LEBANON TRANSPORTATION SYSTEM PLAN

VOLUME 1

Lebanon, Oregon
September 2018

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A special acknowledgment goes out to the Lebanon residents, property owners, and visitors who attended community meetings or submitted comments, and to the Oregon Department of Transportation, which financed the project and provided invaluable staff support.

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Volume 2 of the City of Lebanon Transportation System Plan includes all background memoranda, meeting summaries, and technical data that were the basis for its development. The contents of Volume 2 represent an iterative process in the development of the TSP. Refinements to various plan elements occurred throughout the process as new information was obtained. In all cases, the contents of Volume 1 supersede those in Volume 2.

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THE PROCESS

THE PROCESS

Why create a Transportation System Plan?

A TSP is a long-range plan that sets the vision for a community's transportation system for the next 20 years. This vision is developed through community and stakeholder input and is based on the system's existing needs, opportunities, and anticipated available funding.

A TSP is required by the State of Oregon. In compliance with State requirements, the City of Lebanon updated the City's TSP, replacing the previous TSP adopted in 2007. This Lebanon TSP update establishes a new 2016 baseline condition and identifies transportation improvements needed through the year 2040. The TSP addresses compliance with new or amended federal, state, and local plans, policies, and regulations including the Oregon Transportation Plan, the State's Transportation Planning Rule, and the Oregon Highway Plan.

How was this TSP created?

The best way to build a community-supported TSP is through an open, inclusive process. The decision-making structure for this TSP was developed to establish clear roles and responsibilities throughout the project.

Lebanon City Council was responsible for all final decisions for this TSP project.

Project Advisory Committee (PAC) was approved by the City Council to provide community-based recommendations. The PAC was the primary recommendation body for the project team. PAC meetings were open to the public.

Project Management Team (PMT) made recommendations to the City Council based on technical analysis and stakeholder input.

Technical Advisory Committee (TAC), consisting primarily of various state and local agency representatives, supported the PMT. The TAC's role was to provide regulatory reviews of work products and to strengthen coordination between the TSP update and other related planning efforts in the region.

Figure 1. Study Area for Lebanon TSP

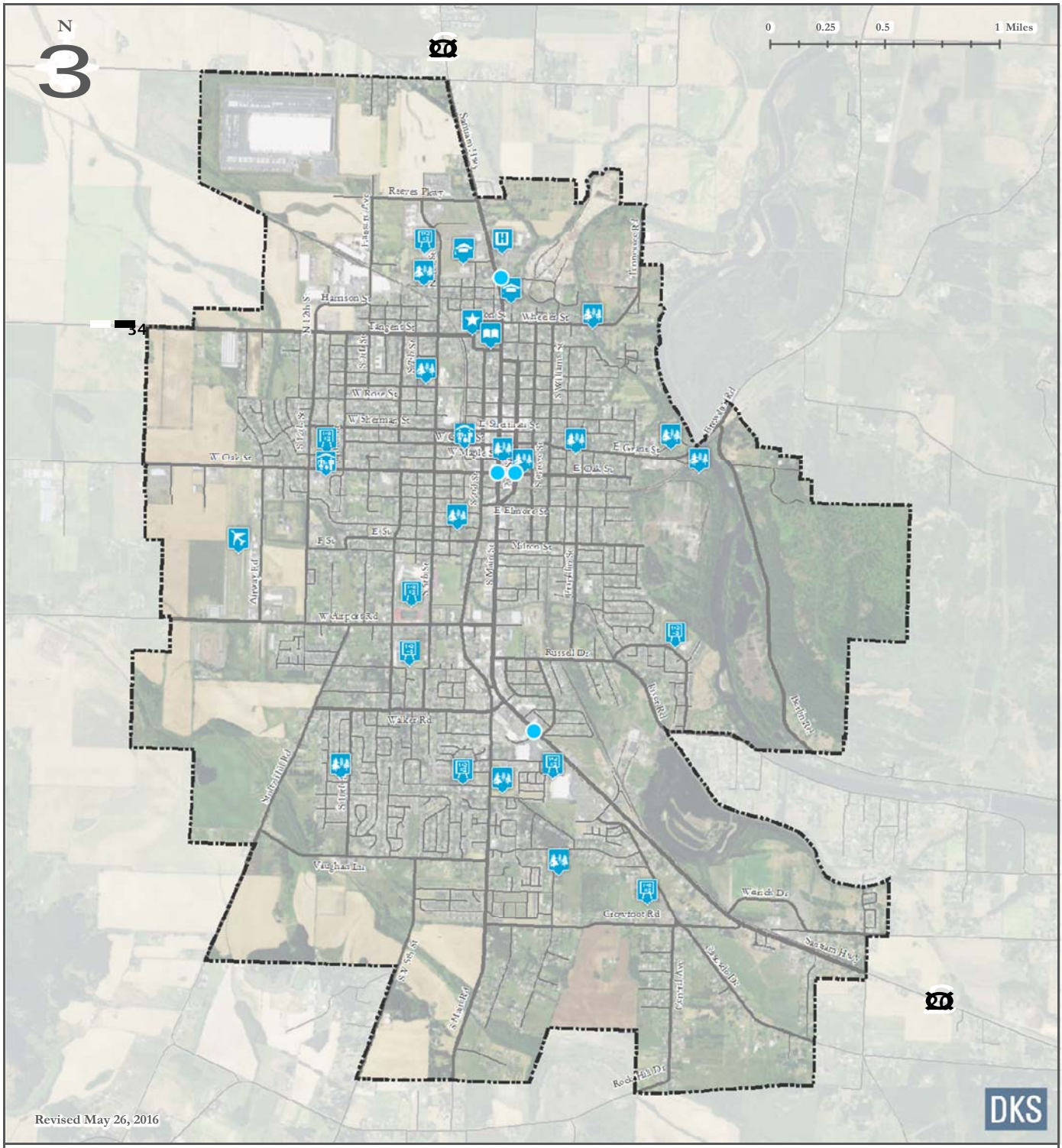
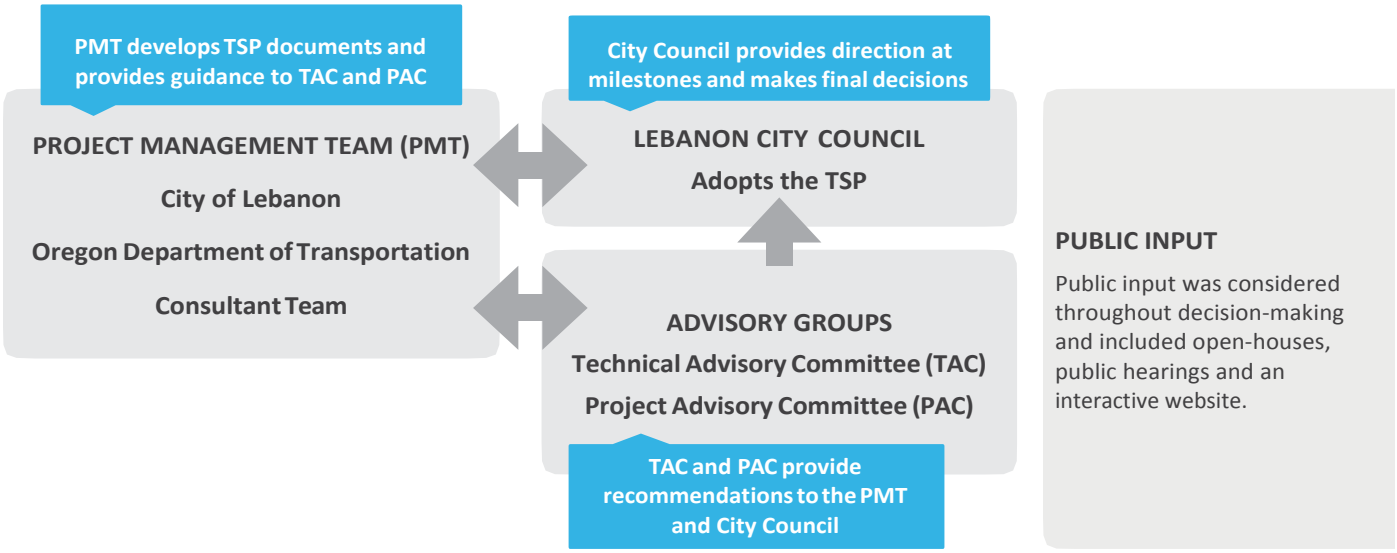


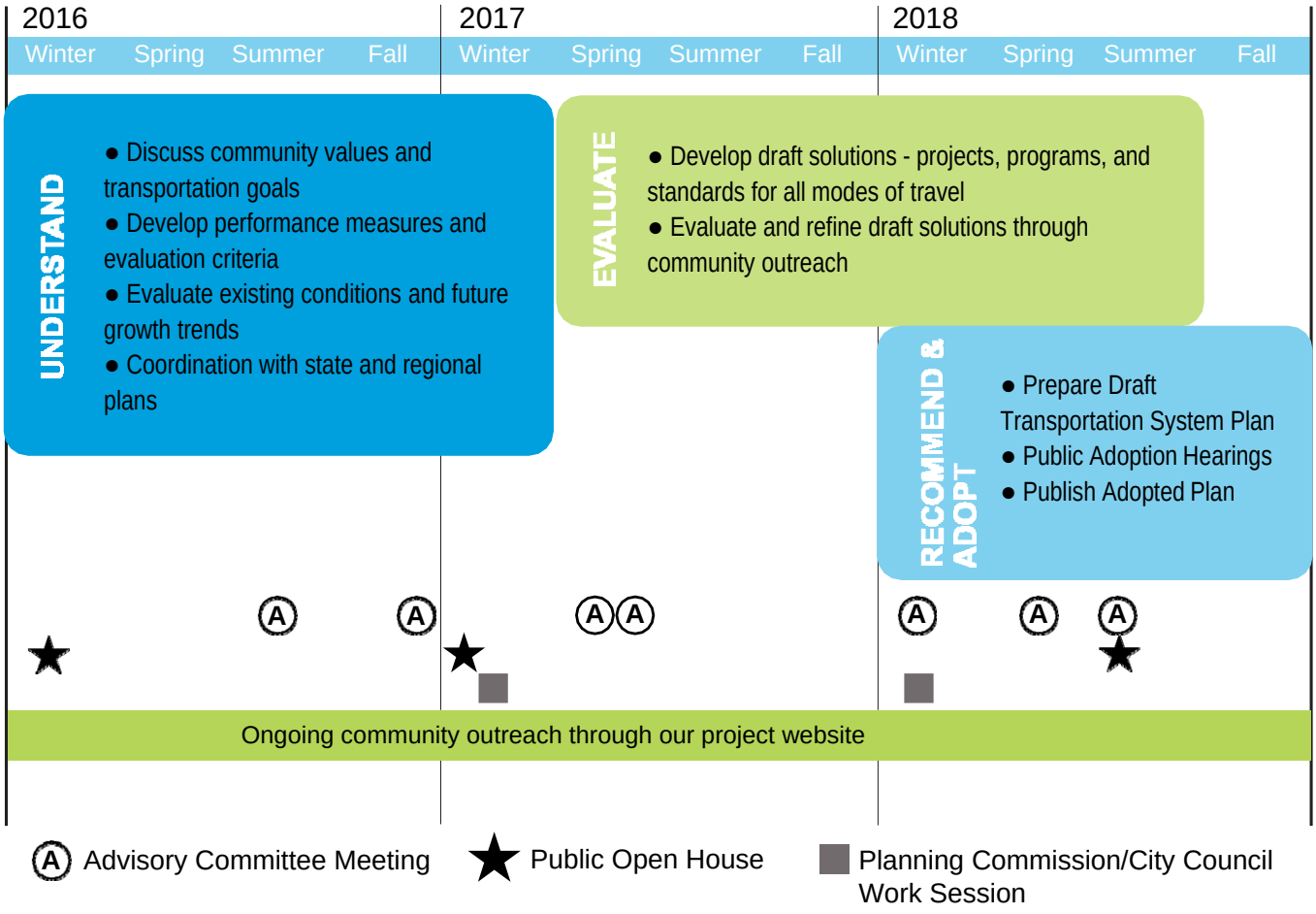
Figure 2. Lebanon TSP Decision-Making Structure



Engaging the Public

The strategy used to guide stakeholder and public involvement throughout the TSP update reflects the commitments of the City of Lebanon and the Oregon Department of Transportation (ODOT) to carry out public outreach that provided community members with the opportunity to weigh in on local transportation concerns and to provide input on the future of transportation within their city.

Figure 3. City of Lebanon TSP Development Process



The City of Lebanon involved the public and stakeholders through a series of committee meetings, public open houses, and work sessions with elected officials and by providing project materials through the project's website www.lebanontsp.org. Engaging community members and organizations in the TSP process included engaging with the TAC and the PAC, which included members representing:

- Agency partners working on related plans
- Business organizations, associations and chambers of commerce
- Bicycle and pedestrian interests
- Freight interests
- Lebanon School District
- Senior services
- Emergency services providers
- Large employers

LEBANON 2017

LEBANON 2017

Situated along the shoreline of the South Santiam River in Oregon's Central Willamette Valley, Lebanon is a burgeoning community of businesses and residences. With a population of nearly 16,000 residents, home of the Medical College of the Western University of Health Sciences and Linn-Benton Community College, and many large employers, Lebanon has an expanding local economy. With easy access to Interstate 5 and available industrial land, the local economy is primed for continued growth.

Lebanon is a short trip from Corvallis and Albany and offers an abundance of nearby recreational activities. Lebanon also has an active downtown providing a venue for various events, including a farmer's market. Lebanon is also home to the annual Strawberry Festival. For more information on current transportation conditions, see Technical Memorandum #5 included in Volume 2.

Key Destinations

The first step in planning an effective transportation system is understanding the key destinations throughout the city. These destinations, also called 'activity generators', typically fall into the categories of residential areas, employment, shopping, schools, civic buildings, recreation, and entertainment, such as: Downtown Lebanon for the farmers market, Kuhn Cinema, Cheadle Lake Park, Willamette Speedway; schools, including Western University of Health Sciences, Linn-Benton Community College, and Lebanon High School; places of employment like Lowes Regional Distribution Center, Entek International, and Samaritan Lebanon Community; and spaces for civic engagement and community like City Hall, Lebanon Public Library, Lebanon Senior Center and the Lebanon Community Pool.

Current Issues

Lebanon's existing transportation system poses issues for all users, including the following:

Pedestrians

- Traveling by foot is far more common in the northeast and southwest areas of the City.
- Gaps in the sidewalk system are more common in southwest and southeast Lebanon, and on roadway segments outside the City limits.
- Most crashes involving pedestrians occur downtown, along US 20 between Airport Road and Russell Drive, and at the Airport Road intersection with 2nd Street.
- The clear majority of pedestrian-involved crashes (71 percent) were caused by drivers failing to yield the right of way to a pedestrian in a crosswalk or along a sidewalk.
- Overall, the walking network rates relatively high near downtown, and poor towards the edges of the City.
- Key themes from public comments related to the walking network included:
  - Sidewalk improvements are needed along streets with heavy pedestrian traffic, including OR 34, and Airport Road.
  - Rail crossings need pedestrian safety features.
  - Safety concerns for pedestrians was expressed at the US 20- Main Street intersection with Oak Street.
  - Pedestrian crossings at off-set intersections should be improved, including at the US- Main Street/ Grant Street, US 20/ Walker Road-Dewey Street, and 2nd Street/ E Street- Milton Street intersections.
  - Areas near schools need better sidewalk connectivity.

Bicyclists

- Traveling by bicycle is far more common in the northeast and southwest areas of the City.
- Significant segments of continuous bicycle lanes exist along OR 34, 5th Street, S 2nd Street and Main Road, and Airport Road.
- The proposed Santiam–Calapooia Scenic Bikeway through Lebanon would follow River Drive, to Franklin Street, to Milton Street, to 2nd Street–Main Road, to Vaughan Lane, to Stoltz Hill Road.
- Most crashes involving bicycles occur at intersections.
- Most of the crashes involving a bicyclist were caused by drivers failing to yield the right of way when turning.
- The majority of arterial and collector streets in Lebanon have a low or moderate level of bicycling stress. However, the streets with highest stress levels are the streets important for local and regional through travel, where most businesses and services are located. Additionally, streets in downtown Lebanon generate high or extreme levels of stress for people on bicycles.
- Key themes from public comments related to the biking network included:
  - Bike connections to schools are needed.
  - Narrower and slower roads are desired to increase safety and encourage more trips by bicycle.

Transit Users

- Bus stops in Lebanon are located near US 20 and Weldwood Drive-Burdell Boulevard, Main Street-Park Street (US 20) and Oak Street, and US 20 and Industrial Way.
- Only the bus stop near US 20 and Industrial Way (in front of Linn-Benton Community College) is signed and provides a bench, shelter, and bus pull out.
- All remaining bus stops are unsigned and have no amenities.
- Most transit users in the City are more than a half-mile from a bus stop.
- Public comments indicate a desire for bus service to be extended west of US 20.

