

September 4, 2019

Jay Magus, P.Eng.  
Director of Transportation  
City of Saskatoon  
2223 3<sup>rd</sup> Avenue North  
Saskatoon SK S7K 0J5

Dear Jay Magus,

**Subject:** Saskatoon Freeway Functional Planning Study Design Workshop for Phase 1

## 1. Introduction

SNC Lavalin, AECOM and Praxis Consulting were retained by the Saskatchewan Ministry of Highways and Infrastructure (the Ministry) to undertake the Saskatchewan Freeway Functional Planning Study, which includes 55 km of freeway, 16 interchanges, 5 railway crossings, at least 2 flyovers and 1 major bridge crossing. The study area is included in **Figure 1**. Each phase will take approximately one year to complete with the project estimated for completion in late 2021.

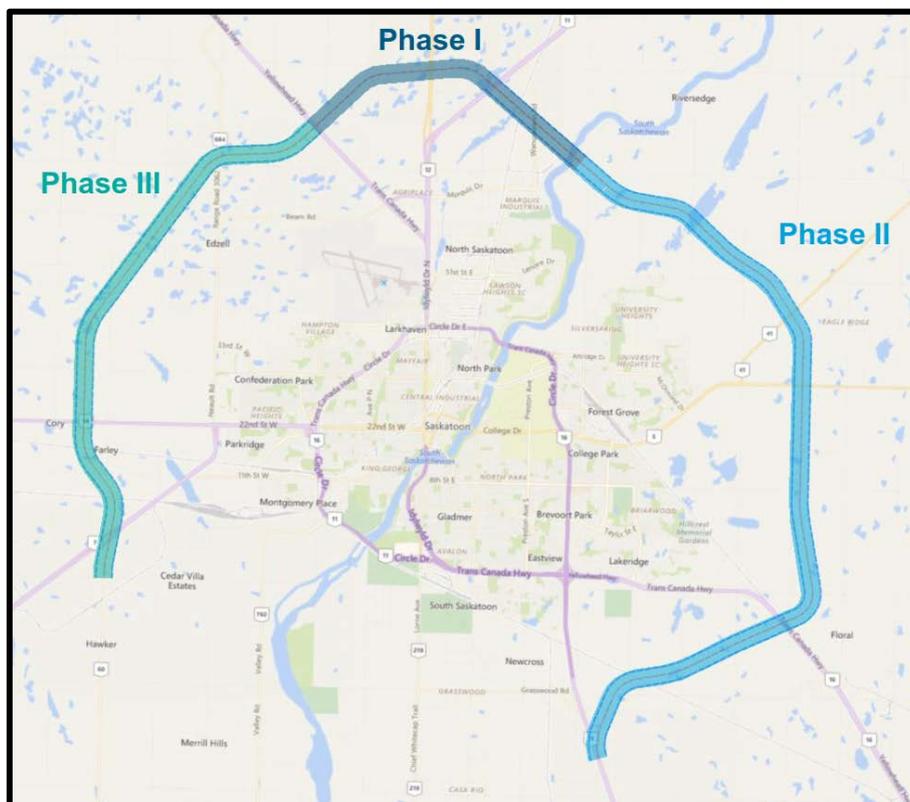
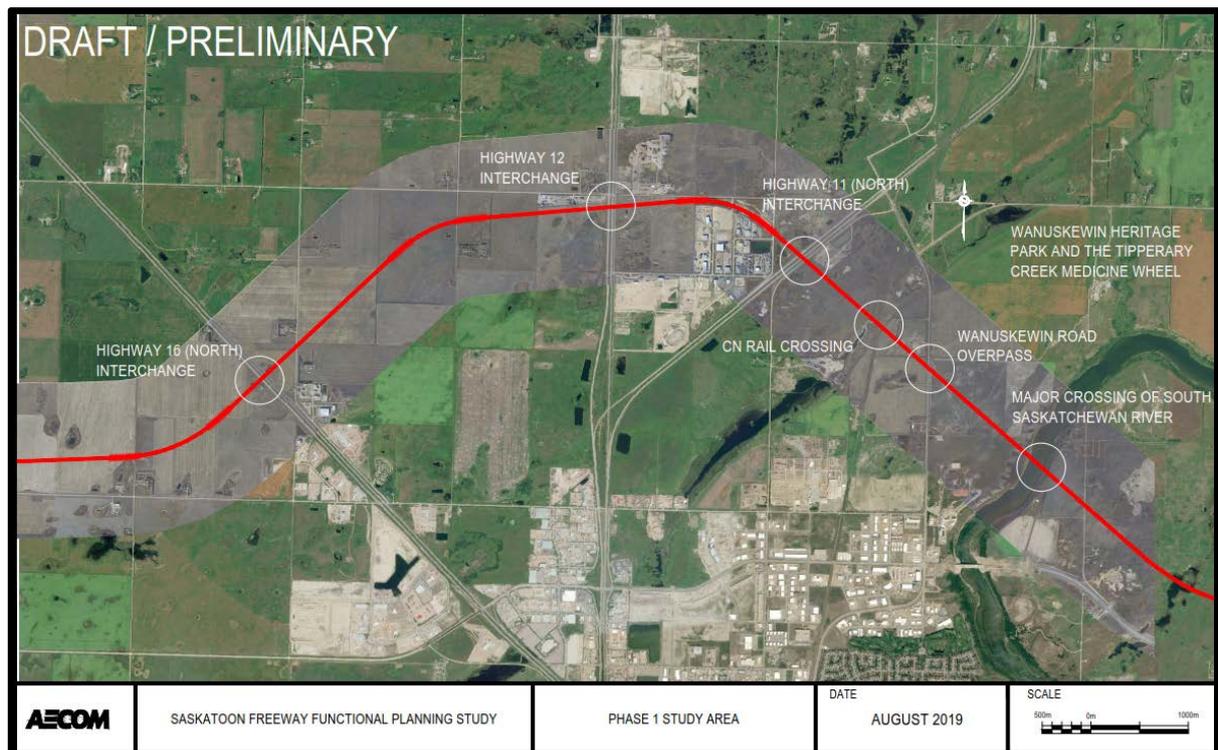


Figure 1: Saskatoon Freeway Functional Planning Study Area

The study limits for Phase 1 (i.e. north section), which was the focus of the Design Workshop, are illustrated in Figure 2.



