

# I-25 Parallel Arterial Study

**CDOT Project No. 22911**

Date: May 7, 2020

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To: Eric Salemi, CDOT Region 4

**Subject: LCR 3 over Hillsboro Ditch  
Structure Selection Memorandum**

## Introduction

This memorandum details the selection process for the replacement of the existing structure on Larimer County Road (LCR) 3 crossing Hillsboro Ditch on the new arterial roadway consisting of Weld County Road (WCR) 9 ½ and LCR 3 (a.k.a. North IPA). The study encompasses an approximate 13.25-mile improvement project, limits of the project are south of WCR 32 to south of US-34, terminating at Ronald Reagan Blvd. The alignment was identified in the 2003 Weld County I-25 Parallel Arterial Study and consists of improvements to the existing sections of WCR 9 ½ and new roadway alignment to complete the 13.25-mile stretch. The ultimate project consists of but is not limited to: at-grade intersections, railroad crossings, floodplain crossings, drainage improvements, utility relocations, access control planning, phased implementation, and right-of-way definition.

## NORTH I-25 PARALLEL ARTERIAL

### DESIGN SEGMENTS – OVERVIEW

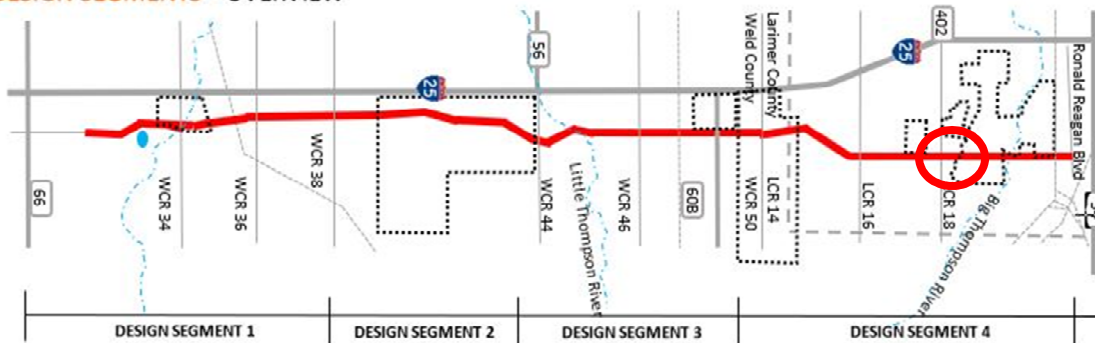


Figure 1 - Project Map

This memorandum is an abbreviated version of the CDOT standard Structure Type Selection Report due to the conceptual nature of this project. The proposed structure selection process broadly follows the guidelines set forth in the CDOT Bridge Design Manual. Precast, prestressed, concrete girders with cast-in-place concrete decks and integral pile-bent substructures were only considered since it is a standard structure type common to Colorado and is considered the best suited for the purposes of this project at this time. A formal Structure Type Selection process will be completed to determine the most cost efficient and prudent structure alternative for this location at a later date.



*Figure 2 - Aerial Photo of LCR 3 and Hillsboro Ditch*

## Existing and Proposed Conditions

LCR 3 is approximately 1.5 miles east of I-25 and is a gravel road with a typically tangent alignment that begins at LCR 18 and extends north to LCR 62. Hillsboro Ditch is located approximately 1100'-0" north of LCR 18 and crosses LCR 3 at a 45-degree skew. The existing road is 14'-0" wide with one 12'-0" lane and 1'-0" shoulders at Hillsboro Ditch. The existing structure is a single span reinforced concrete slab structure that is 25'-0" long face-to-face of abutments, 14'-0" wide out-to-out deck with concrete and stone wingwalls, and steel pipe tubing safety railing with no approach guardrail. Photos of the existing structure and roadway are shown in Figures 3 and 4 below.



*Figure 3 - Existing Structure at Hillsboro Ditch*



*Figure 4 - Existing Roadway at Hillsboro Ditch*

The construction of North IPA through this area will require a complete demolition and reconstruction of the existing structure. The proposed roadway typical section across the structure will consist of a four-lane divided highway with two 12'-0" lanes, an 8'-0" and a 4'-0" shoulder, and an 8'-0" barrier separated sidewalk in each direction with a 15'-0" median. The structure crossing Hillsboro Ditch will be split into separate structures for northbound and southbound traffic and each will be 48'-0" out-to-out deck to accommodate the approach roadway section, CDOT Bridge Rail Type 9 and a 1'-0" wide pedestrian railing. The proposed roadway at the crossing will be on a tangent horizontal alignment and the vertical alignment will be a constant -4.0% grade.