Drivers

- More than 60 percent of the workers in Lebanon live in another City that is located more than ten miles away, creating many long commute trips and encouraging travel by motor vehicle.
- Motor vehicle volumes on the roadways in Lebanon most commonly peak during weekday evenings between 4:35 p.m. and 5:35 p.m.
- Lebanon experiences an average of around 159 crashes a year, though the severity of most crashes is generally low, with 84 percent involving only property damage or minor injuries.
- Nine intersections in Lebanon were noted as having a high rate of crashes, with three other locations identified through ODOT's Safety Priority Index System as having a high combination of crash frequency and severity.
- The five most common driver errors are responsible for nearly 70 percent of all crashes in Lebanon:
  1. Did Not Yield Right-of-Way (29 percent)
  2. Followed Too Closely (22 percent)
  3. Disregarded Traffic Signal (7 percent)
  4. Made Improper Turn (5 percent)
  5. Inattention (5 percent)
- All study intersections meet the mobility targets under existing p.m. peak hour summer conditions. However, a few intersections are operating just under the applicable mobility targets, including US 20/ Airport Road, US 20/ Walker Road, and Airport Road/ 2nd Street.
- Key themes from public comments related to the driving network included:
  - There are peak hour congestion issues at the US 20/ Airport Road intersection.
  - Traffic from the US 20/ Walker Road-Dewey Street intersection backs up to Main Road and impacts the Main Road/ Walker Road intersection.
  - 12th Street is used as a bypass route for Denny School Road and OR 34.
  - Walnut Street and Ash Street are used by drivers to avoid traffic signals along Grant Street.
  - Improvements are needed at the Crowfoot Road/ Central Avenue/ Cascade Drive intersection.

Other Modes of Travel

- Five bridges are flagged as structurally deficient with poor or serious substructure conditions, and one bridge is flagged as functionally obsolete.
- Within Lebanon, OR 34, and US 20 south of OR 34 are classified as Oregon Freight Routes and Federal Truck Routes, while US 20 north of OR 34 is only classified as a Federal Truck Route
- Local truck routes have also been designated by the City, including portions of Wheeler Street, Williams Street, Milton Street, Grant Street, and Oak Street.
- Public comments indicate a desire to modify the Wheeler Street, Williams Street, and Milton Street local truck route. The current route directs trucks through residential neighborhoods.
- Freight rail service is provided to Lebanon by the Albany and Eastern Railroad.
- The Lebanon State Airport serves 9,800 annual operations (i.e., take-offs or landings).
- Regional and international air service for passengers and freight is provided via Portland International Airport (PDX). Eugene Airport provides regional air service.
- Cascades West RideShare provides transportation options outreach including carpool/vanpool matching services for commuters in Benton, Lincoln, and Linn counties.

Funding Constraints

The City's current funding sources provide a relatively stable revenue stream. Based on current funding levels, the City expects to have $27 million available to fund city projects and an additional $8.5 million to fund ODOT projects through the year 2040 that are recommended as part of this TSP. Since the total project list exceeds the amount of funding expected to be available, the City may wish to consider expanding its funding options to implement more of the desired improvements in a timely manner.

The current funding sources summarized below and potential additional funding sources are detailed in Technical Memorandum #7 Finance Program included in Volume 2.

Current Funding Sources

The City uses three general funding sources for transportation, including funds from:

The Surface Transportation Block Grant Program (STBG)

The STBG includes Federal Highway Trust Funds that are received from federal motor vehicle fuel tax and truck-related weight-mile charges. Federal Highway Trust Funds from the STBG flow to the states that use them primarily for safety, highway, and bridge projects. Lebanon receives a portion of these funds based partially upon population.

The State Highway Trust Fund

The State Highway Trust Fund makes distributions from the state motor vehicle fuel tax, vehicle registration and title fees, driver license fees and truck weight-mile taxes. Cities and counties receive a share of State Highway Trust Fund monies, and by statute may use the money for any road-related purpose, including walking, biking, bridge, street, signal, and safety improvements.

HB 2017, Keep Oregon Moving, passed by the Oregon Legislature will provide additional revenues. It increases transportation-related fees including the state gas tax, vehicle registration and title fees and implements a new bicycle tax, public transportation payroll tax and new light vehicle dealer privilege tax. Lebanon will see increased revenues of approximately $380,000 annually from HB 2017.

A System Development Charge (SDC)

The City also collects SDC's from new development, which are a funding source for all capacity adding projects for the transportation system. In Lebanon, these projects include roadway improvements, bikeways and pedestrian facilities. The funds collected can pay for constructing or improving portions of roadways impacted by applicable development. The SDC is a one-time fee. The street SDC rate within the City is currently $1,755 per p.m. peak hour trip end.

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THE VISION

THE VISION

A vision statement is an imaginative description of the desired condition in the future and must align with the community's core values. Goals and objectives create the stepping-stones by which the broad vision is achieved. Goals are brief clear statements of the outcomes that must be achieved to realize the Vision. Goals are broad, measurable, and achievable. Each goal is supported by objectives, which outline the specific actions to be taken to achieve the outcomes described by the goals. The solutions recommended by the TSP must be consistent with the goals and objectives.

Setting the Direction

The process of identifying a vision, goals, and objectives uncovers the transportation system that best fits Lebanon's values and sets the guide for development and implementation of the TSP.

The goals and objectives from Lebanon's current TSP (developed in 2007), Comprehensive Plan (developed in 2004), and 2040 Vision Statement provided a starting point for setting the direction for the TSP.

From that review, the project team developed an initial set of goals and objectives as a starting point for the Lebanon TSP update. The draft goals and objectives were shared with the Project Advisory and Technical Advisory Committees and the general public, with further input sought to refine them. After receiving input, the project team created a final set of goals and objectives, and developed corresponding evaluation criteria. For more information on TSP goals, objectives and evaluation criteria, see Technical Memorandum #4 included in Volume 2.

Vision

The design of transportation infrastructure promotes safe, comfortable travel, shows respect for the City's resources, and showcases the natural environment. All transportation modes flow smoothly and safely to and throughout the city, meeting the needs of residents, businesses, visitors, and people of all physical and financial conditions. Connectivity facilitates travel between and within each neighborhood, where walking and biking environments complement mixed-use development.

Goals & Objectives

Goal 1: An equitable, balanced and well-connected multi-modal transportation system.

OBJECTIVE 1A: Ensure that the transportation system provides equitable access to underserved and vulnerable populations, and is friendly and accommodating to travelers of all ages.

OBJECTIVE 1B: Ensure the pedestrian, and bike throughways are clear of obstacles and obstructions (e.g., utility poles, grates).

OBJECTIVE 1C: Provide connections for all modes that meet applicable Lebanon and Americans with Disabilities Act (ADA) standards.

Goal 2: Convenient facilities for pedestrians and bicyclists.

OBJECTIVE 2A: Allow more walking and biking by providing for their needs (e.g., street lighting, bike parking).

OBJECTIVE 2B: Improve commuting and recreational walking and biking connections to community facilities and amenities.

OBJECTIVE 2C: Enhance way finding signage for those walking and biking, directing them to bus stops, and key routes and destinations.

OBJECTIVE 2D: Promote walking, bicycling, and sharing the road through public information and events.

OBJECTIVE 2E: Encourage necessary changes to the land development code to allow compatible uses to locate within walking and biking distance of each other (e.g., residential use and employment).

Goal 3: Transit service and amenities that encourage a higher level of ridership.

OBJECTIVE 3A: Locate transit stops where safe and convenient for users.

OBJECTIVE 3B: Encourage additional transit services and coordinate with transit providers to improve the coverage, quality and frequency of services, where needed.

OBJECTIVE 3C: Provide for transit user needs beyond basic provision of service (e.g., by providing sidewalk and bicycle connections, shelters, benches, technology) to encourage higher levels of use.

OBJECTIVE 3D: Identify locations for designated Park-and-Ride lots.

Goal 4: Efficient travel to and through the City.

OBJECTIVE 4A: Develop and preserve north-south arterial and collector corridors through the City to provide alternative routes to US 20 for local traffic, and improve connectivity across OR 34.

OBJECTIVE 4B: Develop and preserve east-west arterial and collector corridors through the City to provide alternative routes to OR 34 for local traffic, and improve connectivity across US 20.

OBJECTIVE 4C: Make new or improved transportation connections to enhance system efficiency.

OBJECTIVE 4D: Distribute travel information for motorists to maximize the reliability and effectiveness of US 20 and OR 34.

OBJECTIVE 4E: Implement the City mobility standard to help maintain a minimum level of motor vehicle travel efficiency for local streets. State and County standards for mobility will be supported by the City on facilities under the respective jurisdiction.

Goal 5: Safe and active residents.

OBJECTIVE 5A: At high collision locations, improve safety for walking, biking, and driving.

OBJECTIVE 5B: Enhance existing crossings of US 20 and OR 34 for safe walking and biking (e.g., install rapid flashing beacons, and aids for vulnerable populations, such as chirpers, at signalized pedestrian crossings).

OBJECTIVE 5C: Provide new crossings for pedestrians and bicyclists where needed.

OBJECTIVE 5D: Improve the visibility of travelers in constrained areas, such as on blind curves.

OBJECTIVE 5E: Promote walking and bicycling by educating users regarding good traffic behavior and consideration for all.

Goal 6: A sustainable transportation system.

OBJECTIVE 6A: Reduce reliance on US 20 and OR 34 for local trips.

OBJECTIVE 6B: Avoid impacts to the scenic, natural and cultural resources in the City.

OBJECTIVE 6C: Support alternative vehicle types (e.g., with electric vehicle plug-in stations).

OBJECTIVE 6D: Encourage an arrangement of land use that would shorten trip lengths significantly or reduce the need for motor vehicle travel within the City.

OBJECTIVE 6E: Maintain the existing transportation system assets to preserve their intended function and useful life.

OBJECTIVE 6F: Improve travel reliability and safety with system management solutions.

OBJECTIVE 6G: Establish stable and diverse revenue sources to meet the need for transportation investments in the City.

OBJECTIVE 6H: Determine transportation system investment priorities through open and transparent processes.

OBJECTIVE 6I: Develop and support reasonable alternative mobility targets that align with economic and physical limitations on US 20 and OR 34 and City streets where necessary.

Goal 7: A transportation system that supports a prosperous and competitive economy.

OBJECTIVE 7A: Design elements of the transportation system to be aesthetically pleasing to through travelers, residents, visitors, and users of adjoining land.

OBJECTIVE 7B: Identify transportation improvements that will enhance access to employment.

OBJECTIVE 7C: Design streets and street improvements to capture and highlight views.

OBJECTIVE 7D: Improve the freight system efficiency, access, capacity and reliability.

Goal 8: Coordinate with local and state agencies and transportation plans.

OBJECTIVE 8A: Work with the Cascades West Area Commission on Transportation and the South Valley / Mid Coast Regional Solutions Center to promote projects that improve regional linkages.

OBJECTIVE 8B: Develop TSP policy and municipal code language to implement the TSP update.

OBJECTIVE 8C: Coordinate transportation projects, policy issues, and development actions with all affected government agencies in the area, including Linn County, and the Oregon Department of Transportation.

OBJECTIVE 8D: Coordinate local neighborhood plans and visions with the TSP.

LEBANON 2040

Future land use changes and growth in population, housing, and employment within Lebanon's urban growth boundary (UGB) will have a significant impact on the existing transportation system and will create new travel demands. These growth projections and how they translate to new trips on the transportation network are key elements of the future conditions and performance analysis.

The Corvallis Albany Lebanon Model (CALM) travel demand model is the primary tool used to determine future traffic volumes in Lebanon and the surrounding region. CALM forecasts travel changes in response to future land use and transportation scenarios. This model translates estimated land uses into person trips, selects travel modes and assigns motor vehicle trips to the roadway network. The CALM model was developed by ODOT's Transportation Planning and Analysis Unit, with input provided by affected Metropolitan Planning Organizations (MPOs) and local agencies. It is an informational tool to assist with decision making, providing objective and quantitative information exploring the potential impacts of alternative transportation system investments.

Forecasted Population and Employment Growth

Understanding the influence of area land uses on the transportation system is a key factor in transportation system planning. The amount of land that is to be developed, the types of land uses, and their proximity to each other have a direct relationship to expected demands on the transportation system.

The CALM model includes forecasted land uses for the Lebanon TSP study area. The land uses reflect Lebanon's Comprehensive Plan and growth assumptions identified for the year 2040. Complete land use data sets are developed for both the 2010 base year and 2040 future year (planning horizon). Local land uses were developed with input and review from local agencies.

The land use information has been coordinated with all the other jurisdictions in the CALM travel area.

Table 1 summarizes baseline and projected future totals for population, households, and employment within the Lebanon TSP study area, from which traffic growth estimates were made. These values indicate that growth in employment is expected to outpace residential development, both overall and as a percentage increase. Most household growth is assumed to occur in the north and southeast areas of the city, while employment growth is generally assumed to occur from the southwest and south to the north and northeast.

Table 1: CALM Model Land Use Changes (2010-2040)

LEBANON AREA*	2010	2040	PERCENT INCREASE
Population	18,348	28,365	55%
Households	7,238	12,373	71%
Total Employment	5,711	11,783	106%

Source: CALM Travel Demand Model
Note: * These locations are not limited to the city limits and is based on boundaries approximated by the TAZ boundaries (Figure 1) and may not match current and future city limits.

Future Conditions without Improvements

The population, housing, and employment growth projected to occur through 2040 will result in increased travel demands within and through the city. An evaluation of Lebanon's transportation system under these conditions was performed to understand how transportation needs might change if no further investments to improve the system were made.

The forecast generated by analysis of the future 2040 roadway system identifies the following findings.

- Motor vehicle congestion will likely exceed acceptable levels at some intersections, with nine of the study intersections not meeting their respective mobility target/standard during the 2040 design hour conditions.
- The demand for walking and biking will increase, but key gaps in the infrastructure to support it will remain and crossing busy streets will continue to discourage some trips.
- There will likely continue to be safety concerns at several locations in the city.
- Increased congestion along freight routes may necessitate the need for improvements.
- No major new rail, air, pipeline, or water-based transportation needs were identified.

For more information on future traffic volumes and conditions, see Technical Memorandums #6 and 8 included in Volume 2.

PROJECT LIST

PROJECT LIST

Recommended Projects

Recommended solutions were developed to be consistent with the project vision and goals and to focus on creating a balanced system able to provide travel options for a wide variety of needs and users. The list of recommended projects was prioritized using guidance provided by the project goals and objectives and with input from three main sources:

Stakeholders (via committee meetings, public open houses, and project website comments)

Previous Plans (such as the 2007 TSP and Lebanon Trails Strategic Plan)

Independent Project Team Evaluation (Technical Memorandum #5 and #8)

While the recommended projects include all identified projects for improving Lebanon's transportation system, regardless of their priority or their likelihood to be funded, the TSP planning process eliminated projects that may not be feasible for reasons other than financial limitations (such as environmental or existing development limitations). The recommended project list is composed of the following three lists, created based on each project's priority and likelihood to be funded.

Package 1 is Financially Constrained, and identifies the high priority projects from the Aspirational Projects list that could be constructed with funding anticipated through 2040.

Package 2 identifies projects from the Aspirational Project list that are highly supported but that, due to cost or jurisdiction, were unable to be included in the Financially Constrained list. Should additional funding become available, these are projects the City may want to consider.

Package 3 is comprised of the Aspirational Projects that are neither in the Financially Constrained Project list nor Package 2 Project list. These projects likely will not have city or state funding by 2040.

The City is not required to implement projects identified on the Financially Constrained list first. Priorities may change over time and unexpected opportunities may arise to fund particular projects. The City is free pursue any of these opportunities at any time. The purpose of the Financially Constrained project list is to establish reasonable expectations for the level of improvements that will occur and give the City initial direction on where funds should be allocated.

For more information on future traffic volumes and conditions, see Technical Memorandums #6 and 8 included in Volume 2.

Anticipated Available Funding

For planning purposes, each solution was assigned a primary source of funding (City, County, or State), although such designations do not create any obligation for funding. The prioritized list of 'City' projects (where the City is assumed to be the primary contributor of funding) is constrained to a 20-year funding estimate. The City could use the prioritized list of 'State' projects to make decisions for applying for grants or other funding mechanisms. While there may be 'County' projects that the City would like to be prioritized in the next 20 years, these decisions are ultimately up to the County. The City can, however, choose to provide funds to help support State or County projects — expediting the

timeline on those projects the City would like prioritized. Some projects will also likely be built in coordination with land use actions and future development.

With an estimated $232 million worth of recommended transportation system projects identified, the City made reasonable investment decisions to develop a set of transportation improvements that are likely be funded and that meet identified needs through 2040.

The City expects to have approximately $27 million to spend on more than 151 transportation improvements for which they will be the primary source of funding through 2040[1]. It would take $197 million to construct all the locally-funded projects, meaning over $170 million in investments may not be funded.

The City has identified over $26 million worth of investments along US 20 or OR 34. ODOT has indicated that it would be reasonable to assume that up to $8.5 million would be available to fund projects in Lebanon over the next 20 years. Again, over $17.5 million worth of projects on the state system are not expected to be funded within the TSP planning horizon.

