MovingAhead

STREETS AND PLACES REIMAGINED

# DRAFT FINAL Street and Landscape Trees Technical Report

Lane Transit District
City of Eugene

In cooperation with
Lane Council of Governments
Lane County
Oregon Department of Transportation

**July 7, 2017**

# DRAFT FINAL Street and Landscape Trees Technical Report

*MovingAhead Project*

Prepared in accordance with the
National Environmental Policy Act of 1969, as amended 42 U.S.C. 4322
and the
Federal Transit Act of 1964, as amended 49 U.S.C. 1601 et seq.

***July 7, 2017***

*Prepared for*
Federal Transit Administration
Lane Transit District
City of Eugene

Prepared by
CH2M HILL, Inc.

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# Acronyms, Abbreviations, and Terms

| Acronyms and Abbreviations | Definitions |
|---|---|
| AA | Alternatives Analysis |
| ADA | Americans with Disabilities Act |
| API | area of potential impact |
| BAT | Business Access and Transit |
| BMP | best management practice |
| BRT | bus rapid transit |
| CIP | Capital Improvements Program |
| City | City of Eugene, Oregon |
| Draft Eugene 2035 TSP | *DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016) |
| EmX | Emerald Express, Lane Transit District's Bus Rapid Transit System |
| FTA | Federal Transit Administration |
| FTN | Frequent Transit Network |
| GIS | Geographic Information Systems |
| I-5 | Interstate 5 |
| ISA | International Society of Arboriculture |
| LCC | Lane Community College |
| LCOG | Lane Council of Governments |
| LTD | Lane Transit District |
| MPO | Metropolitan Planning Organization |
| NA | not applicable |
| NEPA | National Environmental Policy Act, 42 U.S.C. 4321-4347 |
| NHPA | National Historic Preservation Act |
| OR | Oregon |
| ROW | right of way |
| RTP | *Central Lane Metropolitan Planning Organization Regional Transportation Plan* (LCOG, adopted 2007, November; 2011 December). (The RTP includes the Financially Constrained Roadway Projects List.) |
| TSP | Transportation System Plan |
| U.S.C. | *United States Code* |
| WEEE | West Eugene EmX Extension |

| Terms | Definitions |
|---|---|
| Charter Tree | A tree defined by the *Eugene Charter* (City of Eugene, 2002, updated 2008) as "… (a living, standing, woody plant having a trunk 25 inches in circumference at a point 4-½ feet above mean ground level at the base of the trunk) of at least fifty years of age within publicly owned rights of way for streets, roads, freeways, throughways, and thoroughfares and within those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915, shall be designated historic street trees and recognized as objects of high historic value and significance in the history of the city and deserving of maintenance and protection." These trees have special historic importance to the City and require special processes be followed if their removal is proposed, including a public vote on the project proposing the removal. |
| Charter Tree Boundary | Defined by the *Eugene Charter* (City of Eugene, 2002, updated 2008) as "…those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915." Trees within this boundary may, if they meet certain criteria, be granted the special title and protective status of a Charter Tree, defined above. |
| Heritage Tree | The *City of Eugene Urban Forest Management Plan* (City of Eugene Public Works Department Maintenance Division, 1992, December) defines "Heritage Trees" as: "Any tree of exceptional value to our community based on its size (relative to species), history, location, or species, or any combination of these criteria." Such a tree cannot be removed "except when otherwise necessary for the public health, safety, or welfare." |
| Landscape Tree | A living, standing, woody plant having a trunk that exists on private property. |
| Street Tree | A living, standing, woody plant having a trunk that exists in the public right-of-way. |

## Street and Landscape Trees Summary

This Street and Landscape Trees Technical Report presents results for the street and landscape trees assessment for the Lane Transit District (LTD) and City of Eugene's MovingAhead Project in Eugene, Oregon. The purpose of the MovingAhead Project is to determine which high-capacity transit corridors identified in the adopted Emerald Express (EmX) System Plan, *Lane Transit District Long-Range Transit Plan* (LTD, 2014) and the Frequent Transit Network (FTN) are ready to advance to capital improvements programming in the near term. LTD and the City of Eugene (City) initiated the MovingAhead Project in 2014 to identify and examine alternatives for improving multimodal safety, mobility, and accessibility in key transit corridors in the City. A main theme of the City's vision is to concentrate new growth along and near the City's key transit corridors and core commercial areas while protecting neighborhoods and increasing access to services for everyone. LTD and the City are jointly conducting the project to facilitate a more streamlined and cost-efficient process through concurrent planning, environmental review, and design and construction of multiple corridors.

LTD and the City of Eugene examined multimodal transit alternatives in five key transit corridors identified in the *Draft Envision Eugene Comprehensive Plan* (Envision Eugene, 2016, July) and the *DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016; Draft Eugene 2035 TSP), the region's highest growth centers, and downtown Eugene:

- Highway 99 Corridor
- River Road Corridor
- 30th Avenue to Lane Community College (LCC) Corridor
- Coburg Road Corridor
- Martin Luther King, Jr. Boulevard Corridor

No-Build, Enhanced Corridor, and EmX Alternatives were developed for each corridor, except the Martin Luther King, Jr. Boulevard Corridor, for which only No-Build and Enhanced Corridor Alternatives were developed. Each proposed corridor location is shown on Figures S.1-1 and S.1-2 for the Enhanced Corridor Alternatives and the EmX Alternatives, respectively. The *MovingAhead Level 2 Definition of Alternatives* (CH2M HILL, Inc. [CH2M] et al., 2016) contains a detailed description of the project alternatives. The following is a summary of the project alternatives evaluated.

- The **No-Build Alternatives** serve as a reference point to gauge the benefits, costs, and effects of the Enhanced Corridor and EmX Alternatives in each corridor. Each No-Build Alternative is based on the projected conditions in 2035. Capital projects are derived from the financially constrained project lists in the Draft Eugene 2035 TSP, the *Lane County Transportation System Plan* (Lane County Public Works, Engineering Division Transportation Planning, 2004, update in progress), the *Lane Transit District Capital Improvement Plan* (LTD, 2015), and the *Lane Transit District Long-Range Transit Plan* (LTD, 2014).
- **Enhanced Corridor Alternatives** are intended to address the project's Purpose, Need, Goals, and Objectives without major transit capital investments, instead focusing on lower-cost capital improvements, operational improvements, and transit service refinements, including 15-minute service frequency. Features can include transit queue jumps (lanes for buses that allow the bus to "jump" ahead of other traffic at intersections using a separate signal phase), stop consolidation, and enhanced shelters. These features can improve reliability, reduce transit travel time, and increase passenger comfort, making transit service along the corridor more attractive.

**Figure S.1-1. Enhanced Corridor Alternative Overview**

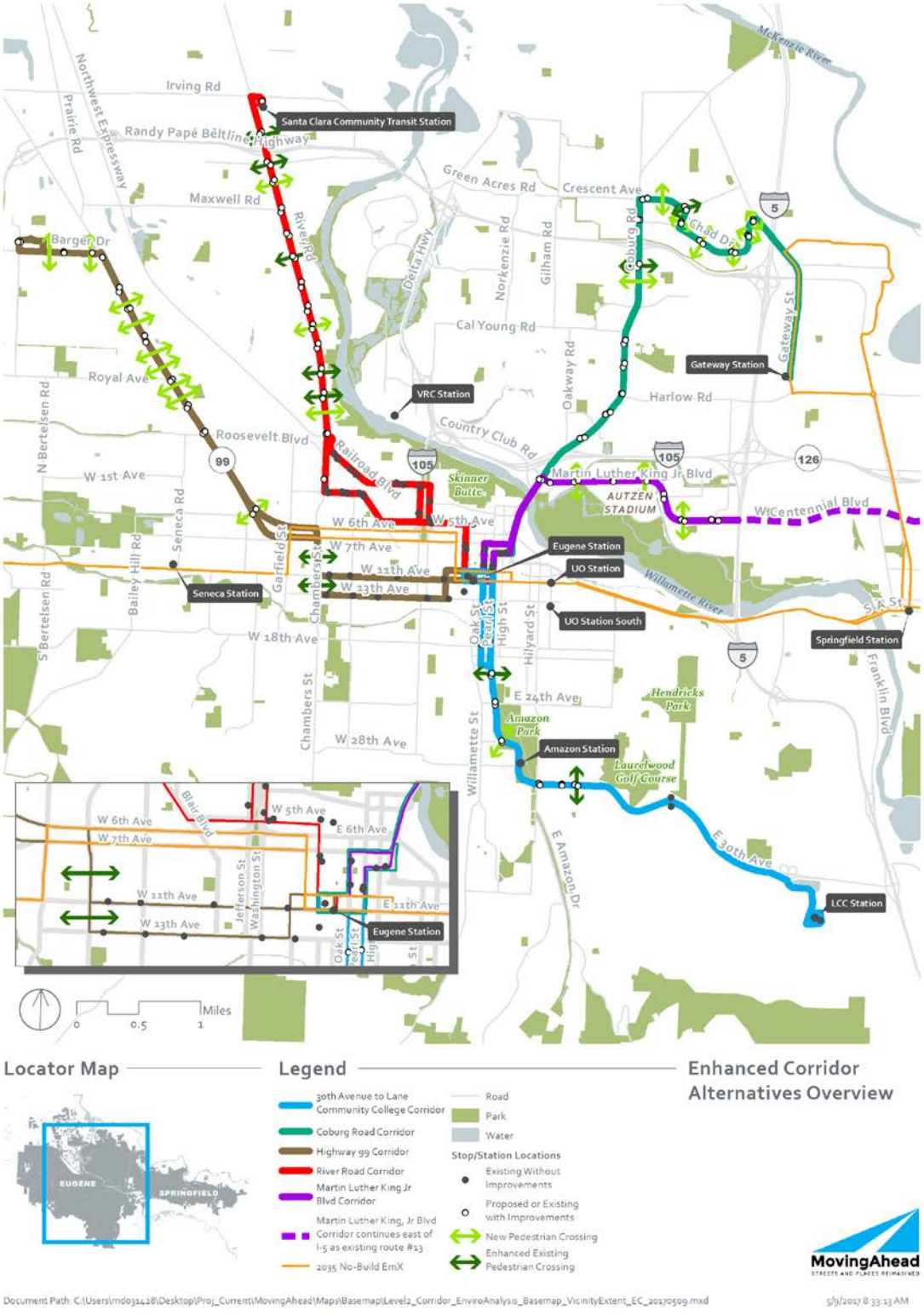
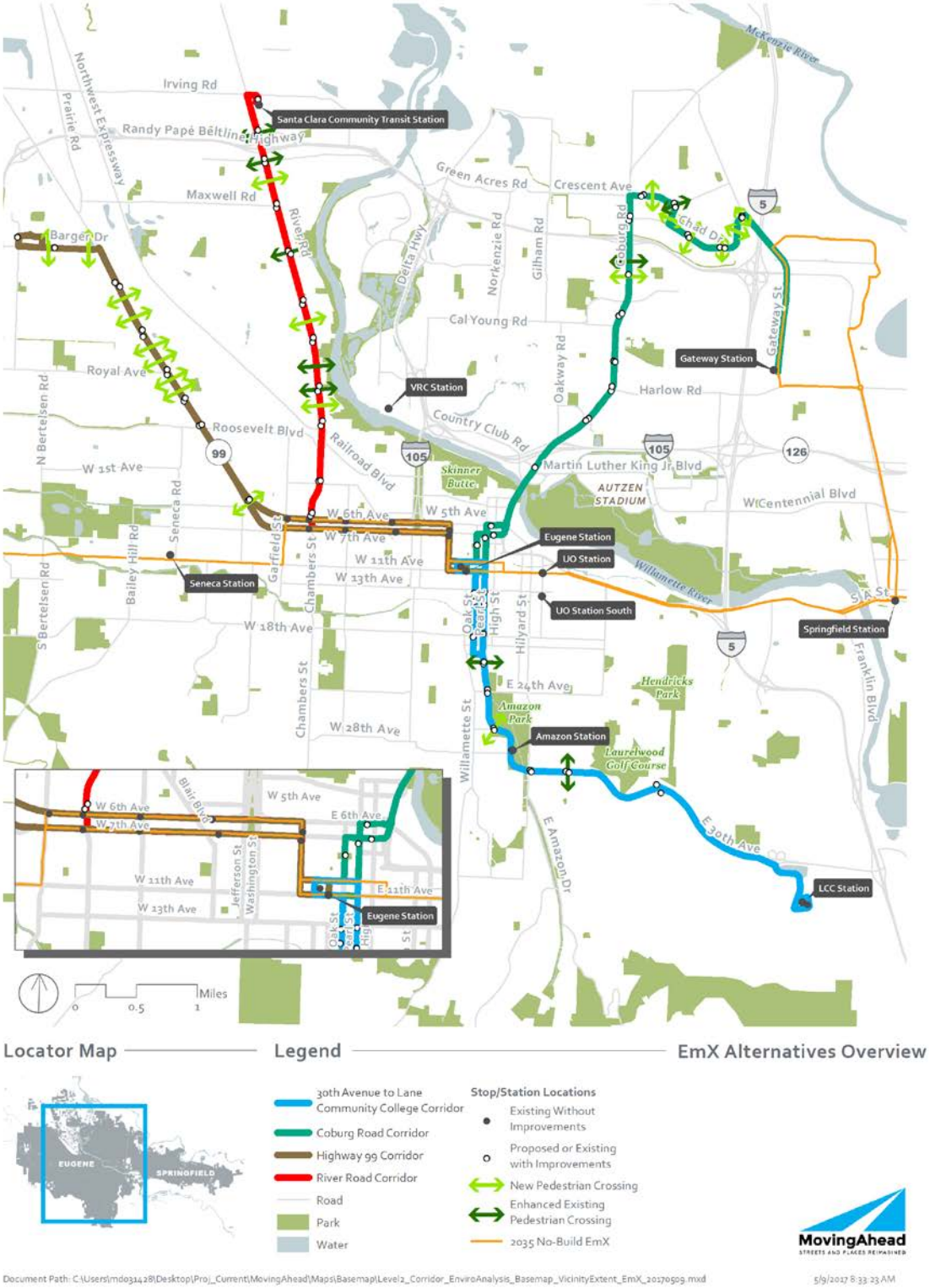


**Figure S.1-2. EmX Alternative Overview**



- **EmX Alternatives** are characterized by sections of exclusive guideway, branded multi-door 60-foot-long bus rapid transit (BRT) vehicles, and enhanced stations with level boarding platforms instead of bus stops; off-board fare collection; transit signal priority; wider stop spacing; and 10-minute service frequencies. In general, EmX is a transit mode positioned between fixed-route bus service operating in mixed traffic and urban-rail service operating in a separate right of way. EmX service is intended to improve transit speed, reliability, and ridership.

Figure S.1-1 shows the proposed corridors for the Enhanced Corridor Alternatives and Figure S.1-2 shows the proposed corridors for the EmX Alternatives.

This report, prepared to support the MovingAhead Project Alternatives Analysis (AA), addresses information on the methods used for the analysis and identifies the potential significant adverse and beneficial effects of each project alternative on street trees (trees present in the public ROW) and landscape trees (trees on adjacent property outside the public right of way) that the project's alternatives might cause. The analysis also includes a review of project alternatives for consistency with applicable City statutes.

This report was prepared in compliance with the National Environmental Policy Act (NEPA) and applicable state environmental policy legislation, as well as local and state planning and land use policies and design standards.

This report places potential impacts to existing trees in two categories, as described below.

- **Long-term Impacts.** Civil construction might require removal of existing trees along a corridor (which is defined as a long-term impact on street or landscape trees). Proposed construction impacts to a tree's root system, trunk, or canopy could result in the tree's failure or decline in long-term health and vigor.
- **Short-term Impacts.** Damage to tree limbs and root systems might occur during construction activity adjacent to trees.

Potential impacts are further classified by the probability that a given build alternative would impact medium and large street and landscape trees. The probability classifications are defined below.

- **No Impact:** No construction activities occur in an area or no trees are present adjacent to proposed construction activities. This includes those parts of a given build alternative's bus routing not within the alternative's construction footprint.
- **Low:** Construction adjacent to or removing new, small, or visibly unhealthy small trees. Construction activities next to medium or large trees that do not require excavation or widening (e.g., restriping and overlay of an existing roadway) and, therefore, only pose short-term construction-related potential impacts to trees.
- **Moderate:** Construction adjacent to the root zone of medium or large trees, such as roadway widening, excavation, or stop or station construction. While the trees are not directly removed, construction activities could impact these trees.
- **High:** Construction may directly impact or remove a medium or large tree, including full-depth excavation in the root zone of trees.

Eugene's City code classify street and landscape trees, which are subject to certain protections, depending on their classification. Of particular note are trees the City's statutes and charter specially protect, classified as Heritage Trees (trees of exceptional community value protected through City code [*Eugene Code*, Chapter 9, "Land Use; Tree Preservation and Removal Standards."]) and Charter Trees (trees protected through the City's Historic Tree Charter [City of Eugene, 2002, updated 2008]).

Beyond regulatory frameworks, corridors subject to tree impacts might experience impacts to ecosystems and to visual and aesthetic resources. This technical report considers potential tree impacts and possible mitigation measures to help decision makers select the preferred alternative in each MovingAhead corridor.

## S.1. Affected Environment

The MovingAhead Project's five corridors are primarily located within the City of Eugene, with a portion of the River Road and 30th Avenue to LCC Corridors located within unincorporated Lane County, and a portion of the Coburg Road Corridor located in the City of Springfield.

The MovingAhead Project encompasses five corridors in the City of Eugene. The area of potential impact) encompasses street and landscape trees within the construction footprint of the build alternatives within each corridor. Street trees are defined as those within the existing public road ROW. Landscape trees are defined as those located on adjacent private property outside the existing public ROW.

The trees that are considered of greater significance are those eligible for Charter Tree status or those that have been designated as Heritage Trees. Such trees are provided protections through City policy and regulations. Heritage Trees are trees of exceptional community value as defined in the *City of Eugene Urban Forest Management Plan* (City of Eugene Public Works Department Maintenance Division, 1992). City code prohibits the removal of designated Heritage Trees unless the City Manager directly issues a permit and only if removal of the tree is for the health, safety, or benefit of the public. The *Eugene Charter* (City of Eugene, 2002, updated 2008) protects Charter Trees. A proposed removal of trees with this status requires a public vote. The Charter Tree boundary's limits with respect to the corridor build alternatives are defined in Figures S.1-3 and S.1-4.

## S.2. Environmental Consequences

The following subsections summarize potential environmental consequences to street and landscape trees as a result of the project alternatives. Sections 4 through 8 provide more detailed narratives, figures, and tables describing street and landscape tree impacts by corridors (Highway 99, River Road, 30th Avenue to LCC, Coburg Road, and Martin Luther King, Jr. Boulevard) and by alternatives (No-Build, Enhanced Corridor, and EmX). Table S.2-1 quantifies the narrated differences in impacts among alternatives.

### S.2.1. Highway 99 Corridor

#### S.2.1.1. No-Build Alternative Impacts

No impacts would be expected to street or landscape trees under the No-Build Alternative for the Highway 99 Corridor.

#### S.2.1.2. Impacts Common to All Build Alternatives

The Enhanced Corridor Alternative and the EmX Alternative present a similar potential for short-term and long-term impacts to street and landscape trees, including some large street trees in the Highway 99 Corridor. This is because the construction proposed adjacent to trees in both corridors would be similar.

**Figure S.1-3. Enhanced Corridor Alternative Overview with Charter Tree Boundary**

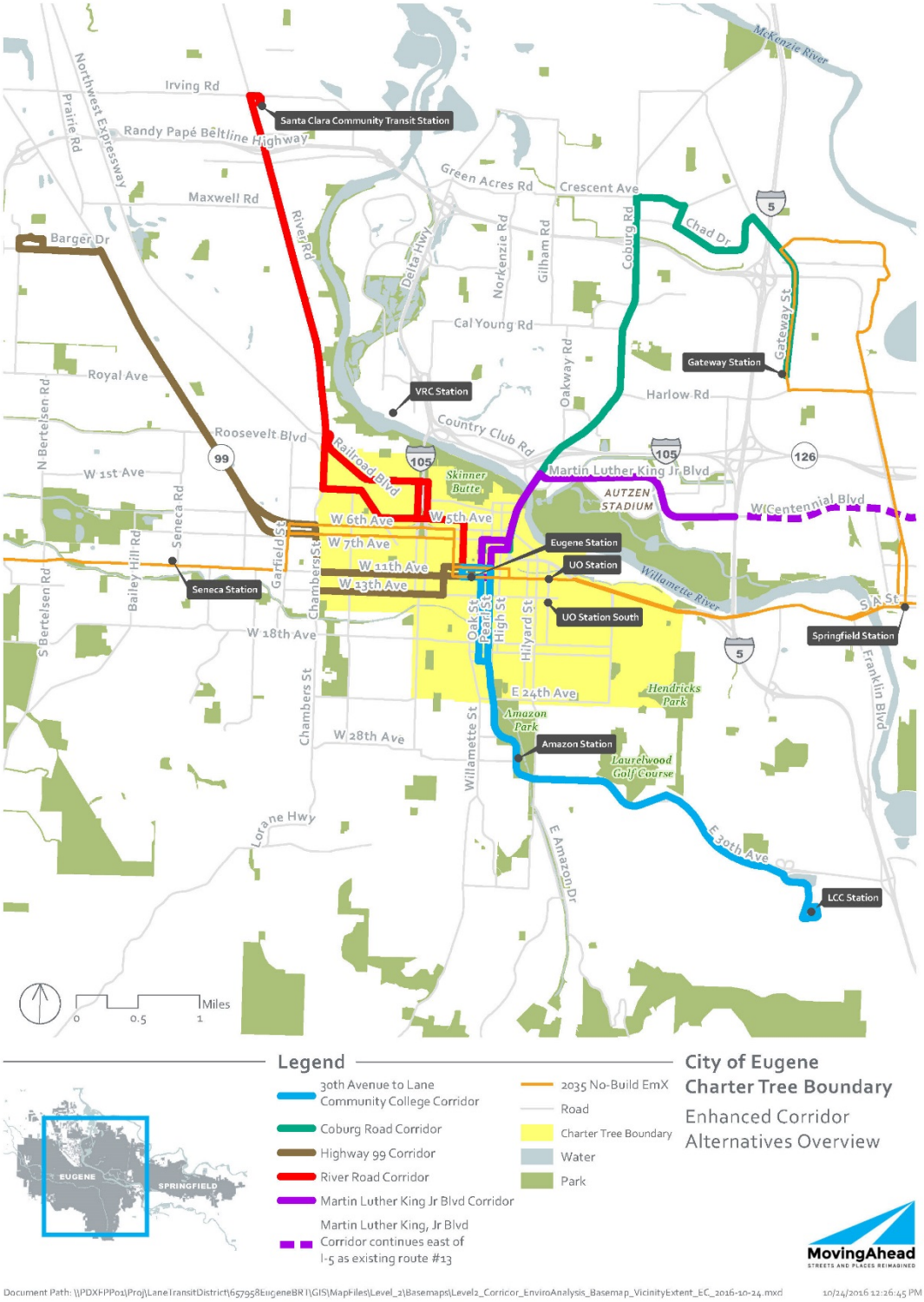


**Figure S.1-4. EmX Alternative Overview with Charter Tree Boundary**

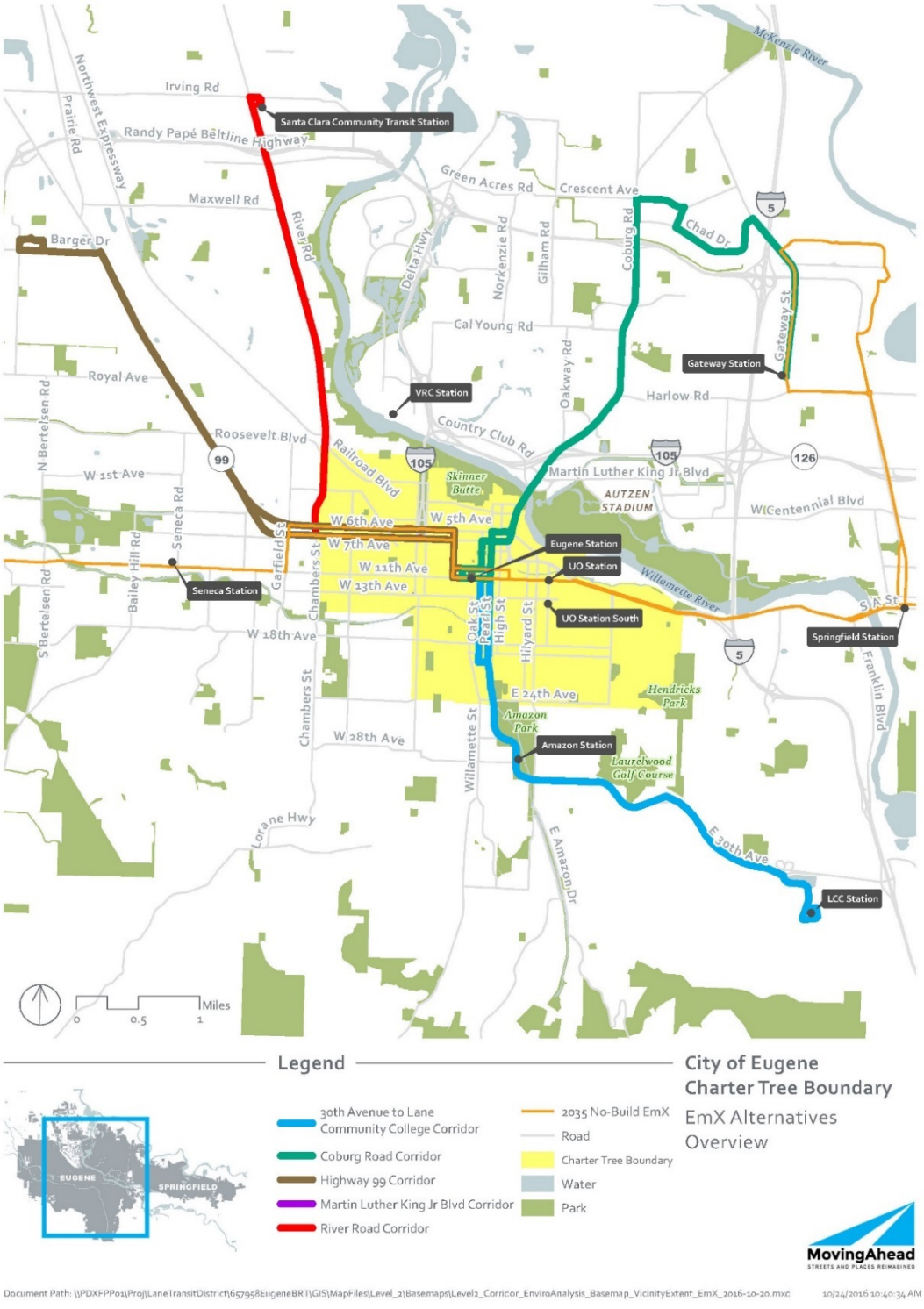


**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| **Highway 99 Corridor** | | | |
| Long-Term Direct Impacts / Benefits | • None | • Three percent of corridor length would have high probability of potential impact to medium and large trees.<br>• In high probability of potential impact areas, up to 14 medium and large street trees may be removed. No landscape trees would be affected. | • Three percent of corridor length would have high probability of potential impact to medium and large trees.<br>• In high impact potential areas, up to 40 medium and large trees may be removed, including 7 to 9 landscape trees. |
| Indirect and Cumulative Effects | • None | • No significant indirect or cumulative effects. | • No significant indirect or cumulative effects. |
| Temporary / Short-Term Construction-Related Impacts / Benefits | • None | • Existing median street trees at Highway 99 at Roosevelt Boulevard might have short-term impacts because of intersection widening and modifications. The existing median and its associated street trees on the north side of the intersection would be preserved, but excavation would take place adjacent to them. Excavation and heavy construction activities could potentially damage trees. | • Existing median street trees at Highway 99 at Roosevelt Boulevard might have short-term impacts because of intersection widening and modifications. The existing median and its associated street trees on the north side of the intersection would be preserved, but excavation would take place adjacent to them. Excavation and heavy construction activities could potentially damage trees.<br>• Existing landscape trees on the north side of Barger Road might have short-term impacts where sidewalk construction would be adjacent to mature landscape trees on private property. Excavation and construction equipment might damage these trees or require that they be limbed. |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Potential Mitigation Measures | • None | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Develop a Tree Protection Plan before construction.<br>• Classify large trees at Roosevelt Boulevard and on Barger Drive. Adjust design to avoid impacts to these large trees depending on classification during design refinement. | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify large trees at Roosevelt Boulevard and on Barger Drive. Adjust design to avoid impacts to these large trees depending on classification during design refinement. |
| Unavoidable Adverse Effects | • None | • None | • None |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| **River Road Corridor** | | | |
| Long-Term Direct Impacts / Benefits | • Trees from Railroad Boulevard to Corliss Lane (approx. 2 miles of corridor) which are not on the City-approved species list and are reaching their maximum life. They might need to be replaced with young, approved-species trees. (Eugene Urban Forestry Staff, 2015 | • One percent of corridor length within the Charter Tree boundary would have high probability of potential impact to medium and large trees. No medium and large street or landscape trees are expected to be removed within this boundary.<br>• Nine percent of corridor outside of the Charter Tree boundary would have high impact potential long-term direct impact to medium and large trees.<br>• In high impact potential areas outside of the Charter Tree boundary, up to 13 medium and large street trees may be removed. No landscape trees would be affected.<br>• Potential impacts would include root zone impacts to trees that are not on the approved species list, in poor health, over mature, and require extensive maintenance. There would be a long-term benefit to replanting these trees with young, approved species. (Eugene Urban Forestry Staff, 2015) | • Two percent of corridor within the Charter Tree boundary would have high probability of potential impact to medium and large trees<br>• In high impact potential areas within the Charter Tree boundary, up to 14 medium and large street trees may be removed. No landscape trees would be affected.<br>• Eleven percent of corridor outside of the Charter Tree boundary would have high impact potential to medium and large trees.<br>• In high impact potential areas outside of the Charter Tree boundary, up to 118 medium and large street trees may be removed. No landscape trees would be affected.<br>• Potential impacts would include root zone impacts to trees that are not on the approved species list, in poor health, over mature, and require extensive maintenance. There would be a long-term benefit to replanting these trees with young, approved species. (Eugene Urban Forestry Staff, 2015) |
| Indirect and Cumulative Effects | • None | • No significant indirect or cumulative effects. | • Identify other locations to perform mitigation planting to offset the loss of trees in the area of the multi-use path proposed on River Road between Silver Lane and Division Avenue, which would preclude the replacement of displaced street and landscape trees along this stretch, resulting in a permanent loss of street and landscape trees in this area for a length of approximately 900 feet. |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Temporary / Short-Term Construction-Related Impacts / Benefits | • None | • Excavation and heavy construction activities could potentially damage trees. | • Potential root zone impacts to existing street and landscape trees because of excavation for BAT lane construction between Railroad Boulevard and Owosso Drive.<br>• Excavation and heavy construction activities could potentially damage trees. |
| Potential Mitigation Measures | • None | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact. | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact.<br>• Identify locations to provide mitigation planting for the 900 feet of lost landscaping area between Silver Lane and Division Avenue because of construction of multi-use path. |
| Unavoidable Adverse Effects | • None | • None | • None |
| **30th Avenue to Lane Community College Corridor** | | | |
| Long-Term Direct Impacts / Benefits | • None | • Eleven percent of corridor within the Charter Tree boundary would have high probability of potential impact to medium and large trees.<br>• In high probability of potential impact areas within the Charter Tree boundary, up to 54 medium and large street trees may be removed. No landscape trees would be affected. | • Seventeen percent of corridor within the Charter Tree boundary would have high probability of potential impact to medium and large trees<br>• In high probability of potential impact areas within the Charter Tree boundary, up to 98 medium and large street trees may be removed. No landscape trees would be affected.<br>• Less than one percent of corridor outside of the Charter Tree boundary would have high probability of potential impact to medium and large trees |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| | | • Less than one percent of corridor outside of the Charter Tree boundary would have high probability of potential impact to medium and large trees.<br>• In high probability of potential impact areas outside of the Charter Tree boundary, up to four medium and large landscape trees may be removed. No landscape trees would be affected. | • In high probability of potential impact areas outside of the Charter Tree boundary, up to 4 medium and large landscape trees may be removed. No landscape trees would be affected. |
| Indirect and Cumulative Effects | • None | • No significant indirect or cumulative effects.<br>• Coordinate downtown impacts with other potential projects in the area and with City Urban Forestry staff. | • No significant indirect or cumulative effects.<br>• In accordance with City statute and best practices, replace removed trees with in-kind trees.<br>• Coordinate downtown impacts with other potential projects in the area and with City Urban Forestry staff. |
| Temporary / Short-Term Construction-Related Impacts / Benefits | • None | • Excavation and heavy construction activities could potentially damage trees. | • Excavation and heavy construction activities could potentially damage trees. |
| Potential Mitigation Measures | • None | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact. | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact. |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Unavoidable Adverse Effects | • None | • None | • None |
| **Coburg Road Corridor** | | | |
| Long-Term Direct Impacts / Benefits | • None | • No construction activities are proposed within the Charter Tree boundary; therefore, 0 percent of corridor would have high probability of potential impact to medium and large trees.<br>• Two percent of corridor outside of the Charter Tree boundary would have high probability of potential impact to medium and large trees.<br>• In high probability of potential impact areas outside of the Charter Tree boundary, up to nine medium and large trees may be removed, including up to six landscape trees. | • 29% of corridor within the Charter Tree boundary would have high probability of potential impact to medium and large trees<br>• In high impact potential areas within the Charter Tree boundary, up to 98 to 100 medium and large street trees within would be potentially removed. No landscape trees would be affected.<br>• Two percent of corridor outside of the Charter Tree boundary would have high probability of potential impact to medium and large trees<br>• In high probability of potential impact areas outside of the Charter Tree boundary, up to 49 medium and large trees would be potentially removed, including up to 11 landscape trees. |
| Indirect and Cumulative Effects | • None | • No significant indirect or cumulative effects.<br>• In accordance with City of Eugene statute and best practices, replace removed trees with in-kind trees. | • No significant indirect or cumulative effects.<br>• In accordance with City statute and best practices, replace removed trees with in-kind trees.<br>• Coordinate downtown impacts with other potential projects in the area and with City Urban Forestry staff. |
| Temporary / Short-Term Construction-Related Impacts / Benefits | • None | • Excavation and heavy construction activities could potentially damage trees. | • Large median street trees between the Ferry Street Bridge and Oakmont Way may potentially be impacted by construction adjacent to these trees to construct exclusive bus lanes. Excavation and heavy construction activities could potentially damage trees. |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Potential Mitigation Measures | • None | • Replant impacted street trees in new sidewalk landscaping strips.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact. | • Replant impacted street trees in new sidewalk landscaping strips and in medians, if necessary.<br>• Replant impacted landscape trees through coordination with individual property owners.<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact. |
| Unavoidable Adverse Effects | • None | • None | • None |
| **Martin Luther King, Jr. Boulevard Corridor** | | | |
| Long-Term Direct Impacts / Benefits | • None | • Less than one percent of corridor would high probability of potential impact to medium and large trees.<br>• In high probability of potential impact areas, up to nine medium and large street trees would be removed. No landscape trees would be affected. | Not applicable |
| Indirect and Cumulative Effects | • None | • No significant indirect or cumulative effects. | |
| Temporary / Short-Term Construction-Related Impacts / Benefits | • None | • Excavation and heavy construction activities could potentially damage trees. | |

**Table S.2-1. Summary of Street and Landscape Trees Environmental Consequences by Corridor and Alternative**

| Alternatives | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Potential Mitigation Measures | • None | • Replant impacted street trees in new sidewalk landscaping strips<br>• Develop a Tree Protection Plan before construction.<br>• Classify any large trees potentially impacted. If a Charter Tree or Heritage Tree potentially would be impacted, the design would be refined to avoid this impact. | |
| Unavoidable Adverse Effects | • None | • None | |

Widening of the intersection at Roosevelt Boulevard to accommodate traffic improvements in the Enhanced Corridor Alternative and semi-exclusive lanes in the EmX Alternative present similar potential for long-term tree impacts. Construction of an on-street terminus facility at Cubit Road and Barger Drive would result in potential long-term impacts on street and landscape trees in both alternatives.

#### S.2.1.3. Enhanced Corridor Alternative Impacts

Potential short-term impacts to street and landscape trees under the Highway 99 Corridor Enhanced Corridor Alternative would be limited to station locations, the terminus location at Barger Street and Cubit Avenue, and Roosevelt Boulevard.

Quantification of possible impacts to large street and landscape trees for this alternative are summarized in Table S.2-1.

#### S.2.1.4. EmX Alternative Impacts

A proposed sidewalk on the north side of Barger Drive would be constructed where a gap in the sidewalk presently exists. This construction would result in potential long-term and short-term impacts to landscape trees under the Highway 99 Corridor EmX Alternative.

Potential short-term impacts to street and landscape trees under the EmX Alternative would include the entirety of the corridor because of potential trenching of continuous communications fiber and Barger Drive from Highway 99 to Cubit Road because of construction of sidewalk on the north side of the street.

