Draft Memorandum

Date:	October 14, 2020
Project:	NW Saltzman Road – Laidlaw Road to Bayonne Lane Washington County | Project 100464
To:	Ben Lively, Project Manager, Washington County
From:	Angel Castro, E.I.T., Murraysmith, Inc. Andrew Giesy, P.E., Murraysmith, Inc.
Reviewed By:	Terry Song, P.E., Murraysmith, Inc.
Re:	Task 10.5 – Alternative Evaluation and Memorandum

Introduction

Washington County (the County) is evaluating potential alternatives to widen the existing two-lane section of NW Saltzman Road from approximately NW Bayonne Lane to NW Laidlaw Road to a three-lane section (one travel lane in each direction with a center turn lane) with bike lanes and sidewalks. Two proposed alignment alternatives for Saltzman Road are being studied. The eastern alignment generally follows the existing path of Saltzman Road. The western alignment realigns Saltzman Road and ties into Laidlaw Road at 130th Avenue. For both alternatives evaluated, improvements to Laidlaw Road are limited to intersection improvements along the south side of the intersection.

Construction of the improvements is targeted for the spring of 2022.

Purpose

The purpose of this memorandum is to facilitate the County's decision to advance the best solution for the current transportation connectivity goals. This document will review options for alignment, conveying Ward Creek and Bronson Creek through the project area and impacts to environmentally sensitive areas and existing utilities to determine, with the County, the preferred alignment for NW Saltzman Road.

This analysis documents high-level planning considerations for each alternative to neutrally evaluate each. The mapping used for this alternatives analysis is based on LIDAR data obtained from the Oregon Department of Geology and Mineral Industries (DOGAMI) with vertical datum

of NAVD 88. The LIDAR data provides enough accuracy for conceptual design, but should not be considered accurate or complete for detailed design layout. Field work to confirm the mapping and assumptions made will take place once an alternative is selected. Future project design resulting from the preferred alternative includes preparation of preliminary and final roadway and stormwater designs, construction cost estimates, procuring all necessary environmental permits, right-of-way and/or easement acquisitions.

A future analysis will accompany the preferred roadway alignment using the Washington County Bicycle Facility Design Toolkit to select the type of bicycle facilities for this project. Using the toolkit with input from the County, the three likely configurations for bicycles include: buffered bike lanes, multi-use path, and raised cycle tracks. Since the bicycle configuration selected is assumed to vary the roadway cross section by less than five feet, this aspect of the future design is omitted from influencing this alternates analysis.

Existing Conditions

NW Saltzman Road is designated as a Type C-1 Urban Collector road near Bethany, Oregon, an unincorporated community located on the northeastern side of Washington County. The project area is bounded by single family residential land use and an undeveloped flood plain and is a high priority infrastructure project for the County. The existing street lacks bicycle and pedestrian facilities that are needed to connect local residents to nearby transportation options. The bicycle and pedestrian improvements will also provide safe routes and important connections to businesses and schools (such as Findley Elementary) in the immediate area. The project provides critical infrastructure to enhance the livability and vitality of the area. Without the proposed improvements, the current state of NW Saltzman Road will not enable it to meet the future transportation needs of the community.

Figure 1
Overview

Within the study area, NW Saltzman Road consists of approximately 1,600 feet of two-lane roadway (one travel lane in each direction, without shoulders or bike lanes) with drainage ditches along both sides of the road. The paved roadway width varies between 23-26 feet wide, and services approximately 7,223 vehicle per day. Adjacent streets to the project area include NW Alsace Place, NW Bayonne Lane, Bannister Drive, 130th Avenue, Red Cedar Court and Laidlaw Road. Posted speed for the corridor is 35MPH.

Alternative Analysis

Evaluation of design requirements and alternatives for project components rely on establishing design criteria and "desktop" data collection as summarized below.

Alternatives Considered

A Project Kick-off Meeting was held February 12, 2020, to discuss the County's vision and objectives for the project. Ongoing discussion has occurred since the kick-off meeting, resulting in the following alternatives for examination:

- Eastern Alignment: This approach follows the existing path of Saltzman Road widening from a two-lane to three-lane section with a center turn lane. The proposed alignment

alters the existing curves to current design standards and has a 2.5 percent superelevation through the curves. The east alignment replaces the existing culvert with a 90-foot long precast concrete box or steel arch culvert to span Ward Creek. A conceptual plan and profile can be found in Appendix A.

- Western Alignment: This approach realigns Saltzman Rd establishing a new footprint through the undeveloped tax lots to the west and connecting to Laidlaw Road at 130th Avenue. The west alignment utilizes a 405-foot long three span bridge crossing Bronson Creek and to traverse and prevent adverse effects to the existing flood plain. A conceptual plan and profile can be found in Appendix A.

Design Criteria, Data Collection, and effect on Alternatives

The County's published standards serve as the source of primary design criteria for the proposed improvements, such as the *Washington County Road Design and Construction Standards* (March 2011), the *Transportation System Plan* (November 2015) and the *Washington County Community Development Code* (January 2017).

Murraysmith developed a Design Criteria Matrix included as Appendix B summarizing the design elements applicable to this project's proposed roadway improvements, the reference standards cited for each element with their selected criteria values. Where element-specific Washington County design criteria are absent, alternative standards from other relevant transportation authorities such as the Oregon Department of Transportation (ODOT) or the American Association of State and Highway Transportation Officials (AASHTO) are referenced. The matrix is considered a living document and will be updated during the life of the project. The County's typical collector roadway section is included in Appendix C to supplement the criteria matrix and alternatives presented.

Several "desktop" reviews necessary for this alternatives analysis are summarized below and tabulated in Table 1 below. Each review is summarized with a short explanation of its relevance to the project and evaluation applicable to the project design. Where any of these reviews contain neutral design considerations across the alternatives considered, language evaluating the alternatives against each other is omitted from the following summaries:

Roadway Design

The proposed roadway alignments widen and realign the two-lane section of NW Saltzman Road from approximately NW Bayonne Lane to NW Laidlaw Road to a three-lane section with bike lanes and sidewalks. The standard section used for comparison purposes began with a three-lane section with a 14-foot turn lane and two 12-foot thru lanes. The bike lanes are 8-foot wide, which includes a 2-foot buffer and 6-foot bike lane. The sidewalks have a 4.5-foot vegetated buffer strip and 6-foot sidewalks. After the initial comparison, the west alignment was refined by eliminating the center turn lane and vegetated buffer strip where practicable in order to reduce the bridge width. The current bike and pedestrian option utilized has the largest footprint out of the three options, to be evaluated at a later date, and was used to delineate the max extent of potential

impacts to surrounding areas. The proposed roadway alignments allow for future use by public transit (bus) as noted in the TSP, as they are designed to County collector standards. Options for maintaining portions of the existing Saltzman Road alignment for property access and bike/ped use are beyond the scope of this analysis.

Environmental Permitting

Mason, Bruce and Girard, Inc. is the project team specialist to facilitate environmental permitting for the project, which includes Endangered Species Act (ESA) compliance and guiding the project through floodplain, wetland, and tree removal regulations.

Neither alignment would be likely to affect federally-listed wildlife or plant species, however which ever option is chosen would need to demonstrate compliance with the ESA for impacts to listed fish species. The project will necessitate a wetland/waters delineation and delineation report for concurrence by the Oregon Department of State Lands (DSL) regardless of the alignment chosen. Any wetland/waters impacts would be permitted via the project's Joint Permit Application (JPA).

The addition of impervious surface and curbs for either alignment will trigger stormwater management for the project's contributing impervious area (CIA). Permanent impacts to jurisdictional wetlands will require a Nation Wide Permit (NWP) 14 from the US Army Corps of Engineers (USACE), which will trigger review and authorization from the Oregon Department of Environmental Quality (DEQ) under Section 401 of the Clean Water Act (CWA). In this case, the JPA and a Post-Construction Stormwater Management Plan (SWMP) are sufficient to obtain approval from the DEQ under an NWP Water Quality Certification.