**Figure 2: Phase 1 Study Limits from West of Highway 12 to East of Wanuskewin Road**

Phase 1 of the Saskatoon freeway is perhaps the most complex of the three phases. It is a busy corridor with Highways 11, 12 and 16, as well as Wanuskewin Road and Millar Avenue. This phase also contains proposed crossings of the South Saskatchewan River and a CN Rail line.

The purpose of the Design Workshop was to bring together a diverse group of stakeholders in an innovative atmosphere, to collaborate, deliberate and select a framework to address this complex section of Saskatoon Freeway in the north. Agencies and associations with strong local knowledge of the area, as well as members of the design team, were invited to participate. The Ministry invited the following stakeholders to attend the Design Workshop:

- City of Saskatoon
- Rural Municipality of Corman Park
- Partnership 4 Growth
- Wanuskewin Heritage Park
- Meewasin Valley Authority
- North Saskatoon Business Association
- Saskatoon Tribal Council

The Design Workshop for Phase 1 was held on June 27<sup>th</sup> and June 28<sup>th</sup>, 2019. The objective of the workshop was to help the Ministry of Highways determine the best alignment and interchange layout for the north section of the Saskatoon Freeway. The Design Workshop enabled participants to provide input towards a suggested layout that addresses local needs, meets all road design standards for safety, and meets the future capacity needs for the community of 750,000 people.

The specific goals of the Design Workshop were for the participants to:

- review the four (4) alternatives developed by the design team;
- provide input from the perspective of individuals who work and live in the community;

- identify best value performance criteria and evaluate which alternative will provide the best value; and
- provide considerations for the design team to consider during development of future options based on the preferred alternative.

Design Workshop participants were asked to share issues, concerns, and requirements with respect to the Phase 1 section of the project. This allowed the group to gain an understanding of issues from each participating stakeholder's perspective.

## 2. Alternatives for Phase 1

To enable the design team to focus on the most complex area of Phase 1, the following project elements were outside the scope of the Design Workshop:

- Alignment is fixed at Highway 12 and at the Saskatchewan River crossing. Only minor alignment changes will be considered between the fixed points;
- South Saskatchewan River Crossing;
- Interchange ramp configurations;
- Developing Service Road and Local Road network;
- Interchange at Highway 16; and,
- Phase 2 (east) and Phase 3 (west).

The design team developed and presented four (4) alternatives for Phase 1. The following key design challenges were factors in the development of the four (4) alternatives, which were presented to the Design Workshop participants:

- Closely Spaced Interchanges
  - 2.2 km between Highway 12 and Highway 11
  - 2.1 km between Highway 11 and Wanuskewin Road
  - Ministry of Highways and Infrastructure desirable interchange spacing is 8 km; minimum spacing is 3.2 km
  - Interchanges between the Freeway and Highways (System Interchanges) require larger footprints (i.e. at Highway 12 and 11)
  - Close spacing will result in weaving concerns and poor operations in the future
- Communities of Warman and Martinsville
  - Two rapidly growing communities close to Saskatoon will create high peak hour commuter traffic that must be accommodated with expected provincial highway traffic
- CN Rail Crossing
  - Potential sight line concerns crossing over the railway
- Proximity and access to Wanuskewin Heritage Park
- Compatibility with City of Saskatoon and RM of Corman Park existing and future infrastructure.

### 2.1 Alternative 1: Three Interchanges

Alternative 1 is illustrated in **Figure 3** and is based on previous transportation planning studies. The key features of this alternative include:

- Closure of Highway 11 from Highway 12 to the Saskatoon Freeway;
- System Interchange at Highway 12;
- Partial System Interchange at Highway 11;
- Service Interchange at Wanuskewin Road;
- Wanuskewin Road connection to Penner Road; and,
- Potential connection from Wanuskewin Road / Penner Road to Warman Road (North).



Figure 3: Alternative 1: Three Interchanges

A critical concern with this alternative is the close spacing of interchanges and the risk of weaving movements between interchanges that may seriously impact traffic flow. One way to address this issue is the use of a core collector system. Figure 4 illustrates a typical freeway cross-section compared to a typical core collector system.

