Draft Feasibility Report

The Dalles Riverfront Trail

The Dalles, Oregon
ODOT Region 4
ODOT Key # 17890

Prepared for

Oregon Department of Transportation
City of The Dalles

March 2017

Prepared by

ch2m SM

This report has been prepared under the direction of a registered engineer.

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Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
APHIS	Animal and Plant Health Inspection Service
BMP	best management practice
BOR	Brewery Overpass Road
CCI	City Center Interchange
CWA	Clean Water Act
DEQ	Department of Environmental Quality
DSL	Department of State Lands
ESA	Endangered Species Act
FAHP	Federal-Aid Highway Program
FHWA	Federal Highway Administration
I-84	Interstate 84
MBTA	Migratory Bird Treaty Act
MP	milepost
MSE	mechanically stabilized embankment
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
Project	The Dalles Riverfront Trail Project
SEM	sequential excavation method
SHPO	State Historic Preservation Office
UPRR	Union Pacific Railroad
US	U.S. Route
USACE	United States Army Corps of Engineers
USCG	U.S. Coast Guard

1 Introduction

1.1 Purpose and Need

The planned 10-mile The Dalles Riverfront Trail currently has gaps that need to be constructed to provide a continuous path system. The purpose of The Dalles Riverfront Trail Project (Project) is to improve safety and connectivity by constructing missing segments of shared use path. The Project would enhance safety and mobility for the overall bicycle and pedestrian network and create a viable transportation alternative. The Dalles Riverfront Trail will ultimately provide over ten miles of continuous shared use path when the Project is constructed.

The Dalles Riverfront Trail Project is an Americans with Disabilities Act (ADA)-accessible, 12-foot wide paved shared use path with 2-foot shoulders on each side. The trail is generally along the Columbia River and a high priority for the City of The Dalles and Oregon Department of Transportation (ODOT) Region 4. This Project has been included in The Dalles Master Plan for over 20 years and an ongoing focus of The Riverfront Trail Board. Alternatives north of Interstate 84 (I-84) were studied and advanced through the 30% stage in 2013 but determined to be infeasible because of cultural resource issues and property impact issues.

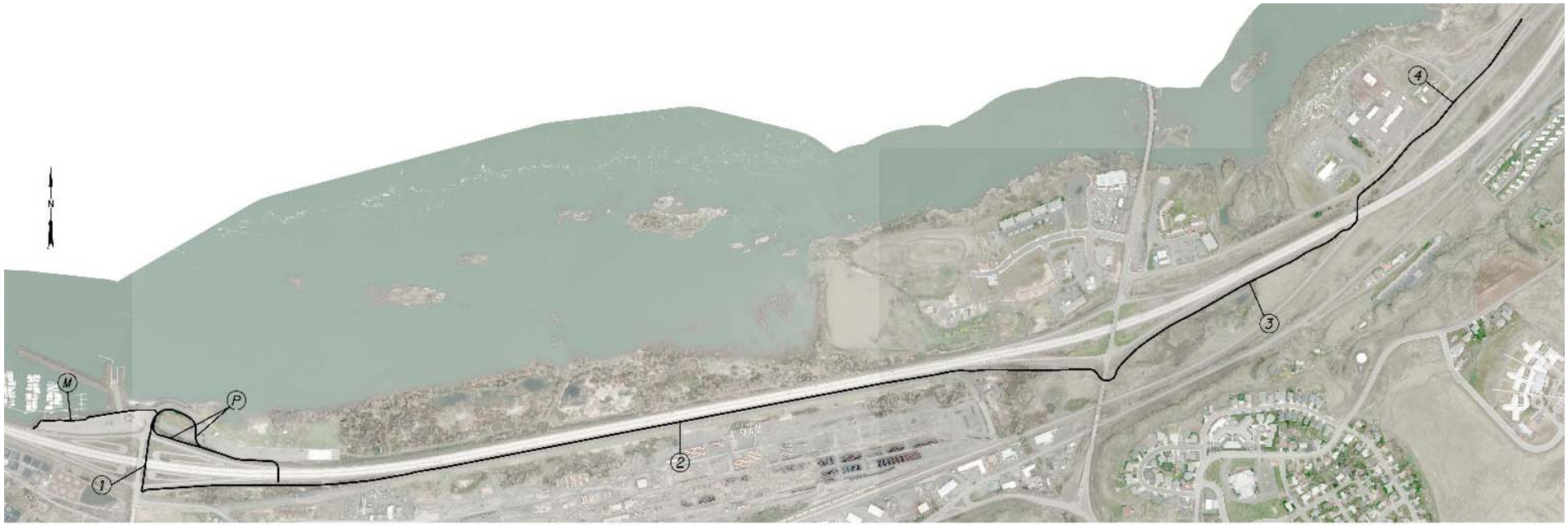
The purpose of this study is to examine new alternatives that alleviate the previous concerns and complete the design of approximately 2.6 miles to close the gaps in the 10-mile path. There are four segments that make up the 2.6 miles; the City Center Interchange (CCI) Segment, CCI to Threemile Creek Segment, Threemile Creek to Bret Clodfelter Way Segment, and the Bret Clodfelter Way Segment. The path and bridge improvements that will be studied with this Project include the following:

- Pavement Marking and Wayfinding improvements through The Dalles Marina parking lot to the intersection of The Dalles Riverfront Park Road with Brewery Overpass Road (BOR)
- A widening of the BOR structure to accommodate bicyclists and pedestrians
- A separate pedestrian/bicycle overpass east of BOR structure
- A tunnel under I-84 from Riverfront Park to the south side of I-84
- A new pedestrian bridge over Threemile Creek
- New path construction along the south I-84 shoulder from BOR to the east side of Threemile Creek
- New path construction from Threemile creek, under US197 and crossing to the north side of I-84 under the Union Pacific Railroad (UPRR) structure
- New path construction along the south side of Bret Clodfelter Way to connect to the existing path on United States Army Corps of Engineers (USACE) land

1.2 Existing Conditions

The Dalles Riverfront Trail Project study area is shown on Figure 1-1.

FIGURE 1-1
Project Study Area



Study Area Segments:
1 – City Center Interchange Segment
2 – City Center Interchange to Threemile Creek Segment
3 – Threemile Creek to Bret Clodfelter Way Segment
4 – Bret Clodfelter Way Segment
M – Marina Option
P – Park Options

Two miles of the Project are located along the south side of I-84 with the remainder on the north side. The terrain is generally rolling and passes through surrounding areas that vary from utilitarian parking lots to wetlands and scenic areas rich with cultural and archaeological elements.

There are numerous utilities that are primarily located in the CCI segment and east of Threemile Creek. The utilities are shown on the plans and identified later in the report.

1.3 Outline of Project Constraints

The Project corridor contains several Project constraints that shaped the Project scope and design. These constraints include topography, geology, hydrology, environmental and cultural, utilities, right-of-way, and cost.

The topography of the Project area would generally be described as rolling, terraced terrain. The close proximity of I-84 creates a topographic as well as a design constraint.

Environmental constraints pertain to both the natural and built environment. The proposed trail alignments strive to minimize environmental impacts in both. Environmental impacts are addressed in Section 2.8, Environmental.

Most of the trail will be constructed on ODOT-owned right-of-way and existing easements. The trail will pass through the Marina parking area on Port of The Dalles property. The eastern most 1,400 feet of the trail is on USACE right-of-way.

There are several utilities within the Project limits including gas, power, water, and sewer. The proposed trail alignment reduces impacts to the extent practicable.

The Project budget is fixed in Transportation Enhancement funds. Current Project cost estimates exceed the Project budget.

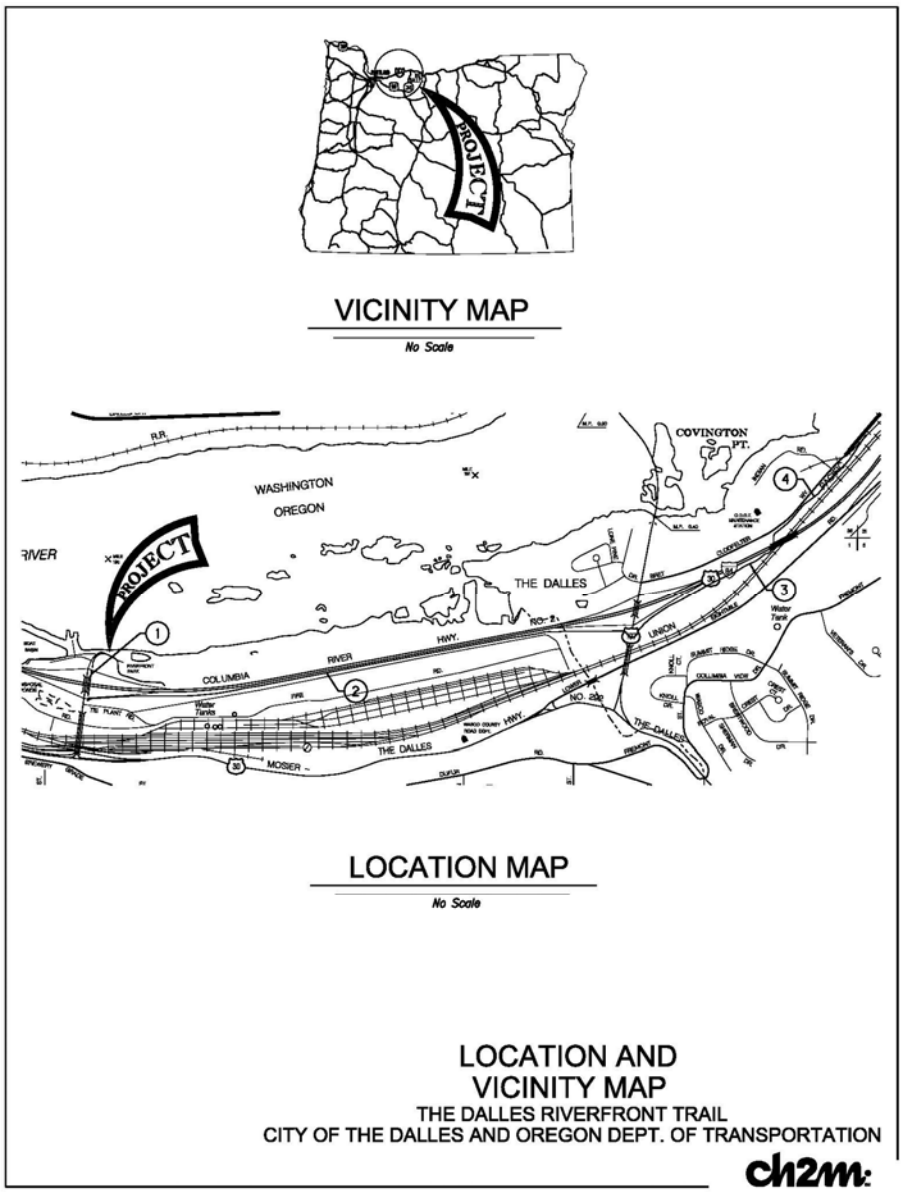
2 Design Solution Alternatives

2.1 Design Approach

2.1.1 Design Approach

The concepts included in this feasibility study are divided into the following Project segments which are shown on Figure 2-1:

FIGURE 2-1
Location and Vicinity Map



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1 – City Center Interchange Segment
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City Center Interchange Segment

A new alignment for The Dalles Riverfront Trail connecting to the existing trail at The Dalles Marina and continues for 2,800 feet before ending on the south side of I-84 at approximate milepost (MP) 85.81. This MP aligns with the east end of Riverfront Park approximately at the location where the eastbound on-ramp merges with I-84. A tunnel beneath the freeway from Riverfront Park to the south side of the freeway will be evaluated along with interchange improvements to facilitate pedestrians and bicyclists through the interchange. For the purposes of cost estimating and Project phasing considerations, the CCI Segment is broken into four sub-segments: Marina Parking Area, two Riverfront Park Alternatives with tunnel to south side of I-84 and the Overpass option which crosses to the south of I-84 via a widening of the existing structure or a separated pedestrian/bicycle structure.

City Center Interchange to Threemile Creek Segment

The CCI to Threemile Creek segment continues from the east end of the CCI Segment for approximately 5,900 feet along the south side of I-84 to the east side of Threemile Creek which coincides with I-84 MP 86.84. The trail will be designed to lie entirely within ODOT right-of-way and steepened slopes or walls may be necessary to avoid any easement or acquisition of UPRR right-of-way. A pedestrian bridge will be constructed over Threemile Creek.

Threemile Creek to Bret Clodfelter Way Segment

This segment begins at the east end of the pedestrian bridge over Threemile Creek and travels east along toe of slope of the eastbound off-ramp at U.S. Route (US) 197). The trail will cross under US 197 and continue east along the south shoulder of I-84 to where it will cross to the north side of I-84 beneath the UPRR structure and cross an existing maintenance road south of Bret Clodfelter Way and directly across from the ODOT/Department of Motor Vehicles/State Police building. The total length of this segment is approximately 3,600 feet.

Bret Clodfelter Way Segment

A new alignment of path begins at the point where the Threemile Creek to Bret Clodfelter Way segment intersects Bret Clodfelter Way. This segment is approximately 1,800 feet in length and will be meander along the south side of Bret Clodfelter Way until the path will connect to the existing path on USACE land. Roughly 1,400 feet of this segment is on USACE land.

2.1.2 Design Solution Alternatives

City Center Interchange Segment:

Marina Parking Area

This segment begins at the Marina Parking Area and provides a connection to the existing trail that terminates at the southwest corner of the parking area. The previous design effort included construction of a shared-use path through the marina parking area which affected a number of parking spaces. The Port's main concern with that design was with the loss of parking and therefore only options that maintain the existing number of parking spaces or minimize impact to parking spaces to the greatest extent possible (with approval of the Port of The Dalles) will be considered in this feasibility study. Potential options include pavement markings to direct pedestrians and bicyclists through the current parking lot layout or providing a continuous pedestrian walkway along the north side of the lot with pavement marking for cyclists to pass through a reconfigured parking lot.

The separate walkway would provide a route for pedestrians through the parking area; however, walkway construction would necessitate retaining walls to limit effects to the riverbank or the parking area. As mentioned above, a reduction in parking spaces is considered unacceptable. Figure 2-2 provides a conceptual reconfiguration of the parking area that the sidewalk construction would necessitate. This

layout is conceptual but represents the feasibility of maintaining the same number of parking spaces currently provided.

FIGURE 2-2
Marina Parking Conceptual Space Reconfiguration

The preferred alternative would provide a separate pedestrian route; however, the improvements could be staged. The initial stage could be the cost effective option to define a pedestrian and bicycle route through the parking area using pavement markings and signage, as needed, with the sidewalk sections being added as funding becomes available. The sidewalk is proposed to be 6 feet wide as shown in the plans in Appendix A.

Four alternatives were examined for the alignment between the Marina parking area and the south side of the BOR eastbound on-ramp to I-84. All three alternatives will cross BOR at the three-legged intersection with the Marina parking lot access and the Riverfront Park access road. The incorporation of a crosswalk on the Riverfront Trail Road leg of the intersection is proposed to facilitate the pedestrian and bicycle crossing as shown in the plans in Appendix A.

Park Options

The first Park Option follows the south edge of the Riverfront Park access road from the three-legged intersection for approximately 450 feet until it reaches the elevation of the park. The existing access road is steep and a 7.0% grade is necessary for the trail to follow the road alignment into the park. At the bottom of the grade the trail alignment crosses the trail parking area until it reaches the south side of the parking area. The trail turns to the east at the foot of the I-84 embankment for 650 feet and then curves south to cross under I-84 via a proposed tunnel.

The final alternative for the alignment connecting the trail from the Marina parking area to the south side of I-84 departs the three-legged intersection and continues to the south along the east side of BOR and turns to the east to follow the embankment of the westbound off-ramp to BOR. The trail transitions down the embankment slope until it connects to the second alternative alignment at the point it crosses the Riverfront parking area. This alternative would also cross I-84 via the proposed tunnel.

As noted, both of these options necessitate the construction of a tunnel as a means to cross under I-84. The tunnel constructability is discussed in Section 2.3.

Overpass Options

From the three-legged intersection the Overpass option 1 run to the south along the east side of BOR, crosses the westbound off-ramp at grade and continues across the interchange on a proposed widened structure. The existing structure has no pedestrian or bicycle facilities; therefore, it is necessary to widen the structure as shown in the plans in Appendix A. The structure widening is discussed in Section 2.4. The alignment will also cross the eastbound on-ramp at grade. ADA improvements are necessary at both ramp crossings and will include curb ramps and striped crosswalks. Additional measures are recommended to alert drivers making the free right onto the eastbound on-ramp to the possibility of pedestrians and bicyclists at the crossing. These could initially include signage to warn drivers to stop for pedestrians and bicyclists in the crosswalk. Signage has been provided for in the cost estimate; however, signalization could be considered in the future as well.

A second alternative that follows the same route as Alternative 1 would cross I-84 via a separate pedestrian bridge. The bridge widening and pedestrian bridge are both discussed in Section 2.4 and shown in the plans in Appendix A. The separated pedestrian structure is the alignment reflected in the trail plans however either option would require similar treatments at the ramp crossings. These first two alternatives provide feasibility to a future connection to the US 30 bicycle network in the future. The pedestrian bridge would necessitate the same ramp intersection improvements as the widened bridge crossing.

City Center Interchange to Threemile Creek Segment

For the alternative that crosses I-84 via the widened interchange structure or separate pedestrian bridge structure, the CCI to Threemile Creek segment begins at the junction of BOR and the eastbound on-ramp and heads east near the top of the ramp embankment.

The two alternatives that cross I-84 via the tunnel option daylight on the south side of I-84 approximately 1,000 feet east of BOR. From this point, the three alternatives converge into one and the trail transitions down the embankment slope and continues east for approximately 1,000 feet with the trail located below the elevation of the highway. Dropping the trail down the slope and away from the shoulder provides some separation between the highway and the trail and reduces the noise level and the risk for trail users of being hit with loose rocks. Alignment options that kept the trail closer to the finish grade of the highway were explored bur eliminated based on feedback from The Dalles Riverfront Trail Board regarding concerns with noise and flying debris from the highway. The trail alternatives at the higher grade also result in taller embankment slopes with would increase the estimated construction costs.

After this short reprieve, the right-of-way narrows and the trail continues east another 4,500 feet tucked as close to the existing right-of-way as possible and with the left edge of the trail approximately 8 to 10

feet behind the back of proposed guardrail as depicted on in the typical sections in the plans in Appendix A.

There are three multi-post signs through this section of narrowed right-of-way there that will require relocation to a monotube cantilever sign structure because there is not enough width for the trail, shoulders, and the multi-post sign foundation.

In the CCI to Threemile Creek segment, the ramps and I-84 mainline are sloped downward to the south and runoff sheet flows off the highway and down the embankment along the south side. In accordance with DEQ requirements, it will be necessary to capture the runoff before it crosses the trail. The trail alignment is proposed to be set with a minimum of 7 feet from the back of guardrail to the edge of paved trail. 7 feet of clear width are necessary to provide adequate width for the proposed stormwater treatment option that is discussed in Appendix C.

There is existing guardrail along the south side of the eastbound on-ramp at BOR. It will be necessary to extend the guardrail to provide protection for pedestrians and bicyclists using the trail. The Project proposes guardrail for the full length of I-84 between BOR and US 197 interchange. The trail transitions from the top of the ramp embankment toward the bottom of the embankment crossing over Threemile Creek on a new pedestrian bridge that is discussed in Section 2.4.

Threemile Creek to Bret Clodfelter Way Segment

This segment picks up on the east side of the Threemile Creek crossing and continues east traversing to the bottom of the I-84 embankment. The trail crosses under the US 197 overpass and turns northerly to traverse up the embankment of the northbound on-ramp. Similar to the CCI to Threemile Creek Segment, the proposed trail will be located slightly down the I-84 embankment to provide some relief from the highway noise to trail users. Guardrail will be proposed at all locations where the trail will be adjacent to I-84 and guardrail does not currently exist.

Approximately 2,000 feet east of US 197 the right-of-way jogs and the usable width available for the trail is constrained between I-84 and the railroad as they converge to the highway overcrossing of the railroad. The trail width is reduced to 10 feet with 2-foot shoulders and cut walls will be necessary on the left side with fill walls on the right as shown on in the plans in Appendix A.

The trail curves to the left to pass underneath I-84 and weaves between the estimated pier locations of the structure over the railroad. Field survey is particularly critical in this area to determine the exact column, abutment, and slope locations for the bridge. The trail continues northerly for another 150 feet before turning to the east to begin the Bret Clodfelter Way Segment.

Bret Clodfelter Way Segment

The alignment for the Bret Clodfelter segment is located along the south side of Bret Clodfelter Way for approximately 800 feet before veering slightly south and continuing east for another 1,250 feet. The first 600 feet of the overall segments is located on ODOT right-of-way and the remaining 1,450 feet is located on USACE right-of-way.

Seemingly the largest factor in the construction of this segment is the coordination with USACE. As also discussed in Section 2.5, Right-of-Way, it is recommended the USACE local office be coordinated with during any future project development.

2.2 Community and Stakeholder Acceptance

The Dalles Riverfront Trail has been planned for over 20 years. *The Dalles Riverfront Plan: Master Plan and Action Recommendations* was completed in October 1989. The Dalles Riverfront Trail Board has continued to foster the plan and provide community and stakeholder coordination. The community and local stakeholders have all continued to express support for the Project.

The alternatives under consideration were presented to The Riverfront Trail Board on February 23, 2017. Feedback received was incorporated into the design and this Feasibility Report. The Project will be presented to City Council on March 27, 2017.

2.3 Geotechnical

2.3.1 Site Geology

The Project site is located in The Dalles, Oregon, south of the Columbia River along the I-84 alignment near interstate exit numbers 84 and 85. According to geologic mapping, the surficial geologic unit present at the Site is alluvium deposited in the Holocene, and consisting of sand, gravel, and silt (Walker and MacLeod, 1991). Bedrock at the site is mapped as Wanapum Basalt of the middle Miocene (Walker and MacLeod, 1991; Hull, 1982).

2.3.2 Subsurface Conditions

Subsurface conditions across the proposed trail alignments were assessed based on review of available geologic and geotechnical resources including previous work performed near the Project site. The two primary sources reviewed are listed as follows.

- *Technical Memorandum: The Dalles Riverfront Trail – Geotechnical Data* (CH2M, 2013). This technical memorandum was prepared for Phase 1 of this Project and includes a summary of geology at the site as well as geotechnical data from two soil borings advanced at select locations.
- *Final Geotechnical Report: FFO – I-84: The Dalles – Fifteenmile Creek Section, Wasco County, Oregon* (ODOT, 2014). This report was prepared for the construction of the I-84 overcrossing of Threemile Creek at MP 86.83. The report includes a summary of the geologic and seismic setting as well as geotechnical data from two soil borings advanced along I-84 at Threemile Creek.

Based on review of the available resources the subsurface conditions present near the Project site can be divided into three general soil and rock layers. Beginning at the ground surface, a description of the soil and rock layers are as follows:

- Fill. Fill deposits, including the I-84 embankment, are located at the ground surface throughout most of the Project area. These deposits range from just a few feet in thickness to over 30 feet in thickness as is the case in areas along the existing I-84 embankment. Fill materials primarily consist of sand to silty sand with varying quantities of gravel and cobbles with the potential for occasional boulder sized material. The fill is generally medium dense to dense in consistency with loose and very dense sublayers.
- Alluvium. Alluvial soil is present below the fill deposits along the entire length of the Project. Basalt bedrock can be relatively shallow throughout the Project area including visible outcrops; therefore, the layer of alluvium can be relatively thin but also has been found to be more than 20 feet in thickness in areas as well. The alluvium primarily consists of sand and low plasticity to non-plastic silt with trace amounts of organic material such as wood debris and is generally wet and very loose to medium dense in consistency.

- **Basalt.** Basalt bedrock is present below the alluvium along the entire length of the Project and, as stated previously, is also visible at the ground surface in some locations that surround the Project site. The basalt at the Project site is mapped as Wanapum Basalt of the Columbia River Basalt Group. The basalt sampled at the Project site is observed to be slightly weathered, medium hard (R3), with very close to moderately close jointing. At the western limits of the Project near BOR, basalt bedrock was encountered at approximately elevation 61 feet. Near the Threemile Creek crossing of the trail alignments, basalt bedrock was encountered at approximately elevation 75 feet.

Groundwater elevation across the Project site is likely to coincide with the elevation of the Columbia River.

2.3.3 Geotechnical Feasibility

For discussion of the geotechnical feasibility of the Project, the two proposed trail alignments were divided into four general areas; (1) the tunnel undercrossing of I-84 just east of BOR, (2) roadway/highway embankment slope construction, (3) retaining walls, and (4) the Threemile Creek Pedestrian Bridge. The following subsections provide a discussion of the geotechnical feasibility as well as other details and recommendations for each of the three highlighted Project areas and additional general recommendations for design and construction of the Project.

Tunnel Undercrossing of I-84

Tunnel construction methods were evaluated based on interpretation of the assumed subsurface conditions and the anticipated ground behavior during construction. Other considerations include the length of the crossing, height or diameter of the tunnel, overburden and traffic loads, site access, and cost of construction.

The tunneled crossing is anticipated to be constructed primarily within alluvium comprised of silt and sand, and coarse-grained fill including cobbles and boulders. The crown of the tunnel will be completed in the fill. While it is assumed the fill material has sufficient fines content to provide an estimated stand-up time of about 10 minutes, it will require continuous support or ground improvement, depending on the tunneling method used. Rapid installation of initial support will be important during tunneling through this ground.

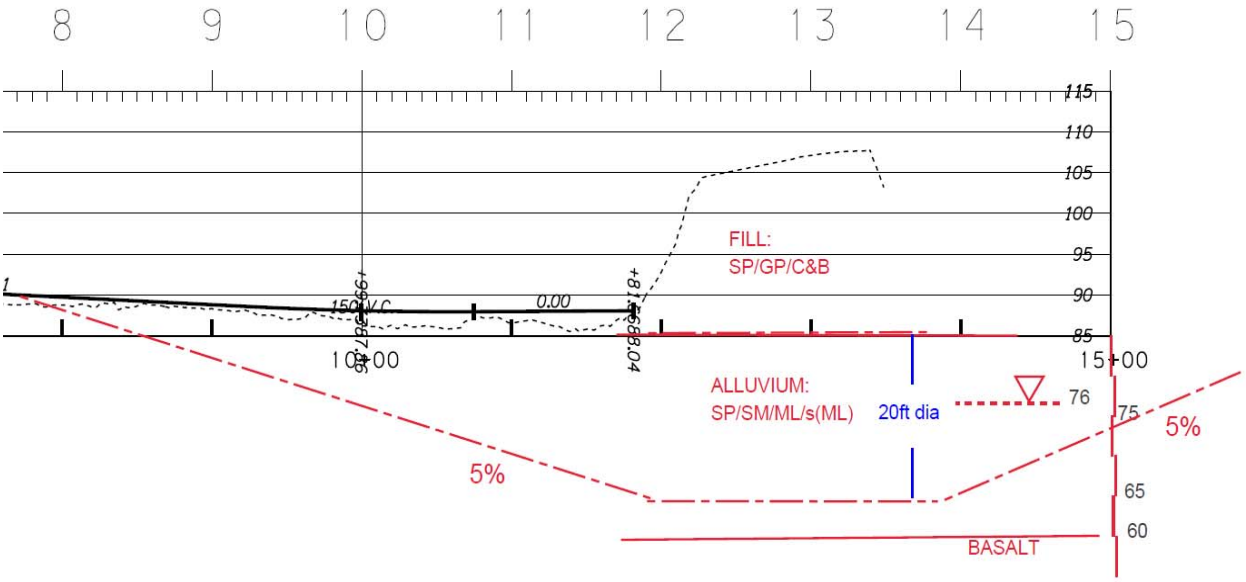


EXHIBIT A
Sketch of Proposed Embankment Tunnel Profile
Note: not to scale

Critical issues to consider in evaluating the feasibility of a tunnel crossing for the I-84 embankment include the subsurface conditions, anticipated tunnel loads, available workspace, and cost.

Tunnel methods considered for application to the crossing included:

- Mechanical excavation of a full-face tunnel with a digger shield and installation of an initial lining constructed of steel liner plate or steel ribs-and-lagging
- Jacking of a precast concrete box
- Continuous pipe roofing (canopy) with smaller diameter steel casing
- Sequential excavation method (SEM) with an initial lining constructed of sprayed concrete

All of the construction methods would require a temporary lowering of the groundwater table for construction. In addition, all methods but the pipe roofing would likely require ground improvement to increase the stand-up time to facilitate installation of the initial ground support. Ground improvement could include pre-grouting of a mass of soil above the crown and driven or drilled spiles or forepoles.

The box jack would demand significant contractor expertise and would require the forming and pouring of a concrete culvert with sufficient time to cure and allow direct jacking and concurrent mining (second option). It is considered feasible and suitable for this application.

Pipe roofing with tunneled steel casings (third option) is an attractive alternative for this crossing, but the presence of cobbles and potentially boulders in the soils at the tunnel crown would introduce significant risk to the successful installation of a fully interlocked canopy of steel pipes using auger boring techniques. It would also cost more because of the requirement to supply a considerable quantity of heavy-wall steel pipe.

The SEM approach would use mechanically excavated tunneling and fiber-reinforced shotcrete for initial tunnel support followed by a secondary cast-in place permanent lining (the fourth option). Exhibit B shows a typical SEM cross-section as applied to a road tunnel. It is assumed that the fill encountered in the tunnel crown will have a sufficient fines content and be self-supporting with a standup time adequate to install the shotcrete initial lining with application of ground improvement. Initial shotcrete with embedded steel fibers is applied directly to the soil or a steel mesh is installed first. Excavation would progress with a single or double top heading, as shown in the schematic in Exhibit B. Excavation is anticipated to use diesel powered excavators or small road headers. Final lining is anticipated to be steel fiber shotcrete or a cast-in-place concrete lining. SEM is assumed to be a relatively costly tunneling method for this crossing and is not considered further in this evaluation.

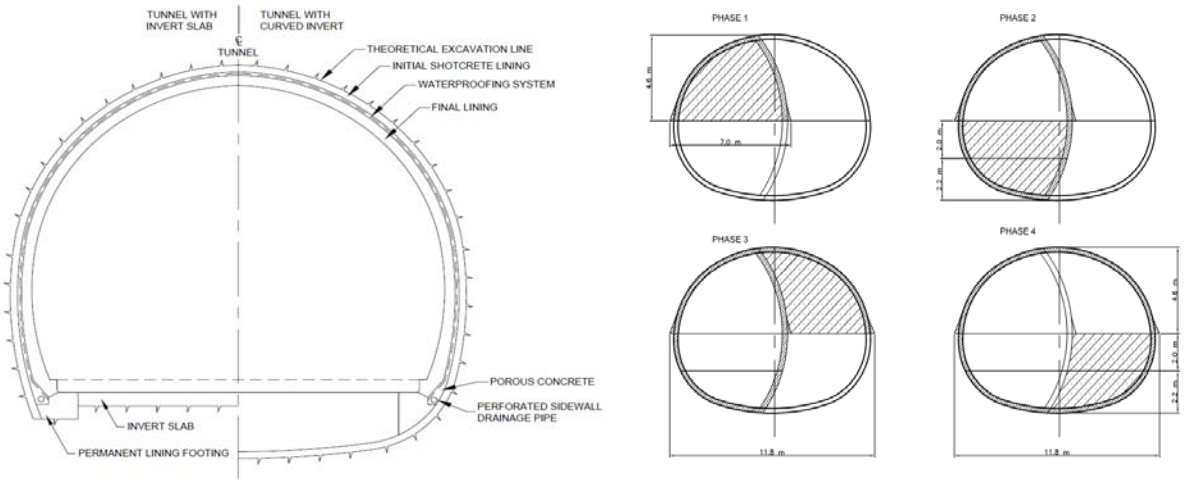


EXHIBIT B
Typical SEM Tunnel Section and Excavation Sequence
*Sources: Federal Highway Administration **(FHWA) 2009 (left) and CH2M (right)***

Mechanical excavation of a full-face tunnel with a digger shield (first option) utilizes an open-faced shield (see Exhibit C) for temporary tunnel support, and the entire face of the tunnel is excavated as the alignment is advanced. Initial ground support, installed behind the advancing digger shield, can be constructed using steel liner plates or steel ribs and wooden lagging ("ribs-and-lagging" – see Exhibit D).

While all the options are considered viable, the pipe roofing and box jacking alternatives require a more highly specialized construction technique. The SEM is similarly suitable but requires a contractor with considerable experience in sequential excavation. For the purposes of developing costs and evaluating feasibility, the tunnel construction method considered most suitable for the I-84 embankment crossing is the digger shield with liner plate or ribs-and-lagging.

EXHIBIT C
Example of Digger Shield
Source: CH2M

EXHIBIT D
Example of Ribs-and-Lagging Support
Source: CH2M

Construction considerations related to the proposed tunnel include tunnel staging area requirements, protecting the tunnel portal from sloughing/falling embankment ground, providing cover between the tunnel crown and the highway surface, and monitoring potential surface settlement.

At the launch portal, the contractor must have room to set up equipment, stockpile spoils, store working equipment (e.g., dump trucks, excavators, and road headers), and store construction supplies. The portal should be founded on stable ground or a working slab should be built with poured concrete or stabilization material to provide a suitable worksite for construction equipment. It is anticipated the I-84 embankment will be scaled to remove loose cobbles and boulders prior to the start of the tunnel construction. These oversized clasts may be unstable or rendered unstable during the tunneling activities. For the safety of workers and equipment, when the slopes are cut the entry and exit tunnel portals should be protected from falling rock to reduce the risk of injury.

The approximate elevation of the trail adjacent to the proposed tunnel site is Elevation 88 feet. To provide reasonable cover for a 20-foot-high tunnel, the approaches at both ends of the tunnel would need to be excavated to lower the depth of the tunnel (see Exhibit A). A grade of 5% was assumed for these approach excavations. Side-wall support may also be required for these excavations, and this conceptual analysis assumes this excavation in conjunction with the horizontal curve of the alignment on the north side of I-84 is constructible. These ramps would add excavation costs, as well as dewatering costs because the lowered tunnel elevation is below the assumed groundwater level, and all of the suitable tunnel construction methods are open-faced. In addition, the ramps would need to be structurally anchored to resist uplift, as they do not have the benefit of restraint because of soil weight that the tunnel would have.

At this very early stage of evaluation, based on the assumptions discussed above, CH2M assumes the use of a digger shield with steel liner plate or ribs-and-lagging support is the most cost-effective tunneling solution for the I-84 embankment. A conceptual cost for this option is estimated in Table 2-1. For any selected tunneling option, additional geotechnical investigation would be required to characterize the subsurface conditions at the tunnel location. Costs for additional investigation are not included in this assessment.

TABLE 2-1
Conceptual Cost Estimate

Project	Dimensions	Cost ($/unit)	Subtotal Cost ($)
Digger Shield Excavation with Steel Liner Plate or Ribs-and-Lagging Support	20-foot diameter × 180 linear feet (LF)	$6,500/LF	$1,170,000
Approach Ramp Excavations (two)	2,350 cubic yards (cy) per ramp	$20/cy	$94,000
Headwalls	21,160 square feet (ft^2)	$10/$ft^2$	$212,000
Dewatering	-	-	$100,000
Total Conceptual Cost:			**$1,576,000**

Embankment Slope Construction

Both of the proposed trail alignments require altering the existing roadway and the I-84 embankments. Predominantly, the existing embankment slopes would be widened at or near the top of embankment in order to make room for the proposed trail. The newly widened embankment slope would match or steepen the existing embankment slope. If the existing embankment slope is already 1.5H:1V, the embankment would be widened to match the same slope as is shown in the Standard Embankment Construction Detail provided on Figure 2-3. If the existing embankment slope is less steep than 1.5:1V the widened embankment would be constructed using the Sliver Fill Benching Detail provided on Figure 2-4 and the toe of the steepened slopes would either terminate somewhere within the existing face of embankment slope or at the toe of slope as shown.

FIGURE 2-3
Standard Embankment Construction

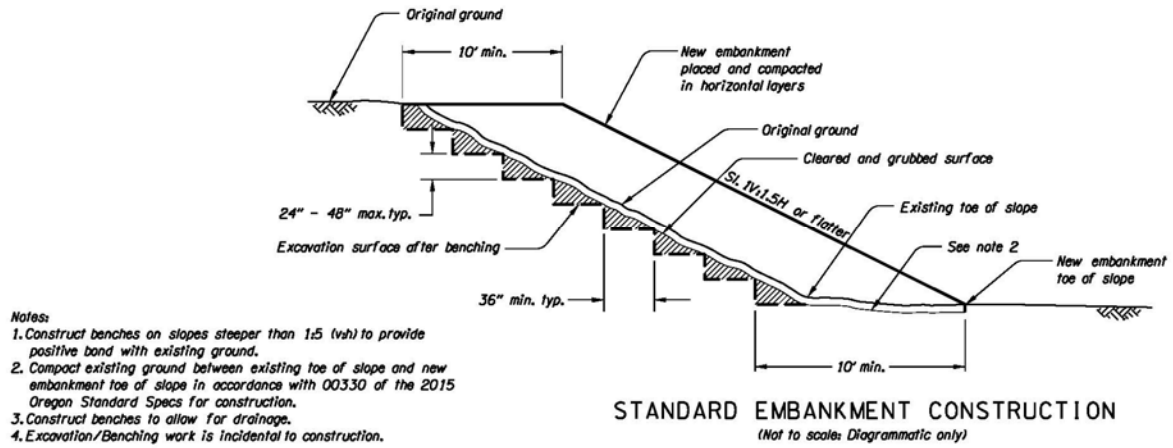
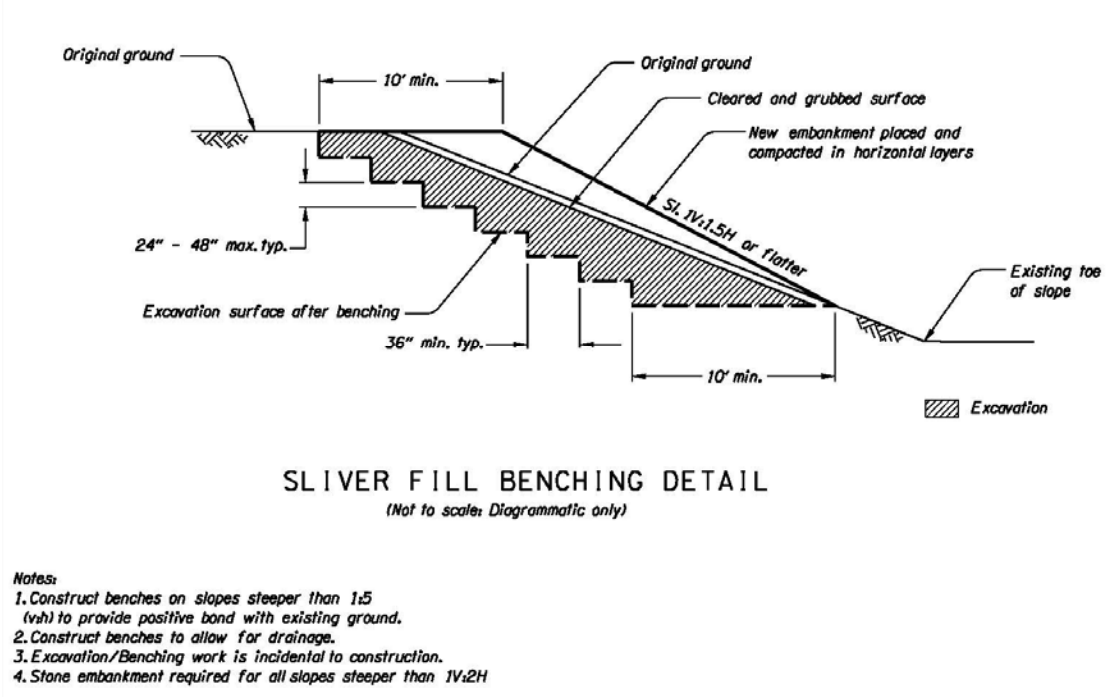
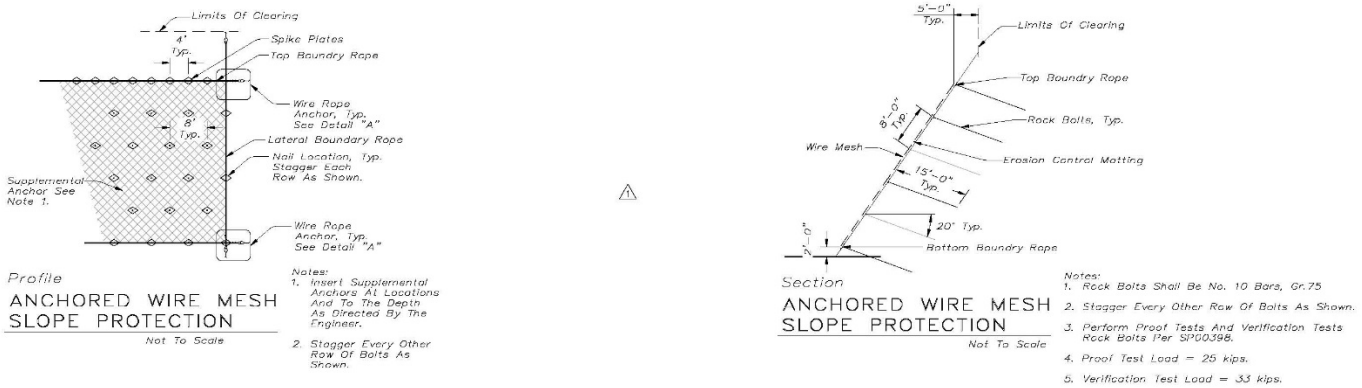


FIGURE 2-4
Sliver Fill Benching Detail



At isolated trail locations along the existing embankment, slopes steeper than 1.5H:1V are required for trail construction. These slopes consist of both cut and fill slopes constructed within the existing embankment and are proposed to be set at 1H:1V. At these locations where embankment slopes of 1H:1V are required, it is recommended that an anchored wire mesh be installed to protect the relatively steep slope. Typical details of the anchored wire mesh are provided in Figure 2-5.

FIGURE 2-5
Anchored Wire Mesh



Based on the proposed vertical and horizontal alignment of the trail in Project areas requiring increased embankment width and/or the alteration of the existing embankment slope, the following are geotechnical considerations and recommendations for the construction of embankment slopes:

- New embankment slopes should be no steeper than 1.5H:1V and constructed using Stone Embankment Material as defined in Section 00330.16 of the 2015 ODOT Standard Specifications (ODOT, 2015).
- If embankment slopes are required to be steeper than 1.5H:1V the use of anchored wire mesh construction will be required to protect the steeper slopes. Slopes with the anchored wire mesh should be no steeper than 1H:1V.