Quantification of possible impacts to large street and landscape trees for the Highway 99 Corridor EmX Alternative are summarized in Table S.2-1.

### S.2.2. River Road Corridor

#### S.2.2.1. No-Build Alternative Impacts

No impacts would be expected to street or landscape trees under the No-Build Alternative for the River Road Corridor. City Urban Forestry staff members have identified some street trees along this corridor from Railroad Boulevard to Silver Lane as trees not on the approved species list that are approaching their maximum life, are in poor health, and require extensive maintenance. Pursuing the No-Build Alternative would leave these trees in place and would replace them later using other means.

#### S.2.2.2. Impacts Common to All Build Alternatives

Both the Enhanced Corridor Alternative and the EmX Alternative have potential long-term and short-term impacts on street and landscape trees in the River Road Corridor. Both alternatives primarily have long-term impacts on street and landscape trees because of station and bus stop construction. Construction of improvements necessitating widening of River Road near the Randy Papé Beltline interchange could also pose potential long-term impacts, though the level of potential impact differs at this location (as discussed below for the Enhanced Corridor and EmX Alternatives).

City Urban Forestry staff members have identified some street trees along this corridor from Railroad Boulevard to Silver Lane as trees not on the approved species list that are approaching their maximum life, are in poor health, and are difficult to maintain. Pursuing a build alternative would allow for replacing impacted trees in this area with approved, young, healthy street trees.

### S.2.2.3. Enhanced Corridor Alternative Impacts

Potential long-term impacts on street and landscape trees within the River Road Corridor Enhanced Corridor Alternative's historic Charter Tree boundary might exist because of bus stop construction on Chambers Street near W. 1st Avenue.

The most potential long-term impacts to street and landscape trees would occur near the Randy Papé Beltline interchange, in addition to potential impacts that could occur due to bus stop construction. The scope of the improvements at this location would be more limited than it would be in the EmX Alternative.

The Enhanced Corridor Alternative improvements would be limited along most of the corridor to bus stop construction. Therefore, short-term impacts generally would be limited to these areas and would be less continuous than it would be for the EmX Alternative.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

### S.2.2.4. EmX Alternative Impacts

Large trees within the Charter Tree boundary would be subject to potential long-term impact because of station construction at the northwest edge of the Charter Tree boundary.

The River Road Corridor EmX Alternative proposes a greater level of investment in civil improvements at the Randy Papé Beltline interchange and therefore would include a larger area of potential long-term impacts than the Enhanced Corridor Alternative. In particular, construction of multi-use paths in the interchange area where ROW would be constrained might prohibit the replanting of impacted street and landscape trees as a mitigation measure in this area unless more ROW was acquired to create a set-back landscaping strip for the path.

The EmX Alternative would have a larger proportion of potential short-term impacts on street and landscape trees because of the extensive reconstruction of the roadway required for full-depth concrete Business Access and Transit (BAT) lanes to replace existing general purpose lanes, as well as trenching for communications fiber.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

## S.2.3. 30th Avenue to Lane Community College Corridor

### S.2.3.1. No-Build Alternative Impacts

No impacts are expected to street or landscape trees under the 30th Avenue to LCC Corridor No-Build Alternative.

### S.2.3.2. Impacts Common to All Build Alternatives

The 30th Avenue to LCC Corridor carries the most potential short-term and long-term impacts to large trees within the Charter Tree boundary because of the location of most of its improvements within the Charter Tree boundary identified in the *Eugene Charter* (Figures S.1-3 and S.1-4).

Potential long-term impacts to large trees for both build alternatives primarily would be because of station or bus stop construction within the Charter Tree boundary. Other than minor curb reconstruction and parking pullout construction on Oak and Pearl Streets, there would be little proposed construction outside of the existing curb in downtown Eugene in either alternative. Extension of

W. 20th Avenue to connect to Amazon Parkway impacts few potential street and landscape trees and introduces new landscaping areas for mitigation in both alternatives.

Outside of downtown Eugene, both build alternatives have similar footprints and, therefore, similar potential impacts to street and landscape trees. Both alternatives would have potential short-term impacts to two mature trees at the intersection of W. 27th Avenue and Amazon Parkway, because of sidewalk construction.

#### S.2.3.3. Enhanced Corridor Alternative Impacts

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative assumes mixed traffic operations on Oak and Pearl Streets with restriping of the existing pavement for buffered bike lanes, which does not require the EmX Alternative's more invasive excavation to implement. This would result in much less potential short-term impacts to street and landscape trees along these streets.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

#### S.2.3.4. EmX Alternative Impacts

The scope of construction under the 30th Avenue to LCC Corridor EmX Alternative would have the greatest potential of short-term impacts on street and landscape trees, including potential Heritage and Charter Trees. Short-term impacts primarily would be because of reconstruction of lanes to full-depth concrete to accommodate BAT lanes along Oak and Pearl Streets. Excavation involved in this work might have a short-term impact on root zones of established street and landscape trees. Trenching for continuous fiber between downtown Eugene and the intersection of 30th Avenue and University Street also would result in continuous potential short-term impacts to street trees in this stretch of the corridor.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

### S.2.4. Coburg Road Corridor

#### S.2.4.1. No-Build Alternative Impacts

No impacts are expected to street or landscape trees under the Coburg Road Corridor No-Build Alternative.

#### S.2.4.2. Impacts Common to All Build Alternatives

Both build alternatives for the Coburg Road Corridor result in a large number of potential short-term and long-term impacts on street and landscape trees. This is because both alternatives propose extensive civil improvements, particularly near the Interstate 105 interchange with Coburg Road and near the Randy Papé Beltline interchange with Coburg Road.

#### S.2.4.3. Enhanced Corridor Alternative Impacts

Because the Coburg Road Corridor Enhanced Corridor Alternative relies on the use of existing bus stops in the downtown core without civil improvements, there would be no potential long-term impacts to Charter Trees in downtown Eugene.

Potential long-term impacts on street and landscape trees under the Enhanced Corridor Alternative outside of downtown Eugene would be primarily because of bus stop construction and widening of intersections to accommodate general-purpose traffic movements. Therefore, these potential impacts

would be more sporadic and intersection-based than potential long-term impacts under the EmX Alternative.

The Enhanced Corridor Alternative relies on existing bus stops and proposes no construction in downtown Eugene so there would be no potential short-term impact on Charter Trees. Potential short-term impacts on street and landscape trees in the Enhanced Corridor Alternative outside of the downtown core would be primarily because of bus stop construction and widening of intersections to accommodate general-purpose traffic movements and, therefore, would be more sporadic and intersection-based.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

#### S.2.4.4. EmX Alternative Impacts

The Coburg Road Corridor EmX Alternative could have potential long-term impacts on large trees within the Charter Tree boundary in downtown Eugene where new station construction and excavation to construct concrete BAT lanes are proposed.

The extensive reconstruction proposed in the Coburg Road Corridor EmX Alternative outside of downtown Eugene would result in a large amount of potential long-term impacts on street and landscape trees. Potential long-term impacts on trees in the EmX Alternative outside of downtown Eugene would be primarily because of roadway widening in order to accommodate exclusive lanes for transit operation without compromising general-purpose traffic operations. These long-term impacts would generally be greater in number and more continuous than the Enhanced Corridor Alternative impacts in the same area. With a few exceptions, they do not impact large, mature street or landscape trees.

The Coburg Road Corridor EmX Alternative would have potential short-term impacts on Charter Trees in the downtown core. There, full-depth reconstruction of lanes on E. 6th Avenue and E. 7th Avenue to accommodate concrete BAT lanes is proposed, as well as adjacent to proposed stations. Potential short - term impacts on trees in the EmX Alternative outside of downtown Eugene would be primarily because of roadway widening in order to accommodate exclusive lanes for transit operation without compromising general-purpose traffic operations. These short-term impacts would generally be greater in number and more continuous than Enhanced Corridor Alternative impacts.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

### S.2.5. Martin Luther King, Jr. Boulevard Corridor

There is only one build alternative for the Martin Luther King, Jr. Boulevard Corridor. Potential long-term and short-term impacts to street trees are discussed below.

#### S.2.5.1. No-Build Alternative Impacts

No impacts would be expected to street trees under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative for this corridor.

#### S.2.5.2. Enhanced Corridor Alternative Impacts

The majority of improvements proposed under the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would be limited to repurposing existing traffic lanes along Martin Luther King, Jr. Boulevard. Stop construction and widening at the intersection of Martin Luther King, Jr. Boulevard and

Coburg Road would have the greatest potential for long-term impacts to street and landscape trees along this corridor. Otherwise, long-term potential impacts on street and landscape trees would be limited.

The potential for short-term impacts on large mature trees near Autzen Stadium on the University of Oregon campus exists because of the potential excavation and reconstruction of existing roadway lanes to full-depth concrete BAT lanes.

Quantification of possible impacts to street and landscape trees for this alternative are summarized in Table S.2-1.

## S.3. Mitigation Measures

Mitigation measures would be common to all build alternatives. No mitigation measures would be required under No-Build Alternatives.

Proposed sidewalks in areas where street trees would be impacted, in general, would be wide enough to incorporate a landscape strip into which new street trees could be planted. Where street tree removals would be required, long-term impacts would be mitigated through planting new trees, replacing all removed trees at a ratio of at least one tree planted for one tree removed, or as otherwise required by *Eugene Code,* Sections 6.300 – 6.330. Tree species selection, soil conditions, and locations would conform to City standards.

If tree surveys determine that a potentially impacted tree fits the classification criteria for a Heritage Tree or a Charter Tree, the design would be refined to avoid that impact.

The analysis identified one location on the River Road Corridor Enhanced Corridor Alternative where the construction of a stop would result in potential impact to a medium- or large-sized tree within the Charter Tree boundary. A mitigation option involving the relocation of this stop is identified in the *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017).

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement with the property owner's agreement. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced. In future phases, design of corridor alternatives might also be refined to mitigate potential short-term and long-term impacts to street and landscape trees.

LTD will require construction contractors to develop a Tree Protection Plan before construction of any corridor alternative to mitigate potential short-term tree impacts. The plan would include, among other things, staging and scheduling practices that minimize impacts on trees close to the construction site. Tree preservation requirements and protection standards should be designed to protect and preserve trees identified on construction plans as preserved. This would require a tree-by-tree evaluation of all trees abutting proposed project construction limits, both public and private. Implementing the plan would mitigate impacts related to construction activity. Best management practices for tree protection would be employed as specified through consultation with an arborist and City Urban Forestry staff.

## S.4. Conclusions

Although each corridor alternative has potential impacts to street and landscape trees, the level of analysis at this phase does not allow for identification of adverse impacts on specific trees. Any alternative advanced to design refinement must be studied in consultation with an ISA-certified project arborist and City Urban Forestry staff to verify the status of each potentially impacted tree and to identify mitigation measures or design changes, as appropriate, to eliminate or reduce impacts.

# 1. Introduction

## 1.1. MovingAhead Technical Reports

A total of 20 technical reports have been prepared for the MovingAhead Project. The technical reports have been prepared to support the selection of preferred alternatives for the MovingAhead Project and subsequent environmental documentation. The technical reports assume that any corridors advanced for environmental review will require a documented categorical exclusion under the National Environmental Policy Act (NEPA). Any corridors requiring a higher level of environmental review would be supported by the technical evaluation but might not be fully covered by the technical evaluation.

Technical reports have been prepared for the following disciplines:

- Acquisitions and Displacements
- Air Quality
- Capital Cost Estimating
- Community Involvement, Agency and Tribal Coordination
- Community, Neighborhood, and Environmental Justice
- Cultural Resources
- Ecosystems (Biological, Fish Ecology, Threatened and Endangered Species, Wetlands and Waters of the U.S. and State)
- Energy and Sustainability
- Geology and Seismic
- Hazardous Materials
- Land Use and Prime Farmlands
- Noise and Vibration
- Operating and Maintenance Costs
- Parklands, Recreation Areas, and Section 6(f)
- Section 4(f)
- Street and Landscape Trees
- Transportation
- Utilities
- Visual and Aesthetic Resources
- Water Quality, Floodplain, and Hydrology

In general, each technical report includes the following information for identifying effects:

- Relevant laws and regulations
- Contacts and coordination
- Summary of data sources and analysis methods described in the *MovingAhead Environmental Disciplines Methods and Data Report* (CH2M HILL, Inc. [CH2M] et al., 2015)
- Affected environment
- Adverse and beneficial effects including short-term, direct, indirect and cumulative
- Mitigation measures
- Permits and approvals
- References

## 1.2. Street and Landscape Trees Technical Report and Purpose

This technical report presents the results of the street and landscape trees impact assessment for the MovingAhead corridor alternatives. Civil construction might require removal of existing trees along a corridor. In addition, when construction occurs adjacent to a tree, its root zone, trunk, or canopy might be fatally damaged. Local law classifies the City's street and landscape trees. These trees are subject to certain protections, depending on their classification. Beyond regulatory frameworks, corridors subject to tree impacts might experience aesthetic impacts. This report considers potential tree impacts and possible mitigation measures to inform selection of the preferred alternative in each MovingAhead corridor.

## 1.3. Discipline Experts

Table 1.3-1 identifies discipline experts who contributed to the preparation of this report. This table includes their areas of expertise, affiliated organizations, titles, and years of experience.

**Table 1.3-1. Discipline Experts**

| Discipline | Technical Expert | Affiliated Organization | Title / Years of Experience |
|---|---|---|---|
| **Street and Landscape Trees** | Adrianna Stanley | CH2M | Engineer / 8 years |
| | Eduardo Montejo | CH2M | Planner / 3 years |
| **Editors** | Ryan Farncomb | CH2M | Senior Transportation Planner / 7 years |
| | Lynda Wannamaker | Wannamaker Consulting | President / 33 years |
| | James McGrath | CH2M | Senior Designer / 18 years |
| | Sasha Luftig | LTD | Transit Development Planner / 9 years |
| | Zach Galloway | City of Eugene, Planning | Senior Planner/ 10 years |
| | Scott Altenhoff | City of Eugene, Public Works | Urban Forestry, Certified Arborist / 20 years |

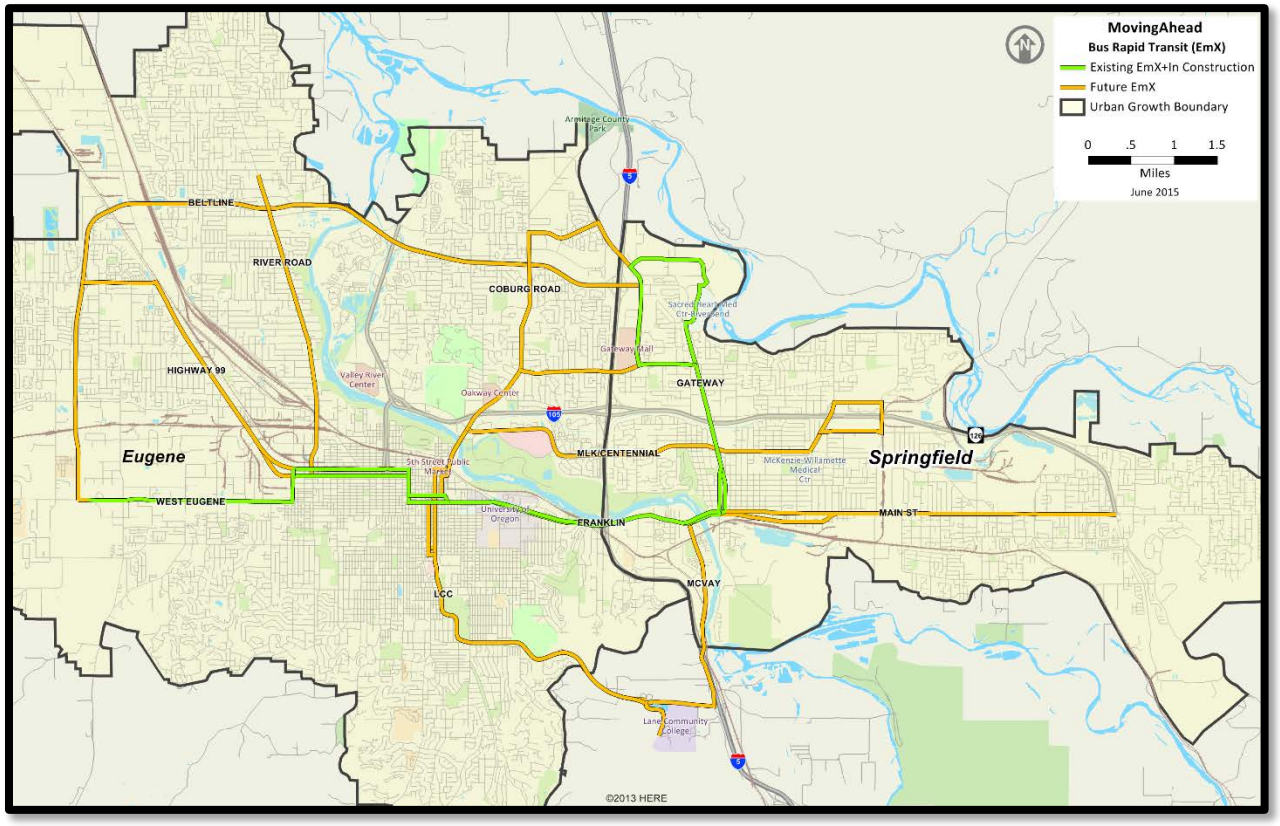
Source: MovingAhead Project Team. (2017).

## 1.4. Study Background

The purpose of the MovingAhead Project is to determine which high-capacity transit corridors identified in the adopted *Central Lane Metropolitan Planning Organization Regional Transportation Plan* (Lane Council of Governments [LCOG], adopted 2007, November; 2011, December; RTP) and the *Lane Transit District Long-Range Transit Plan* (Lane Transit District [LTD], 2014) as part of the Frequent Transit Network (FTN) are ready to advance to capital improvements programming in the near term. The study is being conducted jointly with the City of Eugene and LTD to facilitate a streamlined and cost-efficient process through concurrent planning, environmental review, and design and construction of multiple corridors. The study area includes Eugene and portions of unincorporated Lane County.

The *Lane Transit District Long-Range Transit Plan* (LTD, 2014) identifies the full Martin Luther King, Jr. Boulevard / Centennial Boulevard Corridor as a future part of the FTN. Initially, MovingAhead considered options on Centennial Boulevard to serve Springfield as part of this corridor. Because Springfield does not have the resources available to consider transit enhancements on Centennial Boulevard at this time, MovingAhead will only develop Emerald Express (EmX) and Enhanced Corridor Alternatives within Eugene. Figure 1.4-1 presents LTD's existing and future bus rapid transit (BRT) system.

**Figure 1.4-1. Lane Transit District's Bus Rapid Transit (BRT) System**




Source: LTD. (2015).

## 1.5. Screening and Evaluation of Multimodal Options

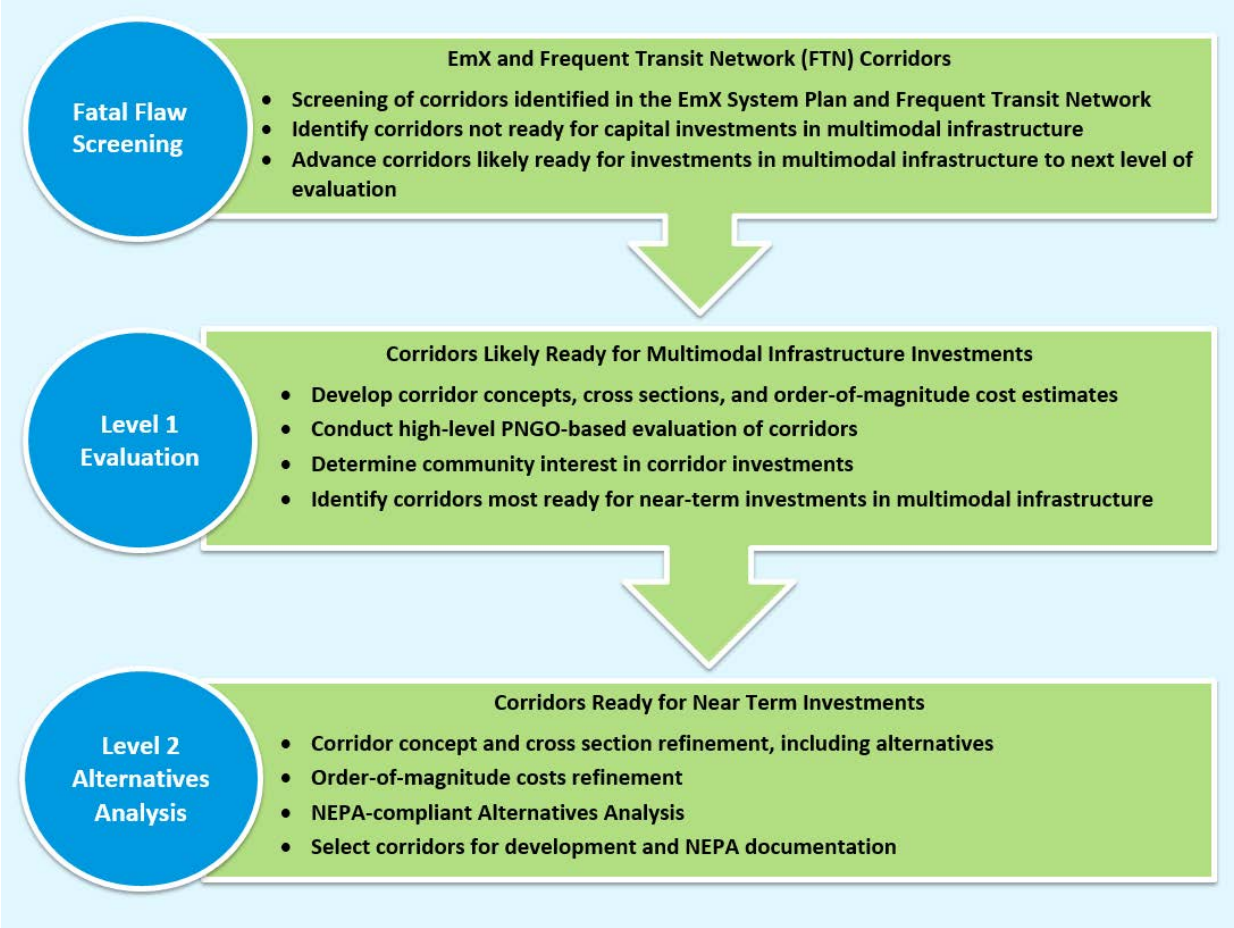
The MovingAhead Project process includes two phases. This first phase has three discrete but closely related tasks: identifying transit improvements; identifying improvements for bicyclists, pedestrians, and users of mobility devices; and preparing a NEPA-compliant evaluation of alternatives focused on the region's transportation system. Corridor options identified as part of the first phase were developed using multimodal cross sections that include variations on automobile, truck, and bus travel lanes; bicycle lanes; landscaping strips; and sidewalks. At the end of the first phase, the City of Eugene and LTD will select the corridors that are most ready for near-term capital improvements and prioritize improvements for funding. The selected corridors will be advanced to the second phase, which will focus on preparing NEPA environmental reviews (Documented Categorical Exclusions), and initiating the Federal Transit Administration (FTA) project development process.

### 1.5.1. Fatal Flaw Screening

The project team conducted a fatal flaw screening in February 2015 to identify which of the 10 corridors should not move forward to the Level 1 Screening Evaluation (Figure 1.5-1). This high-level evaluation used criteria based on MovingAhead's Purpose, Need, Goals, and Objectives (LTD, 2015) and existing data to determine which corridors were not ready for capital investment in BRT or multimodal infrastructure in the next 10 years. The screening was conducted with local, regional, and state agency staff. Of the 10 corridors identified, the following three corridors were not advanced from the fatal flaw

screening to the Level 1 Screening Evaluation: 18th Avenue, Bob Straub Parkway, and Randy Papé Beltline Highway. Table 1.5-1 shows the results of the fatal flaw screening.

**Figure 1.5-1. MovingAhead Phase 1 Steps**




Source: Wannamaker Consulting. (2015).

Although originally advanced from the fatal flaw screening, the Main Street-McVay Highway Corridor was also not advanced to the Level 1 Screening Evaluation because the Springfield City Council (on May 18, 2015) and LTD Board (on May 20, 2015) determined that the corridor is ready to advance to a study to select a locally preferred transit solution. At the time (May 2015), the Main Street-McVay Highway Corridor was on a schedule ahead of the MovingAhead Project schedule. If the Main Street-McVay Highway Corridor study schedule is delayed and its progress coincides with this project, the corridor could be reincorporated back into MovingAhead.

**Table 1.5-1. Results of the Fatal Flaw Screening**

| Corridor | Advanced to Level 1 | Consider Later |
|---|---|---|
| Highway 99 | ✓ | |
| River Road | ✓ | |
| Randy Papé Beltline | | ✓ |
| 18th Avenue | | ✓ |
| Coburg Road | ✓ | |
| Martin Luther King Jr. Boulevard / Centennial Boulevard | ✓ | |
| 30th Avenue to Lane Community College | ✓ | |
| Main Street-McVay Highway | ✓ | |
| Valley River Center | ✓ | |
| Bob Straub Parkway | | ✓ |

Source: LTD and City of Eugene. (2015).

The six remaining multimodal corridors were advanced to the Level 1 Screening Evaluation to determine how they compared with each other in meeting the Purpose, Need, Goals, and Objectives.

### 1.5.2. Level 1 Screening Evaluation

The Level 1 Screening Evaluation assessed how each corridor would perform according to the Purpose, Need, Goals, and Objectives of MovingAhead. The Level 1 Screening Evaluation used existing studies and readily available data to evaluate each corridor. Based on community input and technical analysis, the following corridors and alternatives were advanced from the Level 1 Screening Evaluation to the Level 2 Alternatives Analysis (AA) (Table 1.5-2):

- No-Build Alternatives: all corridors
- Enhanced Corridor and EmX Alternatives:
  - Highway 99 Corridor
  - River Road Corridor
  - 30th Avenue to Lane Community College (LCC) Corridor
  - Coburg Road Corridor
- Enhanced Corridor Alternative:
  - Martin Luther King Jr. Boulevard Corridor

The Valley River Center Corridor received the least public support during public outreach and was not carried forward to the Level 2 AA.

**Table 1.5-2. Corridors and Transit Alternatives Advanced to the Level 2 Alternatives Analysis**

| Corridor | No-Build | Enhanced Corridor | EmX |
|---|---|---|---|
| Highway 99 | ✓ | ✓ | ✓ |
| River Road | ✓ | ✓ | ✓ |
| 30th Avenue to Lane Community College | ✓ | ✓ | ✓ |
| Coburg Road | ✓ | ✓ | ✓ |
| Martin Luther King Jr. Boulevard | ✓ | ✓ | |

Source: CH2M. (2016a).

For a detailed discussion of alternatives and design options considered for each corridor, but not carried forward to the Level 2 AA, please refer to the *Alternatives and Design Options Considered but Eliminated Technical Memorandum* (CH2M, 2016a).

### 1.5.3. Level 2 Alternatives Analysis

To guide the Level 2 AA, LTD prepared new ridership forecasts and related evaluation measures using the LCOG regional model. Base-year and future-year forecasts were prepared for corridor alternatives based upon updated inputs and transit networks specific to each corridor. The planning horizon year used for the Level 2 AA is 2035. The built and natural environments, transit operations, traffic, finance, historical resources, and other areas were also evaluated as part of the Level 2 AA. The findings from the Level 2 AA will aid LTD and the City of Eugene in determining how corridors should be prioritized for capital investments over the next 5 years. Selected corridors will be advanced to Phase 2.

## 1.6. Purpose and Need

The prioritization of capital investments in multimodal transit corridors is a powerful tool for implementing local and regional comprehensive land use and transportation plans, agency strategic plans, and other community planning documents. Capital investments in multimodal transit corridors can have a substantial impact on patterns of growth and development. By coordinating the timing of, and prioritizing the funding for, strategic multimodal capital investments, the MovingAhead Project (a multimodal transit corridor study) helps ensure that future development is consistent with our region's plans and vision.

The Purpose and Need Statement was refined based on public and agency input.

### 1.6.1. Purpose

The purpose of the MovingAhead Project is to:

- Develop a Capital Improvements Program that forecasts and matches projected revenues and capital needs over a 10-year period
  - Balance desired multimodal transit corridor improvements with the community's financial resources
  - Ensure the timely and coordinated construction of multimodal transit corridor infrastructure
  - Eliminate unanticipated, poorly planned, or unnecessary capital expenditures
- Identify the most economical means of financing multimodal transit corridor capital improvements

- Establish partnerships between LTD, City of Eugene, and other local agencies that prioritize multimodal transit infrastructure needs and promote interagency cooperation
- Ensure that multimodal transit corridor investments are consistent with local comprehensive land use and transportation plans

### 1.6.2. Need

The need for the MovingAhead Project is based on the following factors:

- LTD's and the region's commitment to implementing the region's vision for BRT in the next 20 years consistent with the RTP that provides the best level of transit service in a cost-effective and sustainable manner.
- Need for streamlined environmental reviews to leverage systemwide analysis.
- Need to build public support for implementation of the systemwide vision.
- Selection of the next EmX / FTN corridors is based on long-range operational and financial planning for LTD's service.

### 1.6.3. Goals and Objectives

**Goal 1: Improve multimodal transit corridor service**

Objective 1.1: Improve transit travel time and reliability
Objective 1.2: Provide convenient transit connections that minimize the need to transfer
Objective 1.3: Increase transit ridership and mode share in the corridor
Objective 1.4: Improve access for people walking and bicycling, and to transit
Objective 1.5: Improve the safety of pedestrians and bicyclists accessing transit, traveling in and along the corridor, and crossing the corridor

**Goal 2: Meet current and future transit demand in a cost-effective and sustainable manner**

Objective 2.1: Control the increase in transit operating cost to serve the corridor
Objective 2.2: Increase transit capacity to meet current and projected ridership demand
Objective 2.3: Implement corridor improvements that provide an acceptable return on investment
Objective 2.4: Implement corridor improvements that minimize impacts to the environment and, where possible, enhance the environment
Objective 2.5: Leverage funding opportunities to extend the amount of infrastructure to be constructed for the least amount of dollars

**Goal 3: Support economic development, revitalization, and land use redevelopment opportunities for the corridor**

Objective 3.1: Support development and redevelopment as planned in other adopted documents
Objective 3.2: Coordinate transit improvements with other planned and programmed pedestrian and bicycle projects
Objective 3.3: Coordinate transit improvements with other planned and programmed roadway projects
Objective 3.4: Minimize adverse impacts to existing businesses and industry
Objective 3.5: Support community vision for high capacity transit in each corridor
Objective 3.6: Improve transit operations on state facilities in a manner that is mutually beneficial to vehicular and freight traffic flow around transit stops and throughout the corridor
Objective 3.7: Improve transit operations in a manner that is mutually beneficial to vehicular traffic flow for emergency service vehicles

### 1.6.4. Evaluation Criteria

Evaluation criteria will be used during the Trade-off Analysis, which is part of the Level 2 AA, to aid in determining how well each of the corridor alternatives would meet the project's Purpose, Need, Goals, and Objectives. The evaluation criteria require a mix of quantitative data and qualitative assessment. The resulting data will be used to measure the effectiveness of each proposed corridor alternative and to assist in comparing and contrasting the alternatives and options. In Table 1.6-1, evaluation criteria are listed for each of the project's objectives. Some objectives have only one criterion for measuring effectiveness, while others require several criteria.

**Table 1.6-1. Evaluation Criteria**

| Goals and Objectives | | Evaluation Criteria |
|---|---|---|
| **Goal 1: Improve multimodal transit corridor service** | | |
| Objective 1.1: | Improve transit travel time and reliability | • Round trip p.m. peak transit travel time between select origins and destinations<br>• On-time performance (no more than 4 minutes late) of transit service |
| Objective 1.2: | Provide convenient transit connections that minimizes the need to transfer | • Number of transfers required between heavily used origin-destination pairs |
| Objective 1.3: | Increase transit ridership and mode share in the corridor | • Average weekday boardings on corridor routes<br>• Transit mode share along the corridor<br>• Population within 0.5 mile of transit stop<br>• Employment within 0.5 mile of transit stop |
| Objective 1.4: | Improve access for people walking and bicycling, and to transit | • Connectivity to existing pedestrian facilities<br>• Connectivity to existing bicycle facilities |
| Objective 1.5: | Improve the safety of pedestrians and bicyclists accessing transit, traveling in and along the corridor, and crossing the corridor | • Opportunity to provide a safe and comfortable environment for pedestrians and bicyclists in the corridor |
| **Goal 2: Meet current and future transit demand in a cost-effective and sustainable manner** | | |
| Objective 2.1: | Control the increase in transit operating cost to serve the corridor | • Cost per trip<br>• Impact on LTD operating cost<br>• Cost to local taxpayers |
| Objective 2.2: | Increase transit capacity to meet current and projected ridership demand | • Capacity of transit service relative to the current and projected ridership |
| Objective 2.3: | Implement corridor improvements that provide an acceptable return on investment | • Benefit / cost assessment of planned improvements |
| Objective 2.4: | Implement corridor improvements that minimize impacts to the environment and, where possible, enhance the environment | • Results of screening-level assessment of environmental impacts of transit solutions |

**Table 1.6-1. Evaluation Criteria**

| Goals and Objectives | | Evaluation Criteria |
|---|---|---|
| Objective 2.5: | Leverage funding opportunities to extend the amount of infrastructure to be constructed for the least amount of dollars | • Number and dollar amount of funding opportunities that could be leveraged<br>• Meet the FTA's Small Starts funding requirements |
| **Goal 3:** | **Support economic development, revitalization and land use redevelopment opportunities for the corridor** | |
| Objective 3.1: | Support development and redevelopment as planned in other adopted documents | • Consistent with the BRT System Plan and FTN concept<br>• Consistent with the *Regional Transportation System Plan* (Central Lane Metropolitan Planning Organization [MPO], 2007)<br>• Consistent with local comprehensive land use plans |
| Objective 3.2: | Coordinate transit improvements with other planned and programmed pedestrian and bicycle projects | • Capability of transit improvement to coordinate with other planned and programmed pedestrian and bicycle projects identified in adopted plans and Capital Improvements Programs |
| Objective 3.3: | Coordinate transit improvements with other planned and programmed roadway projects | • Capability of transit improvement to coordinate with other planned and programmed roadway projects identified in adopted plans and Capital Improvements Programs |
| Objective 3.4: | Minimize adverse impacts to existing businesses and industry | • Impacts to businesses along the Corridor measured in number and total acres of properties acquired, parking displacements, and access impacts.<br>• Impact on freight and delivery operations for Corridor businesses |
| Objective 3.5: | Support community vision for high capacity transit in corridor | • Community vision includes high capacity transit in corridor |
| Objective 3.6: | Improve transit operations on state facilities in a manner that is mutually beneficial to vehicular and freight traffic flow around transit stops and throughout the corridor | • Impact on current and future year intersection level of service on state facilities<br>• Impact on current and future year p.m. peak hour auto / truck travel times on state facilities |
| Objective 3.7: | Improve transit operations in a manner that is mutually beneficial to vehicular traffic flow for emergency service vehicles | • Qualitative assessment of potential impacts to emergency service vehicle traffic flow and access |

Source: LTD and City of Eugene. (2015).

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# 2. Alternatives Considered

This section briefly reviews the major features of the alternatives considered in the Level 2 AA. For full details on each alternative and the five corridors described in this technical report – Highway 99, River Road, 30th Avenue to LCC, Coburg Road, and Martin Luther King, Jr. Boulevard – refer to the *MovingAhead Level 2 Definition of Alternatives* (CH2M et al., 2016). Each corridor location is shown on Figures 2.1-1 and 2.1-2 for the Enhanced Corridor Alternatives and the EmX Alternatives, respectively.