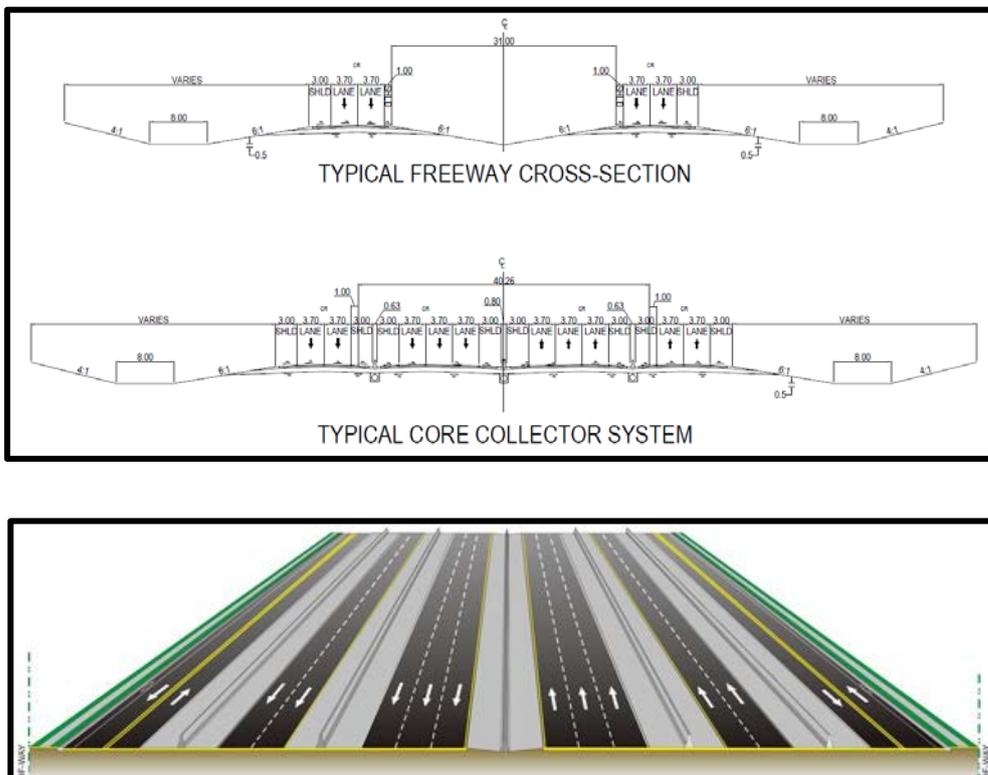


Figure 4: Typical Core Collector System Cross-Section

## 2.2 Alternative 2: Two Interchanges

Alternative 2 shown in **Figure 5** meets the Ministry's minimum spacing requirement between interchanges. Spacing between interchanges is 4.3 km exceeding the minimum spacing of 3.2 km. The key features of this alternative include:

- Realignment of Highway 11 to Wanuskewin Road;
- Closure of Highway 11 from Highway 12 to east of the CN railway;
- System Interchange at Highway 12;
- Hybrid Interchange at realigned Highway 11 and Wanuskewin Road;
- Partial Service Interchange at Penner Road;
- Millar Avenue to Wanuskewin Road Connector; and,
- Potential connection from Penner Road to Warman Road (North).



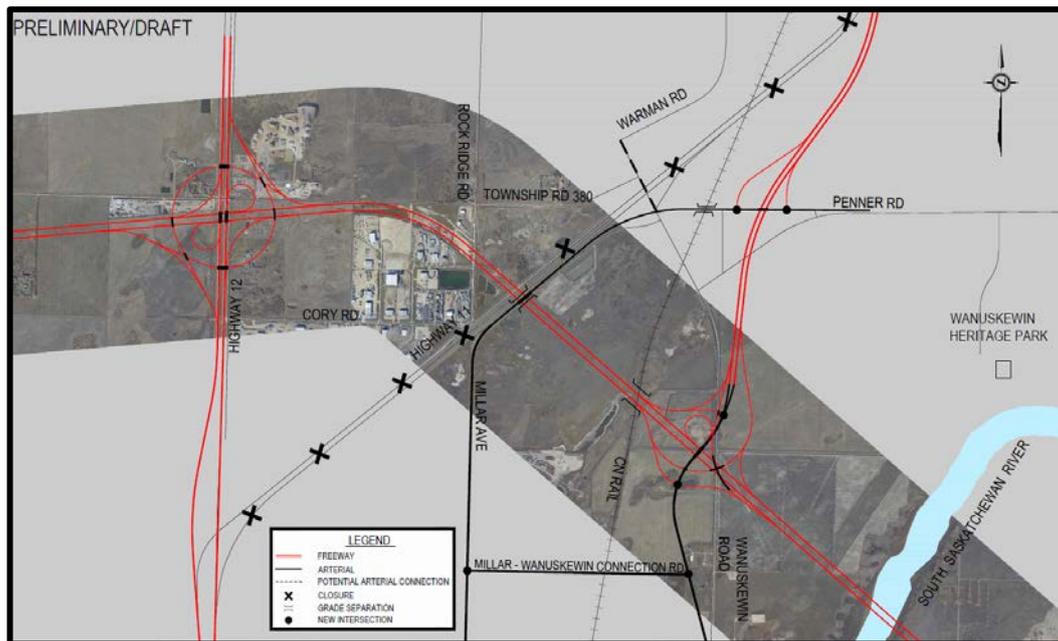
**Figure 5: Alternative 2: Two Interchanges**

## 2.3 Alternative 3: Millar Flyover

Alternative 3 is illustrated in **Figure 6**. The key features of this alternative include:

- Realignment of Highway 11 to Wanuskewin Road;
- Closure of Highway 11 from Highway 12 to east of the CN railway. New Highway 11 relocated eastward;
- Millar Avenue connection with flyover to Penner Road to provide additional access across the Freeway;
- System Interchange at Highway 12;
- Hybrid Interchange at realigned Highway 11;
- Partial Service Interchange at Penner Road;
- Millar Avenue to Wanuskewin Road Connector; and,

- Potential connection from Millar Avenue / Penner Road to Warman Road (North).



