



Happy Saint Patrick's Day

# Glenmore Trail / 37<sup>th</sup> Street SW Interchange

CSCE Presentation  
March 17, 2011

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Chris Delanoy, P.Eng.





# Presentation Outline

- 1) Project Planning
- 2) Short-term Solutions
- 3) Design / Tender Phase
- 4) Bridge Innovations
- 5) Fast-track Construction





# Project Planning

- SWRR Referendum – June 30, 2009



## Tsuu T'ina reject Calgary ring road deal

More than 60 per cent of voting members cast ballots against deal



# Planning Timelines

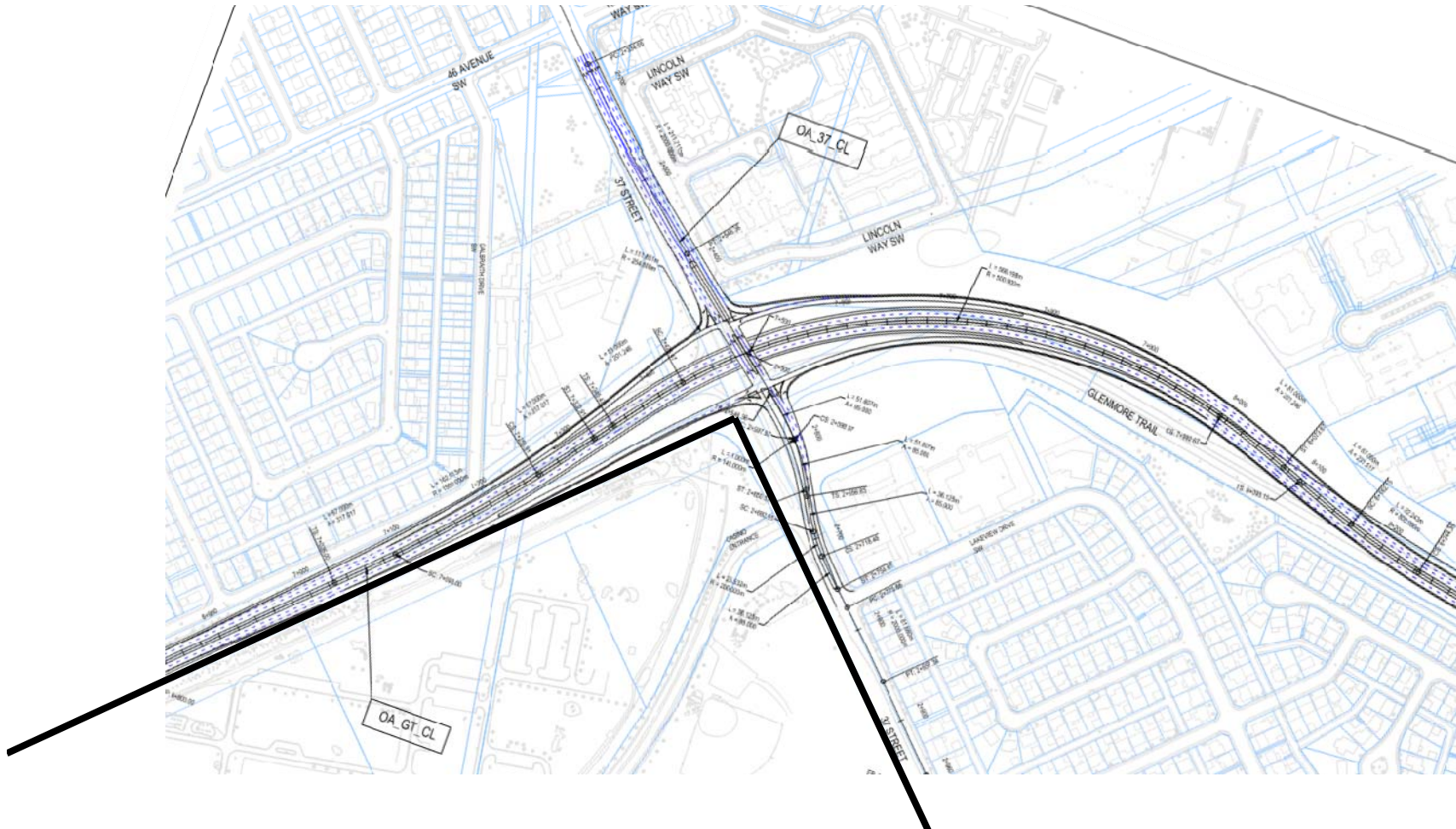
- July 5, 2009 – Council motion on G37
- July 15, 2009 – Project kick-off meeting
- August 17, 2009 – Functional Plan Complete







# Project Planning





Inspiring sustainable thinking  
islengineering.com





# Short-Term Solutions

- Significant queuing / delays - worst in the PM





# Short Term Solutions

- Three optimization options:
  - Ban EBL
  - Ban WBL
  - Ban both EBL/WBL
- 14 sub-options on how to achieve these