The proposed structures consist of nine BX18 adjacent box girders at 5'-0" wide, an 8" cast-in-place concrete deck and integral pile-bent abutments with a span of 45'-0" center-to-center of abutments and a 45-degree skew. The proposed low-chord elevation will be set above the existing structure low-chord clearance, which was field measured at 4'-0" providing an estimated low chord elevation of 4852.50. This layout will place the proposed abutments behind the existing abutments, which will reduce existing substructure removal and provide more waterway area than the existing bridge.

## Right of Way (ROW) Impacts

The existing ROW is located approximately 30'-0" in each direction from the centerline of LCR 3. Proposed ROW for the widened roadway will be 120'-0" wide total, and additional 30'-0" permanent construction easements will be required on each side of the roadway within the vicinity of the structures to allow adequate space to taper the existing canal grading to meet the proposed bridge opening.

## Geotechnical Investigation

A geotechnical investigation was not completed as part of this work and will be completed during the next phase of design. The proposed foundation type will be reevaluated after the geotechnical investigation is complete.

## Traffic Impacts

LCR 3 will be closed to through traffic during construction of the roadway and bridge. Traffic detour plans are not completed at this time, but local traffic for the residents along this roadway can be accommodated during construction. During final design further coordination with property owners and Johnstown will be required to determine detour routes and access needs.

## Utilities

Existing utilities in the area consist of overhead electric lines along the west side of LCR 3. While underground utilities have not been located at this time, a recent site visit shows buried telephone or cable lines along the west side of LCR 3 also. A utility survey will be completed during the next phase of design to ensure that any buried utilities within the area are located.

## Hydraulics

A hydraulic analysis for this structure was not completed because it is a part of a controlled system owned by Consolidated Hillsboro Ditch Company Inc. Water Rights dictate the amount of water allowed to flow through the structure and it is not designed for conveying stormwater. The proposed structures

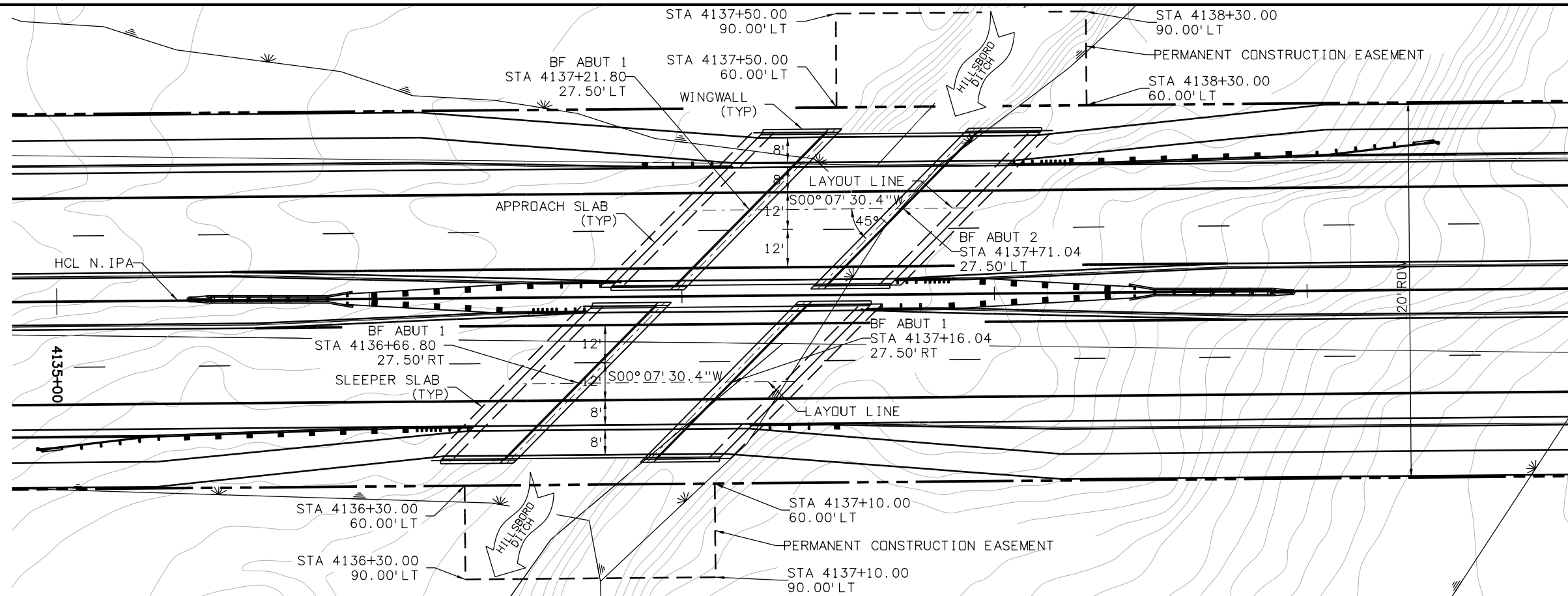
will provide more waterway opening than the existing structure and will not require any additional analysis.

