MEMORANDUM

Date: October 8, 2014

To: Steve Szigethy
Washington County

From: Susan Wright, PE and Karla Kingsley

Project: SW 170th Avenue / SW Merlo Road Conceptual Design Plan

Subject: Existing Conditions, Opportunities, and Constraints

INTRODUCTION AND PROJECT OBJECTIVES

As Washington County’s urban area continues to develop and urbanize, the County has continually sought to serve the transportation needs of its residents, workers, and visitors. Washington County has identified the SW 170th Avenue / SW Merlo Road corridor as an area of needed improvement in order to better serve its diversity of users. The SW 170th Avenue / SW Merlo Road Conceptual Design Plan project will develop a conceptual design for these two connecting arterial roadways, based on an analysis of existing conditions, opportunities and constraints; a broader look at surrounding neighborhood context; an evaluation of best practices and innovative designs; and an inclusive public involvement process. The conceptual design will provide Washington County and corridor stakeholders with a higher level of certainty as to how the corridor will look and function in the future and will better prepare the County for designing, engineering and constructing improvements in the corridor.

Project Objectives

The overarching goal of this Project is to develop a conceptual plan for street design treatments along 170th Avenue between Baseline Road and SW Tualatin Valley Highway (OR8) and along Merlo Road between Jenkins Road and 170th Avenue to incorporate multimodal circulation, to support adjacent land use and development, and to conceptually address a number of environmental constraints including riparian, floodplain, wetland, forest and wildlife habitat resources.

Specific objectives are to:

- Create a corridor that will encourage and support the use of active transportation modes and reduce reliance on the automobile.
• Create a corridor that better links Aloha neighborhoods with nearby destinations including two schools, two Metropolitan Area Express (MAX) light rail stations, Tualatin Hills Nature Park, and a major employment hub anchored by Nike to the northeast of the study area.
• Identify at a planning level means to address potential environmental impacts including stormwater runoff from additional impervious surfaces, construction within floodplain, wetland and/or riparian areas, and impacts on mature trees, considering green street treatments and more conventional measures.
• Address right-of-way and access management needs.
• For the purpose of bicycle and pedestrian mobility, examine the local street and trail network to address safety and connectivity, including connections necessary to link adjacent development to any alternative parallel bicycle or pedestrian facilities.
• Explore the application of innovative bikeway treatments for 170th Avenue and Merlo Road, potentially including a two-way cycle track, one-way cycle tracks, or buffered bike lanes.
• Explore opportunities to accommodate bus stops, including improved pedestrian access, along 170th Avenue and Merlo Road in anticipation of a TriMet-proposed bus line.
• Provide safe routes and crossings for bicyclists and pedestrians to area destinations such as Beaver Acres Elementary School, Merlo Station High School and Tualatin Hills Nature Park.
• Explore project phasing options that could deliver pedestrian/bicycle facilities in advance of planned roadway widening.
• Engage a broad range of public and stakeholders in designing concepts for 170th Avenue and Merlo Road, ensuring compliance with Title VI regulations regarding outreach to disadvantaged and minority citizens.

This memorandum, the Existing Conditions, Opportunities, and Constraints Memorandum, documents the existing land use, natural features, utilities, and transportation-related conditions in the study corridor; provides a discussion of the standards and improvement guidelines relevant to this corridor; and identifies key opportunities and constraints. Figure 1 shows the extents of the study corridor and breaks the corridor into three distinct segments.
CORRIDOR BACKGROUND AND EXISTING CONTEXT

The 170th Avenue/Merlo Road corridor is a critical north-south connection between residential neighborhoods, major employment hubs, transit lines, schools and park facilities; however, it currently faces major challenges for various modes of travel. The corridor is in a high-growth area of Washington County that is experiencing major development and redevelopment activity in both commercial and residential sectors. Neighborhoods to the west and south have concentrations of “environmental justice” populations, including lower income, minority and limited English proficiency (LEP) residents. The corridor currently does not serve the needs of people walking, bicycling and accessing transit, and vehicular congestion will likely remain in the future.

