



TECHNICAL MEMORANDUM

TO: John Greydanus, City of Monroe
FROM: Mike Miotke, DOWL
DATE: 01/18/24
PROJECT: Monroe Pedestrian Bridge Analysis

INTRODUCTION

The City of Monroe (City) proposes to build a pedestrian path to connect downtown Monroe to the park east of the river. To carry the path over the Long Tom River, a pedestrian bridge is needed. In addition to providing pedestrian access across the river, a new bridge can support a new sewer main and water main. This memo addresses the preliminary design of this pedestrian bridge.

The recommendations contained in this memo are based on results of preliminary engineering studies conducted by DOWL and discussions with the City.

Currently, DOWL is only responsible for the concept-level design of the bridge. All other tasks related to this project will be performed at a later date when funding becomes available. This memo focuses solely on the conceptual design of the structure.

STRUCTURE DESIGN CRITERIA

Preliminary bridge design for this project is in accordance with applicable portions of the American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications, 9th Edition, 2020; and AASHTO LRFD Guide Specifications for Design of Pedestrian Bridges, 2nd Edition, 2009.

The bridge will be designed for a 90 pounds-per-square-foot pedestrian load and an H10 maintenance vehicle at the Strength I and applicable service limit states. The bridge will be designed for no present wearing surface and 1 inch of future wearing surface on the path. Utility loads will also be included.

Seismic design according to the 3rd edition of AASHTO Guide Specifications for LRFD Seismic Bridge Design will not be performed for preliminary design but is recommended for final design.

BRIDGE TYPE AND DESCRIPTION

The proposed single-span bridge consists of a steel truss superstructure that spans 189 feet (see Appendix 1). A 12-foot-wide path will be provided between the bridge rails which will match the approaching path width. The bridge soffit will sit 1 foot above the 100-year flood elevation. Approach fills are required at both ends of the bridge to raise the soffit above the flood elevation.

The bridge will also accommodate a 10-inch diameter water main and an 8-inch diameter sewer main.

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The proposed bridge deck is a 6-inch thick, cast-in-place high-performance concrete deck with one mat of uncoated reinforcement. Stay-in-place steel deck forms will be used to cast the bridge deck and will be provided with the truss by the manufacturer.

The bridge rails will be 3'-6" tall pedestrian bridge rails that will be provided by the truss manufacturer.

The bridge will be founded on concrete abutments that are supported on drilled shafts at each bridge end. Spread footings were considered for this bridge, but the large amount of excavation and shoring needed to install spread footings on bedrock makes that option cost-prohibitive. Wingwalls will be constructed at each corner of the bridge to retain the approach fill. At each end of the bridge, a 10-foot-long approach slab may be needed to mitigate the differential settlement between the bents and the approach fill.

PERMITTING

The permitting required for the construction of the bridge will depend on the need for in-water work. A wetland delineation report will need to be submitted to the Department of State Lands (DSL) to determine where ordinary highwater (OHW) is located for this site. If construction work for this bridge is located below the OHW, which is anticipated, in water work permits will be required, which can take 12 to 15 months to acquire. In contrast, if the construction work is above the OHW, then permitting requirements are significantly reduced and can be acquired in 6 to 8 months. Both timeframes account for the 4 months needed for the DSL to review the wetland delineation report.