Table 2-2 presents a summary of the locations where embankment slope widening and/or alteration of zthe existing embankment slope will be required through the use of one of the two methods described above.

TABLE 2-2
Embankment Slope Construction Summary

Approximate Begin to End Station	Type of Construction	Finished Slope	Approximate Maximum Height (feet)
00+00 to 02+60	Standard Embankment Construction	1.5H:1V	19
06+00 to 10+40	Anchored Wire Mesh	1H:1V	12
23+25 to 23+75	Sliver Fill	1.5:1V	13
25+35 to 25+90	Standard Embankment Construction	1.5H:1V	14
27+00 to 44+75	Sliver Fill	1.5H:1V	24
47+55 to 48+90	Standard Embankment Construction and Sliver Fill	1.5H:1V	3
106+80 to 107+00	Standard Embankment Construction	1.5H:1V	4
108+50 to 120+35	Standard Embankment Construction and Sliver Fill	1.5H:1V	28
124+85 to 126+95	Standard Embankment Construction and Sliver Fill	1.5H:1V	15

Retaining Walls

Where the widening or alteration of existing embankment slopes using the methods described previously are not feasible, the use of retaining walls will be required for trail construction. Two different types of retaining walls are proposed for the construction of the trail; (1) cantilevered soldier pile wall with lagging and (2) gabion basket gravity wall. Based on the proposed vertical and horizontal alignment of the trail in Project areas requiring retaining walls, the following are geotechnical considerations and recommendations for design and construction:

- All retaining walls proposed for the Project should be designed in accordance with ODOT *Geotechnical Design Manual* (2015) and American Association of State Highway and Transportation Officials (AASHTO) *Load and Resistance Factor Design Bridge Design Specifications* (2014).

- For this feasibility study it was assumed that the soldier pile with lagging walls can be cantilevered and will not require tiebacks based on the maximum height of wall is approximately equal to 13 feet. A height of 13 feet is approaching the maximum reasonable height for a cantilevered soldier pile wall. Additional analyses will be required to determine that all soldier pile walls can be cantilevered.
- Gabion basket walls should be constructed using the details shown in ODOT DET2000. The maximum batter of the face of gabion basket walls should be equal to 1H:10V.

Table 2-3 presents a summary of the locations where retaining walls will be required.

TABLE 2-3
Retaining Wall Summary

Approximate Begin to End Station	Wall Type	Approximate Maximum Height (feet)
05+00 to 10+20	Gabion Basket	6
09+50 to 12+30	Soldier Pile	11
20+50 to 22+15	Soldier Pile	9
92+80 to 93+35	Soldier Pile	3
93+25 to 94+50	Gabion Basket	3
94+45 to 94+60	Soldier Pile	2
127+00 to 129+95	Soldier Pile	13
200+00 to 203+15*	Soldier Pile	11

*Soldier pile wall located from approximately Station 200+00 to 203+15 would only be required if the Alternative 2 trail alignment is selected that includes the tunnel option.

Threemile Creek Pedestrian Bridge

A single-span pedestrian bridge has been proposed for the crossing of Threemile Creek at approximately Station 97+00 of the trail alignment. Design work performed during Phase 1 of the Project resulted in the proposal of a 48-foot-long single-span prefabricated steel truss pedestrian bridge supported on shallow spread footings. It is assumed that the same design approach for the pedestrian bridge crossing of Threemile Creek for the new trail alignment will be used. Therefore, the following should be considered during the design of the Threemile Creek Pedestrian Bridge:

- The Threemile Creek Pedestrian Bridge should be designed in accordance with ODOT *Geotechnical Design Manual* (2015) and AASHTO *Load and Resistance Factor Design Bridge Design Specifications* (2014).
- The spread footings for the bridge will likely be founded on alluvium (see previous description). Using a footing width equal to approximately 5 feet and a footing depth of approximately 2 feet, an ultimate bearing pressure equal to 4.3 kips per square foot should be used for extreme limit state design. Applying a resistance factor equal to 0.45 to the ultimate bearing pressure results in an allowable bearing pressure equal to 1.9 kips per square foot for strength limit state design.
- Liquefaction analyses were performed as part of the geotechnical work for the I-84 Overcrossing of Threemile Creek at Milepost 86.83 Project (ODOT, 2014). The analyses showed that some of the alluvium layer present at or near the ground surface and present down to the top of basalt at

approximate elevation of 75 feet is susceptible to liquefaction. If seismic design is required for the new Threemile Creek Pedestrian Bridge, liquefaction analyses including post-seismic settlement and pseudo-static global stability for the bridge will be required. Depending on tolerance of bridge and trail embankment deformation, deep foundations may be required.

Other Geotechnical Recommendations

The following is a list of additional general geotechnical recommendations for design and construction of the Project:

- Design and construct embankment fill slopes no steeper than 2.5H:1V where embankment fills are not constructed using Stone Embankment Material (previously referenced).
- Temporary cut slopes should be no steeper than 1.5H:1V.
- Permanent soil slopes should be cut no steeper than 2H:1V. An anchored wire mesh slope protection system should be implemented if steeper cut slopes up to 1H:1V are required for design of the proposed trail alignment.

2.3.4 Recommendations for Final Design

It is recommended that a geotechnical exploration program be performed prior to final design for the Project. The geotechnical exploration program should consist of the following:

- Two borings for the BOR Crossing. The purpose of these borings is to determine the depth to bedrock for deep foundation design, characterize fill and native soil conditions for design of the abutment walls and approach retaining walls, and for use in liquefaction screening. Based on historical drawings for Bridge No. 8805 (BOR over I-84), bedrock is estimated to be 65 feet below the top of pavement. Up to 5 feet of coring would be done to confirm the presence and quality of bedrock:
  - One boring at the northeast corner of the proposed bridge structure, extending to bedrock, and up to 5 feet of coring would be collected.
  - A second boring would be performed in the southbound lane of BOR, immediately north of the intersection with the I-84 exit and entrance ramps.
- If the tunnel undercrossing of I-84 option is selected, then the two borings proposed for the BOR Crossing would be moved to the north and south shoulders of I-84 at the proposed tunnel location.
- Two borings would be placed at select locations along the proposed trail alignment where mechanically stabilized embankment (MSE) walls will be constructed within the existing I-84 embankment. The purpose of these borings is to determine subsurface conditions including depth to bedrock in order to perform global stability analyses for the proposed walls. It is assumed these borings would be advanced along the existing south shoulder of I-84 to a depth where basalt bedrock is encountered.
- One boring would be placed at the location of the new Threemile Creek Pedestrian Bridge. The purpose of this boring is to determine depth to bedrock, foundation and abutment wall design, characterize fill and native soil conditions for design of the approach embankments, and for use in liquefaction screening. Based on the work performed for the I-84 Overcrossing of Threemile Creek Project, bedrock is estimated to be at approximately 75 feet (10 to 15 feet below ground surface).

The results of the geotechnical exploration program including a summary of regional geology and seismicity, a summary of subsurface conditions at the Project site, boring logs, and laboratory test results will be presented in a geotechnical report. In addition, the geotechnical report will also include a summary and results of analyses as well as recommendations for design and construction. Analyses included in the geotechnical report will consist of liquefaction and seismic analysis, bridge abutment and foundation design, embankment and MSE wall slope stability, and design recommendations for MSE walls.

2.4 Structures

2.4.1 Brewery Overpass Road

The alignment under study would require The Dalles Riverfront Trail to traverse I-84. The first option considered is a widening of the existing bridge carrying BOR over I-84. The existing curb and rail on the east side of the structure would be removed, and the deck would be widened to the east. In its final configuration, the deck width would increase by approximately 13 feet, 9 inches. A traffic barrier and pedestrian handrail would be placed at the existing east gutter line. A 14-foot, 0-inch multimodal path would be constructed behind the barrier, with a protective screen or fence placed at the new east edge of deck.

The widened portion of deck would be carried by conventional precast box beams. These beams would be shallower than the existing bridge girders to preserve vertical clearance over I-84. At existing Bents 2 and 3, new columns and caps would be required to support the box beams. These columns would be supported on new piles and pile caps, similar to the existing columns. The abutments would also be widened with 2 to 3 piles each.

A second option is to construct a separate pedestrian crossing east of the existing BOR structure. Within this option are several alternatives, described as follows:

- Three spans, concrete box beams. This structure type is essentially the same as described in the first option, with an overall deck width of 16 feet, 0 inches to provide the 14-foot, 0-inch multimodal path. Intermediate piers would be constructed in line with the existing piers. The structure centerline would be approximately 37 feet east of the current BOR structure centerline to allow for future replacement of that structure in a widened configuration.

- Three spans, prefabricated steel trusses. This structure type would comprise three spans matching the existing span lengths. The superstructure would consist of prefabricated steel trusses with a cast-in-place deck for multimodal traffic. A 14-foot, 0-inch clear path width would be provided with protective fencing on each side. New piers would be constructed in line with the existing. This structure would also be offset to the east to allow for future widening and replacement of the BOR structure.

- One span, prefabricated steel truss. This structure would pass over I-84 with a clear span length of approximately 182 feet. It would also be offset to the east, provide a 14-foot, 0-inch clear path width with protective fences and a cast-in-place deck, and would avoid the costs and efforts involved with constructing intermediate piers.

Preliminary costs for widening the existing Brewery Overpass structure and the two steel truss options are in Table 2-4. These costs are preliminary and do not include traffic control costs nor contingency. A factor for traffic control and design contingency for unknowns is included in the estimates found in Appendix B. Although the line item cost for widening the existing structure is slightly lower than the cost of a standalone 3-span structure, the additional cost of traffic control necessary for the widening would

likely exceed the cost difference between the two options. The standalone structure is the preferred option as it can be constructed without impact to the existing structure and any future work on the existing structure would not impact the pedestrian/bicycle bridge. A line item cost of $730,000 is included in the estimate in Appendix B.

TABLE 2-4
Brewery Overpass Structural Conceptual Cost Estimate

Project	Subtotal Cost ($)
Widen Existing Structure	$697,000
Standalone, 3 spans	$730,000
Standalone, Single Span	$893,000

2.4.2 Threemile Creek Pedestrian Bridge

It is anticipated that this bridge would be a prefabricated steel truss. The 48-foot span would be shipped to the site and supported on spread footing abutments. A 6-inch cast-in-place concrete deck with a 12-foot, 0-inch clear width between rails would carry the trail over the creek.

2.5 Right-of-Way

The general goal with this Project is to design the trail elements to reduce the right-of-way needs when possible. Alignment modifications have been selected keep the trail elements within ODOT right-of-way. At select locations, steps have been taken to reduce the right-of-way effects by reducing the trail or buffer widths and implementing a safety rail. Steepened slopes or retaining walls are also proposed in several locations to reduce the Project footprint.

The proposed alignment of the trail will require a small amount of new easement or right-of-way.

It is anticipated that a 15- to 20-foot wide temporary construction easement will be required along the west and north side of the Marina parking lot should the proposed sidewalk be constructed.

Temporary construction easements would be necessary for the Park Alternatives within the Riverfront Park area to build the trail and fill slopes as shown in the Project plans.

The CCI and Threemile Segments are in ODOT right-of-way; however, it may be necessary to get a temporary construction easement from the railroad for construction of a new wall where the trail crosses underneath I-84 at the east end of the Threemile Segment. The trail remains in ODOT right-of-way as it crosses under I-84 and turns east to continue along the south side of Bret Clodfelter Way.

The trail crosses into USACE land after approximately 600 feet. The remainder of the trail is entirely within USACE land.

The local office of the USACE should be coordinated with during design development of the Bret Clodfelter segment. Costs to provide for USACE services in processing a potential easement agreement has been included as a placeholder in addition to the cost of the actual easement

2.6 Stormwater Management

Stormwater runoff from pedestrian and bike trails carries few of the pollutants that run off roads and highways, which can carry a variety of pollutants that include suspended sediment, nutrients, oils and grease, and heavy metals. The Riverfront Trail will increase the impervious surface area within the Project boundaries, which has the potential to increase volume, velocity, and pollutant loading of stormwater

runoff into the Columbia River and Threemile Creek. It is anticipated that trail runoff will be sheet flow to adjacent vegetation where it will be filtered and infiltrate into the upper soil layer.

Oregon Department of Environmental Quality (DEQ) regulations require that stormwater originating from I-84 be kept separated from trail stormwater prior to stormwater quality treatment. Several stormwater treatment best management practices (BMPs) were evaluated for their feasibility to treat, filtrate, and convey I-84 surface runoff flows through the proposed trail prism. The stormwater treatment alternatives and the preferred option are discussed in the BMP Feasibility Study in Appendix C (Stormwater Management Plan).

2.7 Utility Conflict Analysis

Existing known utility locations that are shown in the plans of Appendix A were obtained from several sources, including field surveys of the One-Call field marks and as-built drawings. Impacts to utilities from the preliminary Project designs vary with each utility and range from a watch condition during construction to some that will require relocation. Each utility owner will be responsible for the design and construction of their facility. Relocation notices and schedules will be according to ODOT processes and Oregon Administrative Rule (OAR) Chapter 734-055.

In some cases, the identified conflicts will require a closer evaluation to determine a more exact vertical and horizontal location. This will be completed during the finalization of the Design Acceptance Package (DA) and will aid in the development of the final conflict list and the ODOT certification of the proposed relocation designs.

A preliminary status of each utility is summarized in Tables 2-5 to 2-9.

TABLE 2-5
City of The Dalles, Water and Sanitary Sewer

Item No.	Conflicting Utility	From Station	To Station	Distance from Centerline	Description of Utility Conflict
1	Water Valve	10+38	10+38		Water valve is located in parking area. No conflict anticipated because proposed improvements are striping only.
2	Sanitary Pipe	18+50	19+00		Underground sanitary pipe. No conflicts because proposed improvements are striping only.
3	Water Valve	19+00			Water valve is located in parking area near entrance. No conflict anticipated because proposed improvements are striping only.
4	Water Valve	202+85	202+85	22 feet LT	Potential conflict with trail slope of park alternative alignment.
5	Stormwater Pipe	7+48			Potential conflict with trail of park alternative alignment.
6	Stormwater Manhole	7+48			Potential conflict with trail of park alternative alignment.
7	Waterline	132+24			Potential conflict with trail
8	Waterline, Valves and Meters	132+85			Conflict with trail

TABLE 2-6
Century Link Fiber Optic

Item No.	Conflicting Utility	From Station	To Station	Description of Utility Conflict
1	Communications	18+45	20+00	Underground communications and vault. Not likely to be in conflict because proposed improvements in the parking lot are striping only.
2	Communications	21+12		Potential conflict with trail because underground communications crosses under BOP Road and into Riverfront Park.
3	Communications	205+50	206+50	Communications line and vault are potentially in conflict with riverfront park alternatives.
4	Communications	130+10	131+25	Potential conflict with trail because underground communications crosses under I-84 and likely to service UPRR.
5	Communications	136+00	138+00	Communications running along south shoulder of Bret Clodfelter Way. Potentially in the trail fill slope.

TABLE 2-7
Northwest Natural Gas

Item No.	Conflicting Utility	From Station	To Station	Description of Utility Conflict
1	6-inch high pressure gas line	94+00	105+00	6-inch high pressure gas line may be in conflict with proposed trail. There are two lines in this location. One is south of the highway right-of-way line. They both lines go north and run parallel to the west side of US 197.

TABLE 2-8
Oregon Department of Transportation

Item No.	Conflicting Utility	From Station	To Station	Distance from Centerline	Description of Utility Conflict
1	Underground Power	10+00			Underground power in the westbound on-ramp. No conflict anticipated because proposed improvements are striping only.
2	Street Light and Underground Power	21+75	22+00		Street light and underground power conflict with trail.
3	Underground Power	201+00	201+60	25 feet RT	Street light and underground power are near park alternative alignment. Could be affected by cut slope construction.
4	Underground Power	12+25			Tunnel construction for the park alternative could affect underground power to the street lights along the westbound off-ramp.
5	Street Light and Underground Power				Street light to light ramp gore area. Should be avoidable.

TABLE 2-9
North Wasco County

Item No.	Conflicting Utility	From Station	To Station	Distance from Centerline	Description of Utility Conflict
1	Power Pole	10+27	10+27		Power pole on south edge of parking lot. No conflict anticipated because proposed improvements are striping only.
2	Electrical Vault	19+00			Electrical near entrance to parking lot. No conflict anticipated because proposed improvements are striping only.
3	Underground Electric	19+00			Underground electric at north edge of parking lot crosses BOP Road into Riverfront Park. Potential conflict with trail construction on east side of BOP Road. No conflict anticipated in parking lot area because proposed improvements are striping only; however, the option to add sidewalk along the north side could create conflict.
4	Electrical Vault and Junction Box	21+07	21+17	35 feet LT	Electrical vault and junction box could be in conflict with toe of slope or construction activities.
5	Underground Electric	4+10			Underground electric crosses trail to street light in park. Potential conflict with trail.

2.8 *Environmental Impacts and Mitigation Measures*

The Area of Potential Impact (API) for The Dalles Riverfront Trail (TDRT) extends 2.6 miles from The Dalles Marina parking lot to The Dalles Dam Visitors Center. This section was compiled from information collected for previously considered TDRT alignments (ODOT Key #17890), the FFO – I-84: Threemile Creek Culvert Bridge #09192 Project (ODOT Key #18661), and supplemental investigations completed during January 2017 for the current alignment.

Environmental Considerations

Estimated Right-of-Way Impacts. The project will occur within existing Port of The Dalles, State of Oregon (ODOT), and City of The Dalles right of way.

Estimated Traffic Volume, Flow Pattern and Safety Impacts. The project is a bike/ped trail construction and will not affect traffic volume, flow pattern, or safety. Construction impacts will be confined to temporary work areas on existing roads and short term delays, but will not require detours or closures for local traffic.

Estimated Land Use and Socioeconomic Impact. The project is included in the City of The Dalles Comprehensive Plan and The Dalles Riverfront Plan, and is located within the City of The Dalles Urban Growth Boundary. The project will improve multi-modal transportation options by completing the missing segments of TDRT, which connects The Dalles Dam Visitor's Center at the east end of The Dalles with The Dalles Discovery Center at the west end of The Dalles. No land use impacts are anticipated as a result of the construction of the project.

There are no building displacements associated with the project. The project will not result in changes in travel patterns or travel capacity nor will it result in changes in travel volume, access, or parking. The project will not divide or disrupt an established community or affect neighborhood character or stability.

The project will not affect minority, elderly, handicapped, low income, transit-dependent, or other specific interest groups. No socioeconomic impacts are anticipated to occur as a result of the construction of the project.

Estimated Wetlands, Waterways and Water Quality Impacts. National Wetlands Inventory Maps show freshwater scrub-shrub wetlands and ponds adjacent to the API, and scrub-shrub wetlands along Threemile Creek. In 2012, DSL concurred that a small depressional wetland exists at the invert to a storm drain culvert under Bret Clodfelter Way (WD #2012-0315). In 2016, DSL concurred with the wetland delineation for the FFO – I-84: Threemile Creek Culvert Bridge #09192 Project (WD #2016-0219) and found that wetlands occur outside the ordinary high water elevation of Threemile Creek. The API does not include navigable waters. A wetland delineation will be required to determine potential wetland/water impacts of the proposed alignment.

The proposed trail alignment crosses the 100-year floodplain associated with Threemile Creek.

Currently, stormwater infiltrates to the ground or sheet flows off existing vehicular roads. Erosion and sediment controls (ESC) are of concern during construction because waters and wetlands subject to water quality standards occur in the project vicinity. Oregon DEQ is responsible for enforcement of water quality standards and issuance of a NPDES Stormwater Construction Discharge (1200-C) permit for construction activities disturbing one acre or more of land. The permit requires a stormwater pollution prevention plan (SWPPP) and best management practices during construction to assure an acceptable water quality. The NPDES 1200-C permit could be acquired by the City or Contractor. Regardless of who obtains the permit, a competent person needs to oversee implementation of the SWPPP and ensure that appropriate BMPs are in place prior to the start of any construction.

New impervious surface will be added in the form of an asphalt bike/ped path, but the project will not measurably affect stormwater flow directions or peak flows. Stormwater quality treatment facilities will not be required because: (1) the bike/pedestrian trail will not generate pollution loads, (2) existing vehicle roads will not be reconstructed or drainage-modified, and (3) runoff from vehicle roads will not run onto the API.

Estimated Biological & Threatened & Endangered Species Impacts. The API runs adjacent to the Columbia River shoreline of Lake Bonneville or south of Interstate-84. Most habitat is upland—scabland or rocky outcrop. Predominant vegetation communities along the proposed trail alignment include pine woodland, broadleaf forest, broad leaf woodland, shrubland, PEM/PFO wetland, ruderal meadow, upland grassland. A search of the StreamNet database (Steve Mader/CH2M, September 9, 2012) revealed that ESA-listed Columbia River salmonids used Threemile Creek historically, and likely will return. Also, federal Species of Concern coastal cutthroat trout (*Oncorhynchus clarkii*) are found in Threemile Creek.

A search of the ORBIC database (Teresa Brasfield/ODOT, September 6, 2011) revealed that no other animal or plant species are known to occur within 5 miles of the API, except federal Species of Concern Dalles Mt. buttercup (*Ranunculus triternatus*). However, the lack of undisturbed grasslands or areas of mixed grasslands and sagebrush with deeper soils in the API suggest that Dalles Mt. buttercup is unlikely to occur. No federal-listed threatened or endangered animal or plant species or designated critical habitats (other than Threemile Creek) were identified within the API during the January 2017 field investigation. See Botanical Clearance Report for The Dalles Riverfront Trail Project (Peggy O'Neill/CH2M, March, 2017).

A Notification for use of the FHWA-ODOT Federal Aid Highway Program programmatic biological opinion will be required to address ESA-listed species in the API, and avoid or minimize take through adherence to Conservation and General Construction Measures.

Estimated Archaeology and Historical Impacts. A technical memorandum was completed in January 2017 and includes the results of a background file search using the Oregon State Historic Preservation Office's (SHPO) online archaeological and historic environments databases. The search was to identify and locate available, recorded archaeological sites and previously recorded historic structure (of greater than 50 years age) within ¼ mile of the four new segments of proposed trail alignment located in the Project Area of Potential Effects (APE). A summary of the sites and structures, providing their National Register of Historic Places (NRHP) Eligibility status and other pertinent information, was included in the technical memorandum. No fieldwork was conducted for this effort.

The background literature review showed that numerous investigations consisting of pedestrian surveys and subsurface testing have been conducted within ¼ mile of the current TDRT footprint. The Columbia River shoreline north of the currently proposed TDRT footprint contains numerous archaeological and historic sites. Ground disturbance in areas of potentially undisturbed soils have a high probability of impacting cultural resources.

An archaeological investigation consisting of at minimum, a pedestrian archaeological survey should be completed in compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA). The survey should identify archaeological sites that are within the Area of Potential Effects (APE) and potentially eligible for listing on the National Register of Historic Places (NRHP). The survey should utilize a field methodology consistent with the Oregon SHPO's Guidelines for Conducting Archaeological Fieldwork. The investigation should use the provided background research combined with field observations to identify areas of high probability for buried archaeological deposits and make recommendations for subsurface testing as needed. The eastern portion of the project terminates within the boundaries of NRHP-eligible site 35WS355. If the project results in unavoidable adverse impacts to 35WS355 or other archaeological sites eligible for listing on the National Register of Historic Places (NRHP), mitigation measures developed in consultation with Oregon SHPO, ODOT, the appropriate tribes, and the City of The Dalles will be implemented. A construction monitoring and inadvertent discovery plan will be developed outlining protocol and procedures in the event of unanticipated discovery of archaeological materials during construction.

A historic property inventory should also be completed in compliance with Section 106 of the NHPA. Preliminary research presented in the Archaeological Desktop Investigation for The Dalles Riverfront Trail Project – Phase 2, The Dalles, Wasco County, Oregon report did not identify previously inventoried properties within the APE. The proposed trail would cross, the Union Pacific Railroad, historically known as the Portland Subdivision (Portland to The Dalles) of the Oregon Railway & Navigation Railroad and constructed in 1882. A determination of eligibility should be prepared for the segment of the railroad associated with this project as well as any other built environment resources identified within the APE. The results of the historic property inventory should be presented in a cultural resources technical memorandum that will describe project methods. During the cultural resources inventory for this project photographs should be taken of historic-era buildings and structures located within the tax parcels through which the proposed trail crosses.

Estimated Park, Visual Impacts and 4(f) Potential. The trail will cross existing City of The Dalles park property at The Dalles Marina parking lot. However, the trail will be sited on the existing roadway edge and will not affect the current use of the park. The eastern terminus of the trail segment will be at Seufert County Park and the federal The Dalles Dam Visitors Center. However, the trail will be sited parallel to Bret Clodfelter Way and will not affect the current use of the park.

The project is not located on or adjacent to a scenic waterway or highway. The construction of a bike/pedestrian trail to connect existing trail segments will not result in a negative impact to the visual setting.

A de minimus 4(f) will be prepared for the project.

Estimated Air, Noise and Energy Impacts. The project is not located in an air quality nonattainment or maintenance area. It does not involve adding lanes, signalization, channelization, and/or alignment changes. Temporary impacts to air quality may occur during construction activities. However, no long-term impacts to air quality are anticipated as a result of the construction of the project.

The project involves the construction of a bike/pedestrian trail. No noise impacts are anticipated as a result of the construction of the project.

The project involves the construction of a bike/ped path and will not negatively affect energy use as a result of changes to traffic patterns or volumes or involve speed zone changes. The project may result in a positive effect of decreasing energy use due to providing a continuous trail from the east end to the west end of The Dalles allowing for alternative transportation options for commuters and recreational activities.

Estimated Hazardous Materials Impacts. Historical uses of the site and adjacent areas are of concern due to the potential that environmental conditions could adversely affect the project construction. Adverse environmental conditions, as defined by OAR 340-122-0115(30), are areas that may contain hazardous materials including petroleum products. A hazardous materials review will be conducted in order to identify potential areas of concern, which will include an environmental database review and a site visit.

Regulatory Setting

The project is subject to federal, state, and city laws and regulations that protect environmental and cultural resources. Many of these regulations require the avoidance or minimization of effects to resources, and compensatory mitigation for unavoidable effects. The following sections summarize federal and state regulations and permits applicable to environmental and cultural resources in the API.

Federal Regulations

- Section 404, Clean Water Act (CWA). Permission is needed from the US Army Corps of Engineers (USACE) for work in wetlands and other waters. The federal permit is a nexus that triggers National Environmental Policy Act review, Endangered Species Act review, fish and wildlife coordination, State Historic Preservation Office (SHPO) clearance, and CWA Section 401 water quality certification. Also, permitting involves joint application to Oregon DSL for Removal-Fill Permit.

- Section 401 of the CWA requires Water Quality Certification by Oregon DEQ. The federal Section 404 permit is invalid without Oregon DEQ Section 401 certification. Oregon DEQ will issue new Water Quality Certification for 2017 Nationwide Permits, effective in March 2017.

- Endangered Species Act (ESA). This law protects threatened and endangered species, and the ecosystems upon which they depend. Section 7 of the ESA requires that FHWA must consult with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) to ensure that the Agency is not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroying or adversely modifying designated critical habitat. Compliance with the ESA is demonstrated through “No-Effect” documentation, or informal or formal consultation. The outcome of formal consultation is a Biological Opinion that may include an incidental take permit. This project probably conforms to the ODOT/FHWA FAHP Programmatic

Biological Opinion (B.O.). Although most new bridge projects are not covered, ODOT guidance suggests that the FAHP Programmatic B.O. can cover a new pedestrian bridge. Conservation measures are required to reduce "take" and contribute to recovery of listed fish species. For example, the clear opening of a single span bridge shall be at least 1.5 times the active channel width.

Section 10(a)(1)(A) of the ESA requires NMFS to issue an ESA Incidental Take Permit (and ODFW to issue an Oregon Scientific Take Permit) for physical removal of fish from isolated in-water work areas (i.e., fish salvage/handling).

- Fish and Wildlife Coordination Act. Coordination occurs through the federal permitting agency. It provides direct input into the federal decision process by the federal and state fish and wildlife agencies.
- Migratory Bird Treaty Act (MBTA). This act makes it unlawful to take, import, export, possess, sell, purchase, or barter any migratory bird, with the exception of the taking of game birds during established hunting seasons. The law also applies to feathers, eggs, nests, and products made from migratory birds. The MBTA requires that clearing, demolition, and other construction operations avoid the taking of adult birds, their young, and eggs in occupied nests. This law is of particular concern when birds nest on structures to be demolished.
- Bald and Golden Eagle Protection Act. This law protects bald and golden eagles by prohibiting the taking of, possession of, and commerce related to such birds. The Act makes it unlawful to take, import, export, sell, purchase, or barter any bald or golden eagle, their parts, products, nests, or eggs. "Take" includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing the eagles.
- Magnuson-Stevens Fishery Conservation and Management Act. The Magnuson-Stevens Act emphasizes the sustainability of the nation's fisheries through habitat conservation. This habitat is called essential fish habitat (EFH), which means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity, and likely includes Threemile Creek.

State Regulations

- Oregon Removal-Fill Permit. Oregon's Removal-Fill Law requires a permit for removal-and-fill activities in state waters, including waters designated as Essential Salmonid Habitat and wetlands. The regulation triggers reviews by DEQ, ODFW, and others; and usually joint application to USACE for Section 404 permit.
- NPDES Construction Stormwater Discharge Permit (1200-C). Required by Oregon DEQ for construction activities (clearing, grading, and excavating) affecting one or more acres. Requires an erosion and sediment control plan (SWPPP) to prevent water quality degradation in jurisdictional waters.
- Endangered Species Act. The Oregon Department of Fish and Wildlife (ODFW) and/or the Oregon Department of Agriculture (ODA) must be consulted if the project might impact a state-listed threatened or endangered species. ODFW regulates state-listed fish and wildlife species, and ODA regulates state-listed plants. If ODOT determines that a proposed action on state-owned or -leased land, or for which it holds a recorded easement, has the potential to violate the guidelines of the state ESA rule, it shall notify the ODFW/ODA. ODFW/ODA shall recommend reasonable and prudent alternatives, if any, to the proposed action that are consistent with the state ESA guidelines. Wildlife "take" is defined as to kill or obtain possession or control of wildlife. Plant "take" is defined as to collect, cut, damage, destroy, dig, kill, pick, remove, or otherwise disturb vegetation.

- Fish Passage Law. Fish passage requirements are triggered because native migratory fish are currently or were historically present in Threemile Creek. Fish passage requirements must be addressed prior to triggering events (e.g., installation, a fundamental change in permit status). Compliance requires a fish-passable bridge structure—either "stream simulation" method (i.e., "clear-span" of the active channel width), "hydraulic design" method (based on known or assumed fish swimming abilities), or approved Alternative design method. Otherwise, compliance might be possible under other alternative designs (which may entail exceptions to criteria or guidelines, some combination of approved Alternative design options, or the use of another entity's criteria or guidelines), waivers, exemptions, or deferrals for structural emergencies that may affect human safety.

City of The Dalles

The City of The Dalles Land Use and Development Ordinance (Ordinance No. 98-1222) directs land use and development activities consistent with the City of The Dalles Comprehensive Plan. Applicable regulations will be verified by the City.

Environmental Permits

The environmental permits and approvals will be sought during the final design process. Anticipated permits are shown in Table 2-10.

TABLE 2-10
Anticipated Permits

Regulatory Agency	Permit/Action Required	Comments
US Army Corps of Engineers	Dredge Permit/ Navigable Waters Permit	Section 404, Clean Water Act
ODFW, NMFS	*Oregon Scientific Take Permit;* ESA Incidental Take Permit	Section 10(a)(1)(A) of the ESA
APHIS, U.S. Department of Agriculture	Migratory Bird Take permit	MBTA; Required only if nesting birds are impacted
Oregon Department of Environmental Quality	Water Quality Certification	Section 401, Clean Water Act
	National Pollutant Discharge Elimination System 1200-C	Section 402 of the Clean Water Act; ORS 468.740
Oregon State Historic Preservation Office	Archaeology Archaeological Excavation Permit	Oregon Revised Statue (ORS) 390.235
	Concurrence with Effect	NHPA Section 106
Oregon Department of State Lands	Oregon Removal-Fill Permit	ORS 196.800-990
Oregon Department of Fish and Wildlife (ODFW); Oregon Department of Agriculture	Clearance	Oregon ESA, ORS 496
ODFW	*Fish passage approval*	Oregon Fish Passage Law
City of The Dalles	Development Permit	• Possibly for tree or riparian habitat, or floodplain impacts; requires verification

Mitigation Measures and Environmental Commitments

Table 2-11 summarizes project-specific mitigation measures and environmental commitments from the environmental documentation phase of the project.

TABLE 2-11
Summary of Mitigation Measures and Environmental Commitments

Biological Resources
Ensure that project Plans/Special Provisions are modified for weed control.
ODFW-preferred in-water work timing for Columbia River tributaries: July 15 - September 30
Conservation measures (terms and conditions) to reduce "take" and contribute to recovery of listed fish species via the ODOT/FHWA FAHP Programmatic Biological Opinion.
Avoid disturbance of bald and golden eagles.
Minimize tree cutting, especially in the riparian area of Threemile Creek.
If feasible, conduct tree cutting, grubbing, or clearing activities between September 1 and March 1 to avoid disturbance to nesting migratory birds and their young. If such activities must be conducted during the nesting season (March 1 through August 31), a qualified wildlife biologist should survey the area for the presence of active nests. If active nests are present, all efforts will be made to modify the project activities to avoid disturbing the nests.
If potential impacts to nesting birds are anticipated, the Animal and Plant Health Inspection Service (APHIS) at the U.S. Department of Agriculture (USDA) should be notified in advance of project activities. Contact information for this APHIS service for ODOT Region 4 is: Wildlife Biologist P.O. Box 533 Lebanon, OR 97355 (541) 258-2189
Habitat restoration opportunities include: (1) Threemile Creek (remove passage obstruction, stabilize failing streambanks, plant woody vegetation to shade water; (2) vegetative screening of highway embankment; and (3) native planting and weed control throughout.
Wetlands and Other Waters
Compensatory mitigation for impacts to non-wetland waters probably will not be required if impacts to Thee Mile Creek and jurisdictional ditches/culverts can be avoided.
Compensatory wetland mitigation appears unavoidable for probable permanent impacts to wetlands associated with Threemile Creek. Mitigation options typically include: purchase of wetland mitigation bank credits, payment-in-lieu of self-performed mitigation, on-site wetland restoration/creation/enhancement, and off-site wetland mitigation. Wetland mitigation banking does not appear to be an option because a local bank does not exist and the project is just outside the service area for the Crooked River Bank (Cowie, 2012a). DSL would be able to accept payment-in-lieu mitigation because wetland impact would be less than 0.2 acre. However, the Corps does not offer the payment-in-lieu option and would require additional (constructed) mitigation—unless wetland impacts can be reduced to less than 0.1 acre so that the Corps might be able to characterize the wetland impact as *de minimis* and waive the mitigation requirement. Failing these options, on-site wetland construction appears to be most feasible. Preliminary on-site wetland mitigation sites appear within ODOT right of way, below the toe of the I-84 embankment and adjacent to the proposed trail. However, on-site wetland mitigation has several cost/liability disadvantages: (1) cost of plan preparation and design, (2) cost of construction, (3) potential cost of ROW/easement acquisition, (4) potential conflict with future ROW operations, (5) cost of post-construction performance monitoring and maintenance, and (6) risk of failure and potential cost of remedial measures.
Oregon DSL, Oregon Department of Fish and Wildlife (ODFW), U.S. Army Corps of Engineers (USACE), or National Marine Fisheries Service (NMFS) might propose additional resource replacement mitigation after further review of the proposed action. At that time, as part of the agency consultation, ODOT would develop more specific measures for inclusion in final plans and specifications.
Erosion and sediment control measures might include sediment fencing, straw wattles, biobags, or compost logs; inlet protection for storm systems; gravel construction entrances; plastic sheeting; vegetative cover (seeding) for disturbed soil areas; and a spill prevention, control, and countermeasures plan.

TABLE 2-11
Summary of Mitigation Measures and Environmental Commitments

Cultural Resources
If the project results in unavoidable adverse impacts to archaeological sites eligible for listing on the National Register of Historic Places (NRHP), mitigation measures developed in consultation with Oregon SHPO, ODOT, the appropriate tribes, and the City of The Dalles will be implemented. A construction monitoring and inadvertent discovery plan will be developed outlining protocol and procedures in the event of unanticipated discovery of archaeological materials during construction.
Hazardous Materials
• Investigate and address areas of known contaminated soil before or during construction to limit exacerbation. These measures could include pre-construction sampling of site soil or groundwater, direct removal of contaminated media, capping or covering contaminated soils, and pumping contaminated groundwater from impacted aquifers. • Implement construction-phase monitoring to identify and manage unknown or unanticipated media. A competent person needs to ensure that BMPs are in place prior to the start of construction and that construction phase monitoring to identify and manage unknown or unanticipated media is in place. • Characterize waste generated during construction (such as excavated soil, wastewater, and construction debris) and assign each waste stream to appropriate waste-disposal facilities. • Limit access to areas of environmental concern/contaminated areas. • Minimize cross-contamination or carryover of contaminated material to clean areas. • Control stormwater runoff from the construction site. • Identify appropriate waste disposal for all waste streams.

2.9 Construction Cost Estimate Summary

Preliminary construction costs have been estimated for the trail and are broken out by Segment in Appendix B. The estimated costs are presented in 2017 dollars.

The cost estimates includes a 30 percent contingency calculated on construction costs, accounting for the preliminary design level of this project. Final project costs will vary from those presented in this document and will depend on actual labor and material costs, competitive market conditions, and final project scope, among other variables. A summary of costs by Segment is provided in Table 2-12.

TABLE 2-12
Cost by Segment

Preferred Alternative Project Costs	Feasibility Stage
Marina Option	$307,933
CCI	$1,724,349
CCI to Threemile Creek	$3,464,906
Threemile Creek to Bret Clodfelter	$1,878,269
Bret Clodfelter Segment	$174,733
ODOT Quality Assurance	$10,000
Project Total	$7,560,190

2.10 Recommendations for Project Phasing

The total cost for the full project exceeds current funding. Phasing of the project segments was discussed with the Riverfront Trail Board on February 23rd and recommendations for project phasing are discussed below.

Phase 1

Improvements through the Marina are a relatively low cost segment of the overall project and these improvements could be phased as funding comes available. The initial action could involve pavements markings for the bicyclists as shown on the plans coupled with pedestrian markings to supplement and guide all users through the parking area.

The improvements could be further stages by constructing the off parking sections of sidewalk in a second phase. Pedestrians could then use the existing sidewalks or the parking area pavement in the interim. The final phase would be completing the pedestrian network and reconfiguring the parking lot layout.

The City Center Interchange Segment exceeds current funding however it is recommended as either the initial phase or the second phase following the Marina improvements. The bridge is a visible project element and could generate public interest in the project. The improvements to provide users an accessible route to the south side also opens up the possibility of a connection to US 30 in the future.

Phase 2

Bret Clodfelter is the lowest cost segment but will require USACE coordination and right-of-way agreements to construct. This segment would provide access from the ODOT offices to the USACE Visitor Center although there would not be a marked pedestrian crossing of Bret Clodfelter Way.

Phase 3

Threemile to Bret Clodfelter is recommended as the third phase. Completion of this segment following the Bret Clodfelter Segment would provide an enjoyable section of trail from the USACE Visitor Center to the Threemile Creek. If desired, the bridge could be constructed with this segment in lieu of the CCI to Threemile Creek Segment.

Phase 4

CCI to Threemile Segment is the segment with the highest projected cost. This would be the final section of The Dalles Riverfront Trail and there would be an expected public interest in seeing the last piece of the trail constructed. Ideally that would equate to increased support to establish funding.