Figure 1 shows the study area of the corridor. For the purposes of the existing conditions and solution alternatives documentation, the corridor is broken into three distinct segments:

- Segment 1 is SW 170th Avenue north of SW Merlo Road to W Baseline Road;
- Segment 2 is SW 170th Avenue south of SW Merlo Road to SW Tualatin Valley Highway, and
- Segment 3 is SW Merlo Road between SW 170th Avenue and SW Jenkins Road.

170th Avenue north of Merlo Road (Segment 1) is designated as an arterial with two to three vehicle travel lanes. Merlo Road and the southern section of 170th Avenue (Segments 2 and 3) are designated as arterials in the Washington County Transportation System Plan with future configurations of four to five vehicle travel lanes. The same segments are also planned for future bus service in TriMet’s Westside Service Enhancement Plan and identified as top-level gaps in the pedestrian and bicycle system through the County’s Bicycle and Pedestrian Improvement Prioritization Project and the Aloha-Reedville Study and Livable Community Plan. The following sections detail the existing conditions in the study area.
Figure 1

Base Map and Study Segments

Segment 1
Segment 2
Segment 3

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet (ft)

H:\projfile\17684 - 170th-Merlo Corridor Concept Plan\gis\01 Base Map and Study Segments.mxd - jsommerville - 10:04 AM 10/8/2014
Zoning and Land Use

The area of 170th Avenue in the study area lies on the border between the City of Beaverton and unincorporated Washington County. Zoning designations on land to the west are from Washington County and to the east are from the City of Beaverton. Figure 2 shows the zoning designations. Both the City of Beaverton and Washington County zoning designations include zones specifically designed for the station areas – Station Community and Transit Oriented, respectively, and these are found in the north end of the corridor.

In Washington County, the community development code states that the intent of the Transit Oriented Districts is to “direct and encourage development that is transit supportive and pedestrian oriented” in areas proximate to transit. To do this, the Transit Oriented zones specify development with densities that are supportive of transit, uses that generate trips serviceable by transit, a complementary mix of land uses, and design that facilitates pedestrian, bicycle, or transit trips. The north end of the corridor is bounded by Transit Oriented business (TO: BUS) and moderate density residential (TO:R24-40, TO:R18-24) zones. The Transit Oriented zones also carry minimum density requirements.

The City of Beaverton code describes the Station Community zone designations in a similar way. Adjacent to the corridor are Station Community multiple use (SC-MU) and employment (SC-E) zones, with high density residential (SC-HDR) on the north side of Baseline Road. The SC-MU and SC-HDR zones have no maximums (but do have minimums) on residential densities and the SC-E zone is designed to have an intensity of 40 employees per acre.

West of 170th, in an area of unincorporated Washington County, the corridor is abutted by a range of moderate density residential zones, which is resulting in gradual increases in densities as infill development occurs in these areas.

At the south end of the corridor, a Central Business District (CBD) zoning designation covers the area between Alexander Street and Tualatin Valley Highway on the west side of the corridor. This CBD zone is one of the highest density zones in unincorporated Washington County, with a 100 foot height limit and a mix of allowed uses; however, it is not currently built out to the level of intensity allowed within the CBD zone.

