MovingAhead

STREETS AND PLACES REIMAGINED

DRAFT FINAL Utilities 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 Utilities 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 eq. seq.

July 7, 2017

Prepared for
Federal Transit Administration
Lane Transit District
City of Eugene

Prepared by
CH2M HILL, Inc.

Americans with Disabilities Act (ADA) Information
If you would like copies of this document in an alternative format – large print, Braille, cassette tape, or on computer disc – or are deaf or hard of hearing, please contact
Sasha Luftig, Project Manager for the MovingAhead Project, at
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Sasha Luftig, Project Manager for the MovingAhead Project, at
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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
BPA	Bonneville Power Administration
BRT	bus rapid transit
CH2M	CH2M HILL, Inc.
City	City of Eugene
Draft Envision Eugene	*Draft Envision Eugene Comprehensive Plan* (Envision Eugene, 2016)
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
EWEB	Eugene Water and Electric Board
FTA	Federal Transit Administration
FTN	Frequent Transit Network
GIS	geographic information systems
I-105	Interstate 105
I-5	Interstate 5
kV	kilovolt
LCC	Lane Community College
LCOG	Lane Council of Governments
LOS	level of service
LTD	Lane Transit District
MPO	Metropolitan Planning Organization
N/A	not applicable
NEPA	National Environmental Policy Act, 42 U.S.C. 4231-4347
NW Natural	Northwest Natural Gas
ODOT	Oregon Department of Transportation
ROW	right of way
RTP	*Regional Transportation Plan* (Central Lane MPO, 2011)

Acronyms, Abbreviations, and Terms (continued)

Acronyms and Abbreviations	Definitions
U.S.C.	United States Code
WEEE	West Eugene EmX Extension

Terms	Definitions
Accessibility	The extent to which facilities are barrier-free and useable for all persons with or without disabilities.
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 Impact	An assessment's Area of Potential Impact for the project is defined separately for each discipline.
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 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.
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.
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.
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.

Terms	Definitions
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.
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. 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.
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).
EmX	Lane Transit District's Bus Rapid Transit System, pronounced "MX," short for Emerald Express.
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: • 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. • To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. • 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.
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.

Acronyms, Abbreviations, and Terms (continued)

Terms	Definitions
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).
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. • Goals are overarching principles that guide decision making. Goals are broad statements. • 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.
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).
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.
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
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.
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.

Terms	Definitions
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.
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.
Mitigation	A means to avoid, minimize, rectify, or reduce an impact, and in some cases, to compensate for an impact.
Mode	A particular form or method of travel distinguished by vehicle type, operation technology, and right-of-way separation from other traffic.
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. 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.
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.
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.
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.
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."
Park and Ride	Designated parking areas for automobile drivers who then board transit vehicles from these locations.
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.
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.

Acronyms, Abbreviations, and Terms (continued)

Terms	Definitions
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.
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.
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.
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.
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.
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.

Utilities Summary

This Utilities Technical Report presents the results of the utilities assessment for the Lane Transit District (LTD) and the 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, 2016a; 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 *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 Alternatives Overview

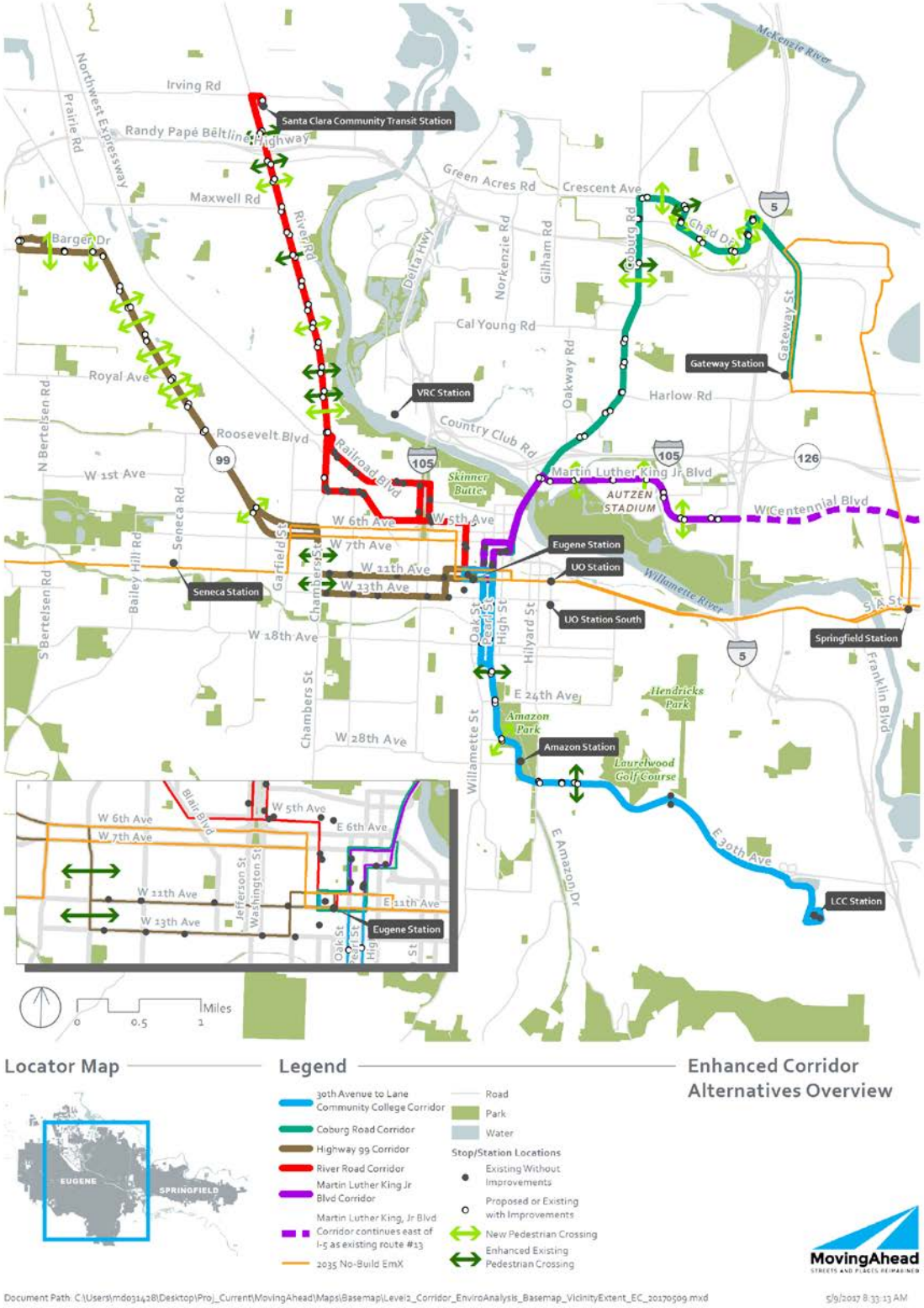
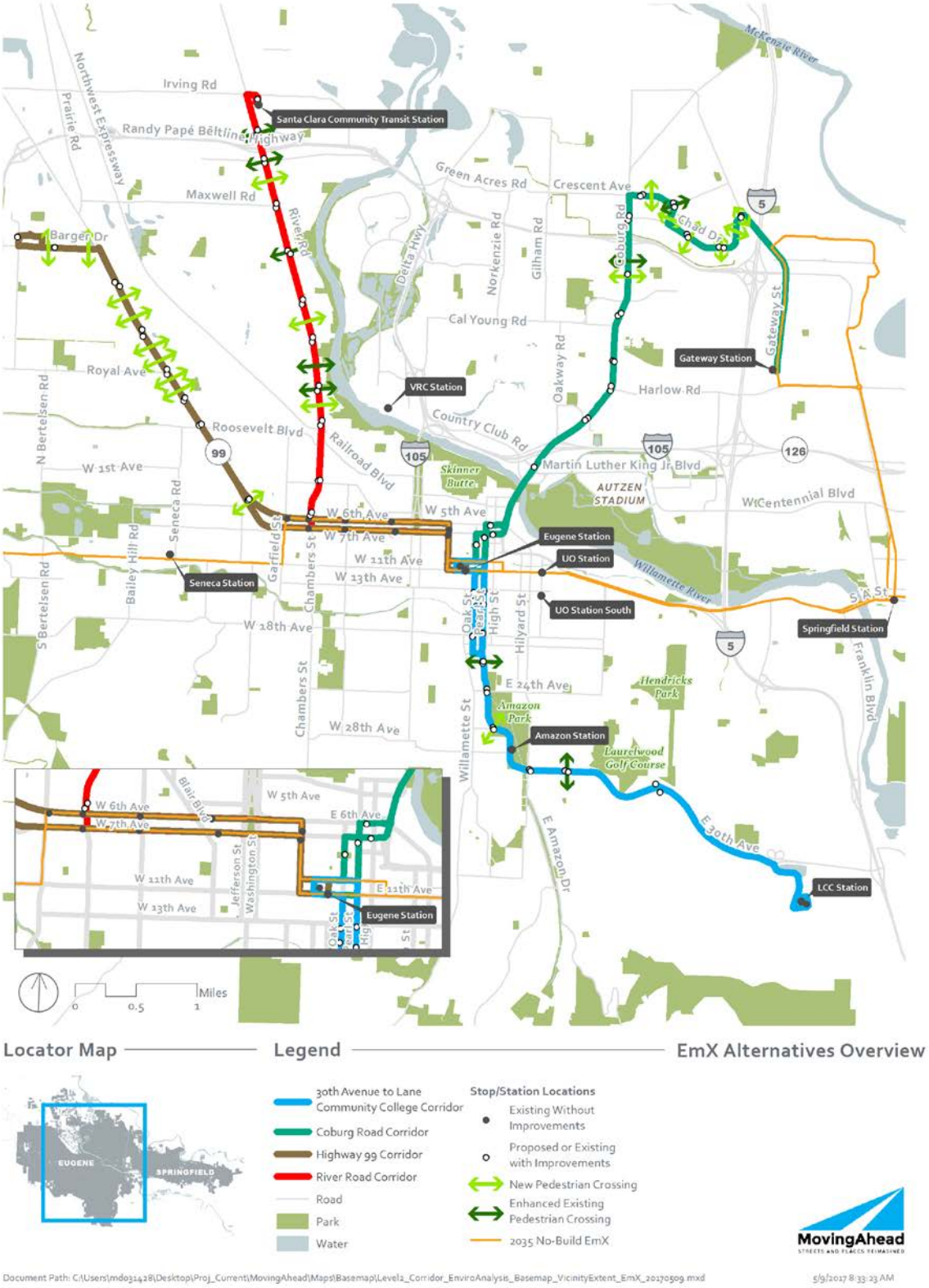


Figure S.1-2. EmX Alternatives Overview



- **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 potential adverse and beneficial effects that the project alternatives would have on utilities. It describes how the proposed project alternatives would affect utilities in the five study corridors. It bases the assessments on how the alternatives would have potential adverse impacts to utilities in the area of potential impact (API) and identifies potential mitigation measures to reduce impacts to utilities.

Existing and proposed future utilities are potentially impacted by each proposed build alternative. Depending on the type, size, location, and importance of a given utility conflict, construction costs and schedule might be impacted due to mitigation efforts. This report describes potential utility conflicts as a result of proposed construction of each build alternative. Precise determination of the number, extent, and location of utility locations at this stage of design is not feasible, but determination of the general risk of relocation of a given utility due to the nature of construction and the infrastructure potentially impacted is included in this report.

This report considers potential utility impacts and possible mitigation measures to help decision makers select the preferred alternative in each MovingAhead corridor.

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.

S.1. Affected Environment

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

The area of potential impact encompasses existing and proposed future utilities within the construction footprint of the build alternatives within each corridor. Utility impacts might result from roadway widening, sidewalk improvements, construction of stops and stations, and excavation or resurfacing activities.

Potentially impacted facilities include underground utilities such as water lines, cables, and conduit for telecommunications and electrical service, sanitary sewer lines, storm sewer lines, fiber-optic cable, natural gas pipes, and associated aboveground access points such as manholes, vaults, and hydrants. Utility poles and traffic signals might also require relocation. The exact location and depth of underground utilities is unknown at this level of design.

This report focuses on identifying potential impacts to utility infrastructure identified as "large," "primary," "main," or "major" based on information that municipal and private utility companies provided to the analysis team. These facilities are typically larger in physical size or capacity of conveyance and, therefore, would require more coordination, cost, and time to adjust or relocate than

routine relocation or adjustment of service laterals or other small lines. No removal of existing services in place would occur in any alternative proposed.

S.2. Environmental Consequences

S.2.1. No-Build Alternative – All Corridors

S.2.1.1. Long-Term Impacts

No-Build Alternatives would have no long-term direct impacts to utilities other than those related to construction already programmed.

S.2.1.2. Cumulative and Indirect Impacts

No-Build Alternatives would have no cumulative impacts to utility infrastructure because no new facilities are proposed beyond those already programmed. A cumulative adverse effect of No-Build Alternatives would result from not replacing aging infrastructure in the project area as anticipated under the build alternatives.

S.2.1.3. Short-Term Construction-Related Impacts

No-Build Alternatives would have short-term construction-related impacts to utilities because no new facilities are proposed beyond those already programmed.

S.2.2. Enhanced Corridor and EmX Alternatives – All Corridors

The following sections summarize the potential environmental consequences to utilities common to build alternatives in all corridors. Under the build alternatives, consequences to corridors would be similar in concept, though their specifics would vary because construction impacts differ by alternative. Table S.2-1 describes the potential impacts to utilities by corridor and alternatives.

