VALUE ANALYSIS REVIEW
OF THE
CENTRAL OKANAGAN
MULTI-MODAL CORRIDOR (COMC)
FOR THE
CITY OF KELOWNA
AND THE
MINISTRY OF TRANSPORTATION

March 2007
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**VALUE ANALYSIS REVIEW**

**CENTRAL OKANAGAN MULTI-MODAL CORRIDOR, KELOWNA, BC**

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Central Okanagan Multi-Modal Corridor VA Report Doc
INTRODUCTION

Value Management Inc. (VMI) was commissioned by the City of Kelowna (the City), in conjunction with the Ministry of Transportation, to carry out a Value Analysis (VA) study on the proposed Central Okanagan Multi-Modal Corridor through Kelowna, BC. The study was carried out by an independent review team, in conjunction with the project team, to review the concept stage design prepared by Urban Systems Ltd. (USL), and to identify and recommend any alternatives that appear to improve value or optimize capital and life cycle costs.

We extend our thanks to the members of the review team - Mike Brugger, Laurie Christiansen, Shawn Grant, Ken Henning, Tom Kneale, Bob Pratt and Harry Thompson. Thanks also to Tim Blackburn of USL for his input and assistance during the workshop.

TERMS OF REFERENCE

Project Description

The City is proposing to provide a new, limited-access, multi-modal corridor extending from the northern edge of downtown Kelowna to the University of British Columbia Okanagan Campus (UBCO). The corridor will include pathways for cyclist and pedestrians, as well as accommodate the railway/transit where its alignment is within the COMC corridor.

Objectives of the Review

The mandate of the VA review team, as established by the City and MoT, was to:

- Determine if the functional design (the baseline) prepared by the project team provides the most cost-effective solution to the stated requirement.
- Identify any other alternatives that might improve value, enhance constructability; and minimize risk.

The review was carried out during a two-day workshop held on Wednesday and Thursday, March 28 and 29, at USL’s offices in Kelowna.

STUDY METHODOLOGY

Documents Reviewed

Prior to commencing the study, the review team was provided with a package of documentation to carry out an off-line evaluation of the project and the proposed alignment. This included:

- COMC Traffic Forecasting (Draft) Memorandum dated March 20, 2007, prepared by USL.
- Project Design Criteria
- Geometric Design Brief Memorandum, dated March 20, 2007 prepared by USL.
Preliminary Geotechnical Input Functional Design, the Central Okanagan Multimodal Corridor Spall Road to UBCO, Kelowna, BC, dated March 15, 2007, prepared by Golder Associates Ltd.

- Environmental Reports, prepared by Summit Environmental Consultants Ltd.
- Structural Design Brief dated March 20, 2007, prepared by USL
- Freight Movement Interim Report prepared by IBI Group
- Private Utility Liaison notes, prepared by USL.

Additional supporting information was provided to the review team during the course of the workshop.

Project Briefing and Creative Session

On Wednesday, March 28, 2007, the study commenced with an overview of the project’s background, objectives. The group was then reduced to the members of the review team to begin the creative session. Through an interactive brainstorming session, the review team identified a series of alternatives and proposals that appeared on first principles to meet the specific VA objectives and evaluation criteria.

During this initial stage of the workshop, the process was restricted to idea generation only, to identify and table proposals and alternatives. No decisions were made concerning subsequent implementation. The idea generation stage was informal, in order to establish an open and creative environment - all existing design criteria were open for discussion and alternative suggestions.

Development and Evaluation

The ideas and alternatives raised during the idea generation stage of the workshop were reviewed to determine if they merited being formulated as draft value proposals and taken to the next level of development and evaluation - proof of concept.

For each draft proposal formulated by the review team its background, implementation methodology, comments, perceived advantages and disadvantages were identified and included in a separate detail sheet for each proposal. Where appropriate, each proposal was analyzed in terms of its constructability, staging, environmental impact and relative cost as compared to the baseline design. In addition, each interchange was assessed in terms of how the proposal affected the overall functionality of the interchange as compared to the baseline.
In order to provide a preliminary indication of the viability of the proposals, the team assessed constructability, staging/phasing and interchange functionality by means of simple check boxes ranging from “much better”, “better”, “slightly better”, “equal”, “slightly worse”, “worse” and “much worse” when compared to the baseline. Environmental impact and cost were assigned scores of “much lower”, “lower”, “slightly lower”, “equal”, “slightly higher”, “higher” and “much higher”, as compared to the baseline. Due to time constraints, it was not possible to quantify the estimated capital cost savings for each proposal other than assigning a high level assessment of the cost relative to the baseline estimate. Actual capital cost implications will need to be verified through further investigation and development of the proposal by the design team.

On completion of the evaluation stage, the proposals were again reviewed in detail by the team. Each proposal was classified as suitable for consideration by the project team as a viable design alternative, or rejected as unacceptable, either by virtue of its feasibility or as a less preferable alternative to other proposals.

Results of the Review

The results of the review are summarized as follows:

- During the idea generation session a total of 26 issues were raised as potential value issues and were discussed during the development stage of the workshop.
- Following the development and evaluation period, a total of 14 proposals were considered by the review team to have the potential to provide improved value for money and were recommended for consideration by the design team to confirm their viability from capital cost, social benefit and traffic safety points of view. 4 Items were raised as notes to the design team for further consideration during the detailed design stage.