Construction, replacement or rehabilitation of a stream crossing would likely trigger review by the Oregon Department of Fish and Wildlife (ODFW) per Oregon's Fish Passage Law. Typically, transportation projects can submit a Stream Simulation Fish Passage Plan to ODFW to demonstrate compliance with the Fish Passage Law, provided the culvert or bridge span width and other design standards comply. A Fish Passage Plan can be submitted shortly after the 60% design milestone, and ODFW approval can take 45 days. In-water work would necessitate fish salvage and relocation during construction by a qualified fisheries biologist. Prior to fish salvage, the biologist would need to apply for a Scientific Take Permit (STP) to authorize handling fish. STP issuance typically takes less than 20 days.

The project will necessitate a Standard Site Assessment (SSA) from Clean Water Services (CWS) to document existing locations and conditions of Sensitive Areas (SAs) and their associated Vegetated Corridors (VCs) in order to obtain a Service Provider Letter (SPL) to permit the project regardless of the alignment chosen. Both alignments are anticipated to require a 50-foot vegetated corridor buffer for this analysis, which will influence improvement placement such as the stormwater management facilities. Future phases of permitting support will determine the actual buffer requirements.

Pursuant to the Washington County Community Development Code, the project will affect Significant Natural Resources (SNRs) identified in the Bethany Community Plan in the 2016 Washington County Comprehensive Plan.

- Eastern Alignment: This approach contains unique environmental and permitting considerations, summarized below:

  The eastern alignment would likely be covered by the Standard Local Operating Procedures for Endangered Species (SLOPES) programmatic Biological Opinion (BiOp). Review by National Marine Fisheries Service (NMFS) would occur as part of the Joint Permit Application process through the USACE.

  The eastern alignment would likely qualify for a NWP 14 from the USACE and a Transportation General Authorization (GA) from the Oregon DSL. The NWP and the GA could take up to 60 days to obtain; however, permit issuance may be contingent on the DSL's concurrence of a wetland delineation report for the project area, which can take up to 120 days after submittal of the report.

  Impacts to the VC regulated by CWS for the eastern alignment would likely be considered Minor Encroachment as per their Design and Construction Standards (D&CS) 3.07.2, which requires VC enhancement as mitigation but no further analysis. If the eastern alignment encroaches into Good Condition corridor, as defined in 3.14.2, an SSA with a full Tier 2 alternatives analysis would be required. A Tier 2 alternatives analysis requires a Functional Analysis (as described in 3.14.7), clear demonstration that no practicable alternative exists, and replacement mitigation. On-site mitigation is required at a ratio of 1:1. Off-site mitigation ranges from 1:1 to 2:1 and may require the acquisition of property or a protected easement. VC Enhancement may or may not be acceptable to CWS for mitigation.

  For Washington County Code specific requirements, the eastern alignment is likely to impact a SNR for Water Area and Wetlands, as well as possibly a SNR for Water Area and Wetlands & Fish and Wildlife Habitat. Exception 422-3.3 (A. (1)) appears to apply to this alternative, allowing its construction. Per 422-3.3 (B) and (C) the alternative would need to comply with the flood plain and drainage hazard area development criteria as well as wildlife passage fencing standards. Specific Flood plain maps are cited in the code (421-1.1 (A.)(1) and (2)) along with other data sources, however review of the online Federal Emergency Management Agency (FEMA) mapping at indicates no special flood hazard areas apply to the east alignment.

- Western Alignment: This approach contains unique environmental and permitting considerations, summarized below:

  The western alignment might also be covered by the SLOPES BiOp, although it does not technically fit the covered actions because it includes a new alignment and bridge crossing. Coordination with NMFS technical personnel would be needed to determine the ESA

permitting pathway. If SLOPES does not apply, a standard Biological Assessment would need to be prepared and submitted to NMFS for consultation.

The western alignment could qualify for the NWP 14 and GA if wetland impacts are limited to 0.5 acre or less and/or 0.1 acre of an Aquatic Resource of Special Concern (ARSC). If the project proposes impacts to an ARSC – such as native Willamette Valley wet prairie or Mature, Forested Wetland – the project will likely require Individual Permits from both agencies which could take up to 90 days for issuance. In addition, any impact to an ARSC or over 0.2 acre of impact to any type of wetland would require an Oregon Rapid Wetland Assessment Protocol (ORWAP) analysis of the affected wetlands. If the project proposes permanent impacts to stream functions and values, the project will require a Stream Functional Assessment Method (SFAM) analysis of the affected stream reach, which consists of additional office analysis, fieldwork, and reporting. All permanent impacts to jurisdictional wetlands will require Compensatory Wetland Mitigation (CWM). CWM can be achieved through the creation of new wetlands of similar classes, functions, and values and/or the purchase of credits from a mitigation bank or the In-Lieu-Fee program (ILF) and/or payment-in-lieu. Mitigation bank and/or ILF credits sufficient to compensate for the project may or may not be available. Payment-in-lieu is not recognized by the USACE therefore this option would only be available for mitigating impacts to wetlands not considered jurisdictional to the USACE.

USACE and the state agency (DSL) may not accept that impacting a jurisdictional stream and jurisdictional wetlands are warranted because the eastern alternative already allows access to existing development. Federal Guidelines 40 CFR 230.10(a) state "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." A permit cannot be issued, therefore, in circumstances where a less environmentally damaging practicable alternative for the proposed discharge exists.

The project team will discuss these alternatives with the USACE and DSL to determine if the western alignment can potentially be permitted.

Impacts to VC regulated by CWS for the western alignment will be extensive and will require an SSA with a full Tier II analysis including the components listed above. Replacement mitigation for the scale of VC encroachment proposed may be very difficult to locate and/or obtain.

For Washington County Code specific requirements, the western alignment is likely to impact a much larger area identified as SNRs for the following categories: Water Areas and Wetlands & Fish and Wildlife Habitat, Water Area and Wetlands, and Wildlife Habitat. Similar to the eastern alignment, Exception 422-3.3 (A. (1)) appears to apply to this alternative, allowing its construction. Per 422-3.3 (B) and (C) the alternative would need to comply with the flood plain and drainage hazard area development criteria as well as wildlife passage and fencing standards.

Specific Flood plain maps are cited in the code (421-1.1 (A.)(1) and (2)) along with other data sources. Review of the online FEMA mapping indicates this alternative would cross a large special flood hazard area as well as the regulatory floodway associated with Bronson Creek. A project within a flood plain or drainage hazard area requires a permit application under 421-3. This option also appears to require a Type II Procedure (421-5.18),but might be Type III per 421-6.2. Permitting is anticipated to require FEMA approval (421-7).

Noise Study

A preliminary review of noise impacts for both alternatives did not find any anticipated increases in noise and no major noise mitigation needed. A noise study will be completed once an alternative has been chosen.

Stormwater Management

A future drainage design for the project area and changes to drainage basins will be prepared by Murraysmith (under separate cover) to document stormwater management options for the project once an alternative is selected. This information will also support environmental permit applications and inform right-of-way acquisition needs resulting from storm conveyance systems and water quality/quantity facilities. While the formal stormwater report for the project will follow the alternatives analysis process, preliminary stormwater management needs associated with each alternative presented in this memorandum are provided to compare costs and potential right-of-way impacts.

- Eastern Alignment: This approach creates a low point for drainage to collect at the crossing with Ward Creek, approximately 200 feet south of the intersection with Laidlaw Road. Water quality treatment is envisioned to include roadside stormwater planters between the curb and sidewalk. While these low impact development approaches (LIDA) will filter and clean roadway drainage, they will not provide enough flow control to manage the project's impervious surfaces alone. A detention basin is needed to control flow rates, and locations for site this facility include alongside Ward Creek (referred to as the 'lower facility'), or within an undeveloped vacant lot opposite NW Alsace Place on the east side of NW Saltzman Road (referred to as the 'upper facility').

  The crossing of Ward Creek will require a new culvert to drain the nearly 650 acres of upstream tributary area. A 16 foot span is anticipated to function for both stream hydraulic and environment needs, including wildlife crossing and fish passage. The interior clearance of the structure should be at least 3 feet from the ordinary high water elevation (OHW) to the underside of the culvert, however determining the actual clearance will follow a detailed hydraulic study.