**Figure 6: Alternative 3: Millar Flyover**

## 2.4 Alternative 4: Highway 11 Flyover

Alternative 4 shown in **Figure 7** was developed to match the preliminary findings from the City of Saskatoon's *North Saskatoon Network Planning Study*. The key features of this alternative include:

- Realignment of Highway 11 to Wanuskewin Road;
- Reverting old Highway 11 to an arterial with flyover to Penner Road;
- Hybrid Interchange at Highway 12 (based on Highway 12 south of Freeway classified as major arterial);
- Hybrid Interchange at realigned Highway 11;
- Partial Service Interchange at Penner Road;
- Millar Avenue to Wanuskewin Road Connector; and,
- Potential connection from Highway 11 Arterial / Penner Road to Warman Road (North).

The following key elements from the draft *North Saskatoon Network Planning Study* are incorporated in this alternative:

- Conversion of Highway 12 and Highway 11 to arterial roads with intersections; and,
- Grade separation of Highway 11 at Saskatoon Freeway (no interchange).

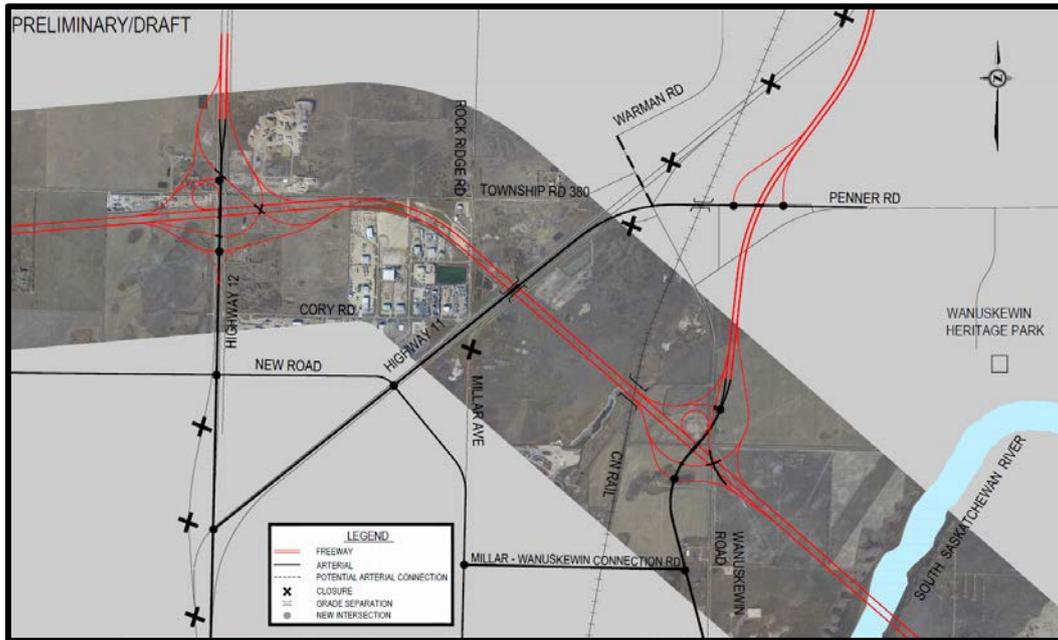


Figure 7: Alternative 4: Highway 11 Flyover

### 3. Evaluation of Alternatives

#### 3.1 Advantages and Disadvantages of the Alternatives

After the technical advantages and disadvantages of the four (4) alternatives were presented by the design team, the Design Workshop participants brainstormed other advantages, disadvantages, opportunities, potential risks and items for the design team to consider for each of the alternatives as the design proceeds. **Appendix A** includes the complete summary of the design team’s technical advantages and disadvantages for each alternative as well as the results of the Design Workshop participants’ discussions.

#### 3.2 Performance Criteria and Measures

By consensus, the Design Workshop participants identified the performance criteria and measures by which the four (4) alternatives would be compared to each other in order for the participants to identify which alternative will provide the best value. Table 1 provides the performance criteria and their measures used by the Design Workshop participants to identify a preferred alternative.

Performance Criteria	Measures
Access Inside Freeway	Access to industrial lands
Access Outside Freeway	Access to industrials, residential and First Nation lands
Access to Wanuskewin Heritage Park	Potential to provide full access from provincial Highway system
Alternative Modes of Transportation	Flexibility to integrate all modes of transportation, including transit and active transportation
Connectivity to Municipal Infrastructure	Aligns with future, planned, and existing infrastructure
Interchange Spacing	Meets Ministry interchange spacing requirements

Environmental/Heritage Impact	Noise, view shed and sound scape impacts to Wanuskewin and Meewasin Valley
Highway to Highway Connectivity	Travel time passing through the city of Saskatoon
Access Across Freeway for Intercity Travel	Travel time and distribution of traffic across multiple points in and out of the City of Saskatoon

**Table 1: Performance Criteria Measures**

### 3.3 Performance Criteria Weighting

Each Performance Criteria required a weight to assist the Design Workshop attendees to more objectively evaluate subjective criteria (or attributes). Two evaluation techniques were used to determine the relative importance of the performance criteria relative to the requirements of the Design Workshop participants.

The first, is the Paired Comparison Method, which provides a simple, balanced approach for comparing multiple criteria. The Design Workshop participants evaluated the relative importance of the performance criteria that would be used to evaluate the four (4) alternatives to determine a preferred alternative. The weighted Paired Comparison Method table and its weights are shown in **Table 2**.

