Associated Engineering

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Bridge Widening – Closure Pours

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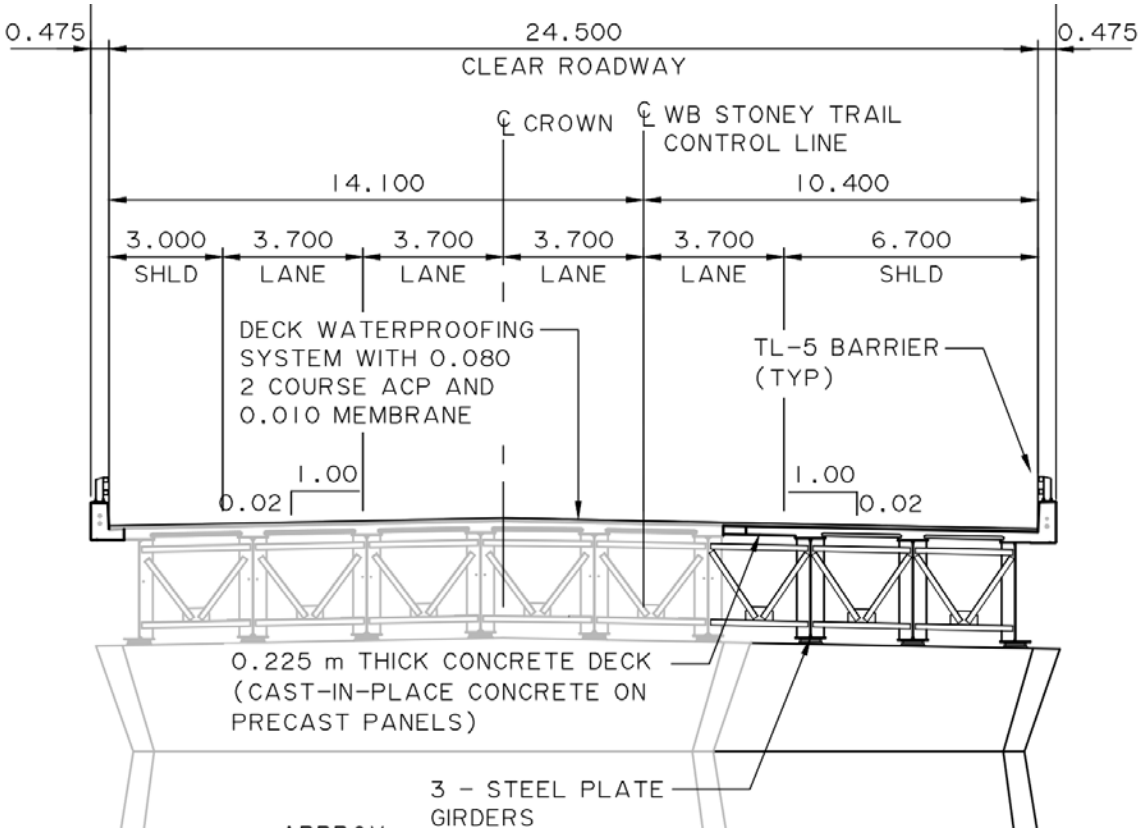
February 2023

SE Stoney Trail over Bow River

SE Stoney Trail over the Bow River

Widening to 4 lanes EB & WB:

- EB Bridge Replacement
- WB Bridge Widening



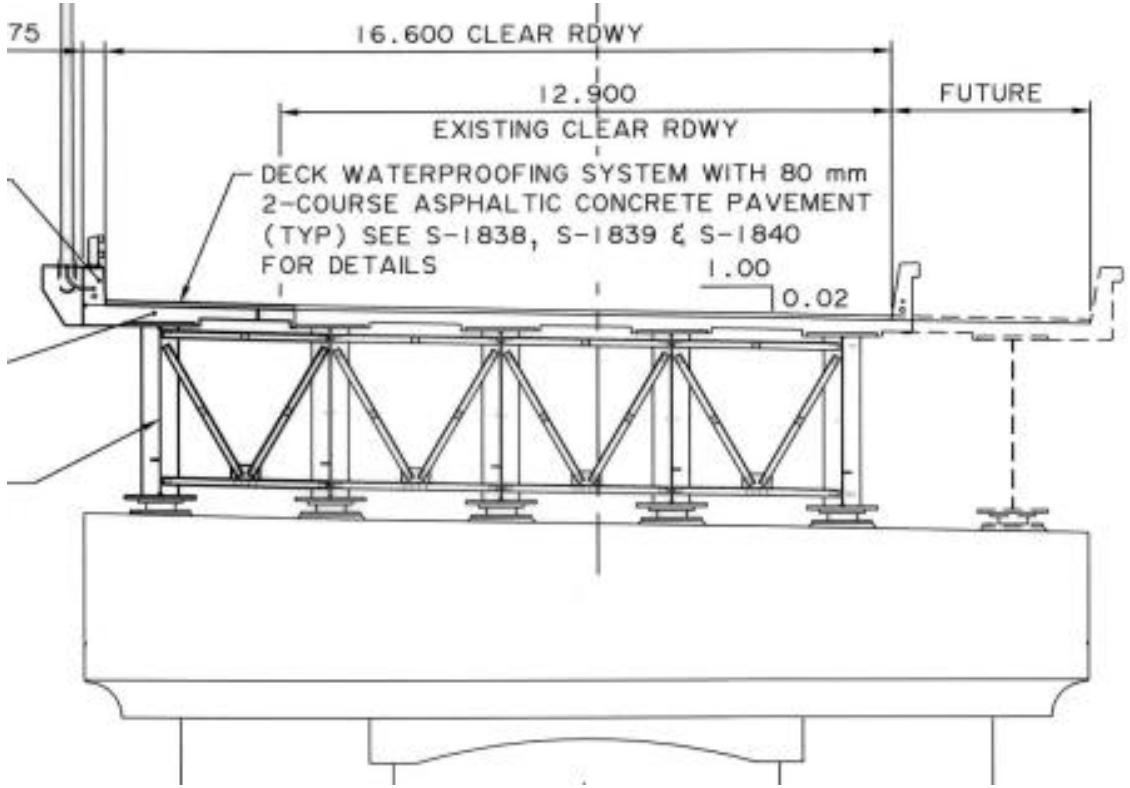
SE Stoney Trail over the Bow River - Construction

