Detroit River
INTERNATIONAL CROSSING
STUDY

Value Planning Workshop for

the Proposed
Detroit River International Crossing

February 2, 2007

MDOT
Michigan Department of Transportation

benesch

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DRIC Executive Summary

The Michigan Department of Transportation (MDOT) is proposing to build a new Detroit River International Crossing (DRIC) between the U.S. and Canada. A Value Engineering (VE) study was held January 29, 2007 through February 2, 2007. The scope of the VE study was focused on the interchange connecting the plaza on the U.S. side to I-75. The study did not include the plaza or the bridge crossing the Detroit River into Canada.

The VE Team organized the workshop into two distinct parts, one to review, analyze and evaluate the seven alternatives (Value Analysis) that the DRIC Early Preliminary Study (EPE) Study Team had developed and the second to speculate on improvements to these alternatives or propose new alternatives (Value Planning). The VE job plan and approach was utilized throughout these workshops.

The DRIC EPE Study Team had identified seven alternative interchanges connecting the plaza to I-75. Adding ramps to and from I-75 to the plaza made it impossible to maintain all cross roads because of conflicting elevations. Alternatives 1 through 3 are three legged interchanges while maintaining different crossroads. The crossing at Waterman Street would be eliminated for Alternatives 1 and 2 while maintained under Alternative 3. Livernois Street is maintained under Alternatives 1 and 2 while eliminated under Alternative 3. Dragoon Street is eliminated under both Alternatives 1 and 3 and maintained under Alternative 2.

Alternatives 4 and 5 introduce a split interchange. Alternative 4 moves the ramps exiting SB and NB I-75 to the south near Springwells leaving ramps entering SB and NB I-75 near Dragoon Street. Alternative 5 switches the location of the exit and entrance ramps. Alternative 4 eliminates crossings at Livernois Street, Dragoon Street and Junction Street while Alternative 5 maintains these crossings.

Alternate 6 is also a three legged interchange similar to Alternatives 1-3 however relocated to the east to maximize distance from Southwestern High School. Because of grade conflicts crossings at Livernois Street, Dragoon Street and Junction Street would be eliminated. Alternatives 1-3 maintains the crossing at Clark Street while Alternative 6 closes this crossing.

Alternate 7 (1 Modified) is similar to 1 however Alternative 1 Mod maintains the crossing at Dragoon Street while eliminating the interchange ramps at Livernois/Dragoon.

During the Information Phase the Owners, Users and Stakeholders were identified as well as the Needs, Desires and Constraints of each. Based on these Needs, Desires and Constraints, Functions were developed and organized in a Function Logic Diagram.

Value Analysis

Performance and Acceptance criteria were developed from the Function Logic diagram which was then used to rank each of the seven alternatives developed by the DRIC EPE Study Team.

The criteria for Performance included; Access to /from Plaza, Traffic operations on I-75, Local access within corridor, Local traffic operations and Bridge geometry/retaining wall. The Acceptance criteria included; Protect community/neighborhood characteristics, impact to N/S neighborhood, constructability, Impact to Utilities, Driver Comfort and Impact to Delray.

The criteria for both the Performance and Acceptance were analyzed for importance by the VE Team. Using these criteria the evaluation teams scored each of the alternatives. The scoring for each criterion was based on a 0 to 5 rating, 5 being the highest and 0 being unacceptable. The seven alternatives ranked between (3.0) good to (4.0) very good (Exhibit 6.5) for Performance. The high rankings were expected due to the level of previous review and refinement by the DRIC EPE Study Team. Using the same procedure each of the alternatives were evaluated and ranked using the Acceptance criteria. The seven alternatives ranked between 2.43 (Interchange 4)

and 3.72 (Interchange 1 Mod.) (Exhibit 6.6). Interchanges 4 and 5 both impact the Delray Community to a higher degree then the others, substantially impacting the Acceptance of either of these two alternatives.

Conceptual level cost estimates were prepared by the Study Team. The costs included construction, right-of-way acquisition and remediation for significant environmental impacts. The cost estimates range from $178 million to $255 million. The VE Team assigned scores to each of these by utilizing a graphical method as defined in the report (Exhibit 6.7).

The VE Team found that all seven alternatives were feasible. Alternatives that ranked lower in either Acceptance or Cost may be improved through further refinement as they are developed in greater detail.

Value Planning

Speculation also occurred based on the Functions identified during the Information Phase of the workshop. The VE Team generated 124 ideas. From these ideas the VE Team proposed four new interchange concepts, two of which were recommended for further study.

Value Planning Alternative 1 (VP 1) is a circular three-leg interchange near Livernois Avenue and Dragoon Street (Exhibit 7.1). This alternative has many advantages including allowing for the interchanges at both Clark and Springwells to remain, localizes the impacts to the service drives, requires less right-of - way, reduces impacts north of I-75 and slows traffic entering the plaza. The disadvantages include a reduced speed on the circle ramp of 30 mph, the closing of Livernois Bridge and the closing of the Livernois/ Dragoon split interchange.

Value Planning Alternative 2A (VP 2A) is a signalized three-leg interchange (Exhibit 7.2). The interchange includes two signals, one each side of I-75. This interchange configuration has advantages which reduce impacts to existing interchanges, service drives, right-of-way, home owners on the north side of I-75, reduces bridge foot print and the number of bridges over Fort Street. This alternative also has disadvantages of stopping southbound I-75 traffic twice as it approaches the plaza and exits the plaza. Other disadvantages include the closing of the Dragoon Bridge and mixing local and international traffic as well as the discontinuity in Service Drives.

Value Planning Alternative 2B (VP 2B) is substantially the same as VP 2A with the exception that only one signal will be required. (Exhibit 7.3) and closes the Livernois Bridge. The signal on the south side of I-75 is eliminated by placing the Service Drive under the ramps to and from the plaza.

The VE Team did not recommend Alternatives VP 2A and VP 2B for further consideration because the stop conditions may create traffic congestion and back-ups on I-75.

Value Planning Alternative 3 (VP3) is a three-leg interchange (Exhibit 7.4). The advantages and disadvantages are similar to VP 1 with the additional closing of the Dragoon Bridge and discontinuity of the SB Service Drive.

The VE Team is recommending that both VP 1 and VP 3 be accepted for further study. After further discussion MDOT would like to modify the ramp speed from 30 mph to 35 mph. The ramp speed as the ramp enters and exits I-75 will remain at 45 mph.

Cost Model

The DRIC EPE Study Team had prepared a conceptual level cost estimate which was reviewed by the VE Team. The VE Team found the estimate to be reasonable for the level of detail available at this stage of the planning process. The VE Team suggests that the cost estimate be further developed in the ASTM format as the alternatives are revised to reflect the outcome of the VE suggestions. Cost estimates should also be prepared for the two interchanges recommended for further study as they are further developed.

2.0 Introduction

2.1 Purpose of Improvements

The Michigan Department of Transportation, in conjunction with the Ontario Ministry of Transport, is proposing to build a new Detroit River International Crossing (DRIC). The new facility will be a toll bridge across the Detroit River connecting the United States and Canada. One major element of this project is the connection between the toll and inspection plaza on the U.S. side to the I-75 freeway.

2.2 Existing Conditions

The potential area for a new international crossing has been narrowed down to the area between Springwells Street and Clark Street along I-75.

An international crossing would be a large bridge requiring a significant distance for the approach spans to touch down to meet existing ground. The relatively close proximity of I-75 to the Detroit River, along with other features, results in short lengths of connecting ramps between the plaza and the I-75.

The Ambassador Bridge freeway ramps are east of the study area. Zug Island and the I-75 bridge over the River Rouge are just west of the study area. I-75 is aligned in roughly an east-west configuration in the study area. Near the Ambassador Bridge I-75 turns in a northerly direction and near the River Rouge Bridge I-75 turns in a southwesterly direction. The east-west component of the proposed plaza ramp radii combined with the lengths of plaza ramp merge, diverge and auxiliary lane facilities parallel to I-75 offer a significant footprint to fit in between other existing or proposed freeway ramp facilities. Potential conflicts with new ramp connections from the existing Ambassador Bridge plaza to I-75 that will be constructed in the near future are eastern constraints. The River Rouge Bridge was a constraint on the west end.

Points of interest including existing schools, churches and parks are shown on Exhibit 2.1 for reference. In addition to these points of interest several other local concerns need to be considered. The impact to the Delray Community should be minimized. Movement across I-75 needs to be maintained to provide dependable access to shopping. Maintaining Service Drives for local traffic is also a priority.


I-75
I-75
I-75
Springwells St.
Produce Terminal
Southwestern HS
S Livernois Ave
Dragoon Street
W Fort Street
Clark Street
S Post Street
Port of Detroit
W Jefferson Ave
Mistersky Power Plant
DTE Substation
Fort Wayne
Detroit River
LaFarge
DETROIT RIVER INTERNATIONAL CROSSING
POINTS OF INTEREST
DATE: JANUARY 2007
PARSONS
Legend
Police and Fire Stations
Churches
Railroads
Schools
Parks

Exhibit 2.1

2.3 Developed Interchange Alternatives

The plaza will include truck and car facilities. Vehicles leaving the U.S. need to merge and combine before entering into the plaza facilities and also merge before entering I-75 from the plaza. Because of the proximity of I-75 and the Detroit River, the plaza is a relatively short distance from I-75, limiting the available space to develop connecting ramp geometries.

Summary of Alternatives

The plaza ramps shown in the following plans consist of three general configurations.

These are:

- Connecting I-75 exit and entrance ramps to a plaza in the same location.
- Splitting the I-75 connection to the plaza with exit ramps more easterly and the entrance ramps more westerly.
- Splitting the I-75 connection to the plaza with entrance ramps more easterly and the exit ramps more westerly.

From the three general configurations, six interchange alternatives were developed. In addition, one hybrid of the six interchange alternatives were also presented. This is identified as Interchange 1 Modified.

Interchange Alternative 1 (Exhibit 2.2)

Interchange Alternative 1 is a directional three-leg interchange.

- Reconfigures location of existing ramps along I-75.
- Closure of Dragoon Street bridge over I-75 due to eastbound ramp from the service drive through the Dragoon intersection with the northbound I-75 service drive (existing one-way pair).
- Closure of Waterman and Junction Street bridges over I-75 due to grade issues.
- Because of the closure of the Dragoon Street bridge, Livernois Avenue is turned into a two way road between Fort Street and Lafayette Boulevard in order to maintain access across I-75.
- Introduces braided ramps.

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 1

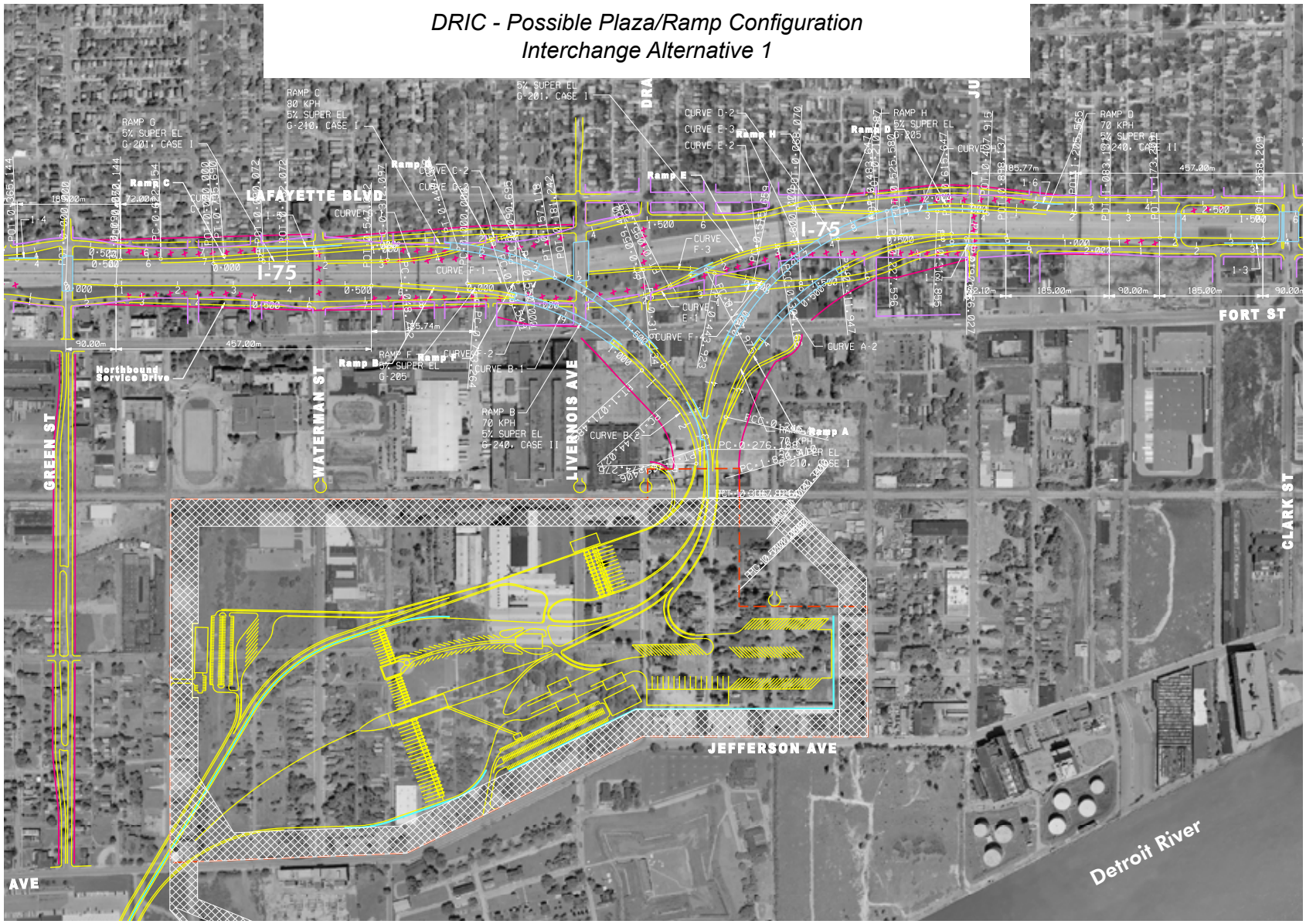


Exhibit 2.2

Interchange Alternative 2 (Exhibit 2.3)

Interchange Alternative 2 is a directional three-leg interchange.

- Reconfigures location of existing ramps along I-75.
- Eliminates braided ramps, introduces auxiliary lanes along I-75.
- Closure of Waterman and Junction Street bridges over I-75 due to grade issues.
- Maintains Livernois Avenue and Dragoon Street bridges over I-75

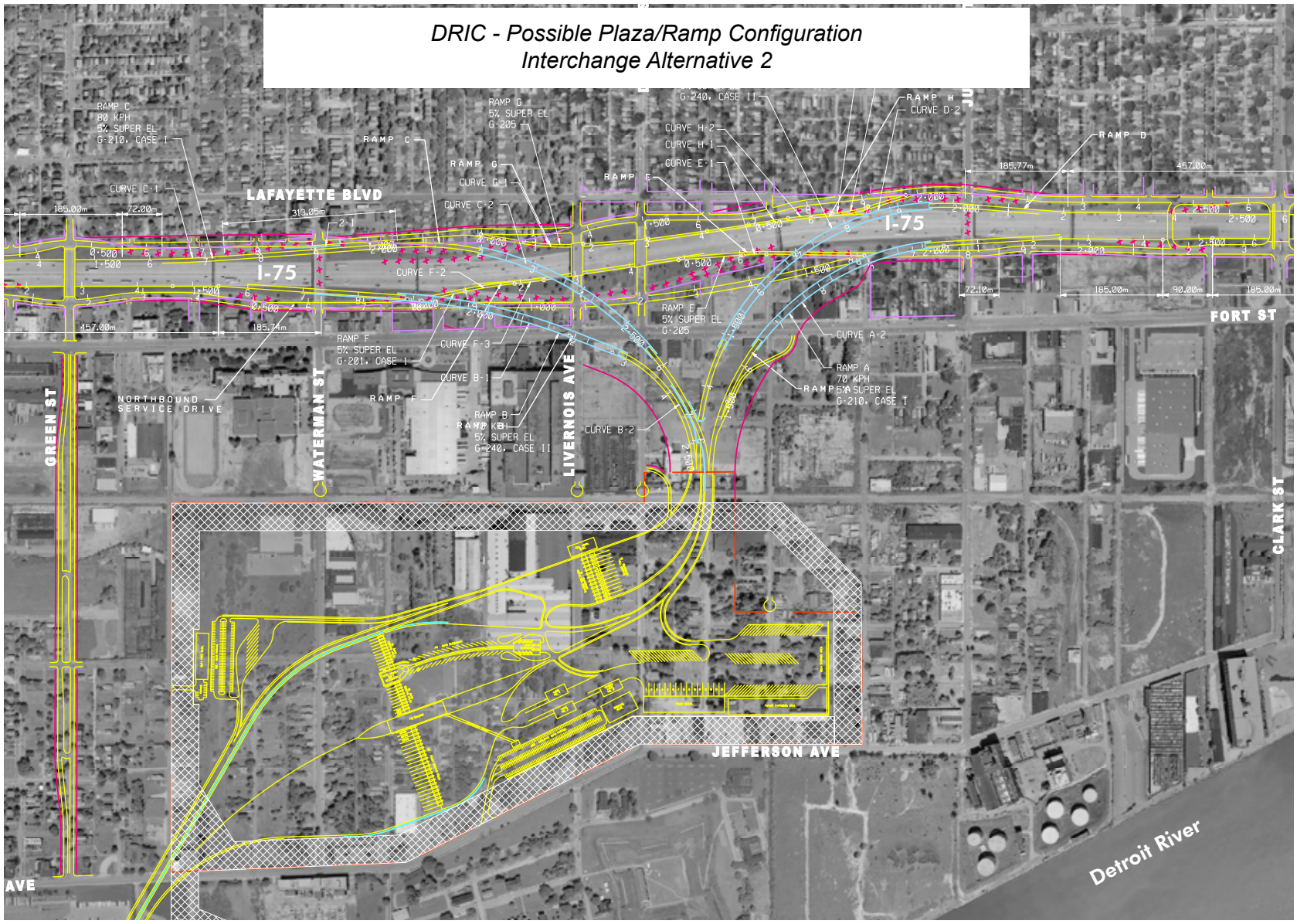

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 2
LAFAYETTE BLVD
I-75
I-75
FORT ST
GREEN ST
WATERMAN ST
LIVERNOIS AVE
CLARK ST
JEFFERSON AVE
Detroit River
NORTHBOUND SERVICE DRIVE
RAMP C
80 KPH
5% SUPER EL
G-210, CASE I
RAMP G
5% SUPER EL
G-205
RAMP F
5% SUPER EL
G-201, CASE I
RAMP B
5% SUPER EL
G-240, CASE II
RAMP E
5% SUPER EL
G-205
RAMP A
70 KPH
5% SUPER EL
G-210, CASE I
RAMP H
CURVE D-2
RAMP D
CURVE C-1
CURVE C-2
CURVE F-2
CURVE F-3
CURVE B-1
CURVE B-2
CURVE H-2
CURVE H-1
CURVE E-1
CURVE A-2

Exhibit 2.3

Interchange Alternative 3 (Exhibit 2.4)

Interchange Alternative 3 is a directional three-leg interchange.