The study corridor currently serves a mix of land uses, with residential neighborhoods to the west ranging from single-family housing at a density of approximately three units per acre to higher-density multifamily housing. At the north end of the corridor, the Steed Creek and Merlo Village developments next to the Elmonica MAX station provide 555 new multi-family units. Towards the south end of the corridor, there are other multi-family developments clustered at Heritage Court, and across 170th, the Arbor Creek Apartments provide 440 units of multi-family housing. The corridor also has some commercial uses at the north and south ends of the corridor, with some live/work units at 170th Ave/Baseline Rd, and at the intersection of 170th Avenue/Merlo Road. The Nike World Headquarters are located just to the northeast of the corridor and is undergoing an expansion. At 158th Ave/Jenkins Rd, there is a Costco in the northwest corner of the intersection and Reser’s Fine Foods distribution
center at the southeast corner; however, the Reser’s distribution center will be relocating. The corridor also features two MAX stations – a park-and-ride facility at the north end of 170th Avenue (Elmonica/170th Ave MAX) and a station with a bus drop-off area on Merlo Road (Merlo/158th Ave MAX). Near these two stations are the Merlo bus garage and the Elmonica Light Rail Vehicle yard. The corridor also has significant natural and recreational land uses, with a large regional park (Tualatin Hills Nature Park) at the southern end of 170th Avenue and the Merlo Station Athletic Fields at the north end. Finally, the corridor serves two schools – Beaver Acres Elementary School and Merlo Station High School – as well as both the Beaverton School District offices and the Tualatin Valley Water District offices. Figure 3 shows the existing land uses in the corridor.

Figure 4 shows areas of potential development and redevelopment, based on Metro’s buildable land inventory data. For the residential land, the methodology considers a property’s capacity to add housing units based on the existing zoning and other constraints. In the case of commercial land, development potential is calculated based on existing land and building values to assess the likelihood of redevelopment. Ultimately, private property owners have the authority on whether or not they redevelop their properties, when they would do so, and how the future land uses and streets would be arranged on their sites to meet the applicable development codes.

Significant residential capacity is available in some of the areas on the west side of the corridor, where original development occurred in the 1960s. This additional density could be accomplished through incremental infill and redevelopment. There are also a number of vacant employment sites in the vicinity of the corridor, including areas at the western edge of the Nike Campus north of Jenkins Rd and several properties along Merlo Road.
Private property owners have the ultimate authority on whether or not they redevelop their properties, when they would do so, and how the future land uses and streets would be arranged on their sites to meet applicable development codes.

Potential Redevelopment Sites

Figure 4

Non-Residential Development Potential
- High
- Medium
- Mixed Use Residential

Potential Additional Residential Units
- 1 - 5
- 6 - 50
- 51 - 100
- 101 - 250
- >250
- Parcels
Natural Features

There are two main areas with natural features to consider on this project. The Beaverton Creek area within Segment 2 is the most significant area, and will require the most attention when considering improvements. The bridge is substandard and would require replacement with any improvement to the roadway. The Tualatin Hills Nature Park is adjacent to this creek, and could also be impacted by improvements. The stream corridor of Beaverton Creek within and near the project area is dominated by palustrine forested wetlands with lesser components of palustrine emergent wetlands. The wetland resources and adjoining upland habitats are of high habitat value for both terrestrial and aquatic species.

The Segment 2 project activities affecting Beaverton Creek will require compliance with a number of state, federal, and local environmental regulations. While the distribution of Endangered Species Act listed salmon and steelhead is anticipated to be limited within Beaverton Creek, compliance with regulations associated with these listed resources is expected. Two expected regulations and process items include Fish Passage Approval from the Oregon Department of Fish and Wildlife and either consultation with the National Marine Fisheries Service (NMFS) or adherence to design standards set forth by this agency. As bridge replacement and roadway development activities would likely encroach on the creek and adjoining wetlands, permits from the Army Corps of Engineers (Corps) and the Oregon Department of State Lands (DSL) are likely. In addition, infringement or impacts to Vegetated Corridors (buffers) around Beaverton Creek and wetlands may require permitting, mitigation/restoration, and approval through Clean Water Services. Minimum anticipated Vegetated Corridor extent along Beaverton Creek is 50 feet from the ordinary high water line on either side of the creek. Corridors extend further depending on local topography and the presence/size of adjoining wetlands.

The second area is located within Segment 1 along the light rail track corridor and can be characterized as palustrine emergent wetland swale with additional flow through (riverine) components. This feature is surrounded by herbaceous buffer of low function and quality, but the swale and corridor habitats are wholly within the Beaverton Creek watershed. This segment of the project area has been recently widened to a three lane cross section with bicycles and vehicles sharing the travel lane for a short portion. Any further widening would have impacts on this wetland area and is also likely to impact degraded Vegetated Corridors. As with the potential impacts to Beaverton Creek and adjacent wetlands, any impacts to wetlands in Segment 1 are likely to require approval and permitting through Clean Water Services, the Corps, DSL, and potentially NMFS.