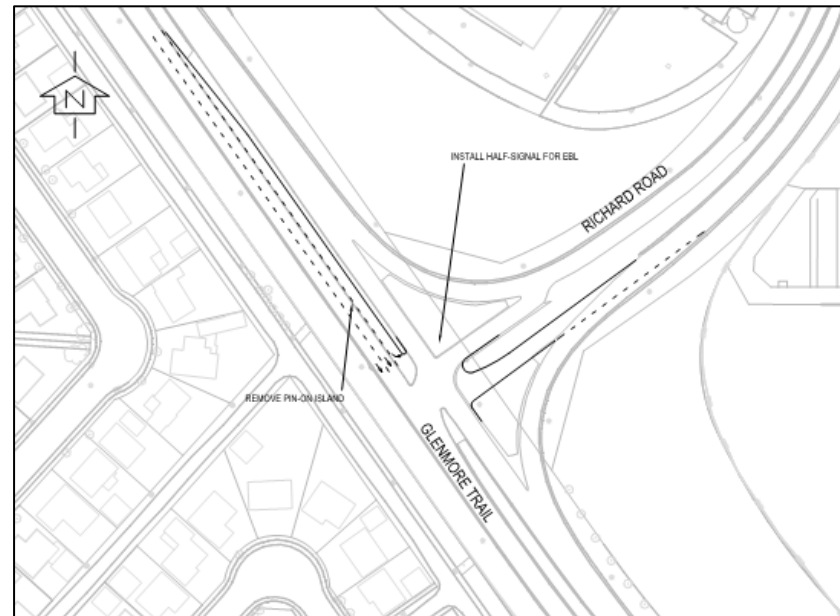






# Short-Term Solutions

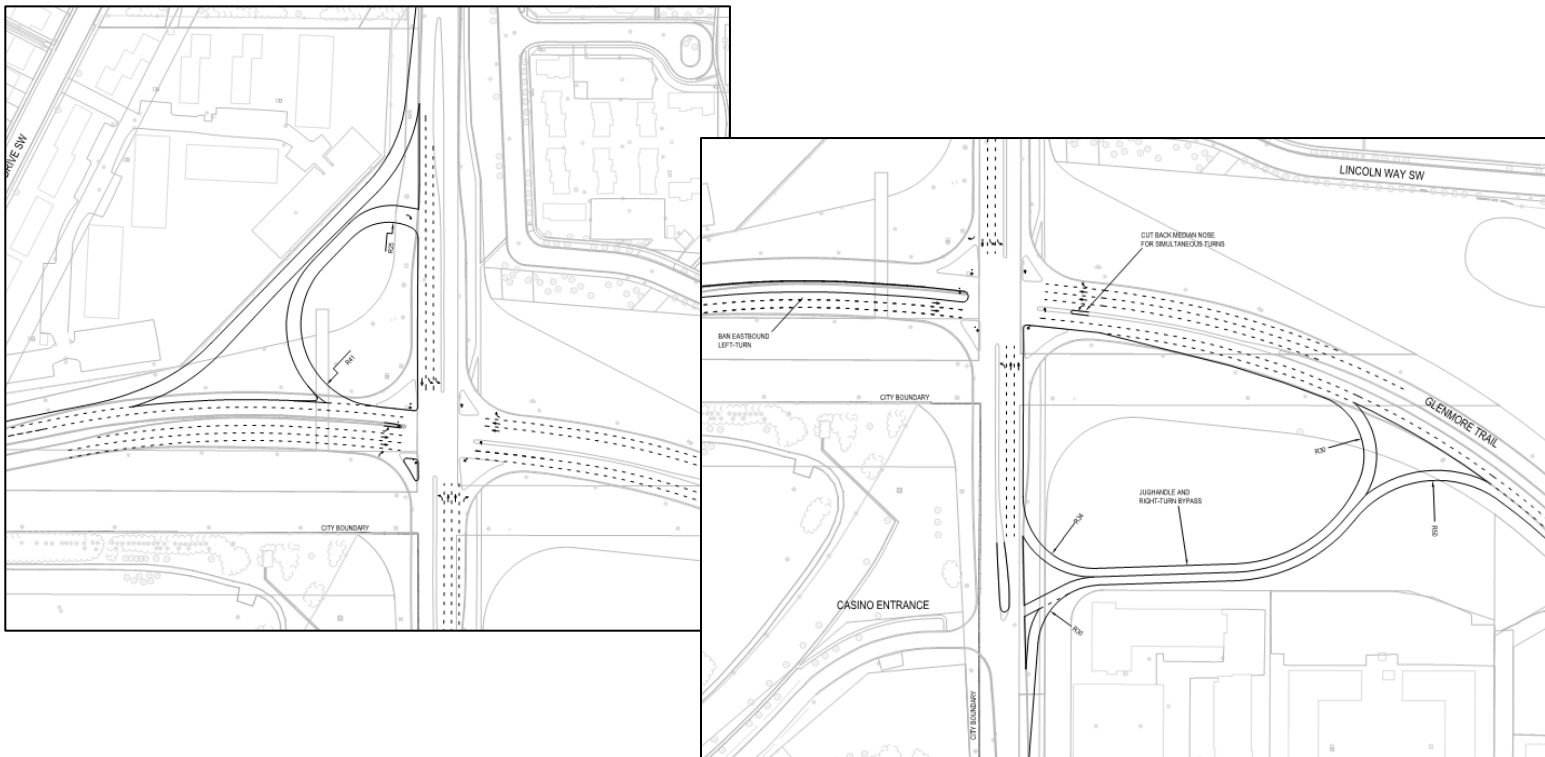
- Detours





# Short-Term Solutions

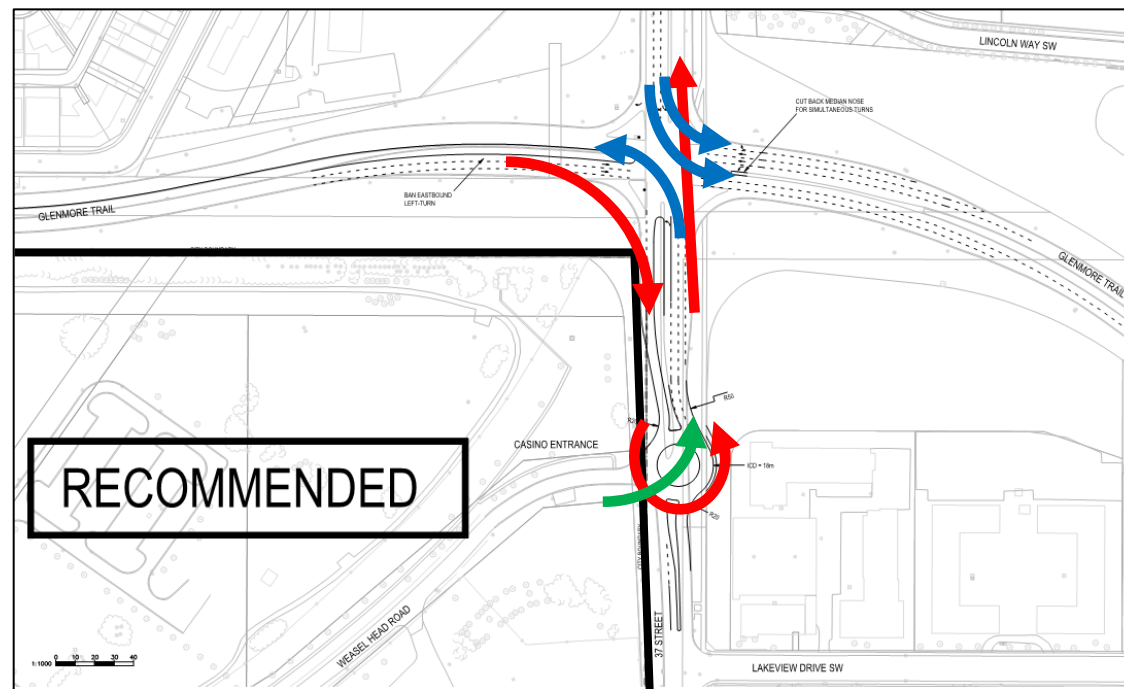
- Jug-handles





# Short-Term Solutions

- Recommended – EBL ban w/ Bowtie Roundabout





- [illegible]





# Short-Term Solutions





# Short-Term Solutions

- Immediate travel time improvements

Movement	Before	After
WB – PM	8:59	6:07
EB – PM	5:02	5:12
SB - PM	11:55	5:53

!!!!





# Planning Timelines

- September 14, 2009 – Council-approved plan  
*Build within one year!*





# Design Stage

- October 28, 2009 – design proposal submission
- November 6, 2009 – project start
- September 2010 – interchange opening deadline







# Integrated Project Delivery

- Project delivered by **Integrated Project Delivery**.
- All parties have a vested interest in the timely completion of the project.
- All parties involved provided solutions to issues
- **PARTNERING** and cooperation by all.



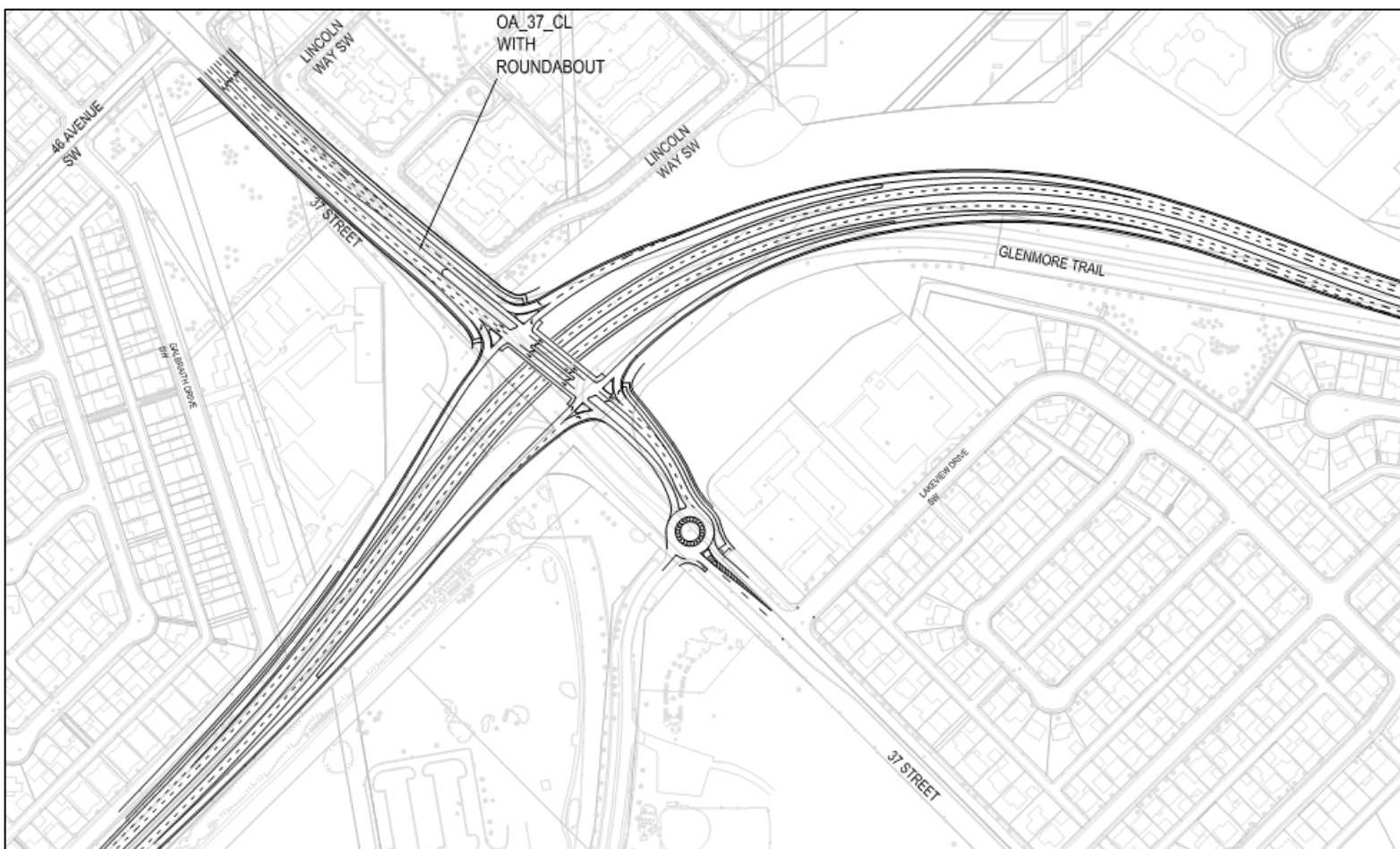
# Integrated Project Delivery

- December 14, 2009 – EOI Issued
- January 7, 2010 – EOI Closes
- Short-listed to 3 Contractors
- Anticipated Dates:
  - RFP / Tender February 1, 2010
  - Award March 15, 2010
  - Bridge Opening September 15, 2010