SE Stoney Trail over the Bow River

SW Anthony Henday Drive

SWAHD over the North Saskatchewan River

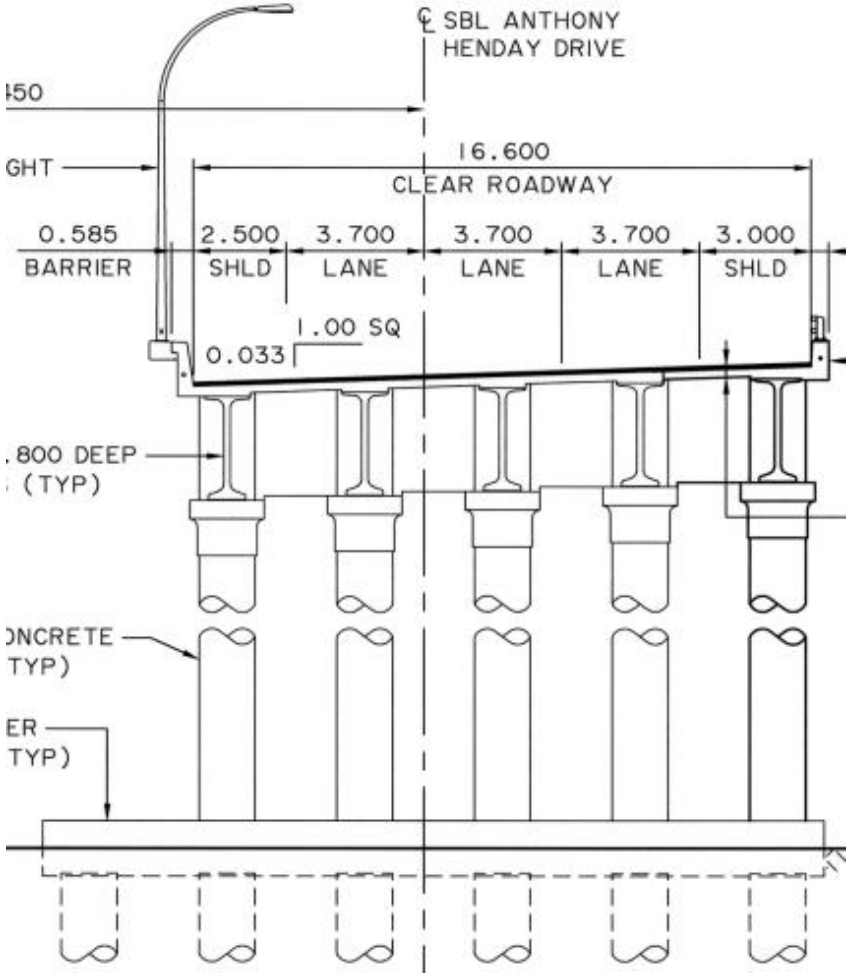
Widening to 3 lanes EB & WB



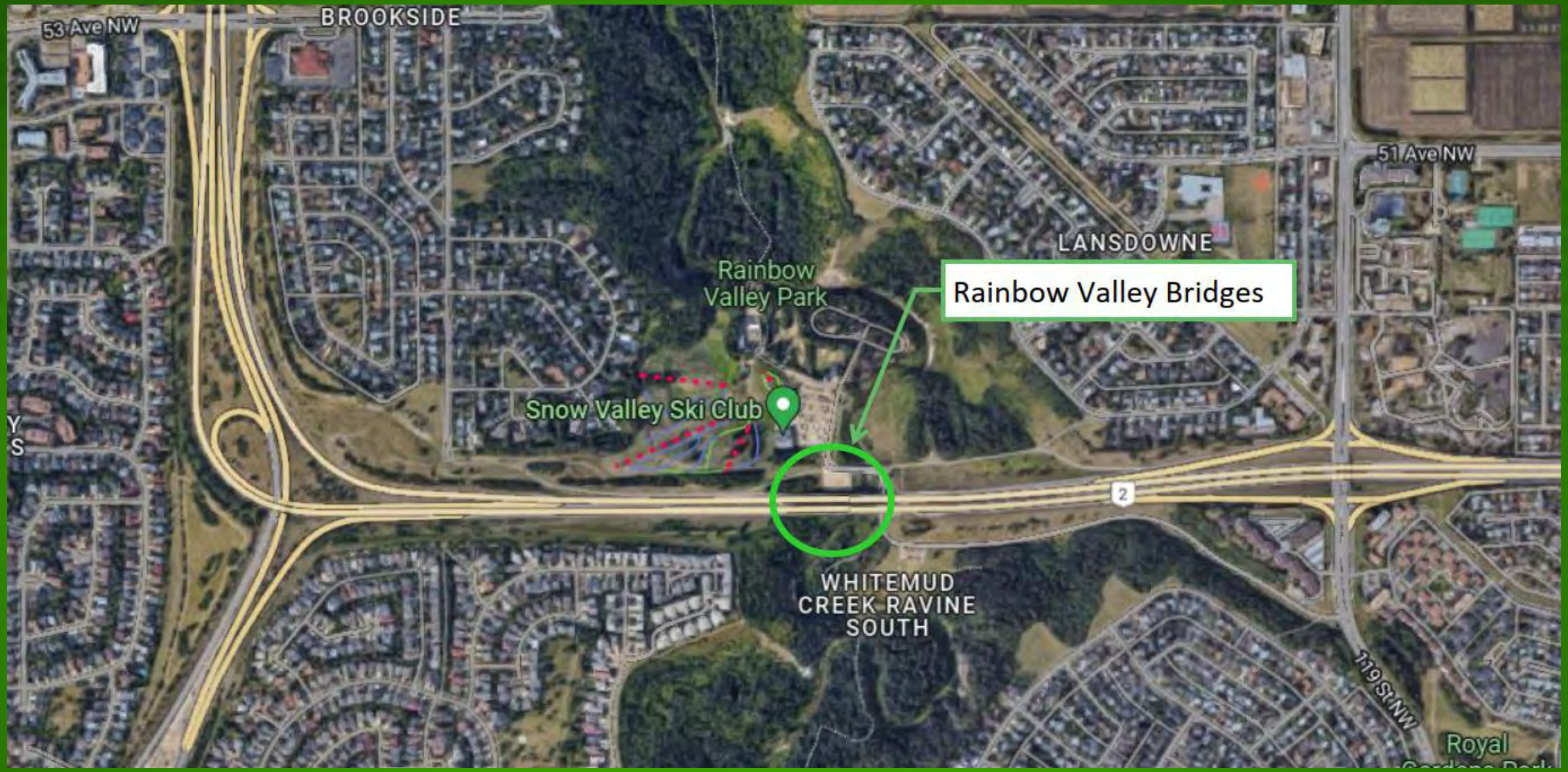
SWAHD over the North Saskatchewan River - Construction

