Stantec

DRAFT Meeting Notes

Status Update Meeting

Exit 3 IJR / 171002151

Date/Time:	May 30, 2019 / 1:00 PM
Place:	SCDOT Headquarters
Next Meeting:	July 10, 2019 / 1:00 PM
Attendees:	Brent Dillon – SCDOT Craig Winn – SCDOT Ron Hinson – SCDOT John Boylston – SCDOT Matt Davis – City of Hardeeville Neil Parsons – City of Hardeeville Shawn Boone – U.S. Army Corps of Engineers (via phone) Ocie Vest – Stratford Land Rob Unell – Stratford and Developer (via phone) Doug Smith – Stratford and Developer Debra Rountree – Stratford and Developer Charlie Rountree – Stratford and Developer Lamar Mercer – Thomas & Hutton Rick Day – Stantec Andy Egan – Stantec Claudia Thompson – Stantec
Distribution:	Attendees

This I-95 Exit 3 Interchange Justification Report (IJR) project progress meeting was held at South Carolina Department of Transportation (SCDOT) headquarters to provide an update for SCDOT and United States Army Corps of Engineers (USACE) staff regarding the ongoing efforts by Stantec. The following are noted discussion items and action items from the meeting.

SCDOT Update on I-95 Widening Plan

SCDOT held a kick off meeting in May 2019 for the I-95 Improvements Feasibility Study in which they began discussion on plans of the widening between the Georgia state line and mile marker 33. There will be a scoping meeting in mid-June 2019 where recommendations for widening will be further discussed as well as any proposed interchange improvements, including the existing Exit 5. It will be at least 10 – 15 years before the widening and improvements are completed. Once the feasibility study has been completed there will be a report generated (in approximately 8-12 months) that will be made available. SCDOT also stated that the locations of the existing weigh stations and northbound welcome center are not anticipated to change.

Update from USACE on Permitting Efforts

USACE stated that there is currently no active permit application for the proposed Exit 3 interchange and the current EIS process is about to end. Ocie stated that it was recommended to stop the current EIS process, which covers the combined RiverPort development along with Exit 3, and instead utilize two separate EAs; one for the Exit 3 Interchange and the other for the RiverPort development. The City of Hardeeville will be the applicant for the Exit 3 EA and Stratford Land will be the applicant for the RiverPort EA.

The new separate EA process should help get the timeline for permitting Exit 3 in line with the timeline for finalizing the IJR. Sligh Environmental Consultants is being retained by Stratford Land to work on the RiverPort EA.

Traffic Analysis Methodology

Using the previously agreed upon development schedule, design hour, and background growth rates, Stantec has conducted 5-year interim year analyses in order to determine when the existing Exit 5 is projected to exceed capacity. At that point, Stantec performed capacity analyses for an improved Exit 5 using the same footprint of the existing interchange but with additional through and turning lanes at each ramp. Next, Stantec conducted capacity analyses in 5-year phases assuming both Exit 3 and Exit 5 are open.

Mainline I-95 General Capacity Analysis

Stantec presented a graph showing the historical AADT along this section of I-95 that included projections to 2050 using the 10-year, 12-year, and LATS model growth rates. It was noted that the statewide model has an estimated 2045 AADT very close to the LATS model being used for the IJR. Next, Stantec presented the 2046 design hour volumes for both directions of I-95. A chart showing the I-95 2046 design hour traffic volumes was discussed that showed the traffic projections assuming background growth only and adding development-related traffic in 10% increments up to 100%. An approximate number of lanes needed for each 10% increment was presented, assuming a base freeway capacity of 2,400 vehicles per hour per lane for each I-95 southbound and northbound. SCDOT preferred a traditional HCS analysis to determine the number of lanes needed instead of the high-level analysis presented.

Exit 5 Capacity Analysis (without Exit 3)

Stantec presented the Synchro results for the Exit 5 ramp intersections with US 17 (existing conditions, 2020, 2025 with traffic signal, & 2025 with the conceptual improvements developed by Michael Baker). The results showed LOS B for the existing conditions, LOS C for 2020, and then failing LOS starting in the 2025 interim year. The Capacity Analysis for Planning of Junctions (CAP-X) program was used to analyze various interchange forms considering the design year traffic volumes for Exit 5. The CAP-X analysis results for Exit 5 were presented, assuming the full development schedule previously agreed upon, which indicate the Partial Cloverleaf interchange form has the number one ranking (lowest volume-to-capacity ratio). It was noted that the configuration of the current Exit 5 interchange does not match the partial cloverleaf form assumed in CAP-X. Therefore, the partial cloverleaf ranking as the preferred configuration may not be representative.

Traffic Analysis Assuming Exit 3 is Constructed

Stantec presented the CAP-X results for traffic split between Exit 3 and Exit 5. The results indicate that Exit 5 would again exceed capacity by the design year even with Exit 3 in place. The City of Hardeeville inquired about the specific split for the traffic between the two interchanges.

Interchange Form Discussion (CAP-X Analysis)

SCDOT made note that if I-95 were widened to 3 lanes each direction that the widening could happen to the inside median, but if a fourth lane is needed each direction then it would be widened to the outside of the existing lanes. SCDOT also stated that no matter what interchange form was built for Exit 3 it would need to accommodate an 8 lane I-95 for possible future widening. It was agreed upon to look further into the Partial Cloverleaf and Diverging Diamond Interchange forms for continued analysis of Exit 3 and Exit 5, as these forms were highest ranked based on the CAP-X analysis. It was suggested by SCDOT that Stantec may want to consider several variations of the Partial Cloverleaf including directional ramps and flyovers due to the large turning movement volumes.

Stantec presented the CAP-X traffic volume and lane assumptions for the Exit 3 and Exit 5 partial cloverleaf and diverging diamond interchange forms. Typical sections for the future RiverPort Parkway were presented showing the estimated number of lanes needed approaching and departing the interchange based on the traffic volumes projections. Stantec noted that a four-lane divided section north of I-95 would be sufficient to handle the traffic demand while an eight-lane divided section south of I-95 would likely be needed in the immediate vicinity of the future Exit 3.

Stratford Land asked if an eight-lane typical section for RiverPort Parkway would be needed all the way to it's connection with US 17 as they have been anticipating a four-lane section. Stantec noted that analysis for the length of RiverPort Parkway had not been conducted and that additional analysis would be needed to determine how far the eight-lane section would be needed.

Due to the close spacing of existing facilities along I-95 (Purrysburg Road overpass, weigh stations, SC welcome center, Exit 5), there was discussion about a collector-distributor (C-D) road to separate the weaving between ramps from the mainline. SCDOT mentioned that the traffic volumes to/from the various ramps would need to be presented to consider if a C-D road would operate acceptably.

Discussion on Weigh Stations and Welcome Center Locations

Weigh Stations

SCDOT mentioned that the Department of Public Safety's State Transport Police are responsible for operating the weigh stations and would be the correct agency to see if there are any plans to re-open, improve, or relocate the weigh stations. It was noted that it is highly unlikely that SCDOT would sell or transfer the land that the weigh stations currently occupy. Even if they are not re-opened as weigh stations, the Intermodal Office may seek to convert the areas to truck parking facilities.

Stantec presented an aerial of the Georgia welcome center and weigh station combined facility, located along I-95 southbound across the state line. The Georgia facilities have two separate exit ramps, combined parking areas, and a shared multi-lane on-ramp. The possibility of allowing this or a similar combination for the South Carolina facilities was discussed along northbound I-95.

The City of Hardeeville and Ocie stated that a land swap to move the northbound weigh station adjacent to the existing welcome center could be considered, but SCDOT was doubtful of transferring or selling current rights-of-way, particularly along the interstate.

Welcome Center

SCDOT mentioned that they are not opposed to the idea of a Welcome Center/Weigh Station combination, but that they have no plans to move either facility at this time.

Ron Hinson believes that SCDOT may have count data for the welcome center on-ramp to I-95 northbound since Stantec noted the permanent count station appears to be at that location with detectors on the ramp.

Action Item: Stantec will send the exact dates for the permanent count station data and Ron Hinson will see if the Welcome Center ramp is included. (Provided to Stantec 5/31/19)

Other

Lamar stated that the CSX crossing at RiverPort Parkway north of I-95 is assumed to be an at-grade crossing, although they have concepts showing grade separated as an option.

Ocie and Stratford mentioned possibly getting a due diligence letter from Stantec for the Exit 3 Interchange to present to SCDOT for review. This letter would be needed for the August 1st SIB application deadline to get additional funding for the project. There was additional discussion between the representatives for Stratford and SCDOT about requirements for the SIB submission and timeline for completing those tasks.

Comments Regarding State Infrastructure Bank Application

There was other discussion that occurred regarding procedures for application to the State Infrastructure Bank and the new requirements that have recently been established. No action items were suggested as a result of this discussion.

Next Steps

Stantec will develop concept designs for Exit 3 and begin traffic capacity analyses of those interchange forms using Synchro.

Next Meeting

July 10, 2019 at 1:00 PM. The location will be SCDOT Headquarters.

The meeting adjourned at 3:40 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately. If no comments are received by close of business June 13, 2019, these minutes will be considered final.

Regards,

Stantec Consulting Services Inc.

Andy Egan PE, PTOE
Transportation Engineer
Phone: 843 740 6349
Fax: 843 740 7707
Andy.Egan@stantec.com

ct

Attachment: 20190530_status_update_mtg_presentation.pdf

EXIT 3

I-95 Exit 3 Interchange Traffic Analysis

STATUS UPDATE MEETING

Stantec

May 30, 2019

Agenda

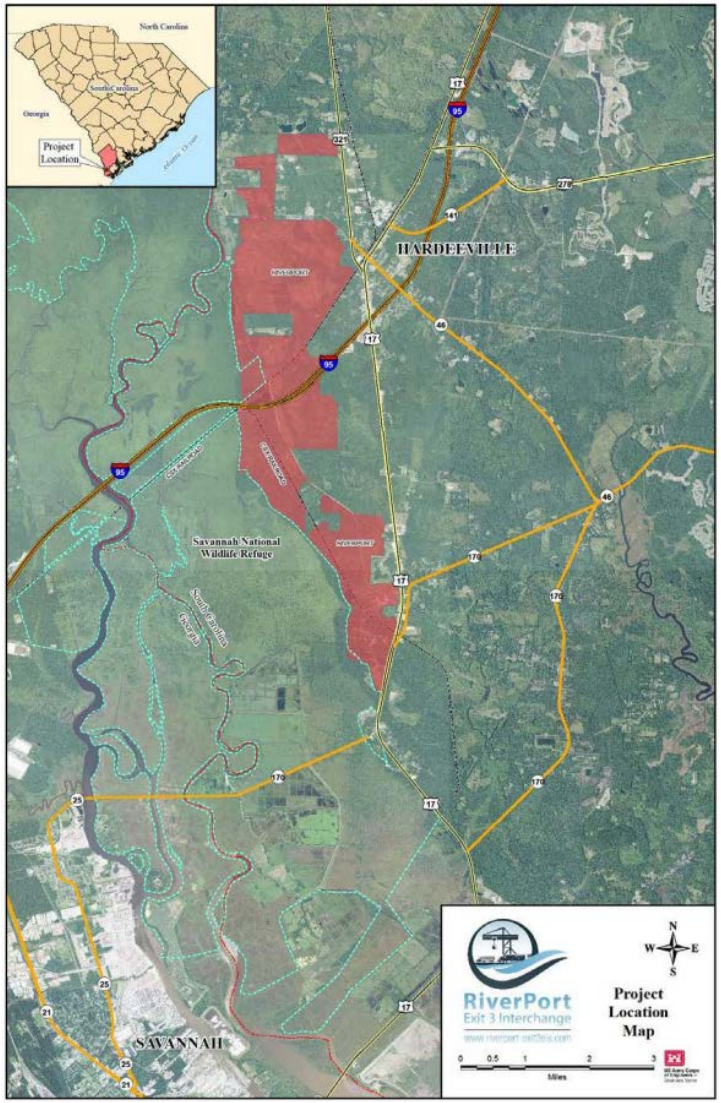
1. Welcome & Introductions
2. SCDOT Update on I-95 Widening Plan
3. Update from USACE on Permitting Efforts
4. Traffic Volume Development
5. Mainline I-95 General Capacity Analysis
6. Exit 5 Capacity Analysis
7. Traffic Analysis Assuming Exit 3 is Constructed
8. Interchange Forms (Cap-X Analysis)
9. Weigh Stations & Welcome Center Locations
10. Meeting Summary
11. Schedule & Next Steps
12. Next Meeting

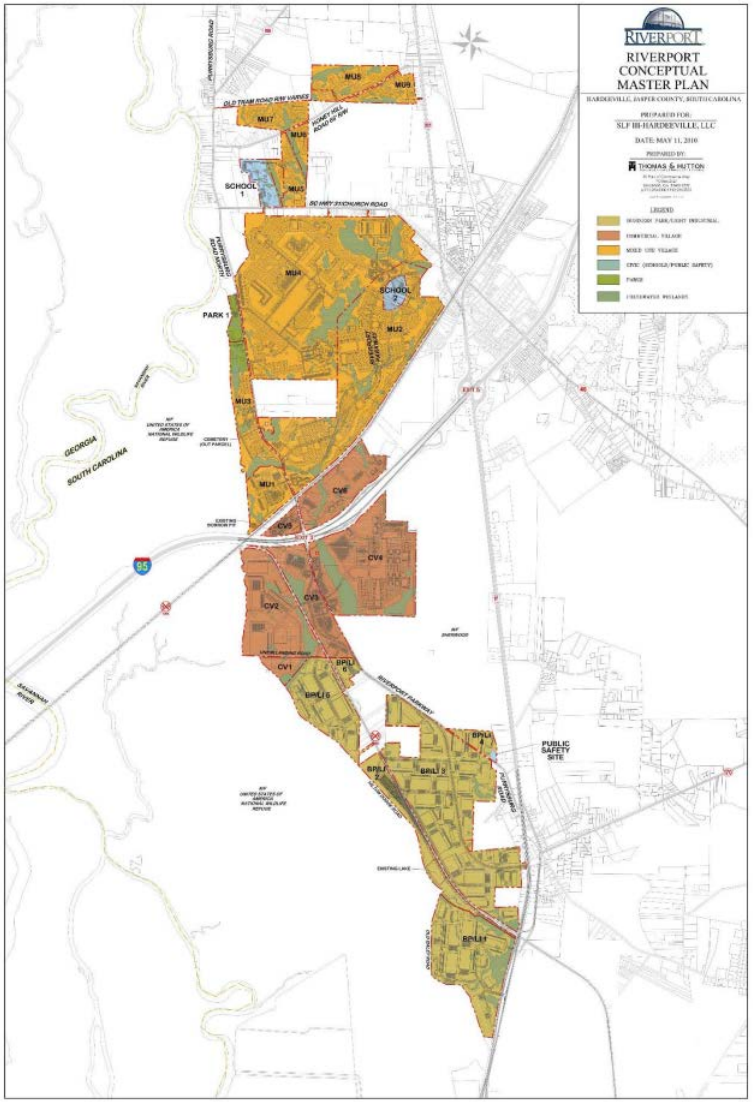
Project Objectives

- **Perform traffic analysis for nearby planned developments, building upon the preliminary traffic study**
- **Develop conceptual designs for the new interchange**
- **Develop an Interchange Justification Report (IJR) for the future Exit 3 along I-95**