The proposals raised by the review team are summarized in appendix A, together with detailed data sheets and supporting information. Electronic copies of the data sheets and sketches generated in support of the proposals were provided to the City and the designers on completion of the presentation stage of the workshop to enable them to immediately commence preliminary evaluation of the proposals.

RECOMMENDATIONS

Spall Rd Interchange (VAPs 01, 02 and 03)

The review team first considered the Spall Rd interchange. The team echoed the Design Team’s concern regarding the difficulty of construction and traffic management of the proposed interchange at the ultimate build-out stage. In that traffic management constraints and the resulting costs will escalate significantly over time, once the COMC is extended and full movements are permitted at the intersection, the team believes it will be more cost effective to construct the Spall Rd. interchange in the first stage (VAP 01). The team noted, however, that the Structural Report identified the approximately $5 million for the structural work on this interchange, and were concerned that this estimate appears to be significantly low based on the
team’s assessment of the likely configuration of the overpass once detailed design is completed. The team feels that more detailed design work is required in order to confirm a more accurate estimated cost prior to making the decision whether to implement the full interchange in the first stage.

In the event that it is not feasible to construct the Spall Rd. interchange in the first phase, the team felt the potentially significant capital and social costs to be incurred at full build-out might actually preclude future construction. Therefore, the team looked at the potential to simplify the interchange by splitting movements to and from COMC between Spall Rd. and Dilworth Dr.; connecting the two intersections via Enterprise Way (VAP 02). They acknowledge this places additional pressures on Enterprise Way that may necessitate four lanes, but feel that the resulting reduction in size and complexity of the Spall Rd. interchange will ease future build-out. This proposal also has the potential to reduce the impact of COMC on the cemetery lands (NB: ramp configurations were not considered due to time constraints).

The review team noted that the NB to EB on-ramp at Spall Rd. has a very tight curve radius and suggested consideration be given to obtaining aerial statutory ROW in order to allow construction of a ramp on structure with a more favourable curve radius (VAP 03).

Dilworth Dr. Overpass (VAPs 04 and 05)

The team then proposed two alternatives for the Dilworth Dr. overpass. The team was concerned a full movement intersection in the first stage might raise driver expectations, and preclude the provision of an overpass in the future.

The first proposal envisions constructing the overpass in the initial stage with no intermediate intersection (VAP 04). This proposal would improve constructability in that the overpass could be built prior to the COMC and would thus avoid traffic management issues. In addition, if this overpass were built first, it could potentially be used as a phasing of VAP 02, in that detours via Dilworth (albeit a slightly different configuration) are possible.

The second proposal envisions a temporary closure of Dilworth in order to build closer to the original alignment (VAP 05). This would avoid encroachment on the adjacent commercial property and take advantage of the natural embankment to achieve the required elevation of the roadway, as well as reducing the impact on the creek. It may be possible to either build on existing centerline; raising the profile to cross the railway and potentially improving the curve radius (currently the design shows two broken back curves).

Highway 33 Interchange (VAPs 06A, 06B and 07)

The review team determined that an at-grade intersection at Highway 33 would operate adequately until at least 2020 - it may require dual lefts onto COMC and possible dual lefts off COMC prior to that time. They noted the purpose of this link is to alleviate congestion at both Enterprise and Highway 97, however, they felt the extension of COMC to McCurdy could provide sufficient relief to Highway 33/Highway 97 such that the Highway 33 link to COMC could be deferred until it is warranted, then built as an interchange. In the interim, the COMC to McCurdy Rd would be constructed (VAP 06A). Deferring the link at Highway 33 will also defer the need to raise Enterprise Ave. to achieve the grades for the rail bridge. In the interim,
the rail line may be closed and the elevations can be reduced to entirely avoid raising Enterprise Ave. However, the team recognized that the proposal to defer the Highway 33 link needs to be carefully reviewed to confirm that there is no significant detriment to the network.

In addition, due to the difficult nature of the property acquisition in this location, the team suggested that, instead of encroaching on the VANKAM property, the deferral of the Highway 33 link might allow a tight diamond interchange to be constructed on the existing ROW (VAP 06B).

In the event that the Highway 33 interchange cannot be built in the existing ROW, the team recommends USL’s design Option 3 - the loop interchange configuration. They feel a loop provides improved road operations. However, they suggest two options for a slight adjustment of the USL proposed alignment, which might improve the geometrics at Enterprise Way so that its elevation no longer needs to be raised (VAP 07A and 07B). Of the two options, the team prefers VAP 07B, which realigns away from the VANKAM property, requiring less property from VANKAM, which might smooth negotiations with the owner.

**McCurdy Road (VAPs 08)**

The review team noted that the current USL design does not indicate an ultimate configuration at McCurdy after COMC is extended to UBCO. They suggest providing a half diamond interchange at McCurdy in the ultimate build-out (VAP 08), which will provide east-west connectivity and relieve pressure on the Highway 33 connection. The half-diamond configuration would allow the interim connection to function as the ultimate ramps. This option could be a stage to eventually provide a full diamond in this location, if required. The team notes this proposal has potential implications for the whole City network, and recommend that more investigation be undertaken.

