West Linn OR 43
2016 Conceptual Design Plan

City of West Linn, Oregon

Adopted October 10, 2016

City of West Linn

Acknowledgments

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Project Purpose and Background

In 2008, the City of West Linn engaged in a planning process involving citizens and agency stakeholders to re-envision OR 43 and create a plan for improving it. This update to the 2008 plan maintains the original plan's objectives and builds on it with refinements to take into account emerging best practices in design for non-automobile travel modes as well as implementation considerations. The 2016 OR 43 Conceptual Design Plan (2016 Plan) is needed to provide clarity on the ultimate cross section envisioned for OR 43 in West Linn, incorporate bicycle facilities that will serve and attract users of all ages and abilities, ensure consistent access for emergency vehicles and maintenance functions, and secure agreement between the Oregon Department of Transportation (ODOT) and the City of West Linn with regards to the geometric and traffic control design elements throughout the corridor.

I. PROJECT PURPOSE

Oregon Highway 43 (OR 43) is a high-volume, Oregon Department of Transportation (ODOT) - operated district highway which runs through the northern edge of the City of West Linn. OR 43 functions as a regional commuter route, carrying a significant volume of traffic from Oregon City and beyond into Portland. OR 43 (locally referred to as Willamette Drive) also functions as an important local route within West Linn. The road is classified as a Major Arterial within the City of West Linn's Transportation System's Plan (TSP).

Significant growth within the region along with lack of roadway maintenance funding has put a strain on the roadway. The road's pavement condition and capacity has not kept up with its demand. The roadway consists of mainly two travel lanes, and lacks left turn bays in many locations. OR 43 has not been modernized to fully meet multi-modal needs. As it currently exists, the roadway contains only intermittent or substandard sidewalks, bike facilities, pedestrian crossings, and a general lack of urban quality streetscape features.

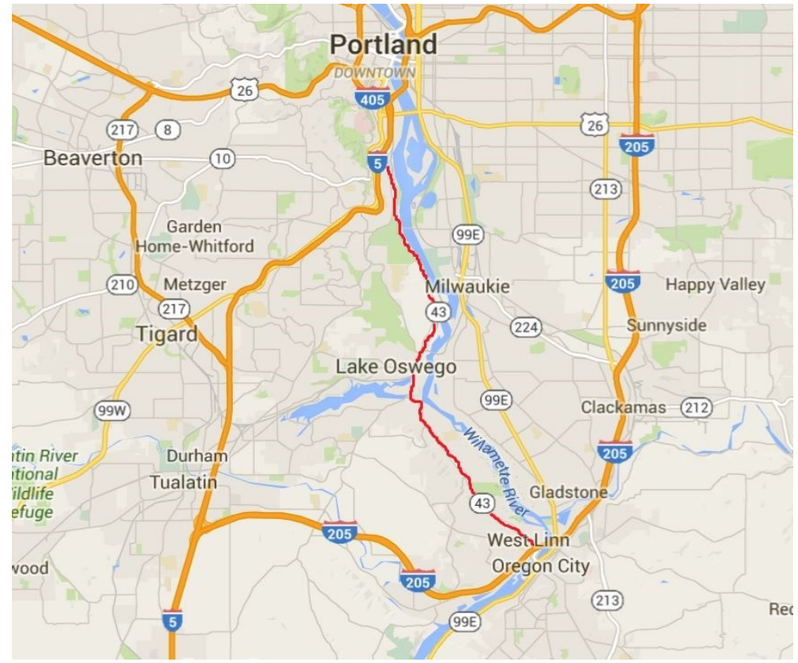
Project objectives

The purpose of this project was to develop a multi-modal Conceptual Design Plan for OR 43 that adequately accommodates bicycles, pedestrians, and vehicles. The final conceptual design strikes a balance between enhancing multi-modal opportunities, accommodating regional needs, providing an arterial street function, and supporting adjacent land uses within the City of West Linn. To meet these objectives, the project considered roadway features such as crossings, landscaping, transit stops, and lighting to better support the needs of all roadway users (as well as adjacent land uses). The stated objectives of the project are to:

- Refine development of conceptual plans for a design treatment along OR 43 in the project area to better accommodate all travel modes along and across the street and to support adjacent land use.
- Involve the public in designing the OR 43 streetscape.
- Create a corridor that will encourage the use of alternative transportation modes and reduce reliance on the automobile.
- Improve the aesthetic environment, pedestrian crossing opportunities, and pedestrian-transit connections along OR-43.
- Improve vehicular access to properties abutting OR 43 while promoting bicycle and pedestrian safety.
- Ensure consistency with adopted plans, policies and standards, including the *Oregon Highway Plan,* the *Oregon Highway Design Manual,* the *Regional Transportation Plan,* the *West Linn System Transportation Plan,* the *West Linn Comprehensive Plan,* and the latest national standards including the *NACTO Urban Bikeway Design Guide.*
- Identify planning-level cost estimates and likely funding sources to design and construct the Final Conceptual Design (including incorporated Stormwater management practices).

The 2016 plan responds to project objectives and community input to strike a balance between addressing traffic congestion, providing access to other modes of transportation while minimizing the need for acquiring additional right of way. All design elements are conceptual. Future survey work, analysis, final detail drawings, and engineering will be necessary to determine the final roadway and right of way alignment. Public input and potential effects on private property, particularly with respect to right of way, has and will continue to be a critical element of the design process.

Exhibit 1 *- OR Regional Context*



The Study Area

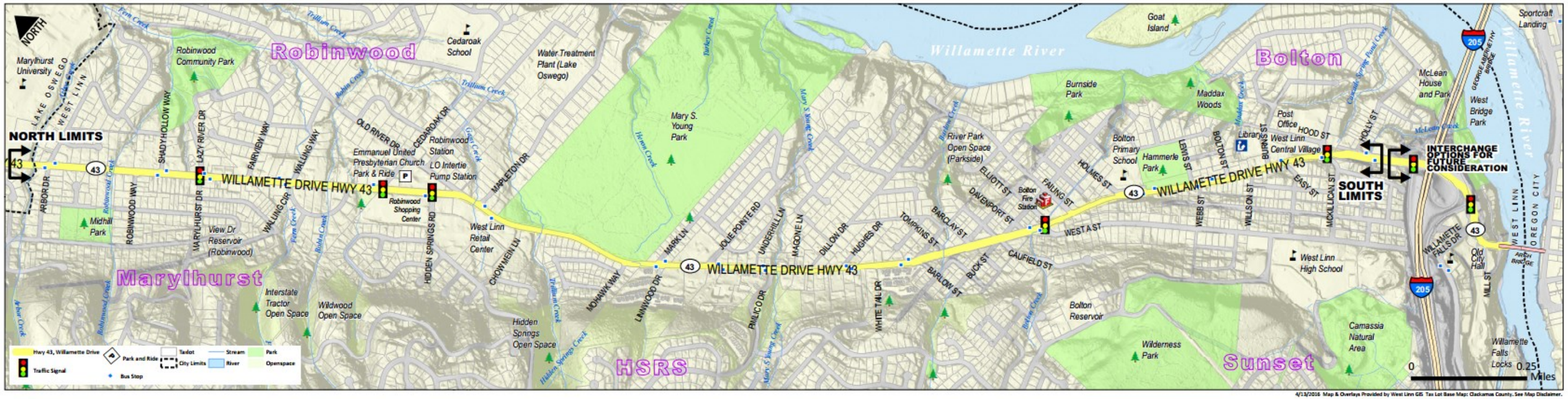
The project study area spans approximately 3.3 miles along the OR 43 corridor within the City of West Linn, from the Lake Oswego / West Linn municipal boundary at the northern end, to just south of the OR 43 / Holly Street intersection to the south. Additional future options are presented for the interchange area from Holly Street to Willamette Falls Drive. For much of its route, OR 43 passes through lower-density, single-family residential areas. However, it also traverses two major commercial nodes: the Robinwood Neighborhood commercial area to the north, and the Bolton Neighborhood commercial node to the south. Additionally, OR 43 borders Mary S. Young State Park, a large regional park which holds recreational and sporting events, and serves as a significant destination point throughout the week. It also passes adjacent to Hammerle Park and Bolton Primary School, two significant community facilities.

No sidewalk in front of Hammerle Park and substandard bike lane widths

Mary S. Young Park along OR 43 lacks sidewalks on both sides

Marylhurst Drive at OR 43 traffic signal has no ADA accessibility at crossing and no sidewalks

***Exhibit 2** - Study Area*



I. Project Purpose and Background

The Planning Process

The 2008 project planning team identified, described, and documented existing conditions along the corridor. This included identifying plans and policies that affect the OR 43 corridor, analyzing transportation and adjacent land uses, and photographing and mapping existing physical and design features along the roadway. Basemaps with City GIS data were compiled describing existing land use, zoning, comprehensive plan designations, transit facilities, nearby historic structures, and environmental conditions such as slope, streams, and wetlands. Updated basemaps were used in completing the 2016 Plan.

In 2008 technical memoranda were prepared as part of the planning process. They analyzed existing traffic mobility conditions, gathering base traffic volume data for the project area, and calculating projected 20-year traffic conditions. Specific level-of-service deficiencies were identified in both current and future conditions. The technical memos identified the various opportunities and constraints within the corridor, based on the prior existing conditions analysis and base mapping. Current and future traffic conditions along the corridor were evaluated. As part of the 2016 Plan this data was reviewed and updated with current conditions and proposed improvements.

In order to ensure that the project was adequately coordinated with agency stakeholders and local jurisdictions, a Technical Advisory Committee (TAC) was formed in 2008. The TAC reviewed draft materials prior to public presentation, ensuring that products were consistent with applicable policies and standards while also providing suggestions and recommendations. The TAC included representatives from the City of West Linn, ODOT, Metro, and TriMet as well as representatives from the Robinwood and Bolton Neighborhood Associations. The 2016 Plan update used key stakeholders for technical input while the Transportation Advisory Board (TAB) provided citizen input with outreach to the Robinwood and Bolton areas.

The 2008 project team used feedback to develop a draft proposed conceptual design. After deliberation and comment from the Technical Advisory Committee, the concept design was presented in a workshop for additional public comment. Community members were encouraged to interact directly with the proposed design, identifying issues directly on plan maps. Community comments were consolidated, and the planning team amended the proposed conceptual design based on this feedback. The final 2008 conceptual design was the result of this process.

West Linn citizens providing feedback on OR 43 in 2008

The 2016 Plan Development Process

The plan update process occurred over the course of a year from March 2015 to March 2016, and engaged stakeholders from the City of West Linn and from external agencies, as well as members of the public, to reach the preferred update to the conceptual layout for the OR 43 corridor. The following section outlines the key steps in the development of the plan update.

Review of Previous Planning Efforts

The project team reviewed planning, outreach, and input received since the development of the 2008 Concept Design Plan. In particular, the team drew on public input received from the *Highway 43/Willamette Falls Drive Vision, Phase I* documentation. In the process of developing this vision, community members emphasized the following needs:

- Provide the ability to shop locally and access daily needs by biking or walking
- Enhance pedestrian and bicycle safety
- Achieve regular, frequent transit service
    - Along the corridor
    - Connecting to City Hall
    - Providing a direct connection to downtown Portland

Ultimately, the vision called for a “complete street” design and noted that a “continuous separated bikeway” was a key component for that vision. This separated bikeway (cycle track) is needed to connect the commercial centers along the corridor and encourage a larger portion of the community to use non-automobile modes to conduct their local trips within the corridor.

I. Project Purpose and Background

Review of Best Practices

The project team also reviewed published guidance on best practices for designing and incorporating cycle tracks into existing roadway facilities:

- *The Centre for Research and Contract Standardization in Civil and Traffic Engineering (CROW) Design Manual for Bicycle Traffic* (Netherlands, 2007)
- *National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide* (2012)
- *NACTO Urban Street Design Guide* (2013)
- *The Federal Highway Administration Separated Bicycle Lanes Planning and Design Guide* (2015)

After a review of the community vision and best practices, the project team determined that the 2016 Plan should include separated bicycle facilities for the full length of the corridor which is a significant enhancement over the 2008 plan.

Stakeholder Meetings

The project team conducted two meetings with key stakeholders, including representatives from the City of West Linn Planning Department, City Council, Public Works, Police Department, and Transportation Advisory Board (TAB), along with the Oregon Department of Transportation (ODOT), Tualatin Valley Fire and Rescue (TVF&R), Metro, TriMet, Clackamas County, the City of Oregon City, and the City of Lake Oswego.

At the initial meeting (April 2014), the project team introduced the project and reviewed potential options for addressing the community desire for the incorporation of separated bicycle facilities, in addition to sidewalks, crossings, transit stop enhancements, traffic control upgrades, and streetscape improvements.

At the second stakeholder meeting (June 2014) the project team proposed design options and requested stakeholder feedback on key components of the update. Because OR 43 is currently owned and maintained by ODOT, the project team sought to understand what types of designs would be acceptable to ODOT, what elements would require a design exception, and what elements would not be approved.

The Technical Appendix includes the presentations and meeting materials from the stakeholder meetings, as well as the feedback received after the meetings.

Public Outreach

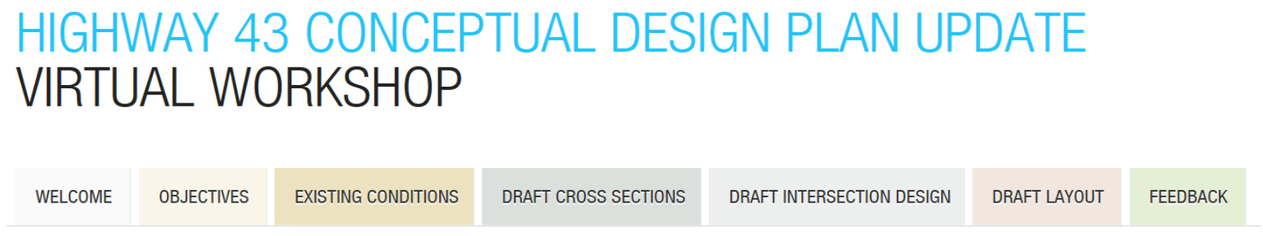
In preparing the initial draft 2016 Plan, the project team drew on documented public input from the 2008 OR 43 Conceptual Design Plan, the OR 43/ Willamette Falls Drive Vision, Phase I, and the West Linn Transportation System Plan update that was recently updated. The project team also held an online Virtual Open House, in which over 150 people provided input on the proposed designs. Finally, City staff attended meetings in the surrounding Robinwood and Bolton neighborhoods to discuss the plan and hear input from community members in addition to the regular TAB meetings which are posted and open to the public. The input gathered in these forums highlighted the importance of creating safe and comfortable multimodal connections through the entire corridor; providing safe and convenient pedestrian crossings at key locations; improving safety and traffic operations at key intersections along the corridor; and finding ways to ease congestion along the corridor. A summary of input from these forums, as well as notes and comments from the Virtual Open House are included in the Technical Appendix.

Corridor Audit

The project team conducted a “corridor audit” in April 2014, between the two stakeholder meetings, in which project team members and stakeholders from the City, ODOT, and Metro walked, bicycled, and drove throughout the corridor to observe conditions and assess the viability of different design options. The group visited the corridor during the afternoon, during the late evening after dark, and during the morning commute period to understand peak and off-peak conditions as well as lighting conditions after dark.

Stakeholders walking OR 43 corridor

Stakeholders biking the OR 43 corridor



Existing Conditions

As previously discussed, the initial phase of the project involved identifying and analyzing existing conditions along the corridor, assembling photographs, and constructing base maps illustrating existing conditions. What follows is a discussion of those existing conditions along OR 43 that informed and shaped the final conceptual design. Conditions have remained largely unchanged since the 2008 Conceptual Plan.

Varying Right of Way

The amount of right of way available along the OR 43 corridor varies significantly within the study area. At its widest, the right of way measures approximately 200 feet across, but is only 50 feet at its most narrow. This tremendous variation in available right of way width required that several site-specific streetscape design cross sections be considered. The variation in right of way also constrained streetscape design options in certain areas, as limited right of way within certain segments required close examination of the various trade-offs implicit in allocating right of way (ROW). For example, while on-street parking facilities are common along typical commercial nodes, doing so precludes allocating that limited right of way to other, more pressing needs, such as sidewalks in this corridor.

Varying Land Use

The OR 43 corridor passes through areas with distinctly different land uses. The northernmost section of the corridor is less-intensely developed, primarily with single-family homes. There are two higher-density, commercial nodes along the corridor - one within the Robinwood neighborhood, and the other within the Bolton neighborhood. Between these two commercial areas lies Mary S. Young State Park - a significant community and regional asset - as well as a mix of single-family and multi-family residential uses. There is an opportunity to better connect commercial areas to nearby residences, many of which are not served by sidewalks currently.

Exhibit 3 *- Right of Way*

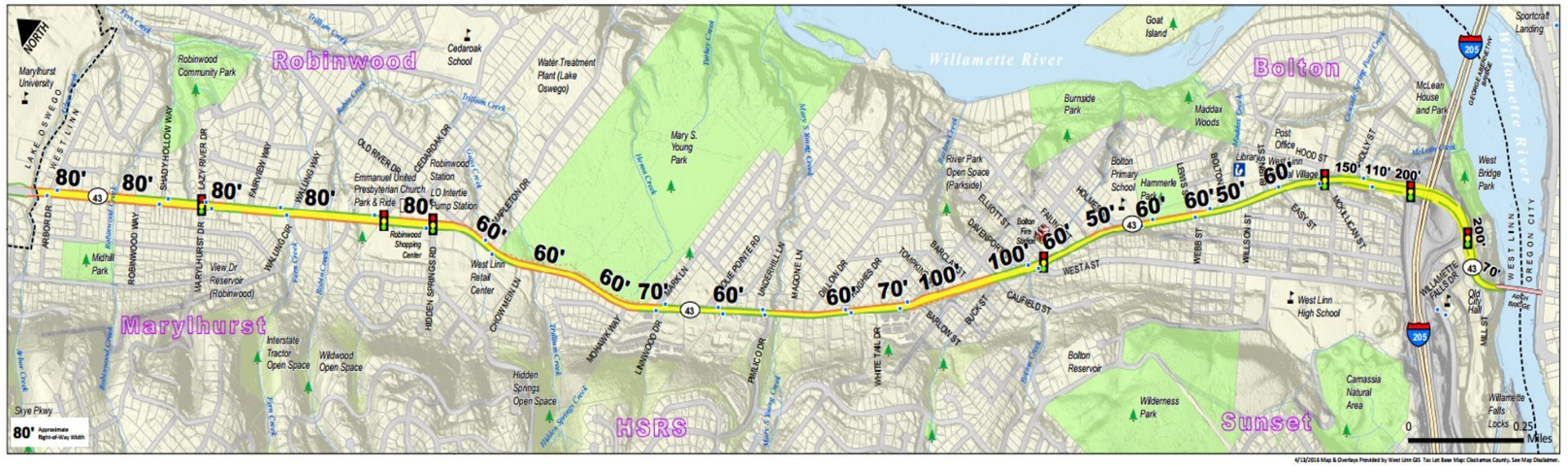
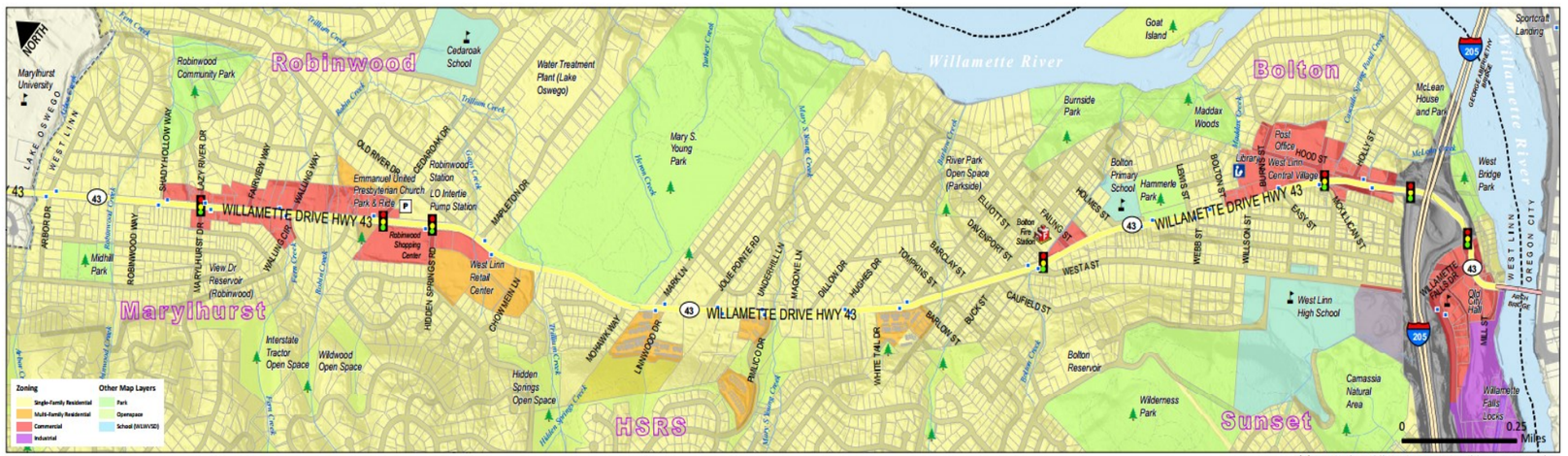


Exhibit 4 *- Existing Land Use*



Current Pedestrian Environment

As the map at right illustrates, sidewalks along OR 43 are sporadic in many areas, and are altogether absent in others. Sidewalks may exist on one side of the street but not the other, and in the residential areas to the north, they are lacking on both sides of the street. The Robinwood commercial area provides sidewalks on both sides of the street, but these sidewalks are fragmented, often leaving a pedestrian with no option but to walk on the roadway.