S.2.2.1. Long-Term Impacts

A long-term impact to utilities would result if utility infrastructure was required to relocate. Any utilities that might be impacted in this manner would be relocated or replaced in-kind or with betterments.

Beneficial long-term impacts would result from construction of additional utility infrastructure to provide needed services associated with a particular civil improvement (such as new signals, operator restroom facilities, or communications fiber).

Table S.2-1 quantifies the approximate number and type of long-term impacts to major utilities. Sections 4 through 8 contain more specific narratives detailing locations and types of potential impacts to each utility.

S.2.2.2. Cumulative and Indirect Impacts

No cumulative disruption to utilities would be anticipated for any build alternative. Service would not be permanently disrupted and the replacement and/or relocation of aging utility infrastructure would provide a cumulative benefit to area businesses and residences.

Table S.2-1. Summary of Utilities Environmental Consequences by Corridor and Alternative

	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Highway 99 Corridor			
Long-Term Direct Impacts / Benefits	None	• Major storm sewer: 1 line impacted on Highway 99 • Major electrical: 7 lines impacted on Highway 99 • Major water: 1 line impacted on Highway 99	• Major sanitary sewer: 1 line impacted on Highway 99 • Major storm sewer: 1 line impacted on Highway 99 • Major electrical: 7 lines impacted on Highway 99 • Major water: 1 line impacted on Highway 99 • Beneficial effect of constructing new fiber connections along the length of the corridor
Indirect and Cumulative Effects	None	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide an indirect benefit	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit
Temporary / Short-Term Construction-Related Impacts / Benefits	None	• Short-term service disruptions during construction	• Short-term service disruptions during construction
Potential Mitigation Measures	None	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions
Unavoidable Adverse Effects	None	None	None

Table S.2-1. Summary of Utilities Environmental Consequences by Corridor and Alternative

	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
River Road Corridor			
Long-Term Direct Impacts / Benefits	None	• Major sanitary sewer: 3 lines impacted on River Road • Major electrical: 6 lines impacted on River Road • Major water: 1 line impacted on River Road	• Major sanitary sewer: 3 lines impacted on River Road • Major storm sewer: 1 line impacted on River Road • Major electrical: 9 lines impacted on River Road • Major water: 2 lines impacted on River Road • Potential impact to major Northwest Natural Gas (NW Natural) gas transmission line on River Road near its interchange with the Randy Papé Beltline Highway • Beneficial effect of constructing new fiber connections along the length of the corridor
Indirect and Cumulative Effects	None	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit
Temporary / Short-Term Construction-Related Impacts / Benefits	None	• Short-term service disruptions during construction	• Short-term service disruptions during construction
Potential Mitigation Measures	None	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions
Unavoidable Adverse Effects	None	None	None

Table S.2-1. Summary of Utilities Environmental Consequences by Corridor and Alternative

	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
30th Avenue to Lane Community College Corridor			
Long-Term Direct Impacts / Benefits	None	• Major sanitary sewer: 2 lines impacted on W. 20th Avenue, 1 line impacted on Amazon Parkway • Major electrical: 1 line impacted on Oak Street, 2 lines impacted on Amazon Parkway • Major water: 2 lines impacted on Amazon Parkway • Potential impacts to steam lines on Oak Street and Pearl Street	• Major sanitary sewer: 2 lines impacted on W. 20th Avenue, 1 line impacted on Amazon Parkway • Major storm sewer: 1 line impacted on Pearl Street • Major electrical: 4 lines impacted on Pearl Street, 1 line impacted on Oak Street, 5 lines impacted on Amazon Parkway • Major water: 3 lines impacted on Amazon Parkway • Potential impacts to steam lines on Oak Street and Pearl Street • Beneficial effect of constructing new fiber connections from downtown Eugene to University Street
Indirect and Cumulative Effects	None	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit
Temporary / Short-Term Construction-Related Impacts / Benefits	None	• Short-term service disruptions during construction	• Short-term service disruptions during construction
Potential Mitigation Measures	None	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions
Unavoidable Adverse Effects	None	None	None

Table S.2-1. Summary of Utilities Environmental Consequences by Corridor and Alternative

	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Coburg Road Corridor			
Long-Term Direct Impacts / Benefits	None	• Major sanitary sewer: 2 lines impacted on Coburg Road • Major storm sewer: 2 lines impacted on Coburg Road • Major electrical: 10 lines impacted on Coburg Road, 2 lines impacted on Crescent Road, 2 lines impacted on Old Coburg Road • Major water: 1 line impacted on Coburg Road • Potential intermittent impacts to major NW Natural gas transmission lines on Coburg Road	• Major sanitary sewer: 2 lines impacted on Coburg Road • Major storm sewer: 1 line impacted on W. 6th Avenue, 1 line impacted on Pearl Street, 4 lines impacted on Coburg Road, 1 line impacted on Crescent Avenue • Major electrical: 1 line impacted on W. 7th Avenue, 1 line impacted on Pearl Street, 1 line impacted on W. 11th Avenue, 10 lines impacted on Coburg Road, 2 lines impacted on Crescent Avenue, 2 lines impacted on Old Coburg Road • Major water: 1 line impacted on Coburg Road • Potential impact to major NW Natural gas transmission lines on Coburg Road • Beneficial effect of constructing new fiber connections along the length of the corridor
Indirect and Cumulative Effects	None	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit
Temporary / Short-Term Construction-Related Impacts / Benefits	No replacement of aging infrastructure except for already programmed projects	• Short-term service disruptions during construction	• Short-term service disruptions during construction
Potential Mitigation Measures	None	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions

Table S.2-1. Summary of Utilities Environmental Consequences by Corridor and Alternative

	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Unavoidable Adverse Effects	None	None	None
Martin Luther King, Jr. Boulevard Corridor			
Long-Term Direct Impacts / Benefits	None	• Major sanitary sewer: 1 line impacted on Martin Luther King, Jr. Boulevard • Major electrical: 6 lines impacted on Martin Luther King, Jr. Boulevard • Major water: 2 lines impacted on Martin Luther King, Jr. Boulevard • Potential impact to major NW Natural gas transmission line on Coburg Road	Not applicable
Indirect and Cumulative Effects	None	• No cumulative disruption • Replacement and/or relocation of aging utility infrastructure would provide a potential indirect benefit	
Temporary / Short-Term Construction-Related Impacts / Benefits	None	• Short-term service disruptions during construction	
Potential Mitigation Measures	None	• Modify project design, where feasible, to avoid and minimize impacts to utilities • Coordinate with utility providers early and throughout design and construction process • Use environmental BMPs during construction and relocation to mitigate potential hazards • Notify businesses and residences, as appropriate, for extended service disruptions	
Unavoidable Adverse Effects	None	None	

S.2.2.3. Short-Term Construction-Related Impacts

Short-term utility impacts (such as temporary service disruptions) would occur during project construction. The project team, working with utility providers early and throughout the design process to coordinate and schedule relocations, would minimize impacts on the overall construction schedule. Careful coordination with utility providers before and during construction for guidance and design assistance would minimize the risk of construction-related impacts and associated cost, delay, and inconvenience to utility customers.

S.3. Mitigation Options

In general, the design of build alternatives would avoid or minimize utility relocations to avert disruptions to the community and utility companies. This would, in turn, help reduce costs and schedule impacts because of utility relocation requirements.

Prior to construction, all utility locations would be determined. LTD, the City, and the construction contractor would communicate and coordinate with utility owners so that necessary plans and permitting were in place to successfully relocate affected utilities before commencing construction. During construction, LTD, the City, and the construction contractor would coordinate all construction activities, scheduling, and staging with utility companies. As appropriate, businesses and residents would be notified of extended temporary utility disruptions. Best management practices (BMPs) would be in place to mitigate the potential hazards associated with the relocation of storm or sanitary lines. Hazardous materials BMPs would be employed when relocation would involve transformers or other potentially hazardous materials.

Flexibility in station locations and other project facilities would offer opportunities for avoiding utility conflicts altogether. Typically, this design work is part of preliminary and final engineering, because it is usually these phases of the design process when the design team has enough information about the location of potentially impacted utilities. The information needed to adequately locate and design around existing utilities normally consists of the following:

- Topographic design survey of the alignment
- Existing utility lines marked (blue-staked) and included in field survey
- Existing utility features (valves, manholes, etc.) included in field survey, with elevation/invert data
- Utility access and relocation criteria defined
- Environmental clearance complete or in final stages

LTD, the City, and the design team would work to identify where small adjustments to project facilities would allow existing utilities to be unaffected. Small adjustments would not trigger additional environmental analysis beyond the clearance already received.

Following a detailed utility investigation and refinement of the corridor alternatives leading into preliminary design, there might be opportunities to leave utility lines in place where stations or other project facilities would be located. These opportunities would be specific to individual utilities and the conditions of the site. The design team would study these opportunities. During preliminary and final engineering, the design team would present them to LTD and the City for a case-by-case analysis and strategy determination.

The typical reasons to leave utilities in place are because the impacts from the utility and from the project would be so minimal that the cost would not be worth the benefit to either party, and project construction or operations would not affect existing access points to the utility line. After the design team presented the analysis, the decision makers would mutually agree to leave the utilities in place.

Sometimes designers might recommend a mitigation strategy to lessen the physical effect on the utility – new manhole locations are one such practice that protects utilities in place.

While no large utilities are found to be potentially affected with the project alternatives, in future phases, where the relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

S.4. Conclusions

No significant adverse impacts would be anticipated for the No-Build Alternatives or for any build alternatives. For the Enhanced Corridor and EmX Alternatives, the MovingAhead Project team could reasonably relocate, replace, and/or alter designs to avoid significant impacts to all potentially affected utilities. Table S.2-1 summarizes potential environmental consequences for all corridors and alternatives.

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. Utilities Technical Report and Purpose

This technical report presents the results of the utilities assessment for the MovingAhead corridor alternatives. Each proposed build alternative would potentially impact existing and proposed future utilities. Depending on the type, size, location, and importance of a given utility conflict, construction costs and schedule might be affected because of mitigation efforts. This report describes potential utility conflicts as a result of proposed construction for each build alternative, as well as any potential effects on utility infrastructure under the No-Build Alternative. Precise determination of the number, extent, and location of utilities at this stage of design is not feasible. However, this technical report provides a determination of the general risk of relocation of a given utility because of the nature of construction and the infrastructure potentially impacted.

Utility relocations were generally addressed in each alternative's cost estimate. Large relocations of utility infrastructure or removal of utilities were considered generally unlikely because of the mandate to design build alternatives to avoid significant impacts. In general, design refinement of any selected alternative would seek to avoid or minimize utility relocations and disruptions.

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
Utilities	Adrianna Stanley	CH2M	Engineer / 7 years
Editors	Karin Fusetti	CH2M	Senior Planner / 15 years
	Lynda Wannamaker	Wannamaker Consulting	President / 33 years
	Scott Richman	CH2M	Senior Project Manager / 20 years
	Hart Migdal	LTD	Planning Technician / 3 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], 2011; RTP) and the *Lane Transit District Long Range Transit Plan* (Lane Transit District [LTD], 2014b) 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 (City) 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).

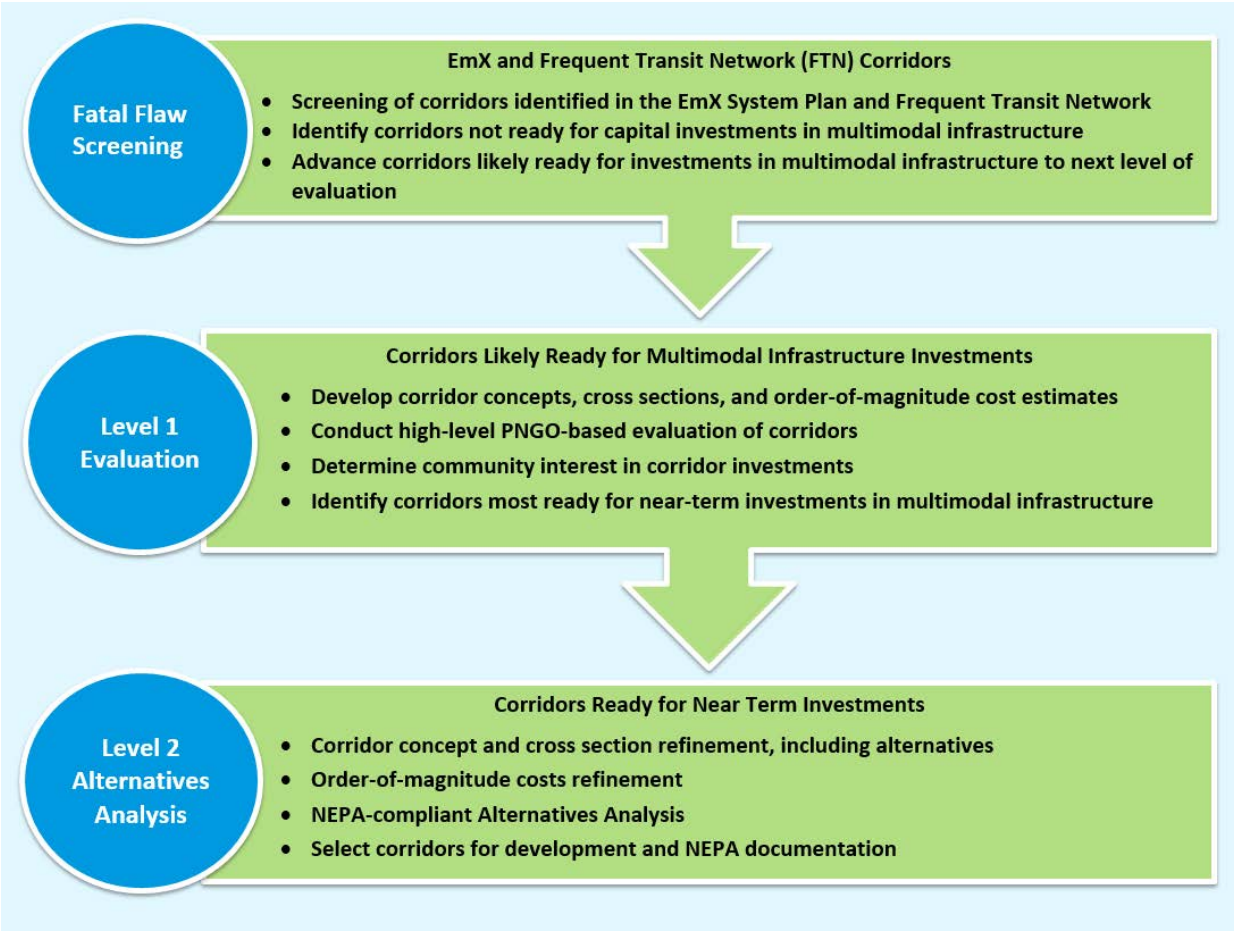
1.5. Screening and Evaluation of Multimodal Options

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 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).