- Shifts I-75 southerly to minimize impacts to residences on north side.
- Reconfigures location of existing ramps along I-75.
- Closure of Livernois Avenue and Dragoon Street bridges over I-75 due to conflicts with the eastbound ramp from the service drive.
- Closure of Junction Avenue bridge over I-75 due to grade issues.
- Waterman Street over I-75 can be kept open with grade raise.

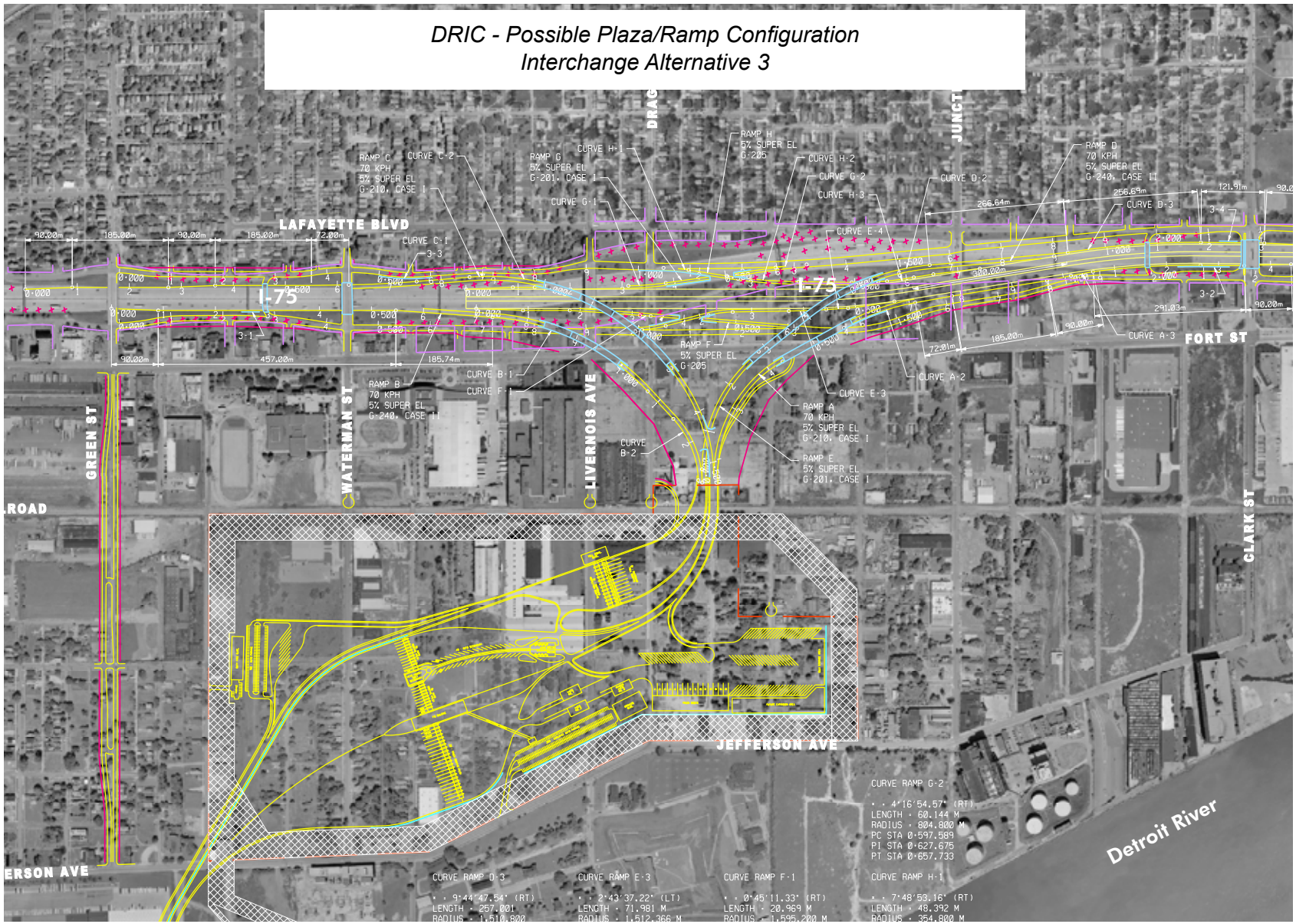

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 3
LAFAYETTE BLVD
I-75
FORT ST
JEFFERSON AVE
GREEN ST
WATERMAN ST
LIVERNOIS AVE
CLARK ST
Detroit River
RAMP C
70 KPH
5% SUPER EL
G-210, CASE I
RAMP G
5% SUPER EL
G-201, CASE I
RAMP H
5% SUPER EL
G-205
RAMP D
70 KPH
5% SUPER EL
G-240, CASE II
RAMP F
5% SUPER EL
G-205
RAMP B
70 KPH
5% SUPER EL
G-240, CASE II
RAMP A
70 KPH
5% SUPER EL
G-210, CASE I
RAMP E
5% SUPER EL
G-201, CASE I
CURVE RAMP G-2
CURVE RAMP D-3
CURVE RAMP E-3
CURVE RAMP F-1
CURVE RAMP H-1

Exhibit 2.4

Interchange Alternative 4 (Exhibit 2.5)

Interchange Alternative 4 is a split interchange. Ramp terminals for traffic from the USA to Canada are located west of Springwells Street. Ramp terminals for traffic from Canada to the USA are located at Livernois/Dragoon.

- Reconfigures location of existing ramps along I-75.
- Closure of Livernois Avenue and Dragoon bridges over I-75 due to impacts with Plaza Ramp D.
- Ramp D is on bridge structure from Livernois Avenue through Green Street.
- Waterman Street over I-75 can be kept open.
- Closure of Junction Avenue bridge over I-75 due to grade issues.
- It may be possible to create a hybrid option by combining the plaza ramp with the service drive.

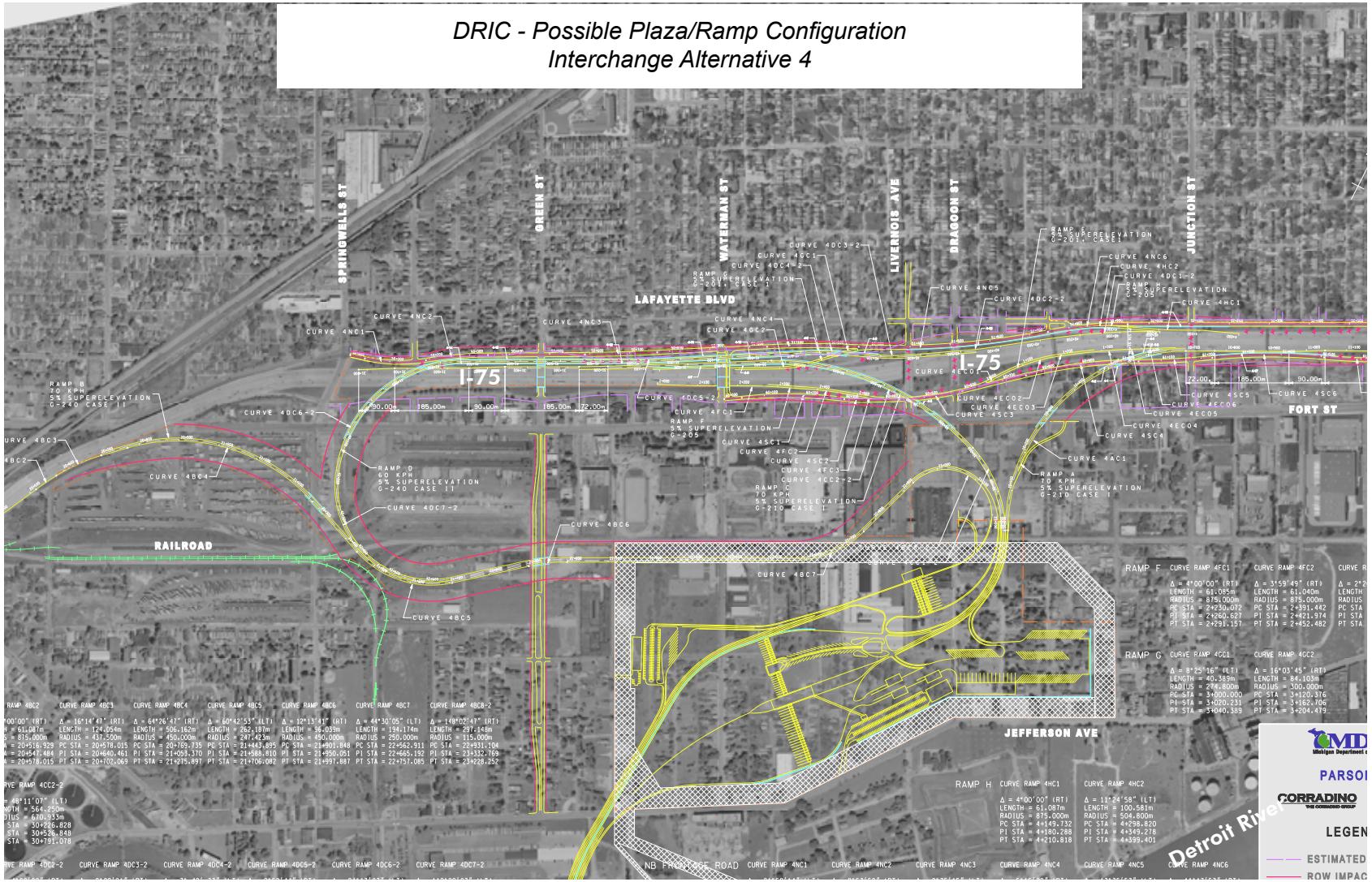

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 4
SPRINGWELLS ST
GREEN ST
WATERMAN ST
LIVERNOIS AVE
DRAGOON ST
JUNCTION ST
LAFAYETTE BLVD
I-75
I-75
FORT ST
RAILROAD
JEFFERSON AVE
NB FRONTAGE ROAD
Detroit River
RAMP B 70 KPH 5% SUPERELEVATION G-240 CASE II
RAMP D 60 KPH 5% SUPERELEVATION G-240 CASE II
RAMP C 70 KPH 5% SUPERELEVATION G-210 CASE I
RAMP A 70 KPH 5% SUPERELEVATION G-210 CASE I
RAMP F 5% SUPERELEVATION G-205
RAMP G 5% SUPERELEVATION G-205 CASE I
RAMP H 5% SUPERELEVATION G-205
RAMP F
RAMP G
RAMP H
PARSONS
CORRADINO
LEGEND
ESTIMATED
ROW IMPACT

Exhibit 2.5

Interchange Alternative 5 (Exhibit 2.6)

Interchange Alternative 5 is a split interchange. Ramp terminals for traffic from the USA to Canada are located west of Springwells Street. Ramp terminals for traffic from Canada to the USA are located at Livernois/Dragoon.

- Reconfigures location of existing ramps along I-75.
- Livernois Avenue and Dragoon Street over I-75 remain open.
- Waterman Street and Junction Avenue over I-75 remain open.
- The northbound service drive merges with Ramp A and is depressed under Livernois Avenue and Dragoon Street.
- The northbound service drive exit ramp weaves with Ramp A.
- The design speed for ramps is 70km/hr in the gore area. The tighter curve in the plaza entrance ramp to northbound I-75 away from the freeway can have a 50 km/hr design speed.
- A separate service drive may not be needed. It may be possible to combine Ramp A with the service drive and merge them together sooner. It would need to be determined if it is acceptable to provide trucks access to local streets as they exit the plaza.

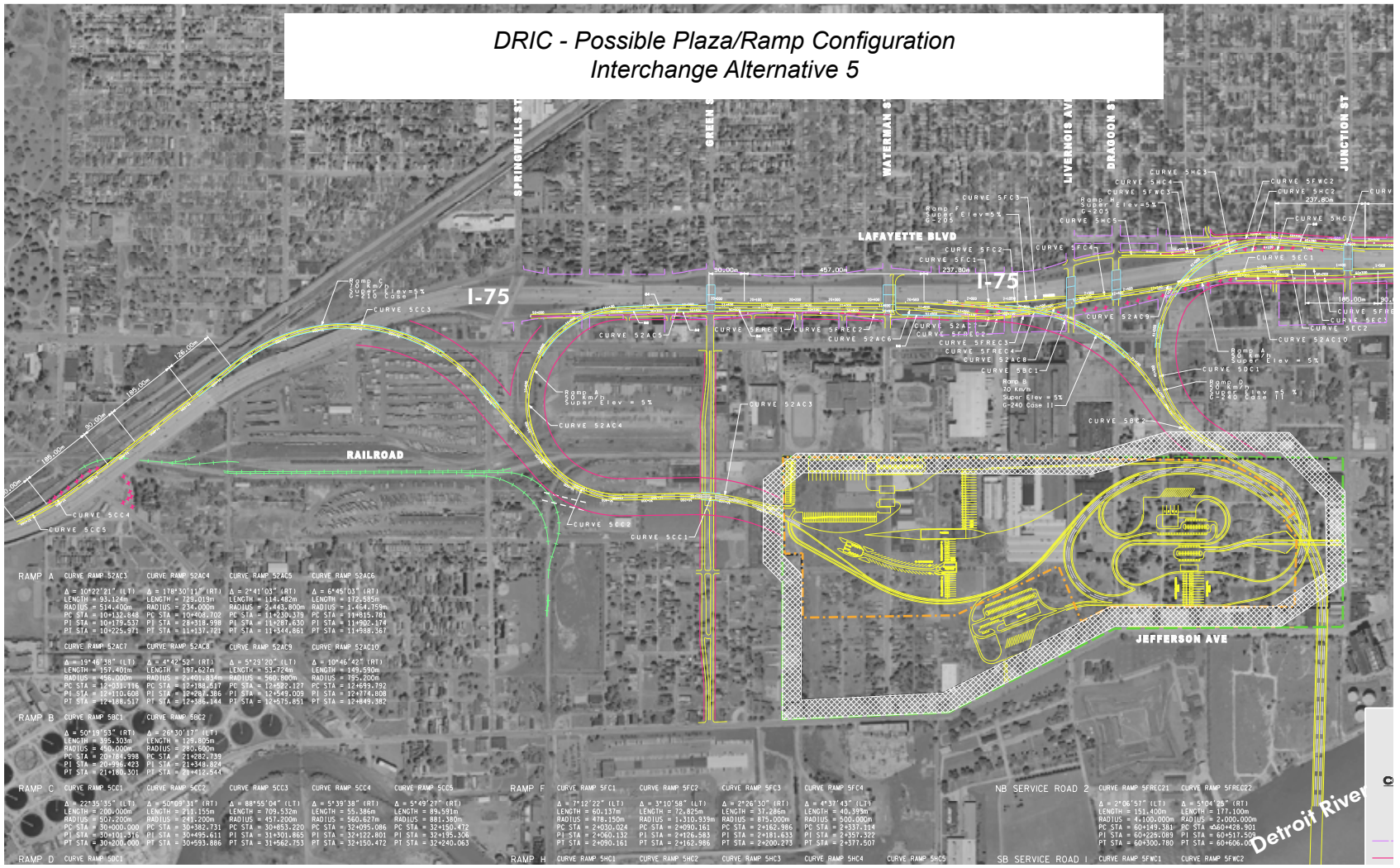

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 5
I-75
I-75
LAFAYETTE BLVD
RAILROAD
JEFFERSON AVE
SPRINGWELLS ST
GREEN ST
WATERMAN ST
LIVERNOIS AVE
DRAGOON ST
JUNCTION ST
NB SERVICE ROAD 2
SB SERVICE ROAD 1
Detroit River
RAMP A
RAMP B
RAMP C
RAMP D
RAMP F
RAMP H

Exhibit 2.6

Interchange Alternative 6 (Exhibit 2.7)

Interchange Alternative 6 is a three-leg directional interchange.

- Interchange shifted to the east to maximize the distance from Southwestern High School.
- Reconfigures location of existing ramps along I-75.
- Introduces auxiliary lanes along I-75
- Closure of Livernois Avenue and Dragoon Street bridges over I-75 due to conflicts with the local ramps.
- Closure of Junction Avenue bridge over I-75 due to grade issues.
- Waterman Street over I-75 remains open.
- This option appears to be one of the better options for permanent signing.

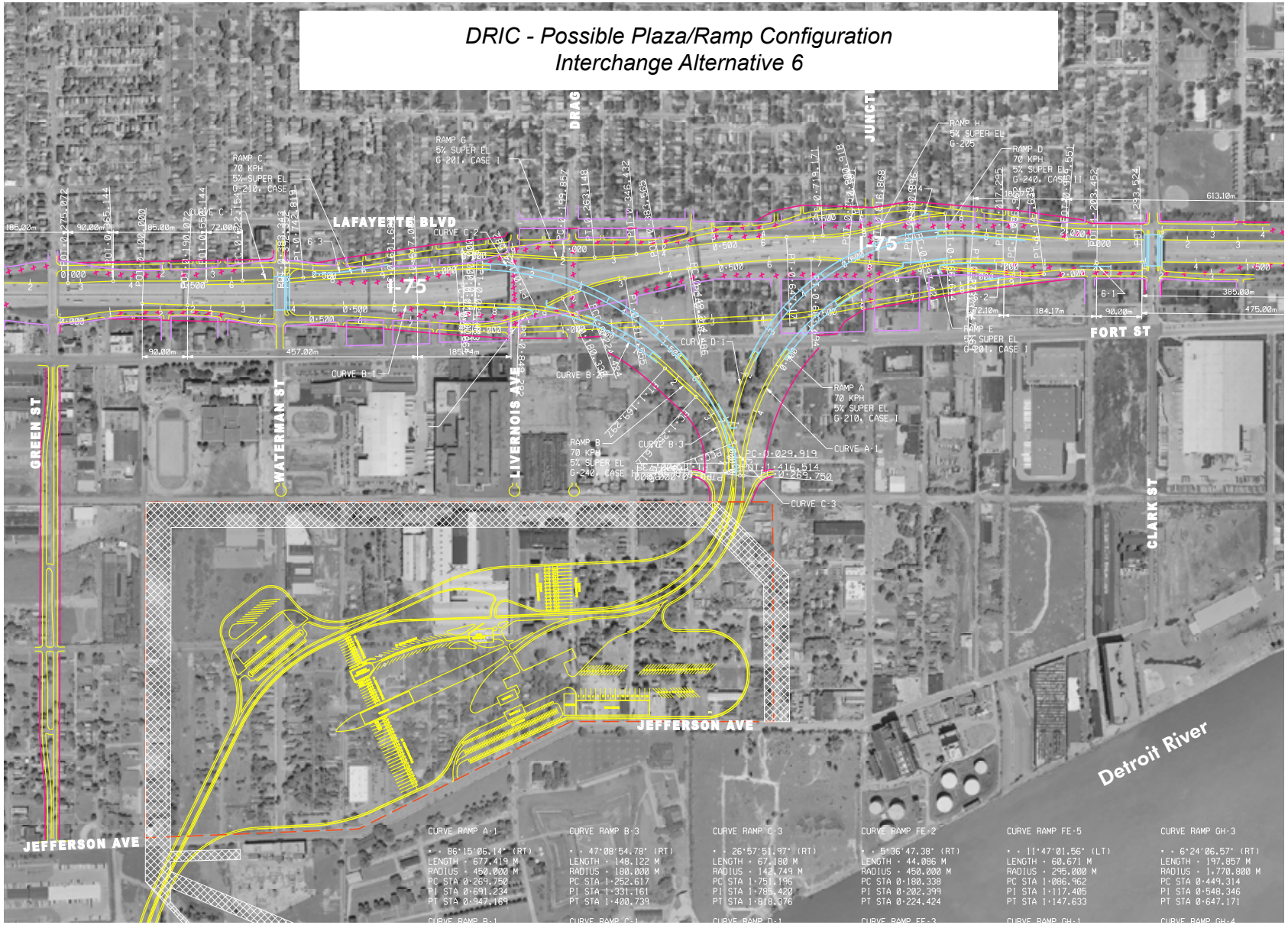

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 6
LAFAYETTE BLVD
I-75
FORT ST
JEFFERSON AVE
GREEN ST
WATERMAN ST
LIVERNOIS AVE
CLARK ST
Detroit River
RAMP C
70 KPH
5% SUPER EL
G-210, CASE I
RAMP G
5% SUPER EL
G-201, CASE I
RAMP H
5% SUPER EL
G-205
RAMP D
70 KPH
5% SUPER EL
G-240, CASE II
RAMP E
5% SUPER EL
G-201, CASE I
RAMP A
70 KPH
5% SUPER EL
G-210, CASE I
RAMP B
70 KPH
5% SUPER EL
G-240, CASE I
CURVE RAMP A-1
CURVE RAMP B-3
CURVE RAMP C-3
CURVE RAMP FE-2
CURVE RAMP FE-5
CURVE RAMP GH-3

Exhibit 2.7

Interchange Alternative 1 Modified (Exhibit 2.8)

Interchange Alternative 1 is a three-leg directional interchange.