Where sidewalks do exist, they are often narrow (sometimes only 3' to 4' wide), making it difficult for two people to walk side by side. Sidewalks occasionally contain obstacles such as telephone or light poles, rendering them impassable to people with disabilities as they are not accessible. Driveways are common which bring pedestrians into direct conflict with motor vehicles.

Sidewalks throughout the study area are "curb-tight," meaning that in most instances there is no buffering between pedestrians and the roadway. Planting strips and/or furnishing zones in commercial areas along with cycle track facilities located between the pedestrian way and the street could help to visually enhance the streetscape and buffer pedestrians from fast-moving vehicle traffic.

Exhibit 5 *- Sidewalk Inventory*

Many locations have sidewalks that end abruptly or have obstructions within the sidewalk

Driveways are often in conflict with pedestrians and bicyclists

Current Bike Facilities

Bicycle travel facilities are currently provided intermittently on both sides of OR 43 throughout the corridor - either as striped bike lanes, shoulders, or shared bike / parking lanes. While basic facilities are provided in some areas, there are several opportunities to improve existing substandard bicycle facilities along OR 43. In addition, there is an opportunity to attract more cyclists with separated facilities, especially those that are intimidated by riding on a state highway that carries an average of 21,000 vehicles per day with a posted speed limit of 35 mph.

Where existing parallel on-street parking is provided, the parking zone and the bike zone intermingle, and autos often infringe upon the bike lane. In fact, in some areas, a shoulder is only wide enough for a parked car, which forces bikes out into the travel lane. Providing adequate width and separation for bikes helps to limit confusion and conflict.

Existing bike lanes/shoulders are often littered with debris - mostly sand and gravel - that is uncomfortable for cyclists and potentially hazardous. Separated facilities could help improve this condition.

Environmental Conditions

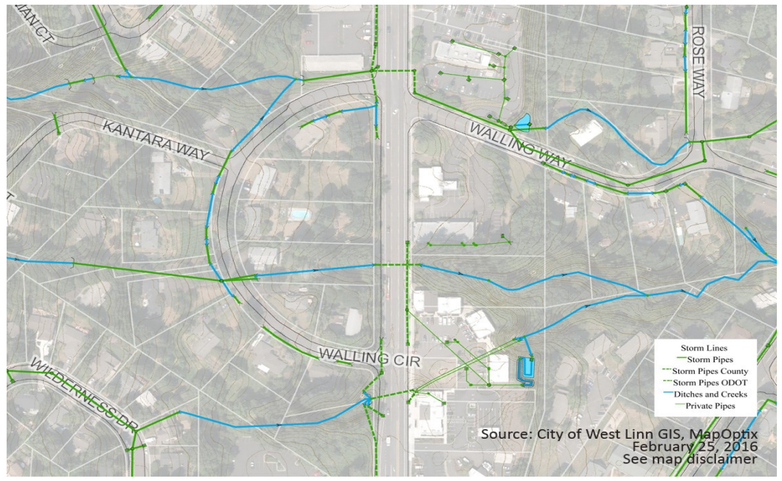
OR 43 lies at the foot of a significant slope to the northeast, and the resulting variations in topographic conditions along the length of the corridor presents significant constraints in the middle and southern portions of the study area. Where steep slopes are present immediately adjacent to one or both sides of OR 43, choices for right of way allocation are quite limited.

According to GIS data, OR 43 crosses multiple drainage ways within the study area. It is important that these drainage ways be separated from polluting run-off to the maximum extent practical as determined by the City Engineer with any modifications made within OR 43 right of way. In more developed areas of the corridor, stormwater run-off is currently channeled with curbs to storm drains. In less intense residential areas at the northernmost portion of the study length, stormwater is allowed to collect in ditches at the side of the roadway.

Given the steep slopes in portions of the study area, run-off during significant rain events can be quite heavy. There are opportunities to introduce sustainable stormwater practices along OR 43, which will help to protect water quality and provide visual (green) amenities along the corridor.

Existing bike facilities along OR 43 require bicyclists to deal with obstructions, gravel, limited shoulder space, and motor vehicles parked within bike lanes

Varying right of way and steep slopes present challenges to the improvement of OR 43



Example of some of the existing Stormwater facilities and drainage impacting the OR 43 corridor

Many storm drains existing along OR 43 are in poor condition or clogged with debris

Bus Stops

TriMet operates the #35 bus line through West Linn along OR 43. While the OR 43 corridor through West Linn contains a number of residences and general commercial uses, overall density is relatively low. With no major employment centers, densities in the corridor are not sufficient to support high frequency transit, therefore, transit primarily serves commuter trips and provides an option for those for whom other options are not available or desirable.

However, transit stops - and the connections to them - can be greatly improved along OR 43. Sidewalks and bike facilities are limited or missing and need improvement. Benches and bike racks are currently lacking at many bus stops, and providing such amenities helps to increase the appeal of transit. The City should work with TriMet, adjacent businesses, and/or local neighborhood associations to provide and maintain transit amenities like benches.

Improvements to pedestrian connections to and from bus stops will also help to bolster transit ridership. Several stops have sidewalk approaches from only a single direction, while others lack sidewalks entirely. Completing sidewalk connections to transit stops will be crucial to ensure that transit riders can make their connections safely and comfortably. Improving pedestrian connections throughout the corridor can help increase ridership.

Aesthetic Concerns

While pedestrian safety and access are of primary importance, aesthetic conditions also greatly influence a street's pedestrian appeal. Trees are a defining feature of the OR 43 corridor, and the City currently maintains an ordinance aimed at preserving and protecting trees on private property. This ordinance is enforced during site development through design review. In addition, there may be opportunities to introduce landscaping to the streetscape to enhance the visual appeal of the roadway. Incorporating a planting strip between the sidewalk and the roadway, and bringing vegetation to the streetscape could help to soften the visual impacts of the corridor.

Many transit stops lack adequate shoulder space causing buses to block travel lanes

Often transit stops are along areas without benches or sidewalks

Existing Park and Ride facility has no adjacent sidewalks

Improving streetscape would be beneficial as aesthetic conditions are lacking throughout most of the corridor

Traffic Mobility

Comments gathered at public workshops revealed that the community places a priority on improving traffic safety and mobility along the corridor. Some key traffic circulation issues that needed to be addressed throughout the course of the project development are as follows:

- Two intersections have significant congestion during commute hours and show high crash rates compared to other parts of the corridor: OR 43 at Cedaroak, and OR 43 at Hidden Springs.
- Access to Bolton Primary School is constrained, with backups occurring before and after school sessions
- Cross-streets can have long waits for adequate "gaps" to make turns onto OR 43
- Marked crossings along OR 43 on foot or by bike are currently limited. The segment of OR 43 from Hidden Springs to West A stretches 1.5 miles without a marked crossing.

Crash History

ODOT keeps a record of crashes that are reported on roadways throughout the state and analyzes crash data to identify areas that are priorities for safety improvements. OR 43 in West Linn had 264 crashes over the period of time from January 1, 2009 to March 31, 2014, including two fatalities, 124 injury crashes, and 138 property damage only crashes. Exhibit 6 shows the crashes in the corridor over this period of time by crash severity. There are three locations on OR 43 that are identified on ODOT's 2014 Safety Priority Index System List—the segment of OR 43 between Hidden Springs Road and Cedar Oak Drive (milepoint 8.81 to 8.91); the segment between Lewis Street and Bolton Street (milepoint 10.59 to 10.70); and the segment of OR 43 immediately north of I-205 (milepoint 11.02 to 11.14).

Existing traffic conditions along OR 43

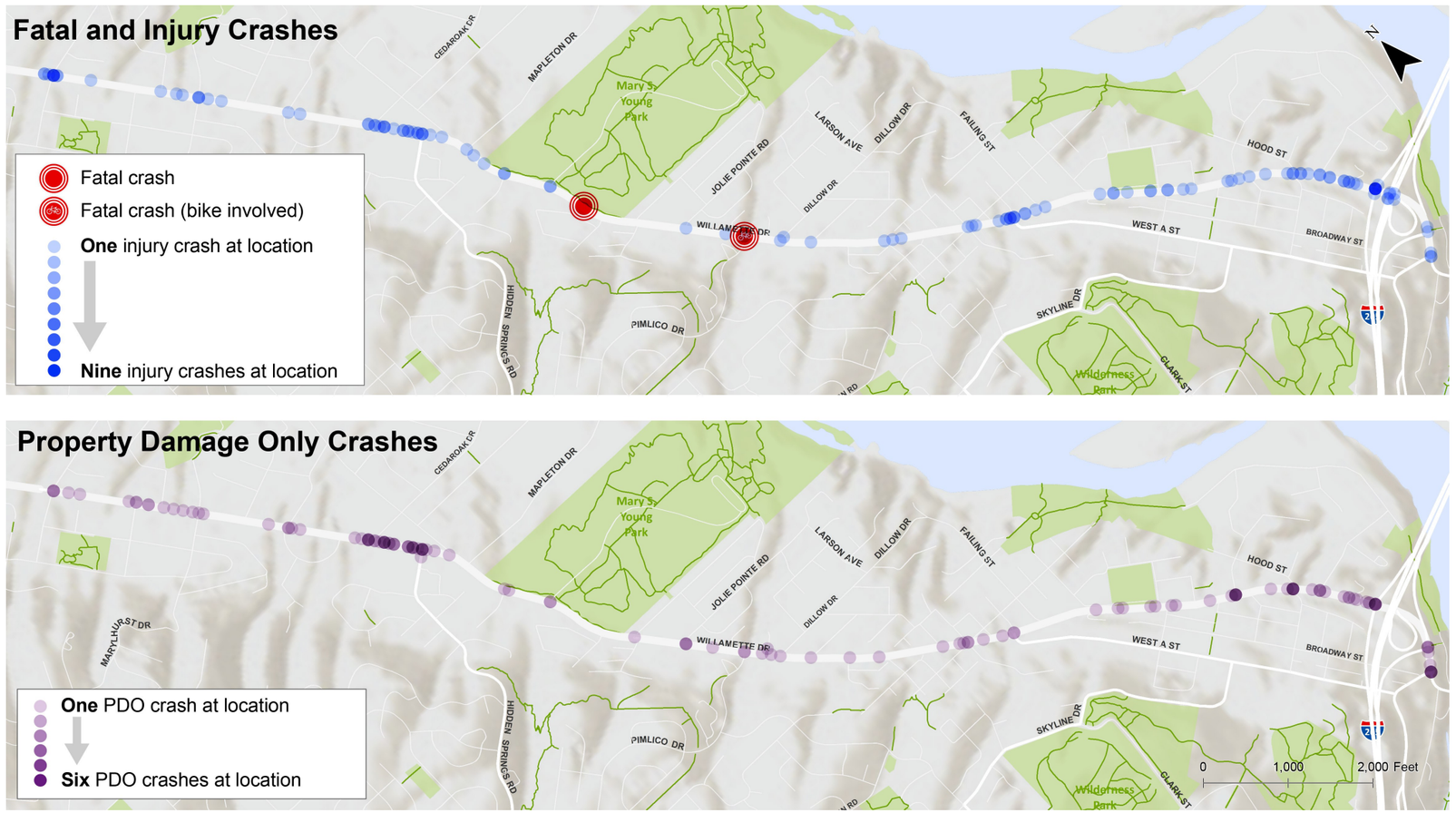


***Exhibit 6** - ODOT crash data along OR 43 corridor*

The Plan Update

II. THE PLAN UPDATE: GENERAL CONCEPTS

This 2016 Plan replaces the 2008 OR 43 Conceptual Design Plan; however, much of work from the original plan is still applicable and the intent of the plan remains the same. This section summarizes the general concepts and approach of the plan update.

General Plan Characteristics

The 2016 Plan replaces the varying cross sections in the 2008 Plan with a more consistent cross section throughout the corridor. The update consists of three preferred overall cross sections: typical, transit stop, and constrained. These cross sections are shown in Exhibit 7. Each of the three cross sections was developed to provide the following key features:

- Comfortable bicycle facilities grade-separated from motor vehicle traffic.
- Continuous sidewalks on both sides of the street, adjacent to the bicycle facilities.
- A continuous two-way left-turn lane to provide improved access to side streets and driveways along OR 43 along with improved emergency response where no (or limited) shoulder space currently exists.
- Sufficient roadway width for utility vehicles to perform maintenance on utilities throughout the corridor while still allowing for two-way motor vehicle flow and clear bicycle facilities.
- One foot of additional right of way at the back of the sidewalk allowing for utilities, signage, and maintenance. A thirteen foot center turn lane is recommended throughout the corridor but could be modified to twelve feet where necessary. Final width of the center turn lane shall be determined during final design.

Because the preferred cross sections have cycle tracks, instead of standard separate bike lanes, vehicles cannot use this space as a shoulder or breakdown lane; instead, the necessary width is provided by the continuous two-way left-turn lane.

Typical Cross Section

The typical preferred cross section includes six-foot sidewalks, cycle tracks, a landscape buffer, one motor vehicle travel lane in each direction, and a two-way left-turn lane. In commercial areas, the sidewalk width may be greater than six feet. The typical preferred cross section is applied throughout the corridor in locations not limited by extreme topography or potential building impacts. As development occurs along the corridor, property owners shall either construct or dedicate sufficient right of way and pay fee in lieu of construction for the typical cross section.

Transit Stop Cross Section

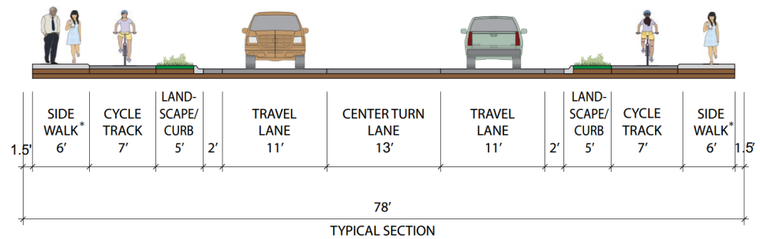
The transit stop cross section is very similar to the typical cross section, but it replaces the landscape buffer with a slightly wider transit stop platform to allow for accessible boarding and a landing for the transit vehicles in a location separated from the bicycle facility. This cross section is to be used at significant transit stop locations in coordination with TriMet. Other bus stops will be located along the corridor and will follow the latest edition of TriMet's Bus Stop Guidelines. Final bus stop locations and amenities will be determined with final design and construction. Due to the nature of the proposed improvements it is anticipated that a portion of transit riders will use a bicycle to access the bus stop locations. As such, adequate bicycle parking should be provided at transit stops.

Constrained Cross Section

The constrained cross section is similar to the typical cross section, but it removes the landscape buffers between the bicycle facility and the motor vehicle travel lane. However, the bicycle facility remains grade-separated from the motor-vehicle travel lane. The constrained cross section is applied on one or both sides of the roadway only in locations where topography, drainage, other natural features, or building impacts limit the total roadway width. In some instances, a cross section between the typical and constrained may be utilized to meet physical limitations while providing some separation. The constrained cross section can be applied only with the approval of the City Engineer.

Typical Cross Section (Final design is subject to ODOT approval)

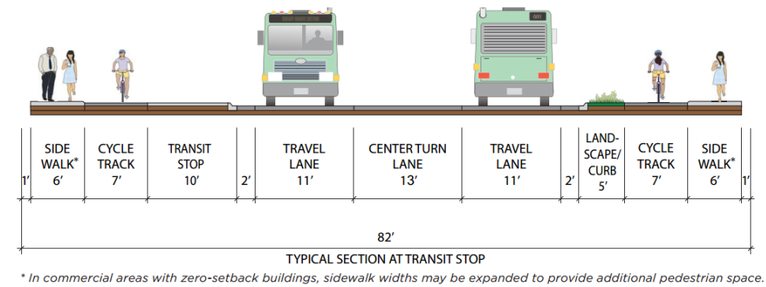
The typical cross section includes sidewalks, protected bike facilities (cycle tracks), a landscape buffer, one motor vehicle travel lane in each direction, and a center turn lane. This cross section is the preferred cross section throughout the corridor and is applied in locations not limited by extreme topography or potential building impacts.



** In commercial areas with zero-setback buildings, sidewalk widths may be expanded to provide additional pedestrian space.*

Transit Stop Cross Section (Final design is subject to ODOT approval)

The transit stop cross section is very similar to the typical cross section, but it replaces the landscape buffer with a slightly wider transit stop platform to allow for accessible boarding and alighting of the transit vehicles in a location separated from the bicycle facility.



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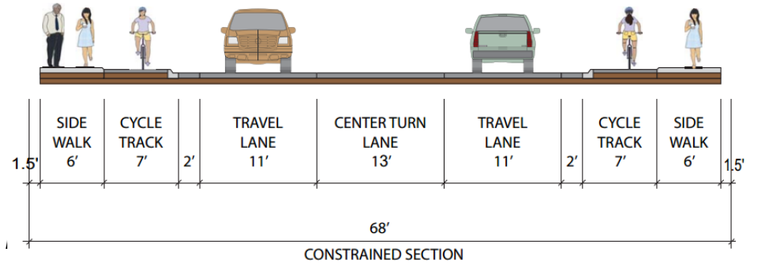


Pedestrian Improvements

OR 43 is currently designed to address the needs of automobile drivers, often to the detriment of other users. One of the primary charges of the project was to re-design OR 43 into a truly multi-modal corridor. The OR 43 corridor through West Linn has sidewalk gaps and the quality of the bicycle facility can be enhanced for a highway that carries approximately 18,000 vehicles per day. Pedestrian and bike facilities in the project area are defined as substandard or completely lacking in the ODOT Active Transportation Needs Inventory as well as in the 2014 Metro Regional Transportation Plan. Deficiencies along OR 43 are identified in the West Linn Transportation System Plan.

Improved Pedestrian Crossings

The final concept design includes improved traffic signals and roadway crossings for pedestrians at existing signalized intersections. In addition to clear striping, the plan calls for count-down pedestrian timers at intersections. Such timers visually display and count down the amount of time a pedestrian has to safely cross the street before a signal change. In addition to improvement of existing pedestrian crossings, the final concept design will incorporate new opportunities for enhanced crossings along the corridor that meet ADA requirements in locations where they are warranted.

The final concept plan recommends pedestrian crossings that are strategically located near activity centers, commercial areas, and high-density residential developments.

ODOT requires a crosswalk study, approved by the state traffic engineer, for all marked crosswalks at unsignalized locations to ensure that new crossings would provide actual safety benefits as opposed to the false perception of security. Criteria for establishing such crosswalks on State highways can be found in the ODOT Traffic Manual which is available on ODOT's website.

Continuous, High-Quality Sidewalks

Providing continuous sidewalks throughout the entire corridor remains one of the foremost priorities for the project and the public. The majority of the project area does not have sidewalk on both sides of OR 43 and numerous locations have no sidewalk at all. Sidewalk is missing along the only area Park & Ride transit facility, which is also a key commercial center. In addition to sidewalk infill, many areas of non-compliant or obstruction-laden sidewalk (e.g. non-ADA curb ramps, insufficient clearance around power poles/utility boxes/ pedestals, etc.) will be made ADA compliant.

To improve the overall quality and buffer of pedestrian facilities, where right of way allows, existing curb-tight sidewalks will be replaced with sidewalks that are set back from the roadway, separated by planting strips and cycle tracks between the sidewalk and the road itself. Such separation effectively improves safety for the pedestrian by providing a physical buffer from motorized vehicle traffic. This increases both actual and perceived safety in addition to beautifying the streetscape.

Bike Improvements

Bicycle facilities as they currently exist along OR 43 may not encourage use by different types of bicycle commuters. Although limited bike lanes are mostly provided throughout, they often share space with the emergency shoulder and/or on-street parking, creating a confusing, ambiguous space which often causes conflict between parking and turning cars and bikes. Furthermore, bike lanes along OR 43 are often cluttered with debris which can create obstacles for bicyclists.