- Western Alignment: This approach shifts the low point for drainage from eastern alignment to the north at the Laidlaw Road intersection. Water quality treatment is similarly envisioned to include roadside stormwater planters between the curb and sidewalk, however the more direct route of the alignment reduces the overall length of

need. A detention basin is needed to control flow rates, and the previous eastern alignment locations of the lower and upper facilities remain viable. These systems require approximately 10% less overall area to manage the smaller impervious area associated with this alternative.

Maintaining the location of the lower facility is recommend to avoid further impacts to environmentally sensitive areas and vegetated buffers to the west at the proposed bridge. A flow splitter is needed near NW Oxbridge Road to divert stormwater within and existing 24-inch pipe towards this new facility for detention. Stormwater could then discharge from the new roadway alignment without detention in lieu, so that the peak flow within the stream meets permitting requirements.

The bridge crossing is downstream of the confluence of Ward Creek and Banister Creek, where they merge to become Bronson Creek. This stream conveys approximately 1,300 acres of tributary area runoff and requires a significantly larger conveyance area than the crossing of only Ward Creek under the eastern alignment. The proposed bridge provides this conveyance area with sufficient clearance for debris and wildlife crossings.

Structural Design

Future structural design for the project will be prepared by Murraysmith (under separate cover) to document retaining wall, culvert and/or bridge requirements.

- Eastern Alignment: Improving NW Saltzman Road along the east alignment will require retaining walls and a culvert replacement at Ward Creek.

  Widening the existing NW Saltzman Road corridor would create cut slopes near NW Avignon Lane to a degree that will require retaining walls for approximately 500 feet. This wall height will vary between 4 and 20 feet, with an average of approximately 10 feet.

  The new culvert at Ward Creek must be at least as long as the design roadway width of 78 feet, plus the length required to return to existing grade with either headwalls or embankment slopes. This will be accomplished with an approximately 90 feet long culvert with headwalls on each end.

  The culvert will enable wildlife to move from one side of the road to the other without crossing the road surface, with clearance dimensions as noted in the Stormwater Management subsection above. Common culvert types for this height and width are

precast concrete box or steel arch culverts. Both can be rapidly assembled on site and are available from a wide range of manufacturers with a history of working in Oregon.

- Western Alignment: Improving NW Saltzman Road along the west alignment will require a bridge and retaining walls near Bronson Creek.

  The west alignment ties NW Saltzman Road into Laidlaw Road along a more direct route through a regulatory floodway. To limit the hydraulic impact within this area, this alignment requires a bridge to span a large portion of the floodway. While it is technically feasible to span over the entire floodway with a single span bridge, this would require a single span length of over 400 feet. Spans of this length typically require structures such as cable-stayed or suspension bridges, which are cost-prohibitive for this project. Additionally, the two-span, 360-foot long bridge options shown in the WH Pacific Report result in a very tall abutment wall required on the south side of the bridge. Therefore, to avoid expensive single spans, and reduce the wall heights at the abutments, this alternatives analysis assumes that the bridge will be a three-span, 405-foot long precast concrete girder bridge consisting of three 135-foot long simple spans.

  Precast concrete girder configurations are a common, economical bridge type throughout the state, and is commonly constructed in Washington County. The bridge will span much of the floodway to balance the floodway hydraulic requirements with the cost-implications of longer span bridges. The bridge will carry the design road section of two 6'-0" sidewalks, two 8'-0" buffered bike lanes, two 12'-0" travel lanes, and a 14'-0" left turn lane at the intersection of NW Laidlaw Rd. An additional 1'-0" on each side is added to accommodate the bridge rail, resulting in a total bridge width of 67'-0". This center lane transitions out of the section towards the southern portion of the bridge, reducing the bridge width to 53'-0". Total bridge depth, including the precast girders and the concrete deck is assumed to be 96" (8'-0").

  For the bridge to achieve its purpose of carrying the road over the floodway, the bottom of the bridge (the soffit) must be above the 100-year flood elevation. It is typical design practice to require the bridge soffit to be at least two feet above the 100 year flood elevation (approximately 270 feet) to allow for debris or other flotsam to pass under the bridge without snagging on the girders. This results in a minimum design bridge deck elevation of approximately 280 feet.

  As the bridge will be elevated above the existing ground and will not span the entire floodway, it will be necessary to construct 15 to 20 foot tall retaining/wing walls on each side of the bridge abutments to retain the roadway fill and further limit the ingress of new material into the floodway.

  Common wall types for "fill" conditions are Mechanically Stabilized Earth (MSE) or cantilever, cast in place retaining walls. These types of walls rely on the soil behind the wall to assist in stabilizing the wall structure, something complementary of the proposed fill configuration.

Traffic Analysis

A preliminary review of both alternatives was prepared by Kittelson & Associates, Inc. Existing physical and operational characteristics of NW Saltzman Road and adjoining roadways within the project area were evaluated.

Both alternatives were evaluated for 2040 traffic volumes evaluating intersection spacing and intersection control and configuration at tie in intersection.

- Eastern Alignment:
    - Intersection Spacing: The queues based on the 2040 traffic volumes do not show impacts to nearby intersections.
    - Intersection Control and configuration at Saltzman/Laidlaw: The existing four way stop control at Saltzman/Laidlaw will continue to meet Washington County Standards. In addition, the proposed east and west leg configuration are expected to serve traffic needs. To improve serviceability, it is recommended to include a northbound left-turn lane to better serve the 350 peak hour left-turn from northbound Saltzman to westbound Laidlaw. The standard three-lane cross section for a collector road accommodates a northbound left turn lane.
- Western Alignment:
    - Intersection Spacing: Due to intersection spacing, connectivity, and expected queuing, it would not be feasible to maintain the same level of access to Red Cedar Ct if a new intersection is added at 130th/Laidlaw. Proposed solutions would be to cul-de-sac the north end of Red Cedar Ct , providing access only to the seven homes via right-in and right-out only access to Laidlaw Rd. Another option would be to close the Red Cedar Ct/Laidlaw Rd intersection, and provide access to the seven homes from 130th Ave. Conceptual designs for Red-Cedar Ct are outside the scope of work for this alternative analysis.
    - Intersection Control and/or Configuration at 130th/Laidlaw: Bannister Drive would continue to provide connectivity to the neighborhood to the north of Laidlaw Rd if the western alignment is constructed, an if no additional improvement to the existing street network on Red Cedar Ct/Hamel Way are made. The Red Cedar Ct/Hamel Way alignments are currently not connected and require roadway improvements to meet County standards. A separate traffic analysis to model future traffic patterns that reroute traffic volumes to the 130th Ave/Laidlaw Rd intersection would be necessary and is beyond the scope of work for this alternative analysis.

      As noted in the County's Transportation System Plan, a future opportunity is indicated that would connect Laidlaw Road to Springville Road to the north utilizing

the existing 130th Ave./Red Cedar Ct/Hamel Way alignments and extending Hamel Way to the north. This future connection would require extensive coordination with Multnomah County and is beyond the scope of work for this alternative analysis. To improve neighborhood connectivity for this project, at a minimum, roadway improvement to the existing street network to connect Red Cedar Ct and Hamel Way could be made. This future connection would cause different choices for drivers, impacting overall traffic patterns. These impacts would be expected to cause more significant impacts to turning movements at 130th/Laidlaw than simply reassigning the 2040 eastern alignment traffic. A separate traffic analysis to model future traffic patterns would be necessary and is beyond the scope of work for this alternative analysis.

For the neighborhood connectivity of the western alignment to be comparable to the eastern existing alignment, a full street improvement of Hamel Way would have to be assumed. These improvements would provide better north/south connectivity to the future opportunity that would connect Hamel Way to Springville Rd.

If existing access to the existing Saltzman Rd alignment remains, many neighborhood vehicles currently utilizing the roadway via Bannister Dr could be expected to continue to utilize the same roadway. If the western alignment becomes the major roadway, through access from Banister Dr to Saltzman Rd may need to be discouraged. Analysis and determination of the best method to discourage traffic on Saltzman Rd is beyond the scope of work for this alternatives analysis.