3 References

American Association of State Highway and Transportation Officials. 2012. *Guide for the Development of Bicycle Facilities.* (GDBF, 2012)

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Walker and MacLeod. 1991. Geologic Map of Oregon, US Geologic Survey (1991)

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APPENDIX A

Design Plans

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
2A-2A-5	Typical Sections
3-32	Plan and Profiles
	Brewery Overpass Structure Options
	Threemile Creek Pedestrian Bridge

STATE OF OREGON

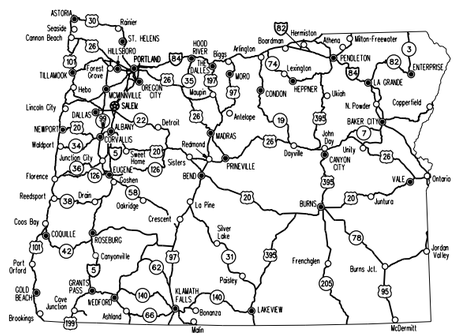
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, & ROADSIDE DEVELOPMENT

THE DALLES RIVERFRONT TRAIL

WASCO COUNTY



Overall Length Of Project - 1.25 Miles

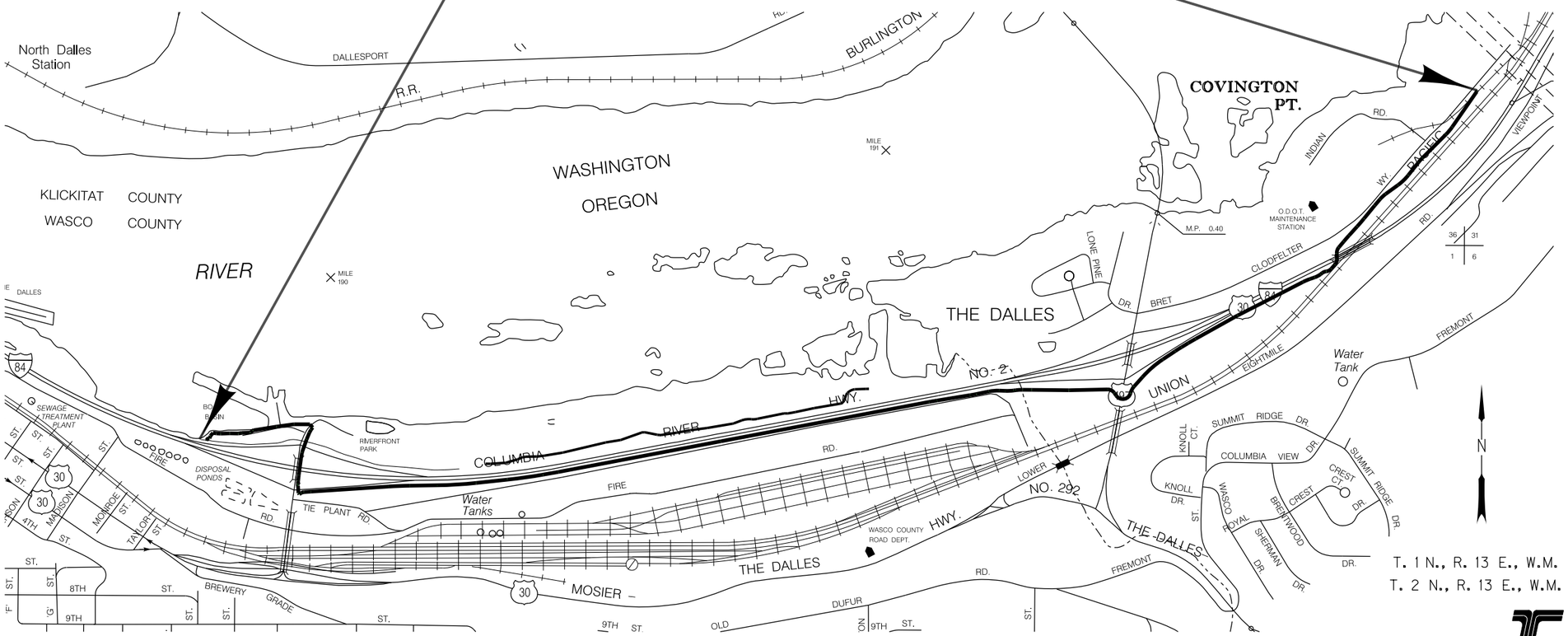
ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

FEASIBILITY REPORT
PLANS FOR REVIEW

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

BEGINNING OF PROJECT

END OF PROJECT



OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
David Lohman	COMMISSIONER
Mary F. Olson	COMMISSIONER
Mark Frohnmayer	COMMISSIONER
Tammy Baney	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using AASHTO design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

Approving Authority: _____
Signature & date

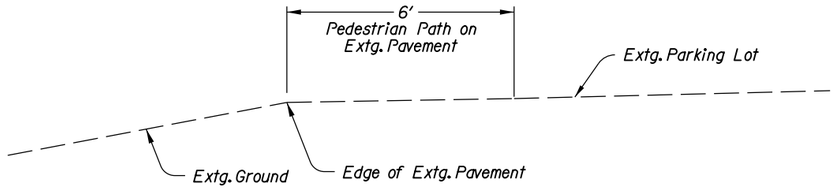
_____
Print name and title

_____
Concurrence by ODOT Chief Engineer

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	TEA - 1342(007)	1

FEASIBILITY REPORT
PLANS FOR REVIEW



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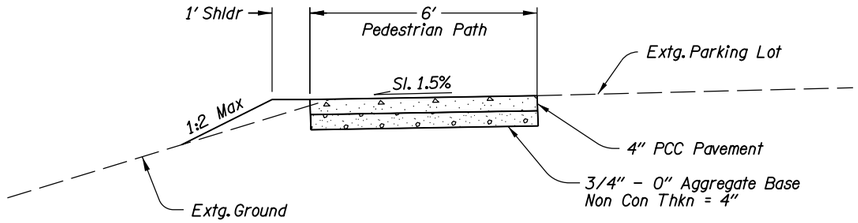
'MA' 2+60 To STA. 'MA' 4+80



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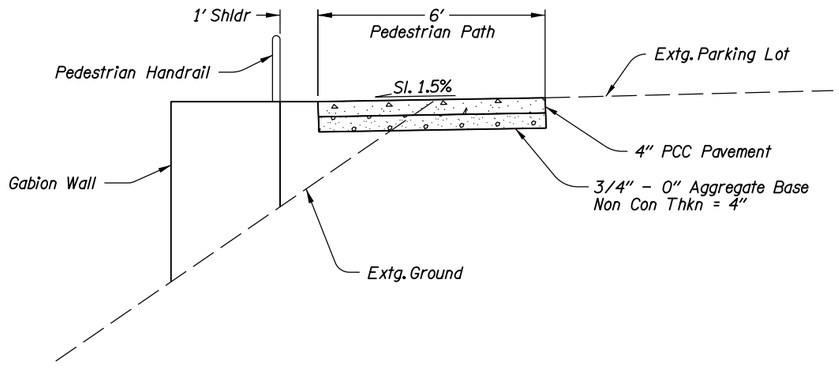
6+90 To 8+00*

* 7+15 to 7+92
At Grade Crossing of Boat Ramp.



TDRT TRAIL MARINA
STA. 'MA' 4+80 To STA. 'MA' 6+90
8+00 To 10+24

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'MA' LINE
TYPICAL SECTIONS

SHEET NO. 2A

ROADWAY

17890ty02A.dgn

PW: 439154: $FILENAME 15-MAR-2017 11:17 $$$$username$$$$

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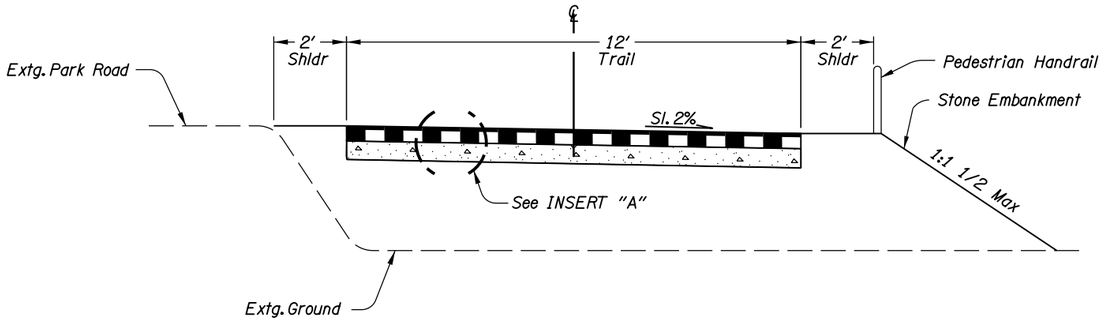

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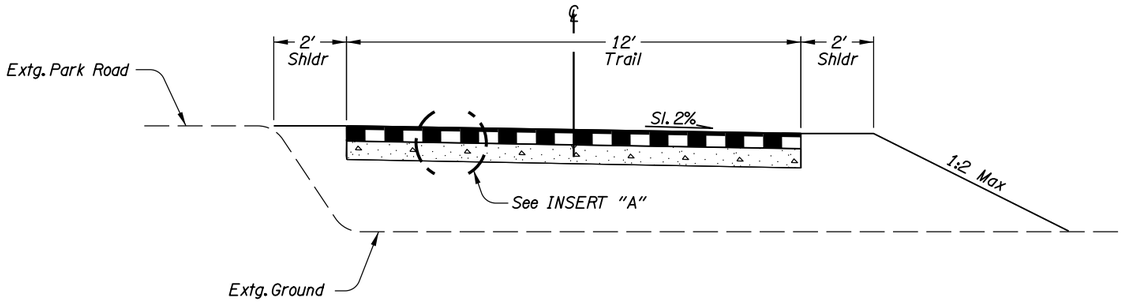

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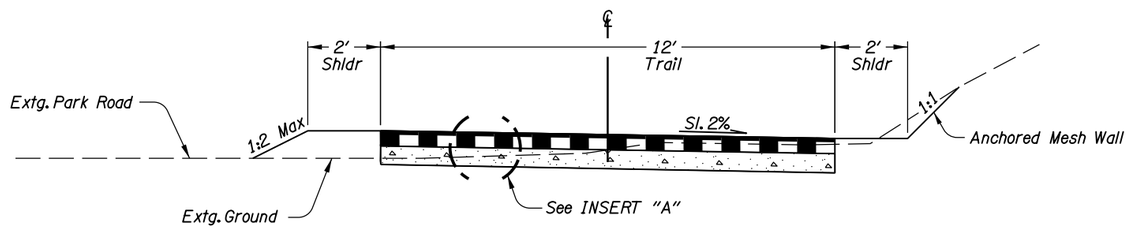
STA. 'PR'2+65 To STA. 'PR'4+47
5+05 To 5+85



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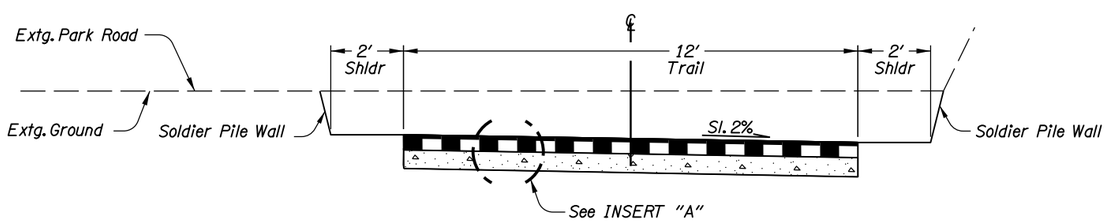

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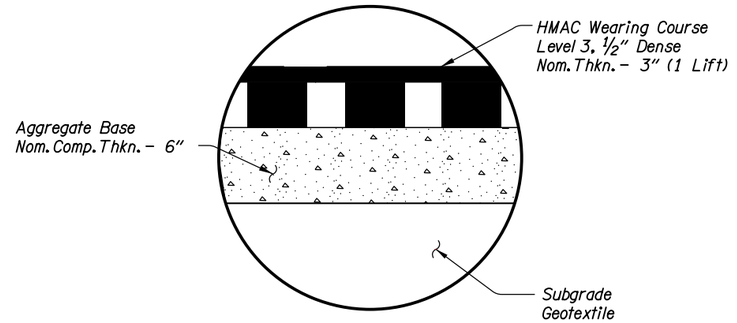
NOTE:
4+47 to 5+05 is At-Grade Crossing in Park.



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WASCO COUNTY

Reviewed By – K. Thomas
Designed By – S. Daleo
Drafted By – M. Wainscott

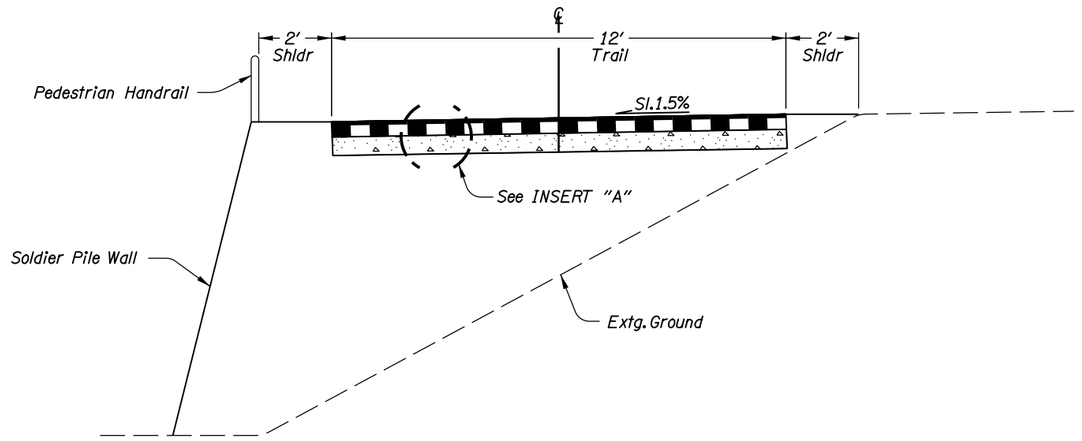
'PR' LINE – ALT 1
TYPICAL SECTION

SHEET NO. 2A-1

ROADWAY

17890ty02A1.dgn

FEASIBILITY REPORT
PLANS FOR REVIEW



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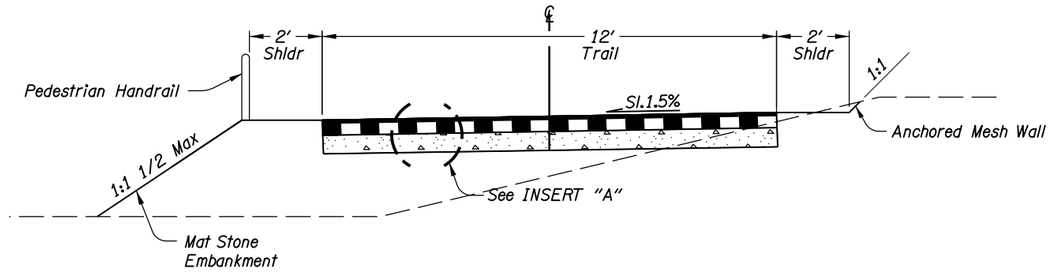

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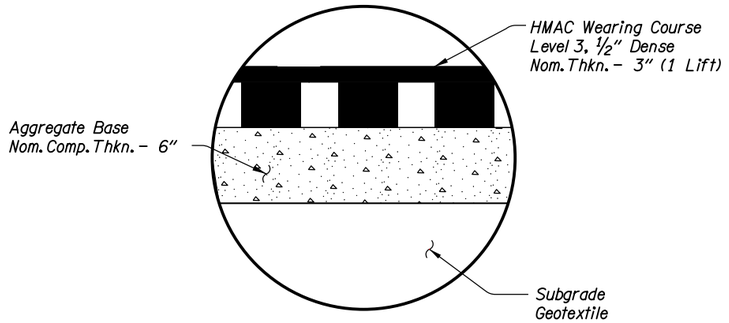

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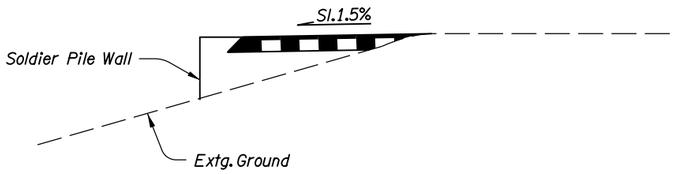
'PR2' LINE - ALT 2 TYPICAL SECTION

SHEET NO. 2A-2

ROADWAY

17890ty02A2.dgn

FEASIBILITY REPORT
PLANS FOR REVIEW



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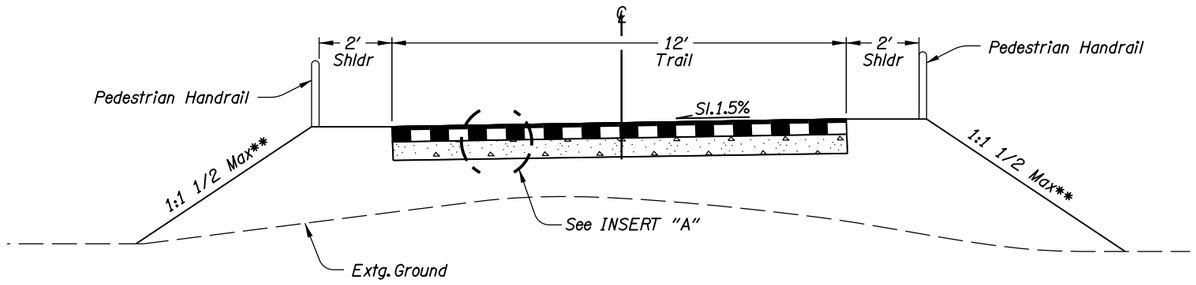

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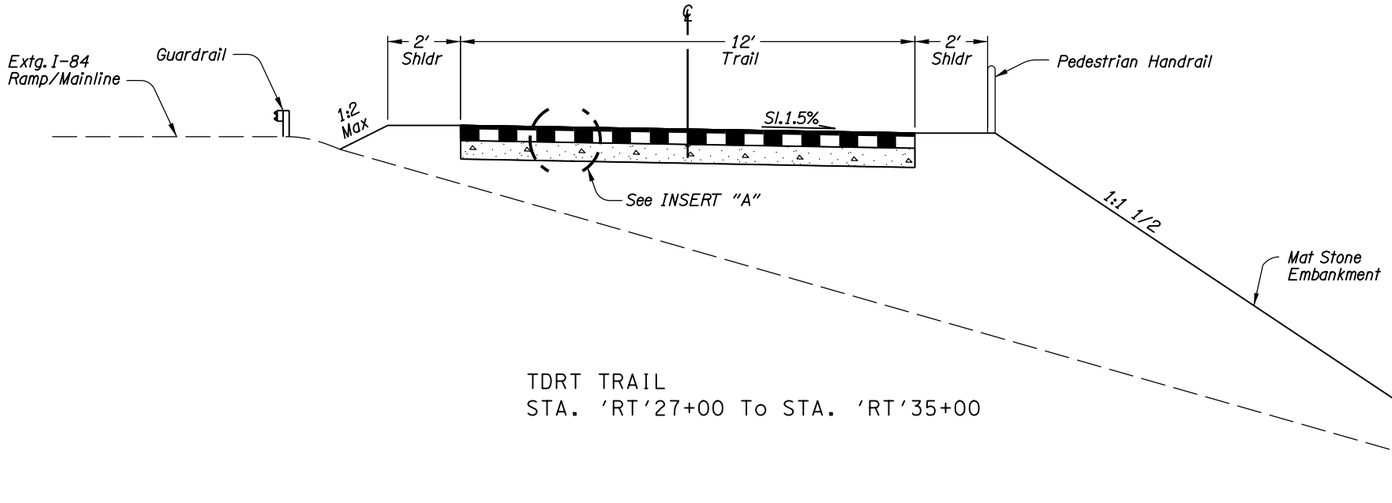
25+62 To 27+00*



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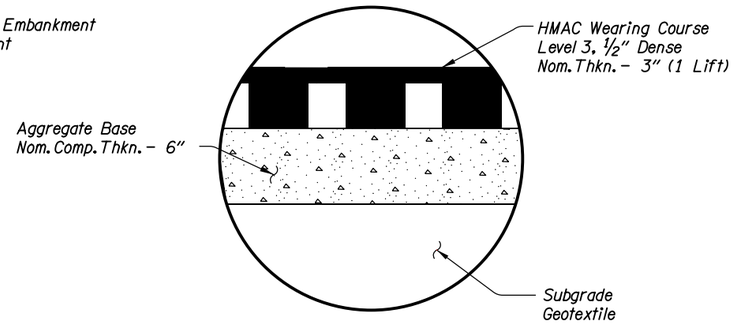
* At-Grade Crossing:
22+24 To 22+74
26+39 To 26+90
Pedestrian/Bicycle Bridge
23+80 To 25+62

** 1:1 1/2 = Mat Stone Embankment
1:2 = Embankment



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Drafted By - M. Wainscott

'RT' LINE TYPICAL SECTION

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ROADWAY

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PRELIMINARY DESIGN

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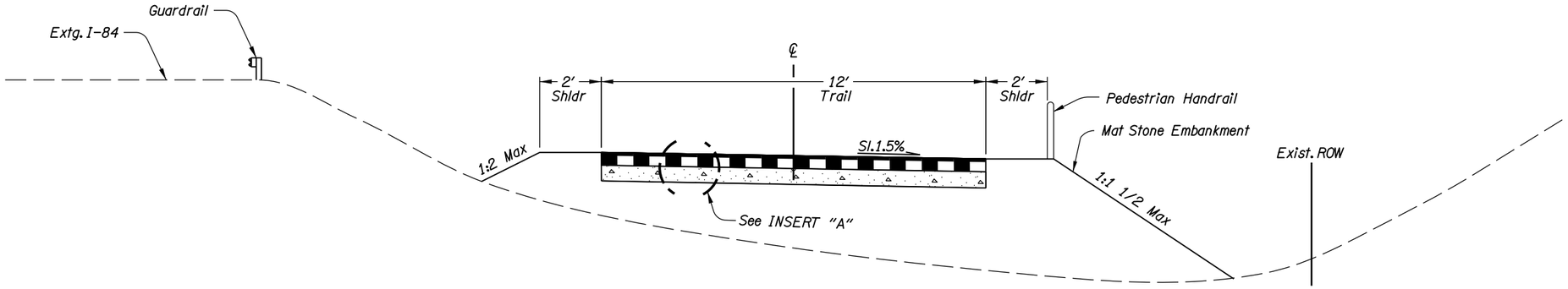

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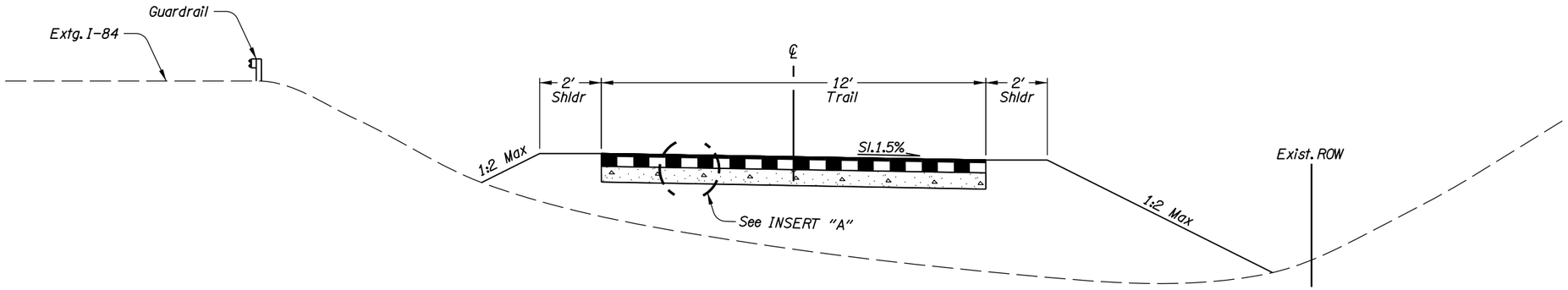
108+45 To 120+35
124+90 To 126+90



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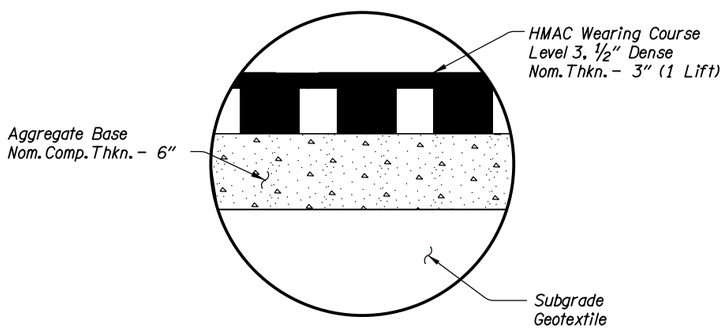
94+25 To 100+10*
100+95 To 105+55
106+60 To 108+45
120+35 To 124+90
129+90 To 141+60
143+50 To 151+34

* Threemile Creek Bridge
Sta. 96+97 To Sta. 97+49



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WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S.Daleo
Drafted By - M. Wainscott

'RT' LINE TYPICAL SECTION

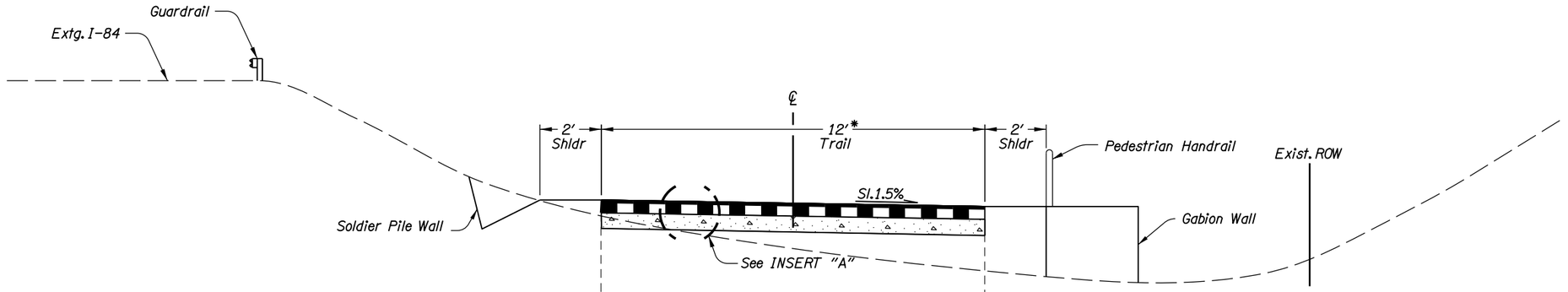
SHEET NO. 2A-4

ROADWAY

17890ty02A4.dgn

PW: 439154: $FILENAME | 15-MAR-2017 11:18 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

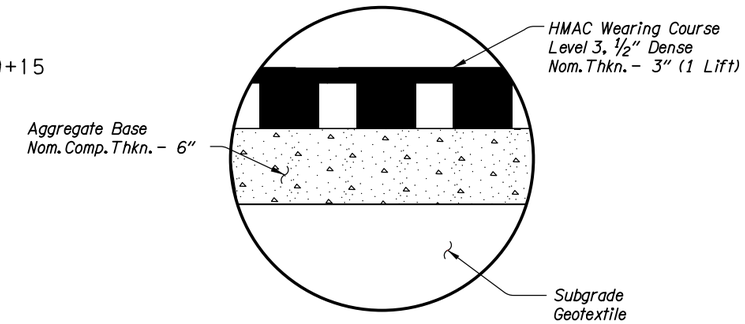


TDRT - TRAIL
STA. 'RT'92+60 To STA. 'RT'94+25
126+90 To 129+90

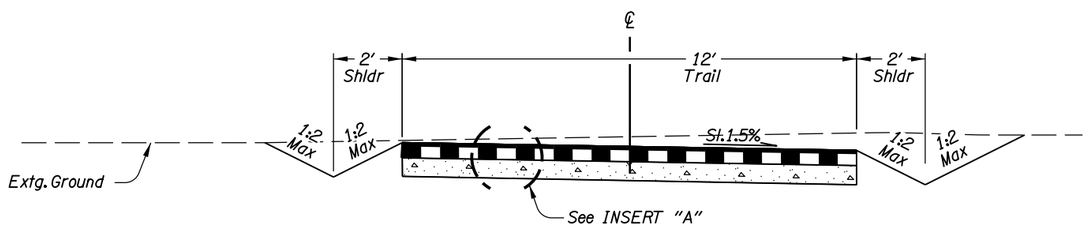
*10′ Trail
Sta. 'RT'128+00 to 'RT'130+00

TDRT - TRAIL
STA. 'RT'126+90 To STA. 'RT'127+35

TDRT - TRAIL
STA. 'RT'128+05 To STA. 'RT'129+15



INSERT "A"



TDRT - TRAIL ALT
STA. 'RT'100+10 To STA. 'RT'100+95
105+55 To 106+60
141+60 To 143+50

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m:
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE TYPICAL SECTION

SHEET NO. 2A-5

ROADWAY

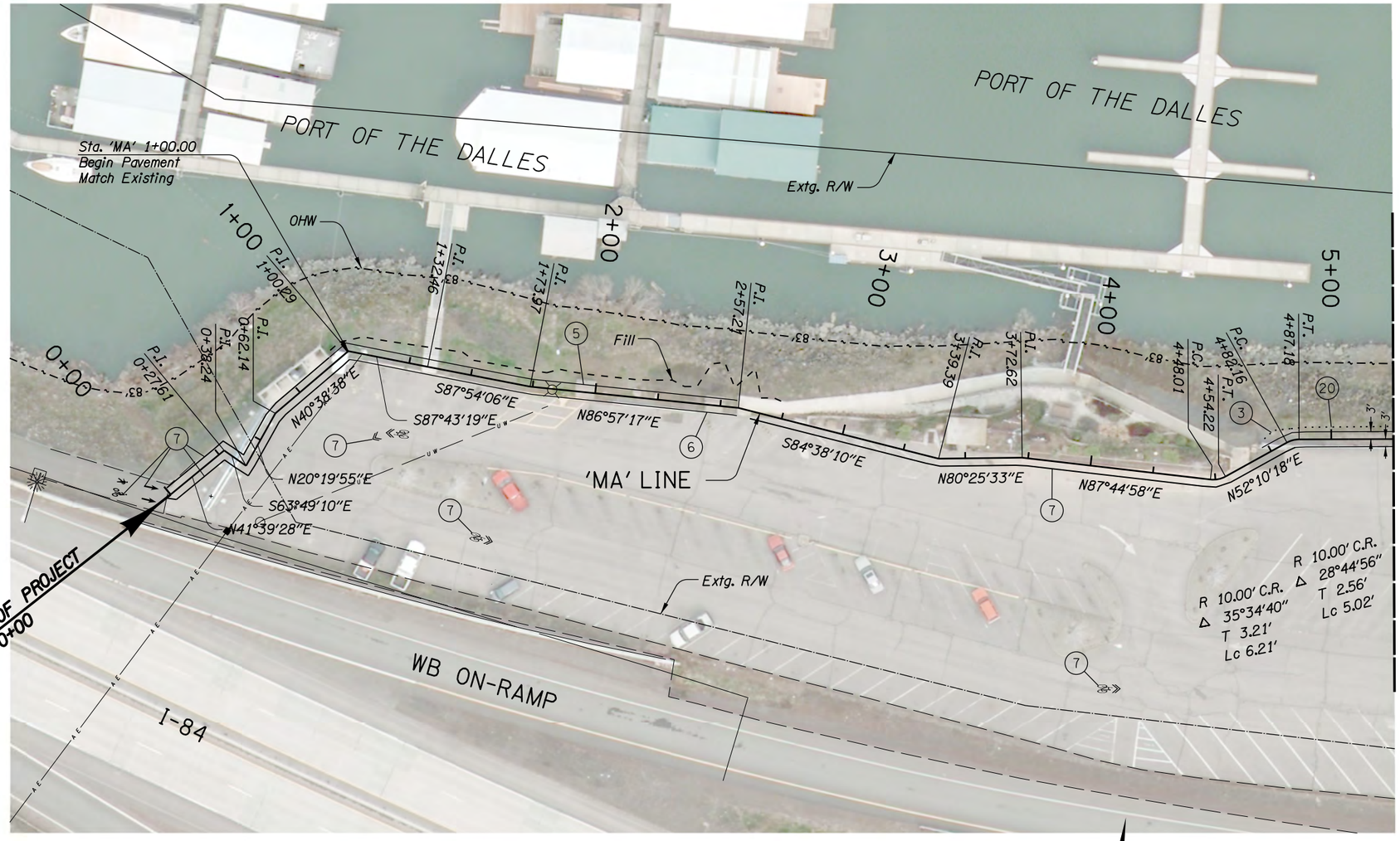
17890ty02A5.dgn

PW: 439154: $FILENAME | 15-MAR-2017 11:19 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

- (3) Const. Gabion Wall
- (5) Const. Conc. Sidewalk
- (6) Const. Conc. Curb
- (7) Install Pavement Markings
- (20) Const. Pedestrian Rail



STA. 'MA' 5+25 SEE SHEET 4A
MATCH LINE

N

0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'MA' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 3A

ROADWAY

17890pp03A.dlv

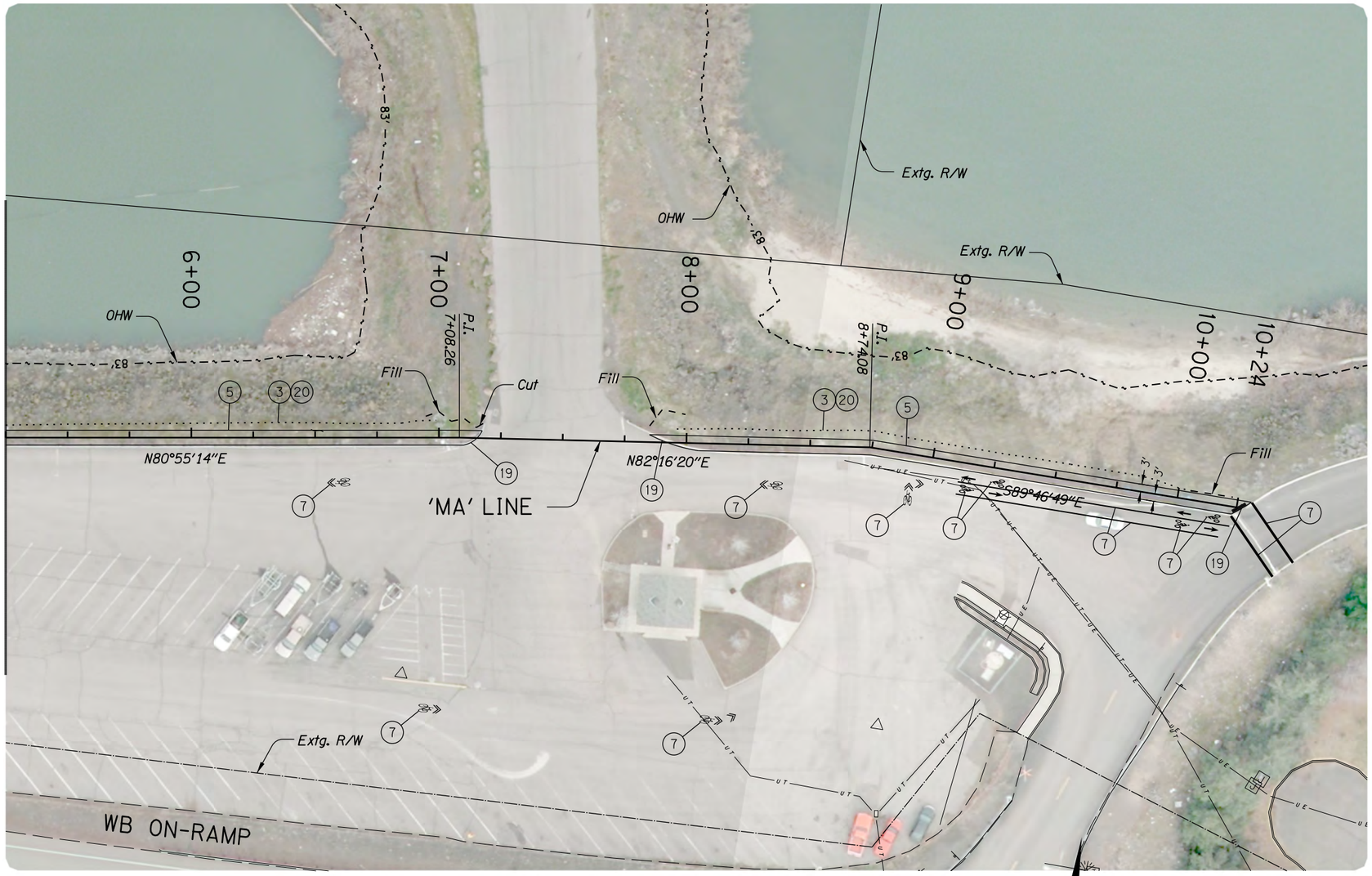
PW: 439154: $FILENAME | 15-MAR-2017 11:19 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(3) Const. Gabian Wall
(5) Const. Conc. Sidewalk
(7) Inst. Pavement Markings
(19) Const. Conc. Sidewalk Ramp
(20) Const. Pedestrian Rail

ROADWAY

MATCH LINE
STA. 'MA' 5+25 SEE SHEET 3A



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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'MA' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 4A

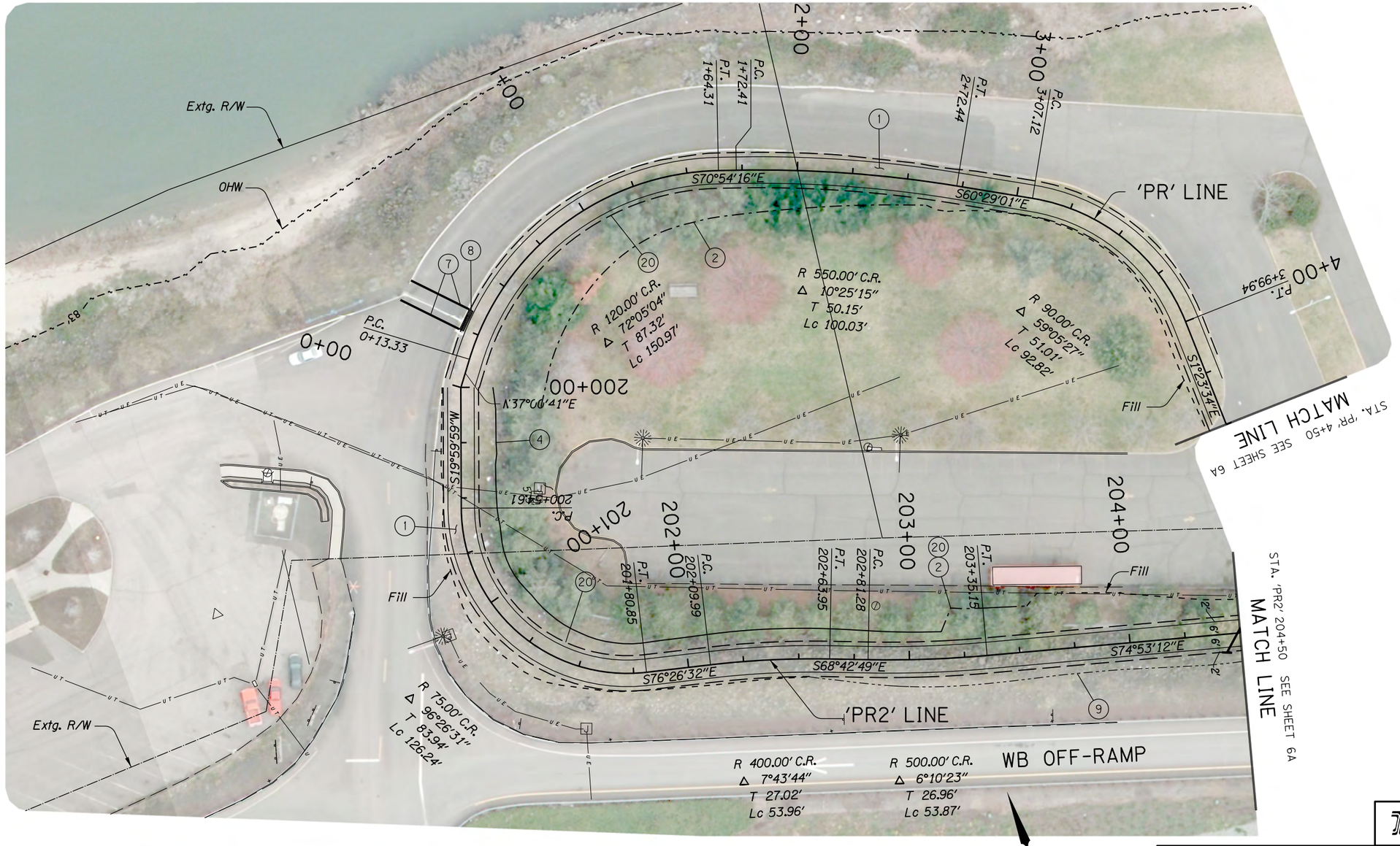
17890pp04A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:19 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

1. Const. Asph. Conc. Shared-Use Path
2. Const. 1:1 1/2 Mat Stone Embankment
3. Const. Gabion Wall
4. Const. Soldier Pile Wall
7. Inst. Pavement Marking
8. Const. Truncated Domes
9. Const. Anchored Mesh Wall
20. Const. Pedestrian Rail



Note:
Two Park Alternatives are Shown on 5A and 6A. Only one Option would be constructed if an Alternative in the Park was Selected as the Preferred Alternative.

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'PR' LINE GENERAL CONSTRUCTON & DRAINAGE

SHEET NO. 5A

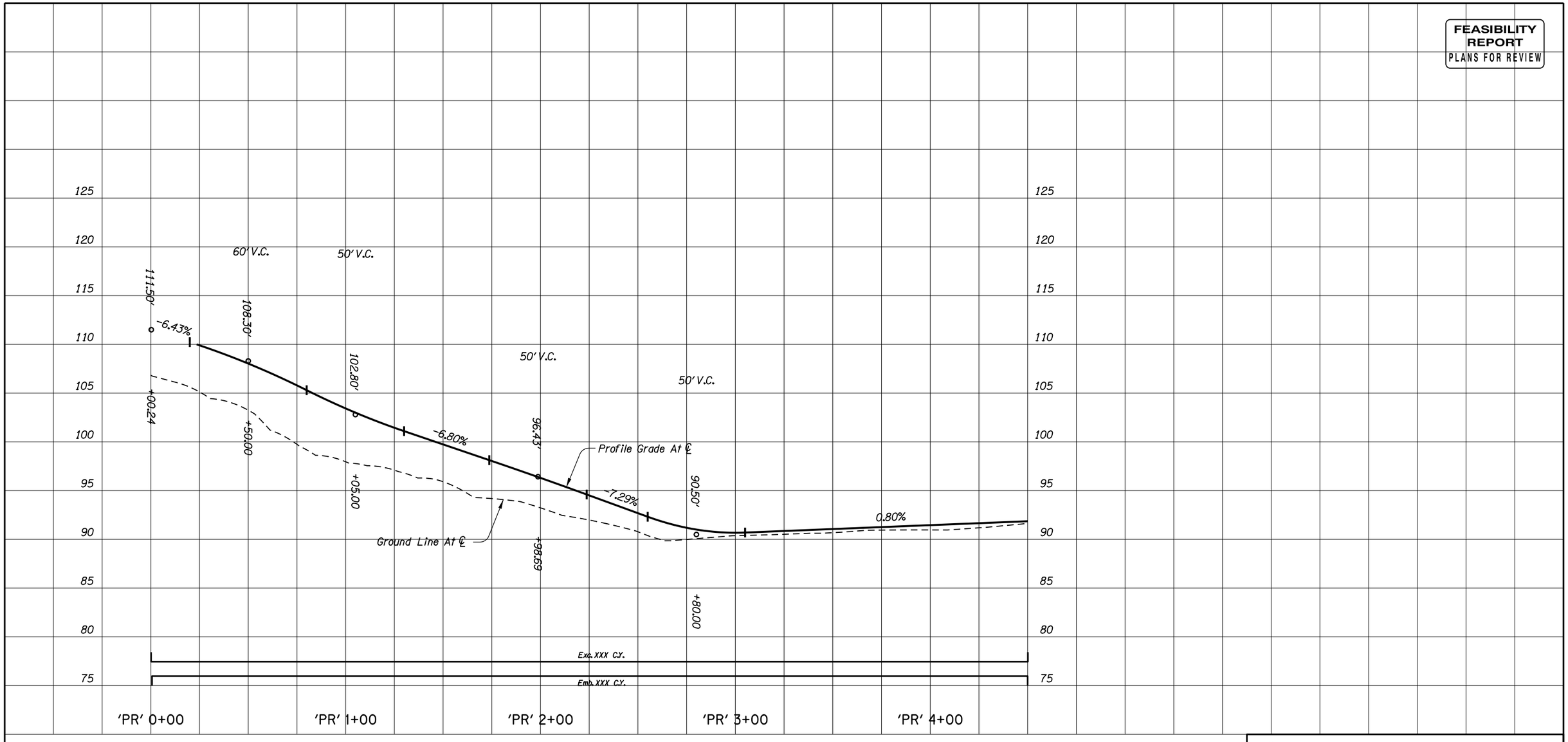
ROADWAY

17890pp05A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:20 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW



ROADWAY

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
JULY 12, 2011
SHARON KAY DALEO
EXPIRES: 12/31/2017

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 5B

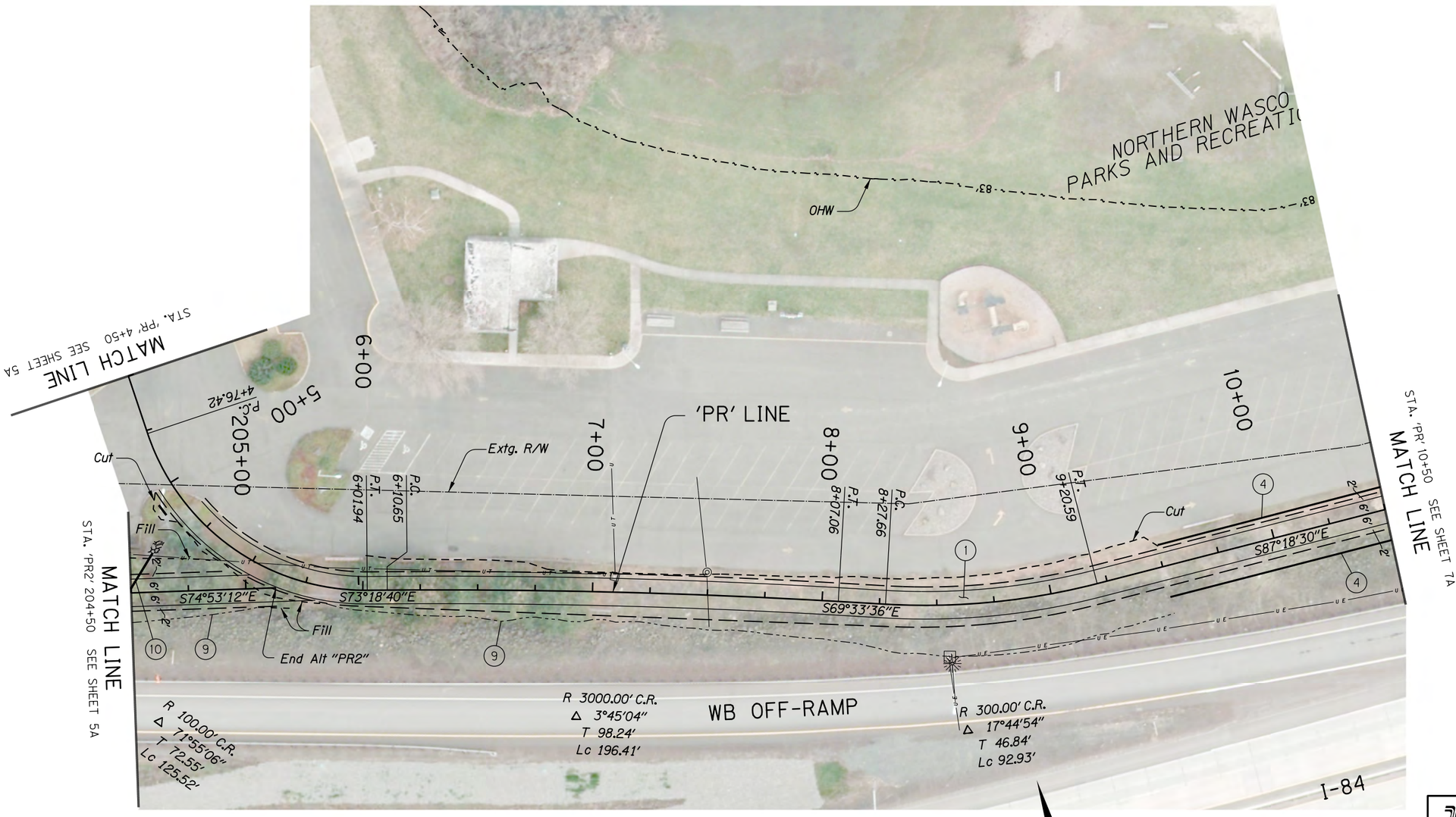
17890pp05B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:20 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

1 Const. Asph. Conc. Shared-Use Path
4 Const. Soldier Pile Wall
9 Const. Anchored Mesh Wall
10 Const. Culvert



Note:
Two Park Alternatives are Shown on 5A and 6A. Only one Option would be constructed if an Alternative in the Park was Selected as the Preferred Alternative.