SCDOT Update

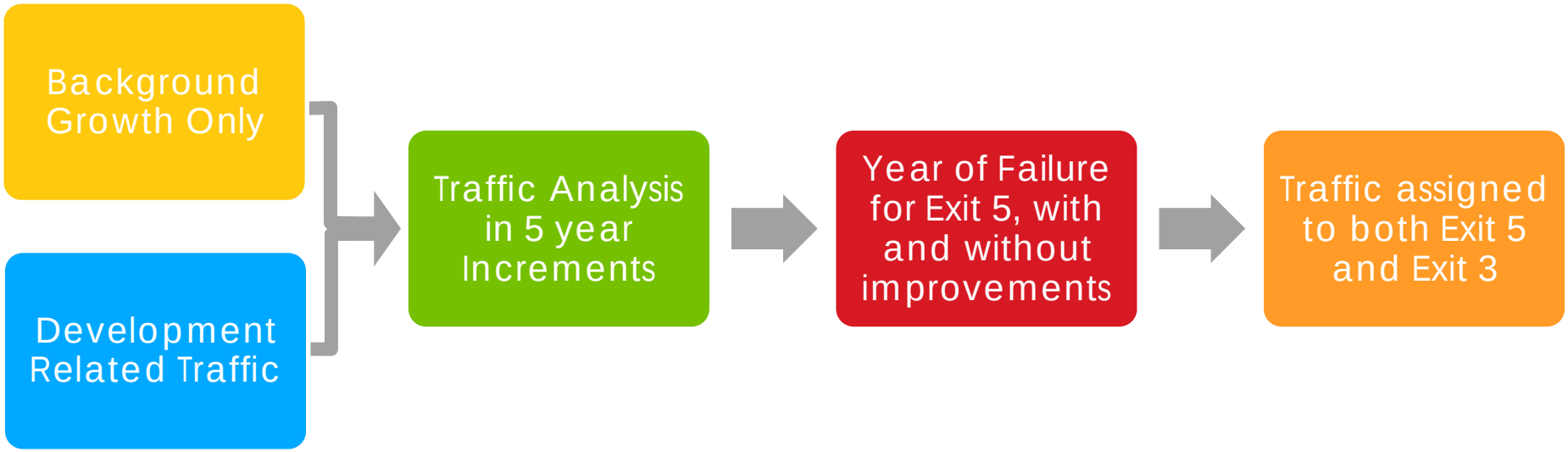
USACE Update



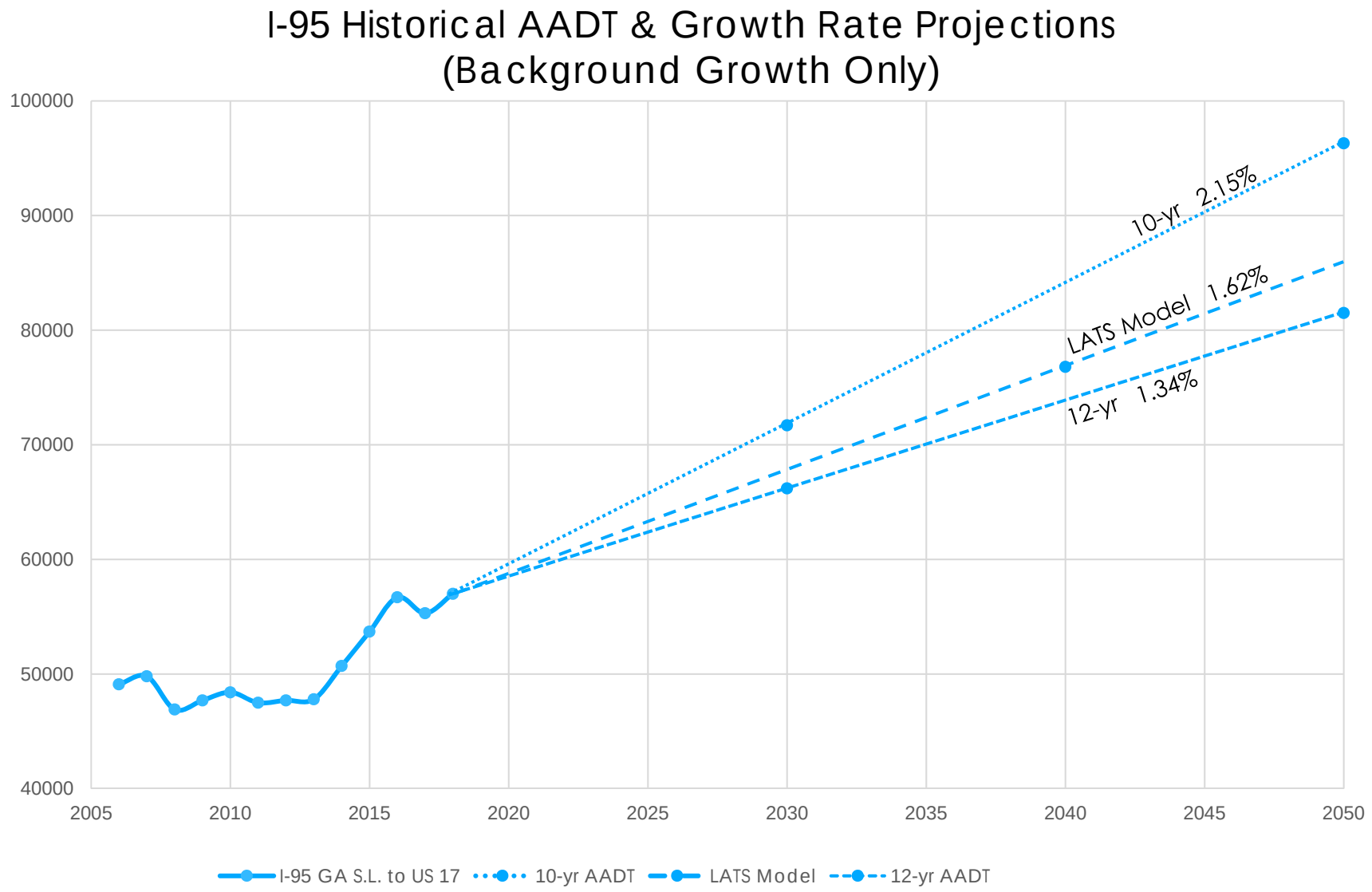


Methodology

- **Background traffic growth, with no development-related traffic, is applied to existing counts.**
- **Development-related traffic is added incrementally with 5-year interim analyses assuming no Exit 3 to determine year of failure for Exit 5.**
- **After Exit 5 fails, development-related traffic is split between Exit 3 and Exit 5 for the Design Year analysis.**



Mainline I-95 General Capacity Analysis



Mainline I-95 General Capacity Analysis

2046 Build I-95 Southbound Mainline Lanes Needed

Development Traffic		Background Traffic Volume	Combined Volume	Number of Lanes Needed*	
				Calculated	Rounded
0%		3967	3967	1.7	2
10%	488	3967	4455	1.9	2
20%	**976**	**3967**	**4943**	**2.1**	**3**
30%	1464	3967	5431	2.3	3
40%	1952	3967	5919	2.5	3
50%	2440	3967	6407	2.7	3
60%	2927	3967	6894	2.9	3
70%	**3415**	**3967**	**7382**	**3.1**	**4**
80%	3903	3967	7870	3.3	4
90%	4391	3967	8358	3.5	4
100%	4879	3967	8846	3.7	4

*assuming Base Freeway Capacity of 2,400 vphpl

Mainline I-95 General Capacity Analysis

2046 Build I-95 Northbound Mainline Lanes Needed

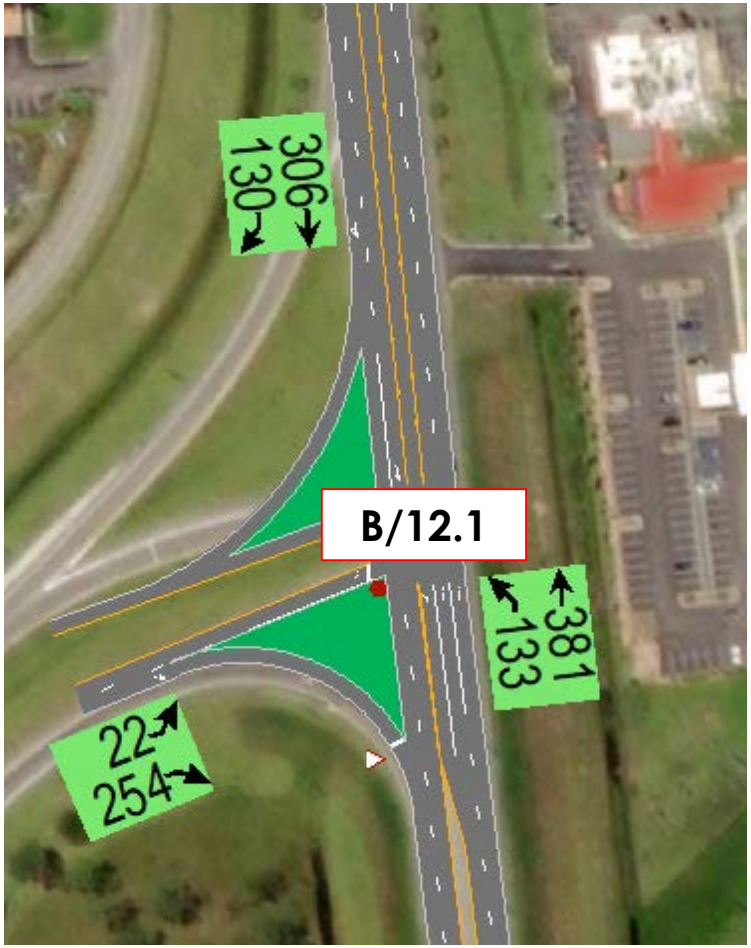
Development Traffic		Background Traffic Volume	Combined Volume	Number of Lanes Needed*	
				Calculated	Rounded
0%		4194	4194	1.7	2
10%	426	4194	4620	1.9	2
20%	**853**	**4194**	**5047**	**2.1**	**3**
30%	1279	4194	5473	2.3	3
40%	1705	4194	5899	2.5	3
50%	2132	4194	6326	2.6	3
60%	2558	4194	6752	2.8	3
70%	2984	4194	7178	3.0	3
80%	**3410**	**4194**	**7604**	**3.2**	**4**
90%	3837	4194	8031	3.3	4
100%	4263	4194	8457	3.5	4