**Figure 2.1-1. Enhanced Corridor Alternatives Overview**

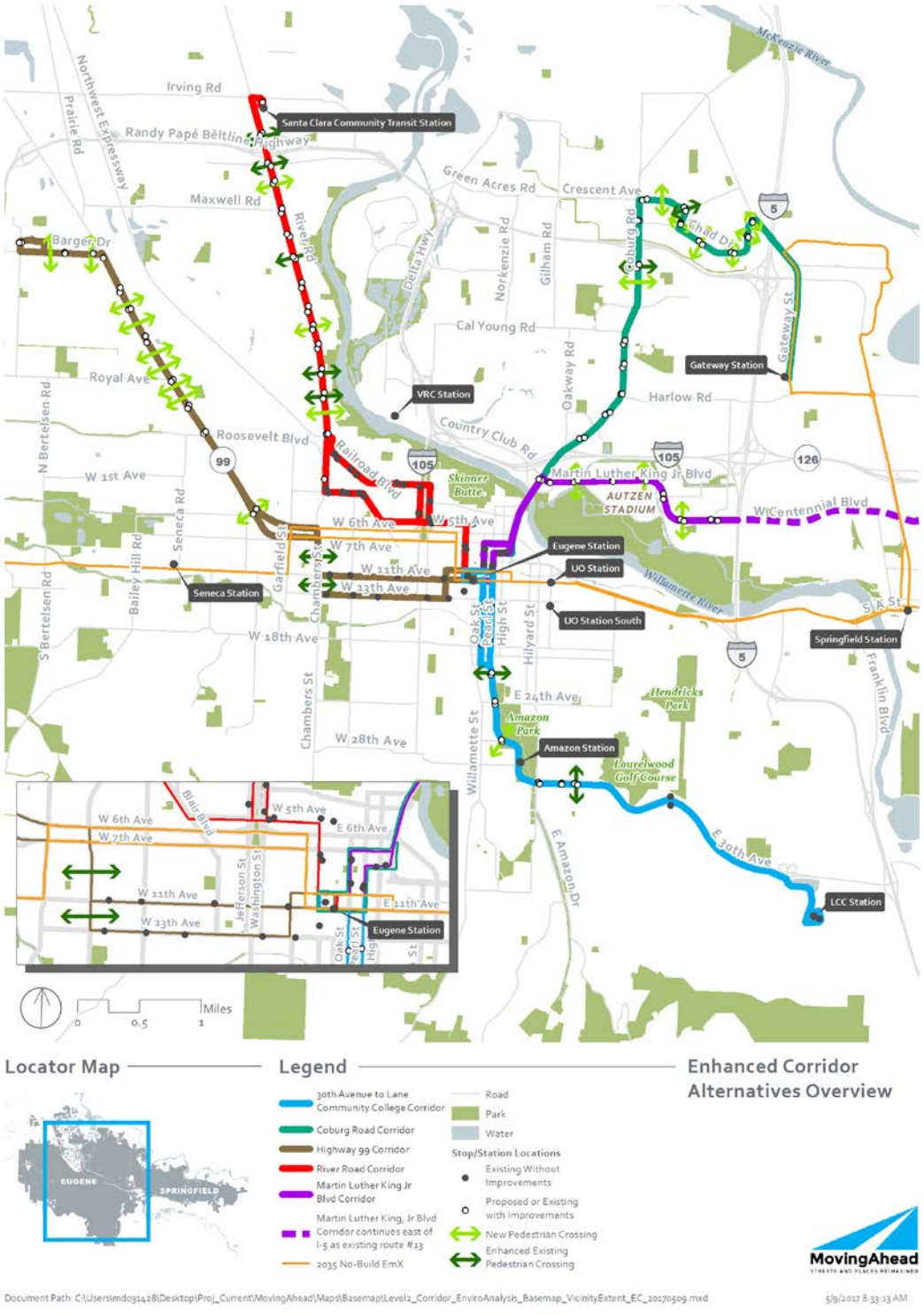
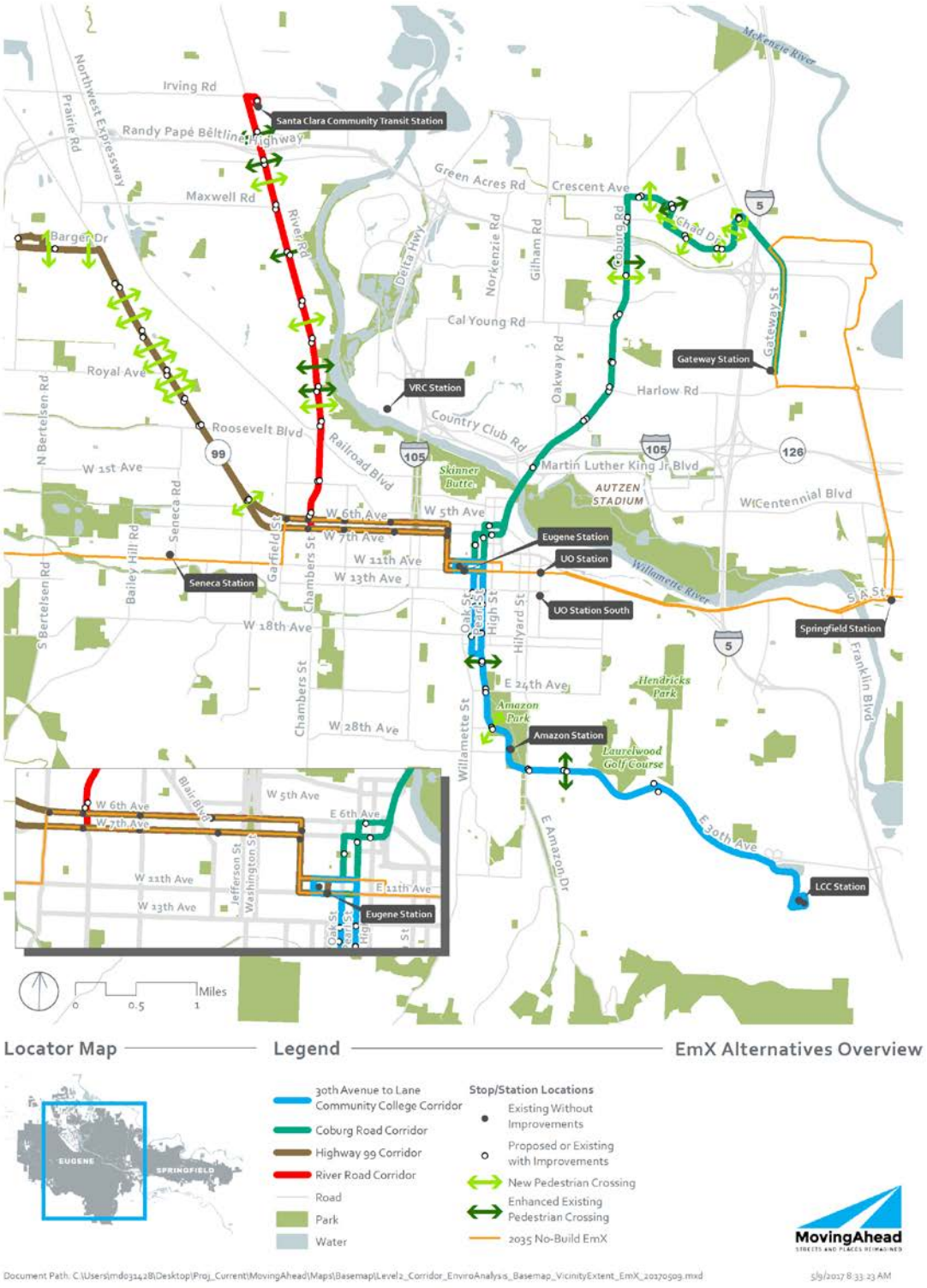


**Figure 2.1-2. EmX Alternatives Overview**



## 2.1. No-Build Alternative Transit Network

This section describes the No-Build Alternative transit network, which is based on projected conditions in the year 2035, the project's environmental forecast year. For each corridor, the No-Build Alternative serves as a reference point to gauge the benefits, costs, and effects of the build alternatives.

### 2.1.1. Capital Improvements

Under the No-Build Alternative, the following capital improvements are anticipated by 2035:

- **West Eugene EmX Extension**. Currently under construction, the West Eugene EmX Extension (WEEE) project and its associated capital improvements will be completed in 2017.
- **Santa Clara Community Transit Center**. The existing River Road Station is located at the southeast corner of the River Road / Randy Papé Beltline Highway interchange between the eastbound on-ramp and River Avenue. To meet growing demand and avoid the impacts of increasing congestion, LTD plans to relocate the River Road Station to a site north of the Randy Papé Beltline Highway at the southeast corner of River Road and Hunsaker Lane. Once relocated to the new site, the River Road Station would be renamed the Santa Clara Community Transit Center. This new transit center is planned to include a mix of uses including a park and ride lot, residential housing, community space, and commercial uses. The River Road Station relocation to the new site is anticipated to be completed by the end of 2018.
- **Main Street EmX Extension**. Included in the RTP and currently under study, the extension of the existing Franklin EmX line on Main Street from Springfield Station to Thurston Station and associated capital improvements (e.g., stations, bicycle and pedestrian facilities, and signal modifications) is anticipated to be completed within the 20-year planning horizon (2035). The No-Build Alternative transit network assumes EmX service on Main Street. However, the outcome of this study, and the ultimate improvements chosen, are uncertain at this time.
- **McVay Highway Enhanced Corridor**. Included in the RTP and currently under study, Enhanced Corridor service from Springfield Station on McVay Highway to LCC and associated capital improvements (e.g., improved stops, transit queue jumps, and improved bicycle and pedestrian crossings) is anticipated to be completed within the 20-year planning horizon (2035).

### 2.1.2. Transit Operations

The No-Build Alternatives for each corridor include changes to transit service anticipated as a result of the WEEE project, Main Street EmX Extension project, development of the Santa Clara Community Transit Center, and other changes to fixed route service. The following changes to the existing 2016 fixed route services are anticipated by 2035:

- Eliminated routes:
  - Route 11 (replaced by Main Street EmX service)
  - Route 32 (replaced by WEEE service)
  - Route 76 (replaced by WEEE service)
  - Route 85 (replaced by Enhanced Corridor service on the McVay Highway)
  - Route 43 (replaced by WEEE service)
- Other route modifications:
  - Add WEEE service (replaces Route 43 service on W. 11th Avenue) as extension of existing EmX service
  - Add Main Street EmX service from Springfield Station to Thurston Station
  - Add Route 2 with service from Barger Drive / Echo Hollow Road to Eugene Airport

  - Add Route 16 to connect north and south of Main Street with EmX service
  - Add Enhanced Corridor service on McVay Highway from Springfield Station to LCC (replaces Route 85)
  - Reroute Route 33 and extend to Amazon Parkway
  - Reroute Route 36 to extend north of W. 11th Avenue to Barger Drive (replaces Route 43)
  - Reroute Route 41 via Highway 99 / Royal Avenue / W. 11th Avenue
  - Reroute Route 40 via Royal Avenue / Elmira Road / Roosevelt Boulevard / Chambers Street / W. 2nd Avenue / Oak and Pearl Streets
  - Add Route 44 paralleling Route 40 above to serve West Eugene
  - Reroute Route 55 to extend to Santa Clara Community Transit Center
  - Reroute Route 93 with service continuing to Eugene Station via Seneca Station and service terminating at the WEEE terminus
- Change in service frequencies:
  - Increase service on Route 24 from 30-minute peak frequencies to 15-minute peak frequencies
  - Increase service on Route 28 from approximately 30-minute peak frequencies (varying 20- to 30-minute intervals) to 15-minute peak frequencies
  - Increase service on Route 41 from 30- and 15-minute peak frequencies to 15-minute peak frequencies
  - Increase service on Route 51 from 60-minute off-peak frequencies to 30-minute off-peak frequencies
  - Increase service on Route 52 from 60-minute off-peak frequencies to 30-minute off-peak frequencies
  - Increase service on Route 66 from 30- and 15-minute weekday a.m. peak, off-peak, and p.m. peak frequencies to 15-minute weekday a.m. peak, off-peak, and p.m. peak frequencies
  - Increase service on Route 67 from approximately 30-minute weekday a.m. peak, off-peak, and p.m. peak frequencies to 15-minute weekday a.m. peak, off-peak, and p.m. peak frequencies
  - Increase service on Route 78 from approximately 60-minute frequencies from 8 a.m. to 6 p.m. to 30-minute weekday a.m. peak, off-peak, and p.m. peak frequencies
  - Increase service on Route 79x from 30-minute peak frequencies to 10-minute peak frequencies, and modify off peak frequencies to 15 minutes from between 10 and 30 minutes currently
  - Decrease a.m. peak service on Route 93 from 60-minute frequencies to 120-minute frequencies during a.m. peak hours, and increase from no service between Veneta and the WEEE terminus to 120-minute frequencies during p.m. peak hours (off-peak service is 120-minute frequencies between Veneta and the WEEE terminus)
  - Decrease a.m. peak service on Route 96 from 30-minute frequencies to 60-minute frequencies, and increase off-peak service from no service between 8:20 a.m. and 3:40 p.m. to 60-minute off-peak frequencies

Key transportation improvements specific to each corridor are described under each corridor's No-Build Alternative.

## 2.2. Enhanced Corridor Alternatives

Enhanced Corridor Alternatives are intended to address the project's Purpose, Need, Goals, and Objectives without major transit capital investments, instead focusing on lower-cost capital improvements, operational improvements, and transit service refinements. Features could include transit queue jumps (lanes for buses that allow the bus to "jump" ahead of other traffic at intersections using a separate signal phase), stop consolidation, enhanced shelters, and redesigned service to improve

cross-town connectivity. These features improve reliability, reduce transit travel time, and increase passenger comfort.

Enhanced Corridor service would run from 6:45 a.m. to 11:30 p.m. weekdays, 7 a.m. to 11 p.m. Saturdays, and 8 a.m. to 8 p.m. Sundays. Service frequencies are assumed to be 15 minutes during all periods.

## 2.3. EmX Alternatives

EmX (BRT) Alternatives are characterized by exclusive guideways (business access and transit lanes [BAT] or bus-only lanes); branded, multi-door 60-foot-long BRT vehicles; enhanced stations with level boarding platforms instead of stops; off-board fare collection; signal priority; wider stop spacing; and frequent and redesigned service to improve cross-town connectivity.

EmX service is assumed to run from 6:45 a.m. to 11:30 p.m. weekdays, 7 a.m. to 11 p.m. Saturdays, and 8 a.m. to 8 p.m. Sundays. Service frequencies are assumed to be 10 minutes during all periods.

## 2.4. Highway 99 Corridor

The Highway 99 Corridor begins at the Eugene Station, travels through downtown, then extends northwest along Highway 99 to Barger Drive, turning west at Barger Drive to terminate on Cubit Street north of the intersection of Barger Drive and Cubit Street east of the Randy Papé Beltline Highway. This corridor is approximately 10.5 round-trip miles.

### 2.4.1. No-Build Alternative

The Highway 99 Corridor No-Build Alternative includes existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the *DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016; Draft Eugene 2035 TSP). The No-Build Alternative would not include capital improvements on Highway 99. As part of the Draft Eugene 2035 TSP, the following transportation improvements are planned along or adjacent to the corridor:

- Upgrade Bethel Drive, from Highway 99 to Roosevelt Boulevard, to a two-lane urban facility with sidewalks on both sides of the road, bicycle lanes, and planting strips
- Widen Barger Drive immediately west of the Randy Papé Beltline Highway interchange to include an additional travel lane in each direction
- Add a shared-use path on the west side of Highway 99 from Roosevelt Boulevard south to the intersection of W. 7th Avenue and Garfield Street (the section of this project from Roosevelt to W. 5th Avenue has been completed)
- Add bicycle lanes on Garfield Street from Roosevelt Boulevard south to W. 6th Avenue
- Add a bicycle lane on W. 6th Avenue from Garfield Street to W. 5th Avenue
- Complete the sidewalk network on Highway 99 from Roosevelt Boulevard south to Garfield Street
- Add a shared-use path on Roosevelt Boulevard from Maple Street to Highway 99
- Add a bicycle lane on Roosevelt Boulevard from Highway 99 east to railroad tracks

Under the No-Build Alternative, Highway 99 Corridor service would remain at 15-minute headways during peak periods and 30-minute headways during off-peak periods and evenings. Under the No-Build Alternative, a slight change is also made to Route 93, which would stop at the Pearl Buck Center in the absence of Route 44.

### 2.4.2. Enhanced Corridor Alternative

Capital improvements under the Highway 99 Corridor Enhanced Corridor Alternative would include enhanced bicycle and pedestrian crossings; improvements to existing bus stops and the construction of new stops; construction of queue jumps at some intersections; traffic signal reconstruction; construction of bus-only left turn lanes; and roadway widening at some locations in the corridor.

Existing conventional fixed-service routes would remain the same as with the No-Build Alternative, with the exception of the elimination of Route 41. Service west of WinCo would also remain the same or be improved.

### 2.4.3. EmX Alternative

The Highway 99 Corridor EmX Alternative would include creating BAT lanes on segments of W. 7th Avenue and Highway 99; reconstructing the Highway 99 / Roosevelt Boulevard intersection (traffic signal, turn lanes, and queue jump); completing other intersection modifications in the corridor; roadway widening at some locations; and constructing nine new enhanced pedestrian and bicycle crossings, new sidewalks, and a pedestrian bridge across the railroad line from Highway 99 to the Trainsong neighborhood. Four existing bus stop locations would be improved to EmX stations, in addition to constructing new stations. Some existing EmX stations would be used for the Highway 99 Corridor EmX service.

Route 44 is a conventional service line added to this alternative only, providing coverage on 11th and 13th Avenues as well as service to the Pearl Buck Center on W. 1st Avenue, with 30-minute headways during all periods. This would be a decrease in service for the 11th and 13th Avenue corridors that currently have 15-minute peak service. Route 44 is primarily intended to replace conventional service lost with the removal of the existing Route 41. Route 41 would be replaced with the Highway 99 Corridor EmX service described in this alternative.

## 2.5. River Road Corridor

The River Road Corridor begins at the Eugene Transit Center, travels through downtown and then north to the Santa Clara Community Transit Center (intersection of Hunsaker Lane and River Road). This corridor is approximately 10.3 round-trip miles.

### 2.5.1. No-Build Alternative

The River Road Corridor No-Build Alternative would include existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. There would be no additional major bus capital improvements under the No-Build Alternative.

As part of the Draft Eugene 2035 TSP, the following transportation improvements are planned adjacent to and along the River Road Corridor:

- Upgrade the Hunsaker Lane / Beaver Street intersection to urban collector standards, including two travel lanes, a center turn lane, bicycle lanes, sidewalks on both sides of the road, and planting strips from River Road to Division Avenue
- Provide bicycle boulevards on Ruby Avenue, Horn Lane, Arbor Drive, and Park Avenue
- Include sidewalks on Hunsaker Lane, Howard Avenue, and Hilliard Lane
- Provide protected bicycle lanes on River Road from the Northwest Expressway to Division Avenue

Under the No-Build Alternative, River Road Corridor service would remain at 30-minute headways for both Routes 51 and 52 (which together effectively provide 15-minute service during peak periods) and off-peak periods. After 6:15 p.m., there is no longer a combined 15-minute frequency, and headways return to 30 minutes.

### 2.5.2. Enhanced Corridor Alternative

Capital improvements constructed as part of the River Road Corridor Enhanced Corridor Alternative would include BAT lanes on River Road approaching the Randy Papé Beltline Highway and other roadway improvements, like traffic signal reconstruction at certain locations along the corridor. Improvements to existing bus stops and the construction of new stops would also occur.

Routes 51 and 52 would be eliminated, and Enhanced Corridor service for River Road includes a split alignment in order to serve portions covered by those routes at 30-minute headways. In this arrangement, the area from Railroad Boulevard to W. 1st Avenue is served by one Enhanced Corridor service as a replacement for the Route 51 service, while the area along Blair Boulevard and W. 2nd Avenue is served by the other alignment to replace service lost with removal of Route 52. Those alignments meet at Railroad Boulevard and River Road to serve the River Road Corridor with consistent 15-minute headways.

### 2.5.3. EmX Alternative

New construction under the River Road Corridor EmX Alternative would include lane repurposing on River Road for BAT lanes, constructing short sections of exclusive bus lanes near the Randy Papé Beltline Highway, reconstructing traffic signals and intersections at several locations, constructing new bicycle and pedestrian crossings, improving existing stops to EmX stations, and constructing new stations. Some existing EmX stations would be used with the River Road EmX service.

Transit service changes would also include modifying headways on Route 40 during the a.m. and p.m. peak hours to 15 minutes, developing a new Route 50 “River Road Connector” with 30-minute headways all day, and eliminating Routes 51, 52, and 55. These replacements ensure no loss in existing coverage or service.

## 2.6. 30th Avenue to Lane Community College Corridor

The 30th Avenue to LCC Corridor begins at Eugene Station and travels south along Pearl Street (outbound) to Amazon Parkway, then on E. 30th Avenue to its terminus at the LCC Station. The return trip travels on Oak Street (inbound), which is the northbound couplet to Pearl Street. This corridor is approximately 10.2 round-trip miles.

### 2.6.1. No-Build Alternative

The 30th Avenue to LCC Corridor No-Build Alternative would include existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. There would be no additional major bus capital improvements to the 30th Avenue to LCC Corridor under the No-Build Alternative.

The Draft Eugene 2035 TSP identifies the following transportation improvements along or adjacent to the corridor:

- Bicycle boulevard on Alder Drive

For the portion of E. 30th Avenue in unincorporated Lane County, Lane County does not plan to improve bicycle facilities along the road.

Under the No-Build Alternative, 30th Avenue to LCC Corridor service would remain at 30-minute headways on Route 81. The Route 82 service would remain at 10-minute headways during the a.m. peak, 15-minute headways during off-peak periods, and 20-minute headways during the p.m. peak, with no weekend service.

### 2.6.2. Enhanced Corridor Alternative

Capital improvements as part of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative would include the construction of new bus stops, capital improvements to some existing bus stops, a new traffic signal on Amazon Parkway at E. 20th Avenue, and new bike facilities on Oak and Pearl Streets.

Under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative, service to LCC provided by Routes 81 and 82 would be eliminated and replaced by Enhanced Corridor service. The direct connection between LCC and the University of Oregon Station along Route 81 would be eliminated. It would be replaced by connecting the 30th Avenue to LCC Corridor Enhanced Corridor Alternative to the Franklin EmX line with a transfer at Eugene Station.

### 2.6.3. EmX Alternative

The 30th Avenue to LCC Corridor EmX Alternative would include repurposing parking and general-purpose lanes to BAT lanes on Oak and Pearl Streets, constructing queue jumps, extending E. 20th Avenue, adding a new traffic signal on Amazon Parkway, and adding a new cycle track on High Street. In addition to constructing new EmX stations, existing bus stops would be improved to EmX stations in certain locations.

Service to LCC provided by Routes 81 and 82 would be replaced with EmX service. The direct connection between LCC and the University of Oregon Station along Route 81 would be eliminated. It would be replaced by connecting the 30th Avenue to LCC Corridor EmX Alternative to the Franklin EmX line with a transfer at Eugene Station.

## 2.7. Coburg Road Corridor

The Coburg Road Corridor begins at Eugene Station and continues to Coburg Road using the Ferry Street Bridge. The corridor continues north on Coburg Road to Crescent Avenue, east on Crescent Avenue and Chad Drive to N. Game Farm Road, and south on N. Game Farm Road and Gateway Street to the existing Gateway Station at the Gateway Mall. Although service extends from N. Game Farm Road to the Gateway Station, capital improvements for the corridor terminate at Interstate 5 (I-5). This corridor is approximately 11.2 round-trip miles.

### 2.7.1. No-Build Alternative

The Coburg Road Corridor No-Build Alternative includes existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. There would be no additional major transportation improvements to the Coburg Road Corridor under the No-Build Alternative.

Under the No-Build Alternative, the Coburg Road Corridor service would remain at 15-minute headways on Routes 66 and 67 at all weekday times, 30-minute headways on Saturdays, and 60-minute headways on Sundays.

### 2.7.2. Enhanced Corridor Alternative

The Coburg Road Corridor Enhanced Corridor Alternative would include new traffic signal construction, intersection reconstruction at several locations on Coburg Road, the addition of queue jumps, and the addition of BAT lanes south of the Interstate 105 interchange. New crossings for bicyclists and pedestrians would be constructed. Existing bus stops would be improved and new stops would also be constructed.

Route 12 would be altered to serve Valley River Center and Marcola Road. A new route (Route 60) would be added to serve Valley River Center, and Routes 66 and 67 would be eliminated. This change would provide new service and coverage to the Cal Young neighborhood and along Hayden Bridge Way in Springfield. It would require current passengers along Harlow Road to transfer in order to get downtown.

### 2.7.3. EmX Alternative

Improvements to the corridor under the Coburg Road Corridor EmX Alternative would include construction of exclusive transit lanes at several locations on Coburg Road and intersection reconstruction at multiple locations. New bicycle and pedestrian crossings and EmX stations would be constructed, and some existing bus stops would be improved to EmX stations.

As in the Coburg Road Corridor Enhanced Corridor Alternative, Route 12 would be altered to serve Valley River Center and Marcola Road, and Route 60 would be added to serve Valley River Center, while Routes 66 and 67 would be eliminated. This change would provide new service and coverage to the Cal Young neighborhood and along Hayden Bridge Way in Springfield. It would require current passengers along Harlow Road to transfer in order to get downtown.

## 2.8. Martin Luther King, Jr. Boulevard Corridor

The Martin Luther King, Jr. Boulevard Corridor begins at Eugene Station and travels through downtown Eugene on Oak and Pearl Streets and on 7th and 8th Avenues. The corridor uses the Ferry Street Bridge to reach Martin Luther King, Jr. Boulevard and continues east on Martin Luther King, Jr. Boulevard past Autzen Stadium to Centennial Boulevard. Although transit service continues along Centennial Boulevard, capital improvements for the corridor terminate at I-5. The corridor is approximately 6.0 round-trip miles.

### 2.8.1. No-Build Alternative

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative includes existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. The Draft Eugene 2035 TSP identifies the following transportation improvements along or adjacent to the Martin Luther King, Jr. Corridor:

- Add a center turn lane along sections of Martin Luther King, Jr. Boulevard from Club Road to Leo Harris Parkway

Under the No-Build Alternative, the Martin Luther King, Jr. Boulevard Corridor service would remain at 30-minute headways.

### 2.8.2. Enhanced Corridor Alternative

Capital improvements associated with the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would include reconstructing traffic signals at the intersections of Coburg Road and Martin Luther King, Jr. Boulevard and of Martin Luther King, Jr. Boulevard and Centennial Loop; repurposing existing outside general-purpose lanes to BAT lanes on Martin Luther King, Jr. Boulevard; adding a new traffic signal at the intersection of Martin Luther King, Jr. Boulevard and Leo Harris Parkway; enhancing pedestrian crossings; constructing new bus stops; and improving existing bus stops. Existing Route 13 would be eliminated.

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# 3. Methods and Data

This report describes the analysis methodologies and data that were used for the Street and Landscape Trees evaluation for the MovingAhead Project.

## 3.1. Relevant Laws and Regulations

The following federal, state, and local laws, regulations, and agency jurisdiction and management guidance describe the applicable requirements for tree removal, evaluation of the degree of impact, and identification of the requirements and needs for mitigation.

### 3.1.1. Federal

**National Environmental Policy Act, 42 *United States Code* (U.S.C.) 4321-4347.** The NEPA process consists of an evaluation of the environmental effects of a federal undertaking including its alternatives. There are three levels of analysis depending on whether an undertaking could significantly affect the environment. These three levels are categorical exclusion determination; preparation of an environmental assessment/finding of no significant impact; and preparation of an environmental impact statement.

### 3.1.2. State

**Oregon Statewide Planning Goal 5 Natural Resources, Scenic and Historic Areas, and Open Spaces.** This goal calls for the conservation of open space and protection of natural and scenic resources that promote healthy and visually attractive environments. Street trees located along state-owned road facilities would be subject to state regulations.

### 3.1.3. Local

At the local level, the City of Eugene and the City of Springfield are the agencies that regulate the removal of street and landscape trees. They might require that LTD obtain a permit to remove trees as part of a future high-capacity transit project. The *Eugene Code,* Chapters 6 and 9, document tree preservation and removal standards. Permit issuance and approval criteria have different requirements for trees in City right-of-way, in commercial lots, and on private property. Administrative Rule R-6.305 clarifies Eugene tree preservation code, *Eugene Code,* Sections 6.300 – 6.330. Administrative Rule R-7.280 clarifies Eugene Street Tree Program code, *Eugene Code,* Section 7.280, and establishes standards for tree protection, planting, and pruning.

**City of Eugene Urban Forest Management Plan (City of Eugene Public Works Department Maintenance Division, 1992).** This document contains goals and policies that guide the City of Eugene in its actions and decisions affecting trees within the city limits. It also provides policies on protecting "Heritage Trees," defined as: "Any tree of exceptional value to our community based on its size (relative to species), history, location, or species, or any combination of these criteria." Such a tree cannot be removed "except when otherwise necessary for the public health, safety, or welfare." Oaks must be at least 34 inches in diameter and other trees listed must be 44 inches in diameter to be further evaluated to determine if they qualify as Heritage Trees (Appendix C).

**City of Eugene Historic Tree Charter.** Adopted during a special city election held on November 6, 1984, this law requires, with exceptions, voter approval for the removal of any historic tree(s) for any road-

widening project, unless the City Manager approves an exception. A "Charter Tree" is defined as "… (a living, standing, woody plant having a trunk 25 inches in circumference at a point 4.5 feet above mean ground level at the base of the trunk) of at least fifty years of age within publicly owned rights of way for streets, roads, freeways, throughways, and thoroughfares and within those portions of the city that were in the incorporated boundaries of the city as of January 1, 1915, shall be designated historic street trees and recognized as objects of high historic value and significance in the history of the city and deserving of maintenance and protection" (*Eugene Charter* Chapter XIII, Section 52, Amendment II; excerpted in Appendix D of this technical report). These trees have special historic importance to the City and require special processes be followed if their removal is proposed, including a public vote on the project proposing the removal.

## 3.2. Analysis Area

The MovingAhead Project encompasses five corridors in the City of Eugene. The area of potential impact (API) encompasses street and landscape trees within the construction footprint of the build alternatives within each corridor. Street trees are defined as those within the existing public road ROW. Landscape trees are defined as those located on adjacent private property outside the existing public ROW.

The trees that are considered of greater significance are those eligible for Charter Tree status or those that could be designated as Heritage Trees within the City. Such trees are provided protections through City code and policy.

Heritage Trees are trees of exceptional community value as defined in the *City of Eugene Urban Forest Management Plan* and are prohibited from removal under *Eugene Code*, Section 6.305(4) and Administrative Order No. 58-00-01F, R-6.305-C unless the City Manager determines their removal is necessary to protect the public health, safety, or welfare.

Charter Trees are protected through the City of Eugene *Historic Tree Charter*. Section 3.1.3 discusses these regulations and policies.

## 3.3. Contacts and Coordination

Project staff used previous planning efforts as guiding documents for regulatory agencies to help scale the level of analysis. Information sources used include the following:

- Federal
  - None
- State
  - Oregon Department of Transportation
- Local
  - Lane County
  - City of Eugene
  - Lane Regional Council of Governments

## 3.4. Level 2 Alternatives Analysis

For the Level 2 AA, to determine whether street and landscape trees meet the definition of a large tree, the project obtained available Geographic Information Systems (GIS) data on the historic 1915 city boundary (City of Eugene, 1915), within which Charter Trees are potentially present. There is no existing inventory of Charter Trees. City Urban Foresters must determine Charter Tree status based on the size, location, and age of the tree. The determination of probability of potential impacts is based on

overlaying the construction footprint for each corridor with the Charter Tree boundary and determining potential impacts within the boundary and outside of the boundary. Aerial photography and Google™ Street View was used in areas of overlap to qualitatively assess whether there is a "low," "moderate," or "high" probability of impacts to medium and large trees. These impact probability thresholds are described as follows:

- **No Impact**: No construction activities occur in an area or no trees are present adjacent to proposed construction activities. This includes those parts of a given build alternative's bus routing not within the alternative's construction footprint.
- **Low:** Construction adjacent to or removing new, small, or visibly unhealthy small trees. Construction activities next to medium or large trees that do not require excavation or widening (e.g., restriping and overlay of an existing roadway) and, therefore, only pose short-term construction-related potential impacts to trees.
- **Moderate:** Construction adjacent to the root zone of medium or large trees, such as roadway widening, excavation, or stop or station construction. While the trees would not be directly removed, construction activities could impact these trees.
- **High:** Construction may directly impact or remove medium or large trees, including full-depth excavation in the root zone of trees.

The project team prepared maps illustrating this qualitative assessment for each corridor and build alternative. The level of impact potential to large trees within and outside of the Charter Tree boundary are expressed qualitatively as a percentage of the overall corridor length. Estimates of potential impact were particularly conservative within the Charter Tree boundary due to the high value placed on these trees by the community and Charter of the City of Eugene. The mileage of the corridor used to determine impacts to street and landscape is the overall physical length of the corridor and accounts for potential impacts on both sides of the roadway, as well as different one-way streets traveled in downtown Eugene. It does not correspond to the round-trip distance either bus or EmX service would travel on a corridor.

Areas that would have a high potential for impacts to medium and large trees were further tabulated to classify the approximate number and size of trees that would be potentially impacted and the reason for potential impact. Medium (greater than 8 inches) and large (greater than 24 inches) trees were included in these tables to account for future growth of potentially valuable trees.

Determination of whether a potentially impacted tree is a Charter Tree or a Heritage Tree would occur in a later stage of the project during design refinement, at which time impacts would be avoided through appropriate mitigation as described in subsequent sections of this report. In general, design refinement would seek to minimize or avoid impacts to as many medium to large trees as technically feasible and would identify appropriate locations for mitigation planting to offset removal of small or visibly unhealthy trees.

### 3.4.1. Impact Analysis

#### 3.4.1.1. Long-Term Impacts Analysis Approach

The data gathered for this study was used to evaluate potential long-term impacts of the project, such as permanently altered corridor environments that do not allow for the trees to be either replanted in the vicinity or replaced on-site with new trees as outlined in the *Eugene Code*, Chapters 6 and 9, "Tree Preservation Code." The long-term impacts analysis also included:

- An analysis of affected street and landscape trees that are at locations where the existing curb would be moved to accommodate roadway widening and sidewalk improvements or station construction. Areas of street reconstruction where BAT lanes and concrete intersection pads are proposed were also included in this category. This construction activity would require excavating and compacting new base materials, thus creating of the potential for fatal damage to root systems of nearby trees.
- Documentation of large trees that proposed construction might potentially impact, including their approximate diameter and number, and the reason for the potential impact.

#### 3.4.1.2. Short-Term Impacts Analysis Approach

Construction activities could affect trees beyond the direct impacts of roadway widening accounted for in previous sections. Excavation could impact shallow root systems and affect tree health. Trees might also face potential damage from operation of heavy equipment, required utility relocation work, and unintended collisions with lower branches.

#### 3.4.1.3. Indirect Impacts Analysis Approach

Future development in the area identified in regional and municipal plans and other proposals might result in additional impacts on trees in the API. If the tree canopy were substantially altered, project effects could occur across disciplines. The cooling and shading benefits of trees affect energy use. Trees contribute to the maintenance of local air quality. The removal of a healthy tree canopy affects visual quality and diminishes habitat for birds and animals. Trees also provide benefits by retaining water and minimizing the impact of stormwater runoff from impervious surfaces. Tree replacement and landscaping at and around the project improvements could mitigate these impacts.

#### 3.4.1.4. Cumulative Impacts Analysis Approach

The cumulative impacts analysis focused on those impacts resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes such other actions. Cumulative impacts could result from individually minor but collectively significant actions that take place over time. Impacts on street and landscape trees could include the determination of net loss or gain of trees and tree canopy in conjunction with other projects throughout the region.

#### 3.4.1.5. Mitigation Measures Analysis Approach

The proposed project alternatives would be refined in future phases of design to avoid and minimize street and landscape tree impacts within the constraints of providing an acceptable rapid transit operating environment and serving travel destinations along the corridor. Where possible, the project would modify the design to avoid and minimize impacts on tree crowns and root systems. As with previous LTD projects where medium and large trees were identified as potentially impacted, an arborist and City Urban Forestry staff would conduct a tree survey to determine if the trees are classifiable as Heritage or Charter Trees. City Urban Forestry staff would review tree survey information, results, and conclusions compiled and submitted by project arborists. This may include charging Urban Forestry staff time to the project. The design would be refined to avoid impacts to trees with these classifications.

For significant impacts that cannot be avoided, LTD would identify project-specific mitigation that would be directly related to impacted street and landscape trees. In addition, LTD would analyze the long-term operational and short-term construction impacts on street and landscape trees to identify potential impacts that would need mitigation.

Where street tree removals were required, long-term impacts would be mitigated through planting new trees; replacing all removed trees at a ratio of at least one tree planted for one tree removed or as otherwise required by *Eugene Code*, Sections 6.300 – 6.330; and coordinating with the City Urban Forestry staff on the selection of tree species to be planted and their specific locations.

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

LTD would require the construction contractor to develop a Tree Protection Plan before construction. The plan would include, among other things, staging and scheduling practices that minimize the potential for harming trees close to the construction site. Implementing the plan would mitigate impacts related to construction activity. Best management practices (BMPs) for tree protection would be employed as specified through consultation with an International Society of Arboriculture (ISA) certified project arborist, a landscaping professional, and City Urban Forestry staff.

### 3.4.2. Changes from Original Analysis Approach

The impact analysis described in Section 3.4.1 deviated from the original methods because of the limited availability of existing conditions data. The modifications to the original methods included the following items:

- **Windshield surveys and field work to verify potential impacts on known Heritage and Charter Trees.** Windshield surveys and field walks to confirm tree impacts and classify them further will be completed after alternatives are selected and advanced to the next stage of design.
- **Tabulation of the exact number of potential short-term and long-term impacts on Heritage and Charter Trees by alternative.** A GIS inventory of known Charter Trees was not available to support the level of analysis needed to identify individual trees. An ISA-certified project arborist will conduct field review and confirmation after alternatives are selected and advanced to the next stage of design.