The TSP has also identified nine projects estimated at over $9 million for which Linn County would be the primary source of funding.

The Financially Constrained list in Tables 2 to 7 focuses on achieving a relatively even balance of goal areas and high-impact projects, informed by conversations with the PAC, TAC, and general public. By cost, this list is about 73% active transportation projects, 25% connectivity and congestion projects, 1% transit projects, and 1% demand and system management projects.

Tables 2 to 7 also presents a Package 2 list of highly supported projects that, due to cost or jurisdiction, were unable to be included in the Financially Constrained list. By cost, this list is about 48% active transportation projects, 39% connectivity and congestion projects, 13% transit projects, and less than 1% demand and system management projects.

Financially Constrained and Aspirational Projects

The following pages include the Financially Constrained and Aspirational Projects in table form and on an accompanying maps. Package 1, Financially Constrained Plan, totals the $27 million expected to be available through existing city funding sources. It also suggests how the city would use a likely amount of revenue from state and/or federal sources. Improvement Package 2 identifies projects from the Aspirational project list that are highly supported but that, due to cost or jurisdiction, were unable to be included in the Financially Constrained list. Should additional funding become available, these are projects the city may want to consider. Package 3, Aspirational Plan, includes projects that likely would not have city or state funding by 2040.

The project design elements depicted are identified for the purpose of creating a reasonable cost estimate for planning purposes. The actual design elements for any project are subject to change and will ultimately be determined through a preliminary and final design process, and are subject to City, County and/or ODOT approval. All recommended projects along US 20/OR 34 in Lebanon will also be subject to review for a reduction in vehicle-carrying capacity.

1 Funding Assumptions are detailed in Technical Memorandum #7, found in Volume 2.

Figure 4. Proposed Motor Vehicle Projects

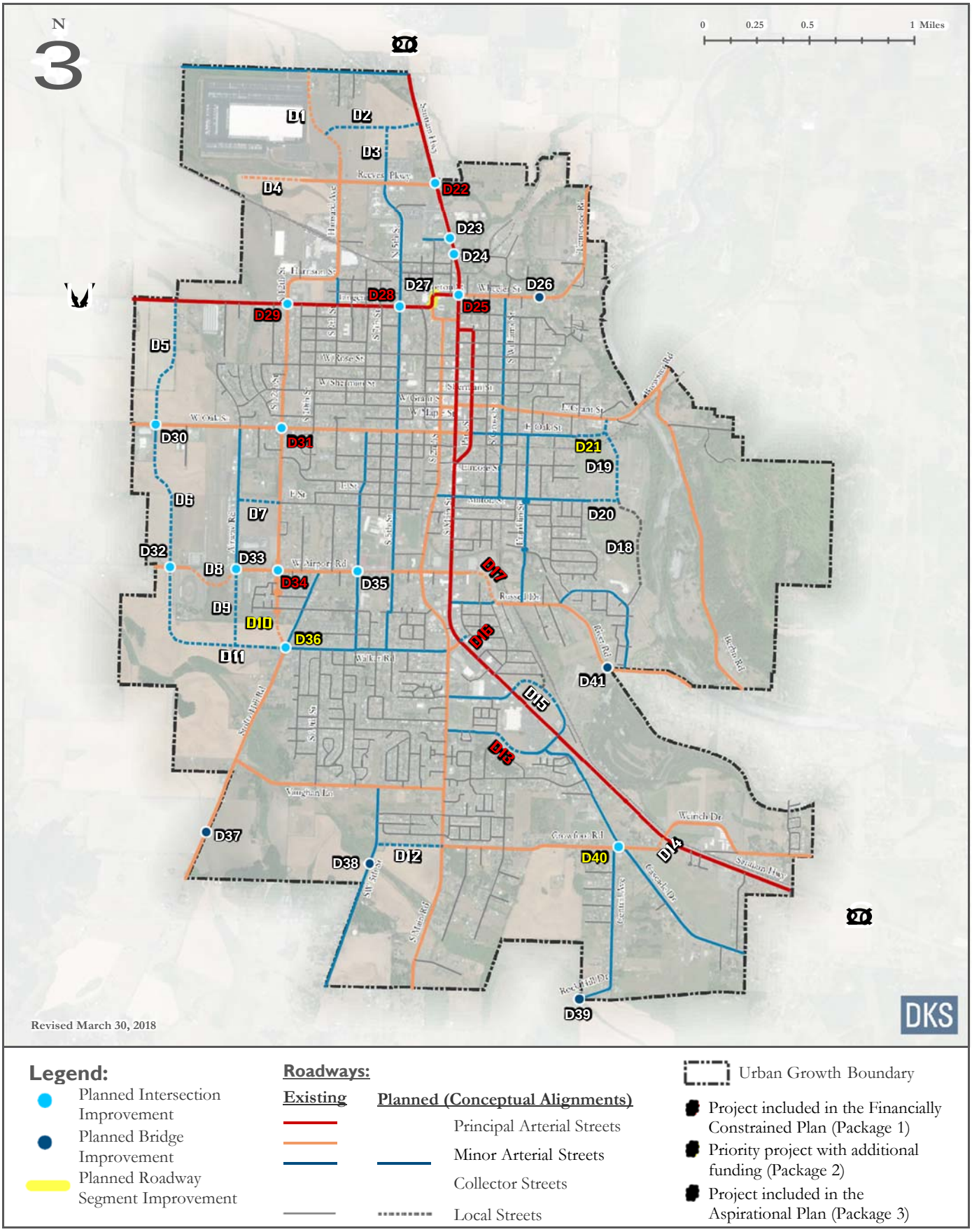


Figure 5. Proposed Pedestrian Projects

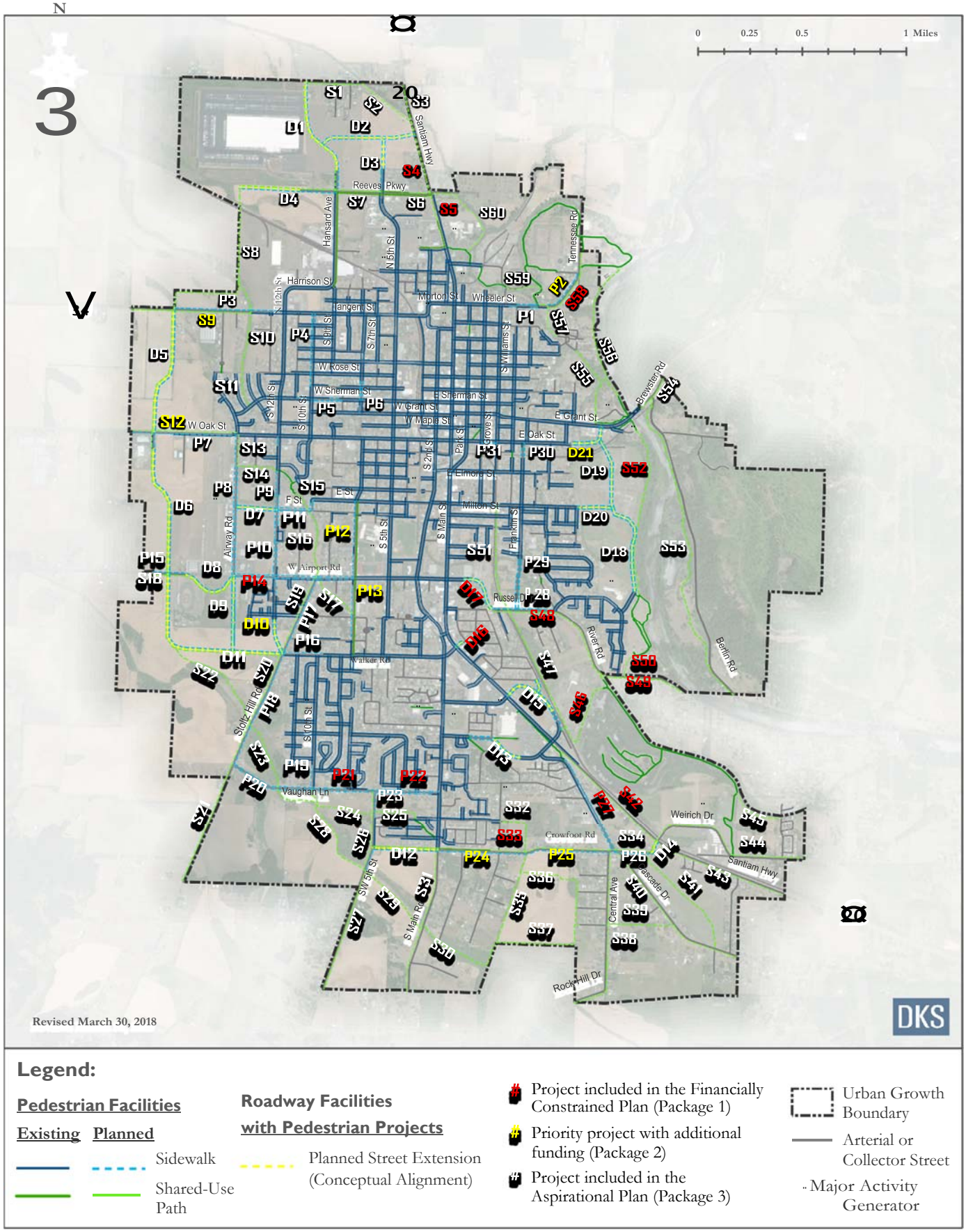
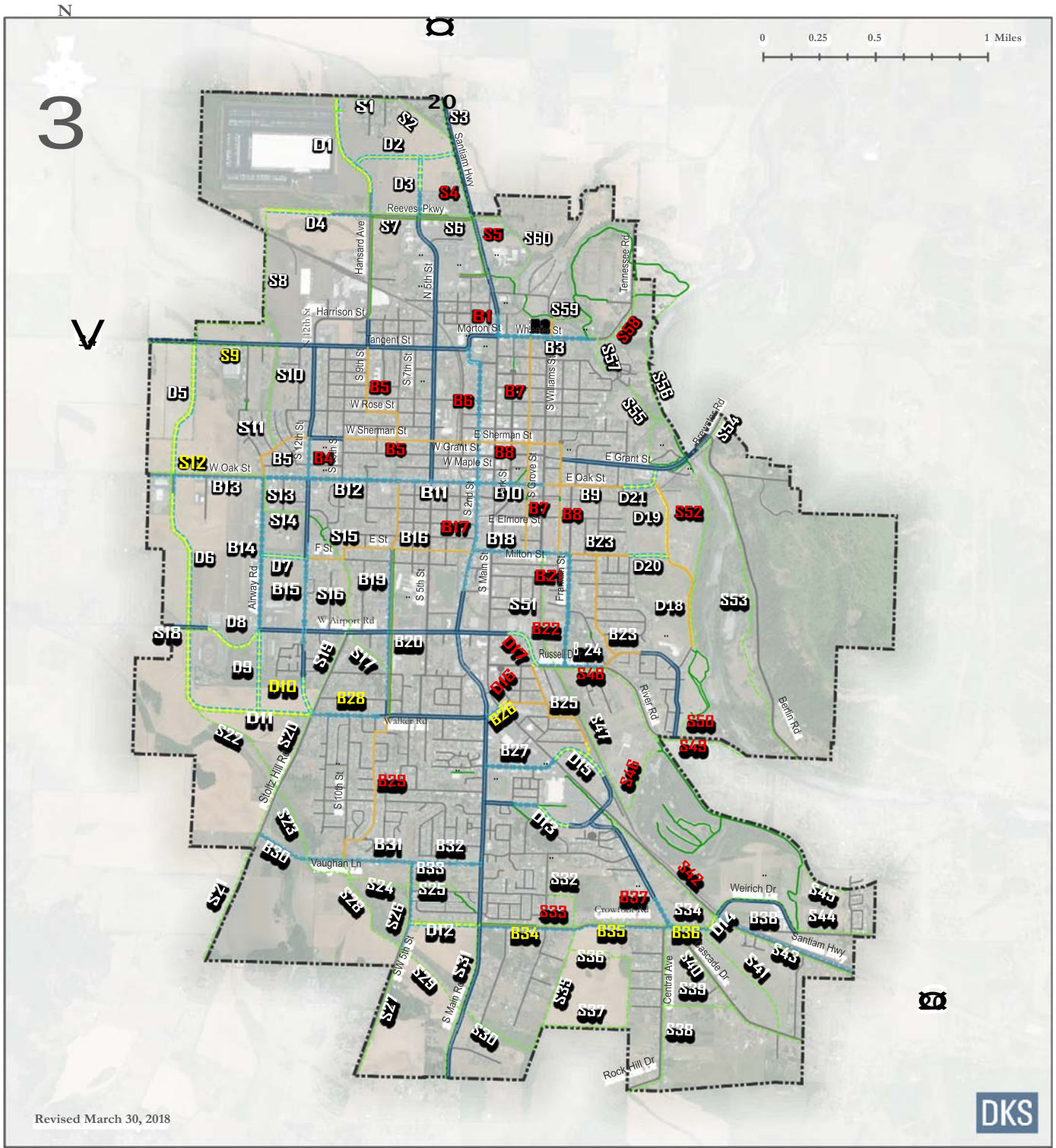


Figure 6. Proposed Bicycle Projects



Project List

Table 2. Demand and System Management Projects

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
A	Neighborhood Traffic Calming Program	Reduce motor vehicle travel speeds along residential streets.	Demand / System Management	$100,000	City	1
	Implement program to process community requests for neighborhood traffic calming, investigate options, and implement improvements.					
B	Bike Parking Program	Increase bike parking.	Demand / System Management	$30,000	City	1
	Install new bike parking throughout the city.					
C	Wayfinding Signage Program	Improve wayfinding signage.	Demand / System Management	$75,000	City	1
	Install wayfinding signage to assist pedestrians and bicyclists in choosing comfortable routes and to help visitors navigate through the city.					

Table 3. Transit Projects

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
T1	Cascade Ridge Transit Stop	Enhance transit service and amenities.	Transit	$75,000	City	1
	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.					
T2	US 20 northbound/ Oak Street Transit Stop	Enhance transit service and amenities.	Transit	$75,000	City	1
	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.					
T3	US 20 southbound/ Oak Street Transit Stop	Enhance transit service and amenities.	Transit	$75,000	City	1
	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.					
T4	US 20/ Airport Road Transit Stop	Enhance transit service and amenities.	Transit	$75,000	City	1
	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.					
T5	Lebanon Walmart Transit Stop	Enhance transit service and amenities.	Transit	$75,000	City	1
	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
T6	Implement Deviated Fixed-Route Transit	Enhance transit service and amenities.	Transit	$2,750,000 ($125,000 annually)	City/ State	2
	Implement deviated fixed-route transit service, as identified in the Lebanon Transit Development Plan.					

