



APPENDIX L

GRAPHIC REPRESENTATIONS OF RANKING FOR SCREENING CRITERIA

DRAFT METHODOLOGY FOR RANKING OF ROUND 2 ALTERNATIVES USING GRAPHICAL REPRESENTATIONS OF DATA SETS

State Project No. H.013284

Federal Aid Project No. H013284

MRB South GBR: LA 1 to LA 30 Connector

New Route: Ascension, East and West Baton Rouge, and Iberville Parishes

Enhanced Planning Investigation Recommendations

Atlas Project No. 20-LDOTD-001

This document provides the overall methodology followed to develop scores for the various data categories for each of the 10 preliminary alternatives based on similarities and natural groupings of the data. The quartile system previously used for classification of the preliminary alternatives forced the data into three rankings: the three that are most beneficial, three that are least beneficial, and four that are moderately beneficial.

METHODOLOGY

The data for 10 preliminary alternatives were presented to the public as a table matrix (Attachment 1: Table 4-2. Round 2 Preliminary Alternatives Screening) in a series of public information meetings. Data categories presented for each alternative included:

- Mileage of the new roadway and bridge between LA 1 and LA 30;
- Traffic volume of expected vehicles per day (Average Daily Traffic [ADT]) on the tolled bridge in Planning Year 2042;
- Change in area-wide total vehicle hours traveled in Planning Year 2042 (in Vehicle Hours Traveled [VHT]);
- Change in I-10 total vehicle hours traveled in Planning Year 2042 between LA 415 and the I-10/I-12 Split (in VHT);
- Property impacts in acres, number of structures impacted, and linear feet of pipelines and power lines;
- Bridge constructability issues;
- Preliminary estimated cost to construct the project;
- Preliminary estimated 50-year toll net present value;
- Number of facilities potentially impacted that hold Louisiana Department of Environmental Quality (LDEQ) permits;
- Acreage of essential fish habitat; and
- Acreage of wetlands.

The following data categories that were reported in Table 4-2 were eliminated from use in the Round 2 screening due to reasons described below:

- **Mileage of New Roads and Bridges** - The mileage of new roads and bridges was a simple measure shown on Table 4-2 of the distance between LA 1 and LA 30 along each preliminary alternative. The difference in mileage is resultant of where the termini align on LA 1 and LA 30. The mileage does not measure merit of the roadway/bridge, therefore this data category was eliminated.
- **Change in I-10 VHT in 2042** - While of interest to the traveling public, the change in total vehicle hours traveled on I-10 criterion was not included, largely due to the project's preliminary purpose and need being connectivity and system redundancy between LA 1 and LA 30.
- **Property Impacts in acres, number of structures, and number of LDEQ-Permitted Facilities** - Property impacts such as these are important to consider; however, due to the 600-foot wide corridor used to determine impacts, during future design phases, actual impacts could be avoided, minimized, and/or mitigated to the greatest extent practicable for each of the alternatives.
- **Estimated Cost to Construct and Net Present Value** - The estimated costs of construction and the Net Present Value of the expected tolls for the 10 remaining preliminary alternatives in Round 2 were all determined to be reasonable; thus making them less important for the final ranking.

Criteria determined necessary for the final screening and included in the Round 2 Preliminary Alternative Screening Results (Attachment 2) were:

- **Traffic**
 - Vehicles per day expected on the tolled bridge in 2042 (ADT),
 - Change in area-wide vehicle hours traveled (VHT),
- **Environmental and Permitting**
 - Bridge/Constructability issues,
 - Bridge/Navigation issues,
 - Linear feet of pipelines/powerlines,
 - Acres of potential wetlands, and
- **Public/Stakeholder Input**

