue. The alignment then continues south on SW 70th Avenue, crossing over SW Dartmouth Street on structure to SW Elmhurst Street, where it turns west. A station would be located on SW Elmhurst in the vicinity of SW 70th and SW 72nd avenues. The alignment crosses SW 72nd Avenue at grade before crossing over Highway 217 in the vicinity of SW Hermosa Way. The alignment then crosses SW Hunziker Street at grade in the vicinity of SW Knoll Drive to a station, park-and-ride lot and operation and maintenance facility on the east side of SW Hall Boulevard in the vicinity of the WES Commuter Rail/Portland and Western railroad tracks. From here, the alignment heads southeastward along the east side of the WES Commuter Rail/Portland and Western railroad tracks and goes onto a structure over SW Bonita Road with a station and park-and-ride in the vicinity of SW Bonita Road. From there the alignment continues southeastward adjacent to and east of the Tillamook Branch of the Union Pacific/Portland and Western Railroad, crossing SW 72nd Avenue to a station and park-and-ride west of SW Sequoia Drive and in the vicinity of SW Upper Boones Ferry Road/SW Carmen Drive. It then continues southeastward to I-5, where it crosses southward over the railroad tracks on an elevated structure, then continues southward at grade paralleling I-5 on its west side to its terminus station, park-and-ride and bus facilities north of SW Lower Boones Ferry Road and east of SW 72nd Avenue east of Bridgeport Village. Additionally, a park-and-ride structure would be located south of SW Lower Boones Ferry Road that connects to the station with an elevated walkway.

Light Rail Stations

Six light rail stations are provided in the Tigard/Tualatin Segment.

SW 68th Parkway Station. The SW 68th Parkway Station is located in the vicinity of Highway 99W and SW 68th Parkway. This station provides access to the North Tigard and Tigard Triangle neighborhoods.

SW Elmhurst Street Station. The SW Elmhurst Street Station is located in the vicinity of SW Elmhurst Street and SW 70th and SW 72nd Avenues. This station provides access to the Tigard Triangle neighborhood.

SW Hall Boulevard (Tigard Transit Center) Station. The SW Hall Boulevard Station is located in the vicinity of SW Hall Boulevard and SW Knoll Drive. This station provides access to the Downtown, Tigard Triangle and Durham Road neighborhoods. While the SW Hall Boulevard station would be located in close proximity to the Tigard Transit Center, reference to the Tigard Transit Center is not meant to imply that the transit center will relocate. Relocation of the Tigard Transit Center to the SW Hall Boulevard station location is not part of the Project.

SW Bonita Road Station. The SW Bonita Road Station is located in the vicinity of the Union Pacific/Portland and Western railroad tracks and SW Bonita Road. This station provides access to the Tigard Triangle and Durham Road neighborhoods.

SW Upper Boones Ferry Road/SW Carmen Drive Station. The SW Upper Boones Ferry Road/SW Carmen Drive Station is located in the vicinity of Union Pacific/Portland and Western railroad tracks, SW Sequoia Drive and SW Upper Boones Ferry Road/SW Carmen Drive. This station provides access to the Durham Road neighborhood.

Bridgeport Village Station. The Bridgeport Village Station is located in the vicinity of Interstate 5, SW 72nd Avenue and SW Lower Boones Ferry Road. This station provides access to the Durham Road neighborhood, Bridgeport Village, and southwest Lake Oswego.

Park-and-Ride Lots

There are five park-and-ride lots in the Tigard/Tualatin Segment. The SW 68th Parkway Station Park-and-Ride will provide up to 900 parking spaces in a maximum four-story structure. The SW Hall Boulevard (Tigard Transit Center) Station Park-and-Ride will provide up to 300 parking spaces in a maximum three-story structure. The SW Bonita Road Station Park-and-Ride will provide up to 100 surface parking spaces. The SW Upper Boones Ferry Road/SW Carmen Drive Station Park-and-Ride will provide up to 50 surface parking spaces. The Bridgeport Village Station Park-and-Ride, located south of SW Lower Boones Ferry Road and connected to the station by a pedestrian bridge, will provide up to 950 parking spaces in a maximum four-story structure.

Operations and Maintenance (O&M) Facilities

The Tigard/Tualatin Segment contains one operations and maintenance facility located in the vicinity of the SW Hall Boulevard Station and Park-and-Ride.

Highway Improvements

The major highway improvements in the Tigard/Tualatin Segment are as follows:

- Construction or reconstruction of segments of SW 70th Avenue between SW Baylor Street and SW Elmhurst Street and on SW Elmhurst Street between SW 70th Avenue and SW 72nd Avenue.
- Street improvements on SW Hall Boulevard between SW Hunziker Road and the WES Commuter Rail/Portland and Western railroad tracks to improve pedestrian and bicycle access to the SW Hall Boulevard (Tigard Transit Center) Station.

Additionally, there would be mitigation measures and minor improvements along the alignment and within and along roadways adjoining or near the alignment, including road realignments, sidewalk improvements, signalization, electrification, and sound walls.

6.4.3.2: Criterion 3: Neighborhood Impacts

- (3) Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial districts, industrial districts, and mixed-use centers. Identify measures that could increase beneficial impacts or reduce adverse impacts, and that could be imposed as conditions of approval during processes required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (NEPA), or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”**
 - (A) Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing**
 - (1) the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;**
 - (2) the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and**
 - (3) the need to protect affected neighborhoods, districts, and centers from identified adverse impacts.**
 - (B) Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.**

Description of affected residential neighborhoods, commercial and industrial districts, and mixed use centers in the Tigard/Tualatin Segment

Extending from the jurisdictional boundary between Portland and Tigard in the vicinity of SW 68th Parkway on the north to its terminus east of Bridgeport Village, the Tigard/Tualatin Segment affects seven neighborhoods within the Cities of Tigard, Tualatin, Lake Oswego, and Durham, and a portion of unincorporated Clackamas County. Neighborhoods include

Tigard Triangle, Downtown Tigard, Durham Road, Lake Forest, Durham, Lower Boones Ferry Road Commercial and Industrial Area, and Downtown Tualatin. A brief description of each neighborhood is presented below. More detailed neighborhood information is included in DEIS Appendix B4.4.

The **Tigard Triangle** neighborhood is located in the northeast corner of Tigard, east of the Downtown Tigard neighborhood. A notable natural feature is Red Rock Creek, which crosses the north end of the neighborhood, running east to west. Although the area commonly referred to as the Tigard Triangle is bounded by I-5 to the east, Highway 217 to the southwest and Pacific Highway (99W) at the north edge, the Tigard Triangle neighborhood extends southwest beyond Highway 217. On Tigard's neighborhood networks map⁹, SW Hall Boulevard, the Westside Express Service (WES) Commuter Rail and freight railroad tracks, and SW Bonita Road form the western and southern edges of the Tigard Triangle neighborhood. However, on Tigard's *High Capacity Transit Land Use Plan* maps, the western border of the Tigard Triangle is more closely aligned with Highway 217, and lands west of there and east of SW Hall Boulevard, including the proposed location for the SW Hall Boulevard Station, park-and-ride and O&M facility, are identified as being within Downtown Tigard. For the purposes of the LUFO and these findings, the Metro Council relies upon the location of the Tigard Triangle set forth in Tigard's *High Capacity Transit Land Use Plan*.

The primary land uses in the Tigard Triangle neighborhood are commercial and industrial, with some single-family residences at the edges. Major big box stores in the Tigard Triangle include Costco, WinCo, Walmart and Lowe's. This area has long been forecasted for future growth and development, and in 2013 a formal plan for the area was produced that included a strong focus on developing the area to be a mix of uses, such as housing, employment and shopping. This Tigard Triangle Strategic Plan puts an emphasis on improved connectivity for pedestrians, bikes and cars, and includes plans to establish more natural areas.

Tigard Triangle contains high percentages of several transit-dependent populations compared to the region overall, but relatively few total residents compared to the other study neighborhoods. This neighborhood includes U.S. Census block groups that contain up to 60 percent low-income population, which is nearly double the percentage for the overall region. The neighborhood also includes U.S. Census tracts and block groups with percentages of minorities, people with disabilities, people with limited English proficiency and households with limited vehicle access that are higher than those of the overall region.

The **Downtown Tigard** neighborhood is bound by SW McDonald Street, SW Hall Boulevard and Pacific Highway, as illustrated on Tigard's neighborhood networks map. These three roads create a triangle, with the Downtown Tigard neighborhood in the center. Fanno Creek Park creates a barrier between the main commercial area of Downtown Tigard and the residential areas to the south and west. However, as noted above in the description of the Tigard Triangle area, Tigard's *High Capacity Transit Land Use Plan* includes lands east of SW Hall Boulevard within the Downtown area. For the purposes of the LUFO and

⁹ This map was located on the internet and has been placed into the record.

these findings, the Metro Council relies upon the location of Downtown Tigard set forth in Tigard's High Capacity Transit Land Use Plan, and for the reasons set out in Section 8.2 of these Findings, the Council expressly finds that the SW Hall Boulevard Station, park-and-ride lot and O&M facility are within Downtown Tigard.

This neighborhood is characterized by the commercial strips running along Pacific Highway, single family residences, scattered apartment complexes near Pacific Highway and Fanno Creek Park. Within these neighborhood boundaries, there are also multiple senior care centers and senior living facilities. This area's history of development and growth can be traced back to 1910 and 1911 with the arrival of the streetcar and electricity. In 1940 an overpass for Pacific Highway was built north of SW Main Street, shifting development away from SW Main Street to Pacific Highway, as is seen today. In 2005, a group of residents and property and business owners created a new plan for development in downtown Tigard called the Downtown Improvement Plan. This plan detailed future plans for land use, transportation, improved connectivity for all modes and creation of a space for recreation surrounding Fanno Creek.

Downtown Tigard contains high concentrations of many transit-dependent populations. The neighborhood includes U.S. Census tracts and block groups with percentages of minorities, low income population, people with limited English proficiency, older adults, people with limited vehicle access and people with disabilities that are higher than those of the region overall. Only the percentage of youth in the neighborhood is lower than that of the region.

The **Durham Road** neighborhood is located south of the Tigard Triangle and Downtown Tigard neighborhoods. The neighborhood is generally bounded by SW Bonita Road and the WES and freight railroad tracks to the northeast, SW Hall Boulevard to the west, SW Durham Road to the south and I-5 to the east. Additional major roadways providing access within the neighborhood include SW 72nd Avenue and SW Upper Boones Ferry Road. The barrier created by the WES and freight railroad tracks and Fanno Creek limits east/west connectivity through the neighborhood.

Fanno Creek Park is located mainly within the boundaries of the Durham Road neighborhood. The rest of the neighborhood's land use is divided almost evenly between single-family residential in the western half of the neighborhood and industrial in the east. A small area of mixed-use residential borders the general commercial area at the southernmost end of the neighborhood.

The Durham Road neighborhood contains varying concentrations of transit-dependent populations. The neighborhood includes U.S. Census tracts and block groups with percentages of low-income population, people with limited English proficiency, older adults, youth and people with disabilities that are higher than those of the region overall. The portion of the neighborhood west of SW Hall Boulevard is in a block group with 41 percent of the population age 65 or older, which is more than three times the percentage of older adults for the region overall. The percentages of minorities and households with limited vehicle access are lower than those of the overall region.

The **Lake Forest** neighborhood is bound by I-5 to the west, SW Kruse Way to the north, SW Boones Ferry Road to the east and the railroad tracks to the south. This neighborhood is just west of Lake Oswego and is well known for its rural feel, large lots and abundant nature. The neighborhood prides itself on its safe, quiet and peaceful streets, and on maintaining these features given the increasing development occurring around the area. The Lake Forest neighborhood consists primarily of single family and multifamily housing and commercial districts.

The Lake Forest neighborhood has relatively low percentages of transit-dependent populations compared to the region overall. Portions of the neighborhood have a slightly higher percentage of older adults and youth than the region. All other transit-dependent populations are below the regional percentage for all U.S. Census block groups or tracts within the neighborhood.

The **City of Durham** is included as a single study neighborhood because of its relatively small geographic area. Durham is located west of Bridgeport Village, between Tigard and Tualatin. SW Upper Boones Ferry Road provides the primary access north/south through Durham. Because the city is bounded to the west by WES and freight railroad tracks, Fanno Creek and the Tualatin River, there is no auto connectivity to the western edge of Durham. Retail businesses are not allowed in the city of Durham. Zoning allows professional office use, light industrial businesses, and single-family and multifamily housing. In the early 1900s, this neighborhood was a productive nursery, and the value of trees and natural areas in Durham is very high. Of the 265 acres in the neighborhood, 52 acres are parks and open space. Fanno Creek runs through the largest of these parks, Durham City Park, and trails connect this park to parks in both Tigard and Tualatin.

Durham contains varying concentrations of transit-dependent populations. The city includes U.S. Census tracts and block groups with higher percentages of people with disabilities, older adults and people with limited English proficiency than the overall region. The percentages of other transit dependent populations in Durham are lower than those of the region overall.

The **Lower Boones Ferry Road area** is outside of Tigard and Lake Oswego's formally designated neighborhoods. The area is bound by the Durham neighborhood to the west, the Durham Road and Lake Forest neighborhoods to the north, and the Rosewood neighborhood to the east. I-5 and SW Lower Boones Ferry Road run across this area, as does the Union Pacific Railroad. The Tualatin River separates this area from Tualatin.

This area serves as the commercial district for surrounding neighborhoods, but especially the neighborhood of Durham (which has no commercial zoning), and includes Bridgeport Village and additional big box stores and industrial commercial businesses.

The Lower Boones Ferry Road area includes few residents, because it contains primarily industrial and commercial land uses. There are an estimated 375 multifamily residential units in the neighborhood, primarily located along SW Lower Boones Ferry Road near

Bridgeport Village. Because most of the units were built within the past few years, there is little demographic information available about the residents.

Downtown Tualatin is outside of Tualatin's formally designated neighborhoods, so a study neighborhood boundary was created for the DEIS to approximate the downtown area. Several roads intersect the Downtown Tualatin neighborhood, including SW Boones Ferry Road, SW Tualatin-Sherwood Road, SW Nyberg Street, SW Martinazzi Avenue and SW Tualatin Road. The Tualatin River runs along the northern edge of Downtown Tualatin. North south auto access across the river is limited to SW Boones Ferry Road and I-5. The Downtown Tualatin neighborhood includes a range of land uses, including large portions that are zoned for industrial uses to the west, and a mix of single-family, rural and multifamily residential to the east.

The Downtown Tualatin neighborhood includes areas with a higher proportion of several transit dependent populations than the region overall. The neighborhood includes U.S. Census tracts or block groups that have more than twice the regional percentage of low-income population and people with limited English proficiency. Most of the neighborhood exceeds the regional percentage of minority population, with the highest concentrations located in block groups near I-5 (up to 51 percent). There is a higher percentage of households with limited vehicle access in the western portion of the neighborhood than in the region overall.

Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial and industrial districts, and mixed-use centers.

Economic Impacts

Economic impacts include business displacements, loss of parking or access, impacts to the local tax base, and impacts to efficient freight movement.

Displacements. In every instance where the Southwest Corridor Project displaces an existing commercial or industrial use, that represents an adverse economic impact. Even though the adverse impacts associated with displacement may not be significant on a regional or city-wide level, the Council recognizes and is sympathetic to the significance of each displacement at the individual business and neighborhood level. Adverse economic impacts associated with displacements include the loss of employment and payroll, loss of retail services, and loss of assessed value and tax base associated with the business.

Section 4.1.2 of the DEIS presents the likely property acquisitions in the Tigard/Tualatin Segment based on the current conceptual designs, and Section 4.3.2 identifies estimated impacts to businesses and employment. Updated information is provided in the Parametrix memorandum dated November 5, 2018. It is important to note that the list of acquisitions should not be interpreted as the final determination regarding property acquisition and the list could be updated as the Project design is further refined.

As indicated in the Parametrix memorandum, the light rail alignment, stations, and park-and-ride lots would displace 30 commercial and industrial properties and 643 employees in the Tigard/Tualatin Segment. This does not include partial acquisitions, which are assumed not to displace a business or place of employment. Partial acquisitions would affect an additional 45 commercial or industrial properties.

Adverse economic impacts associated with the displacements include the loss of employment and payroll, loss of retail services, and loss of assessed value and tax base associated with the business. The LRT alignment, stations, park-and-ride lots and operations and maintenance facility will be in public ownership and off the tax rolls.