# Design Stage

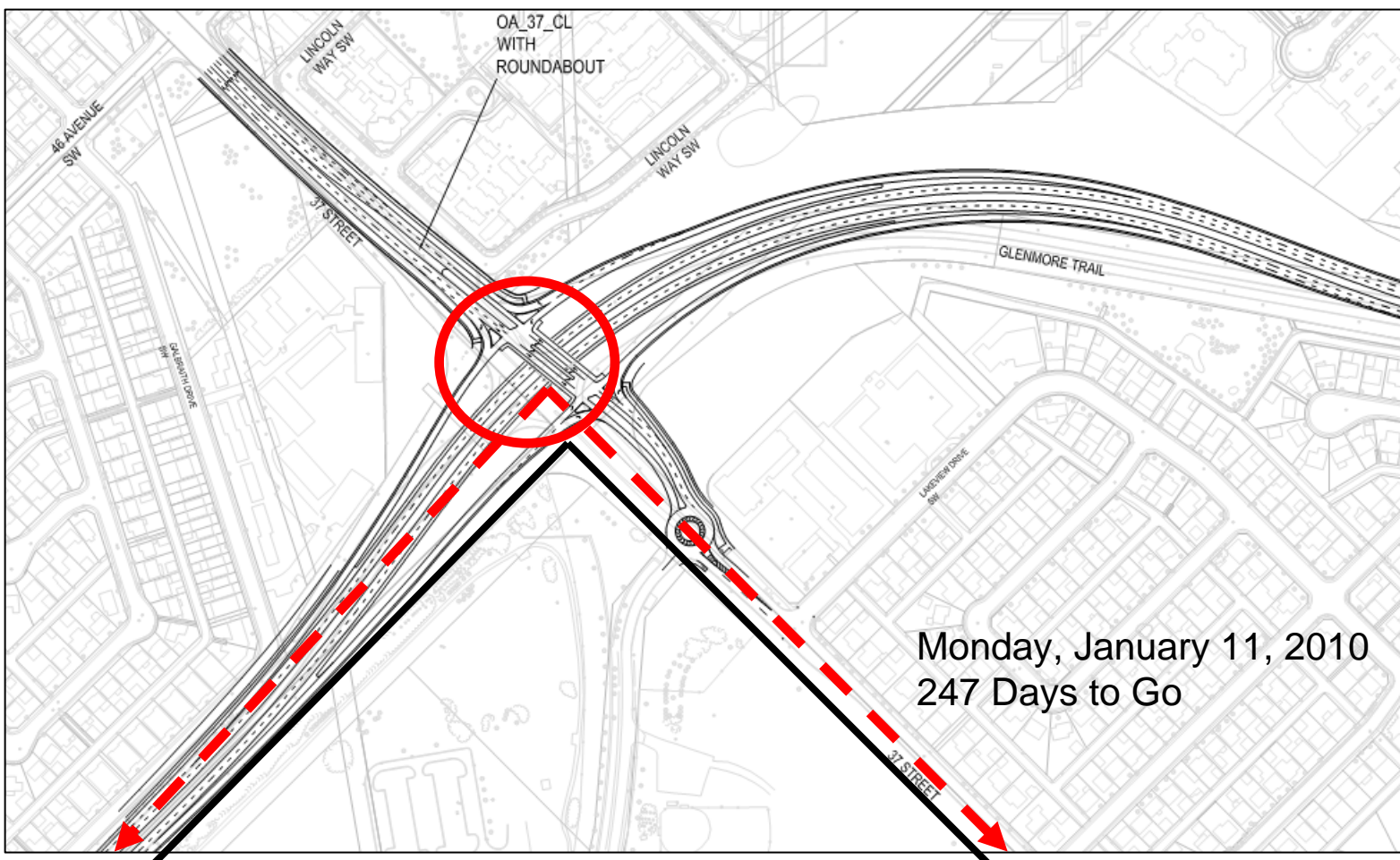








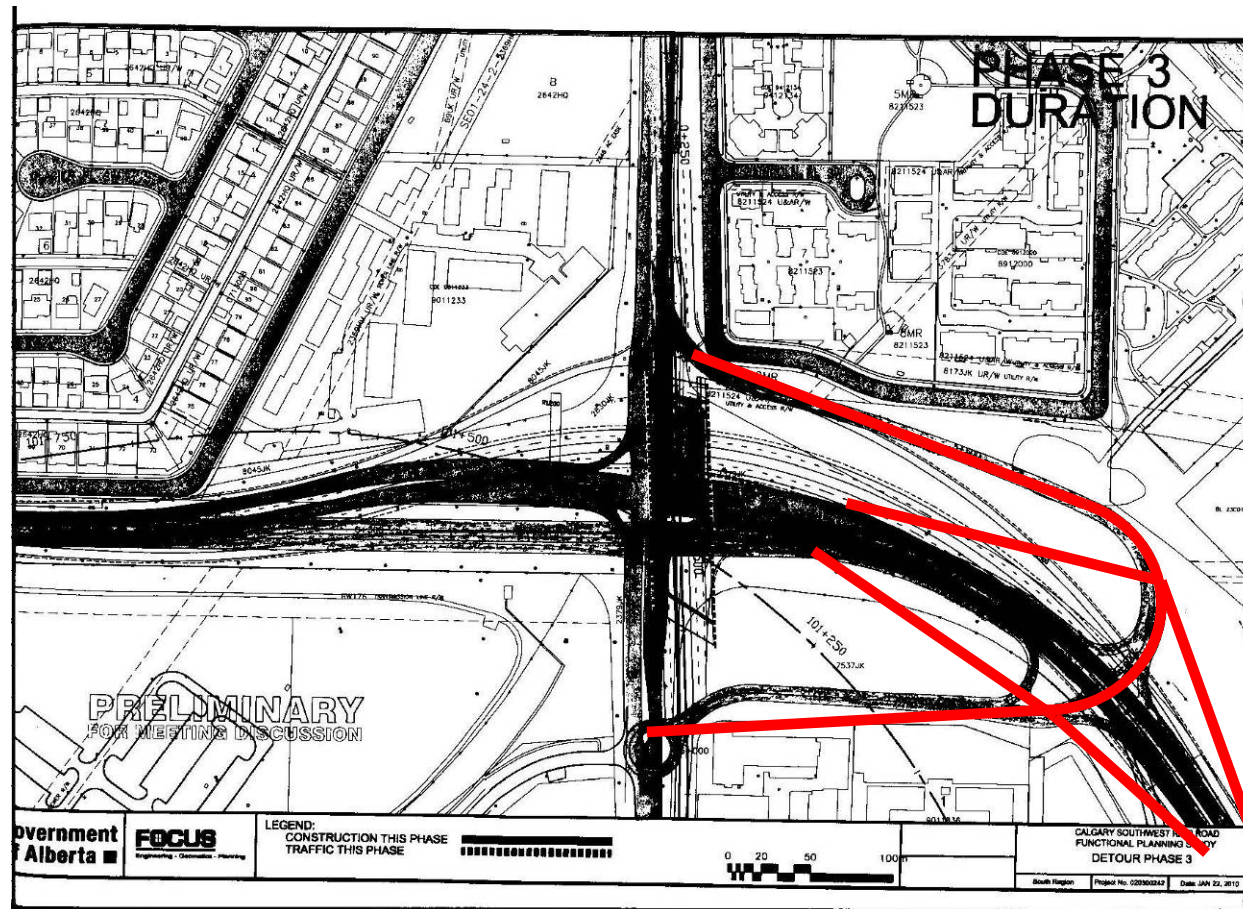
# Design Stage



Monday, January 11, 2010  
247 Days to Go



# Design Stage



Friday, January 15, 2010 243 Days to Go







# Design Stage



Monday, January 25, 2010 233 Days to Go





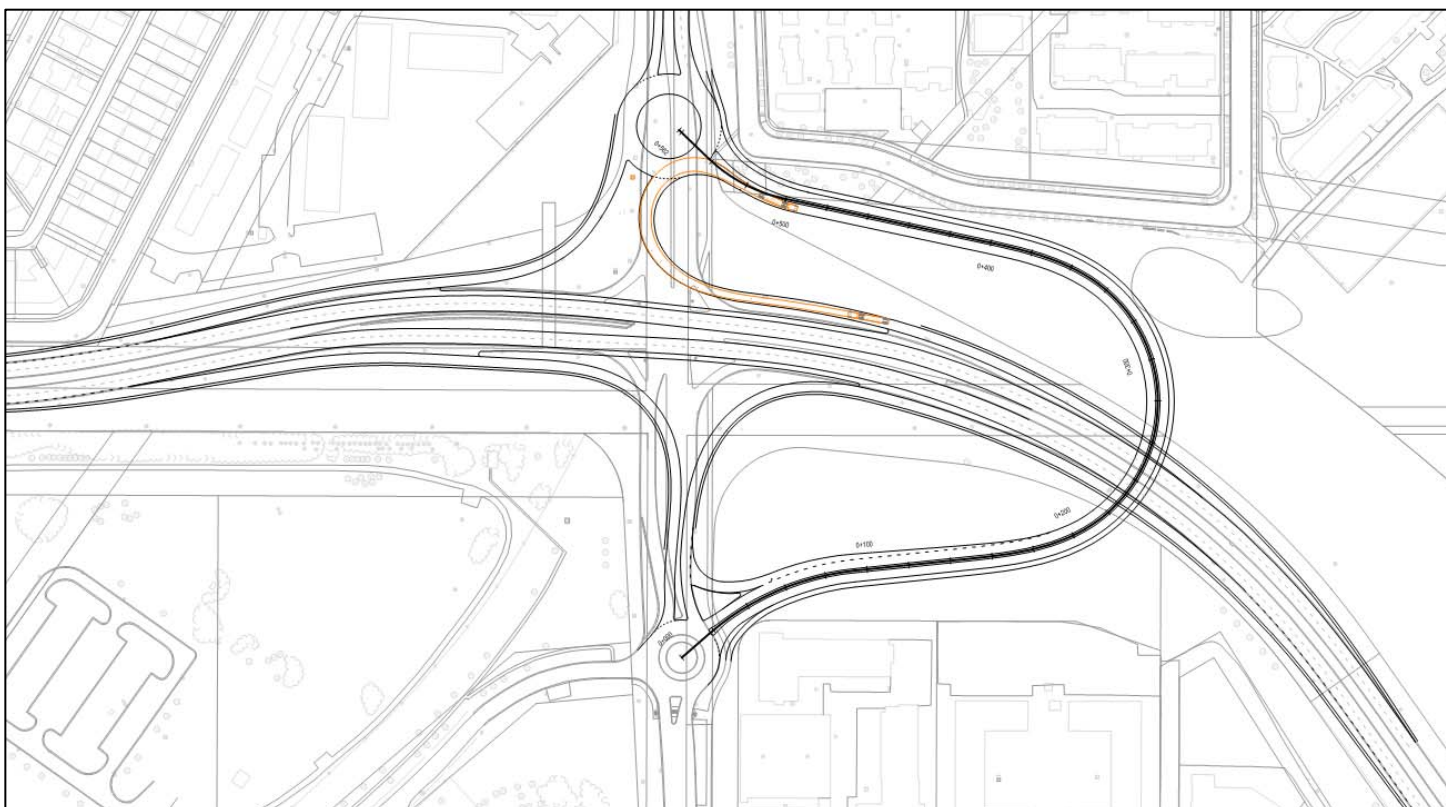