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).

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.

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, 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 • 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 • Transit mode share along the corridor • Population within 0.5 mile of transit stop • 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 • 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 • Impact on LTD operating cost • 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
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 • Meet the FTA's Small Starts funding requirements

Table 1.6-1. Evaluation Criteria

Goals and Objectives	Evaluation Criteria
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 • Consistent with the *Regional Transportation System Plan* (Central Lane Metropolitan Planning Organization [MPO], 2007) • 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. • 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 • 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

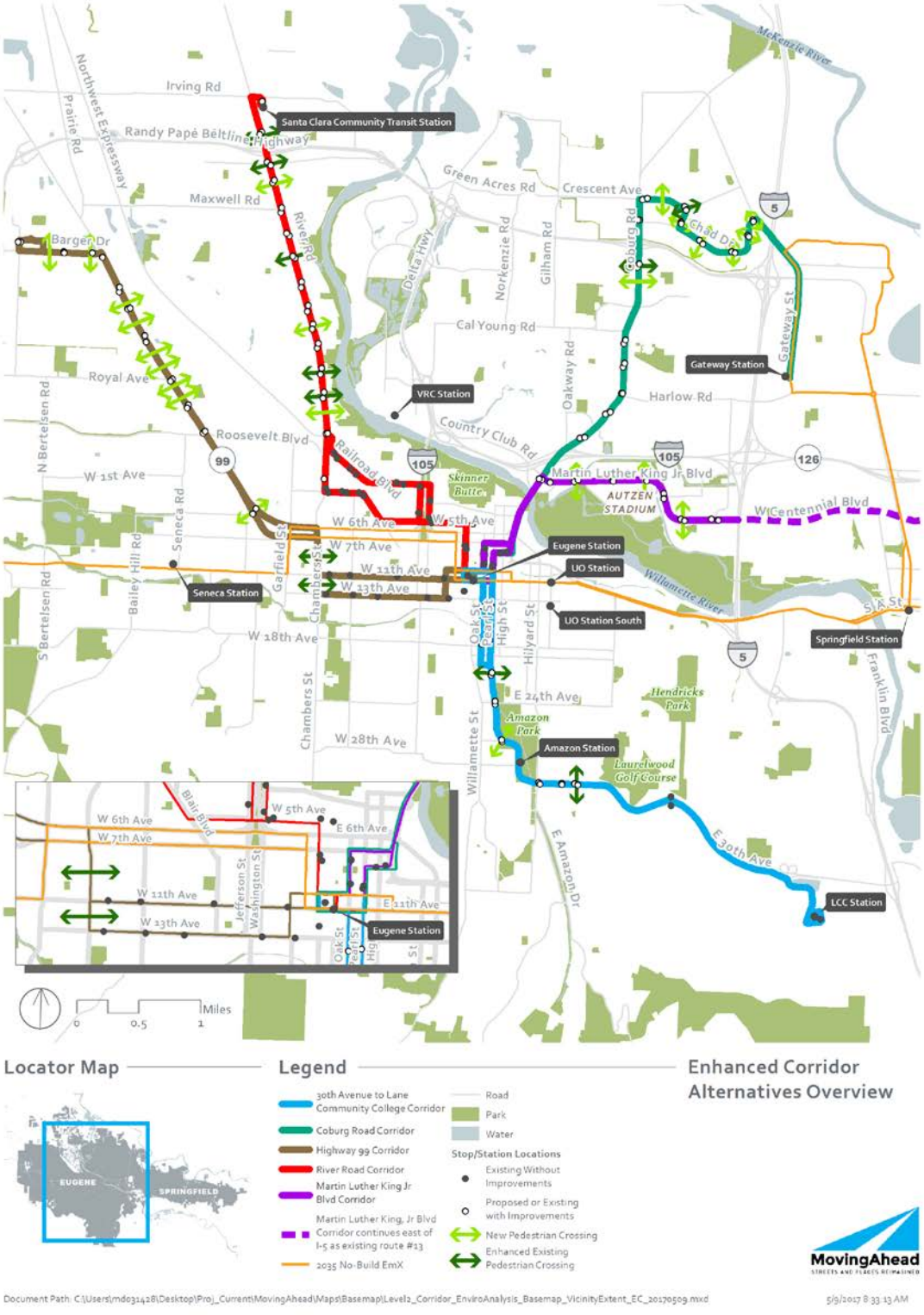
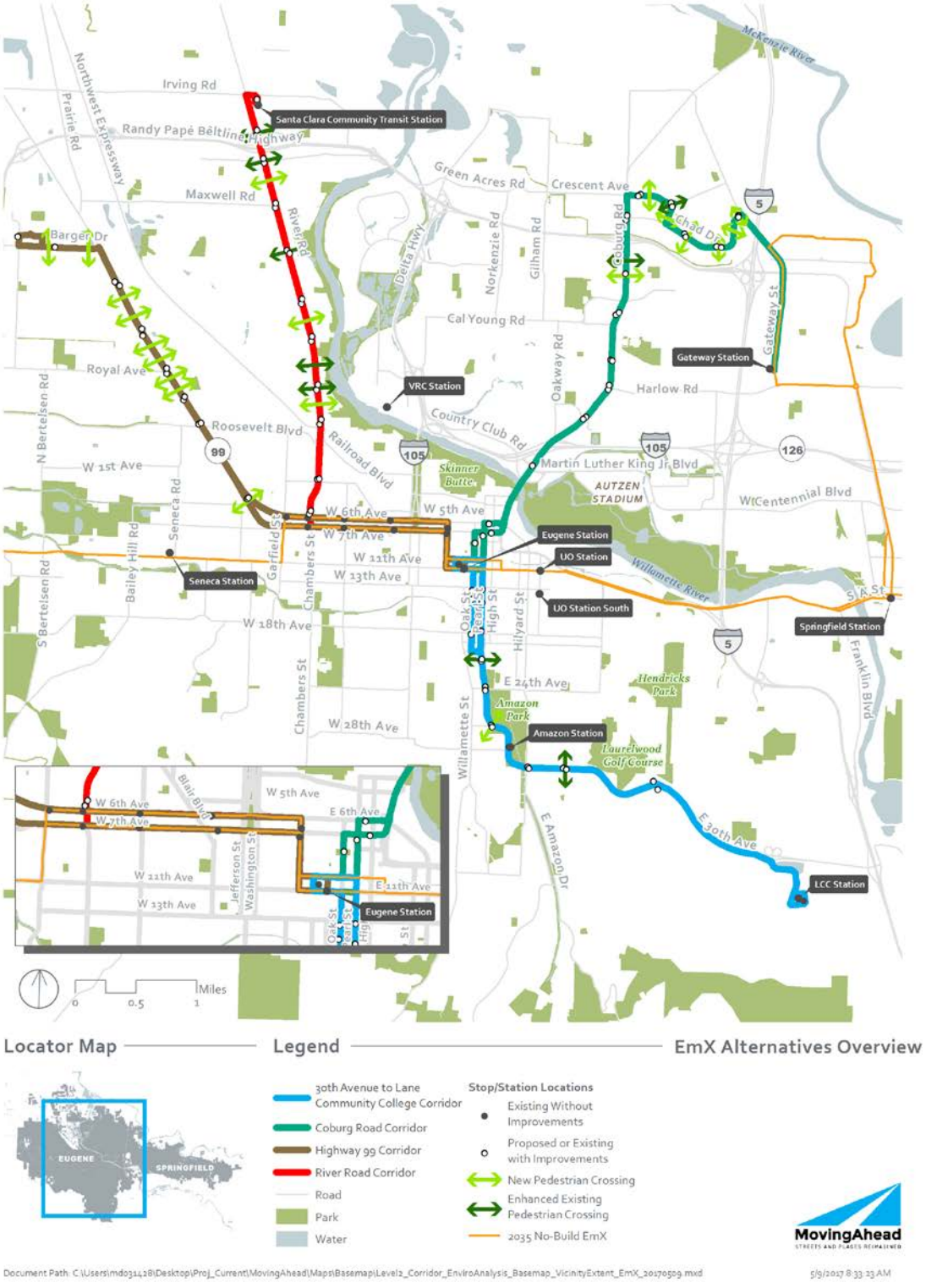


Figure 2.1-2. EmX Alternatives Overview



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 [BAT] lanes 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 (I-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 section describes the analysis methodologies and data used for the utilities evaluation for the MovingAhead Project.

The assessment of impacts to utilities focused on determining which, if any, utilities would likely need relocation as a result of the alternatives under consideration. In addition, the analysis considered any major planned utility projects or relocations within project corridors. Because the design work is at a conceptual engineering level during the Level 2 AA, precise determination of the number, extent and location of utility relocations is generally not feasible. Instead, this assessment provides a determination of the general level of risk that a given alternative would require utility relocation. As corridor design progresses, the level of certainty concerning utility relocations would increase. Ultimately, utility relocation would become a part of the project's construction documents, performed either by utilities or their contractors, or by the project and LTD's contractors.

In general, the design of the alternatives, including the Locally Preferred Alternative, seeks to avoid or minimize utility relocations to avoid disruptions to the community and the utilities and to help reduce costs. Design refinement up to and including final design coordination with affected utility purveyors would seek to minimize disruptions and costs incurred by each project alternative due to utility relocations.

3.1. Relevant Laws and Regulations

The City and the Oregon Department of Transportation (ODOT) have standards for utility design, location and installation within their area of jurisdiction. The project obtained regulations for utilities potentially requiring relocation based on whether the City and / or ODOT would have jurisdiction at a given location. The project would seek to relocate utilities within existing public right of way (ROW). State laws might apply to regional utility facilities and design regulations for public utilities would also apply (e.g., Eugene Water and Electric Board [EWEB]).

3.2. Analysis Area

The analysis area for the utility assessment was within the footprint of the alignments selected for further analysis in the Level 2 AA. The footprint encompasses all proposed civil improvements for a given build alternative plus a buffer to account for future design refinement or potential relocation of elements of the design to account for the findings of this report and other technical memoranda.

3.3. Contacts and Coordination

The analysis team contacted and coordinated with the following agencies and jurisdictions as the utility assessment was prepared:

- MovingAhead Project's design team
- City of Eugene Public Works
- EWEB
- Northwest Natural Gas (NW Natural)

3.4. Level 1 Screening

No data were collected for the Level 1 Screening.

3.5. Level 2 Alternatives Analysis and Approach

Project staff reviewed detailed design drawings provided in the *Level 2 Definition of Alternatives* (CH2M et al., 2015) to determine the construction and permanent footprint of the alternatives. The project team defined the area of potential direct impact to utilities as the construction and permanent footprint of the alternatives. Relocation of utilities may result in indirect impacts (temporary loss of service, or relocation of other facilities to accommodate facilities needing relocation due to construction) outside of the immediate construction and permanent footprint of the alternatives, thus the rest of the corridor was considered the area of potential impact (API).

Project staff reviewed available geographic information systems (GIS) utility location data within the project footprints, including natural gas, electrical, sewer, stormwater, steam, and oil. The general presence, location, and ownership of each utility was determined. Based upon the construction activities likely to occur within a given segment of the alternative, project staff assessed and documented the likelihood that any utilities within the project footprint would need to be relocated. Due to the confidentiality and sensitivity of some utility data (e.g., the U.S. Homeland Security restrictions on pipeline locations), precise information about some utilities and their risks of relocation was not available during the Level 2 AA.