Performance Criteria Matrix												
Project Name: Saskatoon Freeway Functional Planning Study										Date: June 28th, 2019		
Evaluative Criteria												
ID	Criteria		Measures									
A	Access Inside Freeway		Access to industrial lands									
B	Access Outside Freeway		Access to industrials, residential and First Nation lands									
C	Access to Wanuskewin Heritage Park		Potential to provide full access from provincial Highway system									
D	Alternative Modes of Transportation		Flexibility to integrate all modes of transportation, including transit and active transportation									
E	Connectivity to Municipal Infrastructure		Aligns with future, planned, and existing infrastructure									
F	Interchange Spacing		Meets interchange spacing requirements									
G	Environmental/Heritage Impact		Noise, view shed and sound scape impacts									
H	Highway to Highway Connectivity		Travel time passing through the city of Saskatoon									
I	Access Across Freeway for Intercity Travel		Travel time and distribution of traffic across multiple points in and out of the city of Saskatoon									
Criteria Matrix												
	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)		<b>Total Points</b>	<b>% of Total</b>	<b>Adjusted Values</b>
(A)	A/B	A3	A3	A/E	F3	A3	H3	I3		11.0	10.8%	10.8%
	(B)	B3	B3	B/E	F3	B3	H3	I3		11.0	10.8%	10.8%
		(C)	C3	E2	F3	C3	H3	I3		6.0	5.9%	6.0%
			(D)	E3	F3	D/G	H3	I3		1.0	1.0%	1.0%
				(E)	F3	E3	H3	E/I		11.0	10.8%	10.8%
					(F)	F3	F3	F3		24.0	23.5%	23.5%
						(G)	H3	I3		1.0	1.0%	1.0%
							(H)	H3		21.0	20.6%	21.0%
								(I)		16.0	15.7%	15.5%
											0.0%	
									<b>Total</b>	<b>102.0</b>		<b>100.4%</b>
<b>With emphasis on preference</b>						<b>How Important</b>						
A# = A is of greater importance with # preference emphasis						WITH 3 - Major Preference						
A/B = A and B are of equal importance						2 - Medium Preference						
						1 - Minor Preference						

**Table 2: Paired Comparison Table**

It is important to note that a low assigned criteria weight does not indicate that the criteria is not important, but rather that the criteria is not a significant discriminator between the alternatives.

The second evaluation technique is the 100 Point Allocation, in which all participants are given 100 points to distribute over the performance criteria based on their own opinion of the importance of each criterion to the project. Once all of the Design Workshop participants provide their weights for each criterion, the average of the weights for each criterion was calculated. The results of the 100 Point Allocation Method are provided in **Table 3**.

**Table 3** also provides the weights for each criterion based on the Paired Comparison Method. The average of the two evaluation techniques is calculated and shown in the “Average of the Two Methods” column. The workshop participants agreed by consensus that the “Average of the Two Methods” weights highlighted in yellow in **Table 3** were the most representative of the relative importance of the criteria and would be used to compare the alternatives.

Criteria	Number of Participants													100 Point Results	Pairwise Comparison Results	Average of the Two Methods
	1	2	3	4	5	6	7	8	9	10	11	12	13			
Access Inside Freeway	10	5	12	11	15	10	10	12	10	15	7	7	15	11	10.8	11
Access Outside Freeway	10	5	12	11	15	5	5	12	10	15	7	7	15	10	10.8	10
Access to Wanuskewin Heritage Park	10	5	6	7	5	10	10	8	5	3	10	3	10	7	6	7
Alternative Modes of Transportation	5	5	3	4	3	5	5	5	2	10	5	1	5	4	1	3
Connectivity to Municipal Infrastructure	10	10	10	10	10	5	10	10	10	14	10	5	10	10	10.8	10
Interchange Spacing	25	35	22	21	20	25	25	22	20	10	25	36	15	23	23.5	23
Environmental/Heritage Impact	5	5	3	4	2	5	5	7	3	7	10	2	5	5	1	3
Highway to Highway Connectivity	10	25	20	18	20	15	15	14	25	10	20	32	10	18	21	20
Access Across Freeway for Intercity Travel	15	5	12	14	10	20	15	10	15	16	6	7	15	12	15.5	14
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

**Table 3: 100 Point Allocation Method and Selected Performance Criteria Weights**

### 3.4 Alternative Evaluation Matrix

All participants of the Design Workshop then evaluate each of the alternatives against the performance criteria by using a rating scale of 1 to 10, where 1 is the worst and 10 is the best. The performance criteria rating is multiplied by the weighting of the particular performance criteria and summed with all other criteria ratings to provide an overall total performance score for each alternative. The results of the evaluation of the alternatives is provided in **Table 4**.