**Sexsmith Road (VAP 09)**

All of the options for this connection appear to require a loop in the ALR land to the south of the COMC tie in to Highway 97. This configuration requires a significant amount of ALR land to accommodate the loop. The team’s review led them to the conclusion that the alignment to the west side of the Cemetery was their preferred option - whether or not the area remains ALR. They felt that bisecting the property with COMC could have ALC implications. The team suggests that Sexsmith Rd. could be realigned slightly further to the south to permit a future tight diamond interchange, and recommend the ROW for the future interchange be protected. Turning volumes will determine how much separation is required.

**UBCO Connection (VAPs 10A, 10B and 11)**

The team looked at options for the UBCO connection. VAPs 10A and 10B realign USL’s option A2 to reduce or eliminate the need for a tunnel or deep cut. Option A aligns COMC as close as possible to the pond without encroaching on it, and Option B reconfigures the pond and provides compensation to permit the alignment to move even further south; thus further reducing residual development lands adjacent to the rail line. The team also recommends adjusting USL’s two interchange options at UBCO so that they generally utilize a common
ROW footprint that can be protected until such time as the final interchange option is
determined. They felt this was an excellent way to identify future land requirements without a
firm commitment to any one alignment option.

The team then investigated alternatives to USL’s option A2 that enhance the movement onto
COMC from Highway 97 SB (VAP 11). They developed a concept with a similar footprint that
loads the main line traffic to the COMC instead of Highway 97. They recognize the main line
of Highway 97 needs to remain intact until a second bridge crossing of Okanagan Lake is
constructed, but felt that this connection is likely a long way into the future and that a cleaner
transition to the COMC is required.

High Road (VAP 12)

There are already significant communities in the High Road area, with planned future
development. Following their review of the Spall St interchange, the Team felt that relieving
pressure on the Spall connection could be achieved by an additional connection at High Road,
as well as serving the High Road communities. Acknowledging that COMC is planned as a
bypass, the team recommends further network analysis to in order to determine optimum
connections and movements without sacrificing mobility.

Cross Section (VAP 13)

The review team then looked at the proposed urban cross section of COMC and determined that,
in order to avoid throwaway of raised median, curb and gutter, drainage, etc., consideration
should be given to constructing the 4-lane cross section from the outside, with sufficient median
width to allow the additional lanes to be constructed within the median. This approach would
have significantly less traffic disruption in the ultimate stage of construction, particularly since
the interchange ramps would already be in the ultimate location. The team acknowledges the
desire of the City to retain an urban character, but felt that providing greenspace in the median
should not necessarily detract from this. This proposal would require all ROW property
acquisition to occur in the first phase.

Notes to Designer (VAPs 14, 15 and 16)

During the course of their review the team identified a number of minor design issues that will
likely require attention during the detailed design stage and have listed them for information
purposes to assist the designers.

One item of particular concern to the Team is the significant amount of cost is being directed
towards meeting CP Rail design requirements for the various structures - geometry, overhead
and side clearance, crash walls, etc. The Team also noted, from the IBI Report, there is some
uncertainty as to the anticipated remaining life of this rail corridor. It is obvious the rail service
to downtown Kelowna is limited, the track is in need of significant maintenance and/or repair
and such maintenance would not be economic, given current rail volumes. If the rail east/south
of the Kelowna airport is discontinued, significant project savings can be achieved by
dereducing length and height of structures, improving grades on ramps and roads leading to
structures and decreasing costs of associated road works (e.g., raising grade of Enterprise at Highway 33 in order to achieve viable grade over COMC/Hwy 33 I/C).

Accordingly, the Team recommends the City enter into discussions with Tolko Industries regarding short, medium, long term rail use with a view as to when rail operations might cease, since, without Tolko’s current level of rail traffic, it is unlikely that rail service would continue.
APPENDIX A