# Design Stage



Monday, January 25, 2010 233 Days to Go



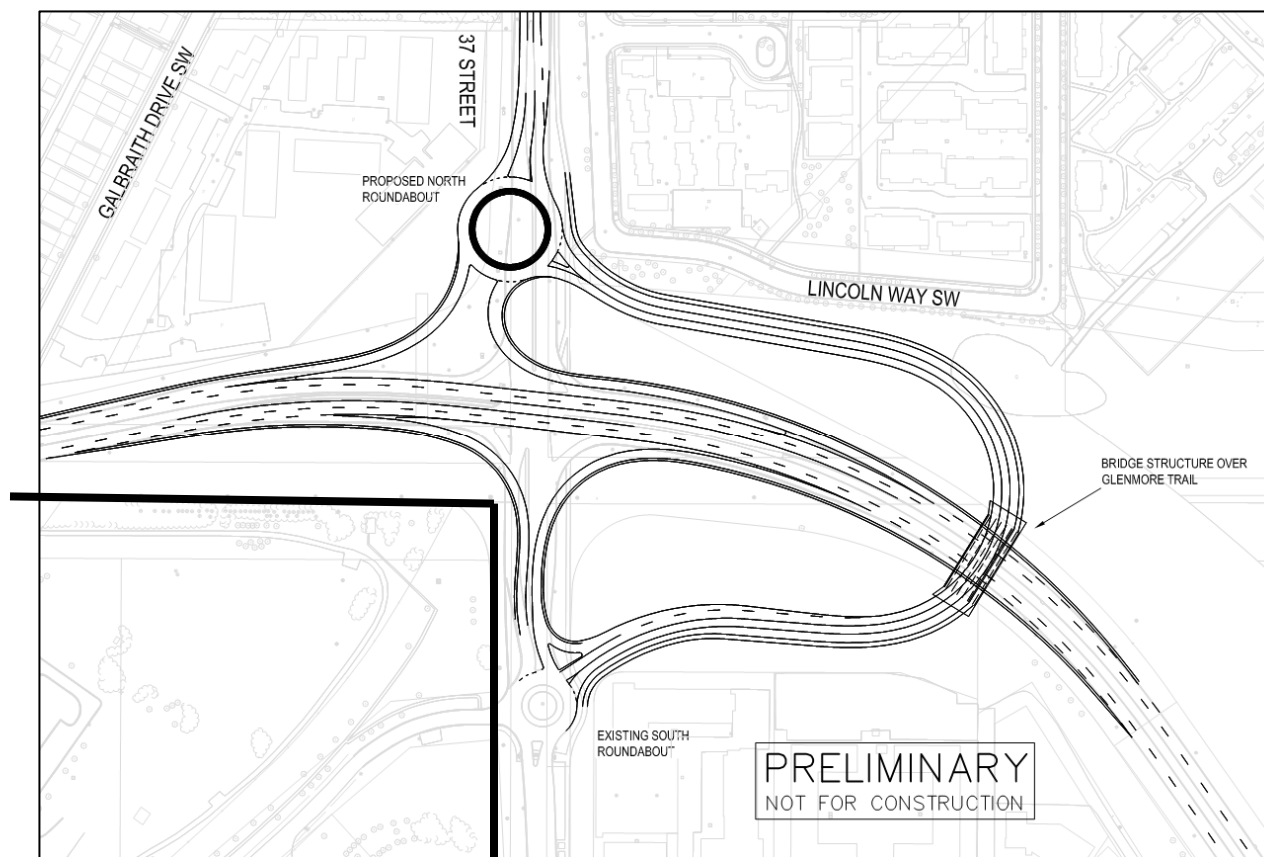
# Design Stage



Tuesday, January 26, 2010 232 Days to Go




# Design Stage



Friday, January 29, 2010  
229 Days to Go



# Tender



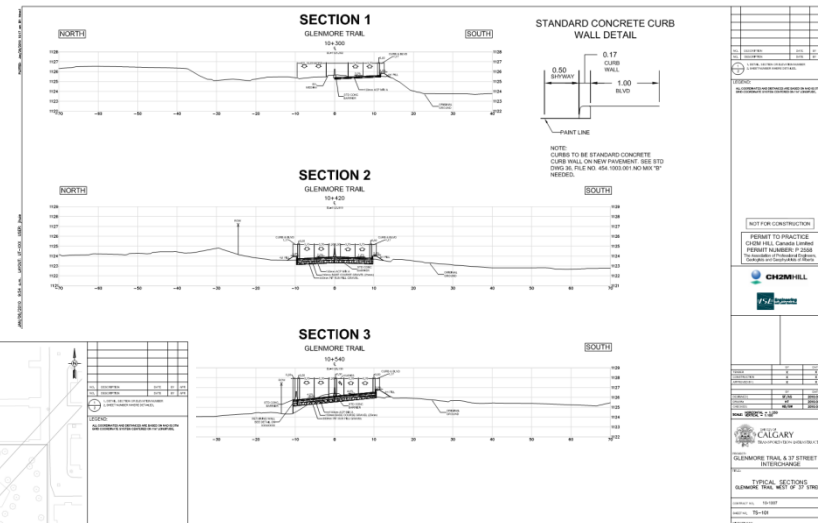
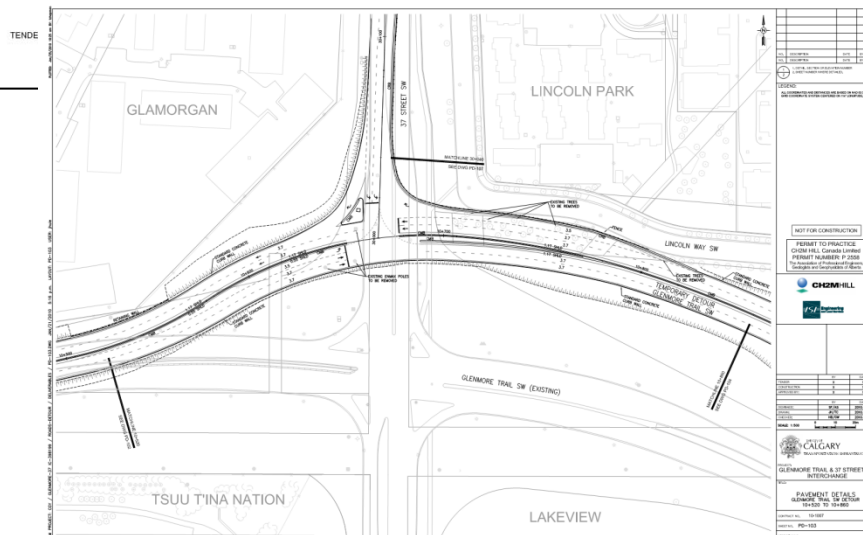
THE CITY OF CALGARY  
TRANSPORTATION INFRASTRUCTURE