Figure 5 shows the natural features in the corridor including, floodplains, wetlands, and 5-foot contours.

Appendix A includes larger scale figures of the corridor by segments. They include 2-foot contours throughout the corridor overlaid on an aerial photo base.
Transportation Facilities

The corridor currently serves automobiles, freight vehicles, transit riders using LIFT services or accessing the MAX light-rail stations, bicyclists, and pedestrians; however, the existing facilities do not provide a high quality of service for these various modes, and in some cases there are no facilities for some modes. Facilities for each mode are described herein.

Auto/Freight mode

Figure 6 shows the existing characteristics of the roadways in the study area, including 85th percentile speeds and daily traffic. Segment 1 is currently three lanes and is designated as such in the 2035 Transportation System Plan (TSP). Segments 2 and 3 are both designated as five-lane arterials in the 2035 TSP, though currently they are 2 and 3 lanes, respectively. Though the corridor does serve freight movements, with truck percentages shown on Figure 6, none of the segments is designated as a freight route in the Washington County TSP. All three segments in the corridor have 40 mph posted speed limits.

At the southern end of the corridor, 170th Avenue connects with Tualatin Valley Highway, the primary east/west route between Hillsboro and Beaverton. The June 2013 TV Highway Corridor Plan recommends adding dual left-turn lanes for all directions of travel at the 170th Ave/TV Highway intersection in order to maintain mobility and meet the existing mobility standards for the auto mode.

North/south connectivity is also limited in the vicinity of the corridor with 185th Avenue 0.75 miles to the west and Murray Boulevard 1.25 miles to the east providing the nearest continuous north/south routes.

Pedestrian Mode

The study corridor, with nearby schools, dense housing, two MAX light-rail stations, and a regional park, has the potential to serve increased pedestrian use; however, currently the pedestrian facilities are discontinuous in portions of the corridor. Figure 7 shows the existing facilities currently serving pedestrians as well as planned facilities. The majority of sidewalks present in the corridor are built to Washington County’s minimum 5-foot standard, with the exception of a portion of Segment 1 in front of the Tualatin Valley Water District. Also in Segment 1, there are portions of 5-foot curb-tight sidewalk near the Elmonica/170th Ave MAX station. In segment 3, the sidewalk is curb-tight on both sides, with the south side meandering around utility poles. In addition to facilities shown on the map, there is a 3-foot wide worn asphalt path on the west side of 170th south of Augusta Lane; however, there are no facilities on the east side of the corridor along the Tualatin Hills Nature Park Frontage and no crosswalks allowing pedestrians to access the park. Though not shown on the map, any sidewalk gaps on arterials or collectors would be filled as development or roadway improvements occur.

In the Transportation System Plan, Segment 1 and the southernmost block of Segment 2 are designated as Pedestrian Oriented Street Overlay areas, defined as “a segment of urban roadway in which
enhanced pedestrian features and/or expanded pedestrian facility dimensions are encouraged to facilitate a safe, comfortable, attractive walking environment and to leverage community and economic development.” Appropriate features and dimensions vary by context and shall be determined through the project development and/or land development review process, with consideration of other modal classifications including freight. Features may include (but are not limited to): sidewalks with widths greater than those shown in the Washington County Road Design and Construction Standards, medians, narrower travel lanes and/or narrower pavement widths, curb extensions, on-street parking, pedestrian-scale lighting, enhanced crosswalks, traffic calming, street trees, landscaping, street furniture and public art.”

Finally, 170th Avenue between Merlo Road and Alexander Street was identified as one of the top 30 bicycle/pedestrian needs in the 2012 Washington County Bicycle and Pedestrian Improvement Prioritization Project.