PROPOSALS, DETAIL SHEETS AND WORKING PAPERS
<table>
<thead>
<tr>
<th>Proposal No.</th>
<th>Proposal</th>
<th>Approx. Project Cost Net Increase or (Saving)</th>
<th>Review Team Recommendation</th>
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<tbody>
<tr>
<td>01</td>
<td>Reduce future cost and complexity by constructing an interchange at Spall Road in the first stage.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>02</td>
<td>Connect Spall and Dilworth via Enterprise to provide split interchange.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>03</td>
<td>To improve curve radius for Spall/COMC SPUI options 1 and 2 NB to EB on ramp to utilize aerial statutory ROW over Terasen/Fortis properties.</td>
<td></td>
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<tr>
<td>04</td>
<td>Build overpass at Dilworth to full 6-lane length with no intermediate step of an at-grade intersection.</td>
<td></td>
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<tr>
<td>05</td>
<td>Realign Dilworth overpass closer to original alignment by utilizing a small portion of temporary road at the private land point or temporarily closing Dilworth.</td>
<td></td>
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</tr>
<tr>
<td>06A</td>
<td>Defer Highway 33 link to COMC until it is warranted.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>06B</td>
<td>Defer Highway 33 link to COMC until it is warranted. When Highway 33 is linked with a grade-separated interchange, align the interchange on the existing Highway 33 ROW to facilitate traffic management during construction of the interchange.</td>
<td></td>
<td>A</td>
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<tr>
<td>07</td>
<td>Revised alignments to USL’s Option 3 (see sketch). Protect for both future tight diamond and loop quadrant at Highway 33 to COMC WB. (Baseline Option 3 modified)</td>
<td></td>
<td>A</td>
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<td>08</td>
<td>Current USL design does not indicate an ultimate configuration at McCurdy after COMC is extended to UBCO. This proposal suggests providing a half diamond interchange at McCurdy in the ultimate buildout.</td>
<td></td>
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<tr>
<td>09</td>
<td>Realign Sexsmith further to the south at the COMC connection to permit a future tight diamond interchange. Protect ROW for the future grade-separated interchange.</td>
<td></td>
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<tr>
<td>10</td>
<td>Realign USL’s option A2 to reduce or eliminate the need for a tunnel or deep cut. A. Align as close as possible to the pond without encroaching on its existing without encroaching. B. Reconfigure the pond and provide compensation to permit the alignment to move even further south.</td>
<td></td>
<td>A</td>
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<tr>
<td>11</td>
<td>Realign USL’s option A2 to enhance the movement onto COMC from Highway 97 SB.</td>
<td></td>
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<tr>
<td>12</td>
<td>Consider connection to COMC at High Road - and allow some or all movements, in order to reduce the number of turn movements at Spall Rd.</td>
<td></td>
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<tr>
<td>13</td>
<td>Construct urban 4-lane cross section with a wide median width to accommodate the additional 2 lanes. Construct additional two lanes into the median to reduce throwaway of curb, gutter &amp; raised median.</td>
<td></td>
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<tr>
<td>14</td>
<td>Utilize 4% superelevation in lieu of 2% at intersections, and 4% grade in lieu of 6% grade at intersections.</td>
<td></td>
<td>INFO/NTD</td>
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**VMI**

A - ACCEPTABLE FOR FURTHER REVIEW  
R - REJECT, RIF - REJECT IN FAVOUR OF  
NTD - NOTE TO DESIGNER
## Proposal Review Team

**Recommendation**

### CENTRAL OKANAGAN MULTI-MODAL CORRIDOR, KELOWNA

<table>
<thead>
<tr>
<th>Proposal No.</th>
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<th>Approx. Project Cost Net Increase or (Saving)</th>
<th>Review Team Recommendation</th>
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<tr>
<td>15</td>
<td>Consider a multiplate structure for Mill Creek crossings at Dilworth, Highway 33, McCurdy, similar to the structure used at Spall Rd.</td>
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<td>16</td>
<td>Lower the grade of the rail line at Highway 33 (when the rail ties require replacement) to minimize height of ramps and eliminate raising Enterprise Way.</td>
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<td>17</td>
<td>Access to properties on the south side of Spall/COMC interchange is a concern. Access to Terasen and Fortis facilities could be particularly impacted by ramp over rail and COMC. Reasonable permanent access must be maintained.</td>
<td></td>
<td>INFO NTD</td>
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</table>
PROPOSAL:
Reduce future cost and complexity by constructing an interchange at Spall Road in the first stage.

BASELINE & BACKGROUND TO THE PROPOSAL:
Construction staging to accommodate traffic will significantly increase cost. This work will become more difficult and costly as traffic volumes increase and once the full movement at-grade intersection is established.

METHODOLOGY:
Full interchange is operational on “opening day”. Consider local traffic detour west of Spall through existing south parking lot to temporarily relocated intersection and vacant property at the north. Consider removing traffic from COMC prior to Spall intersection to simplify detour configuration.

ATTRIBUTES:
- improved constructability/cost
- improved traffic management/cost
- disruption occurs immediately and is less than disruption in future.

EVALUATION:

<table>
<thead>
<tr>
<th>Criteria 1</th>
<th>Constructability</th>
<th>Much Better</th>
<th>Better</th>
<th>Slightly Better</th>
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<td>Staging/Phasing</td>
<td>Much Better</td>
<td>Better</td>
<td>Slightly Better</td>
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<td>Slightly Worse</td>
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<td>Criteria 3</td>
<td>Environmental Impact</td>
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<td>Equal</td>
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<td>Much Higher</td>
</tr>
<tr>
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<td>Cost</td>
<td>Much Lower</td>
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<td>Slightly Lower</td>
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<td>Higher</td>
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</tr>
<tr>
<td>Criteria 5</td>
<td>Functionality of interchange</td>
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<td>Slightly Better</td>
<td>Equal</td>
<td>Slightly Worse</td>
<td>Worse</td>
<td>Much Worse</td>
</tr>
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Central Okanagan Multi-Modal Corridor,

Proposal No: 02

Proposal:
Connect Spall and Dilworth via Enterprise to provide split interchange.

Baseline & Background to the Proposal:
Constructability and cost concerns of structures.
Large volume of traffic through the single point interchange.

Methodology:
See sketch.
In the event that the SB on-ramp from Bernard is not feasible, the alternative could be to make Dilworth full movement and Spall an overpass with limited movements.

Attributes:
Better than the baseline:
- splitting volumes between two interchanges.
- reduced structure costs.
- reduced impact to Cemetery lands.