- All of the other concepts include maintaining an interchange (Service Drive ramps) in between the Clark Street and Springwells Street interchanges. This concept includes removing the Livernois/Dragoon interchange and providing service drive access to Clark/Junction and Springwells Streets.
- The plaza ramps are similar to interchange alternative 1.
- The service drives are similar to interchange alternative 2.
- Six of the eight Service Drive entrance and exit ramps to I-75 at the Springwells Street and Clark Street interchanges are anticipated to be two lane ramps. The northbound I-75 exit ramp to Springwells Street and the southbound I-75 exit ramp to Clark Street are anticipated to be one lane ramps.
- Livernois Avenue and Dragoon Street over I-75 remain open.
- Closure of Junction Avenue and Waterman Street bridges over I-75 due to grade issues.

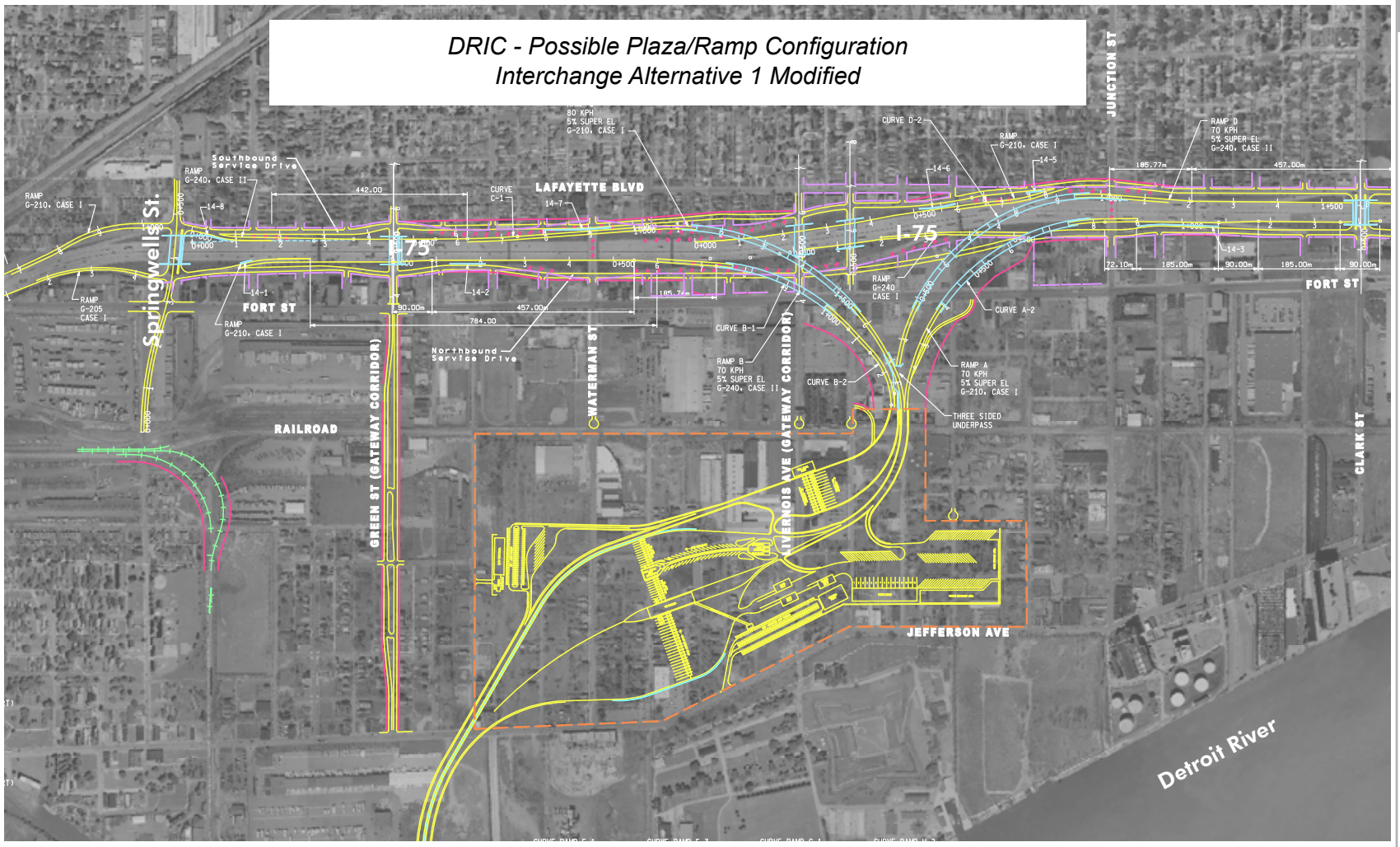

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 1 Modified
Springwells St.
Southbound Service Drive
Northbound Service Drive
LAFAYETTE BLVD
FORT ST
I-75
RAILROAD
GREEN ST (GATEWAY CORRIDOR)
WATERMAN ST
RIVERNOIS AVE (GATEWAY CORRIDOR)
JUNCTION ST
CLARK ST
JEFFERSON AVE
THREE SIDED UNDERPASS
Detroit River

Exhibit 2.8

2.4 Cost Estimates for Developed Interchange Alternatives

The DRIC EPE Study Team prepared concept level cost estimates for construction (Exhibit 2.9) and Right-of-Way Remediation (Exhibit 2.10)

Items	Unit	Unit Cost (US$)	Alternative 1 Quantity	Total (US$)	Alternative 2 Quantity	Total (US$)
Roadways & Ramps						
Freeways Lanes						
Reconstructed 8-lane freeway with concrete median barrier	m	$3,000	0	$0	0	$0
Plaza Ramps						
Entrance Ramps G-210 Case 1 Urban 2 Lanes	m	$770	1,780	$1,370,600	1,920	$1,478,400
Exit Ramps G-240 Case 2 Urban 2 Lanes	m	$770	1,060	$816,000	1,700	$1,309,000
Service Drive Ramps						
Entrance Ramps G-201 Case 1 Urban 1 Lanes	m	$670	1,730	$1,159,100	2,150	$1,440,500
Exit Ramps G-205 Urban 1 Lanes	m	$670	1,090	$730,300	1,090	$730,300
Service Drives						
Constructing 10 m wide Service drive	m	$770	5,280	$4,065,600	5,280	$4,065,600
Removing existing 10 m service drive	m	$84	5,280	$443,520	5,280	$443,520
Local Roads						
New Construction per 3.6 m lane	m	$290	6,420	$1,861,800	6,660	$1,931,400
Remove existing local road per 3.6 m lane w/ curb and gutter	m	$35	5,588	$195,580	4,792	$167,720
subtotal (rounded to 10,000's)				$10,640,000		$11,570,000
Sound Abatement Walls (To be determined)	m			$0		$0
subtotal (rounded to 10,000's)				$0		$0
Bridges						
Plaza Ramp Bridges	m^2	$2,400	15,930	$38,232,000	21,000	$50,400,000
Crossing Bridges	m^2	$2,400	6,280	$15,072,000	7,530	$18,072,000
Pedestrian Bridges (same locations as existing bridges)	ea	$300,000	5	$1,500,000	5	$1,500,000
subtotal (rounded to 10,000's)				$54,800,000		$69,970,000
Retaining Walls						
Gravity Walls	m^2	$540	20	$10,800	120	$64,800
MSE/Gravity Concrete Walls	m^2	$1,100	5,760	$6,336,000	5,370	$5,907,000
Driven Walls	m^2	$2,700	680	$1,836,000	0	$0
subtotal (rounded to 10,000's)				$8,180,000		$5,970,000
Bridge Demolition						
Entire bridge, grade separation	m^2	$270	4,490	$1,212,300	2,990	$807,300
subtotal (rounded to 10,000's)				$1,210,000		$810,000

Exhibit 2.9

Alternative 3 Quantity	Total (US$)	Alternative 4 Quantity	Total (US$)	Alternative 5 Quantity	Total (US$)	Alternative 6 Quantity	Total (US$)	Alternative 7 Quantity	Total (US$)
1,620	$4,860,000	0	$0	0	$0	0	$0	0	$0
1,680	$1,293,600	2,070	$1,593,900	5,050	$3,888,500	2,020	$1,555,400	3,740	$2,879,800
1,140	$877,800	5,000	$3,850,000	2,500	$1,925,000	1,310	$1,008,700	1,480	$1,139,600
2,690	$1,802,300	600	$402,000	330	$221,100	2,670	$1,788,900	1,780	$1,192,600
1,090	$730,300	490	$328,300	430	$288,100	1,090	$730,300	2,000	$1,340,000
4,720	$3,634,400	4,440	$3,418,800	3,670	$2,825,900	4,800	$3,696,000	5,740	$4,419,800
4,720	$396,480	4,440	$372,960	3,670	$308,280	4,800	$403,200	5,740	$482,160
5,380	$1,560,200	6,970	$2,021,300	6,970	$2,021,300	5,380	$1,560,200	5,880	$1,705,200
3,512	$122,920	2,840	$99,400	2,840	$99,400	3,512	$122,920	4,012	$140,420
	$15,280,000		$12,090,000		$11,580,000		$10,870,000		$13,300,000
	$0		$0		$0		$0		$0
	$0		$0		$0		$0		$0
13,400	$32,160,000	11,660	$27,984,000	9,790	$23,496,000	16,400	$39,360,000	18,000	$43,200,000
4,680	$11,232,000	4,240	$10,173,000	8,700	$20,880,000	4,780	$11,472,000	11,360	$27,264,000
5	$1,500,000	5	$1,500,000	5	$1,500,000	5	$1,500,000	5	$1,500,000
	$44,890,000		$39,660,000		$45,880,000		$52,330,000		$71,960,000
230	$124,200	0	$0	0	$0	140	$75,600	0	$0
6,070	$6,677,000	21,030	$23,133,000	8,600	$9,460,000	7,790	$8,569,000	5,760	$6,336,000
0	$0	0	$0	0	$0	0	$0	880	$2,376,000
	$6,800,000		$23,130,000		$9,460,000		$8,640,000		$8,710,000
5,300	$1,431,000	2,490	$672,300	0	$0	6,120	$1,652,400	2,010	$542,700
	$1,430,000		$670,000		$0		$1,650,000		$540,000

Exhibit 2.9 continued

Items	Unit	Unit Cost (US$)	Alternative 1 Quantity	Total (US$)	Alternative 2 Quantity	Total (US$)
Roadway Storm Drainage						
Freway drainage	m	$860	0	$0	0	$0
Ramp drainage	m	$160	5,660	$905,600	6,860	$1,097,600
Local roud drainage	m	$160	3,210	$513,600	3,330	$532,800
Service drive drainage	m	$160	5,280	$844,800	5,280	$844,800
Remove exist storm drainage system (per side)	m	$46	8,490	$390,540	8,610	$396,060
Pump station (to be determined)	LS		0	$0		$0
subtotal (rounded to 10,000's)				$2,650,000		$2,870,000
			Subtotal:	$77,480,000	**Subtotal:**	$91,190,000
Design Contingencies (20%)	LS		1	$15,496,000	1	$18,238,000
			Subtotal:	$92,980,000	**Subtotal:**	$109,430,000
Maintenance of Traffic (excluding Plaza Ramps - 5%)	LS		1	$2,628,060	1	$2,812,130
Maintenance of Traffic (Plaza Ramps - 2%)	LS		1	$808,376	1	$1,063,748
Mobilization (5%)	LS		1	$4,649,000	1	$5,471,500
SUBTOTAL A - CONSTRUCTION (rounded TO 10,000'S				$101,070,000		$118,780,000
SUBTOTAL B - CONSTRUCTION CONTINGENCY (10%) (rounded TO 10,000'S				$10,110,000		$11,878,000
SUBTOTAL C - MANAGEMENT CONTINGENCY (5%) (rounded TO 10,000'S				$5,050,000		$5,939,000
Environmental Impacts (To be determined)	LS		1	$0	1	$0
Right-of-Way (To be determined)	LS		1	$0	1	$0
Utilities (To be determined)	LS		1	$0	1	$0
SUBTOTAL D				$0		$0
TOTAL (A,B,C,D)				$116,230,000		$136,600,000
Inflation (20 percent applied to 2006 prices for start of construction in 2010)				$23,246,000		$27,320,000
Total including Inflation				$139,476,000		$163,920,000
Rounded Total (Millions of Dollaars)				**139**		**164**

Exhibit 2.9 continued

Alternative 3 Quantity	Total (US$)	Alternative 4 Quantity	Total (US$)	Alternative 5 Quantity	Total (US$)	Alternative 6 Quantity	Total (US$)	Alternative 7 Quantity	Total (US$)
1,620	$1,393,200	0	$0	0	$0	0	$0	0	$0
6,600	$1,056,000	8,160	$1,305,600	8,310	$1,329,600	7,090	$1,134,400	9,000	$1,440,000
2,690	$430,400	6,970	$1,115,200	6,970	$1,115,200	2,690	$430,400	2,940	$470,400
4,720	$755,200	4,440	$710,400	3,670	$587,200	4,800	$768,000	5,740	$918,400
13,890	$638,940	450	$20,700	450	$20,700	7,490	$344,450	8,680	$399,280
0	$0	0	$0	1	$0	0	$0	0	$0
	$4,270,000		$3,150,000		$3,050,000		$2,680,000		$3,230,000
Subtotal:	$72,670,000	**Subtotal:**	$78,700,000	**Subtotal:**	$69,970,000	**Subtotal:**	$76,170,000	**Subtotal:**	$97,740,000
1	$14,534,000	1	$15,740,000	1	$13,994,000	1	$15,234,000	1	$19,548,000
Subtotal:	$87,200,000	**Subtotal:**	$94,440,000	**Subtotal:**	$83,960,000	**Subtotal:**	$91,400,000	**Subtotal:**	$117,290,000
1	$2,643,430	1	$3,050,605	1	$2,732,625	1	$2,473,795	1	$3,503,530
1	$686,628	1	$668,580	1	$586,190	1	$838,482	1	$944,388
1	$4,360,000	1	$4,722,000	1	$4,198,000	1	$4,570,000	1	$5,864,500
	$94,890,000		$102,880,000		$91,480,000		$99,280,000		$127,600,000
	$9,489,000		$10,288,000		$9,148,000		$9,928,000		$12,760,000
	$4,744,500		$5,144,000		$4,574,000		$4,964,000		$6,380,000
	$0		$0		$0		$0		$0
	$0		$0		$0		$0		$0
	$0		$0		$0		$0		$0
	$0		$0		$0		$0		$0
	$109,120,000		$118,310,000		$105,200,000		$114,170,000		$146,740,000
	$21,824,000		$23,662,000		$21,040,000		$22,834,000		$29,348,000
	$130,944,000		$141,972,000		$126,240,000		$137,004,000		$176,088,000
	131		**142**		**126**		**137**		**176**

Exhibit 2.9 continued

DETROIT RIVER INTERNATIONAL CROSSING STUDY
Summary of Major Impacts

MAJOR IMPACT	INTERCHANGE / ALTERNATIVE	1 1,6,7	2 2,8,9	3 3,10,11	4 4,12	6 5	5 13	1 MOD 14
TRAFFIC	STREETS CLOSED	8	7	9	9	6	1	8
POTENTIAL ACQUISITION	OCCUPIED RESIDENTIAL	184	180	190	171	233	29	200
	ACTIVE BUSINESSES	18/15	17/14	25/20	25/26	25	22	22
	PLACES OF WORSHIP SCHOOL	4 - FIRST LATIN BAPTIST DET FRIENDS MTG QUAKERS, OLD LANDMARK CHURCH, BEARD SCHOOL (PARTIAL)	5 - FIRST LATIN BAPTIST DETROIT FRIENDS MTG QUAKERS, OLD LANDMARK CHURCH, MILITARY AVE. BEARD SCHOOL (PARTIAL)	4 - FIRST LATIN BAPTIST DETROIT FRIENDS MTG QUAKERS, OLD LANDMARK CHURCH, MILITARY AVE. CHURCH	5 - FIRST LATIN BAPTIST DETROIT FRIENDS MTG QUAKERS, ALL SAINTS, MILITARY AVE. CHURCH BEARD SCHOOL (PARTIAL)	3 - OLD LANDMARK CHURCH, MILITARY CHURCH, BEARD SCHOOL (PARTIAL)	4 - FIRST LATIN BAPTIST, ALL SAINTS , MILITARY AVE. CHURCH OLD LANDMARK CHURCH	4 - FIRST LATIN BAPTIST DET FRIENDS MTG QUAKERS, OLD LANDMARK CHURCH, BEARD SCHOOL (PARTIAL)
ENVIRONMENTAL SITES AFFECTING PLAN IMPLEMENTATION	NUMBER	6	6	4	9/3	5	9	6
ABOVE GROUND HISTORIC/ NATL REG	NUMBER	0	0	0	0	0	0	0
POTENTIALLY ELIGIBLE FOR REGISTER STRUCTURES	NUMBER/SITE	2- OLIVET CHURCH APART BUILDING	2- OLIVET CHURCH APART BUILDING	2- OLIVET CHURCH APART BUILDING	3 - ALL SAINTS CHURCH PRODUCE TERMINAL APART BUILDING	3- OLIVET CHURCH APART BUILDING DETROIT SAVINGS BANK	4 - ALL SAINTS CHURCH PRODUCE TERMINAL MICHIGAN BELL BLDG FORT POLICE STA. OLIVET CHURCH	2- OLIVET CHURCH APART BUILDING
ARCHAELOGICAL SITE	NUMBER	0	0	0	0	0	0	0
PARKLANDS	NUMBER / SITE	0	0	0	0	0	0	0
SIGNIFICANT HABITAT (ED-Endangered / PL - Potential)	NUMBER / SITE	0	0	0	0	0	0	0
ROW & REMEDIATION (ESTIMATED)	**COST IN MILLION OF DOLLARS (ESTIMATED)**	**$42 / $31 M**	**$37 / $28 M**	**$47 / $33**	**$113 / $129 M**	**$57 M**	**$84 M**	**$46 M + / -**

Note: The range in ROW & Remediation cost reflect the highest and lowest impact based on the plaza location and configuration associated with the interchange alternative.