Sections 4 through 8 of this report summarize information about utilities that potentially require relocation. The lists do not completely account for all infrastructure present in the corridor, but rather for those utilities identified as "large," "main," or "major" assets subject to potential relocation due to construction activities proposed over or adjacent to their locations. Those utilities considered large, main, or major are defined as follows:

- Sanitary sewer: lines greater than 8 inches in diameter
- Storm sewer: lines or culverts greater than 48 inches in diameter
- Electrical power: transmission lines or those lines otherwise defined by the EWEB GIS inventory as "primary"
- Steam: all lines
- Gas: all lines identified by the publicly-available National Pipeline Mapping System as gas transmission pipelines (National Pipeline Mapping System, 2016)
- Water: lines 16 inches in diameter or greater

The results of the utility relocation assessment will be considered in the development of the project costs during design refinement, accounting for the level of risk that any given utility might need to be relocated under a particular alternative. The cost of utility relocations for a given corridor build alternative are currently expressed as a percentage of overall civil construction cost, which varies depending on the overall extent and complexity of potential utility relocations.

3.5.1. Data Collection

Data sources for the utility relocation assessment included:

- MovingAhead Project Conceptual Designs (CH2M, 2015)
- Description of Project Construction Activities
- GIS utility records at the City, ODOT, and potentially affected utilities
- Consultation with relevant staff at utility agencies

3.5.2. Significance Thresholds

Utility relocation by its nature is not a significant impact and each project's cost estimate would generally address utility relocations. It is highly unlikely that any alternative would remove and not subsequently replace any utility. If that removal would affect a relatively large number of residents and/or businesses, then the removal would be designated as significant. LTD would mitigate such potentially significant impacts during design refinement by altering design components to avoid or minimize the significance of the impact.

3.5.3. Mitigation Measures Approach

Flexibility in station locations and other project facilities offer opportunities to avoid utility conflicts altogether. Typically, this design work is part of preliminary and final engineering, as it is typically these phases of the design process where enough information about the location of potentially impacted utilities is known to inform the design team. The information needed to adequately locate and design around existing utilities typically consists of the following:

- Topographic design survey of the alignment
- Existing utility lines marked (blue-staked) and included in field survey
- Existing utility features (valves, manholes, etc.) included in field survey, with elevation/invert data
- Utility access and relocation criteria defined
- Environmental clearance complete or in final stages

LTD, the City, and the design team would work to identify where small adjustments to project facilities would allow existing utilities to be unaffected. Small adjustments would not trigger additional environmental analysis beyond the clearance already received.

Following a detailed utility investigation and refinement of the corridor alternatives leading into preliminary design, there might be opportunities to leave utility lines in place where stations or other project facilities would be located. These opportunities are specific to individual utilities and the conditions of the site. These opportunities would be studied by the design team and brought to LTD and the City for a case-by-case analysis and strategy during preliminary and final engineering when more information is known about each affected utility.

The typical reasons to leave utilities in place are that the impacts from the utility and from the project are so minimal that the cost would not be worth the benefit to either party and project construction or operations would not affect existing access points to the utility line. It is a mutually agreed decision after the analysis is brought forward. After the design team presented its analysis, the decision makers would mutually agree to leave utilities in place. Sometimes, designers would recommend a mitigation strategy to lessen the physical effect on the utility such as new manhole locations and placing the existing utility that cannot be moved into conduit, so that the utility can be removed and reinserted in street crossings without disturbing the surface under the transit corridor. These practices protect utilities in place.

Where relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

3.5.4. Utility Types and Ownership

The analysis team's evaluation of utility resources relied on GIS data that the utility companies (listed in Table 3.5-1) provided and publicly available mapping. The evaluation included consultations with each

utility company and acquisition of available GIS utility inventories from them for analysis of potential impacts.

Table 3.5-1. Public and Private Utilities Serving the Study Area

Utility Company Name or Owner Agency	Type of Service
Bonneville Power Administration	Power
City of Eugene	Sanitary Sewer
City of Eugene	Stormwater Conveyance
City of Eugene / ODOT	Street Lighting
City of Eugene / ODOT	Traffic Signals
Comcast	Fiber Optics / Telecommunications
EWEB	Power
EWEB	Water
NW Natural	Natural Gas
CenturyLink	Fiber Optics / Telecommunications

Source: CH2M. (2016b).

4. Highway 99 Corridor Environmental Consequences

4.1. Affected Environment

The API for utility infrastructure encompasses the areas of proposed improvements for the Highway 99 Corridor Enhanced Corridor and EmX Alternatives (Figures 4.1-1 and 4.1-2, respectively). Underground utilities within the ROWs include cables for telecommunication and energy; pipes for natural gas, water, sanitary sewer, and stormwater; fiber-optic lines; and access points (manholes and vaults) for all types of utilities. In general, the depths of the underground utilities are unknown. Aboveground utilities include CenturyLink telephone poles, EWEB power poles, and traffic signals and street lights and associated conduit and controls.

4.2. Long-Term Direct Impacts

A long-term direct impact to utilities would result if utility infrastructure was required to relocate as a result of the proposed improvements. It is anticipated that any functional utilities potentially impacted long term would be relocated to maintain the same function or replaced with equal or better facilities.

The lists provided in the following subsections do not represent a comprehensive accounting of all facilities in the corridor. Analysis of the long-term direct impacts of each alternative does not account for the numerous small laterals and other utilities roadway construction projects routinely encounter and modify.

Potential impacts to underground infrastructure cannot be fully determined at this time. The depth and exact location of these facilities have not been surveyed. The assessment lists discuss activities potentially impacting each utility. Type, size, and location of all utilities and the subset of those utilities requiring potential relocation would be determined during preliminary and final design. Where feasible, design refinement would avoid and minimize impacts to reduce costs and service disruptions.

4.2.1. No-Build Alternative

The No-Build Alternative would have no adverse or beneficial long-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

4.2.2. Impacts Common to All Build Alternatives

Numerous small laterals and other utilities that roadway construction projects routinely encounter and modify might require relocation under all build alternatives. Natural gas, telecommunication, power, telephone, and storm and sanitary sewer lines could be present and potentially impacted wherever roadway reconstruction, roadway widening, or station construction activities occur. All build alternatives would modify or relocate these facilities as needed to mitigate conflicts.

Potential impacts to stormwater facilities would occur due to curb movement or reconstruction, thus impacting curbside catch basins and manholes as well as underground pipe. Both the Enhanced Corridor and the EmX Alternatives would include replacement of affected stormwater facilities and installation of new conveyance and treatment facilities to address the estimated stormwater impact of the project.

Figure 4.1-1. Highway 99 Corridor Enhanced Corridor Alternative Area of Potential Utility Impacts

Figure 4.1-2. Highway 99 Corridor EmX Alternative Area of Potential Utility Impacts

At various locations, street lighting and traffic signals would require movement or modification. In many cases, this movement or modification would include all associated signals, loops, pedestals, vaults, cabinets, and mast arms. Both build alternatives propose the construction of new signals. Final design documentation would detail replacement and design of this infrastructure.

Table 4.2-1 summarizes the potential impacts to major utilities that could occur under either build alternative. Common conflicts are discussed in more detail below.

Table 4.2-1. Highway 99 Corridor Potential Utility Impacts by Corridor Build Alternative

	Enhanced Corridor Alternative	EmX Alternative
Major sanitary sewer line	None	1
Major storm sewer line	1	1
Major electrical line	7	7
Major water line	1	1
New or modified traffic signals	30	16

Source: CH2M. (2016b).

4.2.2.1. Stormwater (City of Eugene)

Stormwater facilities (e.g., catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline would potentially require reconstruction of these facilities. The major stormwater lines (greater than 48 inches in diameter) that could be impacted by both build alternatives include:

- 60-inch-diameter stormwater line crossing W. 5th Avenue and W. 6th Avenue; potential impact due to sidewalk and signal construction

4.2.2.2. Electrical Power and Steam (EWEB, Bonneville Power Administration)

Electrical service lines and laterals are present throughout the corridor along existing ROWs. The major lines (that EWEB identified as "primary" according to its GIS data) that could be impacted by both alternatives include:

- 440-kilovolt (kV) transmission line crossing Highway 99 at Roosevelt Boulevard; poles might be impacted due to intersection widening and reconstruction
- Overhead 12-kV line crossing Highway 99 at Roosevelt Boulevard; poles might be impacted due to intersection widening and reconstruction
- Overhead 12.5-kV line crossing Highway 99 at Roosevelt Boulevard; poles might be impacted due to intersection widening and reconstruction
- Overhead 12-kV line running parallel to Highway 99 on both sides of the roadway from W. 5th Avenue to Dove Lane; poles might be impacted due to widening for intersection reconstruction and/or station and pullout construction
- Underground 12-kV electrical lines at Highway 99 and Elmira Road; potential impacts due to sidewalk construction and intersection widening
- Underground 12-kV electrical lines at Cubit Street; potential impacts due to terminus construction
- Underground 7.2-kV electrical line at Barger Drive and Century Drive; potential impacts due to enhanced pedestrian crossing construction

4.2.2.3. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs. The major water lines (16 inches in diameter and greater) that could be impacted by both alternatives include:

- 30-inch-diameter water line crossing Highway 99 at Roosevelt Boulevard; might be impacted by both build alternatives due to intersection reconstruction and widening

4.2.3. Enhanced Corridor Alternative

The Enhanced Corridor Alternative would not impact any additional utilities other than those described in Section 4.2.2.

4.2.4. EmX Alternative

In addition to the major utility conflicts described in Section 4.2.2, the EmX Alternative would potentially impact the following other utilities:

4.2.4.1. Sanitary Sewer (City of Eugene)

Major sewer lines potentially impacted by the EmX Alternative include:

- 18-inch-diameter sewer line running parallel to and under Barger Drive; potential impact due to station construction

Sanitary sewer lines are extensively located within the construction footprint. This alternative would not impact any lines greater than 8 inches in diameter.

4.2.4.2. Stormwater (City of Eugene)

Stormwater facilities (e.g., catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline would potentially require reconstruction of these facilities. Under this alternative, stormwater facility adjustments would generally be intermittent due to the intermittent nature of construction along the corridor. The more substantial structures (greater than 48 inches in diameter) potentially impacted by this alternative include:

- 60-inch-diameter storm sewer line crossing W. 5th Avenue and W. 6th Avenue; potential impact due to sidewalk and signal construction

4.2.4.3. Electrical Power and Steam (EWEB)

Electrical service lines and laterals are present throughout the corridor along existing ROWs for this alternative. The more substantial lines (that EWEB identified as “primary” according to its GIS data) include:

- 440-kV transmission line crossing Highway 99 at Roosevelt Boulevard; potential impact due to intersection widening and reconstruction
- Overhead 12-kV line crossing Highway 99 at Roosevelt Boulevard; potential impact due to intersection widening and reconstruction
- Overhead 12.5-kV line crossing Highway 99 at Roosevelt Boulevard; potential impact due to intersection widening and reconstruction

- Overhead 12-kV line running parallel to Highway 99 on both sides of the roadway from W. 5th Avenue to Dove Lane; potential impact due to widening for intersection reconstruction and/or station and pullout construction
- Underground 12-kV electrical lines at Highway 99 and Elmira Road; potential impacts due to sidewalk construction and intersection widening
- Underground 12-kV electrical lines at Cubit Street; potential impacts due to terminus construction
- Underground 7.2-kV electrical line at Barger Drive and Century Drive; potential impacts due to enhanced pedestrian crossing construction

4.2.4.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. The more substantial lines (16 inches in diameter and greater) are noted below:

- 30-inch-diameter water line crossing Highway 99 at Roosevelt Boulevard; might be impacted due to intersection reconstruction and widening

4.2.4.5. Communications (LTD)

In addition to the potential numerous impacts to minor communications fiber and telephone lines, this alternative would add trenched fiber along the length of the corridor to connect into LTD's existing fiber network.

4.3. Indirect and Cumulative Effects

4.3.1. No-Build Alternative

The No-Build Alternative would have no cumulative impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

4.3.2. Common to All Build Alternatives

No cumulative disruption to utilities would be anticipated for any build alternative. Service would not be permanently disrupted and the replacement and/or relocation of aging utility infrastructure would provide an indirect benefit to area businesses and residences.

4.4. Short-Term Construction-Related Impacts

4.4.1. No-Build Alternative

The No-Build Alternative would have no short-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

4.4.2. Common to All Build Alternatives

Short-term utility impacts (such as temporary service disruptions while utilities are relocated) would occur during project construction. The project team, working with utility providers early and throughout the design process to coordinate and schedule relocations, would minimize impacts on the overall construction schedule. Careful coordination with utility providers before and during construction for

guidance and design assistance would minimize the risk of construction-related impacts and associated cost, delay, and inconvenience to utility customers in the corridor.

Three large 115-kV transmission lines operated by the Bonneville Power Administration (BPA) cross Highway 99 north of Fairfield Avenue en route to their facility at the northeast corner of the Highway 99 and Fairfield Avenue intersection. No construction would impact these lines directly in either corridor alternative, but some sidewalk reconstruction, stop or station construction, and signal reconstruction would occur adjacent to these facilities. Coordination with BPA would be necessary during construction to ensure appropriate clear distances from these lines and any facility infrastructure associated with them.

4.5. Potential Mitigation Measures

4.5.1. No-Build Alternative

The No-Build Alternative would require no mitigation measures as no new facilities are proposed beyond those already programmed.

4.5.2. Common to All Build Alternatives

In general, the design of build alternatives would seek to avoid or minimize utility relocations to avoid disruptions to the community and utility companies. This would in turn help reduce costs and schedule impacts due to utility relocation requirements. The typical reasons to leave utilities in place are that the impacts from the utility and from the project are so minimal that the cost would not be worth the benefit to either party and project construction or operations would not affect existing access points to the utility line. Where relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

If after the design team presents its analysis, the decision makers mutually agree to leave the utility in place, designers may recommend mitigation strategies to minimize the physical effect on the utility such as a new manhole or placing an existing utility that cannot be moved into conduit, so that the utility can be removed and reinserted in street crossings without disturbing the surface under the transit corridor.