Worse than the baseline:
- added pressures on Enterprise Way.
- added pressures on Dilworth
- difficult to add an WB off-ramp at High.

Evaluation:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Constructability</th>
<th>Staging/Phasing</th>
<th>Environmental Impact</th>
<th>Cost</th>
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<td></td>
<td>Much Better</td>
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To improve curve radius for Spall/COMC SPUI options 1 and 2 NB to EB on ramp to utilize aerial statutory ROW over Terasen/Fortis properties.

**PROPOSAL:**

**1. SPALL RD.**

**SUBJECT:** See sketch.

Although Fortis/Terasen infrastructure is fixed, use of their air space may be possible.

**METHODOLOGY:**

- Improved curve radius.

**EVALUATION:**

**BASELINE & BACKGROUND TO THE PROPOSAL:**

The team expressed concern about the tight/short curve radius.

- Improved curve radius.

**BETTER THAN THE BASELINE:** WORSE THAN THE BASELINE:

**ATTRIBUTES:**

Although Fortis/Terasen infrastructure is fixed, use of their air space may be possible.

- Improved curve radius.

**FUNCTIONALITY OF INTERCHANGE:**

- Improved curve radius.

**MATCHING:**

- Improved curve radius.
CENTRAL OKANAGAN MULTI-MODAL CORRIDOR, PROPOSAL

SUBJECT: 02. DILWORTH DR.

PROPOSAL:
Build overpass at Dilworth to full 6-lane length with no intermediate step of an at-grade intersection.

BASELINE & BACKGROUND TO THE PROPOSAL:
Baseline proposal is to build at-grade intersection first and then, when volumes/mobility requirements warrant it, build the overpass. Issues were:
1. At grade provides full movement, and to move to no turns may be unacceptable to public.
2. Easier construction to build in greenspace than over traffic.

METHODOLOGY:
See sketch.

ATTRIBUTES:

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<tr>
<th>BETTER THAN THE BASELINE:</th>
<th>WORSE THAN THE BASELINE:</th>
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<tbody>
<tr>
<td>- Constructability much easier (detours may require signal/railway gate)</td>
<td>- Additional cost.</td>
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<tr>
<td>- Eliminates risk of working over high-speed, high-volume traffic</td>
<td>- Lose network connections of an all-movement at-grade intersection in the interim stage.</td>
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EVALUATION:

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Ref #: 4
March 27, 2007
CENTRAL OKANAGAN MULTI-MODAL CORRIDOR,

PROPOSAL:
Proposal No: 05
Status: A

Realignment of Dilworth overpass closer to original alignment by utilizing a small portion of temporary road at the private land point or temporarily closing Dilworth.

BASELINE & BACKGROUND TO THE PROPOSAL:

METHODOLOGY:
See sketch.

ATTRIBUTES:

BEetter THAN THE BASELINE:
- will not impact parking lot layout for commercial business on the east side of Dilworth Dr.
- minimize impact on City-owned Mill site.
- disturbs less of the existing creek channel

WORSE THAN THE BASELINE:
- Dilworth Dr. must be closed to traffic during overpass construction.

EVALUATION:

Criteria 1 Constructability
○ Much Better ○ Better ○ Slightly Better ○ Equal ○ Slightly Worse ○ Worse ○ Much Worse

Criteria 2 Staging/Phasing
○ Much Better ○ Better ○ Slightly Better ○ Equal ○ Slightly Worse ○ Worse ○ Much Worse

Criteria 3 Environmental Impact
○ Much Lower ○ Lower ○ Slightly Lower ○ Equal ○ Slightly Higher ○ Higher ○ Much Higher

Criteria 4 Cost
○ Much Lower ○ Lower ○ Slightly Lower ○ Equal ○ Slightly Higher ○ Higher ○ Much Higher

Criteria 5 Functionality of interchange
○ Much Better ○ Better ○ Slightly Better ○ Equal ○ Slightly Worse ○ Worse ○ Much Worse
Defer Highway 33 link to COMC until it is warranted.

BASELINE & BACKGROUND TO THE PROPOSAL:
At grade intersection will operate adequately until at least 2020 (will likely require dual lefts onto COMC and maybe dual lefts off COMC). The purpose of this link would alleviate congestion at both Enterprise and Highway 97. However, with the extension made to McCurdy, that link may provide sufficient relief to Highway 33/Highway 97 that the R33ext link to COMC could be deferred. This option assumes COMC continues to McCurdy.

METHODOLOGY:
See VAP 07, which explains benefits of going to an interchange when the connection is made. Recommend deferral of link as long as possible and build interchange when required.

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<td>- reduced property acquisition (building on existing ROW).</td>
<td>- Highway 33 and Enterprise are the only options to access city core from Highway 33.</td>
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<td>- deferred construction costs.</td>
<td>- may put more pressure on other crossings of COMC.</td>
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<td>- build ultimate when required.</td>
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<td>- no detours required.</td>
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EVALUATION:

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Central Okanagan Multi-Modal Corridor, Proposal

Proposal No: 06B

Proposal:
Defer Highway 33 link to COMC until it is warranted. When Highway 33 is linked with a grade-separated interchange, align the interchange on the existing Highway 33 ROW to facilitate traffic management during construction of the interchange.

