

Using VA to determine the “right” project scope

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A ship in port is safe, but that's not what ships are built for.

Grace Hopper

There is as much risk in doing nothing as in doing something.

Trammell Crow

No one ever achieved greatness by playing it safe.

Harry Gray

You can't steal second with your foot on first.

Chuck Noe

Cost and Quality have no direct relations

Larry Miles

Why Does VE Work for Right-Scoping ?

- All Projects, Products and Processes Have Unnecessary Costs
- Decisions Are Often Made Without Knowing The Cost Impact
- The typical Design Process Focuses On Expected Solutions
- Cost effective, timely and defined process to re-evaluate a project

Two Studies

- Highway 7 New Alignment Kitchener To Guelph
 - Cost/Risk and Value Engineering
- Highway 6 New Alignment Freelton to Guelph
 - Value Engineering Study

Steps after EA Clearance

● Typical Process

- Initiate Consultant Engineering Assignment for Preliminary or Detail Design through a Proposal process

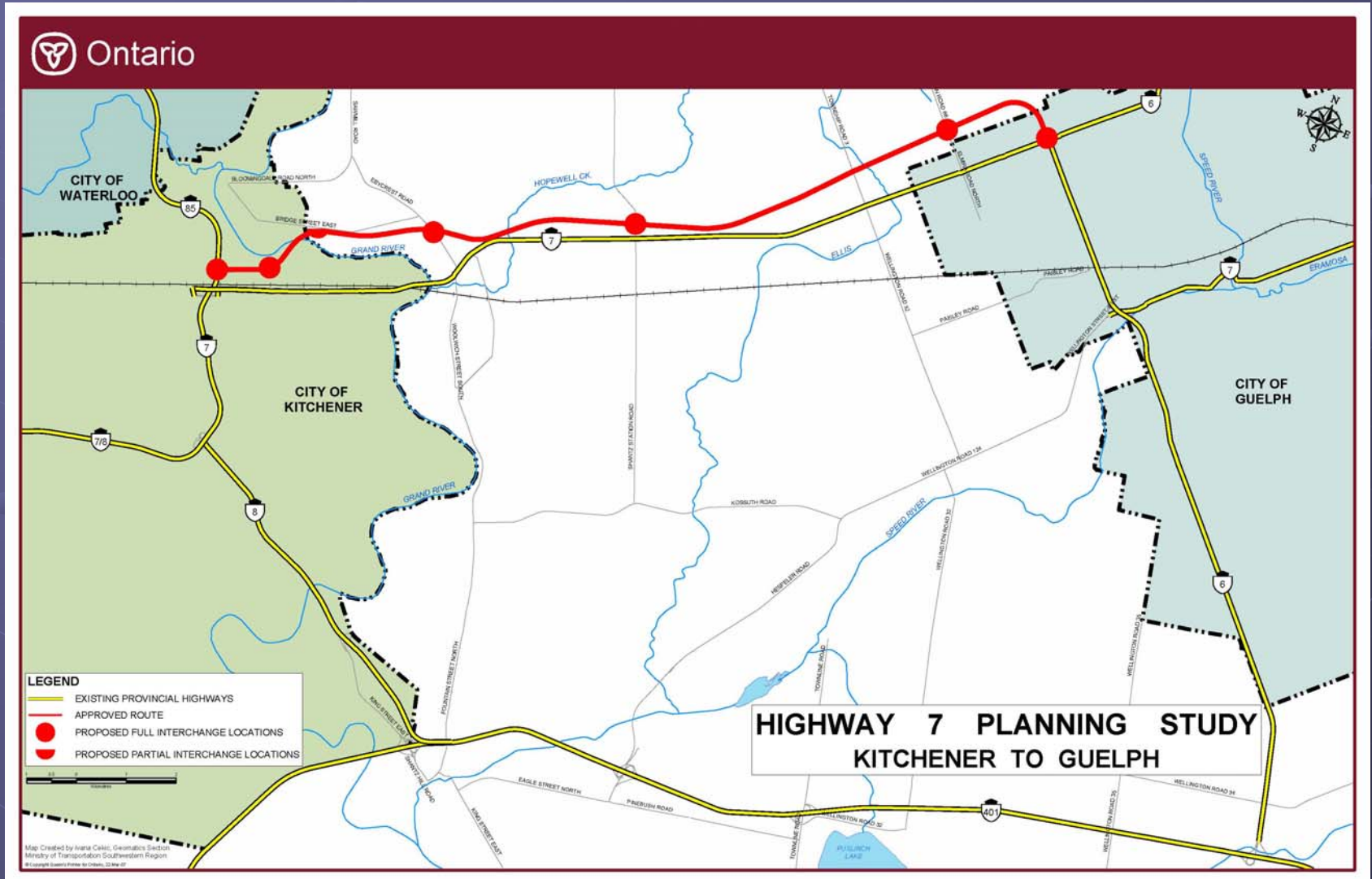
● Right-scoping process

- Complete a VE Study on the approved EA alternative
- Seek implementation of ideas for right-scoping
- Initiate Proposal Process

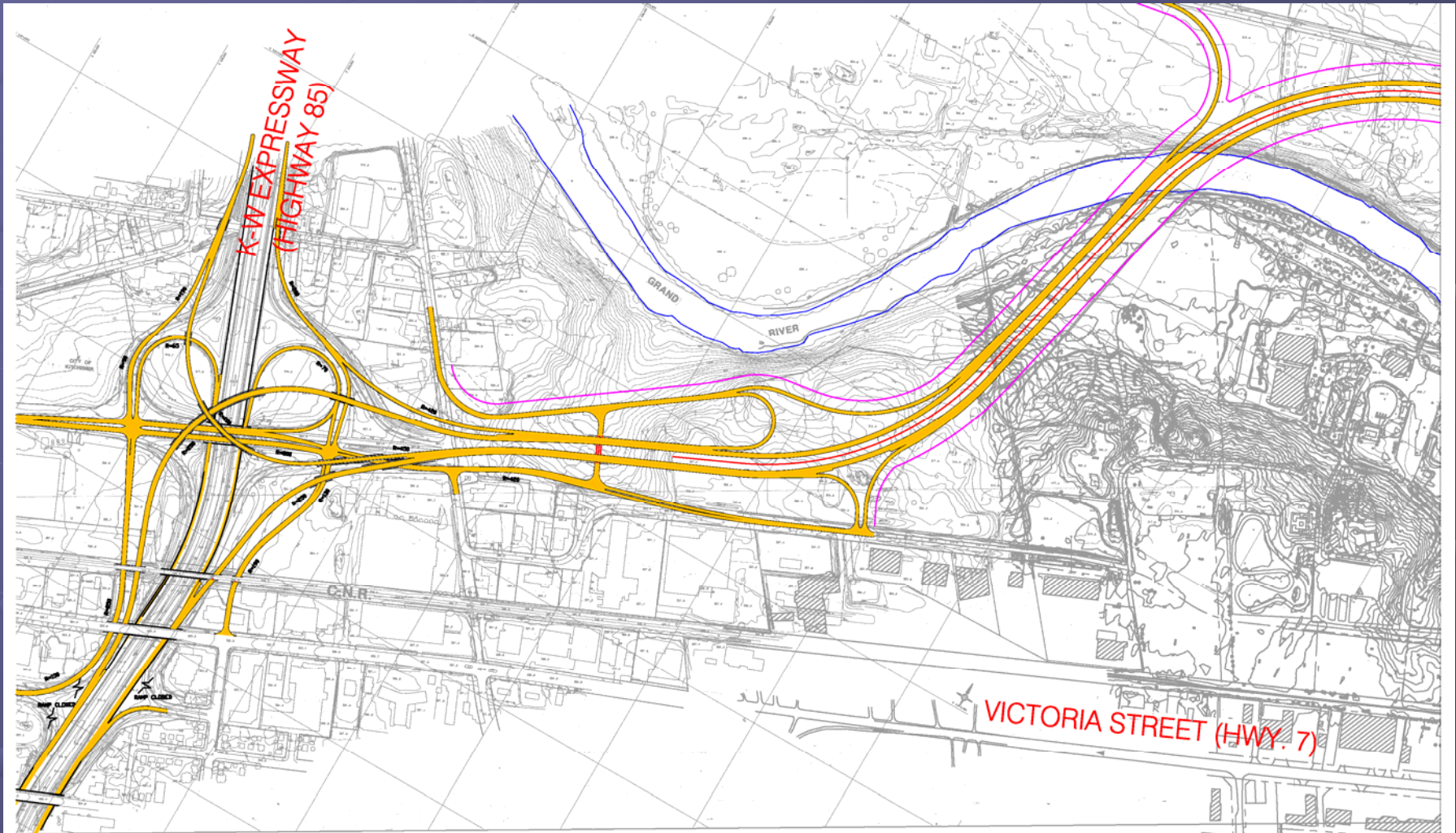
Why Right-scope?