CONTRACT FOR THE CONSTRUCTION OF  
TEMPORARY DETOUR AND PERMANENT ROADWORKS FOR  
GLENMORE TRAIL/37 STREET SW INTERCHANGE

ISSUED FOR TENDER  
FEBRUARY 04, 2010

2  
0  
1  
0

SET NO.



READY FOR TENDER

Thursday, February 4, 2010

223 Days to Go







# Tender



- Defer one month – redesign from scratch!
- Still be open by September 15, 2010



# Bridge Design

- After lengthy deliberations and essentially reaching an **impasse** between the municipal and provincial visions in late January 2010, ISL and CH2M HILL responded with a plan to construct a **temporary, low cost interchange as far away from the critical area of the ultimate SWRR as possible, and which could serve as the detour for the eventual SWRR construction**. The new plan was the essence of simplicity, with two roundabout ramp terminals, one on each side of Glenmore Trail, that provide access to a two-lane fly-over situated to the east.



# Bridge Design

- Has ISL done anything beyond the norm, **NO!!!!**
- ISL however has taken many innovative ideas and put them **ALL** into one interchange project
- The City of Calgary has accepted these innovative ideas as part of the design and has allowed the project to be completed in **record time**.



# Bridge Design

The project was **temporary**, some new approaches to construction were permitted having a design life of only **15-20 years**.

- Full-depth, full-width **precast bridge deck panels** were allowed
- The **three R's of sustainability** - Reduce, Re-use and Recycle - were adopted as a measure for the suitability of both design and materials.
- **Re-usable pre-stressed girders**, surplus to another project, were sourced and utilized.
- **Spread footing bridge abutments** were founded on Mechanically Stabilized Embankments (MSE) without piles, avoiding future abandonment of the piles underground.
- The fly-over bridge was designed so that it **could be taken apart** and re-used in its entirety, as were the MSE Wall Panels.

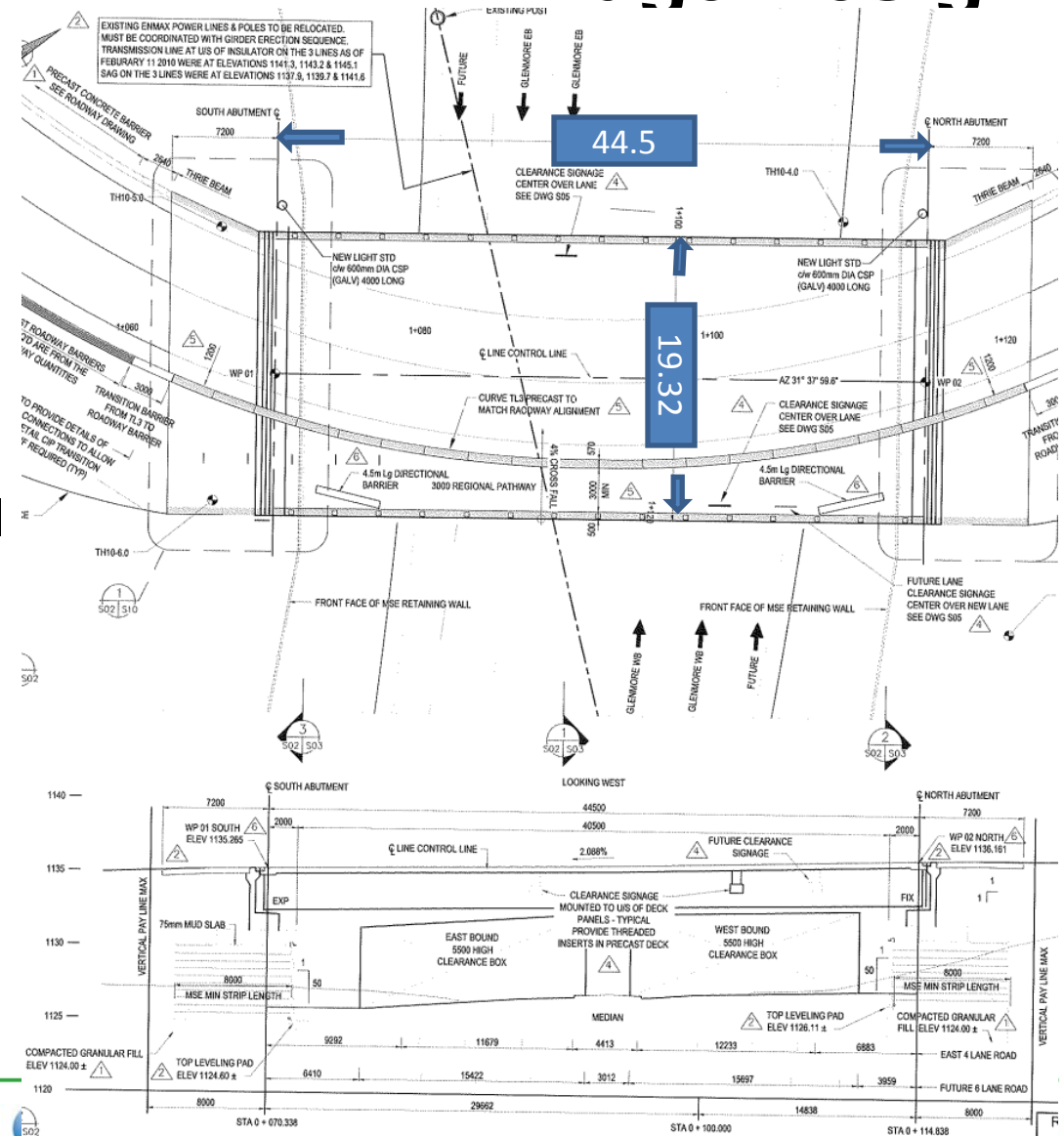




# Bridge Design


Plan view of the bridge.  
Very simple. Bridge is  
44.5 m long with a deck  
that is 19.32 m wide.  
The bridge is on a 4%  
cross fall and a longitudinal  
grade of 2.1%.

Curved Road /  
Straight Bridge!