Table 4. Motor Vehicle Projects

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
D1	Hansard Avenue extension from Reeves Parkway to Gore Drive	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$4,500,000	City	3
	Extend Hansard Avenue from Reeves Parkway to Gore Drive. This street should be constructed as a Minor Arterial, with a sidewalk and bike lane on the east side and shared-use path on the west side.					
D2	New east to west street between the Hansard Avenue extension and the N. 5th Street extension	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$4,300,000	City	3
	Construct a new east to west street between the Hansard Avenue extension and the N. 5th Street extension. This street should be constructed as a Collector, with sidewalks and bike lanes.					
D3	N. 5th Street extension from Reeves Parkway to the new east to west street	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$1,025,000	City	3
	Extend N. 5th Street from Reeves Parkway to the new east to west street. This street should be constructed as a Collector, with sidewalks and bike lanes.					
D4	Reeves Parkway extension west of Hansard Avenue	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$2,725,000	City	3
	Extend Reeves Parkway to the west of Hansard Avenue. This street should be constructed as a Minor Arterial, with a shared-use path on the north side and sidewalk and bike lane on the south side.					
D5	Lebanon Parkway extension from Oak Street to OR 34	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$4,450,000	City	3
	Extend Lebanon Parkway from Oak Street to OR 34. This street should be constructed as a Collector, with a sidewalk and bike lane on the east side and shared-use path on the west side.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
D6	Lebanon Parkway extension from Oak Street to Airport Road	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$4,475,000	City	3
	Extend Lebanon Parkway from Oak Street to Airport Road. This street should be constructed as a Collector, with a sidewalk and bike lane on the east side and shared-use path on the west side.					
D7	F Street extension from 12th Street to Airway Road	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$1,375,000	City	3
	Extend F Street from 12th Street to Airway Road. This street should be constructed as a Collector, with sidewalks and bike lanes.					
D8	Airport Road Realignment	Runway expansion; walking and biking facility gap	Airport (Pedestrian/ Bicycle)	$2,750,000	City	3
	Realign Airport Road to the south of the Lebanon Airport to allow for runway expansion. This street should be constructed as a Minor Arterial, with a sidewalk and bike lane on the north side and shared-use path on the south side.					
D9	Airway Road extension from Airport Road to the Walker Road extension	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$2,525,000	City	3
	Extend Airway Road from Airport Road to the Walker Road extension. This street should be constructed as a Collector, with sidewalks and bike lanes.					
D10	12th Street extension from Kees Street to Stoltz Hill Road	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$1,650,000	City	2
	Extend 12th Street from Kees Street to Stoltz Hill Road. This street should be constructed as a Minor Arterial, with sidewalks and bike lanes.					
D11	Walker Road extension from Stoltz Hill Road to Airport Road	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$6,325,000	City	3
	Extend Walker Road from Stoltz Hill Road to Airport Road. This street should be constructed as a Collector, with a sidewalk and bike lane on the north side and shared-use path on the south side.					
D12	Crowfoot Road extension from South Main Road to 5th Street	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$2,275,000	City	3
	Extend Crowfoot Road from South Main Road to 5th Street. This street should be constructed as a Collector, with a shared-use path and bike lane on the north side and sidewalk on the south side.					
D13	Weldwood Drive extension from Cascade Drive to Lebanite Drive	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$1,175,000	City	1
	Extend Weldwood Drive from Cascade Drive to Lebanite Drive. This street should be constructed as a Collector, with sidewalks and bike lanes.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
D14	Crowfoot Road realignment to Weirich Drive	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$2,675,000	County/ State	3
	Realign Crowfoot Road to connect with Weirich Drive at US 20, and improve the intersection (e.g., possible installation of a roundabout or traffic signal, if warranted). This street should be constructed as a Minor Arterial, with a shared-use path on the north side and sidewalk and bike lane on the south side.					
D15	Burdell Boulevard extension to Market Street	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$2,500,000	City	3
	Extend Burdell Boulevard to connect with Market Street at US 20. This street should be constructed as a Collector, with sidewalks and bike lanes. Create a Local Street connection to Railroad Street, with sidewalks and pavement markings/ signage designating it as a shared street for bikes.					
D16	Dewey Street realignment to Walker Road	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	Funded	City	1
	Realign Dewey Street to connect with Walker Road at US 20. This street should be constructed as a Collector, with sidewalks and pavement markings/ signage designating it as a shared street for bikes.					
D17	Airport Road extension to Russell Drive	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	Funded	City	1
	Extend Airport Road to Russell Drive. This street should be constructed as a Minor Arterial, with sidewalks and bike lanes.					
D18	Mayfly Street extension from Mountain River Drive to the Milton Street extension	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$3,450,000	City	3
	Extend Mayfly Street from Mountain River Drive to the Milton Street extension. This street should be constructed as a Local Street, with sidewalks and pavement markings/ signage designating it as a shared street for bikes.					
D19	New north to south street between Grant Street and the Milton Street extension	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$2,800,000	City	3
	Construct a new north to south street between Grant Street and the Milton Street extension. This street should be constructed as a Collector, with sidewalks and pavement markings/ signage designating it as a shared street for bikes. This street will require a new rail crossing (pending a ODOT Rail crossing order).					
D20	Milton Street extension from Post Street to the Mayfly Street extension	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$1,200,000	City	3
	Extend Milton Street from Post Street to the Mayfly Street extension. This street should be constructed as a Collector, with sidewalks and bike lanes.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
D21	Oak Street extension from River Street to the new north to south street	Street connectivity; walking and biking facility gap	Motor Vehicle (Pedestrian/ Bicycle)	$1,050,000	City	2
	Extend Oak Street from River Street to the new north to south street. This street should be constructed as a Collector, with sidewalks and bike lanes.					
D22	US 20/ Reeves Parkway intersection improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	State	1
D23	US 20/ Mullins Drive intersection improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	State	3
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted).					
D24	US 20/ Industrial Way intersection improvements	Motor vehicle congestion	Motor Vehicle	$175,000	State	3
	Intersection improvements (e.g., installation of a westbound left-turn lane on Industrial Way).					
D25	US 20/ OR 34 - Wheeler Street intersection improvements	Motor vehicle congestion	Motor Vehicle	$1,050,000	State	1
	Intersection improvements (e.g., installation of a southbound right-turn lane on US 20)					
D26	Wheeler Street bridge over Lebanon Santiam Canal improvements	Bridge improvement	Motor Vehicle	$1,000,000	County	3
	Provide improvements to the structurally deficient Wheeler Street bridge over Lebanon Santiam Canal.					
D27	OR 34/ N. 2nd Street - S. 2nd Street intersection improvements	Motor vehicle safety	Motor Vehicle	$650,000	State	3
	Intersection improvements (e.g., installation of left-turn lanes on OR 34 to N. 2nd Street and S. 2nd Street).					
D28	OR 34/ 5th Street intersection improvements	Motor vehicle congestion	Motor Vehicle	$525,000	State	1
	Intersection improvements (e.g., installation of northbound and southbound left-turn lanes on 5th Street).					
D29	OR 34/ 12th Street intersection improvements	Motor vehicle safety	Motor Vehicle	$300,000	State	1
	Intersection improvements (e.g., installation of northbound left-turn lane on 12th Street).					
D30	Oak Street/ Lebanon Parkway extension intersection Improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	City	3
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
D31	Oak Street/ 12th Street intersection Improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	City	1
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted).					
D32	Airport Road/ Lebanon Parkway extension intersection Improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	City	3
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted).					
D33	Airport Road/ Airway Road intersection Improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	City	3
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted).					
D34	Airport Road/ 12th Street intersection Improvements	Motor vehicle congestion	Motor Vehicle	$2,000,000	City	1
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted).					
D35	Airport Road/ 7th Street intersection Improvements	Motor vehicle congestion	Motor Vehicle	$275,000	City	3
	Intersection improvements (e.g., installation of a southbound left-turn lane on 7th Street)					
D36	12th Street extension/ Walker Road intersection Improvements	Motor vehicle congestion	Motor Vehicle	$3,300,000	City	2
	Intersection improvements (e.g., possible installation of a roundabout or traffic signal, if warranted, and realignment of Stoltz Hill Road).					
D37	Stoltz Hill Road bridge over Oak Creek improvements	Bridge improvement	Motor Vehicle	$750,000	City	3
	Provide improvements to the structurally deficient Stoltz Hill Road bridge over Oak Creek.					
D38	5th Street bridge over Oak Creek improvements	Bridge improvement	Motor Vehicle	$750,000	City	3
	Provide improvements to the structurally deficient 5th Street bridge over Oak Creek.					
D39	Rock Hill Drive bridge over Oak Creek improvements	Bridge improvement	Motor Vehicle	$750,000	City	3
	Provide improvements to the structurally deficient Rock Hill Drive bridge over Oak Creek.					
D40	Crowfoot Road/ Cascade Drive intersection Improvements	Motor vehicle safety	Motor Vehicle	$2,375,000	County	2
	Intersection improvements (e.g., possible installation of a roundabout).					
D41	River Drive bridge over Lebanon Santiam Canal improvements	Bridge improvement	Motor Vehicle	$750,000	City	3
	Provide improvements to the structurally deficient River Drive bridge over Lebanon Santiam Canal.					

Table 5. Pedestrian Projects

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
P1	Wheeler Street pedestrian improvements between Williams Street and the Albany Santiam Canal	Walking facility gap	Pedestrian	$400,000	City	3
	Add pedestrian improvements to Wheeler Street between Williams Street and the Albany Santiam Canal (e.g., complete sidewalk gaps on both sides).					
P2	Tennessee Road pedestrian improvements between Wheeler Street and Beaton Lane	Walking facility gap	Pedestrian	$525,000	City	2
	Add pedestrian improvements to Tennessee Road between Wheeler Street and Beaton Lane (e.g., complete sidewalk gap on the west side).					
P3	OR 34 pedestrian improvements between the west urban growth boundary and 12th Street	Walking facility gap	Pedestrian	$1,125,000	State	3
	Add pedestrian improvements to OR 34 between the west urban growth boundary and 12th Street (e.g., complete sidewalk gap on the north side).					
P4	10th Street pedestrian improvements between OR 34 and Ash Street	Walking facility gap	Pedestrian	$925,000	City	3
	Add pedestrian improvements to 10th Street between OR 34 and Ash Street (e.g., complete sidewalk gap on the west side).					
P5	Sherman Street pedestrian improvements between 8th Street and 11th Street	Walking facility gap	Pedestrian	$525,000	City	3
	Add pedestrian improvements to Sherman Street between 8th Street and 11th Street (e.g., complete sidewalk gaps on both sides).					
P6	7th Street pedestrian improvements between Rose Street and Grant Street	Walking facility gap	Pedestrian	$500,000	City	3
	Add pedestrian improvements to 7th Street between Rose Street and Grant Street (e.g., complete sidewalk gaps on both sides).					
P7	Oak Street pedestrian improvements between the west urban growth boundary and Airway Road	Walking facility gap	Pedestrian	$1,100,000	City	3
	Add pedestrian improvements to Oak Street between the west urban growth boundary and Airway Road (e.g., complete sidewalk gap on the south side).					
P8	Airway Road pedestrian improvements between Oak Street and Airport Road	Walking facility gap	Pedestrian	$2,700,000	City	3
	Add pedestrian improvements to Airway Road between Oak Street and Airport Road (e.g., complete sidewalk gaps on both sides).					
P9	12th Street pedestrian improvements between Oak Street and F Street	Walking facility gap	Pedestrian	$700,000	City	3
	Add pedestrian improvements to 12th Street between Oak Street and F Street (e.g., complete sidewalk gaps on both sides).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
P10	12th Street pedestrian improvements between F Street and Antioch Street	Walking facility gap	Pedestrian	$1,175,000	City	3
	Add pedestrian improvements to 12th Street between F Street and Antioch Street (e.g., complete sidewalk gaps on both sides).					
P11	F Street pedestrian improvements between 12th Street and E Street	Walking facility gap	Pedestrian	$950,000	City	3
	Add pedestrian improvements to F Street between 12th Street and E Street (e.g., complete sidewalk gaps on both sides).					
P12	7th Street pedestrian improvements between E Street and Airport Road	Walking facility gap	Pedestrian	$750,000	City	2
	Add pedestrian improvements to 7th Street between E Street and Airport Road (e.g., complete sidewalk gap on the west side).					
P13	7th Street pedestrian improvements between Airport Road and Wassom Street	Walking facility gap	Pedestrian	$600,000	City	2
	Add pedestrian improvements to 7th Street between Airport Road and Wassom Street (e.g., complete sidewalk gap on the west side).					
P14	Airport Road pedestrian improvements between Airway Road and 7th Street	Walking facility gap	Pedestrian	$2,600,000	City	1
	Add pedestrian improvements to Airport Road between Airway Road and 7th Street (e.g., complete sidewalk gaps on both sides).					
P15	Airport Road pedestrian improvements between the west urban growth boundary and the Airport Road realignment	Walking facility gap	Pedestrian	$350,000	City	3
	Add pedestrian improvements to Airport Road between the west urban growth boundary and the Airport Road realignment (e.g., complete sidewalk gap on the north side).					
P16	Walker Road pedestrian improvements between Stoltz Hill Road and 9th Street	Walking facility gap	Pedestrian	$450,000	City	3
	Add pedestrian improvements to Walker Road between Stoltz Hill Road and 9th Street (e.g., complete sidewalk gap on the north side).					
P17	Stoltz Hill Road pedestrian improvements between Airport Road and Walker Road	Walking facility gap	Pedestrian	$900,000	City	3
	Add pedestrian improvements to Stoltz Hill Road between Airport Road and Walker Road (e.g., complete sidewalk gap on the east side).					
P18	Stoltz Hill Road pedestrian improvements between Walker Road and Vaughan Lane	Walking facility gap	Pedestrian	$1,325,000	City	3
	Add pedestrian improvements to Stoltz Hill Road between Walker Road and Vaughan Lane (e.g., complete sidewalk gap on the east side).					
P19	10th Street pedestrian improvements between Charlie Avenue and Vaughan Lane	Walking facility gap	Pedestrian	$275,000	City	3
	Add pedestrian improvements to 10th Street between Charlie Avenue and Vaughan Lane (e.g., complete sidewalk gap on the west side).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
P20	Vaughan Lane pedestrian improvements between Stoltz Hill Road and 10th Street	Walking facility gap	Pedestrian	$1,850,000	City	3
	Add pedestrian improvements to Vaughan Lane between Stoltz Hill Road and 10th Street (e.g., complete sidewalk gaps on both sides).					
P21	Vaughan Lane pedestrian improvements between 10th Street and 5th Street	Walking facility gap	Pedestrian	$1,125,000	City	1
	Add pedestrian improvements to Vaughan Lane between 10th Street and 5th Street (e.g., complete sidewalk gaps on both sides).					
P22	Vaughan Lane pedestrian improvements between 5th Street and South Main Road	Walking facility gap	Pedestrian	$1,300,000	City	1
	Add pedestrian improvements to Vaughan Lane between 5th Street and South Main Road (e.g., complete sidewalk gaps on both sides).					
P23	5th Street pedestrian improvements between Vaughan Lane and Oak Creek	Walking facility gap	Pedestrian	$550,000	City	3
	Add pedestrian improvements to 5th Street between Vaughan Lane and Oak Creek (e.g., complete sidewalk gaps on the east side).					
P24	Crowfoot Road pedestrian improvements between South Main Road and View Lane	Walking facility gap	Pedestrian	$675,000	County	2
	Add pedestrian improvements to Crowfoot Road between South Main Road and View Lane (e.g., complete sidewalk gap on the south side).					
P25	Crowfoot Road pedestrian improvements between View Lane and Cascade Drive	Walking facility gap	Pedestrian	$1,300,000	County	2
	Add pedestrian improvements to Crowfoot Road between View Lane and Cascade Drive (e.g., complete sidewalk gap on the south side).					
P26	Crowfoot Road pedestrian improvements between Cascade Drive and the Crowfoot Road realignment	Walking facility gap	Pedestrian	$375,000	County	3
	Add pedestrian improvements to Crowfoot Road between Cascade Drive and the Crowfoot Road realignment (e.g., complete sidewalk gap on the south side).					
P27	Cascade Drive pedestrian improvements between Weldwood Drive and Crowfoot Road	Walking facility gap	Pedestrian	$1,475,000	City	1
	Add pedestrian improvements to Cascade Drive between Weldwood Drive and Crowfoot Road (e.g., complete sidewalk gaps on both sides).					
P28	Russell Drive pedestrian improvements between Porter Street and Mountain River Drive	Walking facility gap	Pedestrian	$675,000	City	3
	Add pedestrian improvements to Russell Drive between Porter Street and Mountain River Drive (e.g., complete sidewalk gap on the north side).					
P29	Franklin Street pedestrian improvements between Russell Drive and the Lebanon Santiam Canal	Walking facility gap	Pedestrian	$1,125,000	City	3
	Add pedestrian improvements to Franklin Street between Russell Drive and the Lebanon Santiam Canal (e.g., complete sidewalk gaps on both sides).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
P30	Franklin Street pedestrian improvements between Oak Street and Elmore Street	Walking facility gap	Pedestrian	$275,000	City	3
	Add pedestrian improvements to Franklin Street between Oak Street and Elmore Street (e.g., complete sidewalk gaps on both sides).					
P31	Oak Street pedestrian improvements between Grove Street and Williams Street	Walking facility gap	Pedestrian	$175,000	City	3
	Add pedestrian improvements to Oak Street between Grove Street and Williams Street (e.g., complete sidewalk gap on the south side).					