LTD would communicate and coordinate with utility owners so that necessary plans and permitting are in place to successfully relocate affected utilities prior to the commencement of construction. Prior to construction, all utility locations would be determined. LTD, the City, and the construction contractor would coordinate all construction activities, scheduling, and staging with utility companies. As appropriate, businesses and residents would be notified of extended temporary utility disruptions. Best management practices (BMPs) would be in place to mitigate the potential hazards associated with spills from transformers or from the relocation of storm or sanitary lines. Hazardous materials BMPs would be employed when relocation involves transformers or other potentially hazardous materials.

4.6. Permits and Approvals

Table 4.6-1 lists permits that might be required for utility relocations or other mitigation activities during construction of the Highway 99 Corridor build alternatives.

Table 4.6-1. Highway 99 Corridor Build Alternatives Potential Permits and Approvals

Permits and Approvals	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Public Utilities Commission Permits (ODOT)		X	X
Plan Review and Permits (ODOT)		X	X
Public improvement permits (City of Eugene)		X	X
Electric permits (EWEB)		X	X

Source: CH2M. (2016b).

5. River Road Corridor Environmental Consequences

5.1. Affected Environment

The API for utility infrastructure encompasses the areas of proposed improvements for the River Road Corridor build alternatives (Figures 5.1-1 and 5.1-2). Underground utilities within the ROWs include cables for telecommunication and energy; pipes for natural gas, water, sanitary sewer, and stormwater; fiber-optic lines; and access points (manholes and vaults) for all types of utilities. In general, the depths of the underground utilities are unknown. Aboveground utilities include CenturyLink telephone poles, EWEB power poles, and traffic signals and street lights and associated conduit and controls.

5.2. Long-Term Direct Impacts

A long-term direct impact to utilities would result if utility infrastructure were required to relocate as a result of the proposed improvements. It is anticipated that any functional utilities that would be potentially impacted long term would be relocated to maintain the same function or replaced with equal or better facilities.

The lists in the following subsections do not represent a comprehensive accounting of all facilities on the corridor. Analysis of the long-term direct impacts of each alternative does not account for the numerous small laterals and other utilities that roadway construction projects routinely encounter and modify.

Potential impacts to underground infrastructure cannot be fully determined at this time. The depth and exact location of these facilities have not been surveyed. The assessment lists discuss activities potentially impacting each utility. Type, size, and location of all utilities and the subset of those utilities requiring potential relocation would be determined during preliminary and final design. Where feasible, design refinement would avoid and minimize impacts to reduce costs and service disruptions.

5.2.1. No-Build Alternative

The No-Build Alternative would have no adverse or beneficial long-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

5.2.2. Impacts Common to All Build Alternatives

Numerous small laterals and other utilities that roadway construction projects routinely encounter and modify might require relocation under all build alternatives. Natural gas, telecommunication, power, telephone, and storm and sanitary sewer lines could be present and potentially impacted wherever roadway reconstruction, roadway widening, or station construction activities occur. All build alternatives would modify or relocate these facilities as needed to mitigate conflicts.

Stormwater facilities operated by the City exist within the construction footprint of all corridor alternatives. Potential impacts to these facilities would occur due to curb movement or reconstruction, thus impacting curbside catch basins and manholes as well as underground pipe. All build alternatives would include replacement of affected stormwater facilities and installation of new conveyance and treatment facilities to address the estimated stormwater impact of the project.

Figure 5.1-1. River Road Corridor Enhanced Corridor Alternative Area of Potential Utility Impacts

Figure 5.1-2. River Road Corridor EmX Alternative Area of Potential Utility Impacts

At various locations, street lighting and traffic signals would require movement or modification. In many cases, this movement or modification would include all associated signals, loops, pedestals, vaults, cabinets, and mast arms. Both build alternatives propose the construction of new signals. Final design documentation would detail replacement and design of this infrastructure.

Table 5.2-1 summarizes the major utility conflicts that could occur under either build alternative. While the utilities impacted among alternatives might be the same, the type of construction impacting the utilities might differ and result in a different magnitude or probability of impact.

Table 5.2-1. River Road Corridor Potential Utility Impacts by Corridor Build Alternative

	Enhanced Corridor Alternative	EmX Alternative
Major sanitary sewer line	3	3
Major storm sewer line	0	1
Major electrical line	5	9
Major water line	1	2
New or modified traffic signals	14	16
Gas transmission line	0	1

Source: CH2M. (2016b).

5.2.2.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint, running parallel to or beneath all roadways upon which construction is proposed or crosses. Most of these lines are 8 inches or smaller in diameter. Major lines potentially impacted by both build alternatives include:

- 48-inch-diameter sanitary sewer main crossing at Silver Lane; potentially impacted due to intersection widening and construction of BAT lanes
- 30-inch-diameter sanitary sewer main crossing at the Randy Papé Beltline Highway interchange with River Road; potentially impacted due to intersection widening
- 15-inch- and 8-inch-diameter sanitary sewer main crossing at Division Avenue; potentially impacted due to intersection widening

5.2.2.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint of both build alternatives. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. There would be no major (greater than 48 inches in diameter) storm sewer lines impacted by this build alternative.

5.2.2.3. Electrical Power and Steam (EWEB)

- 795-all-aluminum-conductor transmission conductor line crossing River Road at the Randy Papé Beltline Highway interchange; potential impact due to signal modification; existing pole locations are well clear of proposed construction.
- 12.5-kV underground line at River Road and Hansen Lane; potential impact due to stop and bus pad construction

- 12-kV underground lines beneath River Road at Silver Lane; potential impact due to widening for BAT lanes at intersection

5.2.2.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for both alternatives. The more substantial lines (16 inches in diameter and greater) potentially impacted by both alternatives include:

- 30-inch-diameter water line crossing River Road at Railroad Boulevard; potential impact due to intersection widening

5.2.3. Enhanced Corridor Alternative

The following list provides a general description of utilities present in the Enhanced Corridor Alternative construction footprint by utility that might require relocation. The list describes potential construction impacts and their consequences to each individual utility. In general, the Enhanced Corridor Alternative has a smaller and more intermittent construction footprint than the EmX Alternative. Potential utility impacts are expected to be reduced in proportion to the reduction on footprint and non-continuous in nature.

5.2.3.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint, running parallel to or beneath all roadways upon which construction is proposed or crosses. Most of these lines are 8 inches or smaller in diameter. No substantial lines other than those common to all build alternatives are impacted by this alternative.

5.2.3.2. Electrical Power and Steam (EWEB)

Most construction proposed under this alternative occurs within the existing roadway width, thus there will be minimal potential for impact to overhead facilities except for the proposed widening at the Randy Papé Beltline Highway and intermittent station construction areas. The more substantial lines (that EWEB identified as “primary” according to its GIS data) potentially impacted include:

- Three 12-kV underground lines at River Road and Railroad Boulevard; potential impact due to intersection widening
- 12-kV underground line underneath River Road between Stults Avenue and Elkay Drive; potential impact due to stop and bus pad construction

5.2.3.3. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. No substantial lines (16 inches in diameter and greater) other than those common to all build alternatives would be impacted by this alternative.

5.2.3.4. Gas (NW Natural)

In addition to standard facilities beneath and adjacent to all roadways inside this corridor alternative’s footprint, NW Natural operates an underground natural gas transmission line with visible aboveground structures at River Road north of the Randy Papé Beltline Highway that runs to Irving Road. While there would be no potential direct impacts to this line due to proposed construction under this alternative, engineers and contractors should coordinate carefully with utility owners so as to not disturb the line or structures during planned activity near this critical infrastructure.

5.2.4. EmX Alternative

The following list provides a general description of utilities present in the EmX Alternative construction footprint by utility that might require relocation. The list describes potential construction impacts and their consequences to each individual utility.

5.2.4.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint, running parallel to or beneath all roadways upon which construction is proposed or crosses. Most of these lines are 8 inches or smaller in diameter. No substantial lines other than those common to all build alternatives would be impacted by this alternative.

5.2.4.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. Construction of BAT lanes requiring excavation below the existing roadway sub base and overlay of the existing roadway section might also require adjustment of existing stormwater facilities. The more substantial structures (greater than 48 inches in diameter) potentially impacted by this alternative include:

- 54-inch-diameter storm sewer line crossing River Road at Larson Lane; potential impact due to excavation for construction of BAT lanes

5.2.4.3. Electrical Power and Steam (EWEB)

Most construction proposed under this alternative occurs within the existing roadway width, thus there will be minimal potential for long-term impact to overhead facilities except for the proposed widening at the Randy Papé Beltline Highway and intermittent station construction areas. Excavation within the roadway for BAT lane construction exceeding the depth of the existing sub base would potentially impact underground facilities. The more substantial lines (that EWEB identified as "primary" according to its GIS data) potentially impacted include:

- Three 12-kV underground lines at River Road from Railroad Boulevard to north of Fir Lane; potential impact due to intersection widening and excavation for construction of BAT lanes
- 12-kV underground lines at River Road from Stults Avenue to Elkay Drive; potential impact due to excavation for construction of BAT lanes
- 12-kV overhead lines and associated utility poles on the east side of River Road from Kourt Drive to Silver Lane; potential impacts due to station construction and widening for construction of BAT lanes; additional relocation of overhead distribution lines and poles on the west side of River Road that feed from this line might also be required due to intersection widening
- 12-kV overhead line on the north side of the Randy Papé Beltline Highway interchange north ramp terminal intersection; utility pole relocation might be required due to intersection widening for construction of BAT lanes
- 12-kV underground line underneath River Road between Stults Avenue and Elkay Drive; potential impact due to station construction

5.2.4.4. Water (EWEB)

Water service lines are present under and parallel to all existing street ROWs for this alternative. The more substantial lines (16 inches in diameter and greater) include:

- 36-inch-diameter water line crossing River Road at the Randy Papé Beltline Highway interchange; potential impact due to intersection widening

5.2.4.5. Gas (NW Natural)

NW Natural operates an underground natural gas transmission line with visible aboveground structures at River Road north of the Randy Papé Beltline Highway. There are potential impacts to this line and its associated aboveground structures due to widening of the roadway beneath the Randy Papé Beltline Highway for BAT lanes under this alternative. While the roadway itself does not impact the structures, the proposed multi-use path on the west side of the widened section of River Road is close to a structure shown on aerial photographs. Section 5.5.3 discusses mitigation of this potential impact.

5.2.4.6. Communications (LTD)

In addition to the potential numerous impacts to minor communications fiber and telephone lines, this alternative would add trenched fiber along the length of the corridor to connect into LTD's existing fiber network.

5.3. Indirect and Cumulative Effects

5.3.1. No-Build Alternative

The No-Build Alternative would have no cumulative impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

5.3.2. Common to All Build Alternatives

No cumulative disruption to utilities would be anticipated for any build alternative. Service would not be permanently disrupted and the replacement and/or relocation of aging utility infrastructure would provide an indirect benefit to area businesses and residences.

5.4. Short-Term Construction-Related Impacts

5.4.1. No-Build Alternative

The No-Build Alternative would have no short-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

5.4.2. Common to All Build Alternatives

Short-term utility impacts (such as temporary service disruptions while utilities are relocated) would occur during project construction. The project team, working with utility providers early and throughout the design process to coordinate and schedule relocations, would minimize impacts on the overall construction schedule. Careful coordination with utility providers before and during construction for guidance and design assistance would minimize the risk of construction-related impacts and associated cost, delay, and inconvenience to utility customers in the corridor.

5.5. Potential Mitigation Measures

5.5.1. No-Build Alternative

The No-Build Alternative would require no mitigation measures as no new facilities are proposed beyond those already programmed.

5.5.2. Common to All Build Alternatives

In general, the design of build alternatives would seek to avoid or minimize utility relocations to avoid disruptions to the community and utility companies. This would in turn help reduce costs and schedule impacts due to utility relocation requirements.

The typical reasons to leave utilities in place are that the impacts from the utility and from the project are so minimal that the cost would not be worth the benefit to either party and project construction or operations would not affect existing access points to the utility line. Where relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

If after the design team presents its analysis, the decision makers mutually agree to leave the utility in place, designers may recommend mitigation strategies to minimize the physical effect on the utility such as a new manhole or placing an existing utility that cannot be moved into conduit, so that the utility can be removed and reinserted in street crossings without disturbing the surface under the transit corridor.

LTD would communicate and coordinate with utility owners so that necessary plans and permitting are in place to successfully relocate affected utilities prior to the commencement of construction. Prior to construction, all utility locations would be determined. LTD and the construction contractor would coordinate all construction activities, scheduling, and staging with utility companies. As appropriate, businesses and residents would be notified of extended temporary utility disruptions. BMPs would be in place to mitigate the potential hazards associated with spills from transformers or from the relocation of storm or sanitary lines. Hazardous materials BMPs would be employed when relocation involves transformers or other potentially hazardous materials.

5.5.3. EmX Alternative

The NW Natural gas transmission line and associated structures at this location would potentially be in conflict with a proposed sidewalk on the west side of a widened section of River Road. Refinement would be made to the design in close coordination with NW Natural and other stakeholders to ensure this piece of critical infrastructure would not be impacted as its relocation might prove to be cost and schedule prohibitive.