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# 4. Highway 99 Corridor Environmental Consequences

## 4.1. Affected Environment

The greatest concentration of street and landscape trees along the Highway 99 Corridor is at the northwestern end along Barger Drive and Echo Hollow Road. Street and landscape trees along the older and more residential southern side of Barger Drive are larger, but fewer in number, than those found on the northern side. Properties north of Barger Drive and along Echo Hollow Road contain newer commercial and residential developments and associated landscaping and street trees. Street and landscape trees and vegetation are present in landscaped areas between the sidewalk and parking areas and buildings to the north.

Much of the Highway 99 Corridor is next to areas with industrial and commercial/retail land uses that generally do not contain much landscaping. However, some properties do have street trees in planting strips between sidewalks and Highway 99 and Highway 99 contains a few medians planted with trees (most notably north of Roosevelt Boulevard).

The figures in Section 4.3, *Long-Term Direct Impacts,* depict the Highway 99 Corridor. Appendix C, *Existing Conditions Examples Along the Study Corridors,* of the *Visual and Aesthetic Technical Report* includes photographs from along this corridor, including a number of photographs of street and landscape trees.

## 4.2. Effects Common to Most or All Build Alternatives

No impacts on Charter Trees would be expected under any Highway 99 Corridor build alternative.

## 4.3. Long-Term Direct Impacts

Figures 4.3-1 and 4.3-2 provide overviews of the route of the Highway 99 Corridor. Appendix C: *Existing Conditions Examples Along the Study Corridors* of the *Visual and Aesthetic Technical Report* includes photographs from along the Highway 99 Corridor, including a number of photographs of street and landscape trees.

### 4.3.1. No-Build Alternative

No significant long-term direct impacts on Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Highway 99 Corridor No-Build Alternative.

### 4.3.2. Enhanced Corridor Alternative

Figure 4.3-1 shows probable impacts to medium and large trees along the Highway 99 Corridor Enhanced Corridor Alternative. The second column of Table 4.3-1 summarizes the potential of impacts to medium and large trees from construction of the Highway 99 Corridor Enhanced Corridor Alternative for areas within, and outside, the Charter Tree Boundary. Note than none of the Highway 99 Corridor is located within the Charter Tree Boundary.

**Figure 4.3-1. Highway 99 Corridor Enhanced Corridor Alternative Potential Impacts to Medium and Large Trees – Corridor Extent**

**Figure 4.3-2. Highway 99 Corridor EmX Alternative Potential Impacts to Medium and Large Trees – Corridor Extent**


Document Path: \\PDXFPP01\Proj\LaneTransitDistrict\65795 8EugeneBRT\GIS\MapFiles\Environmental_Analysis\Level2_Corricor_EnviroAnalysis_Basemap_CorricorExtent_StreetTrees_Hwy99EmX_Heritage.mxd 5:20:50 PM

Because the corridor has relatively few existing medium and large trees, and due to the intermittent nature of construction that would occur with this alternative, potential impacts to street and landscape trees would be relatively low compared to other alternatives. Three percent of the corridor would have a high probability for impacts to medium and large trees and three percent would have a moderate probability. Twelve percent would have a low probability, and 81 percent would have no potential impacts to medium and large trees. Between 0 and 14 medium and large street trees along the corridor would be potentially removed. The removals would occur near proposed station locations, particularly Barger Street and Cubit Avenue and Roosevelt Avenue. Appendix E, *Detailed Impact Tables by Alternative,* provides detailed information related to the number, location, size, etc. of potentially removed trees along the Highway 99 Corridor Enhanced Corridor Alternative. Appendix F, *Detailed Impact Figures by Alternative,* graphically depicts the locations of potential impacts along the corridor to a greater degree than Figure 4.3-1 does.

**Table 4.3-1. Highway 99 Corridor Potential Impacts to Medium and Large Trees**

| | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|
| **Inside the Charter Tree Boundary** | | |
| ***Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted*** | | |
| High | NA | NA |
| Moderate | NA | NA |
| Low | NA | NA |
| None | NA | NA |
| Total Corridor Length | NA | NA |
| ***Number and Type of Medium and Large Trees Potentially Removed*** | | |
| | NA | NA |
| **Outside the Charter Tree Boundary** | | |
| ***Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted*** | | |
| High | 2,280 (3%) | 2.360 (3%) |
| Moderate | 2,760 (3%) | 2,880 (3%) |
| Low | 11,610 (13%) | 10,250 (12%) |
| None | 69,634 (81%) | 67,147 (81%) |
| Total Corridor Length | 86,284 | 82,637 |
| ***Number and Type of Medium and Large Trees Potentially Removed*** | | |
| | 14 street and 0 landscape trees | 31 street and 7 to 9 landscape trees |

NA = not applicable because no construction would occur in this area.

During the design refinement phase, trees the project would potentially impact would be assessed by an ISA-certified project arborist to confirm their tree-classification status, their health, and any measures that could be employed to avoid and minimize potential impacts.

### 4.3.3. EmX Alternative

Figure 4.3-2 shows the locations of probable impacts to medium and large trees along the Highway 99 Corridor EmX Alternative. The third column of Table 4.3.1 summarizes the probability of impacts to medium and large trees from construction of the Highway 99 Corridor EmX Alternative for areas outside of the Charter Tree Boundary. None of the EmX Alternative would be located within the Charter Tree Boundary. The areas where there would be high and moderate probability of impacts to medium and large trees would total approximately 6 percent of the route. Twelve percent would have a low probability, and the remaining 81 percent would have no potential impacts to medium and large trees. Of the 31 street trees and 7 to 9 landscape trees that would be potentially removed with this alternative, 15 street trees and 7 to 9 landscape trees would be potentially removed along Barger Drive between Echo Hollow Road/Cubit Street and Empire Park Drive. Appendix E, *Detailed Impact Tables by Alternative* provides detailed information related to the number, location, size, etc. of potentially removed trees along the Highway 99 Corridor Enhanced Corridor Alternative. Appendix F, *Detailed Impact Figures by Alternative,* graphically depicts the locations of potential impacts along the corridor to a greater degree than Figure 4.3-2 does.

During the design refinement phase, trees the project would potentially impact would be assessed by project staff including an ISA-certified project arborist to confirm their tree classification status, their health, and any measures that could be employed to avoid and minimize potential impacts.

## 4.4. Indirect and Cumulative Effects

Future development in the area identified in regional and municipal plans and other reasonably foreseeable future actions may result in additional impacts to trees in the API. If the tree canopy were substantially altered, project effects could occur across disciplines. The cooling and shading benefits of trees affect energy use. The removal of a healthy tree canopy affects visual quality and diminishes habitat for birds and animals. Trees also provide benefits by retaining water and minimizing the impact of stormwater runoff from impervious surfaces. However, all these impacts could be mitigated by providing tree replacement and landscaping around proposed improvements.

### 4.4.1. No-Build Alternative

No significant indirect or cumulative effects related to Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Highway 99 Corridor No-Build Alternative.

### 4.4.2. Enhanced Corridor Alternative

No significant indirect or cumulative effects related to potentially removing existing street trees would be expected under the Highway 99 Corridor Enhanced Corridor Alternative.

### 4.4.3. EmX Alternative

No significant indirect or cumulative effects related to potentially removing existing street and landscape trees would be expected under the Highway 99 Corridor EmX Alternative.

## 4.5. Short-Term Construction-Related Impacts

Construction activities could affect trees beyond the direct impacts of roadway widening accounted for above. Areas of street reconstruction would require excavation and compaction of new base materials where BAT lanes, concrete bus pads, and concrete intersection pads are proposed. Excavation could impact shallow root systems and affect tree health. Trees may also face potential damage from operation of heavy equipment and unintended collisions with lower branches.

### 4.5.1. No-Build Alternative

No significant short-term impacts to Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Highway 99 Corridor No-Build Alternative.

### 4.5.2. Enhanced Corridor Alternative

Potential short-term construction-related impacts to street and landscape trees under the Highway 99 Corridor Enhanced Corridor Alternative might occur in the following location:

- Highway 99 at Roosevelt Boulevard because of intersection widening and modifications. The existing median and its associated street trees on the north side of the intersection would be preserved but excavation would take place adjacent to them.

During the design refinement phase, trees the project might potentially impact would be assessed by project staff including an ISA-certified project arborist to confirm their tree-classification status, their health, and any measures that could be employed to avoid and minimize potential impacts.

### 4.5.3. EmX Alternative

Most of the scope of construction that involves significant excavation adjacent to street and landscape trees would be confined to intersections and station areas under the Highway 99 Corridor EmX Alternative. Restriping and overlay activities along Highway 99 generally would not be expected to result in excavation that would potentially impact root zones of street trees.

Potential short-term construction-related impacts to street trees would be expected in the following location:

- Highway 99 at Roosevelt Boulevard because of intersection widening and modifications. The existing median and its associated street and landscape trees on the north side of the intersection would be preserved, but excavation would take place adjacent to them.

Potential short-term construction-related impacts to landscape trees would be expected in the following location:

- The north side of Barger Road where sidewalk construction would be adjacent to mature landscape trees on private property. Excavation and construction equipment might damage these trees or require that they be limbed.

During the design refinement phase, trees the project might potentially impact would be assessed by project staff including an ISA-certified project arborist to confirm their tree-classification status, their health, and any measures that could be employed to avoid and minimize potential impacts.

## 4.6. Potential Mitigation Measures

### 4.6.1. No-Build Alternative

No potential mitigation measures would be required under the Highway 99 Corridor No-Build Alternative.

### 4.6.2. Common to All Build Alternatives

Under the Highway 99 Corridor build alternatives, proposed sidewalks in areas where street trees would be impacted would be wide enough to incorporate a landscape strip into which new street trees could be planted. Where street tree removals would be required, long-term impacts would be mitigated through planting new trees; replacing all removed trees at a ratio of at least one tree planted for one tree removed or as otherwise required by *Eugene Code,* Sections 6.300 – 6.330; and coordinating with the City Urban Forestry staff on the selection of tree species to be planted, their specific locations, and provision of adequate soil conditions per City of Eugene standards.

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

LTD would require the construction contractor to develop a Tree Protection Plan before construction. The plan would include, among other things, staging and scheduling practices that minimize the potential for harming trees close to the construction site. Implementing the plan would mitigate impacts related to construction activity. BMPs for tree protection would be employed as specified through consultation with an ISA-certified project arborist, a landscaping professional, and City Urban Forestry staff. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

### 4.6.3. Enhanced Corridor Alternative

An ISA-certified project arborist would engage with City Urban Forestry staff would need to further analyze the medium and large street trees at Roosevelt Boulevard and the medium and large landscape trees on Barger Drive to establish tree classification. If impacts to these or other street and landscape trees were determined to be significant, adjustment of bus stop locations and geometric features to preserve these trees would be explored in the design refinement phase of the Highway 99 Corridor Enhanced Corridor Alternative.

### 4.6.4. EmX Alternative

Where landscape tree removals would be required on Cubit Street and along Barger Drive, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

For the Highway 99 Corridor EmX Alternative, an ISA-certified arborist and City Urban Forestry staff would need to further analyze the medium and large street trees at Roosevelt Boulevard and the medium and large landscape trees on Barger Drive to establish tree classification. If impacts to these or

other street and landscape trees were determined to be significant, adjustments of station locations and geometric features to preserve these trees would be explored in the design refinement phase.

## 4.7. Permits and Approvals

Table 4.7-1 lists permits and approvals that may be required for tree removal in the Highway 99 Corridor.

**Table 4.7-1. Highway 99 Corridor Alternatives Permits and Approvals**

| Permits and Approvals | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Street Tree Removal Permit (R-6305-C3) | | ✓ | ✓ |
| Oregon Department of Transportation Plan Review and Permits | | ✓ | ✓ |

Source: *Eugene Code*, Chapter 9, "Land Use; Tree Preservation and Removal Standards."

# 5. River Road Corridor Environmental Consequences

## 5.1. Affected Environment

Street and landscape trees are common along the majority of the River Road Corridor. Numerous places along River Road have mature canopies formed by street trees that line the edges of the road, sidewalks, and landscape trees on adjacent properties. The tree canopy continues east and west along many streets that intersect River Road, particularly north of the Northwest Expressway.

Figures in Section 5.2, *Long-Term Direct Impacts*, depict the River Road Corridor. Appendix C, *Existing Conditions Examples Along the Study Corridors,* of the *Visual and Aesthetic Technical Report* includes photographs from along this corridor, including a number of photographs of street and landscape trees.

## 5.2. Long-Term Direct Impacts

### 5.2.1. No-Build Alternative

No significant probability of long-term direct impacts to medium and large trees would be expected under the River Road Corridor No-Build Alternative. The existing street trees on this corridor from Railroad Boulevard to Corliss Lane are cherry trees, which are not on the City Urban Forestry Department's list of approved species. Presently, these trees are in poor health, over mature, and require extensive maintenance. An adverse effect of the No-Build Alternative would result from leaving these trees in-place without replanting.

### 5.2.2. Enhanced Corridor Alternative

Table 5.2-1 summarizes the probability of impacts to medium and large trees along portions of the River Road Corridor within, and outside of, the Charter Tree boundary. Within the Charter Tree boundary, the Enhanced Corridor Alternative would have a high or moderate probability of impacting medium and large trees along less than two percent of the corridor. Construction of a bus stop on Chambers Street at W. 1st Avenue would result in potential impacts to trees within the Charter Tree boundary. Design refinement activities should include having an ISA-certified arborist submit findings of a field assessment of trees in this area confirming tree classification status to City Urban Forestry staff for review. Where impact probability to large trees within the Charter Tree boundary have been identified, an ISA-certified project arborist would conduct a field assessment of potentially impacted trees to confirm tree classification status and submit to City Urban Forestry staff for review. If a Charter Tree would be subject to impact, the design would be refined to avoid this impact. A mitigation option shifting the proposed bus stop to another location in order to avoid tree impacts is available for review in the *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017). Bus stop construction elsewhere on the corridor beyond the Charter Tree boundary might impact street and landscape trees whose status as potential Heritage Trees should be verified using the mitigation measures identified in Section 5.5.

Beyond the Charter Tree boundary, the alternative would have a high or moderate potential of impacting medium and large trees along 16 percent of the route, and low or no potential along the remaining 84 percent. Figures 5.2-1 and 5.2-2 show the locations of probable impacts to medium and large trees along the River Road Enhanced Corridor Alternative within, and outside of, the Charter Tree boundary. Nine to 13 street trees along River Road (mostly between Ruby and Santa Clara Avenues)

would be potentially removed by this alternative. Appendix E, *Detailed Impact Tables by Alternative* provides detailed information related to the number, location, size, etc. of potentially removed trees along the River Road Enhanced Corridor Alternative. Appendix F, *Detailed Impact Figures by Alternative,* includes figures that graphically depict the locations of potential impacts along the corridor to a greater degree than Figures 5.2-1 and 5.2-2 do.

**Table 5.2-1. River Road Corridor Potential Impacts to Medium and Large Trees**

| | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|
| **Inside the Charter Tree Boundary** | | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | | |
| High | 300 (1%) | 600 (2%) |
| Moderate | 410 (1%) | 1,880 (5%) |
| Low | 0 (0%) | 700 (2%) |
| None | 39,354 | 32,911 (91%) |
| Total Corridor Length | 40,064 | 36,091 |
| **Number and Type of Medium and Large Trees Potentially Removed** | | |
| | 0 | 14 street and<br>0 landscape trees |
| **Outside the Charter Tree Boundary** | | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | | |
| High | 2,940 (9%) | 4,120 (11%) |
| Moderate | 2,320 (7%) | 5,260 (14%) |
| Low | 17,740 (51%) | 11,480 (32%) |
| None | 11,481 (33%) | 15,507 (43%) |
| Total Corridor Length | 34,481 | 36,367 |
| **Number and Type of Medium and Large Trees Potentially Removed** | | |
| | 9 to 13 street and 0 landscape trees | 98 to 118 street and<br>0 landscape trees |

**Figure 5.2-1. River Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Corridor Extent**

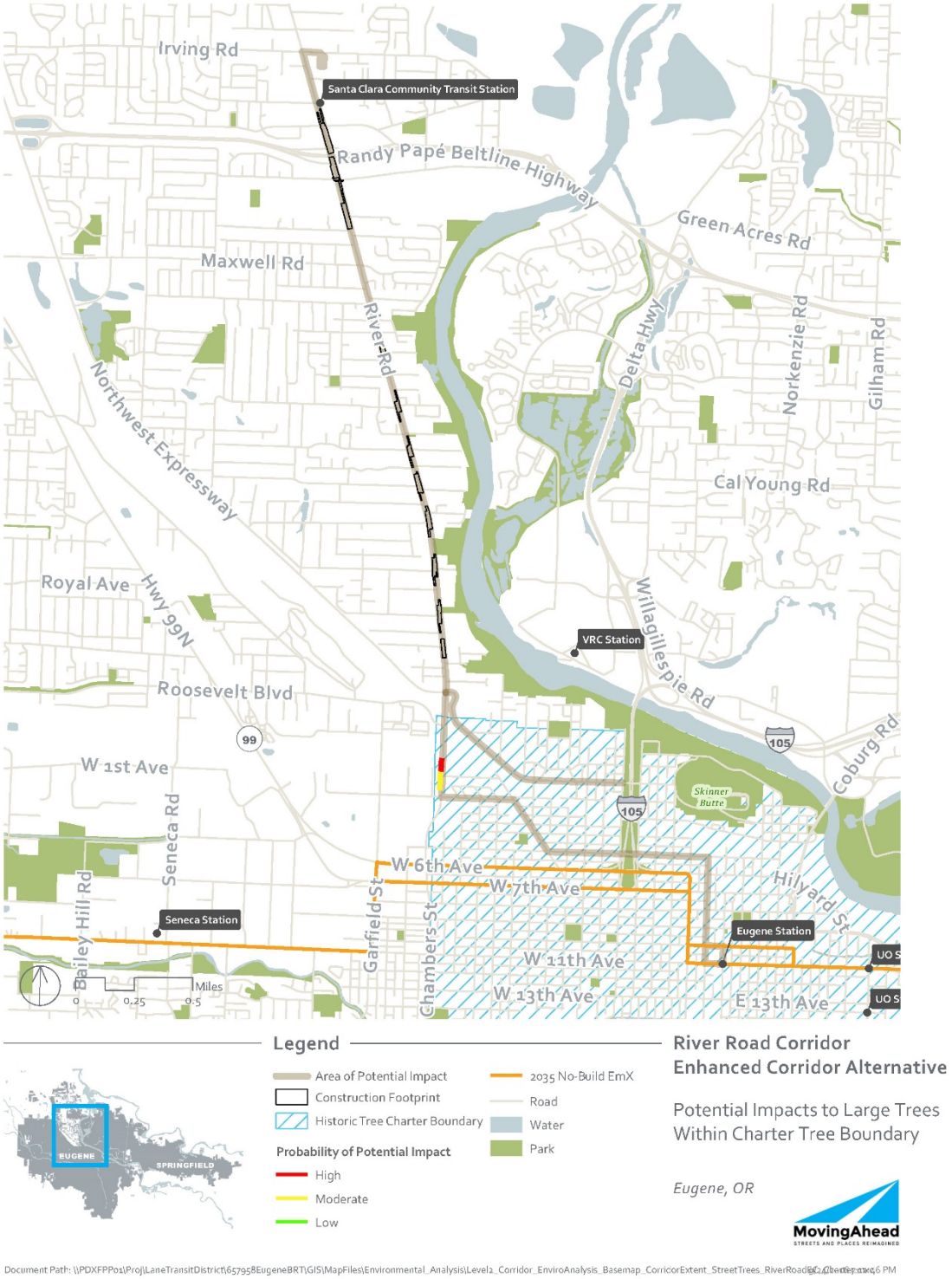

**Figure 5.2-2. River Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Corridor Extent**


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### 5.2.3. EmX Corridor Alternative

Figure 5.2-3 depicts areas where there would be probable impacts to medium and large trees within the Charter Tree boundary and Figure 5.2-4 depicts probable impacts outside the boundary. The third column in Table 5.2-1 summarizes the probability of impacts to medium and large trees from construction of the River Road Corridor EmX Alternative. Approximately 7 percent of the portion of the corridor within the Charter Tree Boundary would have a high or moderate likelihood of impacting medium and large trees, 2 percent would have a low probability, and 91 percent would have no probability. The EmX Alternative would potentially remove 14 medium and large trees within the Charter Boundary, mostly along Chambers Street between Railroad Boulevard and W 5th Avenue.

Outside of the Charter Tree boundary, the River Road EmX Corridor Alternative would have high probability to impact medium and large trees along 11 percent of the corridor, a moderate probability on 14 percent, a low likelihood along 32 percent of the route, and no probability along 43 percent. This alternative would potentially remove between 98 and 118 medium and large street trees outside of the Charter Tree boundary. The primary areas along River Road where these trees would be removed would include the area between Randy Papé Beltline and Santa Clara Avenue; Maxwell Road and Silver Lane; Horn Lane and Maxwell Road; and Hawthorne Avenue and Elkay Drive. Appendix E, *Detailed Impact Tables by Alternative,* provides detailed information regarding the number, location, sizes, etc., of potentially removed medium and large trees along the River Road Corridor. The overall lengths expressed may be up to the total length of the corridor multiplied by two to account for impacts on both sides of the roadway. Appendix F, *Detailed Impact Figures by Alternative,* contains figures that graphically depict the locations of potential impacts along the corridor to a greater degree than Figures 5.2-3 and 5.2-4 do.

During the design refinement phase, trees potentially impacted by the alternative would be assessed by project staff including an ISA-certified project arborist to confirm their tree classification status, their health, and any measures that could be employed to avoid and minimize potential impacts. City Urban Forestry staff identified street trees between Railroad Boulevard and Santa Clara Avenue as cherry trees, which are not on the City's approved species list for street trees. Presently, these trees are in poor health, over mature, and require extensive maintenance (City of Eugene, 2015, June 23). They might require replacement in the long term, even if proposed construction under the River Road Corridor EmX Alternative would not directly impact these trees. Design refinement activities should include a field assessment of these potentially impacted trees by an ISA-certified arborist to verify their species and overall health.

Where potential impacts to medium and large trees within the Charter Tree boundary have been identified, an ISA-certified arborist would conduct a field assessment of potentially impacted trees to confirm the tree-classification status and report their findings to City Urban Forestry staff for review. If a Charter Tree would be impacted, the design would be refined to avoid this impact. This would most likely result in the minor adjustment of bus stop locations within the proposed construction footprint.

**Figure 5.2-3. River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Corridor Extent**

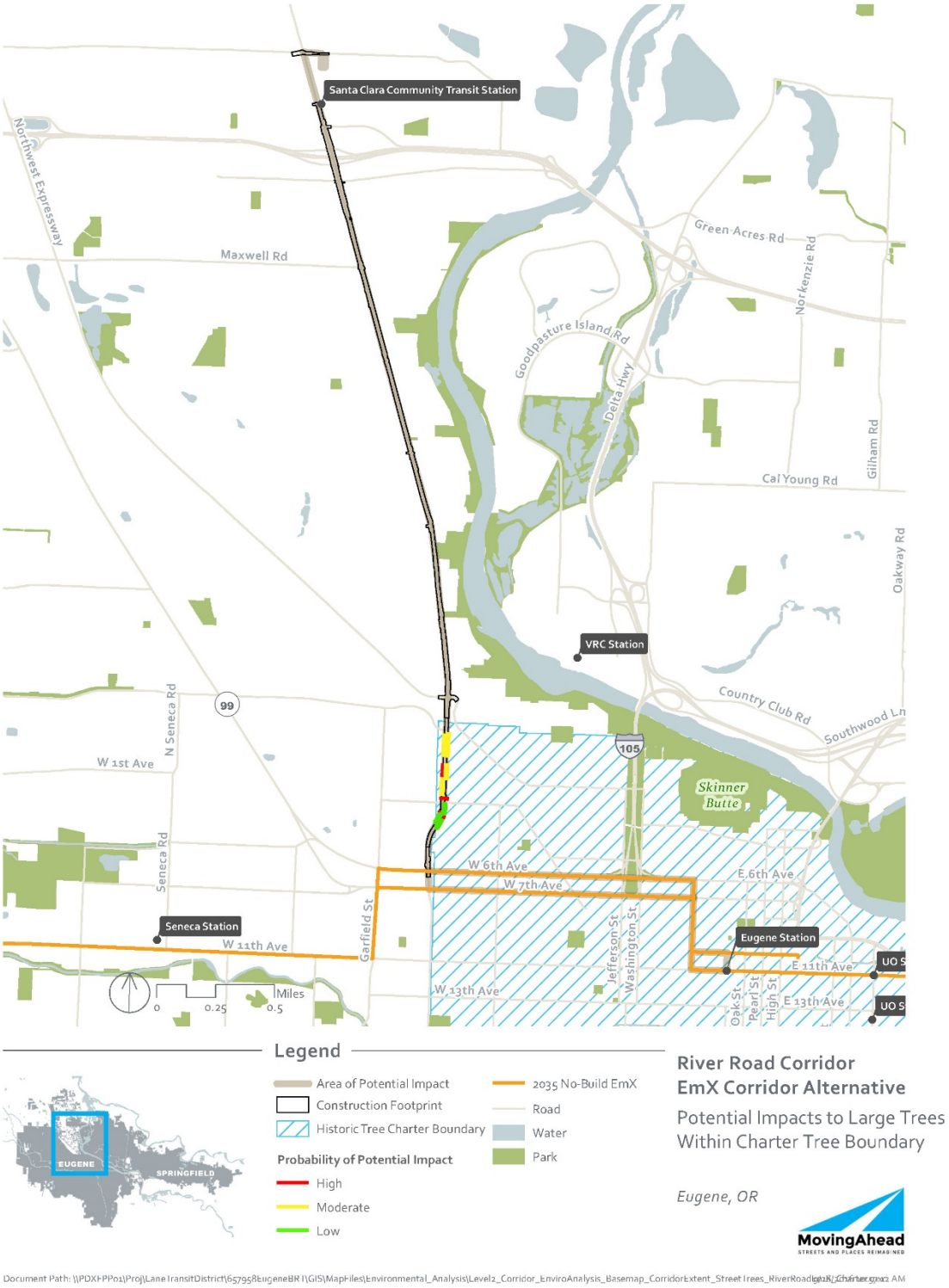
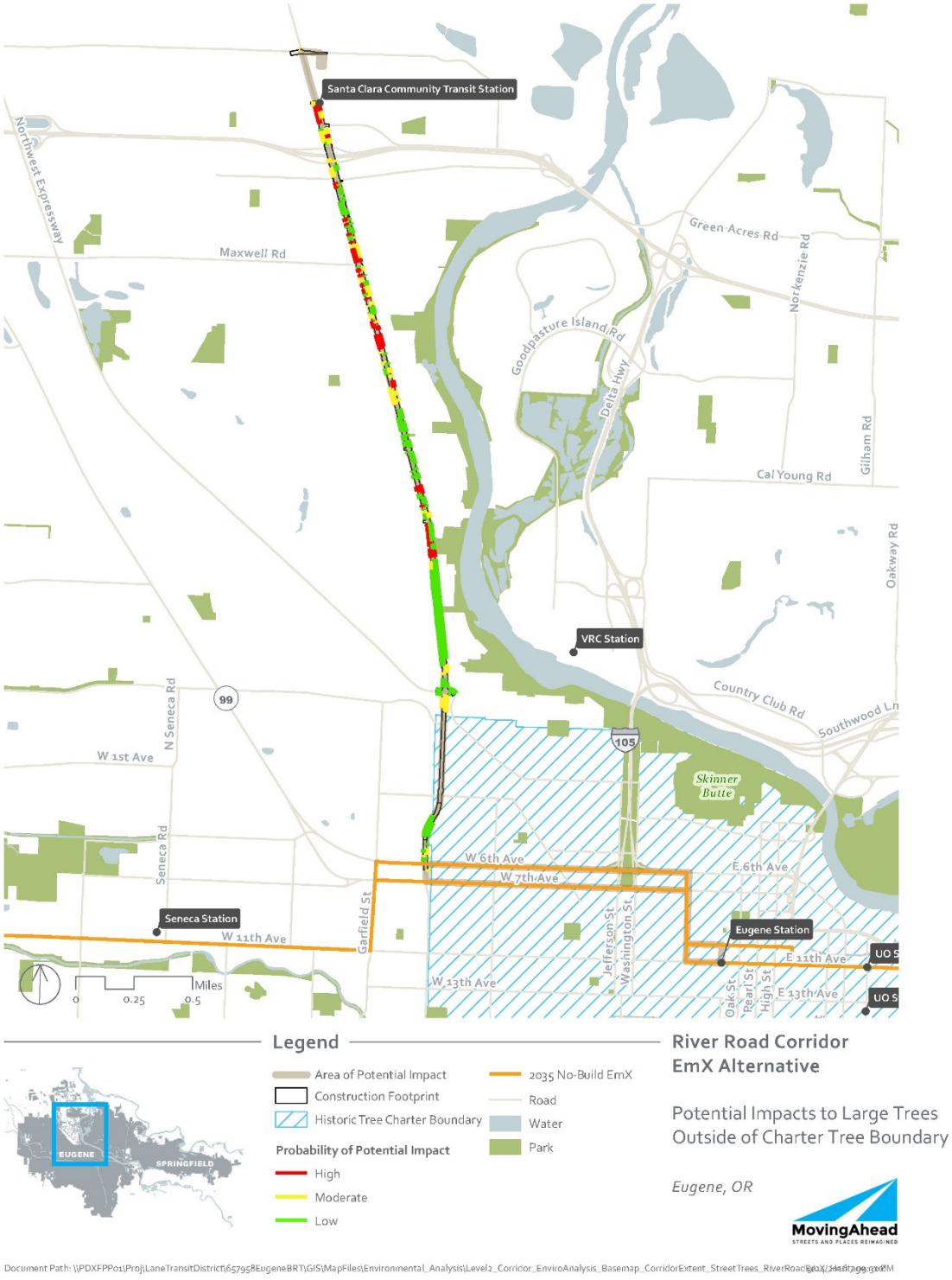


**Figure 5.2-4. River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Corridor Extent**



## 5.3. Indirect and Cumulative Effects

Future development in the area identified in regional and municipal plans and other reasonably foreseeable future actions may result in additional impacts to trees in the API. If the tree canopy were substantially altered, project effects could occur across disciplines. The cooling and shading benefits of trees affect energy use. The removal of a healthy tree canopy affects visual quality and diminishes habitat for birds and animals. Trees also provide benefits by retaining water and minimizing the impact of stormwater runoff from impervious surfaces. However, all these impacts could be mitigated by providing tree replacement and landscaping around proposed improvements.

### 5.3.1. No-Build Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the River Road Corridor No-Build Alternative.

### 5.3.2. Enhanced Corridor Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the River Road Corridor Enhanced Corridor Alternative. In accordance with City statute and best practices, removed trees would be replaced in-kind.

### 5.3.3. EmX Alternative

The multi-use path proposed on River Road between Silver Lane and Division Avenue would preclude the replacement of displaced street and landscape trees along this stretch, resulting in a permanent loss of street and landscape trees in this area for a length of approximately 900 feet. Other locations would be identified to perform mitigation planting to offset the loss of trees in this area under the River Road Corridor EmX Alternative.

## 5.4. Short-Term Construction-Related Impacts

Construction activities could affect trees beyond the direct impacts of roadway widening accounted for above. Areas of street reconstruction would require excavation and compaction of new base materials where BAT lanes, concrete bus pads, and concrete intersection pads are proposed. Excavation could impact shallow root systems and affect tree health. Trees may also face potential damage from operation of heavy equipment and unintended collisions with lower branches.

### 5.4.1. No-Build Alternative

No significant short-term impacts on Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the River Road Corridor No-Build Alternative.

### 5.4.2. Enhanced Corridor Alternative

No significant short-term impacts on Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Enhanced Corridor Alternative. There might be some minor short-term impacts to street and landscape trees directly adjacent to bus stop construction.

### 5.4.3. EmX Alternative

There would be the potential for root-zone impacts on existing street and landscape trees, including some medium and large trees, because of excavation for the construction of BAT lanes within the existing roadway on River Road between Railroad Boulevard and Owosso Drive. There could be some minor short-term impacts on street and landscape trees directly adjacent to station construction. City Urban Forestry identified these trees as cherry trees, which are not on the City of Eugene's approved species list for street trees. Presently, these trees are over mature, in poor health, and require extensive maintenance. They might require replacement in the long term, even if the proposed construction under the River Road Corridor EmX Alternative would not directly impact these trees.

## 5.5. Potential Mitigation Measures

### 5.5.1. No-Build Alternative

No potential mitigation measures would be required under the River Road Corridor No-Build Alternative.

### 5.5.2. Common to All Build Alternatives

Under the River Road Corridor build alternatives, proposed sidewalks in areas where street trees would be impacted would be wide enough to incorporate a landscape strip into which new street trees could be planted. Where street tree removals would be required, long-term impacts would be mitigated through planting new trees; replacing all removed trees at a ratio of at least one tree planted for one tree removed or as otherwise required by *Eugene Code,* Sections 6.300 – 6.330; and coordinating with the City Urban Forestry staff on the selection of tree species to be planted, their specific locations, and provision of adequate soil conditions per City of Eugene standards.

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

LTD would require the construction contractor to develop a Tree Protection Plan before construction. The plan would include, among other things, staging and scheduling practices that minimize the potential for harming trees close to the construction site. Implementing the plan would mitigate impacts related to construction activity. BMPs for tree protection would be employed as specified through consultation with an ISA-certified project arborist, a landscaping professional, and City Urban Forestry staff. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

### 5.5.3. Enhanced Corridor Alternative

Where potential impacts to medium and large trees have been identified in Sections 5.2.2 and 5.4.2, an ISA-certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit their findings to City Urban Forestry staff for review. If a Charter Tree or Heritage Tree would be subject to impact, the design would be refined to avoid this impact. This would most likely result in the minor adjustment of bus stop locations within the proposed construction footprint of the River Road Corridor Enhanced Corridor Alternative.

### 5.5.4. EmX Alternative

Where potential impacts to medium and large trees have been identified in Sections 5.2.3 and 5.4.3, an ISA certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit their findings to City Urban Forestry staff for review. If a Charter Tree or Heritage Tree would be subject to impact, the design would be refined to avoid this impact. This would most likely result in the minor adjustment of station locations within the proposed construction footprint of the River Road Corridor EmX Alternative.

## 5.6. Permits and Approvals

Table 5.6-1 lists permits and approvals that may be required for tree removal in the River Road Corridor.

**Table 5.6-1. River Road Corridor Alternatives Permits and Approvals**

| Permits and Approvals | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Street Tree Removal Permit (R-6305-C3) | | ✓ | ✓ |

Source: *Eugene Code*, Chapter 9, "Land Use; Tree Preservation and Removal Standards."

# 6. 30th Avenue to Lane Community College Corridor Environmental Consequences

## 6.1. Affected Environment

The species and ages of street and landscape trees planted along the portion of the 30th Avenue to LCC Corridor route that would pass through downtown Eugene via Oak and Pearl Streets are varied. Many medium and large street and landscape trees are mature and form wide canopies over streets, sidewalks, and adjacent properties in some areas. The portion of the proposed corridor that would connect Oak Street and Amazon Parkway would extend E. 20th Avenue eastward through the streets right-of-way. The right-of-way passes through the north end of a paved lot used for parking which has no landscape or street trees. Street trees are found along parts of Amazon Parkway south of Civic Stadium and the western part of E. 30th Avenue. These street trees are not as old as most trees found downtown and generally do not form full canopies. Their generally younger ages reflect the later dates of development of the adjacent areas. The portion of the routes east of the residential area that E. 30th Avenue passes through to just west of LCC is primarily undeveloped. Trees on the heavily vegetated lands adjacent to most of the road in this part of the corridor are a mix of coniferous and deciduous natives. There are few street trees within the road ROW in this part of the corridor.

Figures in Section 6.2, *Long-Term Direct Impacts*, indicate the routes of the 30th Avenue to LCC Corridor. Appendix C: *Existing Conditions Examples Along the Study Corridors* of the *Visual and Aesthetic Technical Report* includes photographs from along this corridor, including a number of photographs of street and landscape trees.

## 6.2. Long-Term Direct Impacts

### 6.2.1. No-Build Alternative

No significant long-term direct impacts to Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the 30th Avenue to LCC Corridor No-Build Alternative.

### 6.2.2. Enhanced Corridor Alternative

Figures 6.2-1 and 6.2-2 show locations where the 30th Avenue to LCC Corridor Enhanced Corridor Alternative would likely impact medium and large trees within, and outside of, the Charter Tree boundary. As indicated in Table 6.2.-1, 11 percent of the portion of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative that would be located within the Charter Tree boundary would have a high probability of impacting medium and large trees and another 3 percent would have a moderate probability. There would be low, or no, likelihood of impacting trees along the remaining 86 percent of the corridor within the Charter Tree boundary. This alternative would potentially remove 49 to 54 medium and large trees with in the Charter Tree boundary along Oak Street (between E. 13th and E. 14$^{th}$ Avenues) and Pearl Street (between E. 12th and E. 16th Avenues.