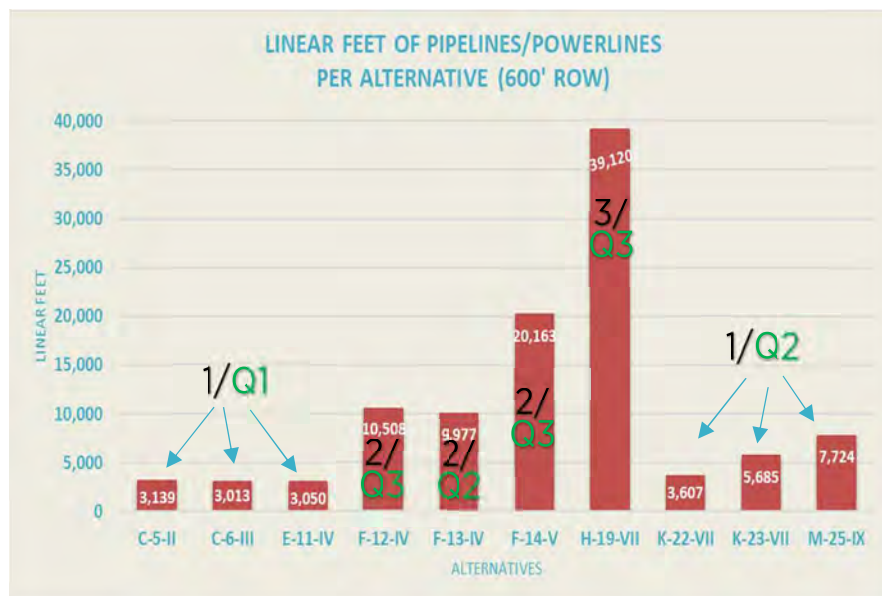
Due to the lack of variation in some data categories, the Table 4-2 data values were originally divided into the quartile system to determine a classification of three most beneficial alternatives, four moderately beneficial alternatives, and three least beneficial alternatives. However, some of the data categories had extreme differences between the 10 preliminary alternatives. The project team determined that the raw data sets should be projected into bar or line graphs to get a visual sense of the sameness or differences between the data for a more natural ranking system rather than the forced ranking of the quartile system.

The project team collectively analyzed the graphics in order to determine if classifications that are more natural could be observed within the data to characterize the most beneficial, those of moderate benefit, and the least beneficial alternatives. Like values were grouped together, resulting in most criteria demonstrating three groups of values. While several criteria could have supported four or five groupings, without having a consistent number

for all criteria, the ranking and weighting of the criteria could not be consistently applied. Rank numbers represent the value of the individual preliminary alternative relative to the other preliminary alternatives. The most favorable alternatives were grouped as ones (1), the least favorable were grouped as threes (3), and the moderate alternatives were grouped as twos (2). These classifications were used in the Round 2 Preliminary Alternatives Screening Results table to compare the 10 preliminary alternatives and determine the best alternatives to carry forward into the planning process.

For example, Exhibit 1 provides the bar chart of linear feet of pipelines and powerlines within the 600-foot corridor of each preliminary alternative. Preliminary Alternative H-19-VII is obviously the least beneficial having nearly double the linear footage of known pipelines and powerlines within its corridor than the second worst alternative F-14-V. Therefore, the Atlas Team ranked only H-19-VII with the least favorable ranking (3). The six preliminary alternatives with the lowest values (C-5-II, C-6-III, E-11-IV, K-22-VII, K-23-VII, and M-25-IX) were ranked as most favorable (1), thus leaving three preliminary alternatives (F-12-IV, F-13-IV, and F-14-V) to be ranked as moderate (2). Using the quartile method, Preliminary Alternatives C-5-II, C-6-III, and E-11-IV were classified as most beneficial, which matches with the “like value” grouping. However, the moderately beneficial and least beneficial preliminary alternatives are forced into quartile groups with very large value ranges, such as least beneficial values from 10,508 linear feet to 39,120 linear feet.

Exhibit 1. Linear Feet of Pipelines/Powerlines Screening Data in Bar Graph Projection to Classify Most Beneficial Alternatives (1), Alternatives with Moderate Benefit (2), and Least Beneficial Alternatives (3) in comparison to Classifications using Quartile System (Q1, Q2, and Q3).