N

0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'PR' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 6A

ROADWAY

17890pp06A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:21 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

110
105
100
95
90
85
80
75
70

150' V.C.

92.50'

+30.00

-1.17%

Profile Grade At ℄

Ground Line At ℄

150' V.C.

87.95'

+20.32

Exc. XXX C.Y.

Emb. XXX C.Y.

'PR' 5+00 | 'PR' 6+00 | 'PR' 7+00 | 'PR' 8+00 | 'PR' 9+00 | 'PR' 10+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
JULY 12, 2011
SHAWN KAY DALEO
EXPIRES: 12/31/2017

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 6B

17890pp06B.dlv

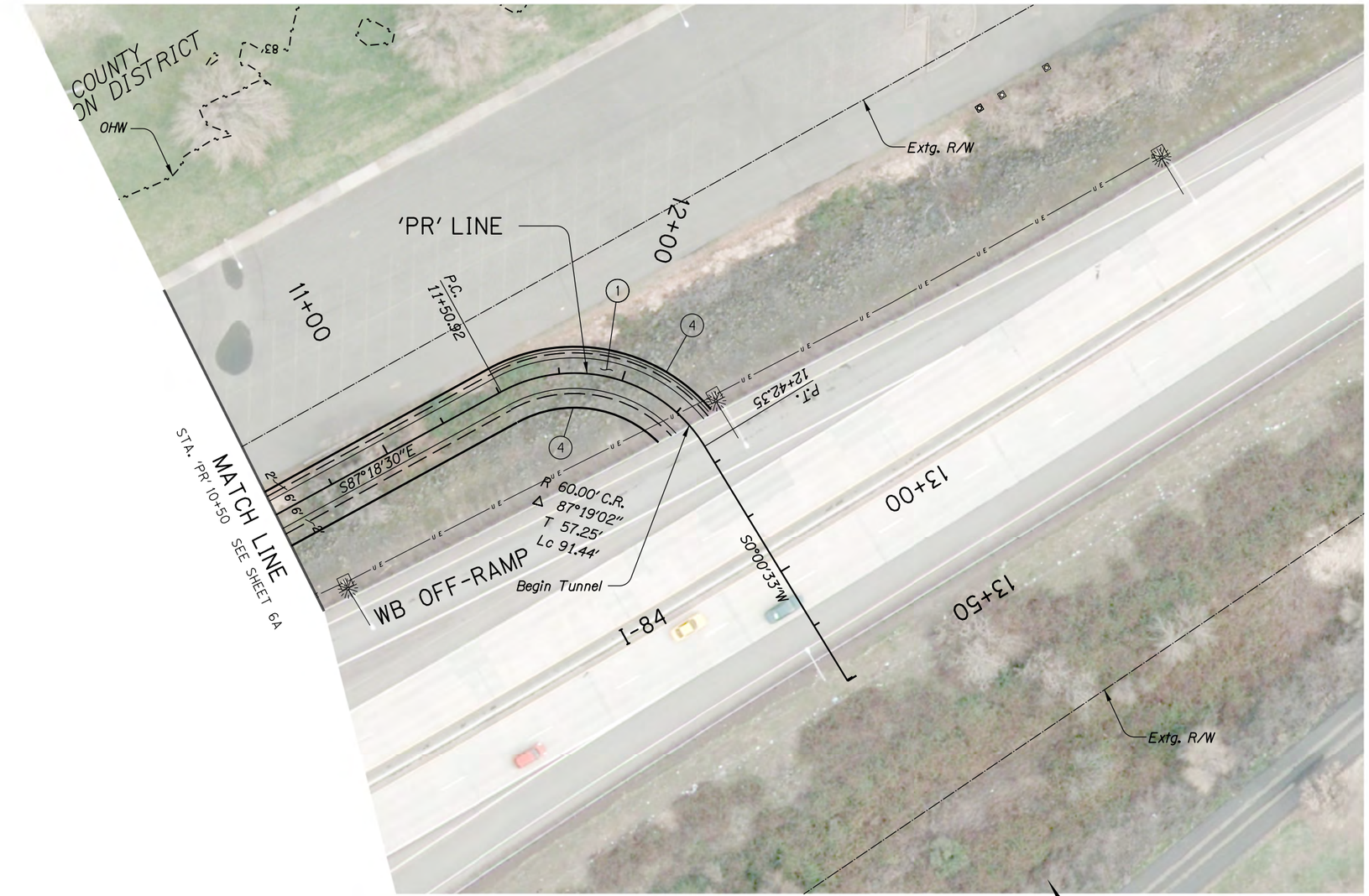
PW: 439154: $FILENAME | 15-MAR-2017 11:21 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*
(4) *Const. Soldier Pile Wall*



ROADWAY

17890pp07A.dlv

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

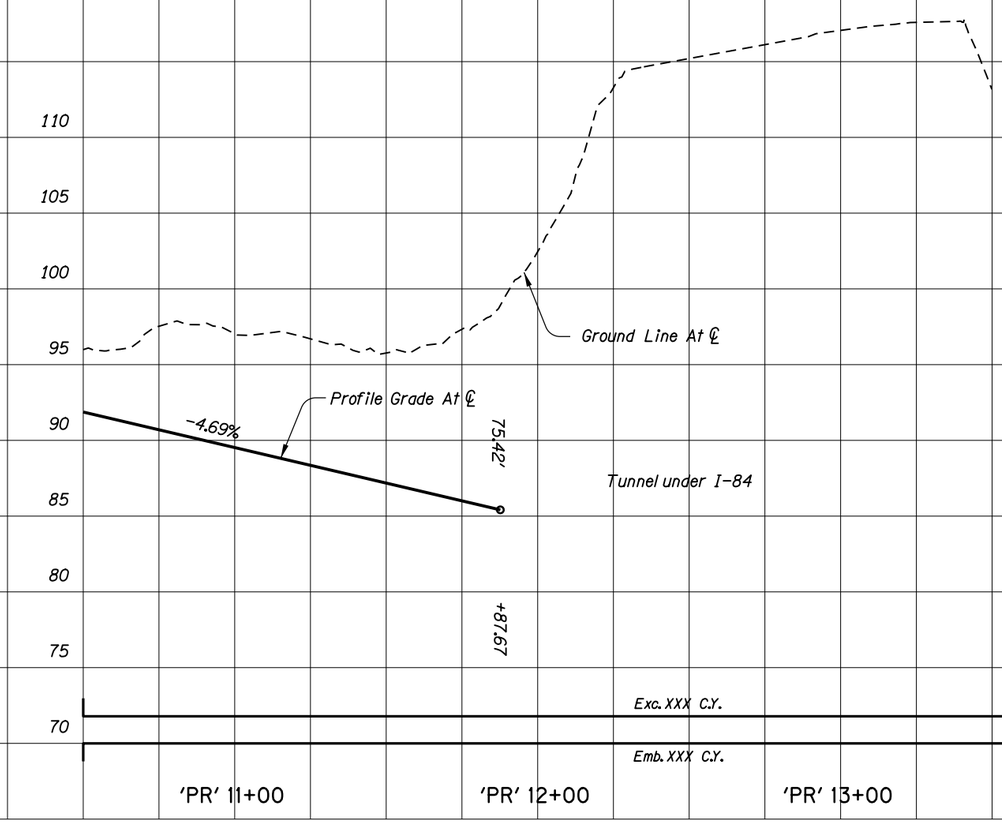
Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'PR' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 7A

PW: 439154: $FILENAME | 15-MAR-2017 11:21 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
January 12, 2011
SHAWN KAY DALEO
EXPIRES: 12/31/2017

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 7B

ROADWAY

17890pp07B.dlv

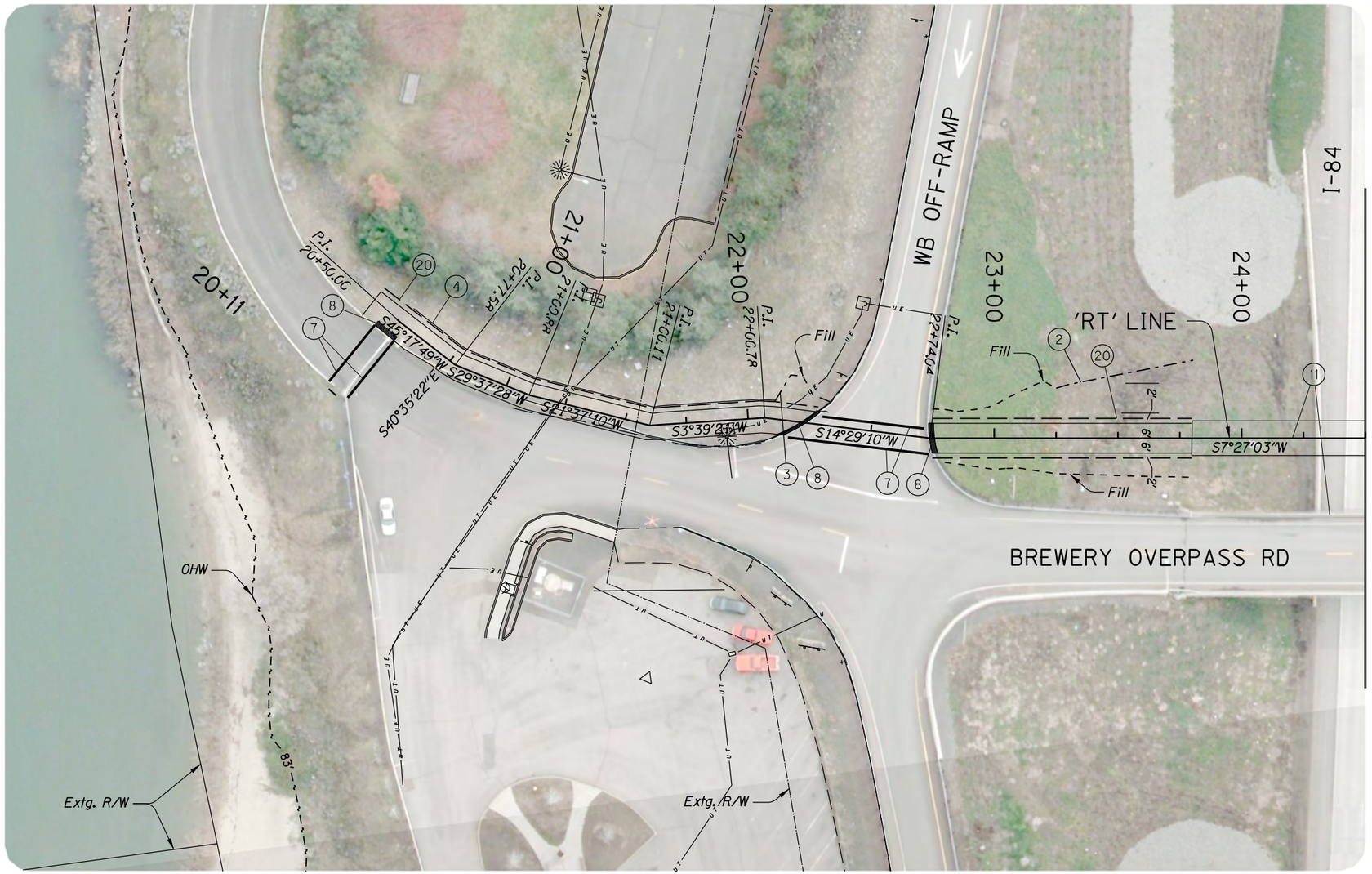
PW: 439154: $FILENAME

15-MAR-2017 11:22

$$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW



MATCH LINE
STA. 'RT' 24+50 SEE SHEET 9A

1 Const. Asph. Conc. Shared-Use Path
2 Const. 1:1 1/2 Mat Stone Embankment
4 Const. Soldier Pile Wall
7 Inst. Pavement Marking
8 Const. Truncated Domes
11 Bridge Options (See Sheet X-X)
20 Const. Pedestrian Rail

N

0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 8A

ROADWAY

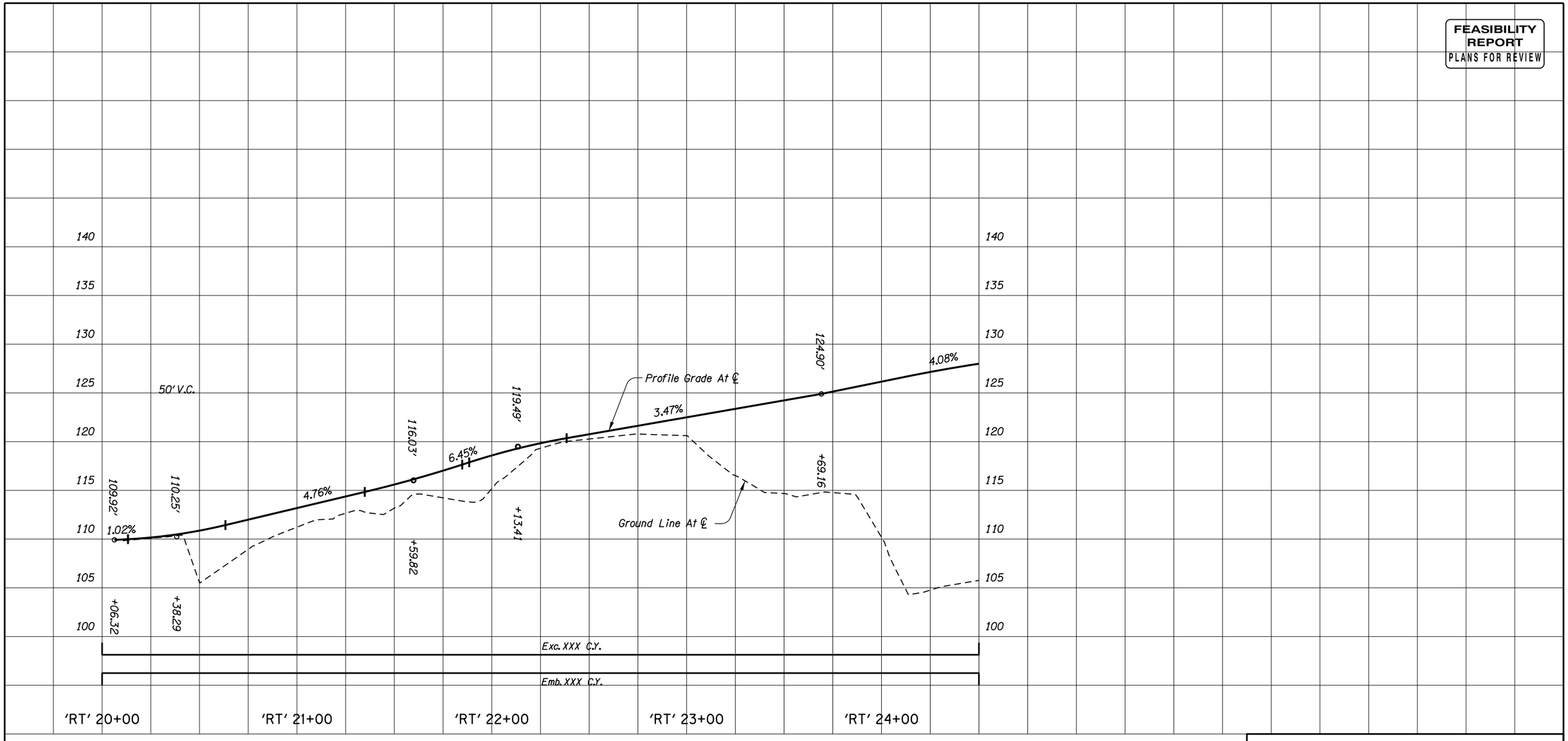
17890pp08A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:22 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 8B

17890pp08B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:23 | $$$$username$$$$

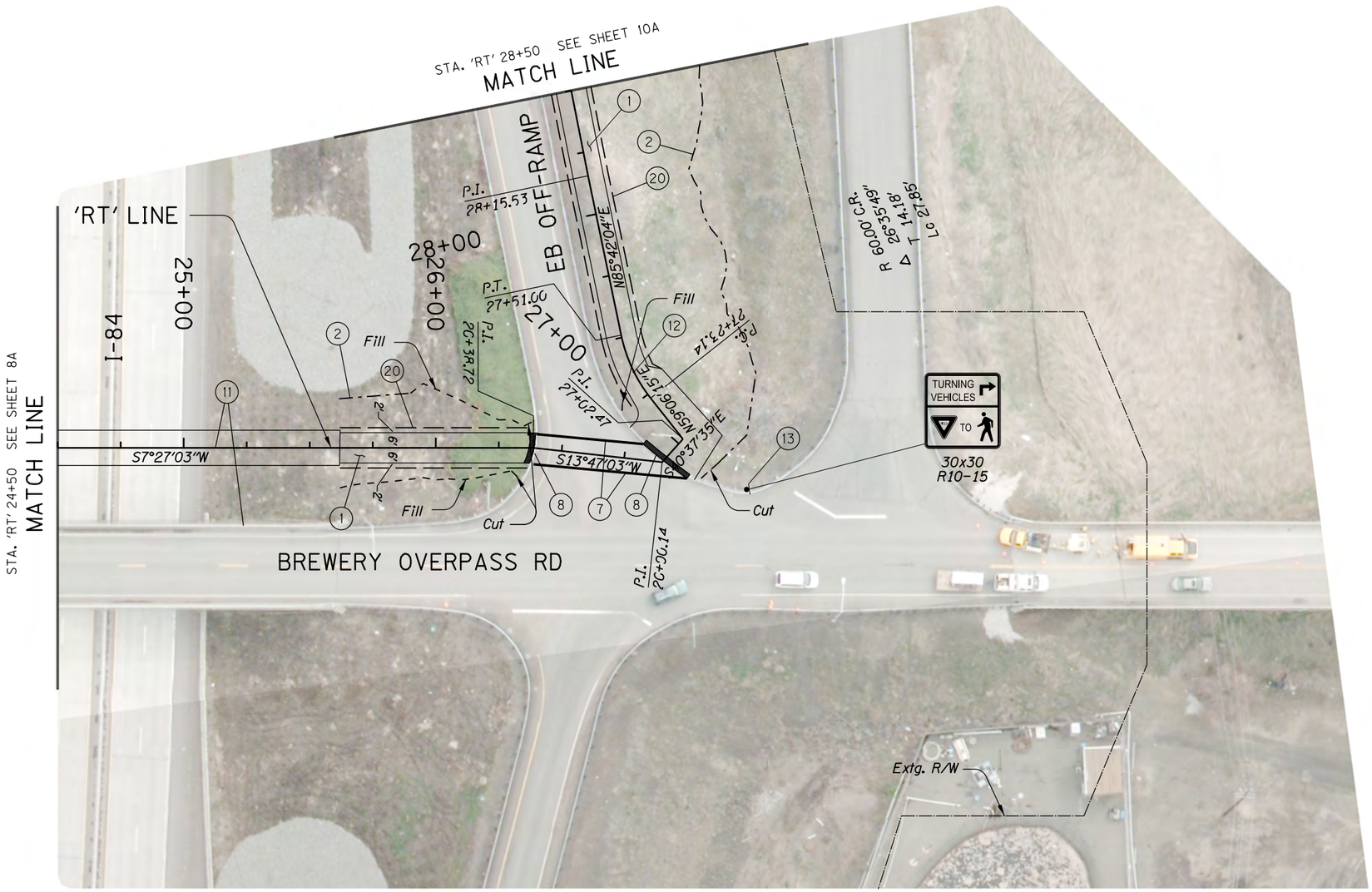
PRELIMINARY DESIGN

ROADWAY

17890pp09A.dlv

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(7) Inst. Pavement Marking
(8) Const. Truncated Dome
(11) Bridge Options (See Sheet X-X)
(12) Const. Bollard
(13) Place Sign
(20) Const. Pedestrian Rail



N

0 25 50 75
Scale In Feet

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ch2m
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PORTLAND, OR 97201-4953
TEL. 503.235.5000

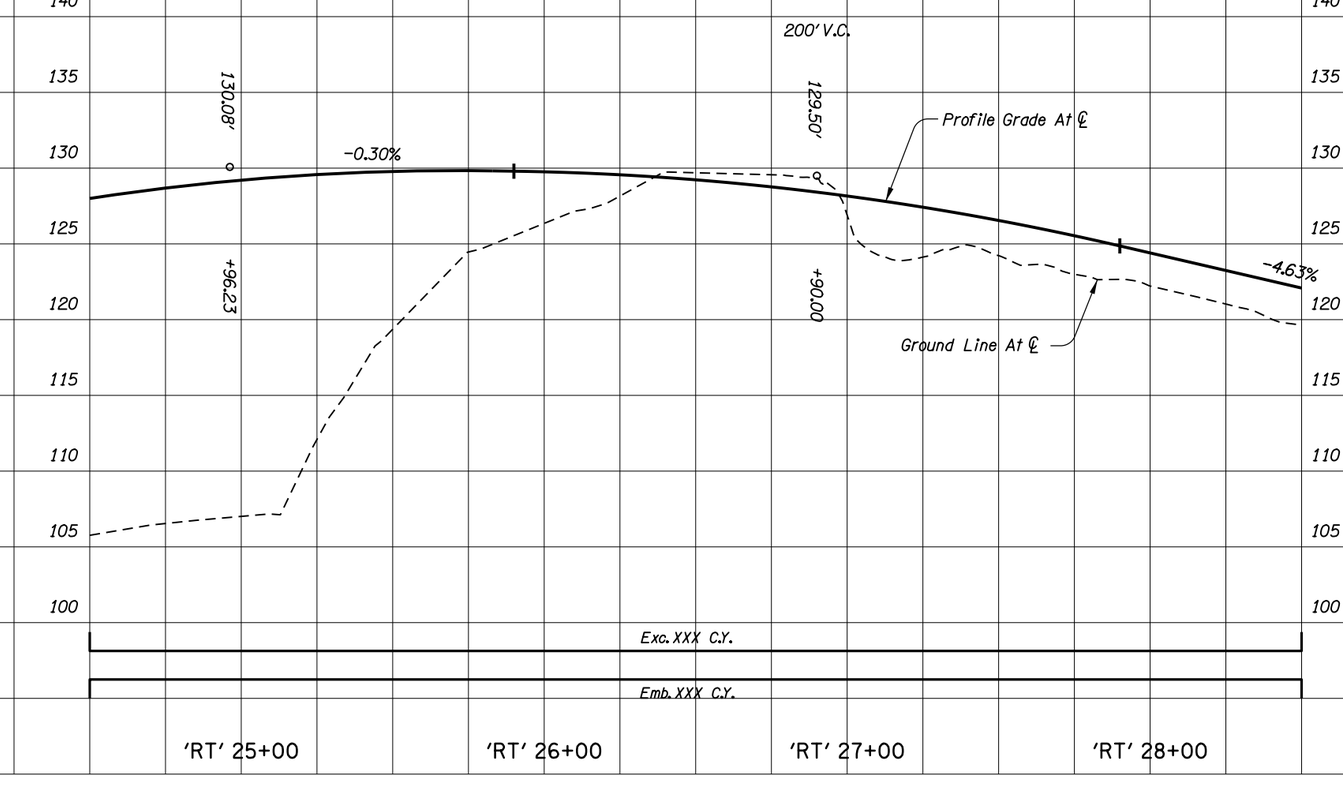
THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 9A

FEASIBILITY REPORT
PLANS FOR REVIEW



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
SHAWN KAY DALEO
JULY 12, 2011
EXPIRES: 12/31/2017

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 9B

ROADWAY

17890pp09B.dlv

PW: 439154: $FILENAME

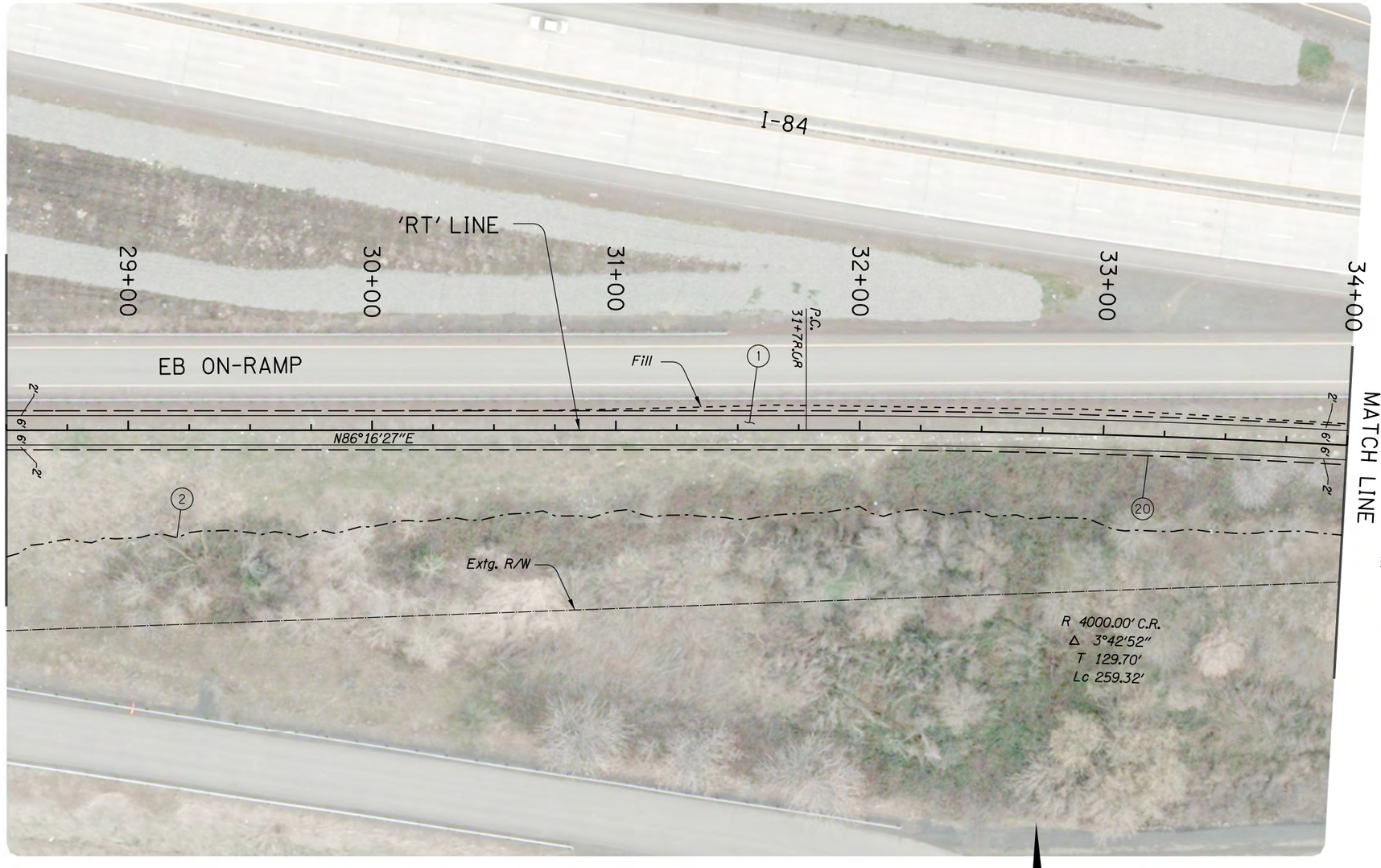
15-MAR-2017 11:23

$$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(20) Const. Pedestrian Rail



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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 10A

ROADWAY

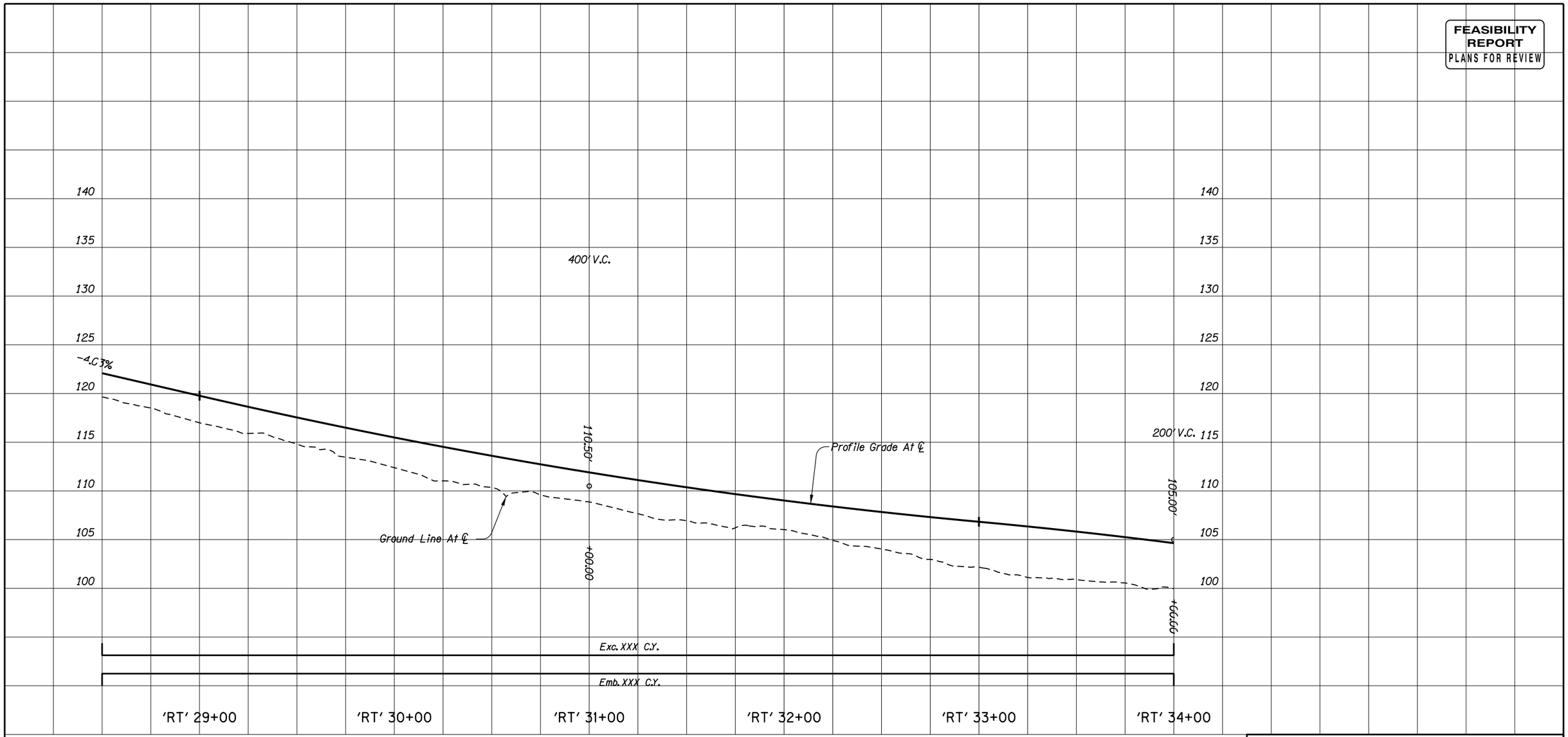
17890pp10A.dlv

PW: 439154: $FILENAME 15-MAR-2017 11:24 $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
JULY 12, 2011
SHAWN KAY DALEO
EXPIRES: 12/31/2017

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 10B

17890pp10B.dlv

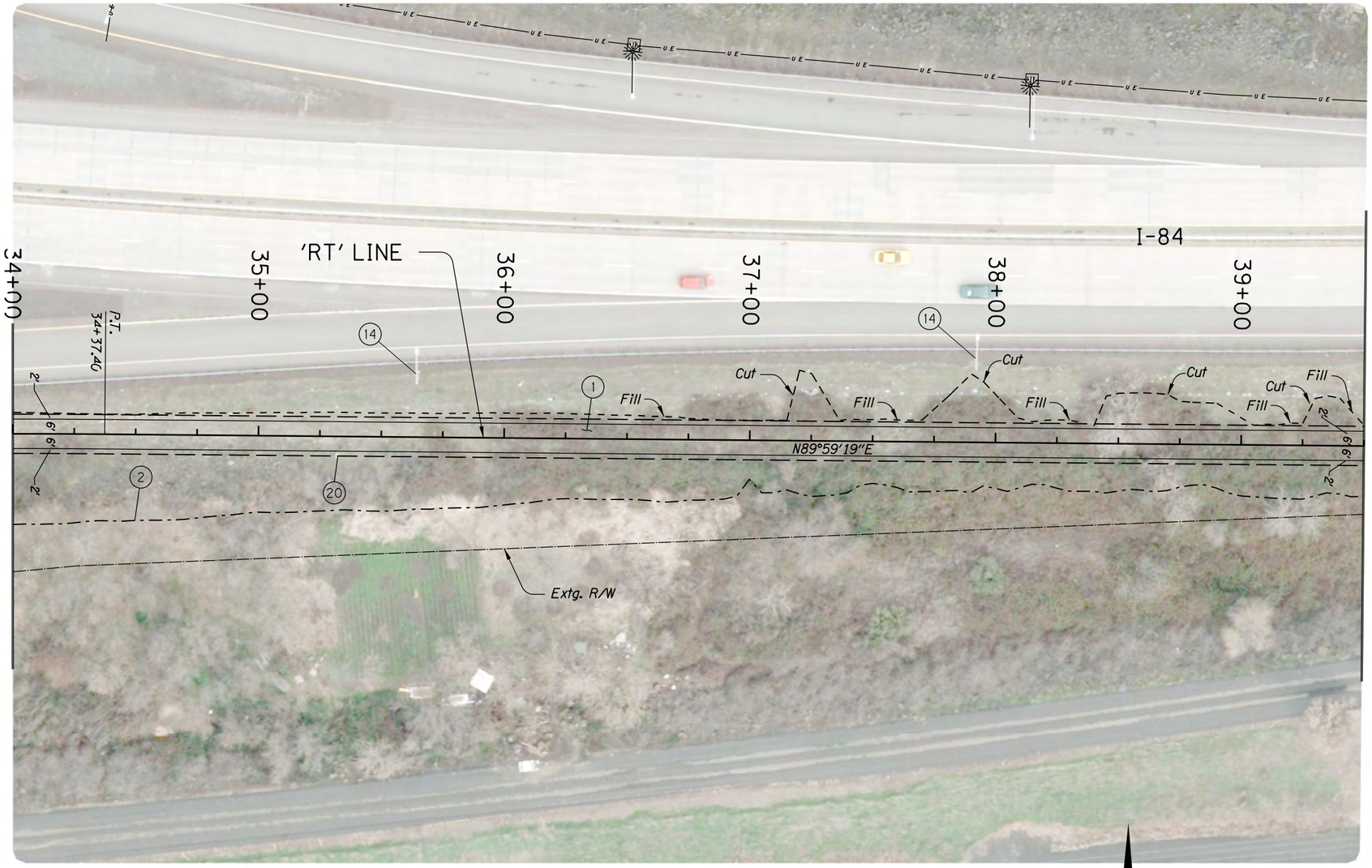
PW: 439154: $FILENAME | 15-MAR-2017 11:25 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(14) Protect Extg. Light in Place
(20) Const. Pedestrian Rail

ROADWAY



MATCH LINE
STA. 'RT' 34+00 SEE SHEET 10A

MATCH LINE
STA. 'RT' 39+50 SEE SHEET 12A

N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 11A

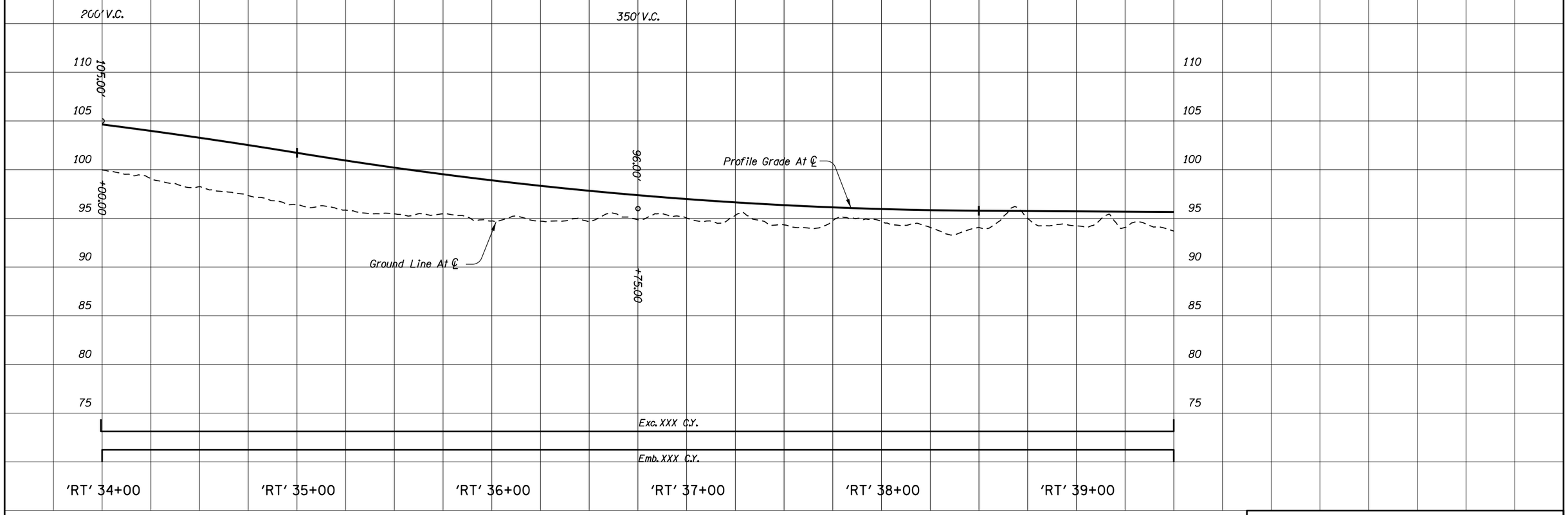
17890pp11A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:25 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
SHAWN KAY DALEO
EXPIRES: 12/31/2017

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m:
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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 11B