In terms of mitigation, displaced commercial uses will be acquired at fair market value, and relocation benefits will be provided to business owners and tenants as required by law (and as described in Section 6.3.1 of the LUFO General Findings). During the preliminary and final engineering processes, staff will try to minimize displacement impacts to the extent practicable through design refinements. In addition, the increased accessibility provided to people and places by LRT will likely result in increased sales and property values to remaining businesses, which could mitigate or even reverse any overall business losses directly due to construction of the light rail system. At the same time, if properties redevelop due to increased property values, existing businesses and their associated jobs may need to relocate. This need to relocate could result in additional business closures or job loss for some parties, although overall economic activity levels would increase. The Council finds that application of Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy—as discussed in the Social Equity portion of the General Findings for Criterion 3—could help mitigate indirect adverse impacts to businesses.

Loss of Parking/Access. The loss of parking, and the loss or change of access, can have adverse economic impacts on businesses. If an existing access must be removed by the Project and cannot be relocated or reconfigured to provide adequate and safe access, the entire business use is assumed to be displaced. Even if alternative access is available, it may not be as convenient as the existing access and could result in some loss of business. As indicated in DEIS Section 3.2.6, in the Tigard/Tualatin Segment, the Project would reduce parking supply by eight spaces along SW 70th Avenue. As indicated by the Parametrix memorandum, the Project could also eliminate up to 10 parking spaces on SW Elmhurst Street between SW 70th Avenue and SW 72nd Avenue. The current design would displace properties on the south side of the street and the replacement roadway design does not include on-street parking.

In addition, partial acquisitions may eliminate off-street parking spaces associated with businesses. As discussed above under Displacements, mitigation for these impacts would include payment of just compensation and assistance from TriMet. In addition, it may be possible that parking spaces could be reconfigured in places to add more spaces.

The Council finds that parking mitigation strategies that could be implemented if parking supply were to become over-utilized once the Project is in place include replacement of

parking, parking management strategies, and/or parking restrictions. TriMet would work with the affected neighborhoods and/or local jurisdiction to determine the appropriate parking mitigation strategy, if needed.

Tax Base. Local jurisdiction tax bases are affected in two ways by the development of large public infrastructure projects such as the Southwest Corridor MAX Light Rail Project. First, and by far the greatest long-term impact, is the development and redevelopment that could occur in conjunction with the Project. As described in DEIS Table 4.18-1, which summarizes indirect impacts, as development occurs, the investments attract new businesses and employment, and would increase tax revenues and property values. The effect of this kind of impact is difficult to estimate because it is dependent upon many independent private decisions that would occur in the future. However, for the reasons set out in Table 4.18-1, the Council finds that redevelopments would have net beneficial indirect economic impacts.

The second type of impact is the direct impact to tax bases that occurs through property acquisition for construction of the Project. Through acquisition, private property converts to public property and, as such, is removed from the tax rolls unless resold for private purchase. As indicated in DEIS Table 4.3-2 and the Parametrix memorandum, the LRT route in the Tigard/Tualatin Segment would result in an estimated \$331,647 in annual property tax loss for the City of Tigard (approximately 0.3% of Tigard's FY19 budget¹⁰) and \$19,188 for the City of Tualatin (approximately 0.02% of Tualatin's proposed 2018-2019 budget¹¹). Decreases in revenue could be partially offset over time through the sale of remnant parcels that could be used for new commercial and mixed-use buildings and land uses in the future.

The Council also finds that properties near light rail stations in the Tigard/Tualatin Segment will likely experience an increase in value after the Project is completed, thereby increasing property tax revenue in the long term to balance short-term adverse impacts.

Freight Movement. Efficient movement of freight and goods throughout the Southwest Corridor is critical to the economic vitality of the region.

Rail. Portland and Western (P&W) Railroad is a short-line operator that provides freight rail service on tracks owned by Union Pacific Railroad to customers in Tigard and Tualatin with connections to Clatsop, Columbia and Washington counties; to the Union Pacific Railroad tracks at Willsburg Junction; and to points south within the Willamette Valley. As indicated in DEIS Section 3.2.7, the LRT Project would parallel a portion of the P&W Railroad right of way, from south of SW Hall Boulevard in Tigard to just south of SW Upper Boones Ferry Road. The Project would provide for a minimum 25-foot separation between the light rail tracks and the freight railroad tracks where they run parallel. This separation would result in wider at-grade, gated railroad crossings. At two locations (SW 72nd Avenue and SW Upper

¹⁰ Source: http://www.tigard-or.gov/city_hall/finance_and_information_services.php

¹¹ Source: <https://www.tualatinoregon.gov/finance/2018-2019-proposed-budget>

Boones Ferry Road) the existing at-grade crossings would be widened to accommodate light rail. The wider crossings would not impact freight rail operations.

There would be no at-grade light rail crossings of the main freight rail lines. In locations where the light rail alignment would cross existing spur lines, either the light rail would be grade-separated, or the existing spur line would be acquired and removed.

Truck. As indicated in DEIS Section 3.2.7 and the Parametrix memorandum, the LRT alignment would be predominantly located in exclusive right of way adjacent to local streets, major highways or railroads, with a few local streets featuring median light rail that would limit driveway access to right-in/right-out access. Currently freight movements to the Hunziker Industrial Area are generally taken from SW Hall Boulevard and SW Hunziker Road, connecting to smaller local roads or private access roads. This access would not change with the Project. LRT would run alongside SW Commercial Street for a short distance and cross SW Commercial and SW Hunziker Road at grade in one location on each road. These at-grade crossings would result in traffic stopping temporarily when light rail vehicles are crossing, but it is not expected to result in substantial delays and would not change freight routes or access.

Conclusions. The Council finds that, on balance, the Southwest Corridor Project will result in positive economic consequences in the Tigard Triangle, Downtown Tigard, Durham Road, Lake Forest, Durham, Lower Boones Ferry Road Commercial and Industrial Area, and Downtown Tualatin neighborhoods in the Tigard/Tualatin Segment, particularly because improved transit capacity and new transit connections will be available to support existing and planned development in these areas consistent with local plans. Residents and businesses in the affected neighborhoods will have improved access to the regional rail transit system, which offers convenient travel and connections to regional centers offering employment, education, entertainment, recreation and public services.

The improved access, along with higher levels of activity in station areas, could support and encourage new development within the Tigard Triangle and Downtown Tigard, consistent with the vision articulated in Tigard's *High Capacity Transit Land Use Plan* and *Tigard Triangle Strategic Plan*.

Based on the information contained in the DEIS and supporting documents, the Council concludes that the LRT improvements in the Tigard/Tualatin Segment can be designed to mitigate adverse impacts associated with the displacement of up to 30 businesses, as well as impacts on parking and freight movement that have been identified in the DEIS and that may be identified based on further design and engineering studies conducted as part of the FEIS process.

Social Impacts

Various sections of the DEIS evaluate the potential effects of the Southwest Corridor Project on neighborhoods and communities in the corridor. The analysis of adverse social impacts for the Tigard/Tualatin Segment includes consideration of residential displacements, social

equity, access to community facilities, barriers to neighborhood interaction, and visual/aesthetic impacts.

Residential Displacements. As with business displacements, the Council recognizes that in every instance where the Southwest Corridor Project displaces an existing household, that represents an adverse social impact, and the Council is sympathetic to the significance of each residential displacement. It understands and acknowledges that relocations can cause significant anxiety and trauma to families, uprooting them from neighborhoods, schools and friends and imposing change on them.

As indicated in Parametrix memorandum, the LRT Project could displace up to eight single-family residences in the Tigard/Tualatin Segment. No displacement of multi-family residences is anticipated. One additional single-family residence could be affected by a partial acquisition.

It may be possible in some instances to reduce some residential displacements by taking only a portion of a property and/or structure and by modifying the remaining property and/or structure to allow continued occupancy. Where displacements are unavoidable, the Project will provide compensation for real property and relocation benefits to property owners and tenants based on fair market value and a comprehensive relocation program as required by law.

Social Equity. As indicated in DEIS Table B4.4-2, some of the neighborhoods in this Segment exceed the regional percentage for vulnerable and transit-dependent populations, including minority, low income, older adults, those with limited English proficiency, and people with disabilities. The Council finds that the Project would provide significant mobility benefits to transit-dependent populations in this Segment. These include more frequent and reliable transit service as well as safer and better-connected routes for walking and biking.

However, the Council also acknowledges that residential and business displacements could disrupt individual social ties, and that the Project could indirectly cause property values to increase through redevelopment around stations. Resulting potential displacements would have disproportionate impacts on low-income populations. As indicated in DEIS Section 4.18.3, displacements and acquisitions related to other development may be mitigated by ordinance or as a condition of approval for other projects. Cooperative multiagency programs could also provide assistance or additional relocation options for displaced parties. During final design and construction, TriMet and Metro would coordinate with local partners to develop station area redevelopment plans that include measures to minimize indirect impacts, including advancing programs to increase affordable housing supply in the corridor.

The Council also finds that Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy (described in Section 6.3.1 of these findings) are important tools to help ensure that Corridor neighborhoods will

experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Access to Community Facilities. The Council finds that the Southwest Corridor Project will provide improved transit access to community facilities within the Tigard/Tualatin Segment and in the larger region. The Project will improve transit access to various City of Tigard facilities, including City Hall, the Police Department office, and the Public Library, as well as two Tualatin Valley Fire & Rescue stations and park facilities including the Fields Natural Area. The light rail connection would also provide neighborhoods in this Segment access to other facilities along the corridor, including PSU, OHSU, VA Portland, and PCC-Sylvania, among others. No adverse impacts to community facilities are anticipated in this Segment.

Barriers to Neighborhood Interaction. The Council finds that the LRT alignment and highway improvements will not result in barriers to neighborhood interaction in the Tigard/Tualatin Segment. Within the Tigard Triangle and Downtown Tigard neighborhoods, the project would change circulation by creating new LRT or street rights of way. The project would change the character of SW 70th Avenue by reconstructing or adding portions of the roadway with light rail and sidewalks and displacing existing single-family residences. The overall character of the southern portion of the Downtown Tigard neighborhood would become more urban, with the addition of sidewalks, light rail, and a multistory parking garage. Improvements in this area would include a new signalized intersection and streetscaping at SW Hall Boulevard and SW Commercial Street, which would improve connectivity across SW Hall Boulevard. The light rail trackway would not create a new barrier at this location because it would be located adjacent to an existing major roadway. South of Downtown Tigard, the trackway would mostly run parallel to the existing barriers of the railroad tracks or I-5.

Visual/Aesthetic. DEIS Table 4.5-4 provides a summary of visual impacts associated with LRT improvements in the Tigard/Tualatin Segment. The DEIS evaluates impacts to visual quality by landscape unit, which are general geographic areas with similar visual conditions (as illustrated in DEIS Figure 4.5-1). The following landscape units are present in the Tigard/Tualatin Segment:

- **Tigard Triangle Landscape Unit** varies in character, and includes contemporary commercial developments, single-family housing and undeveloped vegetated areas. Big box retail buildings with large parking fields are located on the west end of this landscape unit. Mid-rise office buildings with landscaping are located on the eastern and southern edges of the Tigard Triangle. Undeveloped land and small residential lots are in the center and north of this landscape unit.
- **Downtown Tigard Landscape Unit** encompasses the historic town center, as well as industrial land slightly to the south. Buildings in the downtown are two to three stories and set close to the street, with regularly occurring street trees. The industrial land consists of warehouse buildings and parking/storage yards. An existing freight railway runs north/south through this unit.
- **I-5 Commercial Corridor Landscape Unit** follows I-5 south from Tigard to Bridgeport Village. It contains a mix of low-rise and mid-rise office parks, and low-rise industrial

complexes. The landscape unit includes Bridgeport Village, a large outdoor shopping center.

Long-term impacts to each landscape unit are described below.

In the Northern End of the Tigard Triangle Landscape Unit, adding light rail would rebuild existing roads and extend SW 70th Avenue. This would create a prominent new continuous visual feature in an area that has frequent changes in visual character, but where some residences and undeveloped lands are now present. The DEIS identified visual impacts associated with the previously proposed widening and realignment of SW Beveland Street. While this is no longer part of the Project, similar impacts would be likely for the proposed alignment along SW Elmhurst Street, which is associated with Design Refinement 5. A new flyover section of trackway over SW Dartmouth Street would be visually prominent in a sloping area. A bridge over Highway 217 would be a prominent visual feature, crossing areas with wetlands and vegetation as well as areas with major transportation infrastructure and large buildings. As indicated by DEIS Table 4.5-5, overall visual impacts to the Tigard Triangle Landscape Unit are considered high.

The visual impacts to the Downtown Tigard Landscape Unit identified in the DEIS are no longer relevant, since the DEIS did not analyze Design Refinement 6. However, the SW Hall Boulevard station and park-and-ride would likely have similar visual impacts to the station and park-and-ride previously considered in the DEIS for SW Ash Street. The DEIS indicated that those impacts would reshape the visual character and increase the prominence of transportation infrastructure in this mixed-use area, which has major transportation facilities and commercial areas today as well as areas with multifamily housing. Assuming impacts would be similar, the overall impact to the Downtown Tigard Landscape Unit would be considered high.

For the I-5 Commercial Corridor Landscape Unit, light rail would run in the existing WES rail corridor on newly constructed trackway, but with minimal contrast to the transportation-intensive corridor. A new, elevated crossing over SW Bonita Road would be prominent and visible to residential areas and users of Fanno Creek Park. New stations and park-and-rides at SW Bonita Road, SW Upper Boones Ferry Road/SW Carman Drive, and Bridgeport Village will also provide changes to the visual landscape. The Bridgeport Village park-and-ride will be a new structure with up to 4 stories, while the others will be surface lots. As indicated by DEIS Table 4.5-5, overall visual impacts to the Tigard Triangle Landscape Unit are considered low.

As indicated in DEIS Table 4.5-8, sidewalk improvements in the Tigard/Tualatin Segment might remove strips of vegetation, but frequently would add more visual continuity and could also incorporate other landscaping elements such as street trees or plantings. New bikeways could cause minor changes to visual features and could remove strips of vegetation, but these improvements would maintain or improve the visual character of adjacent streets. The visual impacts associated with sidewalk and bicycle improvements are considered low.

The Council finds that long-term mitigation options applicable to all segments, as described in Section 6.3.1 of these findings, could be applied in the Tigard/Tualatin Segment to mitigate the identified visual impacts.

Neighborhood Quality of Life. As indicated in DEIS Table 4.4-4, overall, the Project would improve quality of life in the surrounding neighborhoods of the Tigard/Tualatin Segment. The primary benefit would be improved transit access for the adjacent neighborhoods. As discussed below, station access improvements in the Segment would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. However, potential adverse neighborhood impacts include the addition of traffic accessing new park-and-rides at congested interchange locations along I-5 at SW Upper and Lower Boones Ferry roads, and the introduction of a new source of noise and vibration along the LRT alignment. Mitigation for traffic impacts is addressed below, and mitigation for noise and vibration impacts is addressed under Section 6.4.3.3 of these findings. The Council finds that adverse impacts are far outweighed by the quality of life benefits to neighborhoods.

Conclusions. The Council finds that the social impacts of the Southwest Corridor Project are generally positive in the affected Tigard Triangle, Downtown Tigard, Durham Road, Lake Forest, Durham, Lower Boones Ferry Road Commercial and Industrial Area, and Downtown Tualatin neighborhoods in the Tigard/Tualatin Segment. Efforts have been taken to minimize displacements and the LRT improvements will be integrated with the built and planned urban environment. Residents and businesses in the Segment neighborhoods will have important new transit connections to a range of important destinations throughout the region, including the Portland Airport, Convention Center, Rose Quarter, Expo Center, OMSI, Zoo, OHSU, Portland State University, and PCC-Sylvania.

Relative to visual impacts, the Council finds that adverse visual effects can be mitigated through careful coordination with the affected neighborhoods and jurisdictions through the FEIS process.

Improved transit access to employment centers and services would especially benefit residents with limited alternatives to driving, who are more dependent on availability of transit to access employment centers, services, and community facilities.

The improved transit access, along with higher levels of activity in station areas, could encourage redevelopment and new services, and potentially increase property values. The Council finds that overall, these improvements, together with pedestrian and bicycle improvements, would maintain or enhance the viability of neighborhoods in the Segment. However, the Council also acknowledges that potential displacements resulting from increased property values, rent, and redevelopment would have disproportionate impacts on low-income and other vulnerable or transit-dependent populations. The Council finds that Metro's Southwest Corridor Equitable Development Strategy and the Portland/Tigard SW Corridor Equitable Housing Strategy will be important to ensuring that Corridor neighborhoods will experience equitable outcomes as a result of the Project, and that adverse impacts do not disproportionately affect vulnerable populations.

Urban Form Impacts

The Council finds that light rail transit is critical to achieving compact, efficient development in designated town centers and around light rail stations in the Tigard/Tualatin Segment, as called for by the Metro 2040 Growth Concept and Tigard's *High Capacity Transit Land Use Plan* and *Tigard Triangle Strategic Plan*. The Growth Concept identifies the Tigard Triangle and Downtown Tigard as a town center, which is anticipated over time to become the focus of compact development and redevelopment, with high capacity transit service and multi-modal street networks. The Tigard Triangle, however, is surrounded by congested regional highways and has only basic transit service. The Council finds that providing light rail transit to this area, which has half the acreage of downtown Portland, would allow for multi-story mixed-use development to accommodate a substantial portion of the growth in population and jobs in locations that can be efficiently serviced.