- Projects with long histories (20-30 years)
- Opportunity to engage a team of experts in to seek value and validation
- Milestones allows time for right-scoping before moving into the next project phase
- Independent review of Cost Model
- **BUILD THE RIGHT PROJECT!**

Highway 7 New Kitchener to Guelph



Highway 7 New Kitchener to Guelph



Hwy 7 Value Engineering Study

- Largest single VE study ever undertaken by MTO (prior to DRIC studies)
- VE Team jointly lead by Marshall Macklin Monaghan (MMM Group) and iTrans (now HDR)
 - Additional members from: Faithful+Gould, MACTEC, Davis-Langdon, WCS, Thurber, Human Factors North, HCI, and MTO
- Safety Audit of base case completed pre-study.
- Value Engineering Study completed in Kitchener April 30 to May 4, 2007.
- Focused 5 days on workshop. Split pre/post activities as concerned over maximizing time for workshop.

Hwy 7 Performance Measures



Team Developed 7 Performance Measures

		Weight
● Safety	(collisions)	22
● Human Factors	(predictability, signs, geometry)	17
● Traffic Operations	(v/c, weaving, queuing)	19
● Access	(interchange access, local road across)	13
● Sustainability	(environmental, growth)	12
● Constructability	(staging complexity, resources, access)	8
● Maintainability	(structures, roadway cross-section)	8

Hwy 7 VE Scenarios

- 212 ideas generated, 56 ideas evaluated in detail, 29 were developed into VE alternatives.
- The VE Team grouped these alternatives into 5 Scenarios based on function or impact.
- Scenario 1 - Minimal Improvements
- Scenario 2 - Minimal Improvements with various interchanges deferred
- Scenario 3 - Moderate Improvements with Roundabouts
- Scenario 4 - Moderate Improvements
- Scenario 5 - Reduced Expenditure / Constrained Funding
- MTO Subsequently developed Scenario 6 which became the basis for implementation

Next Steps for Highway 7

- Implementation of VE alternatives would be considered a significant change to the approved EA
- Prepare a TESR to document changes and obtain environmental approval before implementing
- Affects Engineering Property Acquisition and EA for the Detail Design
- evaluate VE ideas, and incorporate acceptable VE ideas into the project design
- develop the EA Planning Design to 30% Detail Design completion