**Figure 6.2-1. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Corridor Extent**

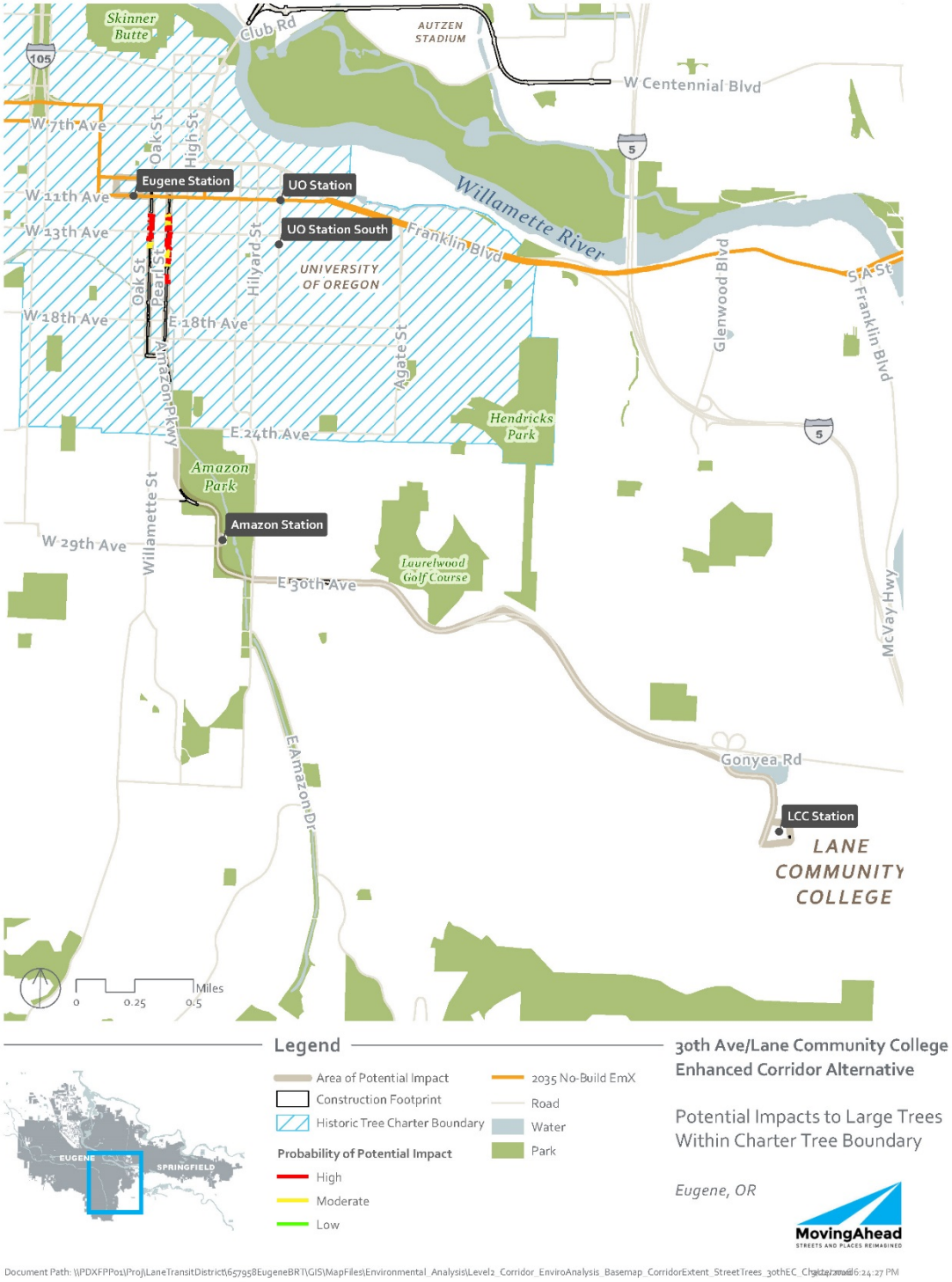


**Figure 6.2-2. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Corridor Extent**

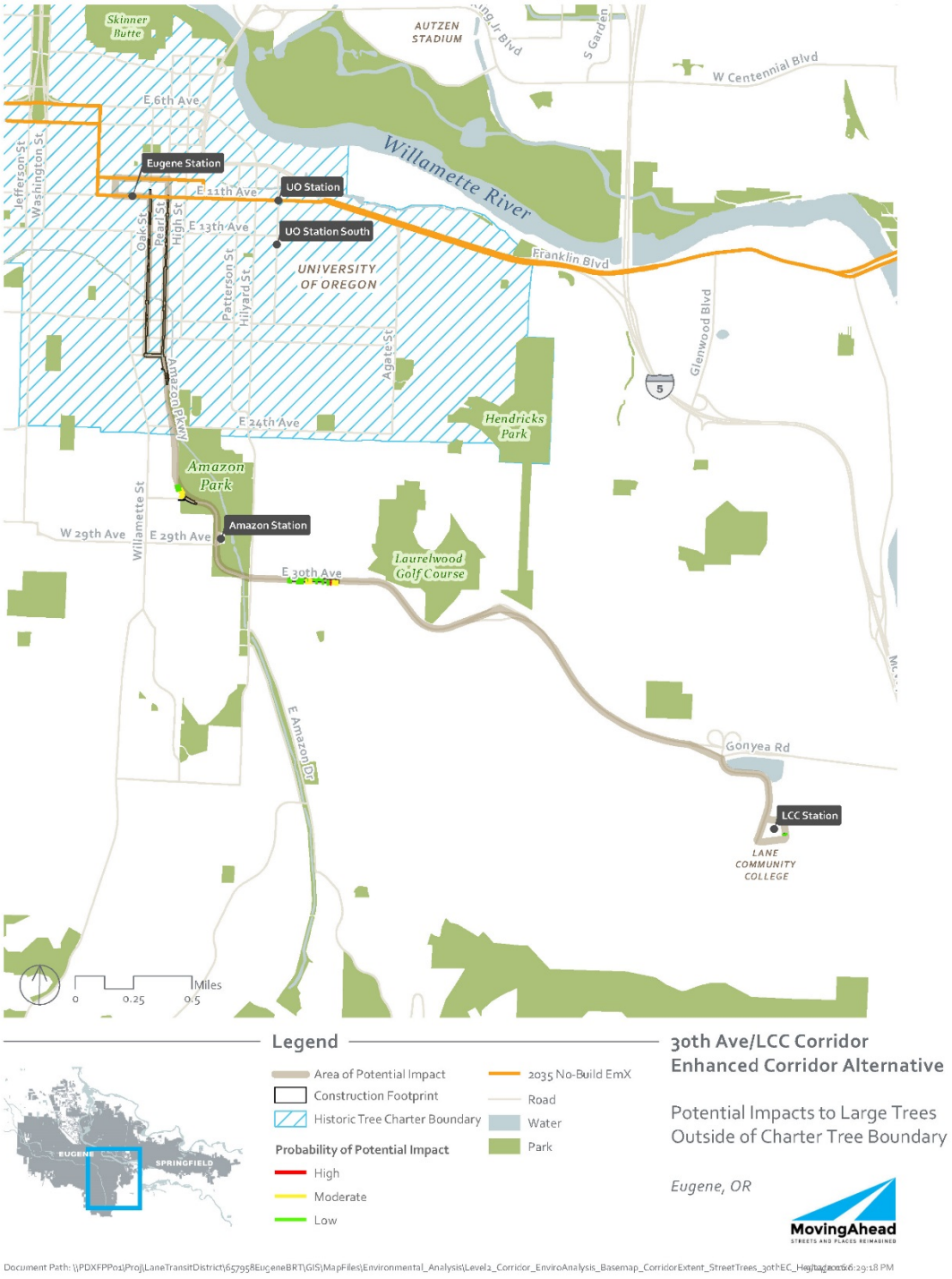


**Table 6.2-1. 30th Avenue to Lane Community College Corridor Potential Impacts to Medium and Large Trees**

| | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|
| **Inside the Charter Tree Boundary** | | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | | |
| High | 2,630 (11%) | 5,440 (17%) |
| Moderate | 700 (3%) | 2,570 (8%) |
| Low | 30 <1%) | 1,620 (5%) |
| None | 21,067 (86%) | 21,986 (70%) |
| Total Corridor Length | 24,427 | 31,616 |
| **Number and Type of Medium and Large Trees Potentially Removed** | | |
| | 49 to 54 streets and 0 landscape trees | 98 streets and 0 landscape trees |
| **Outside the Charter Tree Boundary** | | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | | |
| High | 40 (<1%) | 40 (<1%) |
| Moderate | 720 (2%) | 1,340 (3%) |
| Low | 1,020 (2%) | 3,990 (10%) |
| None | 39,887 (96%) | 36,297 (87%) |
| Total Corridor Length | 41,667 | 41,667 |
| **Number and Type of Medium and Large Trees Potentially Removed** | | |
| | 0 street and 2 to 4 landscape trees | 0 street and 2 to 4 landscape trees |

Outside of the Charter Tree boundary, the Enhanced Corridor Alternative would have a high probability of impacting medium and large trees along one percent of the route and a moderate probability along two percent. It would have a low probability along 2 percent of the corridor and no likelihood of having impacts to medium and large trees along the remaining 95 percent of this portion of the route. Between two and four medium and large landscape trees outside of the Charter Tree boundary would likely be impacted. Appendix E, *Detailed Impact Tables by Alternative,* provides detailed information related to the number, location, size, etc. of potentially removed trees along the Enhanced Corridor Alternative. Appendix F, *Detailed Impact Figures by Alternative,* includes figures that graphically depict the locations of potential impacts along the corridor to a greater degree than Figures 6.2-1 and 6.2-2 do.

Construction activities in this alternative are generally limited to restriping of the existing roadway to provide buffered bike lanes, stop and bus-pad construction, and some limited reconstruction of curbs. The construction of the extension of E. 20th Avenue to Amazon Parkway would create new landscape strips within the Charter Tree boundary that could be used to plant new street trees. Where the probability of tree impacts has been identified, an ISA-certified project arborist should conduct a field

assessment of potentially impacted trees to confirm the tree-classification status and submit to City Urban Forestry staff for review. If a Charter Tree would be subject to impact, the design might be refined to avoid this impact. This would most likely result in the minor adjustment of bus stop locations or movement/removal of proposed parking/loading pullouts within the proposed construction footprint of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative.

### 6.2.3. EmX Alternative

Figures 6.2-3 and 6.2-4 show locations where the 30th Avenue to LCC Corridor EmX Corridor Alternative would likely impact medium and large trees within, and outside of, the Charter Tree boundary. As indicated in Table 6.2-1, approximately 17 percent of the portion of the 30th Avenue to LCC Corridor EmX Alternative within the Charter Tree boundary would have a high probability of impacting medium and large trees and another 8 percent would have a moderate probability. Five percent would have a low probability and 70 percent would have no likelihood of impacting medium and large trees. The EmX Alternative would impact 98 street trees within the Charter Tree boundary.

Most of the impacted trees would be located on Pearl Street between W. 11th and W. 17th Avenues (54), on Oak Street between W. 11th and 17th Avenues (34), and on Oak Street between E. 19th and E. 20th Avenues (9). Appendix E, *Detailed Impact Tables s by Alternatives,* provides detailed information related to number, location, size, etc. of trees that would likely be impacted. Appendix F, *Detailed Impact Figures by Alternative,* graphically depicts the locations of potential impacts along the corridor to a greater degree than Figures 6.2-3 and 6.2-4 do.

Despite a similar construction footprint, the 30th Avenue to LCC Corridor EmX Alternative would have more probability of potential impacts to large trees within the Charter Tree boundary than the Enhanced Corridor Alternative. Construction activities in this alternative would include full-depth excavation of the existing roadway adjacent to planting strips to construct concrete BAT lanes in downtown Eugene. Because this excavation might potentially be deeper than the existing roadbed, there is a potential for impact to the root zones of trees. Station construction also potentially impacts trees within the Charter Tree boundary.

Outside of the Charter Tree boundary, the EmX Alternative would have a high probability of impacting medium and large trees along one percent of the route and a moderate probability along three percent. It would have a low probability along 10 percent of the corridor and no likelihood of having impacts to medium and large trees along the remaining 87 percent of this portion of the route. Between two and four medium and large landscape trees outside of the Charter Tree boundary would likely be impacted.

Construction of the extension of E. 20th Avenue to Amazon Parkway would create new landscape strips within the Charter Tree boundary that could be used to plant new street trees.

Where a probability of potential tree impacts has been identified, an ISA-certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit to City Urban Forestry staff for review. If a Charter Tree would be subject to impact, the design might be refined to avoid this impact. This would most likely result in the minor adjustment of station locations or movement/removal of proposed parking/loading pullouts within the proposed construction footprint of the 30th Avenue to LCC Corridor EmX Alternative.

**Figure 6.2-3. 30th Avenue to Lane Community College Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary– Corridor Extent**

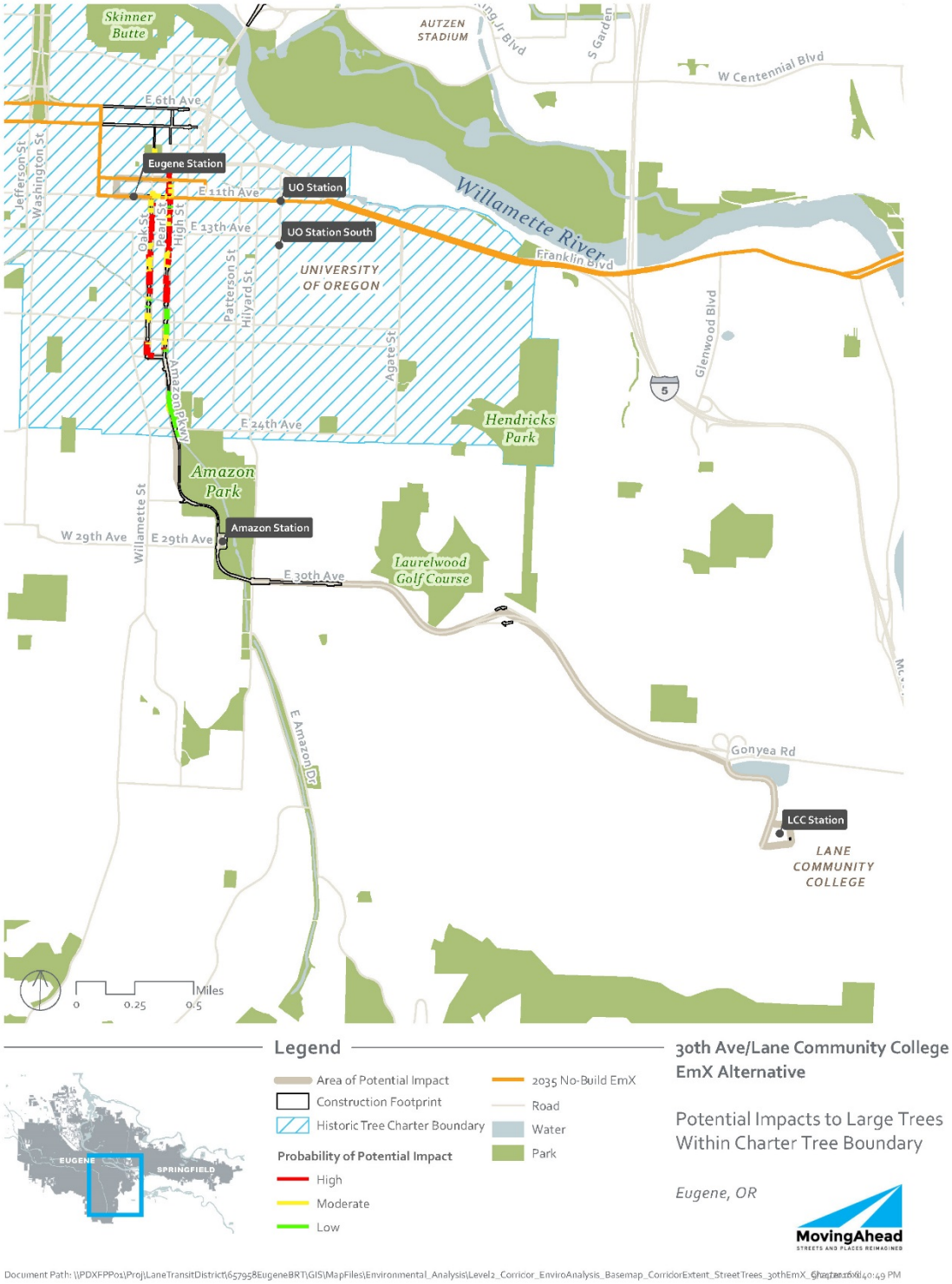
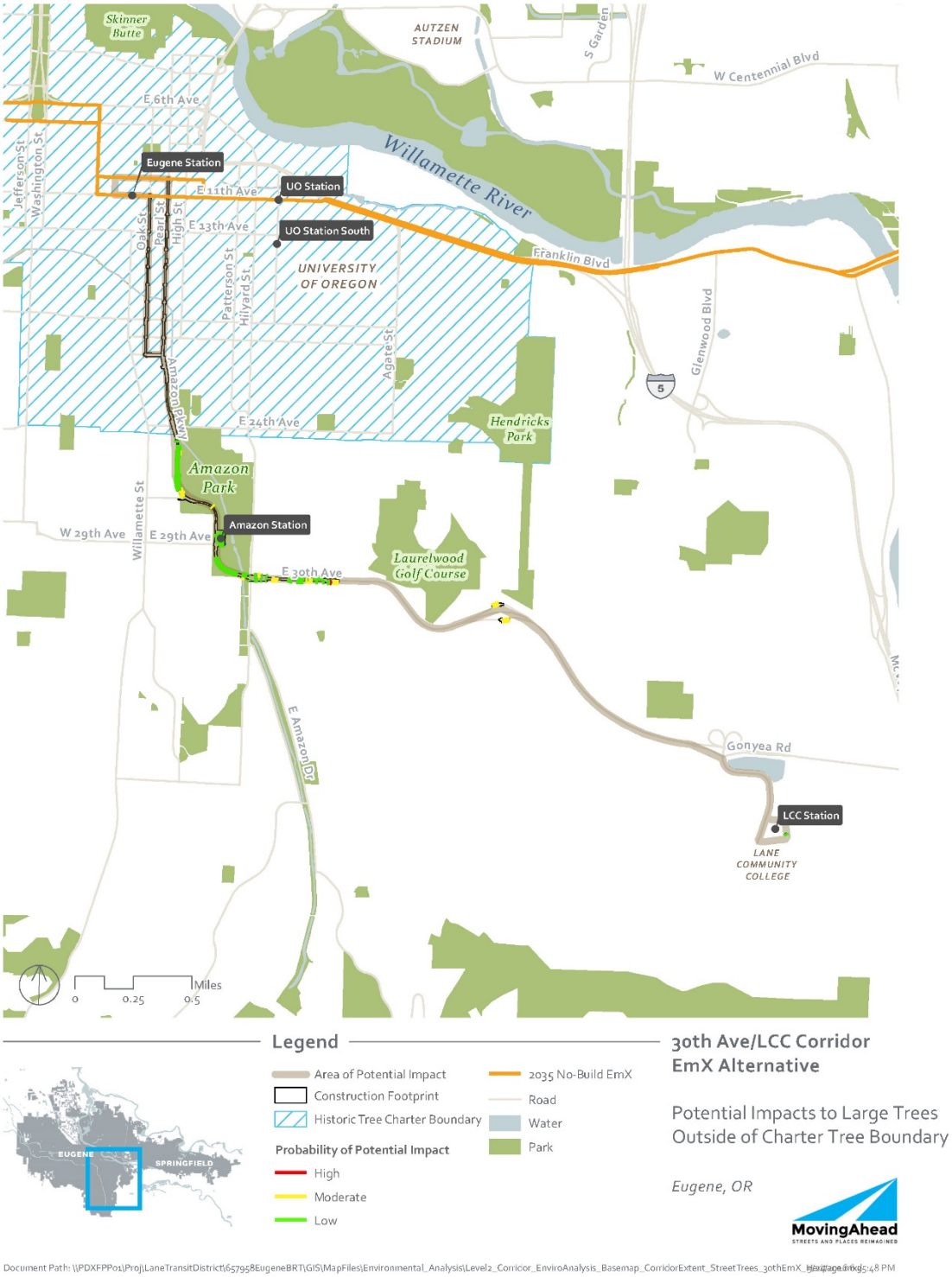


**Figure 6.2-4. 30th Avenue to Lane Community College Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary**



## 6.3. Indirect and Cumulative Effects

Future development in the area identified in regional and municipal plans and other reasonably foreseeable future actions may result in additional impacts to trees in the API. If the tree canopy were substantially altered, project effects could occur across disciplines. The cooling and shading benefits of trees affect energy use. The removal of a healthy tree canopy affects visual quality and diminishes habitat for birds and animals. Trees also provide benefits by retaining water and minimizing the impact of stormwater runoff from impervious surfaces. However, all these impacts could be mitigated by providing tree replacement and landscaping around proposed improvements.

### 6.3.1. No-Build Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the 30th Avenue to LCC Corridor No-Build Alternative.

### 6.3.2. Enhanced Corridor Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative. In accordance with City statute and best practices, removed trees would be replaced in-kind.

Particular attention would be paid to the potential long-term and short-term impacts on the street and landscape trees within the City's downtown core. Future iterations of the design would take into account any other potential projects affecting street and landscape trees in downtown Eugene and coordinated with the City Urban Forestry staff.

### 6.3.3. EmX Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the 30th Avenue to LCC Corridor EmX Alternative. In accordance with City statute and best practices, impacted trees would be replaced in-kind.

Particular attention would be paid to the potential long-term and short-term impacts on street and landscape trees within the City's downtown core. Future iterations of the design would take into account any other potential projects affecting street and landscape trees in downtown Eugene and coordinated with the City Urban Forestry staff.

## 6.4. Short-Term Construction-Related Impacts

Construction activities could affect trees beyond the direct impacts of roadway widening accounted for above. Areas of street reconstruction would require excavation and compaction of new base materials where BAT lanes, concrete bus pads, and concrete intersection pads are proposed. Excavation could impact shallow root systems and affect tree health. Trees may also face potential damage from operation of heavy equipment and unintended collisions with lower branches.

### 6.4.1. No-Build Alternative

No significant short-term impacts to Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the 30th Avenue to LCC Corridor No-Build Alternative.

### 6.4.2. Enhanced Corridor Alternative

Resurfacing activities associated with restriping Oak and Pearl Streets would have minimal impacts on existing street and landscape trees during construction under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative.

### 6.4.3. EmX Alternative

Excavation within the downtown core of Eugene along Oak and Pearl Streets to construct full-depth concrete BAT lanes could potentially impact medium and large trees within the Charter Tree boundary of the 30th Avenue to LCC Corridor EmX Alternative. While the excavation and construction activities would be confined to the existing roadway, construction activities would occur adjacent to these potentially high-value trees. The primary potential for impacting the health of trees adjacent to construction would be impacts on branches and low-hanging features of the trees by construction equipment and inadvertent excavation into the root zones of trees whose roots have grown into the existing roadway. Mitigation strategies, which are covered in Section 6.5, should be followed diligently to reduce impacts on trees in this area.

Construction of stations and sidewalk at the intersection of E. 27th Avenue and Amazon Parkway would be directly adjacent to an existing traffic island with two large trees. To avoid impacts, construction activities should carefully follow the mitigation plan identified in Section 6.5.

## 6.5. Potential Mitigation Measures

### 6.5.1. No-Build Alternative

No potential mitigation measures would be required under the 30th Avenue to LCC Corridor No-Build Alternative.

### 6.5.2. Common to All Build Alternatives

Under the 30th Avenue to LCC Corridor build alternatives, proposed sidewalks in areas where street trees would be impacted would be wide enough to incorporate a landscape strip into which new street trees could be planted. Where street tree removals would be required, long-term impacts would be mitigated through planting new trees; replacing all removed trees at a ratio of at least one tree planted for one tree removed or as otherwise required by *Eugene Code,* Sections 6.300 – 6.330; and coordinating with the City Urban Forestry staff on the selection of tree species to be planted, their specific locations, and provision of adequate soil conditions per City standards.

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

LTD would require the construction contractor to develop a Tree Protection Plan before construction. The plan would include, among other things, staging and scheduling practices that minimize the potential for harming trees close to the construction site. Implementing the plan would mitigate impacts related to construction activity. BMPs for tree protection would be employed as specified through consultation with an ISA-certified project arborist, a landscaping professional, and City Urban Forestry staff. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017) that evaluates ways to avoid or minimize impacts at some properties.

Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

### 6.5.3. Enhanced Corridor Alternative

Where probability of potential tree impacts has been identified in Sections 6.2.2 and 6.4.2, an ISA-certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit to City Urban Forestry staff for review. If a Charter Tree would be subject to impact, the design would be refined to avoid this impact. This would most likely result in the minor adjustment of bus stop locations or movement/removal of proposed parking/loading pullouts within the proposed construction footprint of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative.

### 6.5.4. EmX Alternative

Where a probability of potential tree impacts has been identified in Sections 6.2.3 and 6.4.3, an ISA-certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit to City Urban Forestry staff for review. If a Charter Tree would be subject to impact, the design would be refined to avoid this impact. This would most likely result in the minor adjustment of station locations or pavement design within the proposed construction footprint of the 30th Avenue to LCC Corridor EmX Alternative.

## 6.6. Permits and Approvals

Table 6.6-1 lists permits and approvals that may be required for tree removal in the 30th Avenue to LCC Corridor.

**Table 6.6-1. 30th Avenue to Lane Community College Corridor Alternatives Permits and Approvals**

| Permits and Approvals | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Street Tree Removal Permit (R-6305-C3) | | ✓ | ✓ |

Source: *Eugene Code*, Chapter 9, "Land Use; Tree Preservation and Removal Standards."

# 7. Coburg Road Corridor Environmental Consequences

## 7.1. Affected Environment

The greatest concentration of medium and large street and landscape trees along the Coburg Road Corridor is between State Highway 569 and Interstate 105. This portion of the corridor passes by residential areas as well as a number of commercial / retail developments. The older residential areas typically have residences and yards close to Coburg Road and frequently contain mature landscaping and have mature street trees adjacent to the properties. Some commercial and retail developments along Coburg Road contain buildings that abut the road, while others have buildings set off of the road behind large parking areas. Street and landscape trees are sporadically found adjacent to these developments and in landscaping buffering adjacent parking lots., Landscaping (without street trees) is found in parking strips between sidewalks and the street in some locations. Commercial and residential areas along the corridor north of State Highway 569 have very similar street tree and landscaping patterns.

Figures in Section 7.2, Long-Term Direct Impacts, depict the Coburg Road Corridor. Appendix C, *Existing Conditions Examples Along the Study Corridors,* of the *Visual and Aesthetic Technical Report* includes photographs from along the Coburg Road Corridor, including photographs of street and landscape trees.

## 7.2. Long-Term Direct Impacts

### 7.2.1. No-Build Alternative

No significant long-term direct impacts to Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Coburg Road Corridor No-Build Alternative.

### 7.2.2. Enhanced Corridor Alternative

None of the Enhanced Corridor Alternative would pass though the Charter Tree boundary. Figure 7.2-1 depicts locations where the 30th Avenue to LCC Corridor Enhanced Corridor Alternative would likely impact medium and large trees outside of the Charter Tree boundary. The potential for impacting medium and large trees beyond the Charter Tree boundary would be high along 2 percent of its route and moderate along 10 percent as indicated in Table 7.2-1. There would be a low probability of impacting medium and large trees along 20 percent of the route and no likelihood along 68 percent. Construction of this alternative would impact three street trees (in medians in Coburg Road between Oakmont Way and Rustic Place) and four to six landscape trees (on Coburg Road between Pioneer Pike and Harlow Road). Appendix E, *Detailed Impact Tables by Alternative,* provides more detail related to the impacted trees. Appendix F, *Detailed Impact Figures by Alternative,* graphically depicts the locations of potential impacts along the corridor to a greater degree than Figure 7.2-1 does.

**Figure 7.2-1. Coburg Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees – Corridor Extent**

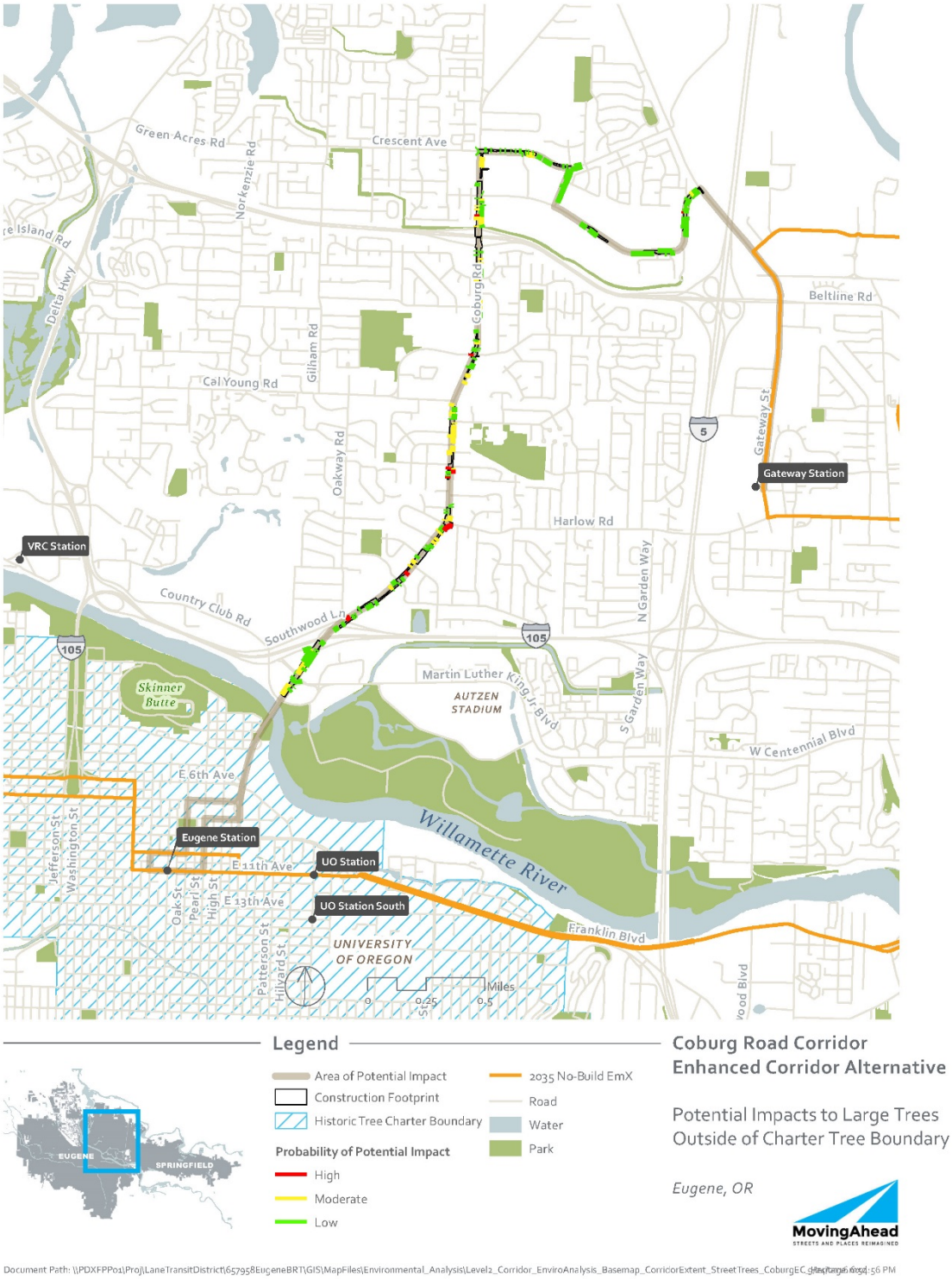


**Table 7.2-1. Coburg Road Corridor Potential Impacts to Medium and Large Trees**

| | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|
| **Inside the Charter Tree Boundary** | | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | | |
| High | 0 (0%) | 5,600 (29%) |
| Moderate | 0 (0%) | 3,990 (20%) |
| Low | 0 (0%) | 160 (1%) |
| None | 10,824 (100%) | 9,782 (50%) |
| Total Corridor Length | 10,824 | 19,532 |
| **Number and Type of Medium and Large Trees Potentially Removed** | | |
| | 0 | 98 to 100 street trees and 0 landscape trees |
| **Outside the Charter Tree Boundary** | | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | | |
| High | 840 (2%) | 950 (2%) |
| Moderate | 4,720 (10%) | 5,800 (12%) |
| Low | 9,890 (20%) | 13,300 (28%) |
| None | 32,844 (68%) | 28,244 (58%) |
| Total Corridor Length | 48,294 | 48,294 |
| **Number and Type of Medium and Large Trees Potentially Removed** | | |
| | 3 street trees and 4 to 6 landscape trees | 33 to 38 street trees and 9 to 11 landscape trees |

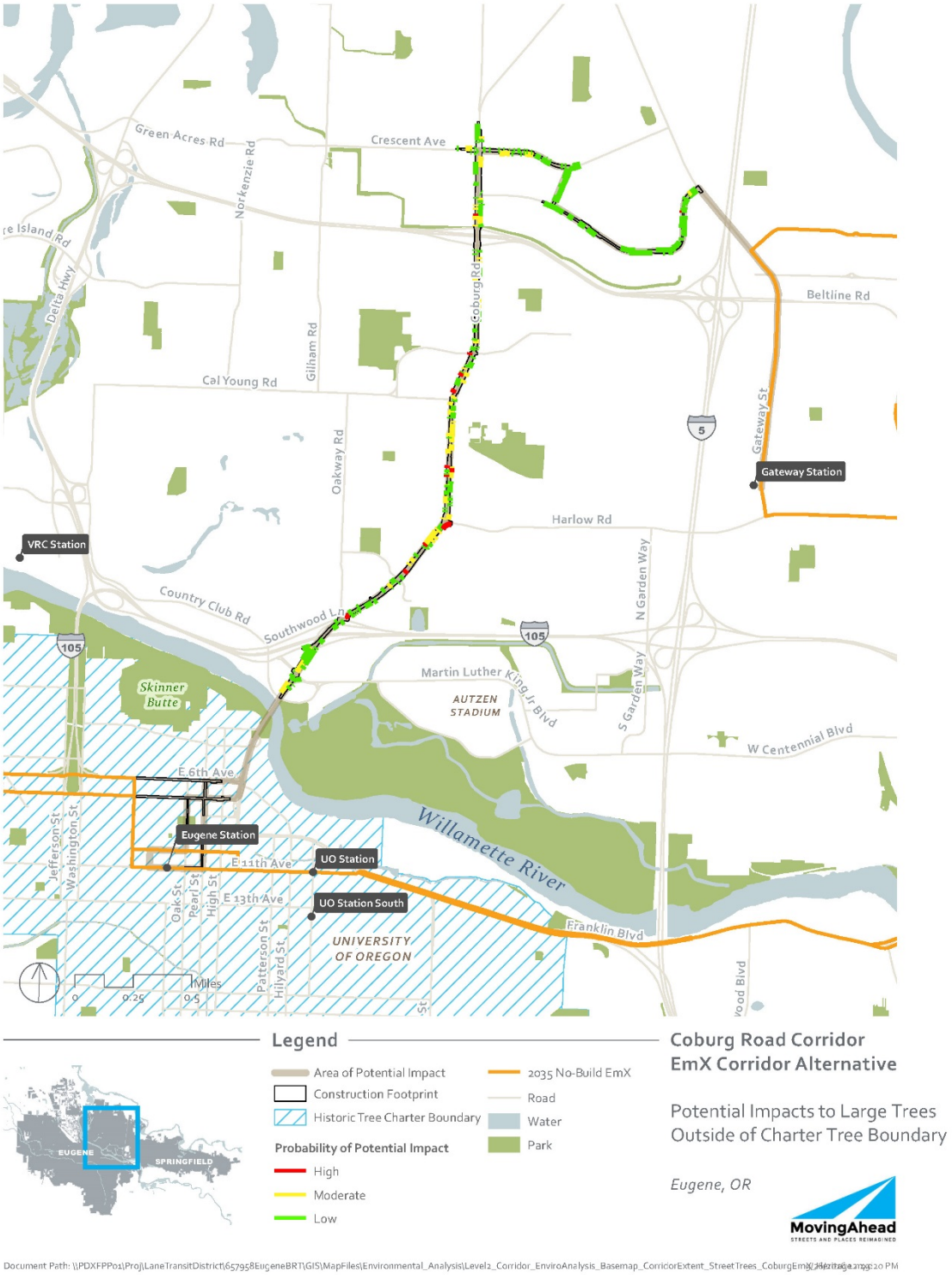
NA = not applicable because no construction would occur in this area.

