

# Draft Alternatives Evaluation Criteria

## *Hwy 47 (Ferry Street) and BNSF Railway Crossing*

*Report Version 3.0*

**Minnesota Department of Transportation  
Metro District**

Prepared by:



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# Introduction

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This report describes the alternatives evaluation criteria for the Trunk Highway (Hwy) 47 and BNSF Railway Crossing Project (SP 0206-81). The Purpose and Need Statement provides the basis for developing criteria for comparative evaluation of alternatives. A summary of the purpose and need for the proposed action is provided below. In addition, evaluation criteria for other transportation considerations and social, economic, and environmental (SEE) considerations have been identified and will be used for comparing alternatives.

## Project Location

The Hwy 47 and BNSF Railway Crossing Project is in the city of Anoka in Anoka County, Minnesota. The Hwy 47 rail crossing is approximately 0.3 miles north of US Highway (US Hwy) 10 and approximately 200 feet west of the Rum River. The Hwy 47 and BNSF Railway crossing is one of the last remaining at-grade highway rail crossings in the area.

Hwy 47 crosses BNSF Railway's two mainline tracks that serve both freight and commuter trains. Figure 1 illustrates the Hwy 47 and BNSF Railway crossing.

**Figure 1. Hwy 47 and BNSF Railway Crossing**



## Brief Summary of Purpose and Need

The purpose and need statement developed for the Hwy 47 and BNSF Railway Crossing Project is documented in a separate report from this evaluation criteria report. The purpose and need for the Hwy 47 and BNSF Railway Crossing Project is summarized below.

### Project Need

MnDOT identified several factors justifying the need for the Hwy 47 and BNSF Railway Crossing Project. The needs have been categorized as primary or secondary as defined below.

*Primary needs* include the primary transportation problems that led to the start of the project. One primary need has been identified: railroad crossing safety (systemic safety risks).

*Secondary needs* are other transportation problems that may be able to be addressed at the same time as the primary needs are worked on. Two secondary needs have been identified: vehicle safety and vehicle mobility. The secondary vehicle safety and mobility needs are connected to operations on Hwy 47 and how the BNSF Railway grade crossing affects the larger project area.

### Additional Considerations

*Additional considerations* are elements that are not central to the purpose and need of the project but are important criteria for evaluating build alternatives. Two additional considerations have been identified: contaminated materials management and the Rum River floodway.

### Purpose Statement

The purpose of this project is to address the at grade railroad crossing safety at Hwy 47 and the BNSF Railway for vehicles, trains, and non-motorized modes. In addition, a secondary purpose of this project is to improve vehicle safety and mobility through the project area related to the Hwy 47 and BNSF Railway grade crossing.

# Alternatives Evaluation Process and Criteria

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## Alternatives Evaluation Process

The alternatives evaluation process for the Hwy 47 and BNSF Railway Crossing Project uses a three-step process as described below. The first step includes evaluating a Build Concept (Hwy 47 and BNSF Railway grade-separated design) and the No Build Alternative against the primary railroad crossing safety need for the project.

The second step includes evaluating a range of potential design alternatives for the Hwy 47 intersections at Martin Street and Pleasant Street south of the BNSF Railway.

The third step includes combining the recommended Build Concept from Step 1 with the recommended design for Hwy 47/Martin Street/Pleasant Street into a range of Build Alternatives for the entire Hwy 47 project corridor from Pleasant Street to north of the BNSF Railway. The third step includes evaluating the No Build Alternative and Build Alternatives against the secondary needs for the proposed action, other transportation considerations, and social, economic, and environmental (SEE) impact considerations. The outcome of the evaluation process is the identification of a preferred alternative for the Hwy 47 and BNSF Railway Crossing Project.

- Step 1: Do the concepts address the primary railroad crossing safety need for the Hwy 47 and BNSF Railway Crossing Project? This step includes qualitative and quantitative performance measures.
- Step 2: Assessment of design alternatives for Hwy 47 at Martin Street and Pleasant Street intersections. This includes qualitative and quantitative performance measures for vehicle safety and mobility and right-of-way impacts.
- Step 3: Combines recommendations from Step 1 and Step 2 into Hwy 47 project corridor alternatives. Do the alternatives address the secondary vehicle safety and mobility needs for the Hwy 47 and BNSF Railway Crossing Project? This step includes qualitative and quantitative performance measures of other transportation factors and potential SEE impacts.