Exhibit 2.10

3.0 Scope of Study - Value Analysis/ Value Planning

The scope of the Value Engineering (VE) Study was to look strictly at the interchange between I-75 and any of the three new DRIC Plazas under consideration. The configurations and location of the Plaza and the alignment of the bridge were not part of the VE study.

As discussed in Section 2, conceptual level arrangements for seven interchange alternatives were developed by the DRIC EPE Study Team to provide access to/from the Plaza and I-75. These alternatives were presented to some stakeholders and also extensively reviewed by MDOT. Since the concepts were already developed, the Value Engineering (VE) Team structured the study into two steps. The first step is to review, analyze and evaluate the merits of the developed alternatives using a Value Analysis (VA) process. The second step was to utilize a Value Planning (VP) process to investigate other feasible alternatives.

The objective of the VA process is to evaluate the developed alternatives to check whether they perform adequately to the satisfaction of the stakeholders at a reasonable cost. If the ratings are good, the developed alternatives will be validated. If the results of the VA process indicate that any of the seven developed alternatives are not good solutions, the VP process will search for better alternatives. Even if the seven developed alternatives are good, the VP process will test whether other alternatives can be developed that are better solutions.

The standard VE job plan was utilized in both cases. The VE Team developed the Information Phase for the VA and VP processes. Based on the needs, desires and constraints of the stakeholders, a Function-Logic Diagram was developed. At this point, the Value Analysis process began. Using the Function-Logic Diagram, criteria for evaluation were developed. These criteria were divided into Performance and Acceptance criteria. Using the criteria, the alternatives were rated.

For the Value Planning process, VE Team speculated and developed 124 ideas. Using these ideas, alternatives were developed. Due to a lack of time and information, these VP alternatives are not fully analyzed. They were judged solely for their feasibility. In addition, the VE Team identified other ideas for consideration by the DRIC EPE Study Team.

4.1 Owners, Users, Stakeholders

In general, everyone involved in a project is a stakeholder. However, during this part of the Information Phase, they are grouped separately as owners, users and stakeholders, as defined below:

Owners – Those who:

1. Own the project;
2. Fund the project;
3. Share in the funding;
4. Represent the owner's interests; or
5. Manage the project for the owner.

Users – Those who:

1. Use the project;
2. Operate the project; or
2. Maintain the project.

Stakeholders – Those who are:

1. Financially affected by the project;
2. Environmentally concerned about the project; or
3. Disturbed by a required change in habits or recreation.

These groupings help the VE Team better understand what the project does and what it should do. In subsequent sections of the VE Study, the owners, users and stakeholders will be referred to only as stakeholders.

List of Owners, Users & Stakeholders

Owners

1. MDOT – Traffic Safety
2. MDOT – Construction
3. MDOT – Finance
4. MDOT – Planning & Environmental
5. MDOT – Utilities
6. MDOT – Metro Region
7. MDOT – Real Estate
8. MDOT – Detroit TSC
9. MDOT – Design
10. MDOT – Maintenance
11. FHWA

Users

1. State Police
2. Local Police
3. Local EMS
4. Local Fire Dept.
5. Trucking/logistic firms
6. OJ Logistics
7. Yellow Trucking
8. NB I-75 Trucks
9. SB I-75 Trucks
10. International Trucks
11. Local Trucks
12. NB I-75 Cars
13. SB I-75 Cars
14. International Cars
15. Local Cars
16. DDOT (Buses)
17. Smart (Buses)
18. Commuter Traffic
19. Recreational Traffic

Stakeholders

1. Governor (MI)
2. Legislature (MI) – Senate
3. Legislature (MI) – House
4. Department of Homeland Security - National
5. Department of Homeland Security - State
6. Department of Homeland Security – Local
7. Customs and Border Protection
8. NEPA Participation agencies
9. US Department of State
10. US Department of Defense
11. City of Detroit
12. US General Services Administration
13. Detroit Planning Commission
14. Detroit Council
15. Detroit Mayor
16. Detroit DPW/Engineering
17. Detroit Planning & Development
18. Detroit Economic Growth Corp
19. Detroit Water & Sewer Dept.
20. Detroit Public Lighting
21. SEMCOG
22. SW Detroit Business Assoc.
23. SW Detroit Improvement Assoc.
24. SW Detroit Environmental Vision
25. Ambassador Bridge
26. Fort Street Business Assoc
27. Canadian Pacific Railroad
28. Delray Action Council
29. General Motors
30. Ford
31. Chrysler
32. Detroit River Tunnel Partnership
33. CSX Railroad
34. Canadian National Railroad
35. Norfolk Southern Railroad
36. Conrail
37. Switching RR (US Steel)
38. Arvin Meritor
39. Detroit Produce Terminal
40. Local Businesses
41. Fort Wayne
42. Lafarge
43. Detroit Wayne County Port Authority
44. Detroit Parks & Recreation Dept.
45. Wayne County
46. Detroit Public Schools
47. Local Residents
48. Ontario Ministry of Transport
49. Transport Canada
50. City of Windsor
51. Canada Border Service Agency
52. Sterling Fuels/Canadian Interests
53. Detroit Edison
54. Level 3 Communications
55. Private Utilities
56. Contractors
57. Designers
58. Potential Private Partners
59. Churches
60. MDEQ
61. Gateway Community Design Collaborative
62. State Historic Preservation Office
63. Ferry
64. Local Advisory Council
65. ACCESS - Arab Community Center for Economic and Social Services
66. Mexican Town Dev. Corp.
67. City of Dearborn
68. City of Melvindale
69. Condo Developer(s)

4.2 Stakeholders Constraints, Needs and Desires

Each stakeholder is expecting something from the project. The stakeholder's expectations are grouped into constraints, needs and desires, as defined below:

Constraints are:

1. Legal requirements;
2. Standards of the owner;
3. Physical conditions of the site; or
4. Commitments to stakeholders.

Needs are:

1. Expectations that must be fulfilled by the project if constraints are not violated.
2. Limitations or restrictions that are imposed by stakeholders but which can be violated. The degree of violations will be considered in the evaluation of alternatives.

Desires are:

1. Expectations that should be fulfilled if cost is not a factor.

There are several points to keep in mind in identifying the stakeholder constraints, needs and desires. First of all, the majority of constraints are proscribed by the law and by applicable codes and standards. These constraints are too numerous to be listed for each VE Study.

The constraints that should be listed are those imposed by a stakeholder or by a special code or standard. For example, in upgrading an interstate highway, the "AASHTO Policy on Geometric Design of Highways and Streets" calls for a minimum vertical clearance over the interstate of 16'-6". However, if the upgrade is limited in scope, it is possible to reduce the required minimum vertical clearance to 14'-6" or to even maintain the existing vertical clearance if it is less than 14'-6".

Secondly, design criteria should be described as a constraint, need and desire. For example, some stakeholders may say that vertical clearance over an expressway might be shown as a constraint of 14'-6" (to meet most urban requirements), a need of 16'-0" (to meet AASHTO) and a desire of 16'-3" (to account for future overlays). On the other hand, other stakeholders may say that 16'-3" is the constraint (No design exceptions), the need is 16'-0" (to meet AASHTO) and the desire is 14'-6" (to reduce the cost of the improvement).

The above illustrates an example of how the VE Team generally identifies constraints, needs and desires. the section of I-75 within this VE project has been designated a "Exempt Area" and requires, by agreement with FHWA, a 14'-5" vertical clearance and no additional clearance is needed or desired.

List of Constraints, Needs & Desires

Constraints

1. General Service Administration Plaza design standards
2. 14'-6" vertical clearance over I-75
3. 14'-6" vertical clearance over all ramps
4. 14'-6" vertical clearance over Service Drives
5. 17'-0" vertical clearance for pedestrian bridges
6. 23'-0" vertical clearance for bridges over RR
7. Maintain one lane in each direction on I-75 during construction
8. Build Plaza within Plaza opportunity area
9. Maintain access to Southwestern HS during construction
10. Project completion by 2013
11. Maintain RR connection to Zug Island
12. Eliminate utilities under Plaza
13. Eliminate RR under Plaza

Needs

1. Provide design time to relocate utilities
2. Meet MDOT Design Guidelines
3. Meet AASHTO Design Guidelines
4. Meet MDOT Drainage Guidelines
5. Meet DWSD Drainage Guidelines
6. Minimize design exceptions
7. Maintain 2 lanes in each direction on I-75 during construction
8. Provide direct access to Bridge/Plaza
9. Maintain traffic on Fort Street during construction
10. Mitigate noise impact
11. Maintain access across I-75
12. Maintain level of service of I-75
13. Maintain Pedestrian access across I-75
14. Maintain local truck access to/from I-75
15. Avoid ramp traffic backing up on I-75
16. Minimize City of Detroit impacts on schedule
17. Do not impact River Rouge Bridge on I-75
18. Do not impact Ambassador Bridge Gateway Interchange with I-75
19. Avoid Clark Park
20. Provide cost effective project
21. Design for 2035 traffic
22. Develop funding source
23. Develop funding plan
24. Coordinate with other projects
25. Approval of EIS by 2008
26. Coordinate signage for DRIC, Ambassador Bridge and Tunnel

Desires

1. Revitalize Fort Wayne
2. No design exceptions
1. Maintain I-75 on existing alignment
2. Relocate I-75 to south
3. Maintain 3 lanes in each direction on I-75 during construction
4. Close I-75 during construction & detour traffic
5. Maintain RR operations during construction
6. Maintain I-75 mobility during construction
7. Provide local access to Bridge/Plaza
8. Leverage project for community benefit
9. Remove international trucks from local streets
10. Improve air quality
11. Minimize noise impact
12. Minimize impacts of trucks on Livernois/Dragoon N of I-75
13. Minimize impacts to West Delray
14. No impact to Detroit Produce Terminal
15. No impact to Public Safety Bldg
16. Do not build DRIC Interchange
17. Maintain Service Drives
18. Improve operations on I-75
19. Minimize impact on I-75 during construction
20. Minimize utility relocation
21. Minimize utility impacts on schedule
22. Relocate utilities prior to construction
23. Minimize residential relocation
24. Minimize business relocation
25. Maximize business opportunities
26. Avoid Beard School
27. Maintain entry way to Delray
28. Minimize impacts to City of Detroit streets
29. Improve drainage on local streets
30. Eliminate East Delray RR Spur
31. Maintain East Delray RR Spur
32. Provide RR connection (right-turn) to Zug Island
33. Improve Economic climate in State of Michigan

Desires (continued)

34. Provide context sensitive solutions
35. Minimize use of braided ramps
36. Minimize number of structures
37. Maximize distance between ramps – improve weave & merge
38. Maximize cross street over I-75
39. Reduce impacts on N side of I-75
40. Maintain full access at Springwells
41. Maintain full access at Clark
42. Maintain full access at Livernois/Dragoon
43. Reduce impact of ramps at Livernois/Dragoon
44. Spread out impact of Plaza ramps on I-75
45. Limit number of access points to I-75
46. Minimize impacts to Historical Structures
47. Minimize construction time
48. Minimize construction claims
49. Early identification of contaminated soils
50. Deal with undocumented subsurface conditions
51. Early identification of private utilities
52. Reduce uncertainty / risk of unknown utilities
53. Early identification of long lead time purchases
54. Minimize temporary work
55. Perform demolition prior to construction
56. Address detour route improvements prior to construction
57. Ensure operations on detour routes
58. Construct Service Drives first
59. Develop reliable construction cost estimates
60. Identify property acquisitions early
61. Identify critical ROW
62. Earmark funds for ROW acquisition
63. Prepare English unit plans
64. Work with adjacent I-75 interchanges
65. Reduce number of revisions
66. Provide adequate time for design & review
67. Early identification of governance structure
68. Provide Emergency Access
69. Minimize financial participation from City of Detroit
70. Provide jobs to local residents
71. Assist City of Detroit with design
72. Improve connectivity to Fort Wayne
73. Create buffer (Green St) between Residential / Industrial areas
74. Improve access to Riverfront on East Side
75. Coordinate with Community Master Plan
76. Minimize driver confusion at decision points
77. Improve drainage on I-75
78. Improve drainage on Service Drives

4.3 Project Functions

Functions that the project should fulfill are derived from the list of stakeholder constraints, needs and desires. However, at this point, the VE Team has to make judgments about any conflicts between what various stakeholders expect from the project. That is, functions are considered from the project perspective. Where it is not possible for the VE Team to resolve conflicts, each constraint, need or desire is listed as a function. The list of project functions is shown below:

Again, there are several points to keep in mind in identifying functions. First of all, every function should have a corresponding constraint, need or desire. If a function is proposed without a corresponding constraint, need or desire, either the function is not legitimate or the list of constraints, needs and desires must be modified.

Secondly, since functions follow from constraints, needs and desires, they are generally not executable. Sometimes, executable ideas are mistakenly offered in lieu of functions.

The VE Facilitator should not attempt to differentiate between functions and ideas at this time in order to keep the flow of the VE Study. However, the VE Facilitator should be aware of the substitution of ideas for functions. When an idea is proposed, the VE Facilitator must ask the question "Why is "X" a function?" As will be seen later in the discussion of the Function-Logic Diagram, in this way the VE Facilitator can try to determine what the underlying function really is.

For example, "Lengthen bridge" was listed as a function. However, this is really an executable idea. If the question is asked "Why do we need to lengthen the bridge?" one answer would be "Store vehicles." Therefore, "Store vehicles" would be the function. "Lengthen bridge" would be an idea under the Speculation Phase.

Another example of an idea being offered as a function is "Rehabilitate mainline pavement." Again, this is an idea that was offered as a function. If the question is asked "Why do we need to rehabilitate the mainline pavement?" one answer would be to "Improve roadway surface." Therefore, "Improve roadway surface" would be the function. "Rehabilitate mainline pavement" would be an idea under the Speculation Phase.

Provide direct access to Bridge/Plaza
Receive Traffic
Channel Traffic
Distribute Traffic
Maintain I-75 mobility during construction
Leverage project for community benefit
Improve air quality
Minimize noise impact
Maintain LOS of I-75
Improve operations on I-75
Minimize utility relocation
Minimize residential relocation
Minimize business relocation
Maximize business opportunities
Maintain local truck access to/from I-75
Improve operations on Service Drives
Provide context sensitive solutions
Minimize impacts to historical structures
Minimize construction time
Coordinate with Community Master Plan
Minimize driver confusion at decision points

5.0 Function Analysis Phase

As described in Section 4.3, the VE Team developed a list of functions that the project should address. This involves grouping of needs and desires and separating general functions from actions.

The next step in the function analysis process is to develop the Function-Logic Diagram.

5.1 Function-Logic Diagram

The Function-Logic Diagram is a tool to help the VE Team put the functions in an order and to better understand what the project is expected to do.

The sequence of functions in the Function-Logic Diagram, proceeding from left to right, answer the question “How is the function to its immediate left performed?”

The sequence of functions proceeding from right to left answers the question “Why is the function to its immediate right performed?”

In the Function-Logic Diagram shown on the following pages, the functions are grouped into three categories:

- Task
- Basic Functions
- Enhancing Functions

The task is the reason or purpose for the project. It answers the “why” question of the basic function.

The basic function is the primary purpose or most important expectation from the project. The basic function must always exist, although the methods or designs to achieve it may vary.

The enhancing functions support the basic function and result from the specific design approach chosen to achieve the basic function. As shown in the Function-Logic Diagram, the enhancing functions are grouped into four subcategories:

- Assure Dependability
- Assure Convenience
- Satisfy Stakeholder
- Attract Stakeholder

Functions that assure dependability do the following:

- Make the project stronger;
- Make the project more reliable;
- Make the project safer - protect the stakeholders;
- Lengthen the life of the project;
- Reduce maintenance; or
- Protect the environment.

Functions that assure convenience do the following:

- Make the project easier to use;
- Contribute to spatial arrangements;
- Facilitate maintenance and repair; or
- Furnish instructions to the stakeholder.

Functions that satisfy stakeholders do the following:

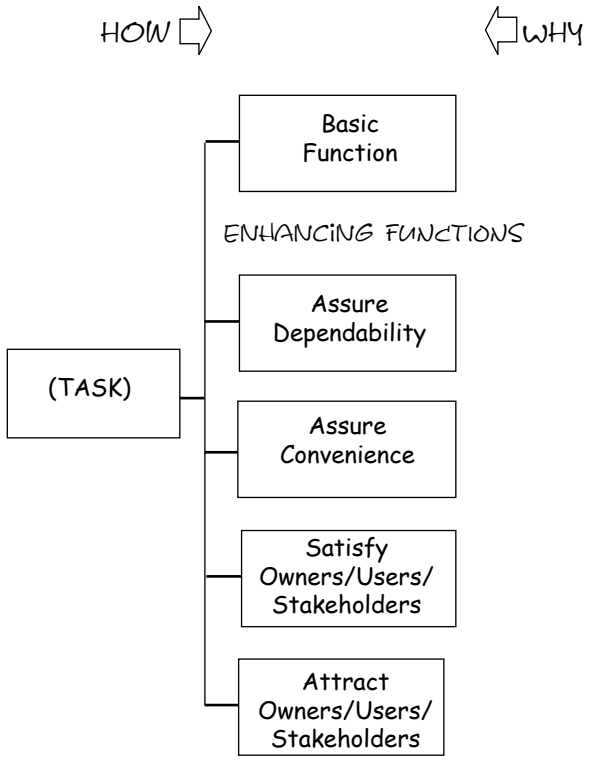
- Make the project satisfy individual desires;
- Make the stakeholder’s life more pleasant (such as minimize noise); or
- Follow standards and specifications of a stakeholder.