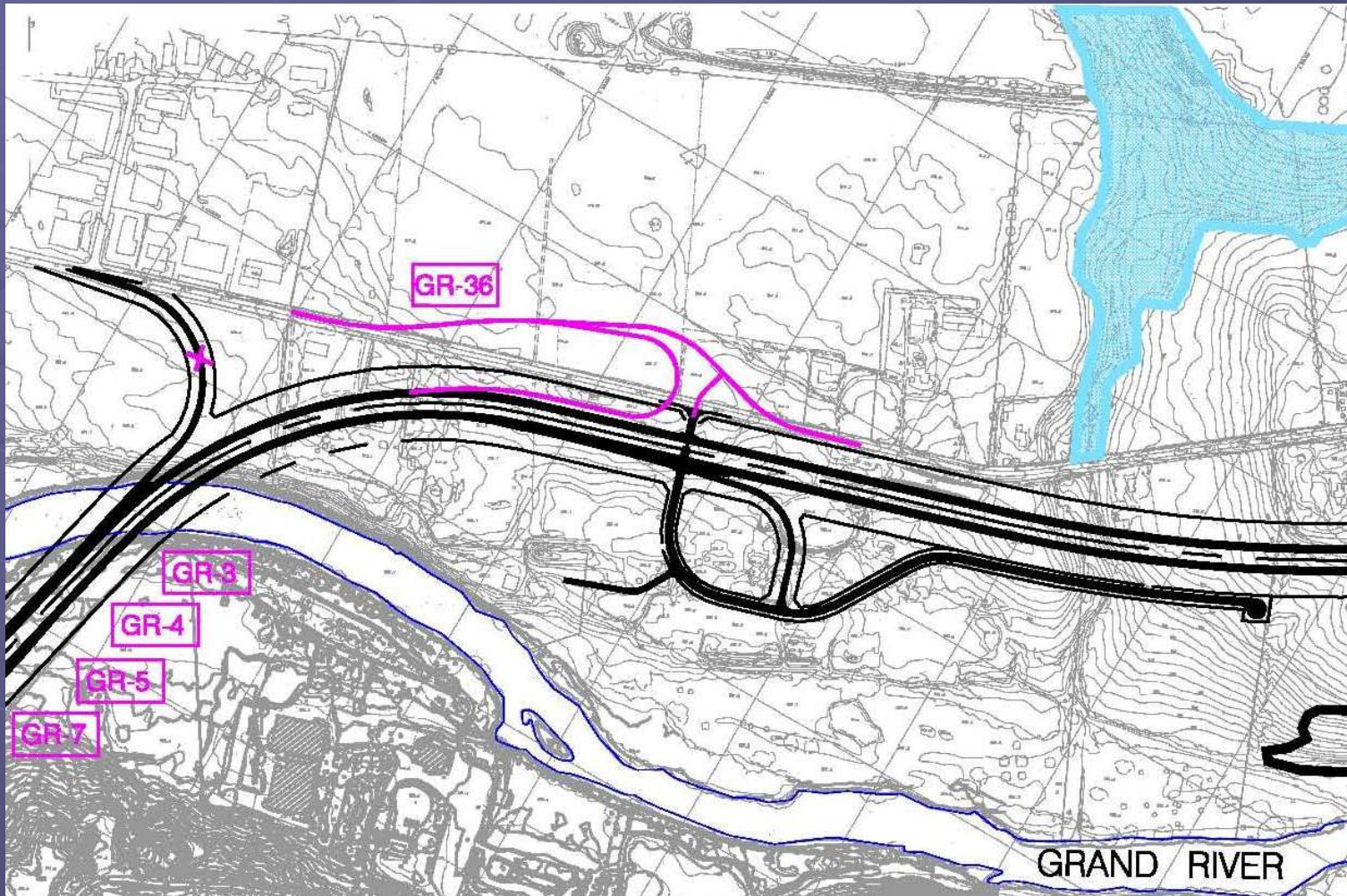
Proposal Included:

- Stakeholder meeting to consult with affected parties
- Preparation of a TESR
- MTO identified the specific VE ideas to be further assessed
- VE ideas considered acceptable will be incorporated into the project design.
- Document the assessment and recommendations
Alignments (horizontal and profile), cross-section, quantities and cost, environmental impacts, and property impacts will be assessed and documented.
- RFP process allows proponent to propose plan for assessment and the TESR