5.6. Permits and Approvals

Table 5.6-1 lists permits that might be required for utility relocations or other mitigation activities during construction of the River Road Corridor build alternatives.

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

Permits and Approvals	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Public Utilities Commission Permits (ODOT)		X	X
Plan Review and Permits (ODOT)		X	X
Public improvement permits (City of Eugene)		X	X
Electric permits (EWEB)		X	X

Source: CH2M. (2016b).

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

6.1. Affected Environment

The API for utility infrastructure encompasses the areas of proposed improvements for the River Road Corridor build alternatives (Figures 6.1-1 and 6.1-2). Underground utilities within the ROWs include cables for telecommunication and energy; pipes for natural gas, water, sanitary sewer, and stormwater; fiber-optic lines; and access points (manholes and vaults) for all types of utilities. In general, the depths of the underground utilities are unknown. Aboveground utilities include CenturyLink telephone poles, EWEB power poles, and traffic signals and street lights and associated conduit and controls.

6.2. Long-Term Direct Impacts

A long-term direct impact to utilities would result if utility infrastructure was required to relocate as a result of the proposed improvements. It is anticipated that any functional utilities that would be potentially impacted long term would be relocated to maintain the same function or replaced with equal or better facilities.

The lists in the following subsections do not represent a comprehensive accounting of all facilities on the corridor. Analysis of the long-term direct impacts of each alternative does not account for the numerous small laterals and other utilities that roadway construction projects routinely encounter and modify.

Potential impacts to underground infrastructure cannot be fully determined at this time. The depth and exact location of these facilities have not been surveyed. The assessment lists below discuss activities potentially impacting each utility. Type, size, and location of all utilities and the subset of those utilities requiring potential relocation would be determined during preliminary and final design. Where feasible, design refinement would avoid and minimize impacts in order to reduce costs and service disruptions.

6.2.1. Impacts Common to All Build Alternatives

Numerous small laterals and other utilities that roadway construction projects routinely encounter and modify might require relocation under all build alternatives. Natural gas, telecommunication, power, telephone, and storm and sanitary sewer lines could be present and potentially impacted wherever roadway reconstruction, roadway widening, or station construction activities occur. All build alternatives would modify or relocate these facilities as needed to mitigate conflicts.

Stormwater facilities operated by the City exist within the construction footprint of all corridor alternatives. Potential impacts to these facilities would occur due to curb movement or reconstruction, thus impacting curbside catch basins and manholes as well as underground pipe. All build alternatives would include replacement of affected stormwater facilities and installation of new conveyance and treatment facilities to address the estimated stormwater impact of the project.

At various locations, street lighting and traffic signals would require movement or modification. In many cases, this movement or modification would include all associated signals, loops, pedestals, vaults, cabinets, and mast arms. Both build alternatives propose the construction of new signals. Final design documentation would detail replacement and design of this infrastructure.

Figure 6.1-1. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative Area of Potential Utility Impacts

Figure 6.1-2. 30th Avenue to Lane Community College Corridor EmX Alternative Area of Potential Utility Impacts

Table 6.2-1 summarizes the major utility conflicts that could occur under either build alternative. While there would be conflicts with many of the same proposed utility lines under both build alternatives for this corridor, the nature of construction responsible for the potential impact differs greatly. These impacts are summarized in Sections 6.2.3 and 6.2.4.

Table 6.2-1. 30th Avenue to Lane Community College Corridor Potential Utility Impacts by Corridor Build Alternative

	Enhanced Corridor Alternative	EmX Alternative
Major sanitary sewer line	3	3
Major storm sewer line	0	1
Major electrical line	3	10
Major water line	2	3
New or modified traffic signals	17	20
Steam Lines	2	2

Source: CH2M. (2016b).

6.2.2. No-Build Alternative

The No-Build Alternative would have no adverse or beneficial long-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

6.2.3. Enhanced Corridor Alternative

The lists in the following subsections provide a general description of utilities present in the Enhanced Corridor Alternative construction footprint by utility that might require relocation. The lists describe potential construction impacts and their consequences to each individual utility.

6.2.3.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint. Sanitary mains serving Oak Street in Downtown Eugene run in the alleys adjacent to this street and so would not be subject to long-term impacts due to construction. Major lines potentially impacted by this alternative include:

- 15-inch-diameter sanitary sewer line running down the centerline of W. 20th Avenue and tying in to Amazon Parkway's existing 27-inch-diameter sanitary main; potential impact to these lines due to the extension of W. 20th Avenue to tie into Amazon Parkway and all associated signal and widening work on Amazon Parkway
- 12-inch-diameter sanitary sewer line crossing W. 20th Avenue midway between Oak Street and Pearl Street; potential impact due to extension of W. 20th Avenue
- Sanitary sewer construction would be required to complete the construction of an operator restroom at the line's terminus at LCC

6.2.3.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. In this alternative stormwater facility, adjustments would generally be intermittent due to the intermittent nature of construction. Impacts would be minimal in Downtown Eugene because most construction proposed is restriping and stop construction, which requires minimal curb adjustment. There are no major (greater than 48 inches in diameter) storm sewer lines impacted by this alternative.

Coordination of design and construction with the future Amazon channel naturalization project south of W. 20th Avenue would be required and might influence station placement and/or intersection geometry at the intersection of W. 20th Avenue and Amazon Parkway. Similar coordination would be required with the development of the Civic Stadium site at the future intersection of W. 20th Avenue and Amazon Parkway.

6.2.3.3. Electrical Power and Steam (EWEB)

Electrical service lines and laterals are present throughout the corridor along existing ROWs for this alternative. Electrical service is located on alleys adjacent to Oak Street and Pearl Street and so would not be impacted under this alternative. Overhead utilities in Downtown Eugene south of W. 18th Avenue run on streets crossing Oak and Pearl streets and might not be impacted by construction of this alternative. The more substantial lines (that EWEB identified as "primary" according to its GIS data) include:

- 12-kV overhead lines and associated utility poles at the intersection of Oak Street and W. 20th Avenue; potential due to intersection and signal construction
- 12.5-kV overhead lines at the intersection of E. 24th Avenue and Amazon Parkway; potential impact due to sidewalk reconstruction, stop and bus pad construction, and signal modification
- 12-kV Type D duct bank and parallel underground 12.5-kV underground line crossing Amazon Parkway at University Street; potential impact due to signal construction and stop and bus pad construction

Steam lines run through Downtown Eugene along Oak and Pearl streets from the northern edge of the construction footprint for this alternative to W. 13th Avenue where they tie into crossing steam lines that run along W. 13th Avenue. Construction activities would be limited to restriping within these limits for this alternative, thus impacts to the steam lines would be minimal.

6.2.3.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. The more substantial lines (16 inches in diameter and greater) potentially impacted by construction include:

- 16-inch-diameter water main under Amazon Parkway from north of W. 20th Avenue to south of proposed Civic Stadium driveway; potential impact due to roadway and signal construction and widening as well as stop and bus pad construction
- 30-inch-diameter water main crossing Amazon Parkway at E. 24th Avenue; potential impact due to stop and bus pad construction

6.2.4. EmX Alternative

The lists in the following subsections provide a general description of utilities present in the EmX Alternative construction footprint by utility that might require relocation. The lists describe potential construction impacts and their consequences to each individual utility.

6.2.4.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint. Sanitary mains serving Oak Street in Downtown Eugene run in the alleys adjacent to this street and so would not be subject to long-term impacts due to construction. Construction activities on High Street would generally be limited to restriping, thus sanitary sewer would generally not be impacted along that street with the possible exception of where enhanced pedestrian crossing signals would be constructed (W. 15th Avenue and W. 17th Avenue). Major lines potentially impacted by this alternative include:

- 60-inch-diameter sanitary sewer main under Pearl Street from W. 17th Avenue to W. 11th Avenue; potential impacts due to station construction, intersection widening and construction at the proposed W. 20th Avenue extension, and full-depth excavation for reconstruction of existing roadway to concrete BAT lanes on Pearl Street
- 36-inch- and 27-inch-diameter sanitary mains crossing Amazon Parkway at Hilyard Street; potential impact due to potential conflict with trenching communications fiber under this alternative

6.2.4.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. The more substantial structures (greater than 48-inch-diameter) potentially impacted by this alternative include:

- 60-inch-diameter storm sewer line under Pearl Street between W. 10th Avenue and W. 11th Avenue; potential impact due to reconstruction of existing lane to full depth concrete BAT lane and intersection reconstruction

Coordination of design and construction with the future Amazon channel naturalization project south of W. 20th Avenue would be required and might influence station placement and/or intersection geometry at the intersection of W. 20th Avenue and Amazon Parkway. Similar coordination would be required with the development of the Civic Stadium site at the future intersection of W. 20th Avenue and Amazon Parkway.

6.2.4.3. Electrical Power and Steam (EWEB)

Electrical service lines and laterals are present throughout the corridor along existing ROWs for this alternative. Electrical service is located on alleys adjacent to Oak Street and Pearl Street rather than on these streets themselves and so would not be impacted under this alternative. Overhead utilities in Downtown Eugene south of W. 18th Avenue run on streets crossing Oak and Pearl streets and might not be impacted by construction of this alternative. The more substantial lines (that EWEB identified as "primary" according to their GIS data) include:

- Three 12-kV underground lines underneath Pearl Street from W. 11th Avenue to W. 10th Avenue and at the intersection of Oak Street and W. 10th Avenue; potential impact due to reconstruction of existing lane to full depth concrete BAT lane and intersection reconstruction
- 12.5-kV underground line crossing Pearl Street at W. 13th Avenue; potential impact due to intersection reconstruction

- 12-kV overhead lines and associated utility poles at the intersection of Oak Street and W. 20th Avenue; potential due to intersection and signal construction
- 12.5-kV overhead lines at the intersection of E. 24th Avenue and Amazon Parkway; potential impact due to sidewalk reconstruction, station construction, and signal modification
- 12.5-kV underground line crossing Amazon Parkway at E. 29th Avenue; potential impact due to trenching communications fiber
- Two 12-kV underground lines crossing Amazon Parkway at Hilyard Street; potential impact due to trenching communications fiber
- 12-kV Type D duct bank and parallel underground 12.5-kV underground line at Hilyard Street intersection and crossing Amazon Parkway at University Street; potential impact due to signal construction and station construction at Hilyard Street and University Avenue; additional potential impact due to trenching communications fiber under this alternative between Hilyard Street and University Avenue

Steam lines run through Downtown Eugene along Oak and Pearl streets from the northern edge of the construction footprint for this alternative to W. 13th Avenue where they tie into crossing steam lines that run along W. 13th Avenue. Potential impacts to these facilities exist on Oak and Pearl streets between W. 11th Avenue and W. 13th Avenue where full-depth reconstruction of lanes and intersections to accommodate concrete BAT lanes are proposed and where trenching for communications fiber is proposed.

6.2.4.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. The more substantial lines (16 inches in diameter and greater) potentially impacted by construction are noted below:

- 16-inch-diameter water main under Amazon Parkway from north of W. 20th Avenue to south of proposed Civic Stadium driveway; potential impact due to roadway and signal construction and widening as well as station construction and communications fiber trenching
- 30-inch-diameter water main crossing Amazon Parkway at E. 24th Avenue; potential impact due to station construction and communications fiber trenching
- 30-inch-diameter water main crossing Amazon Parkway at Hilyard Street; potential impact due to communications fiber trenching

6.2.4.5. Communications (LTD)

In addition to the potential numerous impacts to minor communications fiber and telephone lines, this alternative would add trenched fiber along the length of the corridor to connect into LTD's existing fiber network.

6.3. Indirect and Cumulative Effects

6.3.1. No-Build Alternative

The No-Build Alternative would have no cumulative impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

6.3.2. Common to All Build Alternatives

No cumulative disruption to utilities would be anticipated for any build alternative. Service would not be permanently disrupted and the replacement and/or relocation of aging utility infrastructure would provide an indirect benefit to area businesses and residences.

6.4. Short-Term Construction-Related Impacts

6.4.1. No-Build Alternative

The No-Build Alternative would have no short-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

6.4.2. Common to All Build Alternatives

Short-term utility impacts (such as temporary service disruptions while utilities are relocated) would occur during project construction. The project team, working with utility providers early and throughout the design process to coordinate and schedule relocations, would minimize impacts on the overall construction schedule. Careful coordination with utility providers before and during construction for guidance and design assistance would minimize the risk of construction-related impacts and associated cost, delay, and inconvenience to utility customers in the corridor.

6.5. Potential Mitigation Measures

6.5.1. No-Build Alternative

The No-Build Alternative will require no mitigation measures as no new facilities are proposed beyond those already programmed.

6.5.2. Common to All Build Alternatives

In general, the design of build alternatives would seek to avoid or minimize utility relocations to avoid disruptions to the community and utility companies. This would in turn help reduce costs and schedule impacts due to utility relocation requirements. The typical reasons to leave utilities in place are that the impacts from the utility and from the project are so minimal that the cost would not be worth the benefit to either party and project construction or operations would not affect existing access points to the utility line. Where relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

If after the design team presents its analysis, the decision makers mutually agree to leave the utility in place, designers may recommend mitigation strategies to minimize the physical effect on the utility such as a new manhole or placing an existing utility that cannot be moved into conduit, so that the utility can be removed and reinserted in street crossings without disturbing the surface under the transit corridor. LTD and the City would communicate and coordinate with utility owners so that necessary plans and permitting are in place to successfully relocate affected utilities prior to the commencement of construction. Prior to construction, all utility locations would be determined. LTD, the City, and the construction contractor would coordinate all construction activities, scheduling, and staging with utility companies. As appropriate, businesses and residents would be notified of extended temporary utility

disruptions. BMPs would be in place to mitigate the potential hazards associated with spills from transformers or from the relocation of storm or sanitary lines. Hazardous materials BMPs would be employed when relocation involves transformers or other potentially hazardous materials.