Utility Conflicts

A cursory review of potential utility conflicts was done using GIS data available and street view imagery. One-call locates were not requested, and preliminary utility coordination was not performed as part of this alternatives analysis. Utility mapping that was readily available online was obtained from Clean Water Services (CWS, storm drainage and sanitary sewer) and Northwest Natural (NWN, gas). Only CWS facilities were added to the conceptual design basemap to analyze impacts. Other utilities are likely in the area based on visible above ground features included water (Tualatin Valley Water District), power (PGE), communication (Centurylink, Comcast, and likely others). Additional effort would be required to determine type/size/material/vintage/location of utilities within the area and coordinate potential conflicts and resolution.

- Eastern Alignment: It appears that most of the existing utilities within Saltzman Rd are typically located within the existing right-of-way and would likely require relocation at the cost of the utility. One apparent exception that there is an existing CWS storm line and sanitary sewer line that crosses Saltzman Rd near Station 7+30. These facilities extend beyond the Saltzman Rd right-of-way and into property and or easements owned by CWS. Any impacts to these facilities beyond the right-of-way would likely require the

project to reimburse CWS for any design and relocation costs. An existing CWS water quality facility (swale) located beyond the right-of-way between Saltzman Rd and Avignon Ln near Station 9+00.

Tualatin Valley Water District (TVWD) reports an existing 24" diameter water transmission line that is located within the Saltzman Rd right-of-way. In addition, TVWD reports that a 16" diameter distribution water line runs along Laidlaw Rd with neighborhood distribution connections on Banister Dr. The proposed east alignment lowers the profile grade and could require relocation of the TVWD 24" diameter transmission line.

- Western Alignment: South of the proposed horizontal curve near Station 7+00, it is assumed that utilizes are located within the exiting right-of-way and that any utility relocation costs would be at the utilities expense.

  North of Station 7+00, the proposed alignment extends beyond the existing right-of-way where any existing utility would likely have compensable rights to reimbursement if required to relocate due to project impacts. It appears that CWS mapping indicates that there are existing storm and sanitary sewer facilities of various sizes located in private easements along this alignment. These facilities would likely be impacted by this alternative and may require relocation at the cost of the project.

  Based on the County's Transportation System Plan, Freight Element map and street view imagery at the intersection of Laidlaw Rd and 130th Ave, there appears to be an existing major gas pipeline owned and operated by Kinder-Morgan that transports gas products north/south through the intersection. The gas line appears to generally follow Bannister Creek north of Laidlaw Rd and Bronson Creek south of Laidlaw Rd. The gas line is likely located within an existing easement and any impacts to this facility beyond the existing right-of-way would likely require the project to reimburse Kinder-Morgan for any design and relocation costs.

Right-of-way Impacts

Right-of-way impacts vary by proposed alignment. The eastern alignment utilizes retaining walls to minimize right-of-way impacts along the existing Saltzman Rd alignment. The eastern alignment widens and realigns the existing roadway and impacts the adjacent properties along Saltzman Rd. The approximate right-of-way take based on GIS property lines is 2.18 acres with 8 case files. The western alignment realigns the roadway through private property owned by Tualatin Parks and Recreation Department (THPRD). The approximate right-of-way take based on GIS property lines is 2.44 acres, with 4 case files.

Tree Impacts

Clearing wooded areas adjacent to both proposed alignments is required to construct the improvements. The approximate area of wooded land to be cleared along eastern alignment, is

3.3 acres. The approximate area of wooded land to be cleared along western alignment, is 2.7 acres. The quality of trees to be removed will be determined once an alternative is selected. The linear impact on the existing tree line could have a cascading effect on even adjacent trees that are retained if they are subject to increased windthrow.

Safety Benefits

The proposed alignments provide improved safety for pedestrians, cyclists, and vehicles. Both proposed alignments update Saltzman Road to current collector cross sectional standards, and meet the required horizontal and vertical design standards, improving existing geometry and sight distance. In addition, bicycle and pedestrian improvements will also provide safe routes and important connections to businesses and schools (such as Findley Elementary) in the immediate area.

Cost Estimation

Cost estimate summaries for each alternative are provided in Appendix D and include a 40 percent construction cost contingency and 15 percent allowance for construction engineering and administration. Right-of-way acquisition costs are accounted for by assuming $25/$20 per square foot for permanent acquisition for the eastern/western alignments respectively, $8 per square foot for temporary construction easements, and a $10,000 per case file cost for administration.

Traffic Control

Moving forward both alignments will need to provide continued vehicular service or an alternate route during construction. The eastern alignment alternative is anticipated to be the greatest impact to level of service. During construction, the roadway will need to be temporarily closed only allowing local access to the residents with driveways along the work area. Northbound and Southbound traffic would be rerouted to McDaniel Rd or Kaiser Rd for the duration of the project. The western alignment would utilize the existing Saltzman Rd while the western alignment is constructed. Minimal impact to level of service will occur when the proposed work is tied into the existing roadway.

Landslide Hazard

As part of the preliminary assessment both alignments were evaluated for landslide hazards based on review of GIS layers in the DOGAMI. Based on the review neither alignment is located in mapped historic or prehistoric slides. Further review of the lidar for the western alignment showed no additional concerns. For the eastern alignment there appears to be scour or unmapped landslide features east of the embankment along the eastern alignment that will require additional study. Based on preliminary reviews grading and retaining walls would address the steep slopes and additional mitigation measures will not likely be required.

Table 1
Alternative Comparison Summary

Comparison Criteria[1]	Alt 1 – East Alignment	Alt 2 – West Alignment
Environmental Permitting	**	****
Stormwater Management	****	****
Structures	**	****
Traffic	*	***
Utilities	**	****
Right-of-Way	***	****
Trees	***	**
Safety	*	*
Cost Estimate	$10.6 m	$19.1 m

[1] = Low impact potential = *, High impact potential = ****

Citizen Involvement

Outreach to a Public Advisory Committee (PAC) led by the County, will occur prior to the County's selection of the preferred alternative to inform stakeholders and the public for additional feedback regarding input as may impact the design.