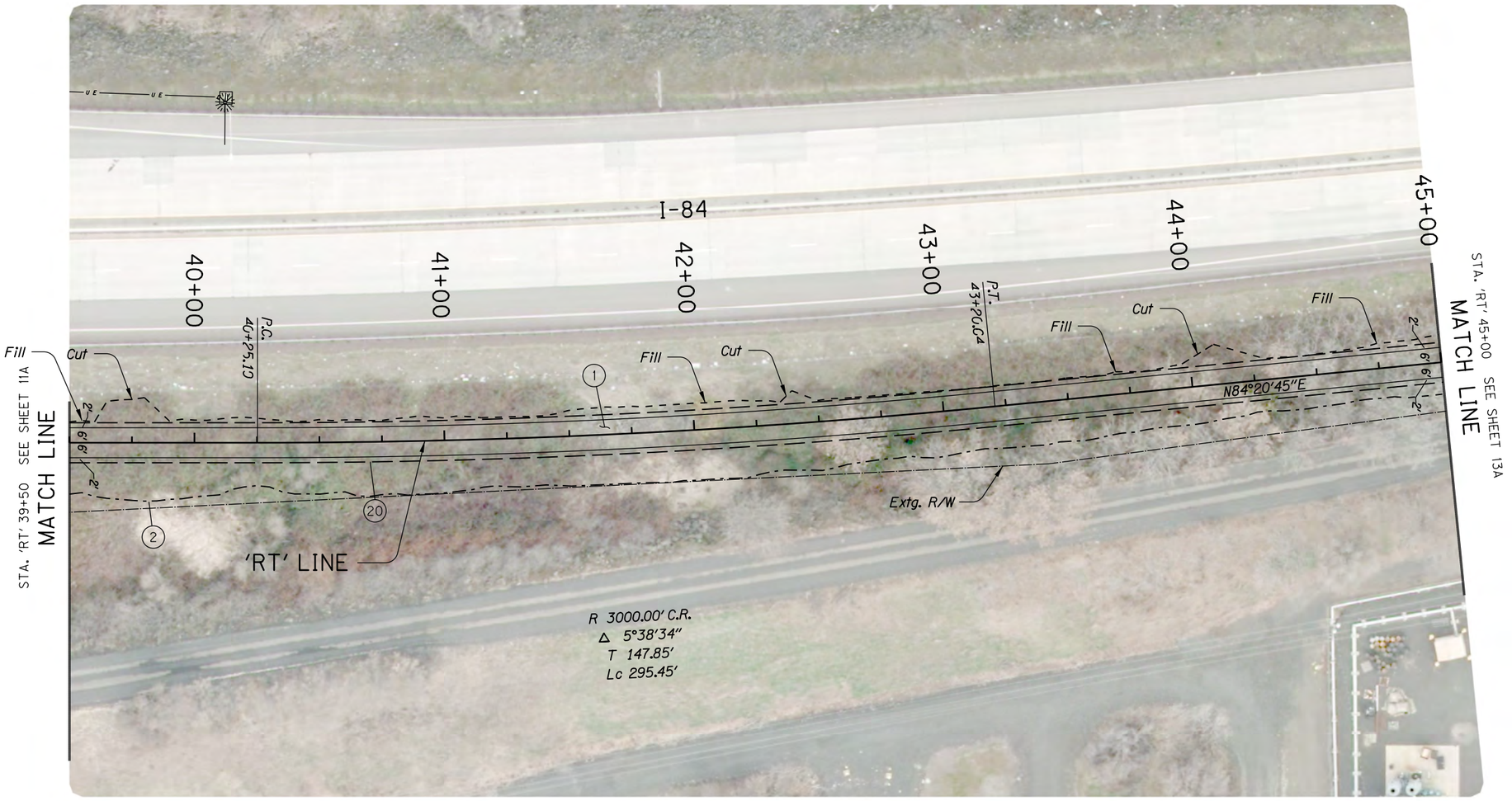
17890pp11B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:25 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(20) Const. Pedestrian Rail



N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

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ch2m
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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 12A

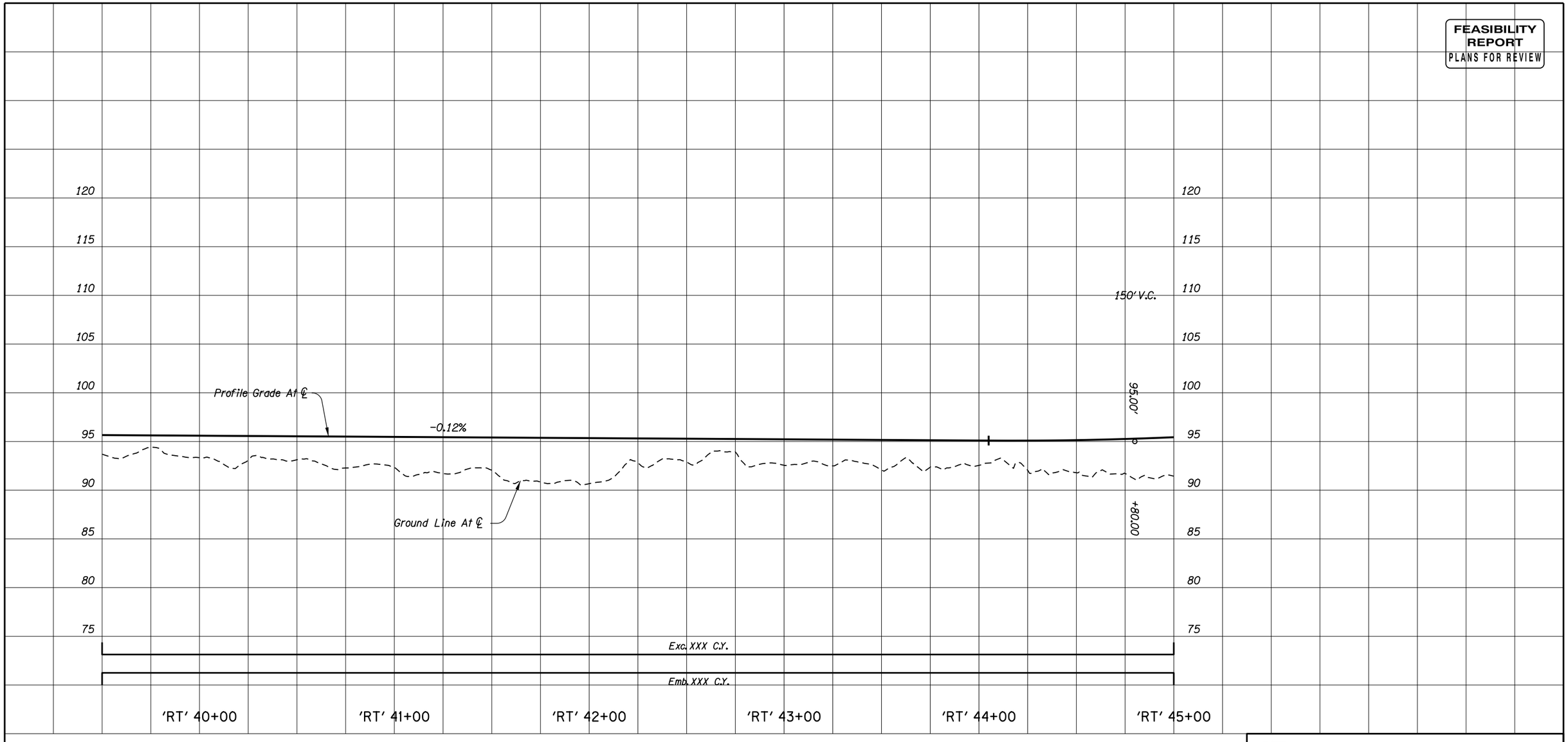
ROADWAY

17890pp12A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:26 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
JULY 12, 2011
SHARON KAY DALEO
EXPIRES: 12/31/2017

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 12B

17890pp12B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:26 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(15) Protect Extg. Sign in Place
(20) Const. Pedestrian Rail

ROADWAY

STA. 'RT' 45+00 SEE SHEET 12A
MATCH LINE

STA. 'RT' 50+50 SEE SHEET 14A
MATCH LINE

N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m:
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

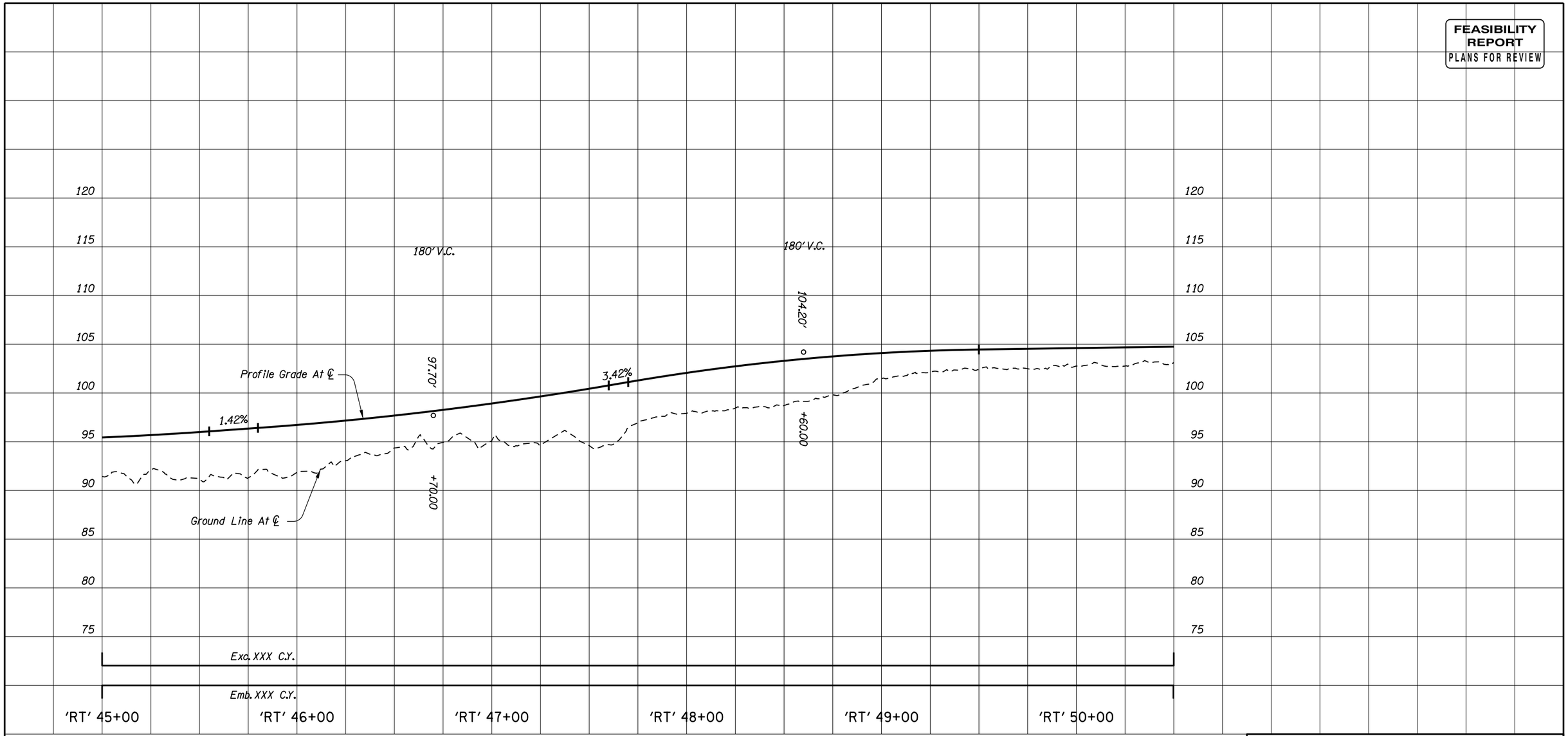
SHEET NO. 13A

17890pp13A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:26 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
85539PE
OREGON
January 12, 2011
SHARON KAY DALEO
EXPIRES: 12/31/2017

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OREGON DEPARTMENT OF TRANSPORTATION

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

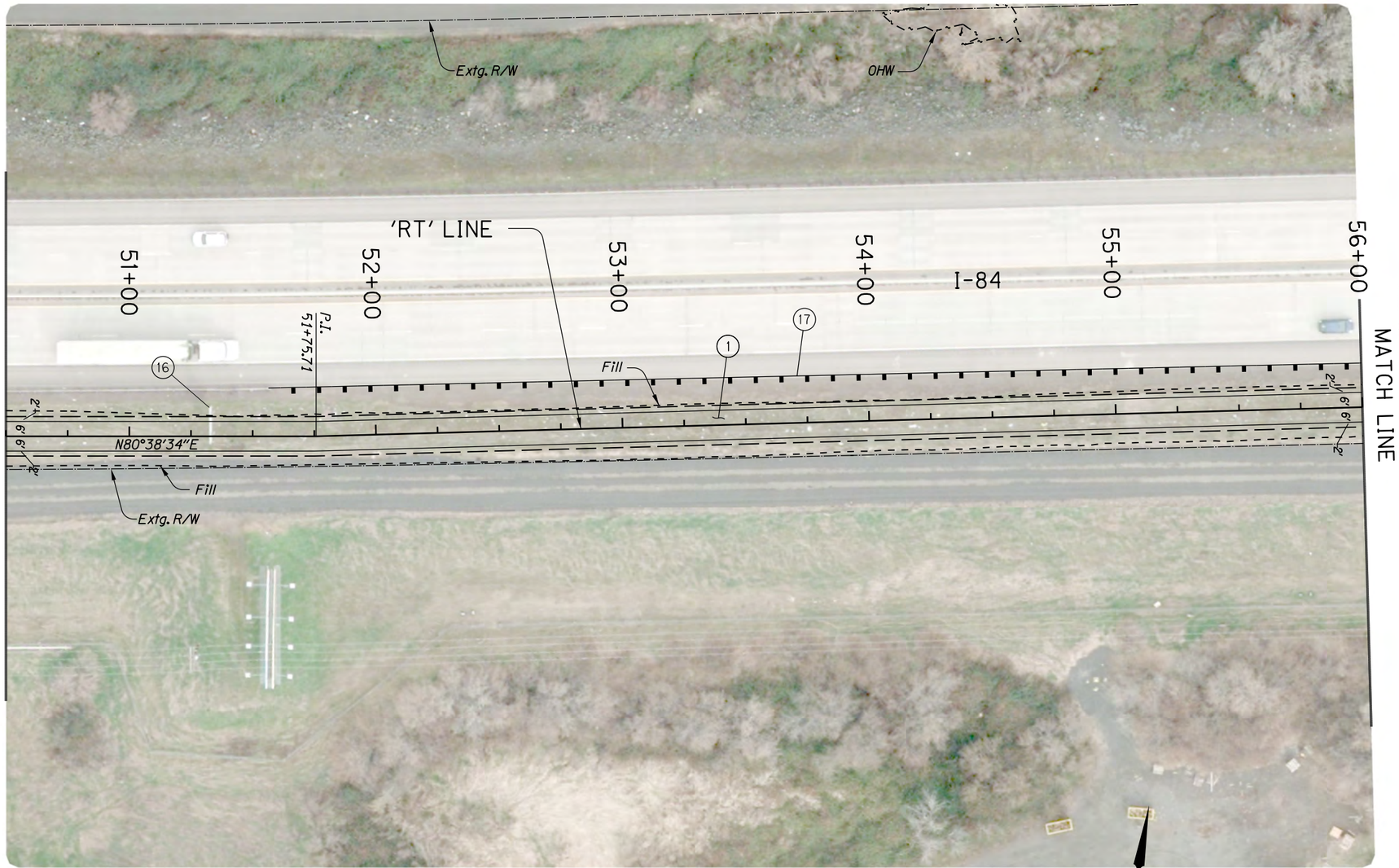
Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 13B

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(16) Relocate Extg. Sign to Monotube Cantilever
(17) Const. Guardrail



STA. 'RT' 50+50 SEE SHEET 13A
MATCH LINE

STA. 'RT' 56+00 SEE SHEET 15A
MATCH LINE

ROADWAY

17890pp14A.dlv

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 14A

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

125
120
115
110
105
100
95
90
85
80
75

0.29%

105.50' @ +05.00

Profile Grade At ℄

Ground Line At ℄

Exc. XXX C.Y.

Emb. XXX C.Y.

'RT' 51+00 'RT' 52+00 'RT' 53+00 'RT' 54+00 'RT' 55+00 'RT' 56+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 14B

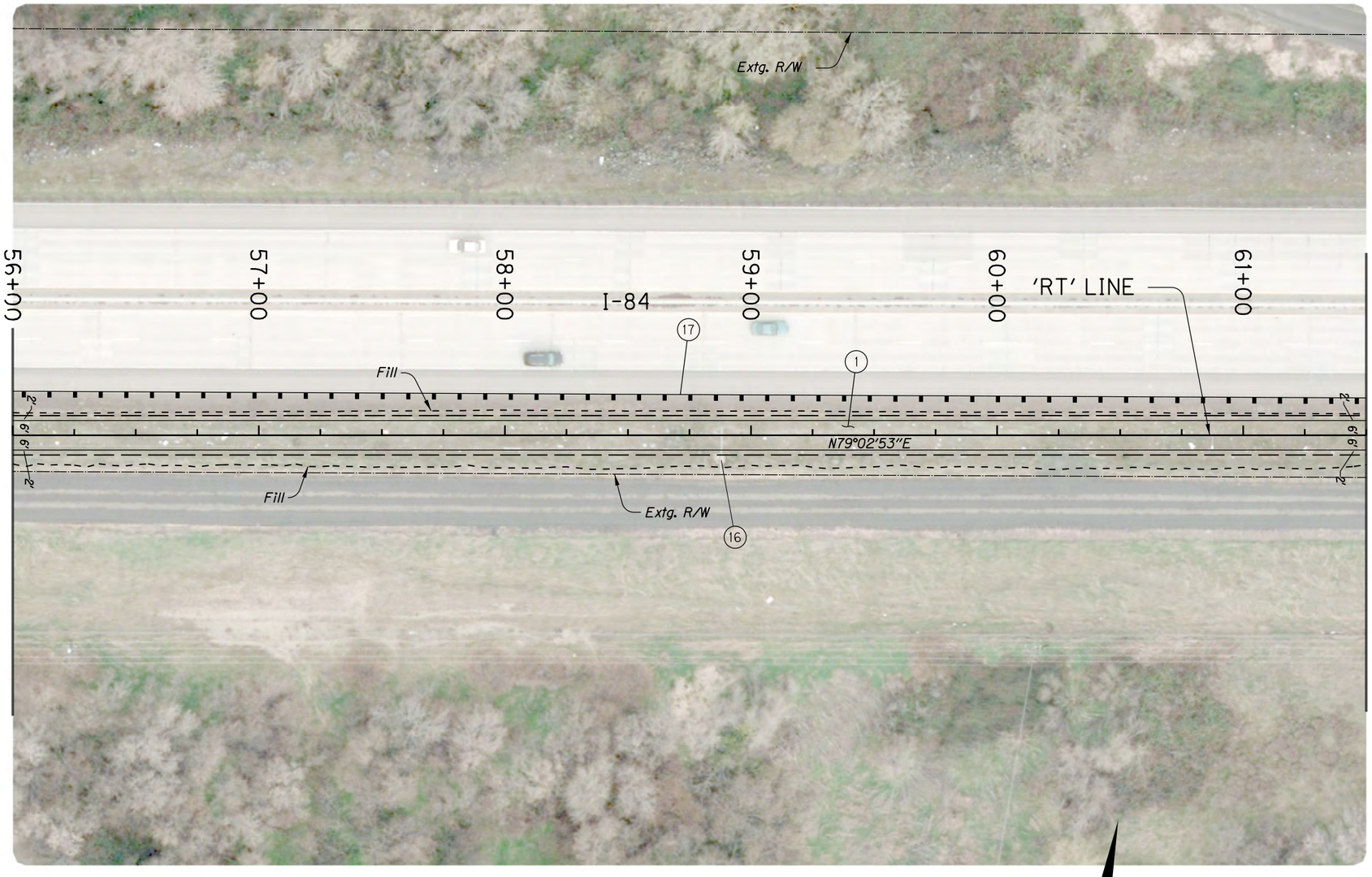
17890pp14B.dlv

PW: 439154: $FILENAME 15-MAR-2017 11:27 $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*
(16) *Relocate Extg. Sign to Monotube Cantilever*
(17) *Const. Guardrail*



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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 15A

ROADWAY

17890pp15A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:27 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

125
120
115
110
105
100
95
90
85
80
75

-0.08%

Profile Grade At ℄

Ground Line At ℄

105.00'

+55.00

0

Exc. XXX C.Y.

Emb. XXX C.Y.

'RT' 56+00 | 'RT' 57+00 | 'RT' 58+00 | 'RT' 59+00 | 'RT' 60+00 | 'RT' 61+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 15B

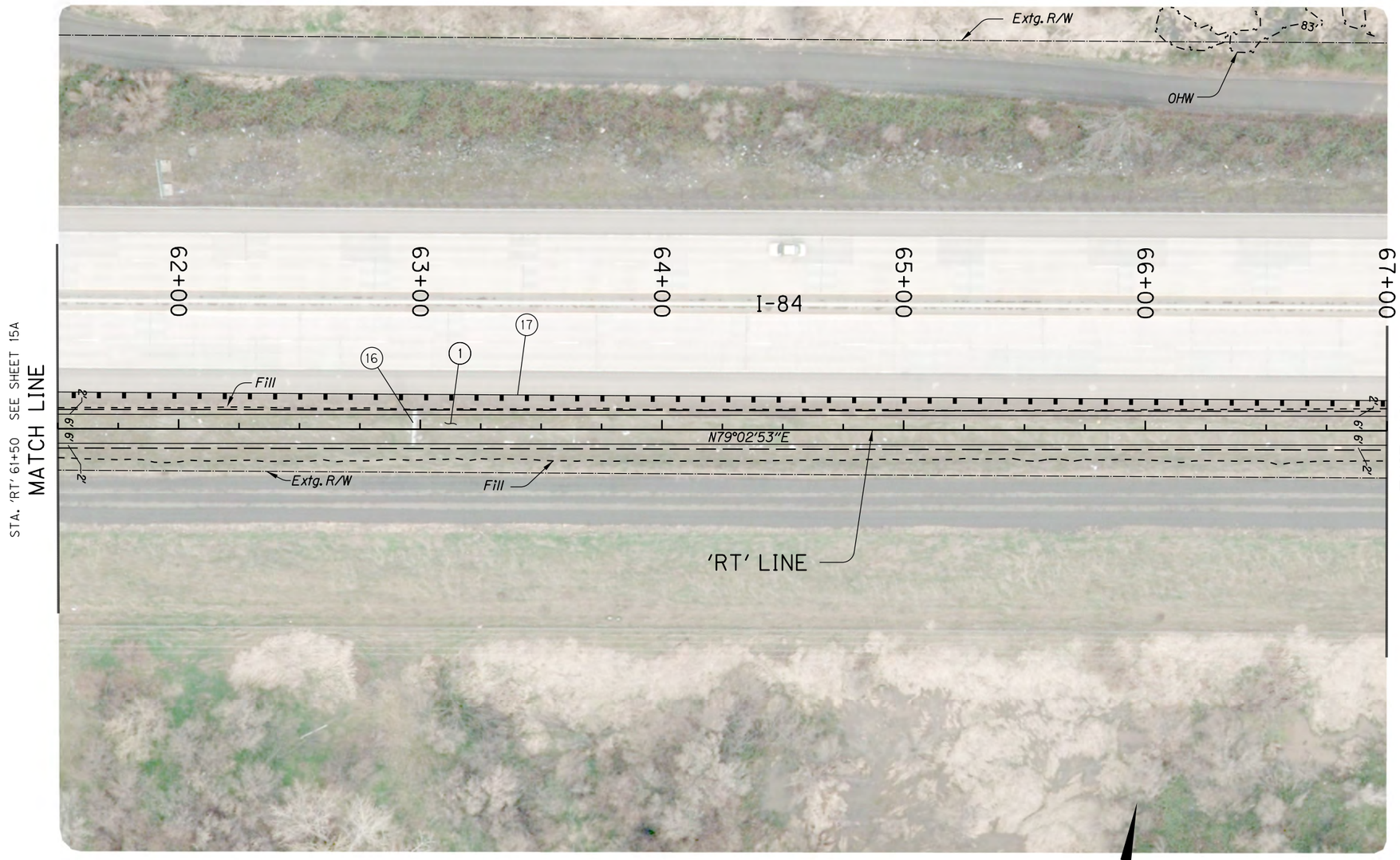
17890pp15B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:28 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*
(16) *Relocate Extg. Sign to Monotube Cantilever*
(17) *Const. Guardrail*



ROADWAY

17890pp16A.dlv

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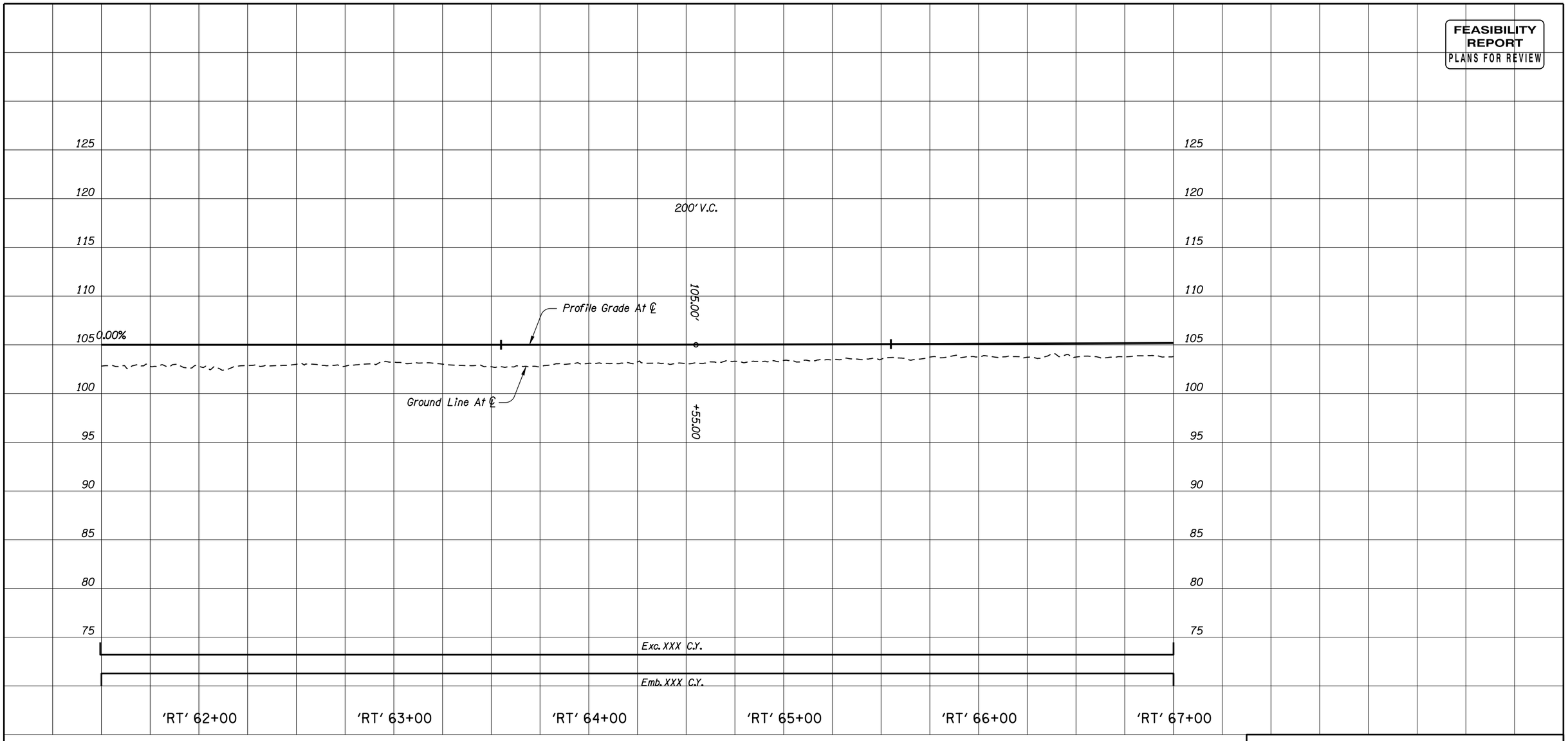
THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 16A

FEASIBILITY REPORT
PLANS FOR REVIEW



ROADWAY

17890pp16B.dlv

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

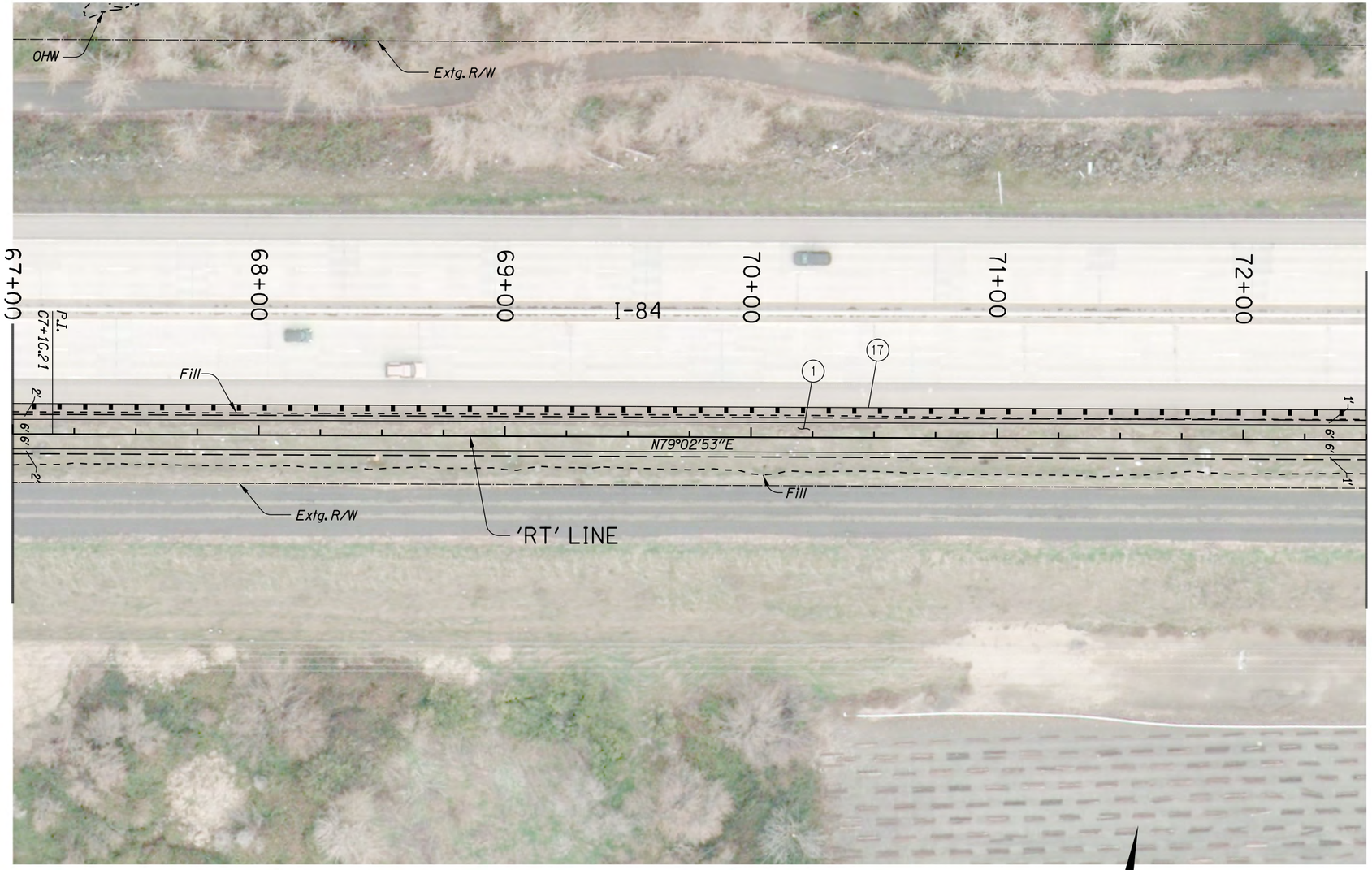
PROFILE

SHEET NO. 16B

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*

(17) *Const. Guardrail*



STA. 'RT' 67+00 SEE SHEET 16A
MATCH LINE

STA. 'RT' 72+50 SEE SHEET 18A
MATCH LINE

N

0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 17A

ROADWAY

17890pp17A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:29 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

125
120
115
110
105
100
95
90
85
80
75

0.07%

Profile Grade At ℄

Ground Line At ℄

Exc. XXX C.Y.

Emb. XXX C.Y.

'RT' 67+00 | 'RT' 68+00 | 'RT' 69+00 | 'RT' 70+00 | 'RT' 71+00 | 'RT' 72+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 17B

17890pp17B.dlv

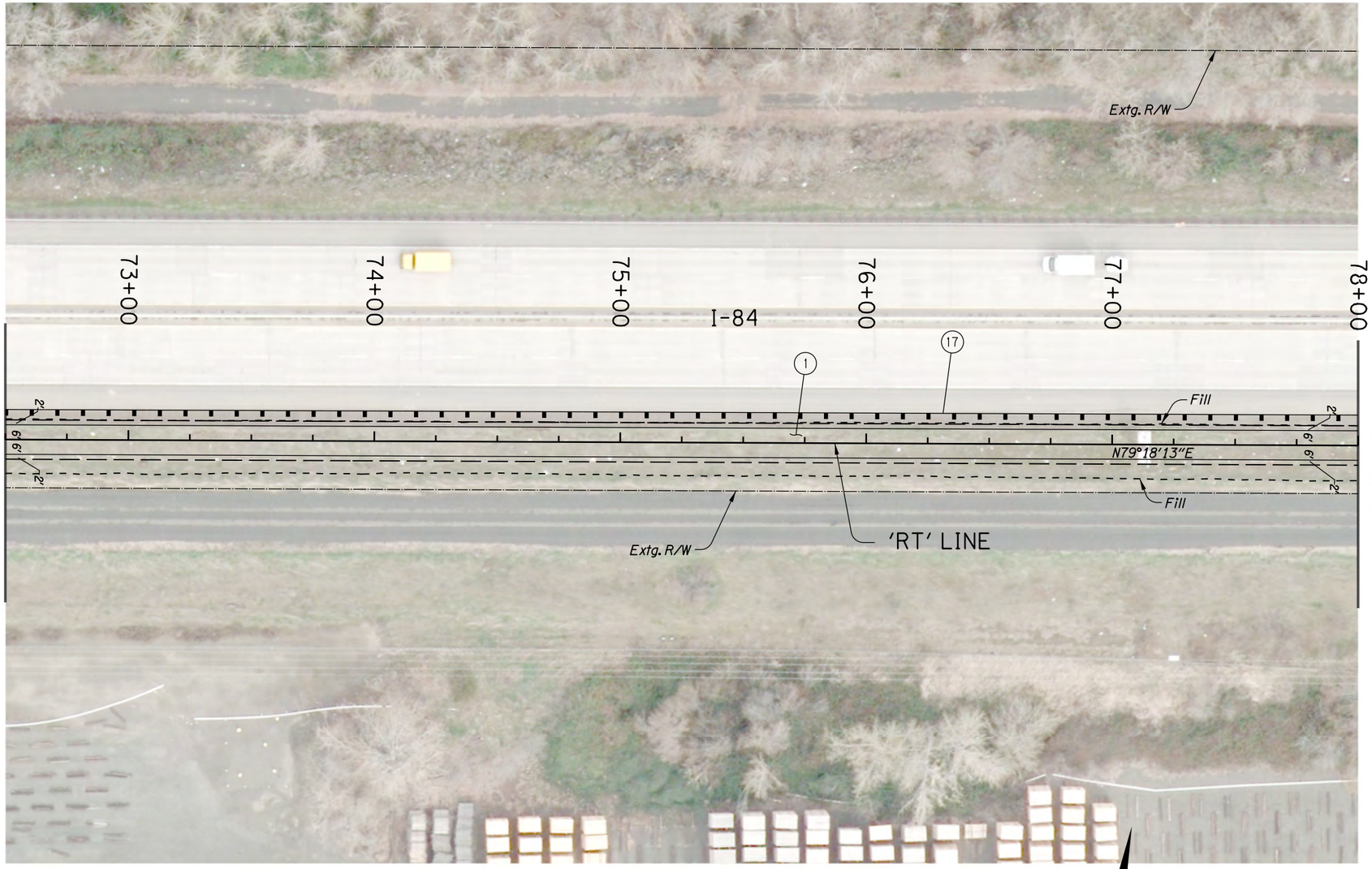
PW: 439154: $FILENAME | 15-MAR-2017 11:29 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*

(17) *Const. Guardrail*



N

0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 18A

ROADWAY

17890pp18A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:29 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

125
120
115
110
105
100
95
90
85
80
75

300' V.C.

10560'

+55.00

Profile Grade At ℄

Ground Line At ℄

Exc. XXX C.Y.

Emb. XXX C.Y.

'RT' 73+00 | 'RT' 74+00 | 'RT' 75+00 | 'RT' 76+00 | 'RT' 77+00 | 'RT' 78+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 18B

17890pp18B.dlv

PW: 439154: $FILENAME

15-MAR-2017 11:30

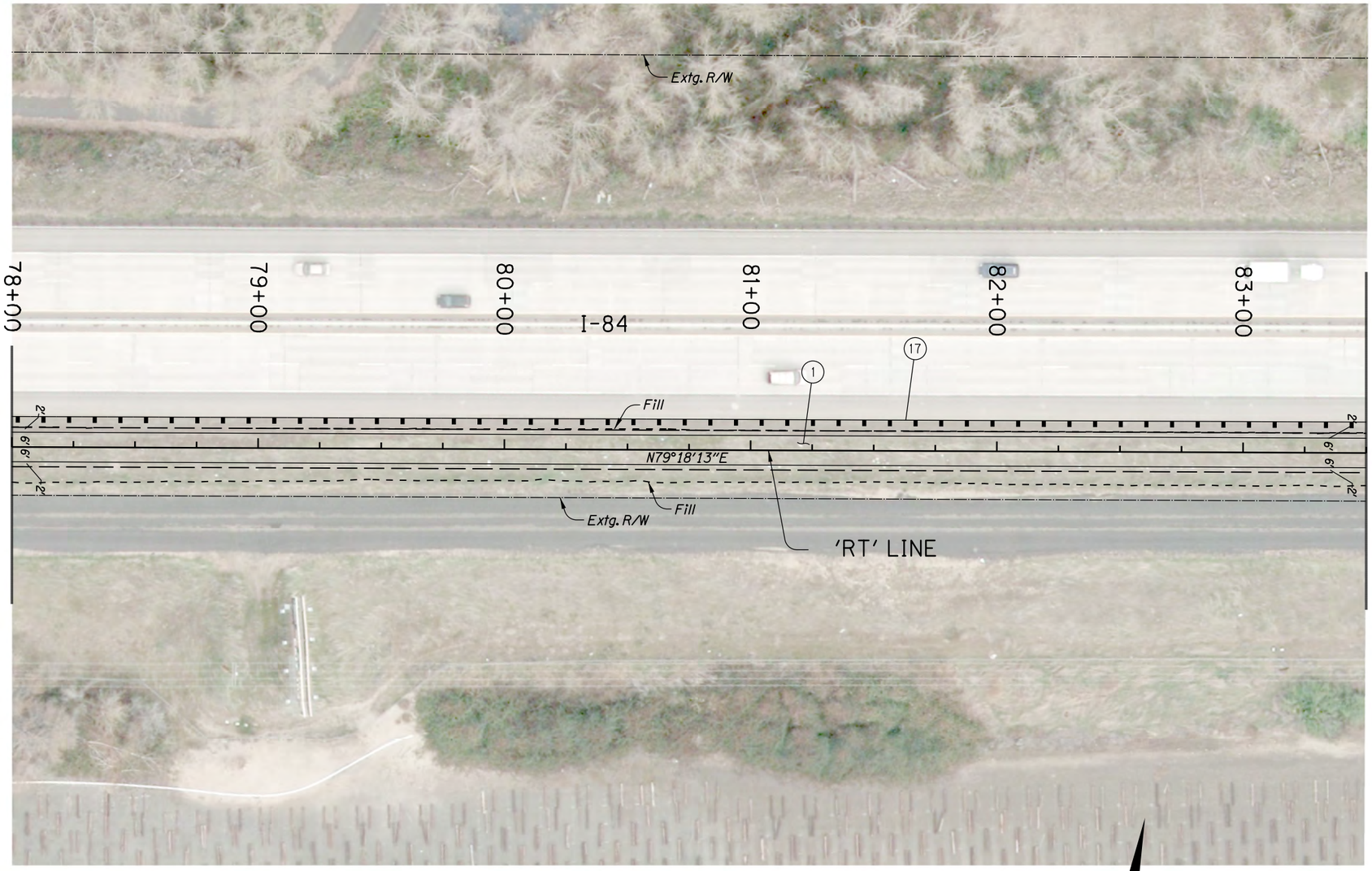
$$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*

(17) *Const. Guardrail*



STA. 'RT' 78+00 SEE SHEET 18A
MATCH LINE

STA. 'RT' 83+50 SEE SHEET 20A
MATCH LINE

N

0 25 50 75
Horizontal Scale In Feet

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2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 19A

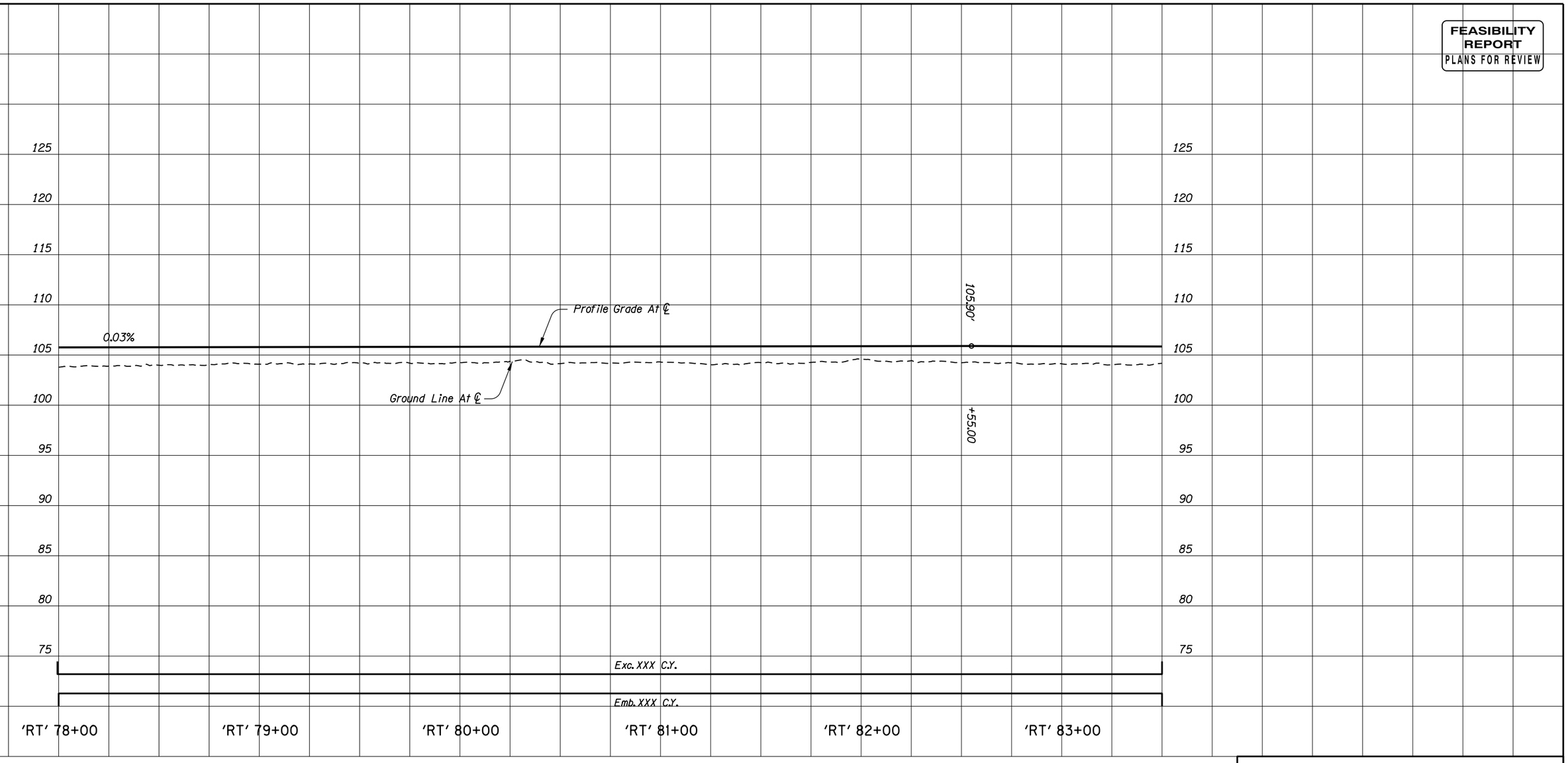
ROADWAY

PW: 662654: $FILENAME 15-MAR-2017 11:30 $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

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2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 19B

17890pp19B.dlv

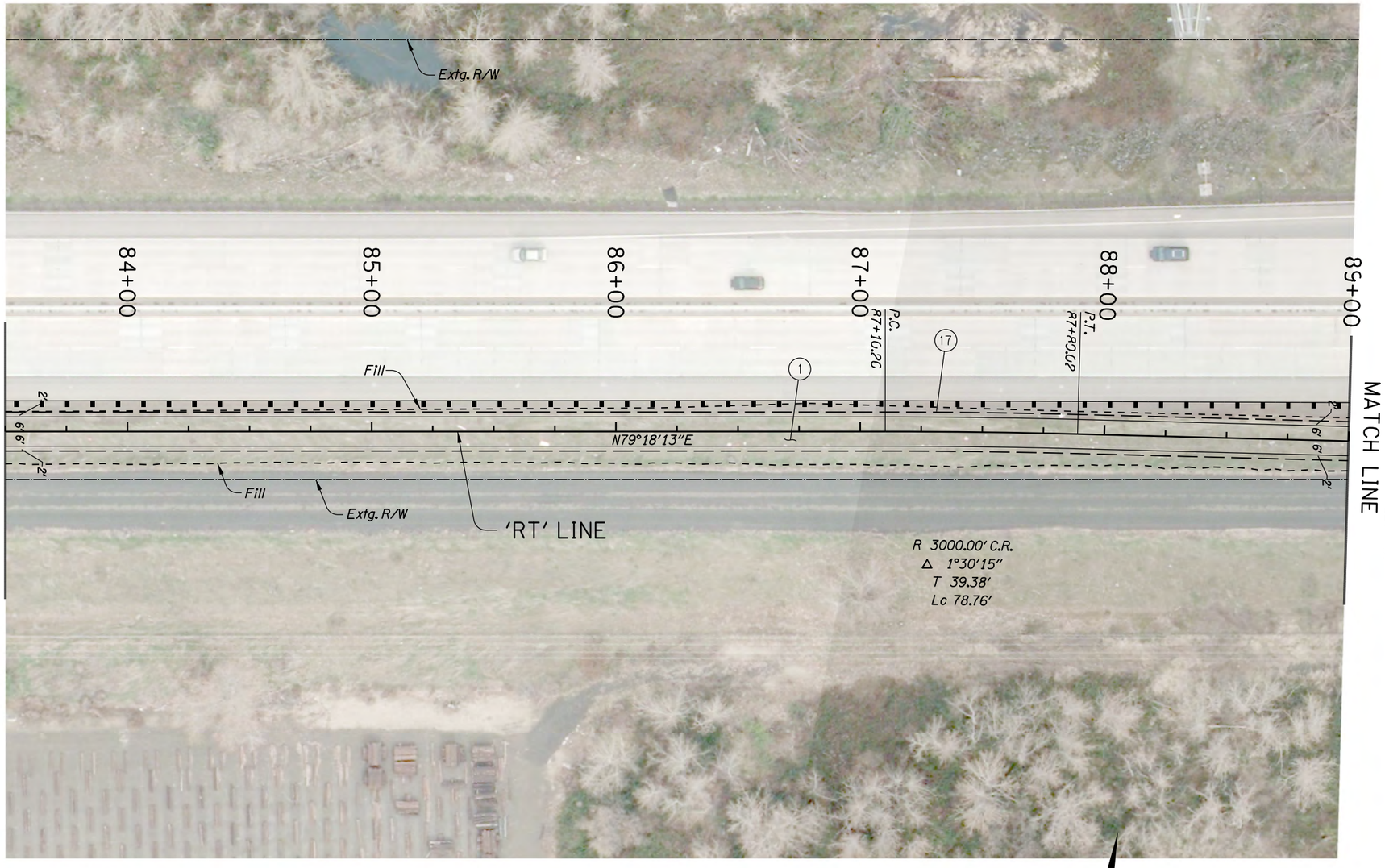
PW: 439154: $FILENAME | 15-MAR-2017 11:31 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*

(17) *Const. Guardrail*



STA. 'RT' 83+50 SEE SHEET 19A
MATCH LINE

STA. 'RT' 89+00 SEE SHEET 21A
MATCH LINE

N

0 25 50 75
Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 20A

ROADWAY

17890pp20A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:31 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

125
120
115
110
105
100
95
90
85
80
75

300' V.C.