# Tender



THE CITY OF CALGARY  
TRANSPORTATION INFRASTRUCTURE

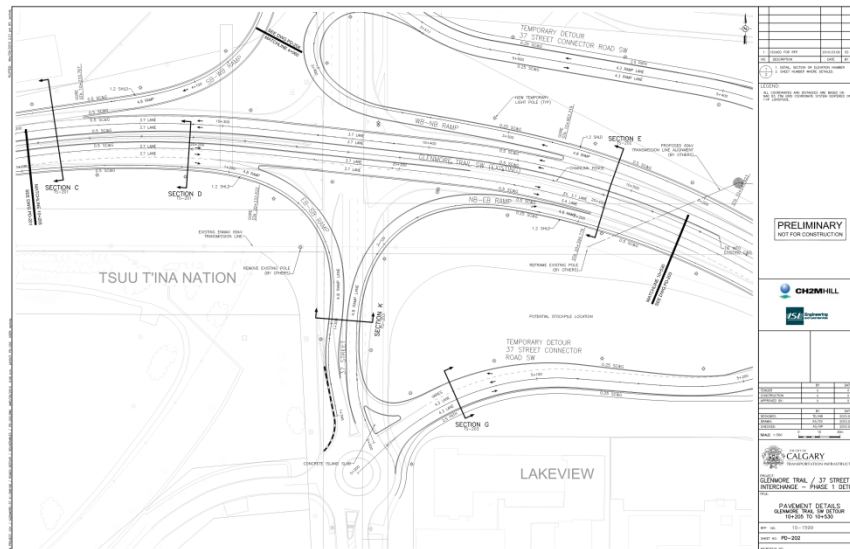
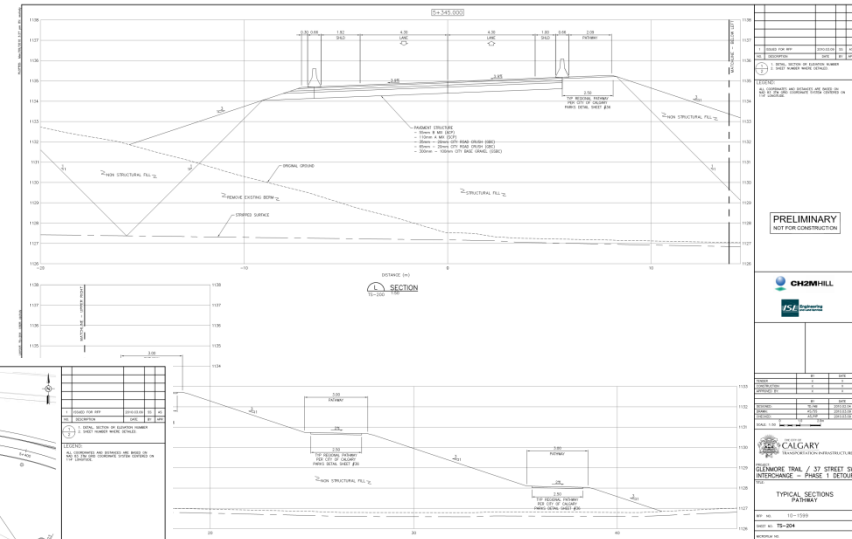
CONTRACT FOR THE CONSTRUCTION OF  
GLENMORE TRAIL/37 STREET SW INTERCHANGE - PHASE 1 DETOUR

ISSUED FOR RFP NO. 10-1599  
MARCH 09, 2010

RFP NO. 10-1599

2010

CH2MHILL



NEW RFP ISSUED @  
70% Design

Tuesday, March 9, 2010

190 Days to Go



# Tender

- RFP Closed – April 1, 2010
- Contract Award – April 15, 2010
- 153 Days to Go



**CONSTRUCTION LEADERS**



# Construction

- Ready to Build – May 12, 2010
- 126 Days to Go!







# Construction



May 21, 2010

117 Days to Go



# Construction



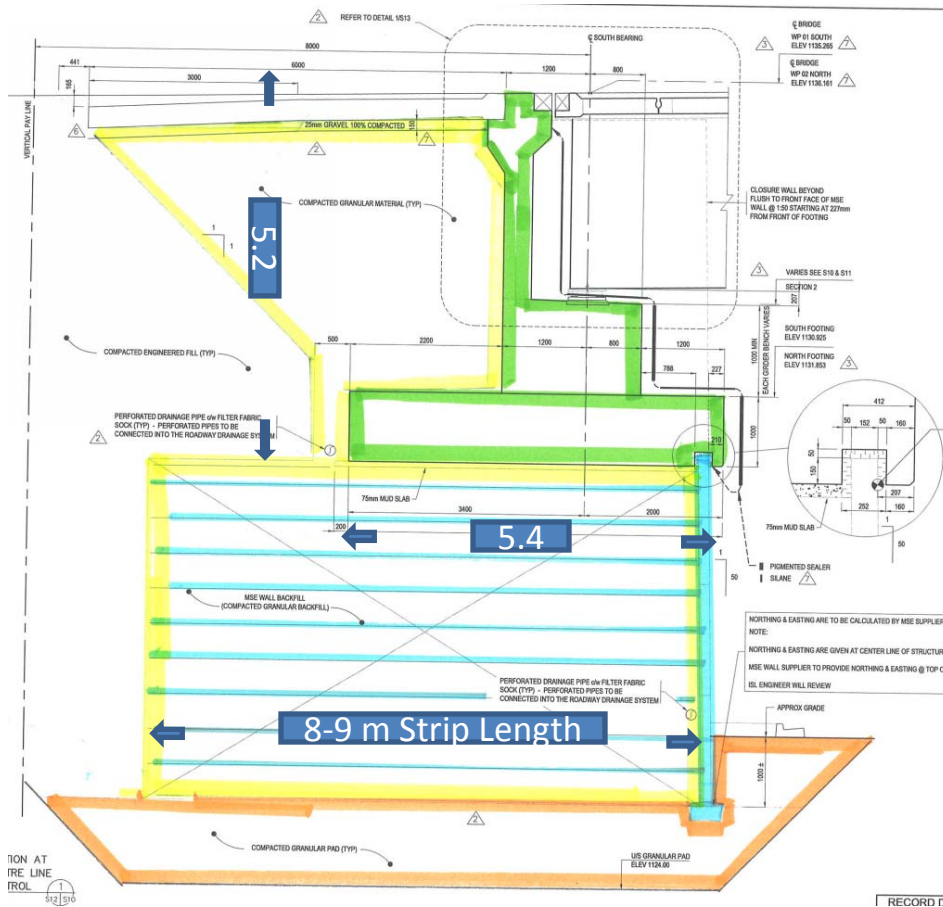
2.4 NU Girder  
Stockpiled in  
Calgary

Armtec Stockpiled Girders used for the G37 Project





# Construction



June 10, 2010  
97 Days to Go



# Construction



July 16, 2010

61 Days to Go





# Construction

MSE Wall being completed  
Along with Abutment



July 30, 2010

47 Days to Go





# Construction



August 9, 2010

37 Days to Go



# Construction

Completed Abutment on the eve of Girder Erection. The girders were erected over two nights from August 19 to 20.