EVALUATION MATRIX											
1. HOW WELL DOES THE SCENARIO SATISFY THE PERFORMANCE CRITERIA (ENTER RATING FROM 1-10, 10=BEST) 2. ENTER ASSIGNED WEIGHT TIMES RATING IN SUB TOTAL 3. SUM ACROSS AND RANK	Performance Criteria - Performance Measure	Access Inside Freeway	Access Outside Freeway	Access to Wanuskewin Heritage Park	Alternative Modes of Transportation	Connectivity to Municipal Infrastructure	Interchange Spacing	Environmental / Heritage Impact	Highway to Highway Connectivity	Access Across Freeway for Intercity Travel	Total Performance (P)
Alternatives	Weight →	11	10	7	3	10	23	3	20	14	
Alternative 1: Three Interchanges	Rating 1-10	1.00	3.00	5.00	3.00	3.00	1.00	7.00	5.00	1.00	
	Sub Total	11.00	30.00	35.00	9.00	30.00	23.00	21.00	100.00	14.00	273
Alternative 2: Two Interchanges	Rating 1-10	2.00	4.00	9.00	2.00	4.00	7.00	4.00	8.00	5.00	
	Sub Total	22.00	40.00	63.00	6.00	40.00	161.00	12.00	160.00	70.00	574
Alternative 3: Millar Flyover	Rating 1-10	5.00	6.00	9.00	5.00	6.00	8.00	4.00	8.00	6.00	
	Sub Total	55.00	60.00	63.00	15.00	60.00	184.00	12.00	160.00	84.00	693
Alternative 4: Highway 11 Flyover	Rating 1-10	8.00	7.00	9.00	5.00	8.00	8.00	4.00	9.00	8.00	
	Sub Total	88.00	70.00	63.00	15.00	80.00	184.00	12.00	180.00	112.00	804

**Table 4: Alternatives Evaluation Matrix**

Based on the results of the evaluation, *Alternative 4: Highway 11 Flyover* has the highest performance score of 804. All participants of the Design Workshop agreed that Alternative 4 was the best value alternative and is the preferred framework for the design team to develop further.

### 3.5 Design Considerations for the Preferred Alternative

After the selection of the preferred alternative, the Design Workshop participants marked up the alternative display boards to provide design considerations for the design team to take into account in the next iterations of the preferred alternative. These design considerations are being reviewed and incorporated into the options being developed for the preferred framework. One example is the need to provide all movements at the interchange at Highway 11 / Penner Road to provide easy access into the Wanuskewin Heritage Park. These options will be presented to stakeholders and the public in Fall 2019 in order to gain additional input.

## 4. Conclusions

Phase 1 is the most complex of the three phases of the Saskatoon Freeway study, given the proximity of Highway 11, Highway 12, Wanuskewin Road and existing developments. The Design Workshop was required to quickly evaluate and select an alternative for further development. The preferred alternative was selected because it best addressed the numerous technical challenges, including interchange spacing and access requirements, while ensuring the future Saskatoon Freeway meets all road design standards for safety, and meets the future capacity needs for the community of 750,000 people.

The key features from the highest rated framework include:

- Realignment of Highway 11 to Wanuskewin Road;
- Providing an interchange connection to Penner Road at Highway 11;

- Interchanges at Highway 12 and at the realigned Highway 11 with the Saskatoon Freeway;
- Connector from Millar Road to Wanuskewin Road; and,
- A flyover across the Saskatoon Freeway at the old Highway 11 location.

The realignment of Highway 11 into Wanuskewin Road is a major component of the preferred framework. This change eliminates an existing high collision intersection (Highway 11/Wanuskewin Rd) and follows the flow of the majority of existing Highway 11 users turning onto Wanuskewin Rd.

The preferred alternative will provide the framework for all future options that will be developed and reviewed. The Ministry will continue working with its consultants and stakeholders to develop numerous options that will be shown to stakeholders and the public to receive additional input. These options are expected to be finalized by late Fall 2019 and presented to the public prior to the end of the year.

Sincerely,



Geoffrey Meinert, P.Eng.  
Senior Project Manager

Enclosure

# **Appendix A**

## **Advantages and Disadvantages of the Alternatives**

**Advantages, Disadvantages, Potential Risks and Items to Consider for Each Alternative**

Alternatives	Advantages	Disadvantages	Opportunities	Potential Risks	Items to Consider
Alternative 1: Three Interchanges	<ul style="list-style-type: none"> <li>• Least amount of change to the existing network; therefore, public opinion may approve of maintaining continuity</li> <li>• Easy to add on more pieces without complete redesign</li> <li>• More points of access to Saskatoon Freeway</li> <li>• Opportunity to provide arterial connection between Wanuskewin and Warman Road via Highway 11 overpass</li> <li>• Basic Service interchange at Wanuskewin</li> </ul>	<ul style="list-style-type: none"> <li>• Larger property impacts near Wanuskewin Heritage Park               <ul style="list-style-type: none"> <li>○ cuts into their buffer the most</li> <li>○ possible to re-alignment to have less impact</li> </ul> </li> <li>• Interchange spacing doesn't meet Ministry's minimum standards of 3.2 km's between interchanges (3 interchanges in 4.3 km's)</li> <li>• Highway 11 traffic enters a high-speed road on a curve, which is a potential safety risk</li> <li>• Increased capital and maintenance costs</li> <li>• Costs due to purchasing property within the industrial park               <ul style="list-style-type: none"> <li>○ encroachment onto existing developed property</li> </ul> </li> <li>• Additional structure required to separate railway</li> <li>• Traffic accommodation during construction will be difficult</li> <li>• Connectivity north-south (N-S) is not as easily accomplished compared to other alternatives</li> <li>• Less potential for active or alternative modes of transportation, particularly at structures</li> <li>• TWS Road 380 unable to maintain current connection</li> <li>• Concerns with complex and confusing overhead directional signing</li> <li>• Ultimately may require core-collector lanes</li> <li>• Driver education and confusion due to core collector</li> <li>• Core collector would require additional property requirements and higher cost</li> <li>• Direct connection from Highway 11 into Saskatoon removed, results in out-of-way travel i.e. traffic must backtrack to Highway 12 or 'zig-zag' to Wanuskewin via Saskatoon Freeway</li> <li>• Requires 2.5 km closure of Highway 11</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>	<ul style="list-style-type: none"> <li>• Early congestion, early failure in traffic movement system (due to weaving between interchanges)</li> <li>• Penner Road gets more traffic than model suggests</li> <li>• Land purchases required in East Cory Industrial Park</li> </ul>	<ul style="list-style-type: none"> <li>• Potentially leave Wanuskewin Road where it is located now</li> <li>• Potentially, 10 lane wide crossing-core collector</li> <li>• Consider impacts to TLE Lands</li> <li>• High speed ramp bulging out</li> <li>• Potential right-of-way provisions may be required for Wanuskewin and trail along the river</li> <li>• Green network provisions (i.e. maintain corridors and consider future phases)</li> <li>• Residential future development northeast (NE) along the river; therefore, consider future connections for alternative modes of transportation</li> <li>• Drainage network from Warman and Martinsville needs to be considered</li> <li>• City transit implications and accommodations potential for high occupancy vehicles such as LRT/BRT</li> <li>• SaskWater line / SaskPower lines to be considered</li> <li>• Consider Hudson Bay Swale impact</li> <li>• Provision of N-S cycling routes for commuter cyclists</li> </ul>