*assuming Base Freeway Capacity of 2,400 vphpl

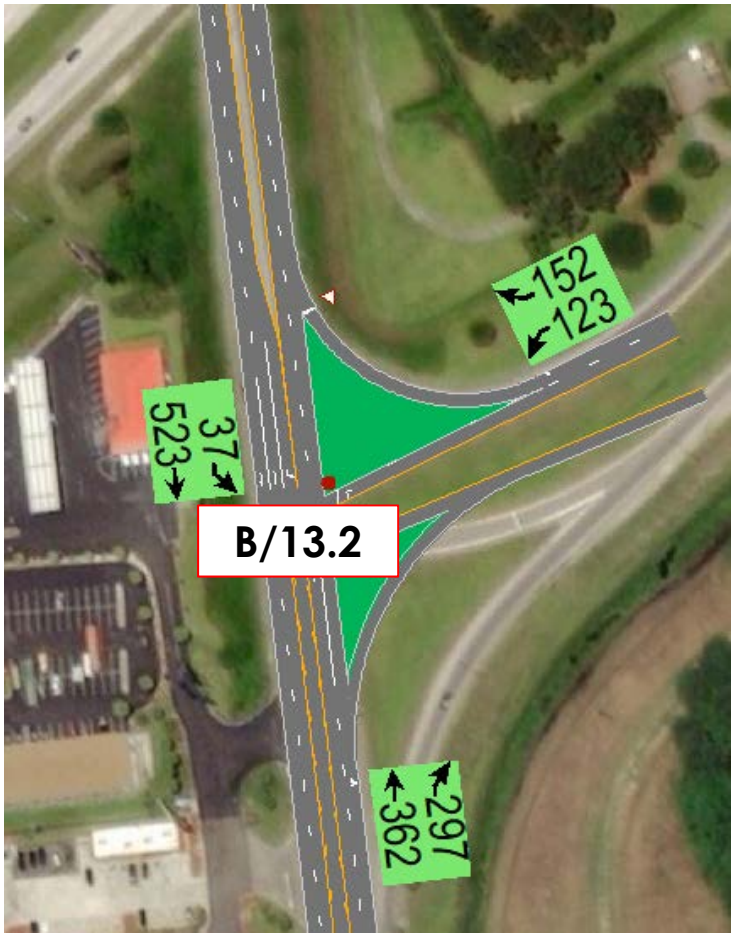
Exit 5 Capacity Analysis: Synchro

2019 Existing Conditions

I-95 Southbound Ramps



I-95 Northbound Ramps

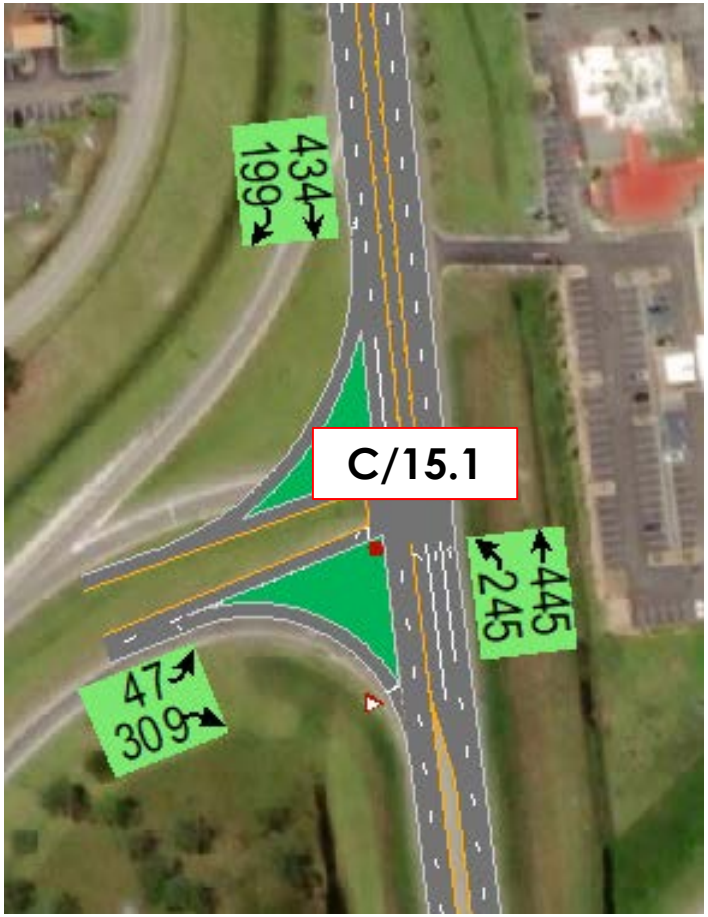


NOT TO SCALE

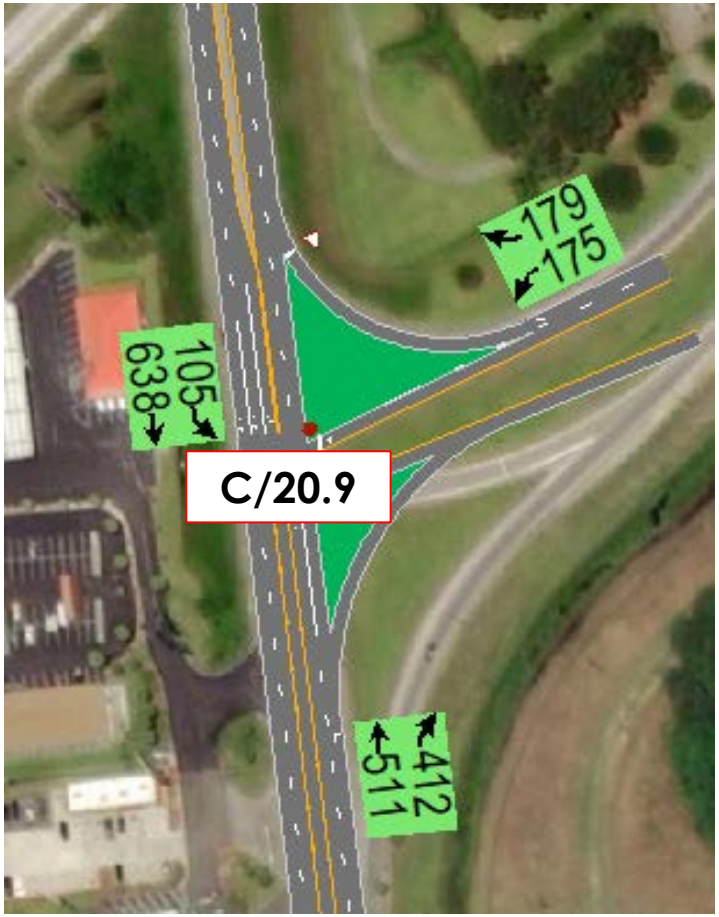
Exit 5 Capacity Analysis: Synchro

2020 No Build Conditions (Existing Geometry)

I-95 Southbound Ramps



I-95 Northbound Ramps

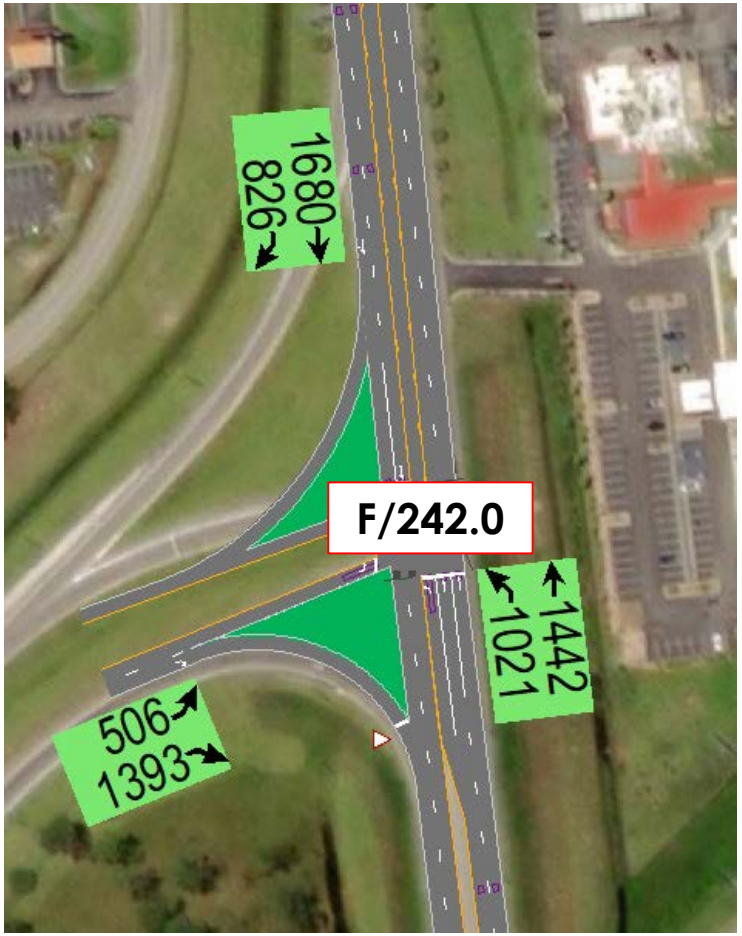


NOT TO SCALE

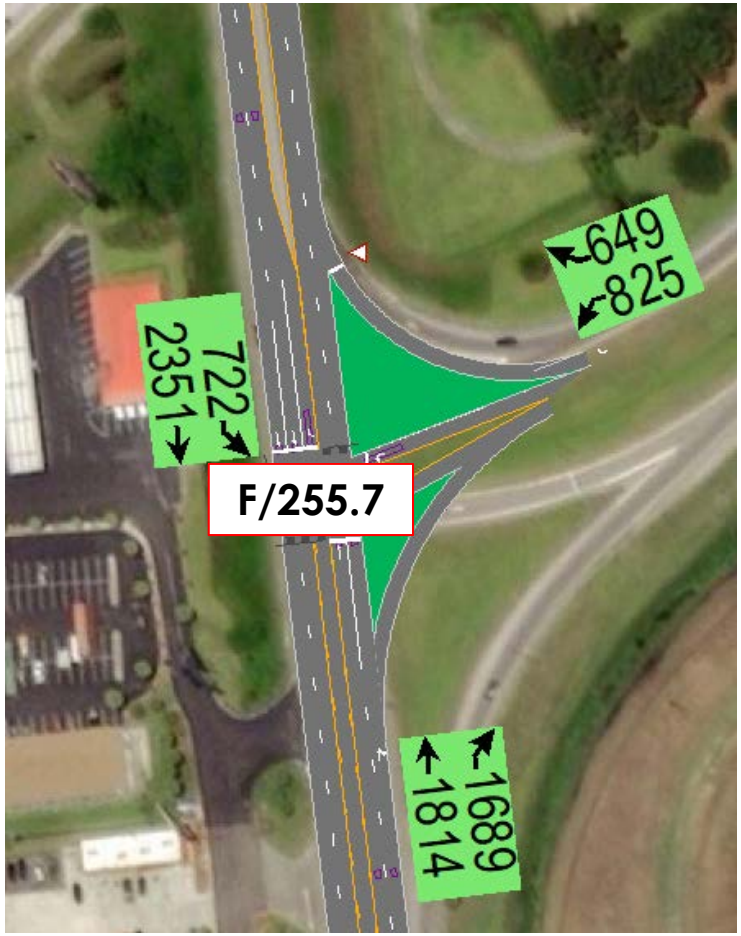
Exit 5 Capacity Analysis: Synchro

2025 No Build Conditions (Existing Geometry with Traffic Signal)

I-95 Southbound Ramps



I-95 Northbound Ramps

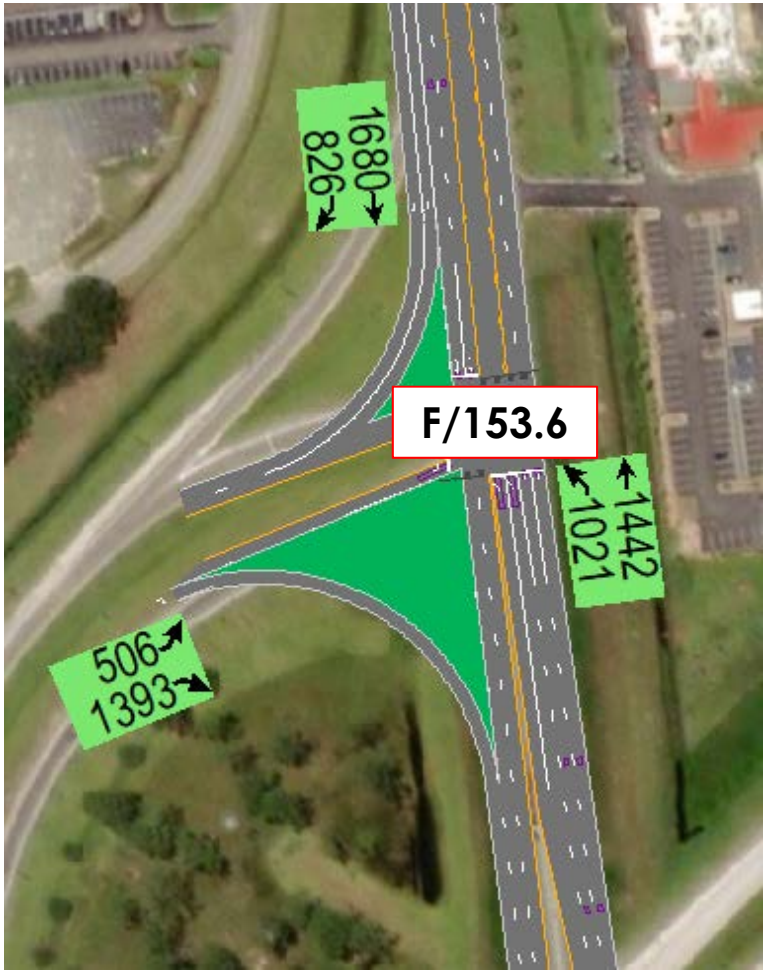


NOT TO SCALE

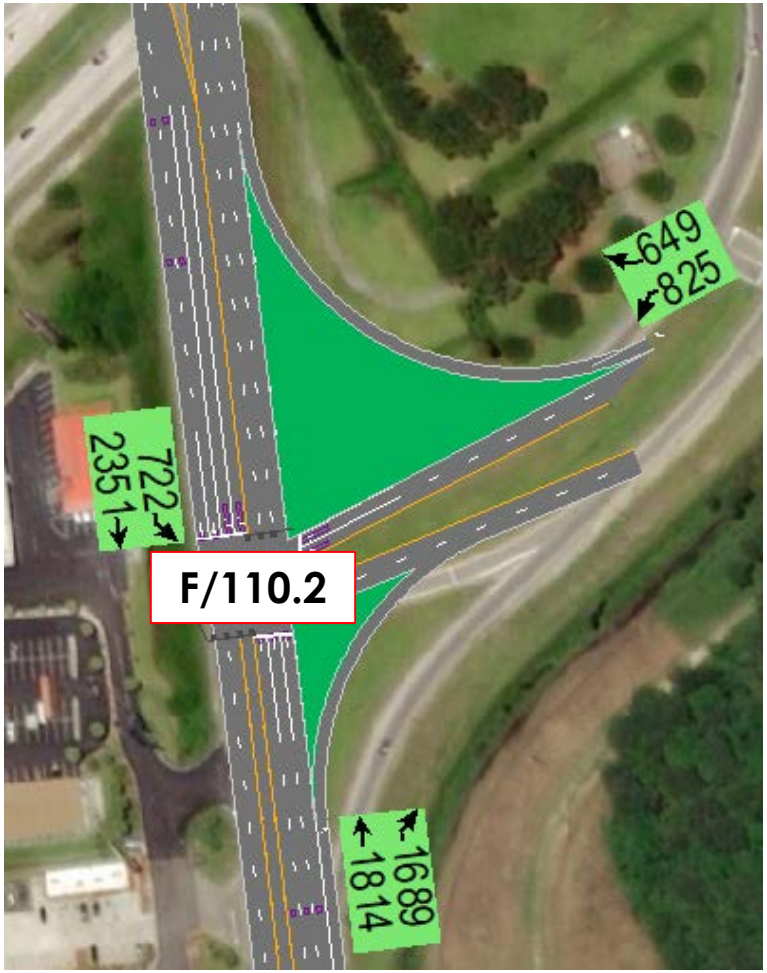
Exit 5 Capacity Analysis: Synchro

2025 No Build Conditions (Alt 1)

I-95 Southbound Ramps



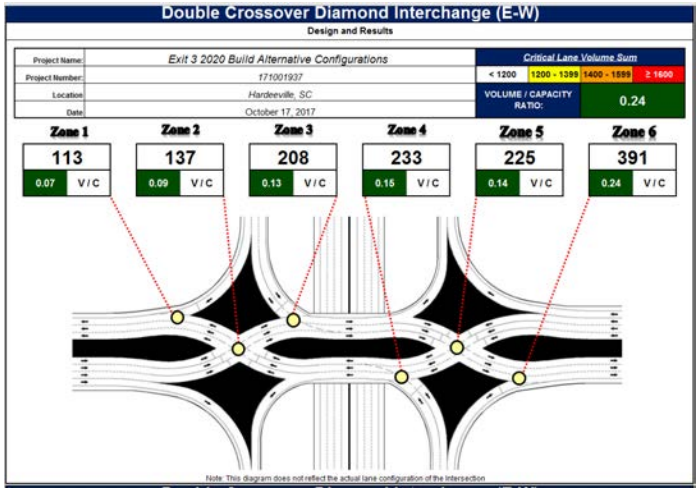
I-95 Northbound Ramps



NOT TO SCALE

FHWA's Capacity Analysis for Planning of Junctions (CAP-X)

- Evaluates interchanges using the method of critical lane volume (CLV) summation to assess capacity
- Involves comparing a sum of conflicting movements to an adjusted saturation flow-rate (i.e. capacity)
- The level of service (LOS) is indexed to this v/c ratio and ranges from zero to one
- A volume to capacity ratio equal to 1.0 is at capacity



Results for Interchanges

#	TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Ranking
			CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C		
10.1	Diamond	N-S					494	0.31	368	0.23					0.31	8
10.2		E-W					322	0.20	331	0.21					0.21	3
11.1	Partial Cloverleaf	N-S					130	0.08	157	0.10					0.10	1
11.2		E-W					523	0.31	268	0.17					0.33	9
13.1	Displaced Left Turn	N-S	264	0.17			474	0.30	291	0.18			349	0.22	0.30	6
13.2		E-W	209	0.13			253	0.16	454	0.28			486	0.30	0.30	7
14.1	Double Crossover Diamond	N-S	264	0.17	425	0.27	120	0.08	216	0.13	167	0.10	349	0.22	0.27	5
14.2		E-W	113	0.07	137	0.09	208	0.13	233	0.15	225	0.14	391	0.24	0.24	4
15.1	Single Point	N-S	269	0.17			311	0.19					312	0.19	0.19	2
15.2		E-W	141	0.09			535	0.33					391	0.24	0.33	10

example only

Cap-X Analysis Findings

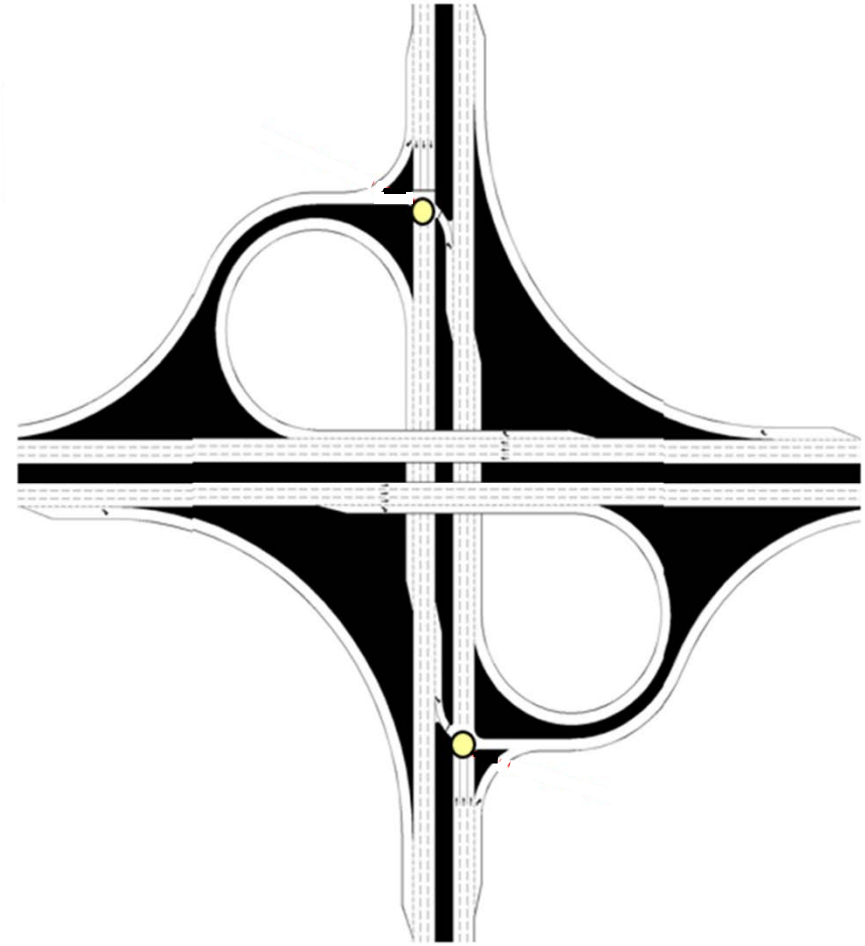
The first scenario tested was for the background traffic growth and the proposed development program traffic with only Exit 5 in place.

Table 1. Exit 5 No Build (without Exit 3) Analysis

PM Peak Hour							
Interchange Type	Direction	Overall Capacity v/c					
		2020	2025	2030	2035	2040	2046
Diamond	N-S	0.39	1.56	2.16	2.14	2.86	3.03
Partial Cloverleaf	N-S	0.26	1.03	1.46	1.74	1.92	2.04
Displaced-Left Turn	N-S	0.38	1.51	2.07	2.02	2.82	2.99
Double-Crossover Diamond	N-S	0.39	1.39	1.94	2.08	2.60	2.76
Single-Point	N-S	0.36	1.40	1.88	1.88	2.55	2.71

Cap-X Analysis Findings

Cap X Partial Cloverleaf Interchange Configuration



Exit 5 Partial Cloverleaf Interchange Configuration

Cap-X Analysis Findings

The second scenario tested assigned the background traffic growth and development traffic to both Exit 3 and Exit 5 interchanges.

Table 2. Exit 3 Build Analysis

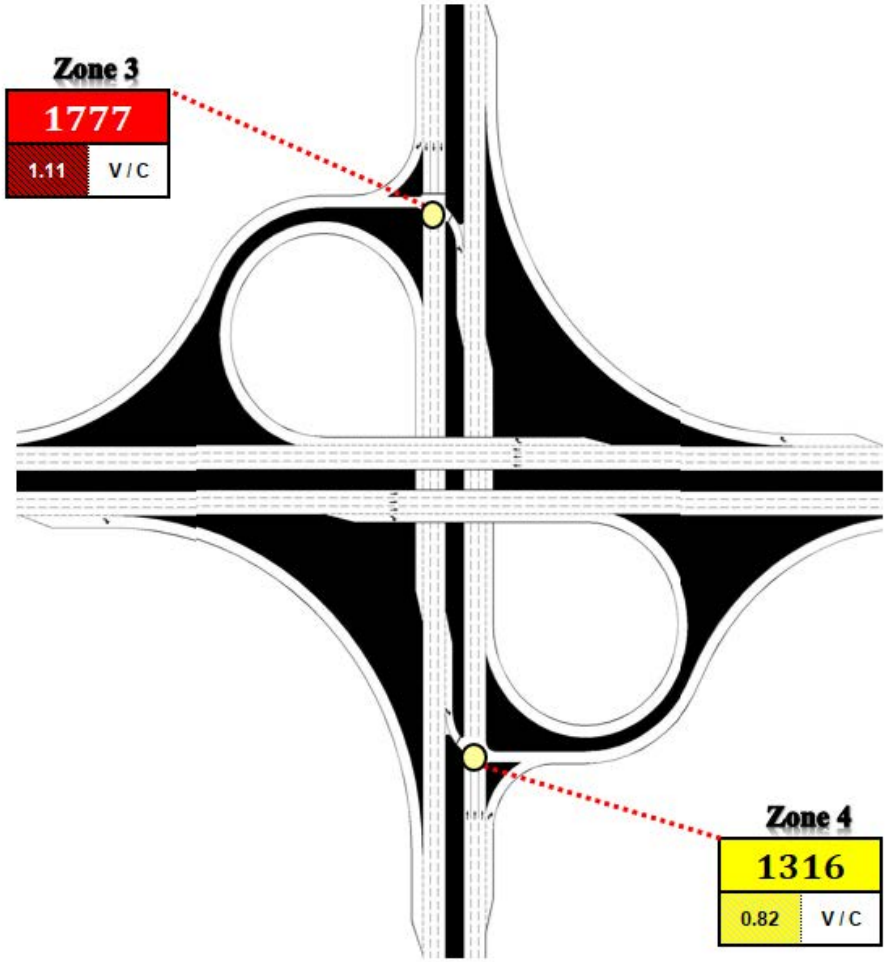
PM Peak Hour							
Interchange Type	Direction	Overall Capacity v/c					
		2020	2025	2030	2035	2040	2046
Diamond	N-S	-	0.80	1.18	1.36	1.48	1.60
Partial Cloverleaf	N-S	-	0.56	0.84	0.97	1.06	1.14
Displaced Left-Turn	N-S	-	0.70	1.02	1.18	1.27	1.37
Double-Crossover Diamond	N-S	-	0.62	0.90	1.07	1.17	1.25
Single-Point	N-S	-	0.79	1.15	1.32	1.42	1.53

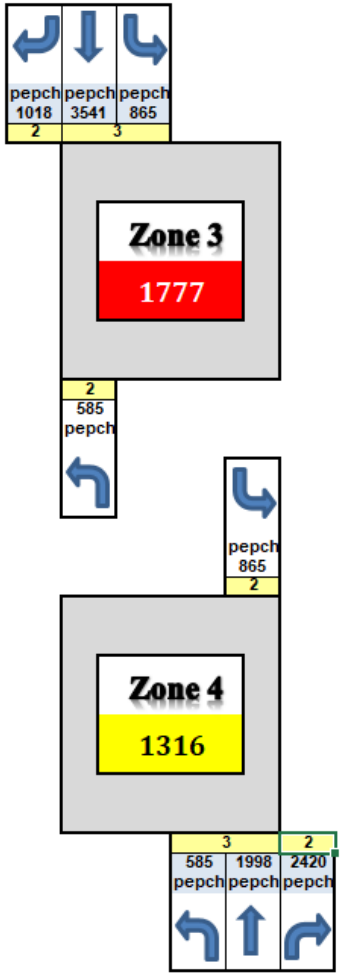
Table 3. Exit 5 Build Analysis

PM Peak Hour							
Interchange Type	Direction	Overall Capacity v/c					
		2020	2025	2030	2035	2040	2046
Diamond	N-S	-	0.95	1.30	1.59	1.77	1.87
Partial Cloverleaf	N-S	-	0.56	0.77	0.93	1.05	1.11
Displaced-Left Turn	N-S	-	1.11	1.51	1.87	2.07	2.17
Double-Crossover Diamond	N-S	-	0.90	1.21	1.48	1.66	1.75
Single-Point	N-S	-	0.89	1.20	1.50	1.69	1.78