Light rail transit can also readily serve a broader a range of housing options by permitting greater density and increasing the supply of multiple types of housing. City of Tigard zoning along the corridor supports higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of households that are smaller, have a modest household income or both. As part of establishing a Tigard Triangle Plan District, the Tigard City Council voted in December of 2017 to rezone most of the land in the Triangle to Triangle Mixed Use (TMU), which is a zoning designation (and comprehensive plan designation) specific to the Tigard Triangle. The intent of the rezoning was "to accelerate pedestrian-friendly, mixed-use development".¹²

The Council finds that by adding transit stops within the Tigard Triangle area, the Southwest Corridor project would be highly complementary to the pedestrian-oriented mixed-use development proposed for the Tigard Triangle Plan District and would be compatible with the TMU zoning within the Triangle. The Council further finds that these density-enabling land use regulations will allow more homes to be built for the region's growing population, thus expanding the housing supply and meeting the demand for needed housing.

High capacity transit services also mean that new residential and employment uses can lower the amount of necessary onsite parking—due to easy access to jobs and services via transit, biking or walking. The Council finds that such multimodal access is possible as a result of the region's existing high capacity transit network, into which the Southwest Corridor LRT would connect.

In addition, the Council finds that as the region grows, implementation of light rail will be critical to improving transit connections between jobs and residences. Mixed-use transit-oriented development may allow some residents to live and work within the same station area. Light rail stations that can be accessed by a variety of travel options, including biking, walking or taking local transit, will also allow the growing number of people in the corridor

¹² See http://www.tigard-or.gov/tigard_triangle.php; Tigard Comprehensive Plan, Chapter 18.666; and http://www.tigard-or.gov/Projects/TigardTriangle/TT_LeanCode_approved.pdf

and region to have better mobility while limiting impacts to the environment and to quality of life.

Safety

Security Concerns. The Council is sensitive to the importance of safety and security at stations and in neighborhoods affected by the Southwest Corridor Project. For the Project to succeed, passengers must feel safe using the stations and trains.

As indicated in DEIS Section 4.17.2, the Tigard/Tualatin Segment has several areas with comparatively higher levels of reported crime than other station areas along the alignment, but overall crime levels are low and crimes against persons remain very low. The primary areas with elevated levels of reported crime (which still average less than one per day and involve property crimes and crimes against society) are in the Tigard Triangle and near the existing transit center in downtown Tigard. Bridgeport Village also has a comparatively higher level of property crimes than many of the other potential station areas, which is not uncommon for major retail centers that have high numbers of parked vehicles.

The SW 68th Parkway Station park-and-ride would be located in close proximity to the public street. The station area designs would maximize visibility between the station platform and adjacent public streets. The Elmhurst Station would be street-oriented, with good visibility and no unique security concerns. The SW Hall Boulevard Station would also involve a street-oriented station just south of SW Hall Boulevard, offering good visibility.

The Bonita Station and the Upper Boones Ferry Station would be in areas with low levels of reported crimes. The elevated Bonita Station would not be very visible from nearby streets and developments, nor would its surface park-and-ride. The Upper Boones Ferry Station would be at grade, and nearby streets and existing buildings would have views of the station and its park-and-ride; therefore, no unique concerns are anticipated. The above-grade Bridgeport Station would have good visibility from nearby streets. The upper parking garage and pedestrian bridge would also have good visibility from multiple locations. The transit center could interrupt some sight lines, but the added activity of the transit center would be beneficial. No unique concerns are anticipated at this station.

As indicated in the General Findings of Section 6.3.1, the Council finds that TriMet's dedicated transit police division would continue to work cooperatively with Tigard and Tualatin law enforcement, as well as fire and other emergency responders, to respond to incidents. The Southwest Corridor Project would feature the same safety and security techniques and systems that are applied throughout the regional transit system. TriMet's transit police and contracted security staff patrols and supporting resources, technology, and safety and security systems would be expanded to address the additional facilities developed as part of the Project.

The Council finds that for all facilities, final design and operations planning will consider best Crime Prevention Through Environmental Design practices, including modified siting or layout concepts; the use of lighting, communications, electronic and security/police

surveillance; and controlled entry. For park-and-ride facilities, a combination of customized site-specific measures could be necessary, and would be developed in consultation with local agencies and emergency service providers.

TriMet is committed to maintaining a safe and effective transit system. As the project continues into final design, the Council finds that TriMet would continue to develop and refine specific safety and security measures in consultation with the Cities of Tigard and Tualatin and other corridor jurisdictions by doing the following:

- Park-and-rides and station area design will consider site-specific measures to maximize security and discourage criminal activity.
- Bicycle and pedestrian facilities will consider design features that enhance visibility and discourage criminal activity.
- During final design, TriMet would form a Project Safety and Security Committee comprising internal operations staff, staff from local jurisdictions, project design staff and maintenance staff. The committee will review CPTED approaches being applied to the project.
- TriMet would prepare a Safety and Security Management Plan addressing potential safety hazards and security vulnerabilities.

The Council also finds that TriMet would form a Fire, Life and Safety Committee for the light rail project composed of police, fire and safety personnel, and other emergency services providers in the corridor, to advise on design development and operations planning. This committee would review and advise on procedures, staff levels, and safety and security concerns.

Emergency Vehicle Access. As indicated in DEIS Section 4.16.2, in the Tigard/Tualatin Segment, neither the Tigard Police Department nor the Tualatin Police Department has facilities that would be directly impacted. The Southwest Corridor Project would alter the configuration of and conditions on roadways in the Project area. There would be gated intersections, new traffic signals, new median barriers and other obstacles associated with light rail along critical emergency response routes, which could delay emergency vehicles. A portion of property for the Tualatin Valley Fire and Rescue's Command Center would be acquired for the Project. The area to be acquired is currently vacant and unused; the center and station would not require relocation and would remain fully operational.

The Council finds that planning and coordination with the service providers before the Project begins operation would mitigate the long-term impacts that the Project would have on the routes and operations of emergency vehicle services. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and emergency services, so that they can safely and effectively respond to emergencies involving light rail. The Council finds that TriMet already has an existing fire, life and safety coordination program with the City of Portland, which would be expanded to include providers in Tigard and Tualatin as well.

Health Impacts. The primary human health-related impact from the Southwest Corridor Project is related to air quality. As further described in Section 6.3.7 of these findings, the Project will improve air quality in the long term due to reduced criteria pollutants and mobile source air toxics, compared with No-Build conditions. The Council finds that improved air quality will have positive human health benefits for neighborhoods.

Additionally, as indicated in Section 1.2 of the DEIS, one of the goals of the Project is to advance transportation projects that increase active transportation and encourage physical activity. Numerous studies cited by Metro's *Benefits of Active Transportation and Considerations for Implementation* report (a supplemental report of Metro's 2014 *Regional Active Transportation Plan*) indicate that access to active modes of transportation such as walking and bicycling help reduce the risk of life-threatening health conditions. As such, the Council finds that improvements to sidewalks, bicycle facilities, and other active transportation improvements in the Tigard/Tualatin Segment neighborhoods could have positive health impacts for surrounding communities.

Finally, the Council believes and finds that traveling by light rail during rush hour will be less stressful than driving in highly congested conditions, and that this will have positive health benefits.

Conclusions. Relative to safety and security impacts, the Council acknowledges and supports TriMet's continuing efforts to ensure passenger and community safety throughout its service area. The Council finds that with appropriate location and design; continued development and refinement of specific safety and security measures during final design; coordination with police, fire and safety personnel, and other emergency services providers in the corridor; and with implementation of system-wide transit security measures as described above, most security impacts can be mitigated.

Relative to emergency vehicle access, the Council finds that the long-term impacts that the Project would have on the routes and operations of emergency vehicle services would be mitigated by planning and coordination with the service providers before the Project begins operation. This planning and coordination would include facility design considerations that would support the training needed for public services staff, particularly police, fire and emergency services, so that they can safely and effectively respond to emergencies involving light rail.

Relative to health impacts, the Council finds that the Project would improve air quality throughout the Southwest Corridor, which will have positive human health benefits for neighborhoods in the Tigard/Tualatin Segment. In addition, improvements to active transportation facilities in the Segment, and reduced stress for those using light rail rather than driving, could have positive health impacts for surrounding communities.

Traffic Impacts

Transit. As indicated in the General Findings of Section 6.3.1, impacts of the Southwest Corridor Project on transit service are generally positive. The General Findings indicate

transit impacts using three measures: travel time, reliability, and ridership. As indicated in Section 3.2.2 of the DEIS, the LRT Project would reduce peak-hour transit travel times in the Corridor, making it more comparable to auto travel times. The Project would improve transit reliability, due to the use of reserved or exclusive right of way, compared to buses operating in mixed traffic, which are subject to traffic congestion and delay. With introduction of the Southwest Corridor Project, total transit ridership in the corridor, including riders on light rail, buses and commuter rail in the corridor, would be 8 percent greater than with the No-Build Alternative. Though the DEIS does not break out transit impacts by Segment, the Council finds that the Project's overall positive impacts to transit travel times, reliability, and ridership would also benefit communities in the Tigard/Tualatin Segment.

Highway and Street Impacts. DEIS Section 3.2 and the *Transportation Impacts Results Report* evaluate impacts of the Project on the highway and street network.

Major roadways within the Tigard/Tualatin Segment include I-5, Highway 217, Pacific Highway (99W), SW 72nd Avenue, and SW Hall Boulevard.

The *system-wide* analysis reviews motor vehicle travel patterns, including changes to circulation patterns as well as the potential for traffic to divert to other streets. In the Tigard/Tualatin Segment, the Project would result in minor changes to the roadway network that maintain roadway capacity and motor vehicle traffic patterns. The Project would lead to slightly more traffic (less than 1 percent) on SW Boones Ferry Road at the Tualatin River because of trips to the park-and-rides at the Bridgeport Station and Upper Boones Ferry Station. Pacific Highway (OR 99W) and I-5 would see changes in volume of less than 1 percent throughout this Segment. The segment of SE 72nd Avenue between Pacific Highway and SW Dartmouth Street would see a reduction of 6 percent/4 percent (AM/PM). No other significant impacts are anticipated.

With relation to *localized* traffic impacts, as indicated in DEIS Section 3.1.4, the analysis of motor vehicle operations focuses on intersections. It combines regional travel forecasts and traffic analysis and simulation models to predict future conditions in the year 2035 (and 2045 for freeway ramps) for the No-Build Alternative and for the light rail alternatives. The *Transportation Impacts Results Report* provides more detail on the types of models that were used and the technical results. Mobility targets are determined by the operating jurisdiction or agency. Impacts to motor vehicle operations at intersections are identified based on two measures: volume-to-capacity (V/C) ratio and queuing.

The DEIS indicates a number of locations where the Project could result in intersections that would not meet operating targets in 2035. When intersections are operating below targets, delays increase as cars wait through several signal cycles to pass through an intersection. The identified adverse impacts were associated with vehicles accessing new park-and-ride lots. In addition, the DEIS identified queuing impacts where freeway ramps intersect with the local street system using 2045 traffic volumes (to be consistent with FHWA and ODOT analysis requirements).

Notwithstanding these impacts identified and analyzed in the DEIS, the Council finds that additional specific impacts will be determined through more detailed engineering study as part of the FEIS. The recommended alignment will likely have adverse impacts on some of the same intersections identified in the DEIS, some impacts may not apply, and new impacts may be found on intersections not yet identified.

In each case, the Council finds that the DEIS provides potential mitigation strategies for the intersections where the Project would cause the operations to exceed operating (V/C) targets or to increase queue lengths in locations where the additional queuing would impact intersection or freeway operations. The Council finds that similar mitigation options to those for the Inner and Outer Southwest Portland segments would be appropriate. These mitigation options may include adding traffic signals, building roundabouts, modifying signal timing, adding turn lanes, signal preemption, timing optimization, and grade separation of rail crossings.

In addition, the Council finds that additional analysis of localized traffic impacts will be conducted as part of the FEIS. Specific mitigation measures for impacted intersections will be identified at that time. A determination regarding mitigation will be made in consultation with the local jurisdiction or operating agency. The Council finds that the potential mitigation strategies identified here or as part of the FEIS process can mitigate adverse localized traffic impacts in the Tigard/Tualatin Segment.

As indicated in the Parametrix memorandum, the City of Tigard raised concerns about the proposed LRT crossing on SW Hunziker Street and its proximity to the existing WES Crossing at Hall/Commercial. Specifically, there is concern that having two independent crossings in close proximity creates additional complications and risk to ensure the roadway network and system can adequately accommodate the traffic implication of a dual demand (i.e both trains at once) scenario.

This issue will be further analyzed in the FEIS, but some potential mitigation for this potential impact includes:

- Ensure that the gate down time on both crossings is set at minimum allowable
- Use signage to direct some traffic to alternative routes in order to reduce volumes on Hall and Hunziker
- TriMet should coordinate schedules on both WES and SWC LRT to minimize the risk of simultaneous or back to back gate-down events

Regarding *transportation safety* impacts, the Project would improve pedestrian and bicycle safety in the Tigard/Tualatin Segment by including new or improved pedestrian and bicycle facilities. All of the in-street segments of the light rail alignment would feature sidewalks, bicycle lanes or adjacent trails and marked crossings. These new and improved facilities would fill in existing gaps in the pedestrian and bicycle facilities in the corridor, and would attract increased pedestrian and bicycle activity on the streets and structures. Areas near light rail transit stations would see increased pedestrian activity from transit riders accessing the stations.

Compared to the No-Build Alternative, the Project would substantially increase the number of marked crossings, add ramps that are compliant with the Americans with Disabilities Act, and improve safety and reduce the risk of unsafe crossings that result from the current long distance between marked crosswalks. Many locations also would feature improved intersections and signals. At-grade roadway crossings with light rail will follow TriMet's Design Criteria for at-grade crossings. In addition, locations where bicycles would cross the light rail tracks would be designed to minimize the risk of bicycle tires getting caught in the trackway. The Council concludes that these methods and devices provide for a safe multi-modal environment.

Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council's decision to approve the Southwest Corridor Project as applied-for by TriMet provides for a light rail route, light rail stations, park-and-ride lots and a maintenance facility in the Tigard/Tualatin Segment, as identified in the LUFO.

The Council finds as well that this project will achieve the primary purposes that were adopted by the Southwest Corridor Steering Committee, which are identified in the General Findings for Criterion 3 (Section 6.3.1). The project purpose and objectives closely parallel the emphasis of Criterion 3(A) for this Land Use Final Order. The effectiveness evaluation of the Southwest Corridor Project relative to meeting the project purpose is provided in DEIS Section 5.1 and summarized below, as it applies to Criterion 3(A) for the Tigard/Tualatin Segment.

Address the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership.

The LRT Project offers high capacity transit service to help meet the projected growth in demand for transit trips in the corridor, while reducing congestion along major arterials within the Project area, including I-5, as compared to the No-Build alternative. The Project will connect residents of Tigard/Tualatin neighborhoods with major employment centers in the corridor, including several colleges and universities, industrial areas, shopping destinations, town centers, and Portland's Central Business District—which are expected to be large sources of future transit ridership. The Council finds that the Project will also facilitate transit service to existing and future residential and mixed-use areas in the transit corridor and around stations, as called for by Metro's *2040 Growth Concept*. Providing light rail transit to these areas would allow for new development that helps accommodate anticipated growth in population and jobs in locations that can be efficiently serviced by transit. The Project will also provide service to several major recreational areas in the corridor, including the Fields Natural Area in the Tigard/Tualatin Segment. And the Project

will conveniently connect residents of Tigard/Tualatin neighborhoods with the other parts of the metropolitan area served by light rail transit.

The Council finds that as a result of providing service to these key residential, employment, and recreational areas, the Project is expected to result in an 8 percent increase in total transit ridership in the full Corridor by the year 2035, compared to the No-Build Alternative.

Address the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety.

As discussed above under Urban Form Impacts, the Council finds that light rail transit is critical to achieving compact, efficient development along the transit corridor and in town centers and station areas, as called for by the *2040 Growth Concept*. Development around light rail stations can readily serve a broader range of housing options by permitting greater density and increasing the supply of multiple types of housing. City of Tigard zoning along the Tigard/Tualatin Segment supports higher density housing types such as apartments, condos and townhouses, which can be clustered around stations to meet the needs of a greater range of household sizes and incomes.