### 7.2.3. EmX Alternative

Figures 7.2-2 and 7.2-3 show areas along the Coburg Road Corridor EmX Alternative within, and outside of, the Charter Tree boundary where the likelihood of impacts would occur. Twenty-nine percent of the EmX Alternative would be located within the Charter Tree boundary and produce high potential impacts to medium and large trees (Table 7.2-1). The remainder of the alternative would produce moderate potential impacts along 20 percent of the route within the Charter Tree boundary, low impacts on 1 percent, and have no impact on 50 percent. Approximately 98 to 100 street trees would be impacted within the Charter Tree boundary. Forty-one to 43 of the impacted street trees would be located along W. and E. 6th Avenue between Charnelton and High Streets, 29 along W. and E. 7th Avenue between Charnelton and High Streets, 6 along Oak Street between E. 7th Avenue and S. Park Street, 12 on Pearl Street between E. 6th and E. 8th Avenues, and 10 on Pearl Street between E. 10th and E. 11th Avenues. No landscape trees would be removed. Beyond the Charter Tree boundary, the EmX Alternative would have a high potential of impacting medium and large trees along 2 percent of its route within the boundary, a 10 percent potential of moderate impacts, a 20 percent likelihood of low impacts, and no probability along 68 percent of the route. Appendix E, *Detailed Impact Tables by Alternatives,* provides

**Figure 7.2-2. Coburg Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Corridor Extent**

**Figure 7.2-3. Coburg Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Corridor Extent**



## 7.3. Indirect and Cumulative Effects

Future development in the area identified in regional and municipal plans and other reasonably foreseeable future actions may result in additional impacts to trees in the API. If the tree canopy were substantially altered, project effects could occur across disciplines. The cooling and shading benefits of trees affect energy use. The removal of a healthy tree canopy affects visual quality and diminishes habitat for birds and animals. Trees also provide benefits by retaining water and minimizing the impact of stormwater runoff from impervious surfaces. However, all these impacts could be mitigated by providing tree replacement and landscaping around proposed improvements.

### 7.3.1. No-Build Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the Coburg Road Corridor No-Build Alternative.

### 7.3.2. Enhanced Corridor Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the Coburg Road Corridor Enhanced Corridor Alternative. In accordance with City statute and best practices, removed trees would be replaced in-kind.

### 7.3.3. EmX Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the Coburg Road Corridor EmX Alternative. In accordance with City statute and best practices, removed trees would be replaced in-kind.

Particular attention would be paid to the potential long-term and short-term impacts on street and landscape trees within the City of Eugene's downtown core. Future iterations of the design would take into account any other potential projects affecting street and landscape trees in downtown Eugene and coordinated with the City Urban Forestry staff.

## 7.4. Short-Term Construction-Related Impacts

Construction activities could affect trees beyond the direct impacts of roadway widening accounted for above. Areas of street reconstruction would require excavation and compaction of new base materials where BAT lanes, concrete bus pads, and concrete intersection pads are proposed. Excavation could impact shallow root systems and affect tree health. Trees may also face potential damage from operation of heavy equipment and unintended collisions with lower branches.

### 7.4.1. No-Build Alternative

No significant short-term impacts on Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Coburg Road Corridor No-Build Alternative.

### 7.4.2. Enhanced Corridor Alternative

Potential short-term impacts on large mature landscape trees occur on the south side of the intersection between Coburg Road and Harlow Road because of intersection and ROW widening.

Potential short-term impacts on street and landscape trees exist adjacent to proposed bus stop improvements because of sidewalk widening.

### 7.4.3. EmX Alternative

Short-term construction-related impacts on medium and large trees within the Charter Tree boundary may occur because of proposed station construction and trenching for communications fiber taking place within the Charter Tree boundary. Excavation within the existing roadway on W. 6th and W. 7th Avenues for the construction of full-depth concrete BAT lanes might result in short-term construction impacts on the root zones of trees within the Charter Tree boundary.

Short-term construction-related impacts to medium and large trees occur at the following locations:

- In the median of Coburg Road between Country Club Road and the Beltline Interchange because of construction activities directly adjacent to the median, including excavation for construction of concrete bus-exclusive lanes (area identified as moderate potential for long-term impacts to these trees, according to Table E-16 and Figure 7.2-3).
- On the south side of the intersection between Coburg Road and Harlow Road where sidewalk reconstruction associated with roadway and ROW widening for exclusive transit lanes would be directly adjacent to large mature landscape trees on private property.

## 7.5. Potential Mitigation Measures

### 7.5.1. No-Build Alternative

No potential mitigation measures would be required under the Coburg Road Corridor No-Build Alternative.

### 7.5.2. Common to All Build Alternatives

Proposed sidewalks in areas where street trees would be impacted would be wide enough to incorporate a landscape strip into which new street trees could be planted. Where street tree removals would be required, long-term impacts would be mitigated through planting new trees; replacing all removed trees at a ratio of at least one tree planted for one tree removed or as otherwise required by *Eugene Code,* Sections 6.300 – 6.330; and coordinating with the City Urban Forestry staff on the selection of tree species to be planted, their specific locations, and provision of adequate soil conditions per City standards.

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

LTD would require the construction contractor to develop a Tree Protection Plan before construction. The plan would include, among other things, staging and scheduling practices that minimize the potential for harming trees close to the construction site. Implementing the plan would mitigate impacts related to construction activity. BMPs for tree protection would be employed as specified through consultation with an ISA-certified project arborist, a landscaping professional, and City Urban Forestry staff. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

### 7.5.3. Enhanced Corridor Alternative

Where potential tree impacts have been identified in Sections 7.2.2 and 7.4.2, an ISA-certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit to City Urban Forestry staff for review. If a Heritage Tree would be subject to impact, the design might be refined to avoid this impact. This would most likely result in the minor adjustment of station locations or pavement design within the proposed construction footprint of the Coburg Road Corridor Enhanced Corridor Alternative.

### 7.5.4. EmX Alternative

Where potential tree impacts have been identified in Sections 7.2.3 and 7.4.3, an ISA-certified project arborist should conduct a field assessment of potentially impacted trees to confirm the tree-classification status and submit to City Urban Forestry staff for review. If a Charter Tree or a Heritage Tree would be subject to impact, the design might be refined to avoid this impact. This would most likely result in the minor adjustment of station locations or pavement design within the proposed construction footprint of the Coburg Road Corridor EmX Alternative.

## 7.6. Permits and Approvals

Table 7.6-1 lists permits and approvals that may be required for tree removal in the Coburg Road Corridor.

**Table 7.6-1. 30th Avenue to Lane Community College Corridor Alternatives Permits and Approvals**

| Permits and Approvals | No-Build Alternative | Enhanced Corridor Alternative | EmX Alternative |
|---|---|---|---|
| Street Tree Removal Permit (R-6305-C3) | | ✓ | ✓ |

Source: *Eugene Code*, Chapter 9, "Land Use; Tree Preservation and Removal Standards."

# 8. Martin Luther King, Jr. Boulevard Corridor Environmental Consequences

## 8.1. Affected Environment

The greatest concentration of medium and large street and landscape trees along this corridor are found in the residential area along Martin Luther King, Jr. Boulevard west of Autzen Stadium. This area has many mature street and landscape trees as well as landscaping on adjacent properties. Street and landscape trees as well as landscaping line most of the route as it passes through the area that contains Autzen Stadium and other athletic facilities. After leaving the stadium area, the route enters a commercial area where the primary trees are street and landscape trees, and landscape trees in parking lots.

The figures in Section 8.2, Long-Term Direct Impacts, depicts the Martin Luther King, Jr. Boulevard Corridor. Appendix C, *Existing Conditions Examples Along the Study Corridors,* of the *Visual and Aesthetic Technical Report* includes photographs from along the Martin Luther King, Jr. Boulevard Corridor, including photographs of street and landscape trees.

## 8.2. Long-Term Direct Impacts

### 8.2.1. No-Build Alternative

No significant long-term direct impacts on Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

### 8.2.2. Enhanced Corridor Alternative

Figure 8.2-1 shows the Martin Luther King, Jr. Boulevard Corridor's Enhanced Corridor Alternative probability of potential impacts to medium and large trees for the extent of the corridor outside of downtown Eugene. Table 8.2-1 summarizes the probability of potential impacts to medium and large along the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative. No impact to trees within the Charter Tree Boundary would be expected. Less than 1 percent of the corridor outside of the Charter Tree boundary would have a high probability of potential impacts to medium and large trees. Ninety-three percent of the corridor outside of the Charter Tree boundary would have low or no probability of potential impacts to large trees. Table E-21 identifies and quantifies areas of high probability of potential impact. Seven to nine street trees along Martin Luther King, Jr. Boulevard north of Kinsrow Avenue would potentially be removed. Appendix E, *Detailed Impact Tables by Alternative,* provides more detail related to the impacted trees. Appendix F, *Detailed Impact Figures by Alternative,* graphically depicts the locations of potential impacts along the corridor to a greater degree than Figure 8.2-1 does.

**Figure 8.2-1. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees – Corridor Extent**

**Table 8.2-1. Martin Luther King, Jr. Boulevard Corridor Potential Impacts to Medium and Large Trees**

| | Enhanced Corridor Alternative |
|---|---|
| **Inside the Charter Tree Boundary** | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | |
| High | NA |
| Moderate | NA |
| Low | NA |
| None | NA |
| Total Corridor Length | NA |
| **Number and Type of Medium and Large Trees Potentially Removed** | |
| | NA |
| **Outside the Charter Tree Boundary** | |
| **Probability of Impact Along Corridor by Length (in Feet) and Percent of Corridor Impacted** | |
| High | 110 (<1%) |
| Moderate | 2,600 (7%) |
| Low | 8,570 (21%) |
| None | 28,651 (72%) |
| Total Corridor Length | 39,931 |
| **Number and Type of Medium and Large Trees Potentially Removed** | |
| | 7 to 9 street trees and 0 landscape trees |

NA = not applicable because no construction would occur in this area.

## 8.3. Indirect and Cumulative Effects

Future development in the area identified in regional and municipal plans and other reasonably foreseeable future actions may result in additional impacts to trees in the API. If the tree canopy were substantially altered, project effects could occur across disciplines. The cooling and shading benefits of trees affect energy use. The removal of a healthy tree canopy affects visual quality and diminishes habitat for birds and animals. Trees also provide benefits by retaining water and minimizing the impact of stormwater runoff from impervious surfaces. However, all these impacts could be mitigated by providing tree replacement and landscaping around proposed improvements.

### 8.3.1. No-Build Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

### 8.3.2. Enhanced Corridor Alternative

No significant indirect or cumulative effects related to existing street and landscape trees would be expected under the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative.

## 8.4. Short-Term Construction-Related Impacts

Construction activities could affect trees beyond the direct impacts of roadway widening accounted for above. Areas of street reconstruction would require excavation and compaction of new base materials where BAT lanes, concrete bus pads, and concrete intersection pads are proposed. Excavation could impact shallow root systems and affect tree health. Trees may also face potential damage from operation of heavy equipment and unintended collisions with lower branches.

### 8.4.1. No-Build Alternative

No significant short-term impacts on Charter Trees, Heritage Trees, or existing street and landscape trees would be expected under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

### 8.4.2. Enhanced Corridor Alternative

Excavation for construction of BAT lanes within the existing roadway might potentially impact the root zone of adjacent and otherwise unaffected street and landscape trees from the intersection of Martin Luther King, Jr. Boulevard and Centennial Loop to the intersection of Martin Luther King, Jr. Boulevard and Marche Chase Drive. Additional short-term impacts might result from the construction of sidewalk improvements for bus stops adjacent to existing street and landscape trees. Many of the trees potentially impacted would be large, mature, healthy street and landscape trees. Of particular note would be the stands of trees ranging from 700 feet northwest of the intersection of Kinsrow Avenue and Martin Luther King, Jr. Boulevard to the intersection of Martin Luther King, Jr. Boulevard and Leo Harris Parkway. Some of the trees in this large stand would have the potential to become Heritage Trees in the future, and all would provide one of the largest continuous healthy canopies in the project area.

## 8.5. Potential Mitigation Measures

### 8.5.1. No-Build Alternative

No potential mitigation measures would be required under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

### 8.5.2. Enhanced Corridor Alternative

Under the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative, proposed sidewalks in areas where street trees would be impacted would be wide enough to incorporate a landscape strip into which new street trees could be planted. Where street tree removals would be required, long-term impacts would be mitigated through planting new trees; replacing all removed trees at a ratio of at least one tree planted for one tree removed or as otherwise required by *Eugene Code,* Sections 6.300 – 6.330; and coordinating with the City Urban Forestry staff on the selection of tree species to be planted, their specific locations, and provision of adequate soil conditions per City standards.

Where landscape tree removals would be required, long-term impacts would be mitigated through tree replanting or replacement as agreed to by the property owner. LTD would coordinate with respective property owners on the selection of trees to be replanted or replaced.

LTD would require the construction contractor to develop a Tree Protection Plan before construction. The plan would include, among other things, staging and scheduling practices that minimize the potential for harming trees close to the construction site. Implementing the plan would mitigate impacts related to construction activity. BMPs for tree protection would be employed as specified through consultation with an ISA-certified project arborist, a landscaping professional, and City Urban Forestry staff. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

## 8.6. Permits and Approvals

Table 8.6-1 lists permits and approvals that may be required for tree removal in the Martin Luther King, Jr. Boulevard Corridor.

**Table 8.6-1. Martin Luther King, Jr. Boulevard Corridor Alternatives Permits and Approvals**

| Permits and Approvals | No-Build Alternative | Enhanced Corridor Alternative |
|---|---|---|
| Street Tree Removal Permit (R-6305-C3) | | ✓ |

Source: *Eugene Code*, Chapter 9, "Land Use; Tree Preservation and Removal Standards."

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# Appendix A: Glossary and Naming Conventions

This appendix includes a detailed list of acronyms, abbreviations and technical terms used throughout this report. It also includes naming conventions used in the MovingAhead project.

## Acronyms and Abbreviations

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| /H-RCP | Historic Structures or Sites Combine Zone |
| /WP | Waterside Protection |
| /WQ | Water Quality |
| °C | degree(s) Celsius |
| µg/L | microgram(s) per liter |
| µg/$m^3$ | microgram(s) per cubic meter |
| AA | Alternatives Analysis |
| AAC | all aluminum conductor |
| AASHTO | American Association of State Highway and Transportation Officials |
| AAI | All Appropriate Inquiry |
| ACS | American Community Survey |
| ADA | Americans with Disabilities Act |
| AEO | Annual Energy Outlook |
| APE | Area of Potential Effect |
| API | Area of Potential Impact |
| approx. | approximately |
| ARTS | All Roads Transportation Safety Program |
| ATR | Automated Traffic Recording |
| BAT | business access and transit |
| BEST | Better Eugene Springfield Transit |
| BFE | Base Flood Elevation |
| BMP | best management practice |
| BPA | Bonneville Power Administration |
| BRT | bus rapid transit |
| Btu | British thermal unit |
| c | circa |
| CAA | Clean Air Act |
| CAFE | Corporate Average Fuel Economy |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| CERCLIS | Comprehensive Environmental Response Compensation and Liability Information System |
| CFR | Code of Federal Regulations |
| CFU | Colony-Forming Unit |
| CH2M | CH2M HILL, Inc. |
| CIG | Capital Investment Grant |
| CIP | Capital Improvements Program |
| City | City of Eugene |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| COGP | County Opportunity Grant Program |
| Corps | U.S. Army Corps of Engineers |
| CRL | Confirmed Release List |
| CSZ | Cascadia Subduction Zone |
| CTR | commute trip reduction |
| CWA | Clean Water Act |
| CY | cubic yard |
| dB | decibel |
| dBA | A-weighted decibel |
| DBE | Disadvantaged Business Enterprise |
| DEIS | Draft Environmental Impact Statement. Also referred to as Draft EIS. |
| DEQ | Oregon Department of Environmental Quality |
| DKS | DKS Associates |
| DLS | Donation Land Claim |
| DOE | Determination of Eligibility |
| DOGAMI | Oregon Department of Geology and Mineral Industries |
| DOT | Department of Transportation |
| Draft EIS | Draft Environmental Impact Statement. Also referred to as DEIS. |
| Draft Envision Eugene | *Draft Envision Eugene Community Vision* (Envision Eugene, 2016, July) |
| Draft Eugene 2035 TSP | *Draft Eugene 2035 Transportation System Plan* (Central Lane MPO, 2016, May) |
| DSL | Oregon Department of State Lands |
| DU | dwelling unit |
| EA | Environmental Assessment or each |
| EC | City of Eugene Code |
| EC | eligible contributing |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| EC | Enhanced Corridor Alternative (in some tables) |
| ECLA | *Eugene Comprehensive Lands Assessment* (ECONorthwest, 2010, June) |
| ECSI | Environmental Cleanup Site Information database (Oregon DEQ, 2016) |
| EFH | essential fish habitat |
| EIS | Environmental Impact Statement |
| EJ | Environmental Justice |
| EmX | Emerald Express, Lane Transit District's Bus Rapid Transit System |
| EmX | EmX Alternative (in some tables) |
| EOA | Equity and Opportunity Assessment |
| EPA | U. S. Environmental Protection Agency |
| ES | eligible significant |
| ES NR | eligible significant NRHP |
| ESA | Endangered Species Act or Environmental Site Assessment |
| ESH | essential indigenous anadromous salmonid habitat |
| ESU | Evolutionarily Significant Unit |
| EWEB | Eugene Water & Electric Board |
| FAST Act | Fixing America's Surface Transportation Act |
| FEIS | Final Environmental Impact Statement. Also referred to as Final EIS. |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act of 1974 |
| Final EIS | Final Environmental Impact Statement. Also referred to as FEIS. |
| FOE | Finding of Effect |
| FPPA | Farmland Protection Policy Act, 7 U.S.C. 4201-4209 and 7 CFR 658 |
| FRA | Federal Railroad Administration |
| ft | foot (feet) |
| $ft^2$ | square foot (feet) |
| FTA | Federal Transit Administration |
| FTN | Frequent Transit Network |
| FY | fiscal year |
| GAN | Grant Anticipation Note |
| GARVEE | Grant Anticipation Revenue Vehicle |
| GHG | greenhouse gas |
| GIS | geographic information system |
| GLO | General Land Office |
| Heritage | Heritage Research Associates, Inc. |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| HGM | Hydro-geomorphic |
| HMTA | Hazardous Materials Transport Act of 1975, with amendments in 1990 and 1994 |
| HOV | high-occupancy vehicle |
| HPNW | Historic Preservation Northwest |
| I-5 | Interstate 5 |
| I-105 | Interstate 105 |
| IOF | Immediate Opportunity Fund |
| ISA | International Society of Arboriculture |
| ISTEA | Intermodal Surface Transportation Efficiency Act |
| kV | kilovolt(s) |
| LaneACT | Lane Area Commission on Transportation |
| LCC | Lane Community College |
| LCDC | Land Conservation and Development Commission |
| LCOG | Lane Council of Governments |
| Ldn | day-night sound level |
| LE | Listed Endangered |
| LEP | limited English proficiency |
| $L_{eq}$ | equivalent sound level |
| LF | lineal foot (feet) |
| LGAC | Local Government Affairs Council |
| LGGP | Local Government Grant Program |
| LID | Local Improvement District |
| $L_{max}$ | maximum sound level |
| $L_{min}$ | minimum sound level |
| LNG | liquefied natural gas |
| LOS | level of service |
| LPA | Locally Preferred Alternative |
| LRAPA | Lane Regional Air Protection Agency |
| LRFP | LTD's Long-Range Financial Plan |
| LRT | Light Rail Transit |
| LRTP | LTD's Long-Range Transit Plan |
| LT | Listed Threatened |
| LTD | Lane Transit District |
| LUST | leaking underground storage tank |
| LWCF | Land and Water Conservation Fund |
| m | meter(s) |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| MAP-21 | Moving Ahead for Progress in the 21st Century |
| MBTA | Migratory Bird Treaty Act |
| Metro Plan | *Metro Plan, Eugene-Springfield Metropolitan Area General Plan* (LCOG et al., 1987, as updated on 2015, December 31) |
| mg/kg | milligram(s) per kilogram |
| MI | mile(s) |
| mL | milliliter(s) |
| MMA | Michael Minor and Associates, Inc. |
| MOA | Memorandum of Agreement |
| MOE | Measure of Effectiveness |
| MPC | Metropolitan Policy Committee |
| mpg | miles per gallon |
| mph | miles per hour |
| MPO | Metropolitan Planning Organization |
| MTIP | *Metropolitan Transportation Improvement Program Federal FY 2015 to Federal FY 2018* (Central Lane MPO, adopted 2014, October, as amended) |
| Mw | Earthquake moment magnitude |
| N/A | not applicable |
| NA | not applicable; no data available |
| NAAQS | National Ambient Air Quality Standards |
| NAC | Noise Abatement Criteria |
| NAVD88 | North American Vertical Datum of 1988 |
| ND | nodal development |
| NEPA | National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321-4347 |
| NFA | no further action |
| NHPA | National Historic Preservation Act |
| NMFS | National Marine Fisheries Service |
| $NO_2$ | nitrous dioxide |
| $NO_x$ | nitrous oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NPMS | National Pipeline Mapping System |
| NPS | Department of Interior's National Park Service |
| NR | Natural Resource |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NS | no standard established |
| NW Natural | Northwest Natural |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| $O_3$ | ozone |
| O&M | operations and maintenance |
| OAR | Oregon Administrative Rule |
| OARRA | Oregon Archaeological Records Remote Access |
| ODA | Oregon Department of Agriculture |
| ODEQ | Oregon Department of Environmental Quality |
| ODFW | Oregon Department of Fish and Wildlife |
| ODOE | Oregon Department of Energy |
| ODOT | Oregon Department of Transportation |
| OHP | Oregon Highway Plan |
| OPA | Oil Pollution Act of 1990 |
| OPRD | Oregon Parks and Recreation Department |
| OR | Oregon |
| ORBIC | Oregon Biodiversity Information Center |
| ORS | Oregon Revised Statutes |
| OTIB | Oregon Transportation Infrastructure Bank |
| Pb | lead |
| PCB | polychlorinated biphenyl |
| PEM | Palustrine Emergent Wetland |
| PM | particulate matter |
| $PM_{10}$ | particulate matter – 10 microns in diameter |
| $PM_{2.5}$ | particulate matter – 2.5 microns in diameter |
| PMT | Project Management Team |
| ppb | parts per billion |
| PPE | personal protective equipment |
| ppm | parts per million |
| PROS | Parks, Recreation, and Open Space |
| PUC | Public Utilities Commission |
| Qls | landslide and debris avalanche deposits |
| Qtg | terrace and fan deposits |
| Qty | quantity |
| RCRA | Resource Conservation and Recovery Act of 1976 |
| RFFA | reasonably foreseeable future action |
| ROW | right of way |
| RRFB | Rectangular Rapid Flash Beacon |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| RTP | *Central Lane Metropolitan Planning Organization Regional Transportation Plan* (LCOG, adopted 2007, November; 2011, December). (The RTP includes the Financially Constrained Roadway Projects List.) |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SARA III | Emergency Planning and Community Right to Know Act of 1986; part of the SARA amendments |
| SC | sensitive critical |
| SCC | Standard Cost Categories |
| SCORP | Statewide Comprehensive Outdoor Recreation Plan |
| SDC | Systems Development Charge |
| SDWA | Safe Drinking Water Act |
| sec | second(s) |
| Section 4(f) | Section 4(f) of the Department of Transportation Act of 1966 |
| Section 6(f) | Section 6(f) of the LWCF Act of 1965 |
| Section 106 | Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800.5) |
| SF | square foot (feet) |
| SHPO | Oregon State Historic Preservation Office |
| SIP | State Implementation Plan |
| SMU | Species Management Unit |
| $SO_2$ | sulfur dioxide |
| SOC | species of concern |
| SSGA | Small Starts Construction Grant Agreement |
| STA | Special Transportation Area |
| STIP | Statewide Transportation Improvement Program |
| SV | Sensitive Vulnerable |
| SY | square yard(s) |
| TAP | Transportation Alternatives Program |
| TAZ | transportation analysis zone |
| TCE | Temporary Construction Easement |
| TD | transit-oriented development |
| TDM | Transportation Demand Management |
| TEA-21 | Transportation Equity Act for the 21st Century |
| Teoe | siliciclastic marine sedimentary rocks |
| TESCP | Temporary Erosion and Sediment Control Plan |
| TIF | Tax Increment Financing |
| TIP | Transportation Improvement Program |
| TMDL | total maximum daily load |

**Table A-1. Acronyms and Abbreviations**

| Acronyms and Abbreviations | Definitions |
|---|---|
| TOD | transit-oriented development |
| TPAU | Department of Transportation – Transportation Planning Analysis Unit |
| TPR | Transportation Planning Rule |
| TransPlan | *Eugene-Springfield Transportation System Plan* (City of Eugene et al., adopted 2002, July) |
| TRB | Transportation Research Board |
| TSI | Transportation System Improvement |
| TSM | Transportation System Management |
| TSP | Transportation System Plan |
| UGB | Urban Growth Boundary |
| UMTA | Urban Mass Transit Administration |
| Uniform Act | Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 42 U.S.C. 4601 et. seq., 49 CFR Part 24 |
| URA | Urban Renewal Area |
| U.S.C. | United States Code |
| USDOT | U.S. Department of Transportation |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UST | underground storage tank |
| v/c | volume-to-capacity |
| VHT | vehicle hours traveled |
| VMT | vehicle miles traveled |
| VOC | volatile organic compound |
| WEEE | West Eugene EmX Extension |
| WEG | wind erodibility group |
| $yd^2$ | square yard(s) |
| $yd^3$ | cubic yard(s) |
| YOE | year of expenditure |