SWAHD over Wedgewood Creek

Widening to 3 lanes EB & WB



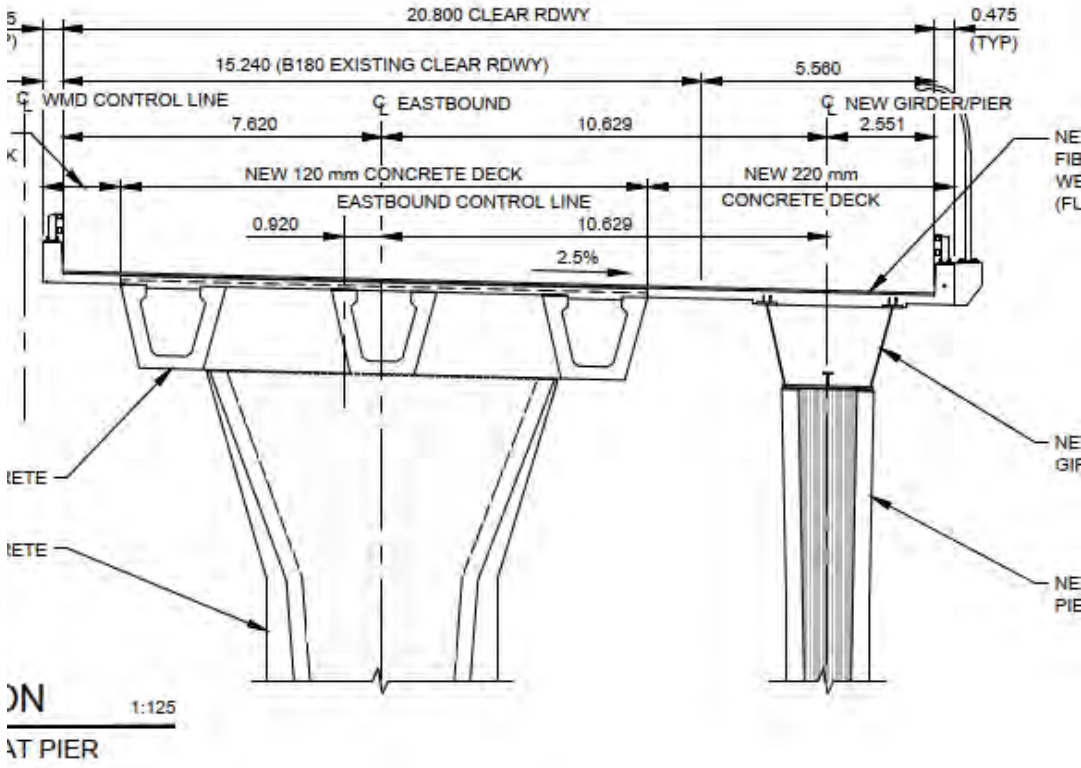
SWAHD over Wedgewood Creek - Construction