**Bicycle Mode**

Though the corridor has potential to serve regional bicycle travel for various users, currently it lacks bicycle facilities on much of its length and therefore serves only bicyclists willing to operate on a shared roadway with other vehicles. Figure 8 shows the existing bicycle facilities in the study area, along with the route designations from the TSP – Enhanced Major Street Bikeways and Major Street Bikeways. All three segments of the study corridor are designated as Enhanced Major Street Bikeways, which is defined as “an urban arterial or collector roadway that has or is planned to have buffered bike lanes or cycle tracks on one or both sides of the road as illustrated in the Washington County Bicycle Facility Design Toolkit. Enhanced Major Street Bikeways typically have higher traffic volumes, higher speeds, more lanes, and users with diverse skills such that additional separation between the bikeway and vehicular traffic is desired. Bikeway facility types and dimensions shall be context-sensitive and determined on a case-by-case basis through engineering review.” Also, Alexander Street, Johnson Street, and Augusta Lane are proposed neighborhood bikeways.

As shown in Figure 8, the very southern end of the corridor currently has bike lanes – these lanes extend to the south as far as Rigert Road.

Figures 7 and 8 also show the existing and planned multi-use trails in the corridor vicinity. These facilities serve both pedestrians and bicyclists, and include:

- The existing Waterhouse Trail, which was recently completed north of the Merlo/158th Ave MAX Station;
- The Westside Trail, running north/south just to the east of the Tualatin Hills Nature Park, which is planned to be routed along Merlo Road / 158th Avenue to go around the Nike World Campus;
- The Beaverton Creek Trail, which has been funded east of Merlo Road parallel to the MAX tracks and is planned to be a natural surface west of 170th Avenue; and
• The TV Highway Trail, which is envisioned as part of a future Turf to Surf Trail and is a Regional Trail Refinement Area in the TSP.

**Transit Mode**

The study area is currently served by both bus and rail transit in the vicinity, though there is not existing transit service running along 170th Avenue or the majority of Merlo Road. The MAX Blue Line crosses both 170th Avenue and Merlo Road, with stations at each of these points – Elmonica/170th Ave, which has a 430-space park-and-ride and bicycle racks, and Merlo/158th Ave. The Blue line provides service every 5-10 minutes during the morning and evening commute hours, with roughly trains arriving roughly every 15 minutes in off-peak hours between 3:30 a.m. and 1:00 a.m. Currently there is bus service connecting the Merlo Rd/158th Ave station to the north along 158th Ave (route #67), and future bus service is planned in the TriMet Westside Service Enhancement Plan along Segments 2 and 3 of the study corridor, as well as along Jenkins Road. The #67 bus currently travels between Bethany and the Merlo/170th Ave MAX station at approximately 15 minute headways during the commute hours, and its future expansion would create a major north/south transit connection between Bethany, the Nike Campus, Aloha, South Beaverton/Progress Ridge, and Tigard.

Figure 9 shows the existing and planned transit in the study corridor.

**Safety**

Washington County maintains a Safety Priority Index System (SPIS) to help identify and rank potentially hazardous intersections based on three years of crash data. Intersections included in the list have three or more crashes or one or more severe injury or fatal crashes. The 2010-2012 SPIS identified several intersections in the corridor based on their crash history, summarized in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Corridor intersections on SPIS list</th>
</tr>
</thead>
<tbody>
<tr>
<td>170th Ave / Alexander Street</td>
</tr>
<tr>
<td>170th Ave / Baseline Road</td>
</tr>
<tr>
<td>170th Ave / Tualatin Valley Hwy</td>
</tr>
<tr>
<td>158th Ave / Jenkins Road</td>
</tr>
</tbody>
</table>
2013 85th Percentile: 39 mph
ADT: 11,723
Existing Lanes: 3

2013 85th Percentile: 45 mph
ADT: 16,227
Existing Lanes: 2

Functional Roadway Classifications
- Arterial
- Collector
- Neighborhood Route
- Proposed Collector
- Proposed Neighborhood Route
- 2/3 Proposed Lanes
- 4/5 Proposed Lanes