During the public process, many community members voiced their support for separating bicycle facilities from vehicular traffic in order to increase bicycle quality along the corridor. The final concept plan proposes the construction of innovative grade separated cycle tracks including separated signalized intersection design that increases separation of different travel modes. A cycle track is an exclusive bikeway that has elements of a separated path and on-road bike lane. A cycle track is located within or next to the roadway, but is made distinct from both the sidewalk and the vehicular roadway by vertical grade, separation such as a planter strip, or varying material type. Cycle tracks are designed to encourage bicycling in an effort to relieve automobile congestion and reduce pollution, while increasing safety and comfort for bicyclists. Cycle tracks will in most cases prevent cars from merging into the bike lane in order to pass stopped, or left turning cars. The cycle tracks will increase bicycle safety by separation of facilities.

Transit

The preferred method for loading and unloading bus passengers is to do so while remaining within the travel lane, as this is most efficient. However, there may be a need to provide bus pullouts in some locations over the length of the corridor. These pullouts allow buses to pull out of the roadway as they load and unload passengers, and give the bus a place to idle when dwell time is needed. Pullouts also permit cars to pass stopped, loading buses. Although they can allow for greater automobile mobility, transit vehicles may be delayed, as operators can find it difficult to pull back into traffic during peak volume times of the day.

OR 43 is not currently a frequent bus route, and vehicular delays caused by in-flow loading are therefore not extreme in nature. Other improvements associated with this conceptual design plan will help to alleviate delays. TriMet does intend to eventually convert this line into a frequent bus route in the future. It is anticipated that this extra service will tie in with the pedestrian and streetscape improvements proposed within this plan. An area of continuous concern as it relates to transit resides at the only Park & Ride facility on the OR 43 corridor within West Linn. Currently, there are no sidewalks along the road where the Park & Ride exists. The intended result in improving pedestrian access to the Park & Ride facility, and improving overall bus stop conditions along the corridor is to promote an increase in transit use. Future additional Park & Ride facilities should be considered as the existing facility is nearing capacity.

Aesthetic Improvements

Several opportunities to introduce vegetation to the streetscape exist along the OR 43 corridor. Since OR 43 is an ODOT facility, streetscape design elements along the corridor are subject to ODOT design standards. Tree placement within the planting strip is subject to ODOT review. Current ODOT standards stipulate that trees should be a minimum of 6' from the curb at maturity to ensure that visual clearance is maintained at driveways and intersections. Landscaping design that meets both ODOT and City objectives will need to be addressed during final design and construction. In addition, The City of West Linn wishes to incorporate City standard decorative poles and arms at signalized intersections much like those present at the Santa Anita and Rosemont intersection in order to have a consistent and uniform appearance throughout the community.

Operational and Traffic Control Improvements

The 2016 Plan has been developed to offer operational and traffic control improvements for all modes traveling along the corridor. Key operational features of the plan include the following elements.

- A continuous two-way left-turn lane on OR 43.
- Redesigned, consolidated, and new signalized intersections.
- Improvements at unsignalized intersections.
- A modification of the Hidden Springs and Cedaroak Drive intersections.

Two-way left-turn lane on OR 43

This feature of the design increases efficiency and safety by providing left-turning vehicles a place to wait for a break in oncoming traffic, where they don't block the flow of through traffic in their lane. The two-way left-turn lane also provides the opportunity for drivers making a left turn on to OR 43 to make the turn in two stages. For example, a northbound driver making a left turn would first find a gap in the eastbound traffic, turning left into the two-way left-turn lane, and then finding a gap and merging into the westbound stream of traffic.

Signalized Intersections

The 2016 Plan draws on recent innovations in "separated intersection" design, which are just starting to be implemented in cities across the United States. This type of intersection (also known as "Dutch-style intersections") has been in operation in the Netherlands for decades and is being currently deployed in the United States (e.g. Davis, California and Salt Lake City, Utah). Exhibit 8 shows the separated intersection concept and highlights key elements of the design.

Each signalized intersection on the OR 43 corridor has a different context, operating characteristics, lane configurations, and physical constraints. As such, it is recommended that each intersection is analyzed in more detail during design in order to determine optimal operations strategies, signal phasing, and proposed lane configurations.

In some cases, implementation of the separated intersection design as shown may result in impacts or trade-offs that outweigh the benefits of the design. In these cases, it may be necessary to make modifications to the design, potentially incorporating other types of intersection treatments described in the published design guidance best practices.

The 2016 Plan also includes a new signal at the Pimlico Road/OR 43 intersection, when it is warranted. While the 2014 volumes did not warrant a signal at Pimlico Rd., it is forecasted to be warranted in the future. Signalized intersections in the corridor are listed to the right. All signalized intersections are proposed to utilize City standard mast arm designs with LED street lighting incorporated into the poles for enhanced visibility.

- Marylhurst Drive/Lazy River Drive/OR 43
- Hidden Springs Road/Old River Road/OR 43 (consolidation of existing signals at Cedaroak Drive/OR 43 and Hidden Springs Road/OR 43)
- Pimlico Road/OR 43 (when warranted)
- West A Street/Elliot Street/OR 43
- McKillican Street/Hood Street/OR 43

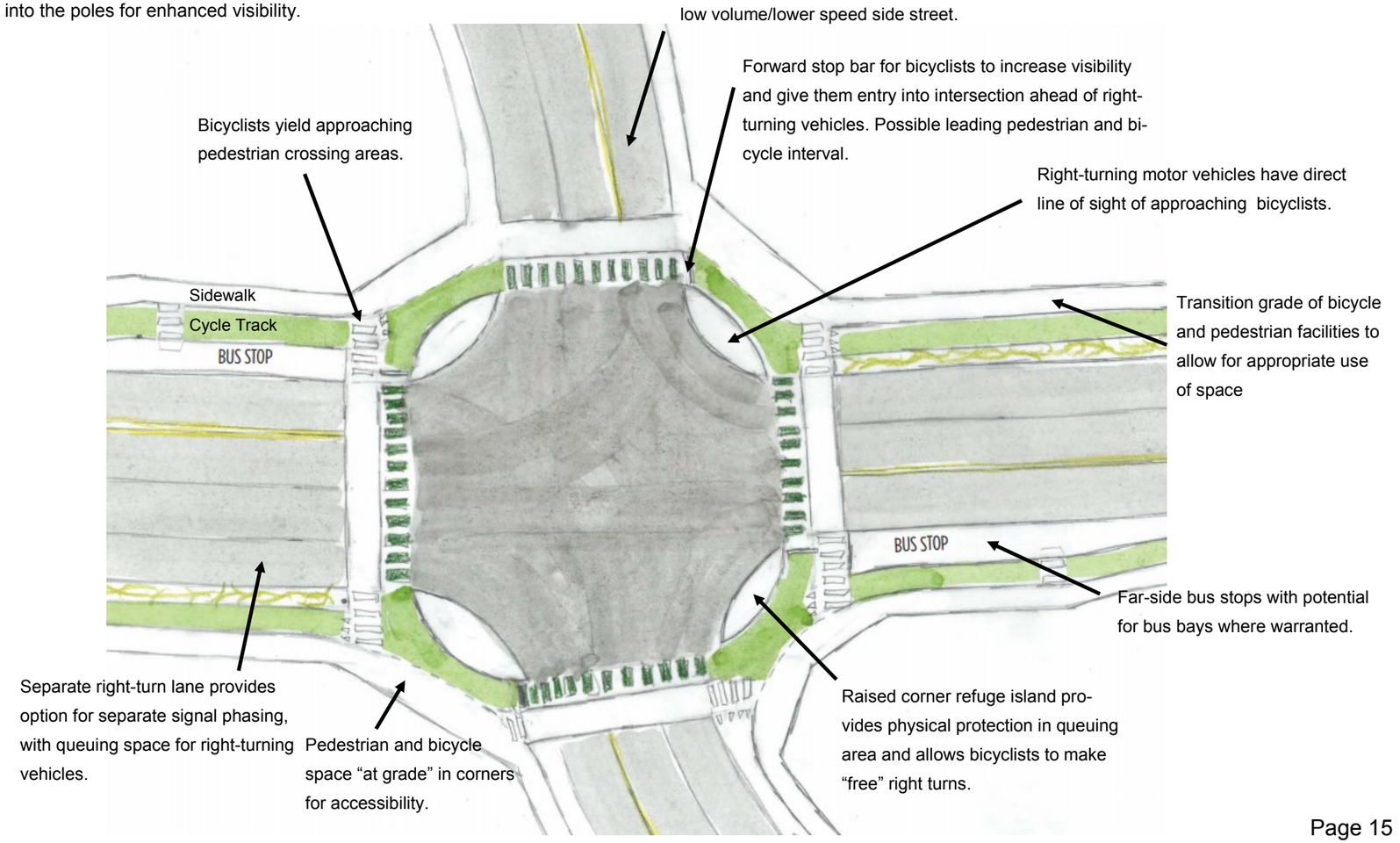


***Exhibit 8** - Proposed Signalized Intersection Design*

Unsignalized Intersections

Unsignalized intersections also will be treated differently depending on their context and use. Treatments may include the following:

- Addition of turn lanes on the approach to OR 43 in some locations.
- Inclusion of raised or painted crossings of side streets for pedestrian and bicyclists. In some locations, these crossings may be set back from OR 43 to provide vehicles with the opportunity to first cross the bicyclist and pedestrian crossing, and then find a gap in traffic on OR 43.
- Inclusion of enhanced pedestrian crossing treatments of OR 43 at selected high-demand locations with adequate sight distance (locations to be determined in future design phase)
- Change from full access to partial access or closures for some side streets. For example, a minor side street may be changed from right-in right-out only, to right-out only, or to right-in only, to improve safety and operations for all users, particularly in areas where sight distance and topography are limiting factors.
- The redesign of side-street approaches to lessen the skewed angles of some intersections.
- Installation of additional City standard LED street lighting for enhanced visibility.

Some of these treatments are illustrated in the conceptual plan layout, while others may be added during the design phase as feasible.

Hidden Springs/Cedaroak Realignment

The 2016 Plan includes a reconfiguration of Hidden Springs Road/OR 43 and Cedaroak Drive/OR 43—two closely spaced signalized intersections that have been identified as a Safety Priority Index System (SPIS) site in both 2012 and 2014. The design of the reconfiguration was developed in collaboration with the stakeholder groups to improve the operations and safety of the area. The reconfiguration includes the addition of a fourth leg at the Hidden Springs Road/OR 43 intersection, connecting with Old River Road. This intersection provides an intuitive connection and increased connectivity for all modes between the neighborhoods and land uses on both sides of OR 43.

The Cedaroak Drive intersection will be deemphasized, limited to right-in right-out left-in movements, and signal will be removed. Left turning movements onto OR 43 will be provided at the Hidden Springs Road/OR 43/Old River Drive intersection. A planning level operational analysis of the intersection is included in the Technical Appendix.

Stormwater Improvements

Stormwater run-off on this section of OR 43 is managed by existing ODOT stormwater facilities. Off-site stormwater is passed through the corridor while street runoff is conveyed and discharged directly to adjacent natural drainage ways often without treatment or detention. There are locations along OR 43 where street and off-site stormwater drains to adjacent private properties, into bicycle lanes, on to pedestrian pathways and/or creates localized overflow situations along the corridor due to lack of curb and inadequate conveyance systems with limited maintenance.

Stormwater Conveyance Improvements

Implementing the 2016 Plan design cross section will require the installation of new curb and drainage conveyance systems where necessary. Additionally, inadequate existing drainage facilities will need to be improved to convey and handle stormwater events as needed. Improvements should be considered in the final design such as the installation of combination curb and grate inlets as existing grate only inlets frequently clog with debris such as leaves.

Stormwater Quality Improvements

The 2016 Plan cross sections will provide the opportunity to construct planters between the curb and sidewalk/cycle tracks. The planter can be designed as a vegetative stormwater treatment facility such as a rain garden or swales similar to what is typically implemented during private development projects. Installation of rain gardens and other stormwater treatment facilities along the corridor where possible will provide improvement to stormwater quality. Rain gardens typical remove a majority of total suspended solids as run-off is captured and treated at these facilities prior to entering the closed stormwater pipe system. No Stormwater quality facilities will be required for non-pollutant generating impervious areas including separated sidewalks and cycle tracks. Storm filter catch basins and pollution control manholes can be utilized as an alternate or supplemental option for pollutant reduction. In addition, development and redevelopment of private property both upstream and downstream of this corridor is required to provide stormwater quality improvements in accordance with City code.

Stormwater Quantity Improvements

Due to topographic constraints, multiple drainage/watershed areas, and limited right of way along OR 43, the option of constructing regional stormwater facilities for detention is not being considered for this project. Proper detention of stormwater run-off along OR 43 will be achieved by development and redevelopment along the corridor, on private property in accordance with the City Development Code requirements. Stormwater run-off can be collected, detained, and released back into the system at a more manageable release rate in comparison to existing conditions in these developments outside of roadway right of way.

Example of rain garden Stormwater facility

Existing Pollution Control Manhole trapping debris

The 2016 Plan

III. THE 2016 PLAN: DETAILED LAYOUTS

The following section discusses in greater detail the design features and recommendations contained within the 2016 Plan for OR 43. It is organized geographically, and will examine the corridor segment by segment, from north to south.

Segment A

City Limits North of Arbor Dr. to South of Hidden Springs Rd.

Segment A is a section that spans both residential and commercial areas. The standard cross section is proposed for a majority of this section with the constrained cross section used at creek crossings and drainage areas with steep slopes. Impacts to drainage crossings will include extension of existing storm drainage pipes/culverts and installation of retaining walls/ handrails as needed.

Intersection improvements include the addition of a southbound right-turn from OR 43 onto Marylhurst Drive. The addition of the center turn lane on OR 43 allows for the possibility of making a two stage left turn from side streets onto OR 43. Marylhurst Drive/Lazy River Way intersection improvements include the provision of left turn pockets in all directions for OR 43 and Marylhurst Drive/Lazy River Way.

Further south is where the Robinwood Shopping Center and TriMet's Park and Ride facility is located (just north of Hidden Springs Road). As previously stated, some issues associated with the Cedaroak and Hidden Springs Road/Old River Road reconfiguration will need to be addressed during engineering design. The 2016 Plan recommends some of the following improvements along this section of the corridor such as:

- Addition of new connection of Old River Drive to OR 43/Hidden Springs Road intersection
- Removal of left turn onto OR 43 at Cedaroak Drive approach and remove traffic signal (intersection design and traffic control to be determined in future final design phase).
- Reconfiguration of bus stops (final placement and design of bus stops will be determined in future final design phase).

Right of way impacts are present in this area, most notably at the northwest corner of Marylhurst Drive and from Hidden Springs to Cedaroak Drive. The City's only existing TriMet park and ride facility is located at 19200 Willamette Drive and significant right of way impacts are anticipated at this location. No right of way impacts are expected on Old River Drive.

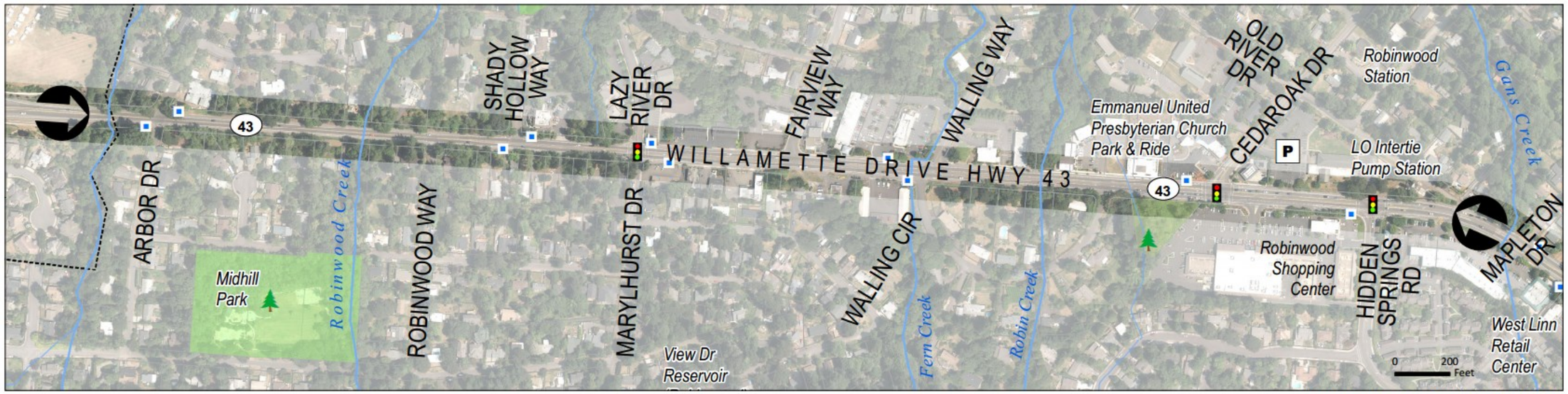


Exhibit 9 *- Segment A of 2016 Plan stretching from City limits north of Arbor Dr. to south of Hidden Springs Rd.*

Segment B

South of Hidden Springs Road to North of Dillow Drive

This segment of the plan includes areas with limited commercial and priority residential uses. This section also includes Mary S. Young regional park. In portions of this segment, higher density residential areas exist. A curbed median currently exists to prevent left turn maneuvers into the limited commercial area near Hidden Springs Road and the plan maintains this structure.

The standard cross section is proposed for a majority of this section with the constrained cross section used at creek crossings and drainage areas with steep slopes. Impacts to drainage crossings will include extension of existing storm drainage pipes/culverts and installation of retaining walls/ handrails as needed.

This segment of the corridor includes right of way impacts from Mapleton Drive to Mark Lane predominately on the east side of OR 43. Right of way impacts include the entire frontage of Mary S. Young Park where right of way was never dedicated to the road due to both areas being State owned. The initial phase of the project has the potential to tie into the existing multiuse path along the frontage of Mary S. Young Park.

The west side of OR 43 will require some right of way impacts from Mohawk Way to Dillow Drive but will be less extensive than the east side of OR 43. The 2016 Plan recommends using a constrained cross section north of Dillow Drive to minimize right of way impacts and account for steep topography in the area. If private redevelopment occurs the standard cross section should be considered in designated constrained cross section areas. Final placement and design of bus stops at Mark Lane and Linwood Drive as well as at Mapleton Drive will be determined in the future final design phase.

The 2016 Plan recommends the following improvements to this section of the corridor:

- Consideration of additional crossing treatments in the vicinity of the Mary S. Young Park (to be determined in future final design phase)
- Alignment of Mark Lane and Linwood Drive to create a perpendicular approach on Mark Lane (pending survey and engineering feasibility).

Exhibit 10 *- Segment B of 2016 Plan stretching from south of Hidden Springs Road to north of Dillow Drive*

Segment C

North of Dillow Drive to South of Failing Street

This segment includes right of way surrounded by both single-family and higher density residential uses. In addition to multiple land uses, this areas includes some sections of steep topography.

The standard cross section is proposed for a majority of this section with the constrained cross section used at creek crossings and drainage areas with steep slopes. Impacts to drainage crossings will include extension of existing storm drainage pipes/culverts and installation of retaining walls/ handrails as needed.

Intersection improvements include better alignment of side streets including Dillow Drive, Hughes Drive, Buck Street, and Caufield Street. Due to topography in the area, Barlow Street is planned to be disconnected from OR 43 with a bike and pedestrian connection to remain.

The realignment of Dillow Drive will trigger right of way impacts around 2690 Dillow Drive. The west side of OR 43 will have right of way impacts from Dillow Drive to White Tail Drive as well as on the east side from Elliott Street/West A Street to Failing Street. It is anticipated that some earthwork and retaining walls will be required along this section in key areas.

The 2016 Plan recommends the following improvements to this section of the corridor:

- Realignment of Dillow Drive to create a perpendicular approach (pending survey and engineering feasibility).
- Addition of a new traffic signal at Pimlico Drive (once warrants are met)
- Improvement to bus stops at Hughes Drive (final design and placement of stops will be determined in future final design phase).
- Create perpendicular approaches for Buck St. and Caufield St. (actual alignment to be determined in final design phase pending survey and engineering feasibility).
- Convert Barlow Street/OR 43 connection to a non-motorized connection. Re-route vehicle traffic to access Barlow Street via White Tail Drive.
- Change Failing Street to right-in, left-in only with exiting vehicles to be directed to signal on Elliot Street.