Cap-X Analysis Findings (2046)

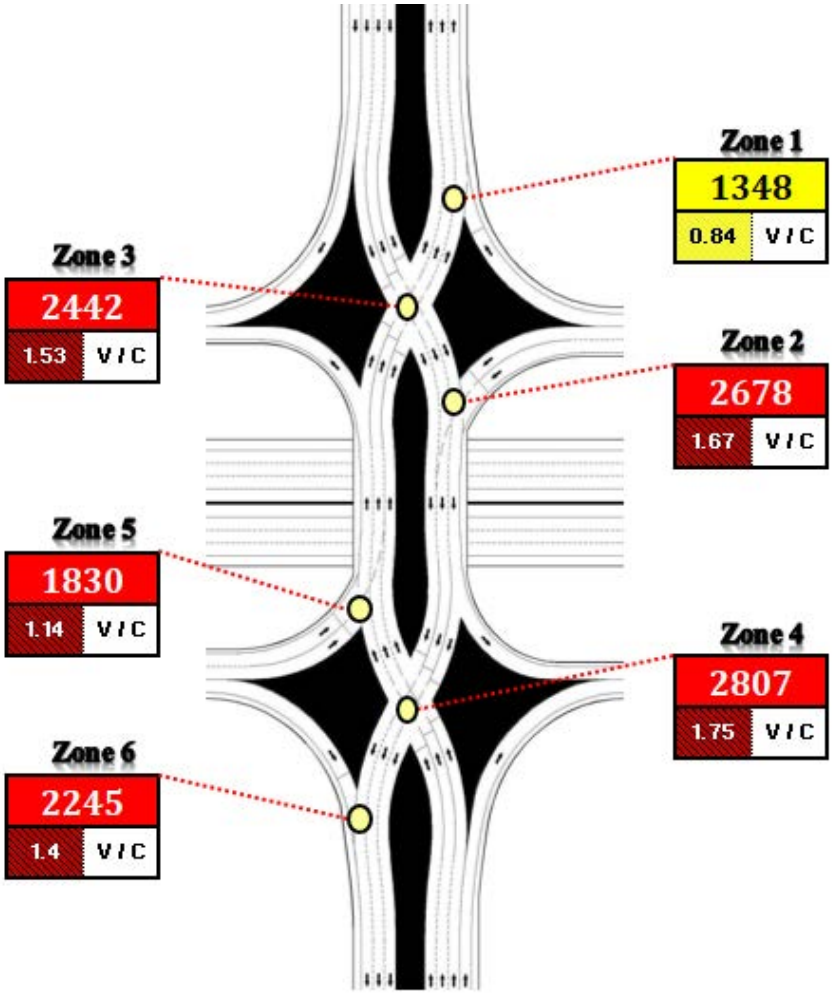
Exit 5 Build Interchange Configuration Options:
Partial Cloverleaf Interchange

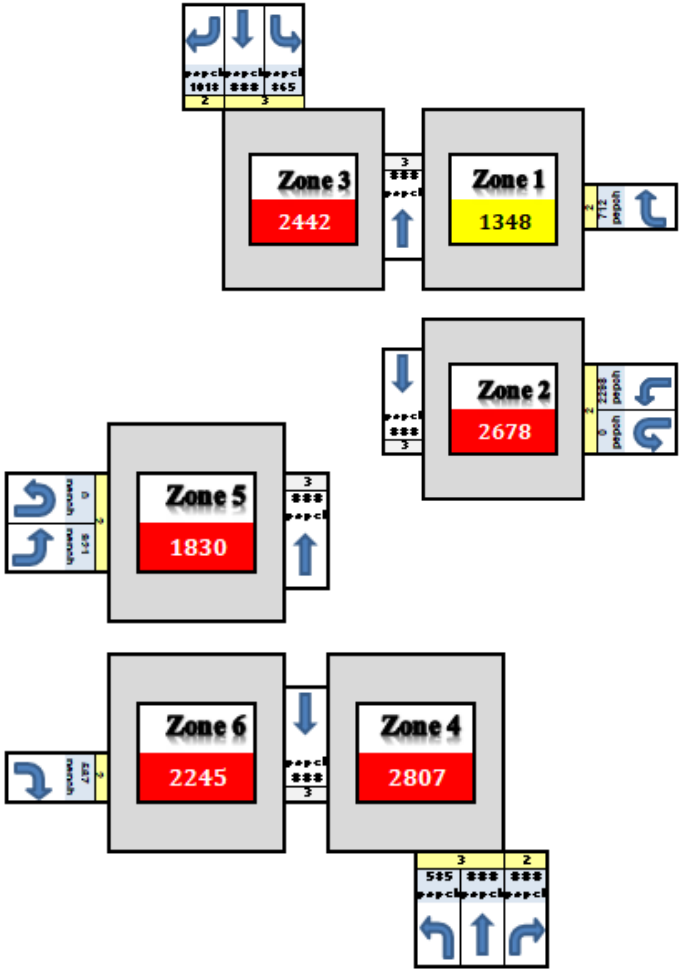




Cap-X Analysis Findings (2046)

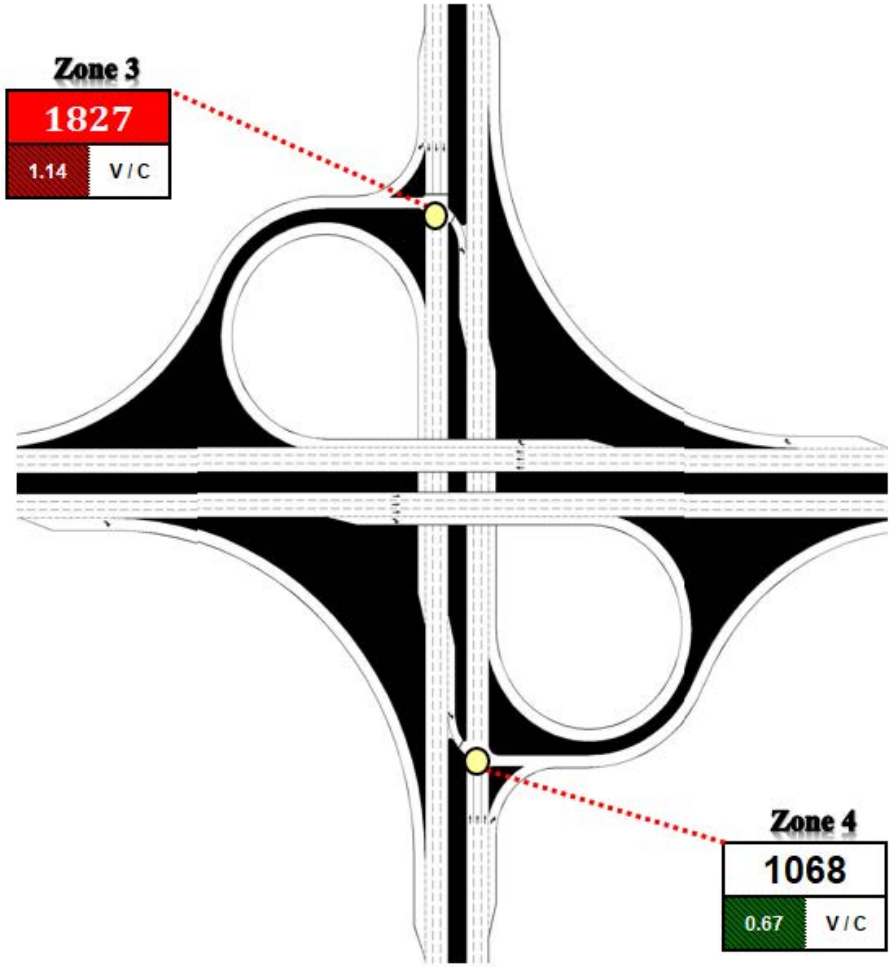
Exit 5 Build Interchange Configuration Options:
Diverging Diamond Interchange

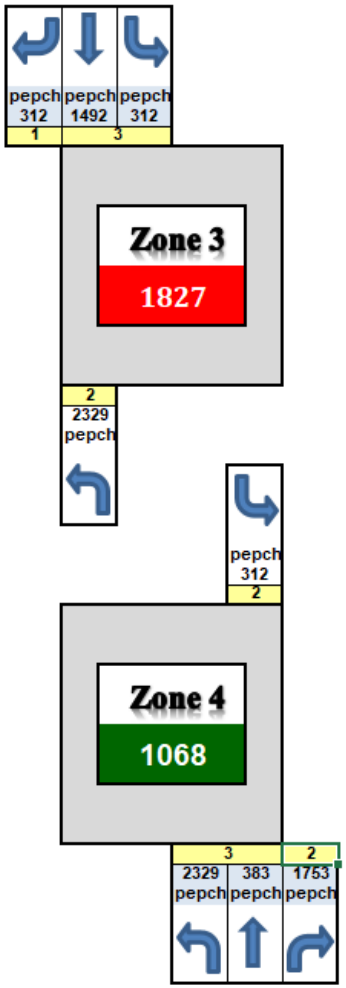




Cap-X Analysis Findings (2046)

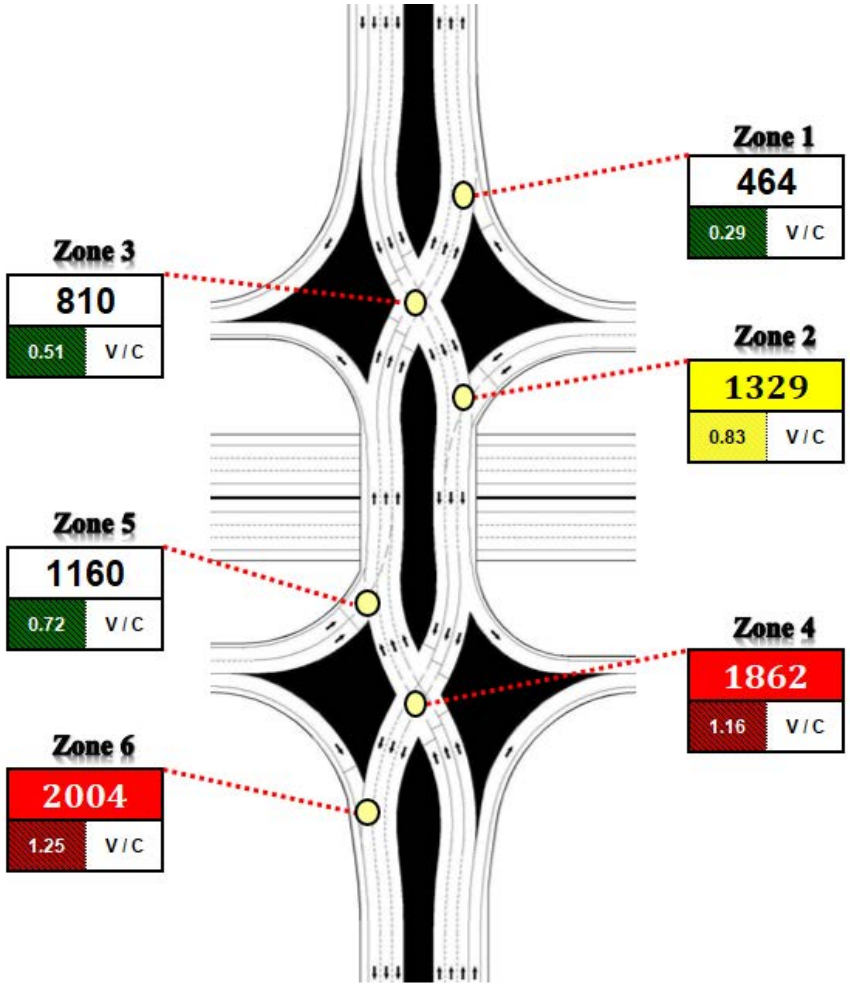
Exit 3 Build Interchange Configuration Options:
Partial Cloverleaf Interchange

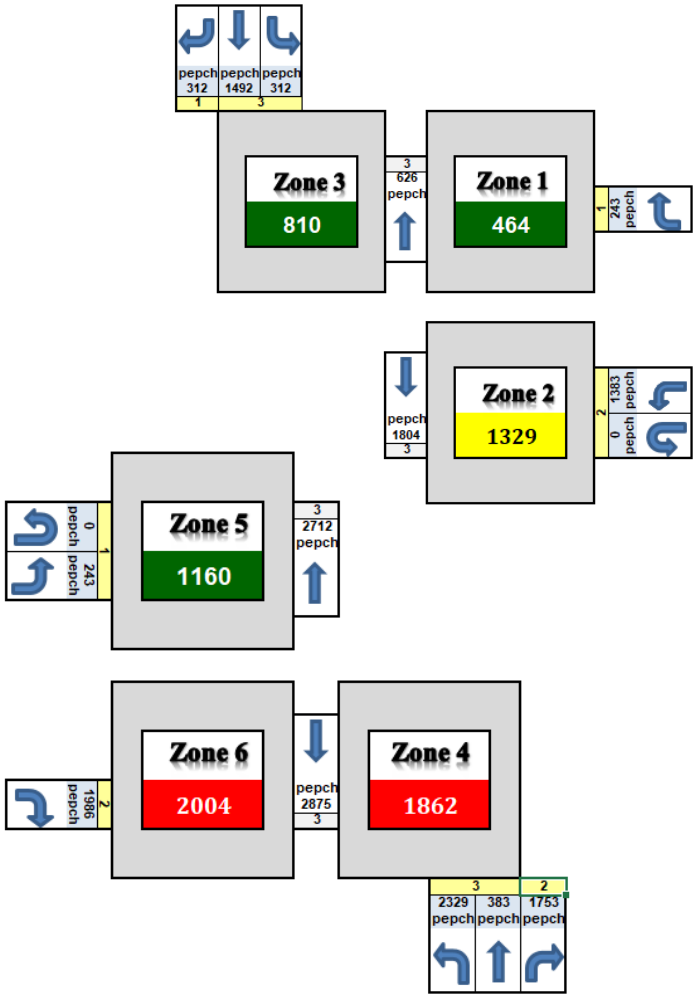




Cap-X Analysis Findings (2046)

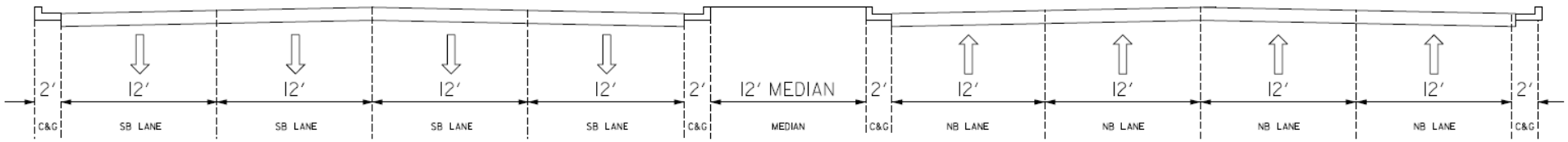
Exit 3 Build Interchange Configuration Options:
Diverging Diamond Interchange





Exit 3 Typical Section

South of I-95

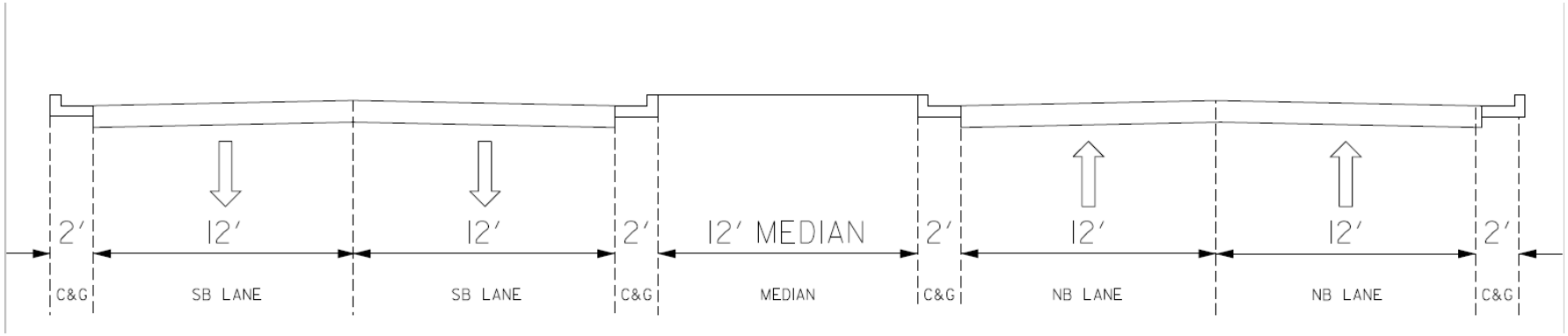


2046 Build Southbound
3,208 vph

2046 Build Northbound
3,995 vph

Exit 3 Typical Section

North of I-95



2046 Build Southbound
800 vph

2046 Build Northbound
578 vph

Weigh Station & Welcome Center

Weigh Station & Welcome Center

Meeting Summary

1. Traffic Volume Development
2. I-95 Widening (6 vs 8 lanes)
3. Need for Exit 3?
4. Interchange Types for Detailed Analysis of Exit 5 and Exit 3
5. Weigh Station & Welcome Center Decision for Analysis

Schedule

No.	Task Name	May	June	July	August	September
2	Development Traffic Analysis					
3	IJR Traffic Analysis					
4	Concept Plan Development					
5	Project Coordination Meeting with CSX Railroad					
6	Work Zone Traffic Control Plans					
7	Conceptual Signing Plans					
8	IJR Report					

Next Steps

1. Receive feedback on Meeting Summary Issues
2. Obtain traffic volume estimates for Welcome Center & Weigh Station to include in HCS analysis
3. Develop interchange concepts
4. Prepare IJR Analysis (Synchro, HCS)

I-95 WIDENING FROM MM 0 – 18 FEASIBILITY REPORT SCOPING MEETING
RECOMMENDATIONS FOR MAINLINE AND OVERPASS BRIDGES

A meeting was held on Monday, July 15 between Preconstruction, Maintenance, and Construction personnel to determine recommendations to provide to the PDT for the following:

- Should existing mainline bridges be widened or replaced.
- Should existing overpasses be jacked or replaced if needed, or not included as part of this project.