## Step 1 Evaluation Criteria

Step 1 includes evaluating the Build Concept(s) against the primary railroad crossing safety need for the project. The No Build Alternative will be used as the basis for comparison. Build concepts will be developed to a concept sketch level of detail. Table 1 lists the Step 1 evaluation criteria, performance measures and methodologies/tools for each evaluation criteria.

**Table 1. Step 1 Evaluation Criteria (Primary Need)**

Category	Evaluation Criteria	Performance Measure	Methodology/Tool
Primary Need	Railroad Crossing Safety (Trains, Vehicles, and Pedestrians/Bicyclists) <sup>(1)</sup>	Does or does not improve systemic safety risk (risk rating, number of risk factors)	Qualitative assessment MnDOT Rail Grade Crossing Safet Project Selection Report <sup>(2)</sup>
		Train-Vehicle Exposure	Quantitative assessment (volume-cross product, roadway AADT x total trains per day)

(1) Indicates evaluation criteria used with the MnDOT *Railroad Separation at Highway 47 (Ferry St.) Feasibility Study* (December 2016).

(2) Source: Minnesota Department of Transportation. June 2016. *Rail Grade Crossing Safety Project Selection*. Report Number 2016-25.

## Step 2 Evaluation Criteria

The Hwy 47 intersections with Martin Street and Pleasant Street are south of the BNSF Railway grade crossing. The Hwy 47 and Pleasant Street intersection is the southern terminus for the project. The distance between Martin Street and Pleasant Street is 450 feet.

The Hwy 47 and BNSF Railway Crossing Project includes potential vertical and horizontal impacts at the Hwy 47 and Martin Street intersection. Design alternatives for Martin Street results in operational impacts to the Hwy 47 and Pleasant Street intersection (e.g., re-routing traffic from Martin Street to Pleasant Street). Therefore, Step 2 includes evaluating design alternatives for the Hwy 47 intersections at Martin Street and Pleasant Street.

Design alternatives for Martin Street and Pleasant Street will be developed to a concept design level of detail. Evaluation criteria include vehicle mobility, vehicle safety, and SEE performance measures. The outcome of Step 2 is a preferred alternative design for the Hwy 47 intersections at Martin Street and Pleasant Street.

Table 2 lists the Step 2 evaluation criteria, performance measures and methodologies/tools for each evaluation criteria.

**Table 2. Step 2 Evaluation Criteria (Hwy 47/Martin Street/Pleasant Street Intersections)**

Category	Evaluation Criteria	Performance Measure	Methodology/Tool
Other Transportation Considerations	Changes in access at Martin Street and Pleasant Street	Number of access closures	Concept layouts
	Changes in Traffic Patterns	Re-routing of traffic through neighborhood west of Hwy 47	Concept layouts
	Martin Street Intersection Operations	Morning and afternoon peak hour intersection level of service (LOS)	Highway Capacity Manual, (HCM)
	Pleasant Street Intersection Operations	Morning and afternoon peak hour intersection level of service (LOS)	Highway Capacity Manual (HCM)

Category	Evaluation Criteria	Performance Measure	Methodology/Tool
Other Transportation Considerations	Vehicle Safety	Roadway and intersection geometry (sightlines, turn lane configuration)	Concept layouts
Social, Economic, and Environmental (SEE) Considerations	Property Impacts	Amount of new right of way (acres) Number of partial and full takings Number of residential and commercial relocations	Concept layouts Parcel data

### Step 3 Evaluation Criteria

Step 3 includes combining the recommended alternatives from Step 1 and Step 2 into a range of Build Alternatives for the Hwy 47 project corridor. Evaluation Criteria in Step 3 include the secondary needs for the project, other transportation considerations, and SEE impact performance measures. The No Build Alternative and Build Alternatives will be compared based on their ability to address the secondary needs for the project and a qualitative and quantitative assessment of SEE impacts. Build Alternatives will be developed to a concept layout level of detail. The outcome of Step 3 is the identification of a preferred alternative for the Hwy 47 and BNSF Railway Crossing Project.

Table 3 lists the Step 3 evaluation criteria, performance measures and methodologies/tools for each evaluation criteria.