105+70'

+55.00

-0.05%

-0.23%

Profile Grade At ℄

Ground Line At ℄

Exc. XXX C.Y.

Emb. XXX C.Y.

'RT' 84+00 | 'RT' 85+00 | 'RT' 86+00 | 'RT' 87+00 | 'RT' 88+00 | 'RT' 89+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 20B

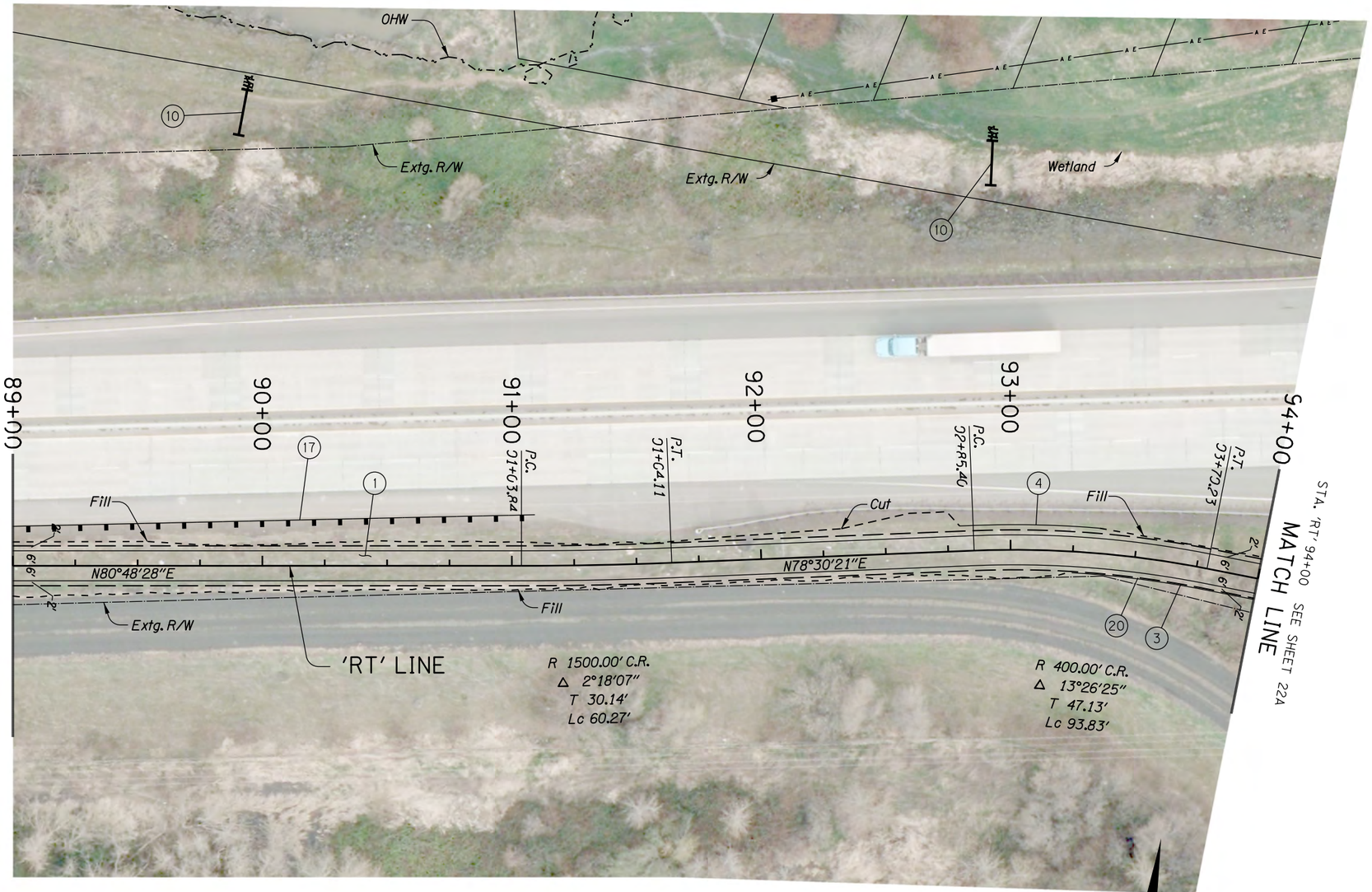
17890pp20B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:32 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(3) Const. Gabion Wall
(4) Const. Soldier Pile Wall
(17) Const. Guardrail
(20) Const. Pedestrian Rail



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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

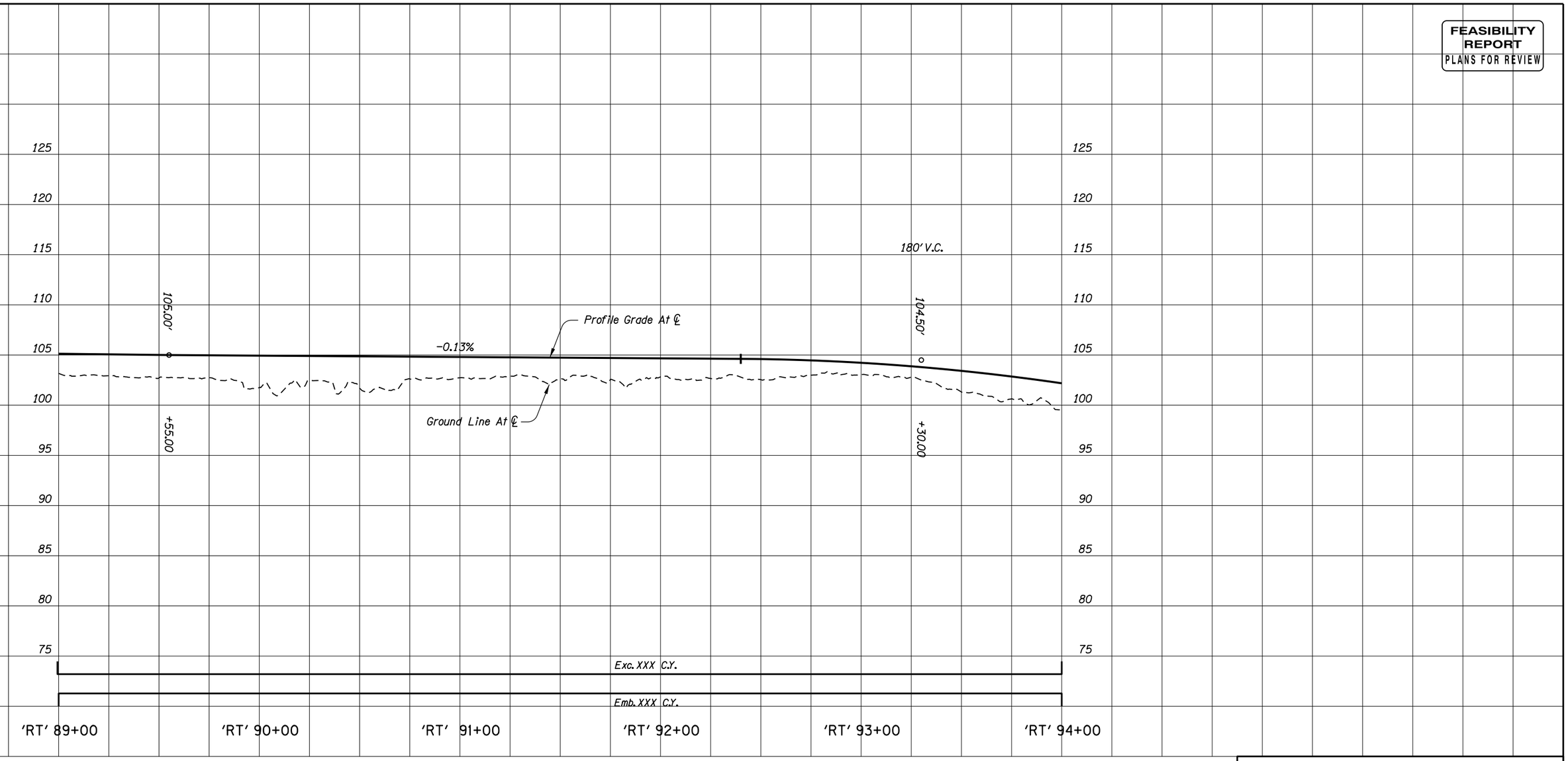
SHEET NO. 21A

ROADWAY

17890pp21A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:32 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW



ROADWAY

17890pp21B.dlv

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

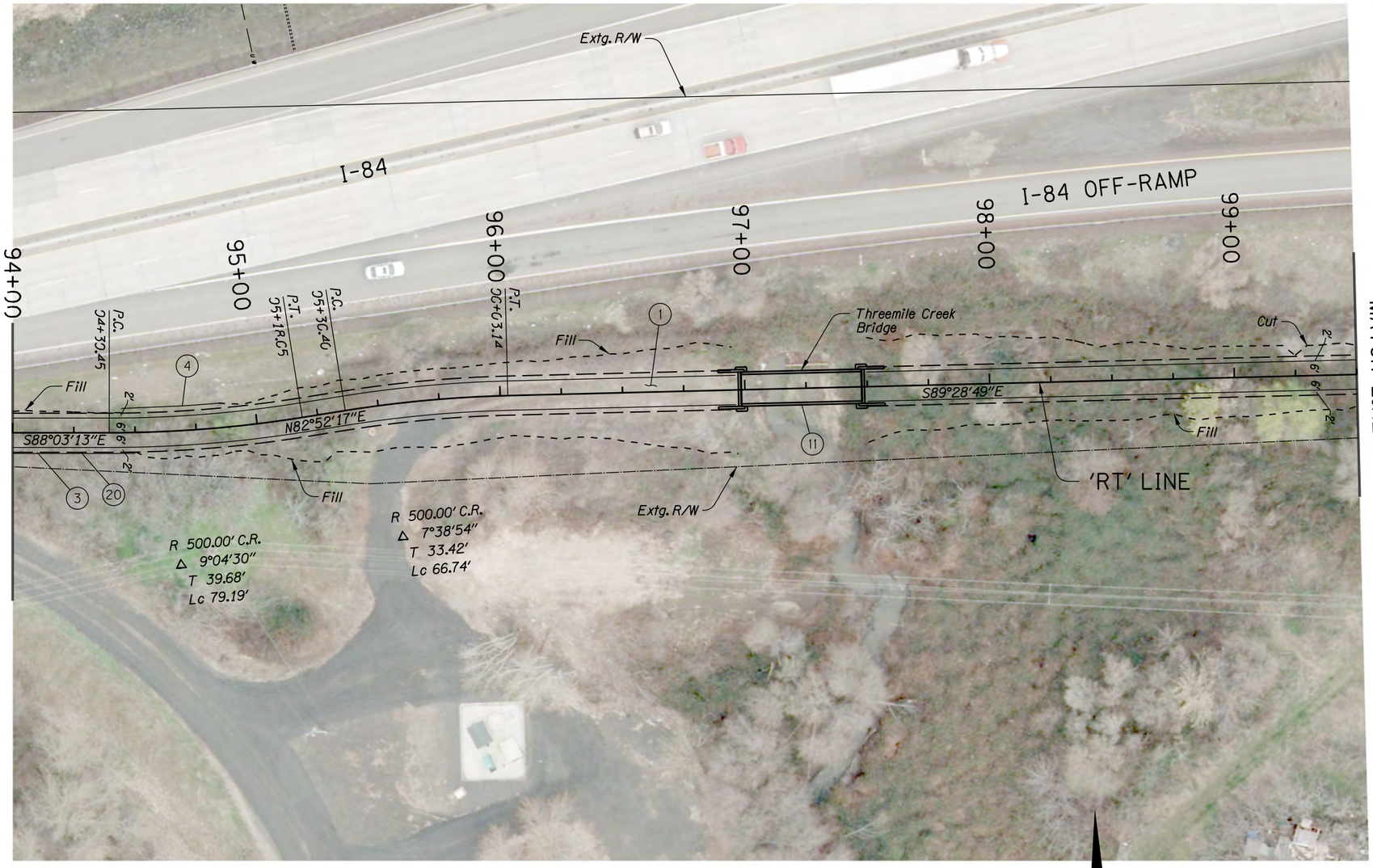
SHEET NO. 21B

PW: 439154: $FILENAME | 15-MAR-2017 11:32 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(3) Const. Gabian Wall
(4) Const. Soldier Pile Wall
(11) Bridge (See Sheet X-X)
(20) Const. Pedestrian Rail



STA. 'RT' 94+00 SEE SHEET 21A
MATCH LINE

STA. 'RT' 99+50 SEE SHEET 23A
MATCH LINE

N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 22A

ROADWAY

17890pp22A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:33 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

125
120
115
110
105
100
95
90
85
80
75

200' V.C.

150' V.C.

-3.26%

-2.42%

97.50'
o
+45.00

100.20'
o
+20.00

Threemile Creek Bridge

Profile Grade At ℄

Ground Line At ℄

Exc. XXX C.Y.

Emb. XXX C.Y.

'RT' 94+00 | 'RT' 95+00 | 'RT' 96+00 | 'RT' 97+00 | 'RT' 98+00 | 'RT' 99+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 22B

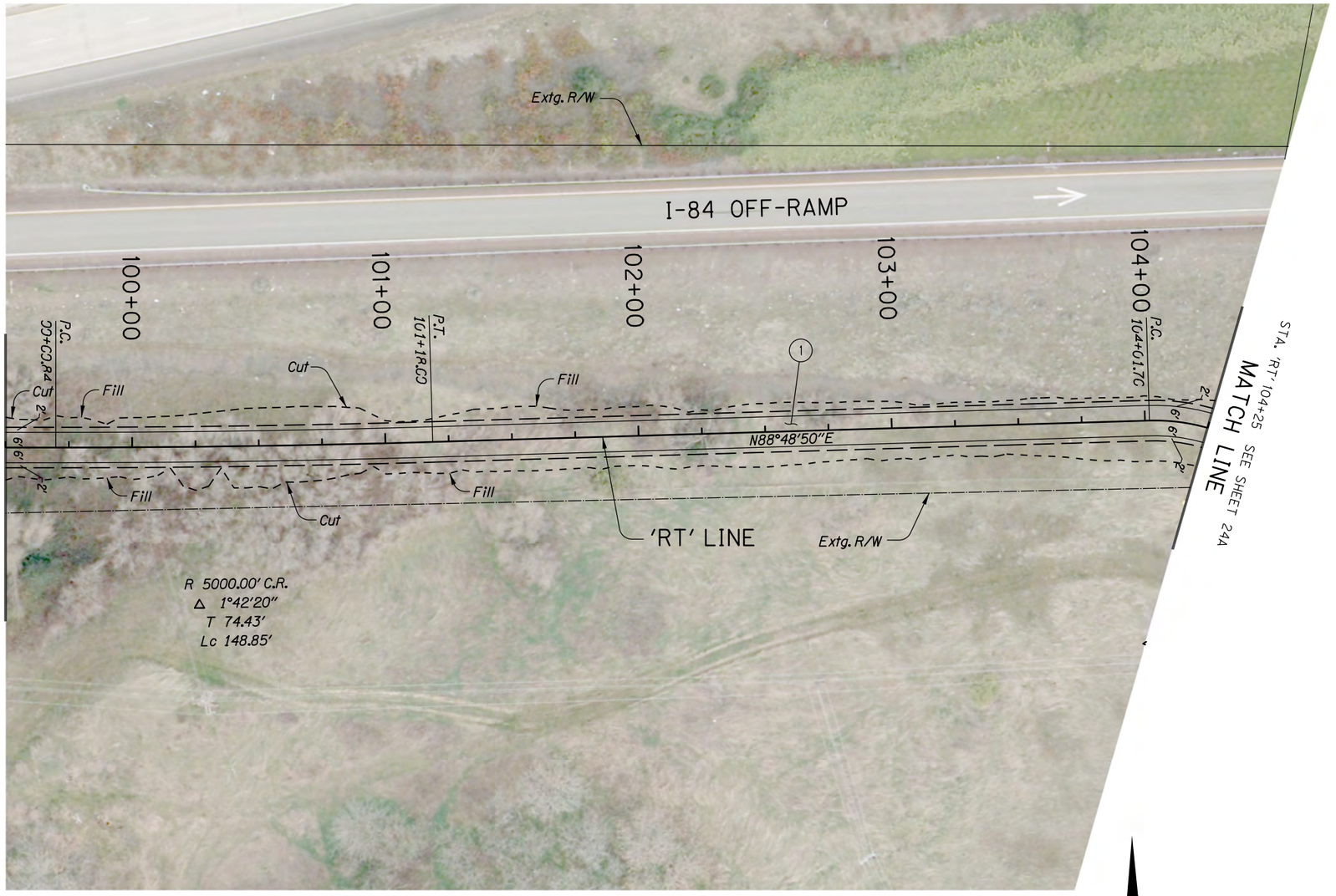
17890pp22B.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:33 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*



ROADWAY

17890pp23A.dlv

N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

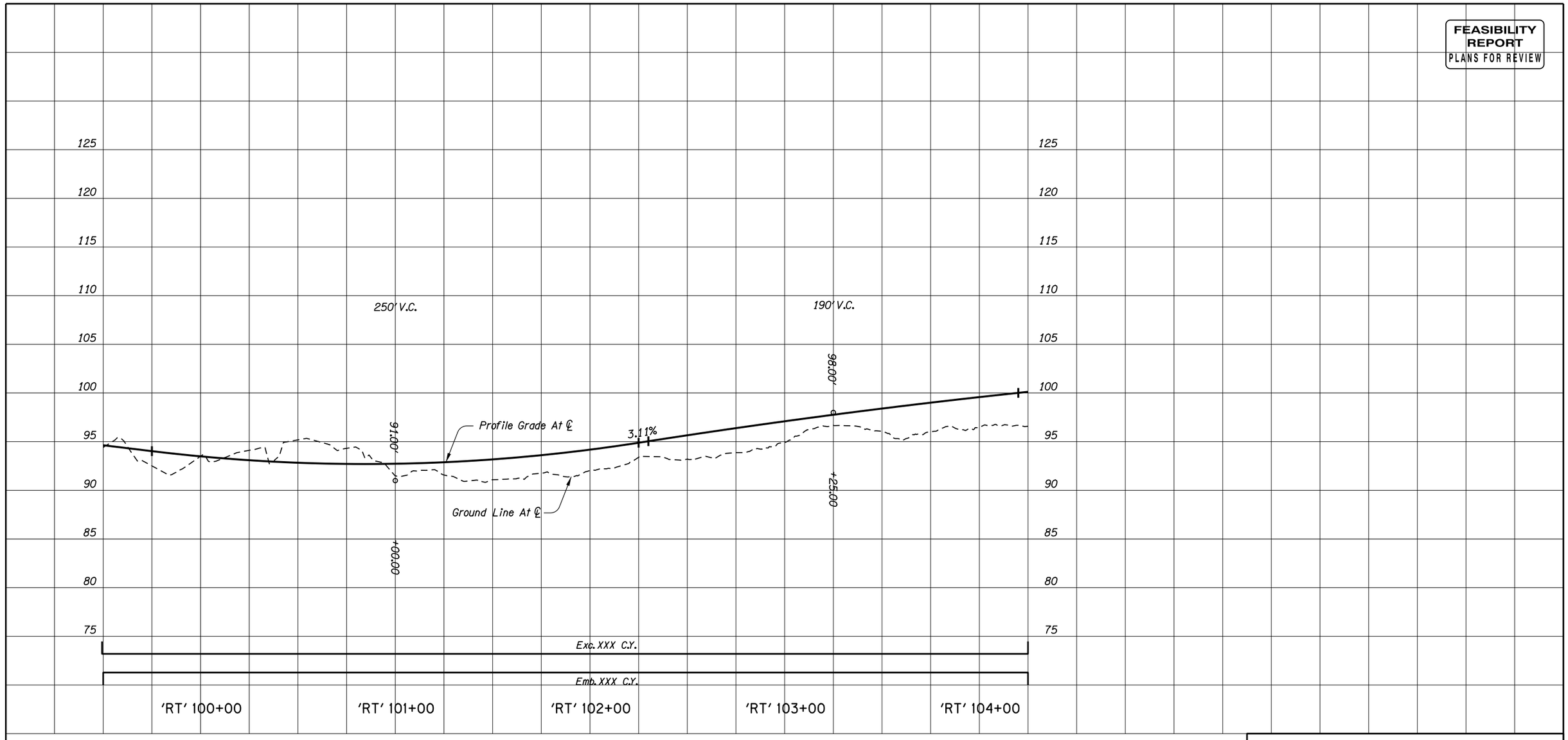
Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 23A

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 23B

17890pp23B.dlv

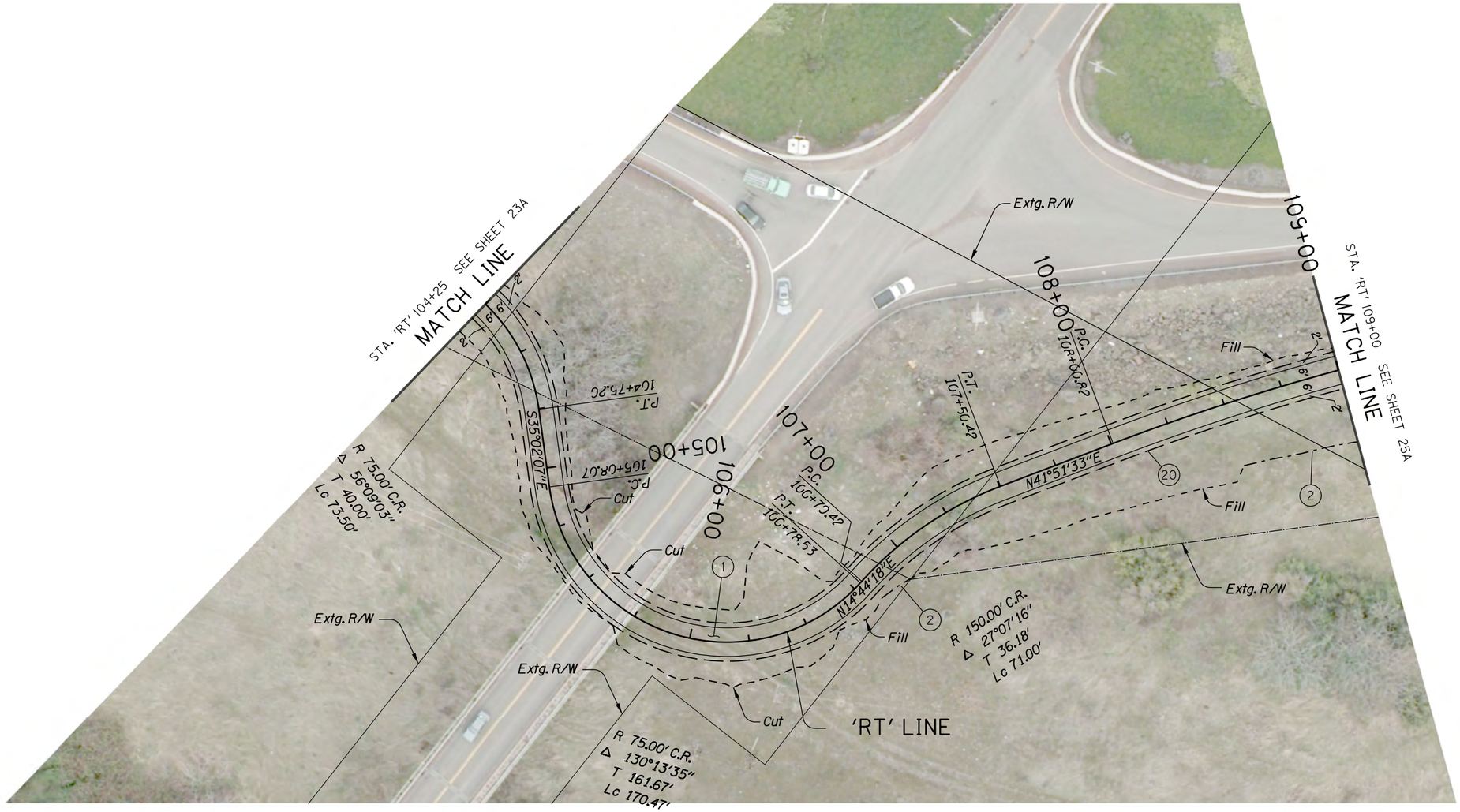
PW: 439154: $FILENAME | 15-MAR-2017 11:34 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(20) Const. Pedestrian Rail



N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 24A

ROADWAY

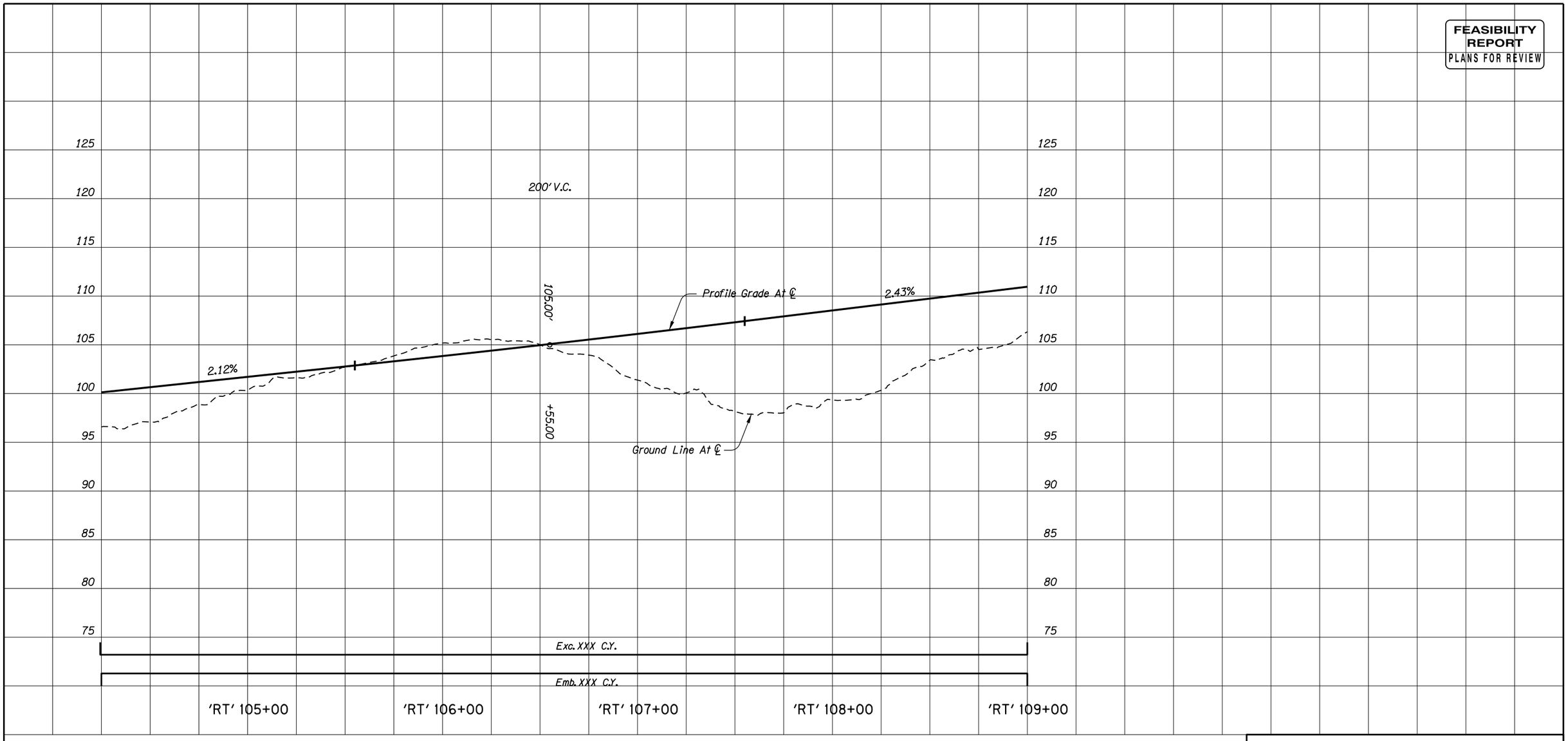
17890pp24A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:34 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 24B

17890pp24B.dlv

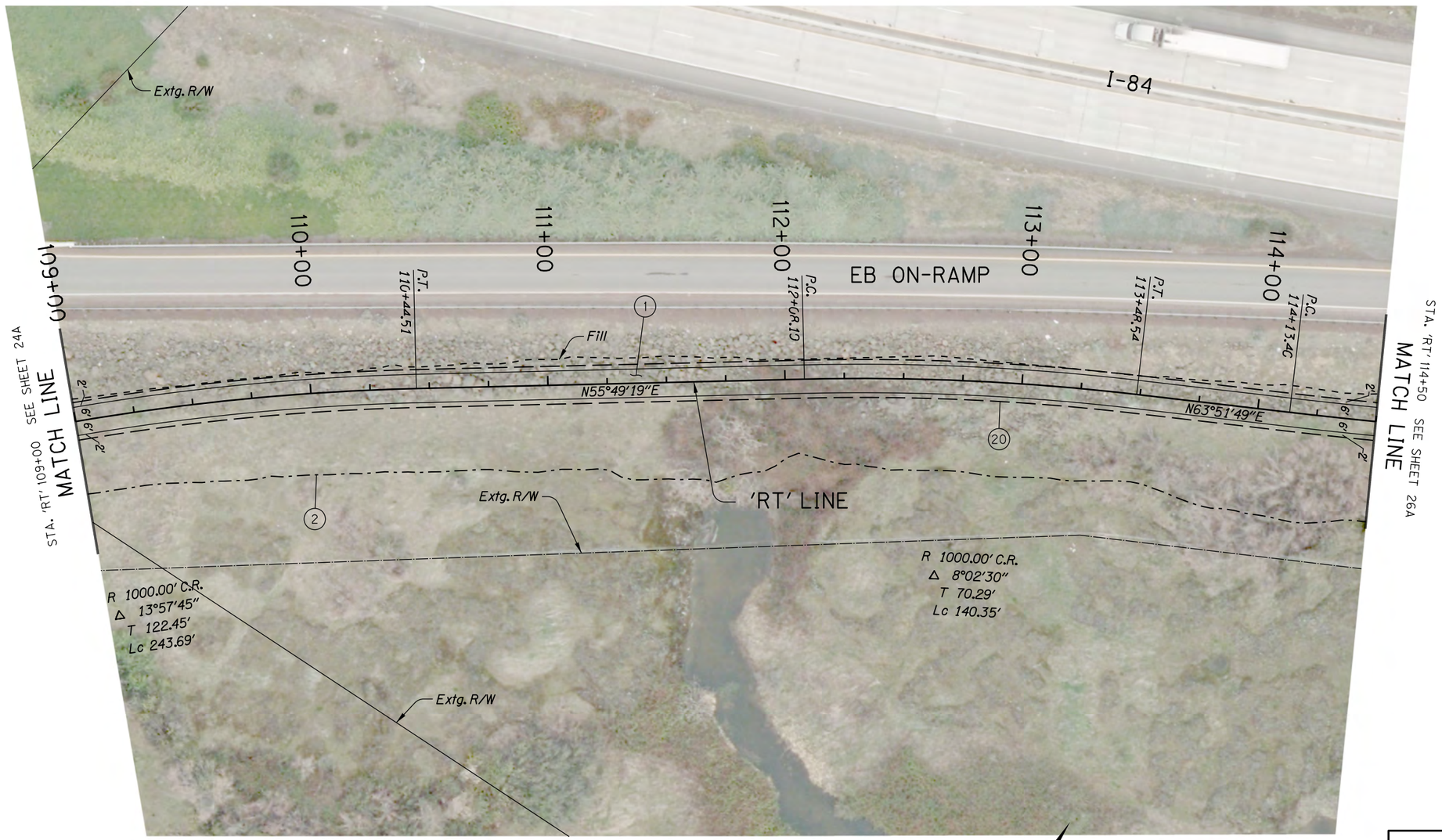
PW: 439154: $FILENAME | 15-MAR-2017 11:34 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(20) Const. Pedestrian Rail



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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 25A

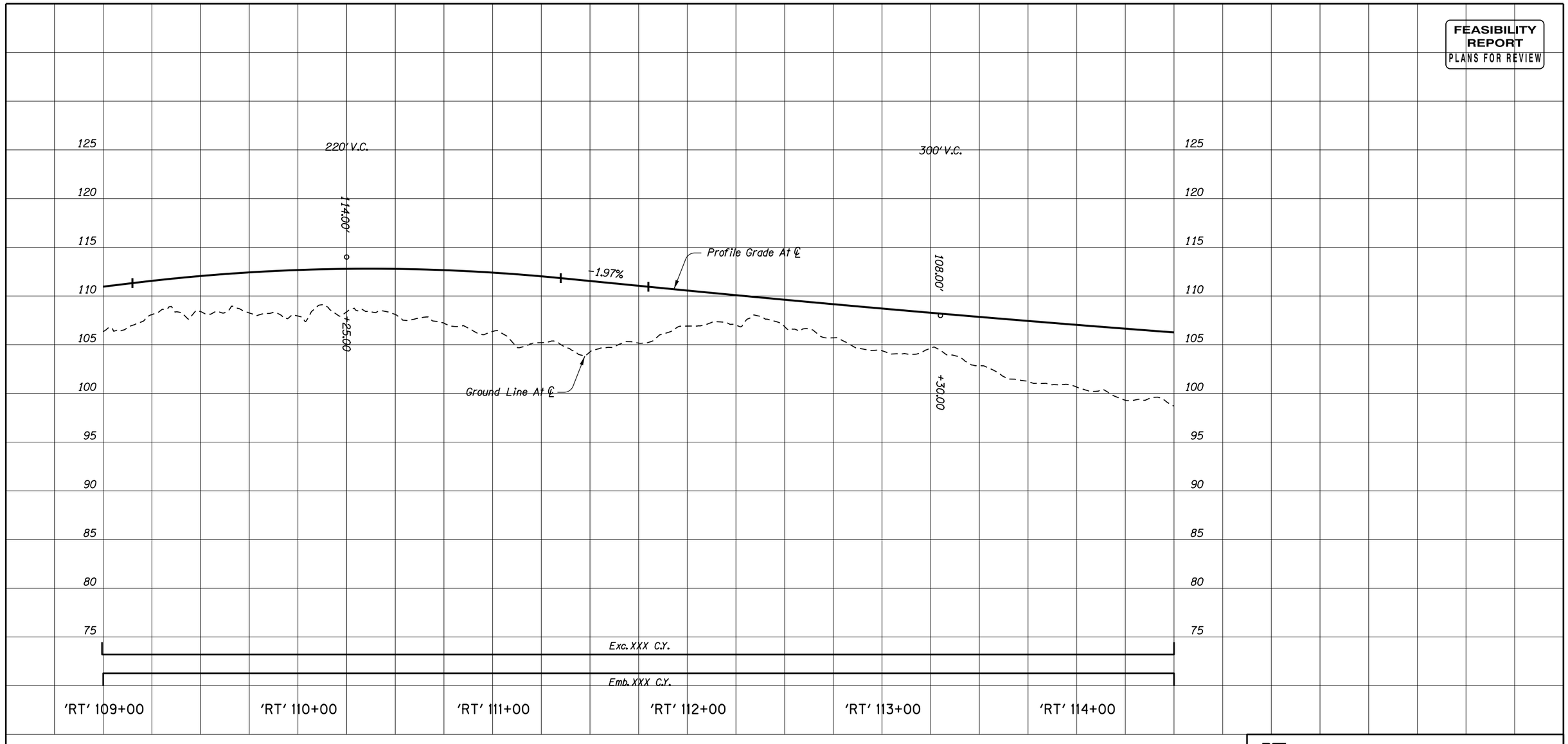
ROADWAY

17890pp25A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:35 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 25B