The Council finds that the Project will enhance safety for pedestrians and bicyclists by including new or improved pedestrian and bicycle facilities. All of the in-street segments of the light rail alignment would feature sidewalks, bicycle lanes or adjacent trails and marked crossings. The station access improvements would also improve safety for pedestrians and bicyclists accessing light rail stations from adjacent neighborhoods. The Council also finds that the Project will be designed to address security concerns at stations and along the corridor by employing best CPTED practices, lighting, communications, electronic and security/police surveillance, and controlled entry, and that the corridor will be patrolled by TriMet's dedicated transit police.

Address the need to protect affected neighborhoods, districts and centers from identified adverse impacts.

The Council finds that the Project will provide many positive impacts to neighborhoods in the Tigard/Tualatin Segment, and that adverse impacts can be mitigated, as discussed above under Economic and Social Impacts. Positive impacts include improved transit access to local and regional jobs and community facilities, new or improved pedestrian and bicycle facilities, and enhanced health and quality of life. The LRT Project will also help reduce vehicle miles traveled. The Project would maintain roadway capacity while providing an efficient and reliable alternative to vehicle travel for trips to and from major destinations, including downtown Portland and Bridgeport Village.

The Council is aware that LRT facilities within the Tigard/Tualatin Segment will have some adverse impacts, particularly in the form of business and residential displacements, shifting traffic patterns, intersection operations, visual changes, and safety and security concerns. However, these impacts can be minimized during preliminary engineering, and mitigation measures can and will be taken to reduce adverse community impacts. Overall, for the

reasons stated above, the Council concludes that the identified benefits of LRT to the affected Tigard Triangle, Downtown Tigard, Durham Road, Lake Forest, Durham, Lower Boones Ferry Road Commercial and Industrial Area, and Downtown Tualatin neighborhoods in the Tigard/Tualatin Segment outweigh the adverse impacts. From an economic, social, urban form, safety, and traffic standpoint, the affected neighborhoods should benefit substantially from the proximity and availability of light rail transit.

Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.

The major highway improvements in the Tigard/Tualatin Segment are as follows:

- Construction or reconstruction of segments of SW 70th Avenue between SW Baylor Street and SW Elmhurst Street and on SW Elmhurst Street between SW 70th Avenue and SW 72nd Avenue.
- Street improvements on SW Hall Boulevard between SW Hunziker Road and the WES Commuter Rail/Portland and Western railroad tracks to improve pedestrian and bicycle access to the SW Hall Boulevard (Tigard Transit Center) Station.

Additionally, there would be mitigation measures and minor improvements along the alignment and within and along roadways adjoining or near the alignment, including road realignments, sidewalk improvements, signalization, electrification, and sound walls.

The Council finds that the highway improvements in the Tigard/Tualatin Segment will have mostly positive impacts on neighborhoods and improve opportunities for pedestrian, bicycle and vehicle circulation. The improvements on SW 70th Avenue, SW Elmhurst Street, and SW Hall Boulevard will improve pedestrian and bicycle access and safety for neighborhood residents and employees accessing destinations in the Tigard Triangle and Downtown Tigard. No adverse impacts associated specifically with these highway improvements have been identified, the Council finds that any potentially adverse traffic impacts in the vicinity of these improvements can be mitigated through the types of mitigation measures identified above, under Traffic Impacts.

The Council concludes that the benefits of these highway improvements strongly outweigh any adverse impacts that may be associated with them.

6.4.3.3: Criterion 4: Noise Impacts

“Identify adverse noise impacts and identify measures to reduce noise impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”

Noise and vibration impacts specific to the Tigard/Tualatin Segment are addressed in the following section. Noise and vibration impacts common to all segments are discussed in

Section 6.3.2. An overview of noise and vibration measurements and identification of potential noise mitigation by noise type are included in the DEIS and in the *Noise and Vibration Results Report* (Attachment E of the DEIS). Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Noise and Vibration Impacts in the Tigard/Tualatin Segment

The Tigard/Tualatin Segment connects Northeast Tigard to Bridgeport Village in Tualatin. The Segment includes a mix of residential, commercial, and industrial uses. The noise environment in this Segment is dominated by automobile and truck traffic on I-5 and on the major arterial streets.

FTA Noise Impact Criteria groups noise-sensitive land uses into the following three categories:

- **Category 1:** Buildings or parks where quiet is an essential element of their purpose.
- **Category 2:** Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and office buildings which depend on quiet as an important part of operations.

Land use in this Segment consists of single-family and multifamily residences, Westside Sleep Center, and several hotels (FTA Category 2); and commercial and light-to-heavy industrial uses that are not considered noise-sensitive under FTA criteria. As indicated in the *Noise and Vibration Results Report*, there are no Category 1 land uses in the Tigard/Tualatin Segment.

As shown on Figure 5-1 and Table 5-3 of the *Noise and Vibration Results Report*, there were six noise monitoring sites in the Tigard/Tualatin Segment. The ambient noise levels (Ldn) at the noise monitoring locations ranged from 59 dBA to 74 dBA, with the higher noise levels at hotels near I-5 and along SW Hall Boulevard near the Tigard City Center.

LRT Operational Noise Impacts. In this Segment, there is a potential for noise impacts at the Quality Inn Hotel, unless it is displaced for the new park-and-ride. Displacement of the Quality Inn Hotel would prevent any noise or vibration impacts near the 68th Avenue Park and Ride, as the hotel is the only noise and vibration sensitive property in this area.

Although current design drawings show that most of the single-family residences along SW Elmhurst Street would be displaced, one remaining single-family residence along SW 72nd Avenue and the multi-family complex south of the station could have noise impacts.. From SW 72nd Avenue to the Highway 217 crossing, noise impacts would be expected at the remaining single-family residences along SW Hermoso Way. Vibration impacts would also be predicted at many of these same residences.

There are 3 to 4 single-family residences along SW Knoll Drive, north of SW Hunziker Street that would be expected to have noise and vibration impacts, with some due in part to the added noise from at-grade crossing safety systems (bells). The multi-family units north of Hall Boulevard between SW Hunziker road and SW Commercial Street are located far enough from the station that noise impacts would only be expected at the closest units to the trackway.

The alignment south of downtown Tigard along the WES corridor has no noise impacts, because there are no noise-sensitive receivers near the alignment.

LRT Wheel Squeal Impacts. Table 4.11-2 of the DEIS and the Parametrix memorandum summarize anticipated wheel squeal impacts by segment. For the Tigard/Tualatin Segment, all curves with a radius of 400 feet or less located in noise-sensitive areas were identified. Three curves in this segment were identified with potential for wheel squeal: the curve at the corner from SW 70th Avenue to SW Elmhurst Street; the curve from the corner of SW Hall Boulevard to SW Commercial Street; and the curve at the transition from the rail corridor to the I-5 corridor. Mitigation for wheel squeal includes non-oil-based lubricants and friction modifiers.

Road Traffic and Bus Noise Impacts. The potential for traffic noise impacts in the Tigard/Tualatin Segment as a result of the LRT project is reduced substantially with the proposed alignment compared to the DEIS alternatives. Although there are multiple structures being displaced, the majority of these structures are not providing acoustical shielding from other major roadways, and therefore would not be expected to result in any new traffic related noise impacts. The one notable exception is the realignment of SW 70th Avenue, where the realigned road, removal of structures, and station-related traffic could result in potential noise impacts between SW Baylor and SW Dartmouth Streets. The FHWA Traffic Noise model will be used during preparation of the FEIS, where required, to determine if any project-related traffic noise impacts occur, and to model any potential noise walls for those impacts.

Removal of acoustical shielding in other areas of this Segment either have no noise sensitive uses nearby, or have low traffic volumes and traffic noise levels that are predicted to remain below the traffic noise impact criteria. The Bonita, Upper Boones Ferry, and Bridgeport Park-and-rides are all sufficiently far from noise-sensitive receivers that no noise impacts were predicted for those locations. The FHWA Traffic Noise Model will be used during preparation of the FEIS to determine if sound walls would be effective to provide mitigation of traffic noise impacts.

Noise from Ancillary Facilities. The DEIS analysis included noise and vibration impacts from the O&M facility options and other ancillary facilities. The Hunziker O&M Facility located in the Tigard/Tualatin Segment is in an established industrial area and no noise impacts are predicted.

LRT Vibration Impacts. FTA provides criteria for acceptable levels of ground-borne vibration. As stated in the *Noise and Vibration Results Report*, the FTA criteria for ground-

borne vibration are 72 VdB for Category 2 (residential) structures and 75 VdB for Category 3 (institutional) structures.

The existing vibration environment in the Tigard/Tualatin Segment is dominated primarily by heavy truck traffic on public roadways. Typical vibration levels for these vehicles range from 45 VdB for smooth roadways to 65 VdB for rough roadways or roads with large potholes. There is one location in this Segment where rail traffic is likely the dominant vibration source: near the Tigard City Center, where the WES Commuter Rail service runs. Vibration levels from heavy rail, such as the WES, could produce short-term maximum vibration levels above 72 VdB for sites located near the tracks.

A number of vibration impacts are predicted for the Tigard/Tualatin Segment. While most of the single-family residences along SW Elmhurst Street would be displaced, one remaining single-family residence along SW 72nd Avenue and the multi-family complex south of the station could have vibration impacts. From SW 72nd Avenue to the Highway 217 crossing, vibration impacts are predicted at many of the remaining single-family residences along SW Hermoso Way.

There are 3 to 4 single-family residences along SW Knoll Drive, north of SW Hunziker Street that would be expected to have vibration impacts. The multi-family units north of Hall Boulevard between SW Hunziker road and SW Commercial Street are located far enough from the station that noise impacts would only be expected at the closest units to the trackway.

Vibration impacts would also be expected at residences within 50 to 100 feet of the trackway between Highway 217 and the SW Hall Boulevard station. Speed, track type and crossovers, along with displacements will determine the actual level of vibration impact. Vibration levels at the hotels south of the SW Hall Boulevard station, along the I-5 corridor, are all predicted to be below the FTA impact criteria. Vibration impacts from the Hunziker O&M facility were also included in this analysis, and none were found to have a potential for increased vibration at any nearby vibration-sensitive property.

Mitigation Options for Noise and Vibration Impacts in the Tigard/Tualatin Segment

Potential mitigation for noise and vibration impacts are provided for the Southwest Corridor Light Rail project as a whole (as discussed in Section 6.3.2 of these findings), rather than for individual segments. The Council finds that the type of mitigation measures discussed in that section of the findings could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.3.4: Criterion 5: Natural Hazard Impacts

“Identify Project improvements in areas subject to natural hazards (including landslide areas, areas of severe erosion potential, areas subject to earthquake damage

and lands within the 100-year floodplain) and demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques that could be imposed during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Natural hazard impacts specific to the Tigard/Tualatin Segment are addressed in the following section. Natural hazard impacts common to all segments are discussed in Section 6.3.3. Natural hazard impacts, and associated mitigation measures, also are described in Section 4.8 of the DEIS. Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Natural Hazard Impacts and Mitigation in the Tigard/Tualatin Segment

The types of potential natural hazards that are applicable to the Tigard/Tualatin Segment, include seismic hazards, landslides and rock fall hazards, corrosive and hydric soils, and flood hazards. Landslide and rock fall hazards are less likely in this Segment due to the general lack of steep slopes (over 25 percent slope). However, the Tigard/Tualatin Segment is the only segment of the Southwest Corridor Project that includes a FEMA-mapped floodplain, which is associated with Red Rock Creek.

Potential impacts to mapped floodplains are associated with the LRT alignment and construction of an operations and maintenance facility in the Hunziker industrial area. Development within the floodway and 100-year floodplain is regulated locally by the City of Tigard Community Development Code (CDC) and federally by Executive Order (EO) 11988. The alternatives being considered would require crossing and being adjacent to Red Rock Creek and associated floodplains. Therefore, detailed analysis to identify the boundaries of the floodway and floodplain are being conducted.

The LRT alignment is proposed in areas that are mapped locally as special flood hazard areas and sensitive lands. Potential flood hazard impacts in the Tigard/Tualatin Segment include placement of columns near the stream buffer and in the floodplain of Red Rock Creek. Placement of columns within the floodplain would likely require an engineering study to determine the base-flood elevation, evaluate floodplain protections and quantify fill restrictions. In addition, if the ground disturbance or land alteration occurs within a floodway or floodplain, then a Type 3 land use process would be required, which specifies consideration and approval by a hearings officer.

If the proposed Hunziker facility were classified as a critical facility due to its likely use of hazardous materials (Tigard CDC 18.510.040(P)), this designation would require that additional floodproofing and other design criteria be implemented to avoid hazardous materials releases during flood events. This classification requires that development occurs in accordance with Tigard CDC 18.510.070, including the maintenance of a zero-foot rise in the floodway and no rise in the water surface elevation in the floodplain. During final

design, specific measures would be incorporated into the design to meet these city criteria and to avoid changing flood levels or causing hazardous material releases.

If an increase, decrease, or other change in the base flood elevation occurs through additional analysis, a process through the Federal Emergency Management Agency (FEMA) called a letter of map amendment will likely be required to accurately describe the floodplain in the area.

The Council finds that flood hazard mitigation options in the Tigard/Tualatin Segment include designing the Project to avoid stream buffers and floodplains wherever possible. In locations where the Project would encroach upon these areas, the Project would implement required studies, stream buffer replacement, and floodplain compensatory storage, and follow the required local and federal regulatory procedures described above.

In addition, TriMet will coordinate with the City of Tigard to design a project that supports proposed Red Rock Creek flood and stream restoration plans. Of the 18 ranked projects in the City's stormwater master plan that were identified to alleviate flooding, erosion, and sedimentation issues, six involved the Red Rock Creek drainage. These extend from where the stream enters the City of Tigard to its confluence with Fanno Creek. During future design phases, detailed analysis of impacts to the floodplains at these sites would include an analysis of the areas upstream and downstream. It is possible that stream and hydraulic improvement projects upstream of the Southwest Corridor sites might help alleviate downstream flooding. Therefore, a holistic approach to the system would be analyzed, including the potential for construction of a regional stormwater facility by Oregon Clean Water Services.

Long-term impacts to the geologic environment are likely to be limited, but could include:

- Changes to localized topography and drainage patterns, which could affect existing landslide-prone areas and areas with unstable slopes;
- Minor settlement near surface features; and
- Encountering corrosive soils that could compromise concrete and steel structures.

The Council finds that the potential long-term geologic impacts in the Tigard/Tualatin Segment can all be mitigated through design in accordance with standard geotechnical engineering practices, applicable regulations, and application of management practices (BMPs). According to section 00721 of the TriMet General Provisions, new construction must be designed and constructed in accordance with the standards for seismic safety detailed in the Department of Transportation Seismic Safety Regulations (49 CFR Part 41). Meeting these standards ensures that engineered bridges and structures for both light rail and road facilities will withstand a major seismic event. Examples of BMPs and standard geotechnical engineering practices are provided in the general findings of Section 6.3.3.

6.4.3.5: Criterion 6: Natural Resource Impacts

“Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland, and park and recreational areas that are protected in acknowledged local comprehensive plans or functional plans and, where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Natural resource impacts specific to the Tigard/Tualatin Segment are addressed in the following section. Natural resource impacts common to all segments are discussed in Section 6.3.4. Natural resource impacts, along with associated mitigation measures, also are described in Sections 4.5, 4.7, 4.9 and Appendices B.4.5 and D of the DEIS, and in the *Ecosystems Results Report* (Attachment D of the DEIS). Supplemental information is provided in the Parametrix memorandum dated November 5, 2018.

Identification of Impacts to Significant Natural Resources in the Tigard/Tualatin Portland Segment

Within the Tigard/Tualatin Segment, the majority of the Project area consists of developed land cover. Developed land cover includes commercial and residential buildings, schools, roads, sidewalks, railways and other infrastructure. The remainder of the Project area consists of several undeveloped areas primarily within road and railway rights of way; the riparian corridor of Red Rock Creek, Fanno Creek and others, including several wetlands; park areas adjacent to creeks; and undeveloped lots.

Fish and Wildlife Habitat. While the DEIS did not identify impacts to fish habitat in this Segment, according to the Parametrix memo, additional coordination with project partners has indicated that Red Rock Creek is considered fish-bearing for cutthroat trout at least up to the culvert under Highway 217. Therefore, fish passage would need to be maintained below this point. Although, no ESA-listed fish are recorded as being present in this stretch of the stream, it is possible that they could be present. Direct impacts to streams could also be possible, because most of the six streams that currently traverse the LRT alignment do so on the surface. Impacts to other aquatic species, including turtles, amphibians and invertebrates, are possible within Red Rock Creek, because potential habitat is present in that stream.