Mainline Bridges

The following options were evaluated for replacement/widening.

Option 1 Replace all bridges bringing them up to current design standards.

STRUCTURE #	BRIDGE DESCRIPTION	Replace/Widen
2710009510100	GA/SC Line	Replace
2710009530100	GA/SC Line	Replace
2710009510200	Savannah Overflow	Replace
2710009530200	Savannah Overflow	Replace
2710009510300	Sand Island Swamp	Replace
2710009530300	Sand Island Swamp	Replace
2710009510400	S.C.L. Railroad	Replace
2710009530400	S.C.L. Railroad	Replace
2710009530500	SC 46	under contract
2710009510500	SC 46	under contract
2710009530700	Bahama Swamp	Replace
2710009510700	Bahama Swamp	Replace
2710009530800	Bagshaw Swamp	under contract
2710009510800	Bagshaw Swamp	Replace
2710009530900	Great Swamp	Replace
2710009510900	Great Swamp	Replace

Replace with widened structure: **13** Bridges
Widen existing structure: **0** Bridges

Option 2 Replace all bridges with a condition rating of 5 or less for the deck, superstructure, or substructure. Also include parallel bridge if adjacent structure is being replaced.

		Replace/Widen	
STRUCTURE #	**BRIDGE DESCRIPTION**	**<= 5**	**Parallel**
2710009510100	GA/SC Line	Replace	Replace
2710009530100	GA/SC Line	Replace	Replace
2710009510200	Savannah Overflow	**Widen**	**Widen**
2710009530200	Savannah Overflow	**Widen**	**Widen**
2710009510300	Sand Island Swamp	**Widen**	Replace
2710009530300	Sand Island Swamp	Replace	Replace
2710009510400	S.C.L. Railroad	Replace	Replace
2710009530400	S.C.L. Railroad	Replace	Replace
2710009530500	SC 46	under contract	
2710009510500	SC 46	under contract	
2710009530700	Bahama Swamp	Replace	Replace
2710009510700	Bahama Swamp	Replace	Replace
2710009530800	Bagshaw Swamp	under contract	
2710009510800	Bagshaw Swamp	Replace	Replace
2710009530900	Great Swamp	**Widen**	**Widen**
2710009510900	Great Swamp	**Widen**	**Widen**

Replace with widened structure: **9** Bridges
Widen existing structure: **4** Bridges

Option 3 Only replace bridges with a condition rating of 5 or less for the superstructure or substructure. (This option is in place to consider deck rehabs.)

STRUCTURE #	BRIDGE DESCRIPTION	Replace/Widen
2710009510100	GA/SC Line	Replace
2710009530100	GA/SC Line	Replace
2710009510200	Savannah Overflow	**Widen**
2710009530200	Savannah Overflow	**Widen**
2710009510300	Sand Island Swamp	**Widen**
2710009530300	Sand Island Swamp	Replace
2710009510400	S.C.L. Railroad	Replace
2710009530400	S.C.L. Railroad	Replace
2710009530500	SC 46	under contract
2710009510500	SC 46	under contract
2710009530700	Bahama Swamp	**Widen**
2710009510700	Bahama Swamp	Replace
2710009530800	Bagshaw Swamp	under contract
2710009510800	Bagshaw Swamp	Replace
2710009530900	Great Swamp	**Widen**
2710009510900	Great Swamp	**Widen**

Replace with widened structure: **7** Bridges
Widen existing structure: **6** Bridges

Summary				
STRUCTURE #	**BRIDGE DESCRIPTION**	**Option 1**	**Option 2**	**Option 3**
2710009510100	GA/SC Line	Replace	Replace	Replace
2710009530100	GA/SC Line	Replace	Replace	Replace
2710009510200	Savannah Overflow	Replace	**Widen**	**Widen**
2710009530200	Savannah Overflow	Replace	**Widen**	**Widen**
2710009510300	Sand Island Swamp	Replace	Replace	**Widen**
2710009530300	Sand Island Swamp	Replace	Replace	Replace
2710009510400	S.C.L. Railroad	Replace	Replace	Replace
2710009530400	S.C.L. Railroad	Replace	Replace	Replace
2710009530500	SC 46	under contract		
2710009510500	SC 46	under contract		
2710009530700	Bahama Swamp	Replace	Replace	**Widen**
2710009510700	Bahama Swamp	Replace	Replace	Replace
2710009530800	Bagshaw Swamp	under contract		
2710009510800	Bagshaw Swamp	Replace	Replace	Replace
2710009530900	Great Swamp	Replace	**Widen**	**Widen**
2710009510900	Great Swamp	Replace	**Widen**	**Widen**

Recommendation for Mainline Bridges

- Option 3 should not be considered due to constructability and MOT issues associated with deck replacements on interstate bridges. These same issues are associated with trying to replace one bridge in a set of parallel bridges.

- Option 2 could be considered. Both bridges over the Great Swamp and Savannah Overflow are in overall good condition (condition ratings are 6 or better for all 4 bridges). However, these bridges are currently between 44 and 53 years old. The design life for all four bridges will likely be exceeded prior to or during the construction of this project. This will require additional construction not long after this project is complete.

- Based on the issues stated above, Option 1 is our recommendation to the PDT. By proceeding with Option 1, all bridges are brought up to current specs (including seismic design), costly constructability and MOT issues are reduced, and additional construction will not be required soon after this project is complete.

Overpass Bridges

The following options were evaluated for replacement/jacking.

Option 1 Jack all overpasses with less than 17 feet of clearance and replace any overpass bridge with a condition rating of 5 or less.

STRUCTURE #	BRIDGE DESCRIPTION	Jacking Required	<=5
2770001300100	S-13 Bridge over I-95	yes	Replace
2770003400101	S-34 Bridge over I-95	no	leave in place
2720001700400	US-17 at Exit 5	no	leave in place
2770014100400	S-141 over I-95	yes	Jacking
2720027800600	US 278 at Exit 8	yes	Jacking
2770021000100	S-210 over I-95	yes	Jacking

Option 2 Jack all overpasses with less than 17 feet of clearance. No replacements.

STRUCTURE #	BRIDGE DESCRIPTION	Jacking Required
2770001300100	S-13 Bridge over I-95	yes
2770003400101	S-34 Bridge over I-95	no
2720001700400	US-17 at Exit 5	no
2770014100400	S-141 over I-95	yes
2720027800600	US 278 at Exit 8	yes
2770021000100	S-210 over I-95	yes

Option 3 Jack all bridges with less than 16 feet of clearance. No replacements.

*** All overpass bridges currently have a clearance of 16 ft. or greater.**

Summary				
STRUCTURE #	**BRIDGE DESCRIPTION**	**Option 1**	**Option 2**	**Option 3**
2770001300100	S-13 Bridge over I-95	**Replace**	**Jacking**	no work
2770003400101	S-34 Bridge over I-95	no Jacking	no Jacking	no work
2720001700400	US-17 at Exit 5	no Jacking	no Jacking	no work
2770014100400	S-141 over I-95	**Jacking**	**Jacking**	no work
2720027800600	US 278 at Exit 8	**Jacking**	**Jacking**	no work
2770021000100	S-210 over I-95	**Jacking**	**Jacking**	no work

Recommendation for Overpass Bridges

Our recommendation is to not include overpass jacking in this project, since the existing overpasses meet the minimum for vertical clearance. Below are a few comments provided to justify our recommendation.

- Options 1 and 2 would bring the vertical clearance up to the preferred 17 feet. However, currently all overpasses are well over 16 ft. (min. clearance of 16ft 7in.) and meet the required minimum with some room for pavement overlays in the future.
- Overpass jacking can be a standalone project that can be completed with very little, if any impact to traffic on I-95. These projects could be completed easily at another time.
- Bridge jacking and tying back into existing grade can quickly expand project boundaries, increasing the size of an already large project.

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Oct-02-2019 16:10:22 PM

Parameters: Bridge Serial Number

Bridge Serial Number: 103-0026-0 **County: Effingham** **SUFF. RATING: 77.2**

Location & Geography

Structure ID:	103-0026-0
200 Bridge Information:	6
*6 Feature Intersected:	SAVANNAH RIVER
*7A Route Number Carried:	SR00405
*7B Facility Carried:	I-95 (SBL)
9 Location:	4 MI N OF JCT SR 21
2 GDOT District:	4841500000 - D5 District Five Jesup
*91 Inspection Frequency:	24 Date: Apr-17-2018
92A Fracture Critical Insp. Freq:	0 Date: Feb-01-1901
92B Underwater Insp Freq:	60 Date: Oct-07-2015
92C Other Spc. Insp Freq:	24 Date: Apr-16-2019
* 4 Place Code:	00000
*5A Inventory Route(O/U):	1
5B Route Type:	1 - Interstate
5C Service Designation:	1- Mainline
5D Route Number:	00095
5E Directional Suffix:	0. Not applicable
*16 Latitude:	32 - 14.1738
*17 Longtitude:	81 - 9.0462
98A Border Bridge:	0 98B: GA% 00
99 ID Number:	000140007200100
*100 STRAHNET:	1- The Feature is on an Interstate STRAHNET route.
12 Base Highway Network:	Yes
13A LRS Inventory Route:	1031040500
13B Sub Inventory Route:	0
101 Parallel Structure:	L. Left structure of parallel bridges
*102 Direction of Traffic:	1- One Way
*264 Road Inventory Mile Post:	0.40
*208 Inspection Area:	Area 05
*104 Highway System:	1-Inventory Route is on the NHS
*26 Functional Classification:	1- Rural - Principal 5 - Interstate
*204A Federal Route Type:	I - Interstate.
*204B Federal Route Number:	00951
105 Federal Lands Highway:	0. Not applicable
*110 Truck Route:	1- The Feature is part of the National Network For Trucks
217 Benchmark Elevation:	0000.00
* Location ID No:	103-00405D-112.31N

218 Datum:	0- Not Applicable
*19 Bypass Length:	1
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	6- HS 20 + Mod (2-24,000# Axles @ 4ft Ctrs., when they govern)
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	001
27 Year Constructed:	1976
106 Year Reconstructed:	0
33 Bridge Median:	1-Open
34 Skew:	0
35 Structure Flared:	No
38 Navigation Control:	1- Navigation is controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	1- Lead Chromate Oil Alkyd System. Year : 1976
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	D - Concrete pile. O. Concrete N. Steel-Concrete O. Concrete
259 Pile Encasement:	3
*43A Structure Type Main material:	4-Steel (Continuous)
*43B Structure Type Main Type:	2-Stringer/Multi-Beam or Girder
45 Number of Main Spans:	3
44 Structure Type Approach:	A:5- Prestressed Concrete B: 2- Stringer/Multi-Beam or Girder
46 Number of Approach Spans:	25
226 Bridge Curve:	A: Vertical: YesB: Horizontal: No
111 Pier Protection:	2 - Protection is in place and it is functioning.
107 Deck Structure Type:	1 - C-I-P Portland Cement Concrete - Epoxy Coated Rebars
108A Wearing Surface Type:	1. Concrete
108B Membrane Type:	3. Epoxy
108C Deck Protection:	1. Epoxy Coated Reinforcing
265 Underwater Inspection Area:	2

Signs & Attachments

225 Expansion Joint Type:	09- Modular.
242 Deck Drains:	1- Open Scuppers.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	0.0
238B Curb Material:	0- None.
239A Handrail Left:	9- Concrete New Jersey Type Barrier.
239B Handrail Right:	9- Concrete New Jersey Type Barrier.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	6- Both sides, approach and continuous.
*230B Guardrail Location Direction Fwrd:	2- Right side only.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	3- Forward and Rear.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	65
236 Warning Sign:	No
234 Delineator:	Yes
235 Hazard Boards:	Yes
237A Gas:	00- Not Applicable
237B Water:	00- Not Applicable
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	Yes
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	1- Meets current standards
36B Transition:	2- Inspected feature meets acceptable construction date standards.
36C Approach Guardrail:	2- Inspected feature meets acceptable construction date standards.
36D Approach Guardrail Ends:	2- Inspected feature meets acceptable construction date standards.

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Oct-02-2019 16:10:22 PM

Bridge Serial Number: 103-0026-0

County: Effingham

SUFF. RATING: 77.2

Programming Data

201 Project Number:	I-95-1 (55) 108 CT.2
202 Plans Available:	1- Plans at General Office.
249 Proposed Project Number:	00000000000000000000000000
250A Reconstruction Approval Status:	Yes
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00000
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$11,155
95 Roadway Improvement Cost: (X$1,000)	$1116
96 Total Improvement Cost: (X$1,000)	$16733
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	69495
115 Future AADT Year:	2032

Hydraulic Data

113 Scour Critical:	3. Bridge is Scour Critical;foundations unstable for conditions
216A Water Depth:	23.5
216B Bridge Height:	67
222 Slope Protection:	1
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	3- Steel Piles.
220 Dolphin:	
223A Culvert Cover:	000
223B Culvert Type:	0- Not Applicable
223C Number of Barrels:	0
223D Barrel Width:	0
223E Barrel Height:	0
223F Culvert Length:	0
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	55'
40 Navigation Horizontal Clearance:	150
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:	46330
*30 AADT Year:	2012
109 % Truck Traffic:	1
* 28A Lanes On:	2
*28B Lanes Under:	0
210A Tracks On:	00
210B Tracks Under:	0
* 48 Maximum Span Length:	220
* 49 Structure Length:	2855
51 Bridge Roadway Width:	40.8'
52 Deck Width:	44.2'
* 47 Total Horizontal Clearance:	40.8'
50A Curb / Sidewalk Width Left:	0
50B Curb / Sidewalk Width Right:	0
32 Approach Rdwy. Width:	48'

***229 Approach Roadway**

Rear Shoulder Left: Width:	12	*Right Width:*12	Type: 2 - Asphalt.
Fwd Shoulder: Left Width:	12	*Right Width:*12	Type: 2 - Asphalt.
Rear Pavement: Width:	24	*Type:*2- Asphalt.	
Forward Pavement: Width:	24	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*0	

53 Minimum Vertical Clearance Over Rd:	99' 99"
54A Under Reference Feature:	N- Feature not a highway or railroad.
54B Minimum Clearance Under:	0' 0"

***228 Minimum Vertical Clearance**

228A Actual Odometer Direction:	99'99"
228B Actual Opposing Direction:	99'99"
228C Posted Odometer Direction:	00'00"
228D Posted Opposing Direction:	00'00"
55A Lateral Underclearance Reference:	N- Feature not a highway or railroad.
55B Lateral Underclearance on Right:	0
56 Lateral Underclearance on Left:	0
10A Direction of Travel for Max Min:	0
10B Max Min Vertical Clearance:	99'99"
245A Deck Thickness Main:	8.0
245B Deck Thickness Approach:	8
246 Overlay Thickness:	0

Ratings and Posting

65 Inventory Rating Method:	1-Load Factor (LF)
63 Operating Rating Method:	1-Load Factor (LF)
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	25
64A Operating Type:	2 - HS loading.
64B Operating Rating:	43

231Calculated Loads		**Posting Required**
231A H-Modified:	21	No
231B Type3/Tandem:	30	No
231C Timber:	36	No
231D HS-Modified:	30	No
231E Type 3S2:	40	No
231F Piggyback:	40	No

261 H Inventory Rating:	20
262 H Operating Rating:	33
67 Structural Evaluation:	5
58 Deck Condition:	7 - Good Condition
59 Superstructure Condition:	6 - Satisfactory Condition
* 227 Collision Damage:	
60A Substructure Condition:	6 - Satisfactory Condition
60B Scour Condition:	7 - Good Condition
60C Underwater Condition:	5 - Fair Condition
71 Waterway Adequacy:	8-Equal to present desirable criteria.
61 Channel Protection Cond.:	8-Equal to present desirable criteria.
68 Deck Geometry:	7
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	N - Not Applicable
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads

232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Oct-02-2019 16:12:43 PM

Parameters: Bridge Serial Number

Bridge Serial Number: 103-0025-0 **County: Effingham** **SUFF. RATING: 81.3**

Location & Geography

Structure ID:	103-0025-0
200 Bridge Information:	6
*6 Feature Intersected:	SAVANNAH RIVER
*7A Route Number Carried:	SR00405
*7B Facility Carried:	I-95 (NBL)
9 Location:	4 MI N OF JCT SR 21
2 GDOT District:	4841500000 - D5 District Five Jesup
*91 Inspection Frequency:	24 Date: Apr-17-2018
92A Fracture Critical Insp. Freq:	0 Date: Feb-01-1901
92B Underwater Insp Freq:	60 Date: Oct-07-2015
92C Other Spc. Insp Freq:	24 Date: Apr-16-2019
* 4 Place Code:	00000
*5A Inventory Route(O/U):	1
5B Route Type:	1 - Interstate
5C Service Designation:	1- Mainline
5D Route Number:	00095
5E Directional Suffix:	0. Not applicable
*16 Latitude:	32 - 14.1606
*17 Longtitude:	81 - 9.0360
98A Border Bridge:	0 98B: GA% 00
99 ID Number:	002710009510100
*100 STRAHNET:	1- The Feature is on an Interstate STRAHNET route.
12 Base Highway Network:	Yes
13A LRS Inventory Route:	1031040500
13B Sub Inventory Route:	0
101 Parallel Structure:	R. Right structure of parallel bridges
*102 Direction of Traffic:	1- One Way
*264 Road Inventory Mile Post:	0.39
*208 Inspection Area:	Area 05
*104 Highway System:	1-Inventory Route is on the NHS
*26 Functional Classification:	1- Rural - Principal 5 - Interstate
*204A Federal Route Type:	I - Interstate.
*204B Federal Route Number:	00951
105 Federal Lands Highway:	0. Not applicable
*110 Truck Route:	1- The Feature is part of the National Network For Trucks
217 Benchmark Elevation:	0000.00
* Location ID No:	103-00405D-112.30N