Functions that attract stakeholders do the following:

- Emphasize visual aspect of project; or
- Create a positive image of the project.

As shown in Exhibit 5.1, the Function-Logic Diagram is developed using a How/Why logic. From left to right the Function-Logic Diagram describes how the function will be achieved. As a check on the logic, the Function-Logic Diagram describes why we do something by reading it right to left.

The Function Logic Diagram for the Interchange between the DRIC Plaza and I-75 is shown in Exhibit 5.2.



Structure of Function-Logic Diagram
Exhibit 5.1

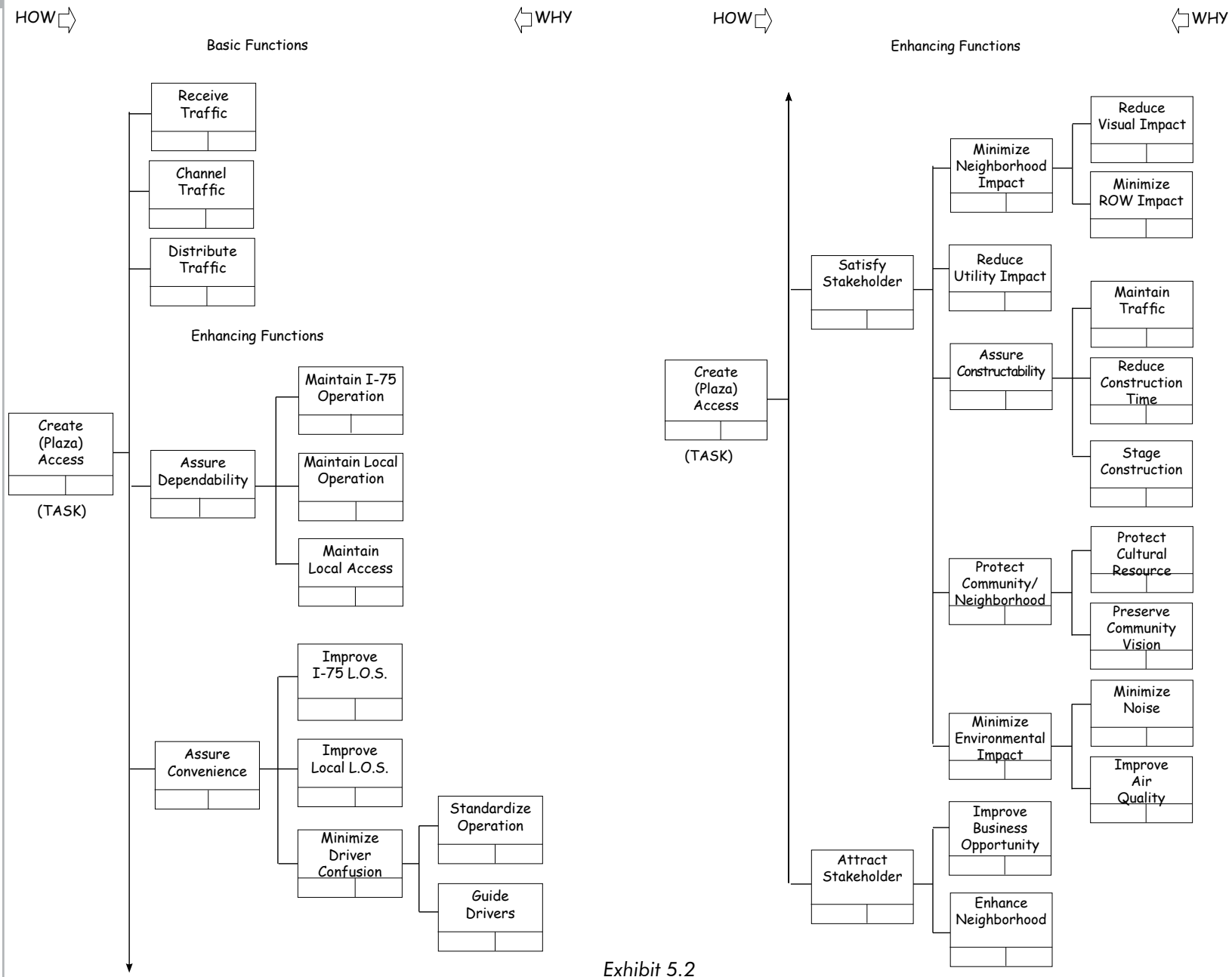

HOW
WHY
Basic Functions
Receive Traffic
Channel Traffic
Distribute Traffic
Enhancing Functions
Create (Plaza) Access
(TASK)
Assure Dependability
Maintain I-75 Operation
Maintain Local Operation
Maintain Local Access
Assure Convenience
Improve I-75 L.O.S.
Improve Local L.O.S.
Minimize Driver Confusion
Standardize Operation
Guide Drivers
HOW
WHY
Enhancing Functions
Create (Plaza) Access
(TASK)
Satisfy Stakeholder
Minimize Neighborhood Impact
Reduce Visual Impact
Minimize ROW Impact
Reduce Utility Impact
Assure Constructability
Maintain Traffic
Reduce Construction Time
Stage Construction
Protect Community/ Neighborhood
Protect Cultural Resource
Preserve Community Vision
Minimize Environmental Impact
Minimize Noise
Improve Air Quality
Attract Stakeholder
Improve Business Opportunity
Enhance Neighborhood

Exhibit 5.2

6.1 Identification of Evaluation Criteria

Based on the Function-Logic Diagram discussed in Section 5.1, the VE Team identified Performance and Acceptance Criteria against which the Developed Interchange Alternatives would be evaluated.

Performance Criteria

Performance criteria are generally objective and measurable. They come from the Basic Function, Assure Dependability and Assure Convenience functions in the Function-Logic Diagram. As determined by the VE Team, the Performance Criteria are as follows:

- Access To/From the Plaza
  In considering **Access To/From the Plaza**, the VA/VP Team looked at travel time along the ramps and rider comfort under each interchange alternative.

- Traffic Operations on I-75
  In considering **Traffic Operations on I-75**, the VE Team looked at the total number of access points to/from I-75 under each interchange alternative (see Exhibit 6.1)

- Local Access within the Corridor
  In considering Local Access **within the Corridor**, the VE Team looked at the number of existing crossings of I-75 that were maintained under each interchange alternative (see Exhibit 6.2)

- Local Traffic Operations
  In considering **Local Traffic Operations**, the VA/VP Team looked at how each interchange affected the mobility & travel time of local traffic from the current condition. This would include street closures and new routes.

- Bridge Geometry/Retaining Walls
  In considering **Bridge Geometry/Retaining Walls**, the VA/VP Team looked at the skew of the bridges, number of curved bridges, and the total length of retaining wall under each interchange alternative.

Acceptance Criteria

Acceptance criteria are generally subjective and not measurable. They come from the Assure Convenience, Satisfy Stakeholder and Attract Stakeholder functions in the Function-Logic Diagram. As determined by the VE Team, the Acceptance Criteria are as follows:

- Protect Community/Neighborhood Characteristics
  In considering **Protect Community/Neighborhood Characteristics**, the VA/VP Team looked at the location of the ramps to local community, the number of businesses taken, and the amount of residential taken under each interchange alternative.

- Impact to North/South Neighborhood
  In considering **Impact to North/South Neighborhood,** the VA/VP Team looked at the number of crossings over I-75 that were being maintained under each interchange alternative.

- Constructability
  In considering **Constructability, the VA/VP Team** looked at complexity, access, number of bridges, number of walls, and construction time for each interchange alternative.

- Impact to Utilities
  In considering **Impact to Utilities**, the VA/VP Team looked at the existing major utility facilities and determined the relocation that would be needed under each interchange alternative.

Driver Comfort
In considering **Driver Comfort**, the VA/VP Team looked at the distance between consecutive off-ramps, the weave merge areas, the number of exits, and the number of diverge points under each interchange alternative (see Exhibit 6.1)

- Impact to the Delray Neighborhood
  In considering **Impact to the Delray Neighborhood**, the VA/VP Team looked at neighborhood cohesion, neighborhood access, and neighborhood acquisitions under each interchange alternative.

DRIC SUMMARY OF ACCESS POINTS

INT.	DIRN.	TOTAL ACCESS	TOTAL OFF	BRIDGE OFF TO LOCAL OFF	COMMENT	SPRINGWELLS OFF TO BRIDGE OFF	COMMENT	WEAVE DIST.
1	NB	6	3	330		1400		0
	SB	6	3	300		800		0
2	NB	6	3	400		1000		450
	SB	6	3	350		800		350
3	NB	6	3	320		1250		0
	SB	6	3	300		770		0
4	NB	7	3	425	BRIDGE OFF TO SPRINGWELLS OFF	1200	SPRINGWELLS TO LOCAL OFF	850
	SB	6	3	450		1000		0
5	NB	6	3	250		1200		900
	SB	7	4	350		950		950
6	NB	5	3	750		1400		400
	SB	5	2	800		N/A		350
1 MOD	NB	6	3	500		1400		800
	SB	6	3	2000		850		450

Exhibit 6.1

			EPE Study Interchanges													
		Element / Road	1		2		3		4		5		6		1 Mod	
EXISTING	Interchange	Dearborn St.	Maintain		Maintain		Maintain		Maintain		Modify	Remove SB On Ramp	Maintain		Maintain	
		Springwells St.	Modify	Remove NB On Ramp and SB Off Ramp	Modify	Remove NB On Ramp and SB Off Ramp	Modify	Remove NB On Ramp and SB Off Ramp	Modify	Remove SB Off Ramp	Maintain		Modify	Remove NB On Ramp and SB Off Ramp	Improve	Relocate Ramps
		West End St.	Maintain		Maintain		Maintain		Maintain		Maintain		Maintain		Improve	Realign
		Livernois St. / Dragoon	Modify	Braided Ramps NB Off Ramp Indirect	Modify	Auxiliary Lanes/ Indirect Access	Modify	Braided Ramps and indirect Access	Modify		Modify	NB Indirect Access	Modify	NB & SB Indirect Access	Eliminate	
		Clark St.	Modify	Remove NB Off and SB On Ramps	Modify	Remove NB Off and SB On Ramps	Modify	Remove NB Off and SB On Ramps	Modify	Remove NB Off and SB On Ramps	Modify	Remove NB Off and SB On Ramps	Eliminate	Conflicts with Plaza Ramps A & D	Modify	Relocate NB Off & SB On Ramps Ramps to Junction
	North-South	Springwells St.	Maintain		Maintain		Maintain		Maintain		Maintain		Maintain		Improve	New Bridge Realigned (U-Turns)
		Green St.	Improve	New Bridge	Improve	New Bridge (U-Turns)	Maintain		Improve	New Bridge	Improve	New Bridge	Maintain		Improve	New Bridge (U-Turns)
		Waterman St.	Eliminate	Due to grade issues	Eliminate	Due to grade issues	Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)	Eliminate	
		Livernois St.	Improve	Turned into a Two-way St. (U-Turns)	Improve	New Bridge	Eliminate	Due to conflicts with EB Ramp	Eliminate	Due to Impacts with Ramp D & NB Svc Dr conflicts	Improve	New Bridge	Eliminate	Due to conflicts with Local Ramps & Interchange Ramps	Improve	New Bridge
		Dragoon St.	Eliminate	Due to EB Ramp from Service Dr. through Intersection	Improve	New Bridge	Eliminate	Due to conflicts with EB Ramp	Eliminate	Due to Impacts with Ramp D & NB Svc Dr conflicts	Improve	New Bridge	Eliminate	Due to conflicts with Local Ramps & Interchange Ramps	Improve	New Bridge
		Junction St.	Eliminate	Due to grade issues	Eliminate	Due to grade issues	Eliminate	Due to grade issues	Eliminate	Due to grade issues	Improve	New Bridge	Eliminate	Due to grade issues	Eliminate	
		Clark St.	Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)	Maintain		Improve	New Bridge (U-Turns)	Improve	New Bridge (U-Turns)
	East-West	Lafayette Blvd.	Maintain	Eliminate direct conn. From SB Svc Dr	Maintain	Eliminate direct conn. From SB Svc Dr	Maintain	Eliminate direct conn. From SB Svc Dr	Maintain		Maintain		Modify		Modify	
		SB Service Drive	Improve / Modify		Improve / Modify		Improve / Modify	Shift to South	Improve / Modify		Modify		Modify		Modify	
		Mainline I-75					Modify	Shift to South btwn Waterman & Clark	Maintain		Maintain		Maintain		Maintain	
		NB Service Drive	Improve / Modify		Improve / Modify		Improve / Modify	Shift to South btwn Waterman & Clark	Improve / Modify		Modify		Modify		Modify	
		Fort St.	Maintain		Maintain		Maintain		Maintain		Maintain		Maintain		Maintain	
		Railroad	Improve	New RR Bypass	Improve	New RR Bypass	Improve	New RR Bypass	Improve	New RR Bypass	Improve	New RR Bypass	Improve	New RR Bypass	Improve	New RR Bypass
		Jefferson Ave.	Maintain		Maintain		Maintain		Maintain		Maintain		Maintain		Maintain	

Exhibit 6.2

6.2 Ranking of Performance Criteria

The Performance Criteria were compared to each other, as shown in Exhibit 6.3, to assign a Weight of Importance to each criterion.

In assigning the Weight of Importance, the most important criterion, Access To/From the Plaza, is usually given a weight of 10. The second most important criterion, Traffic Operations on I-75, must be given a weight of 10 or less. In this case, the weight given to Traffic Operations on I-75 was also a 10. The third most important criterion, Local Access within the Corridor, must be given a weight of 10 or less. In this case, it was given a weight of 7.

Criteria Ranking Chart (Performance)

Element:

Criteria	1.	2.	3.	4.	5.
1. Access to/from Plaza	1	1	1	1	1
2. Traffic Operations on I-75	0	1	1	1	1
3. Local Access within Corridor	0	0	1	1	1
4. Local Traffic Operations	0	0	0	1	1
5. Bridge Geometry/Retaining Wall	0	0	0	0	1
Rank					
Weight					

Exhibit 6.3

6.3 Ranking of Acceptance Criteria

The Acceptance Criteria were compared to each other, as shown in Exhibit 6.4, to assign a Weight of Importance to each criterion.

In assigning the Weight of Importance, the most important criterion, Protect Community/Neighborhood Characteristics, is usually given a weight of 10. The second most important criterion, Driver Comfort, must be given a weight of 10 or less. In this case, the weight given to Impact to Driver Comfort was a 9. The third most important criterion, Constructability, must be given a weight of 9 or less. In this case, it was given a weight of 8.

Criteria Ranking Chart (Acceptance)

Element:

Criteria	1.	2.	3.	4.	5.	6.
1. Protect Community / Neighborhood Characteristics	1	1	1	1	1	1
2. Impact to N/S Neighborhood	0	1	0	1	0	1
3. Constructability	0	1	1	1	0	1
4. Impact to Utilities	0	0	0	1	0	0
5. Driver Comfort	0	1	1	1	1	1
6. Impact to Delray	0	0	0	1	0	1
Rank						
Weight						

Exhibit 6.4

6.4 Performance Evaluation of Developed Interchange Alternatives

Using the Weighted Performance Criteria discussed above, the seven Developed Interchange Alternatives were evaluated based on how well they satisfied each of the performance criteria. For each alternative, a rating of 0 to 5 was given, with 5 being excellent and 0 being unacceptable.

Each criterion was rated against the seven Developed Interchange Alternatives. The evaluation teams briefly reviewed the description for each criterion and gave their rating. The five ratings were summed and divided by 5. This averaging process is the reason why the matrix shows ratings of 3.2 or 3.4 for some of the alternatives.

The results of the Performance Evaluation (Exhibit 6.5) show that all of the Developed Interchange Alternatives were rated between good (3.0) and very good (4.0). This was expected because the seven alternatives have been subjected to a rigorous review and development process by the DRIC EPE Study Team.

PERFORMANCE RATING

Excellent = 5 Very Good = 4 Good = 3 Acceptable = 2 Poor = 1 Unacceptable = 0	Weight of Importance	Interchange 1		Interchange 2		Interchange 3		Interchange 4		Interchange 5		Interchange 6		Interchange 1 Mod	
		Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating
Criteria	(1-10)	(1-5)		(1-5)		(1-5)		(1-5)		(1-5)		(1-5)		(1-5)	
1 Access to and from Plaza	10	4.6	46.0	4.6	46.0	4.0	40.0	3.0	30.0	2.8	28.0	4.6	46.0	4.6	46.0
2 Traffic Operations on I-75	10	4.2	42.0	3.2	32.0	4.0	40.0	3.6	36.0	3.4	34.0	3.8	38.0	3.4	34.0
3 Local Access within Corridor	7	3.0	21.0	3.0	21.0	3.0	21.0	3.6	25.2	3.8	26.6	2.8	19.6	3.0	21.0
4 Local Traffic Operations	6	3.0	18.0	4.0	24.0	2.6	15.6	2.8	16.8	4.4	26.4	2.4	14.4	4.0	24.0
5 Bridge Geometry/Retaining Walls	5	3.4	17.0	2.8	14.0	4.2	21.0	2.6	13.0	3.0	15.0	3.2	16.0	3.0	15.0
Total Weighted Rating	38		144.0		137.0		137.6		121.0		130.0		134.0		140.0
Average Weighted Rating		3.79		3.61		3.62		3.18		3.42		3.53		3.68	

Exhibit 6.5

6.5 Acceptance Evaluation of Developed Interchange Alternatives

Using the Weighted Acceptance Criteria discussed above, the seven Developed Interchange Alternatives were evaluated based on how well they satisfied each of the acceptance criteria. For each alternative, a rating of 0 to 5 was given, with 5 being excellent and 0 being unacceptable.

Again, the VE Team was divided into five, two-person evaluation teams.

Each criterion was rated against the seven Developed Interchange Alternatives. The evaluation teams briefly reviewed the description for each criterion and gave their rating and the ratings were summed and divided by 5.

The results of the Acceptance Evaluation (Exhibit 6.6) show that the range of ratings for the Developed Interchange Alternatives vary between 2.43 (Interchange 4) and 3.72 (Interchange 1 Mod.). Again, this spread was expected because Interchanges 4 and 5 impact the Delray area much more than the other alternatives.