Because much of the Tigard/Tualatin Segment is urbanized and developed, it contains less area of mapped vegetation than the Inner and Outer Southwest Portland Segments. Vegetated corridors mapped by the City of Tigard to meet Clean Water Services (CWS) standards are intended to provide consultants, planners, and resource managers information on the location of vegetated corridors as defined and regulated by Chapter 3 of the CWS Design and Construction Standards (CWS, 2017), but do not have specific protection. These corridors are located mainly around surface waters. As indicated by the Parametrix memorandum, impacts to these vegetated corridors associated with the footprint and construction buffers of Design Refinements (DR) 4, 5, and 6 encompass approximately 6.89 total acres in this Segment. There may be additional impacts to vegetated corridors

associated with the Project alignment south of DR 6, but these have not yet been quantified. Most of these impacts are associated with the forested areas along Red Rock Creek and Fanno Creek.

The presence of threatened or endangered wildlife species under the federal ESA within the Segment is not likely; however, Nelson's checkermallow could occur in the Knez Wetland, as discussed under "Wetlands" below. Sensitive bird, mammal and reptile species, including purple martin, Townsend's big-eared bat and western pond turtle, likely inhabit the vegetated and wetland areas along Red Rock Creek. Removal of trees and modification of wetland and pond areas would have a negative impact on these species, but the impact would be minimal in the context of the remaining habitat in the wetland areas along Red Rock Creek that will not be affected by the LRT project. Overall, impacts to vegetation and wildlife species within this Segment would be minimal.

Vegetation at the Hunziker operations and maintenance (O&M) facility is mapped as grass/open area, with no forested vegetation present. The O&M facility would be located in an area with existing development, and no direct impacts are anticipated.

Scenic and Open Space Areas. There are no designated scenic resources in the Tigard/Tualatin Segment.

Riparian Areas. As described under "Fish and Wildlife Habitat" above, most of the impacts to vegetated corridors are associated with the forested/riparian areas along Red Rock Creek and Fanno Creek.

Wetland Areas. The Tigard/Tualatin Segment contains by far the greatest amount of wetland resources, which are associated with streams such as Red Rock Creek, Ball Creek and Fanno Creek in level areas near Tigard. The portions of these wetlands near the light rail alternatives are generally surrounded by development.

Historically, the area associated with Red Rock Creek was part of a larger wetland. The historical "Red Rock Creek Wetland" was probably more than 25 acres in size and contained a mix of forested, shrub, emergent and open water wetland types. The construction of Highway 217 severed the wetland into two portions: a 6.7-acre wetland/pond complex on the southwest side of the highway that contains the Knez Wetland and a 15-acre wetland area on the northeast side of the highway. The two wetlands are still hydrologically connected by Red Rock Creek, which passes under the highway in a culvert. Both wetlands are mapped by the National Wetlands Inventory and Regional Land Information System as wetland. The Knez Wetland, a 1.87-acre site, contains a relatively high quality, remnant Willamette Valley wet prairie plant community. Red Rock Creek flows south along the eastern edge of the Knez Wetland site and then continues south through a narrow strip of land that ends at SW Hunziker Street.

As indicated in the Parametrix memorandum, the LRT alignment in the Tigard/Tualatin Segment will impact a total of 1.8 acres of significant and jurisdictional wetlands. These impacts are associated with Design Refinement 6. There may be additional wetland impacts

associated with the Project south of the SW Hall Boulevard station, but these have not yet been quantified. The LRT alignment would impact the Knez Wetland. One federally listed plant, the Nelson's checkermallow, was noted as being planted within the Knez Wetland as part of a restoration effort. It is unknown whether it is currently present, but the species could be impacted by the LRT alignment. Further analysis of these potential impacts will be addressed through federal ESA consultation and coordination with Oregon Department of Fish and Wildlife.

Park and Recreational Areas. As described in Section 4.7.2 of the DEIS, the LRT alignment would not have impacts to existing parks facilities in the Tigard/Tualatin segment. The alignment would be located to the northeast of Fields Natural Area across six sets of heavy railroad tracks. The light rail infrastructure would be visible to future natural area users.

The City of Tigard is planning to develop trails, two neighborhood parks, plazas and pathways in the Tigard Triangle; however, except for having general plans for the future Red Rock Creek greenway and trail area, the city has not yet sited these other planned facilities. As the Southwest Corridor Light Rail Project develops, TriMet, Metro and the City of Tigard will continue to coordinate their planning to support the goals of the *Tigard Triangle Strategic Plan* for the Tigard Triangle. The Tigard/Tualatin Segment alignment would need to acquire properties in the Tigard Triangle area, because it would either expand existing street rights of way or would traverse a mix of developed and undeveloped parcels. Areas acquired and permanently occupied by the Project would no longer be available to become future parks, but property that is not permanently needed could later be available for development as parks.

Mitigation Options for Natural Resource Impacts in the Tigard/Tualatin Segment

The Council finds that measures available to mitigate natural resource impacts that cannot be avoided include the following:

1. During construction, the Project will employ BMPs to avoid impacts to *wetlands and waters* from erosion, spills, *damage to vegetation* or *disruption of hydrology*, and to mitigate impacts to *fish and wildlife* and *riparian resources*. Standard specifications and special provisions would direct contractors to avoid and minimize impacts. BMPs associated with existing construction specifications and standard natural resources protection measures are described in the general findings of Section 6.3.4.
2. Additional mitigation measures to protect existing *fish* habitat in Red Rock Creek would include typical impact minimization measures such as BMPs and permit terms and conditions, as discussed in the general findings above.
3. Compensatory mitigation for direct *wetland* impacts is regulated by federal, state and local jurisdictions, and would typically require restoring or enhancing degraded wetland areas or establishing new wetlands nearby to compensate for functions lost or degraded by those impacts. Within this Segment, where wetland impacts could occur, compensatory mitigation could consist of restoration or enhancement of

wetlands or purchasing credits through an approved mitigation bank or in-lieu-fee program. In addition, impacts to the existing Knez Wetland could be mitigated through enhancement or restoration of the existing wetland complex, or purchase of adjacent parcels for the benefit of protecting the existing wetland complex.

4. City of Tigard natural resources site assessments will also be required in accordance with the following development codes, primarily:
 - CDC 18.510.130 – Significant Habitat Areas Map Verification Procedures
 - CDC 18.510.070 – Sensitive Lands Application
 - CDC 18.510.080 – Development within Locally Significant Wetlands

Examples of criteria that need to be met for significant wetlands include:

- The proposed land form alteration or development is neither on wetland in an area designated as significant wetland on the comprehensive plan special flood hazard area and wetland map nor is within the vegetative corridor and the extent and nature of the proposed land form alteration or development will not create site disturbances to an extent greater than the minimum required for the use;
- Any encroachment or change in on-site or off-site drainage that would adversely impact wetland characteristics have been mitigated by creating a new wetland or restoring or enhancing an existing wetland
- Where natural vegetation has been removed due to land form alteration or development, erosion control provisions of the Surface Water Management program of Washington County shall be met and areas not covered by structures or impervious surfaces will be replanted in like or similar species

5. Applicable standards from Clean Water Services include the following from their Design and Construction Standards (Resolution and Order 17-05):
 - Chapter 3.03 – Vegetated Corridors
 - Chapter 3.05 – General Requirements for Development Activities
 - Chapter 3.08 – Replacement Mitigation Standards
 - Chapter 3.14 – Assessment Methodology
6. As described above, no designated *scenic resources* are identified within the Tigard/Tualatin Segment; therefore no mitigation for scenic resources is required.
7. As described above, no impacts to *park and recreational* resources are identified in the Tigard/Tualatin Segment; therefore no mitigation for park and recreational resources is required.

The Council finds that the type of mitigation measures discussed above could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.3.6: Criterion 7: Stormwater Runoff Impacts

“Identify adverse impacts associated with stormwater runoff and demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Stormwater runoff impacts specific to the Tigard/Tualatin Segment are addressed in the following section. Stormwater runoff impacts common to all segments are discussed in Section 6.3.5. Stormwater impacts and mitigation measures are also described in Section 4.10 of the DEIS.

Identification of Stormwater Impacts in the Tigard/Tualatin Segment

An estimated 17 acres of vegetation would be converted to impervious area in the Tigard/Tualatin Segment. General stormwater runoff impacts associated with conversion of land are discussed in Section 6.3.5 of these findings.

For the portion of the Tigard/Tualatin Segment east of SW 72nd Avenue, the LRT project includes adding light rail track by converting existing commercial parcels, highway, municipal roadway and vegetated areas to new impervious surface.

Floodplain impacts in the Project area west of SW 72nd Avenue are shown in in Figure 4.10-2 of the DEIS. In this area, the LRT alignment would require placement of columns near the stream buffer and in the floodplain of Red Rock Creek. Placement of columns within the floodplain would likely require an engineering study to determine the base-flood elevation, evaluate floodplain protections and quantify fill restrictions. A detailed study of required stream buffer replacement would likely be required, as well.

In the southern portion of the Tigard/Tualatin Segment, the LRT alignment largely runs along a Railroad alignment before continuing along the I-5 right of way. Land conversions in this portion of the segment would convert mostly vegetated railroad or freeway right of way and some impervious commercial areas to impervious track structure. It is assumed that some of the light rail track structure along the alignment would be on ballast.

The greatest potential stormwater runoff impacts for the Tigard/Tualatin Segment would occur at station sites, as described below, where there could be larger changes in the area of impervious surface. These changes would trigger stormwater management requirements, and the inclusion of flow control and water quality facilities in the design of these areas.

- **SW 68th Parkway Station.** The SW 68th Parkway Station Park-and-ride would convert existing, largely impervious, commercial area to impervious parking area. If existing runoff does not currently have stormwater management, then a potential benefit to water resources would result.
- **SW Elmhurst Street Station.** The SW Elmhurst Street Station would convert existing impervious and some vegetated areas to impervious station area. If existing runoff does not currently have stormwater management, then a potential benefit to water resources would result.
- **SW Hall Boulevard Station.** The SW Hall Boulevard park-and-ride would convert existing impervious commercial area to impervious parking area. If existing runoff does not currently have stormwater management, then a potential benefit to water resources would result.
- **Bonita.** The Bonita Park-and-ride would convert existing impervious commercial area to impervious surface for parking. The park-and-ride lot is located immediately adjacent to Ball Creek (Stream Number 1227534454137); therefore, the facility design for this park-and-ride would need to include protection of the stream buffer.
- **Upper Boones Ferry.** The Upper Boones Ferry Park-and-ride would convert existing impervious commercial area to impervious parking area.
- **Bridgeport Village.** The existing land area for the Bridgeport Park-and-ride is impervious parking, and reconfiguration and replacement of the impervious parking would trigger stormwater management requirements, which would benefit water resources.

O&M Facility. O&M facilities, where light rail vehicles are stored and maintained, engage in activities that use hazardous materials, including petroleum products and metals, in areas that can come into contact with rainfall or stormwater runoff, thus impacting stormwater quality. Such facilities are subject to stormwater management requirements. Operations would follow procedures to protect water quality, and the facilities would be designed with appropriate stormwater facilities, which would benefit water resources.

The proposed location for the O&M facility near SW Hunziker Street is adjacent to the stream buffer and within the floodplain of Red Rock Creek (as shown in Figure 4.10-2 of the DEIS). Design of the facility would likely require an engineering floodplain study to determine the base-flood elevation, evaluate floodplain protections and quantify fill restrictions. Uncontrolled spills during operation of the facility would impact water quality within the stream.

Mitigation Options for Stormwater Impacts in the Tigard/Tualatin Segment

The Council finds that water quantity and quality impacts in the Tigard/Tualatin Segment can be substantially mitigated through BMPs designed to comply with guidance outlined in

the *Clean Water Services Design and Construction Standards for Sanitary Sewer and Surface Water Management*. Water quality treatment BMPs might include settling ponds, filter strips, sand filters, bio-infiltration swales, or mechanical treatment. Flow control BMPs might include vegetated detention or retention ponds or vaults. Required stormwater management facilities would likely be larger in areas where more vegetation is converted to new impervious surfaces. Stormwater management will address specific pollutants of concern, including dissolved metals and temperature.

Applicable standards from Clean Water Services (CWS) include the following from their Design and Construction Standards (Resolution and Order 17-05):

- Chapter 3 .03 – Vegetated Corridors
- Chapter 3.06 – General Requirements for Development Activities
- Chapter 3.08 – Replacement Mitigation Standards
- Chapter 3.14 – Assessment Methodology

Project design would be more constrained in areas adjacent to or within stream buffers or floodplains. The Project would be designed to avoid stream buffers and floodplains wherever possible, but in locations where the Project would encroach upon these areas, the Project would implement required studies, stream buffer replacement, and floodplain compensatory storage. Habitat restoration requirements will also focus on restoration of riparian corridors with trees and other vegetation designed to cool urban streams.

The Council finds that BMP and other water quality and quantity control measures are mandated by local, state and federal regulations. Site-specific mitigation for stormwater quantity and quality impacts will be refined and selected during the FEIS design and local permitting process.

6.4.3.7: Criterion 8: Historic and Cultural Resource Impacts

“Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans and, where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.”

Historic and cultural resource impacts specific to the Tigard/Tualatin Segment are addressed in the following Section. Historic and cultural resource impacts common to all segments are discussed in Section 6.3.6. Historic and cultural resource impacts and mitigation measures are also described in Section 4.6 of the DEIS and in the *Cultural Resource Survey for the Southwest Corridor Light Rail Project, Multnomah and Washington Counties, Oregon* (*Cultural Resource Survey*). Supplemental information is also provided in the Parametrix memorandum dated November 5, 2018.

Identified Significant and Protected Historic and Cultural Resources in the Tigard/Tualatin Segment

As listed in Table 5 of the *Cultural Resources Survey*, there are five (5) listed, eligible, or potentially eligible historic resources in the area of potential effect for the Tigard/Tualatin Segment. The resources are described in the *Cultural Resources Survey*.

As indicated in the Parametrix memorandum, the Project will result in one full acquisition of a property that is potentially eligible for listing in the National Register of Historic Places (NRHP). The affected property is the Oregon Education Association building (6900 Atlanta Street, Tigard). Full acquisitions are direct effects that are most likely to result in adverse effects. Indirect effects (i.e. those effects that the action caused, but are later in time or farther removed in distance) could also occur as a result of project construction, but are less likely to result in adverse effects.

Archaeological Resources. There are no known archaeological resource sites within the area of potential effect in the Tigard/Tualatin Segment. However, there are areas along the Corridor that have the potential to contain significant archaeological resources. As indicated in the *Cultural Resources Survey*, LRT construction for the recommended alignment in this Segment could result in impacts to up to nine Archaeological High Probability Areas (HPAs). The Hunziker O&M facility could result in construct-related impacts on one additional HPA. None of the affected HPAs are potentially NRHP-eligible. The HPAs indicate locations that would likely need further detailed preconstruction surveys or archaeological monitoring during construction to discover whether or not an archaeological site exists and to reduce the potential for impacts. Consultation with the tribes has identified no known Traditional Cultural Properties that could be affected by the Project.

Mitigation Options for Identified Historic and Cultural Resource Impacts in the Tigard/Tualatin Segment

The Council finds that the LRT improvements in the Tigard/Tualatin Segment may have adverse effects on the resource that will be affected by full acquisition described above. The Council finds that specific impacts and mitigation commitments will be addressed in a formal Memorandum of Agreement (MOA) with the SHPO and executed for inclusion in the FEIS. The Council finds the following to be examples of mitigation options:

- Move rather than demolish historic buildings.
- Provide assistance/funds for rehabilitation and adaptive reuse efforts.
- Provide financial assistance for restoration efforts that will contribute to the preservation of cultural heritage in an affected community.
- Develop and support interpretative public history exhibits or on-site kiosks that highlight information gained about cultural resources.
- Develop online history articles.
- Rehabilitate historic properties affected by construction to their original condition.

- Install residential sound insulation to mitigate project-related noise impacts on historic properties.
- Support updates to local government historic resource inventories to capture property information for significant historic resources.
- Construct sound walls to mitigate project-related noise impacts in a manner sensitive to the historic character of the building, if the building is considered a noise-sensitive property.
- Minimize visual impacts on historic resources (i.e., from transit stations near resources) through site-specific, culturally appropriate and historically appropriate design or visual buffers.
- Minimize parking and access impacts to businesses in historic buildings with signs to direct traffic and pedestrians to the businesses and services, and provide alternative access and parking during construction.
- Develop a monitoring and inadvertent discovery plan to provide procedures for the identification and documentation of archaeological resources encountered during project construction.

The Council further finds that the type of mitigation measures listed above could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

6.4.3.8: Criterion 9: Air Quality and Energy Impacts

Identify general or anticipated impacts on air pollution, greenhouse gas emissions, and energy usage from project improvements that would help meet state, regional and local reduction goals.