This “like value” exercise was conducted for the remaining data categories as shown as the series of exhibits below.

Exhibit 2 shows the similarity or lack of meaningful difference between the data for expected ADT in the 2042 Planning Year by preliminary alternative. ADT for each of the preliminary alternatives were so similar that the project team determined there should be no “least beneficial” classification.

Exhibit 2. 2042 Bridge ADT Screening Data in Bar Graph Projection to Classify Most Beneficial Alternatives (1) and Alternatives with Moderate Benefit (2) in comparison to Classifications using Quartile System (Q1, Q2, and Q3).

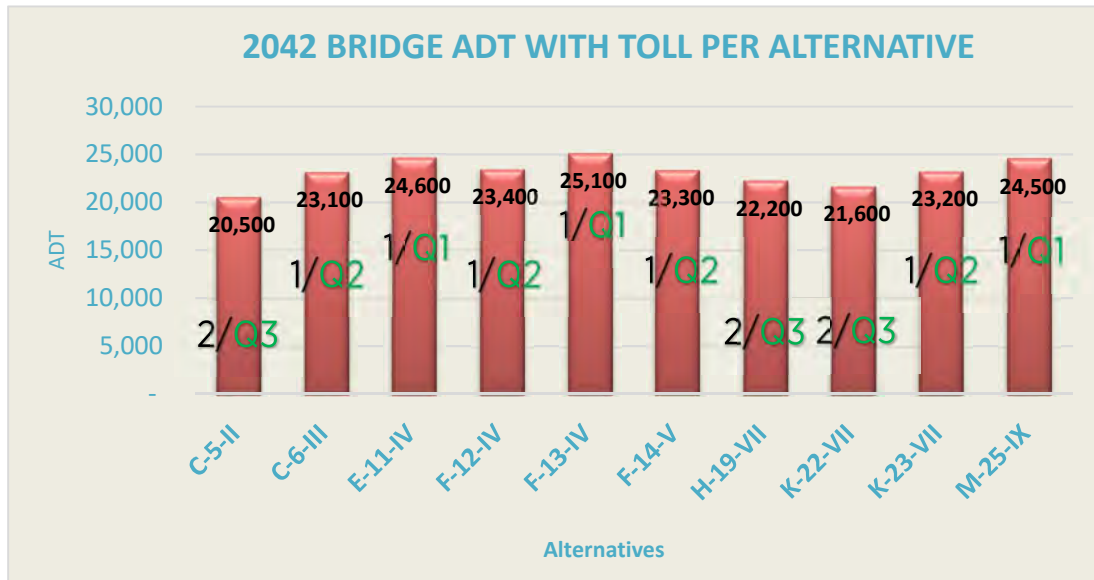
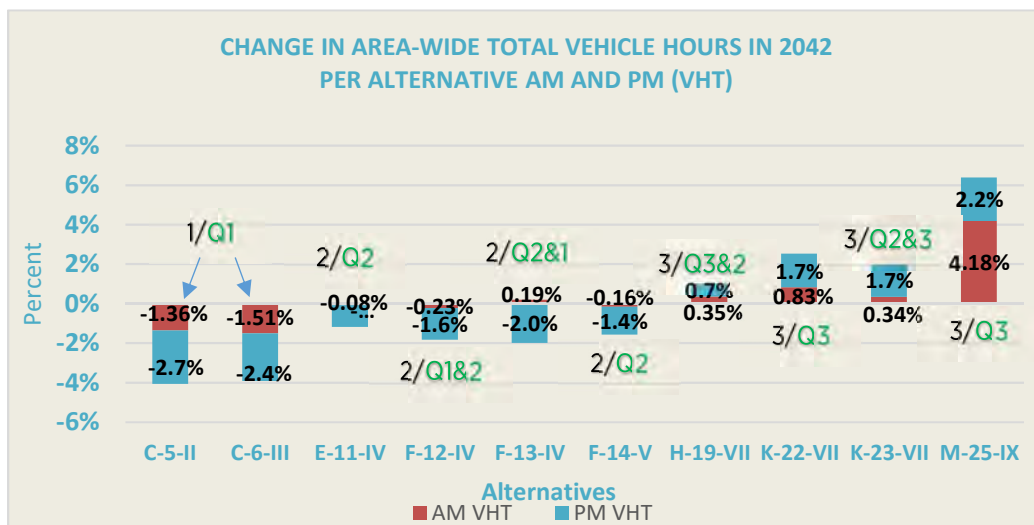