Roadway Features | Figure 6

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, Washington County
Pedestrian Facilities

Transportation System Plan Designations

- Sidewalk
- Pedestrian Path
- Multi-Use Trail
- Planned Multi-Use Trail
- Ped Oriented Street Overlay
- Pedestrian Districts

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, Washington County
Available Right-of-Way (ROW) and Existing Cross Sections

Appendix A includes larger scale figures of the corridor by segments. They identify the existing right-of-way and parcel lines throughout the corridor overlaid on an aerial photo base. As shown, the existing right-of-way varies throughout the corridor. Table 2 provides a summary of the minimum, maximum, and predominant (a typical range) right-of-way for each of the three study area segments.

Table 2: Existing right-of-way

<table>
<thead>
<tr>
<th>Segment</th>
<th>Minimum ROW (ft)</th>
<th>Maximum ROW (ft)</th>
<th>Predominant ROW (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment 1 (SW 170th Ave. North)</td>
<td>52'</td>
<td>90'</td>
<td>75'-90'</td>
</tr>
<tr>
<td>Segment 2 (SW 170th Ave. South)</td>
<td>55'</td>
<td>140'</td>
<td>65'-75'</td>
</tr>
<tr>
<td>Segment 3 (SW Merlo Rd)</td>
<td>75'</td>
<td>95'</td>
<td>85'</td>
</tr>
</tbody>
</table>

The following cross-sections provide estimated facility widths and a view of the corridor in Google Streetview for several locations throughout the corridor. As shown, there are several locations throughout the corridor where there is available right-of-way for improvements; however, it may not be sufficient to accommodate the ultimate future cross-section.
Segment 1: 170th Avenue at Berkeley Lane (90 feet ROW)

Segment 2: 170th Avenue at Augusta Lane (70 feet ROW)
Segment 2: 170th Avenue at Nyssen Street (90 feet ROW)

Segment 3: Merlo Road (75 feet ROW)
Utilities

Utilities within the study area are overhead and underground. Overhead power runs along the east side of 170th Avenue from Baseline Road to Merlo Road/Marty Lane then heads toward the east. The overhead power starts again from just north of 170th Avenue/Berkeley Lane intersection and runs along the east side toward Alexander Street, then diverges to the northeast and continues past Tualatin Valley Highway. Overhead telephone/cable runs along the power poles. Other utilities in the corridor include underground fiber optics cables, telephone, water, gas, sanitary sewer, and storm drains. Street lighting is limited throughout the corridor. There are existing traffic signals on 170th Avenue at the Baseline road, Merlo Road, Alexander Street, and Tualatin Valley Highway intersections. There is also a traffic signal at Merlo Road and Jenkins Road. Figure 10 shows the existing utility lines in the corridor.

In reviewing the pole locations, Google images, right-of-way, and tax lots maps have been utilized to assess whether these poles have a direct impact to the safety of the corridor due to their locations. All of the poles along the 170th Avenue have been placed at least 2 feet from the edge of curb and/or pavement except for the pole at the southwest corner of the Johnson Street/170th Avenue intersection. This pole is at the edge of pavement return and appears to be less than two feet from the pavement. The majority of the poles along this corridor appear to have been placed within the right-of-way except for a few locations. Between Heritage Court and Johnson Street, there are two poles that appear to have been placed outside of the street right-of-way. Approximately 300 feet north of Johnson Street, there is an existing pole that appears to have been placed outside of the right-of-way. Between Vendla Park Lane and Augusta Lane, there are two poles that appear to have been placed outside of the right-of-way. There is no available record of utility easement for these poles. Along the Merlo Road corridor, the existing utility poles appear to have been placed within the right-of-way and at least 2 feet from the edge of curb. A phone inquiry to Portland General Electric indicates that there is no plan for scheduled maintenance or upgrades for the 170th Avenue and Merlo Road corridors.
Existing utility poles on Merlo Road (left) and utilities adjacent to the bridge crossing on 170th (right)