218 Datum:	0- Not Applicable
*19 Bypass Length:	1
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	6- HS 20 + Mod (2-24,000# Axles @ 4ft Ctrs., when they govern)
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	001
27 Year Constructed:	1976
106 Year Reconstructed:	0
33 Bridge Median:	1-Open
34 Skew:	0
35 Structure Flared:	No
38 Navigation Control:	1- Navigation is controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	0- Not Applicable. Year : 1976
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	D - Concrete pile. O. Concrete N. Steel-Concrete O. Concrete
259 Pile Encasement:	3
*43A Structure Type Main material:	4-Steel (Continuous)
*43B Structure Type Main Type:	2-Stringer/Multi-Beam or Girder
45 Number of Main Spans:	3
44 Structure Type Approach:	A:5- Prestressed Concrete B: 2- Stringer/Multi-Beam or Girder
46 Number of Approach Spans:	25
226 Bridge Curve:	A: Vertical: YesB: Horizontal: No
111 Pier Protection:	2 - Protection is in place and it is functioning.
107 Deck Structure Type:	1 - C-I-P Portland Cement Concrete - Epoxy Coated Rebars
108A Wearing Surface Type:	1. Concrete
108B Membrane Type:	3. Epoxy
108C Deck Protection:	1. Epoxy Coated Reinforcing
265 Underwater Inspection Area:	2

Signs & Attachments

225 Expansion Joint Type:	09- Modular.
242 Deck Drains:	1- Open Scuppers.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	0.0
238B Curb Material:	0- None.
239A Handrail Left:	9- Concrete New Jersey Type Barrier.
239B Handrail Right:	9- Concrete New Jersey Type Barrier.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	6- Both sides, approach and continuous.
*230B Guardrail Location Direction Fwrd:	6- Both sides, approach and continuous.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	3- Forward and Rear.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	65
236 Warning Sign:	No
234 Delineator:	Yes
235 Hazard Boards:	No
237A Gas:	00- Not Applicable
237B Water:	00- Not Applicable
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	Yes
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	1- Meets current standards
36B Transition:	1- Meets current standards
36C Approach Guardrail:	1- Meets current standards
36D Approach Guardrail Ends:	1- Meets current standards

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Oct-02-2019 16:12:43 PM

Bridge Serial Number: 103-0025-0

County: Effingham

SUFF. RATING: 81.3

Programming Data

201 Project Number:	I-95-1 (55) 108 CT.2
202 Plans Available:	1- Plans at General Office.
249 Proposed Project Number:	000000000000000000000000
250A Reconstruction Approval Status:	Yes
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00000
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$11,155
95 Roadway Improvement Cost: (X$1,000)	$1116
96 Total Improvement Cost: (X$1,000)	$16733
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	69495
115 Future AADT Year:	2032

Hydraulic Data

113 Scour Critical:	3. Bridge is Scour Critical;foundations unstable for conditions
216A Water Depth:	22.5
216B Bridge Height:	66.5
222 Slope Protection:	1
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	3- Steel Piles.
220 Dolphin:	
223A Culvert Cover:	000
223B Culvert Type:	0- Not Applicable
223C Number of Barrels:	0
223D Barrel Width:	0
223E Barrel Height:	0
223F Culvert Length:	0
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	55'
40 Navigation Horizontal Clearance:	150
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:	46330
*30 AADT Year:	2012
109 % Truck Traffic:	1
* 28A Lanes On:	2
*28B Lanes Under:	0
210A Tracks On:	00
210B Tracks Under:	0
* 48 Maximum Span Length:	220
* 49 Structure Length:	2855
51 Bridge Roadway Width:	40.8'
52 Deck Width:	44.2'
* 47 Total Horizontal Clearance:	40.8'
50A Curb / Sidewalk Width Left:	0
50B Curb / Sidewalk Width Right:	0
32 Approach Rdwy. Width:	42'

***229 Approach Roadway**

Rear Shoulder Left: Width:	12	*Right Width:*6	Type: 2 - Asphalt.
Fwd Shoulder: Left Width:	12	*Right Width:*6	Type: 2 - Asphalt.
Rear Pavement: Width:	24	*Type:*2- Asphalt.	
Forward Pavement: Width:	24	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*0	

53 Minimum Vertical Clearance Over Rd:	99' 99"
54A Under Reference Feature:	N- Feature not a highway or railroad.
54B Minimum Clearance Under:	0' 0"

***228 Minimum Vertical Clearance**

228A Actual Odometer Direction:	99'99"
228B Actual Opposing Direction:	99'99"
228C Posted Odometer Direction:	00'00"
228D Posted Opposing Direction:	00'00"
55A Lateral Underclearance Reference:	N- Feature not a highway or railroad.
55B Lateral Underclearance on Right:	0
56 Lateral Underclearance on Left:	0
10A Direction of Travel for Max Min:	0
10B Max Min Vertical Clearance:	99'99"
245A Deck Thickness Main:	8.0
245B Deck Thickness Approach:	8
246 Overlay Thickness:	0

Ratings and Posting

65 Inventory Rating Method:	1-Load Factor (LF)
63 Operating Rating Method:	1-Load Factor (LF)
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	31
64A Operating Type:	2 - HS loading.
64B Operating Rating:	59

231Calculated Loads		**Posting Required**
231A H-Modified:	21	No
231B Type3/Tandem:	30	No
231C Timber:	36	No
231D HS-Modified:	30	No
231E Type 3S2:	40	No
231F Piggyback:	40	No

261 H Inventory Rating:	20
262 H Operating Rating:	34
67 Structural Evaluation:	5
58 Deck Condition:	7 - Good Condition
59 Superstructure Condition:	6 - Satisfactory Condition
* 227 Collision Damage:	
60A Substructure Condition:	5 - Fair Condition
60B Scour Condition:	7 - Good Condition
60C Underwater Condition:	5 - Fair Condition
71 Waterway Adequacy:	8-Equal to present desirable criteria.
61 Channel Protection Cond.:	8-Equal to present desirable criteria.
68 Deck Geometry:	7
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	N - Not Applicable
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads

232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

STATE AID PROJ. No.	REGION No.	STATE	FEDERAL AID PROJECT No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
	3	GA.	I-95-1(21)108	71	1	69

GEORGIA
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED

SAVANNAH, GA. TO HARDEEVILLE, S.C. INTERSTATE ROAD

CHATHAM, EFFINGHAM COS. GA. & JASPER CO. S.C.

LIMITED ACCESS PROJECT

FEDERAL AID PROJECT

EMPI-95-1(45)108

FEDERAL ROUTE #

STATE ROUTE #

INTERSTATE ROUTE # 95

PREPARED BY: Donald E. Landgraebe C.E. II

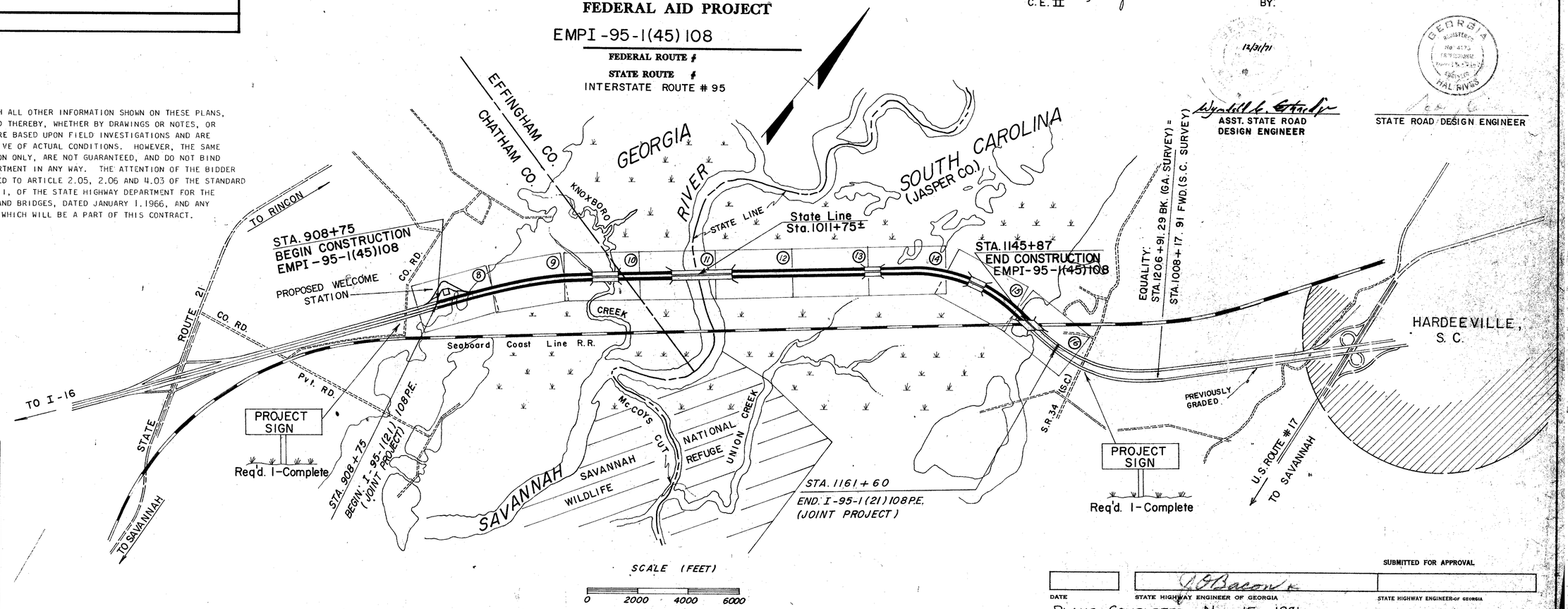
RECOMMENDED FOR SUBMISSION BY: 12/31/71 Wyndell L. Strickler ASST. STATE ROAD DESIGN ENGINEER

SUBMITTED BY: GEORGIA REGISTERED No. 4173 PROFESSIONAL ENGINEER HAL RIVERS STATE ROAD DESIGN ENGINEER

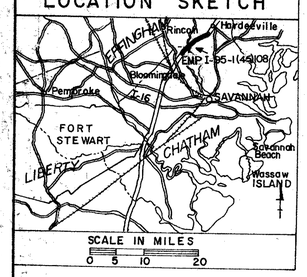
INDEX

SHEET	DESCRIPTION
1	COVER
2	REVISION SUMMARY
3	SCOPE OF WORK
4-5	TYPICAL SECTIONS
6	SUMMARY SHEET
7	DETAILED ESTIMATE
8-18	PLAN AND PROFILE - MAINLINE
19-23A	CONSTRUCTION DETAILS
24	POSSIBLE BORROW AREA SITES
25	POSSIBLE WASTE AREA SITES
26	WASTE AREA LOCATION SKETCHES
27-28	DRAINAGE AREA MAP
29	GA. STD. 1030-D PIPE CULVERTS (FEB. 1971)
30	GA. STD. 9003 CONSTRUCTION DETAILS OF MARKERS (10-6-59)
31	GA. STD. 9028-B (MOD) SUPERELEVATION AND WIDENING FOR CIRCULAR CURVES (SEPT. 1971)
32	GA. STD. 9044-A CONSTRUCTION IDENTIFICATION SIGNS (10-3-67)
33	GA. STD. 9046 (MOD) EARTH SPUR DIKE (8-6-71)
34	DRAINAGE CROSS SECTIONS
35-69	EARTHWORK CROSS SECTIONS.
69	TOTAL SHEETS

NOTE: THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED, AND DO NOT BIND THE STATE HIGHWAY DEPARTMENT IN ANY WAY. THE ATTENTION OF THE BIDDER IS SPECIFICALLY DIRECTED TO ARTICLE 2.05, 2.06 AND 4.03 OF THE STANDARD SPECIFICATIONS, VOLUME I, OF THE STATE HIGHWAY DEPARTMENT FOR THE CONSTRUCTION OF ROADS AND BRIDGES, DATED JANUARY 1.1966, AND ANY MODIFICATIONS THEREOF, WHICH WILL BE A PART OF THIS CONTRACT.



LOCATION SKETCH



NOTE: ALL WORK TO BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE STATE HIGHWAY DEPARTMENT OF GEORGIA, DATED JAN 1, 1966.

APPROVED BY FED. HIGHWAY ADMINISTRATION AUG. 30, 1966 AND REVISIONS SUBMITTED FOR PROJECT.

JOINT GA.-S.C. PROJECT

I-95-1(1)	R/W (S.C.)
I-95-1(20)101	R/W (GA.)
I-95-1(21)108	P.E.
EMPI-95-1(45)108	CONST'N

A.D.T. = **16160** 1972
A.D.T. = **31474** 1992
D = **60%**
D.H.V = **3776**
T = **11%**
24 HR. T = **SU 3.3%, COMB 17%**
SPEED DESIGN = 70/80 MPH.

LENGTH OF PROJECT	MILES
NET LENGTH OF ROADWAY	3.535
NET LENGTH OF BRIDGES	0.000
NET LENGTH OF PROJECT	3.535
NET LENGTH OF EXCEPTIONS	0.955
GROSS LENGTH OF PROJECT	4.490

SUBMITTED FOR APPROVAL

DATE — STATE HIGHWAY ENGINEER OF GEORGIA (J. E. Bacon) — STATE HIGHWAY ENGINEER OF GEORGIA

PLANS COMPLETED Nov. 15, 1971
PLANS REVISED Nov. 16, 1971
PLANS REVISED Dec. 8, 1971

CHAIRMAN-STATE HIGHWAY DEPARTMENT OF GEORGIA
APPROVED DATE

DIVISION ENGINEER
FEDERAL HIGHWAY ADMINISTRATION
DEPARTMENT OF TRANSPORTATION

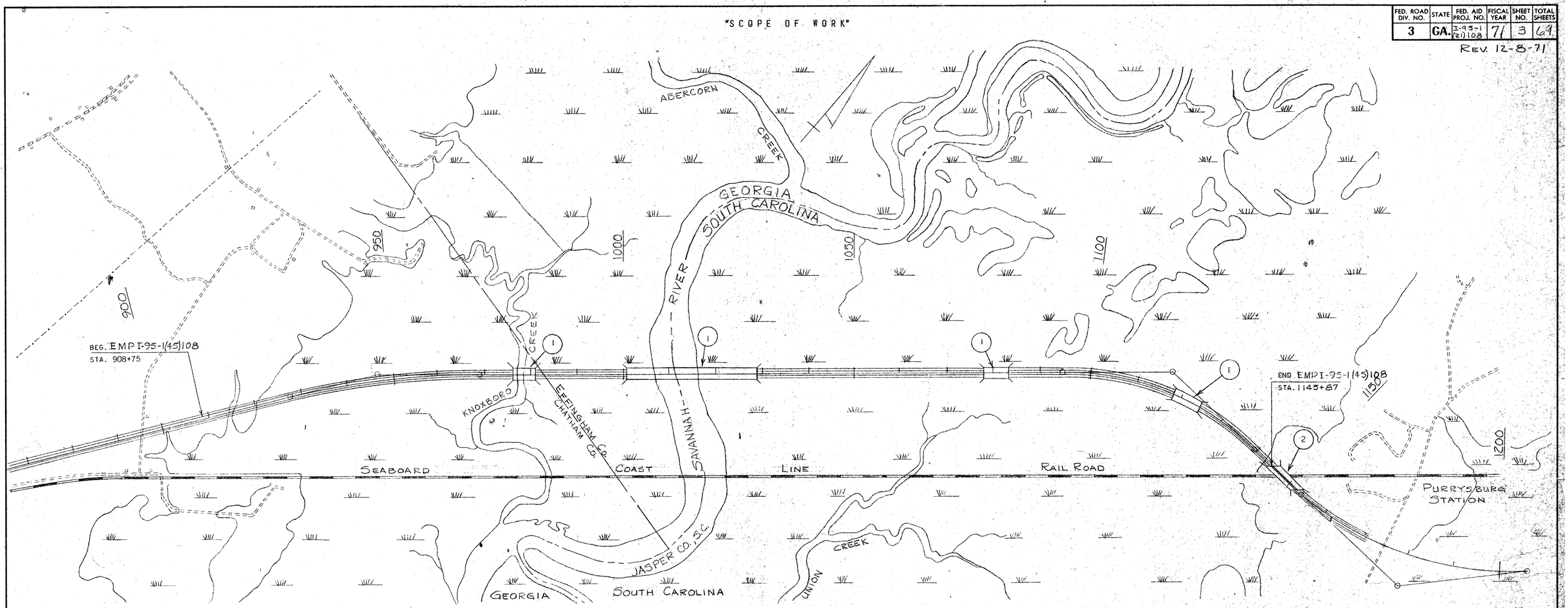
K+E DE 7045 17 8153

CHAT.- EFFING.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	GA.	I-95-1 (21) 108	71	3	69

REV. 12-8-71

"SCOPE OF WORK"



SCALE: 1" = 1000'

NOTES:

ALL EMBANKMENTS FOR THIS PROJECT ARE TO BE LET TO CONTRACT AS "IN PLACE EMBANKMENT, INCLUDING MATERIAL", NEAT MEASURE (NO SHRINKAGE)

REQUIRED SURCHARGE HEIGHTS ARE SHOWN ON PLANS. THERE IS AN 18 MONTH WAITING PERIOD THROUGH OUT THIS PROJECT.