# Construction

## NU 2.4 Girder Erection



August 19, 2010

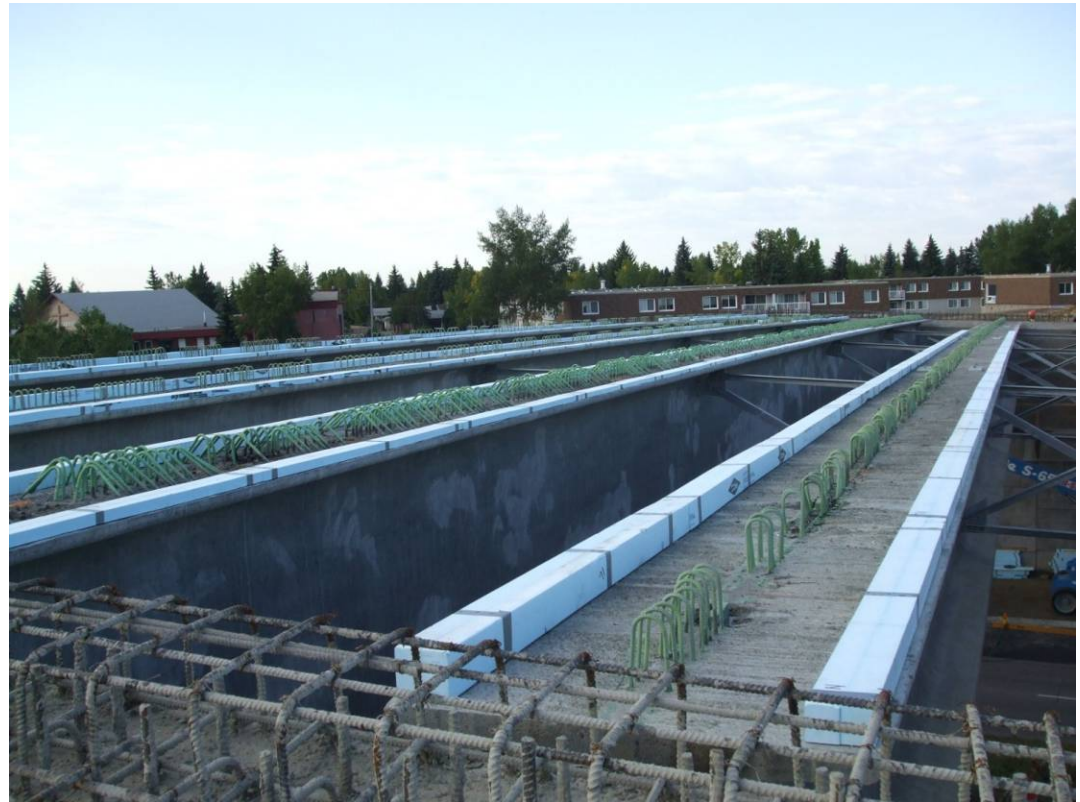
27 Days to Go





# Construction

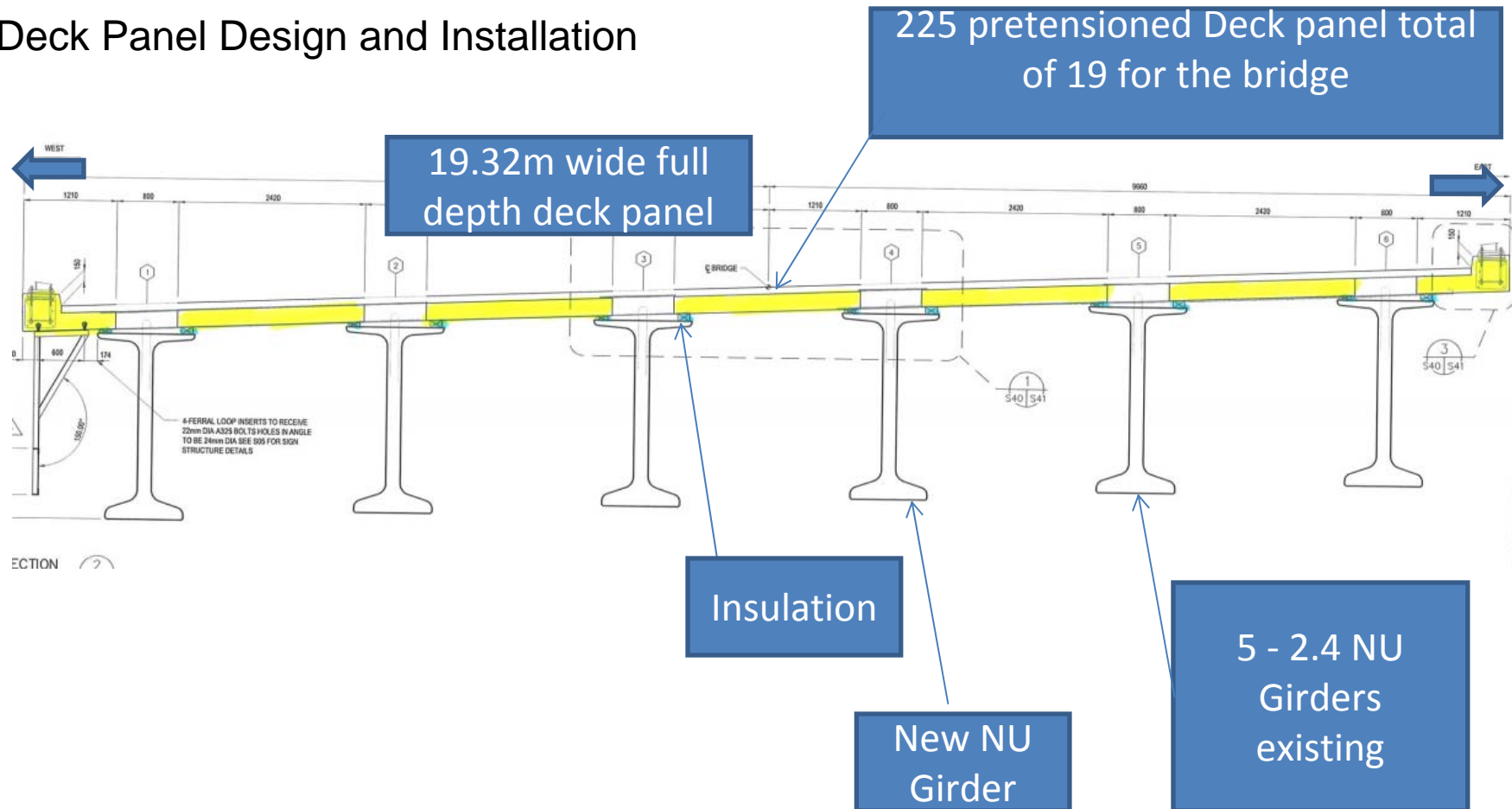
NU Girder is prepared and ready to receive the full width deck panels. Styrofoam used to create girder haunches. With the girders at 5 years old very large cambers. Some girders The foam depth was 125mm at the abutments.