17890pp25B.dlv

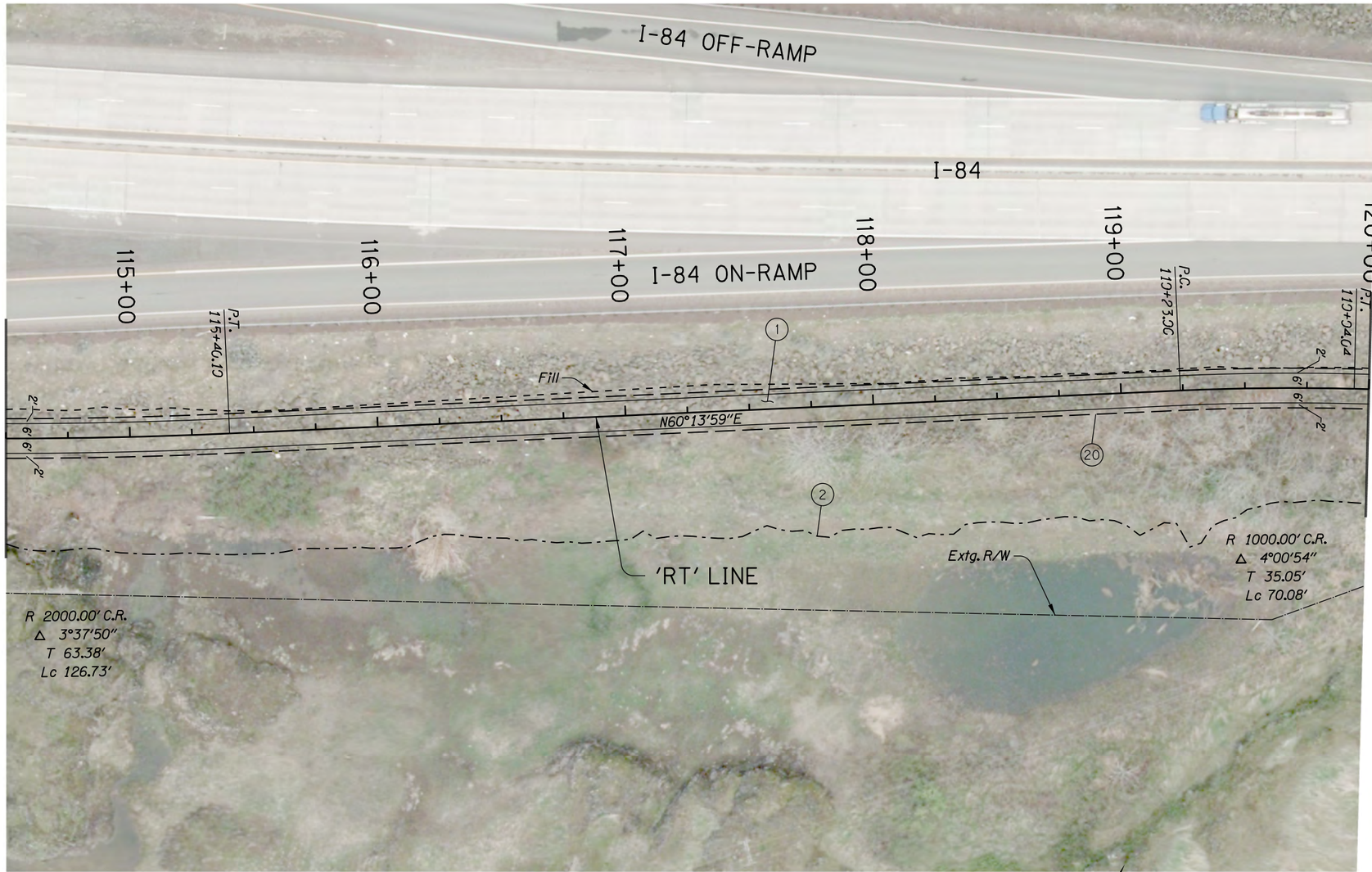
PW: 439154: $FILENAME | 15-MAR-2017 11:36 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(20) Const. Pedestrian Rail



STA. 'RT' 114+50 SEE SHEET 25A
MATCH LINE

STA. 'RT' 120+00 SEE SHEET 27A
MATCH LINE

N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 26A

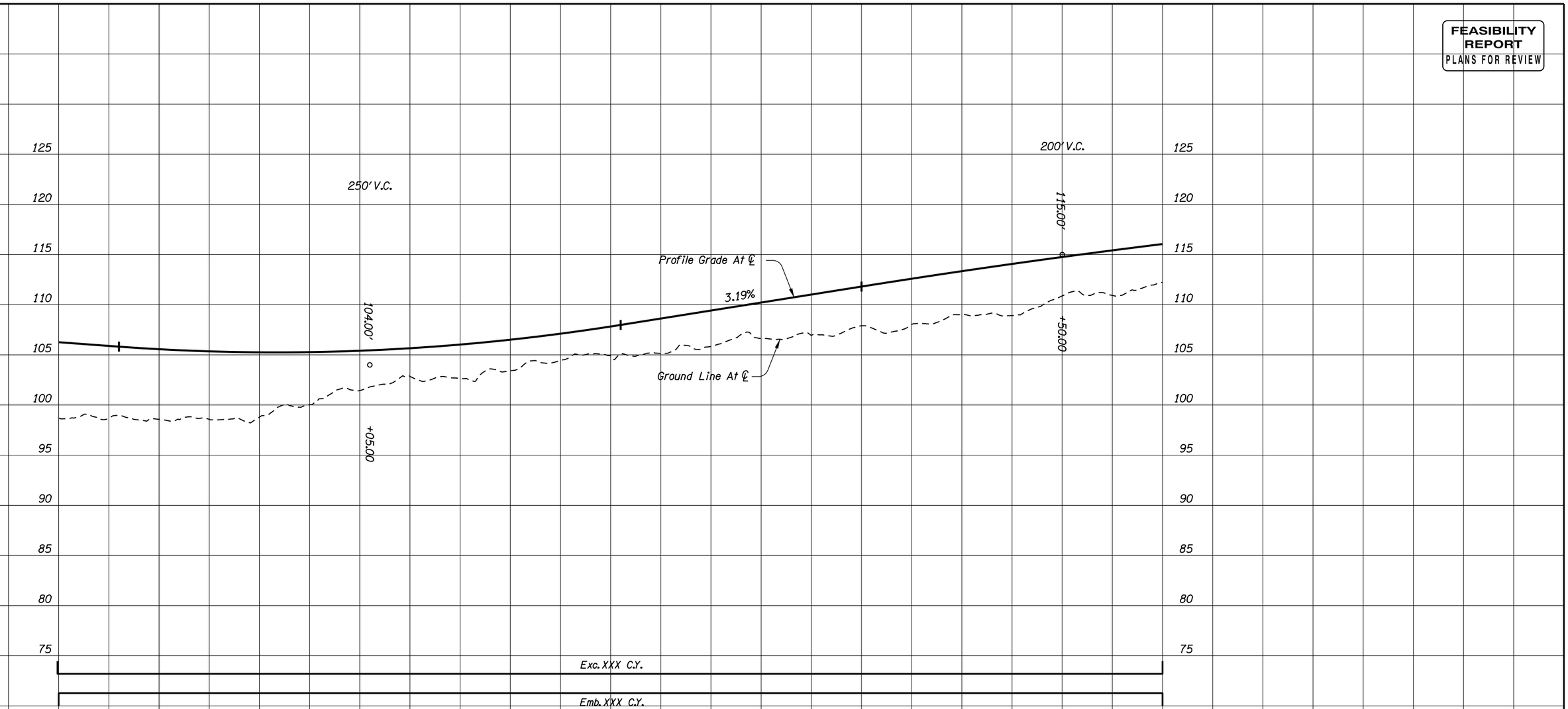
ROADWAY

17890pp26A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:36 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 26B

17890pp26B.dlv

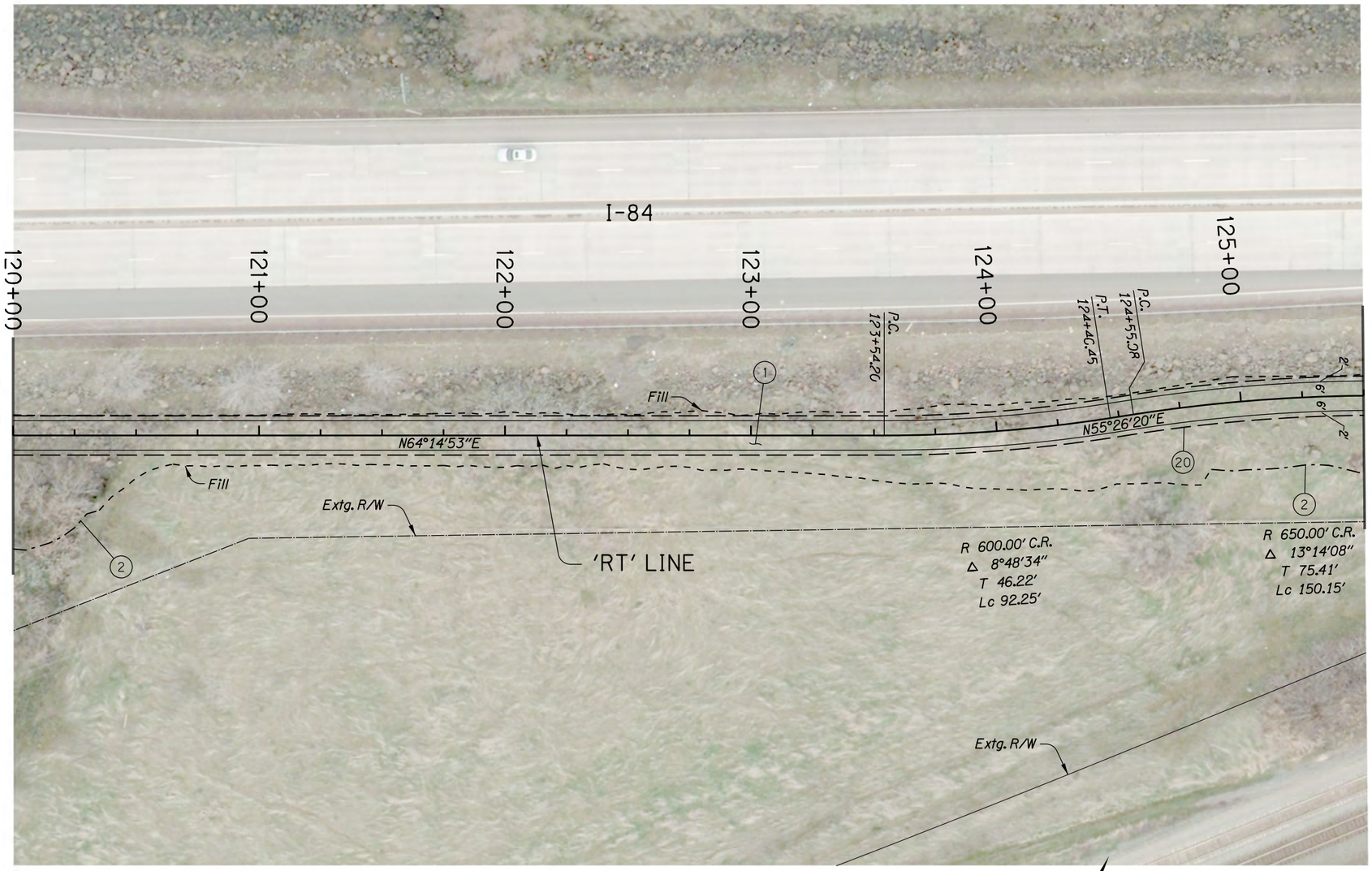
PW: 439154: $FILENAME | 15-MAR-2017 11:37 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(2) Const. 1:1 1/2 Mat Stone Embankment
(20) Const. Pedestrian Rail



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0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 27A

ROADWAY

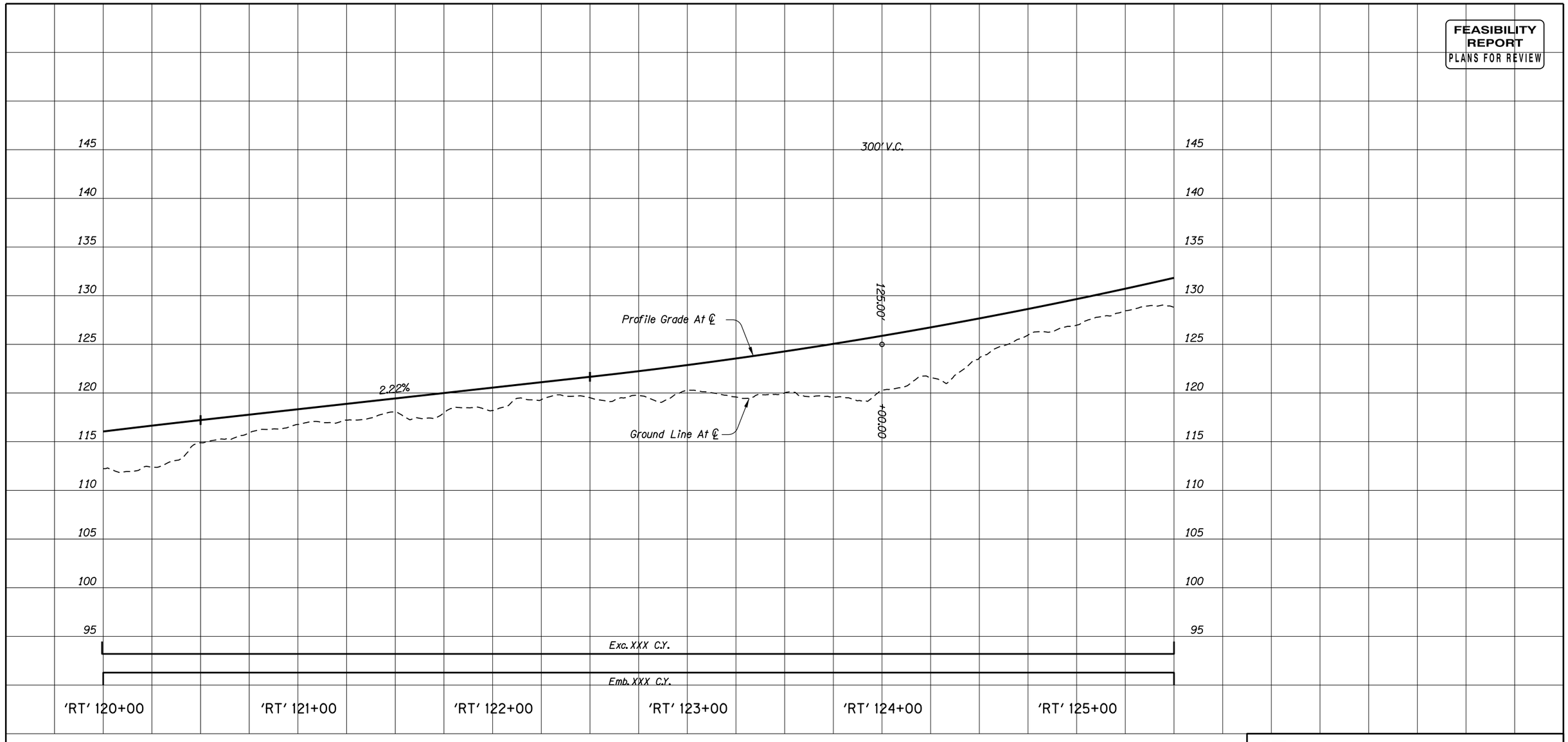
17890pp27A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:37 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 27B

17890pp27B.dlv

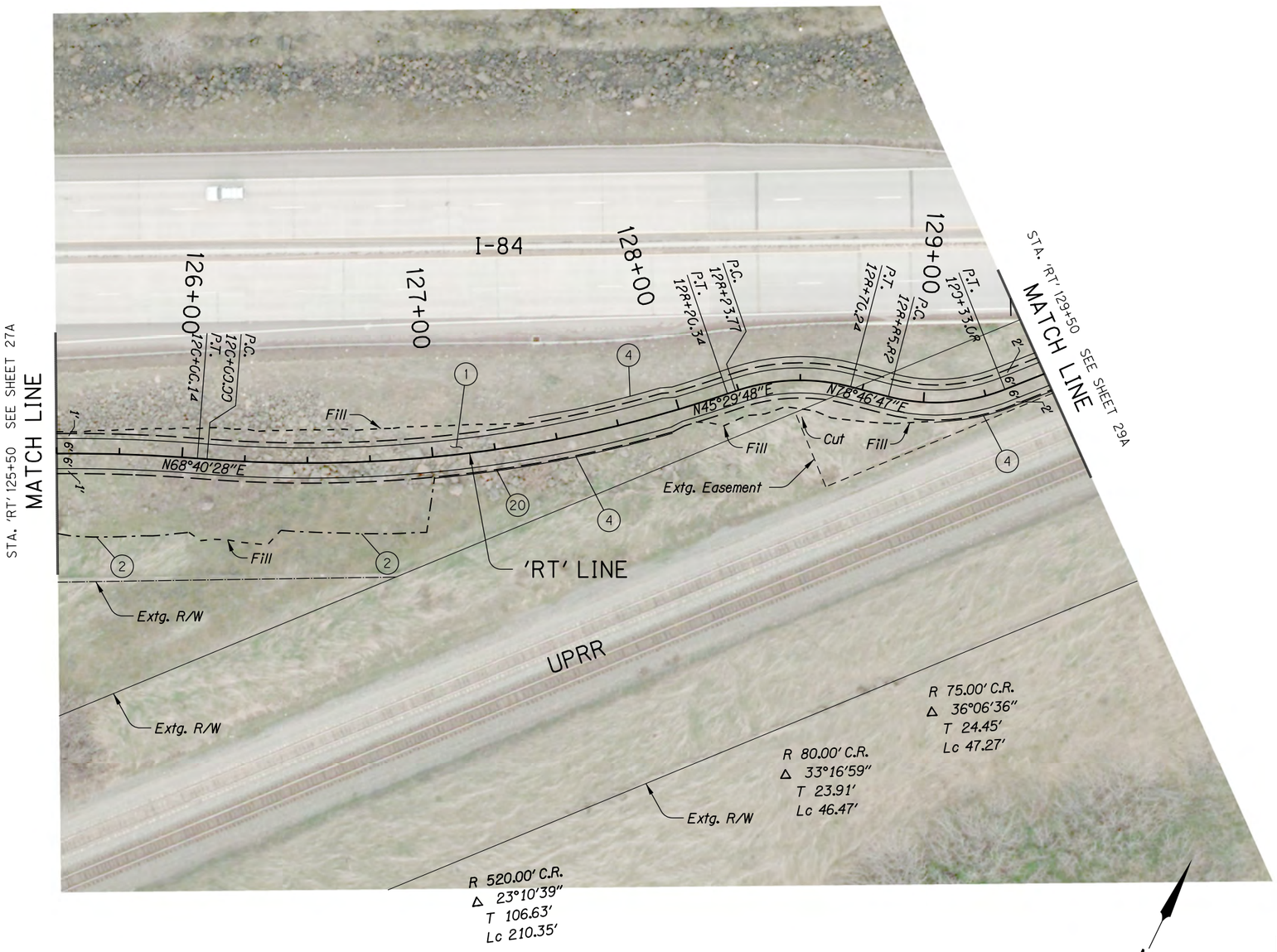
PW: 439154: $FILENAME 15-MAR-2017 11:37 $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

1. Const. Asph. Conc. Shared-Use Path
2. Const. 1:1 1/2 Mat Stone Embankment
4. Const. Soldier Pile Wall
20. Const. Pedestrian Rail



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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 28A

ROADWAY

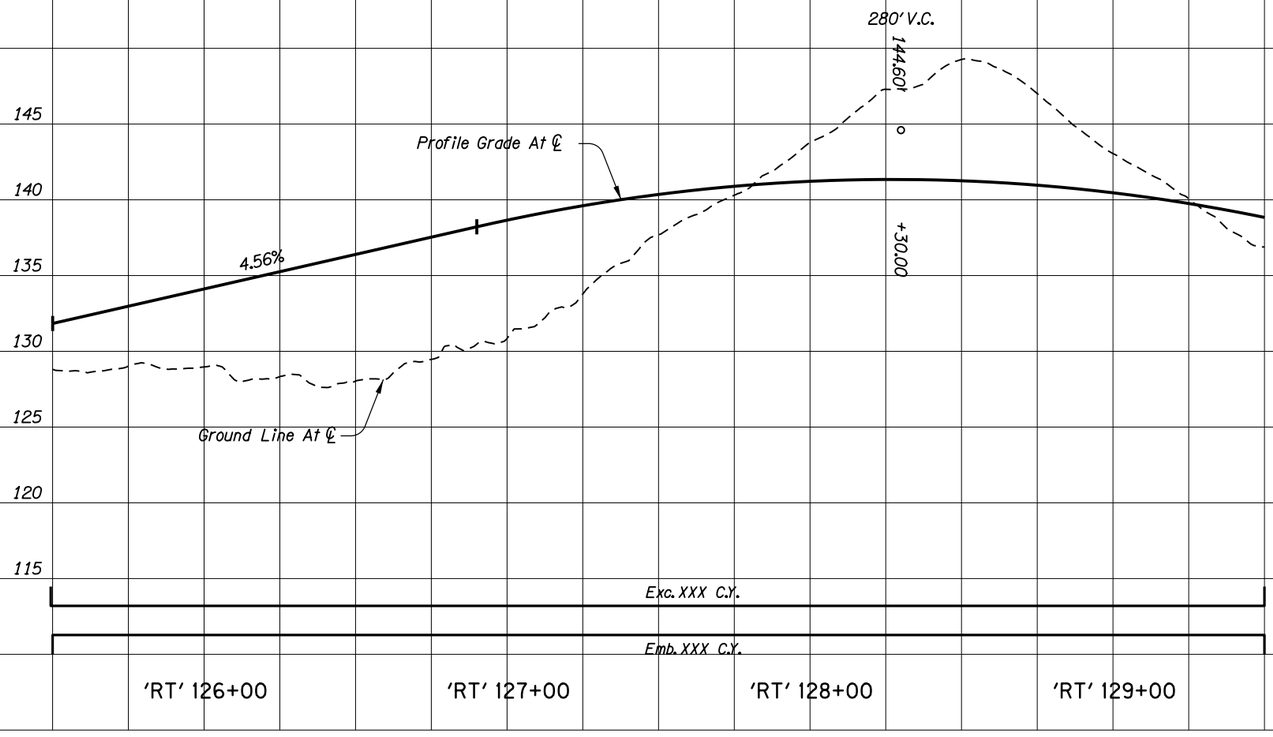
17890pp28A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:37 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



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Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

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ch2m:
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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 28B

17890pp28B.dlv

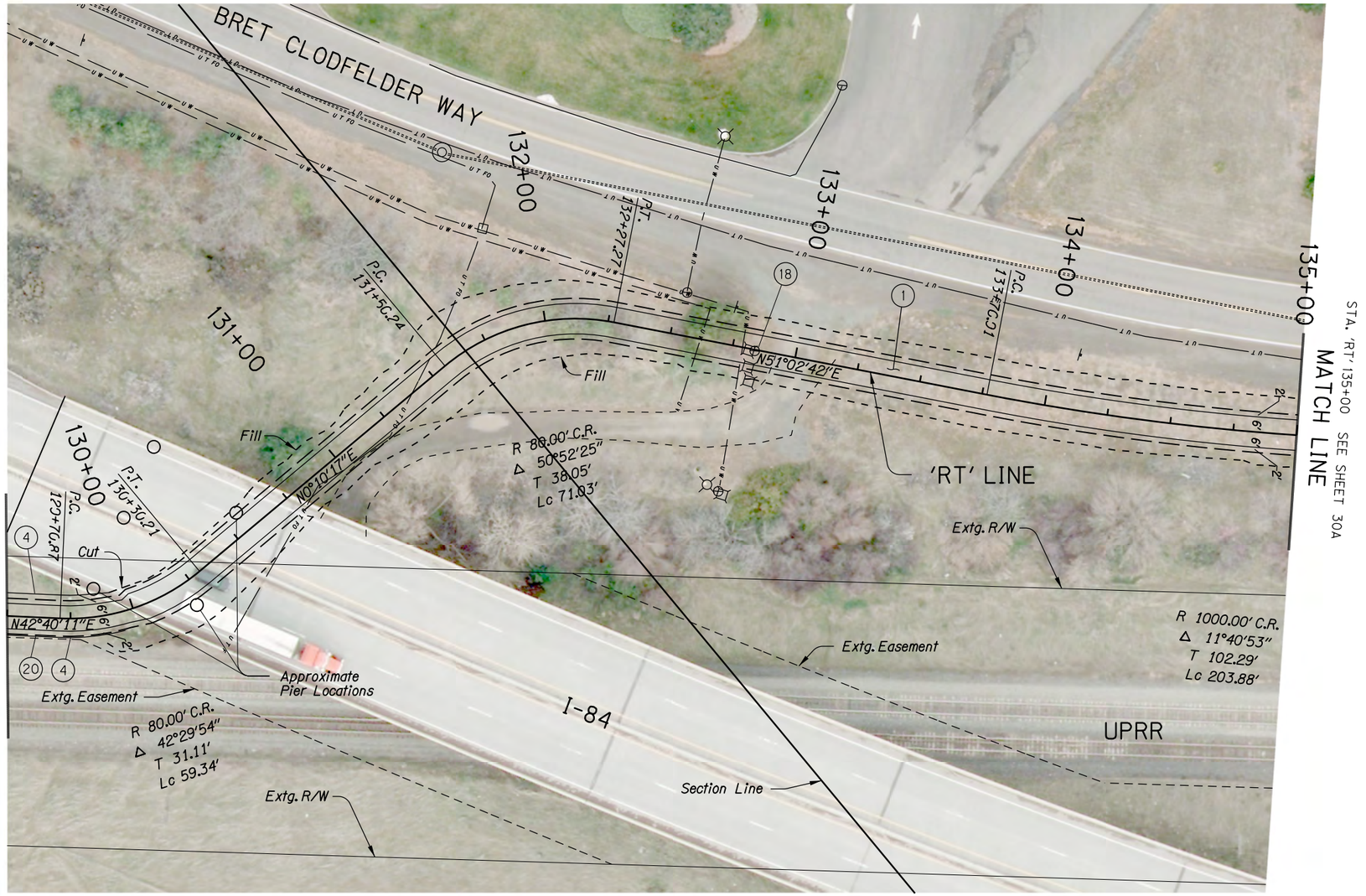
PW: 439154: $FILENAME | 15-MAR-2017 11:38 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(4) Const. Soldier Pile Wall
(18) Relocate Extg. Water Equipment
(20) Const. Pedestrian Rail



N

0 25 50 75
Scale In Feet

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 29A

17890pp29A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:38 | $$$$username$$$$ | PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY

165
160
155
150
145
140
135
130
125
120
115

110' V.C.
140' V.C.
150' V.C.

-4.75%
1.75%

132.50'
128.00'
131.85'

+85.00
+10.00
+30.00

Profile Grade At ℄
Ground Line At ℄

Exc. XXX C.Y.
Emb. XXX C.Y.

'RT' 130+00
'RT' 131+00
'RT' 132+00
'RT' 133+00
'RT' 134+00
'RT' 135+00

0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

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ch2m
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 29B

17890pp29B.dlv

PW: 439154: $FILENAME
15-MAR-2017 11:39
$$$$username$$$$

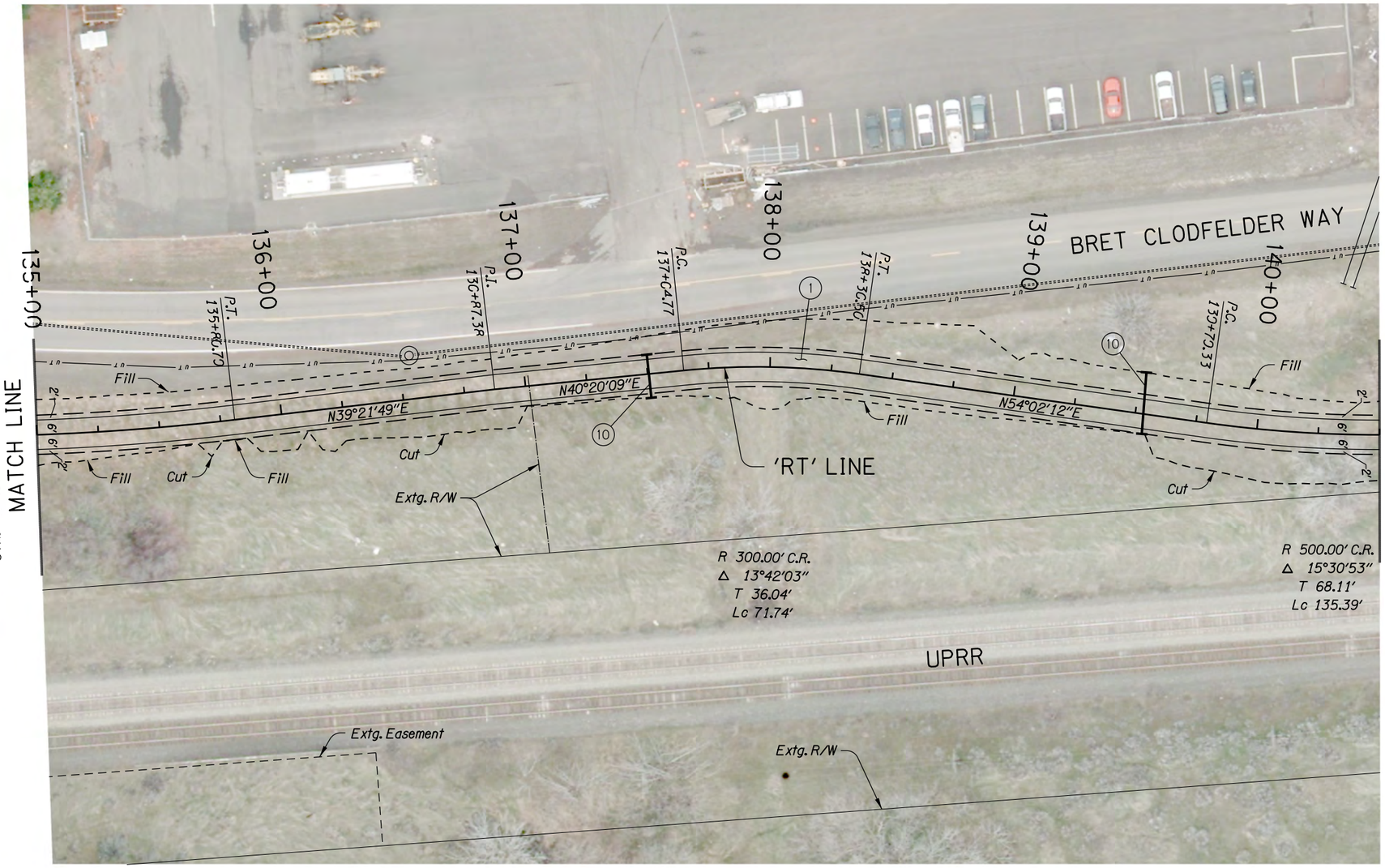
PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*

(10) *Const. Culvert*



ROADWAY

17890pp30A.dlv

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

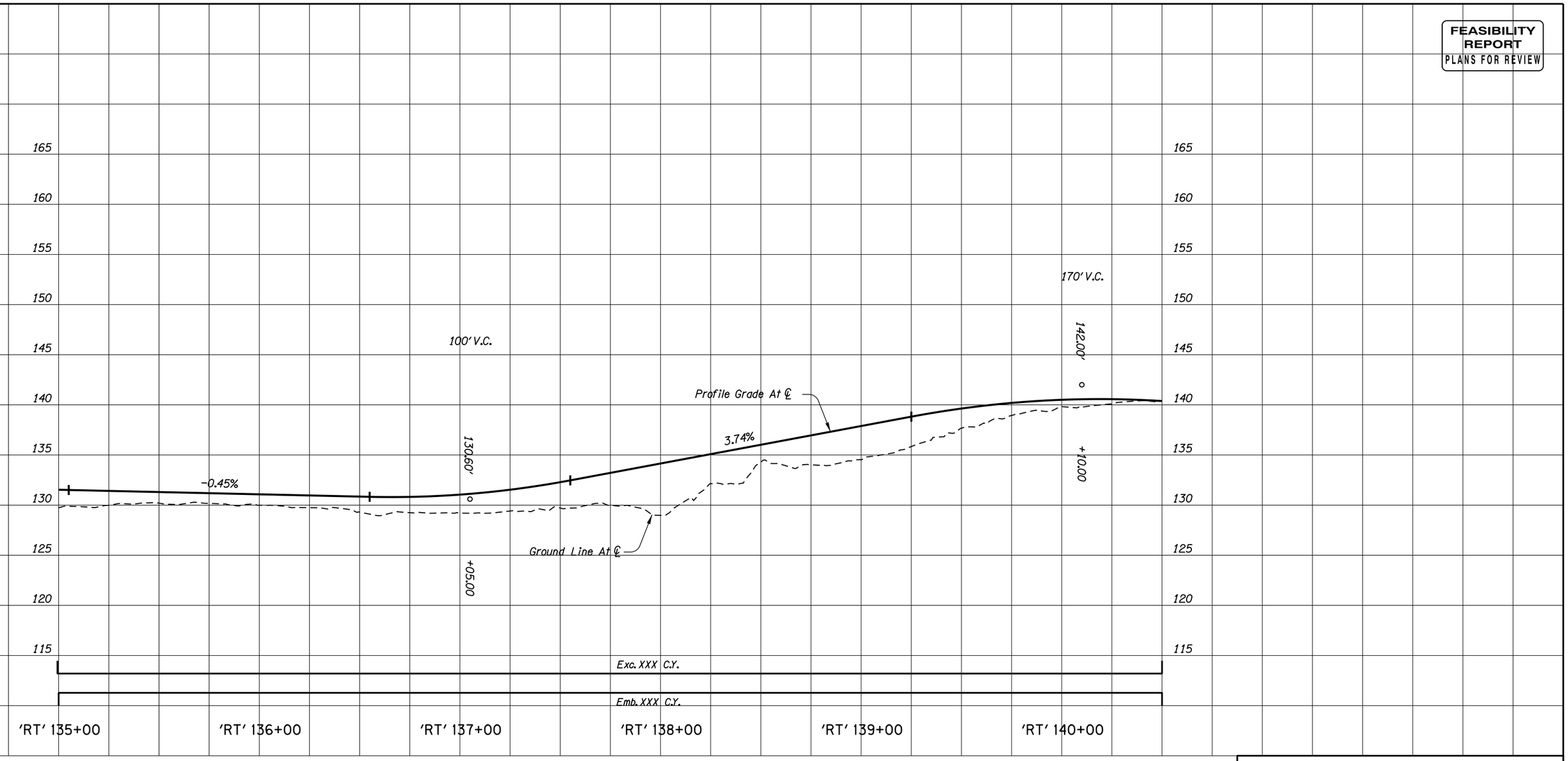
Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 30A

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



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Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

ch2m
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 30B

17890pp30B.dlv

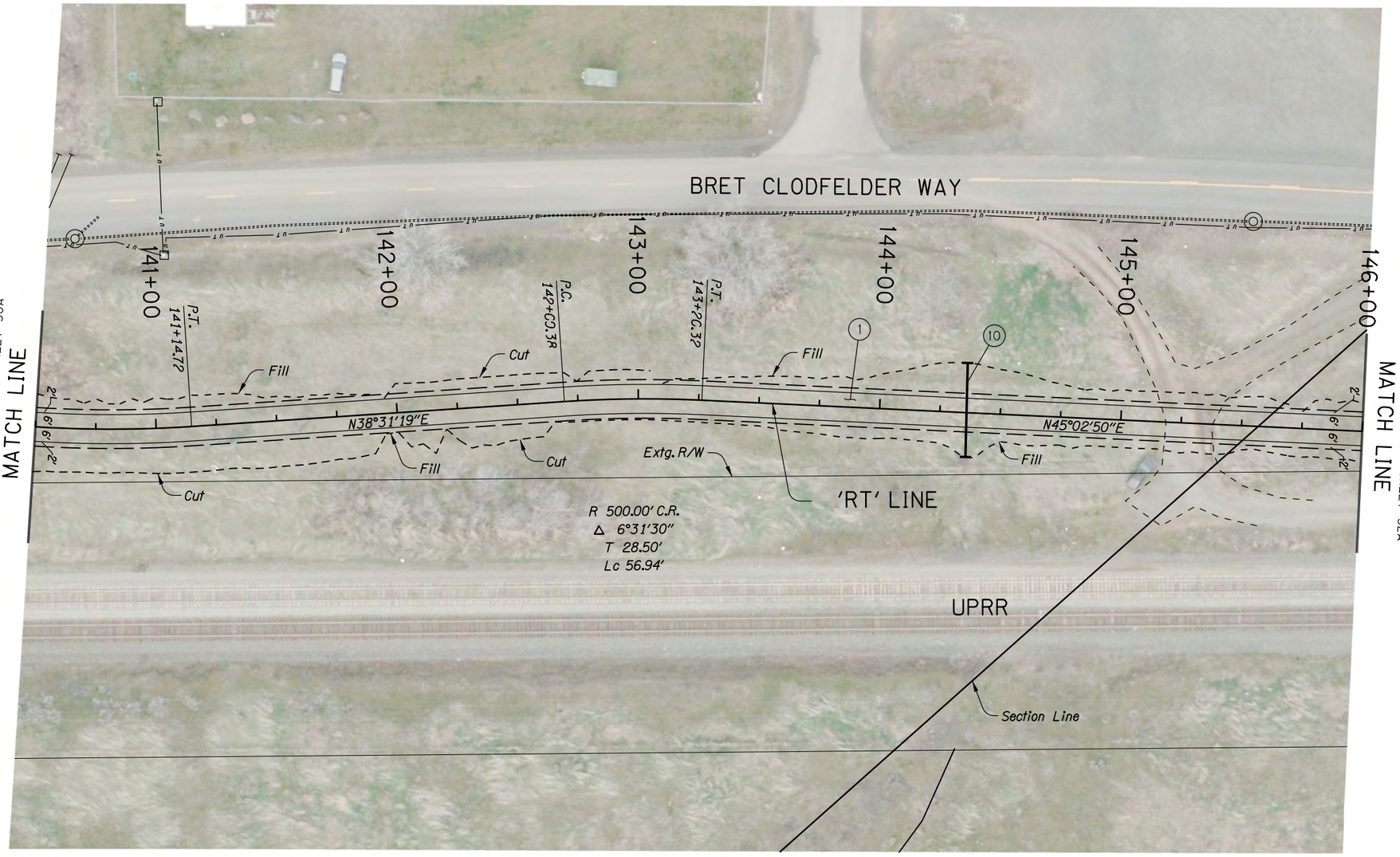
PW: 439154: $FILENAME | 15-MAR-2017 11:39 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) Const. Asph. Conc. Shared-Use Path
(10) Const. Culvert



STA. 'RT' 135+00 SEE SHEET 30A
MATCH LINE

STA. 'RT' 146+00 SEE SHEET 32A
MATCH LINE

ROADWAY

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 31A

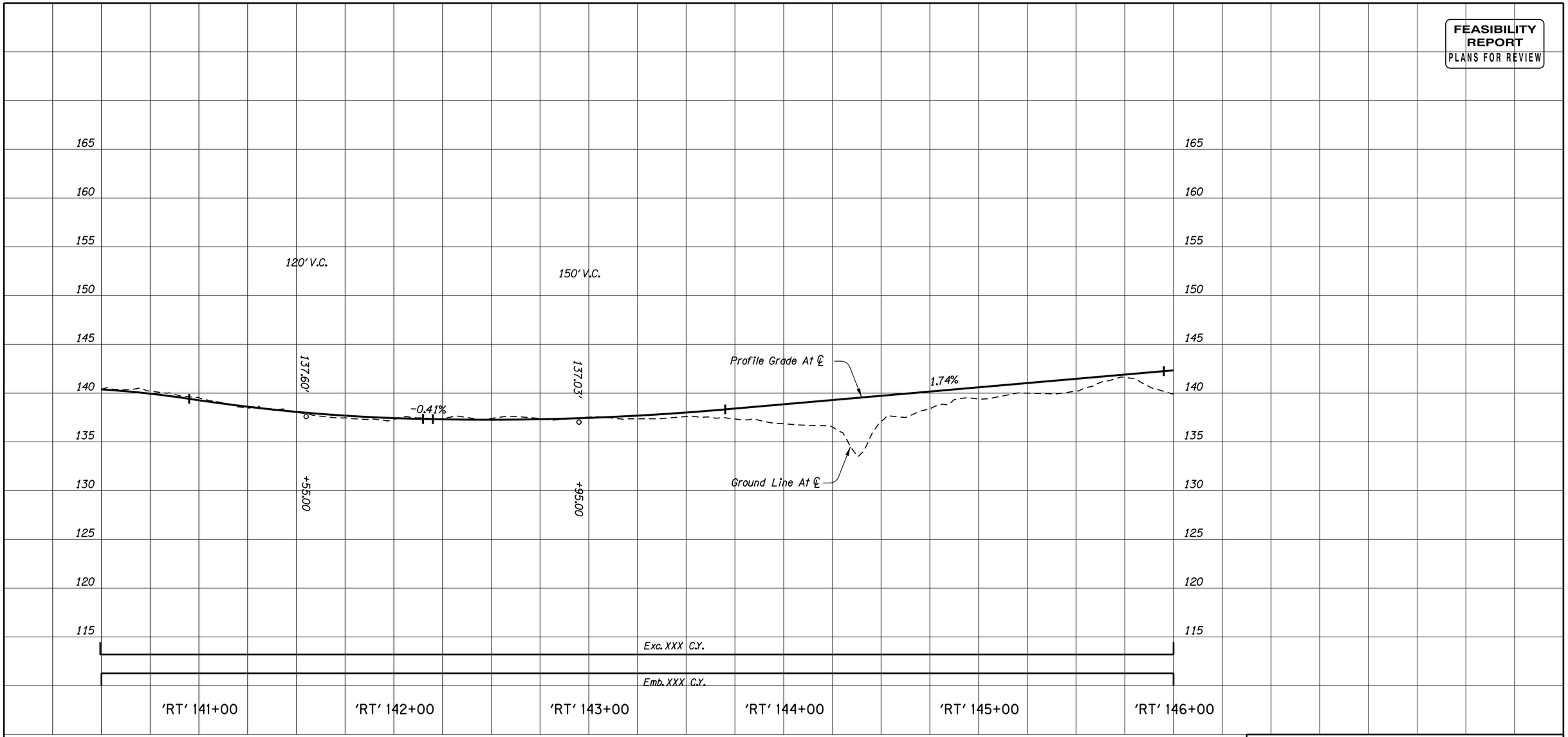
17890pp31A.dlv

PW: 439154: $FILENAME | 15-MAR-2017 11:40 | $$$$username$$$$

PRELIMINARY DESIGN

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



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Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

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ch2m:
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PORTLAND, OR 97201-4953
TEL. 503.235.5000

THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 31B

17890pp31B.dlv

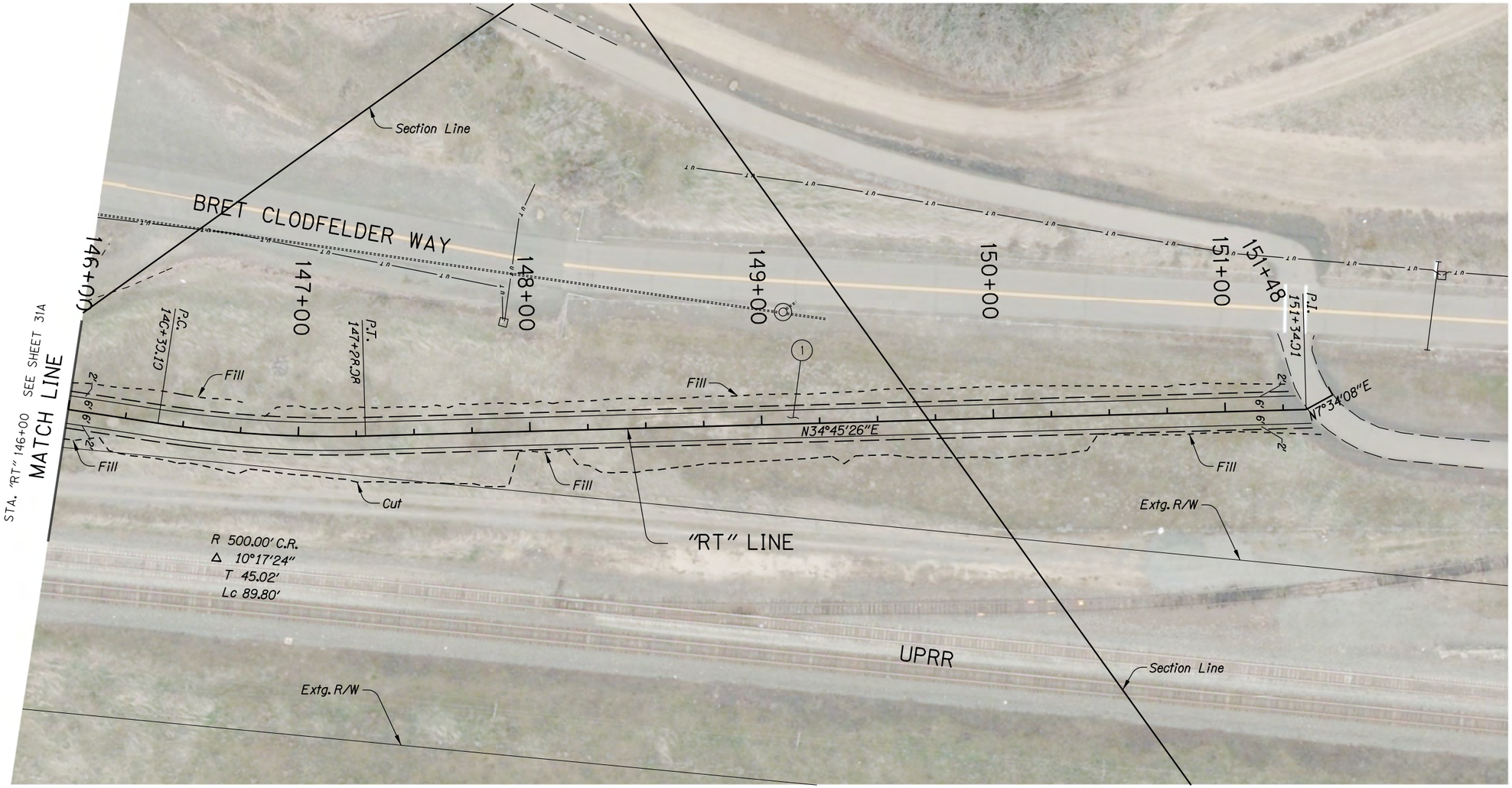
PW: 439154: $FILENAME | 15-MAR-2017 11:40 | $$$$username$$$$

PRELIMINARY DESIGN

Sec. 03, T.1N, R.1E, W.M.