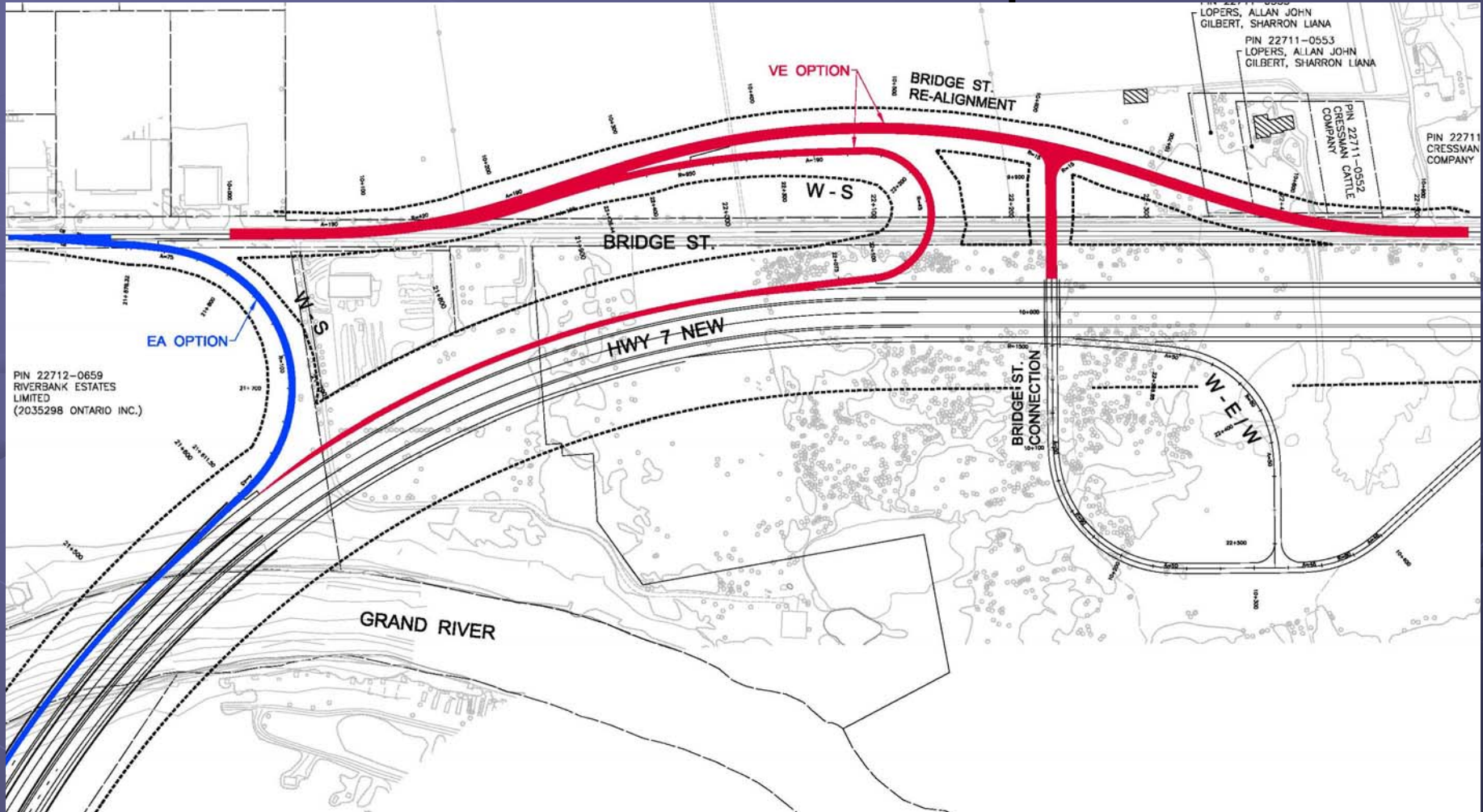
Moving Forward....

- 2 engineering assignments currently underway.
 - MMM Group developing VE recommendations within a Preliminary Design/Detail Design assignment.
 - Thurber Engineering undertaking a Foundation and Pavement Field investigation.

Example: GR-36 Realign Bridge Street and Relocate On-ramp



GR-36 Realign Bridge Street and Relocate On-ramp



GR-36 Realign Bridge Street and Relocate On-ramp

● Advantages of VE Option

- Allows the WB outer loop on-ramp to be shifted far enough east to eliminate the expensive speed change lane off the WB Grand River bridge
- Reduces footprint of Grand River bridge which has environmental benefits as well as cost savings. If combined with modification of Riverbend exit ramp (KWE-9), could eliminate entire lane on WB bridge
- Improved geometry along the bridge and significant improvement to constructability