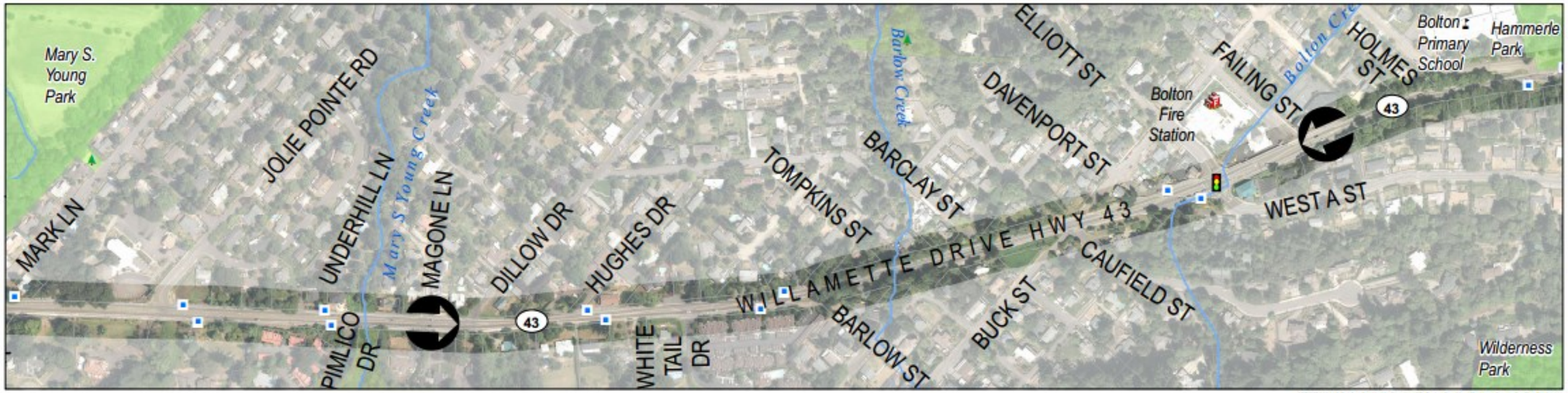


Exhibit 11 *- Segment C of 2016 Plan stretching from north of Dillow Drive to south of Failing Street*

Segment D

South of Failing Street to South of Holly Street

Segment D passes the Bolton Primary School, Hammerle Park and the West Linn Central Village shopping area with primarily residential development on the east side of the road. Steep topography characterizes this section of OR 43. Providing a safe, continuous, high-quality pedestrian network is crucial in this segment. A pedestrian activated signal currently exists at OR 43 and Holmes Street. The plan maintains a pedestrian crossing improvement on this section but relocates it to the area of Lewis Street.

The standard cross section is proposed for a majority of this section with the constrained cross section used at creek crossings and drainage areas with steep slopes. Impacts to drainage crossings will include extension of existing storm drainage pipes/culverts and installation of retaining walls/ handrails as needed.

Significant mobility improvements are recommended from Holmes Street to Lewis Street with the layout to be determined at final design. This will have an impact to Hammerle Park and the existing adjacent parking areas. In order to facilitate traffic during school drop-off and pick-up hours, a circulation path will need to be determined during final design.

A dedicated right-turn lane is planned for north-bound OR 43 at Hood Street. A median is currently in place in this segment and extends from Hood Street/ McKillican Street to Easy Street. The plan recommends removal of this median. In addition, grading and access to side streets will be critical during final design. It is anticipated that the entire intersection of Hood Street/McKillican Street will be raised by over one foot to better align side street grading.

There is potential to use the constrained cross section in this segment due to the presence of steep slopes and right of way impacts in certain areas. Most notable potential right of way impacts exist along the frontage of Hammerle Park and the east side of OR 43 from Lewis Street to south of Hood Street. Retaining walls are recommended on the east side of OR 43 north of Holmes Street as well as from Burns Street to Hood Street.

The 2016 Plan recommends the following improvements to this section of the corridor:

- Possibility of shifting existing pedestrian crossing and bus stops to the east end of Hammerle Park at Lewis Street.
- Improvements to bus stops and/or locations at Hood Street/OR 43/McKillican Street and OR 43 near Burns Street (final placement and design of bus stops will be determined in future final design phase).

Exhibit 12 *- Segment D of 2016 Plan stretching from south of Failing Street to south of Holly Street*

Segment E

South of Holly Street to South of Willamette Falls Drive

Segment E passes by the I-205 interchange and the intersection of OR 43 and Willamette Falls Drive with primarily commercial development on both sides of the road. Providing a safe pedestrian and bicycle network is crucial to this section as it provides a connection to Oregon City and the Willamette River area.

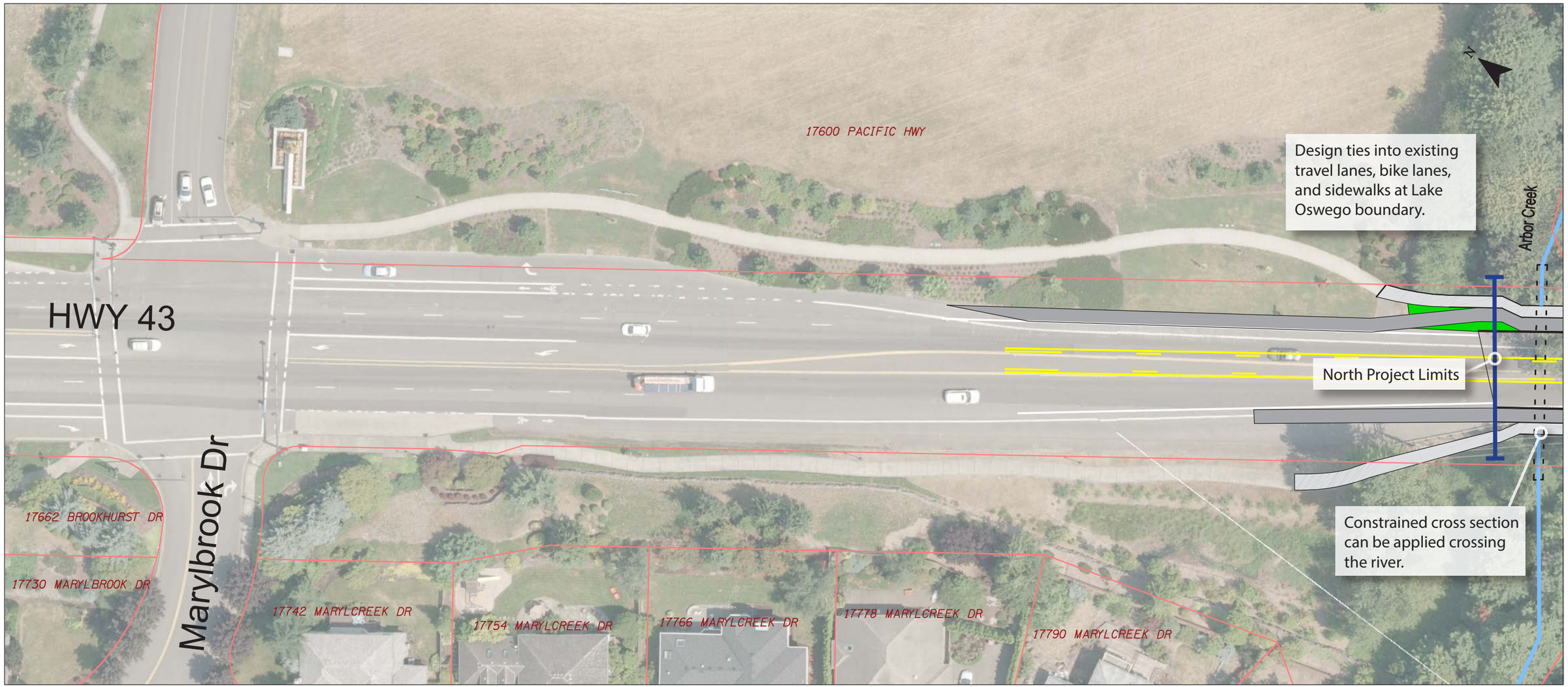
The standard cross section is proposed for a majority of this section with widening at major intersections as required. Impacts to drainage crossings will include extension of existing storm drainage pipes/culverts and installation of retaining walls/handrails as needed.

Current conditions in the area include a left-turning lane from the northbound lane and a right-turn lane from the southbound lane of OR 43 onto Willamette Falls Drive. Minimal distances between Willamette Falls Drive and the signalized intersection at the I-205 onramps create significant queuing on OR 43 and on Willamette Falls Drive at this intersection. In combination with high traffic volumes into downtown Oregon City.

This area includes an I-205 interchange and is subject to further review and refinement. Additional plan details for this area will need to be developed in the future for this segment. The initial concepts explored as part of the 2016 planning process are included in the Technical Appendix.

Exhibit 13 *- Segment E of 2016 Plan stretching from south of Holly Street to south of Willamette Falls Drive*

Existing Conditions at OR 43 and Willamette Falls Drive



Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]

[1] Bus stop locations are preliminary based on existing stop locations and potential stop consolidation. Final stop locations will be determined in the design phase of the project.
[2] Signalized Intersection design will be refined in the next design phase of the project. Signalized intersections will be designed to provide a high level of comfort and protection to bicyclists, pedestrians, and transit riders, utilizing design elements shown in the 'Signalized Intersection Concept'.
[3] Potential Right-of-way impacts are estimated and not based on survey. Actual right-of-way impacts will be determined in the next phase after acquiring survey data and refinement of the design to account for vertical grading, stormwater retention and utility relocation.

SCALE
0 50 100

Transit stop locations shown in concepts are approximate and will be revised in the design phase. In conjunction with transit stops, additional signing, striping, beacons and/or signals will be added to pedestrian crossings where warranted.

West Linn, Oregon

Figure **1**

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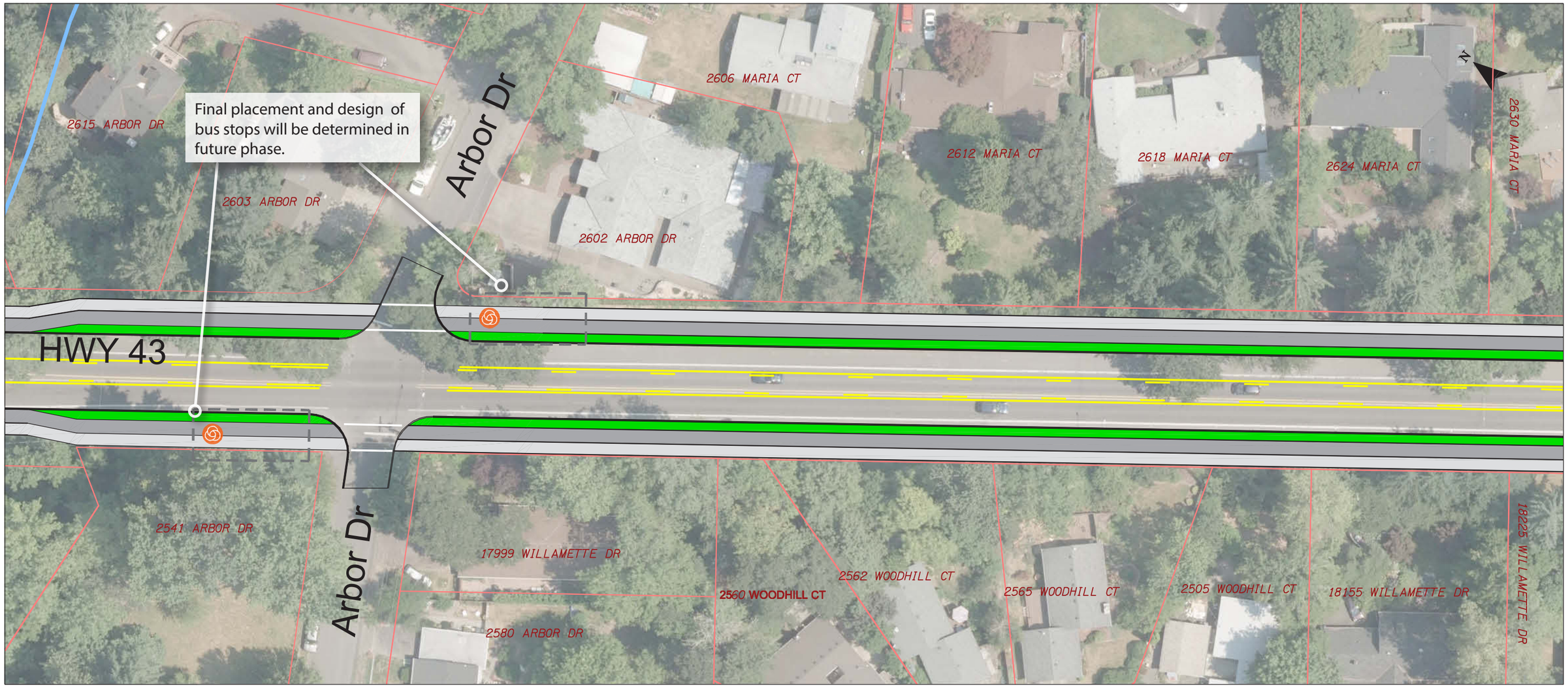

Final design is subject to ODOT approval

- Sidewalk
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West Linn, Oregon

Figure **2**

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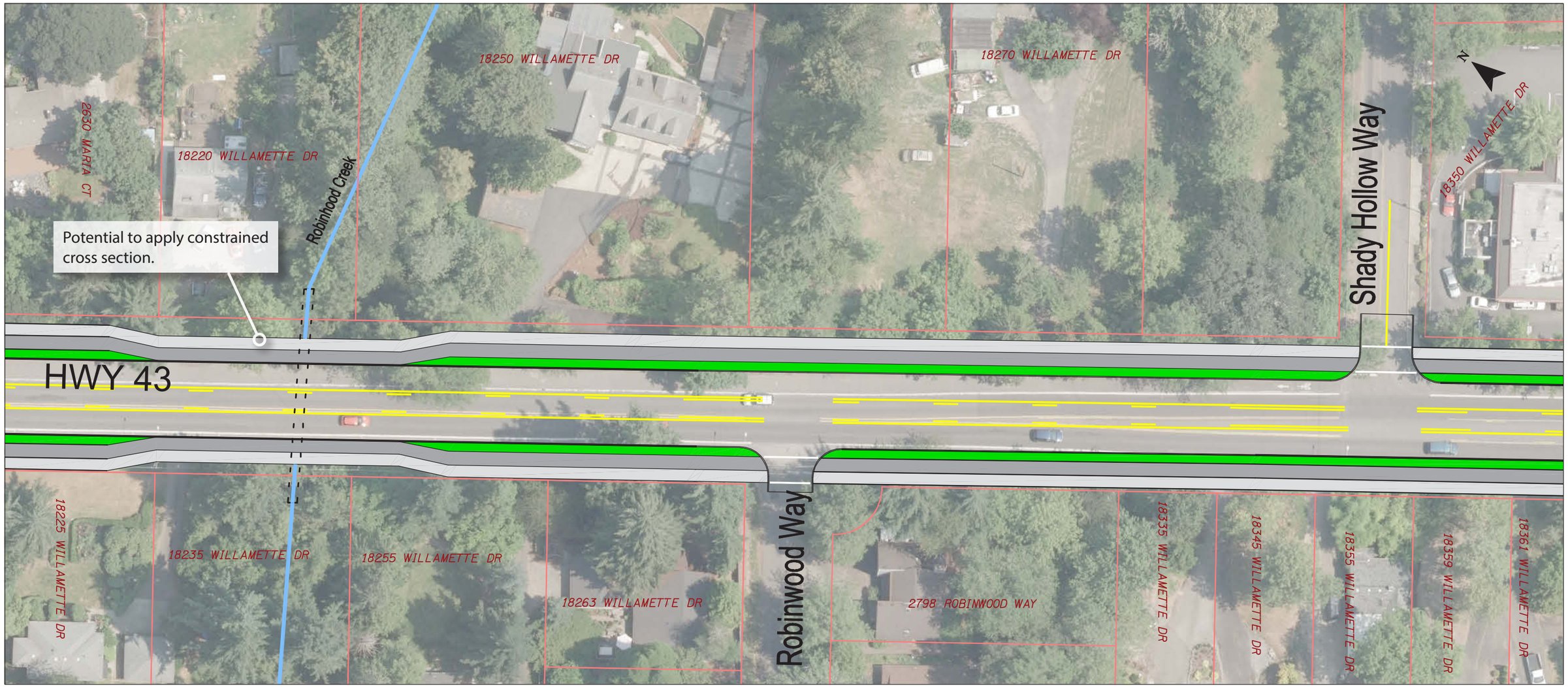

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- **Sidewalk**
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- **Buffer/Landscape**
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- **Signalized Intersection[2]**
- **Potential Right-of-way Impacts[3]**

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West Linn, Oregon

Figure **3**

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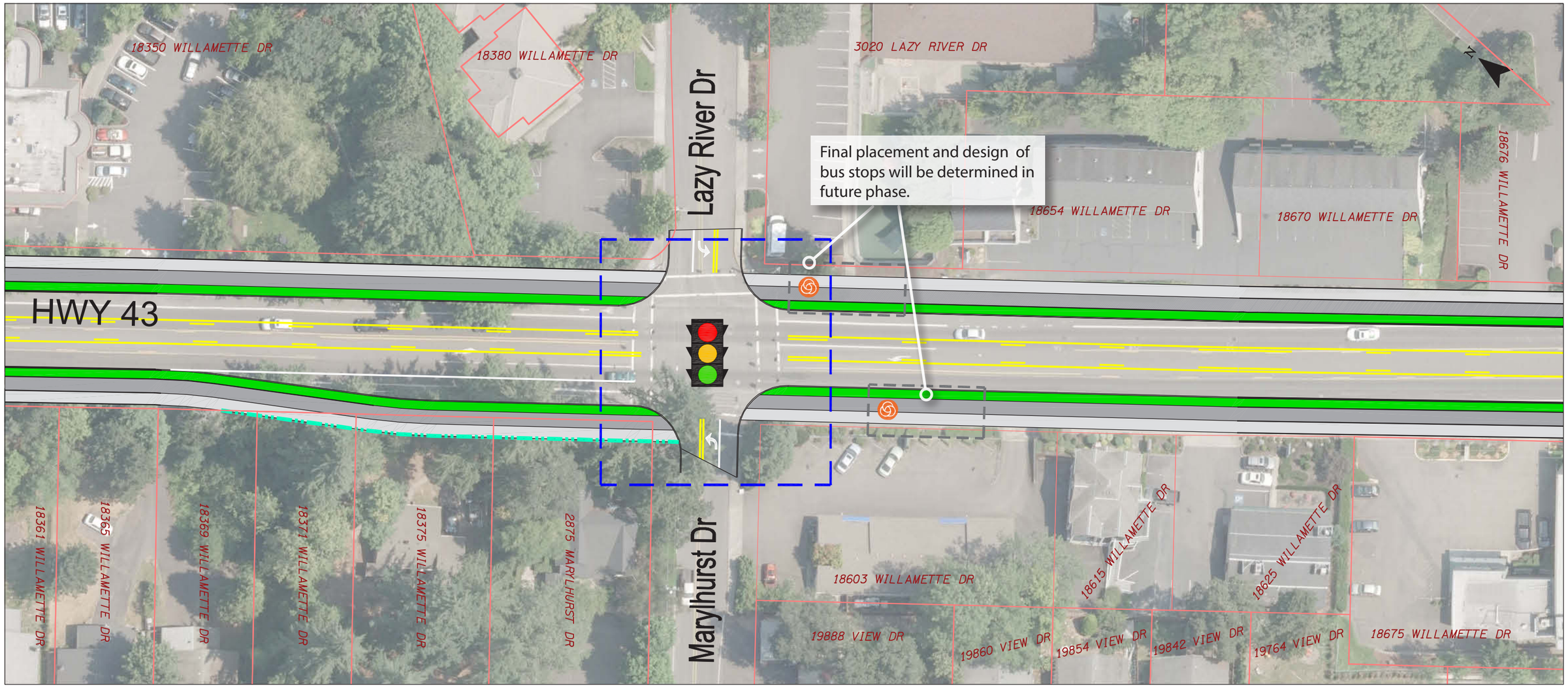

Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location**[1]
- **Signalized Intersection**[2]
- **Potential Right-of-way Impacts**[3]