As indicated in Sections 4.12 and 4.13 of the DEIS, no segment-specific air quality or energy impacts are anticipated for the Southwest Corridor Project. Discussion of general air quality and energy impacts for the Project is found in Section 6.3.7 of these findings. As stated in that section, the Portland region is in attainment for criteria air pollutants, and that the Southwest Corridor Project is expected to create a benefit to greenhouse gas (GHG) emissions. Further, the operation of the Project would not affect the regional power supply and would reduce overall energy consumption for the total transportation system compared to the No-Build Alternative. From this, the Council concludes that the Project will have a positive impact in meeting state, regional and local reduction goals.

7. Compliance with Substantive Criteria (3-9) Short Term (Construction) Impacts

7.1: Introduction

This section summarizes the short-term impacts associated with construction of the Southwest Corridor Project and highlights mitigation measures that are applicable in all three segments. The primary goals of including short-term construction impacts in the LUFO findings are to:

- Identify locations, importance and duration of potential major construction impacts; and
- Identify potential mitigation measures (in general terms) for major impacts.

Linear projects such as the Southwest Corridor Project are typically divided into various segments or line sections for construction of the trackway, structures, park-and-ride facilities and related work. The construction sequence will vary depending upon pre-existing conditions and the nature of the LRT facilities. In sections of the alignment where the track is located within a separate right-of-way, extensive clearing and grading may be required. During the grading phase, culverts or other permanent drainage structures will be installed. Underground utility services may be relocated during the grading phase to avoid interference with light rail construction.

Following the grading and preliminary site work, installation of light rail utility duct banks, catenary pole foundations, platform foundations, and major structures such as bridges will begin. Bridge work will be accompanied by foundation construction which may involve pile driving or other specialized operations. Other activities outside the trackway also may occur during this period, such as construction or relocation of roadways, park-and-ride construction, and construction of traction power substations and signals buildings.

The next construction phase involves the installation of track work, catenary poles, catenary wire, signals, communications cables, and other system-wide elements. Once all elements of the LRT system are completed, integrated testing and start-up will begin.

Construction of transitway improvements will proceed with construction of the light rail alignment. Other highway improvements can occur concurrently with construction of LRT improvements.

7.2: Criterion 3: Neighborhood Impacts

“Identify economic, social, urban form, safety and traffic impacts in affected residential neighborhoods, commercial districts, industrial districts, and mixed-use centers. Identify measures that could increase beneficial impacts or reduce adverse impacts, and that could be imposed as conditions of approval during processes

required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (NEPA), or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”

- (A) **Provide for a light rail route, stations, lots and maintenance facilities, including their locations, balancing**
 - (1) **the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;**
 - (2) **the likely contribution of light rail proximity and service to the development of an efficient and compact urban form, and to improved safety; and**
 - (3) **the need to protect affected neighborhoods, districts, and centers from identified adverse impacts.**
- (B) **Provide for highway improvements, including their locations, balancing the need to improve the highway system with the need to protect affected neighborhoods, districts and centers from the identified adverse impacts.**

Information identifying short-term (construction) economic, social, urban form, safety and traffic impacts of the Project on affected neighborhoods, districts, and centers, and potential mitigation, is included in the DEIS and its appendices and attachments. See especially DEIS Sections 3.2.9, 4.1.3, 4.2.3, 4.3.3, 4.3.4, 4.4.5, 4.4.6, 4.5.4, 4.5.5, 4.15.3, 4.16.3, 4.16.4, 4.17.3, 4.17.4, and Attachment B.

For the purpose of these findings, short-term impacts generally are grouped under one of five headings: economic, social, urban form, safety or traffic impacts. The Council recognizes, however, that impacts often can fall under more than one heading. For example, impacts on freight movement may be relevant as economic, safety and traffic impacts. Displacements can have economic, social and urban form impacts. The Council intends these findings to be interpreted broadly to allow overlap among the different categories.

Although the following list is not exclusive, the Council finds that the economic, social, urban form, safety and traffic impacts associated with the Project fall primarily within the following categories¹³:

¹³ Impacts associated with noise, natural resources, water quality and other concerns identified in Criteria 4 through 9 also can fall within these broad categories. In particular, they can have economic and social effects. Because the adopted LCDC criteria require separate findings on these concerns, they are addressed in those separate findings rather than under Criterion 3.

Economic Impacts

- Business displacements
- Loss of parking/access
- Freight movement

Social Impacts

- Residential displacements
- Access to community facilities
- Barriers to neighborhood interaction
- Visual/aesthetic
- Neighborhood quality of life
- Other

Urban form Impacts

Safety Impacts

- Security Concerns
- Emergency Access

Traffic Impacts

- Transit
- Highway and street impacts

Short-term impacts associated with each of these categories are summarized in a general manner for the Project in the following section. Potential mitigation to reduce adverse impacts are also highlighted. More detailed information on these and other identified economic, social, urban form, safety and traffic impacts are presented in the segment findings.

Economic Impacts

Displacements. During construction, property will be needed in each segment for staging areas, construction access and temporary construction easements. Much of the construction needs would be accommodated within property required for permanent rights of way, although some other properties would be needed. Many staging and access requirements could be fulfilled through temporary construction easements or leases, but some full acquisitions would still be likely. Staging areas would primarily be adjacent to the proposed alignment. Off-site staging areas might be needed by the contractor to stockpile excavated materials or to cast and store precast structural elements. These areas would be located close to work sites, when possible, to minimize the impact on local traffic.

The Council finds that for property that is permanently or temporarily acquired for the Southwest Corridor Light Rail Project, TriMet will compensate property owners affected by the Project, as required by the federal Uniform Act, as amended, and state relocation and property acquisition law and regulations. Benefits would vary by property depending on the level of impact, available relocation options and other factors. The primary mitigation for

acquisitions and displacements would be payment of just compensation and relocation assistance.

A public agency must pay just compensation to property owners for land and improvements acquired for public purposes. Just compensation must not be less than the fair market value of the property acquired, including damages or benefits to the remaining property in the case of partial parcel acquisitions.

For temporary construction easements, in addition to just compensation, the property would be restored to its previous condition for the owner or another type of compensation would be employed, or both, as agreed upon during the negotiation process for the easement.

Loss of Parking/Access. Construction can negatively affect businesses by reducing access and visibility of businesses, increasing congestion and travel times by rerouting traffic, and removing on-street parking. Potential customers might choose to avoid businesses due to real or perceived inconvenience caused by construction, including noise, dust and access changes, resulting in adverse short-term impacts.

Temporary impacts are most likely for commercial establishments adjacent to construction for the Outer Southwest Portland Segment, where SW Barbur Boulevard and I-5 run parallel. In this area, businesses include strip retail and freestanding sites such as gas stations, motels, fast food restaurants, and a grocery store. Signage and adequate detour arrangements will largely offset potential impacts on these businesses; however, some decline in sales during construction might still occur.

The urban context for the Tigard/Tualatin Segment is more oriented to business parks with primarily office and light industrial uses. Workers, patrons and visitors of those firms could experience construction-related inconvenience, but the establishments are unlikely to see a decline in business performance as a result. There are, however, a number of restaurant, retail and personal service establishments operating in the business parks that could experience similar nuisance impacts to those expected in the Outer Southwest Portland Segment. These short-term impacts could be mitigated by adequate detour arrangements and signage during construction.

The Inner Southwest Portland Segment, which has far less retail and dining activity than the other two segments, is least likely to experience significant impacts due to construction-related nuisances.

The Council finds that construction of the Project would be planned to minimize road closures and to avoid complex detours to businesses. Signs to identify the location of these access points and the businesses served by them would be provided during detours or closures. Programs to help businesses affected during construction could include business planning assistance, marketing and retail consulting, business-oriented workshops and promotions to generate patronage.

Freight. Construction of the Project would result in temporary impacts to local and regional transportation operations, including freight movement. These impacts are discussed below under “Highway and Street Impacts.”

Social Impacts

Residential Displacements. Short-term displacements are discussed above under “Economic Impacts.”

Access to Community Facilities. The function of community facilities located near the light rail alignment could be temporarily diminished during construction. Construction could impede access to community facility parking lots or buildings in the areas directly adjacent to active construction sites. The Council finds that efforts can be made to maintain access to community facilities by establishing detours and alternative methods for entrance and egress to businesses and facilities that remain open during construction. Visual impacts, light, glare, dust and noise could affect users of parks and other community facilities with outdoor functions located near the light rail alignment. Short-term visual, dust, and noise impacts, and impacts to parks and recreational resources are addressed in other sections of these findings.

Barriers to Neighborhood Interaction. Certain neighborhoods could temporarily experience reduced cohesion if the construction activities create a perceived barrier along the alignment. In the Inner and Outer Southwest Portland Segments, construction activities could reinforce the feeling of SW Barbur Boulevard acting as a barrier to east/west neighborhood connectivity within or between neighborhoods. In the Tigard/Tualatin Segment, the Tigard Triangle and Downtown Tigard neighborhoods could experience temporarily reduced cohesion during construction, because the light rail alignment would not follow existing boundaries between neighborhoods. Adjacent businesses could experience a temporary reduction in customer activity due to a real or perceived inconvenience caused by construction activities. Among the businesses adjacent to the construction, commercial establishments such as restaurants and shops would be most likely to be affected. Potential mitigation for access to businesses is addressed above, under “Loss of Parking/Access”.

Visual/Aesthetic. Construction would be staged and would occur over several years. Generally, existing vegetation and obstructing structures would be removed first, likely creating areas that present a barren visual aesthetic. Staging and construction sites could add temporary visual clutter. Short-term impacts would affect a greater area than the finished project, because more land would be required to stage, divert and construct the Project than would be needed for the finished project. The new I-5 and Highway 217 overpasses would have a larger visual impact during construction than during operation, because they would have equipment, scaffolding and partial finishes that would temporarily lack cohesion.

The Council finds that mitigation measures for short-term visual impacts could include:

- Restore landscaping and streetscaping as the Project is being constructed rather than waiting for the final phases of construction.
- Shield light resources used in nighttime construction.

- Create viewing areas with project-related information for pedestrians.
- Design and place construction screens or barriers to limit the visibility of work areas that are adjacent to high-activity areas, particularly where pedestrians, parks, trails or residences are present.
- Use murals or other techniques to create barriers with visual interest in high use areas.
- Minimize construction debris storage on-site.

Neighborhood Quality of Life. Neighborhood quality of life would be diminished in the area directly adjacent to the alignment during the construction period as a result of noise, dust, detours, loss of on-street parking, increased congestion and increased truck. Detours and congestion during construction could result in slower and less reliable bus service, and could increase traffic volumes on other streets near the directly affected roadways.

Other. During construction of the Southwest Corridor Project, there will be impacts to utilities within the Project area. Short-term impacts to utilities are discussed in Section 4.15.3 of the DEIS. Within the Project area, there are overhead and underground utilities that are owned by public or private entities. These utilities include above- and below-ground facilities such as pipelines, cables and wires that provide water, power and communications services, and remove wastewater and stormwater throughout the Project area. Within the Project area, primary arterial roads, such as SW Barbur Boulevard, are typically major utility corridors.

Construction of the LRT Project would conflict with existing utilities. The DEIS highlights conflicts with utilities where the relocation of utilities or interruption of service is likely to affect larger service areas or create longer, more complex utility construction and relocation activities. Other, less complex utility conflicts are listed in DEIS Appendix B4.15.

Construction impacts to overhead utilities could occur if the alignment requires road widening and would impact existing power poles or towers. These impacts can involve relocation of the overhead lines and their poles or towers farther from the roadway, but in some cases the lines, poles or towers may need to be moved to adjacent streets. There would also be an impact to an overhead utility in locations where the project raises the grade of the ground or requires a structure that reduces the clearance the utility has for either light rail vehicles or other traffic passing underneath. The overhead utilities would also need to have enough clearance to avoid conflicting with the overhead power line system used for light rail.

Underground utility conflicts along the alignment could also be created where the Project would need to lower the existing grade, which could expose or reduce the depth of cover for an underground utility, and require the utility to be moved to a deeper location. In some locations, this can have a ripple effect of impacts to other utilities, especially when several utilities cross each other underground.

Utility relocations can be large projects in themselves and often are conducted as an early phase of the construction of the light rail facility. Underground utilities that are in direct conflict with light rail tracks or structures are normally moved to allow them to be maintained or upgraded in the future without interrupting light rail service. Light rail drainage or stormwater features could also conflict with a utility and require its relocation.

Most of the utility relocations would be fairly routine, meaning they would be localized, have disruptions of service to few users or have less potential for relocation out of the existing right of way. However, there are several locations where more complex utility relocations would be required; detailed descriptions of these more complex impacts are provided in the DEIS.

Regarding mitigation for short-term utility impacts, all affected utility companies would be contacted during the preliminary engineering phase to help locate and map potentially affected utilities and to develop plans to coordinate either protection of the facilities within the construction area or relocation of impacted facilities. During final design and before construction, TriMet would conduct utility location surveys to identify and develop avoidance or relocation plans to address utility conflicts. TriMet would also employ standard construction procedures to minimize the potential for damage to utilities and unscheduled disruption to utility service during construction.

The Council finds that proper coordination with utilities, advance communication to utility customers and the use of standard construction management techniques would minimize disturbance to system users and would also avoid damaging existing facilities that do not require relocation. Temporary utility impacts such as service disruption could occur during construction activities, but in general those impacts are short in duration, and advance communication about outages can minimize the inconvenience to customers. Service interruptions are often controlled by permits required by local jurisdictions.

Typically, new facilities such as poles, conduits or pipe are installed and then service is switched over, thereby minimizing any disruption of service. With these measures in place, the Council finds that no significant impacts to utilities are expected, and no additional mitigation measures would be required.

Urban Form Impacts

No short-term impacts to urban form are identified for the Project. However, the appearance of areas around construction sites will be temporarily altered, as addressed above under “Visual/Aesthetic Impacts.” Impacts to urban form are generally long-term impacts, which are addressed in other sections of these findings.

Safety Impacts

Security Concerns. TriMet will work with the contractors and cities to minimize disruption to the transportation network. Unsecured construction areas could pose a threat to the traveling public if the plans, policies and procedures that are in place to protect the public are not followed. Rerouting of traffic, pedestrians and bicycles might cause confusion and

could increase the risk of incidents. Additionally, the high crime areas could pose a challenge for construction crews. As discussed below under “Emergency Vehicle Access,” TriMet will work closely with and communicate construction issues to the police departments of each affected municipality, and will coordinate its construction management plan with emergency responders.

Emergency Vehicle Access. During construction in the Inner and Outer Southwest Portland Segments, street or lane closures on major roadways, such as on SW Barbur Boulevard, would impact law enforcement, fire protection, rescue and emergency medical service operations and emergency response routes, including routes to the hospitals on Marquam Hill. The Marquam Hill Connection options would construct facilities to cross SW Terwilliger Boulevard, which would create short-term delays or lane closures for a section of this primary route to the medical centers, although emergency access would be maintained. Complete lane closures of SW Barbur Boulevard would require alternative fire response plans, and limited access could require multi-unit responses. Construction in the Tigard/Tualatin Segment within Tigard and Tualatin would also increase response times for the Tigard Police Department, Tualatin Police Department, and Tualatin Valley Fire and Rescue.

The Council finds that to mitigate for the short-term street and lane closures that would occur throughout the study area during construction, TriMet can and would work closely with and communicate construction issues to the police departments, fire and emergency service providers, hospitals and ambulance services, schools, the U.S. Postal Service and solid waste collection services. TriMet’s standard procedures for light rail construction require notice of closures well in advance and feature ongoing coordination with police, fire and emergency responders during construction planning as well as during construction.

The Council finds that a construction management plan would be developed with the public services providers. It would further define construction-period communications and coordination measures and techniques that would minimize impacts. It finds as well that a construction traffic management plan would also be developed for the Project. It would include traffic control measures such as bypasses, detours, signage and flaggers, which would be used to minimize and avoid delays for emergency responders and minimize impacts to all public services. These plans would be developed in coordination with the cities, school districts and other service providers.

Traffic Impacts

Construction of LRT and highway improvements would result in temporary impacts to local and regional transportation operations. These impacts could include temporary lane closures, signals, detours and related impacts to motor vehicle, bus, bicycle and pedestrian operations.

Transit. Detours and congestion during construction could result in slower and less reliable bus service.

Highway and Street Impacts. Potential outcomes of construction impacts could also result in temporary:

- Traffic intrusion on local streets due to congestion detours
- Lane closures on SW Barbur Boulevard, I-405, I-5, Highway 217 and other arterial, collector and local streets
- Disruption of access to local businesses
- Loss of on-street parking
- Increase in truck deliveries and trucks removing construction materials
- Temporary detours for bicycles and pedestrians
- Impacts to transportation operations within the Corridor.