Exhibit 3 shows the relatively large differences between the modeled VHT changes in the 2042 Planning Year by preliminary alternative. The changes in VHT are shown in a percentage value. Negative values represent a travel time savings.

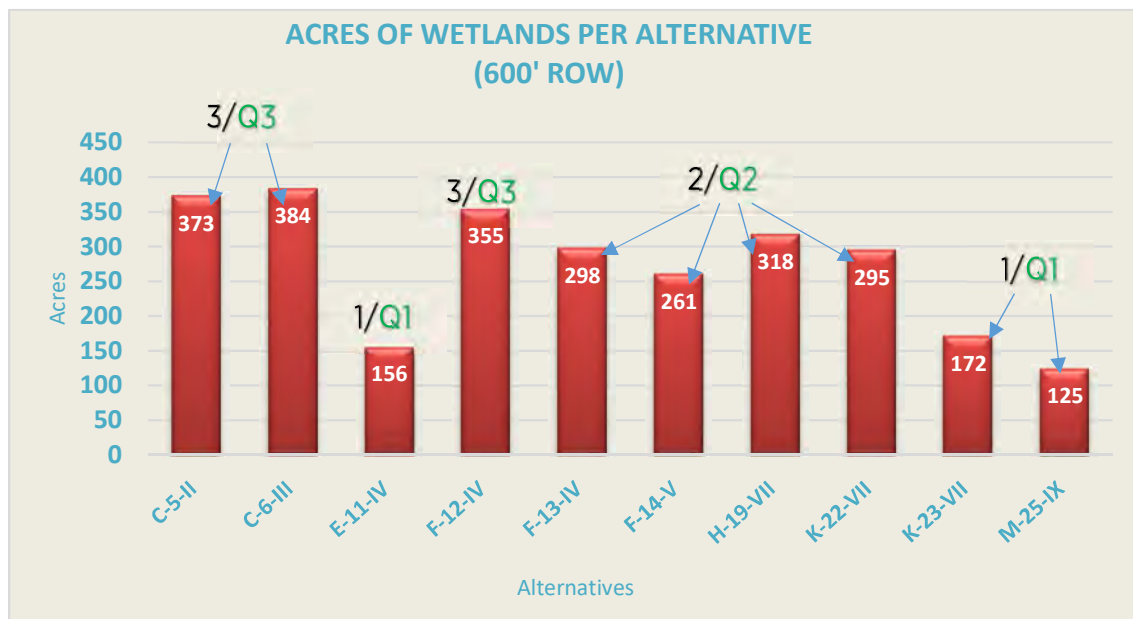
Exhibit 3. 2042 Change in Area-Wide VHT Screening Data in Bar Graph Projection to Classify Most Beneficial Alternatives (1), Alternatives with Moderate Benefit (2), and Least Beneficial Alternatives (3) in comparison to Classifications using Quartile System (Q1, Q2, and Q3).



For the Bridge Constructability and Bridge Navigation Issues criteria, the data are not necessarily quantifiable. Constructability and navigation issues for each alternative were classified using professional judgement by bridge engineers and waterway users (River Pilots) as having minor issues, moderate issues, and major issues. The quantifiable measure most associated with these criteria would be construction cost. All construction costs presented in Table 4-2 were considered acceptable, so the project team determined that the classifications for most beneficial, moderately beneficial, and least beneficial would be unchanged.