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West Linn, Oregon

Figure **4**

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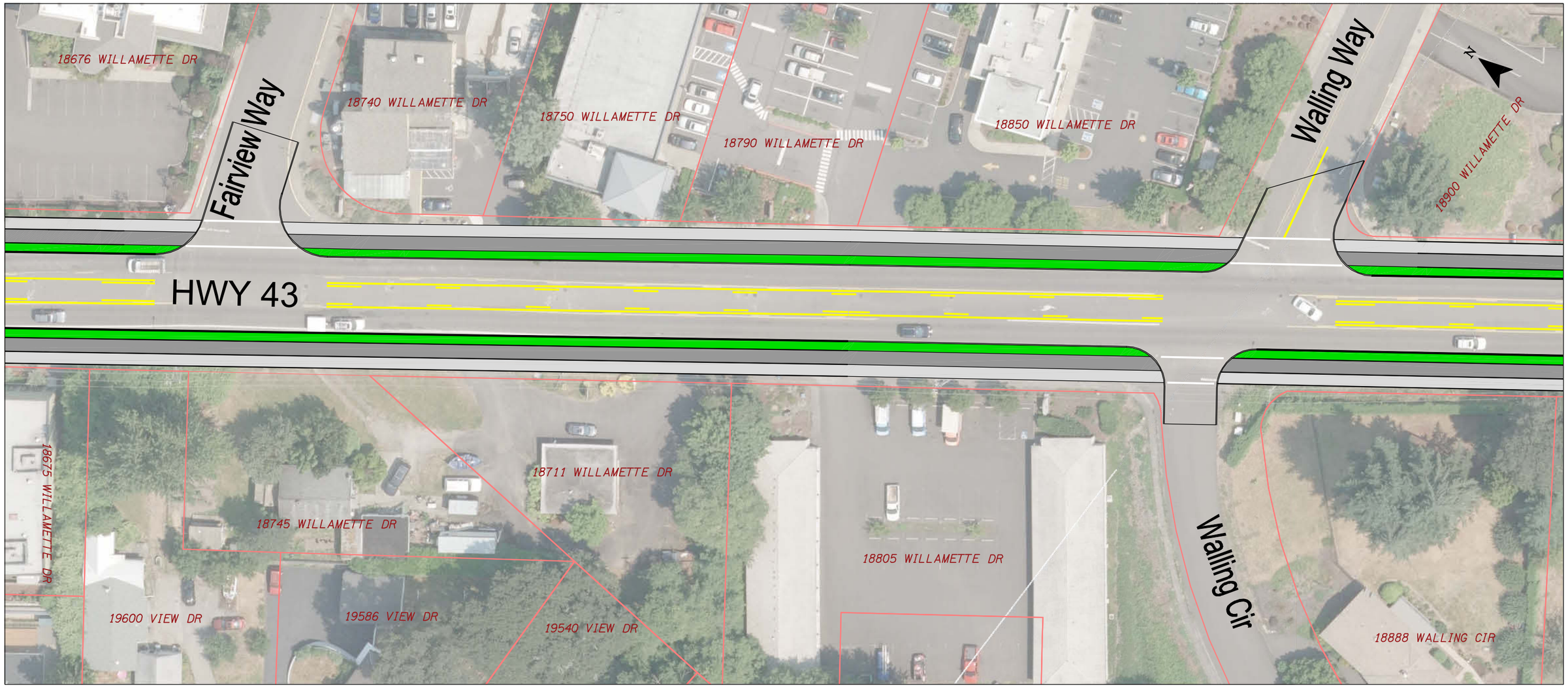

Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location[1]**
- **Signalized Intersection[2]**
- **Potential Right-of-way Impacts[3]**

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West Linn, Oregon

Figure **5**

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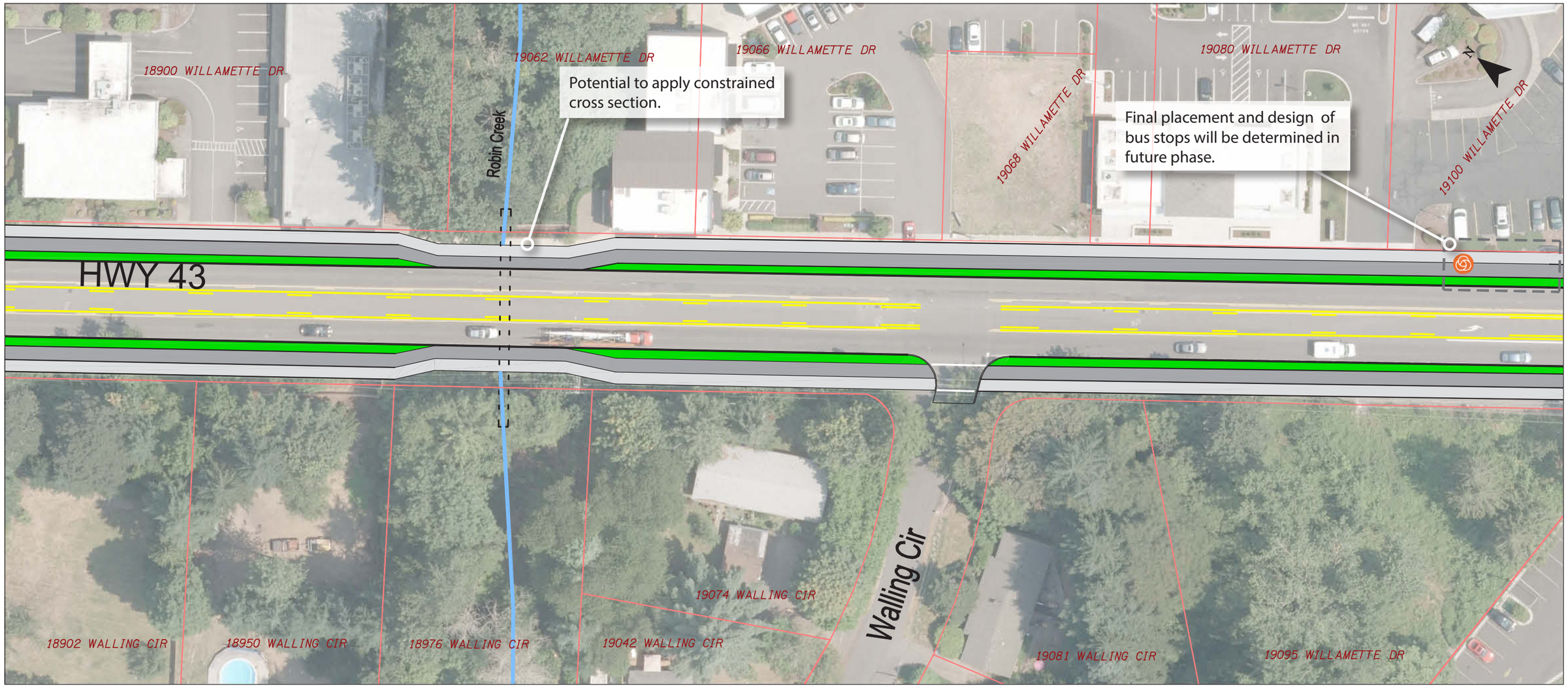

Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location[1]**
- **Signalized Intersection[2]**
- **Potential Right-of-way Impacts[3]**

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West Linn, Oregon

Figure **6**

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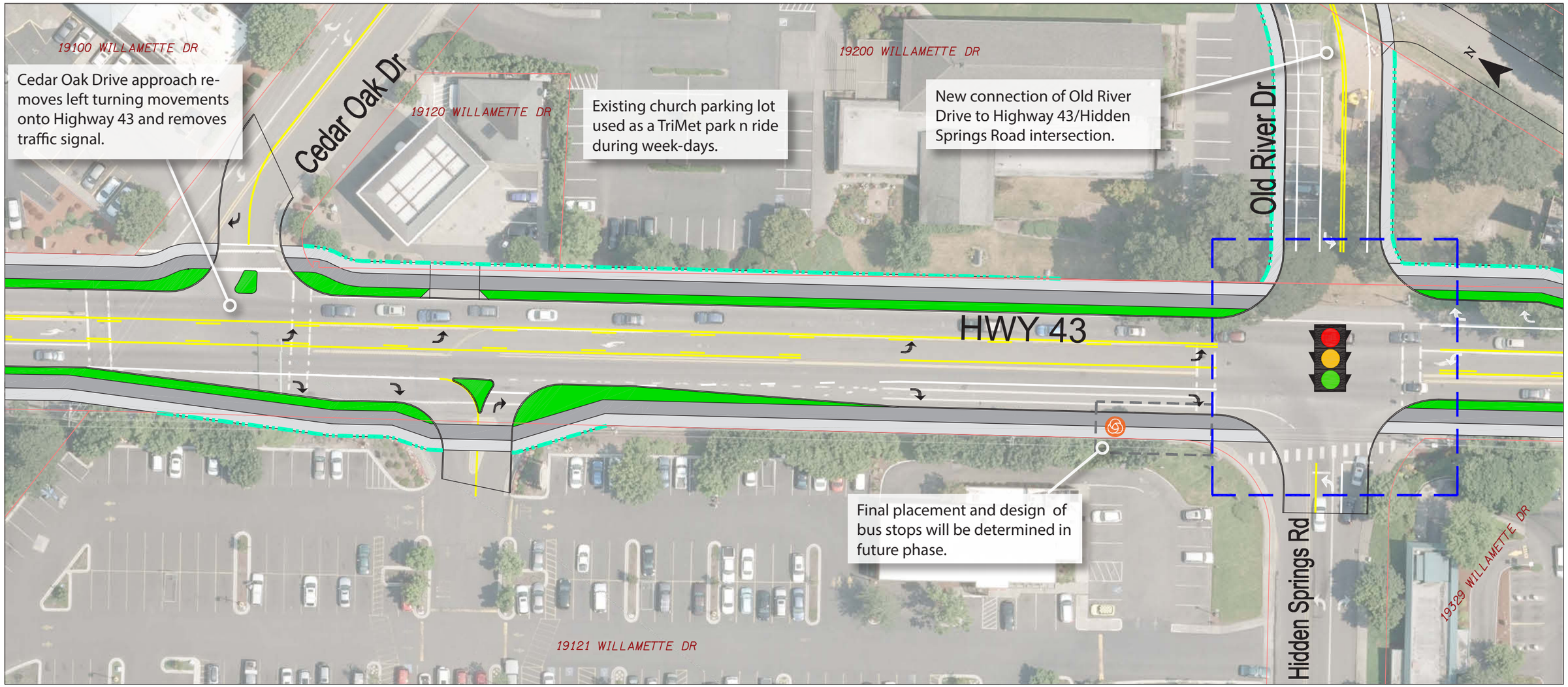

Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location[1]**
- **Signalized Intersection[2]**
- **Potential Right-of-way Impacts[3]**

SCALE
0 50 100

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West Linn, Oregon

Figure **7**

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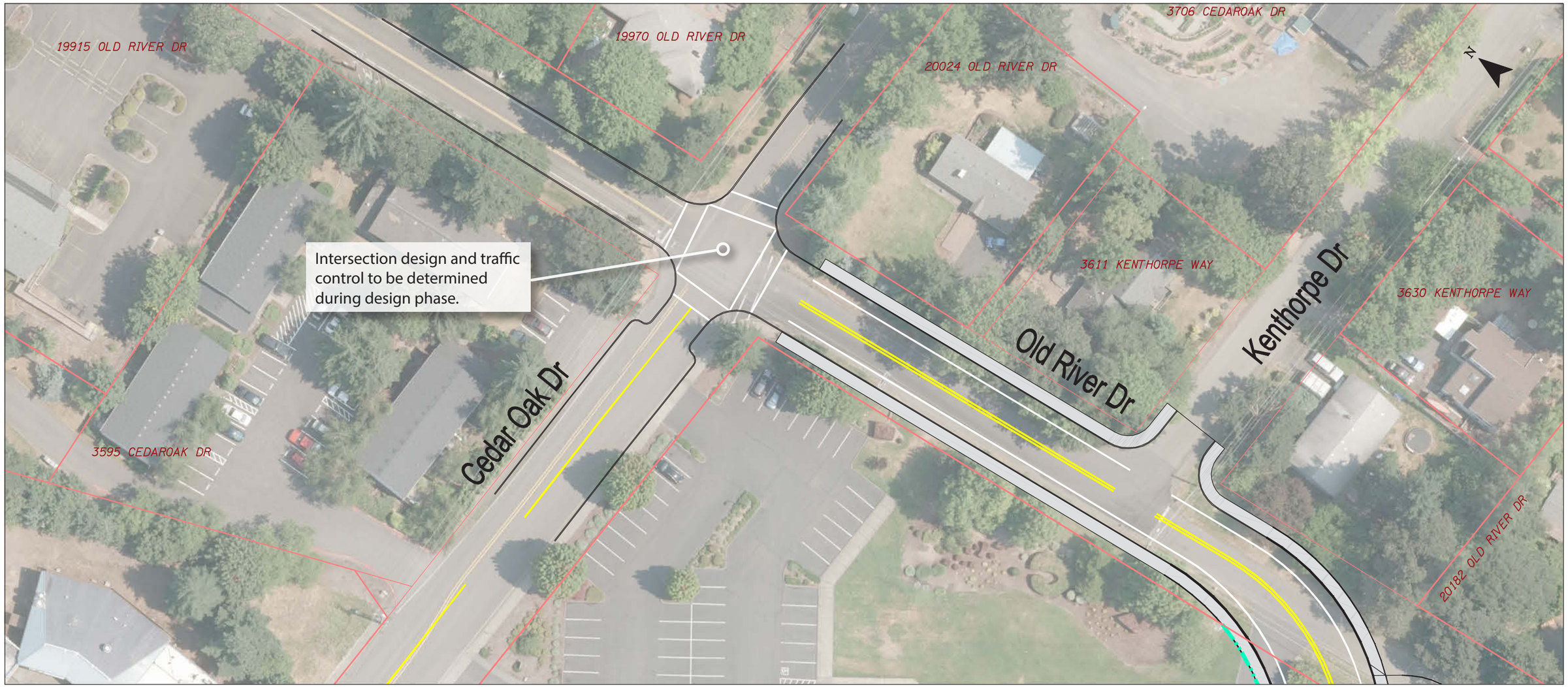

Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]

SCALE
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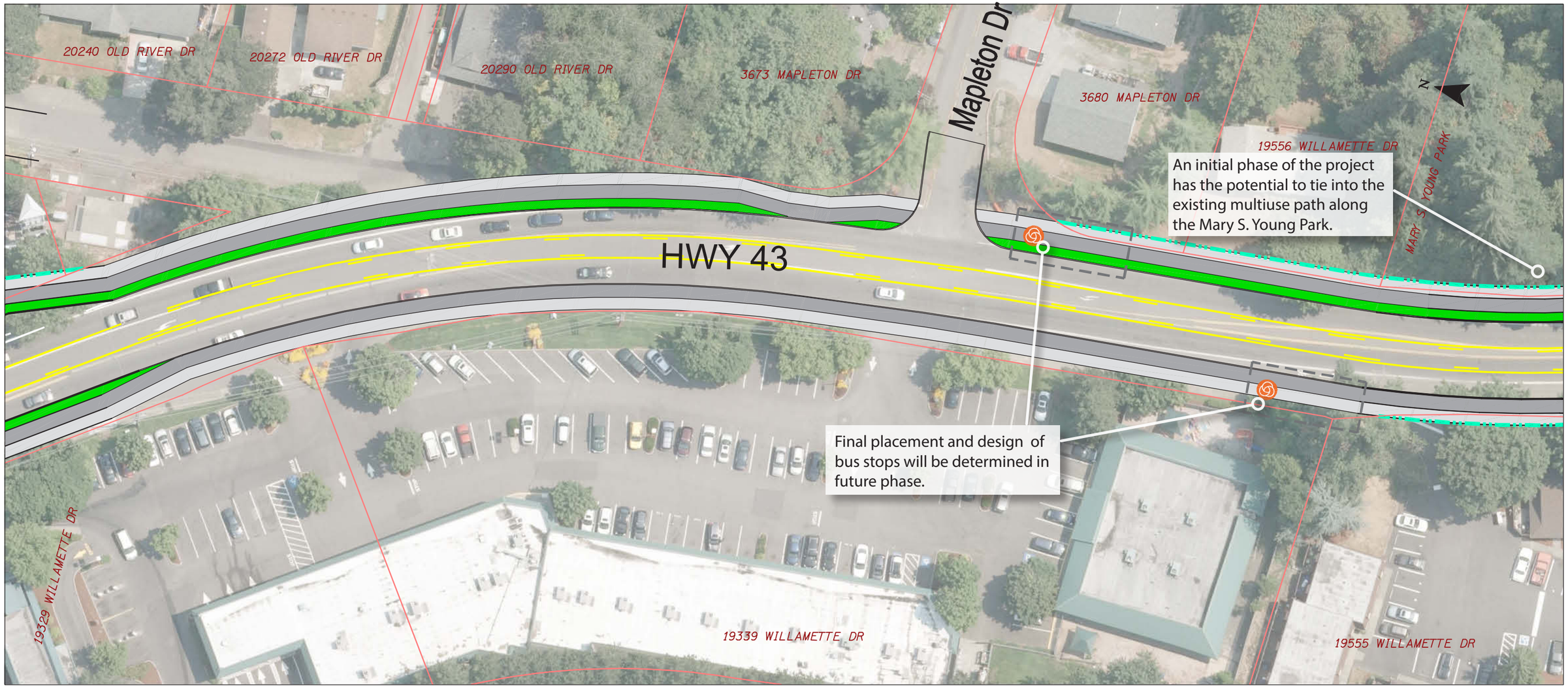
West Linn, Oregon

Figure **7A**

H:\proj\file\18640 - Willamette Drive Conceptual Plan Update\dwgs\figs\18640_CONCEPT_FIGURES_.dwg Mar 30, 2016 - 3:16pm - bcullimore Layout Tab: (FIG7A)



Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location[1]**
- **Signalized Intersection[2]**
- **Potential Right-of-way Impacts[3]**

SCALE
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West Linn, Oregon

Figure **8**

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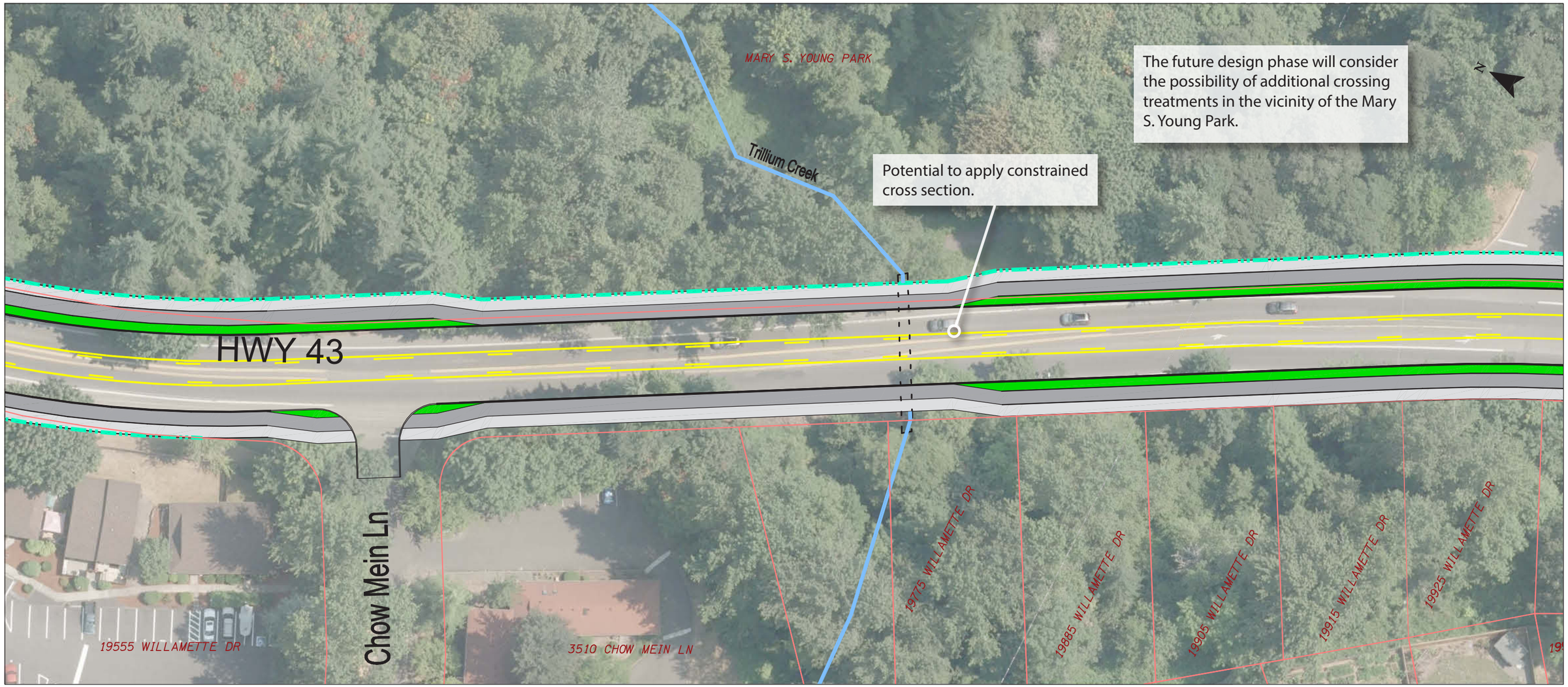
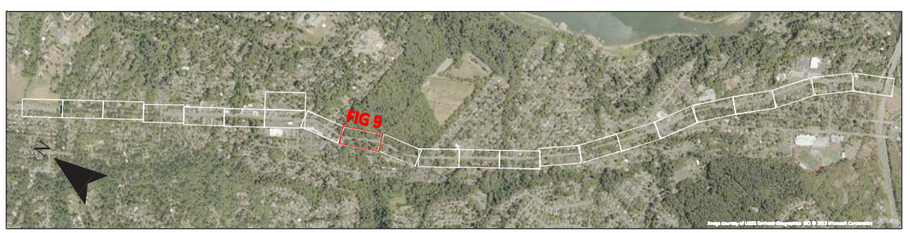


Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]



SCALE
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West Linn, Oregon

Figure **9**

H:\proj\file\18640 - Willamette Drive Conceptual Plan Update\dwgs\figs\18640_CONCEPT_FIGURES_.dwg Mar 30, 2016 - 3:21pm - bcullimore Layout Tab: (FIG9)

The future design phase will consider the possibility of additional crossing treatments in the vicinity of the Mary S. Young Park.