October 2020

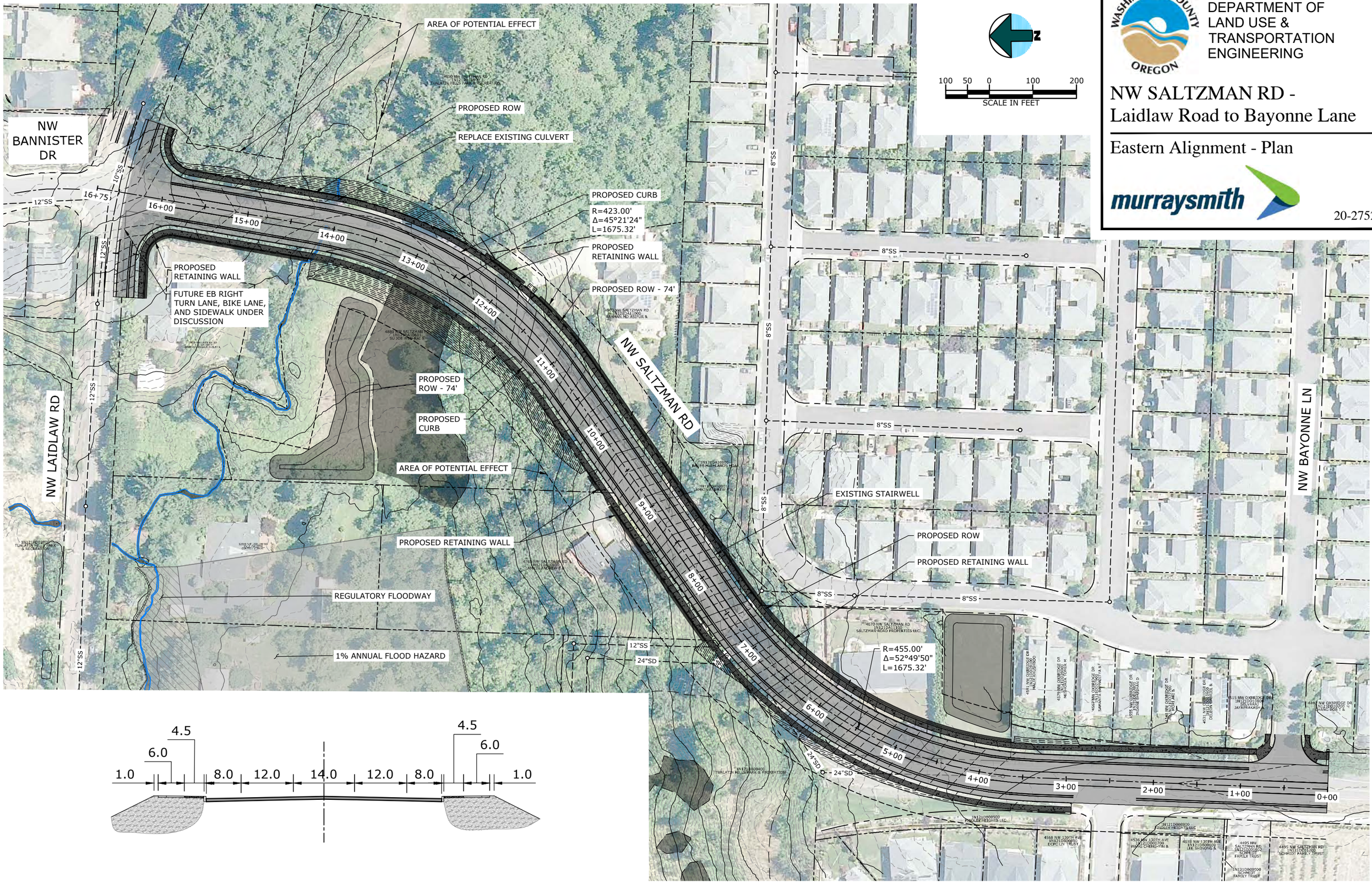
DEPARTMENT OF LAND USE & TRANSPORTATION ENGINEERING

NW SALTZMAN RD - Laidlaw Road to Bayonne Lane

Eastern Alignment - Plan

murraysmith

20-2752



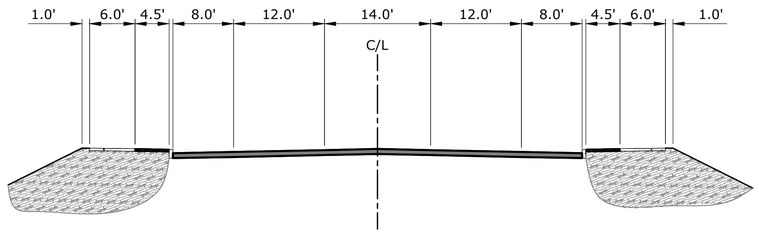
October 2020

Washington County
Saltzman Road Realignment

Eastern Alignment - Profile

murraysmith

20-2752



ROADWAY SECTION
SCALE: 1"=10'

ROADWAY PROFILE
SCALE: 1"=50' HORIZ, 1"=10' VERT

October 2020

DEPARTMENT OF LAND USE & TRANSPORTATION ENGINEERING

NW SALTZMAN RD - Laidlaw Road to Bayonne Lane

Western Alignment - Plan

murraysmith

20-2752

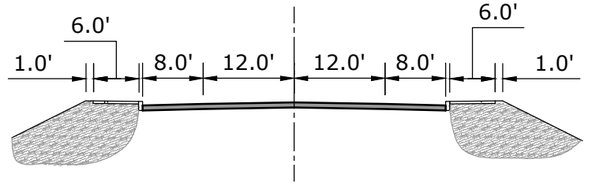
50 25 0 50 100
SCALE IN FEET

NW LAIDLAW RD
NW SALTZMAN RD
NW AVIGNON LN
NW OXBRIDGE DR
NW BAYONNE LN
NW RED CEDAR CT
NW 130TH AVE
NW LAIDLAW RD
NW SALTZMAN RD

REGULATORY FLOODWAY
1% ANNUAL FLOOD HAZARD
AREA OF POTENTIAL EFFECT
PROPOSED CURB
PROPOSED ROW
PROPOSED ROW - WIDTH VARIES
BT-84 = 405
BENT 1
BENT 2
BENT 3
BENT 4
R=530.00'
Δ=21°04'24"
L=1542.30'
R=1000.00'
Δ=21°34'06"
L=1540.18'

8"SS
12"SS
15"SS
18"SS
24"SD

16+42 16+00 15+00 14+00 13+00 12+00 11+00 10+00 9+00 8+00 7+00 6+00 5+00 4+00 3+00 2+00 1+00



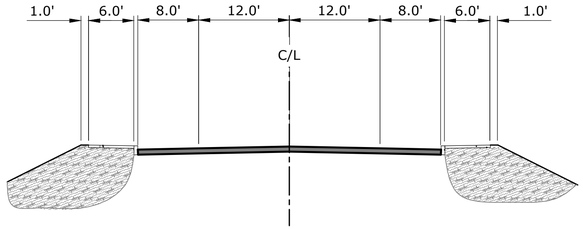
G:\PDX_Projects\20\2752 - Wash. County - NW Saltzman Rd Realignment\CAD\Sheets\20-2752-OR-C-WEST.dwg ALT 2 10/14/2020 3:16 PM ANGEL.CASTRO 23.0s (LMS Tech)

October 2020

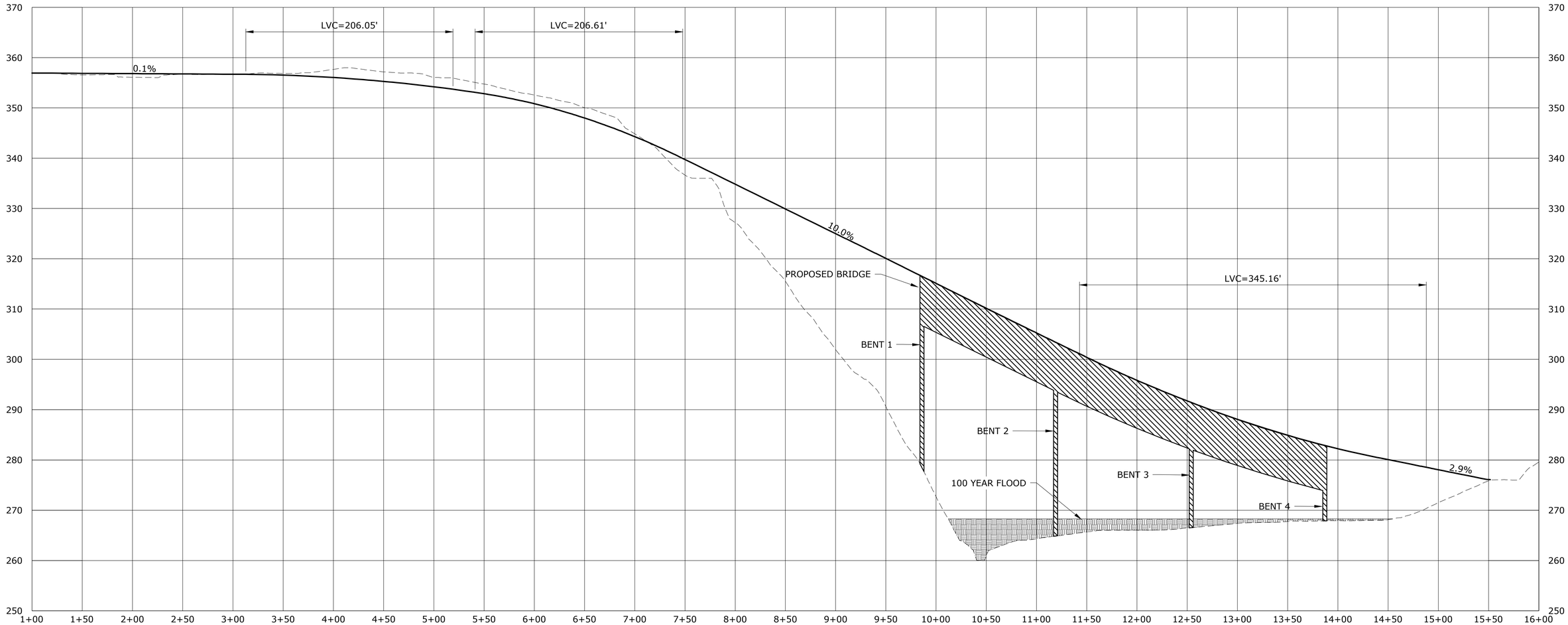
Washington County
Saltzman Road Realignment