## Environmental Concerns

An Environmental Impact Study is not being completed as part of this work. It is anticipated that environmental permits consistent with a Categorical Exclusion will be required for the construction of the structures. During final design appropriate environmental investigations will be completed. It is possible that a Section 404 permit from the Army Corps of Engineers will be required to construct the bridge due to impacts to Waters of the U.S.

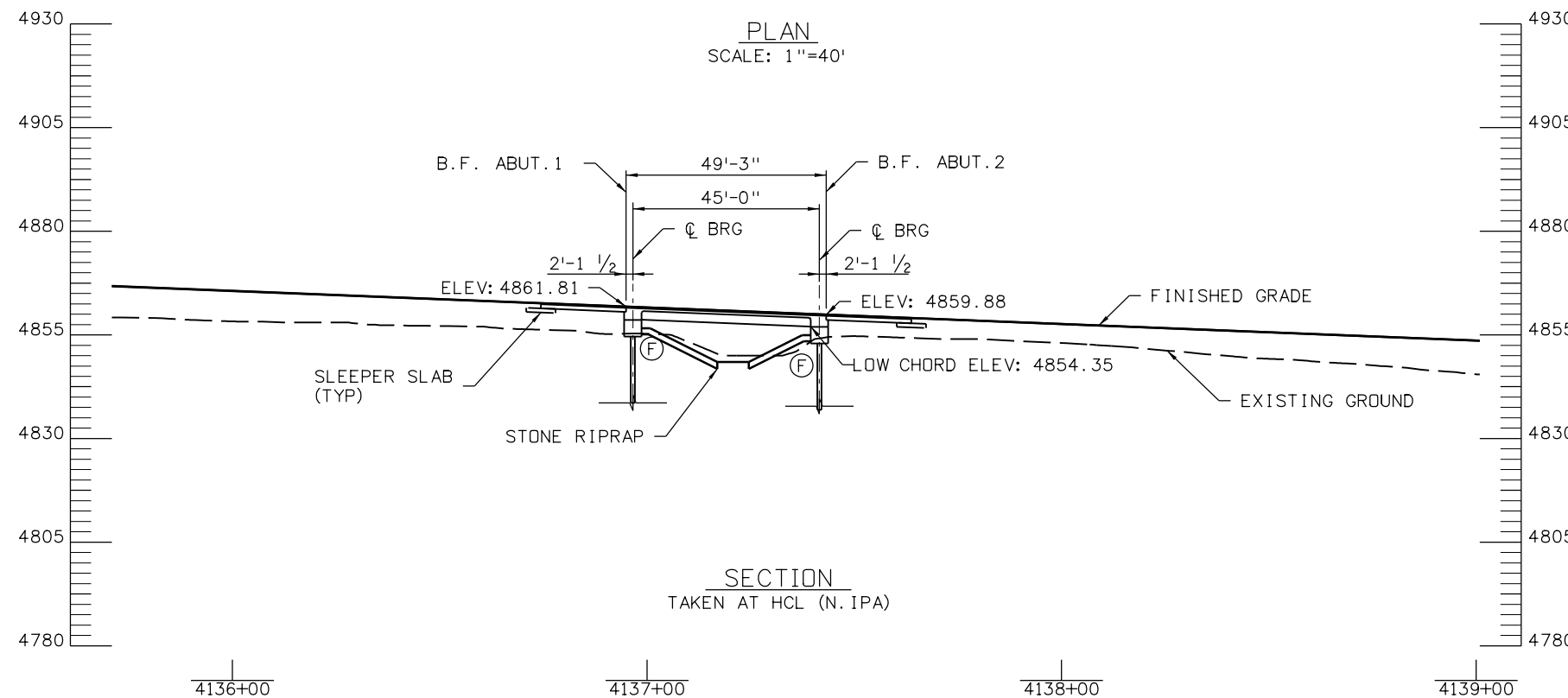
## Conclusion and Recommendation

Based upon information contained within this memorandum, the project team recommends constructing two new structures separating the northbound and southbound traffic of North IPA to replace the existing structure over Hillsboro Ditch. See the attached General Plan and Elevation sheets for additional information.



**NOTES:**

- LIVE LOADING: HL-93 AND COLORADO PERMIT VEHICLE.
- BRIDGE LAYOUT LINE IS A CHORD BETWEEN ABUTMENT BEARING CENTER LINES AT STA. 4137+21.80 AND STA. 4137+71.04, 27.50' LT, AND STA. 4136+66.80 AND STA. 4137+16.04, 27.50' RT OF N. IPA HORIZONTAL CONTROL LINE.
- PROPOSED STRUCTURE LOW CHORD IS AT ELEVATION 4854.35.



PRELIMINARY  
SUBJECT TO REVISION

Print Date: 5/7/2020	Unit Information
File Name: 22911BRG_LAY_01.dgn	Unit Leader Initials
Horiz. Scale: 1:40	Unit Leader Initials
Vert. Scale: As Noted	
Michael Baker INTERNATIONAL	

Sheet Revisions		
Date:	Comments	Init.