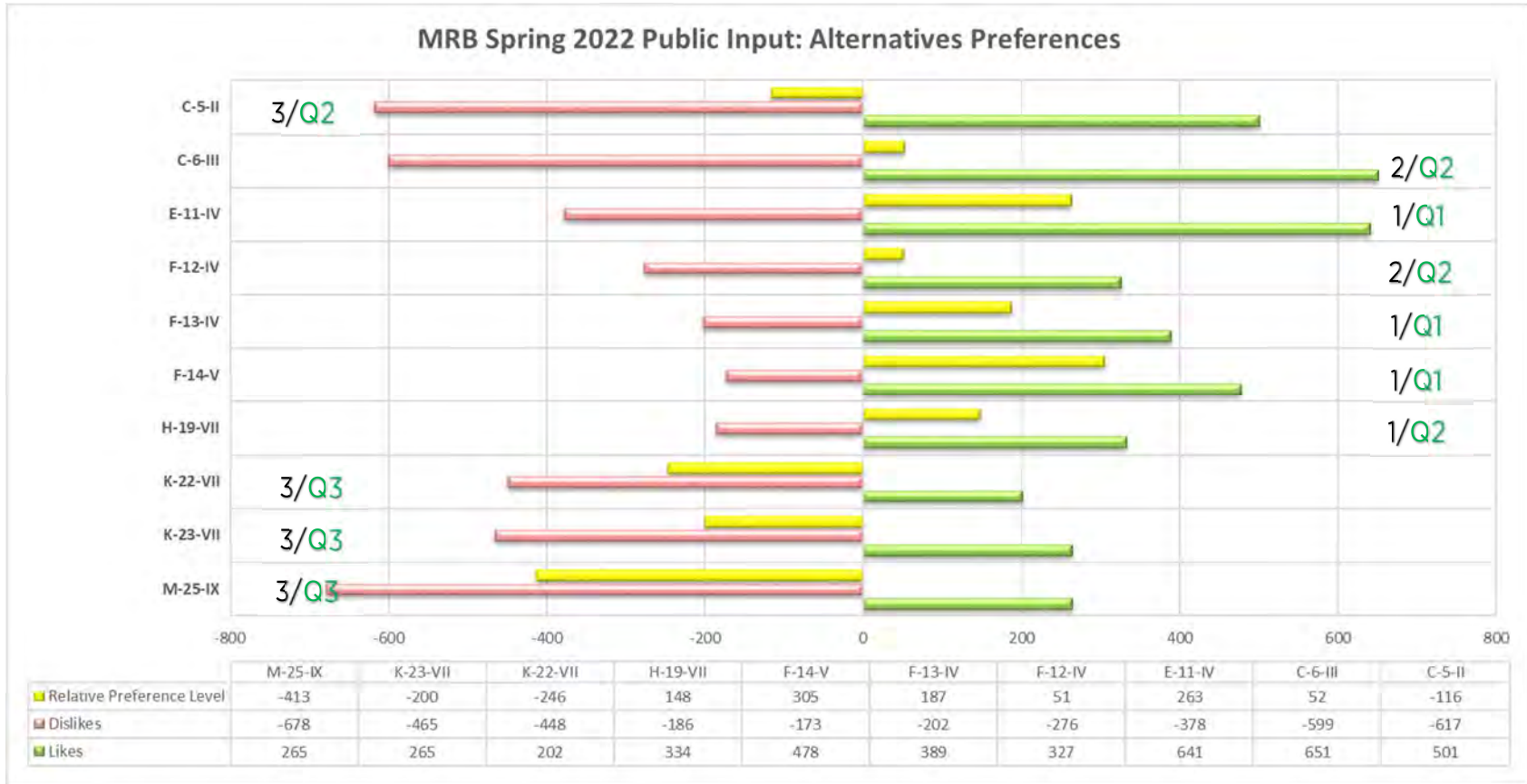
The potential acreage of wetlands impacted by each preliminary alternative, when compared in a bar graph, resulted in no change in the classifications of most beneficial, moderately beneficial, and least beneficial when compared the classes determined by the quartile system as shown in Table 4-2. Exhibit 4 provides the graphical view of the potential impacts to wetlands for each preliminary alternative and identifies the classifications determined.