Tables 3.3-29, 4.3-15, and 5.3-46 in the Transportation Impacts Results Report (Attachment B of the DEIS), incorporated herein by reference, identify the estimated type and duration of specific construction activities that could impact various modes of travel in each segment of the Project. In the Inner Southwest Portland Segment, there are four locations that would have construction impacts for the recommended alignment, with an approximate time frame of one or two years for those impacts. In the Outer Southwest Portland Segment, there are four locations that would have construction impacts for the recommended alignment, with an approximate time frame of one or two years for those impacts. In the Tigard/Tualatin Segment, there are four locations that would have construction impacts for the recommended alignment, with time frames of between 3-6 months and the entire duration of project construction for those impacts.

The Council finds that mitigation for short-term transportation impacts could include a variety of activities ranging from scheduling of construction activities to minimizing conflicts during peak travel periods to using alternative construction techniques or equipment. Some of the options for mitigating the short-term traffic impacts associated with light rail construction could include, but not be limited to the following:

- Limit work areas in congested locations to minimize disruptions to traffic, bus and pedestrian circulation, as well as business access;
- Avoid construction during peak travel hours or seasons such as Christmas when traffic volumes and parking demand in the vicinity of shopping facilities are significantly higher;
- Where lane closures on major regional roadways and freeways are needed to construct new overcrossings, schedule such work during overnight hours and weekends;
- Where ramps or structures are closed for replacement on major regional roadways, provide a temporary structure where feasible, or detour route with temporary operational enhancements if appropriate;
- Maintain accessible pedestrian and bicycle routes through construction zones, including provisions for crossings, as appropriate;
- Develop and maintain a program of coordination and outreach with affected businesses and community interests to oversee construction traffic mitigation and management activities;

- Develop and implement Travel Demand Management strategies to reduce vehicular traffic volumes in congested corridors;
- Where appropriate, develop temporary parking to mitigate loss due to construction staging or work activities;
- Monitor traffic control to identify and resolve issues which occur due to changes in day-to-day construction activities

7.3: Criterion 4: Noise Impacts

“Identify adverse noise impacts and identify measures to reduce noise impacts that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by affected local governments during the local development approval and permitting processes.”

Short-term (construction) noise and vibration impacts and potential mitigation measures for the Southwest Corridor Project are identified in Sections 4.11.5 and 4.11.6 of the DEIS and Section 8 of the *Noise and Vibration Results Report*.

As with any large transportation project, construction of a light rail system involves the use of equipment, machinery and procedures that result in intense noise levels and occasionally high vibration levels in and around the construction sites. Sections of the alignment for the Southwest Corridor Project are adjacent to a number of noise sensitive uses such as dwellings.

As listed in Table 8-1 of the *Noise and Vibration Results Report*, noise levels produced by typical construction equipment at 50 feet from receivers range from 74 dBA (roller for soil compaction) to 101 dBA (pile-driver). Most construction equipment listed in Table 8-1 produces noise in the range of 80 to 89 dBA. Offsetting the relatively high noise levels is the fact that the construction will be of short duration, and the high noise levels can be expected only when the construction equipment is within close proximity of the receivers. As indicated in Figure 8-1 of the *Noise and Vibration Results Report*, noise levels are reduced by approximately 6 dBA per doubling of distance.

Maximum noise levels could reach the following levels at the nearest receivers (i.e., within 50 to 100 feet) during each of the major construction phases:

- Demolition, Site Preparation and Utilities Relocation – 82 dBA to 88 dBA
- Structures Construction, Track Installation and Paving – 82 dBA to 88 dBA
- Miscellaneous Activities – less than 80 dBA to 86 dBA

Local noise ordinances and regulations govern noise for project construction. Regulations and ordinances that are applicable to project construction include those from the cities of Lake Oswego, Portland, Tigard and Tualatin. Each of these jurisdictions has periods when most construction activities are exempt. General exemptions for construction during daytime hours by jurisdiction are:

- 7 a.m. to 6 p.m. in Lake Oswego
- 7 a.m. to 6 p.m. in Portland
- 7 a.m. to 8 p.m. in Tigard
- 7 a.m. to 6 p.m. in Tualatin

Any proposed construction outside the hours listed above would require a noise variance from the local jurisdiction. Noise variances typically limit noise levels and construction times depending on the land use in the area and the type of construction.

Construction-related vibration levels depend greatly on the construction equipment and methods in use. Major sources of construction vibration include impact pile drivers, large track-mounted jackhammers used for demolition (hoe-rams) and vibratory rollers used for compacting soils. Construction has the potential to affect vibration-sensitive equipment, produce rumbling, and in rare circumstances, cause damage to buildings. In general, construction-related vibrations are assessed where prolonged annoyance or damage could be expected.

The Council finds that adverse noise and vibration impacts associated with construction are temporary and can be effectively mitigated by restricting most construction work between 7 a.m. and 7 p.m. Any potential nighttime construction noise would be restricted to the levels authorized by applicable regulations or variances issued to the Project. Additionally, the Council finds that the contractor could either prohibit certain noise-generating activities during nighttime hours or provide additional noise-control measures to meet these noise limits. Noise control for nighttime or daytime work could include the following measures, as necessary, to meet required noise limits:

- Install construction site sound walls by noise-sensitive receivers
- During nighttime work, use smart backup alarms that automatically adjust or lower the alarm level or tone based on the background noise level
- Use low-noise emission equipment
- Implement noise-deadening measures for truck loading and operations
- Conduct monitoring and maintenance of equipment to meet noise limits
- Use lined or covered storage bins, conveyors and chutes with sound-deadening material
- Use acoustic enclosures, shields or shrouds for equipment and facilities
- Install high-grade engine exhaust silencers and engine-casing sound insulation
- Prohibit nighttime above-ground jack-hammering and impact pile-driving
- Minimize the use of generators or use whisper-quiet generators to power equipment
- Limit use of public address systems
- Use movable noise barriers at the source of the construction noise

- Implement pile-driving mitigation measures that focus on limiting the time of day the activity can occur

The Council also finds that measures to minimize short-term annoyance from construction vibration include use of alternate methods with less vibration, such as drilled shafts in place of driven piles or the use of static roller compactors rather than vibratory roller compactors. Activities with potential for short-term annoyance could also be restricted to shorter periods and daytime hours, when vibration is less noticeable.

The Council finds that these types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process.

7.4: Criterion 5: Natural Hazard Impacts

“Identify Project improvements in areas subject to natural hazards (including landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain) and demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques that could be imposed during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Short-term (construction) impacts and potential mitigation related to natural hazard areas for the Southwest Corridor Project are identified in Sections 4.8.3 and 4.8.4 of the DEIS.

During construction of the Project, the following potential short-term effects might occur:

- Wind or water erosion of soils within the construction area
- Degradation of shallow groundwater quality from construction activities
- Lowered groundwater levels due to dewatering (changing the direction of groundwater flow), along with potential localized ground settling
- Increased landslide risk due to destabilization of steep slopes or reactivation of historic landslides

These conditions are general throughout the Project area, although there are differences between segments. Increases to landslide risks are more applicable to the Inner Southwest Portland Segment and the Marquam Hill Connection options, particularly in the vicinity of SW Barbur Boulevard between SW Hamilton Street and Fulton Park. These areas are characterized by steeper slopes, which are more prone to erosion and have higher landslide risks. Impacts to shallow groundwater are more likely with the Tigard/Tualatin Segment and the O&M facility.

Project-specific mitigation measures will be considered in subsequent geotechnical evaluations for the Project. The Council finds that in specific cases where impacts on natural

hazard areas are not avoidable in the Project area, these impacts would be mitigated through the use of appropriate engineering controls and practices. These hazards and possible mitigation measures are described below.

- **Erosion.** Potential erosion by wind and water would be mitigated by minimizing areas cleared of vegetation, providing temporary cover or mulch for exposed soil stockpiles, and using erosion control blankets or mulch on exposed slopes.
- **Slope stability.** In areas of steep slopes and historical landslides or rock falls, affected slopes would be evaluated and designed for adequate stabilization using best management practices, including limited slope inclination, retaining structures and reinforcement, and limitations on loads.
- **Settlement.** In areas where increased loads from new embankments and soil stockpiles might cause settlement, areas of soft soils would be identified and avoided. In areas where dewatering might be necessary, the settlement of associated soils would be mitigated by restricting dewatering to localized areas, using sheet piles to restrict flow and reinjecting groundwater. Surcharging soils could also be considered to mitigate settlement.
- **Groundwater quality.** Best management practices for the protection of water quality in areas of shallow groundwater would include containing and controlling waste and hazardous materials on site, and confining maintenance and refueling activities to areas where open excavations would not be impacted.
- **Stormwater Flow.** Best Management Practices (BMPs) for stormwater runoff management will be used during construction to mitigate potential floodplain hazards. BMPs will be designed to comply with guidance outlined in the applicable stormwater design manuals (i.e., *City of Portland Stormwater Management Manual*, *Clean Water Services Design and Construction Standards for Sanitary Sewer and Surface Water Management*). Examples of construction BMPs for stormwater runoff that could be implemented are provided in Section 7.6 of these findings. Construction activities within the 100-year floodplain will be temporary and no long-term alteration of floodplain levels will occur.

The Council finds that these types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process.

7.5: Criterion 6: Natural Resource Impacts

“Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland, and park and recreational areas that are protected in acknowledged local comprehensive plans or functional plans and, where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts that could be imposed as conditions of approval during processes required by NEPA or, if

reasonable and necessary, by local governments during the local development approval and permitting processes.”

Short-term (construction) impacts to natural resources for the Southwest Corridor Project and potential mitigation are identified in Sections 4.9.3 and 4.9.4 of the DEIS and Section 5 of the *Ecosystem Results Report*.

Construction of the Project could result in soil disturbance and compaction and/or soil erosion and tree and other vegetation removal in or adjacent to wetlands and streams. Soil compaction could cause changes in hydrology, and if severe enough, these changes could be permanent. Soil erosion and vegetation removal could cause soils to enter the wetlands and streams, possibly raising turbidity levels and degrading water quality. Any temporary removal of tree and shrub vegetation for construction would also likely result in decreased shading of project area wetlands and potential habitat loss.

Noise, lights and other disturbance from construction could negatively affect breeding, foraging and dispersal of both common and protected terrestrial wildlife that may avoid loud machinery, and migratory birds that may no longer rest or feed near the construction areas. Lights used for night work could disturb nocturnal animals such as owls or bats, or disrupt night-migrating birds. Construction impacts involving the removal of vegetation during the breeding season could destroy nests or eggs and kill birds protected under the federal Migratory Bird Treaty Act.

No appreciable temporary construction effects are anticipated outside of the construction area, primarily because impact minimization measures, pollution control measures, sediment and erosion control, and stormwater management would be implemented. If in-water work in streams that contain fish or other aquatic species occurs, relocation may be necessary, which would result in direct effects to those organisms.

Access to parks and recreation sites near construction activities could be affected by detours and street closures, and by increased congestion caused by construction traffic. Visual impacts, light, glare, dust and noise could also affect users in some of the parks, although most of these impacts would affect small portions of the parks closest to the light rail infrastructure. Visual and noise impacts would be temporary and would not inhibit park use.

The parks and recreation facilities with direct long-term impacts from the Project (Duniway Park, Lair Hill Park, Terwilliger Parkway, George Himes Natural Area Park, Fulton Park and Community Garden, and Sylvania Natural Area Park) could have areas that are temporarily affected to allow construction access, staging, utility relocation or other construction activities. Specific short-term impacts are described below:

- **Duniway Park**’s limited parking spaces would be temporarily impacted and could be unavailable during project construction.
- The construction footprint of the Project in **Lair Hill Park** would directly impact the western end of the tennis backboard court area. Construction would also be directly adjacent to the 1918 building at the southern end of the site.

- Construction to widen SW Barbur Boulevard and replace the Newbury trestle bridge would temporarily close **SW Trail #3** below the Newbury trestle bridge. The planned **Red Electric Regional Trail** bicycle route traversing the south side of the ravine would also be temporarily closed during construction.
- The forested, steeply sloping area of **Terwilliger Parkway** across from SW Campus Drive would be impacted by construction activities to develop any of the Marquam Hill Connection options. Heavy construction equipment vehicles, including cranes, would be required within the parkway to excavate and grade the soil and construct the facility. Areas disturbed by construction would be revegetated as necessary. The recreation facility impacts for all four connection options would temporarily displace between 35 feet (for Option 1A) and 55 feet (for Options 1B, 1C, and 2) of the paved, approximately 6-foot wide sidewalk used as part of the Terwilliger Parkway Trail. Mitigation for this impact could include temporary rerouting of the trail to maintain the trail connection during construction, then replacing the sidewalk with an improved facility with trail amenities, such as benches, or way finding signs.

Portland Parks and Recreation property adjacent to SW Barbur Boulevard and generally considered part of Terwilliger Parkway was acquired with an LWCF grant, and is identified as being one of the parcels needed for a temporary construction access easement. This parcel does not contain any developed recreation resources or public access features. Vegetation removal, including shrubs and trees, might be necessary for construction, and this vegetation could be replaced at the end of construction.

Scenic and open space resources could be affected by construction-related visual impacts. Construction would be staged and would occur over several years. Generally, existing vegetation and obstructing structures would be removed first, likely creating areas that present a barren visual aesthetic. Staging and construction sites could add temporary visual clutter. Short-term impacts would affect a greater area than the finished project, because more land would be required to stage, divert and construct the Project than would be needed for the finished project. The new I-5 and Highway 217 overpasses would have a larger visual impact during construction than during operation, because they would have equipment, scaffolding and partial finishes that would temporarily lack cohesion. Visual impacts could be visible in the foreground and middle ground of protected scenic resources in the Inner and Outer Southwest Portland segments, but would not obscure the primary focal points of the views.

In accordance with state and federal regulations and Executive Order 11990, the Council finds that the Project would avoid and minimize impacts to riparian, wetland, and fish and wildlife resources to the extent practicable during the construction of the Project. During construction, BMPs would be used to avoid impacts to these resources to the extent practicable during the construction of the Project. Standard specifications and special provisions would direct contractors to avoid and minimize impacts. Potential mitigation measures for short-term impacts to riparian, wetland, and fish and wildlife resources would be the same as the mitigation measures for long-term impacts to these resources identified in

Section 6.3.4 of these findings. In addition, standard terms and conditions of approvals from regulatory agencies will be incorporated into the design of the Project. The Project team would work collaboratively with local, state, and federal permitting agencies to seek compensatory mitigation objectives and site selection after a Preferred Alternative is selected.

The Council finds that short-term mitigation measures for park and recreational resources would be closely coordinated with park owners. Mitigation measures could include providing detour routes around construction areas and temporarily modifying access points to maintain access to park resources where possible. Construction duration around park facilities would be minimized to the extent possible, and the park facilities would be restored to the same condition as or better condition than before the Project started.

The Council finds that short-term mitigation measures for visual impacts to scenic and open space resources could include the following:

- Restore landscaping and streetscaping as the Project is being constructed rather than waiting for the final phases of construction.
- Shield light resources used in nighttime construction.
- Create viewing areas with project-related information for pedestrians.
- Design and place construction screens or barriers to limit the visibility of work areas that are adjacent to high-activity areas, particularly where pedestrians, parks, trails or residences are present.
- Use murals or other techniques to create barriers with visual interest in high use areas.
- Minimize construction debris storage on-site.

The Council finds that these types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process.

7.6: Criterion 7: Stormwater Runoff Impacts

“Identify adverse impacts associated with stormwater runoff and demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality that could be imposed as conditions of approval during processes required by NEPA or, if reasonable and necessary, by local governments during the local development approval and permitting processes.”

Short-term (construction) stormwater runoff impacts and potential mitigation for the Southwest Corridor Project are identified in Sections 4.10.3 and 4.10.4 of the DEIS.

Activities associated with construction for the Project that could affect stormwater runoff include the following:

- **Earthwork, footings, trench work, stockpiling and delivery of materials.** Clearing and grubbing (removing trees and vegetation that are within the new cut/fill limits) and regrading, including fill and/or excavation, exposes and destabilizes soil by removing roots that anchor it in place. If exposed soil becomes dry, wind and water can erode it and carry it off-site to stormwater channels or streams, where it can increase turbidity in the water. Construction vehicle tires can track soil onto roadways, from which the soil can be carried into ditches or streams during storms.
- **Concrete work and road paving.** Concrete work is associated with the construction of track structures; stations; retaining walls; and park-and-ride curbs, sidewalks and traffic barriers. The pH in surface water can be increased to levels that are harmful to fish and wildlife if runoff comes in contact with process water or slurry from concrete work or from curing of concrete.
- **Construction machinery and material storage.** Water quality in surface water bodies and groundwater can be impacted by leaks or spills from construction machinery or stored materials. Hydrocarbons, metals and other hazardous materials associated with construction can increase turbidity or affect other water quality parameters, such as pH levels or the amount of available oxygen in the water.
- **Construction activity in or near a water body or sensitive area.** Over-water work and construction in and near stream buffers can pose a direct risk to water quality through pollutant spills, sediment transport or wind deposition of stockpiled materials.
- **Dewatering.** Unrestricted construction subsurface dewatering can impact the water supply to underground aquifers. In addition, uncontrolled surface discharge of dewatering water can increase flows and therefore result in the erosion of surface soils.