**Table 3. Step 3 Evaluation Criteria**

Category	Evaluation Criteria	Performance Measure	Methodology/Tool
Secondary Needs	Vehicle Mobility <sup>(1)</sup>	Projected traffic volume and roadway capacity (volume to capacity ratio) Network delay due to train crossings (hours) Traffic queue lengths due to train crossings (feet)	Regional Travel Demand Model (RTDM) PTV VISSIM <sup>(3)</sup>
	Vehicle Safety	Risk assessment for crashes and vehicle queuing due to train crossings Design speed of Hwy 47 horizontal curves north of BNSF Railway	Qualitative assessment (concept layouts) Crash Modification Factor Clearinghouse
Other Transportation Considerations	Constructability	Construction area needed and duration of construction (years)	Qualitative assessment (concept layouts)
	Access Management <sup>(1)</sup>	Number of access closures	Concept layouts

Category	Evaluation Criteria	Performance Measure	Methodology/Tool
Other Transportation Considerations	Maintenance of traffic during construction (Motor vehicles and rail) <sup>(1)</sup>	Construction detours, duration of full closures of Hwy 47 and BNSF Railway crossing	Qualitative assessment (concept layouts)
	Walkability/Bikeability	Does or does not improve safety risk for pedestrians/bicyclists at BNSF Railway crossing (yes or no) Does or does not maintain pedestrian and bicycle connectivity along Hwy 47 (yes or no)	Qualitative assessment (concept layouts)
	Hwy 47 horizontal and vertical geometry	Horizontal curve locations in comparison to Hwy 47 vertical profile	Qualitative assessment (concept layouts), MnDOT Road Design Manual (RDM)
Social, Economic, and Environmental (SEE) Considerations	Aquatic Resource Impacts	Impacts to wetlands and other aquatic resources (acres) Rum River channel impacts/public waters	Concept layouts and NWI wetlands Stable slope assessment/Section 404 Permitting/DNR Public Waters Work Permit
	Rum River Floodway Impacts <sup>(1)</sup>	Encroachment into Rum River floodway and flood fringe Impacts to insurable structures	Concept layouts and FEMA mapping Qualitative assessment of flooding extents and floodplain fill potential
	Section 4(f) Resources	Permanent use of Section 4(f) resources (acres) Description of temporary impacts during construction	Concept layouts and Section 4(f) resource maps (location and size of use) Qualitative assessment (activities, features, and attributes affected)
	Contaminated Soil <sup>(1)</sup>	Amount of remediation cost Type of remediation Regulatory approvals/liability protections/closure letters Potential long-term risks Estimated timeframe for remediation, monitoring, or engineered barrier maintenance	Concept layouts Qualitative assessment
	Anoka County Fairgrounds <sup>(1)</sup>	Impacts to fairgrounds property and buildings	Concept layouts
	Cultural Resources <sup>(1)</sup>	Impacts to NRHP-eligible or listed historic properties	Concept layouts Cultural resources investigations
	Property Impacts <sup>(1)</sup>	Amount of new right-of-way (acres) Number of partial and full takings	Concept layouts Parcel data



Category	Evaluation Criteria	Performance Measure	Methodology/Tool
Social, Economic, and Environmental (SEE) Considerations	Property Impacts <sup>(1)</sup>	Number of residential and commercial relocations	Concept layouts Parcel data
	Risk-Based Cost Estimate	Preliminary cost estimate (retaining walls, utilities, construction)	Concept layouts
	Rum River State Wild and Scenic River <sup>(2)</sup>	Construction activities within Rum River State Wild and Scenic River land use district boundary (yes or no) Construction within 200 feet of Rum River (yes or no) Tree impacts (amount of tree loss, acres) Impacts to fish and wildlife Impacts to visual quality (views from Rum River)	Qualitative assessment (concept layouts) Aerial photography
	Water Quality (temporary and permanent) <sup>(1)</sup>	Stormwater runoff from highway (need for BMPs and related impacts)	Concept layouts

(1) Indicates evaluation criteria used with the MnDOT *Railroad Separation at Highway 47 (Ferry St.) Feasibility Study* (December 2016).

(2) Minnesota Rules 6105.0200 (Standards and Criteria for Construction of New Public Roads or Reconstruction of Existing Roads).

(3) PTV VISSIM is a computer simulation model used by traffic engineers to evaluate traffic patterns and operations.