MARY S. YOUNG PARK

HWY 43

N

19945 WILLAMETTE DR
19975 WILLAMETTE DR
19995 WILLAMETTE DR
19944 WHITE CLOUD CIR
19978 WHITE CLOUD CIR
19990 WHITE CLOUD CIR
20026 WHITE CLOUD CIR
20044 WHITE CLOUD CIR
20060 WHITE CLOUD CIR
20110 WHITE CLOUD CIR
20128 WHITE CLOUD CIR
Mohawk Way
3855 MOHAWK WAY

Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]

SCALE
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West Linn, Oregon

Figure **10**

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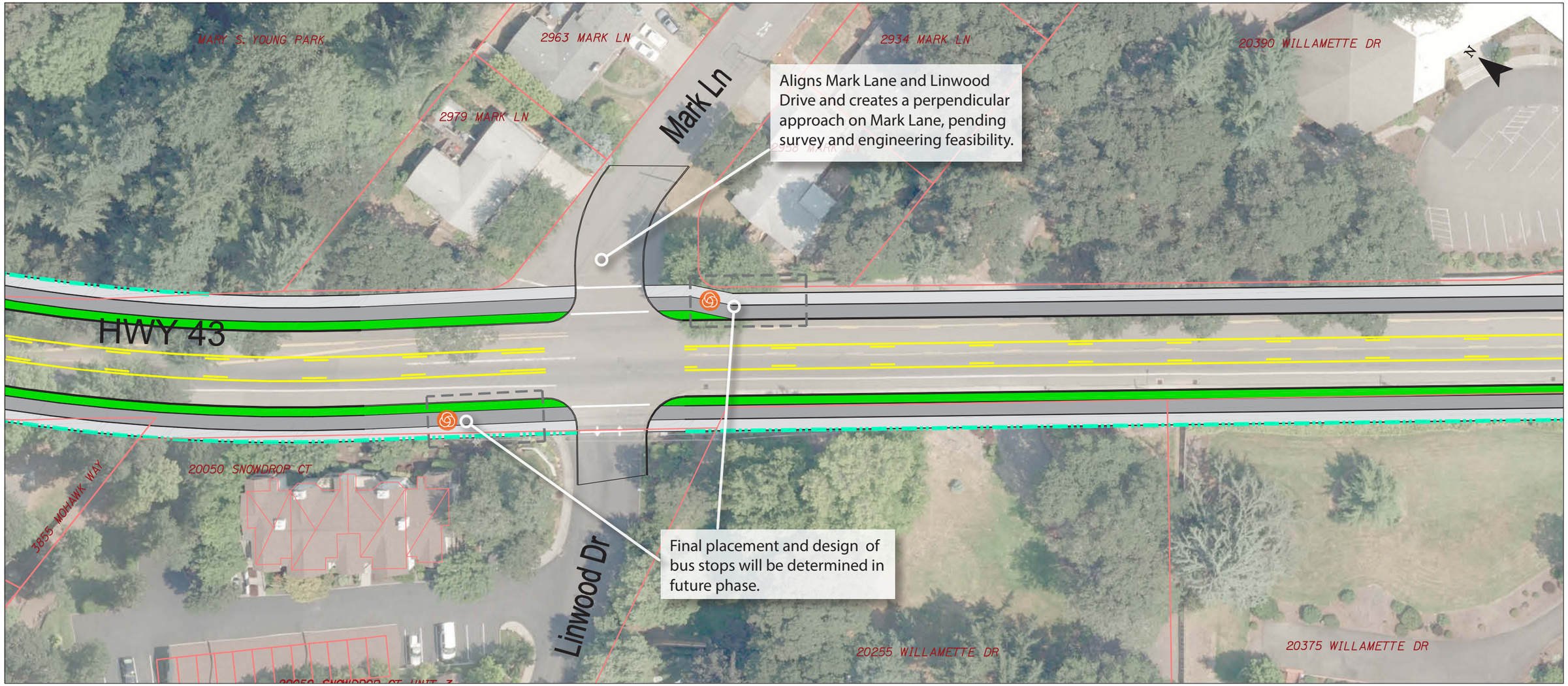
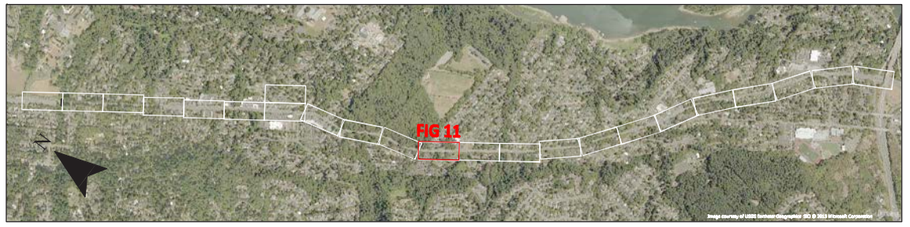


Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]



SCALE
0 50 100

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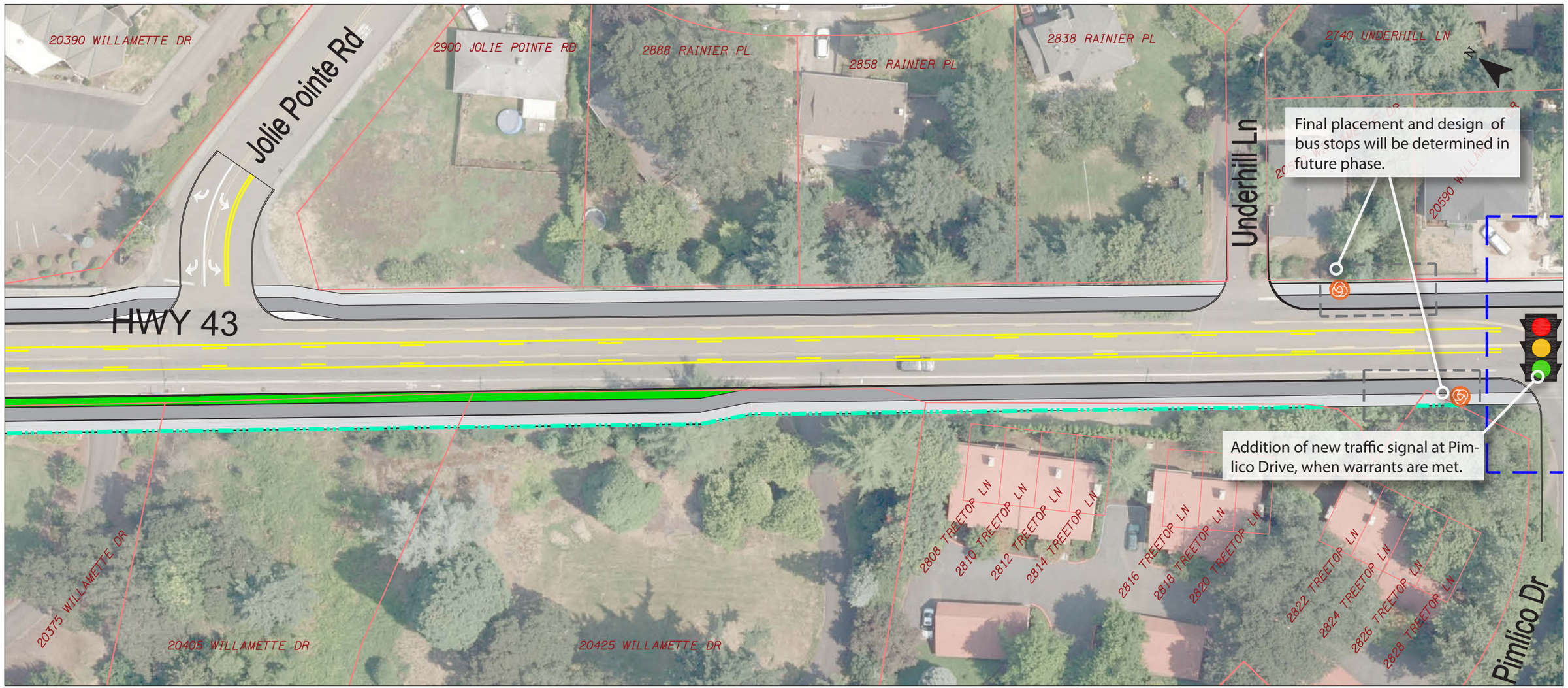
West Linn, Oregon

Figure **11**



Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location**[1]
- **Signalized Intersection**[2]
- **Potential Right-of-way Impacts**[3]

SCALE

0 50 100

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West Linn, Oregon

Figure **12**

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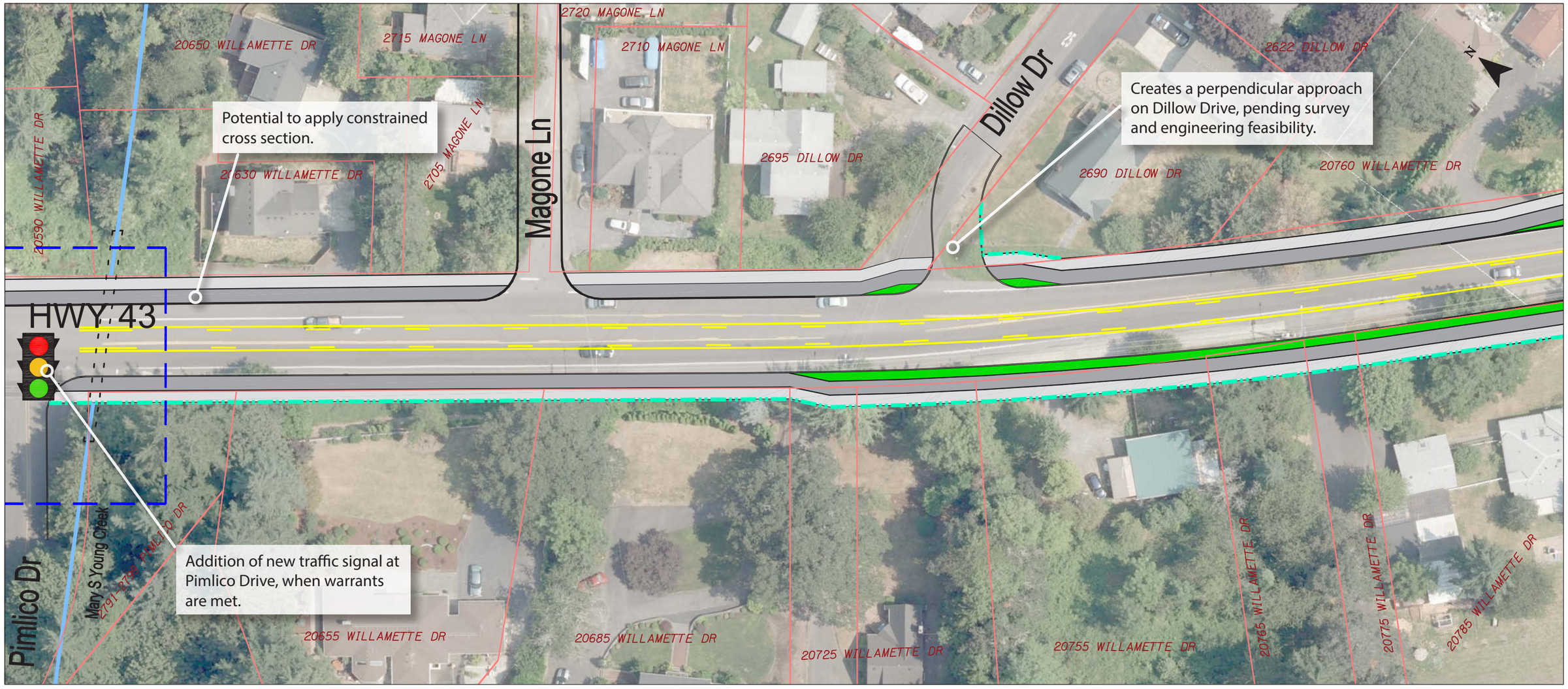
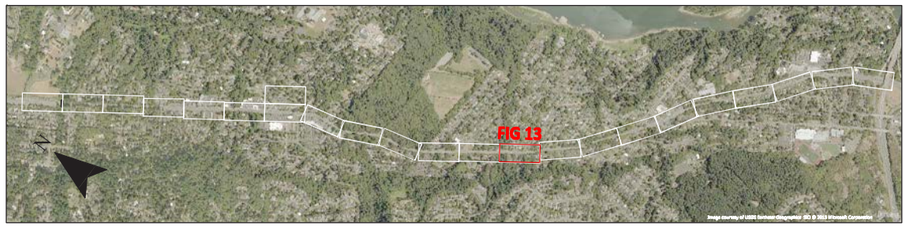


Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location**[1]
- **Signalized Intersection**[2]
- **Potential Right-of-way Impacts**[3]



SCALE

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West Linn, Oregon

Figure **13**

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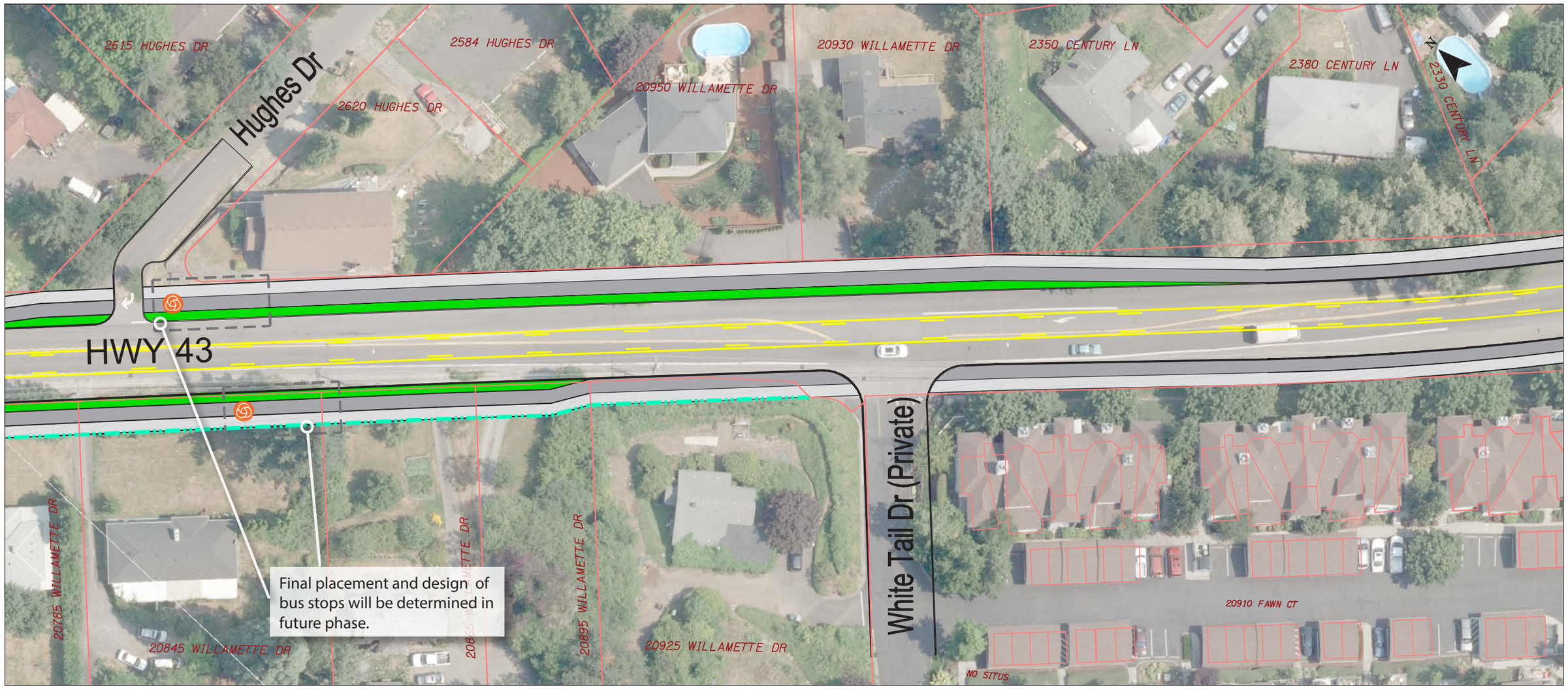

Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location[1]**
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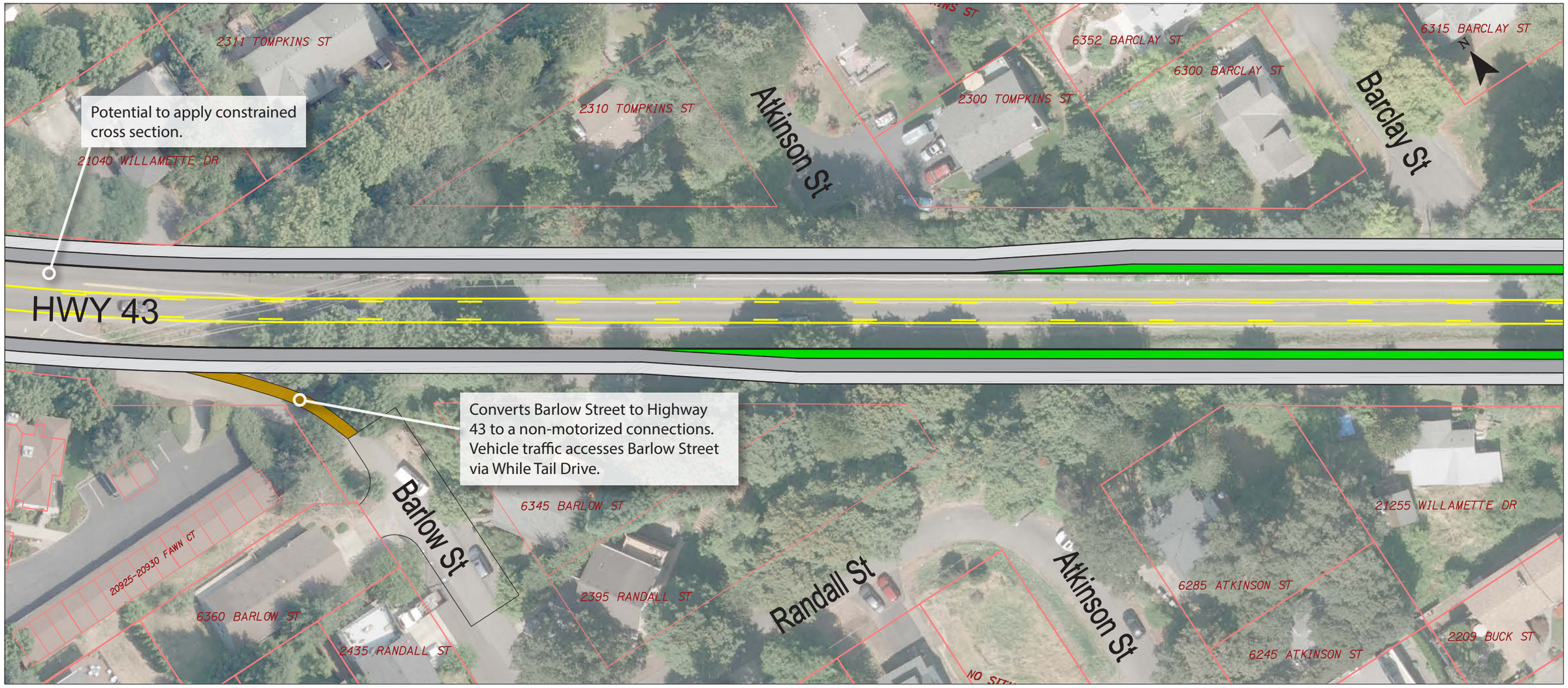
West Linn, Oregon

Figure **14**



Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location**[1]
- **Signalized Intersection**[2]
- **Potential Right-of-way Impacts**[3]