Exhibit 4. Potential Acreage of Wetlands Impacted Screening Data in Bar Graph Projection to Classify Most Beneficial Alternatives (1), Alternatives with Moderate Benefit (2), and Least Beneficial Alternatives (3) in comparison to Classifications using Quartile System (Q1, Q2, and Q3).



The element of Public Input was not included in Table 4-2, so the data was not classified using the quartile system. Data for relative preference levels (likes or dislikes) for each of the Preliminary Alternatives was pulled from Public Comments and compiled. Exhibit 5 graphs “likes” trending to the right axis, “dislikes” trending to the left axis, and the difference of the two towards the associated axis depending on if there were more likes or dislikes. Likes or dislikes for alternatives could be based on any characteristic that the commenter believed to be important (*i.e.*, ease of access to route, environmental impacts, social preferences). Quartile classification is provided in Exhibit 5 for comparison purposes.

Exhibit 5. Results of Public Preference of Preliminary Alternatives in Bar Graph Projection to Classify Most Beneficial Alternatives (1), Alternatives with Moderate Benefit (2), and Least Beneficial Alternatives (3) in comparison to Classifications using Quartile System (Q1, Q2, and Q3).



ATTACHMENT 1

**Table 4-2. MRB South GBR: LA 1 TO LA 30 Connector
(SPN H.013284)**

Round 2 Preliminary Alternatives Screening

PRELIMINARY ALTERNATIVES SCREENING

ALTERNATIVES	APPROX. LENGTH IN MILES	NUMBER OF VEHICLES PER DAY ON TOLLED BRIDGE IN 2042 (ADT)	CHANGE IN AREA-WIDE TOTAL VEHICLE HOURS IN 2042 (VHT)		CHANGE IN I-10 TOTAL VEHICLE HOURS IN 2042 (LA 415 to I-10/12) (VHT)		PROPERTY IMPACTS ¹					BRIDGE/CONSTRUCT-ABILITY ISSUES ^{2,3}	PRELIMINARY ESTIMATED COST TO CONSTRUCT ⁴ (millions)	PRELIMINARY ESTIMATED 50-YEAR TOLL NET PRESENT VALUE ⁵ (millions)	ENVIRONMENTAL ^{6,7,8}				
			AM	PM	AM	PM	Acres	Structures							PIPELINES/POWER LINES (linear feet)	LDEQ PERMITTED FACILITIES	ESSENTIAL FISH HABITAT PRESENT (acres)	WETLANDS (acres)	
								R	B	P	I								O
C-5-II	8.0	20,500	-1.36%	-2.7%	1.0%	-8.0%	M	0	1	0	1	0	L	MODERATE	\$ 1,596	\$206	1	0	H
C-6-III	7.8	23,100	-1.51%	-2.4%	-6.1%	-12.9%	M	0	1	0	1	0	L	MODERATE	\$ 1,577	\$233	1	0	H
E-11-IV	7.7	24,600	-0.08%	-1.1%	2.7%	2.6%	L	14	3	0	0	10	L	MINOR	\$ 1,300	\$262	0	0	L
F-12-IV	8.3	23,400	-0.23%	-1.6%	2.6%	8.1%	H	12	3	0	4	9	H	MODERATE	\$ 1,554	\$251	1	0	H
F-13-IV	7.6	25,100	0.19%	-2.0%	2.9%	4.1%	L	14	3	0	5	10	M	MAJOR	\$ 1,430	\$269	1	0	M
F-14-V	6.9	23,300	-0.16%	-1.4%	-1.5%	3.9%	L	7	0	0	6	5	H	MAJOR	\$ 1,409	\$250	2	0	M
H-19-VII	8.5	22,200	0.35%	0.7%	2.0%	17.2%	H	0	0	0	0	3	H	MODERATE	\$ 1,940	\$240	0	0	M
K-22-VII	9.1	21,600	0.83%	1.7%	7.3%	13.3%	H	2	0	0	0	1	M	MINOR	\$ 1,399	\$246	0	0	M
K-23-VII	8.2	23,200	0.34%	1.7%	3.4%	21.2%	M	0	0	0	0	5	M	MODERATE	\$ 1,364	\$263	0	0	L
M-25-IX	8.1	24,500	4.18%	2.2%	1.7%	10.5%	M	5	0	0	0	2	M	MODERATE	\$ 1,293	\$281	1	30	L