## Terms

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Accessibility | The extent to which facilities are barrier-free and useable for all persons with or without disabilities. |
| Action | An "action," a federal term, is the construction or reconstruction, including associated activities, of a transportation facility. For the purposes of this Handbook, the terms "project," "proposal," and "action" are used interchangeably unless otherwise specified. An action may be categorized as a "categorical exclusion" or a "major federal action." |
| Agricultural / Forest / Natural Resource | AG, EFU-25, EFU-30, EFU-40, F-1, F-2, and NR |
| Alignment | Alignment is the street or corridor that the transit project would be located within. |
| Alternative Fuels | Low-polluting fuels which are used to propel a vehicle instead of high-sulfur diesel or gasoline. Examples include methanol, ethanol, propane or compressed natural gas, liquid natural gas, low-sulfur or "clean" diesel and electricity. |
| Alternatives Analysis (AA) | The process of evaluating the costs, benefits, and impacts of a range of transportation alternatives designed to address mobility problems and other locally-defined objectives in a defined transportation corridor, and for determining which particular investment strategy should be advanced for more focused study and development. The Alternatives Analysis (AA) process provides a foundation for effective decision making. |
| Area of Potential Effect | A term used in Section 106 to describe the area in which historic resources may be affected by a federal undertaking. |
| Area of Potential Impact | An assessment's Area of Potential Impact for the project is defined separately for each discipline. |
| Auxiliary Lanes | Lanes designed to improve safety and reduce congestion by accommodating cars and trucks entering or exiting the highway or roadway, and reducing conflicting weaving and merging movements. |
| Base Fare | The price charged to one adult for one transit ride; excludes transfer charges, and reduced fares. |
| Base Period | The period between the morning and evening peak periods when transit service is generally scheduled on a constant interval. Also known as "off-peak period." |
| Boarding | Boarding is a term used in transit to account for passengers of public transit systems. One person getting on a transit vehicle equals one boarding. In many cases, individuals will have to transfer to an additional transit vehicle to reach their destination and may well use transit for the return trip. Therefore, a single rider may account for several transit boardings in one day. |
| Bus Phase | An exclusive traffic signal phase for buses and/or BRT vehicles. |
| Bus Rapid Transit (BRT) | A transit mode that combines the quality of rail transit and the flexibility of buses. It can operate on bus lanes, high-occupancy vehicle (HOV) lanes, expressways, or ordinary streets. The vehicles are designed to allow rapid passenger loading and unloading, with more doors than ordinary buses. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Business Access and Transit (BAT) Lane | In general, a BAT lane is a concrete lane, separated from general-purpose lanes by a paint stripe and signage. A BAT lane provides Bus Rapid Transit (BRT) priority operations, but general-purpose traffic is allowed to travel within the lane to make a turn into or out of a driveway or at an intersecting street. However, only the BRT vehicle is allowed to use the lane to cross an intersecting street. |
| Busway | Exclusive freeway lane for buses and carpools. |
| Capital Improvements Program (CIP) | A CIP is a short-range plan, usually 4 to 10 years, which identifies capital projects and equipment purchases, provides a planning schedule, and identifies options for funding projects in the program. |
| Categorical Exclusion (CE) | A CE means a category of actions that do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. |
| Chambers Special Area Zone | S-C |
| Charter Tree | A tree defined by the Eugene Charter (City of Eugene, 2002, updated 2008) as "…(a living, standing, woody plant having a trunk 25 inches in circumference at a point 4-½ feet above mean ground level at the base of the trunk) of at least fifty years of age within publicly owned rights of way for streets, roads, freeways, throughways, and thoroughfares and within those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915, shall be designated historic street trees and recognized as objects of high historic value and significance in the history of the city and deserving of maintenance and protection." These trees have special historic importance to the City and require special processes be followed if their removal is proposed, including a public vote on the project proposing the removal. |
| Charter Tree Boundary | Defined by the Eugene Charter (City of Eugene, 2002, updated 2008) as "…those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915." Trees within this boundary may, if they meet certain criteria, be granted the special title and protective status of a Charter Tree, defined above. |
| City of Eugene Zoning Classifications | Industrial (I-2 and I-3), Commercial (C-3), Mixed-Use (C-1, C-2, GO, S-C, S-CN, S-DR, S-DW, S-E, S-F, S-HB, S-JW, S-RN, S-W, and S-WS), Single-Family Residential (R-1), Multi-Family Residential (R-2 and R-3), Institution (PL and PRO), Agricultural / Forest / Natural Resource (AG, EFU-25, EFU-30, EFU-40, F-1, F-2, and NR), Office (E-1 and E-2), Special Area Zone (Non-Mixed Use) (S-H and S-RP), Downtown Westside Special Area Zone (S-DW), Chambers Special Area Zone (S-C) |
| Clean Air Act Amendments of 1990 | The comprehensive federal legislation that establishes criteria for attaining and maintaining the federal standards for allowable concentrations and exposure limits for various air pollutants; the act also provides emission standards for specific vehicles and fuels. |
| Collector Streets | Collector streets provide a balance of both access and circulation within and between residential and commercial/industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access, and are located in residential neighborhoods, distributing trips from the neighborhood and local street system. |
| Commercial | C-3 |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Commuter Rail | Commuter rail is a transit mode that is a multiple car electric or diesel propelled train. It is typically used for local, longer-distance travel between a central city and adjacent suburbs, and can operate alongside existing freight or passenger rail lines or in exclusive rights of way. |
| Compressed Natural Gas (CNG) | An alternative fuel; compressed natural gas stored under high pressure. CNG vapor is lighter than air. |
| Conformity | The ongoing process that ensures the planning for highway and transit systems, as a whole and over the long term, is consistent with the state air quality plans for attaining and maintaining health-based air quality standards; conformity is determined by metropolitan planning organizations (MPOs) and the U.S. Department of Transportation (U.S. DOT), and is based on whether transportation plans and programs meet the provisions of a State Implementation Plan. |
| Congestion Mitigation and Air Quality (CMAQ) | Federal funds available for either transit or highway projects that contribute significantly to reducing automobile emissions, which cause air pollution. |
| Cooperating Agency | Regulations that implement the National Environmental Policy Act define a cooperating agency as any federal agency, other than a lead agency, which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment. |
| Coordination Plan | Required under Moving Ahead for Progress in the 21st Century (MAP-21), the coordination plan contains procedures aimed at achieving consensus among all parties in the initial phase of environmental review and to pre-empt disagreements that can create delays later on in a project. |
| Corridor | A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, and transit route alignments. |
| Corridor Transit Service Characteristics | The amount of transit service provided in each corridor, measured by daily vehicle hours traveled, daily vehicle miles traveled, and daily place-miles of service. |
| Demand Responsive | Non-fixed-route service utilizing vans or buses with passengers boarding and alighting at pre-arranged times at any location within the system's service area. Also called “Dial-a-Ride.” |
| Diesel Multiple Unit (DMU) | Each unit carries passengers and can be self-powered by a diesel motor; no engine unit is required. |
| Documented Categorical Exclusion (DCE) | A DCE means a group of actions that may also qualify as Categorical Exclusions (CEs) if it can be demonstrated that the context in which the action is taken warrants a CE exclusion; i.e., that no significant environmental impact will occur. Thus, these actions are referred to as DCEs. Such actions require some National Environmental Policy Act documentation, but not an Environmental Assessment or a full-scale Environmental Impact Statement.<br><br>DCEs documentation must demonstrate that, in the context(s) in which these actions are to be performed, they will have no significant environmental impact or that such impacts will be mitigated. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Downtown Westside Special Area Zone | S-DW |
| Draft Environmental Impact Statement (DEIS) | The DEIS is the document that details the results of the detailed analysis of all of the projects alternatives. The DEIS contains all information learned about the impacts of a project and alternatives. |
| Earmark | A federal budgetary term that refers to the specific designation by Congress that part of a more general lump-sum appropriation be used for a particular project; the earmark can be designated as a minimum and/or maximum dollar amount. |
| Effects | Effects include ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. Effects include: (1) direct effects that are caused by the action and occur at the same time and place, and (2) indirect effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8). |
| Electrical Multiple Unit (EMU) | The EMU is heavier than a light rail vehicle, but it is powered in the same way by an overhead electrical system. |
| EmX | Lane Transit District's Bus Rapid Transit System, pronounced "MX," short for Emerald Express. |
| Environmental Assessment (EA) | A report subject to the requirements of the National Environmental Policy Act (NEPA) demonstrating that an Environmental Impact Statement (EIS) is not needed for a specific set of actions. The EA can lead to a Finding of No Significant Impact (FONSI). |
| Environmental Impact Statement (EIS) | A comprehensive study of likely environmental impacts resulting from major federally-assisted projects; EISs are required by the National Environmental Policy Act. |
| Environmental Justice | A formal federal policy on environmental justice was established in February 1994 with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." There are three fundamental environmental justice principles:<br>• To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.<br>• To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.<br>• To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations. |
| Envision Eugene | The City of Eugene's Comprehensive Plan (latest draft or as adopted). Envision Eugene includes a determination of the best way to accommodate the community's projected needs over the next 20 years. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Evaluation Criteria | Evaluation criteria are the factors used to determine how well each of the proposed multimodal alternatives would meet the project's Goals and Objectives. The Evaluation Criteria require a mix of quantitative data and qualitative assessment. The resulting data are used to measure the effectiveness of proposed multimodal alternatives and to assist in comparing and contrasting each of the alternatives to select a preferred alternative. |
| Exclusive Right of Way | A roadway or other facility that can only be used by buses or other transit vehicles. |
| Fatal Flaw Screening | The purpose of a Fatal Flaw Screening is to identify alternatives that will not work for one reason or another (e.g., environmental, economic, community). By using a Fatal Flaw Screening process to eliminate alternatives that are not likely to be viable, a project can avoid wasting time or money studying options that are not viable and focus on alternatives and solutions that have the greatest probability of meeting the community's needs (e.g., environmentally acceptable, economically efficient, implementable). |
| Finding of No Significant Impact (FONSI) | A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement (EIS). A FONSI is based on the results of an Environmental Assessment (EA). |
| Fixed Guideway System | A system of vehicles that can operate only on its own guideway constructed for that purpose (e.g., rapid rail, light rail). Federal usage in funding legislation also includes exclusive right of way bus operations, trolley coaches, and ferryboats as "fixed guideway" transit. |
| Fixed Route | Service provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers at set stops and stations; each fixed-route trip serves the same origins and destinations, unlike demand responsive and taxicabs. |
| Geographic Information System (GIS) | A data management software tool that enables data to be displayed geographically (i.e., as maps). |
| Goals and Objectives | Goals and objectives define the project's desired outcome and reflect community values. Goals and objectives build from the project's Purpose and Need Statement.<br>• Goals are overarching principles that guide decision making. Goals are broad statements.<br>• Objectives define strategies or implementation steps to attain the goals. Unlike goals, objectives are specific and measurable. |
| Guideway | A transit right of way separated from general purpose vehicles. |
| Headway | Time interval between vehicles passing the same point while moving in the same direction on a particular route. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Heritage Tree | The C*ity of Eugene Urban Forest Management Plan* (City of Eugene Public Works Department Maintenance Division, 1992) defines "Heritage Trees" as: "Any tree of exceptional value to our community based on its size (relative to species), history, location, or species, or any combination of these criteria." Such a tree cannot be removed "except when otherwise necessary for the public health, safety, or welfare." |
| Hydrology | Refers to the flow of water including its volume, where it drains, and how quickly it flows. |
| Impacts | A term to describe the positive or negative effects upon the natural or built environments as a result of an action (i.e., project). |
| In-vehicle Travel Time | The amount of time it takes for a transit vehicle to travel between an origin and a destination. |
| In-vehicle Walk and Wait Travel Time | The amount of in-vehicle travel time plus time spent walking to transit, initial wait time, transfer wait time (if any), and time walking from transit to the destination. |
| Independent Utility | A project or section of a larger project that would be a usable and reasonable expenditure even if no other projects or sections of a larger project were built and/or improved. |
| Industrial | I-2 and I-3 |
| Institution | PL and PRO |
| Intergovernmental Agreement | A legal pact authorized by state law between two or more units of government, in which the parties contract for, or agree on, the performance of a specific activity through either mutual or delegated provision. |
| Intermodal | Those issues or activities that involve or affect more than one mode of transportation, including transportation connections, choices, cooperation, and coordination of various modes. Also known as "multimodal." |
| Jefferson Westside Special Area Zone | S-JW |
| Joint Development | Ventures undertaken by the public and private sectors for development of land around transit stations or stops. |
| Key Transit Corridors | Key Transit Corridors are mapped in Envision Eugene and are anticipated to be significant transit corridors for the City and the region |
| Kiss & Ride | A place where commuters are driven and dropped off at a station to board a public transportation vehicle. |
| Land and Water Conservation Fund (LWCF) Act of 1965 | 16 U.S.C. 4601-4 et seq. The Land and Water Conservation Fund (LWCF) State Assistance Program was established by the LWCF Act of 1965 to stimulate a nationwide action program to assist in preserving, developing, and providing assurance to all citizens of the United States (of present and future generations) such quality and quantity of outdoor recreation resources as may be available, necessary, and desirable for individual active participation. The program provides matching grants to states and through states to local units of government, for the acquisition and development of public outdoor recreation sites and facilities. |
| Landscape Tree | A living, standing, woody plant having a trunk that exists on private property. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Lane Regional Air Protection Agency (LRAPA) | LRAPA is responsible for achieving and maintain clean air in Lane County using a combination of regulatory and non-regulatory methods |
| Layover Time | Time built into a schedule between arrival at the end of a route and the departure for the return trip, used for the recovery of delays and preparation for the return trip. |
| Lead Agency | The organization that contracts and administers a study. For transit projects, FTA would typically fill this role. The lead agency has the final say about the project's purpose and need, range of alternatives to be considered, and other procedural matters. |
| Level of Detail | The amount of data collected, and the scale, scope, extent, and degree to which item-by-item particulars and refinements of specific points are necessary or desirable in carrying out a study. |
| Level of Service (LOS) | LOS is a measure used by traffic engineers to determine the effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways, but the concept has also been applied to intersections, transit, and water supply. |
| Light Rail Transit (LRT) | Steel wheel/steel rail transit constructed on city streets, semi-private right of way, or exclusive private right of way. Formerly known as "streetcar" or "trolley car" service, LRT's major advantage is operation in mixed street traffic at grade. LRT vehicles can be coupled into trains, which require only one operator and often are used to provide express service. |
| Limited (or Controlled) Access | Restricted entry to a transportation facility based upon facility congestion levels or operational condition. For example, a limited access roadway normally would not allow direct entry or exit to private driveways or fields from said roadway. |
| Liquefaction | A phenomenon associated with earthquakes in which sandy to silty, water saturated soils behave like fluids. As seismic waves pass through saturated soil, the structure of the soil distorts, and spaces between soil particles collapse, causing ground failure. |
| Liquefied Natural Gas (LNG) | An alternative fuel; a natural gas cooled to below its boiling point of 260 degrees Fahrenheit so that it becomes a liquid; stored in a vacuum bottle-type container at very low temperatures and under moderate pressure. LNG vapor is lighter than air. |
| Local Streets | Local streets have the sole function of providing direct access to adjacent land. Local streets are deliberately designed to discourage through-traffic movements. |
| Locally Preferred Alternative (LPA) | The LPA is the alternative selected through the Alternatives Analysis process completed prior to or concurrent with National Environmental Policy Act analysis. This term is also used to describe the proposed action that is being considered for New Starts or Small Starts funds. |
| Low-Income Persons | Those whose median household income is at or below the Department of Health and Human Services poverty guidelines. For a four-person household with two related children, the poverty threshold is $24,300 (year 2016 dollars). |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Maintenance area | An air quality designation for a geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have on acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Maintenance/attainment areas are defined using federal pollutant limits set by EPA. |
| Maintenance facility | A facility along a corridor used to clean, inspect, repair and maintain bus vehicles, as well as to store them when they are not in use. |
| Major Arterial | Major arterial streets should serve to interconnect the roadway system of a city. These streets link major commercial, residential, industrial, and institutional areas. Major arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well-placed arterial street. Access control, such as raised center medians, is a key feature of an arterial route. Arterials are typically multiple miles in length. |
| Major Investment Study (MIS) | An alternatives analysis study process for proposed transportation investments in which a wide range of alternatives is examined to produce a smaller set of alternatives that best meet project transportation needs. The purpose of the study is to provide a framework for developing a package of potential solutions that can then be further analyzed during an Environmental Impact Statement process. |
| Metro Plan Designations | Commercial, Commercial / Mixed Use, Government and Education, Heavy Industrial, High Density Residential / Mixed-Use, High Density Residential, Light-Medium Industrial, Low Density Residential, Medium Density Residential, Medium Density Residential / Mixed-Use, Mixed-Use, Parks and Open Space, Major Retail Center, Campus Industrial, University Research |
| Metropolitan Planning Organization (MPO) | The organization designated by local elected officials as being responsible for carrying out the urban transportation and other planning processes for an area. |
| Minimum Operable Segment | A stand-alone portion of the alternative alignment that has independent utility, allowed by FTA to be considered as interim termini for a project. A minimum operable segment (MOS) provides flexibility to initiate a project with available funding while pursuing additional funding to complete the remainder of the project. |
| Minor Arterial | A minor arterial street system should interconnect with and augment the urban major arterial system and provide service to trips of moderate length at a somewhat lower level of travel mobility than major arterials. This system also distributes travel to geographic areas smaller than those identified with the higher system. The minor arterial street system includes facilities that allow more access and offer a lower traffic mobility. Such facilities may carry local bus routes and provide for community trips, but ideally should not be located through residential neighborhoods. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Minority | A person who is one or more of the following:<br>• Black: a person having origins in any of the black racial groups of Africa<br>• Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race<br>• Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent<br>• American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition<br>• Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands |
| Mitigation | A means to avoid, minimize, rectify, or reduce an impact, and in some cases, to compensate for an impact. |
| Mixed-Use | C-1, C-2, GO, S-C, S-CN, S-DR, S-DW, S-E, S-F, S-HB, S-JW, S-RN, S-W, and S-WS |
| Modal Split | A term that describes how many people use different forms of transportation. Frequently used to describe the percentage of people using private automobiles as opposed to the percentage using public transportation, walking, or biking. Modal split can also be used to describe travelers using other modes of transportation. In freight transportation, modal split may be measured in mass. |
| Mode | A particular form or method of travel distinguished by vehicle type, operation technology, and right-of-way separation from other traffic. |
| Moving Ahead for Progress in the 21st Century (MAP-21) | Moving Ahead for Progress in the 21st Century (MAP-21) was signed by President Obama on July 6, 2012, reauthorizing surface transportation programs through FY 2014. It includes new and revised program guidance and regulations with planning requirements related to public participation, publication, and environmental considerations. |
| MovingAhead Project | The City of Eugene and LTD are working with regional partners and the community to determine which improvements are needed on some of our most important transportation corridors for people using transit, and facilities for people walking and biking. MovingAhead will prioritize transit, walking, and biking projects along these corridors so that they can be funded and built in the near-term.<br>The project will focus on creating active, vibrant places that serve the community and accommodate future growth. During Phase 1, currently underway, the community will weigh in on preferred transportation solutions for each corridor and help prioritize corridors for implementation. When thinking about these important streets, LTD and the City of Eugene refer to them as corridors because several streets may work as a system to serve transportation needs. |
| Multi-Family Residential | R-2 and R-3 |
| Multimodal | Multimodal refers to various modes. For the MovingAhead project, multimodal refers to Corridors that support various transportation modes including vehicles, buses, walking and cycling. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| National Environmental Policy Act of 1969 (NEPA) | A comprehensive federal law requiring analysis of the environmental impacts of federal actions such as the approval of grants; also requiring preparation of an Environmental Impact Statement for every major federal action significantly affecting the quality of the human environment. |
| New Starts | Federal funding granted under Section 3(i) of the Federal Transit Act. These discretionary funds are made available for construction of a new fixed guideway system or extension of any existing fixed guideway system, based on cost-effectiveness, alternatives analysis results, and the degree of local financial commitment. |
| No Action or No-Build Alternative | An alternative that is used as the basis to measure the impacts and benefits of the other alternative(s) in an environmental assessment or other National Environmental Policy Act action. The No-Build Alternative consists of the existing conditions, plus any improvements that have been identified in the Statewide Transportation Improvement Program. |
| Nonattainment Area | Any geographic region of the United States that the U.S. Environmental Protection Agency (EPA) has designated as not attaining the federal air quality standards for one or more air pollutants, such as ozone and carbon monoxide. |
| Notice of Intent | A federal announcement, printed in the *Federal Register*, advising interested parties that an Environmental Impact Statement will be prepared and circulated for a given project |
| Off-Peak Period | Non-rush periods of the day when travel activity is generally lower and less transit service is scheduled. Also called "base period." |
| Office | E-1 and E-2 |
| Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP) | The 2013-2017 Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP), entitled *Ensuring Oregon's Outdoor Legacy* (OPRD, No Date), constitutes Oregon's basic 5-year plan for outdoor recreation. The plan guides the use of LWCF funds that come into the state; provides guidance for other OPRD-administered grant programs; and provides recommendations to guide federal, state, and local units of government, as well as the private sector, in making policy and planning decisions. |
| Park and Ride | Designated parking areas for automobile drivers who then board transit vehicles from these locations. |
| Participating Agency | A federal or non-federal agency that may have an interest in the project. These agencies are identified and contacted early-on in the project with an invitation to participate in the process. This is a broader category than "cooperating agency" (see Cooperating Agency). |
| Passenger Miles | The total number of miles traveled by passengers on transit vehicles; determined by multiplying the number of unlinked passenger trips times the average length of their trips. |
| Peak Hour | The hour of the day in which the maximum demand for transportation service is experienced (refers to private automobiles and transit vehicles). |
| Peak Period | Morning and afternoon time periods when transit riding is heaviest. |
| Peak/Base Ratio | The number of vehicles operated in passenger service during the peak period divided by the number operated during the base period. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Place-miles | Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service. |
| Preferred Alternative | An alternative that includes a major capital improvement project to address the problem under investigation. As part of the decision-making process, the Preferred Alternative is compared against the No Action or No-Build Alternative from the standpoints of transportation performance, environmental consequences, cost-effectiveness, and funding considerations. |
| Purpose and Need | The project Purpose and Need provides a framework for developing and screening alternatives. The purpose is a broad statement of the project's transportation objectives. The need is a detailed explanation of existing conditions that need to be changed or problems that need to be fixed. |
| Queuing | Occurs when traffic lanes cannot fit all the vehicles trying to use them, or if the line at an intersection extends into an upstream intersection. |
| Record of Decision (ROD) | A decision made by FTA as to whether the project sponsor receives federal funding for a project. The Record of Decision follows the Draft EIS and Final EIS. |
| Regulatory Agency | An agency empowered to issue or deny permits. |
| Resource Agency | A federal or state agency or commission that has jurisdictional responsibilities for the management of a resource such as plants, animals, water, or historic sites. |
| Revenue Hours | Hours of transit service available for carrying paying riders. |
| Ridership | The number of people using a public transportation system in a given time period. |
| Ridesharing | A form of transportation, other than public transit, in which more than one person shares the use of the vehicle, such as a van or car, to make a trip. Also known as "carpooling" or "vanpooling." |
| Right of Way | Publicly owned land that can be acquired and used for transportation purposes. |
| Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) | SAFETEA-LU was passed by Congress July 29, 2005, and signed by the President August 10, 2005. Includes new and revised program guidance and regulations (approximately 15 rulemakings) with planning requirements related to public participation, publication, and environmental considerations. SAFETEA-LU covers FY 2005 through FY 2009 with a total authorization of $45.3 billion. |
| Scoping | A formal coordination process used to determine the scope of the project and the major issues likely to be related to the proposed action (i.e., project). |
| Screening Criteria | Criteria used to compare alternatives. |
| Section 4(f) of the Department of Transportation Act of 1966 | 23 U.S.C. 138 and 49 U.S.C. 303. Parks are subject to evaluation in the context of Section 4(f) of the Department of Transportation Act of 1966, which governs the use of publicly-owned/open to the public park and recreation lands, government-owned wildlife lands, and historic resources. |
| Section 4(f) resources | (i) any publicly owned land in a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or (ii) any land from a historic site of national, state, or local significance |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Section 6(f) of the LWCF Act of 1965 | The LWCF's most important tool for ensuring long-term stewardship is its "conversion protection" requirement. Section 6(f)(3) strongly discourages conversions of state and local park, and recreational facilities to other uses. Conversion of property acquired or developed with assistance under the program requires approval of the Department of Interior's National Park Service (NPS) and substitution of other recreational properties of at least equal fair market value, and of reasonably equivalent usefulness and location. |
| Section 106 | Section 106 of the National Historic Preservation Act of 1966 requires that federal agencies take into account the effect of government-funded construction projects on property that is included in, or eligible for inclusion in, the NRHP. |
| Shuttle | A public or private vehicle that travels back and forth over a particular route, especially a short route or one that provides connections between transportation systems, employment centers, etc. |
| Single-Family Residential | R-1 |
| Special Area Zone (Non-Mixed Use) | S-H and S-RP |
| Springfield 2030 | Currently underway, this update to the City of Springfield's Comprehensive Plan will guide and support attainment of the community's livability and economic prosperity goals and redevelopment priorities. |
| Springfield Transportation System Plan (TSP) | The City of Springfield's Transportation System Plan looks at how the transportation system is currently used and how it should change to meet the long-term (20-year) needs of the City of Springfield's residents, businesses, and visitors. The Plan, which identifies improvements for all modes of transportation, will serve as the City of Springfield's portion of the Regional Transportation System Plan prepared by Lane Council of Governments (LCOG). It was prepared in coordination with Oregon Department of Transportation, LCOG, and the Oregon Department of Land Conservation and Development. The TSP was adopted March 11, 2014. |
| State Implementation Plan (SIP) | A state plan mandated by the Clean Air Act Amendments of 1990 that contains procedures to monitor, control, maintain, and enforce compliance with national standards for air quality. |
| Strategy | An intended action or series of actions which when implemented achieves the stated goal. |
| Street Tree | A living, standing, woody plant having a trunk that exists in the public right of way. |
| Study Area | The area within which evaluation of impacts is conducted. The study area for particular resources will vary based on the decisions being made and the type of resource(s) being evaluated. |
| Throughput | The number of users being served at any time by the transportation system. |
| Title VI | This Title declares it to be the policy of the United States that discrimination on the ground of race, color, or national origin shall not occur in connection with programs and activities receiving federal financial assistance and authorizes and directs the appropriate federal departments and agencies to take action to carry out this policy. |

**Table A-2. Terms**

| Terms | Definitions |
|---|---|
| Transit Oriented Development (TOD) or Nodal Development | A strategy to build transit ridership, while discouraging sprawl, improving air quality and helping to coordinate a new type of community for residents. TODs are compact, mixed-use developments situated at or around transit stops. Sometimes referred to as Transit Oriented Communities, or Transit Villages. |
| Transit System | An organization (public or private) providing local or regional multi-occupancy-vehicle passenger service. Organizations that provide service under contract to another agency are generally not counted as separate systems. |
| Transitway | A Bus Rapid Transit (BRT) priority lane generally with a concrete lane, with or without concrete tracks with grass-strip divider, and a curb separation, traversable by general-purpose vehicles at signalized intersections. |
| Transportation Demand Management (TDM) | Strategies to attempt to reduce peak period automobile trips by encouraging the use of high occupancy modes through commuter assistance, parking incentives, and work policies that alter the demand for travel in a defined area in terms of the total volume of traffic, the use of alternative modes of travel, and the distribution of travel over different times of the day. |
| Transportation Improvement Program (TIP) | A program of intermodal transportation projects, to be implemented over several years, growing out of the planning process and designed to improve transportation in a community. This program is required as a condition of a locality receiving federal transit and highway grants. |
| Travel Shed | Synonymous with “corridor” (see Corridor). A subarea in which multiple transportation facilities are experiencing congestion, safety, or other problems. |
| urban plaza | An urban plaza is a place that can be used for socializing, relaxation, and/or events. |
| v/c ratio | Used as a principal measure of congestion. The “v” represents the volume or the number of vehicles that are using the roadway at any particular period. The “c” represents the capacity of a roadway at its adopted level of service (LOS). If the volume exceeds the capacity of the roadway (volume divided by capacity exceeds 1.00), congestion exists. |
| Vehicle Hours of Delay | Cumulative delay experiences by transit vehicles during high traffic periods. |
| Water Quality | Refers to the characteristics of the water, such as its temperature and oxygen levels, how clear it is, and whether it contains pollutants. |
| Whiteaker Special Area Zone | S-W |

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# Appendix B: Construction Activities and Methods

## General Construction Methods

The following section describes how construction of the Locally Preferred Alternative (LPA) would likely be staged and sequenced. This description is based on Lane Transit District's (LTD's) experience with the Franklin, Gateway, and West Eugene EmX Corridors. The final plan for construction methods, sequencing, and staging will be determined in coordination with the contractor and permitting authorities.

Utility work will generally be completed before the transportation infrastructure is constructed. Utility work, often conducted by local utility companies, occurs separately from project-related construction. After completing required utility relocation and other preparatory site work, the contractor will begin with construction of new transit lanes, bike lanes, sidewalks, and any other "flatwork." The contractor will modify existing signals or construct new traffic signals as part of this work. In some cases, the contractor may construct the signal footings but install signal arms after initial work is complete. Flatwork for stations, including curbs, ramps, and station footings, will be completed as the work progresses along the alignment. Streets and street segments will be restored to normal operations after this work is complete. The contractor is expected to progress approximately two blocks every two 2 weeks, with additional time required –- up to two 2 weeks –- for each enhanced stop or EmX station. Additional time will be required at intersections that require new or substantially modified traffic signals. The construction sequencing will be determined through coordination between the contractor and local residents, businesses, and property owners regarding construction scheduling preferences. It is expected that, for each major segment, the work would start at one end of the segment and progress to the other end of the segment. All flatwork is expected to be completed in two construction seasons.

Stations will be fabricated during the second construction season and installed during the subsequent (final) construction season, along with landscaping, fare machines, real-time passenger information, enhanced stop or EmX station amenities, and other similar items.

The contractor and LTD will coordinate closely with the Oregon Department of Transportation (ODOT) and with the City of Eugene (as appropriate to the jurisdiction) on traffic control. Depending on the segment, ODOT or the City will review and approve traffic plans for construction.

On streets with multiple lanes in each direction (or multiple lanes in one direction for one-way streets), at least one lane of traffic will be open at all times. Flaggers will coordinate travel at intersections and other points of congestion, as necessary. On streets with a single lane, it may be necessary to close one direction of traffic for certain periods. In those situations, flaggers will be used to manage the traffic flow safely. The contractor and LTD will also coordinate with businesses to ensure that the project maintains access for patrons and deliveries.

## Coordination with Businesses and Residents

LTD's Franklin, Gateway, and West Eugene EmX projects demonstrated LTD's commitment to communicating with impacted businesses, residences, and travelers, both before and during construction. As with those projects, LTD will contact all businesses and residents along the alignment well before construction begins to solicit local concerns, issues, and scheduling preferences. Businesses and residents will also be able to communicate with the contractor and LTD during construction. LTD's construction liaison will provide e-mail updates and serve as an ongoing point of contact to address

concerns and to provide information to affected businesses, residents, and other interested persons. LTD will provide a 24-hour hotline to quickly address construction concerns from businesses and residences.

LTD will also work to enhance activity at businesses affected by construction. This can be done through attractive signage, direct communications with the public (e.g., direct mail and advertising), and community events (e.g., street fairs). These techniques succeeded in keeping business areas active during previous EmX projects.

# Appendix C: Heritage Trees Code

The following pages are excerpted from the *City of Eugene Urban Forest Management Plan* (City of Eugene Public Works Department Maintenance Division. 1992, December).

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13.2 Provide incentives, such as flexible development standards, for planting street trees in new developments.

13.3 Develop flexible sidewalk standards that will accommodate a variety of mature-sized trees within street rights-of-way.

## POLICY

14.0 The City will structure tree plan review and approval to work within existing development processing time frames for subdivision, planned unit development, and development permit approval. Criteria and information for approval will be available with all other permit information.

# *Heritage Trees*

## INTRODUCTION

Some trees on private and public lands reach back to our early days and are a major element in defining Eugene's personality. Their growth adds character, and their size and age have an awe-inspiring beauty. The loss of a tree from natural calamity is understandable. Even the loss for development is understandable if it fulfills a need and the tree's intrinsic value to the community has been considered. The unacceptable loss is that which results from personal whim or from poor site planning or maintenance practices.

Many citizens are concerned with this overlooked element of Eugene's heritage. This element focuses on the preservation of the vital part of Eugene's heritage that certain trees provide. Because these heritage trees occur throughout the community on public and private property, this element overlaps other elements in this plan.

In this section, policies and proposed actions are separated into those that apply to public and private lands. Some apply to both and are listed in both subsections.

## GOAL

1. Retain trees that are links to Eugene's past.

## FINDINGS

1. The Eugene Tree Commission has defined a "heritage tree" as: "Any tree of exceptional value to our community based on its size (relative to species), history, location, or species, or any combination of these criteria."

2. Heritage trees are found on both public and private property.

3. Heritage trees provide aesthetic and cultural value to the community.

4. An estimated 200,000 trees eight inches or greater in diameter breast height are in the city. An estimated one percent (2,000) may be heritage trees.

## Policies and Proposed Actions

## POLICY

15.0 The City will retain heritage trees on street rights-of-way, in parks, and on other City property, except when otherwise necessary for the public health, safety, or welfare.

## PROPOSED ACTIONS

15.1 Amend the Eugene Code to prevent the removal of heritage trees (as defined in proposed action 15.2) on public property except when otherwise necessary for the public health, safety, or welfare.

- and -

15.2 Determine heritage tree status of any tree that is to be removed or otherwise affected by development. A tree may be a heritage tree if it is listed in the Heritage Tree Species Ratings (see Appendix C) and is at least 107 inches in circumference (34 inches in diameter) 4.5 feet above the ground for any oak and 138 inches in circumference (44 inches in diameter) 4.5 feet above the ground for other trees. To qualify as a heritage tree, it also must meet the minimum point value derived from the following formula:

| Location factor | X | Condition factor | X | Basal area | X | Historic factor | = | Point value |
|---|---|---|---|---|---|---|---|---|

(See Appendix D.)

15.3 Adopt Eugene standards to require heritage tree preservation techniques that assure these trees are not damaged or destroyed.

15.4 Seek funding to identify heritage trees on public property throughout the city.

## POLICY

16.0 The City will develop and distribute information on the special characteristics of heritage trees.

## POLICY

17.0 The City will encourage retaining heritage trees on private property, except when otherwise necessary for the public health, safety, or welfare. Monitor results after two years. Revisit use of the word "require" at that time.

## PROPOSED ACTIONS

17.1 Determine heritage tree status of any tree indicated below that is to be removed or otherwise affected by development on private property. A tree may be a heritage tree if it is listed in the Heritage Tree Species Ratings (see Appendix C) and is at least 107 inches in circumference (34 inches in diameter) 4.5 feet above the ground for any oak and 138 inches in circumference (44 inches in diameter) 4.5 feet above the ground for other trees. To qualify as a heritage tree, it also must meet the minimum point value derived from the following formula:

| Location factor | X | Condition factor | X | Basal area | X | Historic factor | = | Point value |
|---|---|---|---|---|---|---|---|---|

(See Appendix D.)

- and -

17.2 Determine criteria under which heritage trees are to be maintained or may be removed (e.g. public safety).

17.3 Design and implement a volunteer program in which the City provides heritage tree care assistance. This may include providing information to property owners on how to record a deed restriction to better ensure retention of heritage trees.

17.4 Expand the Eugene Code provisions that allow flexible design standards to make it easier to retain heritage trees (See Tree Protection Measures in Appendix A.)

17.5 Seek funding to identify heritage trees on private property throughout the city.

17.6 Amend Eugene Code to include heritage tree preservation techniques that assure these trees are not damaged or destroyed.

# *Education*

## INTRODUCTION

Education is an integral and primary element of the Urban Forest Management Plan and overlaps all the other elements. Education tempers the use of regulations by empowering citizens. The City believes citizens will act responsibly if given the information they need to make sound choices.

Distinct educational strategies can be developed to reach a wide range of affected people, including the general public, the development community (property owners, architects, realtors, engineers, investors, builders, and contractors), public agencies, and educational institutions. The common factor in educating these groups is to provide them with information about how proper tree planting, maintenance, and protection can contribute to and enrich the quality of life. Educational programs stress:

- Ways property owners can avoid practices that damage or kill trees.
- Methods and examples of development designs that successfully integrate trees on a development or building site.
- Urban forest fire prevention.

45. Mitigation efforts shall help to reestablish a connected system of wetlands, waterways and uplands resources. (West Eugene Wetlands Special Area Study - Draft Plan 1991, page 29.)

46. Mitigation efforts shall concentrate on restoring wetland type, habitat, functions and values that represent the historic, ecological landscape of the Amazon Creek basin. (West Eugene Wetlands Special Area Study - Draft Plan 1991, page 29.)

47. Mitigation efforts shall use local, native plants species. (West Eugene Wetlands Special Area Study - Draft Plan 1991, page 29.)

48. Mitigation efforts shall be designed and constructed to minimize the level of ongoing maintenance. (West Eugene Wetlands Special Area Study - Draft Plan 1991, page 29.)

49. Develop, adopt and implement a comprehensive wetland mitigation program. (West Eugene Wetlands Special Area Study -Draft Plan 1991, page 29.)

50. Amend applicable City codes, policies and maintenance operation procedures to comply with the provisions of this Plan and implementation measures. (West Eugene Wetlands Special Area Study - Draft Plan 1991, page 29.)

51. Develop performance standards corresponding to the stated mitigation goals of WEWSAS and utilize those standards in designing and evaluating an operation and maintenance program. (West Eugene Wetlands Special Area Study - Draft Plan 1991, page 38.)

52. Waterside protection - control development to maintain and protect water quality and wildlife habitat within minimum setback areas. (Metropolitan Natural Resources Special Study -Policy Report - March 1991 Draft, Page 13.)

53. Waterside development - balance environmental and development interests by allowing sensitive, creative development within or immediately adjacent to water features. (Metropolitan Natural Resources Special Study - Policy Report - March 1991 Draft, page 13.)

54. Significant wetland, riparian, waterway, and upland sites in the Willakenzie area shall be protected from encroachment and degradation in order to retain their important functions related to fish and wildlife habitat, flood control, sedimentation and erosion control, water quality control, and groundwater pollution control. (Willakenzie Area Plan - Draft June 1991, page 160.)

## LANDSCAPE DESIGN, INSTALLATION, AND MAINTENANCE

55. The planting of street trees shall be strongly encouraged, especially for all new developments and redeveloping areas (where feasible) and new streets and reconstruction of major arterials within the urban growth boundary. (Metro Plan -1987 Update, page III E-3.)

56. Identify the most direct and attractive routes into the City, encourage their use, and maintain and improve the character and quality of the entrance experience along these routes. (Entrance Beautification Study, page 3.)

57. Design and implement improvements to Eugene's entrances which recognize the diversity and identity of the areas in which the entrances are located. (Entrance Beautification Study, page 3.)

58. When evaluating designs for entrance beautification projects, give preference to designs which reduce long-term maintenance costs. (Entrance Beautification Study, page 3.)

59. Involve private businesses and community groups in entrance beautification programs and projects. (Entrance Beautification Study, page 3.)

60. As development activities are proposed along designated entranceways, provide a mechanism for additional landscape and buffer treatments on the site and along the street to ensure that the proposed developments respond to Eugene's entrance beautification policies and projects. (Entrance Beautification Study, page 3.)

61. Identify attractive entrances to Eugene and take necessary steps to conserve their attractive qualities, with particular attention to maintaining significant views. (Entrance Beautification Study, page 4.)

62. Require street improvement projects located along designated entrances to include landscaping or other beautification treatments. (Entrance Beautification Study, page 4.)

63. Prepare general plans for major parklands and facilities prior to development or renovation in order to promote project coordination and to conserve and protect natural open spaces where appropriate. (Eugene Parks and Recreation Plan, July 1989, page 12.)

64. Insofar as funds are available for maintenance, provide parks from the neighborhood level to the metropolitan level as well as special purpose recreation facilities such as, but not limited to, bicycle paths, jogging trails, botanical gardens, and sports field complexes. (Eugene Parks and Recreation Plan, July 1989, page 13.)

65. Design maintenance and improvement programs that support natural resources and minimize damage to natural vegetation and critical wildlife habitats. (Eugene Parks and Recreation Plan, July 1989, page 17.)

66. Encourage the development of symbolic "gateways" to the Willakenzie area through the effective use of landscape materials in areas indicated on the Neighborhood Gateway map. (Willakenzie Area Plan - Draft June 1991, page 146.)

67. The City shall identify and encourage preservation of significant historic and cultural resources including buildings, sites, structures, objects, and landscape elements in the Willakenzie area. (Willakenzie Area Plan - Draft June 1991, page 162.)

## EDUCATION

68. Provide natural areas, cultural amenities, and unique open spaces for educational and passive leisure use. (Eugene Parks and Recreation Plan, July 1989, page 13.)

69. Inform the public of its responsibilities for preserving the community's natural heritage when using its recreational resources. (Eugene Parks and Recreation Plan, July 1989, page 15.)

70. Inform the public about the recreational opportunities as well as its responsibility to preserve the environment in the South Hills. (Eugene Parks and Recreation Plan, July 1989, page 23.)

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# Appendix D: Trees Section of Eugene Charter

## Chapter XIII

### Amendments

Section 52. Amendment II
Eugene Charter, Pg. 14-15
Last Updated: 12/02/2008

i. Trees (a living, standing, woody plant having a trunk 25 inches in circumference at a point 4-½ feet above mean ground level at the base of the trunk) of at least fifty years of age within publicly owned rights of way for streets, roads, freeways, throughways, and thoroughfares and within those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915, shall be designated historic street trees and recognized as objects of high historic value and significance in the history of the city and deserving of maintenance and protection.

ii. No street, road, freeway, throughway, or thoroughfare may be widened by the city, nor may the city enter into any agreement approving or facilitating the widening of such street, road, freeway, throughway, or thoroughfare if such widening will result in the removal of any historic street tree unless the widening is first approved by a majority of the voting electors of the city in a city election conducted in accordance with law and unless the agreement is entered into within a time specified by the measure approved by the voters.

iii. The city may, however, without prior approval, assist in the preparation of preliminary plans and specifications, and statements of impact necessary for obtaining financial assistance for the street, road, freeway, throughway, or thoroughfare widening, all of which shall be available to the public at the city hall prior to the election on the street, road, freeway, throughway, or thoroughfare widening which would result in the removal of historic street trees.

iv. Prior to the election, a map and description of the proposed widening and removal of historic street trees shall be published at least once a week for four (4) consecutive weeks, in the newspaper with the largest general circulation published in the city.

v. Street, road, or thoroughfare widening projects confined to intersections only, and intended to improve those intersections shall be exempt from the requirement for approval by the voting electors of the city for the removal of historic street trees.

vi. In the event an historic street tree is to be removed in order to widen a street, road, freeway, throughway, or thoroughfare, the city, if it is the governmental unit implementing the project, shall allocate a portion of the project budget to a fund dedicated to helping maintain the city's remaining historic street trees. If a governmental unit other than the city is implementing the widening project, the city may not enter into any agreement approving or facilitating said widening

project unless the implementing governmental unit agrees to allocate a portion of the project's budget to a fund dedicated to helping maintain the city's remaining historic street trees.

vii. Any officer or employee of the city or of any public utility may act to remove an historic street tree if necessary to remove or alleviate an immediate danger to life or property; to restore utility service; to reopen a public thoroughfare to traffic; or to remove obstructions to the view of vehicular operators at intersections.

viii. An emergency is hereby declared to exist and this charter amendment, being enacted by the city in the exercise of its police power for the purpose of meeting such emergency, and for the immediate preservation of the public peace, health, and safety, shall take effect immediately upon approval by the electors of the city of Eugene and shall supersede any and all actions of the city authorizing, approving, or facilitating the widening of any street, road, freeway, throughway, or thoroughfare which would result in the removal of any historic street tree.

# Appendix E: Detailed Impact Tables by Alternative

The following tables provide additional data related to potential impacts to medium and large trees from the alternatives associated with the corridors examined in this Technical Report.

**Table E-1. Highway 99 Corridor Probability of Potential Impacts to Medium and Large Trees by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **Enhanced Corridor Alternative** | | |
| High | 2,280 | 3% |
| Moderate | 2,760 | 3% |
| Low | 11,610 | 13% |
| No Impact | 69,634 | 81% |
| **Corridor Length** | **86,284** | |
| **EmX Alternative** | | |
| High | 2,360 | 3% |
| Moderate | 2,880 | 3% |
| Low | 10,250 | 12% |
| No Impact | 67,147 | 81% |
| **Corridor Length** | **82,637** | |

Source: CH2M. (2016b).

**Table E-2. Highway 99 Corridor Enhanced Corridor Alternative High Probability of Potential Impacts to Medium and Large Trees – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Highway 99 and Barger Drive (Figure F-1) | 1 along Highway 99 on east side of the road, just northeast of the Highway 99 and Barger Drive intersection | Approximately 35' tall with a basal trunk diameter of more than 12" | Intersection widening, bus stop construction |
| Echo Hollow Road/ Cubit Street between Barger Drive and Wagner Street (Figure F-1) | 2 north of Wagner Street and Cubit Street intersection; 9 between Barger Drive and Wagner Street | Heights ranging from approximately 20' - 30'; basal trunk diameters greater than 8" | Terminus construction and associated intersection widening |
| Highway 99 and Roosevelt Boulevard (Figure F-2) | 2 in right-turn "pork-chop" island at intersection | Heights ranging from approximately 25' - 45'; basal trunk diameters greater than 8" | Intersection widening and modifications, bus stop construction |
| **Total Potentially Removed Medium and Large Trees: Approximately 14 street trees and 0 landscape trees** | | | |

**Table E-3. Highway 99 Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Highway 99 between Dove Lane and Lakewood Court (Figure F-3) | 2 between Dove Lane and Lakewood Court | Heights ranging from approximately 15' - 25'; basal trunk diameters greater than 8" | Station construction and sidewalk widening |
| Highway 99 and Barger Drive (Figure F-3) | 1 along Highway 99 on east side of the road, just northeast of the Highway 99 and Barger Drive intersection | Approximately 35' tall with a basal trunk diameter of more than 12" | Intersection widening |
| Barger Drive between Echo Hollow Road/Cubit Street and Empire Park Drive (Figure F-3) | 7 to 9 landscape trees between Empire Park Drive and Century Drive;<br>8 between Taney Street and Altamont Street;<br>7 between Ruskin Street and Echo Hollow Road | Heights ranging from approximately 20' - 30'; basal trunk diameters greater than 8" | Sidewalk construction and station construction, intersection widening |
| Echo Hollow Road/ Cubit Street between Barger Drive and Wagner Street (Figure F-3) | 2 north of Wagner Street and Cubit Street intersection;<br>9 between Barger Drive and Wagner Street | Heights ranging from approximately 20' - 30'; basal trunk diameters greater than 8" | Terminus construction and associated intersection widening |
| Highway 99 and Roosevelt Boulevard (Figure F-4) | 2 in right turn “pork-chop” island at intersection | Heights ranging from approximately 25' - 45'; basal trunk diameters greater than 8" | Intersection widening and modifications |
| **Total Potentially Removed Medium and Large Trees: Approximately 31 street trees and 7 to 9 landscape trees** | | | |

**Table E-4 River Road Corridor Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **Enhanced Corridor Alternative** | | |
| High | 300 | 1% |
| Moderate | 410 | 1% |
| Low | 0 | 0% |
| No Impact | 39,354 | 98% |
| **Length of Corridor Within Boundary** | **40,064** | |
| **EmX Alternative** | | |
| High | 600 | 2% |
| Moderate | 1,880 | 5% |
| Low | 700 | 2% |
| No Impact | 32,911 | 91% |
| **Length of Corridor Within Boundary** | **36,091** | |

Source: CH2M. (2016b).

**Table E-5. River Road Corridor Probability of Potential Impacts to Large Trees Outside of the Charter Tree Boundary by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **Enhanced Corridor Alternative** | | |
| High | 2,940 | 9% |
| Moderate | 2,320 | 7% |
| Low | 17,740 | 51% |
| No Impact | 11,481 | 33% |
| **Length of Corridor Outside of Boundary** | **43,142** | |
| **EmX Alternative** | | |
| High | 4,120 | 11% |
| Moderate | 5,260 | 14% |
| Low | 11,480 | 32% |
| No Impact | 15,507 | 43% |
| **Length of Corridor Outside of Boundary** | **41,319** | |

Source: CH2M. (2016b).