ACCEPTANCE RATING

Excellent = 5 Very Good = 4 Good = 3 Acceptable = 2 Poor = 1 Unacceptable = 0	Weight of Importance	Interchange 1		Interchange 2		Interchange 3		Interchange 4		Interchange 5		Interchange 6		Interchange 1 Mod	
		Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating
Criteria	(1-10)	(1-5)		(1-5)		(1-5)		(1-5)		(1-5)		(1-5)		(1-5)	
1 Protect Community/ Neighborhood Characteristics	10	4.0	40.0	4.0	40.0	3.8	38.0	1.6	16.0	2.2	22.0	3.0	30.0	3.8	38.0
2 Impact to NS Neighborhood	7	3.6	25.2	3.6	25.2	4.0	28.0	2.4	16.8	2.2	15.4	3.0	21.0	3.6	25.2
3 Constructability	8	3.4	27.2	3.4	27.2	2.2	17.6	3.0	24.0	3.6	28.8	3.4	27.2	3.4	27.2
4 Impact to Utilities	6	3.8	22.8	3.8	22.8	2.4	14.4	2.2	13.2	2.2	13.2	3.0	18.0	3.4	20.4
5 Driver Comfort	9	3.6	32.4	3.0	27.0	3.6	32.4	3.2	28.8	3.4	30.6	3.2	28.8	4.0	36.0
6 Impact to EW Neighborhood	7	3.8	26.6	3.8	26.6	3.6	25.2	2.2	15.4	2.4	16.8	4.0	28.0	4.0	28.0
Total Weighted Rating	47		174.2		168.8		155.6		114.2		126.8		153.0		174.8
Average Weighted Rating		3.71		3.59		3.31		2.43		2.70		3.26		3.72	

Exhibit 6.6

6.6 Cost Evaluation of Developed Interchange Alternatives

Conceptual level construction cost estimates were prepared by the DRIC EPE Study Team for each of the Developed Interchange Alternatives. A summary of these cost estimates is shown in Exhibit 2.9.

In addition, the DRIC EPE Study Team developed conceptual level cost estimates for right-of-way acquisition and remediation of significant environmental impacts. A summary of these cost estimates is also shown in Exhibit 2.10.

The two cost estimates were combined, as follows, to form a comparative cost estimate for each of the Developed Interchange Alternatives:

	Construction Cost	ROW Environmental Cost	Total Cost
Interchange 1	$139	$42	$181
Interchange 2	$164	$37	$201
Interchange 3	$131	$47	$178
Interchange 4	$142	$113	$255
Interchange 5	$126	$57	$183
Interchange 6	$137	$84	$221
Interchange 1 Mod.	$176	$48	$224

(Costs in Millions)

The Cost Rating was developed by the VE Team by assuming that any interchange alternative that cost $160.0 M or less would be rated as a 5.0 (Excellent). In addition, the VE Team assumed that any interchange alternative that cost $300.0 M or more would be rated as a 1.0 (Poor).

The VE Team then looked at two ways to determine the cost ratings for each alternative. One way was to use a straight line variation between the two assumed end points. A second way was to use a parabolic curve between the assumed end points. The reason for considering the parabolic curve was to reduce the impact of small increases in the total cost estimate between alternatives. However, in practice this type of curve provided too little difference between several of the alternatives.

In the end, the VE Team decided to use the straight line variation, as shown below (Exhibit 6.7):

Both sets of cost estimates were developed in 2006 Dollars and inflated to 2010 Dollars. The purpose of the cost estimates is to provide a cost comparison of the Developed Interchange Alternatives to each other.

Because of the conceptual level nature of the EPE Study process, the cost estimates do not include several major items of work. The cost estimates will need to be revisited as the project moves ahead through the preliminary and final engineering phases as more information becomes available.

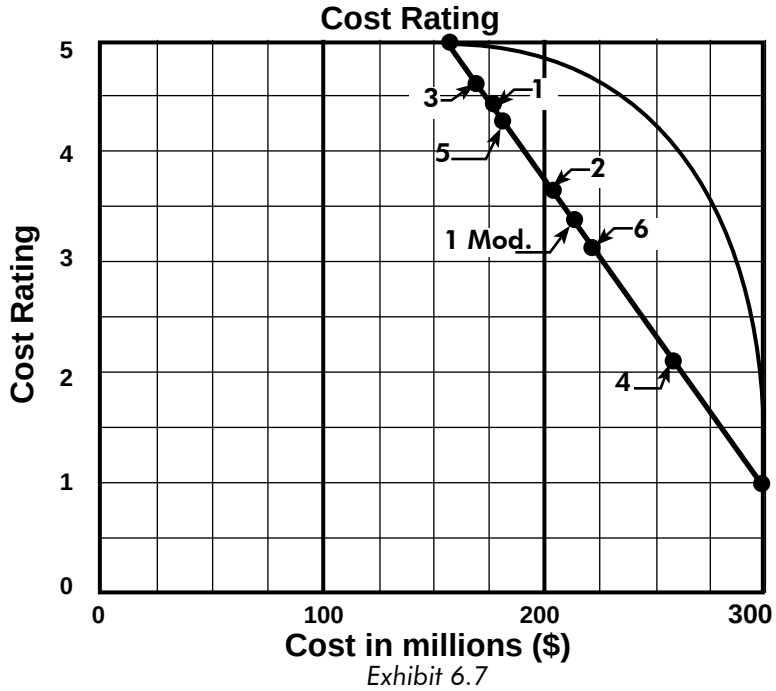


Exhibit 6.7

6.7 Validation of Developed Interchange Alternatives.

A summary evaluation of the Developed Interchange Alternatives is shown below. Using the Average Weighted Rating for Performance, Acceptance and Cost for each of the alternatives, a Value Index can be applied to the ratings as a way to further evaluate the alternatives (Exhibit 6.8).

The Value Index is a tool used to assign different weights of importance to the Performance, Acceptance or Cost Ratings. If Cost is considered to be more important that either Performance or Acceptance, a Value Index can be obtained for the combination of (1) times the Performance Rating plus (1) times the Acceptance Rating plus (2) times the Cost Rating, divided by 4.

As shown Exhibit 6.8, the Value Indices for Interchanges 1 and 3 are uniformly the highest among the seven Developed Interchange Alternatives.

If cost is assumed to be not important at this stage of the project's development, than Interchange 1 Mod rates as high as Interchanges 1 or 3.

Rating Summary

				Interchange 1	Interchange 2	Interchange 3	Interchange 4	Interchange 5	Interchange 6	Interchange 1 Mod
Ratings	Performance - P			3.79	3.61	3.62	3.18	3.42	3.53	3.68
	Acceptance - A			3.71	3.59	3.31	**2.43**	**2.70**	3.26	3.72
	Cost - C			4.60	3.80	4.60	**2.30**	4.50	3.10	3.30
	P	**A**	**C**							
Value Index	1	1	1	**4.03**	3.67	**3.84**	**2.64**	3.54	3.30	3.57
	2	1	1	**3.97**	3.65	**3.79**	**2.77**	3.51	3.36	3.60
	1	2	1	**3.95**	3.65	**3.71**	**2.59**	3.33	3.29	3.61
	1	1	2	**4.18**	3.70	**4.03**	**2.55**	3.78	3.25	3.50
	2	2	1	**3.92**	3.64	**3.69**	**2.70**	3.35	3.34	3.62
	2	1	2	**4.10**	3.68	**3.95**	**2.68**	3.71	3.30	3.54
	1	2	2	**4.08**	3.68	**3.89**	**2.53**	3.56	3.25	3.54

Exhibit 6.8

As discussed in Section 3.0, the VE Team was asked to review, analyze and evaluate the merits of the developed alternatives using a Value Analysis (VA) process. The second step was to utilize a Value Planning (VP) process to investigate other feasible alternatives.

7.1 Speculation Phase

For the Value Planning process, VE Team speculated and developed 124 ideas, as shown in Exhibit 7.1. Using these ideas, alternatives were developed. Due to a lack of time and information, these VP alternatives are not fully analyzed. They were judged solely for their feasibility. In addition, the VE Team identified other ideas for consideration by the DRIC EPE Study Team.

7.1.1 Ideas

Speculation may be carried out in at least three ways:

- Random
- By function
- By project element

Among the rules that govern the Speculation Phase of a VE Study are the following:

- Criticism is ruled out
- Quantity is wanted
- Combinations and improvements are sought.

An idea is a formulated thought or opinion. These ideas are presented in Section 7.2.1 as part of the initial screening

7.2 Evaluation Phase

7.2.1 Initial Screening

Ideas generated during the Speculation Phase were not subject to any criticism. This is done to promote free thinking. The next step is Initial Screening to identify real and potential conflicts and to consider the likelihood for acceptance of each idea. In addition, ideas that violated project constraints were eliminated. The legend below identifies the disposition of each idea in the initial screening step and the reasons for rejecting the idea.

A	Accepted
R1	Excessive ROW
R2	Discontinuous through Project Limits
R3	Violates Constraints
R4	Geometrics
R5	Violates Project Purpose
R6	Not Cost Effective
R7	Not Standalone – needs Idea 63
R8	Out of scope
R9	No Benefit

1.	Reconstruct I-75 within project limits	A
2.	Reconstruct I-75 up to Grand Ave.	A
3.	No local ramps between Springwells & Clark	A
4.	Create CD Roads along I-75 between Springwells & Clark	R1
5.	Create CD Roads along in lieu of service drives	A
6.	Use Fort St in lieu of NB Service Drive	A
7.	Use Lafayette in lieu of SB Service Drive	R2
8.	Separate merge/weave lane in Interchange Alternative 2	A
9.	Depress Ramp A in lieu of Flyover	A
10.	Depress Ramp B in lieu of Flyover	A
11.	Provide local access from Plaza to Jefferson	A
12.	"T" vacated street into Plaza for Local Access	A
13.	Provide local access onto Ramp A	A
14.	Provide local access from Ramp B	A
15.	Use SPUI in lieu of Diamond for local Interchange	A
16.	Use Roundabout at Springwells	A
17.	Use SPUI at Springwells	A
18.	Locate "T" Interchange west of Springwells	A
19.	Diamond Interchange in lieu of "T" Interchange near Livernois/Dragoon	A
20.	Provide local truck travel access to I-75 via ramps	A
21.	Provide local truck travel access to I-75 via Plaza	R3
22.	Abandon local roads between Fort St. & NB Service Dr	A
23.	Combine back to back off ramps	A
24.	Combine Plaza & Local off Ramps	A
25.	Combine Plaza & Local on Ramps	A
26.	Diamond Interchange in lieu of Interchange west of Springwells	A
27.	Use railroad ROW N of Green St for roadnet continuity	A
28.	Add realignment of Springwells (Interchange 1 MOD) to Interchange Alternatives I-6	A
29.	Permit design exceptions (from freeway standards)	A
30.	Keep SB off ramp at Springwells, create weave with Ramp C	A
31.	Keep NB on Ramp at Springwells, create weave with Ramp B	A
32.	Keep all cross access over I-75 open (Refers only to within alternative being studied)	R4
33.	Modify Interchange Alternative 4 (see Exhibit 7.2)	A
34.	Make Ramp A left hand entrance	A
35.	Close Fort St & NB Service Dr. Bring Plaza ramps to grade	A

36. Raise Fort St & NB Service Dr. Ramps at grade R4
37. Use left hand exit for Ramp D A
38. Depress Fort St & NB Service Dr. Ramps at Grade R4
39. Use Fort St for NB access to Plaza R5
40. Stack I-75 R6
41. Realign Ramps B & D to tie into Springwellls in Interchange Alternative 4 R5
42. Look at left hand exit ramps A
43. Have human factors analysis performed on decision points A
44. Use explicit safety analysis to model collision potential A
45. Extend MITS Center operations to this project A
46. Use Design/Build project delivery system A
47. Have MDOT visit successful Design/Build projects A
48. Use Design/Bid/Build Project Delivery System R5
49. Use purchase contracts for long lead items A
50. Early ROW acquisitions A
51. Early utility relocation A
52. Combine Collector/Distributor Roads with Plaza ramp movements A
53. Realign I-75 between Springwells & Grand (with Idea 1 or 2) A
54. Close I-75 during construction A
55. Use incentive/disincentive clause A
56. Boulevard Fort Street A
57. Relocate displaced Businesses to Fort St. A
58. Relocate displaced Businesses in East Delray A
59. Relocate displaced Residents in West Delray A
60. Combine 6 & 56 plus direct connect Springwells interchange to Fort A
61. Put photo-voltaic cells on noise walls A
62. Widen and/or boulevard Jefferson from Clark to Schaefer A
63. Provide full access interchange at Dearborn R4
64. Widen and/or boulevard Dearborn from I-75 to Jefferson R7
65. Increase K value of 1st vertical curve on Ramp B A
66. Verify weave distance between Ramps A & C on Interchange Alternative 4 A
67. Use consistent bridge structure type A
68. Use concrete segmental bridge superstructure A
69. Use radial piers in lieu of skew piers A
70. Minimize bridge skew A
71. Use stormwater to develop wetlands A
72. Accommodate future 5th lane on I-75 A
73. Eliminate Ramp H on Interchange Alternative 1 A
74. Develop Plaza as Green Project R8
75. Demonstrate Green Project at Visitor's center A
76. Depress Ramps B & D in interchange 4 along RR ROW A
77. Revise vertical profile to meet 80 K/hr on Ramp C, Interchange Alternative 1 A
78. Enclose I-75 R6
79. Create "I-696 style" Plaza at Clark St A
80. Create "I-696 style" Plaza at Green St A
81. Create "I-696 style" Plaza at Springwells A
82. Hold accelerated construction technology transfer workshop (AASHTO) A
83. Eliminate Ramp H in Interchange Alternative 4, Exit traffic east of Clark A
84. Eliminate Ramp H in Interchange Alternative 4, Enter traffic at Springwells A
85. Do not build DRIC interchange R5
86. Maintain all pedestrian bridges A
87. Provide pedestrian/bikeways at grade to focus cross traffic A
88. Design to avoid long lead items A

89. Hold contracting risk workshop A
90. Create CSS along local roads A
91. Create CSS along service drives A
92. Incorporate Delray master plan into project A
93. Use formliner for aesthetics A
94. Start final design before approval of FEIS A
95. Start detailed survey as soon as possible A
96. Buy local vacant business for local MDOT office A
97. Use Fort St. as a SB access to plaza R5
98. Realign Ramp D to come off I-75 curve at Gateway A
99. Use Public/Private partnerships A
100. Address detour route condition prior to construction A
101. Use abandoned RR row where possible A
102. Realign Ramps B+D in Interchange Alternative 4 A
103. Build service drives first A
104. Build plaza ramps first R9
105. Eliminate local access to I-75 during construction A
106. Identify contractor staging area A
107. Identify contractor fabrication area A
108. Use subsurface utility exploration after preferred alternative is determined A
109. Separate plaza to minimize utility impacts R8
110. Reconstruct siphons with pre-construction contract A
111. Abandon RR spur track A
112. Build connection to Zug Island R8
113. Connect West Riverfront Greenway to Clark Park A
114. Stack interchange Ramp over RR spur track A
115. Relocate Southwestern HS A
116. Remove one track of RR spur R6
117. Advance design of utilities A
118. Use RR spur ROW for utility corridor A
119. Maintain access to produce market during construction A
120. Provide access to produce terminal via Green St. gateway A
121. Use Junction Street as Gateway A
122. Use lane rental (with 55) A
123. Use A plus B bidding (with 55) A
124. Use circular tree-leg interchange A

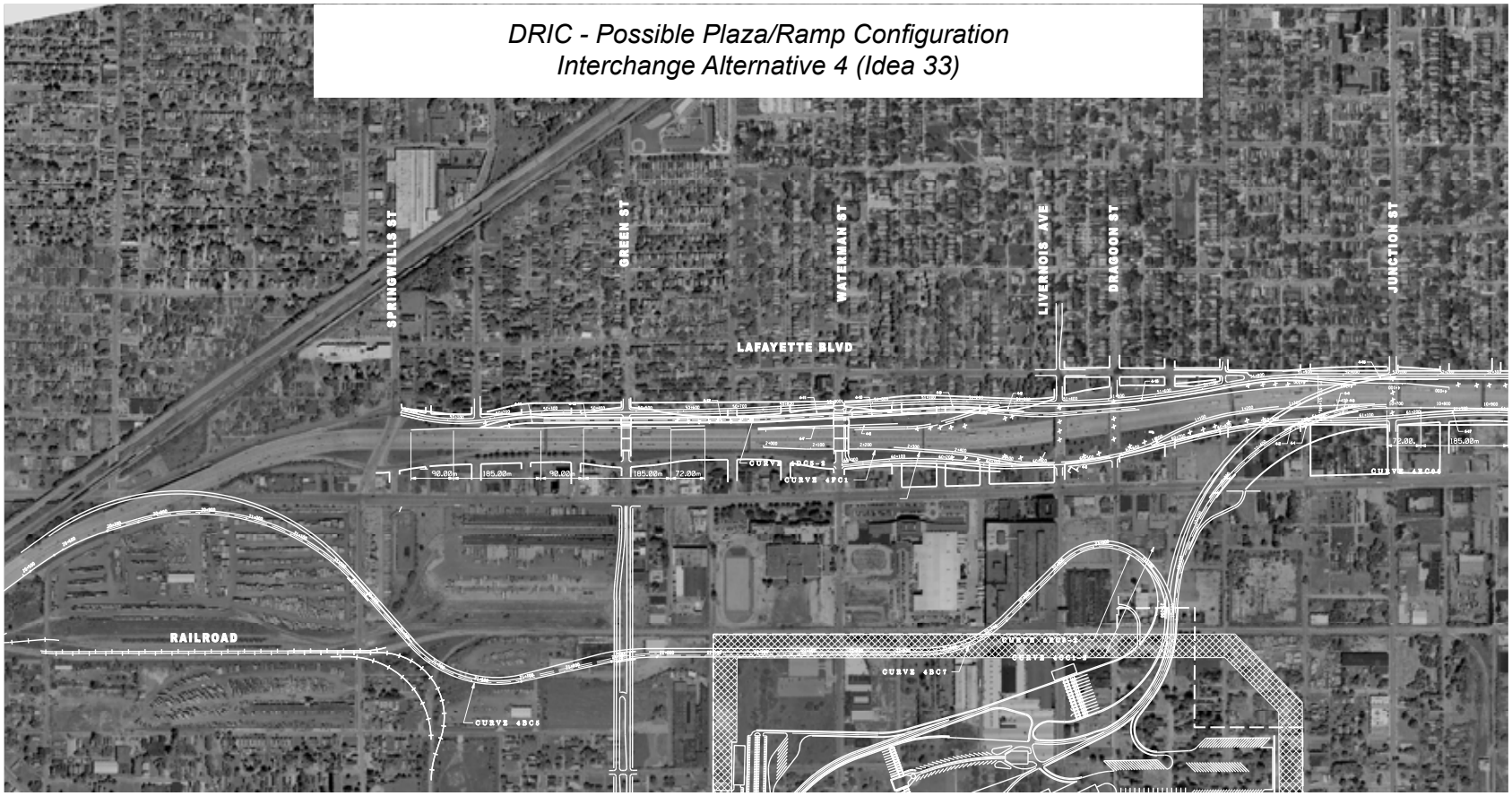

DRIC - Possible Plaza/Ramp Configuration
Interchange Alternative 4 (Idea 33)
SPRINGWELLS ST
GREEN ST
WATERMAN ST
LIVERNOIS AVE
DRAGOON ST
JUNCTION ST
LAFAYETTE BLVD
RAILROAD
CURVE 4BC1
CURVE 4BC5
CURVE 4BC7

Exhibit 7.2

7.3 Value Planning Proposals

Study Team Alternatives

As described in Section 2.3, the DRIC EPE Study Team developed seven interchange alternatives to connect I-75 and the proposed DRIC Plaza. These are summarized as follows:

Interchanges 1, 2, 3, 6 and 1 Mod are all T-Type interchange with access to the Plaza near the Livernois / Dragoon interchange. These interchanges all consist of T-Type plaza ramps radiating outward from a central location within the bridge plaza.