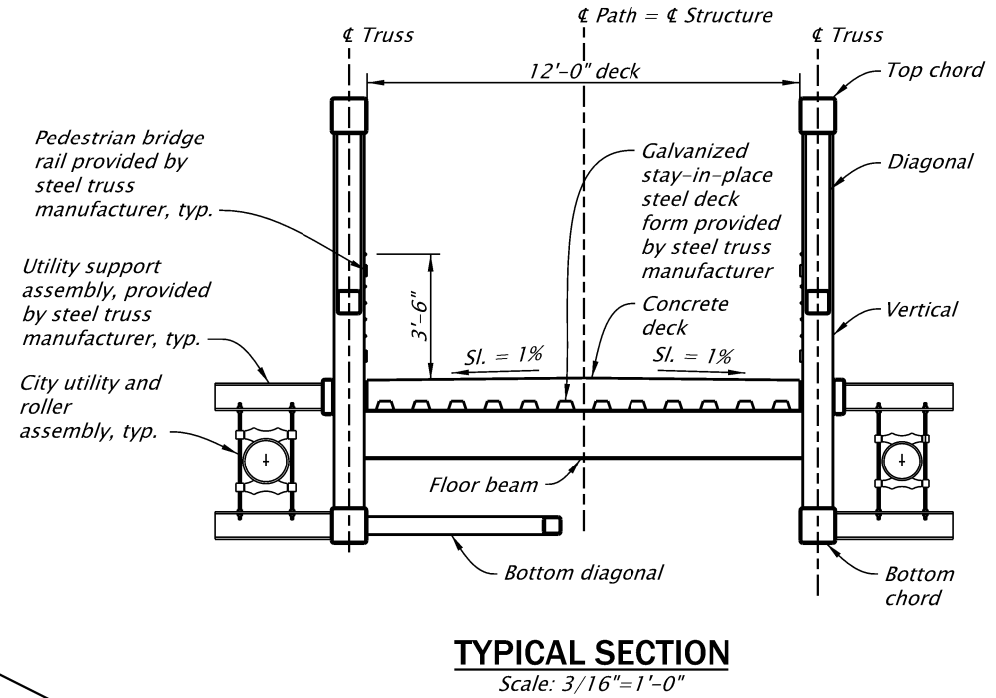
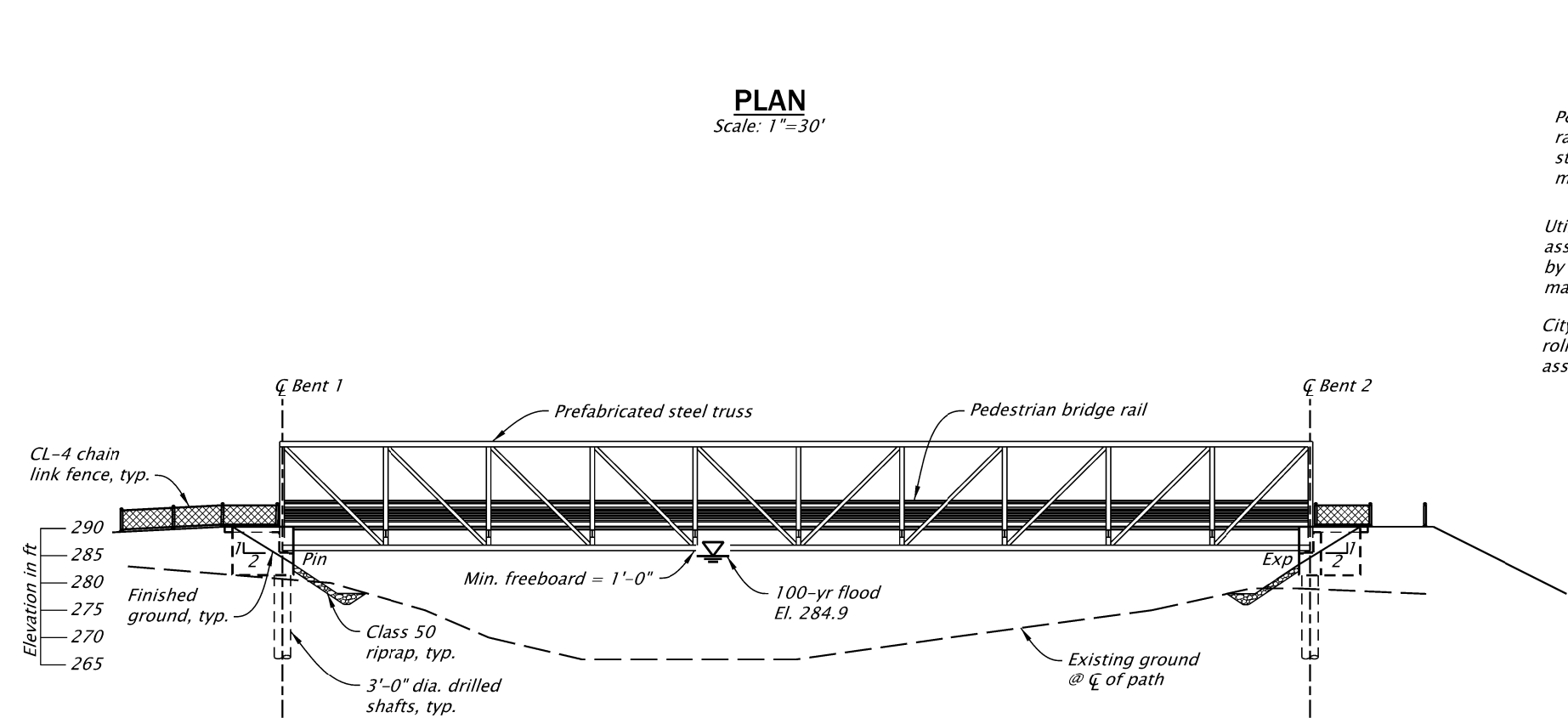
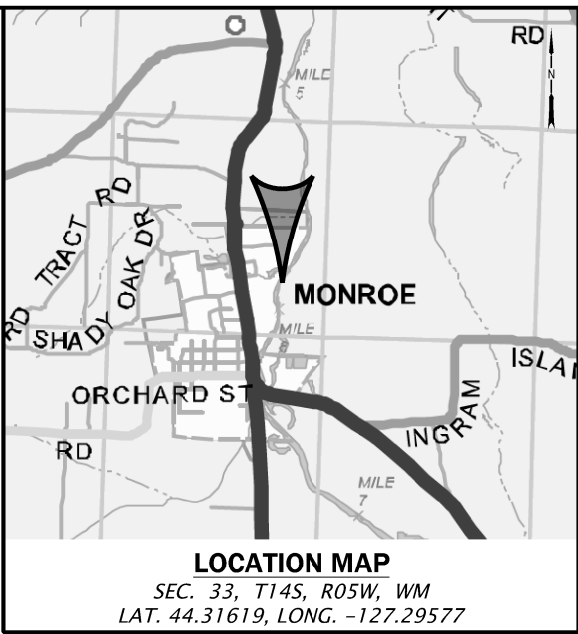
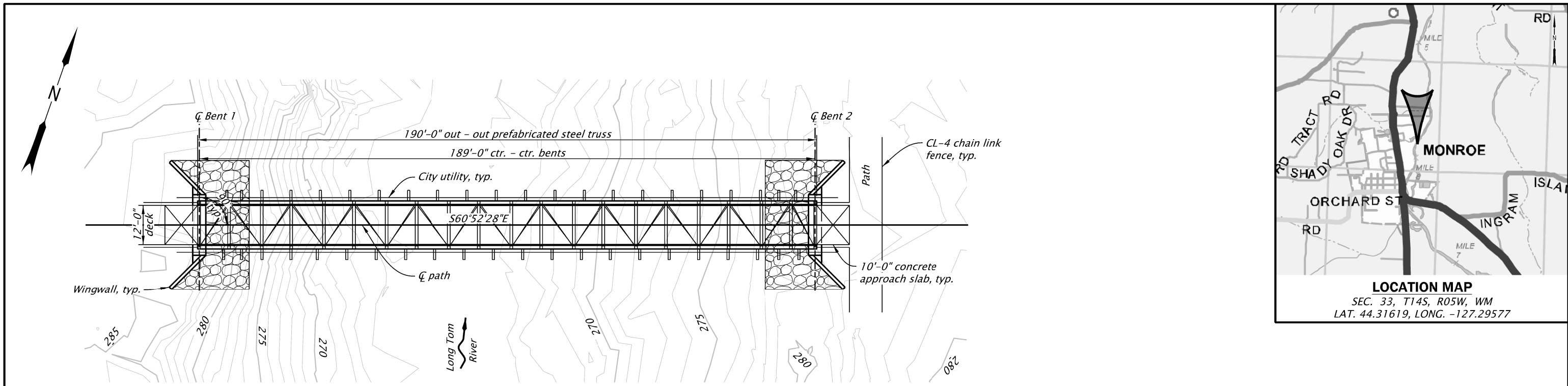
Fill will need to be placed at the abutments to raise the approaches to the bridge. This fill will sit inside the existing floodplain and has the potential to raise flood elevations. The Federal Emergency Management Agency (FEMA) flood hazard area at this site is categorized as Zone A according to the FEMA flood maps. Therefore, a hydraulic analysis is required to verify base flood levels are not expected to increase more than 1 foot.