6.6. Permits and Approvals

Table 6.6-1 lists permits that might be required for utility relocations or other mitigation activities during construction of the 30th Avenue to LCC Corridor build alternatives.

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

Permits and Approvals	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Public Utilities Commission Permits (ODOT)		X	X
Plan Review and Permits (ODOT)		X	X
Public improvement permits (City of Eugene)		X	X
Electric permits (EWEB)		X	X

Source: CH2M. (2016b).

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7. Coburg Road Corridor Environmental Consequences

7.1. Affected Environment

The API for utility infrastructure encompasses the areas of proposed improvements for the Coburg Road Corridor (Figures 7.1-1 and 7.1-2). Underground utilities within the ROWs include cables for telecommunication and energy; pipes for natural gas, water, sanitary sewer, and stormwater; fiber-optic lines; and access points (manholes and vaults) for all types of utilities. In general, the depths of the underground utilities are unknown. Aboveground utilities include CenturyLink telephone poles, EWEB power poles, and traffic signals and street lights and associated conduit and controls.

The lists provided in the following subsections do not represent a comprehensive accounting of all facilities on the corridor. Analysis of the long-term direct impacts of each alternative does not account for the numerous small laterals and other utilities that roadway construction projects routinely encounter and modify.

Potential impacts to underground infrastructure cannot be fully determined at this time. The depth and exact location of these facilities have not been surveyed. The assessment lists discuss activities potentially impacting each utility. Type, size, and location of all utilities and the subset of those utilities requiring potential relocation would be determined during preliminary and final design. Where feasible, design refinement would avoid and minimize impacts to reduce costs and service disruptions.

7.1.1. No-Build Alternative

The No-Build Alternative would have no adverse or beneficial long-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

7.2. Long-Term Direct Impacts

A long-term direct impact to utilities would result if utility infrastructure was required to relocate as a result of the proposed improvements. It is anticipated that any functional utilities that would be Impacts Common to All Build Alternatives

Numerous small laterals and other utilities that roadway construction projects routinely encounter and modify might require relocation under all build alternatives. Natural gas, telecommunication, power, telephone, and storm and sanitary sewer lines could be present and potentially impacted wherever roadway reconstruction, roadway widening, or station construction activities occur. All build alternatives would modify or relocate these facilities as needed to mitigate conflicts.

Stormwater facilities operated by the City exist within the construction footprint of all corridor alternatives. Potential impacts to these facilities would occur due to curb movement or reconstruction, thus impacting curbside catch basins and manholes as well as underground pipe. All build alternatives would include replacement of affected stormwater facilities and installation of new conveyance and treatment facilities to address the estimated stormwater impact of the project.

Figure 7.1-1. Coburg Road Corridor Enhanced Corridor Alternative Area of Potential Utility Impacts

Figure 7.1-2. Coburg Road Corridor EmX Alternative Area of Potential Utility Impacts

At various locations, street lighting and traffic signals would require movement or modification. In many cases, this movement or modification would include all associated signals, loops, pedestals, vaults, cabinets, and mast arms. Both build alternatives propose the construction of new signals. Final design documentation would detail replacement and design of this infrastructure.

Table 7.2-1 summarizes the major utility conflicts that could occur under either build alternative. Common conflicts are discussed in more detail. While there would be conflicts with many of the same proposed utility lines under both build alternatives for this corridor, the nature of construction responsible for the potential impact differs greatly. These impacts are summarized in Sections 7.2.3 and 7.2.4.

Table 7.2-1. Coburg Road Corridor Potential Utility Impacts by Corridor Build Alternative

	Enhanced Corridor Alternative	EmX Alternative
Major sanitary sewer line	2	2
Major storm sewer line	2	7
Major electrical line	14	17
Major water line	1	1
New or modified traffic signals	20	37
Gas transmission line	3	3

Source: CH2M. (2016b).

7.2.1. Enhanced Corridor Alternative

The following subsections provide a general description of utilities present in the Enhanced Corridor Alternative construction footprint by utility that might require relocation. The subsections describe potential construction impacts and their consequences to each individual utility.

7.2.1.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint. Major lines potentially impacted by this alternative include:

- 21-inch-diameter sanitary sewer crossing Coburg Road at Cal Young Road and running south beneath Coburg Road to Tandy Turn; potential impact due to stop and bus pad construction
- 21-inch-diameter sanitary sewer crossing Coburg Road at the Randy Papé Beltline Highway interchange; potential impact due to roadway and signal reconstruction

7.2.1.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. The more substantial structures (greater than 48 inches in diameter) potentially impacted by this alternative include:

- 54-inch-diameter storm sewer under Coburg Road from Cal Young Road to the Randy Papé Beltline Highway interchange with Coburg Road; potential intermittent impact due to roadway widening, roadway reconstruction, signal construction, and station construction

- 60-inch-diameter storm sewer under Coburg Road from the Randy Papé Beltline Highway interchange with Coburg Road to Crescent Avenue; potential impact due to roadway widening, roadway reconstruction, signal construction, and stop and station construction

7.2.1.3. Electrical Power and Steam (EWEB)

Electrical service lines and laterals are present throughout the corridor along existing ROWs for this alternative. The more substantial lines (that EWEB identified as "primary" according to their GIS data) include:

- 12-kV overhead transmission line on the east side of Coburg Road running the length of the corridor with utility poles typically located at the back of walk; potential impact wherever roadway is widened, most notably from Elysium Avenue to Crescent Avenue where roadway is widened to accommodate bi-directional exclusive bus lanes
- Two 12-kV underground lines crossing Coburg Road approximately 200 feet southwest of its intersection with Martin Luther King, Jr. Boulevard; potential impact due to roadway widening and reconstruction to accommodate BAT lanes
- Three 12.5-kV underground lines crossing Coburg Road at the southern I-105 ramp terminal; potential impact due to intersection widening and reconstruction to accommodate BAT lanes. These lines run parallel to Coburg Road on the east side of the roadway to Frontier Drive and with a crossing of Coburg Road at Oakmont Way; potential conflicts occur along this stretch due to intersection widening and stop and bus pad construction
- 12-kV overhead line and associated utility poles on the east side of Coburg Road at the location of intersection improvements at Harlow Road; potential impact due to roadway widening and stop and bus pad construction
- 12-kV overhead lines and associated utility poles on the east side of Coburg Road at Tandy Turn; potential impact due to stop and bus pad construction
- 12-kV overhead line and associated utility poles on the east side of Coburg Road at the location of intersection improvements at Willakenzie Road; potential impact due to roadway widening
- 12-kV overhead line transitioning to underground lines between Elysium Avenue and Crescent Avenue on Coburg Road; potential intermittent impacts due to intersection and roadway widening as well as stop and bus pad construction
- 12.5-kV underground lines on both sides of Crescent Avenue; potential impact due to bus stop and pad construction and sidewalk construction
- 12.5-kV underground lines on Shadowview Lane and Old Coburg Road; potential impacts due to signal construction and bus stop and pad
- 12.5-kV overhead line on the west side of Old Coburg Road; potential impact due to bus stop and pad construction

7.2.1.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. The more substantial lines (16 inches in diameter and greater) potentially impacted by construction include:

- 16-inch-diameter water main crossing Coburg Road at the Randy Papé Beltline Highway interchange; potential impact due to roadway and signal reconstruction

7.2.1.5. Gas (NW Natural)

In addition to typical underground gas infrastructure within the ROW, a large natural gas transmission line runs beneath Coburg Road throughout the corridor extents. Branches of this line are present at the intersection of Coburg Road and Harlow Road and at the intersection of Coburg Road and Crescent

Avenue. Their depth and location should be verified during design refinement to ensure that they are not impacted.

7.2.2. EmX Alternative

The following subsections provide a general description of utilities present in the EmX Alternative construction footprint by utility that might require relocation. The subsections describe potential construction impacts and their consequences to each individual utility.

7.2.2.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint. Major lines potentially impacted by this alternative include:

- 21-inch-diameter sanitary sewer crossing Coburg Road at Cal Young Road and running south beneath Coburg Road to Tandy Turn; potential impact due to trenching for communications fiber and signal reconstruction
- 21-inch-diameter sanitary sewer crossing Coburg Road at the Randy Papé Beltline Highway interchange; potential impact due to roadway reconstruction and widening to provide bi-directional exclusive EmX lanes

7.2.2.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. The more substantial structures (greater than 48 inches in diameter) potentially impacted by this alternative include:

- 52-inch-diameter storm sewer under W. 6th Avenue between Pearl Street and the Ferry Street Bridge; potential impacts due to station construction and excavation to replace existing roadway with full-depth concrete BAT lane
- 60-inch-diameter storm sewer under Pearl Street between W. 6th Avenue and W. 11th Avenue; potential impact due to station construction
- 54-inch-diameter storm sewer under Coburg Road from Cal Young Road to the Randy Pape Beltline Highway interchange with Coburg Road; potential intermittent impact due to roadway widening, roadway reconstruction, signal construction, and station construction
- 60-inch-diameter storm sewer under Coburg Road from the Randy Papé Beltline Highway interchange with Coburg Road to Crescent Avenue; potential impact due to roadway widening, roadway reconstruction, signal construction, and stop and station construction
- 54-inch-diameter storm sewer under Crescent Avenue from Coburg Road to Shadowview Lane; potential intermittent impact due to sidewalk widening, intersection widening, station construction, and signal construction
- 72-inch-diameter storm sewer and 60-inch-diameter storm sewer crossing Coburg Road at the north ramp terminal of the interchange between Coburg Road and the Randy Papé Beltline Highway; potential impact due to intersection widening to construct bi-directional dedicated transitway for BRT vehicles

7.2.2.3. Electrical Power and Steam (EWEB)

Electrical service lines and laterals are present throughout the corridor along existing ROWs for this alternative. A large proportion of the electrical service lines along Coburg Road are underground. Where they exist, overhead transmission lines primarily run overhead on utility poles on the east side of the

street with overhead laterals to utility poles on the west side of the street when overhead service is used. The more substantial lines (that EWEB identified as "primary" according to their GIS data) include:

- 12-kV underground service duct bank on W. 7th Avenue between High Street and Oak Street with major service lines mid-block between Oak Street and Pearl Street; potential impact due to station construction, trenching of communications fiber, and excavation in existing roadway to construct full-depth concrete BAT lanes
- 12-kV underground service duct bank on Pearl Street between W. 7th Avenue and W. 11th Avenue; potential impact due to station construction
- 12-kV underground line on W. 11th Avenue between Pearl Street and Eugene Station; potential impact due to construction of station improvements at Eugene Station
- 12-kV overhead transmission line on the east side of Coburg Road running the length of the corridor with utility poles typically located at the back of walk; potential impact due to roadway widening
- Two 12-kV underground lines crossing Coburg Road approximately 200 feet southwest of its intersection with Martin Luther King, Jr. Boulevard; potential impact due to roadway widening and reconstruction to accommodate center-running exclusive lanes for transit
- Three 12.5-kV underground lines crossing Coburg Road at the southern I-105 ramp terminal and again at the northern ramp terminal; potential impact due to intersection widening and reconstruction to accommodate center-running exclusive lanes for transit; these lines run parallel to Coburg Road on the east side of the roadway to Frontier Drive and with a crossing of Coburg Road at Oakmont Way; potential conflicts occur along this stretch due to intersection widening and station construction
- 12-kV overhead line and associated utility poles on the east side of Coburg Road at the location of intersection improvements at Harlow Road; potential impact due to roadway widening for exclusive bus travel lane northbound and BAT lane southbound would require that these poles be relocated
- 12-kV underground line crossing Coburg Road north of Cal Young Road; potential impact due to station construction
- 12-kV overhead line and associated utility poles on the east side of Coburg Road at the location of intersection improvements at Willakenzie Road; potential impact due to roadway widening
- 12-kV overhead line transitioning to underground lines between Elysium Avenue and Crescent Avenue on Coburg Road due to widening of the existing roadway to accommodate two transit exclusive lanes and station construction
- 12.5-kV underground lines on both sides of Crescent Avenue; potential impact due to station construction and sidewalk construction
- 12.5-kV underground lines on Shadowview Lane and Old Coburg Road; potential impacts due to signal construction and station construction
- 12.5-kV overhead line on the west side of Old Coburg Road; potential impact due to station construction

7.2.2.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. A 10-inch-diameter water line runs beneath Coburg Road for the length of the corridor and might be impacted by construction activities and trenching for communication fiber. The more substantial lines (16 inches in diameter and greater) potentially impacted by construction include:

- 16-inch-diameter water main crossing Coburg Road at the Randy Papé Beltline Highway interchange; potential impact due to roadway and signal reconstruction

7.2.2.5. Gas (NW Natural)

In addition to typical underground gas infrastructure, a large natural gas transmission line runs beneath Coburg Road throughout the corridor extents. Branches of this line are present at the intersection of Coburg Road and Harlow Road and at the intersection of Coburg Road and Crescent Avenue. Design refinement should verify their depth and location to ensure they are not impacted.