TABLE NOTES:
ADT – Average Daily Traffic, VHT – Vehicle Hours Traveled, H – High, M – Moderate, L – Low, R – Residential, B – Business, P – Public, I – Industrial, O – Other, NPV – Net Present Value, LDEQ – Louisiana Department of Environmental Quality.
Green represents the highest benefit, Yellow is of moderate benefit, Red is the least beneficial or most problematic.

2042 Travel Demand (with toll):	ADT:	NPV (in millions):	Travel time change/VHT AM:	Travel time change/VHT PM:	I-10 travel time change/VHT AM:	I-10 travel time change/VHT PM:
L = < 22,425	L = < \$242	L = 0.35% to 4.38%	L = 1.5% to 2.2%	L = 3.3% to 7.3%	L = 12.6% to 21.2%	
M = 22,426 to 24,224	M = \$243 to \$262	M = -0.2% to 0.34%	M = -1.8% to 1.4%	M = 1.4% to 3.2%	M = 3.0% to 12.5%	
H = > 24,225	H = > \$263	H = -1.51% to 0.21%	H = 2.7% to 1.9%	H = -6.1% to 1.4%	H = -12.9% to 2.9%	

Other Values:	Acres:	Pipeline/Power Lines (ft):	Wetlands (acres):	Preliminary Estimated Cost to Construct (in millions):
L = < 580	L = < 3,256	L = < 194	L = < \$1,359	
M = 581 to 617	M = 3,257 to 10,374	M = 195 to 345	M = \$1,360 to \$1,554	
H = > 618	H = > 10,375	H = > 346	H = > \$1,555	

FOOTNOTES:

- ¹Acres are for mainline and interchange areas combined using a 300-foot buffer outside a 300-foot footprint for approximately 600 feet of ROW. This overall area also applies to pipeline/power line and wetland totals. Number of structures is shown.
- ²Constructability Issues are minor, moderate, or major (relative to the alternatives listed) and consider the number of piers in the water, complexity of span arrangements, temporary access required, and exposure of temporary access to navigation traffic.
- ³Impacts to Navigation were addressed in Table 4-1, ten alternatives presented with high impacts to navigation and were removed from Round 2 Screening.
- ⁴Preliminary construction cost reflects the estimated cost to construct the bridge and roadway, estimated cost to acquire ROW acreage and structures, including the buffered areas, and estimated wetland mitigation cost, also including the buffered areas. The cost is based on 2022 dollars with a 2% inflation rate through 2030, representing either the construction midpoint date under a public private partnership/design build or a design-bid-build letting date. Cost does not reflect engineering design, operation and maintenance costs, financing cost, construction project management, noise mitigation, structure relocation, or utility relocation.
- ⁵Net Present Value represents the value of the entire toll revenue stream over a 50-year period in current dollars.
- ⁶ROW for Alternatives C-5 and 6 affect a pipe rack and infringe on Dow Chemical property. ROW for Alternatives F-12, 13, and 14 may affect Shintech's entry, substation, and pipe rack between two of their facilities.
- ⁷ROW for Alternative F-14 may affect a tank farm at Willow Glen on the east bank. M-25-IX is a property only impact to Rubicon.
- ⁸All alternatives involve a bridge over the Mississippi River, which supports the endangered pallid sturgeon.
- ⁹Environmental Justice (EJ) screening for all alternatives did not result in observation of impacts to EJ communities.