Rainbow Valley Bridges - Whitemud Drive over Whitemud Creek, Edmonton

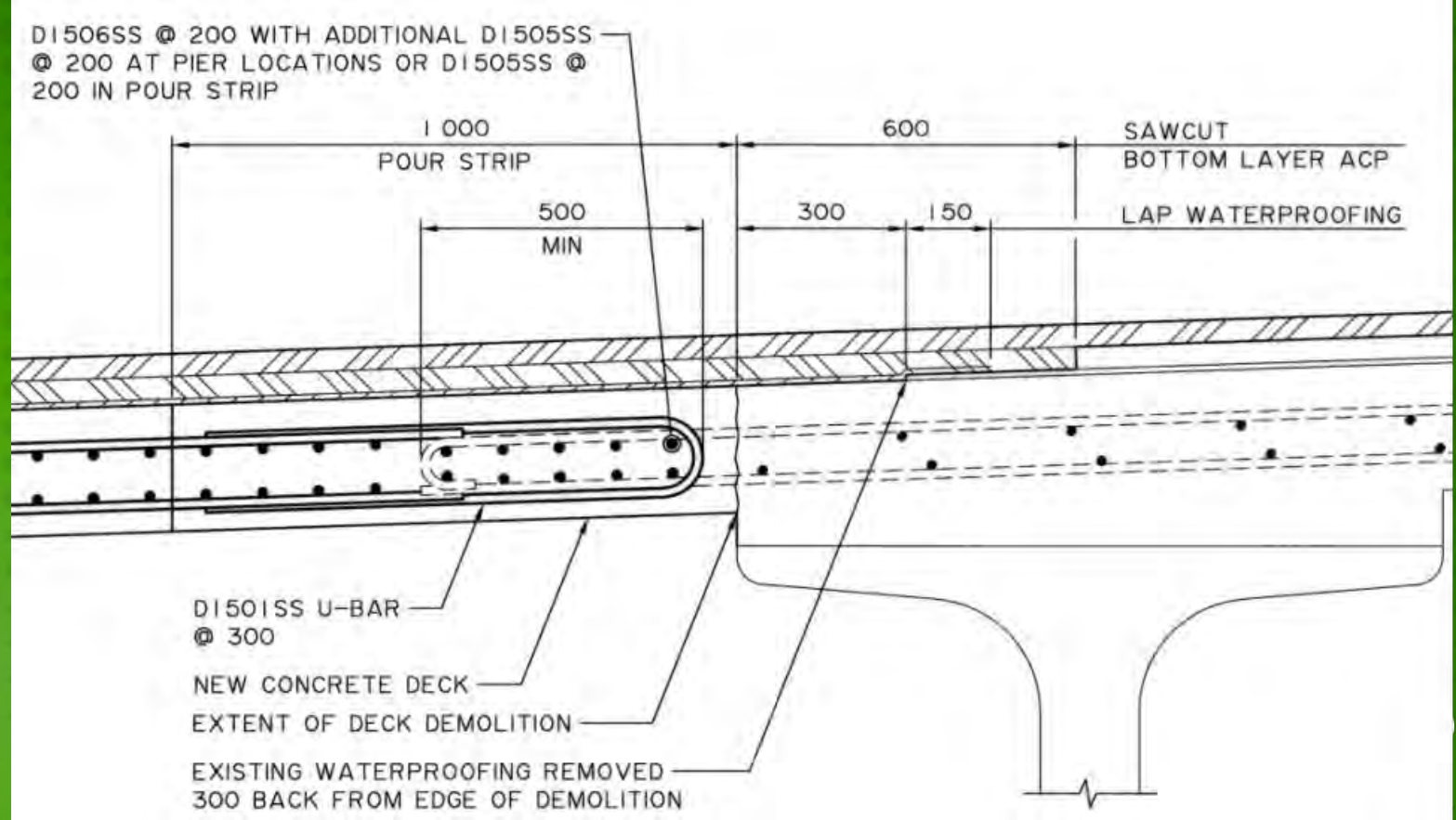
Rainbow Valley Bridges – Whitemud Drive

Widening to 4 lanes EB & WB



CLOSURE POUR

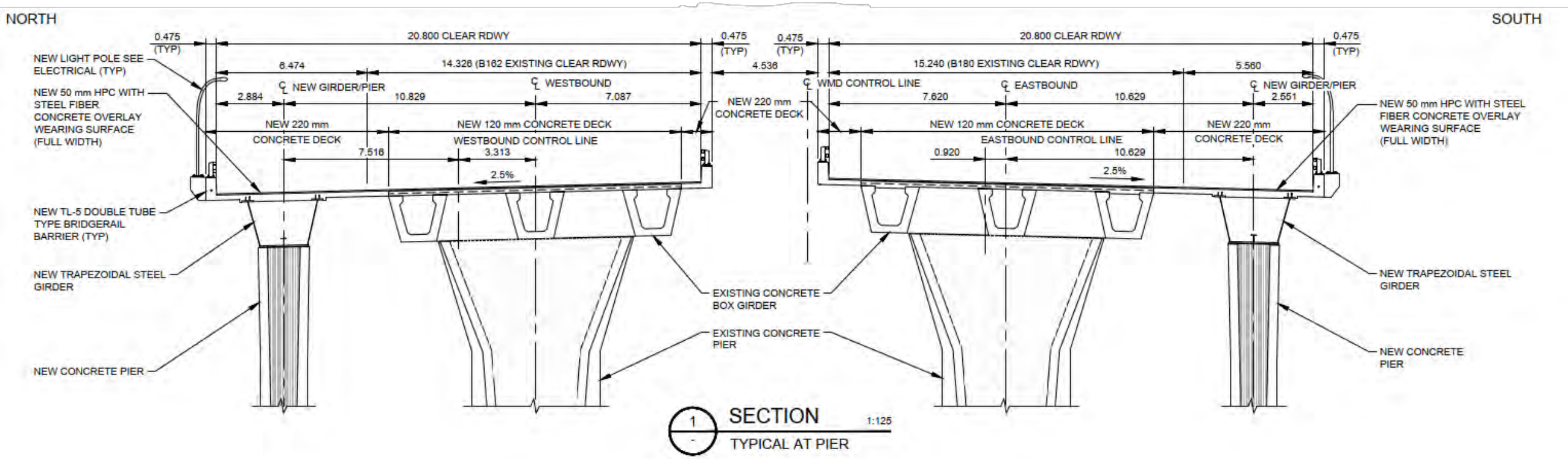
Definition: A closure pour is a strip of deck left un-poured between the new and existing decks. This strip of deck is poured last connecting the new to the existing deck.



WHY CHOOSE A CLOSURE POUR?

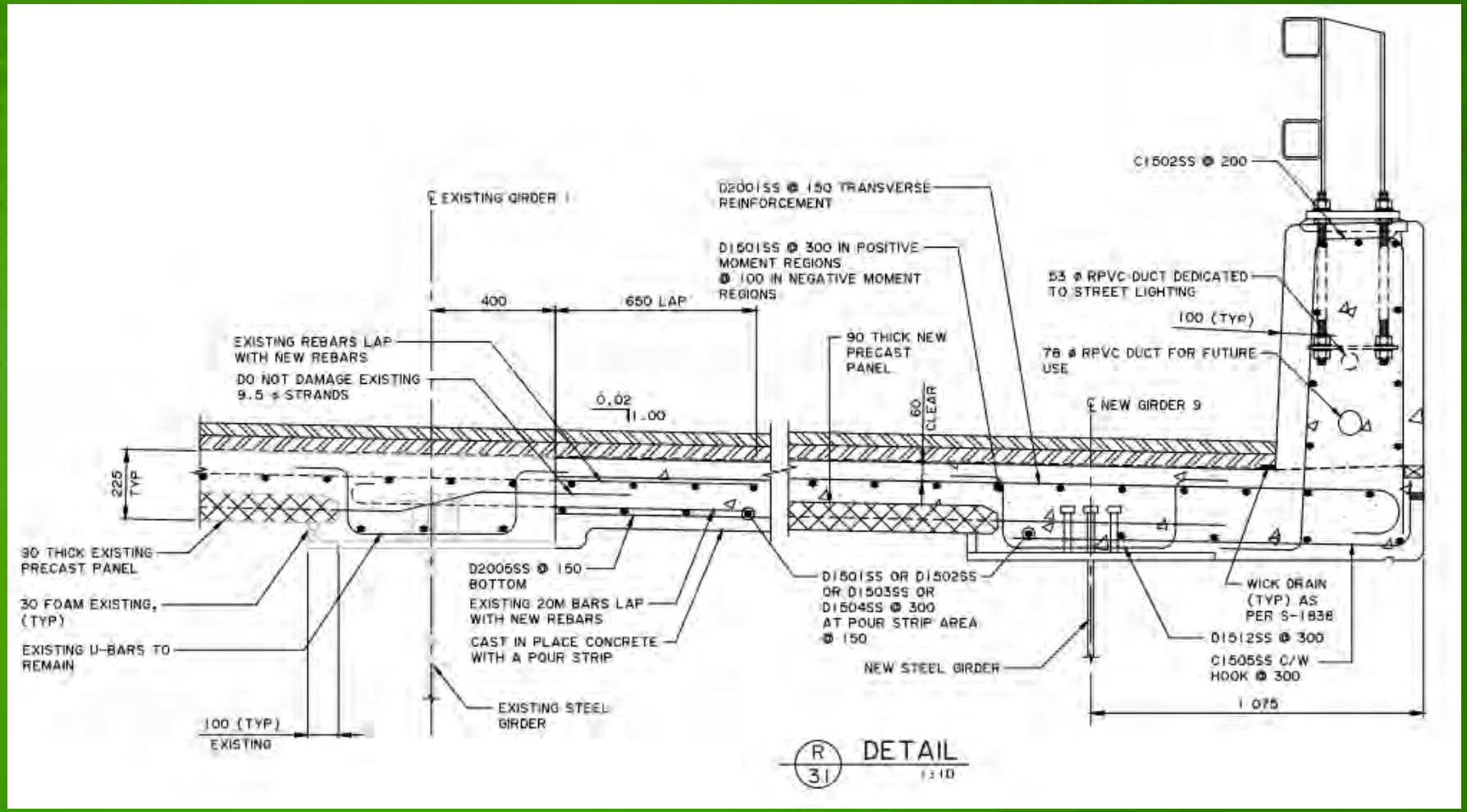
- Separate existing and widened structures during construction
- Control vibrations
- Limit traffic closures

WHY CHOOSE A CLOSURE POUR?



WHY CHOOSE A CLOSURE POUR?