For Interchange 6, the access is shifted east of Livernois / Dragoon. For Interchange 3, I-75 is reconstructed slightly south of its existing alignment.

Interchanges 4 and 5 are both split type interchanges. For Interchange 4, the ramps from USA to Canada are near Springwells St. and ramps from Canada to USA are near Livernois / Dragoon.

For Interchange 5, the ramps from Canada to USA are near Springwells St. and ramps from USA to Canada are near Livernois / Dragoon.

All of the above interchanges fulfill the required MDOT criteria for acceleration to and deceleration from I-75 Mainline. The design speed for I-75 Mainline is 100kph. The design speed for the ramps is 70kph.

Value Planning (VP) Alternates

Four VP Alternatives were identified by the VE Team.

7.3.1 VP Interchange 1

Circular three-leg directional interchange - Idea 124 (Exhibit 7.3)

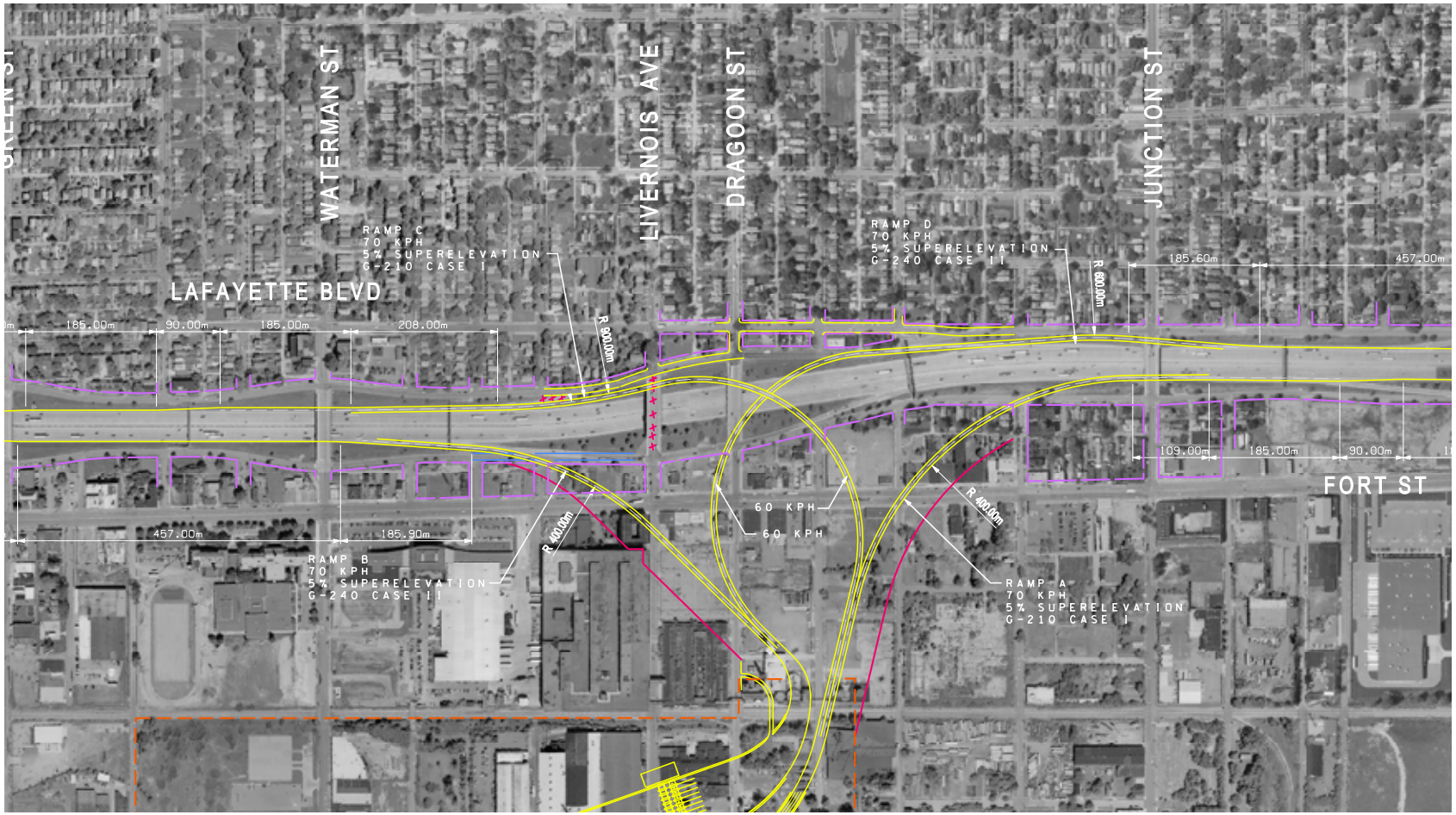
Advantages:
- Maintains Clark and Springwells Interchanges
- Localizes the impacts to service drives
- Requires less Right-of-Way
- Reduces impacts north of I-75
- Slows traffic entering the Plaza

Disadvantages:
- Design Speed of 30 mph in circle
- Close Livernois Bridge
- Close Livernois / Dragoon Interchange

The exits and entrances around Waterman St. and Junction St. will follow the applicable MDOT Standards and would be able to provide the required acceleration and deceleration distances. The exit and entrance ramps to and from the I-75 freeway will be designed to 70 kph (45 mph). However, within the circle, the proposed interchange has a minimum radius of 150 meters with a corresponding design speed of 50 kph (30 mph) for a 6% superelevation design (Based on MDOT Standard R-107-D1, page 1).

Due to the need to decelerate and stop before entering the Plaza, it is assumed that this configuration could work with the minimum radius of 150 and still provide a free flowing traffic. Further traffic studies can be performed to determine the viability of this geometry.

VP Interchange 1 requires the closure of the Livernois/Dragoon interchange and the closure of Livernois Ave. Bridge. The SB entrance to I-75 from Livernois and the NB Exit to Livernois are also closed. Dragoon St. can be kept open by raising the SB entrance ramp (Ramp C) and the SB exit ramp Ramp D that both go over I-75. The initial plan is to let Ramp D go under Ramp C and both ramps are over I-75 and Dragoon St. Profile investigations and



VP Interchange 1
Exhibit 7.3

other geometric calculations need to be performed to validate this alternative.

To provide continuity to the service drives, the SB Service Drive will be realigned and the NB service drive will be re-constructed to go under the NB I-75 exit to the Plaza (Ramp B). Other entrance and exit points to the service drives will have to be investigated.

Conclusion

The VE Team recommended that VP Interchange 1 be considered for further study.

MDOT accepted VP Interchange 1 for further study.

7.3.2 VP Interchanges 2A & 2B

Signalized Three-Leg Interchange

VP 2A (Exhibit 7.4)

Advantages:

- Maintains Clark and Springwells Interchanges
- Localizes the impacts to service drives
- Requires less Right-of-Way
- Reduces impacts north of I-75
- Localizes impact to Delray
- Less Bridge Area
- Reduces bridges over Fort Street.

Disadvantages:

- Stop condition for southbound traffic to and from the Plaza (twice)
- Close Dragoon Bridge
- Mixes local and bridge traffic
- Discontinuity in Service Drives
- Air Quality and Noise impact on north side of I-75

This alternative interchange uses the existing entrance and exit ramps of the Livernois and Dragoon interchange. Livernois Avenue bridge is kept open but Dragoon St. will be closed.

This interchange requires stop condition for southbound traffic to and from the plaza and requires two signalized intersections. Because the ramps to and from the plaza are concentrated in one location above Fort St. there will be less ramp bridge deck area which could result in a significant reduction in ramp bridge cost.

Conclusion

The VE Team did not recommend VP Interchange 2A for further consideration because the stop conditions may create traffic congestion and back-ups on I-75.

VP Interchange 2A
Exhibit 7.4

VP Interchange 2B (Exhibit 7.5)

The proposed VP Interchange 2B is a variation of VP Interchange 2A except that the NB service drive goes under the ramps to and from the plaza. As such VP Interchange 2B has the same advantages and disadvantages as VP Interchange 2A with the exception that only one signal will be required for 2B.

Advantages:

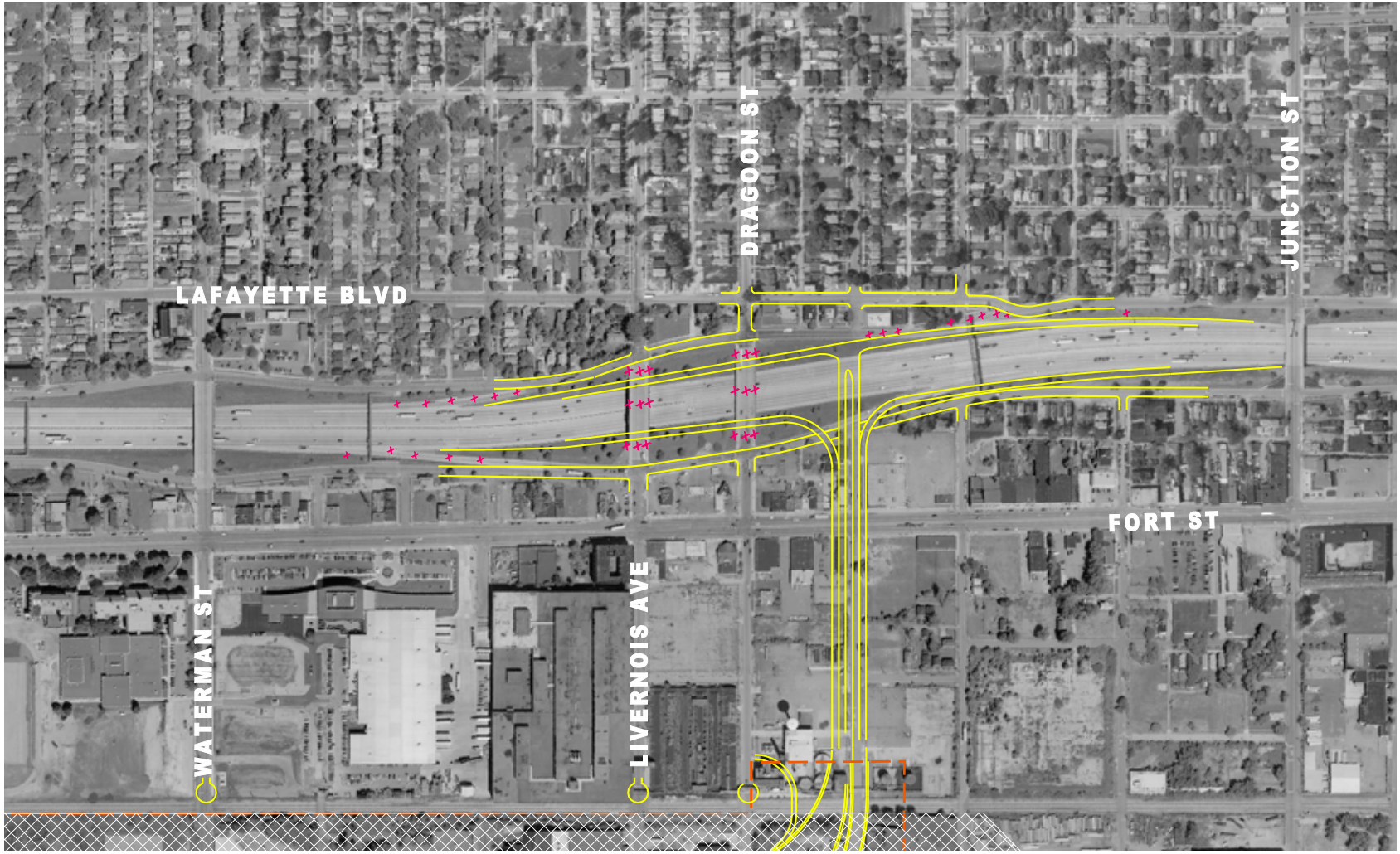
- Maintains Clark and Springwells Interchanges
- Localizes the impacts to service drives
- Requires less Right-of-Way
- Reduces impacts north of I-75
- Localizes impact to Delray
- Less Bridge Area
- Reduces bridges over Fort Street.

Disadvantages:

- Stop condition for southbound traffic to and from the Plaza (area)
- Close Dragoon Bridge
- Mixes local and bridge traffic
- Discontinuity in Service Drives
- Air Quality and Noise impact on north side of I-75

Conclusion

Similar to VP Interchange 2A, the VE Team did not recommended VP Interchange 2B for further consideration because the stop conditions may create traffic congestion and back-ups on I-75.



VP Interchange 2B
Exhibit 7.5

7.3.3 VP Interchange 3

Three-Leg Interchange - Ideas 19 and 29 (Exhibit 7.6)

Advantages:

- Maintain Clark and Springwells Interchanges
- Localizes impacts to Service Drives
- Requires less ROW
- Reduces impacts North of I-75
- Localizes impact to Delray
- Less Bridge area
- Reduces bridges over Fort Street
- Slows traffic entering the Plaza

Disadvantages:

- Design speed 30 mph
- Close Dragoon and Livernois Bridges
- Close Livernois/Dragoon Interchange
- Discontinuity in Service Drives

The exit and entrance ramps to and from the I-75 freeway will be designed to 70 kph (45 mph).

This interchange provides a free flowing traffic utilizing minimum radii of 120m and braiding the ramps to and from the plaza. It is believed that the radii can be increased to 150m to provide a 30 mph design speed.

It is assumed that this configuration could work with the minimum radius of 120 to 150 meters and still provide a free flowing traffic. Further traffic studies can be performed to determine the viability of this geometry.

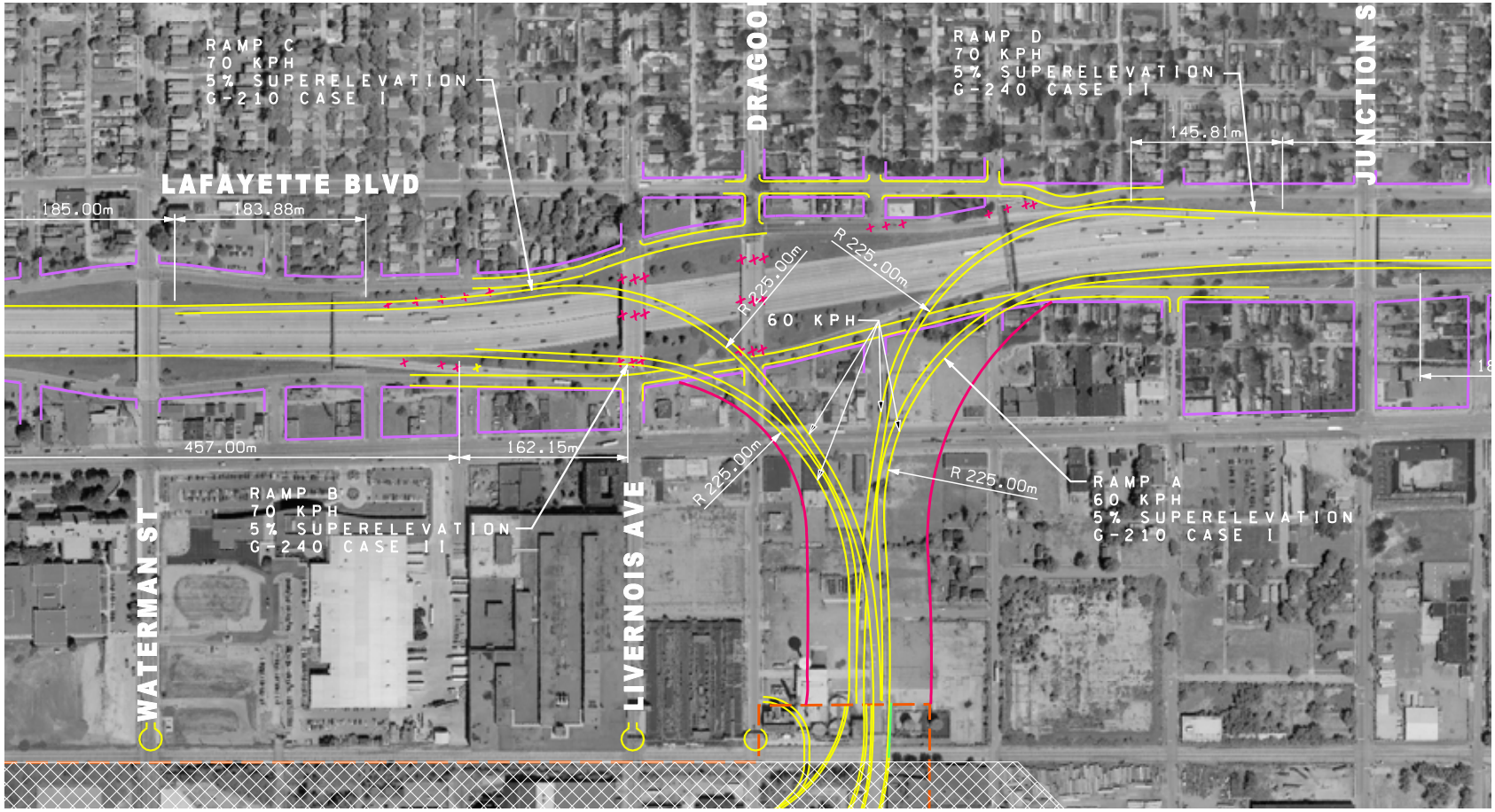
Other entrance and exit points to the service drives will have to be investigated.

Profile investigations and other geometric calculations need to be performed to validate this alternative.

Conclusion

The VE Team recommended that VP Interchange 3 be considered for further study.

MDOT accepted VP Interchange 3 for further study.



VP Interchange 3
Exhibit 7.6

7.4 Value Planning Suggestions

In addition to the VP Proposals discussed in Section 7.3, several ideas generated during the Speculation Phase were considered by the VE Team as worthy of consideration by the DRIC EPE Study Team as the project progresses. Each of these VP Suggestions relates to a Stakeholder Constraint, Need or Desire identified in Section 4.2.

7.4.1 Specific

1. The VE Team suggested that the ramp speed be reduced to 30 mph from the proposed 45 mph beyond the I-75 exit and entrance points. This is captured in Idea 29.

   MDOT has modified the suggestion (Item 3 in letter dated 3/6/07, Appendix B) to say that the ramp speed be reduced to 35 mph from the proposed 45 mph. Increasing the reduced design speed from 30 mph to 35 mph eliminates the need for speed reduction advisory signs. MDOT **accepts** this modified suggestion **for further study.**

2. MDOT has questioned the truck rollover safety factor of all ramps leading to/from the plaza (Item 4 in letter dated 3/6/07, Appendix B).