CONCLUSION

The proposed pedestrian bridge is a prefabricated steel truss structure with a 189-foot span. The bridge will have a cast-in-place concrete deck and will be supported on drilled shafts.

The total estimated cost for the proposed bridge project is \$3,304,000 based on 2023 unit costs (see Appendix 2). This cost estimate includes 10-percent for mobilization, 15-percent for design engineering, 13.5-percent for construction engineering, and 25 percent for contingencies. This cost estimate is an all-inclusive cost estimate that includes costs for temporary features, roadway items, and fencing.

APPENDIX 1: PRELIMINARY P&E



NOTE:
Elevations shown are based on North American Vertical Datum 1988 (NAVD88).

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

PRELIMINARY COPY INFORMATION ONLY	920 Country Club Rd., Ste. 100B Eugene, Oregon 97401 541-683-6090	
	DOWL WWW.DOWL.COM	
	MONROE PEDESTRIAN BRIDGE ANALYSIS	
	ALLIANCE FOR RECREATION AND NATURAL AREAS BENTON COUNTY	
Designer: Jael Wettach-Ogle, PE		Reviewer: Mike Miotke, PE
Drafter: Jake Williams		Checker: Eric E. Bonn, PE
PLAN AND ELEVATION		SHEET NO. JA01

APPENDIX 2: PRELIMINARY COST ESTIMATE

Engineer's Cost Estimate 100% Submittal
Date 01/18/2024

Spec. No.	Item No.	Item	Bid Unit	Est. Unit	Quantity	Unit Price	Total Price	
TEMPORARY FEATURES AND APPURTENANCES								
00210	10	Mobilization	Lump Sum	Lump Sum	1	\$ 160,900.00	\$ 160,900.00	
00221	20	Temporary Protection and Direction of Traffic	Lump Sum	Lump Sum	1	\$ 10,000.00	\$ 10,000.00	
00280	30	Erosion Control	Lump Sum	Lump Sum	1	\$ 46,400.00	\$ 46,400.00	
00290	40	Pollution Control Plan	Lump Sum	Lump Sum	1	\$ 2,000.00	\$ 2,000.00	
00290	50	Work Containment Plan	Lump Sum	Lump Sum	1	\$ 5,000.00	\$ 5,000.00	
ROADWAY								
00305	60	Construction Survey Work	Lump Sum	Lump Sum	1	\$ 39,900.00	\$ 39,900.00	
00320	70	Clearing and Grubbing	Acre	Acre	0.80	\$ 7,500.00	\$ 6,000.00	
00330	80	Embankment in Place	Cu Yd	Cu Yd	3,890	\$ 65.00	\$ 252,850.00	
00350	80	Subgrade Geotextile	Sq Yd	Sq Yd	2,460	\$ 2.00	\$ 4,920.00	
00350	90	Riprap Geotextile, Type 1	Sq Yd	Sq Yd	165	\$ 3.00	\$ 495.00	
00390	100	Loose Riprap, Class 50	Cu Yd	Cu Yd	60	\$ 175.00	\$ 10,500.00	
BRIDGE - MONROE PEDESTRIAN BRIDGE								
00510	110	Granular Wall Backfill	Lump Sum	Cu Yd	128	\$ 130.00	\$ 16,640.00	
00512	120	Furnishing Drilling Equipment	Lump Sum	Lump Sum	1	\$ 80,000.00	\$ 80,000.00	
00512	130	Drilled Shaft Concrete	Lump Sum	Cu Yd	42	\$ 690.00	\$ 28,980.00	
00512	140	Drilled Shaft Reinforcement, Grade 60	Lump Sum	Lb	11,100	\$ 3.00	\$ 33,300.00	
00512	150	CSL Test Access Tubes	Foot	Foot	480	\$ 12.50	\$ 6,000.00	
00512	160	CSL Test	Each	Each	4	\$ 1,800.00	\$ 7,200.00	
00512	170	Drilled Shaft Excavation, 36 Inch Diameter	Foot	Foot	160	\$ 950.00	\$ 152,000.00	
00530	180	Reinforcement, Grade 60	Lump Sum	Lb	32,600	\$ 2.50	\$ 81,500.00	
00540	190	Deck Concrete, Class HPC4500	Lump Sum	Cu Yd	43	\$ 1,500.00	\$ 64,500.00	
00540	200	General Structural Concrete, Class 4000	Lump Sum	Cu Yd	50	\$ 1,200.00	\$ 60,000.00	
00561	210	Prefabricated Steel Truss	Lump Sum	Foot	190	\$ 3,605.00	\$ 684,950.00	
00589	220	Utility Attachment on Structures, 10 Inch Water Line	Lump Sum	Foot	190	\$ 40.00	\$ 7,600.00	
00589	230	Utility Attachment on Structures, 8 Inch Sanitary Force Main	Lump Sum	Foot	190	\$ 40.00	\$ 7,600.00	
RIGHT OF WAY DEVELOPMENT AND CONTROL								
01050	240	CL-4 Chain Link Fence	Foot	Foot	1,300	\$ 70.00	\$ 91,000.00	
							SUB-TOTAL OF ITEMS	\$ 1,860,235.00
							Construction Engineering (13.5%)	\$ 251,131.73
							Subtotal of Biddable Items and CE	\$ 2,111,366.73
							Design Engineering (15%)	\$ 316,705.01
							Construction Contingency (25%)	\$ 527,841.68
							TOTAL	\$ 2,955,913.42