Baseline & Background to the Proposal:
Due to already difficult property negotiations at this location, it may be best to try to stay away from that property.

Methodology:
See sketch.
This proposal speaks to when the Highway 33 connection to COMC is made.

Attributes:
Better than the Baseline:
- reduced VANKAM property acquisition
- interchange provides increased safety and mobility of COMC
- no throwaway costs
- minimizes traffic delay and traffic management costs
- only 1 crossing of Mill Creek
- reduces rail crossing which would required light/gates and operationally could have challenges of where to place stop bars on R33ext.
- lack of separation between Enterprise and COMC may not allow for back to back left turn slots.

Worse than the Baseline:

Evaluation:

Criteria 1: Constructability
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Criteria 2: Staging/Phasing
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Criteria 3: Environmental Impact
- Much Lower
- Lower
- Slightly Lower
- Equal
- Slightly Higher
- Higher
- Much Higher

Criteria 4: Cost
- Much Lower
- Lower
- Slightly Lower
- Equal
- Slightly Higher
- Higher
- Much Higher

Criteria 5: Functionality of interchange
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Ref #: 8
March 27, 2007
CENTRAL OKANAGAN MULTI-MODAL CORRIDOR,  PROPOSAL

SUBJECT: 03. HIGHWAY 33  Proposal No: 07

PROPOSAL:
Revised alignments to USL’s Option 3 (see sketch).
Protect for both future tight diamond and loop quadrant at Highway 33 to COMC WB.
(Baseline Option 3 modified)

BASELINE & BACKGROUND TO THE PROPOSAL:
Flatten 130m radius tie to existing Highway 33 at Enterprise Way. With Traffic signal at Enterprise, intersection geometrics are an issue.

METHODOLOGY:
See sketch. Options 3-A and 3-B.
The Review Team recommends 3-B in preference to 3-A. Scoring reflects 3-B alignment, but both options are viable.
In reviewing the 2 options provided by USL - tight diamond and loop interchanges - the Review Team's preference is the loop; however, this proposal can apply to both.

ATTRIBUTES:

BEetter THAN THE BaseLINE:
- better intersection geometrics at Enterprise Way.

WORSE THAN THE BASELINE:
- More ROW acquisition required for 3-B.
- Option 3-A increases angle crossing of COMC, and works best with loop ramp and not tight diamond.

EVALUATION:

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CENTRAL OKANAGAN MULTI-MODAL CORRIDOR,

PROPOSAL:

Current USL design does not indicate an ultimate configuration at McCurdy after COMC is extended to UBCO. This proposal suggests providing a half diamond interchange at McCurdy in the ultimate buildout.

BASELINE & BACKGROUND TO THE PROPOSAL:

Once the COMC extends north, there appears to be a lack of connectivity to/from McCurdy.

ATTRIBUTES:

**BEETR THAN THE BASELINE:**
- may relieve some pressures at Highway 33 interchange.
- provides east/west connectivity.

**WORSE THAN THE BASELINE:**
- additional cost.

EVALUATION:

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March 27, 200711

Ref #: 11
CENTRAL OKANAGAN MULTI-MODAL CORRIDOR,

PROPOSAL:
Realign Sexsmith further to the south at the COMC connection to permit a future tight diamond interchange. Protect ROW for the future grade-separated interchange.

BASELINE & BACKGROUND TO THE PROPOSAL:
Reference Dwg. Sexsmith 1
Impact to ALR lands - large acreage required with 1/2 Parclo configuration.

ATTRIBUTES:

**BETTER THAN THE BASELINE:**
- less land required from ALR
- improves alignment to existing Sexsmith.

**WORSE THAN THE BASELINE:**
- storage between diamonds may be an issue.

EVALUATION:

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Realign USL’s option A2 to reduce or eliminate the need for a tunnel or deep cut.
A. Align as close as possible to the pond without encroaching on its existing without encroaching.
B. Reconfigure the pond and provide compensation to permit the alignment to move even further south.

BASELINE & BACKGROUND TO THE PROPOSAL:

METHODOLOGY:
COMC moved closer to Carney Pond to reduce mountain cut (generally Sta. 328+00 to Sta. 333+00) and reduce residual development lands adjacent to the rail line. Adjust the two interchange options so that they generally utilize a common ROW footprint.
Geotechnical comments:
Consider moving alignment 100m to east (downslope). This would decrease the required length of the cut from 290m to 280m and would decrease the required height of the cut from 23m to 17m. NOTE: due to geotechnical issues (stability and settlements) moving the alignment closer to the Carney Pond may not be practical. Therefore, if possible, keep alignment away from the Pond (inclusive of fill slope footprint).
Other considerations:
1. Reconfigure Carney Pond (possible relocate?)
2. Increase road grades, in particular heading into the cut area from the north, with the intent to decrease the fill thickness adjacent Carney Pond.
3. Steeper fill slopes to 1.5H:1V

ATTRIBUTES:

BETTER THAN THE BASELINE:
- reduces rock cut through mountain (reduced length and height of cut).
- may provide the opportunity to reconfigure and enhance Carney Pond by providing additional environmental compensation

WORSE THAN THE BASELINE:
- additional property acquisition and increased social costs (must buy College Heights homes)
- potentially more geotechnical constraints (softer soils).