ATTACHMENT 2

Round 2 Preliminary Alternatives Screening Results

**TABLE 5-1
DRAFT MRB SOUTH (SPN H.013284) ROUND 2 PRELIMINARY ALTERNATIVES SCREENING RESULTS**

ALTERNATIVES	TRAFFIC		PERMITTING				PUBLIC COMMENT	WEIGHTED AVERAGE (LOWER SCORES ARE BETTER)
	NUMBER OF VEHICLES PER DAY ON TOLLED BRIDGE IN 2042 (ADT)	CHANGE IN AREA-WIDE TOTAL VEHICLE HOURS IN 2042 (VHT)	BRIDGE/ CONSTRUCTABILITY ISSUES ¹	BRIDGE/ NAVIGATION ISSUES ²	PIPELINES/ POWER LINES (linear feet) ³	WETLANDS (acres) ³	PUBLIC/STAKEHOLDER OUTREACH ⁴	
		AM & PM						
<i>Weight Factor Contribution</i>	13%	20%	7%	7%	7%	13%	33%	
C-5-II	2	1	2	1	1	3	3	2.29
C-6-III	1	1	2	2	1	3	2	1.86
E-11-IV	1	2	1	1	1	1	1	1.29
F-12-IV	1	2	2	1	2	3	2	2.07
F-13-IV	1	2	3	2	2	2	1	1.71
F-14-V	1	2	3	2	2	2	1	1.71
H-19-VII	2	3	2	1	3	2	1	2.00
K-22-VII	2	3	1	1	1	2	3	2.50
K-23-VII	1	3	2	1	1	1	3	2.29
M-25-IX	1	3	2	1	1	1	3	2.29

TABLE NOTES:

ADT - Average Daily Traffic, VHT – Vehicle hours traveled

Numbers are representative of the relative benefit or impact determined by graphing the quartile data provided in Table 4-2.

Area-wide VHT in 2042 represents the combined total of the AM and PM results.

Blue highlighted Alternatives are suggested as the best to advance.

Explanation of Category Weighting:

- ADT: Important: alternatives that did not support enough traffic were already removed from further study.
 - Area-wide VHT: Very important: the purpose is to provide for connectivity and the public will be more apt to use a route that does not measurably increase their travel times.
 - Constructability: Somewhat important: all of the bridges will face constructability challenges due to scope and scale of the project.
 - Navigation: Somewhat important: navigation stakeholder acceptance is required to obtain USCG permit to construct the project; all options currently acceptable.
 - Pipelines/Powerlines: Somewhat important: impacts can be mitigated at relatively smaller costs compared to the overall project cost.
 - Wetlands: Important: this is an important consideration to achieve environmental clearance to allow project construction.
 - Public Outreach: Most important: public and stakeholder acceptance is the key to successful completion of the project.
- Essentially, each category (traffic, permitting, and public comment) represent a third each of the total weight and are colored consistent with the screening data tables using green, yellow, and red representing most to least benefit.

FOOTNOTES:

¹ Constructability Issues are minor, moderate, or major (relative to the alternatives listed) and consider the number of piers in the water, complexity of span arrangements, temporary access required, construction techniques, and exposure of temporary access to navigation traffic.

² Impacts to Navigation were addressed in Table 4-1, ten alternatives presented with high impacts to navigation and were removed from Round 2 Screening.

³ Powerline and wetland totals are for mainline and interchange areas combined using a 300-foot buffer outside a 300-foot footprint for approximately 600 feet of ROW.

⁴Outreach reflects the preferences of all respondents during the public outreach period with consideration of verbal stakeholder input.