



WYDOT DESIGN GUIDES



Bridge Replacement
Off-System (BROS)

2021

Guide for Bridge Replacement Off-System (BROS) Program

RECONSTRUCTION

INTRODUCTION

This Guide is directed to developing bridge replacement off-system (BROS) projects for bridges owned by cities, towns, and counties, located on non-federal aid roadways open to the public. The Guide outlines Eligibility, Programming, and Engineering.

Eligibility

All bridges owned by local agencies on routes that are classified as local or collector are eligible for this program. The route must be under the jurisdiction of and maintained by a public authority, and open to the public.

A bridge is defined as a structure including supports erected over a depression or an obstruction, such as water, a highway, or a railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than or equal to 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

A bridge must be classified as “poor” per the National Highway Performance Program (NHPP), and be at least 10 years old.

Programming

The local agency submits to the District Engineer a request in writing that a structure be accepted into the BROS program. The request should identify the route, milepost, and Structure Number, and include documentation showing the structure is under the jurisdiction of the local agency and within a dedicated public right-of-way.

The request will be reviewed by the State Bridge Engineer and the local agency will be notified in writing if the bridge is eligible and accepted into the BROS program.

Consideration is given to a fair and equitable distribution of projects throughout the state and is on a first come first serve basis. The current matching fund ratio is 90.49% federal-aid funds and 9.51% local funds.

As part of this program, WYDOT will hold a reconnaissance inspection, publish a reconnaissance report, complete preliminary engineering, design, specifications and contract bid documents, bid advertising and bid award, construction contracting, construction engineering, inspection,

environmental clearances and documents, right-of –way easements and acquisition, and project completion and acceptance.

This work will be completed under two cooperative agreements (COOP), between the department and local agency. The first COOP agreement will be to hold a reconnaissance inspection and write a reconnaissance report. Once the reconnaissance report is signed and published, a second COOP agreement will be initiated. The second COOP agreement will be for preliminary engineering, design, specifications and contract bid documents, bid advertising and bid award, construction contracting, construction engineering, inspection, environmental clearances and documents, right-of –way easements and acquisition, and will be based off the preliminary cost estimate and scope of work shown in the reconnaissance report.

Engineering

Developing a BROS project from early reconnaissance inspection through design and construction shall recognize that funding is limited to the replacement of the bridge and minimal amount of roadway work to facilitate logical touchdown points of the approach roadway. As a result, project scopes and designs should be developed with an understanding of those objectives while exercising good stewardship of resources.

Structure Design:

- Current edition of AASHTO *LRFD Bridge Design Specifications*
- Current edition of AASHTO *Guide Specification for LRFD Seismic Bridge Design, if applicable.*
- WYDOT Bridge Design Manual
- WYDOT Bridge Applications Manual

Live Load:

All new structures shall be designed for HL93 Live Load. For Rehabilitation work, the structure shall be designed for HS20 live load.

Disposition of Existing Structures:

Unless otherwise directed from local agency, all parts of the existing structures shall become property of the contractor. If the local agency desires to keep an existing superstructure, whether agreed upon in MOU process for historical bridges or at local agency request, the superstructure will be removed from substructures and stockpiled at the site. Debris from demolished bridges will be made available to federal, state or local governments for erosion control, bank stabilization, ecosystem restoration or marine habitat creation. The recipient shall bear the costs of processing, delivery, placement, use and shall assume all legal responsibilities for placing the material.

Hydraulic Design:

- WYDOT Operating Policy 18-6, Drainage Design For Highway Systems, dated October 8, 2015

Geotechnical Design:

- Current edition of AASHTO *LRFD Bridge Design Specifications*

Highway and Roadside Geometrics:

- Roadway width – Match the existing roadway width which may include a transition from the required bridge clear roadway width to the existing roadway width at the nearest logical touchdown location
- Bridge clear roadway widths (the 20 year future ADT should be used when determining bridge clear roadway width)
 - o Local Road

<u>Future ADT</u>	<u>Design Speed</u>	<u>Bridge Clear Roadway Width (ft)</u>
ADT $\leq$ 100 ADT	Any	16
100 < ADT $\leq$ 250 ADT	DS $\leq$ 50 MPH	20
100 < ADT $\leq$ 250 ADT	DS > 50 MPH	22
250 < ADT $\leq$ 400 ADT	DS $\leq$ 40 MPH	22
250 < ADT $\leq$ 400 ADT	DS > 40 MPH	26
ADT > 400 ADT	Any	26

- If agricultural or resource recovery vehicles use the structure minimum bridge clear roadway width is 26 ft for any ADT
- o Collector Road
 - Bridge clear roadway width 26 ft or minimum as noted in AASHTO A *Policy on Geometric Design of Highways and Streets*
- Clear zone – Use a nominal 10 ft clear zone for low volume designs. Refer to the current edition of the AASHTO *Roadside Design Guide* for guidance.
- Typically horizontal and vertical alignments, profiles, and sight distance will match existing conditions. When changes are required, refer to:
 - o Current edition of AASHTO *guidelines for Geometric Design of Low-Volume Roads*
 - o Current edition of AASHTO A *Policy On Geometric Design of Highways and Streets*, if applicable
- Guardrail across a structure shall be NCHRP350, Test Level (TL-3), unless, the minimum, Test Level 2 (TL-2) is requested

- Approach guardrail typically consists of a transition section and an end terminal section. If site conditions warrant further analysis and design, reference current edition of *WYDOT Standard Plans* and the *AASHTO Roadside Design Guide*

Pavements:

Roadway surfacing shall match existing surfacing and extend to logical touchdown points of the approach roadway

Environmental Services:

- Follow the National Environmental Policy Act (NEPA)
- Follow the Clean Water Act
- Follow Section 106 of the National Historic Preservation Act of 1966
- Follow Section 4(f) of the U.S. Department of Transportation Act of 1966

Right-of-Way:

WYDOT is responsible for right-of-way and utility clearance. Acquisition of right-of-way or payment for utility adjustments is an eligible expense.

- Follow the Wyoming Relocation Assistance Act and the Uniform Relocation Assistance and Real Property Acquisition Policy Act.
- All needed property for the new bridge must be acquired in the name of the local agency before the project can be bid and constructed.

Detour:

- WYDOT will work with the local agency to determine the best route for a detour, if it is not possible to maintain traffic on the existing bridge, or to close the bridge during construction. A traffic control plan shall be developed to facilitate traffic movement during construction

Advertising and Awarding Contracts:

- Advertise and award projects similar to other federal-aid projects. The local agency must approve final design plans, specifications, and cost estimates prior to advertising for bid, and provide concurrence, in writing, of acceptance of awarding the contract to the apparent low bidder.

Designs will be based on the minimum design values presented in this Guide. The use of other design values, from the referenced WYDOT or AASHTO manuals, are available for use when justified due to higher traffic volumes, higher truck traffic volumes, identified safety concerns including higher frequency or more severe crash types, or other identified highway needs.