   MDOT has **accepted for further study** a review of design speed, curve radius, super elevation, railing height and sight distance to prevent truck rollovers on all curved ramps.

3. MDOT has questioned the desirability to construct and operate ramp bridges with tightly-curved alignments, for any design speed Item 5 in letter dated 3/6/07, Appendix B.

   MDOT accepts for further study a review of the EPE proposed and the VE proposed ramp bridges against current MDOT geometric design guidelines.

4. The VE Team suggested that the I-75 pavement be reconstructed at least within the project limits. This is captured in Ideas 1 and 2.

   MDOT accepts the suggestion for further study.

5. The VE Team identified the following ideas to improve public acceptance of the Developed Interchange Alternatives.

   33 Modify Interchange Alternative 4 (see Exhibit 7.2)
   57 Relocate displaced businesses into sites along Fort Street
   67 Develop a consistent bridge structure type
   68 Consider concrete segmental bridge superstructure
   113 Connect West Riverfront Greenway to Clark Park
   121 Use Junction Street as a Gateway to Fort Wayne

   MDOT accepts the suggestions for further study.

6. The VE Team suggested closing I-75 during construction of the DRIC Interchange. This is captured in Idea 54.

   MDOT rejects the suggestion because I-75 will be closed during construction of the Ambassador Bridge Gateway project.

7.4.2 General

One of the Expectations stressed by MDOT during the Study was to complete construction of the DRIC by 2013. In light of this, the VE Team offered the following suggestions to MDOT:

46. Use Design/Build Project Delivery System
49. Use Purchase Contracts for Long Lead Items
50. Begin ROW Acquisition Early
51. Begin Utility Relocation Early
55. Use an Incentive/Disincentive Clause in the Contract Documents

82. Hold an Accelerated Construction Technology Transfer Workshop
94. Start Final Design before Approval of the FEIS
95. Start Detailed Field Surveys Early
99. Use Public/Private Partnership Project Delivery System
100. Address the Condition of Proposed Detour Routes Prior to Construction
105. Eliminate Local Access to I-75 during Construction
108. Perform Subsurface Utility Exploration (SUE) Early
110. Reconstruct Siphons under I-75 with Advanced Work Contract

Another issue that was discussed by the VE Team related to minimizing Driver Confusion at decision points along I-75. In light of this, the VE Team offers the following suggestions to the DRIC EPE Study Team:

24 Combine Plaza and Local I-75 Off-Ramps
43 Have Human Factors Analysis performed on Decision Points
44 Use Explicit Safety Analysis to Model Collision Potential

7.4.3 Related to Developed Interchange Alternatives

Several ideas were generated that identified specific modifications to the seven Developed Interchange Alternatives. The following suggestions are offered to the DRIC EPE Study Team as ways to improve the performance of the Developed Interchange Alternatives:

5. Create CD Roads along I-75 in lieu of Service Drives
6. Use Fort Street as the NB Service Drive
22. Abandon the local roads between the NB Service Drive and Fort Street
27. Use the railroad ROW north of Green Street to provide local street continuity
28. Add the realignment of Springwells shown in Interchange 1 Mod to the other six interchanges

8.1 Conceptual Cost Estimate

Exhibit 2,9 shows the conceptual construction cost estimate for the seven Developed Interchange Alternatives developed by the DRIC EPE Study Team. The details of the construction cost estimates are provided in the Notebook prepared by Parsons for the participants in the VE Study.

The construction cost estimates are based on the conceptual level plans of the seven Developed Interchange Alternatives. As a result, they include quantities for bridge deck areas, length of retaining walls and roadway pavement but do not include quantities for drainage and many other items. Specifically, there is no cost included for utility interferences and/or relocations. To mitigate for the undeveloped items, the construction cost estimate includes a construction contingency of 10% and a management contingency of 5%.

The cost of Right-of-Way and environmental remediation are shown in Exhibit 2.10. Again, these cost estimates are based on the Right-of-Way limits identified on the concept level plans and they include a contingency of 20%.

The VE Team reviewed these cost estimates and found them to be reasonable for the level of detail available at this stage of the planning process.

The VE Team has suggested that the DRIC EPE Study Team consider reconstructing the I-75 pavement through the project limits as well as other suggestions to improve the performance and/or the acceptance of the seven Developed Interchange Alternatives. The conceptual construction cost estimates and the cost for Right-of-Way and environmental remediation should be revised to reflect that outcome of further study of these VE suggestions.

In addition, the VE Team has suggested two new interchange alternatives, VP 1 and VP 3. Again, the conceptual construction cost estimates and the cost for Right-of-Way and environmental remediation need to be developed for these new alternatives.

8.2 Suggested VE Approach to Cost Model

The VE Team suggests that the Cost Model for the DRIC Interchange use the ASTM Standard Classification for Allocated Sums in Construction.

This model organizes the cost of the project into four categories; base cost, allowance, contingency and reserve. These cost categories are defined by the probability of being spent and the reliability of the knowledge upon which the costs are based. The categories are shown in Exhibit 8.1 and are defined as follows:

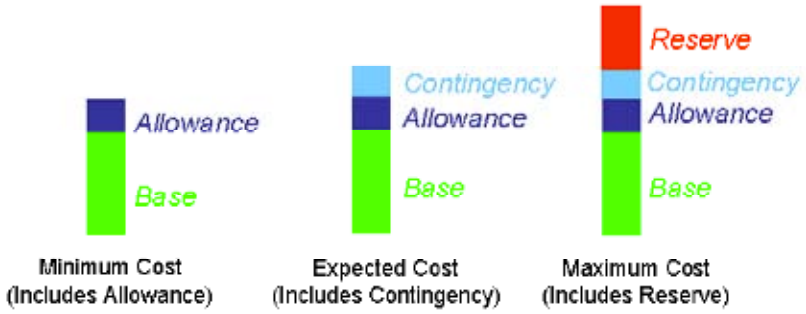


Exhibit 8.1

Minimum Construction Cost

The minimum construction cost is an estimate of all construction work that will be the basis to forecast a reasonable construction cost. It includes base costs and certain allowance costs.

Base Cost

Base costs are developed from easily quantifiable, well-known, and reliable quantities and unit costs. The base costs are the known costs of the project. It is a sum of money intended to be spent.

Allowance

The allowance ensures a full and complete estimate.

The allowance is a sum of money intended to be spent. However, unlike base costs, allowances are used in the absence of precise knowledge, and estimated to ensure a full and complete estimate. Allowances cover events and activities that are normally internal and so are directly controllable within the project plan. There are two types of allowance costs, specific and nonspecific. Where the content of the sum is uniquely identified and the sum is calculated solely for that purpose, it is specific. When the content of the sum is broadly identified and the sum is calculated for general purpose, it is nonspecific.

Expected Construction Cost

The expected construction estimate includes the total minimum construction estimate plus both specific and nonspecific contingency costs.

Contingency

The contingency is a sum of money not intended to be spent. It is used in the absence of precise knowledge, and estimated to ensure that a financial buffer is available within a budget. This buffer is intended to assist in mitigating the effects of unplanned events and other risks that are normally external to the project plan and so are not directly controllable.

Maximum Construction Cost

The maximum construction estimate includes the expected construction estimate plus both specific and nonspecific reserve costs.

Reserve

The reserve is a sum of money usually held by the management (client) and not normally intended to be spent. It is used to provide insurance against a project or program failing to complete on budget or for the revision of a budget in the case of changed management or program direction and requirement.

As discussed above, in conventional cost estimating, a percentage of the estimated construction cost is added as a contingency to compensate for design and construction unknowns (changes and risks) at the concept phase. This usually includes utilities and right-of-way. Therefore, there is no clear understanding of what is included and excluded from the contingency. Each member of the Project Team comes to believe that the Contingency is for their use. Under the ASTM Cost Model, the make-up of the Allowance, Contingency and Reserve are clearly defined and the ownership of each item is known to all.

The conceptual level cost estimates, including both the construction cost and the cost of Right-of-Way and environmental remediation should be put into the ASTM Cost Model. Although it is too early to predict the results of the final cost, the VE Team offers the following observation.

The minimum cost will be based on the Developed Interchange Alternative 3. Some of these costs will be listed under the Base Cost and others will be listed under Specific Allowances. The cost of utility conflicts and relocation should be added under Specific Allowances. Other unknown costs should be captured under Specific or Non Specific Allowances. As a result, the Minimum Construction Cost will be $178 Million plus the Allowance Cost.

The Contingency should include all unexpected planning, design and construction risks. It should also include a cost for escalation in the cost of Right-of-Way. The Expected Construction Cost will be the Minimum Construction Cost plus the Contingency Cost.

All other stakeholder desires, such as reconstruction of the I-75 pavement within the project limits, and the cost of the preferred alternative if it is other than Developed Interchange Alternative 3, should be listed under Reserves. The Maximum Construction Cost will be the Expected Construction Cost plus the Reserve Cost. Based on the current conceptual cost estimates, the Maximum Construction Cost may exceed $300 Million.

In summary, the VE Team suggests that starting the process of applying the ASTM Cost Model now will simplify putting items in the right place later, as the cost estimate progresses.

The study was conducted utilizing value engineering techniques. Value engineering advocates a team-oriented, systematic approach. This systematic approach is embodied in the job plan (Exhibit A.1). The job plan has several phases and imposes a set of rules that must be adhered to for each phase. The rules may appear to be simple, but they are vital to the success of the value planning process. This section describes the typical job plan and explains the rules of the job plan and the reasoning behind them.

Information Phase

The purpose of the Information Phase is to gain an understanding of the project and the stakeholders affected by the project. The information phase can be summarized as follows:

- review all relevant information on the project, including the project description and scope of work;
- identify the owners, users and stakeholders;
- identify the needs, desires and constraints of the owners, users and stakeholders;
- using the stakeholder needs, desires and constraints, develop project related functions;
- determine the task, basic function(s) and supporting functions of the project;
- estimate the cost of project elements and each critical function; and
- analyze the owner's and stakeholder's attitude toward each function.

Speculation Phase

The purpose of the Speculation Phase is to identify ideas that will perform the project functions or will enhance performance or acceptance at a reasonable cost.

Evaluation Phase

The purpose of the Evaluation Phase is to identify the most outstanding alternatives for further development. This identification is accomplished through a series of screening processes that will sort the ideas by comparison and combination. Using these ideas, alternatives will be developed. These alternatives will be rated for performance, acceptance and cost.

Development Phase

The purpose of the Development Phase is to add information that will facilitate selection of a preferred alternative. This will be accomplished through a comparison among the remaining alternatives. The following rules should be considered during the Development Phase:

- Recognize ideas that may be unique.
- Conduct research, as required, to provide additional information.
- Analyze the weaknesses of the selected alternatives and provide improvements.

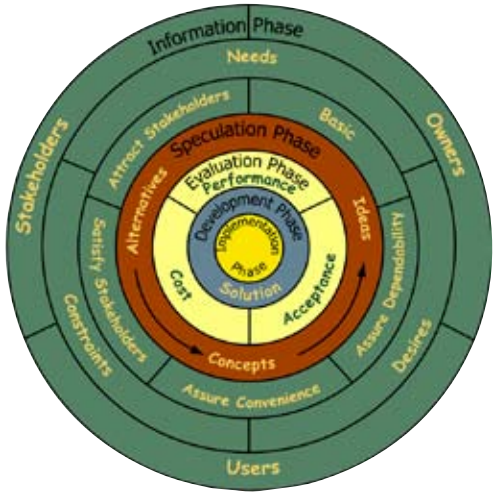


Exhibit A.1

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

March 6, 2007

Mr. James Canham
Alfred Benesch Michigan
222 N. Washington Square, Suite 200
Lansing, MI 48933-1800

Dear Mr. Canham:

MDOT Decisions from VE/VP Decision Meeting Held February 2, 2007
Following Your Value Engineering Presentation and Recommendations
I-75 Access Alternatives to the US/Michigan Plaza for the Proposed
Detroit River International Crossing, Wayne County, CS 82900, JN 80233

The Corradino Group selected Alfred Benesch to perform a Value Engineering/Value Planning (VE/VP) analysis of proposed I-75 access to the proposed Detroit River International Crossing (DRIC), in the City of Detroit, Wayne County. You held your VE/VP analysis over five days, and made your verbal presentation on February 2nd to MDOT, FHWA, and consultant individuals we previously identified as participating in the Decision following your Presentation. MDOT and Ontario Ministry of Transport (MTO) staff were also members of your VE/VP Team and others from MTO participated in the Decision portion.

The list of 35 staff that participated in the Friday discussion and that made these VE/VP decisions is enclosed. Your VE/VP staff remained in the room as each of your VE/VP Recommendations and EPE Suggestions were discussed by MDOT, FHWA, Ontario Ministry of Transport, and the EPE consultants. Your presentation and the MDOT Decision discussion were both video-taped, and copies are available from Mohammed Alghurabi, MDOT's DRIC Project Manager.

This VE/VP Study was done with approximately 50% of the EPE Location Study work finished, knowing three potential river crossings and the three associated US Customs and Toll Plazas, and seven Michigan alternates under EPE study for a new interchange to access adjacent I-75.

You began your Friday presentation by stating the VE/VP Team verified the ability of all seven EPE access alternates to accommodate both I-75 and Plaza expected traffic volumes, although actual DRIC traffic estimates are not yet available.

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) (01/03)

Your VE/VP product included Performance, Acceptance, and Value matrices for each of the seven access alternates currently developed. The DRIC EPE Team can modify the matrices as more information becomes available.

Since this was a combination of Value Analysis, Value Planning, and Value Engineering, I have combined your specific VE/VP Recommendations of two new I-75 interchange access alternates with those of your EPE Suggestions that generated the most discussion into the following list of VE/VP Items and MDOT Decisions.

VE/VP Items Presented and MDOT Decision on Implementation:

1. New Interchange Concept VP1 at I-75: Circular Interchange
   Accept for Further Study
   This is a circular multi-level full-movement interchange approximately opposite Dragoon Street, that retains the current adjacent Clark and Springwells interchanges. A short segment of SB Service Road could be added to the VE interchange to restore SB Service Road continuity. A variety of public or private uses could be made of land within the circle ramps.

2. New Interchange Concept VP3 at I-75: Diamond Interchange
   Accept for Further Study
   This is a diamond-type full-movement interchange approximately opposite Dragoon Street, that retains the current adjacent Clark and Springwells interchanges and both Service Drives. This concept has the elevated directional braiding occur along Plaza Drive, not over I-75. Check that sufficient merge-weave distances are available between the Plaza and the Braid, and that sufficient separation distances are available between the four roadways to allow constructing the braided bridges, lighting, and traffic signing.

3. Reduce Proposed Ramp Design Speed to 35 mph, from EPE-proposed 45 mph
   Accept for Further Study
   MDOT has increased the VE recommendation of 30 mph Design Speed to 35 mph to eliminate the need for speed reduction advisory signs. The reduced Design Speed applies to the ramp curve that begins after the 16' exit gore point. Vehicles exiting I-75 will encounter a dynamic 'end-of-queue' as vehicles merge with the other off-ramp, then slow/stop to pay their bridge toll. Design Speed and queue backups can not be fully analyzed until directional traffic volumes and lane assignments to and from the Plaza become available. Additional specific MDOT geometric discussions have been given the DRIC Project Manager.

4. MDOT questioned the truck rollover safety factor of all ramps leading to the DRIC Plaza, for any Ramp Design Speed
Accept for Further Study
The EPE layout of all curved ramps must provide a Design Speed, curve radius, super elevation, railing height, and sight distance to enhance safety and prevent truck rollovers, as well as address constructability and maintenance issues. These and other Geometric parameters should then be used to review ramp capacity and any exit queuing onto I-75. Additional specific MDOT geometric discussions have been given the DRIC Project Manager.

5. MDOT questioned the desirability to construct, operate, and maintain ramp bridges with tightly-curved alignments, for any Ramp Design Speed
Accept for Further Study
The radii of the EPE-proposed and of the VE-proposed interchange ramp bridges must still be reviewed to determine if they meet current MDOT Bridge Design Guidelines for skewed substructures and abutments on curved bridges. Sufficient EPE detail was not available to your VE Team.

6. Consider Reconstructing I-75 Pavement with all Interchange Alternates
Accept for Further Study
After the I-75 pavement reconstruction with the Ambassador Bridge Gateway project in 2008, there will remain approx 1.5 miles of 25-year old I-75 pavement (1983) south to the River Rouge bridge. Currently only Interchange Alternate 3 (which relocates I-75 southerly) includes a cost to replace a portion of this I-75 pavement, and thus Interchange Alternate 3's cost is unusually high. It will be fairer to cost estimates of all Plaza interchange alternates if the I-75 pavement is reconstructed between the River Rouge bridge and Clark Street in conjunction with whichever new DRIC interchange, and fairer to not require I-75 motorists to later encounter a short pavement replacement project south of the Gateway work.

7. Add Items to Improve Public Acceptance of Interchange Alternate 4, and others
Accept for Further Study
Although Alternate 4 did not rank as high by the VE/VP Team, they suggested that adding low-cost factors might change the Acceptance Matrix score and thus rate this alternate higher. Adding Public Acceptance features to other alternates might also raise their VE/VP Acceptance scores.

8. Close I-75 during constructing whichever new DRIC Interchange
Reject
Portions of I-75 just north of the DRIC interchange will be closed during construction of the Ambassador Bridge Gateway project; this DRIC project will have to be constructed as much under traffic as is possible without another closure for construction.

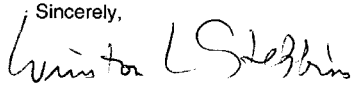
Your VE/VP Team also presented a brief discussion on Cost Validation, using the ASTM Cost Model showing four cost allocations. You stated there are too many major cost and ROW/design/construction items that do not have quantities or cost estimates for the ASTM Cost Model to be fully useful at this early EPE stage.

The VE/VP Team also presented 13 EPE Suggestions from their review of the EPE alternates and the site; these have been given to the DRIC Team. Please include your 13 items on the EPE Suggestions page in your Final VE/VP Report, even though a few of them have also been mentioned here.

MDOT staff on this project will be meeting further to resolve the items noted here as Accepted for Further Study, to discuss specific geometric items raised by your presentation, and to determine which items or portions can be incorporated into the EPE work and be recommended for future phases of this DRIC project. Items accepted or rejected on this VE/VP Study might be used by MDOT on other projects statewide.

Please furnish us 21 bound copies of your Final Value Engineering Report, plus one unbound copy for myself, plus five CDs containing the Final Report and calculations. Please only include your VE calculations on the CDs and in the unbound Final Report. I will distribute the printed copies within MDOT and FHWA, and to Ontario and the DRIC consultants. Thank you for your VE/VP Analysis at this 50% stage of the EPE Study to provide access to I-75 from any of the three proposed Plaza locations in Detroit for the Detroit River International Crossing Study.

Sincerely,



Winston L. Stebbins
Value Engineering Coordinator
Design Division
517-373-2246

Enclosure
cc: Mohammed Alghurabi