- Limit new dead load deflections to the widened structure
- Compensate for minor elevation deviations
- Limit the shrinkage cracking to the closure pour area



BEST PRACTICES
Codes and Guides for Bridge Decks

- Ontario MOT Guideline for Staged Construction of Bridges
- ACI 345.2R-13 Guide for Widening Highway Bridges
- CSA S6:19 Canadian Highway Bridge Design Code
  - Section 5.7 – Analysis of Decks
  - Section 8.12 – Control of Cracking
  - Section 8.18 – Special Provisions for Deck Slabs

ACI 345.2R-13 GUIDE FOR WIDENING HIGHWAY BRIDGES

Section 4.4 Closure Placement Details

- Vibrations from traffic
- Reinforcing details
- Layers of reinforcing
- Formwork details
- Dead load deflections (camber)
- Timing of concrete placement

ONTARIO MOT GUIDELINE FOR STAGED CONSTRUCTION OF BRIDGES

- Minimum width of closure pour
- Minimum longitudinal reinforcement to prevent and limit transverse cracks

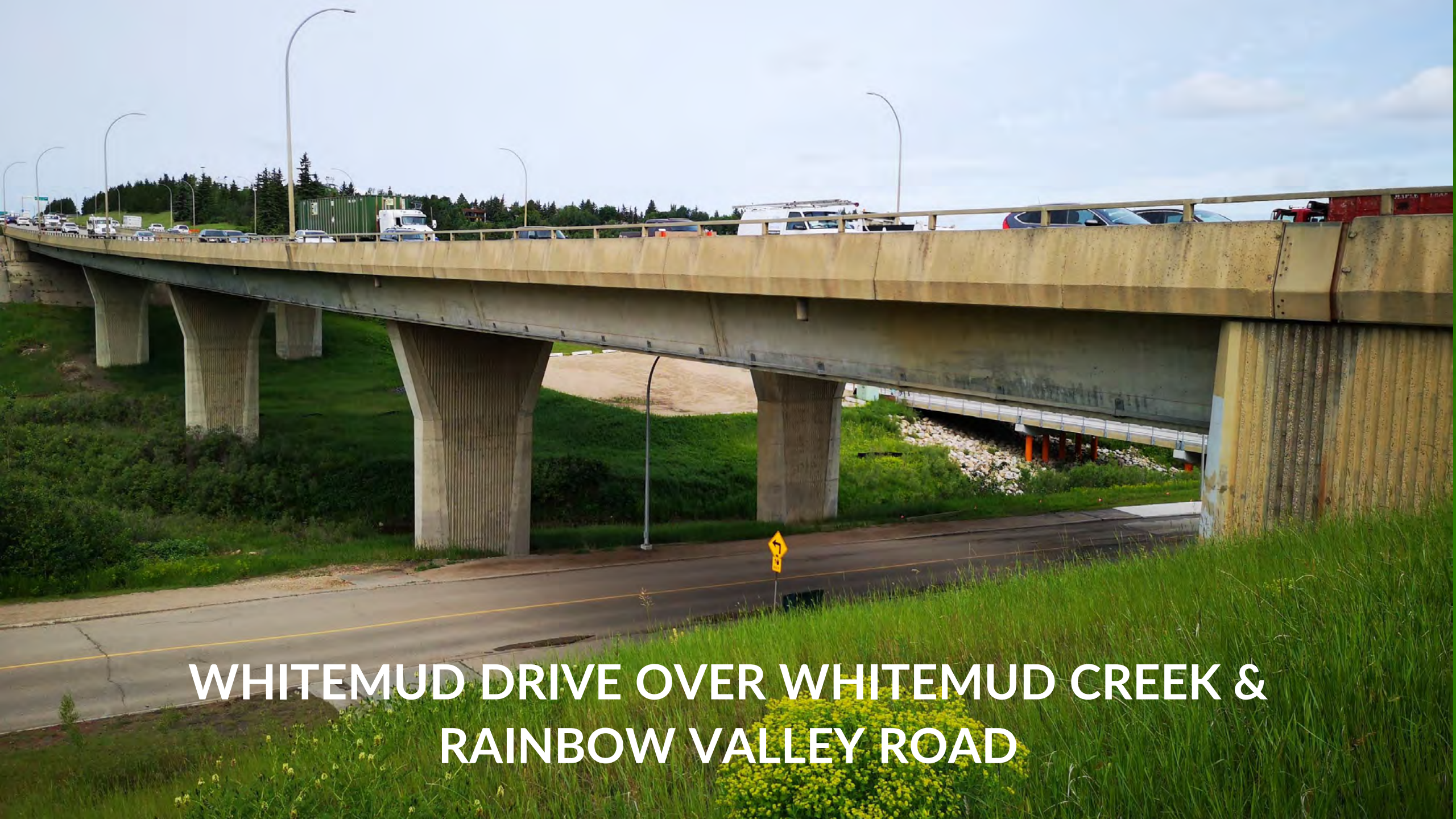
Ministry of Transportation
Bridge Office, Highway Standards Branch

Guidelines for Staged Construction of Bridges

CSA S6:19 CHBDC

Design of Closure Pours

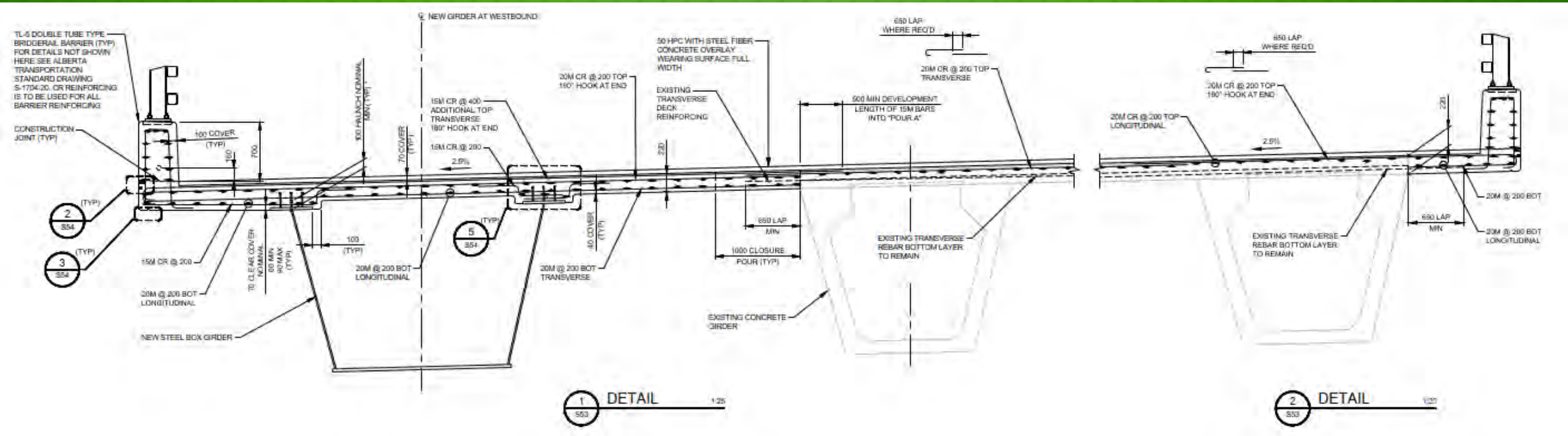
- Deck designed using section 5 and MIDAS models
- Non-composite girder designed using CHBDC with additional torsional checks if barrier is to be placed prior to closure pour