The Council finds that construction-related impacts on water resources would be prevented or minimized by complying with all federal, state and local regulations. Through project planning, design and the application of required BMPs, the Project would provide water quality treatment and flow control to prevent impacts to water resources, including mitigating flow changes to combined sewer systems.

Construction-related BMPs would generally be designed to comply with guidance outlined in the applicable stormwater design manuals (i.e., *City of Portland Stormwater Management Manual*, *Clean Water Services Design and Construction Standards for Sanitary Sewer and Surface Water Management*). Examples of construction BMPs that could be implemented include:

- Phasing the work to minimize the amount of disturbed area at any one time
- Developing construction plans for sensitive areas such as wetlands and their buffers
- Marking and fencing of construction limits
- Clearing only a portion of the construction site at any one time to minimize exposed soils

- Stabilizing construction entrances and haul roads
- Washing truck tires at construction entrances
- Constructing silt fences downslope from exposed soil
- Temporary and permanent seeding to stabilize exposed soil
- Protecting catch basins from sediment
- Containing and controlling concrete and hazardous materials on-site
- Installing temporary ditches to route runoff around or through construction sites
- Providing temporary plastic or mulch to cover soil stockpiles and exposed soil
- Using wattles to reduce the length of unbroken slopes and minimize runoff concentration
- Protecting steep slopes with temporary erosion control blankets, mulch covering, tightline conveyances, etc.
- Using temporary sedimentation ponds to remove solids from runoff and dewatering water
- Conducting vehicle fueling and maintenance activities away from waters of the state
- Implementing stream protection measures, as necessary, including diverting stream flow around the construction area and limiting the construction period to the required “work window,” a period of the year when fish would be minimally affected

The Council finds that through compliance with applicable construction regulations and implementation of required BMPs, the Southwest Corridor Project is not expected to adversely affect water resources during construction.

7.7: Criterion 8: Historic and Cultural Resource Impacts

“Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans and, where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.”

Short-term (construction) impacts to historic and cultural resources for the Southwest Corridor Project and potential mitigation are identified in Sections 4.6.4 and 4.6.5 of the DEIS and in the “Affected Environment” section of the Cultural Resources Survey.

Examples of construction impacts include:

- Possible damage through vibrations caused by earthmoving and heavy equipment
- Temporary loss of access to a historic site
- Potential temporary visual impacts during construction
- Increased dust and noise near the construction area

Short-term construction impacts, such as limited community access or temporary visual effects, are not likely to result in adverse effects on historic properties. Construction impacts on historic properties can be anticipated and evaluated before project construction, thus allowing for the development of avoidance and mitigation strategies. Archaeological resources are unlikely to have only short-term impacts, because any disturbance will permanently alter the resource.

The Council finds that short-term mitigation measures for unavoidable impacts to historic and cultural resources could include the following:

- Rehabilitate historic properties affected by construction to their original condition
- Minimize parking and access impacts to businesses in historic buildings with signs to direct traffic and pedestrians to the businesses and services, and provide alternative access and parking during construction
- Develop a monitoring and inadvertent discovery plan to provide procedures for the identification and documentation of archaeological resources encountered during project construction

Noise and vibration impacts to historic resources could also be mitigated through the short-term noise and vibration mitigation measures discussed under Section 7.3 of these findings.

The Council finds that these types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process. Further, the Council finds that archaeological monitors will be supervised by a professional archaeologist during construction. Special federal and state statutes will apply if any Indian burial sites are encountered during construction of the Southwest Corridor Project.

7.8: Criterion 9: Air Quality and Energy Impacts

“Identify general or anticipated impacts on air pollution, greenhouse gas emissions, and energy usage from project improvements that would help meet state, regional and local reduction goals.”

Short-term (construction) air quality and energy impacts and potential mitigation for the Southwest Corridor Project are identified in Sections 4.12.3, 4.12.4, 4.13.3 and 4.13.4 of the DEIS.

Construction of the Project would involve activities that could temporarily affect air quality, such as operating heavy construction equipment, on-road construction activities and potential activities at staging sites. Traffic congestion will occur on some roadways during construction, and potentially along detour or construction haul routes. The primary impacts will be the generation of dust from demolition, site clearing, excavation and grading activities; direct exhaust emissions from construction equipment; and increased congestion on SW Barbur Boulevard and local streets.

The estimated energy consumption during construction of the Project is 5,886,876 million Btu. The level of energy required for project construction is based on preliminary engineering and anticipated construction costs developed by the Project team in October 2017. Using this information, estimated levels of energy consumption are developed. This amount (5,886,876 million Btu) represents less than 8 percent of the total Portland General Electric 2016 power distribution and would be a temporary impact to energy resources for the duration of construction. The one-time energy use required to construct the Southwest Corridor Project would be offset by the Project's long-term, beneficial operational impacts.

During construction, contractors are required to comply with state regulations (Oregon Administrative Rule [OAR] 340-208-0210) requiring that reasonable precautions be taken to avoid dust emissions. The Council finds that mitigation measures normally used include applying water or suppressants during dry weather and taking other measures, such as truck and equipment washing, to prevent the transport of dirt and dust from construction areas onto nearby roads. The Council further finds that strategies to minimize the occurrence and effects of construction-related congestion will be developed throughout the design of the Project, and that the Project must comply with City of Portland and Multnomah County policies that restrict idling of construction vehicles and encourage clean diesel fuels. These strategies will include refining alternatives, further analyzing traffic impacts and developing detailed construction traffic mitigation plans.

The Council finds that construction-related impacts for the Southwest Corridor Project will be temporary, and that any short-term impacts can either be mitigated, or will be offset by the Project's long-term beneficial operational impacts, which are discussed under Section 6.3.7 of these findings. Therefore, the Council finds that construction of the Southwest Corridor Project will help meet state, regional, and local climate and energy goals.

8. Compliance with Alignment-Specific Criteria (10-11)

8.1: Criterion 10: Portland Alignment

Consider a light rail route connecting Portland's Central City with Southwest Portland neighborhoods along or near the Barbur Boulevard corridor.

Criterion 10 directs Metro to consider a light rail route connecting Portland's Central City with Southwest Portland neighborhoods along or near the Barbur Boulevard corridor.

The LUFO boundary maps show that the light rail route begins at the south end of Portland's central city and stays along or near SW Barbur Boulevard for its entire length through southwest Portland to Interstate 5 and the City of Tigard. Moreover, the route provides for seven new light rail stations between downtown Portland and I-5, thereby providing multiple opportunities for persons residing or working in or visiting these neighborhoods to gain access to the light rail system. For these reasons, the Council finds and concludes that the light rail route connects Portland's central city with the neighborhoods in Southwest Portland along or near the Barbur Boulevard corridor.

8.2: Criterion 11: Tigard and Tualatin Alignments

Consider a light rail route in Tualatin within an area identified as a Transit Ready Place, and in Tigard within an area identified in Tigard's High Capacity Transit Land Use Plan that maintains downtown Tigard as the city's primary transit center for rail and bus, and that does not cause light rail related park-and-ride activity to dominate the downtown area.

Criterion 11 directs Metro to consider a light rail route located within Tigard's High Capacity Transit Land Use Plan (referred to in this Section as "Transit Plan") that maintains downtown Tigard as the city's primary transit center for rail and bus and does not cause light rail-related park-and-ride activity to dominate the downtown area. It further directs Metro to consider a light rail route in Tualatin located within an area identified as a Transit Ready Place.

In Tigard, the proposed alignment enters into the Tigard Triangle area, crosses Highway 217 to the downtown area, and then moves south along the railroad tracks towards Bridgeport Village. The LUFO provides for two stations within the triangle area, a SW Hall Boulevard station in the downtown area, and stations at SW Bonita Road and SW Upper Boones Ferry Road/SW Carmen Drive. The proposed SW Hall Boulevard station includes a park-and-ride lot that could provide up to 300 parking spaces in a maximum three-story building. A larger park-and-ride lot, accommodating up to 900 parking spaces, is proposed in the vicinity of SW 68th Parkway, at the eastern edge of Tigard, some distance from the heart of downtown Tigard. Proposed park-and-ride lots at SW Bonita Road and SW Upper Boones Ferry Road/SW Carmen Drive would be smaller, with maximum 100 and 50 surface parking spaces respectively.

The Council finds that Tigard's Transit Plan identifies potential areas within the city that could accommodate high capacity transit, and it finds that these areas include the Tigard Triangle, Downtown Tigard, and the area extending south across SW Boones Ferry Road to Bridgeport Village. The Council finds that the proposed light rail alignment is located within these areas (Transit Plan at 18-19).

The Council also finds that the proposed SW Hall Boulevard station is located within the "Downtown Tigard" area, as shown on the Downtown Tigard Concept Plan (Concept Plan) contained within the Transit Plan (Transit Plan at 20-21). More specifically, it finds that the proposed site is located in an area east of SW Hall Boulevard and south of SW Hunziker Road, which the Concept Plan identifies as "Town Center/Main Street." This is the same designation that the Concept Plan applies to the commercial and governmental areas west of SW Hall Boulevard and south of SW Pacific Highway. The Council further finds that this station location is in close proximity to the downtown WES station and the Tigard Transit Center. It finds that the proposed SW Hall Boulevard station would be located approximately 1000 feet, or two blocks, south of that existing center. And it finds that bus service into and through downtown Tigard would remain with the proposed light rail station, and additional bus facility improvements would be constructed adjacent to the SW Hall Boulevard station to allow for seamless transfer between transit modes.

From all of this, the Council concludes that a light rail route in Tigard was considered and is in fact located within an area identified in Tigard's High Capacity Transit Land Use Plan that maintains Downtown Tigard as the city's primary transit center for rail and bus because it is within the Downtown Tigard Concept Plan and part of the downtown Town Center/Main Street. It concludes that no other part of Tigard would exhibit the frequency of buses, light rail and commuter rail as downtown Tigard.

Also, because the station is located east of SW Hall Boulevard and adjacent to the railroad tracks, and thus is separated from the heart of the existing downtown commercial and governmental center, the Council finds and concludes that the proposed light rail related park-and-ride activity at SW Hall Boulevard will not dominate the downtown area.

In Tualatin, the light rail alignment terminates in the vicinity of Bridgeport Village. The Council finds that this location is within an area identified as a Transit Ready Place.

9. Compliance with Criteria 12 and 13

9.1: Criterion 12: Future Phases

If future phases or extensions are proposed, then consider light rail routes as identified in applicable plans and policies of affected local governments in effect at that time.

The Council finds that TriMet's application addresses only the initial phase of the Southwest Corridor Project. No future phases or extensions are currently under review. Consequently, Criterion 12 is not applicable.

9.2: Criterion 13: Scope of the LUFO and Findings

Identify the major elements of the Project Improvements; however, the Land Use Final Order and findings addressing these criteria need not identify all of the ancillary facilities as defined in House Bill 3202 enacted by the Oregon State Legislature in 2017.

Criterion 13 directs that the LUFO and its findings addressing LCDC's criteria need not identify all the ancillary facilities as defined in House Bill 3202. In LCDC Order 001887, which adopted findings of fact and conclusions of law in support of LCDC's established criteria for the Project, LCDC explained that neither the statewide goals nor local policies are intended to make every local decision a land use decision; many of the items listed in the definition of "ancillary facilities" could be designed and constructed without a land use action by the local government. LCDC further explained that the intent of HB 3202 is to provide a regional process for the land use decision on the overall alignment, not to apply land use decision-making processes to minor elements that would not otherwise require land use approval.

The Council finds that the findings addressing compliance with Criteria 3-9 address ancillary facilities including vehicular, pedestrian and bicycle improvements, to the extent those facilities and their locations are reasonably known. The Council finds that facilities such as retaining walls, signals, electrification equipment, lighting equipment and staging areas won't be fully determined in terms of identity and location until final engineering or environmental review occurs, which happens after the LUFO is adopted. It also finds that these kinds of improvements generally do not require land use approvals but are, instead, considered an integral part of the approval for the light rail route, stations, lots or maintenance facilities.

The Council further finds that while the precise locations of stormwater facilities or any wetland mitigation sites are not identified at this time and necessitate further engineering and environmental review, its findings demonstrate that local stormwater requirements will be satisfied, and they identify wetland impacts and address how those impacts can be mitigated.

Supplemental Findings, Southwest Corridor Project

Response to Public Testimony Received After Draft Findings Made Public on November 8, 2016

Criterion 3 requires the Council to provide for a light rail route, stations, lots, maintenance facilities and associated highway improvements, “balancing” identified adverse economic, social, urban form, safety and traffic impacts of the Project on affected neighborhoods, districts and centers with the positive benefits provided by light rail proximity and service, including the development of an efficient and compact urban form and improved safety.

In addition, Criterion 11 directs Metro to consider a light rail route located within Tigard’s High Capacity Transit Land Use Plan that maintains downtown Tigard as the city’s primary transit center for rail and bus and does not cause light rail-related park-and-ride activity to dominate the downtown area.

In accordance with Criteria 3, these supplemental findings identify additional impacts in Tigard and Tualatin, and describe additional measures that could mitigate adverse impacts or optimize positive impacts. In addition, in accordance with Criteria 11, these supplemental findings identify additional measures that could be taken to minimize the risk that light rail-related park-and-ride activity will dominate the downtown area of Tigard.

Tualatin – Economic Impacts (Criteria 3)

The Council received testimony from the Tualatin Chamber of Commerce urging TriMet not to displace the Village Inn near Bridgeport Village. The Council understands that this is a concern of many people in the area, as this has become a popular meeting place, and finds that displacement of the Village Inn would be an adverse impact of the project. In order to decrease the likelihood of this potential impact, the Council finds that the LUFO Steering Committee expanded the location boundaries of the light rail station area at Bridgeport Village to allow TriMet to determine whether the station can be sited in a manner that preserves the Village Inn. The Council finds that given this adjustment, TriMet will be able to perform detailed design work that could avoid displacement, and would otherwise mitigate displacement as described in the Findings.

Tigard – Economic, Social, Traffic Impacts (Criteria 3) & Measures to Minimize Impact of Light Rail-Related Park-and-Ride Activity (Criteria 11)

On November 13, 2018, Tigard and TriMet signed a Memorandum of Understanding (MOU) identifying city concerns and providing for joint cooperation on matters mostly related to the SW Hall Boulevard Station, including the station’s proximity to bus transit facilities, connections to downtown businesses and governmental services, encouragement of new business opportunities in the station vicinity, and the study of possible non-transit parking use at the station to serve transit oriented development in downtown Tigard.

The Council finds that Tigard seeks to optimize safe and convenient pedestrian access in the station area and connectivity with the nearby WES station and Tigard Transit Center while facilitating connections to nearby residences and businesses. The Council finds that some combination of the following potential mitigation measures could help achieve these goals:

- Site the light rail platform immediately southeast of SW Hall Boulevard
- Coordinate with ODOT to redesign SW Hall Boulevard in the station area between the railroad tracks and SW Hunziker Street to improve safe and convenient multimodal use and crossing.
- Obtain a jurisdictional transfer of SW Hall Boulevard.
- Consider the potential of additional parking spaces funded outside the project for non-transit parking in the park-and-ride structure that would support transit-oriented development near the station.
- Site and design the operations and maintenance facility in a manner that supports the redevelopment potential of the downtown station area and visually complements adjacent development.
- Establish an Employment Transit Oriented Development District in the Hunziker Industrial Core area to support an overall employment density increase in that area.

The Council finds that the opportunity for non-transit parking in the park-and-ride structure to support transit-oriented development near the station would also have the potential to minimize impacts of park-and-ride activity on the downtown area.

Additionally, the Council finds that to support connectivity goals, the city could establish a multimodal Ash Avenue crossing across the existing freight tracks in coordination with ODOT Rail and the railroad ownerships. To establish an active transportation connection between the Tigard Downtown and the Tigard Triangle, a multi-use bicycle and pedestrian path could be designed and constructed.

The Council finds that some combination of potential mitigation measures, including those identified in the MOU, can be taken to support businesses and residences in proximity to the Project, and these steps would help to minimize and mitigate the impacts to industrial lands identified in Section 6.4.3.2 of the Findings, especially in the Hunziker industrial area, which the Council acknowledges are significant. To capitalize on real estate value created by the Project, TriMet and Tigard could work together on a Joint Development Project Proposal focusing on employment and residential opportunities that enhance ridership. And as noted elsewhere in the findings, the Southwest Corridor Equitable Development Strategy and Portland/Tigard SW Corridor Equitable Housing Strategy can serve as important tools to help corridor neighborhoods experience equitable outcomes as a result of the Project so that adverse impacts do not disproportionately affect vulnerable populations.