Western Alignment - Profile

20-2752



ROADWAY SECTIONS
SCALE: 1"=10'



ROADWAY PROFILE
SCALE: 1"=50' HORIZ, 1"=10' VERT

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Roadway					
Functional Classification	Washington County Transportation System Plan, Online Functional Classification Map	- Collector - NW Saltzman Rd (existing and realigned segment)	N/A	N/A	- Collector - NW Saltzman Rd (existing and realigned segment)
ADT (existing & future)	Washington County 2018 traffic counts	- Saltzman Rd/Thompson Rd [N] - 7,223 (2018)	N/A	N/A	- Saltzman Rd: TBD based on Task 10.9 (Traffic Analysis)
Design Speed	Washington County Road Design and Construction Standards Exhibit 2	- Collector - 35 mph	N/A	N/A	- 35 mph
Typical Road Cross Section	Washington County Road Design and Construction Standards Exhibit 2	- See attached exhibit	N/A	N/A	- See attached exhibits - C-1 County Designation - Saltzman Rd (per SOW)
Paved Width	Washington County Road Design and Construction Standards Exhibit 2	- C-1 Urban Collector - 50 feet - Cross slope - 2.5% Min	N/A	N/A	- 50 feet - Cross slope TBD.
Travel Lane Width	Washington County Road Design and Construction Standards Exhibit 2	- C-1 Urban Collector - 12 feet	N/A	N/A	- 12 feet
Number of Lanes	- Washington County Road Design and Construction Standards Exhibit 2 - Washington County Transportation System Plan, Online Lane Number Map	- C-1 Urban Collector - 3 lanes	N/A	N/A	- 3 lanes
Center Turn Lane Width	Washington County Road Design and Construction Standards Exhibit 2	- C-1 Urban Collector - 14 feet	N/A	N/A	- 14 feet
Right Turn Lane Width	N/A	N/A	AASHTO, A Policy on Geometric Design of Highways and Streets, 2018, Chapter 4, Section 4.3	- As wide as through lanes, but not less than 10 feet wide	- 12 feet wide
Bike Lanes	Washington County Road Design and Construction Standards Exhibit 2	- C-1 Urban Collector - 6 feet	Directed by Washington County	- 6 feet w/ 2 foot buffer (for Alt. Analysis) - To be vetted under Task 10.7	- 6 feet w/ 2 foot buffer (for Alt. Analysis) - To be vetted under Task 10.7

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Bike Classification	Washington County Transportation System Plan, Online Bicycle Element Map	- Saltzman Rd - Major Street Bikeway	N/A	N/A	- Saltzman Road - Major Street Bikeway
Curbs	Washington County Road Design and Construction Standards Chapter 340.050, Standard Drawing 2010	- Emergency mountable curb and gutter are required on urban collectors.	N/A	N/A	- Emergency mountable curb per Standard Drawing 2010
Sidewalks	Washington County Road Design and Construction Standards Chapter 340.060, Exhibit 2, Standard Drawing 2110	- C-1 Urban Collector - 5 feet minimum	Directed by Washington County	- 6 feet	- 6 feet, if mailbox present provide 5' wide sidewalk clearance.
Pedestrian Designation	Washington County Transportation System Plan, Online Pedestrian System Map, Figure 3-24	- Saltzman Rd - No existing designation. - There is a proposed community trail on Laidlaw Rd at the Laidlaw Rd/Saltzman Rd intersection.	Directed by Washington County	N/A	**- No pedestrian designation**
Landscape Buffer Width	Washington County Road Design and Construction Standards Exhibit 2	- C-1 Urban Collector - 4.5 feet minimum	N/A	N/A	- 4.5 feet
Right-of-Way Width	Washington County Road Design and Construction Standards Exhibit 2	- C-1 Urban Collector - 74 feet	N/A	N/A	- 74 feet
Easements	Washington County Road Design and Construction Standards, Chapter 130.070, 320.030 and Exhibit 2	- Obtain slope easements when grading needed outside ROW - Minimum width = 6 feet where needed	N/A	N/A	- TBD based on ROW width, slope and wall needs
Transitions	Washington County Road Design and Construction Standards, Chapter 320.050	- For turn lanes, 10 degree reverse curves, R = 5729/D - Taper width (narrow to wide) = 3:1 - Taper width (wide to narrow), L = (W x S^2)/60 (Less than 45 mph)	N/A	N/A	- For turn lanes, 10 degree reverse curves, R = 5729/D - Taper width (narrow to wide) = 3:1 - Taper width (wide to narrow), L = (W x S2)/60 (Less than 45 mph)
Horizontal Curvature and Superelevation	Washington County Road Design and Construction Standards, Exhibit 9, Chapter 320.030.1 and 320.040	- Varies per Exhibit 9	N/A	N/A	- Varies per Exhibit 9

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Truck Designation	- Washington County Transportation System Plan, Online Roadway Freight System Map, Figure 3-18	- Saltzman Rd is not a truck route.	N/A	N/A	- No design accommodations for trucks
Bus Service	- Washington County Transportation System Plan, Online Transit System Map, Figure 3-29	- Saltzman Rd does not have a current bus service. - Saltzman Rd is identified as a future Regular Bus Service route.	N/A	N/A	- N/A
Intersection Geometry	Washington County Road Design and Construction Standards, Chapter 320.060 and Exhibit 10 and Washington County Community Development Code, Article 501-8.5 F.	- Interior angle 75 to 90 degrees, kept as close to 90 degrees as possible - Minimum 35 foot tangent each side of intersecting curb lines - Collector to Collector Curb Radii = 40 feet min. - Collector to Neighborhood Route Curb Radii = 30 feet min. - Collector to Local Road Curb Radii = 25 feet min. - Curb radii can be reduced by 5 feet if bike lanes are present - Curb ramps meeting ADA at each corner - Intersection Sight Distance Minimum of 350 feet for 35 mph design speed	N/A	N/A	- Interior angle 75 to 90 degrees, kept as close to 90 degrees as possible - Minimum 35 foot tangent each side of intersecting curb lines - Collector to Collector Curb Radii = 40 feet min. - Collector to Neighborhood Route Curb Radii = 30 feet min. - Collector to Local Road Curb Radii = 25 feet min. - Curb radii can be reduced by 5 feet if bike lanes are present - Curb ramps meeting ADA at each corner - Intersection Sight Distance Minimum of 350 feet for 35 mph design speed
Vertical Clearance	Washington County Road Design and Construction Standards, Chapter 320.030.2	- 17 feet minimum	N/A	N/A	- 17 feet minimum
Vertical Grade	Washington County Road Design and Construction Standards 320.030	- Min grade = 0.5% - Neighborhood Route and Local Road Max grade = 15% - All other roads Max grade = 10%	N/A	N/A	- Min grade = 0.5% - N.R. / L.R. Max grade = 15% - All other Road Max Grade =10%
Vertical Curvature and Stopping Sight Distance (SSD)	Washington County Design and Construction Standards, Exhibits 7 & 8, Community Development Code, Article 501-8.5 F.4	- See Exhibits 7 & 8 for required K Values - 1% max grade break - Intersectional Sight Distance = 350' for 35 mph	N/A	N/A	- K = 29 for Design Speed of 35 mph - ISD = 350' for 35 mph