WHITEMUD DRIVE OVER WHITEMUD CREEK & RAINBOW VALLEY ROAD

WHITEMUD DRIVE OVER WHITEMUD CREEK & RAINBOW VALLEY ROAD

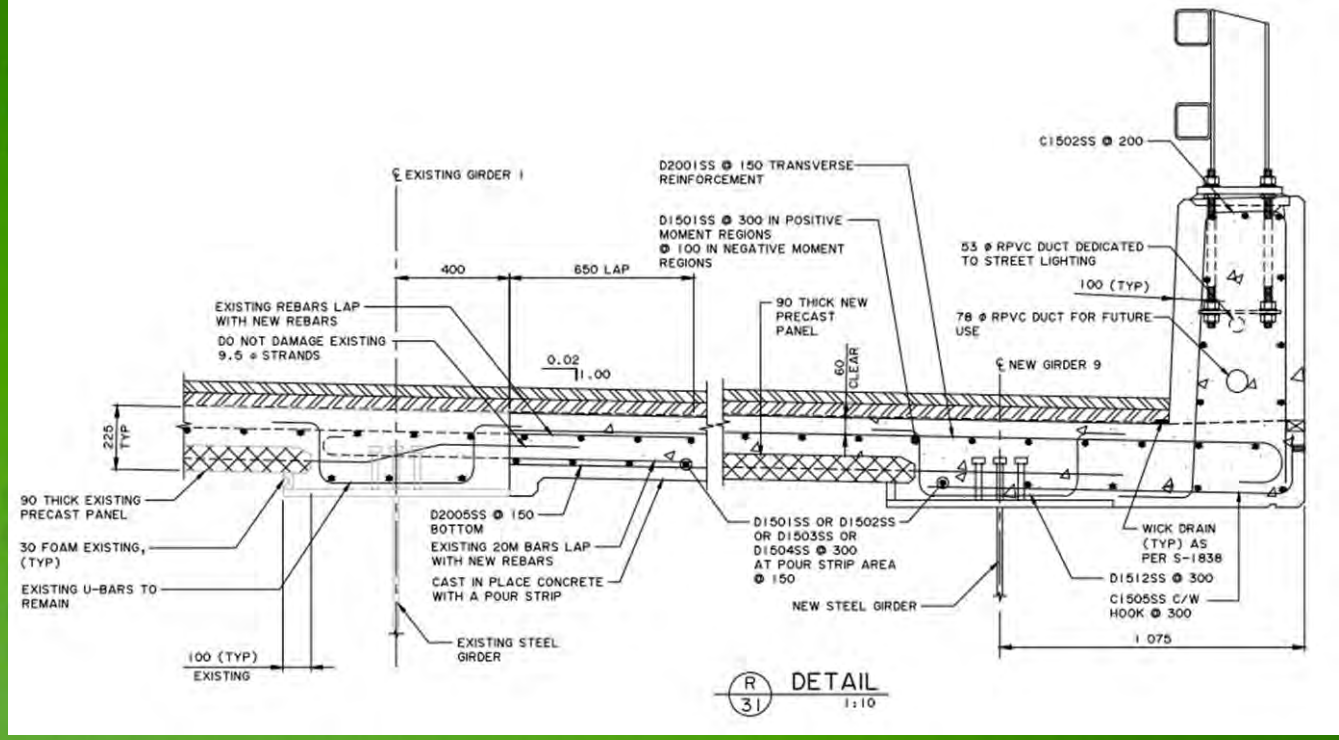
- 2 – 188.976 m long 4 span bridges
- Span arrangement: 42.672 – 51.816 – 51.816 – 42.672 m
- Widened from 12.9 m to 16.6 m
- 1 additional 3.7 m wide lane in each direction
- 225 mm thick cast-in-place concrete deck

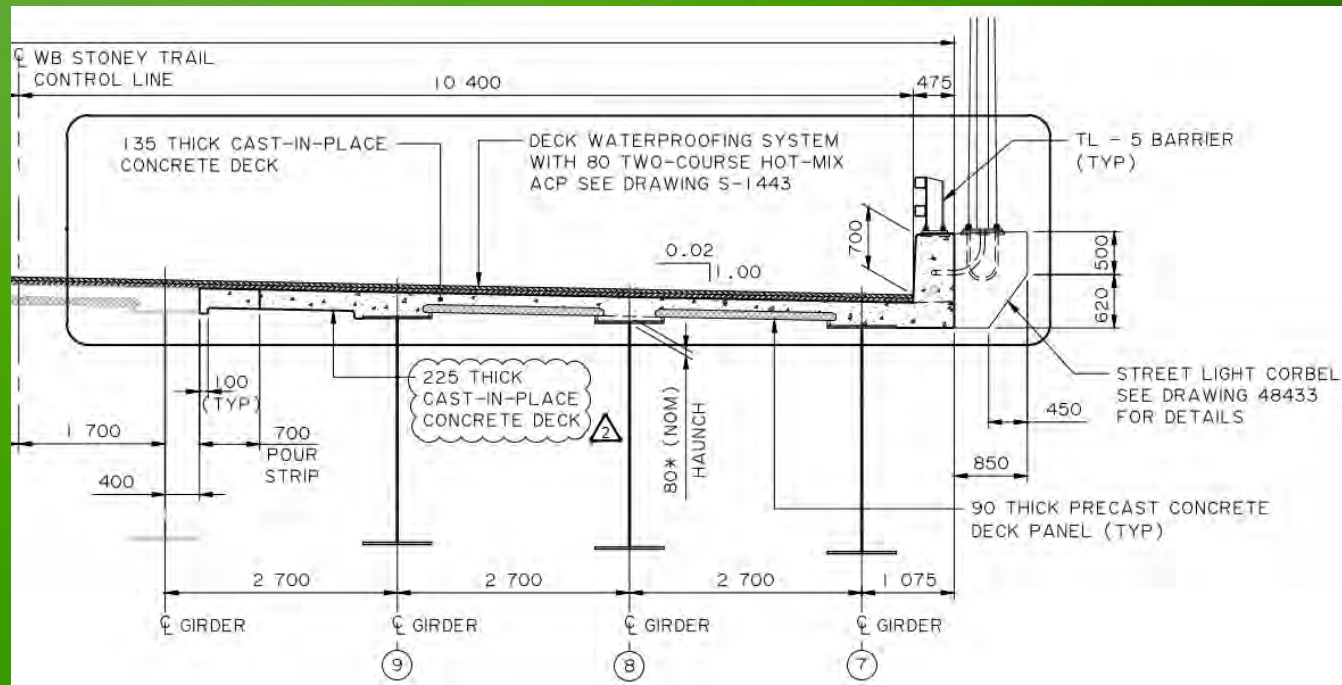



SOUTHEAST STONEY
TRAIL OVER BOW RIVER
WARNING
HEAVY
EQUIPMENT
WORKING
DANGER
DO NOT
ENTER
SBRS - 77547W
15 Aug 2022, 17:05:43