EVALUATION:

Criteria 1 Constructability
- Much Better - Better - Slightly Better - Equal - Slightly Worse - Worse - Much Worse
Criteria 2 Staging/Phasing
- Much Better - Better - Slightly Better - Equal - Slightly Worse - Worse - Much Worse
Criteria 3 Environmental Impact
- Much Lower - Lower - Slightly Lower - Equal - Slightly Higher - Higher - Much Higher
Criteria 4 Cost
- Much Lower - Lower - Slightly Lower - Equal - Slightly Higher - Higher - Much Higher
Criteria 5 Functionality of interchange
- Much Better - Better - Slightly Better - Equal - Slightly Worse - Worse - Much Worse
UPPER (WEST) ALIGNMENT
- EXISTING GRADE

EXISTING GRADE
ALONG ALIGNMENT

PROPOSED
LOWER (EAST) ALIGNMENT

Scale 1:2000
PROPOSAL:
Realign USL’s option A2 to enhance the movement onto COMC from Highway 97 SB.

BASELINE & BACKGROUND TO THE PROPOSAL:
This alternative is predicated on the second crossing being in place.

METHODOLOGY:
See sketch.

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<td>- improves remaining development potential of large ALR parcel.</td>
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<td>- increases weave length to airport interchange.</td>
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<td>- provides a larger contiguous parcel between Hollywood and COMC.</td>
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<td>- minimizes sterilized land between rail line and COMC</td>
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<td>- better utilizes the COMC, and de-emphasizes and reduces traffic volumes on Harvey Ave.</td>
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EVALUATION:

Criteria 1 Constructability
- Much Better - Better - Slightly Better - Equal - Slightly Worse - Worse - Much Worse

Criteria 2 Staging/Phasing
- Much Better - Better - Slightly Better - Equal - Slightly Worse - Worse - Much Worse

Criteria 3 Environmental Impact
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Criteria 4 Cost
- Much Lower - Lower - Slightly Lower - Equal - Slightly Higher - Higher - Much Higher

Criteria 5 Functionality of interchange
- Much Better - Better - Slightly Better - Equal - Slightly Worse - Worse - Much Worse
Consider connection to COMC at High Road - and allow some or all movements, in order to reduce the number of turn movements at Spall Rd.

BASELINE & BACKGROUND TO THE PROPOSAL:
The design for 2030 does not provide connection between High Road and the COMC. This would necessitate a major parallel E-W route through Glenmore neighbourhoods to reach Spall and would add volume to turns at Spall/COMC, impacting operations/queue lengths at the single point interchange already providing ramps to/from downtown. This proposal along with VAP 02, reflects a desire to reduce turning movement volumes at Spall and simplify that interchange.

ATTRIBUTES:

BETTER THAN THE BASELINE:
- eliminates severance impacts of high volume through Old Glenmore neighbourhood.
- makes SBL and WBR movements at Spall E-W through movements.
- reduces volume on critical EBL movement from COMC to Glenmore Rd.
- general reduction in turn volumes extends life, improves operation of single point interchange.

WORSE THAN THE BASELINE:
- creates weaves between on movements at High Rd and off movements at Spall (very heavy right in 2030am (850vph).
- limited space to develop accel/decel lanes: Bernard bridge a constraint.

EVALUATION:

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Ref #: 1  March 27, 2007
**PROPOSAL:**

Construct urban 4-lane cross section with a wide median width to accommodate the additional 2 lanes. Construct additional two lanes into the median to reduce throwaway of curb, gutter & raised median.

**BASELINE & BACKGROUND TO THE PROPOSAL:**

Throwaway construction required for curb and gutter and raised median, including moving of existing lanes will be expensive. Large traffic disruptions associated with future widening.

**METHODOLOGY:**

See sketch.

See attached slide from USL presentation

**ATTRIBUTES:**

**BETTER THAN THE BASELINE:**

- less throwaway construction
- less traffic disruption

**WORSE THAN THE BASELINE:**

**EVALUATION:**

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March 27, 2007
Cross Sections

4 Lanes

Central Okanagan Multi-Modal Corridor

6 Lanes
ULTIMATE SECTION.

INTERIM SECTION
Utilize 4% superelevation in lieu of 2% at intersections, and 4% grade in lieu of 6% grade at intersections.

BASELINE & BACKGROUND TO THE PROPOSAL:
Overly aggressive design criteria.

METHODOLOGY:
More in line with TAC requirements.

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<td>- allows for more alignment flexibility.</td>
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<td>- potentially reduced cost.</td>
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<td>Criteria 5</td>
<td>Functionality of interchange</td>
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Consider a multiplate structure for Mill Creek crossings at Dilworth, Highway 33, McCurdy, similar to the structure used at Spall Rd.

BASELINE & BACKGROUND TO THE PROPOSAL:
The team felt that multiplate structures may provide more vertical grade flexibility for upgrading from at-grade to grade-separated interchanges.

METHODOLOGY:
Include as part of concept design phase.