**Table E-6. River Road Corridor Enhanced Corridor Alternative High Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| River Road between Randy Papé Beltline and Santa Clara Avenue (Figure F-6) | 1 between Randy Papé Beltline and Ruby Avenue;<br>8 to 12 between Ruby Avenue and Santa Clara Avenue | Heights ranging from approximately 25' - 45';<br>basal trunk diameters greater than 8" | Stop construction and roadway widening for BAT lanes |
| **Total Potentially Removed Medium and Large Trees: Approximately 9 to 13 street trees** | | | |

**Table E-7. River Road Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Chambers Street between Railroad Boulevard and W. 5th Avenue (Figure F-9) | 2 between W. 5th Avenue and W. 2nd Avenue;<br>4 between W. 2nd Avenue and W. 1st Avenue;<br>8 between W. 1st Avenue and Railroad Boulevard | Approximately 25' - 35' tall;<br>basal trunk diameter greater than 8" | Trenching of communications fiber, station construction at Chambers Street between W. 6th Avenue and W. 5th Avenue and at Chambers Street and W. 2nd Avenue |
| **Total Potentially Removed Medium and Large Trees: Approximately 14 street trees** | | | |

**Table E-8. River Road Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| River Road between Randy Papé Beltline and Santa Clara Avenue (Figure F-11) | 9 to 12 between Maxwell Road/ E. Rosewood Avenue and Hamilton Avenue;<br>2 between Hamilton Avenue and Kourt Drive;<br>2 between Kourt Drive and Corliss Lane;<br>2 to 3 between Corliss Avenue and Silver Lane | Heights ranging from approximately 20' - 35'; basal trunk diameters greater than 8” | Trenching of communications fiber, station construction, construction of full-depth concrete BAT lanes within existing roadway width, roadway widening |
| River Road between Maxwell Road and Silver Lane (Figures F-11 and F-12) | 9 to 12 between Maxwell Road/ E. Rosewood Avenue and Hamilton Avenue;<br>2 between Hamilton Avenue and Kourt Drive;<br>2 between Kourt Drive and Corliss Lane;<br>2 to 3 between Corliss Avenue and Silver Lane | Heights ranging from approximately 20' - 35'; basal trunk diameters greater than 8” | Trenching of communications fiber, station construction, construction of full-depth concrete BAT lanes within existing roadway width, roadway widening |
| River Road between Horn Lane and Maxwell Road (Figures F-12 and F-13) | 6 between Sandra Lane and Rosetta Avenue;<br>18 to 20 between Merry Lane and Maynard Avenue;<br>7 between Howard Avenue and Maxwell Road | Heights ranging from approximately 25' - 40'; basal trunk diameters greater than 8" | Trenching of communications fiber, station construction, construction of full-depth concrete BAT lanes within existing roadway width |
| River Road between Hawthorne Avenue and Elkay Drive (Figure F-14) | 30 to 40 between Hawthorne Avenue and Park Avenue/ Stephens Drive;<br>1 between Stults Avenue and Sunnyside Drive;<br>6 between Sunnyside Drive and Elkay Drive | Heights ranging from approximately 25' - 40'; basal trunk diameters greater than 8" | Trenching of communications fiber, station construction, construction of full-depth concrete BAT lanes within existing roadway width |
| **Total Potentially Removed Medium and Large Trees: Approximately 98 to 118 street trees** | | | |

**Table E-9. 30th Avenue to Lane Community College Corridor Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **Enhanced Corridor Alternative** | | |
| High | 2,630 | 11% |
| Moderate | 700 | 3% |
| Low | 30 | 0% |
| No Impact | 21,067 | 86% |
| **Length of Corridor Within Boundary** | **24,416** | |
| **EmX Alternative** | | |
| High | 5,440 | 17% |
| Moderate | 2,570 | 8% |
| Low | 1620 | 5% |
| No Impact | 21,986 | 70% |
| **Length of Corridor Within Boundary** | **31,616**[a] | |

Source: CH2M. (2016b).

[a] Includes High Street cycletrack improvements.

**Table E-10. 30th Avenue to Lane Community College Corridor Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **Enhanced Corridor Alternative** | | |
| High | 40 | 0% |
| Moderate | 720 | 2% |
| Low | 1,020 | 2% |
| No Impact | 39,887 | 96% |
| **Length of Corridor Outside of Boundary** | **41,667** | |
| **EmX Alternative** | | |
| High | 40 | 0% |
| Moderate | 1,340 | 3% |
| Low | 3,990 | 10% |
| No Impact | 36,269 | 87% |
| **Length of Corridor Outside of Boundary** | **41,667** | |

Source: CH2M. (2016b).

**Table E-11. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative High Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Oak Street between E. 13th Avenue and E. 14th Avenue (Figure F-15) | 6 between E. 13th Avenue and E. 13th Alley;<br>2 along west side of Oak Street, approximately midblock between E. 13th Alley and E. 14th Avenue | Heights ranging from approximately 20' - 35'; basal trunk circumference approximately 25" or greater | Bus stop and parking pullout construction |
| Pearl Street between E. 12th Avenue and E. 16th Avenue (Figure F-15) | 6 to 8 between E. 12th Avenue and E. 12th Alley;<br>9 between E. 12th Alley and E. 13th Avenue;<br>7 to 9 between E. 13th Avenue and E. 13th Alley;<br>8 between E. 13th Alley and E. 14th Avenue;<br>5 between E. 14th Avenue and E. 14th Alley;<br>3 to 4 between E. 14th Alley and E. 15th Avenue;<br>3 between E. 15th Avenue and E. 16th Avenue | Heights ranging from approximately 20' - 35'; basal trunk circumference approximately 25" or greater | Bus stop and parking pullout construction- bus stop and pullout construction between E. 13th and E. 14th Avenues, parking pullout construction between E. 14th and E. 15th Avenues, E. 12th and E. 13th Avenues |
| **Total Potentially Removed Medium and Large Trees: Approximately 49 to 54 street trees and 0 landscape trees** | | | |

**Table E-12. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative High Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Southeast corner of E. 30th Avenue and University Street, on the south side of 30th Avenue (Figure F-16) | 2 to 4 trees in private yard (landscape trees) | Approximately 25' - 35' tall; basal trunk diameter greater than 8" | These landscape trees are located in backyard of private residence behind wooden fence; construction activity might impact root zones |
| **Total Potentially Removed Medium and Large Trees: Approximately 0 street trees and 2 to 4 landscape trees** | | | |

**Table E-13. 30th Avenue to Lane Community College Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Pearl Street between W. 11th Avenue and W. 17th Avenue (Figure F-17) | 7 between E. 11th and E. 12th Avenues on the east side of Oak Street;<br>14 between E. 12th and E. 13th Avenues;<br>8 between E. 13th Avenue and E. 13th Alley;<br>6 between E. 14th and E. 15th Avenues;<br>7 between E. 15th and E. 16th Avenues;<br>12 between E. 16th and E. 17th Avenues | Heights ranging from approximately 10' - 25', basal trunk circumference ranges, approximately 5" - 25" | Excavation to construct full-depth concrete BAT lanes, station construction |
| Oak Street between W. 11th Avenue and W. 17th Avenue (Figure F-17) | 1 between E. 11th and E. 12th Avenues on the east side of Oak Street;<br>10 between E. 12th and E. 13th Avenues;<br>5 between E. 13th Avenue and E. 13th Alley;<br>2 between E. 14th and E. 15th Avenues;<br>14 between E. 15th and E. 16th Avenues;<br>2 between E. 16th and E. 17th Avenues | Heights ranging from approximately 10' - 20';<br>basal trunk circumference approximately 25" | Excavation to construct full-depth concrete BAT lanes, station construction |
| Block between E. 19th Avenue and E. 20th Avenue, Oak St and Amazon Parkway (Figure F-17) | 7 along Oak Street, between E. 19th and E. 20th Avenues;<br>2 on the northwest corner of Oak Street and E. 20th Avenue;<br>1 along Amazon Parkway between E. 19th and E. 20th Avenues | Heights ranging from approximately 10' - 20';<br>basal trunk circumference approximately 25" | Extension and reconstruction of E. 20th Avenue to tie in to Amazon Parkway |
| **Total Potentially Removed Medium and Large Trees: Approximately 98 street trees and 0 landscape trees** | | | |

**Table E-14. 30th Avenue to Lane Community College Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Southeast corner of E. 30th Avenue and University Street, on the south side of 30th Avenue (Figure F-18) | 2 to 4 trees in private yard (landscape trees) | Approximately 25' - 35' tall; basal trunk diameter greater than 8" | These landscape trees are located in backyard of private residence behind wooden fence; construction activity might impact root zones |
| **Total Potentially Impacted Medium and Large Trees: Approximately 0 street trees and 2 to 4 landscape trees** | | | |

**Table E-15. Coburg Road Corridor Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **EmX Alternative** | | |
| High | 5600 | 29% |
| Moderate | 3,990 | 20% |
| Low | 160 | 1% |
| No Impact | 9,782 | 50% |
| **Length of Corridor Within Boundary** | **19,532** | |

Source: CH2M. (2016b).

**Table E-16. Coburg Road Corridor Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **Enhanced Corridor Alternative** | | |
| High | 840 | 2% |
| Moderate | 4,720 | 10% |
| Low | 9,890 | 20% |
| No Impact | 32,844 | 68% |
| **Length of Corridor Outside of Boundary** | **48,294** | |
| **EmX Alternative** | | |
| High | 950 | 2% |
| Moderate | 5,800 | 12% |
| Low | 13,300 | 28% |
| No Impact | 28,244 | 58% |
| **Length of Corridor Outside of Boundary** | **48,294** | |

**Table E-17. Coburg Road Corridor Enhanced Corridor Alternative High Probability of Potential Impacts to Medium and Large Trees – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Activity Leading to Potential Impact |
|---|---|---|---|
| Southeast Corner of Coburg Road and Pioneer Pike/ Harlow Road (Figure F-21) | 4 to 6 landscape trees on southeast corner of Coburg Road and Pioneer Pike/Harlow Road | Heights ranging from approximately 20' - 40'; basal trunk diameters greater than 8" | Intersection widening and bus stop construction |
| Between Oakmont Way and Rustic Place (Figure F-21) | 3 median planter trees, roughly midblock between Oakmont Way and Rustic Place | Heights ranging from approximately 15' - 20'; basal trunk diameter greater than 8" | Intersection widening and bus stop construction |
| **Total Potentially Removed Medium and Large Trees: Approximately 3 street trees and 4 to 6 landscape trees** | | | |

**Table E-18. Coburg Road Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Impact |
|---|---|---|---|
| W. and E. 6th Avenue between Charnelton Street and High Street (Figure F-22) | 5 to 7 between High Street and Pearl Street;<br>14 between Pearl Street and Oak Street;<br>7 between Oak Street and Willamette Street;<br>1 between Willamette Street and Olive Street;<br>14 between Olive Street and Charnelton Street | Heights ranging from approximately 20' - 35'; basal trunk circumferences appear 20" or greater | Full-depth excavation to construct concrete BAT lanes and station construction |
| W. and E. 7th Avenue between Charnelton Street and High Street (Figure F-22) | 2 between High Street and Pearl Street;<br>4 between Pearl Street and Oak Street;<br>12 between Oak Street and Willamette Street;<br>6 between Willamette Street and Olive Street;<br>5 between Olive Street and Charnelton Street | Heights ranging from approximately 20' - 35'; basal trunk circumferences appear 20" or greater | Full-depth excavation to construct concrete BAT lanes and station construction |
| Oak Street between E. 7th Avenue and S. Park Street (Figure F-22) | 3 between W. 7th Avenue and E. 8th Avenue;<br>3 between E. 8th Avenue and S. Park Street | Heights ranging from approximately 20' - 35'; basal trunk circumferences appear 20" or greater | Full-depth excavation to construct concrete BAT lanes and station construction |
| Pearl Street between E. 6th Avenue and E. 8th Avenue (Figure F-22) | 10 between E. 6th Avenue and E. 7th Avenue;<br>2 between E. 7th Avenue and E. 8th Avenue | Heights ranging from approximately 20' - 30'; basal trunk circumferences appear 20" or greater | Full-depth excavation to construct concrete BAT lanes and station construction |
| Pearl Street between E. Broadway and E. 11th Avenue (Figure F-22) | 3 between E. Broadway and E. 10th Avenue;<br>7 between E. 10th Avenue and E. 11th Avenue | Heights ranging from approximately 30' - 40'; basal trunk circumferences appear 30" or greater | Full-depth excavation to construct concrete BAT lanes and station construction |
| **Total Potentially Removed Medium and Large Trees: Approximately 98 to 100 street trees and 0 landscape trees** | | | |

**Table E-19. Coburg Road Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Impact |
|---|---|---|---|
| Coburg Road, between Chad Drive and Randy Papé Beltline (Figure F-23) | 1 landscape tree on the west side of Coburg Road | Approximately 35' height and a basal trunk diameter of more than 8" | Roadway widening for bi-directional exclusive lanes and stations, trenching of communications fiber |
| Old Coburg Road, just north of Chad Drive, south of Game Farm Road (Figure F-23) | 1 landscape tree on the west side of Old Coburg Road | Approximately 30' height and a basal trunk diameter of more than 8" | Station construction and trenching of communications fiber |
| Coburg Road, between Willakenzie Road and Cal Young Road (Figures F-23 and F-24) | 2 median planter trees and 2 street trees at western leg of Coburg Road/Willakenzie Road intersection; 3 street trees along west side of Coburg Road, roughly in the middle of location segment; 2 street trees just north of Cal Young Road on west side of Coburg Road | Heights ranging from approximately 12' - 35'; basal trunk diameters greater than 8" | Median island/station construction and center dedicated lane construction |
| Coburg Road at the Southwood Lane / Oakway Road / I-105 Junction (Figure F-24) | 4 median planter trees | Heights ranging from approximately 20' - 30'; basal trunk diameters greater than 8" | Station construction; other larger median island trees might have root zone impacts because of construction of full-depth concrete exclusive lanes adjacent to existing median |
| Northwest corner of Coburg Road and Oakway Road, north of I-105 exit ramp (Figure F-24) | 4 median planter trees | Heights ranging from approximately 20' - 30'; basal trunk diameters greater than 8" | Median island construction and center dedicated lane construction |
| Between Pioneer Pike and Frontier Drive (Figure F-24) | 4 to 5 on west side of Coburg Road, roughly midblock between Pioneer Pike and Frontier Drive | Heights ranging from approximately 25' - 45'; basal trunk diameters greater than 8" | Median island construction and center dedicated lane construction |

**Table E-19. Coburg Road Corridor EmX Alternative High Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Impact |
|---|---|---|---|
| Between Oakmont Way and Rustic Place (Figure F-24) | 3 median planter trees, roughly midblock between Oakmont Way and Rustic Place | Heights ranging from approximately 15' - 20'; basal trunk diameter greater than 8" | Median island/station construction and center dedicated lane construction |
| Southeast Corner of Coburg Road and Pioneer Pike/ Harlow Road (Figure F-24) | 4 to 6 landscape trees on southeast corner of Coburg Road and Pioneer Pike/Harlow Road; 3 landscape trees on northeast corner of Coburg Road and Harlow Road on church property | Heights ranging from approximately 20' - 40'; basal trunk diameters greater than 8" | Median island/station construction and center dedicated lane construction, intersection widening |
| Coburg Road, just south of Tandy Turn (Figure F-24) | 5 to 7 on east side of Coburg Road; 3 on southwest corner of Coburg Road and Tandy Turn; 1 roughly midblock between Tandy Turn and Tomahawk Lane | Heights ranging from approximately 20' - 40'; basal trunk diameters greater than 8" | Station construction and trenching for communications fiber |
| **Total Potentially Removed Medium and Large Trees: Approximately 33 to 38 street trees and 9 to 11 landscape trees** | | | |

**Table E-20. Martin Luther King, Jr. Boulevard Corridor Probability of Potential Impacts to Medium and Large Trees by Alternative**

| Alternative | Impact Length (Lineal Feet) | % |
|---|---|---|
| **EmX Alternative** | | |
| High | 110 | <1% |
| Moderate | 2,600 | 7% |
| Low | 8,570 | 21% |
| No Impact | 28,651 | 72% |
| **Length of Corridor** | **39,931** | |

Source: CH2M. (2016b).

**Table E-21. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative High Probability of Potential Impacts to Medium and Large Trees – Quantification and Discussion**

| Location | Number of Potentially Removed Trees | Size of Potentially Removed Trees | Description of Potential Impact |
|---|---|---|---|
| Martin Luther King, Jr. Boulevard, north of Kinsrow Avenue (Figure F-25) | 7 to 9 along east side of Martin Luther King, Jr. Boulevard | Heights ranging from approximately 20’ - 30'; basal trunk diameters greater than 8" | Stop construction and excavation for construction of full depth concrete BAT lanes |
| **Total Potentially Removed Medium and Large Trees: Approximately 7 to 9 street trees and 0 landscape trees** | | | |

# Appendix F: Detailed Impact Figures by Alternative

The following figures provide more site-specific, graphic, information related to potential impacts to medium and large trees from the alternatives associated with the corridors examined in this Technical Report.

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## Highway 99 Corridor

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**Figure F-1** **Highway 99 Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees – North Extent**

**Figure F-2** **Highway 99 Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees – South Extent**


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**Figure F-3** **Highway 99 Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees – North Extent**

**Figure F-4** **Highway 99 Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees – South Extent**

## River Road Corridor

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**Figure F-5** **River Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Downtown Extent**

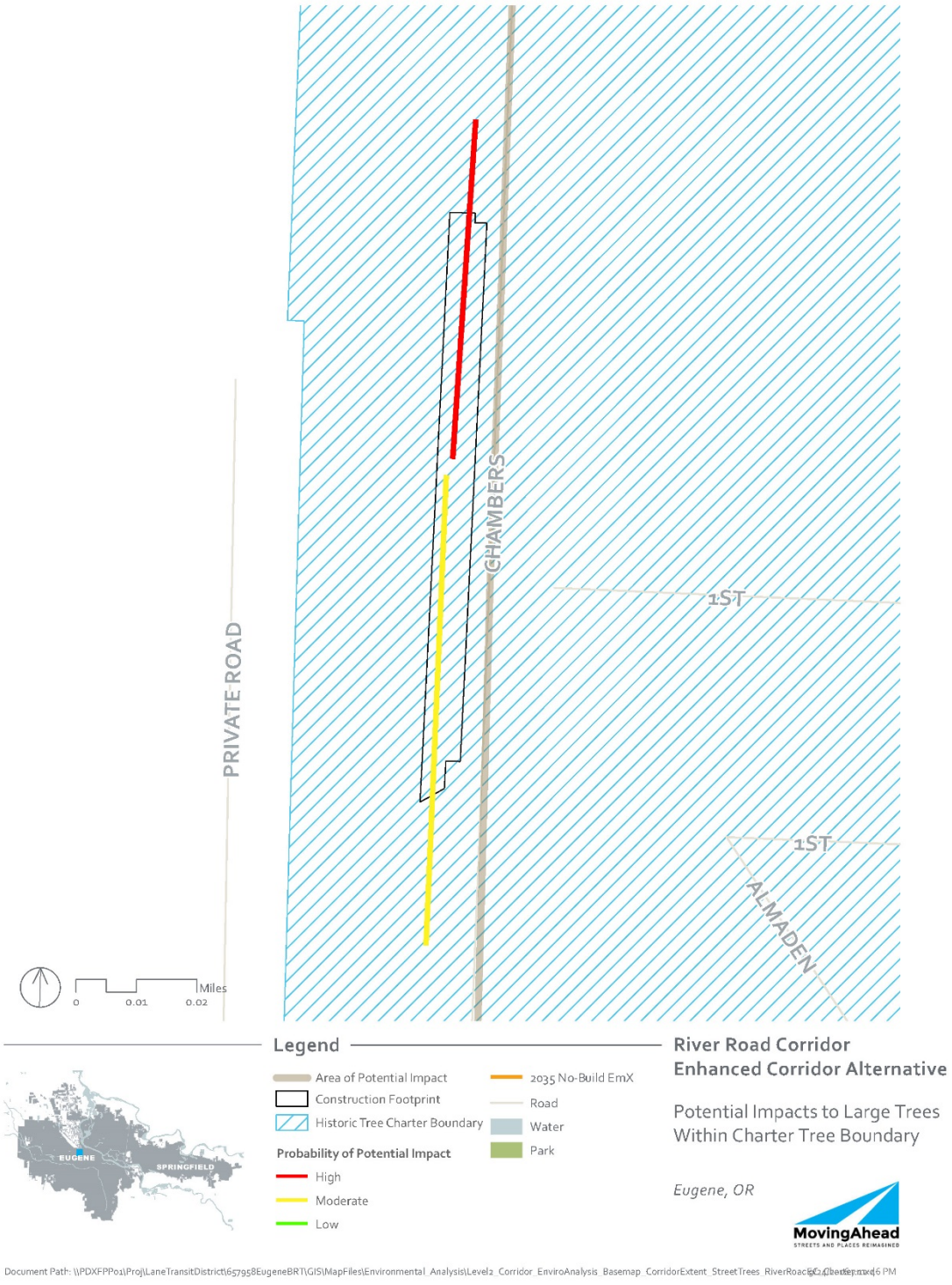

**Figure F-6** **River Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North Extent**

**Figure F-7** **River Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North-Central Extent**

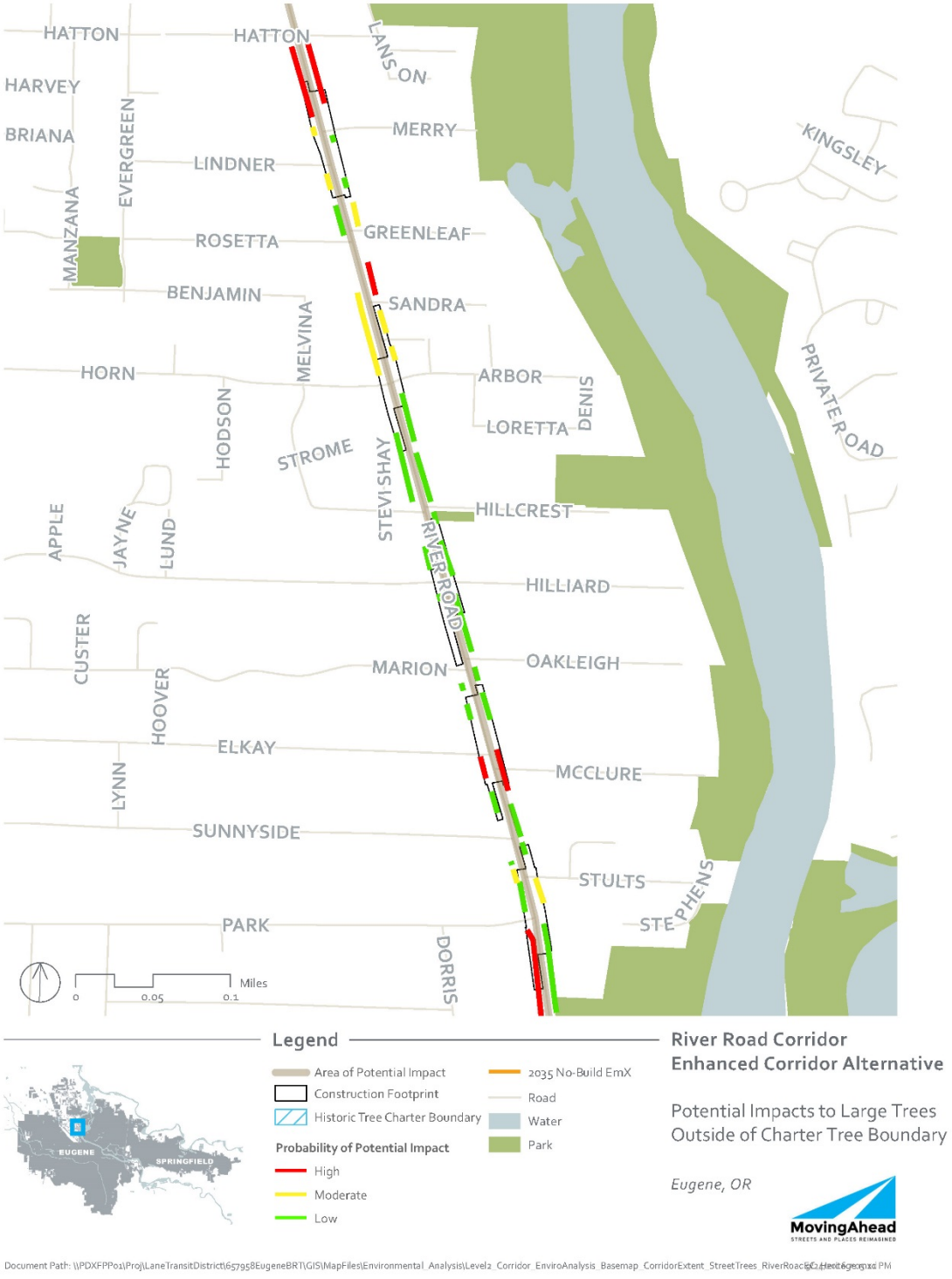

**Figure F-8** **River Road Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – South-Central Extent**

**Figure F-9** **River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Downtown Extent**

**Figure F-10** **River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees – Downtown Extent**

**Figure F-11** **River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North of Beltline Extent**

**Figure F-12** **River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North Extent**

**Figure F-13** **River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North-Central Extent**

**Figure F-14 River Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – South-Central Extent**

## 30th Avenue to Lane Community College Corridor

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**Figure F-15** **30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Downtown Extent**

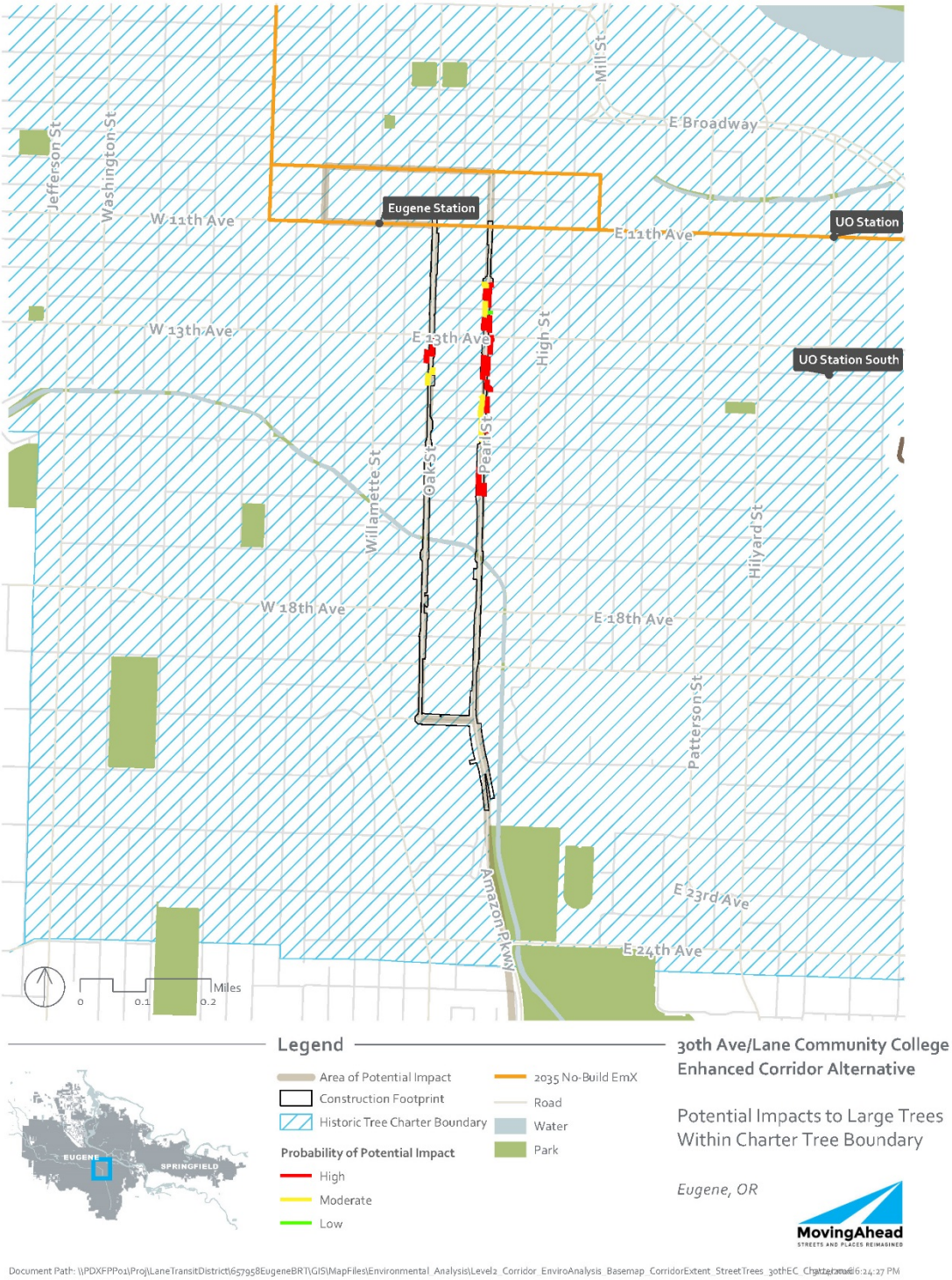

**Figure F-16** **30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North-Central Extent**


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**Figure F-17** **30th Avenue to Lane Community College Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Downtown Extent**

**Figure F-18** **30th Avenue to Lane Community College Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North-Central Extent**

**Figure F-19** **30th Avenue to Lane Community College Corridor EmX Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – South-Central Extent**

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## Coburg Road Corridor

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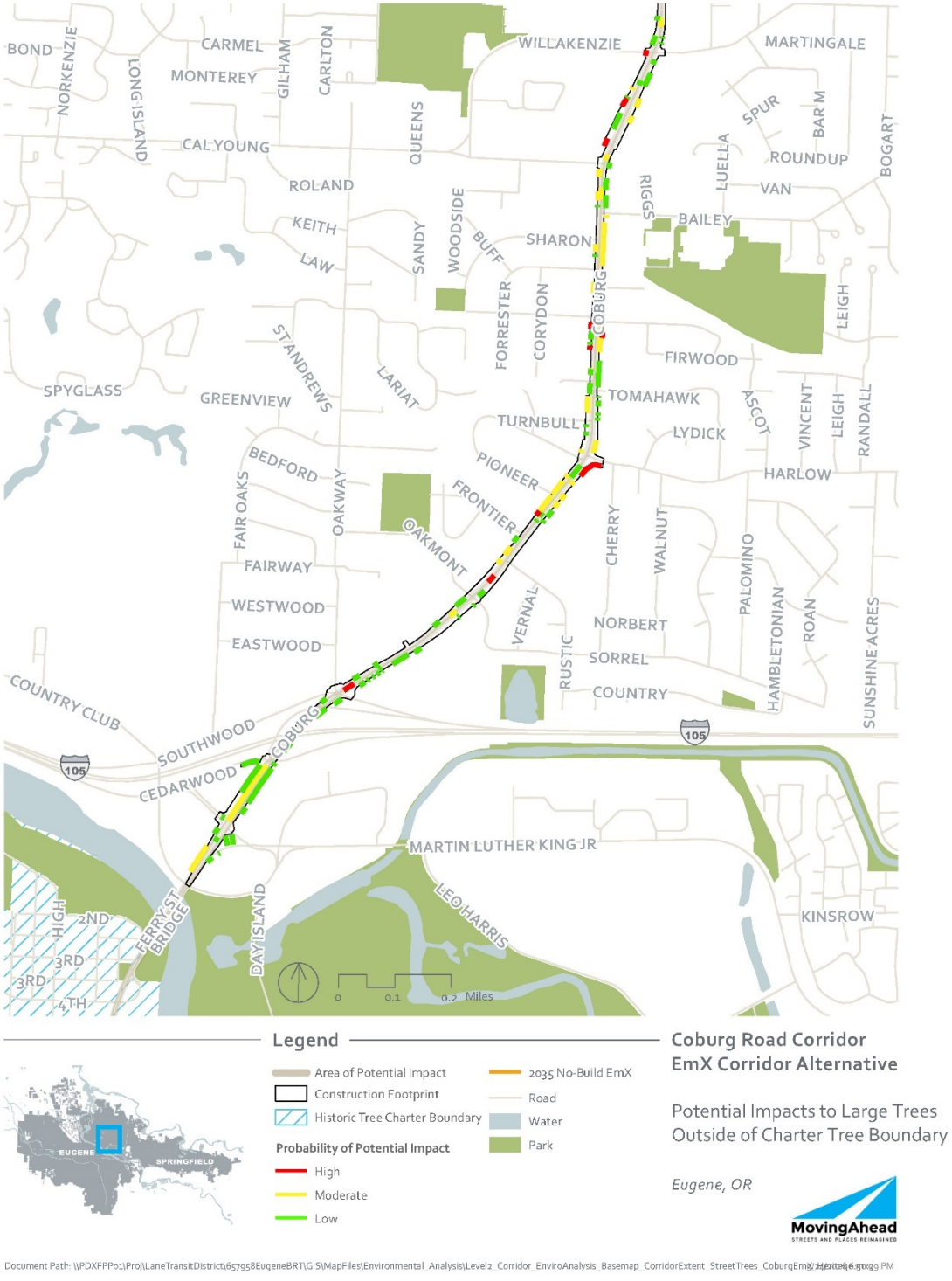
**Figure F-20** **Coburg Road Corridor Enhanced Corridor Alternative Potential Impacts to Large Trees – North Extent**

**Figure F-21** **Coburg Road Corridor Enhanced Corridor Alternative Potential Impacts to Large Trees – South Extent**

**Figure F-22** **Coburg Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Within the Charter Tree Boundary – Downtown Extent**

**Figure F-23** **Coburg Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – North Extent**

**Figure F-24** **Coburg Road Corridor EmX Alternative Probability of Potential Impacts to Medium and Large Trees Outside of the Charter Tree Boundary – South Extent**



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## Martin Luther King, Jr. Boulevard Corridor

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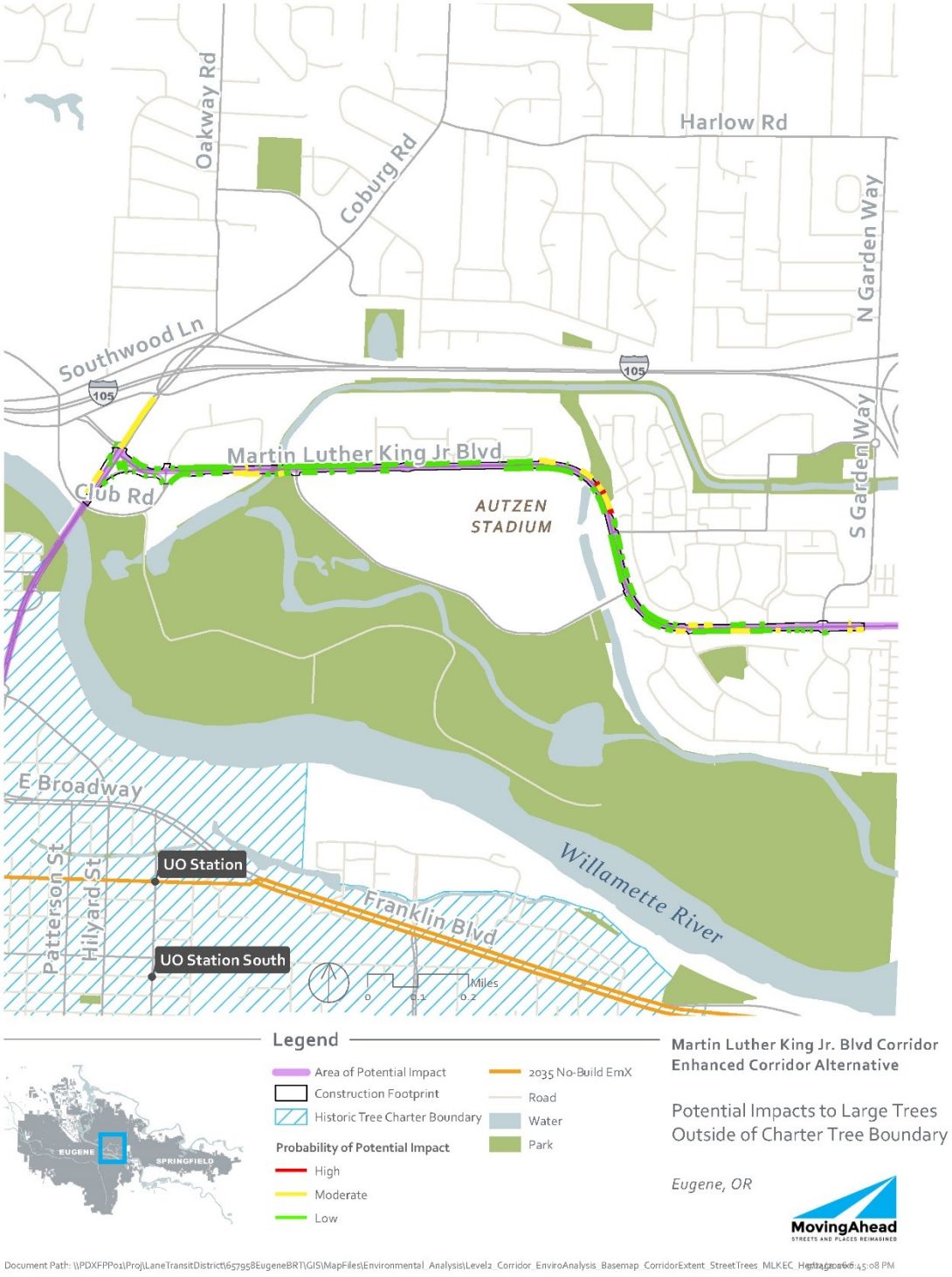
**Figure F-25** **Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative Probability of Potential Impacts to Medium and Large Trees – Central Extent**



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