SOUTHEAST STONEY TRAIL OVER BOW RIVER

- 207.4 m long 5 span bridge
- Span arrangement: 36.6 – 40.7 – 65.0 – 34.6 – 30.5 m
- Widened from 16.6 m to 24.5 m
- 2 additional 3.7 m wide lanes
- Precast deck panels
- Closure pour is 225 mm thick full depth cast-in-place concrete deck

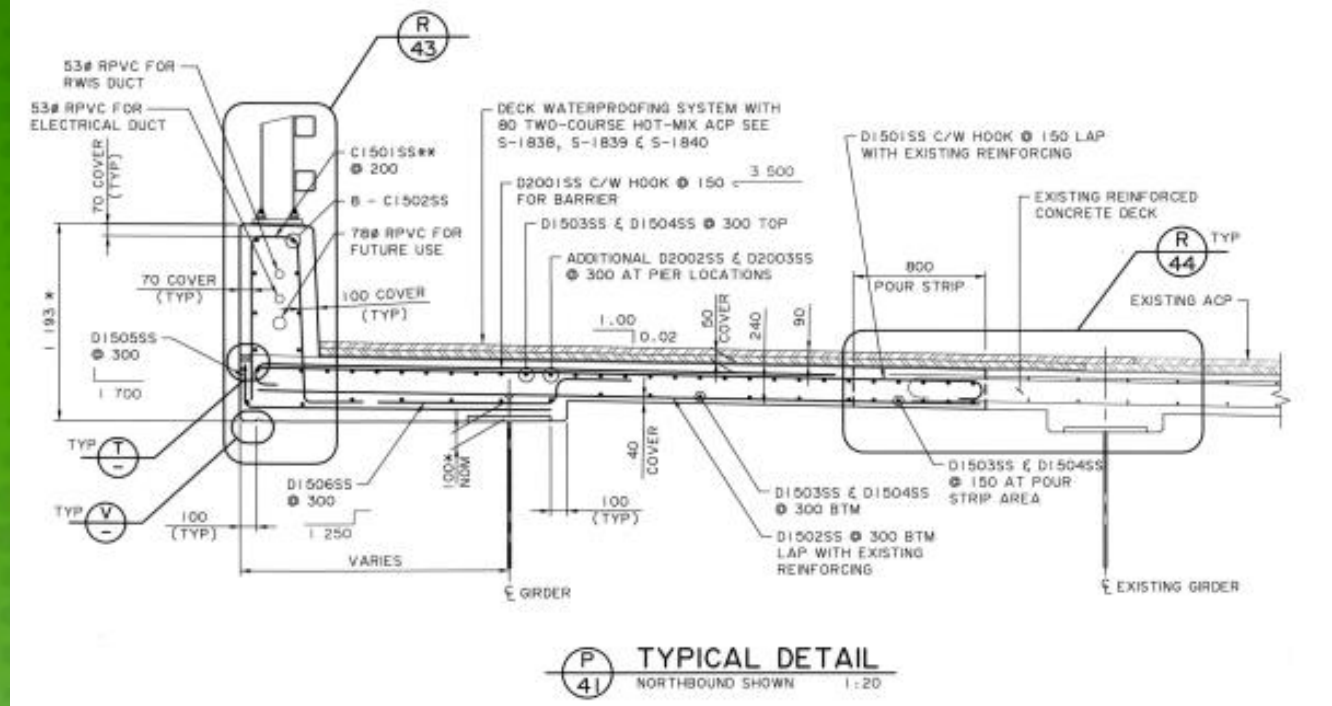




SOUTHWEST ANTHONY HENDAY DRIVE OVER NORTH SASKATCHEWAN RIVER

SOUTHWEST ANTHONY HENDAY DRIVE OVER NORTH SASKATCHEWAN RIVER

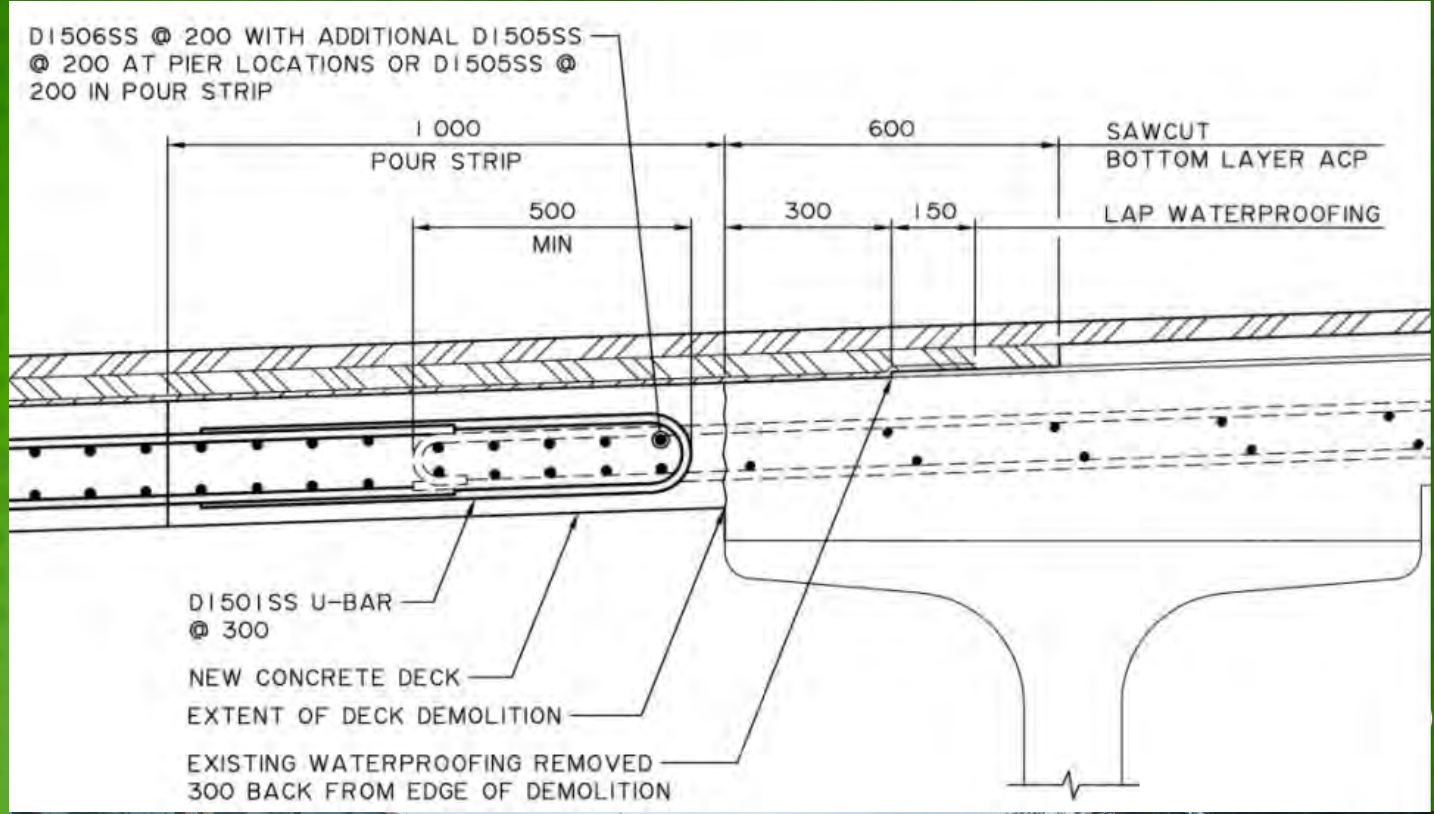
- 2 - 360.0 m long 4 span bridges
- Span arrangement: 80.0 – 100.0 – 100.0 – 80.0 m
- Widened from 12.9 m to 16.6 m
- 1 additional 3.7 m wide lane in each direction
- 225 mm thick cast-in-place concrete deck