SEE ABOVE SKETCH FOR NUMBERED LOCATIONS WHERE NOTES APPLY:

1. BRIDGES TO BE LET ON FUTURE PROJECT
2. BRIDGES TO BE BUILT BY S. CAROLINA.

LENGTH OF PROJECT

STATION TO STATION	ROADWAY LIN. FT.	BRIDGES* LIN. FT.	EQUALITIES AND EXCEPTIONS
908+75 TO 970+70	6195		
970+70 TO 981+50			1080
981+50 TO 1000+89	1939		
1000+89 TO 1028+92			2803
1028+92 TO 1078+40	4948		
1078+40 TO 1083+60			520
1083+60 TO 1119+00	3540		
1119+00 TO 1125+40			640
1125+40 TO 1145+87	2047		
TOTAL	18669		5043
		MILES	
NET LENGTH OF ROADWAY		3.535	
NET LENGTH OF BRIDGES		0.000	
NET LENGTH OF PROJECT		3.535	
NET LENGTH OF EXCEPTIONS		0.955	
GROSS LENGTH OF PROJECT		4.490	

*BRIDGES TO BE LET ON FUTURE CONTRACT

Project Delivery Selection Workshop Summary

Workshop Summary	
Project Name:	US 278 P038450
Workshop Date:	
Workshop Location:	
Facilitator:	Michael Hood
Delivery Method Selected:	

Workshop Participants	
Name	**Email**
Michael Hood	HoodML@scdot.org

Project Delivery Selection Matrix

Overview

This document provides a formal approach for selecting project delivery methods for highway projects. The information below lists the project delivery methods followed by an outline of the process, instructions, and evaluation worksheets for use by SCDOT staff and project team members. By using these forms, a brief Project Delivery Selection Report can be generated for each individual project. The primary objectives of this tool are:

- Present a structured approach to making project delivery decisions;
- Assist in determining if there is a dominant or optimal choice of a delivery method; and
- Provide documentation of the selection decision.

Background

The project delivery method is the process by which a construction project is comprehensively designed and constructed including project scope definition, organization of designers, constructors and various consultants, sequencing of design and construction operations, execution of design and construction, and closeout and start-up. Thus, the different project delivery methods are distinguished by the manner in which contracts between the agency, designers and builders are formed and the technical relationships that evolve between each party inside those contracts. Currently, there are two types of project delivery systems available for publicly funded transportation projects, Design-Bid-Build (DBB) and Design-Build (DB). No single project delivery method is appropriate for every project. Each project should be examined individually to determine how it aligns with the attributes of each available delivery method.

Primary delivery methods

Design-Bid-Build is the traditional project delivery method in which an agency designs, or retains a designer to furnish complete design services, and then advertises and awards a separate construction contract based on the designer's completed construction documents. In DBB, the agency "owns" the details of design during construction and as a result, is responsible for the cost of any errors or omissions encountered in construction.

Design-Build is a project delivery method in which the agency procures both design and construction services in the same contract from a single, legal entity referred to as the design-builder. The method typically uses Request for Qualifications (RFQ)/Request for Proposals (RFP) procedures rather than the DBB Invitation for Bids procedures. The design-builder controls the details of design and is responsible for the cost of any errors or omissions encountered in construction.

Pre-workshop Tasks

Before conducting the selection workshop, a few tasks can be completed by the workshop participants. Preparing for the workshop prior to conducting it will result in a much more concise and informative session. It is advised that participants review all known project information, goals, risks, and constraints prior to the workshop. It is critical to complete the *Project Definition Report* (PDR) before conducting the workshop. Completing the PDR will shorten the time needed to review the project and allows the workshop team to move right into the selection process.

Project Delivery Selection Process

The process is shown in the outline below and a flowchart on the next page. It consists of individual steps to complete the entire process. The steps should be followed in sequential order.

STAGE I – Develop Project Definition Report (PDR) including Project Attributes, Goals, and Constraints

A. Project Description/Goals/Constraints
   1. Describe project attributes
      a. P&N: The purpose of this project is to improve capacity and mobility on I-95 from MM 0 to approximately MM 18 due to a projected increase in traffic demand and volume of freight. Provide additional truck parking due to the lack of truck parking on this section of interstate. Operational and structural deficiencies on interchanges and bridges will be addressed within the corridor. In 2045, the mainline will perform between a LOS of D and F. This corridor ranks among the worst of the rural interstate in freight mobility with a score of 0.9 on a 1 scale.
      b. Scope:
         i. Address mainline geometric issues.
         ii. Avoid pursuing a design exception at the sag at MM1.5
         iii. Evaluate need for additional truck parking and converting truck weigh station to truck parking. (Keep for now until QT is approved)
         iv. Expand ITS
         v. Review options for increasing capacity
         vi. Replace all bridges on mainline and account for 8 lanes
         vii. Retain all overpasses unless the interchange alteration necessitates replacing or the need for more shoulder width exists
         viii. Do not replace or jack any overpasses
         ix. Exceptions for geometric/operational design change
         x. If a bridge is jacked, perform necessary maintenance and rehab on the bridge in this contract.
         xi. Replacements will account for 8 lane width
         xii. Increase capacity at exit 8
         xiii. Address geometric/operational deficiencies at Exit 5 and 18
         xiv. Eliminate ramp access from frontage roads
         xv. Exit 5, relocate frontage road
         xvi. Exit 18, cul-du-sac frontage road
         xvii. All interchange ramps will be improved as necessary and paved based on the May 6, 2010, memo Resurfacing/Rehabilitation of Interstate Ramps.
         xviii. Improve pavement conditions on existing and new lanes based on Pavement Design from the Lab.
         xix. Pave all truck parking areas, welcome centers, and weigh stations
         xx. All crosslines will be inspected and addressed or redesigned as needed based on the inspection.
         xxi. Follow the MASH transition plan in PCDM-14 concerning the existing guardrail
         xxii. Replace fence damaged due to clear zone tree removal.
         xxiii. All trees will be removed from the full clear zone based on clear zone charts for mainline.
         xxiv. All trees will be removed inside of loops and ramps. Tree removal outside of the loops and ramps will follow the clear zone charts.
         xxv. Offset the frontage road entrances from the interstate ramps per the ARMS manual for all interchanges.
   2. Set project goals
      a. Improve Capacity
         i. LOS C or better
      b. Maintain or Improve Truck Travel Time Reliability
         i. Truck Travel Rate of 1.45 (from TAMP) or better
      c. Address Interchange Deficiencies

        i. LOS C or better
        ii. Remove interconnectivity with side roads/frontage roads on ramps
    d. Improve Safety
        i. Improve crash rates from existing
    e. Address Bridge Deficiencies
        i. Improve Condition to 7 or better for all bridges
    f. Address Pavement Deficiencies
        i. Improve structure number, PQI, and ride-ability from existing

3. Determine project dependent constraints
    a. Floodplain impacts, FEMA regulated
    b. Wetland Impacts, JD required
    c. I95 crossing over RR construction timing
    d. Truck volumes limit detour routes
    e. Maintain truck reliability
4. Identify known or anticipated project risks
    a. Potential Exit 3 addition from non-governmental entity
    b. Funding may only be available for MM0-8
    c. Construction issues around existing piles at overpasses
    d. Construction phasing issues at Georgia line
        i. Tie down in Georgia
        ii. Tie down and potential shift in alignment in SC
    e. Property Owner resistance to eliminating frontage road access to interstate ramps (Exit 5 and 18)
    f. Effects of construction on interconnected Savannah River floodplain to the Savannah River National Wildlife Refuge
    g. Timeliness of FEMA approvals
    h. One approved mitigation bank with available but limited credits. Permittee-responsible mitigation plan is possible.
    i. 4(f) is possible if RW is required from Purrysburg Road to the Savannah River.
    j. USTs possible outside of RW at interchanges.
    k. Noise barriers possible in the Hardeeville area due to neighborhoods close proximity to the interstate with some of the neighborhoods being low-income/minority.
5. Prepare Screening Level Cost Estimate
    a. $600M (Original Planning Level Estimate prior to Feasibility Report)

STAGE II – Primary Factor Evaluation

A. Assess the primary factors (these factors most often determine the selection).
    1. Delivery Schedule
        A. Construction Letting 2023
    2. Complexity & Innovation
        A. Potential replacement of dual bridges over the Savannah River
        B. Coordination with GDOT to replace/widen the Savannah River bridges
        C. Numerous overflow structures in wetlands
        D. Coordination with the railroad to widen the I95 crossing structure
        E. Widening of all mainline structures
        F. Impacts due to Exit 8 reconfiguration, businesses adjacent to the existing interchange
        G. Retention of overpasses limiting construction methods and work area
        H. Limit adverse affects to truck reliability
        I. EA anticipated
    3. Level of Design
        A. Planning level work complete at this time. Precon intends to obtain a turnkey contract unless DB wants to pursue the project. If DB wants the project, then Precon will pursue a DB prep package contract.
    4. Cost

B. If the primary factors indicate there is ***not*** a clear choice of the delivery method, then:
    1. Perform an initial risk assessment for the desired delivery method to ensure that risks can be properly allocated and managed, and

STAGE III – Secondary Factor Evaluation

A. Perform a pass/fail analysis of the secondary factors to ensure that they are not relevant to the decision.
    1. Staff Experience/Availability (Agency)
        a. Lack of availability to perform all phases of design
    2. Level of Oversight and Control
        a. Construction input up front due to the replacements of all of the mainline bridges would be desirable
    3. Competition and Contractor Experience
B. If steps 1, 2 & 3 above do not result in clear determination of the method of delivery then perform a more rigorous evaluation of all eight factors against the two potential methods of delivery (DBB, DB).

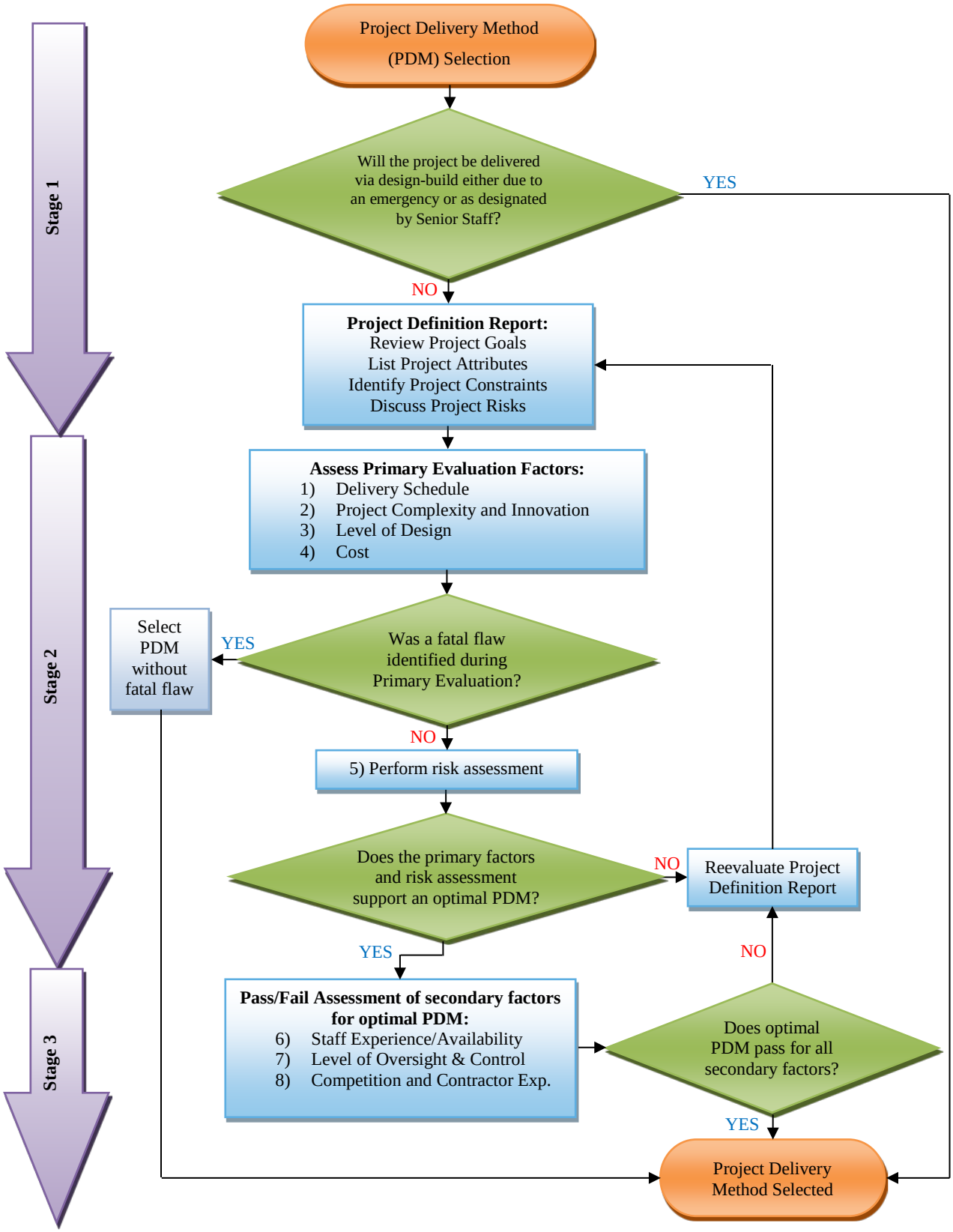


Figure 2: Flowchart of the Project Delivery Selection Matrix

Project Delivery Selection Matrix Worksheets and Forms

The following forms and appendices are included to facilitate this process.

Project delivery selection summary form

The Project Delivery Selection Summary summarizes the assessment of the eight selection factors for the three delivery methods. The form is qualitatively scored using the rating provided in the table below. The form also includes a section for comments and conclusions. The completed Project Delivery Selection Summary should provide an executive summary of the key reasons for the selection of the method of delivery**.**

Rating Key	
++	Most appropriate delivery method
+	Appropriate delivery method
–	Least appropriate delivery method
X	Fatal Flaw (discontinue evaluation of this method)
NA	Factor not applicable or not relevant to the selection

Conclusions and Comments form

This form can be used by the project team for additional documentation of the process. In particular, it can be used to elaborate the evaluation of the *Assessment of Risk* factor.

Project delivery methods selection factor opportunities / obstacles form

These forms are used to summarize the assessments by the project team of the opportunities and obstacles associated with each delivery method relative to each of the eight Selection Factors. The bottom of each form allows for a qualitative conclusion using the same notation as described above. Those conclusions then are transferred to the **Project Delivery Selection Summary.**

Project delivery methods opportunities / obstacles checklists

These forms provide the project team with direction concerning typical delivery method opportunities and obstacles associated with each of the eight Selection Factors. However, these checklists include general information and are not an all-inclusive checklist. Use the checklists as a supplement to developing project specific opportunities and obstacles.

Risk assessment guidance form

Because of the unique nature of Selection Factor 5, *Assessment of Risk*, this guidance section provides the project team with additional assistance for evaluation of the risk factor including: Typical Transportation Project Risks; a General Project Risks Checklist; and a Risk Opportunities/Obstacles Checklist.

Project Delivery Selection Summary

Determine the factors that should be considered in the project delivery selection, discuss the opportunities and obstacles related to each factor, and document the discussion on the following pages. Then complete the summary below.