Table 6. Shared Pedestrian and Bicycle Projects

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S1	Gore Drive shared-use path connection between the Hansard Avenue extension and the Albany Santiam Canal	Walking and biking facility gap	Pedestrian/ Bicycle	$950,000	City	3
	Create a shared-use path connection along the south side of Gore Drive between the Hansard Avenue extension and the Albany Santiam Canal.					
S2	Albany Santiam Canal shared-use path connection between Gore Drive and US 20	Walking and biking facility gap	Pedestrian/ Bicycle	$1,100,000	City	3
	Create a shared-use path connection along the west side of the Albany Santiam Canal between Gore Drive and US 20.					
S3	US 20 shared-use path connection between Gore Drive and the Albany Santiam Canal	Walking and biking facility gap	Pedestrian/ Bicycle	$2,225,000	State	3
	Create a shared-use path connection along the west side of US 20 between Gore Drive and the Albany Santiam Canal. Includes improvements to the US 20 bridge over Lebanon Santiam Canal.					
S4	US 20 shared-use path connection between the Albany Santiam Canal and Reeves Parkway	Walking and biking facility gap	Pedestrian/ Bicycle	$1,150,000	State	1
	Create a shared-use path connection along the west side of US 20 between the Albany Santiam Canal and Reeves Parkway.					
S5	US 20 shared-use path connection between Reeves Parkway and the existing path north of Mullins Drive	Walking and biking facility gap	Pedestrian/ Bicycle	$450,000	State	1
	Create a shared-use path connection along the west side of US 20 between Reeves Parkway and the existing path north of Mullins Drive.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S6	Reeves Parkway shared-use path connection between N. 5th Street and US 20	Walking and biking facility gap	Pedestrian/ Bicycle	$350,000	City	3
	Create a shared-use path connection along the north side of Reeves Parkway between Hansard Avenue and N. 5th Street.					
S7	Reeves Parkway shared-use path connection between Hansard Avenue and N. 5th Street	Walking and biking facility gap	Pedestrian/ Bicycle	$700,000	City	3
	Create a shared-use path connection along the north side of Reeves Parkway between Hansard Avenue and N. 5th Street.					
S8	Shared-use path connection between the Reeves Parkway extension and OR 34	Walking and biking facility gap	Pedestrian/ Bicycle	$3,050,000	City	3
	Create a shared-use path connection between the Reeves Parkway extension and OR 34.					
S9	OR 34 shared-use path connection between the west urban growth boundary and Burkhart Creek	Walking and biking facility gap	Pedestrian/ Bicycle	$1,850,000	State	2
S10	Burkhart Creek shared-use path connection between the west urban growth boundary and Vine Street	Walking and biking facility gap	Pedestrian/ Bicycle	$1,525,000	City	3
	Create a shared-use path connection along the south side of OR 34 between the west urban growth boundary and Vine Street.					
S11	Burkhart Creek shared-use path connection between Vine Street and Sherman Street	Walking and biking facility gap	Pedestrian/ Bicycle	$600,000	City	3
	Create a shared-use path connection along the west side of Burkhart Creek between Vine Street and Sherman Street.					
S12	Oak Street shared-use path connection between the west urban growth boundary and Airway Road	Walking and biking facility gap	Pedestrian/ Bicycle	$1,500,000	State	2
	Create a shared-use path connection along the north side of Oak Street between the west urban growth boundary and Airway Road.					
S13	Airway Road shared-use path connection between Oak Street and D Street	Walking and biking facility gap	Pedestrian/ Bicycle	$500,000	City	3
	Create a shared-use path connection along the east side of Airway Road between Oak Street and D Street.					
S14	Shared-use path connection between Airway Road and 12th Street	Walking and biking facility gap	Pedestrian/ Bicycle	$725,000	City	3
	Create a shared-use path connection between Airway Road and 12th Street.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S15	Burkhart Creek shared-use path connection between D Street and F Street	Walking and biking facility gap	Pedestrian/ Bicycle	$375,000	City	3
	Create a shared-use path connection along the west side of Burkhart Creek between D Street and F Street.					
S16	Burkhart Creek shared-use path connection between F Street and Airport Road	Walking and biking facility gap	Pedestrian/ Bicycle	$1,175,000	City	3
	Create a shared-use path connection along the west side of Burkhart Creek between F Street and Airport Road.					
S17	Burkhart Creek shared-use path connection between Airport Road and 7th Street	Walking and biking facility gap	Pedestrian/ Bicycle	$850,000	City	3
	Create a shared-use path connection along the west side of Burkhart Creek between Airport Road and 7th Street.					
S18	Airport Road shared-use path connection between the west urban growth boundary and the Airport Road realignment	Walking and biking facility gap	Pedestrian/ Bicycle	$500,000	City	3
	Create a shared-use path connection along the south side of Airport Road between the west urban growth boundary and the Airport Road realignment.					
S19	Stoltz Hill Road shared-use path connection between Airport Road and Walker Road	Walking and biking facility gap	Pedestrian/ Bicycle	$1,275,000	City	3
	Create a shared-use path connection along the west side of Stoltz Hill Road between Airport Road and Walker Road.					
S20	Stoltz Hill Road shared-use path connection between Walker Road and Vaughan Lane	Walking and biking facility gap	Pedestrian/ Bicycle	$1,875,000	City	3
	Create a shared-use path connection along the west side of Stoltz Hill Road between Walker Road and Vaughan Lane.					
S21	Stoltz Hill Road shared-use path connection between Vaughan Lane and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$1,975,000	City	3
	Create a shared-use path connection along the west side of Stoltz Hill Road between Walker Road and Vaughan Lane.					
S22	Shared-use path connection between the Walker Road extension and Stoltz Hill Road	Walking and biking facility gap	Pedestrian/ Bicycle	$2,050,000	City	3
	Create a shared-use path connection between the Walker Road extension and Stoltz Hill Road.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S23	Shared-use path connection between Stoltz Hill Road and Vaughan Lane	Walking and biking facility gap	Pedestrian/ Bicycle	$1,050,000	City	3
	Create a shared-use path connection between Stoltz Hill Road and Vaughan Lane.					
S24	Shared-use path connection between Vaughan Lane and 5th Street	Walking and biking facility gap	Pedestrian/ Bicycle	$1,775,000	City	3
	Create a shared-use path connection between Vaughan Lane and 5th Street.					
S25	Shared-use path connection between 5th Street and Joy Street	Walking and biking facility gap	Pedestrian/ Bicycle	$775,000	City	3
	Create a shared-use path connection between 5th Street and Joy Street.					
S26	5th Street shared-use path connection between Vaughan Lane and Oak Creek	Walking and biking facility gap	Pedestrian/ Bicycle	$1,250,000	City	3
	Create a shared-use path connection along the west side of 5th Street between Vaughan Lane and Oak Creek.					
S27	5th Street shared-use path connection between Oak Creek and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$1,850,000	City	3
	Create a shared-use path connection along the east side of 5th Street between Oak Creek and the south urban growth boundary.					
S28	Oak Creek shared-use path connection between 10th Street and 5th Street	Walking and biking facility gap	Pedestrian/ Bicycle	$1,775,000	City	3
	Create a shared-use path connection along the south side of Oak Creek between 10th Street and 5th Street.					
S29	Oak Creek shared-use path connection between 5th Street and South Main Road	Walking and biking facility gap	Pedestrian/ Bicycle	$1,375,000	City	3
	Create a shared-use path connection along the south side of Oak Creek between 5th Street and South Main Road.					
S30	Oak Creek shared-use path connection between South Main Road and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$1,275,000	City	3
	Create a shared-use path connection along the north side of Oak Creek between South Main Road and the south urban growth boundary.					
S31	South Main Road shared-use path connection between Crowfoot Road and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$2,175,000	City	3
	Create a shared-use path connection along the west side of South Main Road between Crowfoot Road and the south urban growth boundary.					
S32	Shared-use path connection between View Lane and Crowfoot Road	Walking and biking facility gap	Pedestrian/ Bicycle	$925,000	City	3
	Create a shared-use path connection between View Lane and Crowfoot Road.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S33	Crowfoot Road shared-use path connection between Bald Eagle Drive and Cascade Drive	Walking and biking facility gap	Pedestrian/ Bicycle	$1,975,000	City	1
	Create a shared-use path connection along the north side of Crowfoot Road between Bald Eagle Drive and Cascade Drive.					
S34	Crowfoot Road shared-use path connection between Cascade Drive and the Crowfoot Road realignment	Walking and biking facility gap	Pedestrian/ Bicycle	$525,000	County	3
S35	Shared-use path connection between Crowfoot Road and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$2,025,000	City	3
	Create a shared-use path connection along the north side of Crowfoot Road between Cascade Drive and the Crowfoot Road realignment.					
S36	Shared-use path connection to Oregon Street, north segment	Walking and biking facility gap	Pedestrian/ Bicycle	$1,725,000	City	3
	Create a shared-use path connection between the Crowfoot Road to south urban growth boundary path and Oregon Street (north segment).					
S37	Shared-use path connection to Oregon Street, south segment	Walking and biking facility gap	Pedestrian/ Bicycle	$1,650,000	City	3
	Create a shared-use path connection between the Crowfoot Road to south urban growth boundary path and Oregon Street (south segment).					
S38	Central Avenue shared-use path connection between Crowfoot Road and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$2,650,000	City	3
	Create a shared-use path connection along the east side of Central Avenue between Crowfoot Road and the south urban growth boundary.					
S39	Shared-use path connection between Central Avenue and Cascade Drive	Walking and biking facility gap	Pedestrian/ Bicycle	$1,150,000	City	
	Create a shared-use path connection between Central Avenue and Cascade Drive.					
S40	Cascade Drive shared-use path connection between Crowfoot Road and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$2,550,000	City	3
	Create a shared-use path connection along the west side of Cascade Drive between Crowfoot Road and the south urban growth boundary.					
S41	Shared-use path connection between Crowfoot Road and Cascade Drive	Walking and biking facility gap	Pedestrian/ Bicycle	$2,050,000	City	3
	Create a shared-use path connection between Crowfoot Road and Cascade Drive.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S42	US 20 shared-use path connection between Weldwood Drive and Weirich Drive	Walking and biking facility gap	Pedestrian/ Bicycle	$2,075,000	State	1
	Create a shared-use path connection along the west side of US 20 between Weldwood Drive and Weirich Drive.					
S43	US 20 shared-use path connection between Weirich Drive and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$2,075,000	State	3
	Create a shared-use path connection along the west side of US 20 between Weirich Drive and the south urban growth boundary.					
S44	Weirich Drive shared-use path connection between US 20 and the east urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$2,600,000	City	3
	Create a shared-use path connection along the north side of Weirich Drive between US 20 and the east urban growth boundary.					
S45	Lebanon Santiam Canal shared-use path connection between the Cheadle Lake Trail and Sodaville Road	Walking and biking facility gap	Pedestrian/ Bicycle	$925,000	City	3
	Create a shared-use path connection along the south side of the Lebanon Santiam Canal between the Cheadle Lake Trail and Sodaville Road.					
S46	Shared-use path connection between River Road and Burdell Boulevard	Walking and biking facility gap	Pedestrian/ Bicycle	$1,475,000	City	1
	Create a shared-use path connection between River Road and Burdell Boulevard.					
S47	Shared-use path connection between Russell Drive and Burdell Boulevard	Walking and biking facility gap	Pedestrian/ Bicycle	$2,150,000	City	3
	Create a shared-use path connection between Russell Drive and Burdell Boulevard.					
S48	Russell Drive-River Road shared-use path connection between Porter Street and the Lebanon Santiam Canal	Walking and biking facility gap	Pedestrian/ Bicycle	$2,225,000	City	1
	Create a shared-use path connection along the south side of Russell Drive-River Road between Porter Street and the Lebanon Santiam Canal.					
S49	River Road shared-use path connection between the Lebanon Santiam Canal and the east urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$1,325,000	City	1
	Create a shared-use path connection along the south side of River Road between the Lebanon Santiam Canal and the east urban growth boundary.					
S50	Shared-use path connection between River Road and Robbins Way	Walking and biking facility gap	Pedestrian/ Bicycle	$450,000	City	1
	Create a shared-use path connection between River Road and Robbins Way.					
S51	Shared-use path connection between Russell Drive and Milton Street	Walking and biking facility gap	Pedestrian/ Bicycle	$1,775,000	City	3
	Create a shared-use path connection between Russell Drive and Milton Street.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
S52	Shared-use path connection between Mayfly Street and Brewster Road	Walking and biking facility gap	Pedestrian/ Bicycle	$2,825,000	City	1
	Create a shared-use path connection between Mayfly Street and Brewster Road.					
S53	Berlin Road shared-use path connection between Brewster Road and the south urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$4,400,000	City	3
	Create a shared-use path connection along the west side of Berlin Road between Brewster Road and the south urban growth boundary.					
S54	Brewster Road shared-use path connection between the South Santiam River and the east urban growth boundary	Walking and biking facility gap	Pedestrian/ Bicycle	$575,000	City	3
	Create a shared-use path connection along the south side of Brewster Road between the South Santiam River and the east urban growth boundary.					
S55	Shared-use path connection between Grant Street and Isabella Street	Walking and biking facility gap	Pedestrian/ Bicycle	$1,525,000	City	3
	Create a shared-use path connection between Grant Street and Isabella Street. Create a shared-use path connection to the proposed South Santiam River path.					
S56	South Santiam River shared-use path connection between River Park and Marks Slough	Walking and biking facility gap	Pedestrian/ Bicycle	$2,400,000	City	3
	Create a shared-use path connection along the west side of the South Santiam River between River Park and Marks Slough Trail.					
S57	Shared-use path connection between Tennessee Road and Nelson Avenue	Walking and biking facility gap	Pedestrian/ Bicycle	$600,000	City	3
	Create a shared-use path connection between Tennessee Road and Nelson Avenue.					
S58	Tennessee Road shared-use path connection between the Albany Santiam Canal and Marks Slough Trail	Walking and biking facility gap	Pedestrian/ Bicycle	$1,175,000	City	1
	Create a shared-use path connection along Tennessee Road between the Albany Santiam Canal and Marks Slough Trail.					
S59	Shared-use path connection between Williams Street and the Had Irvine Park Trail	Walking and biking facility gap	Pedestrian/ Bicycle	$250,000	City	3
	Create a shared-use path connection between Williams Street and the Had Irvine Park Trail.					
S60	Albany Santiam Canal shared-use path connection between Cemetery Road and Industrial Way	Walking and biking facility gap	Pedestrian/ Bicycle	$1,725,000	City	3
	Create a shared-use path connection along the west side of the Albany Santiam Canal between Cemetery Road and Industrial Way.					