FEASIBILITY REPORT
PLANS FOR REVIEW

(1) *Const. Asph. Conc. Shared-Use Path*



ROADWAY

17890pp32A.dlv

N

0 25 50 75
Scale In Feet

REVIEW COPY ONLY

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

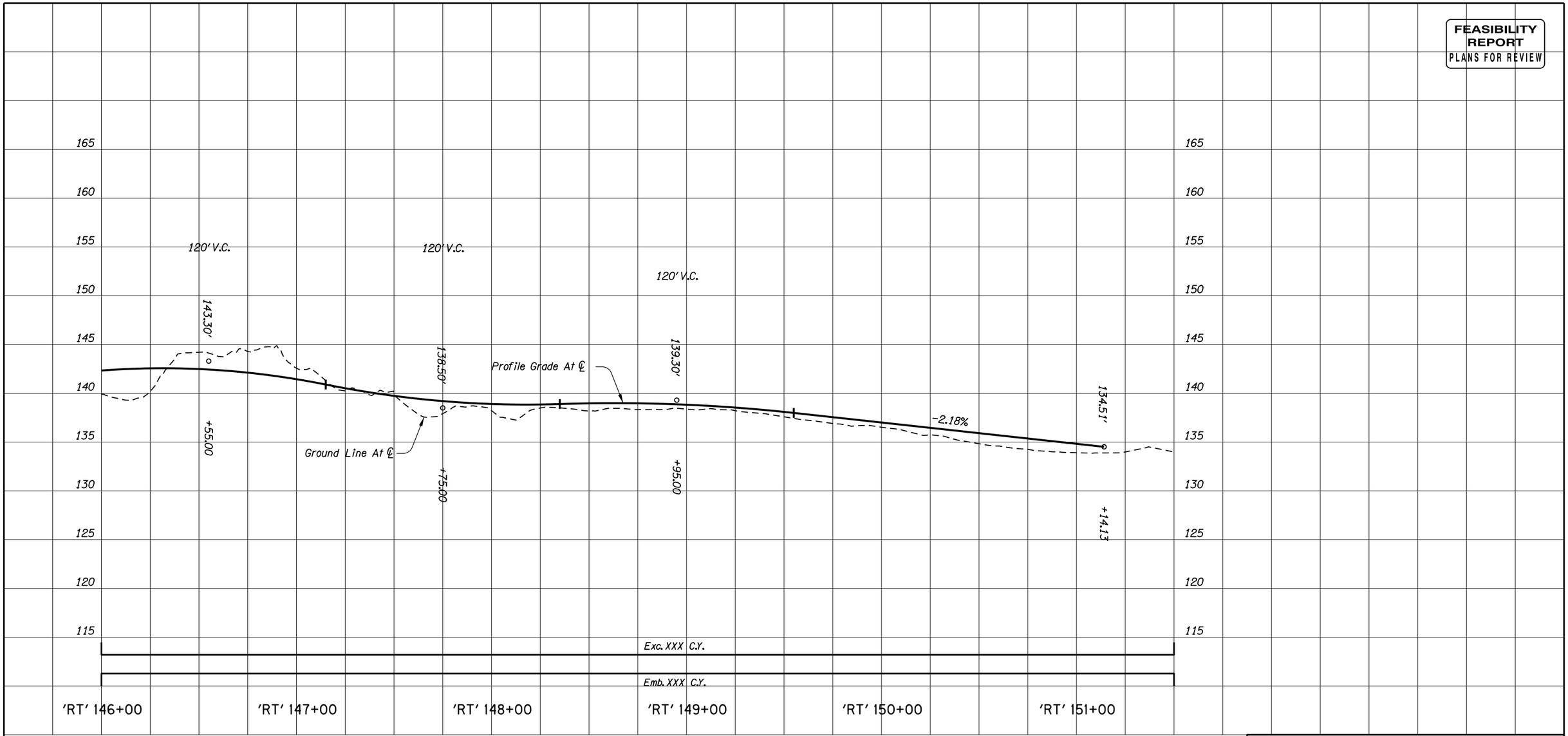
Reviewed By - K. Thomas
Designed By - S. Daleo
Drafted By - M. Wainscott

'RT' LINE GENERAL CONSTRUCTION & DRAINAGE

SHEET NO. 32A

FEASIBILITY REPORT
PLANS FOR REVIEW

ROADWAY



0 25 50 75
Horizontal Scale In Feet

0 2.5 5 7.5
Vertical Scale In Feet

REVIEW COPY ONLY

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PORTLAND, OR 97201-4953
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THE DALLES RIVERFRONT TRAIL
WASCO COUNTY

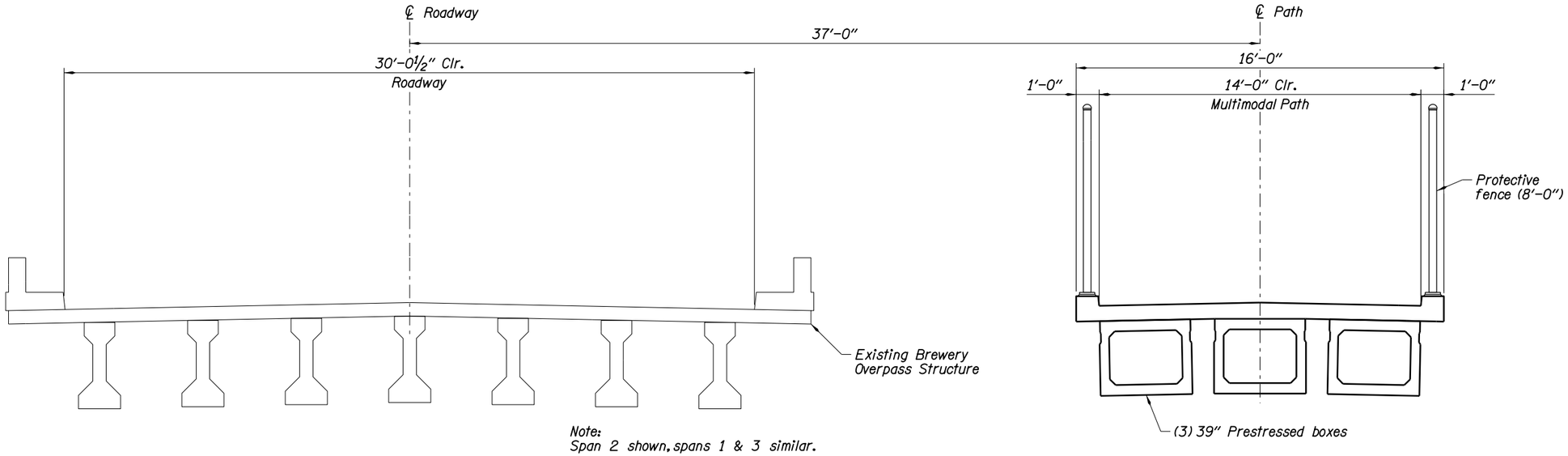
Reviewed By -
Designed By - S. Daleo
Drafted By - M. Wainscott

PROFILE

SHEET NO. 32B

17890pp32B.dlv

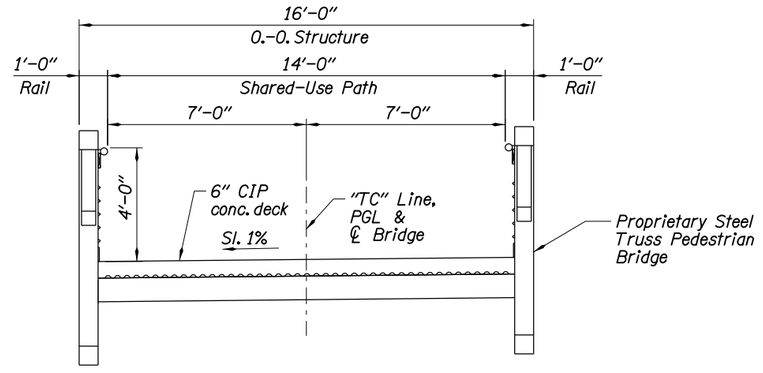
PW: 439154: $FILENAME 15-MAR-2017 11:41 $$$$username$$$$



Note:
Span 2 shown, spans 1 & 3 similar.

TYPICAL SECTION

Scale : ⅜″=1′–0″



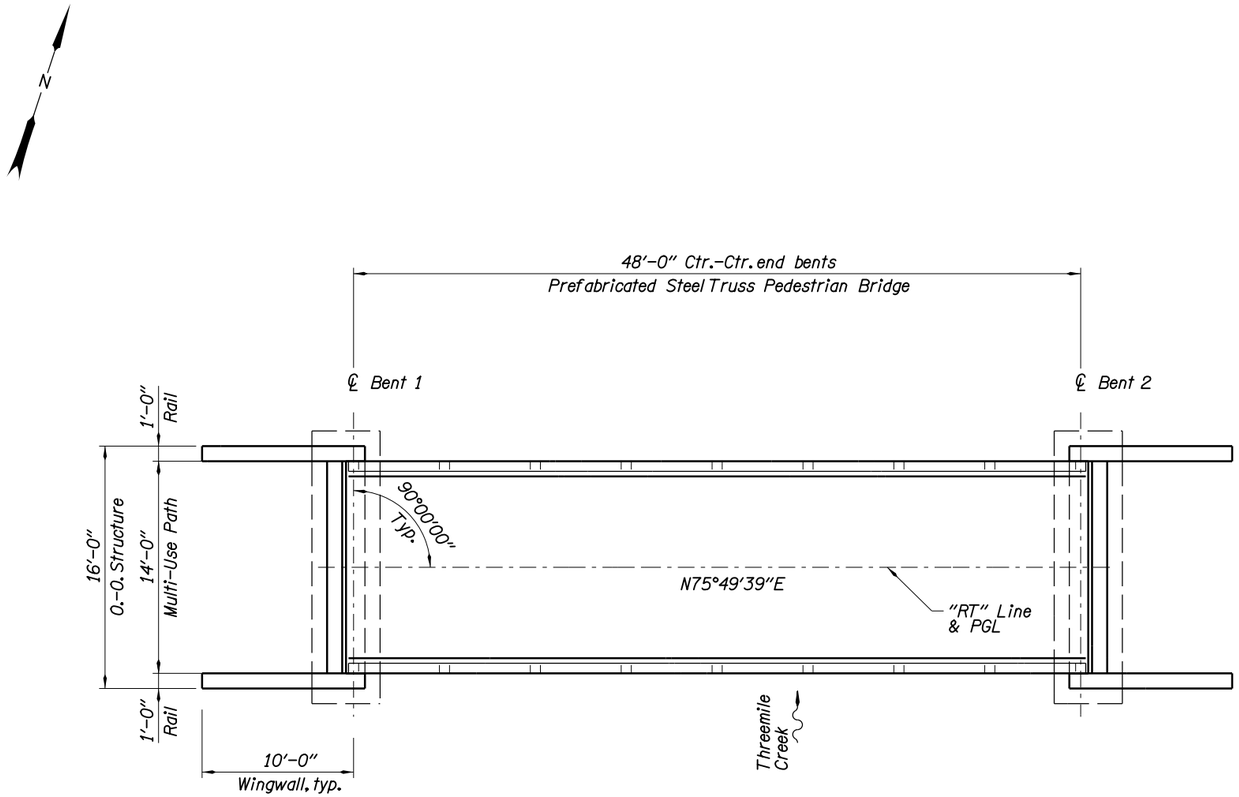
PREFABRICATED TRUSS ALTERNATIVE

Scale : ⅜″=1′–0″

THE DALLES RIVERFRONT TRAIL
MARINA SEGMENT
BREWERY OVERPASS ROAD STRUCTURE WIDENING
SECTIONS

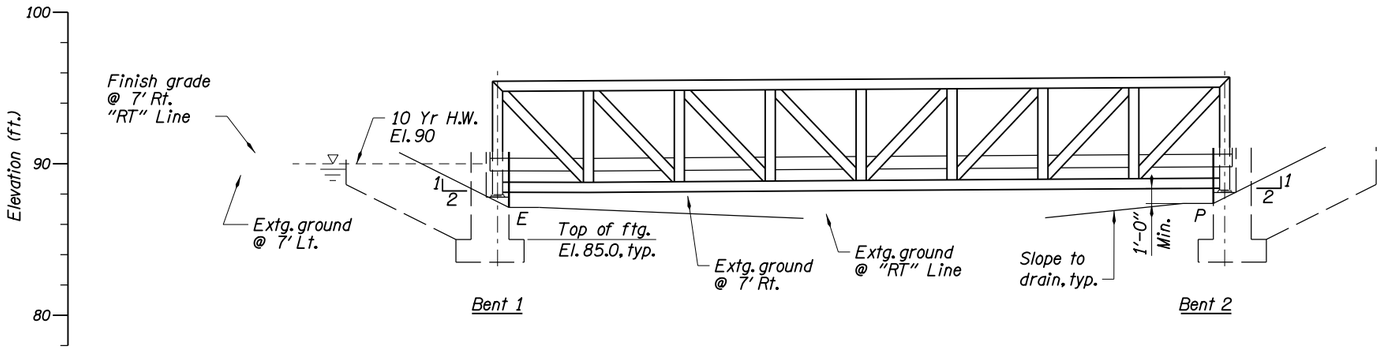
CH2MHILL

FILENAME: $FILENAME PLOT DATE: 14-MAR-2017 PLOT TIME: 13:33



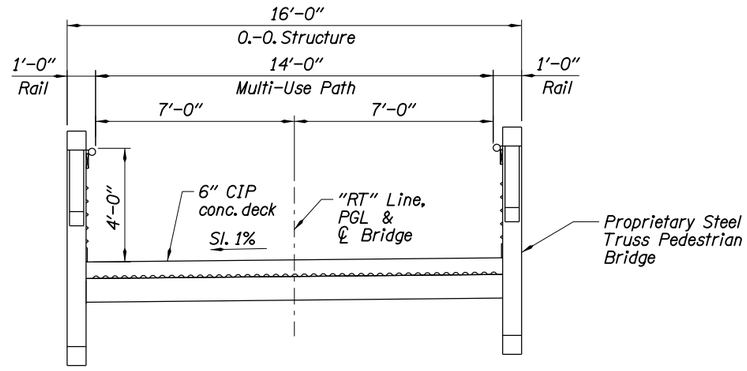
PLAN

Scale : 1" = 5'-0"



ELEVATION

Scale : 1" = 5'-0"



TYPICAL SECTION

Scale : 3/8"=1'-0"

THE DALLES RIVERFRONT TRAIL
MARINA SEGMENT
THREEMILE CREEK BRIDGE
PLAN & ELEVATION

CH2MHILL

FILENAME: $FILENAME
PLOT DATE: 14-MAR-2017
PLOT TIME: 15:40

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*****

APPENDIX B

Preliminary Cost Estimate

PRELIMINARY - COST ESTIMATE - 2015 Items

OREGON STATE HIGHWAY DIVISION - ROADWAY ENGINEERING

SECTION				COUNTY	
Marina Parking Area				Wasco	
KEY NUMBER	KIND OF WORK	LENGTH	DATE	DESIGNER	
17890	Sidewalk, Striping	0.19	3/15/17	Sharon Daleo	

ITEM NUMBER	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
MOBILIZATION AND TRAFFIC CONTROL					
0210-0100000A	MOBILIZATION	LS	All	10.00%	$18,662.62
0280-0100000A	EROSION CONTROL	LS	All	3.00%	$5,332.18
See Traffic Control Estimate, without Mob. And E&C.				2.00%	$3,554.78
ROADWORK					
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	All	3.00%	$5,176.87
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	All	3.00%	$5,008.61
0320-0100000R	CLEARING AND GRUBBING	ACRE	0.2	$3,000.00	$600.00
0330-0123000K	EMBANKMENT IN PLACE	CUYD	184	$20.00	$3,680.00
WALLS					
0599-9Z90000J	RETAINING WALL, GABION	SQFT	2,552	$35.00	$89,320.00
BASES					
0640-0100000M	AGGREGATE BASE	TON	95	$27.00	$2,575.76
WEARING SURFACES					
0759-0110000F	CONCRETE CURBS, STANDARD CURB	FOOT	220	$34.00	$7,480.00
0759-0153000E	CONCRETE SIDEWALK RAMPS	EACH	3	$2,550.00	$7,650.00
0759-0128000J	CONCRETE WALKS	SQYD	4,000	$6.20	$24,800.00
PERMANENT TRAFFIC CONTROL AND GUIDANCE DEVICES					
0587-0127000A	PEDESTRIAN RAIL	FOOT	600	$45.00	$27,000.00
XXXXXXXXXXX	PAVEMENT LEGEND, TYPE B-HS: SHARROW	EACH	12	$325.00	$3,900.00
0867-0145100J	PAVEMENT BAR, TYPE B-HS	SQFT	60	$8.00	$480.00
0860-0200000F	LONGITUDINAL PAVEMENT MARKINGS - PAINT	FOOT	340	$0.20	$68.00
RIGHT-OF-WAY DEVELOPMENT AND CONTROL					
	Right-of-Way Acquisition and Easement				$0.00
SUBTOTAL, Construction Items					**$205,288.82**
	CONSTRUCTION ENGINEERING, for all work listed			15.0%	$30,793.32
	UTILITIES, for all work listed			5.0%	$10,264.44
	CONTINGENCIES, for all work listed			30.0%	$61,586.65
TOTAL CONSTRUCTION COST					**$307,933.23**

PRELIMINARY - COST ESTIMATE - 2015 Items

OREGON STATE HIGHWAY DIVISION - ROADWAY ENGINEERING

SECTION				COUNTY	
Park Alternative				**Wasco**	
KEY NUMBER	KIND OF WORK	LENGTH	DATE	DESIGNER	
17890	**Path, Walls, Tunnel**	**0.24**	**3/15/17**	**Sharon Daleo**	

ITEM NUMBER	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
MOBILIZATION AND TRAFFIC CONTROL					
0210-0100000A	MOBILIZATION	LS	All	10.00%	$252,588.21
0280-0100000A	EROSION CONTROL	LS	All	3.00%	$73,569.38
ROADWORK					
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	All	3.00%	$71,426.58
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	All	3.00%	$69,302.51
0320-0100000R	CLEARING AND GRUBBING	ACRE	0.5	$3,000.00	$1,500.00
0330-0105000K	GENERAL EXCAVATION	CUYD	1,422	$18.00	$25,596.00
0330-0126000K	STONE EMBANKMENT	CUYD	259	$28.00	$7,259.26
0350-0105000J	SUBGRADE GEOTEXTILE	SQYD	1,565	$1.00	$1,565.33
DRAINAGE AND SEWERS					
0445-010012AF	12 INCH CULVERT PIPE, 5 FT DEPTH	FOOT	30	$50.00	$1,500.00
WALLS					
XXXXXXXXXXX	RETAINING WALL, SOLDIER PILE	SQFT	4,689	$120.00	$562,710.00
XXXXXXXXXXX	ANCHORED MESH RETAINING SYSTEM	SQFT	2,606	$30.00	$78,180.00
BRIDGES					
Tunnel Estimate					$1,576,000.00
BASES					
0640-0100000M	AGGREGATE BASE	TON	507	$27.00	$13,682.97
WEARING SURFACES					
0730-0100000M	EMULSIFIED ASPHALT FOR TACK COAT	TON	0	$210.00	$47.43
0745-0301000M	LEVEL 3, 3/4 INCH ACP	TON	281	$52.00	$14,600.65
0745-0620000M	PG 64-22 ASPHALT IN ACP	TON	17	$170.00	$2,863.97
0759-0153000E	CONCRETE SIDEWALK RAMPS	EACH	3	$2,550.00	$7,650.00
PERMANENT TRAFFIC CONTROL AND GUIDANCE DEVICES					
0587-0127000A	PEDESTRIAN RAIL	FOOT	447	$40.00	$17,880.00
0867-0145100J	PAVEMENT BAR, TYPE B-HS	SQFT	60	$8.00	$480.00
0860-0200000F	LONGITUDINAL PAVEMENT MARKINGS - PAINT	FOOT	340	$0.20	$68.00
RIGHT-OF-WAY DEVELOPMENT AND CONTROL					
	Right-of-Way Acquisition and Easement				$0.00
SUBTOTAL, Construction Items					**$2,778,470.30**
	CONSTRUCTION ENGINEERING, for all work listed			15.0%	$416,770.54
	UTILITIES, for all work listed			5.0%	$138,923.51
	CONTINGENCIES, for all work listed			30.0%	$833,541.09
TOTAL CONSTRUCTION COST					**$4,167,705.44**

PRELIMINARY - COST ESTIMATE - 2015 Items

OREGON STATE HIGHWAY DIVISION - ROADWAY ENGINEERING

SECTION				COUNTY	
City Center Interchange to Threemile Creek				Wasco	
KEY NUMBER	KIND OF WORK	LENGTH	DATE	DESIGNER	
17890	Trail construction, bridge, walls, stormwater treatment	0.12	3/15/17	Sharon Daleo	

ITEM NUMBER	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
MOBILIZATION AND TRAFFIC CONTROL					
0210-0100000A	MOBILIZATION	LS	All	10.00%	$99,962.26
0280-0100000A	EROSION CONTROL	LS	All	3.00%	$29,988.68
Traffic Control Estimate, without Mob.				2.00%	$19,992.45
ROADWORK					
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	All	3.00%	$29,115.22
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	All	3.00%	$28,249.73
0320-0100000R	CLEARING AND GRUBBING	ACRE	0.2	$3,000.00	$600.00
0330-0123000K	EMBANKMENT IN PLACE	CUYD	2,012	$20.00	$40,240.00
0330-0126000K	STONE EMBANKMENT	CUYD	448	$28.00	$12,545.56
0350-0105000J	SUBGRADE GEOTEXTILE	SQYD	476	$1.00	$476.00
WALLS					
XXXXXXXXXXX	RETAINING WALL, SOLDIER PILE	SQFT	1,038	$120.00	$124,500.00
BRIDGES					
Standalone, 3-Span Steel Structure					$730,000.00
BASES					
0640-0100000M	AGGREGATE BASE	TON	154	$27.00	$4,160.84
WEARING SURFACES					
0730-0100000M	EMULSIFIED ASPHALT FOR TACK COAT	TON	0	$210.00	$14.42
0745-0301000M	LEVEL 3, 3/4 INCH ACP	TON	85	$52.00	$4,439.89
0745-0620000M	PG 64-22 ASPHALT IN ACP	TON	5	$170.00	$870.90
0759-0153000E	CONCRETE SIDEWALK RAMPS	EACH	5	$2,550.00	$12,750.00
PERMANENT TRAFFIC CONTROL AND GUIDANCE DEVICES					
0587-0127000A	PEDESTRIAN RAIL	FOOT	270	$40.00	$10,800.00
0815-0100000E	BOLLARDS	EACH	1	$500.00	$500.00
0940-0124000J	TYPE "W1" SIGNS IN PLACE	SQFT	9	$40.00	$360.00
SUBTOTAL, Construction Items					**$1,149,565.94**
	CONSTRUCTION ENGINEERING, for all work listed			15.0%	$172,434.89
	UTILITIES, for all work listed			5.0%	$57,478.30
	CONTINGENCIES, for all work listed			30.0%	$344,869.78
TOTAL CONSTRUCTION COST					**$1,724,348.90**

PRELIMINARY - COST ESTIMATE - 2015 Items

OREGON STATE HIGHWAY DIVISION - ROADWAY ENGINEERING

SECTION				COUNTY	
City Center Interchange to Threemile Creek				Wasco	
KEY NUMBER	KIND OF WORK	LENGTH	DATE	DESIGNER	
17890	Trail construction, bridge, walls, stormwater treatment	1.27	3/15/17	Sharon Daleo	

ITEM NUMBER	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
MOBILIZATION AND TRAFFIC CONTROL					
0210-0100000A	MOBILIZATION	LS	All	10.00%	$200,864.12
0280-0100000A	EROSION CONTROL	LS	All	3.00%	$60,259.24
Traffic Control Estimate, without Mob.				2.00%	$40,172.82
ROADWORK					
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	All	3.00%	$58,504.11
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	All	3.00%	$56,459.33
0320-0100000R	CLEARING AND GRUBBING	ACRE	3.9	$3,000.00	$11,700.00
0330-0123000K	EMBANKMENT IN PLACE	CUYD	5,222	$20.00	$104,440.00
0330-0126000K	STONE EMBANKMENT	CUYD	8,911	$28.00	$249,498.15
0330-0131000K	EXTRA FOR SELECTED GRANULAR MATERIAL	CUYD	6,944	$35.00	$243,040.00
0350-0100000J	DRAINAGE GEOTEXTILE	SQYD	28,600	$1.50	$42,900.00
0350-0105000J	SUBGRADE GEOTEXTILE	SQYD	9,343	$1.00	$9,342.67
DRAINAGE AND SEWERS					
XXXXXXXXXXX	MEDIA FILTER STRIP	FOOT	4,950	$30.00	$148,500.00
WALLS					
0599-9Z90000J	RETAINING WALL, GABION	SQFT	792	$35.00	$27,720.00
XXXXXXXXXXX	RETAINING WALL, SOLDIER PILE	SQFT	2,613	$120.00	$313,500.00
BRIDGES					
Bridge					$207,000.00
BASES					
0640-0100000M	AGGREGATE BASE	TON	3,025	$27.00	$81,666.59
WEARING SURFACES					
0730-0100000M	EMULSIFIED ASPHALT FOR TACK COAT	TON	1	$210.00	$283.09
0745-0301000M	LEVEL 3, 3/4 INCH ACP	TON	1,676	$52.00	$87,143.72
0745-0620000M	PG 64-22 ASPHALT IN ACP	TON	101	$170.00	$17,093.58
PERMANENT TRAFFIC CONTROL AND GUIDANCE DEVICES					
0587-0127000A	PEDESTRIAN RAIL	FOOT	2,305	$40.00	$92,200.00
0810-0106000F	GUARDRAIL, TYPE 3 WEATHERIZED	FOOT	3,953	$50.00	$197,650.00
0930-0104000A	MONOTUBE CANTILEVER SIGN STRUCTURES	LS	1	$60,000.00	$60,000.00
SUBTOTAL, Construction Items					**$2,309,937.43**
	CONSTRUCTION ENGINEERING, for all work listed			15.0%	$346,490.61
	UTILITIES, for all work listed			5.0%	$115,496.87
	CONTINGENCIES, for all work listed			30.0%	$692,981.23
TOTAL CONSTRUCTION COST					**$3,464,906.14**

PRELIMINARY - COST ESTIMATE - 2015 Items

OREGON STATE HIGHWAY DIVISION - ROADWAY ENGINEERING

SECTION				COUNTY	
Threemile Creek to Bret Clodfelter				**Wasco**	
KEY NUMBER	KIND OF WORK	LENGTH	DATE	DESIGNER	
17890	**Trail construction, walls, stormwater treatment**	**0.7**	**3/15/17**	**Sharon Daleo**	
MOBILIZATION AND TRAFFIC CONTROL					
0210-0100000A	MOBILIZATION	LS	All	10.00%	$108,885.16
0280-0100000A	EROSION CONTROL	LS	All	3.00%	$32,665.55
Traffic Control Estimate, without Mob.				2.00%	$21,777.03
ROADWORK					
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	All	3.00%	$31,714.12
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	All	3.00%	$30,545.75
0320-0100000R	CLEARING AND GRUBBING	ACRE	2.8	$3,000.00	$8,400.00
0330-0123000K	EMBANKMENT IN PLACE	CUYD	5,129	$20.00	$102,580.00
0330-0126000K	STONE EMBANKMENT	CUYD	11,162	$28.00	$312,539.63
0330-0131000K	EXTRA FOR SELECTED GRANULAR MATERIAL	CUYD	2,174	$35.00	$76,090.00
0350-0100000J	DRAINAGE GEOTEXTILE	SQYD	8,956	$1.50	$13,434.00
0350-0105000J	SUBGRADE GEOTEXTILE	SQYD	4,593	$1.00	$4,592.89
DRAINAGE AND SEWERS					
XXXXXXXXXXX	MEDIA FILTER STRIP	FOOT	1,550	$30.00	$46,500.00
WALLS					
0599-9Z90000J	RETAINING WALL, GABION	SQFT	417	$35.00	$14,595.00
XXXXXXXXXXX	RETAINING WALL, SOLDIER PILE	SQFT	2,438	$120.00	$292,530.00
BASES					
0640-0100000M	AGGREGATE BASE	TON	1,487	$27.00	$40,147.59
WEARING SURFACES					
0730-0100000M	EMULSIFIED ASPHALT FOR TACK COAT	TON	1	$210.00	$139.17
0745-0301000M	LEVEL 3, 3/4 INCH ACP	TON	824	$52.00	$42,840.17
0745-0620000M	PG 64-22 ASPHALT IN ACP	TON	49	$170.00	$8,403.26
PERMANENT TRAFFIC CONTROL AND GUIDANCE DEVICES					
0587-0127000A	PEDESTRIAN RAIL	FOOT	1,595	$40.00	$63,800.00
SUBTOTAL, Construction Items					**$1,252,179.33**
	CONSTRUCTION ENGINEERING, for all work listed			15.0%	$187,826.90
	UTILITIES, for all work listed			5.0%	$62,608.97
	CONTINGENCIES, for all work listed			30.0%	$375,653.80
TOTAL CONSTRUCTION COST					**$1,878,268.99**

PRELIMINARY - COST ESTIMATE - 2015 Items

OREGON STATE HIGHWAY DIVISION - ROADWAY ENGINEERING

SECTION				COUNTY	
Bret Clodfelter				**Wasco**	
KEY NUMBER	KIND OF WORK	LENGTH	DATE	DESIGNER	
17890	**Trail construction, bridge, walls, stormwater treatment**	**0.33**	**3/15/17**	**Sharon Daleo**	
MOBILIZATION AND TRAFFIC CONTROL					
0210-0100000A	MOBILIZATION	LS	All	10.00%	$10,129.45
0280-0100000A	EROSION CONTROL	LS	All	3.00%	$3,038.84
Traffic Control Estimate, without Mob.				2.00%	$2,025.89
ROADWORK					
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	All	3.00%	$2,950.33
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	All	3.00%	$2,759.54
0320-0100000R	CLEARING AND GRUBBING	ACRE	1.2	$3,000.00	$3,600.00
0330-0123000K	EMBANKMENT IN PLACE	CUYD	1,726	$20.00	$34,520.00
0350-0105000J	SUBGRADE GEOTEXTILE	SQYD	2,543	$1.00	$2,542.67
DRAINAGE AND SEWERS					
0445-010012AF	12 INCH CULVERT PIPE, 5 FT DEPTH	FOOT	85	$50.00	$4,250.00
BASES					
0640-0100000M	AGGREGATE BASE	TON	823	$27.00	$22,226.09
WEARING SURFACES					
0730-0100000M	EMULSIFIED ASPHALT FOR TACK COAT	TON	0	$210.00	$77.05
0745-0301000M	LEVEL 3, 3/4 INCH ACP	TON	456	$52.00	$23,716.72
0745-0620000M	PG 64-22 ASPHALT IN ACP	TON	27	$170.00	$4,652.13
PERMANENT TRAFFIC CONTROL AND GUIDANCE DEVICES					
RIGHT-OF-WAY DEVELOPMENT AND CONTROL					
	USACE Permanent Easement Coordination/Review				$20,000.00
	Right-of-Way	SQFT	38845	$0.90	$34,960.50
SUBTOTAL, Construction Items					**$116,488.69**
	CONSTRUCTION ENGINEERING, for all work listed			15.0%	$17,473.30
	UTILITIES, for all work listed			5.0%	$5,824.43
	CONTINGENCIES, for all work listed			30.0%	$34,946.61
TOTAL CONSTRUCTION COST					**$174,733.03**

APPENDIX C

Stormwater Management Plan

BMP Feasibility Study – The Dalles Riverfront Trail

PREPARED FOR:	Sharon Daleo/CH2M
PREPARED BY:	David Baker/CH2M
DATE:	February 10, 2017
PROJECT NUMBER:	680698

This technical memorandum identifies feasible alternative best management practice (BMP) facilities for a portion of The Dalles Riverfront Trail Project. The complete project consists of the design and construction of a bicycle and pedestrian path beginning from the Riverfront Park parking area and extends for approximately 2.7 miles to a point approximately 0.75 miles east of The US 197 interchange. The project consists of 2 segments; The City Center Interchange to 3 Mile Creek Segment and the 3 Mile Creek to Bret Clodfelter Way Segment.

Existing Conditions

The current typical cross-section of I-84 through the project area is crowned at the median and includes two travel lanes and paved shoulders on each side. I-84 is primarily on a fill slope.

In the City Center Interchange to 3 Mile Creek Segment Eastbound I-84 is superelevated to the north for approximately 2500 ft. east of the Brewery Overpass Road Interchange and roadway storm drainage sheetflows towards the north, through scuppered barrier and across the Westbound lanes. Roadway storm drainage to the east of the superelevationed I-84 section sheetflows south to the shoulder and is collected within the roadside ditch between the fill slope and the adjacent railroad access road. This ditch conveys flow to various discharge locations outside of the project limits. The existing I-84 profile is flat or very nearly flat. It is assumed that interchange ramps shed to the south as well.

In the 3 Mile Creek to Bret Clodfelter Way Segment a portion of I-84 is superelevated and sheds to the north. It is assumed that interchange ramps shed to the south as well.

Proposed Conditions

The proposed project includes the design and construction of a bicycle and pedestrian path beginning from the Riverfront Park parking area and extends for approximately 2.7 miles to a point 0.75 miles east of The US 197 interchange.

A portion of the trail alignment is located along the southern edge of I-84 between the Brewery Overpass Rd interchange and the US 197 interchange. Along this portion, the proposed trail alignment comes in close proximity to the southern edge of I-84. The proposed cross section includes the addition of safety barrier along the shoulder of the eastbound lanes and the proposed trail would be separated from the edge of roadway.

Existing drainage patterns are proposed to be maintained. Stormwater runoff from I-84 will continue to sheetflow toward the north in the superelevated section and to the south in the tangent section. Stormwater draining towards the trail will be conveyed through stormwater quality treatment and under the proposed trail via highly permeable substrate and into the existing roadside ditch between the fill slope and the adjacent access road.

Water Quality

DEQ regulations require that stormwater originating from I-84 be kept separated from trail stormwater prior to stormwater quality treatment. Several stormwater treatment BMP's were evaluated for their feasibility to treat, filtrate and convey I-84 surface runoff flows through the proposed trail prism.

BMP feasibility relies on preliminary hydrologic calculations to identify the surface water runoff peak flows and volumes. The ODOT Hydraulics Manual was utilized for guidance regarding hydrologic criteria and methodology. Preliminary sizing of the BMP alternatives was performed using the 2-year 24-hour storm event per ODOT Hydraulics Manual Chapter 14.10.2. The rational method was used to general peak flows and followed the ODOT Hydraulics Manual Chapter 7 with rainfall data from Chapter 7 Appendix A.

Stormwater runoff from larger events is assumed to overtop the proposed trail and maintain existing drainage patterns.

BMP Alternatives

The following text illustrates the proposed BMP's that were considered as well as the identification of a preferred BMP.

Vegetated Filter Strip

Vegetated filter strips rely on maintaining sheet flow across vegetated and permeable ground which maximizes stormwater contact with soil and vegetation. They consist of the right-of-way parallel to the road, with a relatively flat cross slope to maintain stormwater sheet flow over the entire width of the strip. A vegetated filter strip removes pollutants from pavement runoff by means of filtration through vegetation, media filtration and infiltration. Treatment mechanisms include physical trapping of particles, density separation (settling) in hydraulic dead zones and absorption, and to a lesser extent biological uptake and decomposition.

Vegetated filter strips have general siting requirements related to design criteria as well as mechanical criteria specific to filter strips that include:

- The site must be of sufficient size to accommodate filter strips.
  - 12 feet minimum separation from edge of roadway.
  - 5 feet minimum filter strip width.
- Sites where climate conditions promote the growth and survivability of vegetation.
- Receiving water from 75 feet wide pavement section maximum.
  - Lateral slope of pavement section 5% maximum
  - Longitudinal slope of pavement section 4% maximum.
- Filter strips must have slope of 1% minimum and 15% maximum.

Preliminary analysis has identified a vegetated filter strip width requirement of approximately 14 feet (based on Table 1 in ODOT Hydraulics Manual Chapter 14 Appendix B) to adequately treat the stormwater flow generated from I-84. Because there is limited room between the trail and the existing railroad access road, the required width disqualifies this BMP from consideration for use.

Media Filter Drain (Bioslope)

Media Filter Drains (MFD) are flow-through stormwater treatment facilities incorporated into roadside embankments and placed between pavement and a downstream conveyance system. These facilities utilize physical straining or filtration, sorption, carbonate precipitation, vegetative uptake and microbial degradation to provide stormwater treatment.

MFD's have general siting requirements related to design criteria as well as mechanical criteria specific to MFD's that include:

- The site must be of sufficient size to accommodate MFD's.
  - 4 feet minimum separation from edge of roadway which includes a mandatory 3 feet minimum width vegetative filter strip.
  - 2 feet minimum MFD width.
- Sites where climate conditions promote the growth and survivability of vegetation.
- Lateral slope of the roadside shoulder must be 4:1 minimum. Less is preferred.
- Longitudinal slope of the roadside shoulder should be 5% maximum.

Preliminary sizing calculations for proposed MFD's have identified the need for a 3 feet wide MFD section to adequately treat the stormwater flow generated from I-84. The total width of 7' creates a feasible alternative that meets the physical constraints of the trail location. MFD's represent a feasible BMP to be included where possible.

Figure 1 illustrates an application of an MFD cross-section within relevant portions of the project. Porous material under the proposed trail surface would convey stormwater under the trail with sheetflow discharge on the south fill slope. These flows would then be conveyed via the existing roadside ditches, maintaining existing flow patterns.

Cost

Stormwater treatment and conveyance feature costs were estimated using average unit bid prices from Oregon and Washington. Cost estimate is shown in Table 1.

Table 1
The Dalles Riverfront Trail
Drainage Item Cost Estimate

Item	Unit	Unit Cost	City Center Interchange to 3 Mile Cr. Segment	Segment Cost	3 Mile Cr. to Bret Clodfelter Way Segment	Segment Cost	Total Quantity	Total Cost
Media Filter Drain	LF	$30.00	4950	$148,500	1550	46,500	6500	$195,000
Granular Drain Backfill Material	CY	$35.00	6944	$243,031	2174	76,101	9118	$319,132
Drainage Geotextile	SY	$1.50	28600	$42,900	8956	13,433	37556	$56,333
Total Cost				$434,431		136,034		**$570,465**

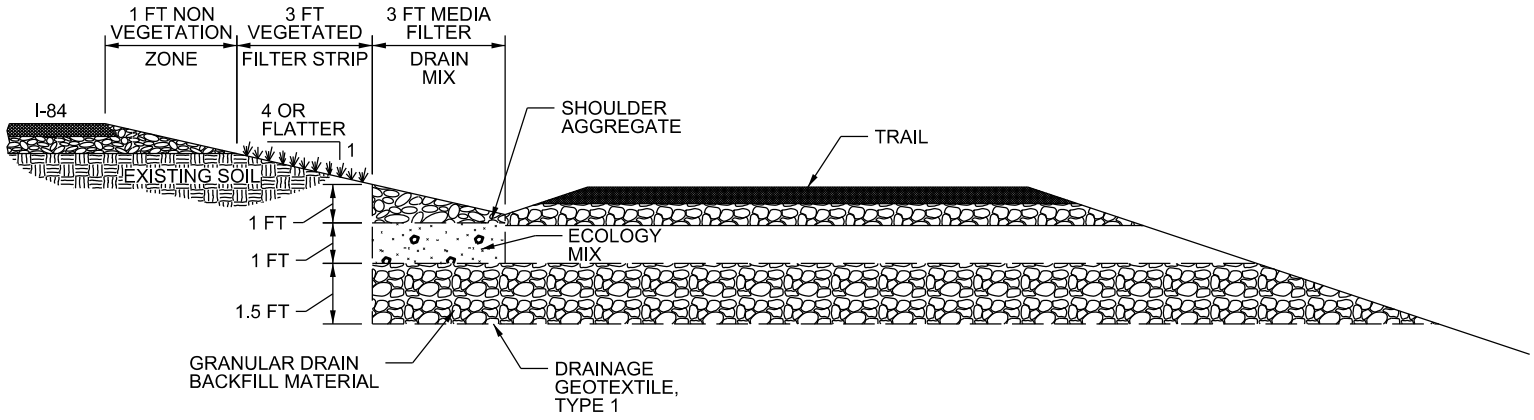

FIGURE 1
MEDIA FILTER DRAIN

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