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Decision Sight Distance	N/A	N/A	AASHTO, A Policy on Geometric Design of Highways and Streets, 2018, Chapter 3 (Table 3-3)	- Avoidance Maneuver B - Stop on Urban Road = 590' for 35 mph design speed	- Avoidance Maneuver B - Stop on Urban Road = 590' for 35 mph design speed
Pavement Design	Washington County Design and Construction Standards, Chapters 320.020.2 , 320.020.3 , 320.020.4 , 320.020.5	- Asphaltic Concrete (AC) or Portland Cement Concrete (PCC) designed per County Standards	ODOT Pavement Design Guide	- Project specific	- Project specific design in accordance with County standards
Side Slopes and Clear Zone	Washington County Road Design and Construction Standards, Chapter 320.070, 340.110, Exhibit 2	- Max 5:1 cut/fill slope from back of walk to ROW. - Max 1.5H:1V cut slope and 2H:1V fill slope beyond ROW. Walls required for flatter slopes. - For uncurbed roadways, apply the guidelines in the AASHTO Roadside Design Guide. - For curbed roadways, horizontal clearance from face of curb to face of non-breakaway obstacle be less than 2 feet.	N/A	N/A	- Max 5:1 cut/fill slope from back of walk to ROW. - Max 1.5H:1V cut slope and 2H:1V fill slope beyond ROW. Walls required for flatter slopes. - For uncurbed roadways, apply the guidelines in the AASHTO Roadside Design Guide. - For curbed roadways, horizontal clearance from face of curb to face of non-breakaway obstacle be less than 2 feet.
Design Vehicle	N/A	N/A	AASHTO, A Policy on Geometric Design of Highways and Streets, 2018, Chapter 2	- Design for Interstate Vehicle (S-BUS 40)	- S-BUS 40
Queuing Storage	N/A	N/A	N/A	N/A	TBD
	N/A	N/A	N/A	N/A	TBD
Accesses	Washington County Road Design and Construction Standards, Chapter 130.020 and 340.070	- Right-Of-Way permit is required to establish the location - Separate Right-Of-Way permit not required when access is constructed in conjunction with the roadway improvements	N/A	N/A	TBD
Pavement Slopes - Transverse	Washington County Road Design and Construction Standards, Chapter 340.050	- Cross-slope of the road section shall be no less than 2.5% and no greater than 5%	N/A	N/A	- Cross-slope of the road section shall be no less than 2.5% and no greater than 5%

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Structures					
Bridges	Washington County Road Design and Construction Standards, Chapter 320.020	- Follow AASHTO LRFD Bridge Design Specifications as modificed by ODOT's Bridge Design and Drafting Manual (BDDM).	- AASHTO LRFD Bridge Design Specifications, 8th Ed, 2017 - AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Ed, 2011 - ODOT Bridge Design and Drafting Manual (BDDM), May 2018	- Multiple requirements.	- See Washington County Road Design and Construction Standards - AASHTO LRFD Bridge Design Specifications, 8th Ed, 2017 - AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Ed, 2011 - ODOT Bridge Design and
Walls	Washington County Road Design and Construction Standards, Chapter 340.110	- Use if slopes flatter than 1.5H:1V cannont be achieved. - Fill walls located w/i ROW - Cut walls located outside of ROW if support private property. - No grids or tiebacks w/I top 5 ft of wall within ROW unless protected by concrete cover. - Vertical drop greater than or equal to 30 inches reqire fencing.	- AASHTO LRFD Bridge Design Specifications, 8th Ed, 2017 - AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Ed, 2011 - ODOT Bridge Design and Drafting Manual (BDDM), May 2018	- Multiple requirements.	- See Washington County Road Design and Construction Standards - AASHTO LRFD Bridge Design Specifications, 8th Ed, 2017 - AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Ed, 2011 - ODOT Bridge Design and Drafting Manual (BDDM), May 2019

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Noise					
Project Classification	Washington County Ordinance Ch. 8.42	Type 2 - Noise Variance Need to Complete Noise Report	N/A	N/A	TBD
Road Designation Date	Washington County Ordinance No. 588	TBD	N/A	N/A	TBD
Residential Property Transaction Date	Washington County Assessor database	- 1930-2001	N/A	N/A	TBD
Signals					
Excluded from project.					
Drainage					
General	Washington County Design and Construction Standards, Chapter 330.010	- In Clean Water Services (CWS) boundary, follow CWS Design and Construction Standards	N/A	N/A	- CWS construction standards
Subgrade Drains	Washington County Design and Construction Standards, Chapter 340.120	- Subgrade drains designed and constructed per the recommendations of the soils report	Clean Water Services Design and Construction Standards, 5.04.2(a)	N/A	TBD
Runoff Treatment & Control	N/A	N/A	- Clean Water Services Design and Construction Standards, Chapter 4	- Multiple requirements, see stormwater report	- Multiple requirements, see stormwater report (TBD)
Conveyance Design, Storm Sewer	Washington County Design and Construction Standards, Chapter 330.020	- Directs design per CWS standards	- Clean Water Services Design and Construction Standards, Chapter 5.05.2	- 25-Year storm w/ 1-foot minimum freeboard	- 25-Year storm w/ 1-foot minimum freeboard
Conveyance Design, Culvert	Washington County Design and Construction Standards, Chapter 330.030	- Standards limited to ditch culverts for driveway applications	- Clean Water Services Design and Construction Standards, Chapter 5.07.6	- Multiple requirements, see stormwater report	- Multiple requirements, see stormwater report (TBD)
Ditch Depth	Washington County Design and Construction Standards, Chapter 330.030	- Maximum depth of 2 feet as measured from road shoulder.	N/A	N/A	- Maximum depth of 2 feet as measured from road shoulder.
Ditch Slope	Washington County Design and Construction Standards, Chapter 330.030	- No steeper than 1V:2H	N/A	N/A	- No steeper than 1V:2H