Table 7. Bicycle Projects

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
B1	US 20 bicycle improvements between Olive Street and Wheeler Street	Biking facility gap	Bicycle	$1,200,000	State	1
	Add bicycle improvements to US 20 between Olive Street and Wheeler Street (e.g., bike lanes).					
B2	N Williams Street bicycle improvements between Wheeler Street and Olive Street	Biking facility gap	Bicycle	$25,000	City	3
	Add bicycle improvements to N Williams Street between Wheeler Street and Olive Street (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B3	Wheeler Street bicycle improvements between US 20 and the Albany Santiam Canal	Biking facility gap	Bicycle	$75,000	City	3
	Add bicycle improvements to Wheeler Street between US 20 and the Albany Santiam Canal (e.g., restripe with bike lanes).					
B4	12th Street bicycle improvements between Sherman Street and Oak Street	Biking facility gap	Bicycle	$825,000	City	1
	Add bicycle improvements to 12th Street between Sherman Street and Oak Street (e.g., bike lanes).					
B5	9th Street-Sherman Street-Airway Road bicycle improvements between US 20 and S. 2nd Street, and Oak Street and 7th Street	Biking facility gap	Bicycle	$75,000	City	1
	Add bicycle improvements to 9th Street, Vine Street, 7th Street, Sherman Street and Airway Road between US 20 and S. 2nd Street, and Oak Street and 7th Street (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B6	S. 2nd Street bicycle improvements between OR 34 and Oak Street	Biking facility gap	Bicycle	$100,000	City	1
	Add bicycle improvements to S. 2nd Street between OR 34 and Oak Street (e.g., restripe with bike lanes).					
B7	Grove Street bicycle improvements between Wheeler Street and Milton Street	Biking facility gap	Bicycle	$75,000	City	1
	Add bicycle improvements to Grove Street between Wheeler Street and Milton Street (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B8	Sherman Street-Hiatt Street bicycle improvements between S. 2nd Street and Milton Street	Biking facility gap	Bicycle	$75,000	City	1
	Add bicycle improvements to Sherman Street-Hiatt Street between S. 2nd Street and Milton Street (e.g., pavement markings/ signage designating it as a shared street for bikes).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
B9	Oak Street bicycle improvements between S. 2nd Street and the east terminus of the street	Biking facility gap	Bicycle	$25,000	City	3
	Add bicycle improvements to Oak Street between S. 2nd Street and the east terminus of the street (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B10	Oak Street bicycle improvements between S. 2nd Street and Williams Street	Biking facility gap	Bicycle	$1,325,000	City	3
	Add bicycle improvements to Oak Street between S. 2nd Street and Williams Street (e.g., bike lanes).					
B11	Oak Street bicycle improvements between 7th Street and S. 2nd Street	Biking facility gap	Bicycle	$1,575,000	City	3
	Add bicycle improvements to Oak Street between 7th Street and S. 2nd Street (e.g., bike lanes).					
B12	Oak Street bicycle improvements between Airway Road and 7th Street	Biking facility gap	Bicycle	$2,700,000	City	3
	Add bicycle improvements to Oak Street between Airway Road and 7th Street (e.g., bike lanes).					
B13	Oak Street bicycle improvements between the west urban growth boundary and Airway Road	Biking facility gap	Bicycle	$700,000	City	3
	Add bicycle improvements to Oak Street between the west urban growth boundary and Airway Road (e.g., bike lane on the south side). Included with project P7.					
B14	Airway Road bicycle improvements between Oak Street and Airport Road	Biking facility gap	Bicycle	$2,675,000	City	3
	Add bicycle improvements to Airway Road between Oak Street and Airport Road (e.g., bike lanes). Included with project P8.					
B15	12th Street bicycle improvements between F Street and Antioch Street	Biking facility gap	Bicycle	$1,925,000	City	3
	Add bicycle improvements to 12th Street between F Street and Antioch Street (e.g., bike lanes). Included with project P10.					
B16	F Street-E Street-7th Street bicycle improvements between 12th Street and S. 2nd Street, and Oak Street and E Street	Biking facility gap	Bicycle	$75,000	City	3
	Add bicycle improvements to F Street, E Street and 7th Street between 12th Street and S. 2nd Street, and Oak Street and E Street (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B17	S. 2nd Street bicycle improvements between Oak Street and H Street	Biking facility gap	Bicycle	$50,000	City	1
	Add bicycle improvements to S. 2nd Street between Oak Street and H Street (e.g., restripe with bike lanes).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
B18	Milton Street bicycle improvements between S. 2nd Street and Franklin Street	Biking facility gap	Bicycle	$1,950,000	City	3
	Add bicycle improvements to Milton Street between S. 2nd Street and Franklin Street (e.g., bike lanes).					
B19	7th Street bicycle improvements between E Street and Airport Road	Biking facility gap	Bicycle	$500,000	City	3
	Add bicycle improvements to 7th Street between E Street and Airport Road (e.g., bike lane on the west side). Included with project P12.					
B20	7th Street bicycle improvements between Airport Road and Wassom Street	Biking facility gap	Bicycle	$425,000	City	3
	Add bicycle improvements to 7th Street between Airport Road and Wassom Street (e.g., bike lane on the west side). Included with project P13.					
B21	Franklin Street bicycle improvements between Milton Street and the Lebanon Santiam Canal	Biking facility gap	Bicycle	$50,000	City	1
	Add bicycle improvements to Franklin Street between Milton Street and the Lebanon Santiam Canal (e.g., restripe with bike lanes).					
B22	Franklin Street bicycle improvements between the Lebanon Santiam Canal and Russell Drive	Biking facility gap	Bicycle	$1,050,000	City	1
	Add bicycle improvements to Franklin Street between the Lebanon Santiam Canal and Russell Drive (e.g., bike lanes).					
B23	Milton Street-Park Drive-Mountain River Drive bicycle improvements between Franklin Street and Russell Drive	Biking facility gap	Bicycle	$75,000	City	3
	Add bicycle improvements to Milton Street, Park Drive and Mountain River Drive between Franklin Street and Russell Drive (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B24	Russell Drive bicycle improvements between Porter Street and Mountain River Drive	Biking facility gap	Bicycle	$400,000	City	3
	Add bicycle improvements to Russell Drive between Porter Street and Mountain River Drive (e.g., bike lane on the north side). Included with project P28.					
B25	Porter Street-Primrose Street-Russell Street-Railroad Street bicycle pedestrian improvements between Russell Drive and the Burdell Boulevard extension	Biking facility gap	Bicycle	$50,000	City	3
	Add bicycle improvements to Porter Street, Primrose Street, Russell Street and Railroad Street between Russell Drive and the Burdell Boulevard extension (e.g., pavement markings/ signage designating it as a shared street for bikes).					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
B26	Walker Road bicycle improvements between South Main Road and US 20	Biking facility gap	Bicycle	$325,000	City	2
	Add bicycle improvements to Walker Road between South Main Road and US 20 (e.g., bike lanes).					
B27	Market Street bicycle improvements between South Main Road and US 20	Biking facility gap	Bicycle	$50,000	City	3
	Add bicycle improvements to Market Street between South Main Road and US 20 (e.g., restripe with bike lanes).					
B28	Walker Road bicycle improvements between Stoltz Hill Road and 7th Street	Biking facility gap	Bicycle	$1,425,000	City	2
	Add bicycle improvements to Walker Road between Stoltz Hill Road and 7th Street (e.g., bike lanes). Included with project P16.					
B29	7th Street-Manor Way-8th Street-10th Street bicycle improvements between Walker Road and Vaughan Lane	Biking facility gap	Bicycle	$50,000	City	1
	Add bicycle improvements to 7th Street, Manor Way, 8th Street and 10th Street between Walker Road and Vaughan Lane (e.g., pavement markings/ signage designating it as a shared street for bikes).					
B30	Vaughan Lane bicycle improvements between Stoltz Hill Road and 10th Street	Biking facility gap	Bicycle	$1,850,000	City	3
	Add bicycle improvements to Vaughan Lane between Stoltz Hill Road and 10th Street (e.g., bike lanes). Included with project P20.					
B31	Vaughan Lane bicycle improvements between 10th Street and 5th Street	Biking facility gap	Bicycle	$1,350,000	City	3
	Add bicycle improvements to Vaughan Lane between 10th Street and 5th Street (e.g., bike lanes). Included with project P21.					
B32	Vaughan Lane bicycle improvements between 5th Street and South Main Road	Biking facility gap	Bicycle	$1,375,000	City	3
	Add bicycle improvements to Vaughan Lane between 5th Street and South Main Road (e.g., bike lanes). Included with project P22.					
B33	5th Street bicycle improvements between Vaughan Lane and Oak Creek	Biking facility gap	Bicycle	$1,750,000	City	3
	Add bicycle improvements to 5th Street between Vaughan Lane and Oak Creek (e.g., bike lanes). Included with project P23.					
B34	Crowfoot Road bicycle improvements between South Main Road and View Lane	Biking facility gap	Bicycle	$400,000	County	2
	Add bicycle improvements to Crowfoot Road between South Main Road and View Lane (e.g., bike lane on the south side). Included with project P24.					
B35	Crowfoot Road bicycle improvements between View Lane and Cascade Drive	Biking facility gap	Bicycle	$775,000	County	2
	Add bicycle improvements to Crowfoot Road between View Lane and Cascade Drive (e.g., bike lane on the south side). Included with project P25.					

PROJECT ID	PROJECT DESCRIPTION	PROJECT PURPOSE	PRIMARY (SECONDARY) MODE	ESTIMATED COST (2017 DOLLARS)	PRIMARY FUNDING SOURCE*	PACKAGE**
B36	Crowfoot Road bicycle improvements between Cascade Drive and the Crowfoot Road realignment	Biking facility gap	Bicycle	$225,000	County	2
	Add bicycle improvements to Crowfoot Road between Cascade Drive and the Crowfoot Road realignment (e.g., bike lane on the south side). Included with project P26.					
B37	Cascade Drive bicycle improvements between Seven Oak Middle School and Crowfoot Road	Biking facility gap	Bicycle	$725,000	City	1
	Add bicycle improvements to Cascade Drive between Seven Oak Middle School and Crowfoot Road (e.g., bike lanes). Included with project P27.					
B38	US 20 bicycle improvements between Weirich Drive and the south urban growth boundary	Biking facility gap	Bicycle	$875,000	State	3
	Add bicycle improvements to US 20 between Weirich Drive and the south urban growth boundary (e.g., bike lane on the east side).					

Note: The project design elements depicted are identified for the purpose of creating a reasonable cost estimate for planning purposes. The actual design elements for any project are subject to change, and will ultimately be determined through a preliminary and final design process, and are subject to City and/or ODOT approval.

Funding will come from a variety of sources. Primary funding source is based on the agency who has jurisdiction over an existing facility, or who is expected to construct a new facility.

**Improvement Package 1: Financially Constrained Plan (Totals the $27 million likely to be available through existing city funding sources. Package 1 also includes a reasonable estimate of how the city would use revenue from various state and/or federal sources).

Improvement Package 2: Identifies projects from the Aspirational project list that are highly supported but that, due to cost or jurisdiction, were unable to be included in the Financially Constrained list. Should additional funding become available, these are projects the city may want to consider.

Improvement Package 3: Comprised of the Aspirational Projects, those remaining projects that likely would not have city or state funding by 2040.

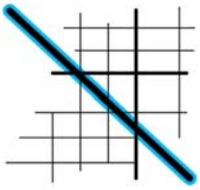
THE STANDARDS

THE STANDARDS

Lebanon applies transportation standards and regulations to the construction of new transportation facilities and to the operation of all facilities to ensure that the system functions as intended and investments are not wasted. These standards reflect the goals of the City for a safe and efficient transportation system and enable consistent future actions.

Street Functional Classification

Street functional classification is an important tool for managing the roadway network. The street functional classification system recognizes that individual streets do not act independently of one another but instead form a network of street types that works together to serve travel needs on a local and regional level. By designating the management and design requirements for each roadway classification, this hierarchal system supports a network of streets that perform as desired. The functional classification system for roadways in Lebanon is described below. The functional classification map, Figure 7, shows the classification for all roadways in the city, including planned future arterial and collector street extensions.



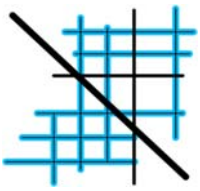
Principal and Minor Arterials

Principal Arterials provide a high degree of mobility and can serve both major metropolitan centers and rural areas. They serve high volumes of traffic over long distances, typically maintain higher posted speeds, and minimize direct access to adjacent land to support the safe and efficient movement of people and goods. Inside urban growth boundaries, speeds may be reduced to reflect the roadside environment and surrounding land uses.

Minor Arterials serve trips of moderate length and smaller geographic areas than Principal Arterials and are often used as a transition between Principal Arterials and Collectors. Minor Arterials typically serve higher volumes of traffic at moderate to high speeds, with posted speeds generally no lower than 30 mph.

Collectors

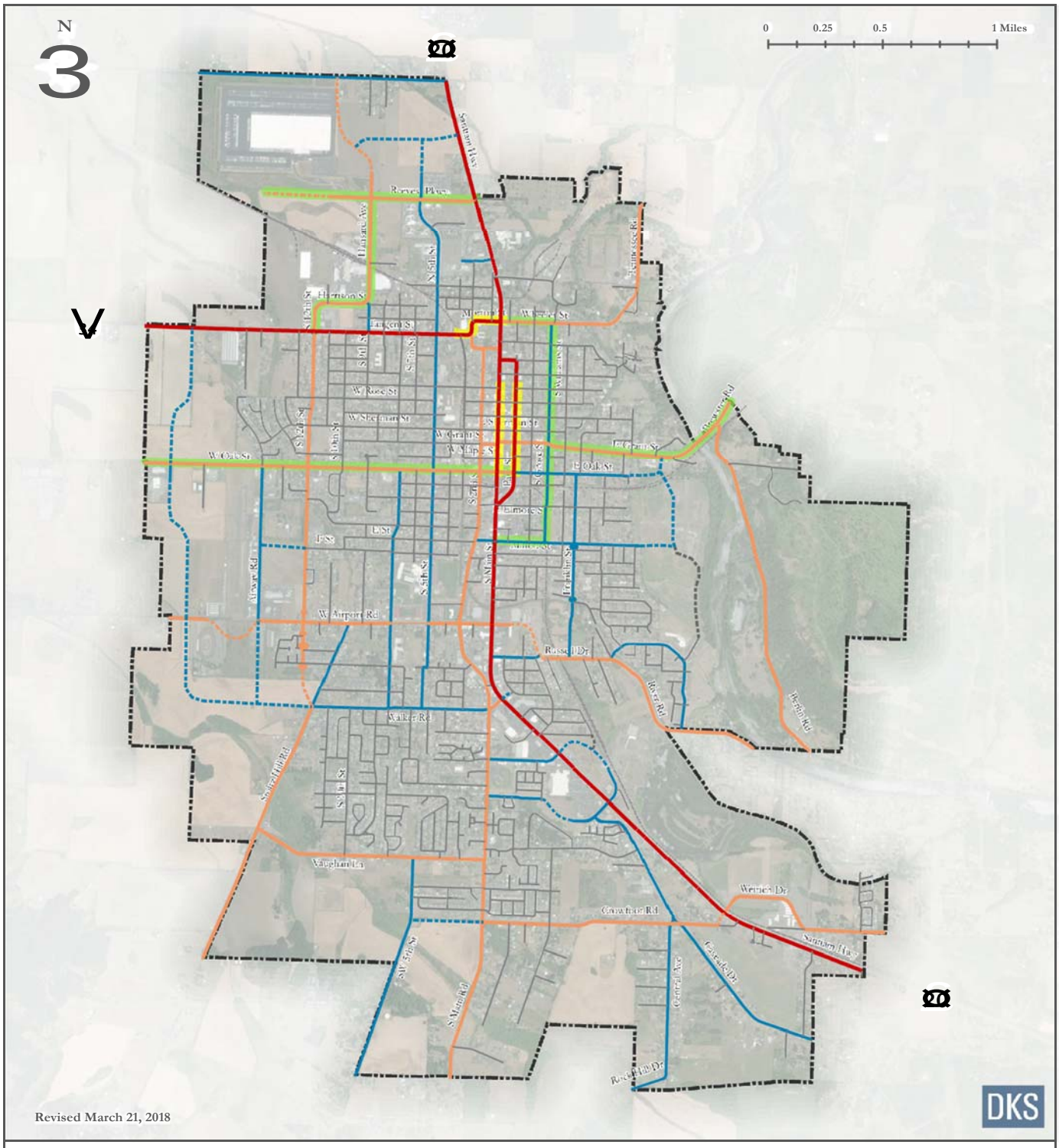
Collectors serve a critical role in the roadway network by connecting traffic from Local Streets with the Arterial network. Major Collector routes are generally distinguished from Minor Collector routes by longer length; lower connecting driveway densities; higher speed limits; greater spacing intervals; and higher traffic volumes. While access and mobility are more balanced than on Arterials, new driveways serving residential units should not be permitted where traffic volume forecasts exceed 5,000 vehicles per day.



Local Streets

Local streets prioritize provision of immediate access to adjacent land. These streets should be designed to enhance the livability of neighborhoods and should generally accommodate less than 2,000 vehicles per day. When traffic volumes reach 1,000 to 1,200 vehicles per day through residential areas, safety and livability can be degraded. A well-connected grid system of relatively short blocks can minimize excessive volumes of motor vehicles and encourage more use by pedestrians and bicyclists. Local streets are not intended to support long distance travel and are often designed to discourage through traffic.

Figure 7. Functional Classification



The federal government also has a functional classification system that is used to determine federal aid funding eligibility. Roadways federally designated as a major collector, minor arterial, principal arterial, or interstate are eligible for federal aid. Lebanon's functional classification system uses the similar designations as the federal government (e.g., a city designated minor arterial is intended to be the same as a federally designated minor arterial and a city designated collector is intended to be the same as a federally designated major collector). Future updates to the federal functional classification system should incorporate the designations reflected in the TSP along city roadways.

Freight and Truck Routes

Figure 8 shows roadways designated to help ensure trucks can efficiently travel through and access major destinations in Lebanon. These routes play a vital role in the economical movement of raw materials and finished products, while maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system.

State and Federal Freight Routes

ODOT has classified OR 34 and US 20 south of OR 34 as freight routes and reduction review routes in Lebanon. These routes and US 20 north of OR 34 are also designated as truck routes by the federal government. Federal truck routes generally require 12-foot travel lanes, but allow 11-foot travel lanes within Special Transportation Areas with lower truck volumes. Reduction review routes are highways that require review with any proposed changes to determine if there will be a reduction of vehicle-carrying capacity.

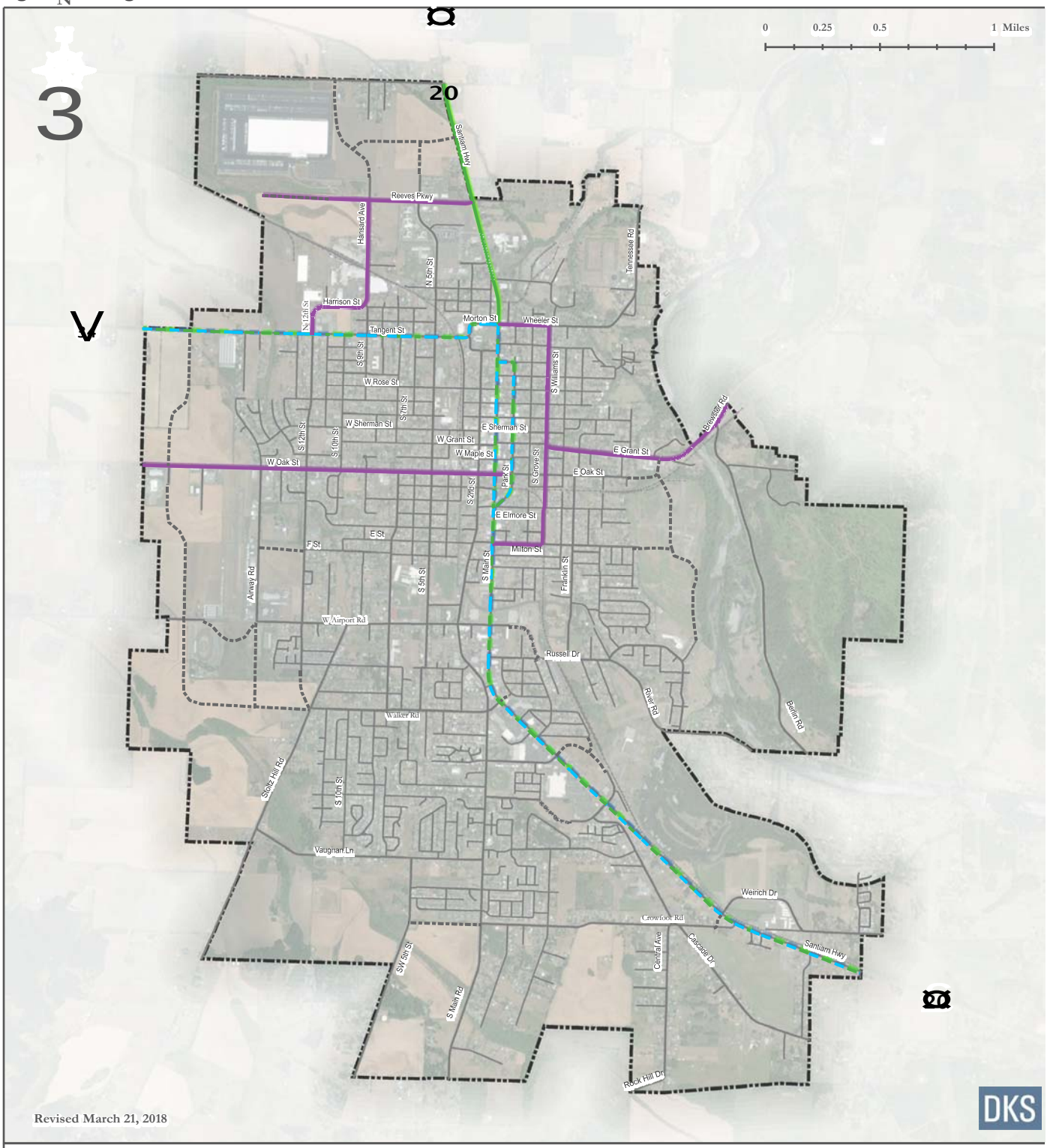
Local Truck Routes

The city has local truck routes designed to facilitate the movement of truck freight between major destinations and state highways. These roadways serve an important role in the city roadway network and should be designed and managed to safely accommodate the movement of goods. These routes require a minimum of 11-foot travel lanes.