Alternatives	Advantages	Disadvantages	Opportunities	Potential Risks	Items to Consider
Alternative 2: Two Interchanges	<ul style="list-style-type: none"> <li>Eliminates an at grade rail crossing at Highway 11 and CN</li> <li>2 interchanges spaced 4.3 km's apart</li> <li>Allows for possibility of N-S flyover for Millar Avenue</li> <li>Travel time reduced for Highway 11</li> <li>Opportunity to provide arterial connection between Penner Road and Warman Road</li> <li>Millar-Wanuskewin Connection Road provides opportunity to better distribute northbound and southbound traffic</li> <li>Establishes north-south orientation of roads to and from Saskatoon</li> <li>Reduced staging impacts at existing roads (i.e. Wanuskewin Interchange)</li> <li>Speed transition from Highway 11 (Freeway) to Wanuskewin (arterial) provided through curvilinear alignment with traffic signals at ramp terminals</li> </ul>	<ul style="list-style-type: none"> <li>Provides less access to city compared to Alternatives 3 and 4</li> <li>Less traffic on Millar Avenue</li> <li>Abandoning infrastructure due to the 6 km closure of Highway 11</li> <li>No provision for flyovers <ul style="list-style-type: none"> <li>less access to city</li> <li>less connectivity</li> </ul> </li> <li>Poor connectivity of local roads north and south of Saskatoon Freeway</li> <li>Less potential for active modes</li> <li>Lack of access from East Cory Industrial Park</li> <li>No direct access to Wanuskewin Heritage Park from the north</li> <li>Tight spacing between partial interchange at Highway 11/Penner Road and Highway 11/Saskatoon Freeway</li> <li>Realignment of Highway 11 has the potential to draw more traffic to Wanuskewin</li> <li>Poor connectivity of local roads north and south of Saskatoon Freeway</li> <li>Poor access to Penner Road and Wanuskewin Heritage Park from the north</li> </ul>	<ul style="list-style-type: none"> <li>Potential north / south flyover at Millar Avenue</li> </ul>	<ul style="list-style-type: none"> <li>Crossing discussions with CN</li> <li>Potential risk with Penner Road vertical alignment</li> <li>Land purchase for relocated Highway 11</li> </ul>	<ul style="list-style-type: none"> <li>Full access on Penner Road</li> <li>More traffic distributed to Wanuskewin Road inside City limits from Highway 11</li> <li>Consider impacts to TLE Lands at Warman Road north and west of existing Highway 11</li> <li>Potential right-of-way provisions may be required for Wanuskewin Heritage Park and trail along the river</li> <li>Green network provisions (i.e. maintain corridors and consider future phases)</li> <li>Residential future development NE along river; therefore, consider future connections for alternative modes of transportation</li> <li>Drainage network from Warman and Martinsville needs to be considered</li> <li>City transit implications and accommodations potential for high occupancy vehicles such as LRT/BRT</li> <li>SaskWater line / SaskPower lines to be considered</li> <li>Consider Hudson Bay Swale impact</li> <li>Provision of N-S cycling routes for commuter cyclists</li> </ul>
Alternative 3: Millar Flyover	<ul style="list-style-type: none"> <li>Eliminates an at grade rail crossing at Highway 11 and CN</li> <li>More suitable for pedestrian crossovers and alternatives modes of transportation</li> <li>Better accommodates future city transit</li> <li>Safety due to interchange spacing</li> <li>Flyovers in-between interchanges to allow for traffic in north industrial to exit/enter city easily</li> <li>Flow is simpler and less stoppages to keep flow higher for drivers; therefore, less chance for driver error <ul style="list-style-type: none"> <li>safer option as it allows drivers to correct in a more spacious area</li> </ul> </li> <li>2 interchanges spaced 4.3 km's apart</li> <li>Millar Avenue connection to Penner Road provides continuity with local road system</li> </ul>	<ul style="list-style-type: none"> <li>Loss of infrastructure on Highway 11 due to using Millar Avenue</li> <li>Poor access to Penner Road</li> <li>No direct access from Freeway to Wanuskewin Heritage Park</li> <li>Poor access to East Cory Industrial Park (Highway 12 is freeway)</li> <li>Wanuskewin Road access to Penner Road from the south is closed; access from south via Millar Avenue</li> <li>Realignment of Highway 11 has the potential to draw more traffic to Wanuskewin Road</li> <li>Requires 5 km closure of Highway 11</li> </ul>	<ul style="list-style-type: none"> <li>City to take over Highway 11 and use as arterial</li> <li>Allow for municipalities to determine the road network south and north of Freeway</li> </ul>	<ul style="list-style-type: none"> <li>Crossing discussions with CN</li> <li>Land purchase for relocated Highway 11</li> </ul>	<ul style="list-style-type: none"> <li>Full access on Penner Road from all directions</li> <li>Consider impacts to TLE Lands</li> <li>Potential right-of-way provisions may be required for Wanuskewin and trail along the river</li> <li>Green network provisions (i.e. maintain corridors and consider future phases)</li> <li>Residential future development NE along river; therefore, consider future connections for alternative modes of transportation</li> <li>Drainage network from Warman and Martinsville needs to be considered</li> <li>City transit implications and accommodations potential for high occupancy vehicles such as LRT/BRT</li> <li>SaskWater line / SaskPower lines to be considered</li> <li>Consider Hudson Bay Swale impact</li> <li>Provision of N-S cycling routes for commuter cyclists</li> </ul>