# Construction

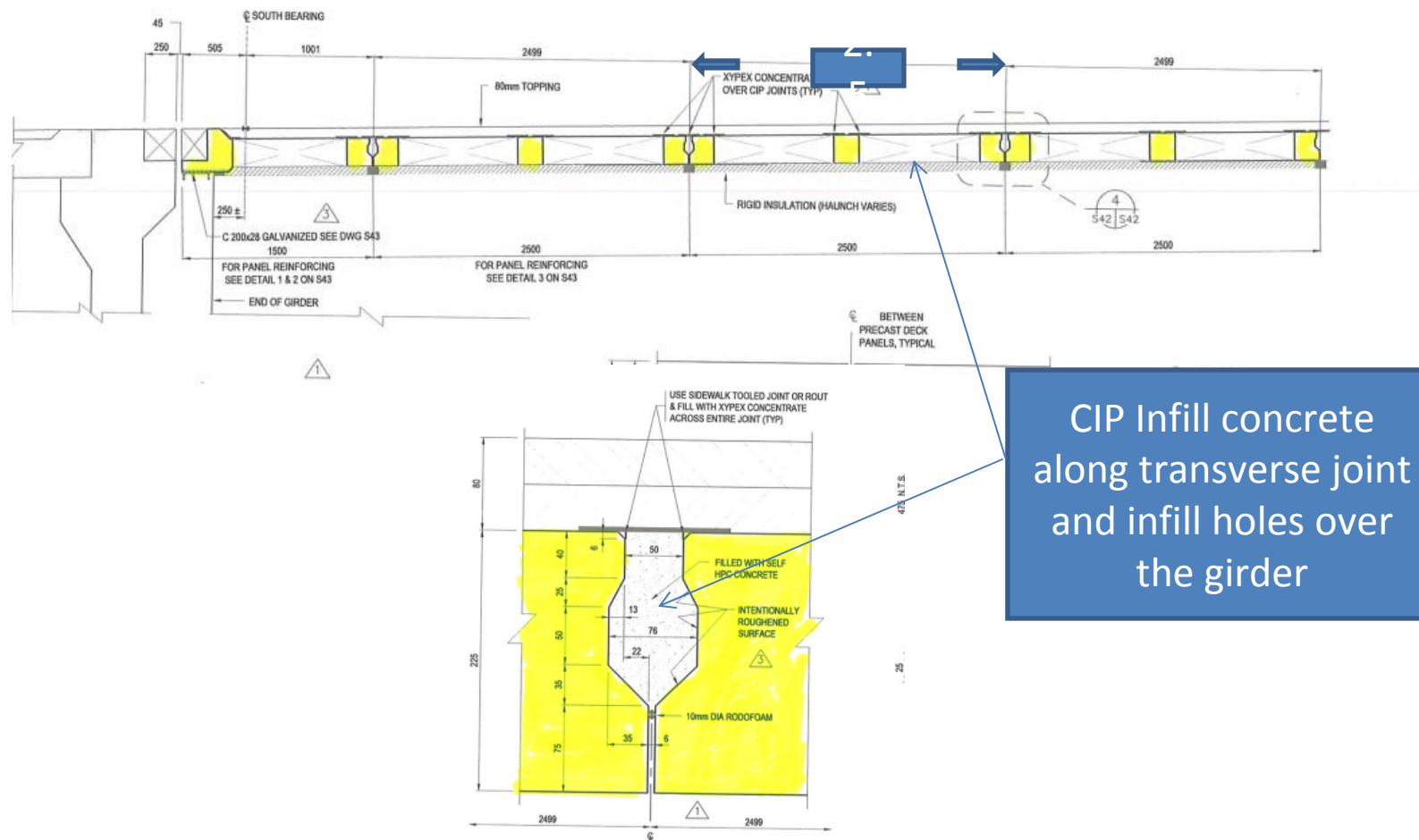
## Deck Panel Design and Installation





# Construction

## Detail of Deck Panels





# Construction



August 25, 2010

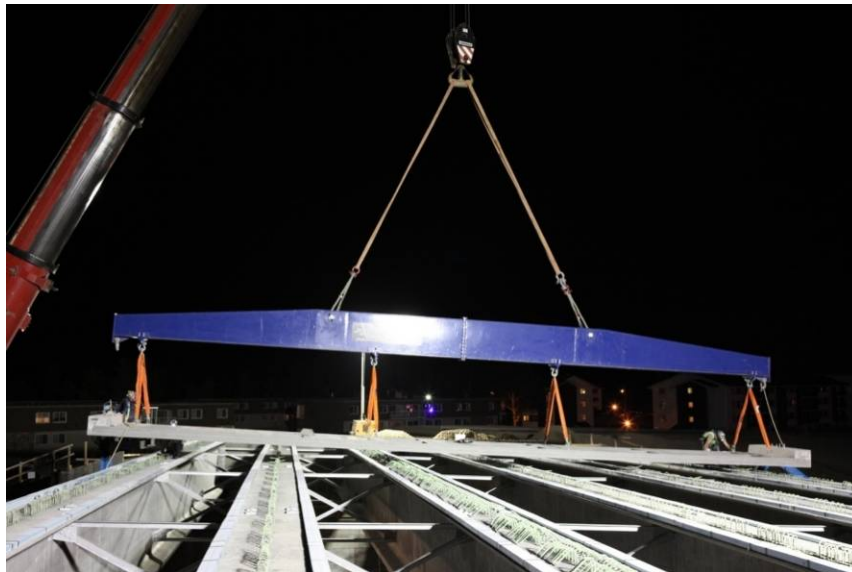
21 Days to Go





# Construction

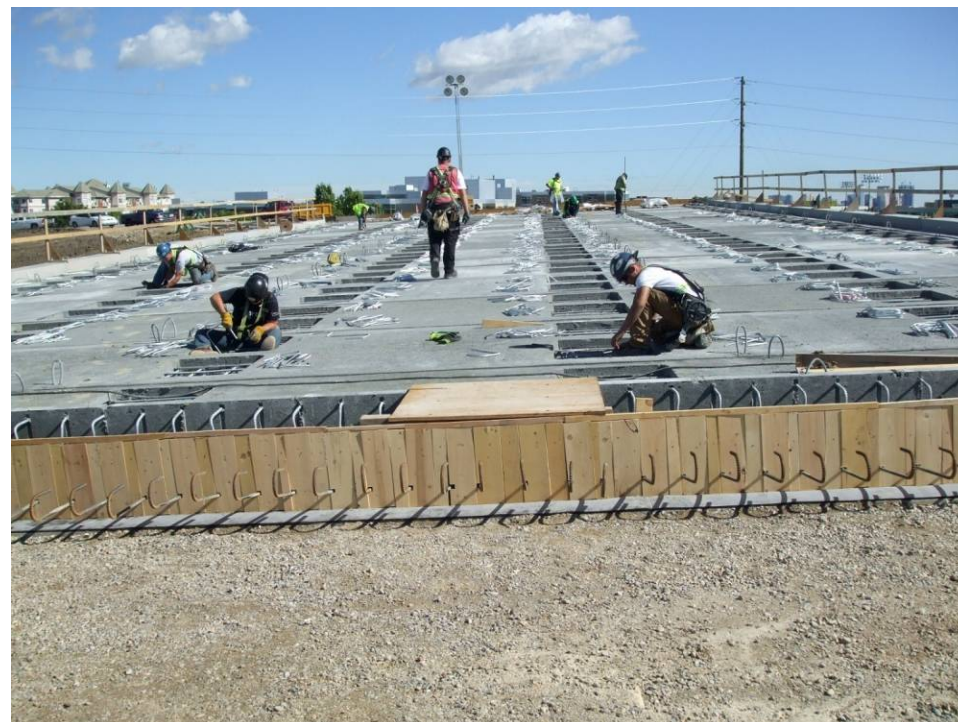
Installation of the full depth deck panels over three nights





# Construction

Instant deck!





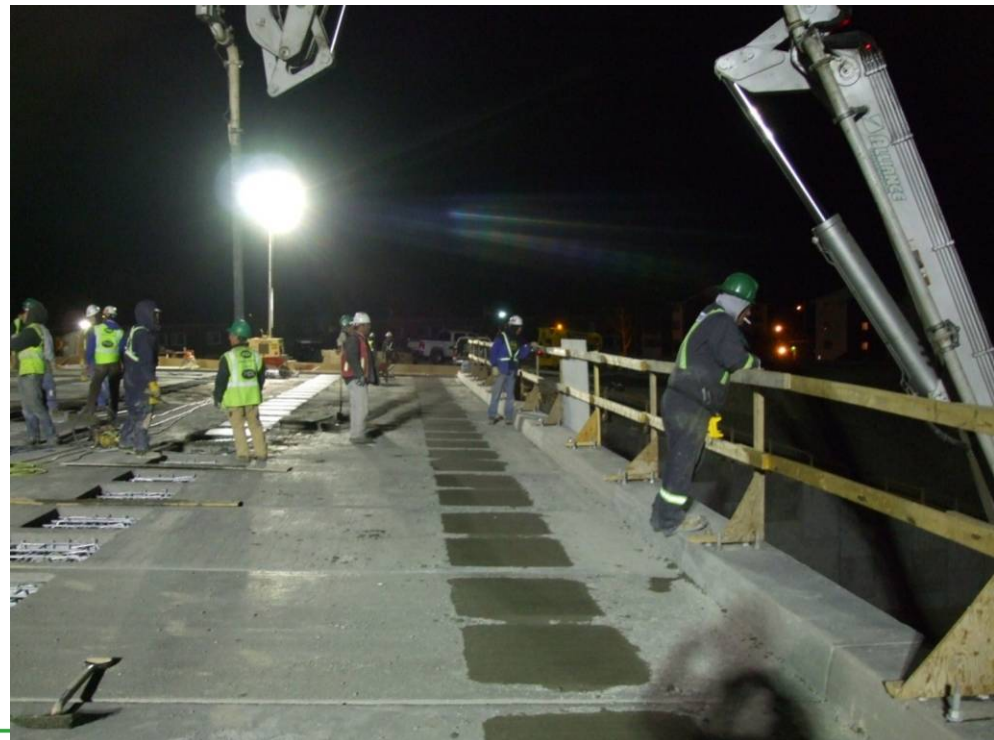


# Construction

## Reinforcing within Deck Panels and Infill Concrete



August 30, 2010  
16 Days to Go





# Construction

Completed deck with PL2 guardrail and pedestrian handrail installed



September 2, 2010  
13 Days to Go





# Construction

- Why no waterproofing?? First it was deemed that it could be too cold to guarantee the proper application. It was thought to place only butyl rubber, but when the shop drawing arrived it said it would need 50 mm of cover. The ACP was only 80mm would have left ridges. Xypex was placed on the joints. Did it work? In most parts yes. At this time with the 4% crossfall there is some water coming through the joints along the curb and this will be repaired in the spring

It was mentioned that the bridge can be dismantled.

- This can be done by removing the ACP and then hydro demolish the C-I-P concrete infills in the deck panels. Once this is done the deck panels can be removed. Girders can then be unbolted from the bearings and moved. Demolish the abutment concrete and then the MSE wall panels can be removed from the strips. **Voila the bridge is now gone.**



# Construction

## Lessons Learned

- a) Abutment resting on MSE wall, very good idea and fast.
- b) Reinforcing Steel within the deck panel and extending through the holes over the girder was **problematic**. In the future best to use **lenton couplers**, this will definitely speed up the process and installation of the deck panels with no interference from reinforcing steel. Thought the rebar would help give the panel a little more rigidity but in the end was an issue with the panel installation.



- c) Bridge appears to be functioning very well.



# Construction



Saturday  
Sept 4, 2010  
11 Days to Go





# Construction



## The final Days





# Construction



Saturday  
Sept 11, 2010

4 Days to Spare



# Construction

Completed Bridge September 11, 2010







# Construction

Bridge open to traffic September 11, 2010





# Construction



Saturday  
Sept 11, 2010

4 Days to Spare





# Construction



Sept 22, 2010

11 Days Later





# Construction



Nov 4, 2010

54 Days Later





# A final thought...



So...  
does it work?



# A final thought...

Then why am I  
still stuck on  
Glenmore?







# A final thought...

Blame Richard Road!





# Teamwork!

## Acknowledgements

City of Calgary: Duane Delaney, Jadwiga Kroman, Jason Lin  
Monique Castonguay

CH2M: Andrew Boucher, Trevor Dueck, Ovi Stroescu

PCL: Duncan Fitzpatrick, Ian Ooi, Wade Straka

ISL: Calvin McClary, and everybody!

Editor: *Vincent Hanley*





# Teamwork!

## Calgary Herald Editorial

October 6, 2010



The new interchange at Glenmore Trail and 37<sup>th</sup> Street S.W. is a prime example of how limited projects can bring huge benefits. The additional of a roundabout and overpass on 37<sup>th</sup> Street for left-turning traffic onto Glenmore and the corresponding removal of traffic lights has wrought an amazing change in traffic flow, reducing stops and starts and shortening commute times through the area. Construction was brief, minimally disruptive and did not landholders' noses out of joint.

In other words, the interchange is an exemplary piece of work which should serve as a model for further improvements citywide.





# Teamwork!



February 4, 2011

Award of Excellence – Project Management



# Teamwork!



Questions?