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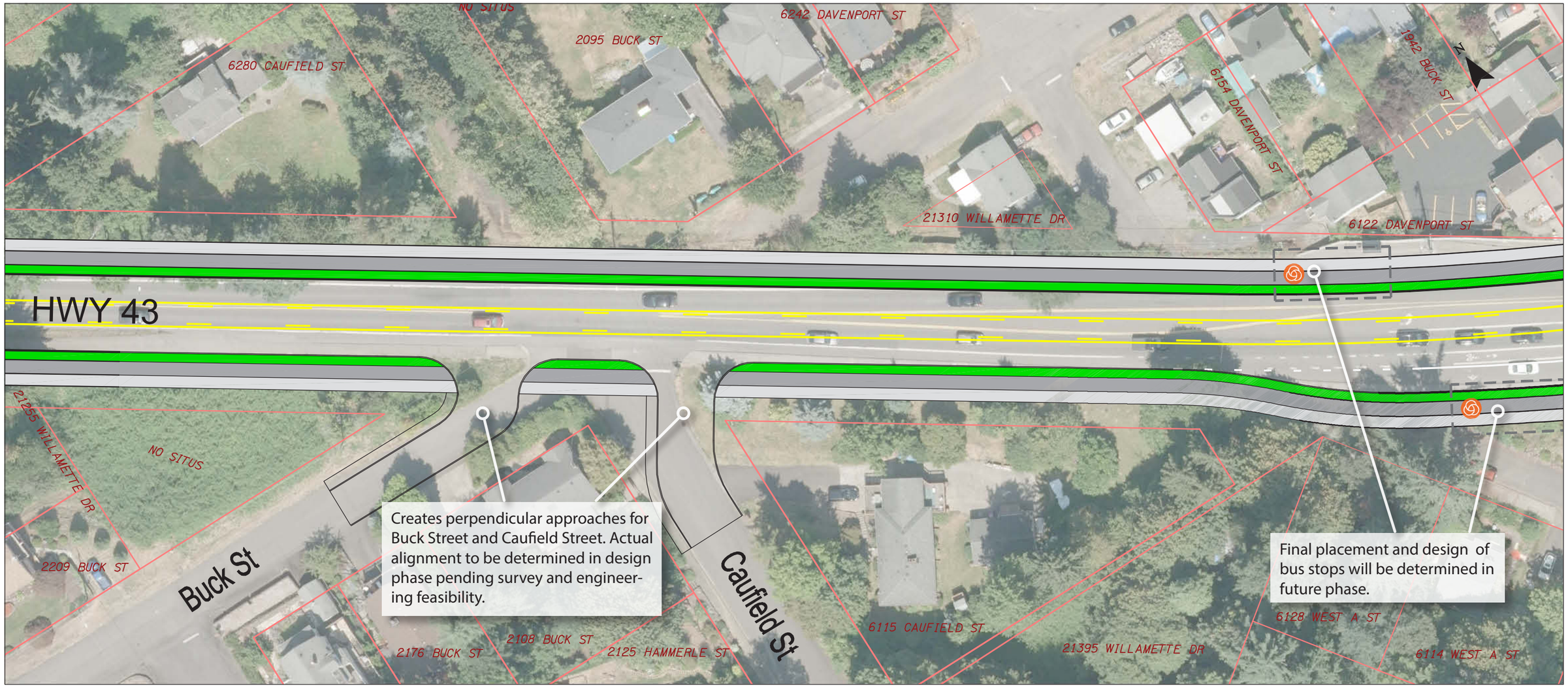
West Linn, Oregon

Figure **15**



Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location**[1]
- **Signalized Intersection**[2]
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West Linn, Oregon

Figure **16**

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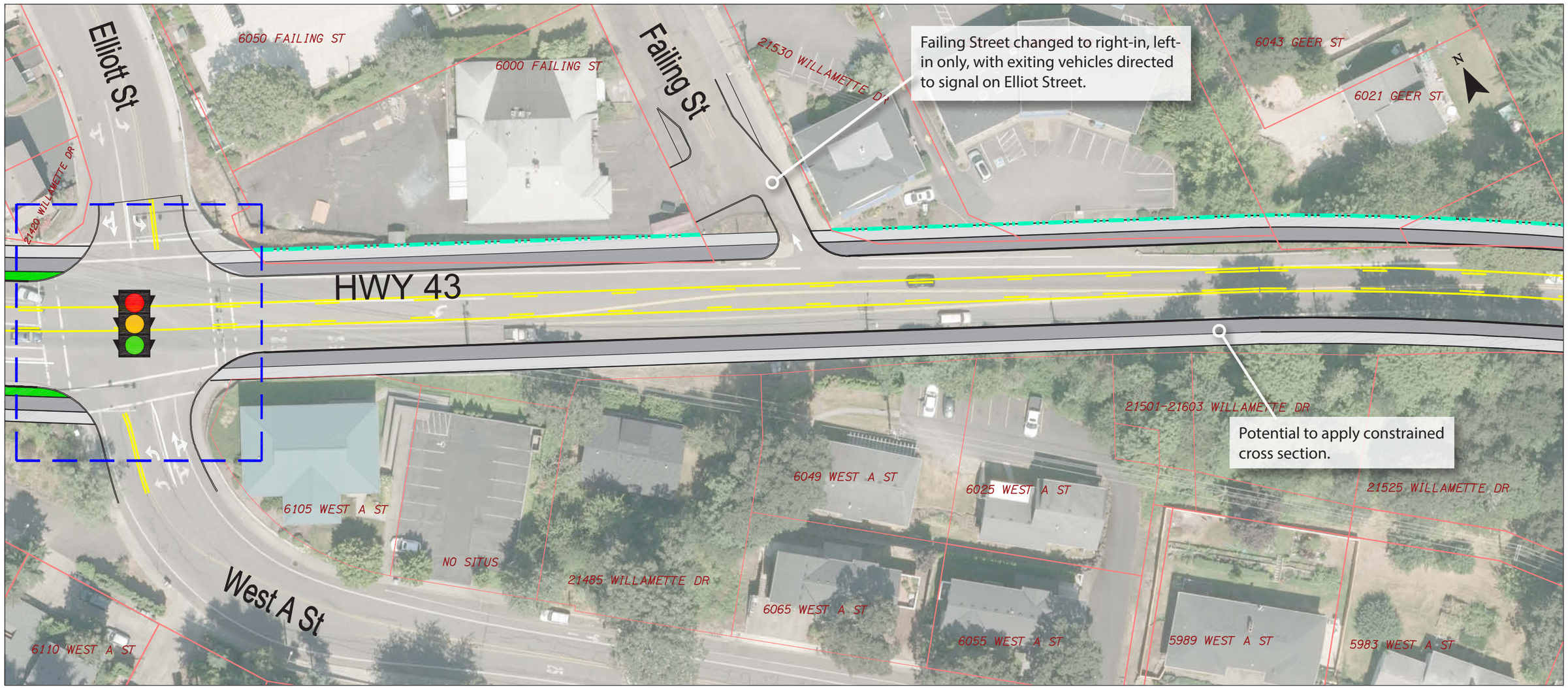

Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]

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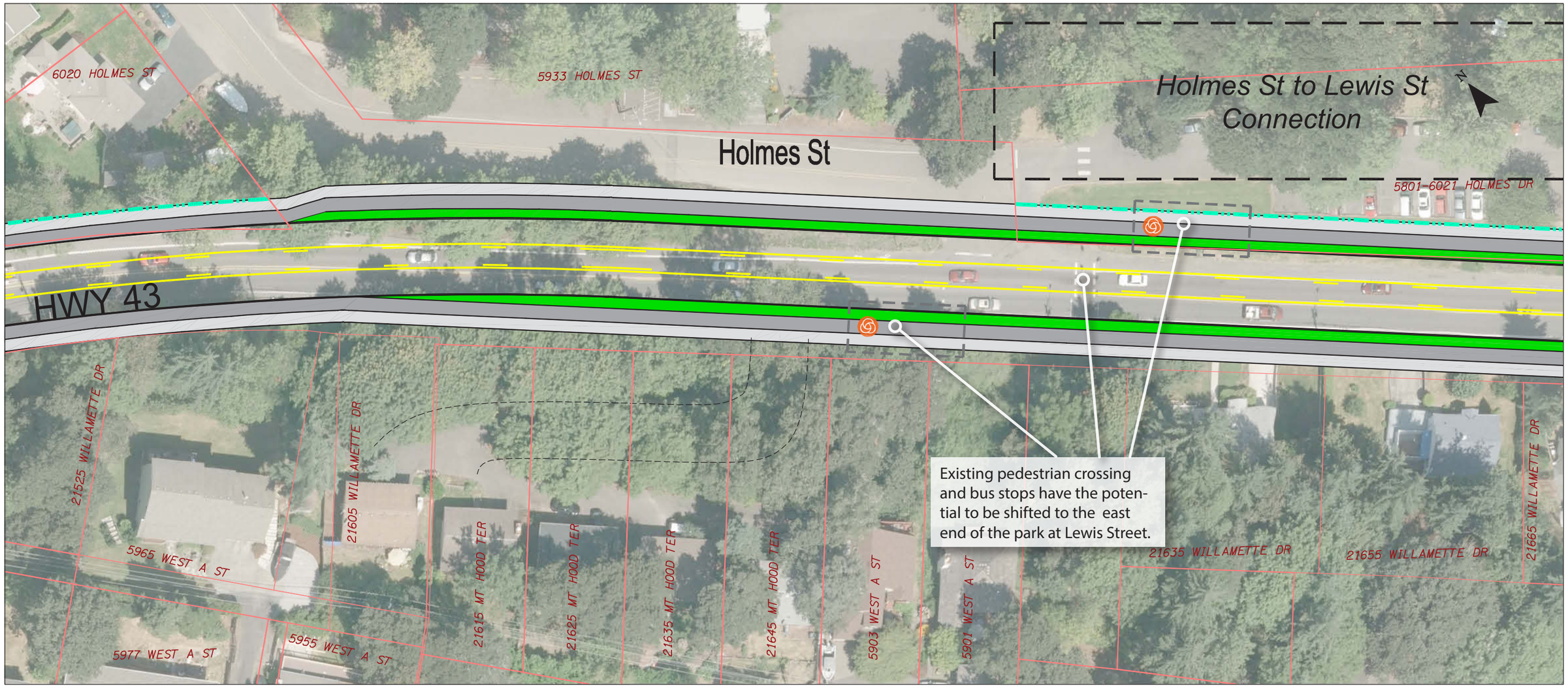
West Linn, Oregon

Figure **17**

H:\proj\file\18640 - Willamette Drive Conceptual Plan Update\dwgs\figs\18640_CONCEPT_FIGURES_.dwg Mar 30, 2016 - 3:39pm - bcullimore Layout Tab: (FIG17)



Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
- Potential Right-of-way Impacts[3]

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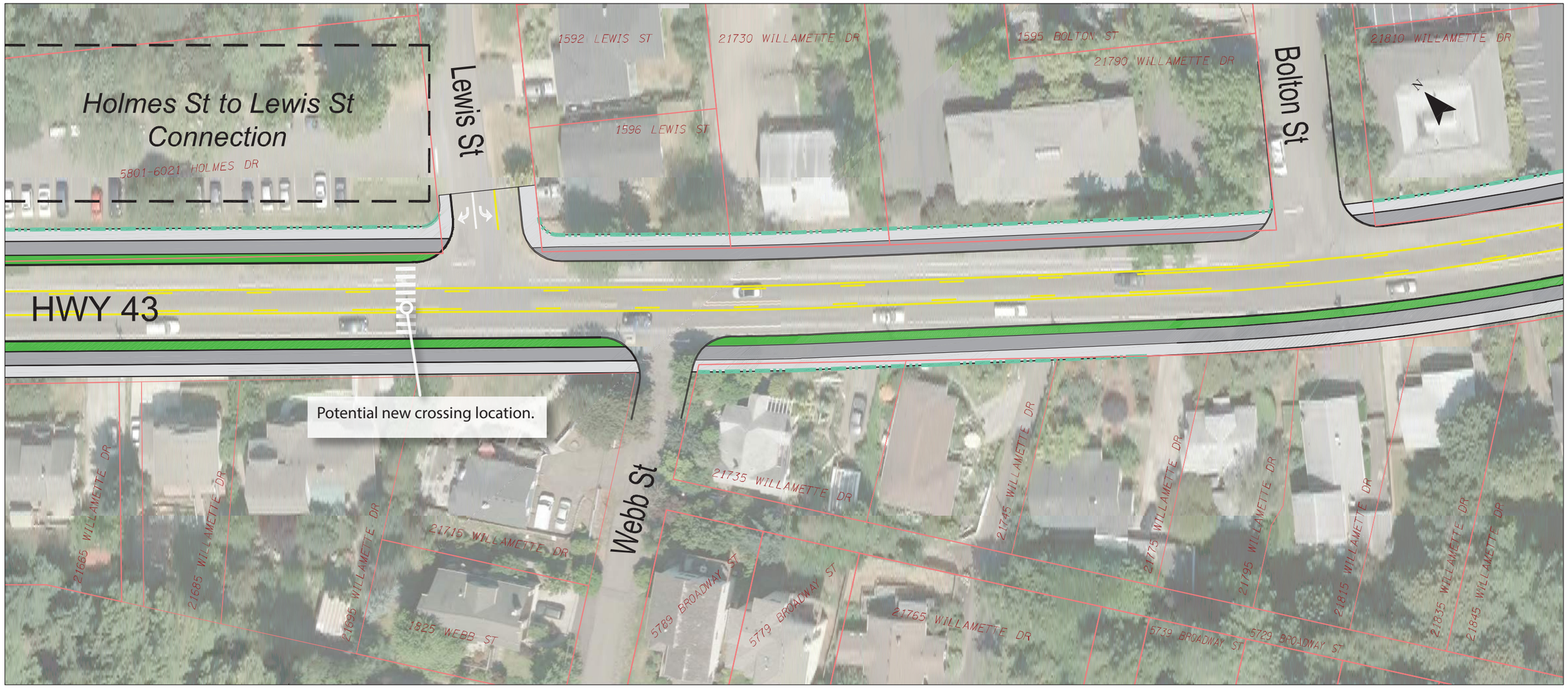
West Linn, Oregon

Figure **18**

H:\proj\file\18640 - Willamette Drive Conceptual Plan Update\dwgs\figs\18640_CONCEPT_FIGURES_.dwg Mar 30, 2016 - 3:42pm - bcullimore Layout Tab: (FIG18)



Final design is subject to ODOT approval

- Sidewalk
- Protected Bike Facility
- Buffer/Landscape
- TriMet Bus Stop Location[1]
- Signalized Intersection[2]
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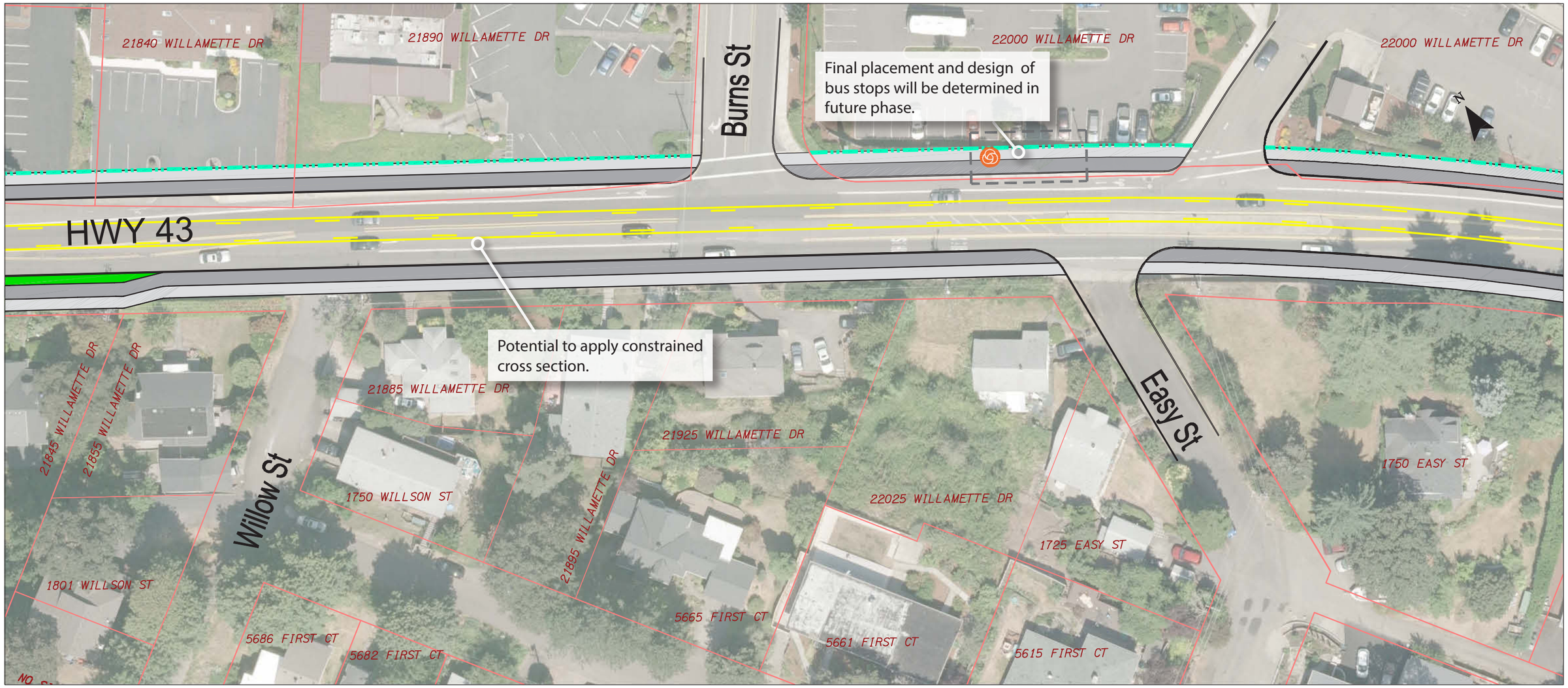
West Linn, Oregon

Figure **19**



Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location[1]**
- **Signalized Intersection[2]**
- **Potential Right-of-way Impacts[3]**

SCALE

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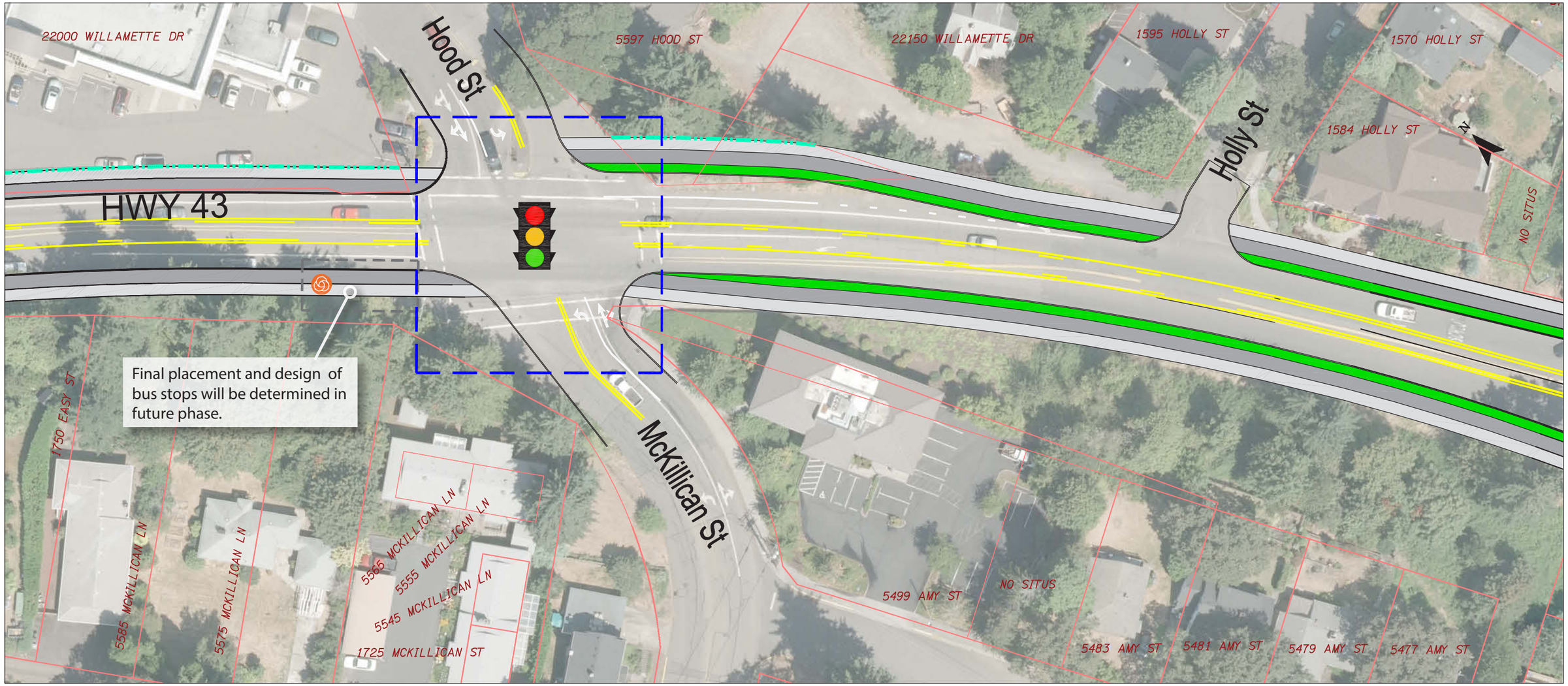
West Linn, Oregon

Figure **20**



Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
- **TriMet Bus Stop Location**[1]
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SCALE
0 50 100

West Linn, Oregon

Figure **21**

The concept transitions to the existing condition south of Holly Street. A future interchange area management plan (IAMP) will develop the design for the Highway 43 / I-205 interchange area. Planning level concepts developed as part of the Highway 43 planning process are included in Section IV.