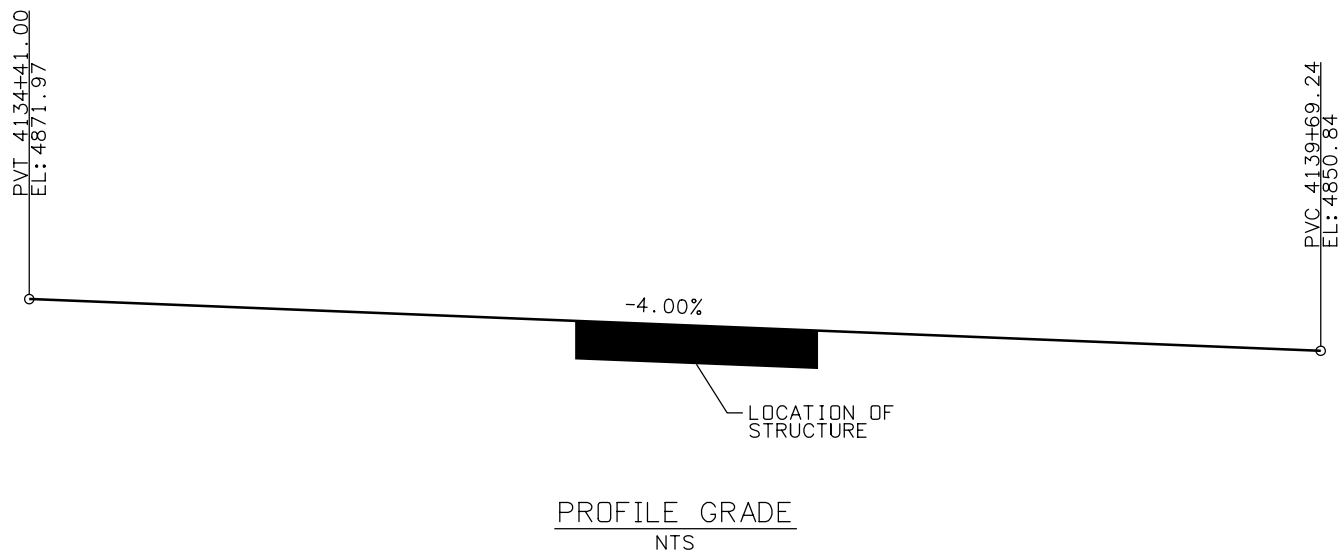
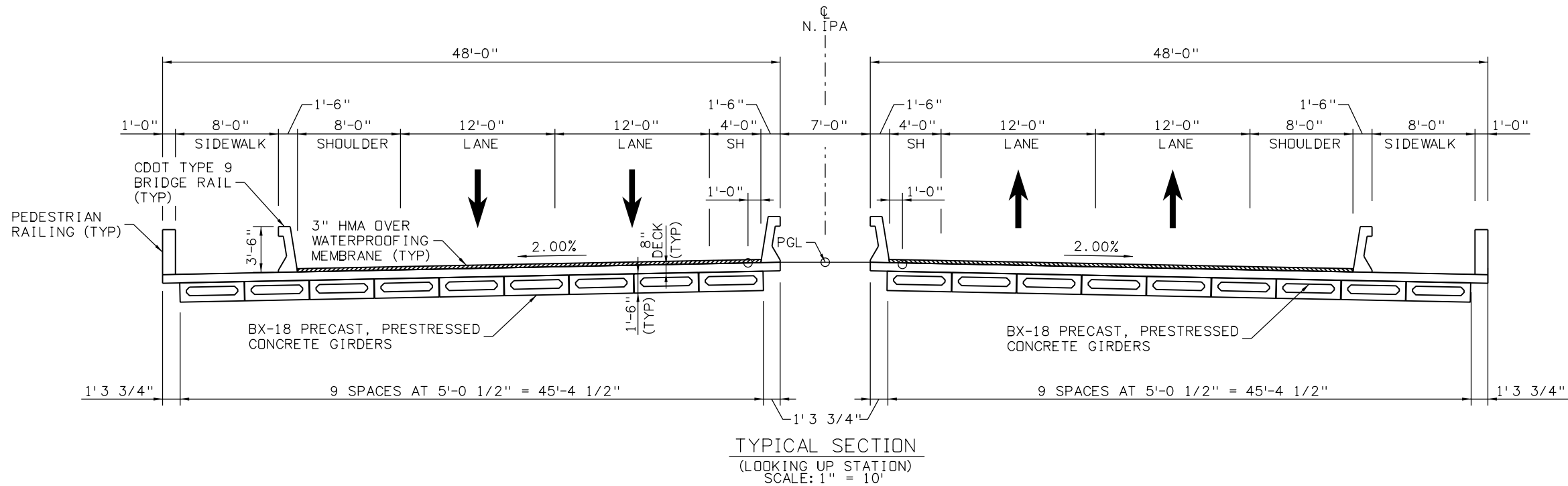
Colorado Department of Transportation  
  
 10601 W. 10th St.  
 Greeley, CO 80634  
 Phone: 970-350-2322 FAX: 970-350-2262  
 Region 4 CJB

As Constructed	No Revisions:
Revised:	Void:

NORTH I-25 PARALLEL ARTERIAL GENERAL LAYOUT HILLSBORO DITCH			
Designer: LAP	Structure Numbers	X-XX-XX	X-XX-XX
Detailer: RBR	Sheet Subset: BRIDGE	Subset Sheets: 01 of 02	

Project No./Code	Project Number
Code	Sheet Number

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Print Date: 5/7/2020	
File Name: 22911BRG_TYP_01.dgn	
Horiz. Scale: 1:10	Vert. Scale: As Noted
Unit Information	Unit Leader Initials
<b>Michael Baker INTERNATIONAL</b>	MICHAEL BAKER INTERNATIONAL, INC. 165 S. UNION BLVD., STE 1000 LAKEWOOD, CO 80228 720.514.1100

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation



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As Constructed	
No Revisions:	
Revised:	
Void:	

NORTH I-25 PARALLEL ARTERIAL TYPICAL SECTION HILLSBORO DITCH BRIDGE			
Designer:	LAP	Structure Numbers	X-XX-XX
Detailer:	RBR	Structure Numbers	X-XX-XX
Sheet Subset:	BRIDGE	Subset Sheets:	02 of 02

Project No./Code	
Project Number	
Code	
Sheet Number	