GR-36 Realign Bridge Street and Relocate On-ramp

● Advantages of VE Option (cont'd)

- Maintains access to Bridgeport
- Weave condition between Bridge St. on-ramp and Riverbend exit ramp is eliminated
- Cost premiums during construction are eliminated

GR-36 Realign Bridge Street and Relocate On-ramp

● Disadvantages of VE Option

- Requires additional property to accommodate realignment including a residential property and removal of woodlot currently screening from roadway
- Bridge Street geometry revised from tangent to curved, but still meets required 100 km/h design speed. Ramp geometry is reduced from 50km/h to 40 km/h, but is consistent with proposed loop ramp geometry at other locations within the project

Assessment Methodology – Performance Measures

- Performance measures developed following similar format to the EA assessment
- Groupings, factor/criterion, indicators & rate

Groupings

- Socio-Economic Environment
- Natural Environment
- Transportation
- Costs

Weight

- 40%
- 15%
- 40%
- 5%

FACTOR COMPARISON

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● Safety	(collisions)	22
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Groupings

	Weight
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■ Natural Environment	15%
■ Transportation	40%
■ Costs	5%

GR-36 Realign Bridge Street and Relocate On-ramp: Summary Table - Weighted Scores

SOCIO-ECONOMIC ENVIRONMENT (40%)	VE	0.80	EA	1.87
NATURAL ENVIRONMENT (15%)		1.32		1.26
TRANSPORTATION (40%)		3.00		1.60
COST (5%)		0.5		0
TOTAL SCORE		5.62		4.73

GR-36 Realign Bridge Street and Relocate On-ramp - Recommendations

- Results in significant constructability improvements and major cost savings of \$2.6 mil. in both eliminating the costly SCL and premiums for constructing variable crossfall and flare
- Improved safety – increased visibility and reduced potential for roll-over accidents, particularly in icy conditions, at the east end of the bridge
- **This option is recommended for implementation**

Ideas into Action...

- Held a second implementation meeting with results of detailed analysis by the TPM engineering consultant
- 10 VE options (plus two modified options) were developed in detail and evaluated based on function or impact
- 7 out of 10 VE options have performance and cost benefits over the EA base case and recommended for implementation into the overall proposed plan
- VE Recommendations have resulted in the overall improved function, operation and safety for the for the proposed facility
- 3 of the 7 accepted VE options have increased costs but represent improved VALUE

Hwy 6 Freelon to Guelph

- A new 5 km 4-lane north-south Controlled Access Highway, linking Highway 6 south of the Hamlet of Puslinch and Highway 401 west of Morriston.
- A new 2-lane Connection Road to link the new highway to Highway 401 east and County Road 46 (Brock Road/Gordon Street).
- Widening of a 3.5 km section of Highway 401 westerly, from its interchange with new highway, to its existing interchange with the Hanlon Expressway
- Improvements to a 1 km north-south section of the Hanlon Expressway, from Highway 401 north to the new interchange with County Road 34

Highway 6 Freelton to Guelph



Highway 6 Freelton to Guelph



Highway 6 Freelon to Guelph

- 5 day VE study held October 26 to October 30, 2009
- Implementation meeting pending....
- Ideas will likely result in significant change to EA
- MTO is planning a consultant assignment and will incorporate the recommended VE ideas into the next phase of work

Benefits of Right-scoping

- VE Process forces project team to look at Function
- Decisions are made with cost consideration
- “Fresh” set of eyes on the project
- Incorporate additional Reviews – Human Factors, Highway Safety Review
- Consider alternatives in light of new information

Benefits of Right-scoping

- Flesh out the scope for the next assignment
- Competitive Acquisition of Services to further develop VE ideas and required EA/design work
- Involvement of key members of the new design team for improved idea transfer if team changeover
- Validation of components of the original design
- Stakeholder input before formal EA process

Caveats of Right-Scoping

- VE is optimal for Internal Advice
- VE Ideas often require further development
- Manage messaging to Stakeholders
- Concerns over “another study”
- Additional EA Work
- Can slow down progress until decisions are made on implementation

VE can be valuable process
to “right-scope” a project