7.2.2.6. Communications (LTD)

In addition to the potential numerous impacts to minor communications fiber and telephone lines, this alternative would add trenched fiber along the length of the corridor to connect into LTD's existing fiber network.

7.3. Indirect and Cumulative Effects

7.3.1. No-Build Alternative

The No-Build Alternative would have no cumulative impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

7.3.2. Common to All Build Alternatives

No cumulative disruption to utilities would be anticipated for any build alternative. Service would not be permanently disrupted and the replacement and/or relocation of aging utility infrastructure would provide an indirect benefit to area businesses and residences.

7.4. Short-Term Construction-Related Impacts

7.4.1. No-Build Alternative

The No-Build Alternative would have no short-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

7.4.2. Common to All Build Alternatives

Short-term utility impacts (such as temporary service disruptions while utilities are relocated) would occur during project construction. The project team, working with utility providers early and throughout the design process to coordinate and schedule relocations, would minimize impacts on the overall construction schedule. Careful coordination with utility providers before and during construction for guidance and design assistance would minimize the risk of construction-related impacts and associated cost, delay, and inconvenience to utility customers in the corridor.

7.5. Potential Mitigation Measures

7.5.1. No-Build Alternative

The No-Build Alternative will require no mitigation measures as no new facilities are proposed beyond those already programmed.

7.5.2. Common to All Build Alternatives

In general, the design of build alternatives would seek to avoid or minimize utility relocations to avoid disruptions to the community and utility companies. This would in turn help reduce costs and schedule impacts due to utility relocation requirements. The typical reasons to leave utilities in place are that the impacts from the utility and from the project are so minimal that the cost would not be worth the benefit to either party and project construction or operations would not affect existing access points to the utility line. Where relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

If after the design team presents its analysis, the decision makers mutually agree to leave the utility in place, designers may recommend mitigation strategies to minimize the physical effect on the utility such as a new manhole or placing an existing utility that cannot be moved into conduit, so that the utility can be removed and reinserted in street crossings without disturbing the surface under the transit corridor.

LTD and the City would communicate and coordinate with utility owners so that necessary plans and permitting are in place to successfully relocate affected utilities prior to the commencement of construction. Prior to construction, all utility locations would be determined. LTD, the City, and the construction contractor would coordinate all construction activities, scheduling, and staging with utility companies. As appropriate, businesses and residents would be notified of extended temporary utility disruptions. BMPs would be in place to mitigate the potential hazards associated with spills from transformers or from the relocation of storm or sanitary lines. Hazardous materials BMPs would be employed when relocation involves transformers or other potentially hazardous materials.

The NW Natural gas transmission lines and associated structures running along Coburg Road, Harlow Road, and Crescent Avenue could potentially be in conflict with proposed improvements under both build alternatives. Design refinement in close coordination with NW Natural and other stakeholders in order would reduce or avoid potential impacts to this piece of critical infrastructure.

7.6. Permits and Approvals

Table 7.6-1 lists permits that might be required for utility relocations or other mitigation activities during construction of the Coburg Road Corridor build alternatives.

Table 7.6-1. Coburg Road Corridor Build Alternatives Potential Permits and Approvals

Permits and Approvals	No-Build Alternative	Enhanced Corridor Alternative	EmX Alternative
Public Utilities Commission Permits (ODOT)		X	X
Plan Review and Permits (ODOT)		X	X
Public improvement permits (City of Eugene)		X	X
Electric permits (EWEB)		X	X

Source: CH2M. (2016b).

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

8.1. Affected Environment

The API for utility infrastructure encompasses the areas of proposed improvements for the Martin Luther King, Jr. Boulevard Corridor (Figure 8.1-1). Underground utilities within the ROWs include cables for telecommunication and energy; pipes for natural gas, water, sanitary sewer, and stormwater; fiber-optic lines; and access points (manholes and vaults) for all types of utilities. In general, the depths of the underground utilities are unknown. Aboveground utilities include CenturyLink telephone poles, EWEB power poles, and traffic signals and street lights and associated conduit and controls.

8.2. Long-Term Direct Impacts

A long-term direct impact to utilities would result if utility infrastructure was required to relocate as a result of the proposed improvements. It is anticipated that any functional utilities that would be potentially impacted long term would be relocated to maintain the same function or replaced with equal or better facilities.

The lists provided in the following subsections do not represent a comprehensive accounting of all facilities on the corridor. Analysis of the long-term direct impacts of each alternative does not account for the numerous small laterals and other utilities that roadway construction projects routinely encounter and modify.

Potential impacts to underground infrastructure cannot be fully determined at this time. The depth and exact location of these facilities have not been surveyed. The assessment lists discuss activities potentially impacting each utility. Type, size, and location of all utilities and the subset of those utilities requiring potential relocation would be determined during preliminary and final design. Where feasible, design refinement would avoid and minimize impacts to reduce costs and service disruptions.

Table 8.2-1 summarizes the major utility conflicts that could occur under the Enhanced Corridor Alternative.

Table 8.2-1. Martin Luther King, Jr. Boulevard Corridor Potential Utility Impacts by Corridor Build Alternative

	Enhanced Corridor Alternative	EmX Alternative
Major sanitary sewer line	1	N/A
Major storm sewer line	0	N/A
Major electrical line	6	N/A
Major water line	2	N/A
New or modified traffic signals	5	N/A
Gas transmission line	1	N/A

Source: CH2M. (2016b).

N/A = not applicable

Figure 8.1-1. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative Area of Potential Utility Impacts

8.2.1. No-Build Alternative

The No-Build Alternative would have no adverse or beneficial long-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

8.2.2. Enhanced Corridor Alternative

8.2.2.1. Sanitary Sewer (City of Eugene)

Sanitary sewer lines are extensively located within the construction footprint. Major lines potentially impacted by this alternative include:

- 24-inch-diameter sanitary sewer main beneath Martin Luther King, Jr. Boulevard from Leo Harris Parkway to Autzen Stadium; potential impact due to reconstruction of existing lanes to full depth concrete BAT lane, intersection reconstruction, and communications fiber trenching

8.2.2.2. Stormwater (City of Eugene)

Stormwater facilities (catch basins, pipe, and manholes) are extensively located within the construction footprint. Construction activities that would widen the roadway or otherwise impact the existing curbline might necessitate reconstruction of these facilities. No substantial structures (greater than 48 inches in diameter) are potentially impacted by this alternative.

8.2.2.3. Electrical Power and Steam (EWEB)

Electrical service lines and laterals are present throughout the corridor along existing ROWs for this alternative. Electrical service is primarily underground in this corridor. The more substantial lines (that EWEB identified as "primary" according to their GIS data) include:

- Two 12-kV underground lines crossing Coburg Road at the intersection of Coburg Road and Martin Luther King, Jr. Boulevard; potential impact due to intersection widening and signal reconstruction
- Two 12-kV underground lines running parallel to Coburg Road at the intersection of Coburg Road and Martin Luther King, Jr. Boulevard; potential impact due to intersection widening and signal reconstruction
- Three 12-kV underground lines at the intersection of Centennial Loop and Martin Luther King, Jr. Boulevard; potential impact due to intersection widening and signal reconstruction
- Three 12.5-kV underground lines crossing Martin Luther King, Jr. Boulevard to provide electrical service to Autzen Stadium and associated facilities; potential impact due to reconstruction of existing lanes to full depth concrete BAT lane and communications fiber trenching
- 7.5-kV and 12.5-kV underground lines crossing Martin Luther King, Jr. Boulevard at Chevy Chase Street; potential impact due to reconstruction of existing lanes to full depth concrete BAT lane, intersection reconstruction, station construction, and communications fiber trenching
- 12.5-kV underground line running under Martin Luther King, Jr. Boulevard from Chevy Chase Street (potential crossing conflict as noted above) and Lindley Lane / S. Garden Way; potential impact due to reconstruction of existing lanes to full depth concrete BAT lane, intersection reconstruction, station construction, and communications fiber trenching

8.2.2.4. Water (EWEB)

Water service lines, hydrants, and laterals are present in existing street ROWs for this alternative. The more substantial lines (16 inches in diameter and greater) potentially impacted by construction include:

- 45-inch-diameter water main crossing Martin Luther King, Jr. Boulevard 200 feet north of Kingsrow Avenue; potential impact due to reconstruction of existing lane to full depth concrete BAT lane, intersection reconstruction, and communications fiber trenching
- 30-inch-diameter water main crossing Martin Luther King, Jr. Boulevard at Kingsrow Avenue; potential impact due to reconstruction of existing lane to full depth concrete BAT lane, intersection reconstruction, and communications fiber trenching

8.2.2.5. Gas (NW Natural)

A major natural gas transmission line runs parallel to Coburg Road at its intersection with Martin Luther King, Jr. Boulevard. Intersection widening and signal reconstruction activities at this location would need to account for the location and depth of this pipeline and the design of these improvements adjusted accordingly to avoid impacts to this large infrastructure.

8.3. Indirect and Cumulative Effects

8.3.1. No-Build Alternative

The No-Build Alternative would have no cumulative impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

8.3.2. Enhanced Corridor Alternative

No cumulative disruption to utilities would be anticipated. Service would not be permanently disrupted and the replacement and/or relocation of aging utility infrastructure would provide an indirect benefit to area businesses and residences.

8.4. Short-Term Construction-Related Impacts

8.4.1. No-Build Alternative

The No-Build Alternative would have no short-term impacts to utility infrastructure as no new facilities are proposed beyond those already programmed.

8.4.2. Enhanced Corridor Alternative

Short-term utility impacts (such as temporary service disruptions while utilities are relocated) would occur during project construction. The project team, working with utility providers early and throughout the design process to coordinate and schedule relocations, would minimize impacts on the overall construction schedule. Careful coordination with utility providers before and during construction for guidance and design assistance would minimize the risk of construction-related impacts and associated cost, delay, and inconvenience to utility customers in the corridor.

8.5. Potential Mitigation Measures

8.5.1. No-Build Alternative

The No-Build Alternative would require no mitigation measures as no new facilities are proposed beyond those already programmed.

8.5.2. Enhanced Corridor Alternative

In general, the design of the build alternative would seek to avoid or minimize utility relocations to avoid disruptions to the community and utility companies. This would in turn help reduce costs and schedule impacts due to utility relocation requirements. The typical reasons to leave utilities in place are that the impacts from the utility and from the project are so minimal that the cost would not be worth the benefit to either party and project construction or operations would not affect existing access points to the utility line. Where relocation of large utilities would be cost- and schedule-prohibitive (such as large power transmission lines, sewer mains, gas mains, or other large and critical infrastructure), the design would be refined to lessen or avoid these impacts.

If after the design team presents its analysis, the decision makers mutually agree to leave the utility in place, designers may recommend mitigation strategies to minimize the physical effect on the utility such as a new manhole or placing an existing utility which cannot be moved into conduit, so that the utility can be removed and reinserted in street crossings without disturbing the surface under the transit corridor.

LTD and the City would communicate and coordinate with utility owners so that necessary plans and permitting are in place to successfully relocate affected utilities prior to the commencement of construction. Prior to construction, all utility locations would be determined. LTD, the City, and the construction contractor would coordinate all construction activities, scheduling, and staging with utility companies. As appropriate, businesses and residents would be notified of extended temporary utility disruptions. BMPs would be in place to mitigate the potential hazards associated with spills from transformers or from the relocation of storm or sanitary lines. Hazardous materials BMPs would be employed when relocation involves transformers or other potentially hazardous materials.

8.6. Permits and Approvals

Table 8.6-1 lists permits that might be required for utility relocations or other mitigation activities during construction of the Martin Luther King, Jr. Boulevard Corridor build alternatives.

Table 8.6-1. Martin Luther King, Jr. Boulevard Corridor Build Alternative Potential Permits and Approvals

Permits and Approvals	No-Build Alternative	Enhanced Corridor Alternative
Public Utilities Commission Permits (ODOT)		X
Plan Review and Permits (ODOT)		X
Public improvement permits (City of Eugene)		X
Electric permits (EWEB)		X

Source: CH2M. (2016b).

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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)
Draft Eugene 2035 TSP	*DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016)
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, 2014)
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
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
O_3	ozone

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
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
RTP	*Central Lane Metropolitan Planning Organization Regional Transportation Plan* (LCOG, adopted 2007, November; 2011, December). (The RTP includes the Financially Constrained Roadway Projects List.)

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
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
TOD	transit-oriented development
TPAU	Department of Transportation – Transportation Planning Analysis Unit

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
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
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. 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; EISsare 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: 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. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. 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. Goals are overarching principles that guide decision making. Goals are broad statements. 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.
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."

Table A-2. Terms

Terms	Definitions
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.
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.

Table A-2. Terms

Terms	Definitions
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).
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.

Table A-2. Terms

Terms	Definitions
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.
Minority	A person who is one or more of the following: Black: a person having origins in any of the black racial groups of Africa Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent 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 Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands

Table A-2. Terms

Terms	Definitions
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, and 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. 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.
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.

Table A-2. Terms

Terms	Definitions
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.
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.

Table A-2. Terms

Terms	Definitions
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
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.

Table A-2. Terms

Terms	Definitions
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.
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.

Table A-2. Terms

Terms	Definitions
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

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 2 weeks, with additional time required – up to 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.