ATTRIBUTES:

** BETTER THAN THE BASELINE: **
- more flexibility to modify grades
- possible cost reduction

** WORSE THAN THE BASELINE: **
- environmental risk

EVALUATION:

Criteria 1  Constructability
- Much Better  Better  Slightly Better  Equal  Slightly Worse  Worse  Much Worse

Criteria 2  Staging/Phasing
- Much Better  Better  Slightly Better  Equal  Slightly Worse  Worse  Much Worse

Criteria 3  Environmental Impact
- Much Lower  Lower  Slightly Lower  Equal  Slightly Higher  Higher  Much Higher

Criteria 4  Cost
- Much Lower  Lower  Slightly Lower  Equal  Slightly Higher  Higher  Much Higher

Criteria 5  Functionality of interchange
- Much Better  Better  Slightly Better  Equal  Slightly Worse  Worse  Much Worse
Lower the grade of the rail line at Highway 33 (when the rail ties require replacement) to minimize height of ramps and eliminate raising Enterprise Way.

BASELINE & BACKGROUND TO THE PROPOSAL:
The current Highway 33 profile extension will result in the Enterprise intersection being raised 2 - 3m.

METHODOLOGY:
We understand that the rail line will soon require major reconstruction of the road ballast and the wooden ties. Propose that consideration be given to lowering the rail profile at the Highway 33 crossing when this work is undertaken.

ATTRIBUTES:
 BETTER THAN THE BASELINE: 
WORSE THAN THE BASELINE:
- lowering the rail line eliminates the need to raise Enterprise profile.

EVALUATION:

Criteria 1 Constructability
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Criteria 2 Staging/Phasing
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Criteria 3 Environmental Impact
- Much Lower
- Lower
- Slightly Lower
- Equal
- Slightly Higher
- Higher
- Much Higher

Criteria 4 Cost
- Much Lower
- Lower
- Slightly Lower
- Equal
- Slightly Higher
- Higher
- Much Higher

Criteria 5 Functionality of interchange
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse
Access to properties on the south side of Spall/COMC interchange is a concern. Access to Terasen and Fortis facilities could be particularly impacted by ramp over rail and COMC. Reasonable permanent access must be maintained.

BASELINE & BACKGROUND TO THE PROPOSAL:

METHODOLOGY:

ATTRIBUTES:

BETTER THAN THE BASELINE: WORSE THAN THE BASELINE:

EVALUATION:

Criteria 1 Constructability
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Criteria 2 Staging/Phasing
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse

Criteria 3 Environmental Impact
- Much Lower
- Lower
- Slightly Lower
- Equal
- Slightly Higher
- Higher
- Much Higher

Criteria 4 Cost
- Much Lower
- Lower
- Slightly Lower
- Equal
- Slightly Higher
- Higher
- Much Higher

Criteria 5 Functionality of interchange
- Much Better
- Better
- Slightly Better
- Equal
- Slightly Worse
- Worse
- Much Worse
APPENDIX B

WORKSHOP ORGANIZATION
AGENDA

VALUE ANALYSIS REVIEW

Wednesday, March 28, 2007

LOCATION: USL’s Offices
500 – 1708 Dolphin Avenue
Kelowna, BC
(250) 762-2517

STAGE 1 – PROJECT BRIEFING (Review Team & Design Team)

TIME: 08:30 – 10:00 (approximately)

PROCESS:
- Overview of the VA process
  Chris Baker, VMI
- Project background and planning goals
  Project Manager
- Design presentation - design criteria, constraints, budget
  Design Team, USL
- Questions & answers
  All
- Establish value objectives and evaluation criteria
  All

STAGE 2 – CREATIVE SESSION (Review Team)

TIME: 10:00 – 17:00 (approximately)

PROCESS:
- Selection of value issues
- Group brainstorming to identify options and alternatives
- Review and rank ideas
- Formulate draft proposals

Lunch - 12:00 to 13:00 (approximately)
AGENDA

VALUE ENGINEERING REVIEW

Thursday, March 29, 2007

LOCATION: USL’s Offices
500 – 1708 Dolphin Avenue
Kelowna, BC
(250) 762-2517

STAGE 3 – EVALUATION AND DEVELOPMENT (Review Team)
TIME: 08:00 - 14:30 (approximately)
PROCESS:
  o Review the draft proposals, make any corrections or changes as required, assign evaluation tasks.
  o Develop sufficient preliminary design input for each proposal to confirm proof of concept.
  o Provide order of magnitude capital costs and benefits for each option.
  o Finalize value proposals and recommendations.

Lunch - 12:00 to 13:00 (approximately)

STAGE 4 – PRESENTATION (Review Team & Project Team)
TIME: 14:30 – 16:00 (approximately)
PROCESS:
  o Present Review Team value proposals and recommendations
  o Discussion
  o Identify next steps and schedule.
# VALUE ENGINEERING REVIEW

## PROJECT BRIEFING

**DATE:** Wednesday, March 28, 2007

<table>
<thead>
<tr>
<th>NAME</th>
<th>REPRESENTING</th>
<th>PHONE</th>
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<tbody>
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VALUE ENGINEERING REVIEW

CREATIVE SESSION and EVALUATION

DATE: Wednesday & Thursday, March 28 & 29, 2007

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VALUE ENGINEERING REVIEW

PRESENTATION

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