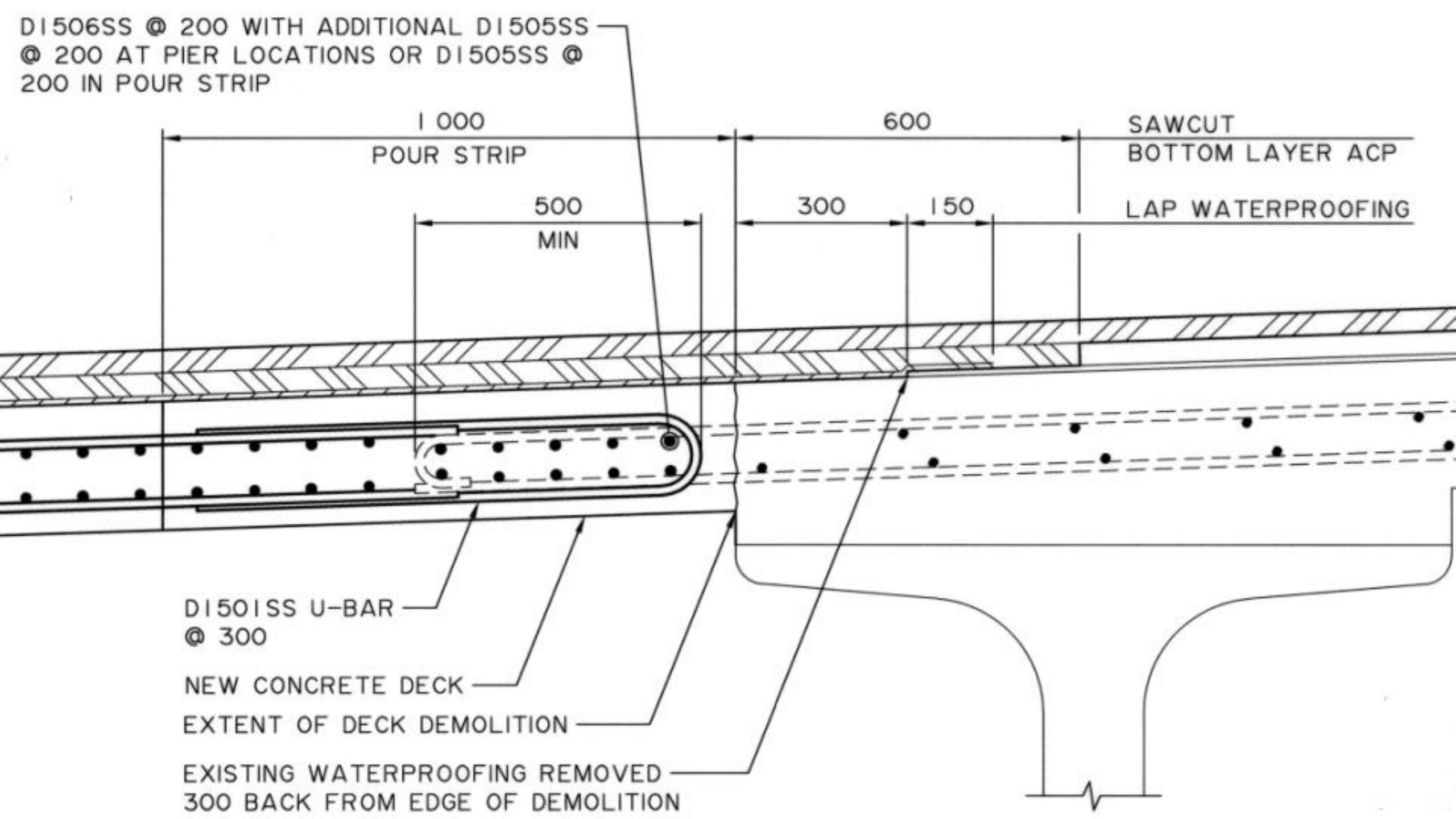


SOUTHWEST ANTHONY HENDAY DRIVE OVER WEDGEWOOD CREEK

SOUTHWEST ANTHONY HENDAY DRIVE OVER WEDGEWOOD CREEK

- 2 - 135.0 m long 3 span bridges
- Span arrangement: 41.5 – 52.0 – 41.5 m
- Widened from 12.9 m to 16.6 m
- 1 additional 3.7 m wide lane in each direction
- 225 mm thick cast-in-place concrete deck




D1506SS @ 200 WITH ADDITIONAL D1505SS @ 200 AT PIER LOCATIONS OR D1505SS @ 200 IN POUR STRIP
1 000
POUR STRIP
600
SAWCUT
BOTTOM LAYER ACP
500
MIN
300
150
LAP WATERPROOFING
D1501SS U-BAR @ 300
NEW CONCRETE DECK
EXTENT OF DECK DEMOLITION
EXISTING WATERPROOFING REMOVED 300 BACK FROM EDGE OF DEMOLITION

Questions?