Alternatives	Advantages	Disadvantages	Opportunities	Potential Risks	Items to Consider
	<ul style="list-style-type: none"> <li>• Opportunity to provide arterial connection between Penner Road and Warman Road</li> <li>• Millar-Wanuskewin Connection Road provides opportunity to better distribute northbound and southbound traffic</li> <li>• Reduced staging impacts at existing roads (i.e. Wanuskewin Interchange)</li> <li>• Speed transition from Highway 11 (Freeway) to Wanuskewin (arterial) provided through curvilinear alignment with traffic signals at ramp terminals</li> </ul>				
Alternative 4: Highway 11 Flyover	<ul style="list-style-type: none"> <li>• Eliminates an at grade rail crossing at Highway 11 and CN</li> <li>• Aligns with current City of Saskatoon sector planning for everything inside Freeway, including not yet approved plans</li> <li>• Existing Highway 11 staying near the railway</li> <li>• Safety due to interchange spacing</li> <li>• Flyovers in-between interchanges to allow for traffic in north industrial to exit/enter city easily</li> <li>• Flow is simpler and less stoppages to keep flow higher for drivers; therefore, less chance for driver error <ul style="list-style-type: none"> <li>◦ safer option as it allows drivers to correct in a more spacious area</li> </ul> </li> <li>• Better utilizes existing Highway 11 infrastructure</li> <li>• More suitable for pedestrian crossovers and alternative modes of transportation</li> <li>• Better accommodates future city transit</li> <li>• Good access to East Cory Industrial Park (Highway 12 is arterial)</li> <li>• 2 Interchanges spaced 4.3 km's apart</li> <li>• Compatible with preliminary recommendations from <i>North Saskatoon Network Planning Study</i> (Highways 12 and 11 converted to arterial roads with intersections south of Saskatoon Freeway)</li> </ul>	<ul style="list-style-type: none"> <li>• More out of way travel due to access to Wanuskewin</li> <li>• No direct access from Freeway to Wanuskewin Heritage Park</li> <li>• Realignment of Highway 11 has the potential to draw more traffic to Wanuskewin</li> <li>• Requires 2.5 km closure of Highway 11</li> </ul>	<ul style="list-style-type: none"> <li>• Allow for municipalities to determine the road network south and north of Freeway</li> </ul>	<ul style="list-style-type: none"> <li>• Land purchase for relocated Highway 11</li> <li>• Crossing discussions with CN Rail</li> </ul>	<ul style="list-style-type: none"> <li>• Move Penner Road intersection north to accommodate for interchange to provide direct access to Wanuskewin</li> <li>• Consider impacts to TLE Lands</li> <li>• Millar Avenue could be a signalized intersection to continue to connect to Highway 11</li> <li>• Leave Highway 11 parallel to railroad to not affect connectivity</li> <li>• Transition from high speed Freeway to interior city arterial roads</li> <li>• Spacing of Highway 11 to rail line may need realignment</li> <li>• Full access on Penner Road</li> <li>• Potential right-of-way provisions may be required for Wanuskewin and trail along the river</li> <li>• Green network provisions (i.e. maintain corridors and consider future phases)</li> <li>• Residential future development NE along river; therefore, consider future connections for alternative modes of transportation</li> <li>• Drainage network from Warman and Martinsville needs to be considered</li> <li>• City transit implications and accommodations potential for high occupancy vehicles such as LRT/BRT</li> <li>• SaskWater line / SaskPower lines to be considered</li> <li>• Consider Hudson Bay Swale impact</li> <li>• Provision of N-S cycling routes for commuter cyclists</li> </ul>

Alternatives	Advantages	Disadvantages	Opportunities	Potential Risks	Items to Consider
	<ul style="list-style-type: none"> <li>• Generally, maintains original road network</li> <li>• High level connectivity on local roads</li> <li>• Opportunity to provide arterial connection between Penner Road and Warman Road</li> <li>• Millar-Wanuskewin Connection Road provides opportunity to better distribute northbound and southbound traffic</li> <li>• Hybrid interchange at Highway 12 requires fewer complex moves, lower costs to construct</li> <li>• Reduced staging impacts at existing roads (i.e. Wanuskewin Interchange)</li> <li>• Speed transition from Highway 11 (Freeway) to Wanuskewin (arterial) provided through curvilinear alignment with traffic signals at ramp terminals</li> </ul>				

# **Appendix B**

**Alternative 4: Highway 11 Flyover**

# Preferred Alternative