Designated local truck routes include:

- Wheeler Street between US 20 and Williams Street, Williams Street between Wheeler Street and Milton Street and Milton Street between Williams Street and US 20
- Grant Street and Brewster Road, east of Williams Street
- Oak Street, west of US 20
- Hansard Avenue-12th Street between OR 34 and Reeves Parkway
- Reeves Parkway between US 20 and the west street terminus

Figure 8. Freight and Truck Routes



Legend:

Freight Routes

- Oregon Freight Route and Federal Truck Route
- Federal Truck Route
- Local Truck Route

- Urban Growth Boundary
- Arterial or Collector Street
- Planned Street Extension (Conceptual alignment)

Typical Roadway Cross-Section Standards

Roadway Cross-Section Standards identify the design characteristics needed to meet the function and demand for each facility type for City of Lebanon streets. Since the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, this system allows standardization of key characteristics to provide consistency, while providing application criteria that allows some flexibility while meeting the design standards.

Figure 9 to Figure 15 illustrate the standard cross-sections for minor arterials, collectors, local streets, and private streets in the City of Lebanon. These street standards are compliant with the Oregon Transportation Planning Rule, which specifies that local governments limit excessive roadway widths. They are intended to be used as guidelines in the development of new roadways and the upgrade of existing roadways. Planning level right-of-way needs can be determined using these figures. Under some conditions a variance to the street standards may be requested from the Engineering Services Director to consider the constrained roadway design options or other adjustments. Typical conditions that may warrant consideration of a variance include:

- Infill sites
- Innovative designs (e.g., roundabouts)
- Severe constraints presented by topography, environmental, or other resources present
- Existing developments and/or buildings that make it extremely difficult or impossible to meet the standards

Roadways under ODOT jurisdiction are subject to design standards in ODOT's Highway Design Manual.

Table 8. Constrained Roadway Design Options

	PRINCIPAL ARTERIAL ROADWAY	MINOR ARTERIAL ROADWAY	COLLECTOR ROADWAY	LOCAL ROADWAY
Minimum Through Lane Width*	N/A	11 feet	10 feet	10 feet
Landscape Strip Width		4.5 feet	4.5 feet	None
Bike Facilities		5-foot bike lane (without a buffer)	Shared roadway**	N/A

* The minimum through lane width along a local truck route should be maintained at 11 feet.
** The minimum through lane width along a shared roadway should be maintained at 12 feet where feasible.

Figure 9. Minor Arterial Roadway

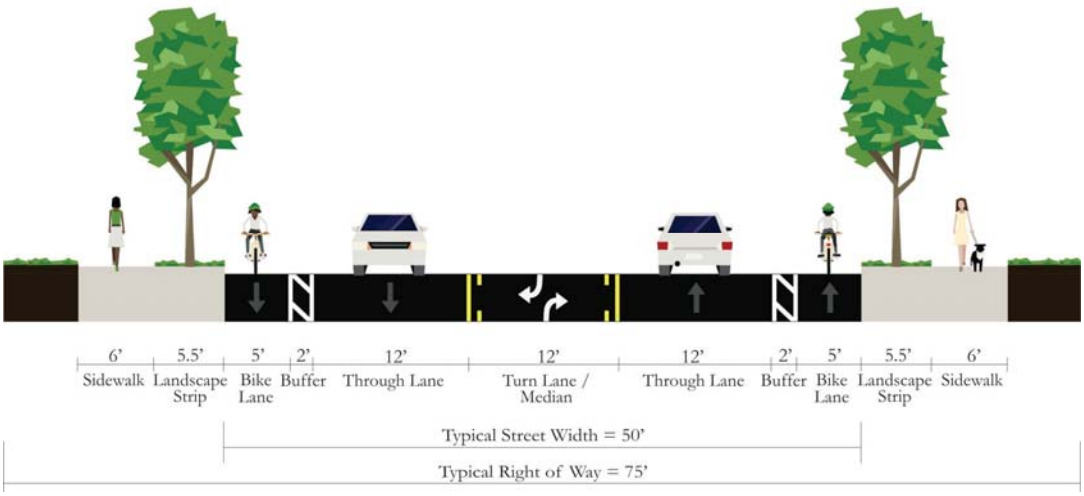


Figure 10. Collector Roadway, without Parking

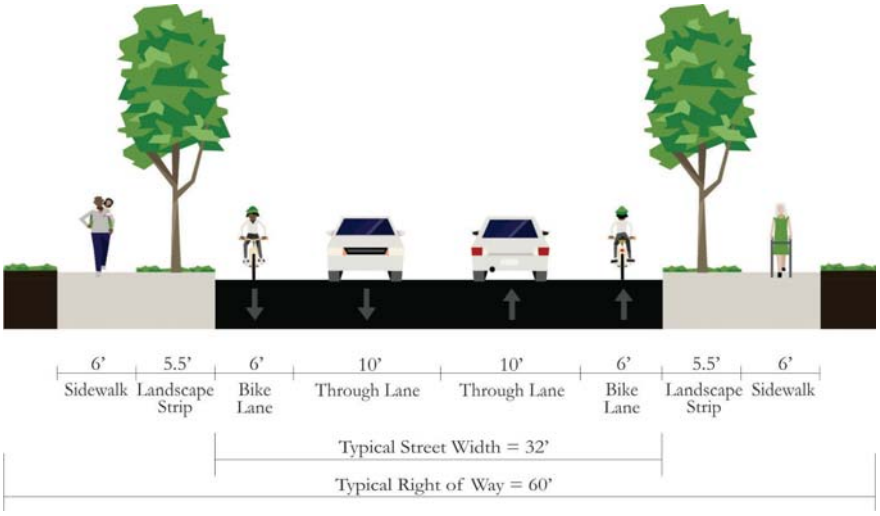


Figure 11. Collector Roadway, with Parking

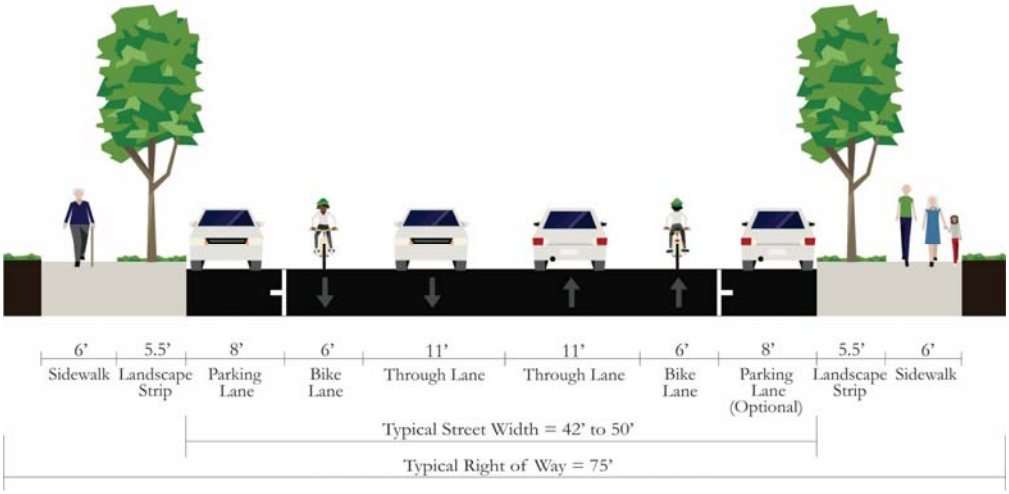


Figure 12. Collector Roadway, on a Truck Route

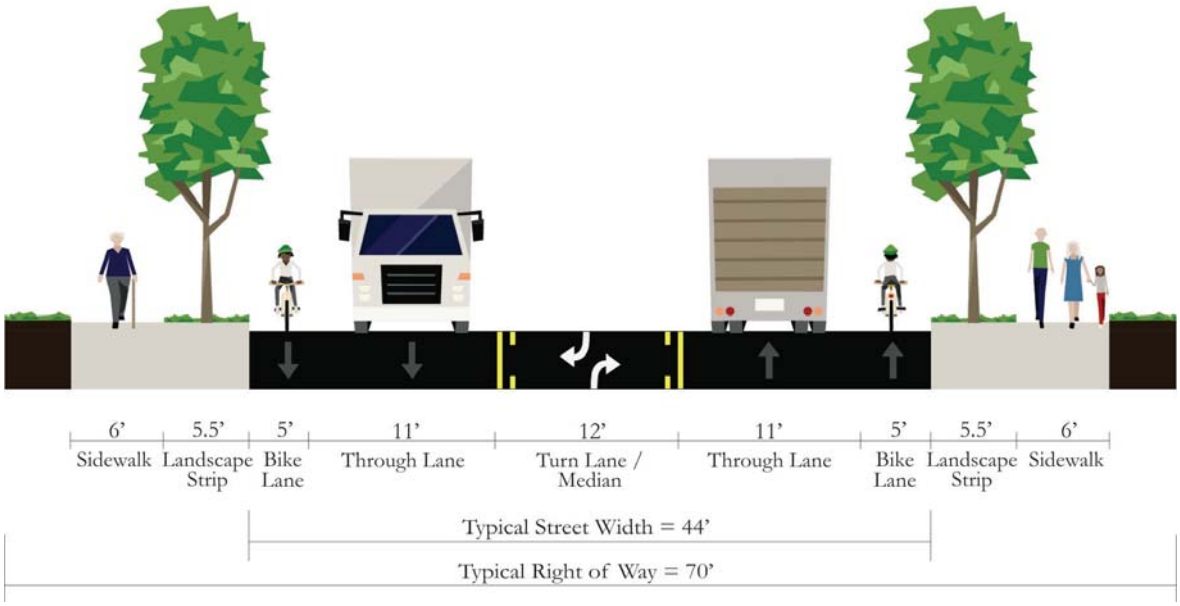


Figure 13. Local Roadway

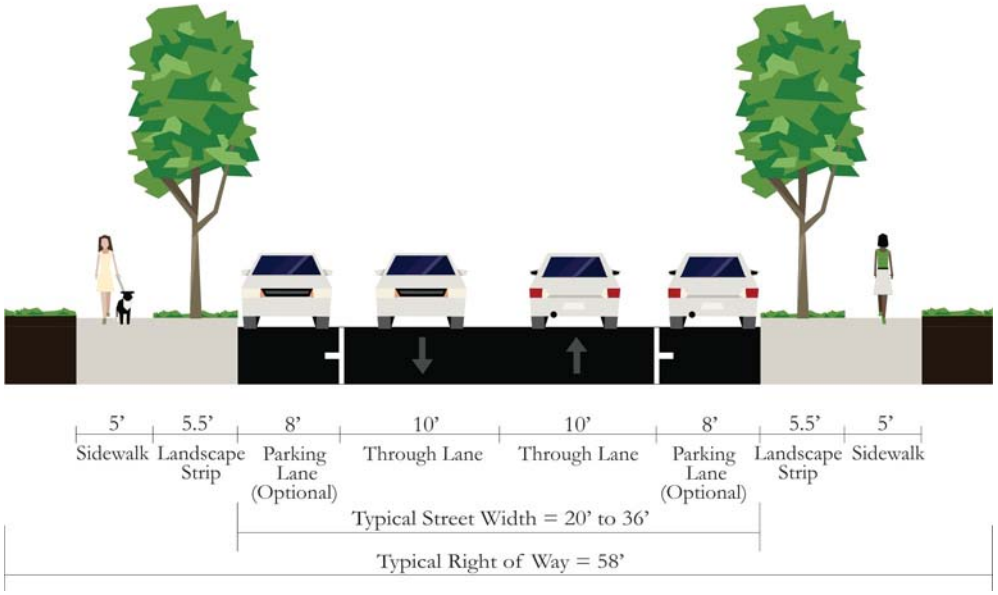


Figure 14. Local Roadway, on a Truck Route

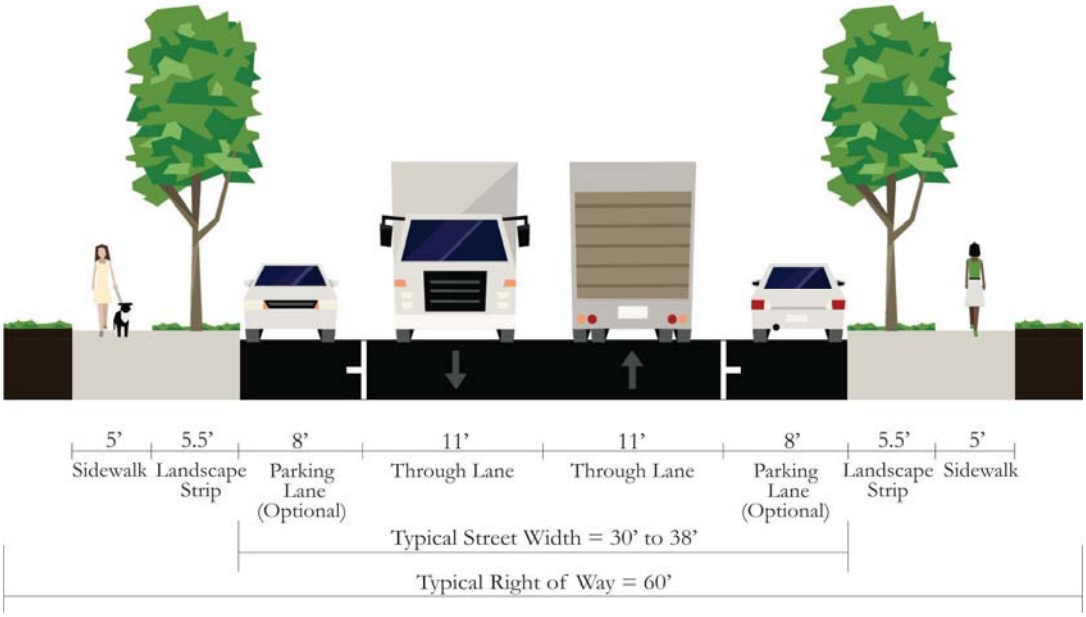
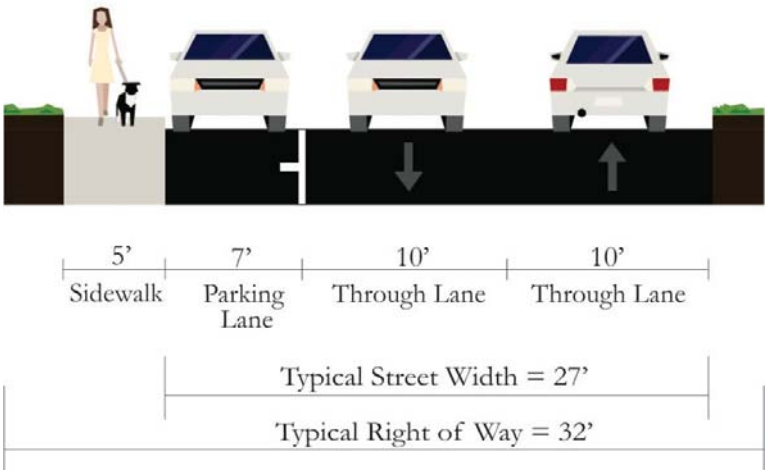


Figure 15. Private Roadway (16 or fewer dwelling units only)



Walking and Biking Design Standards

The following sections detail various walking and biking standards and treatment guidelines.