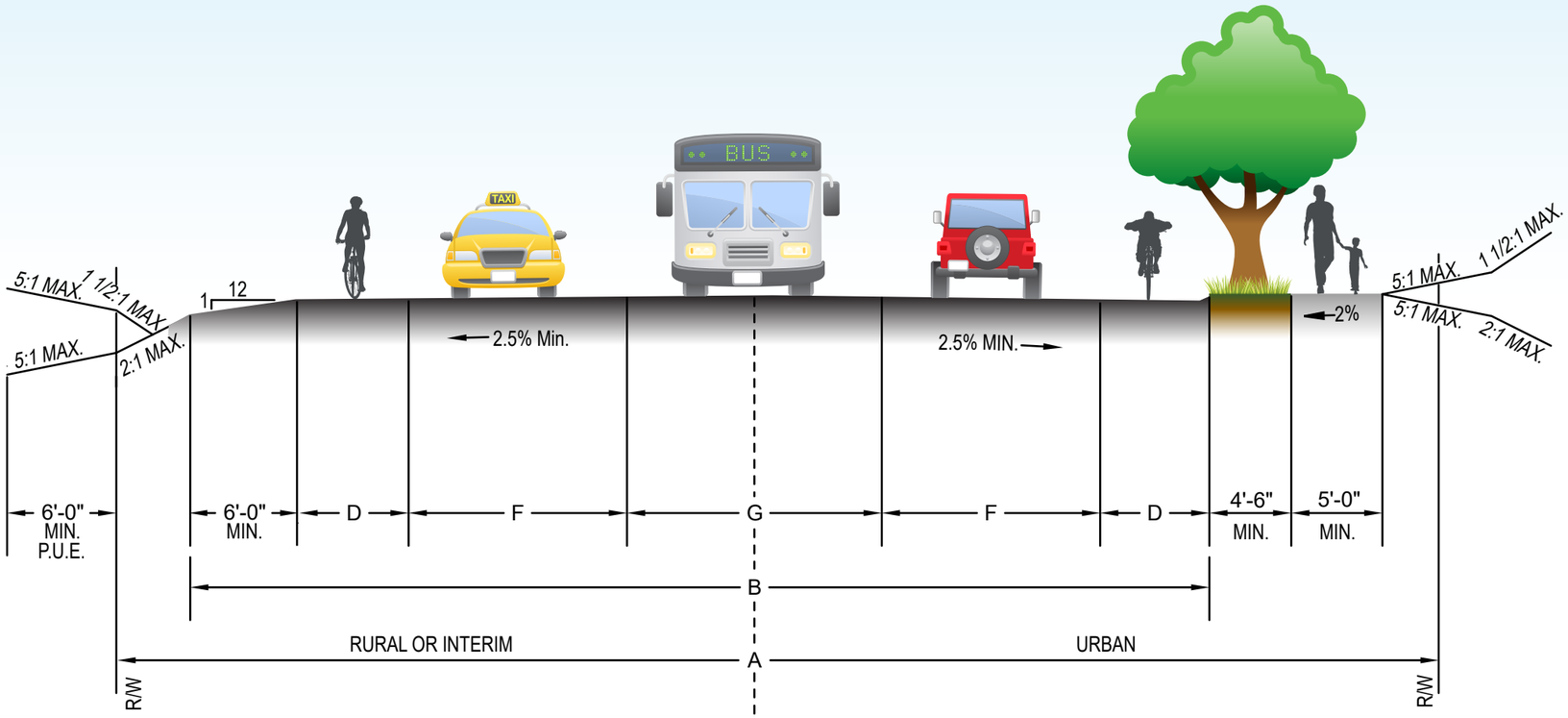
Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Geo / Hydro					
Erosion and Sediment Control	Washington County 1200-CA (Umbrella Permit for all County projects)	- Multiple requirements, see 1200-CA permit	Clean Water Services Design and Construction Standards, Chapter 6	- Multiple requirements, see 1200-CA permit	- Multiple requirements, see 1200-CA permit
Landscaping	Washington County Design and Construction Standards, Chapter 340.130	- Optional materials chosen from County approved lists - Ground cover seeding for erosion control	- Clean Water Services Design and Construction Standards, Appendix A	Multiple requirements for Vegetated Corridors and LIDA Facilities	- Ground cover seeding for erosion control - Meet CWS requirements for Vegetated Corridors and LIDA facilities
Signing					
Signing	Washington County Standard Drawings, Division 6000	N/A	MUTCD, 2009, Part 2	- Sign removal, sign replacement, reinstallation and/or relocation of existing signs, and installation of additional signage as needed - Bring all signs and supports up to current standards	- Sign removal, sign replacement, reinstallation and/or relocation of existing signs, and installation of additional signage as needed - Bring all signs and supports up to current standards
Striping					
Striping	Washington County Standard Drawings, Division 6000	N/A	MUTCD 2009, Part 3	- Pavement markings (longitudinal striping, symbols, bike lanes, left turn channelization and right turn channelization)	- Pavement markings (longitudinal striping, symbols, bike lanes, left turn channelization and right turn channelization)
Lighting					
Lighting	Washington County Road Design and Construction Standards 350.030	- See Washington County Road Design and Construction Standards, Exhibits 11 & 12 - R2/R3 pavement classification from Exhibit 11 - Medium pedestrian conflict area classification from section 350.030.2 - Maximum Uniformity Ratio of 3:1 for all segments. - 1.3 minimum average illuminance for Arterial roadways - 2.6 minimum average illuminance for Arterial-Arterial intersections - 2.0 minimum average illuminance for RRFB crossing	Illuminating Engineering Society of North America, Roadway Lighting, RP-8-00, 2005	N/A	- See Washington County Road Design and Construction Standards, Exhibits 11 & 12 - R2/R3 pavement classification from Exhibit 11 - Medium pedestrian conflict area classification from section 350.030.2 - Maximum Uniformity Ratio of 3:1 for all segments. - 1.3 minimum average illuminance for Arterial roadways - 2.6 minimum average illuminance for Arterial-Arterial intersections - 2.0 minimum average illuminance for RRFB crossing

Design Element	Washington County		Other (ODOT/FHWA/AASHTO/etc.)		
	Reference	Standard/Values	Reference	Standard/Values	Project Value
Temporary Traffic Control					
Lane Restrictions	Washington County Road Design and Construction Standards, Chapter 130.090	- Collectors, and Neighborhood Routes with an ADT greater than 1000, shall not have lane restrictions between 7:00AM to 8:30 AM, and 4:00 PM to 6:00 PM.	N/A	N/A	- Collectors, and Neighborhood Routes with an ADT greater than 1000, shall not have lane restrictions between 7:00AM to 8:30 AM, and 4:00 PM to 6:00 PM.
Temporary Protection and Direction of Traffic During Construction	N/A	N/A	ODOT Traffic Control Plans Design Manual, 2020 / MUTCD 2009, Part 6 / ODOT Standard Drawings, TM800 - TM871	- Multiple requirements, see references	- Multiple requirements, see references

* The corridor along Saltzman is in unincorporated WaCo with Portland addresses, but are not in City of Portland City limits.

Legend: AASHTO = AASHTO A Policy on Geometric Design of Highways and Streets
MUTCD = Manual on Uniform Traffic Control Devices
CWS = Clean Water Services
ODOT = Oregon Department of Transportation

Collector Road Section



NOT DRAWN TO SCALE

DESIGN SPEED 35 MILES PER HOUR

Road Classification	Washington County Designation	Right of Way (Feet)	Paved Width (Feet)	Number of Lanes	Bike Lane/ Paved Shoulder	Travel Lane	Center Turn Lane	Parking Allowed
		A	B		D	F	G	
Collectors	C-1	74	50	3	6	12	14	NONE
	C-2	**	36 *‡	2	6	12	0	NONE

*GRAVEL SHOULDERS AND DITCHES ALLOWED FOR THESE WIDTHS ONLY. STANDARD INTERIM SECTION
** USE ULTIMATE R/W FOR PAVED WIDTH IDENTIFIED IN THE TRANSPORTATION PLAN, IF NOT KNOWN USE 74 FOOT R/W, IN RURAL AREAS 60' OF RIGHT OF WAY IS REQUIRED.
‡ P.U.E.'S REQUIRED OUTSIDE OF R/W IF SHOULDERS AND DITCHES ARE USED.

The applied "Washington County Designation" is determined by the county's transportation plan and the land use decision.
See Appendices C and D for maps of County collector roads.

Collector Road Section

Washington County Exhibit#: 2

Effective Date:

Washington County
Department of Land Use
& Transporation
Engineering Section

EAST ALIGNMENT ALTERNATIVE

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	MOBILIZATION	1	LS	$ 442,000	$ 442,000
2	TEMPORARY FEATURES AND APPURTENANCES (TRAFFIC CONTROL, DRAINAGE, ETC.)	1	LS	$ 238,000	$ 238,000
3	ROADWAY (SURVEY, CLEARING, EARTHWORK, BASES, SURFACINGS, ETC.)	1	LS	$ 1,321,000	$ 1,321,000
4	STRUCTURES (CULVERT AND WALLS)	1	LS	$ 1,517,000	$ 1,517,000
5	STORMWATER DRAINAGE AND MANAGEMENT	1	LS	$ 591,000	$ 591,000

PRELIMINARY COST SUMMARY	TOTAL
Preliminary Engineering	$ 1,300,000
Construction Subtotal	$ 4,109,000
40% Construction Contingency	$ 1,643,600
15% Construction Administration	$ 863,000
ROW Acquisition	$ 2,660,000
Wetland Mitigation	$ 5,000
Total	**$ 10,581,000**

Note: Costs, quantities and assumptions are based on conceptual designs and are subject to change.

WEST ALIGNMENT ALTERNATIVE

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	MOBILIZATION	1	LS	$ 879,000	$ 879,000
2	TEMPORARY FEATURES AND APPURTENANCES (TRAFFIC CONTROL, DRAINAGE, ETC.)	1	LS	$ 200,000	$ 200,000
3	ROADWAY (SURVEY, CLEARING, EARTHWORK, BASES, SURFACINGS, ETC.)	1	LS	$ 1,789,000	$ 1,789,000
4	STRUCTURES (BRIDGES AND WALLS)	1	LS	$ 5,775,000	$ 5,775,000
5	STORMWATER DRAINAGE AND MANAGEMENT	1	LS	$ 424,000	$ 424,000

PRELIMINARY COST SUMMARY	TOTAL
Preliminary Engineering	$ 2,163,000
Construction Subtotal	$ 9,067,000
40% Construction Contingency	$ 3,627,000
15% Construction Engineering	$ 1,905,000
ROW Acquisition	$ 2,248,000
Wetland Mitigation	$ 20,000
Total	**$ 19,010,000**

Note: Costs, quantities and assumptions are based on conceptual designs and are subject to change.