Final design is subject to ODOT approval

- **Sidewalk**
- **Protected Bike Facility**
- **Buffer/Landscape**
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- **Signalized Intersection[2]**
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West Linn, Oregon

Figure **22**

H:\proj\file\18640 - Willamette Drive Conceptual Plan Update\dwgs\figs\18640_CONCEPT_FIGURES_.dwg Mar 30, 2016 - 3:52pm - bcullimore Layout Tab: (FIG22)

Analysis of Future Traffic Conditions

IV. ANALYSIS OF FUTURE TRAFFIC CONDITIONS

This section discusses the effect of the 2016 Plan on 2040 peak hour traffic volumes. The 2016 Plan addresses many of the connectivity and operational issues identified by the public and technical detailed analysis of the corridor. However, some issues will require further refinements and may require design exceptions to typical ODOT details to fully implement this design. Most analysis in this section remains unchanged from the 2008 plan as daily traffic volumes have not had a notable increase while peak hour volumes remain a concern due to commuting traffic along OR 43. An updated operational analysis on the reconfigured Hidden Springs Road and Cedaroak Drive intersections was performed; complete results of this analysis are included in the Technical Appendix.

Review of Traffic Analysis

The following are highlights of the traffic analysis work conducted at the beginning stages of the project, information which was used during the conceptual design process. These findings help in evaluating how well the proposal meets the needs identified in the corridor. Key findings are as follows:

- Peak hour conditions at unsignalized locations have significant delays for the minor street approaches to OR 43. However, only Pimlico Drive intersection was identified to meet warrants for traffic signal control in the future, based on the 2008 analysis.

- Peak hour conditions at the signalized study intersections operate with peak hour congestion, but all comply with the minimum acceptable standards for a state facility, based on the 2008 analysis.

- The Pimlico Drive intersection with OR 43 meets preliminary warrants for installing a traffic signal, based on current peak hour volumes. However, further study is needed to fully justify a traffic signal at this location.

- The two locations that are approaching the minimum acceptable limit are the two adjoining intersections at Cedaroak Drive and at Hidden Springs Road. The Cedaroak Drive intersection operates at 90 percent of capacity in the AM peak hour, and the Hidden Springs Road intersection operates at a high capacity in the PM peak hour. Peak hour delays have been visually documented at these locations due to the close proximity of the signals.

- The Bolton School access onto OR 43 provides for a pedestrian activated signal crossing. Vehicle access at this location can create significant queues on OR 43, since there is not a left-turn lane on the highway.

- Most of the segments of OR 43 do not meet ODOT access spacing standards today. The most significant exemptions are those that have a higher frequency of activity, notably those that serve commercial areas.

- Pedestrian volumes recorded during the AM and PM peak hours at the study intersections showed minimal levels at all locations. The exception is at Cedaroak Drive/Hidden Springs Road where the Park & Ride lot for transit access is located.

- Similarly, the observed bicycle volumes and transit usage during peak hours is relatively low. Bicycle volumes are generally higher during midday and on weekends than the levels observed during weekday commute hours.

2040 Conditions without Proposed Improvements

Table 1 at right illustrates future (2040) intersection performance assuming no roadway capacity or operation improvements are made to OR 43. The table shows that four of the intersections controlled by traffic signals will exceed the minimum operational standards during one or both of the peak hours by 2040 without changes either to the traffic signal timing or to the approaches provided at those locations. Locations without traffic signals will continue to have long delays for traffic turning onto OR 43.

Table 1: 2040 Future Base Weekday Peak Hour Intersection Level of Service without proposed Conceptual Design Plan

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	Average Delay (Sec)	Volume/ Capacity (v/c)	Los	Average Delay (Sec)	Volume/ Capacity (v/c)
Signalized Intersections						
Hwy 43/Marylhurst Dr.- Lazy River Way	D	41.9	**>1**	D	44.7	**>1**
Hwy 43/Cedaroak Dr.	**F**	95.3	**>1**	B	14.8	0.88
Hwy 43/Hidden Springs Rd.	C	21.7	0.78	E	57.2	**>1**
Hwy 43/West A St.	C	23.8	0.88	C	25.4	0.95
Hwy 43/Hood St.-McKillican St.	D	36	0.93	D	48.8	**>1**
Unsignalized Intersections						
Hwy 43/Arbor Dr.	A/**F**	**> 50**	0.00/0.98	B/**F**	**> 50**	0.05/**>1**
Hwy 43/Pimlico Dr.	B/**F**	**> 50**	0.12/**>1**	B/**F**	**> 50**	0.27/**>1**
Hwy 43/Holmes St.	B/**F**	**> 50**	0.06/**>1**	B/**F**	**> 50**	0.04/**>1**
Hwy 43/Lewis St.	B/**F**	**> 50**	0.02/0.49	B/**F**	**> 50**	0.02/0.47

Notes: LOS = Level of Service

Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

Unsignalized Intersections Operations:

A/A = Major street turn LOS/Minor street turn LOS

#/# = Major street turn v/c /Minor street turn v/c

IV. Analysis of Future Traffic Conditions

2040 Conditions with Proposed Concept Design

The 2016 Plan addresses some, but not all of the identified operational problems, primarily because of issues with terrain and right of way constraints along the study corridor. In addition, the City of West Linn and many residents expressed their preference to retain the narrow, three-lane configuration of OR 43 in order to protect the character of the area. This desire is consistent with ODOT's facility plan for OR 43, as well as the Regional Transportation Plan.

At some intersections, additional turn lanes have been added where they improve overall intersection operations. In certain cases, additional through lanes would be required for intersection performance to be within ODOT operational standards. Those intersections may require design exceptions from ODOT.

Storage lengths for turn pockets will be designed to accommodate the forecasted 2040 95th percentile queue or meet minimum ODOT standards, whichever is greater. Exceptions are those locations where storage is limited by geometry (Lewis Street and Hood Street) or where congestion causes longer queues than can be cleared during a single traffic signal cycle. The proposed lane configurations and approximate storage lengths are shown in the detailed layout figures.

2040 intersection performance according to the improvements suggested as part of the 2016 Plan are illustrated in Table 2.

Findings and Recommendations

- According to surveyed residents, many through vehicles pass left-turning vehicles by using the shoulder on the right at the intersection of OR 43/Arbor Drive where there is sufficient pavement width, creating conflicts with cyclists who use the shoulder. The standard proposed cross section for OR 43 at Arbor Drive will improve both safety and queuing on OR 43.
- The intersection of OR 43/Marylhurst Drive cannot be fully mitigated to meet operational standards without the addition of additional through lanes which are not included in the proposed conceptual design. The addition of the south-bound right turn lane and side street left pockets will help mitigate in certain conditions.
- The 2016 Plan proposes that Cedaroak Drive be realigned so that the approach removes the left-turning movements onto OR 43 along with removal of the traffic signal. An approximation of the trips at this location was made based on trip generation for similar land use. This information was used to determine intersection performance and queue lengths for 2040.
- Circulation at the school and park at Holmes Street and Lewis Street will need to be modified to allow additional movement at Lewis Street. This would re-direct vehicle traffic to the school through the parking lot that adjoins the park area. It is expected that the peak school activity (before and after school session) would not occur at the same time as peak park activity, and so the conflicts between parked vehicles and entering school traffic would be minimal. There is sufficient right of way at Lewis Street to provide a southbound left-turn pocket. This modification would improve operations for the side streets allowing left-turning vehicles to be removed from the right-turning traffic stream.
- The intersection OR 43/Hood Street - McKillican Street will need to be modified as identified in the detailed layouts with grade revisions to improve functional performance over existing conditions.

Table 2: 2040 Future Base Weekday Peak Hour Intersection Level of Service with Proposed Conceptual Design Plan

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	Average Delay (Sec)	Volume/ Capacity (v/c)	Los	Average Delay (Sec)	Volume/ Capacity (v/c)
Signalized Intersections						
Hwy 43/Marylhurst Dr. – Lazy River Way [1]	D	41.9	**>1**	D	44.7	**>1**
Hwy 43/Hidden Springs Rd.	D	39	0.96	D	38.6	0.94
Hwy 43/Pimlico Dr.	C	23.8	0.88	C	31.5	**0.99**
Hwy 43/West A St.	C	23.8	0.88	C	25.4	0.95
Hwy 43/Hood St.-McKillican St.	D	36	0.93	D	51	0.99
Unsignalized Intersections						
Hwy 43/Arbor Dr.	A/**F**	**> 50**	0.00/0.98	B/**F**	**> 50**	0.05/**>1**
Hwy 43/Cedar Oak Dr.	**D/F**	**> 50**	0.03/0.25	B/C	16	0.01/0.04
Hwy 43/Holmes St. [2]	B/**F**	**> 50**	n/a/**>1**	B/**F**	**> 50**	n/a/**>1**
Hwy 43/Lewis St. [2]	B/**F**	**> 50**	0.07/0.27	B/**F**	**> 50**	0.07/0.45

Notes: LOS = Level of Service

Delay = For signalized intersections, average vehicle delay in the peak hour for entire intersection in seconds. For unsignalized intersections, average vehicle delay for the critical movement.

Unsignalized Intersections Operations:

A/A = Major street turn LOS/Minor street turn LOS

#/# = Major street turn v/c /Minor street turn v/c

[1] Signalized intersection LOS has not been updated to reflect proposed concept plan for Marylhurst/Lazy River

[2] Operations analysis at Holmes Street and Lewis Street may be revised pending further refinement of circulation patterns around the Bolton Primary School.

Traffic Signal Warrants

PM peak hour traffic signal warrants were evaluated for the unsignalized study intersections in 2008. The intersection of OR 43/Pimlico Drive does meet this warrant for the existing traffic volumes and the 2040 future base conditions; however, the intersection would require additional mitigation with the installation of a traffic signal to meet operational standards. It should also be noted that meeting the PM peak hour traffic signal warrant alone is not sufficient justification for installation of a new signal and additional study would be required. Per 2008 data, the remaining unsignalized intersections would not meet the PM peak hour warrant for a traffic signal installation.

Outstanding Issues

The recommended 2016 Plan would improve the corridor over existing conditions but still does not meet some of the ODOT operating standards during the AM and PM peak hours. In addition, all locations without traffic signals will continue to have significant delays for side street approaching traffic during peak hours. This is consistent with the current findings under existing volumes. Improved side street connectivity to existing signalized intersections would help mitigate this condition.

While this plan does not include designs for the expansion of OR 43 beyond three lanes, nothing in this plan shall prohibit the City from considering, at a later date, other options to increase roadway capacity provided other options are consistent with State and regional plans, policies and standards.

Park and Ride Opportunities

Although it is not within the scope of this document to make recommendations regarding the future land uses along the study area, the City's Transportation System Plan (TSP) specifically identifies the need for additional Park & Ride lots in areas along transit routes. Due to West Linn's topography, lack of transit, and relatively low population density, most citizens must drive or bike to a Park & Ride in order to utilize public transportation and Park & Ride lots are a key provision of the City's Transportation System Management (TSM) strategy to effectively reduce automobile traffic and to encourage the use of alternative modes of transit.

West Linn has only one Park & Ride lot located at Emanuel United Presbyterian Church which should be maintained and its usage should continue to be promoted by the City. The City should actively pursue and encourage additional Park & Ride lots within the OR 43 corridor. In the future, all Park & Ride lots should be equipped with a transit bus shelter as well as bicycle parking and convenient pedestrian access. The location, design, and amenities of all future Park & Ride lots must be coordinated with TriMet and ODOT as necessary.

Plan Implementation

V. PLAN IMPLEMENTATION

Design Phase Refinement Needs

As the plan moves towards implementation through development or capital projects, the design of the corridor will need to provide more detail on some aspects of the plan.

- **Right of way needs** - A survey and more detailed right of way analysis is needed in order to fully understand the right of way impacts of the concept design. The impacts shown in this plan are approximate and not based on actual field survey information. Right of way acquisitions costs are preliminary in nature and final costs could vary considerably.
- **Detailed topographic survey and engineering design** - The concept design and cost estimates will need to be refined in the design phases to account for the detailed field conditions of OR 43 and the need for retaining walls, utility relocation, storm drainage, and other considerations.
- **Lighting** - Existing lighting is limited along the corridor. Enhanced lighting should include City standard LED mast arm pole lighting at signalized intersections similar to the existing signal at Salamo/ Rosemont Road In addition, City standard lighting should be enhanced at unsignalized intersections and designated pedestrian crossings. Street lighting should follow City Public Works standards for new development and/or be power pole based using PGE standard LED lighting. In public capital projects, lighting will coordinate with electric utility pole placement following Public Works standards to the maximum extent practical.
- **Utility Relocation** - Due to the nature of the corridor and cost associated with conversion of overhead electric to underground, it is assumed that this project will maintain and/or relocate overhead utilities in accordance with the existing franchise utility agreements. Cost estimates *do not* include the cost of undergrounding utilities. Private development projects will be responsible for undergrounding utilities consistent with City code requirements.
- **Intersection design and operations** - Particularly at signalized intersections, a more detailed operational analysis is needed in order to determine the final lane configurations and signal phasing for the separated intersections. In addition, separated intersections will need further curb radius and multi-modal accommodations accounted for in final design. At unsignalized approaches, the design of each side street or driveway will need to carefully consider appropriate treatments for the bicycle facility crossing, based on sight distance, topography and property impacts.
- **Detail bus stop placement and design** - TriMet has been involved in the development of the 2016 Plan, which provides preliminary recommendations on bus stop placement and design. As the pedestrian and bicycle facilities on the corridor improve, TriMet will consider consolidation of bus stops to improve bus travel time and reliability. TriMet should continue to be involved in the refinement of design and bus stop placement along the corridor.
- **Location and design of enhanced pedestrian crossings -** The 2016 Plan includes continuous sidewalks and bicycle facilities to enhance the ability for people to walk and bike along the corridor, Oregon State law gives pedestrians the legal right to cross at any intersection, with motor vehicles required to yield. To enable pedestrians comfortable access to destinations on both sides of the corridor as well as transit stops, the future design phase will also need to consider enhanced pedestrian crossing locations in addition to the signalized intersections. The design of these enhanced crossings will consider a variety of potential treatments, including a striped crosswalk, signage, rectangular rapid flash beacons, or pedestrian hybrid beacons. The design phase will determine the locations of enhanced crossings based on pedestrian demand, sight distance, proximity to signalized intersections and other factors. In particular, public input reflected a desire for an enhanced crossing at Mary S. Young Park.

Cost Estimates

Estimated costs for implementation of the 2016 Plan are outlined in the table to the below. The estimates assume that conventional storm drainage systems will be constructed with the roadway along with stormwater quality enhancements such as rain gardens. Cost estimates include construction, right of way acquisitions, design, construction administration, and a contingency. Estimates *do not* include roadway reconstruction, undergrounding utilities, contaminated soil removal, or major drainage improvements. All estimates are in current 2016 dollars based on current bid results of similar projects.

Table 3: Cost Estimate for Construction of 2016 Plan

Segment	Total Length (ft)	Limits	Estimated Cost
A	5,100	City limits north of Arbor Dr. to south of Hidden Springs Rd.	$5,200,000
B	4,200	South of Hidden Spring Rd. to north of Dillow Dr.	$4,200,000
C	3,400	North of Dillow Dr. to south of Failing St.	$4,500,000
D	3,300	South of Failing St. to south of Holly St.	$5,700,000
E	2,000	South of Holly St. to south of Willamette Falls Drive.	TBD
		Total Estimated Cost (not including Segment E)	$19,600,000

V. Plan Implementation

Implementation Steps

The 2016 Plan represents a plan for the OR 43 corridor that represents the goals of the community and is reflective of public input and desires. In the constrained corridor of OR 43 through West Linn, which is lined with homes and businesses as well as steep slopes in some areas, the 2016 Plan represents a balance of providing high quality facilities to serve a variety of travel modes while managing costs and impacts to adjacent parcels. Implementation of the 2016 Plan is critical to the success of West Linn's goals for its transportation system. OR 43 provides the only continuous connection stretching between I-205/Oregon City Bridge and Lake Oswego/Portland and access to all the businesses and destinations located in between. As such, it must provide access for people and goods moving on foot, by bike, by transit or in motor vehicles. It is also a significant utility corridor serving local and regional needs. The implementation of the 2016 Plan can occur in several phases and incrementally through redevelopment along the corridor.

Plan Adoption

The 2016 Plan will be adopted by City Council as an amendment to the 2016 City of West Linn Transportation System Plan. As an adopted part of the Transportation System Plan, the *2016 OR 43 Conceptual Design Plan* provides direction to the City in pursuing funding to improve OR 43 as well as setting clear requirements for property owners in terms of right of way dedication and frontage improvements.

Per the City of West Linn's Charter, impacts to parks and open spaces (for purposes other than recreation) require a public vote of approval. A public vote would need to take place prior to construction of improvements impacting these facilities

Intergovernmental agreement / Jurisdictional transfer framework

OR 43 is currently owned and maintained by the Oregon Department of Transportation (ODOT), and the 2016 Plan has been developed in coordination with ODOT. Because the proposed design includes some elements outside of ODOT's design standards, the 2016 Plan will require a set of ODOT design exceptions to implement. As such the City of West Linn and ODOT have initiated discussions on maintenance agreements and ultimately the future jurisdictional transfer of the OR 43 from ODOT to the City.

The path to jurisdictional transfer includes the development of an intergovernmental agreement between ODOT and the City to determine funding and maintenance responsibilities before, during, and after the design and construction of the 2016 Plan.

Implementation through development and redevelopment

The implementation of the 2016 Plan through private development land use actions and/or land use amendments will follow the development application and approval procedures of the City of West Linn. The 2016 Plan (through its adoption) will serve as the transportation system plan element and provide guidance for identifying the necessary transportation facility provisions (e.g., right of way, improvements, traffic control devices, etc.) associated with a specific land use action(s) and amendment(s). However, the 2016 Plan's adoption does require the City to consider the following elements when reviewing and approving specific land use actions:

- **Right of Way Dedication Requirements:** Right of way dedications should be consistent with the 2016 Plan and typical cross section shown in the detailed layout figures.
- **Direction of Required Construction of Improvements, Partial Improvements, or Fee-in-Lieu Payments:** The City will require through conditions of approval and/or development agreements the specific improvements, partial improvements, or fee-in-lieu payments consistent with and necessary to implement the 2016 Plan based on the impacts and properties associated with the specific land use actions and/or agreement.
- **Administration of Fee-in-lieu Payments (Optional):** The City may seek to receive fee-in-lieu of construction payments for land use actions that would result in smaller isolated elements of the corridor being constructed prior to use. These funds would need to be properly administered by the City in order to both preserve and allocate the funds in the most appropriate manner to facilitate the implementation of the overall improvements.

Implementation as a capital improvement project

Implementation through development will occur gradually over time in small increments; however, implementation as a capital improvement project has the potential to improve significant segments or even the entire corridor within a relatively short time period. Funding sources for capital improvement projects such as this include a variety of local, regional, state, and national sources, as follows:

- Statewide Transportation Improvement Program (STIP) Funding - The City of West Linn has submitted an application to ODOT for the 2018-2021 STIP funding cycle under the "Enhance" program. STIP funding decisions are made on a reoccurring basis.
- Regional Flexible Funds - Metro allocates federal funding dollars through the Regional Flexible Funds program as part of the Metropolitan Transportation Improvement Program (MTIP). Metro maintains and updates funding priority policy guidance with reoccurring funding application periods. The City of West Linn is eligible to apply for this funding.
- Transportation Investment Generating Economic Recover (TIGER) Discretionary Grants - TIGER grants are awarded by the US Department of Transportation to support innovative projects across the country that promote economic development and improve transportation access for a variety of communities. The City of West Linn could consider applying for a future TIGER Grant to fund the construction of the 2016 Plan.
- Local Funding Sources - The City has a variety of funding sources that contribute to funding transportation improvements that could be leveraged as local match funds for grants or could be used to fund portions of the 2016 Plan. These sources include the state gas tax and license fees, a roadway maintenance fee, franchise and miscellaneous fees, and system development charges. A local bond measure may also be considered. The sources are described in more detail in the Transportation System Plan.