Walking and Biking Facilities

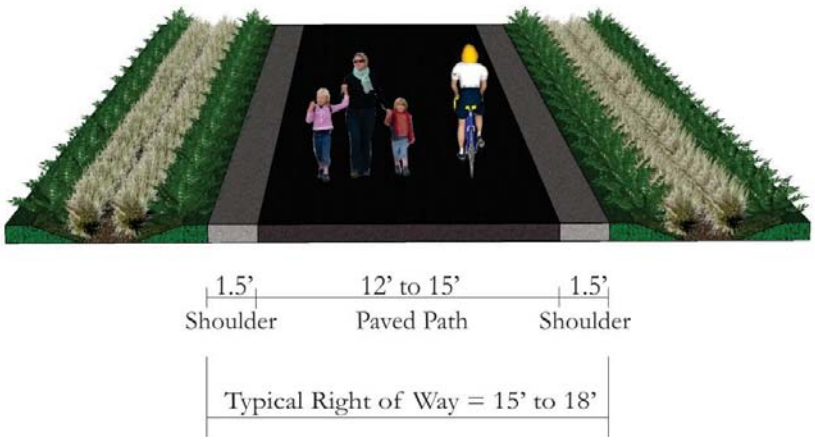
As shown in Figure 9 to Figure 15, the typical roadway cross-section standards require a minimum five-foot sidewalk along both sides of all public streets and bike lanes on arterial and collector roadways. Newly constructed roadways should typically provide accommodations to walking and biking users via a six-foot sidewalk and five-foot bike lane with 2-foot buffer along minor arterial roadways, a six-foot sidewalk and five-foot bike lane along collector roadways and a five-foot sidewalk along local roadways. Shared streets for bikes will also be designated throughout the city and will include pavement markings/ signage.

Shared-Use Paths

Shared-use paths provide off-roadway facilities for walking and biking travel. Depending on their location, they can serve both recreational and transportation needs. Shared-use path designs vary in surface types and widths. Hard surfaces are generally better for bicycle travel. Widths need to provide ample space for both walking and biking and should be able to accommodate maintenance vehicles.

In Lebanon, a paved shared-use path should be 15 feet wide in areas with significant walking or biking demand; otherwise, it should be 12 feet wide (see Figure 16). The city may reduce the width of the typical paved shared-use path to a minimum of ten feet in constrained areas (e.g., steep, environmentally sensitive, historic, or previously developed areas).

Figure 16. Design Standards for Shared-Use Paths



Street Crossings

Roadways with high traffic volumes and/or speeds in areas with nearby transit stops, residential uses, schools, parks, shopping and employment destinations generally require enhanced street crossings with treatments, such as marked crosswalks, high visibility crossings, and curb extensions to improve the safety and convenience. Crossings should be consistent with the block spacing standards shown in Table 9. Blocks longer than the maximum block size shown in Table 9 should have mid-block pedestrian and bicycle access ways at spacing no more than 330 feet. Exceptions include where the connection is impractical due to topography, inadequate sight distance, high vehicle travel speeds, or other factors that may prevent safe crossing (as determined by the city).

Access Management

The number and spacing of access points, such as driveways and street intersections, along a roadway affects its function and capacity. Access Management is the control of these access points to match the functionality and capacity intended by the roadway's functional classification. Balancing access and good mobility can be achieved through various access management strategies, including establishing access management spacing standards for driveways and intersections.

Access management is especially important on arterial and collector facilities to reduce congestion and crash rates and to provide for safe and efficient travel. Since each access point is an additional conflict point, reducing or consolidating driveways on these facilities can decrease collisions and preserve capacity on high volume roads, maintaining traffic flow and mobility within the city.

New access points shall meet or exceed the minimum spacing requirements outlined in Table 9. However, where no reasonable alternatives exist or where strict application of the standards would create a safety hazard, the City may allow a variance.

Like roadway design and mobility targets, access spacing standards for state highways are determined by ODOT. ODOT spacing standards are defined in the Oregon Highway Plan, OAR 731-051, and ODOT's Highway Design Manual.

Table 9: Roadway and Access Spacing Standards

	PRINCIPAL ARTERIAL ROADWAY	MINOR ARTERIAL ROADWAY	COLLECTOR ROADWAY	LOCAL ROADWAY
Maximum Block Size (Public Street to Public Street) *	See Oregon Highway Plan	530 feet	530 feet	530 feet
Minimum Block Size (Public Street to Public Street)	See Oregon Highway Plan	265 feet	265 feet	150 feet
Minimum Driveway Spacing (Public Street to Driveway and Driveway to Driveway)		265 feet	130 feet	25 feet
Note: all distances measured from center to center of adjacent approaches.				

* If the maximum block size is exceeded, mid-block pedestrian and bicycle accessways on public easements or rights-of-way must be provided at spacing no more than 330 feet, unless the connection is impractical due to existing development, topography, environmental constraints or other factors (as determined by the city).

Mobility Standards

Mobility targets for streets and intersections in Lebanon provide a metric for assessing the impacts of new development on the existing transportation system and for identifying where capacity improvements may be needed. They are the basis for requiring improvements needed to sustain the transportation system as growth and development occur. Two methods used to gauge operational conditions for motor vehicles include volume-to-capacity (v/c) ratios and level of service (LOS).

Volume-to-capacity (v/c) ratio: A v/c ratio is a decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. The ratio is the peak hour traffic volume divided by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. A ratio approaching 1.00 indicates increased congestion and reduced performance.

Level of service (LOS): LOS is a "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay is excessive and demand exceeds capacity, typically resulting in long queues and delays. All roadways and intersections owned by Lebanon must operate at or below the following mobility targets.

Signalized, All-way Stop, or Roundabout Controlled Intersections: The intersection as a whole must operate with a Level of Service (LOS) "E" or better and a volume to capacity (v/c) ratio not higher than 1.00 during the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4 p.m. and 6 p.m. during the spring or fall).

Two-way Stop and Yield Controlled Intersections: All intersection approaches during the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4 p.m. and 6 p.m. during the spring or fall) shall operate with a v/c ratio not higher than 0.90.

State-owned roadways must comply with the mobility targets included in the Oregon Highway Plan. The TSP update does not modify these mobility targets.

Neighborhood Traffic Management Tools

Neighborhood Traffic Management (NTM) describes strategies that can be deployed to slow traffic, and potentially reduce traffic volumes, creating a more inviting environment for pedestrians and bicyclists. NTM strategies are primarily traffic calming techniques for improving neighborhood livability on local streets, though a limited set of strategies can also be applied to collectors and arterials. Mitigation measures for neighborhood traffic impacts must balance the need to manage vehicle speeds and volumes with the need to maintain mobility, circulation, and function for service providers, such as emergency responders. Any NTM project must include coordination with emergency response staff to ensure that public safety is not compromised. NTM strategies implemented on a state freight route such as US20/ OR34 will require input from ODOT regarding freight mobility considerations.

Figure 17. Neighborhood Traffic Management Strategies

CHICANES

www.pedbikeimages.org/Dan Burden

CHOKERS

www.pedbikeimages.org/Dan Burden

CURB EXTENSIONS

www.pedbikeimages.org/Carl Sundstrom

DIVERTERS

www.pedbikeimages.org/Adam Fukushima

MEDIAN ISLANDS

www.pedbikeimages.org/Dan Burden

RAISED CROSSWALKS

www.pedbikeimages.org/Tom Harned

SPEED CUSHIONS

NACTO Urban Street Design Guide

SPEED HUMP

www.pedbikeimages.org/Dan Burden

TRAFFIC CIRCLES

www.pedbikeimages.org/Carl Sundstrom

Table 10. Application of Neighborhood Traffic Management Strategies

NTM APPLICATION	USE BY FUNCTION CLASSIFICATION			IMPACT	
	Arterials	Collectors	Local Streets	Speed Reduction	Traffic Diversion
Chicanes					
Chokers					
Curb Extensions					
Diverters (with emergency vehicle pass-through)					
Median Islands					
Raised Crosswalks					
Speed Cushions (with emergency vehicle pass-through)					
Speed Hump					
Traffic Circles					
Pavement Texture					
Narrowing Travel Lanes					
Placing buildings, street trees, on-street parking, and landscaping next to the street					
Roundabout					
Mini-Roundabouts					

The City of Lebanon currently does not have a formal neighborhood traffic management program. If such a program were desired to help respond to future issues, suggested elements include:

- Provide a formalized process for citizens who are concerned about the traffic on their neighborhood street. The process could include filing a citizen request with petition signatures and a preliminary evaluation. If the evaluation finds cause for concern, a neighborhood meeting would be held and formal data would be collected and evaluated. If a problem is found to exist, solutions would be identified and the process continued with neighborhood meetings, feedback from service and maintenance providers, cost evaluation, and traffic calming device implementation. Six months after implementation the device would be evaluated for effectiveness.
- For land use proposals, in addition to assessing impacts to the entire transportation network, traffic studies for new developments must also assess impacts to residential streets. A recommended threshold to determine if this additional analysis is needed is if the proposed project at ultimate build out increases through traffic on any one residential street by 200 or more vehicles per day. Once the analysis is performed, the threshold used to determine if residential streets are impacted would be if their daily traffic volume exceeds 1,200 vehicles.

Traffic Impact Analysis (TIA) Guidelines

Lebanon Transportation Impact Analysis (TIA) requirements implement Sections 660-012-0045(2)(b) and -0045(2)(e) of the State Transportation Planning Rule (TPR). These sections require the city to adopt mobility targets and a process to apply conditions to land use proposals in order to minimize impacts on and protect transportation facilities.

TSP Volume 2 includes the city's required content for a Transportation Impact Analysis (TIA). In general terms, the TIA applies to developments that are presumed to have a transportation impact.

A professional engineer must prepare the TIA and must use appropriate data, methods, and standards as documented in the Lebanon Guidelines for Transportation Impact Analysis.

IMPROVING TRANSPORTATION TO 2040

THE IMPROVED TRANSPORTATION SYSTEM

If constructed, the projects in this TSP would significantly improve transportation to and through Lebanon for all modes of travel and would provide the transportation system described in the community's vision statement. Through steady implementation, which will require the constant pursuit of new funding sources, Lebanon expects the following results by 2040:

Efficient Motor Vehicle Travel

Planned new streets enhance connectivity and ensure that efficient travel routes are provided when future development occurs. The greatest source of recurring congestion for Lebanon residents is along US 20/OR 34 and arterial streets in the city, where local and regional travel converge to create bottlenecks. Continued cooperation with regional partners to secure funding and advance improvements along these corridors is a priority.

Affordable Travel Options

Investing in expanded transit service provides greatly enhanced utility by allowing more interested riders to make round trips to and from work or school or complete other types of trips. A more useful transit system, along with user-friendly investments such as bus stop amenities, promote increased ridership and provide affordable means to travel between cities and access a wider range of services.

Safe Routes to Schools and Active Lifestyles

The network of active transportation facilities, including several new shared-use paths, provides comfortable non-motorized travel access across town and to regional attractions. Integration with regional active transportation networks and improved access to local parks provide new opportunities for healthy living. Sidewalk infill, enhanced street crossings, and dedicated bicycle facilities create safer routes between neighborhoods and schools. Improved local street connectivity shortens travel routes through neighborhoods, making walking and biking trips easier.

Safer Streets

Hazardous locations have been mitigated. More street lighting, enhanced street crossings, and a complete network of separate sidewalks, bike lanes, and shared-use paths across the city reduce risks for people walking and biking.

Preparing for Smart Mobility

Emerging vehicle technology and design approaches will shape our roads, communities, and daily lives. As vehicles become more connected, automated, shared, and electric, the way we plan, design, build, and use our transportation system will change.

When discussing these vehicles as a whole, they can be referred to as connected, automated, shared, and electric (CASE) vehicles. Many of these vehicles will not be exclusive of the others and it is important to think of the host of implications that arise from the combination of these technologies.

Connected Vehicles (CVs) will enable communications between vehicles, infrastructure, and other road users. This means that our vehicles will be able to assist human drivers and prevent crashes while making our system operate more smoothly.

Automated Vehicles (AVs) will, to varying degrees, take over driving functions and allow travelers to focus their attention on other matters. Today, we already have vehicles with combined automated functions such as lane keeping and adaptive cruise control. However, these still require constant driver oversight. In the future, more sophisticated sensing and programming technology will allow vehicles to operate with little to no operator oversight.

Shared Vehicles (SVs) are already on the road today that allow ride-hailing companies to offer customers access to vehicles through smart phone applications. Ride-hailing applications allow for on-demand transportation with comparable convenience to car ownership without the hassle of maintenance and parking. Ride-hailing applications can enable customers to choose whether share a trip with another person along their route, or travel alone.

Electric Vehicles (EVs) have been on the road for decades and are becoming more economically feasible as the production costs of batteries decline.

Planning for Change

The impacts of CASE vehicles on road capacity are uncertain. After CASE vehicles are widely adopted, there is a high likelihood that increases in road capacity will correspond with increasing traffic demand. We can expect that congestion will continue to persist.

The expected congestion can be used to encourage use of transit, shared vehicles, and bike share. These modes could all be encouraged through pricing mechanisms that are vastly less expensive to implement than building more road capacity. A variety of pricing mechanisms are enabled with CASE technology because these vehicles will be tracked geographically, and by time of day. With time/location data, transportation system operators will be able to develop pricing mechanisms that reduce congestion at a lower cost than other roadway improvements. Larger cities will be the first to implement these strategies and smaller cities should follow these developments closely.

Potential Impacts, Questions and Policy Considerations

CONGESTION AND ROAD CAPACITY

Anticipated Impacts

- AVs will provide a more relaxing or productive experience and people will have less resistance to longer commutes.
- Shared AVs will likely cost significantly less on a per mile basis, increasing demand for travel.
- CVs will allow vehicles to operate safely at closer following distances. In the long run, this will increase road capacity in the long run as CVs and AVs comprise increasing portions of the public and private fleet of vehicles.
- In the near term, as AVs still make up a fraction of the fleet of vehicles, road capacity could decrease as AVs operate more slowly and cautiously than regular vehicles.
- A new class of traffic — zero-occupant vehicles — will increase traffic congestion
- Roadways may need to be redesigned or better maintained to accommodate the needs of automated driving systems.

Questions

- How much will AVs cost for people to own them personally?
- How much will AVs cost if they are used as a shared fleet?
- How does cost and the improved ride experience of AVs influence travel behavior?
- How much more efficiently will AVs operate compared to regular human driven vehicles once they dominate the vehicle fleet?
- How will AVs impact road capacity in the near term as they are deployed in mixed traffic with human driven vehicles?
- What portion of traffic will be zero-occupant vehicles and what areas will likely generate the highest portion of zero-occupant vehicles looking for parking or waiting for their next passenger?

PARKING

Because AVs and Shared AVs will be able to park themselves, travelers will elect to get dropped off at their destination while the vehicle goes to find parking or its next passenger. With parking next to their destination no longer a priority for the traveling public, parking may be over-supplied in many areas and new opportunities to reconfigure land use will emerge.

Questions

- How does vehicle ownership impact parking behavior?
- What portion of the AV fleet will be shared?
- How far out of the downtown area will AVs be able to park while remaining convenient and readily available?

Considerations

- Consider building new parking garages that can be converted (with flat instead of ramped floors) to other uses in case AVs make them underutilized in their lifetime. If that isn't financially feasible, consider alternative transportation demand management strategies.
- Consider revising minimum parking requirements for new developments, especially in areas that are within one mile of transit.
- Consider system development charges that fund the installation of charging stations in new developments.

CURB SPACE

The ability to be dropped off at your destination will also create more potential for conflicts in the right-of-way between vehicles dropping off passengers, vehicles moving through traffic, and vehicles parked on the street. In urban areas with ride-hailing companies, popular destinations are already experiencing significant double-parking issues. Curb-space management is a growing consideration. Jurisdictions should inventory parking utilization and identify areas that could be converted from parking to curbside pick-up and drop-off zones.

PACKAGE DELIVERY

With the use of AVs to deliver packages, food, and expanded services, these vehicles will need to be accommodated in the right-of-way. For instance, if the AV parks at the curb in a neighborhood and smaller robots are used to deliver packages to the door, new conflicts will arise between vehicles, pedestrians, and bicyclists.

TRANSIT

AVs could become cost competitive with transit and undermine transit ridership as riders prefer a more convenient alternative. However, transit will remain the most efficient way to move high volumes of people through constricted urban environments. AVs will not eliminate congestion and as discussed above, could exacerbate it — especially in the early phases of AV adoption. In addition, shared AVs may not serve all areas of a community and underserved communities still require access to transit to meet daily needs.

To avoid potential equity and congestion issues, transit agencies need to work together to integrate the use of automated vehicles and transit. Transit needs to adapt to new competition in the transportation marketplace as well as consider adopting CASE technologies to support transit operations.

Considerations

- Partnering with ride-hailing companies to provide first and last-mile solutions.
- Working with ride-hailing companies and bike share to integrate payment platforms and enable one button purchase of a suite of transportation options for multimodal trips.
- Creating fixed route autonomous shuttles to provide first and last-mile solutions.
- Creating on-demand autonomous shuttles to provide first and last-mile solutions.

ELECTRIC VEHICLE CHARGING

To accommodate a future where electric vehicles will come to dominate our vehicle fleet, charging station capacity will need to be increased. Cities, electric utilities, regions, and states will need to work together to meet the significant increase in demand.

MOBILITY HUBS

A mobility hub is a central location that serves as a multimodal connection point for transit, car share, bike share, and ride share stations, see Figure 18. This system can serve as a tool to encourage travelers to take seamless multimodal trips that are well timed and convenient. Mobility hubs make the most sense to put in transit centers that are located near urbanized areas with multimodal supportive infrastructure (e.g., protected bike lanes) to maximize connectivity for first and last-mile solutions.

Figure 18. Mobility Hub