PROJECT DELIVERY METHOD OPPORTUNITY/OBSTACLE SUMMARY		
	DBB	**DB**
Primary Selection Factors		
1. Delivery Schedule	++	+
2. Project Complexity & Innovation	-	++
3. Level of Design	+	+
4. Cost	+	++
5. Perform Initial Risk Assessment	++	+
Secondary Selection Factors		
6. Staff Experience/Availability (Agency)	+	+
7.Level of Oversight and Control	++	-
8. Competition and Contractor Experience	+	+

Rating Key		DBB	DB
++	Most appropriate delivery method	3	2
+	Appropriate delivery method	4	5
–	Least appropriate delivery method	1	1
X	Fatal Flaw (discontinue evaluation of this method)	0	0
NA	Factor not applicable or not relevant to the selection	0	0

Project Delivery Selection Summary Conclusions and Comments

Schedule:

- DB shifts the schedule risk to the DB team and allows industry input into design and schedule. Undefined events or conditions found after procurement, but during design can impact schedule and cost. DB also requires agency and stakeholder commitments to an expeditious review of design, which could present a challenge in this project. +
- DBB projects can more easily be shelved, which is an advantage due to the lack of definite funding and multiple segmented components of this project. DBB allows elements of design to be advanced prior to permitting, construction, etc. DBB allows time to communicate/discuss design with stakeholders. In DBB, design and construction schedules can be unrealistic due to lack of industry input. ++

Innovation:

- DBB doesn't allow for contractor input to optimize costs and limits flexibility for integrated design and construction solutions. -
- DB allows the design and contractor to collaborate through early team integration to optimize means and methods and enhance innovation. Constructability and VE are inherent in the DB process. There are also opportunities for innovation through draft RFP, best value, and ATC processes. However, technical requirements need to be well defined for complex designs to achieve the desired solutions. ++

Level of Design:

- In DB, the contractor is involved early in the design process and will improve constructability and innovation. Design is advanced by the agency to the level necessary to precisely define the contract requirements and properly allocate risk. However, the RFP must be very carefully developed to have clear definitions and requirements, because it is the basis for the contract. Also, DB offers less agency control over the design. +
- DBB allows the agency to have complete control over the design, which could be especially important when coordinating with major stakeholders and government agencies on this project. The project/scope can be developed or refined through the design process. However, DBB minimizes competitive innovation opportunities. +

Cost:

- DB allows contractor input into design that should moderate cost. DB collaboration and ATCs can provide a cost-efficient response to project goals. DB also allows a variable scope to match a fixed budget. However, risks related to design-build, lump sum cost without 100% design complete can compromise the financial success of the project. ++
- DBB can increase the certainty of cost estimates due to a higher level of design completion, but the cost reductions due to contractor innovation and constructability are more difficult to obtain. +

Risk:

- DBB allows the opportunity to avoid or mitigate risk through complete design. Risks related to environmental, railroads, & third party involvement are best resolved before procurement. Utilities and ROW best allocated to the agency and mostly addressed prior to procurement to minimize potential for claim. The project can be shelved while resolving risks. In DBB, the agency accepts risks associated with project and project unknowns. There is also limited industry input in contract risk allocation. ++
- DB allows for industry review of risk allocation through a draft RFP and ATC processes. Designers and contractors can work toward innovative solutions to, or avoidance of, unknowns. The contractor will also help identify risks related to environmental, ROW, and utilities (particularly minimizing stream impacts, the greenway, and utilities). The agency should consider the risks associated with agreements when design is not completed. Also, contractors may avoid risks or drive consultants to decrease cost at risk to quality. +

Staff:

- DB requires less agency staff due to its sole source nature. +
- Agency, contractors, and consultants have high level of experience with DBB. However, staff's responsibilities are spread out over a longer design period with DBB. +

Level of Control:

- DBB offers the maximum control over design due to a linear design and construction process. There is an increased likelihood of claims due to agency design responsibility. ++
- DB would allow input from construction to enhance constructability and innovation. However, DB offers less agency control over design. Control over design relies on proper development of technical requirements, and can require a high level of design oversight. –

Competition and Contractor Experience:

- DBB promotes a high level of competition in the marketplace and opens construction to all reasonably qualified bidders. However, there is no contractor input into the process, and DBB limits the ability to select a contractor based on qualifications. +
- The need for DB qualifications can limit competition. However, DB allows for a balance of qualifications and cost in design-builder procurement. DB also increases the opportunity for innovation possibilities due to the diverse project team. +

SUMMARY:

Project scope has expanded from single bridge replacement to a capacity improvement project with a single bridge replacement, 3 widened bridges and a possible interchange for access to National Wildlife Refuge on the island between pairs of bridges. BR funding has been identified for replacement but funding for widening and interchange is being pursued by Beaufort County. The uncertainty of funding increases the risk for significant scope change on the project making DBB an appropriate delivery method to control project scope. DB could be utilized and allows more opportunity for innovation but reduces control over final design. It was also noted there are a significant number of stakeholders on the project which could further elevate risks whit the loss of control associated with DB.

Project Delivery Selection Matrix Primary Factors

1) Delivery Schedule

Delivery schedule is the overall project schedule from scoping through design, construction and opening to the public. Assess time considerations for starting the project or receiving dedicated funding and assess project completion importance.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☐ Schedule is more predictable and more manageable ☐ Milestones can be easier to define ☒ Projects can more easily be "shelved" ☐ Shortest procurement period ☒ Elements of design can be advanced prior to permitting, construction, etc. ☒ Time to communicate/discuss design with stakeholders	☐ Requires time to perform a linear design-bid-construction process ☒ Design and construction schedules can be unrealistic due to lack industry input ☐ Errors in design lead to change orders and schedule delays ☐ Low bid selection may lead to potential delays and other adverse outcomes.
DESIGN-BUILD	
Opportunities	**Obstacles**
☐ Potential to accelerate schedule through parallel design-build process ☒ Shifting schedule risk to DB team ☐ Encumbers construction funds more quickly ☒ Industry input into design and schedule ☐ Fewer chances for disputes between agency and design-builders ☐ More efficient procurement of long-lead items ☐ Ability to start construction before entire design, ROW, etc. is complete (i.e., phased design) ☐ Allows innovation in resource loading and scheduling by DB team	☐ Request for proposal development and procurement can be intensive ☒ Undefined events or conditions found after procurement, but during design can impact schedule and cost ☐ Time required to define technical requirements and expectations through RFP development can be intensive ☐ Time required to gain acceptance of quality program ☒ Requires agency and stakeholder commitments to an expeditious review of design

Notes:

- DB shifts the schedule risk to the DB team and allows industry input into design and schedule. Undefined events or conditions found after procurement, but during design can impact schedule and cost. DB also requires agency and stakeholder commitments to an expeditious review of design, which could present a challenge in this project. +
- DBB projects can more easily be shelved, which is an advantage due to the lack of definite funding and multiple segmented components of this project. DBB allows elements of design to be advanced prior to permitting, construction, etc. DBB allows time to communicate/discuss design with stakeholders. In DBB, design and construction schedules can be unrealistic due to lack of industry input. ++

2) Project Complexity and Innovation

Project complexity and innovation is the potential applicability of new designs or processes to resolve complex technical issues.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☐ Agencies can have more control of design of complex projects ☐ Agency and consultant expertise can select innovation independently of contractor abilities ☐ Opportunities for value engineering studies during design, more time for design solutions ☐ Aids in consistency and maintainability ☐ Full control in selection of design expertise ☐ Complex design can be resolved and competitively bid	☐ Innovations can add cost or time and restrain contractor's benefits ☒ No contractor input to optimize costs ☒ Limited flexibility for integrated design and construction solutions (limited to constructability) ☐ Difficult to assess construction time and cost due to innovation

DESIGN-BUILD	
Opportunities	**Obstacles**
☒ Designer and contractor collaborate to optimize means and methods and enhance innovation ☒ Opportunity for innovation through draft RFP, best value and ATC processes ☐ Can use best-value procurement to select design-builder with best qualifications ☒ Constructability and VE inherent in process ☒ Early team integration ☐ Sole point of responsibility	☒ Requires desired solutions to complex designs to be well defined through technical requirements (difficult to do) ☐ Qualitative designs are difficult to define (example. aesthetics) ☐ Risk of time or cost constraints on designer inhibiting innovation ☐ Some design solutions might be too innovative or unacceptable ☐ Quality assurance for innovative processes are difficult to define in RFP

Notes:

- DBB doesn't allow for contractor input to optimize costs and limits flexibility for integrated design and construction solutions. -
- DB allows the design and contractor to collaborate through early team integration to optimize means and methods and enhance innovation. Constructability and VE are inherent in the DB process. There are also opportunities for innovation through draft RFP, best value, and ATC processes. However, technical requirements need to be well defined for complex designs to achieve the desired solutions. ++

3) Level of Design

Level of design is the percentage of design completion at the time of the project delivery procurement.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☐ 100% design by agency ☒ Agency has complete control over the design (can be beneficial when there is one specific solution for a project) ☒ Project/scope can be developed through design ☐ The scope of the project is well defined through complete plans and contract documents ☐ Well-known process to the industry	☐ Agency design errors can result in a higher number of change orders, claims, etc. ☒ Minimizes competitive innovation opportunities ☐ Can reduce the level of constructability since the contractor is not bought into the project until after the design is complete

DESIGN-BUILD	
Opportunities	**Obstacles**
☒ Design advanced by the agency to level necessary to precisely define the contract requirements and properly allocate risk ☐ Does not require much design to be completed before awarding project to the design-builder (between ~ 10% - 30% complete) ☒ Contractor involvement in early design, which improves constructability and innovation ☐ Plans do not have to be as detailed because the design-builder is bought into the project early in the process and will accept design responsibility	☒ Must have very clear definitions and requirements in the RFP because it is the basis for the contract ☐ If design is too far advanced it will limit the advantages of design-build ☐ Potential for lacking or missing scope definition if RFP not carefully developed ☐ Over utilizing performance specifications to enhance innovation can risk quality through reduced technical requirements ☒ Less agency control over the design ☐ Can create project less standardized designs across agency as a whole

Notes:

- In DB, the contractor is involved early in the design process and will improve constructability and innovation. Design is advanced by the agency to the level necessary to precisely define the contract requirements and properly allocate risk. However, the RFP must be very carefully developed to have clear definitions and requirements, because it is the basis for the contract. Also, DB offers less agency control over the design. +
- DBB allows the agency to have complete control over the design, which could be especially important when coordinating with major stakeholders and government agencies on this project. The project/scope can be developed or refined through the design process. However, DBB minimizes competitive innovation opportunities. +

4) Cost

Project cost is the financial process related to meeting budget restrictions, early and precise cost estimation, and control of project costs.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☐ Competitive bidding provides a low cost construction to a fully defined scope of work ☒ Increase certainty about cost estimates ☐ Construction costs are contractually set before construction begins	☐ Cost accuracy is limited until design is completed ☐ Construction costs are not locked in until design is 100% complete ☒ Cost reductions due to contractor innovation and constructability is difficult to obtain ☐ More potential of cost change orders due to Agency design responsibility
DESIGN-BUILD	
Opportunities	**Obstacles**
☒ Contractor input into design should moderate cost ☒ Design-builder collaboration and ATCs can provide a cost-efficient response to project goals ☐ Costs are contractually set early in design process with design-build proposal ☒ Allows a variable scope bid to match a fixed budget ☐ Potential lower average cost growth ☐ Funding can be obligated in a very short timeframe	☒ Risks related to design-build, lump sum cost without 100% design complete, can compromise financial success of the project

Notes:

- DB allows contractor input into design that should moderate cost. DB collaboration and ATCs can provide a cost-efficient response to project goals. DB also allows a variable scope to match a fixed budget. However, risks related to design-build, lump sum cost without 100% design complete can compromise the financial success of the project. ++
- DBB can increase the certainty of cost estimates due to a higher level of design completion, but the cost reductions due to contractor innovation and constructability are more difficult to obtain. +

5) Initial Risk Assessment

Risk is an uncertain event or condition that, if it occurs, has an effect on a project's objectives. Risk allocation is the assignment of unknown events or conditions to the party that can best manage them. An initial assessment of project risks is important to ensure the selection of the delivery method that can properly address them. An approach that focuses on a fair allocation of risk will be most successful.

5a) General Project Risk Checklist (Items to consider when assessing risk)

Environmental Risks	External Risks
☐ Delay in review of environmental documentation ☐ Challenge in appropriate environmental documentation ☐ Defined and non-defined hazardous waste ☐ Environmental regulation changes ☐ Environmental impact statement (EIS) required ☐ NEPA/ 404 Merger Process required ☐ Environmental analysis on new alignments required	☒Stakeholders request late changes ☒Influential stakeholders request additional needs to serve their own commercial purposes ☒Local communities pose objections ☒Community relations ☐Conformance with regulations/guidelines/ design criteria ☒Intergovernmental agreements and jurisdiction
Third-Party Risks	**Geotechnical and Hazmat Risks**
☒ Unforeseen delays due to utility owner and third-party ☐ Encounter unexpected utilities during construction ☐ Cost sharing with utilities not as planned ☒ Utility integration with project not as planned ☒ Third-party delays during construction ☒ Coordination with other projects ☒ Coordination with other government agencies	☐Unexpected geotechnical issues ☐Surveys late and/or in error ☐Hazardous waste site analysis incomplete or in error ☐Inadequate geotechnical investigations ☐Adverse groundwater conditions ☐Other general geotechnical risks
Right-of-Way/ Real Estate Risks	**Design Risks**
☐ Railroad involvement ☐ Objections to ROW appraisal take more time and/or money ☐ Excessive relocation or demolition ☒ Acquisition ROW problems ☐ Difficult or additional condemnation ☐ Accelerating pace of development in project corridor ☒ Additional ROW purchase due to alignment change	☐ Design is incomplete/ Design exceptions ☒ Scope definition is poor or incomplete ☐ Project purpose and need are poorly defined ☐ Communication breakdown with project team ☐ Pressure to deliver project on an accelerated schedule ☒ Constructability of design issues ☒ Project complexity - scope, schedule, objectives, cost, and deliverables - are not clearly understood
Organizational Risks	**Construction Risks**
☐ Inexperienced staff assigned ☐ Losing critical staff at crucial point of the project ☐ Functional units not available or overloaded ☐ No control over staff priorities ☐ Lack of coordination/ communication ☐ Local agency issues ☐ Internal red tape causes delay getting approvals, decisions ☐ Too many projects/ new priority project inserted into program	☐ Pressure to delivery project on an accelerated schedule. ☐ Inaccurate contract time estimates ☐ Construction QC/QA issues ☐ Unclear contract documents ☒ Problem with construction sequencing/ staging/ phasing ☒ Maintenance of Traffic/ Work Zone Traffic Control

5b) Assessment of Risk Project Delivery Selection Opportunities/Obstacles Checklist

DESIGN-BID-BUILD

Opportunities	Obstacles
☐ Risks managed separately through design, bid, build is expected to be easier ☐ Risk allocation is most widely understood/used ☒ Opportunity to avoid or mitigate risk through complete design ☒ Risks related to environmental, railroads, & third party involvement are best resolved before procurement ☒ Utilities and ROW best allocated to the agency and mostly addressed prior to procurement to minimize potential for claim ☒ Project can be shelved while resolving risks	☒ Agency accepts risks associated with project complexity (the inability of designer to be all-knowing about construction) and project unknowns ☐ Low-bid related risks ☐ Potential for misplaced risk through prescriptive specifications ☐ Innovative risk allocation is difficult to obtain ☒ Limited industry input in contract risk allocation ☐ Change order risks can be greater ☐ Contractor may avoid risks

DESIGN-BUILD	
Opportunities	**Obstacles**
☐ Performance specifications can allow for alternative risk allocations to the design builder ☐ Risk-reward structure can be better defined ☐ Innovative opportunities to allocate risks to different parties (e.g., schedule, means and methods, phasing) ☒ Opportunity for industry review of risk allocation (draft RFP, ATC processes) ☐ Avoid low-bid risk in procurement ☒ Contractor will help identify risks related to environmental, railroads, ROW, and utilities ☒ Designers and contractors can work toward innovative solutions to, or avoidance of, unknowns	☐ Need a detailed project scope, description etc., for the RFP to get accurate/comprehensive responses to the RFP (Increased RFP costs may limit bidders) ☐ Limited time to resolve risks ☐ Additional risks allocated to designers for errors and omissions, claims for change orders ☐ Unknowns and associated risks need to be carefully allocated through a well-defined scope and contract ☒ Risks associated with agreements when design is not completed ☐ Poorly defined risks are expensive ☒ Contractor may avoid risks or drive consultant to decrease cost at risk to quality

Notes:

- DBB allows the opportunity to avoid or mitigate risk through complete design. Risks related to environmental, railroads, & third party involvement are best resolved before procurement. Utilities and ROW best allocated to the agency and mostly addressed prior to procurement to minimize potential for claim. The project can be shelved while resolving risks. In DBB, the agency accepts risks associated with project and project unknowns. There is also limited industry input in contract risk allocation. ++
- DB allows for industry review of risk allocation through a draft RFP and ATC processes. Designers and contractors can work toward innovative solutions to, or avoidance of, unknowns. The contractor will also help identify risks related to environmental, ROW, and utilities (particularly minimizing stream impacts, the greenway, and utilities). The agency should consider the risks associated with agreements when design is not completed. Also, contractors may avoid risks or drive consultants to decrease cost at risk to quality. +

Project Delivery Selection Matrix Secondary Factors

6) Staff Experience and Availability

Agency staff experience and availability as it relates to the project delivery methods in question.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☒ Agency, contractors and consultants have high level of experience with the traditional system ☐ Designers can be more interchangeable between projects	☐ Can require a high level of agency staffing of technical resources ☒ Staff's responsibilities are spread out over a longer design period ☐ Can require staff to have full breadth of technical expertise
DESIGN-BUILD	
Opportunities	**Obstacles**
☒ Less agency staff required due to the sole source nature of DB ☐ Opportunity to grow agency staff by learning a new process	☐ Limitation of availability of staff with skills, knowledge and personality to manage DB projects ☐ Existing staff may need additional training to address their changing roles ☐ Need to "mass" agency management and technical resources at critical points in process (i.e., RFP development, design reviews, etc.)

Notes:

- DB requires less agency staff due to its sole source nature. +
- Agency, contractors, and consultants have high level of experience with DBB. However, staff's responsibilities are spread out over a longer design period with DBB. +

7) Level of Oversight and Control

Level of oversight involves the amount of agency staff required to monitor the design or construction, and amount of agency control over the delivery process.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☒ Full agency control over a linear design and construction process ☐ Oversight roles are well understood ☐ Contract documents are typically completed in a single package before construction begins ☐ Multiple checking points through three linear phases: design-bid-build ☒ Maximum control over design	☐ Requires a high-level of oversight ☒ Increased likelihood of claims due to agency design responsibility ☐ Limited control over an integrated design/construction process
DESIGN-BUILD	
Opportunities	**Obstacles**
☐ A single entity responsibility during project design and construction ☐ Continuous execution of design and build ☒ Getting input from construction to enhance constructability and innovation ☐ Overall project planning and scheduling is established by one entity	☒ Can require high level of design oversight ☐ Can require high level of quality assurance oversight ☐ Limitation on staff with DB oversight experience ☒ Less agency control over design ☒ Control over design relies on proper development of technical requirements

Notes:

- DBB offers the maximum control over design due to a linear design and construction process. There is an increased likelihood of claims due to agency design responsibility. ++
- DB would allow input from construction to enhance constructability and innovation. However, DB offers less agency control over design. Control over design relies on proper development of technical requirements, and can require a high level of design oversight. –

8) Competition and Contractor Experience

Competition and availability refers to the level of competition, experience and availability in the market place and its capacity for the project.

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
☒ Promotes high level of competition in the marketplace ☒ Opens construction to all reasonably qualified bidders ☐ Transparency and fairness ☐ Reduced chance of corruption and collusion ☐ Contractors are familiar with DBB process	☐Risks associated with selecting the low bid (the best contractor is not necessary selected) ☒No contractor input into the process ☒Limited ability to select contractor based on qualifications
DESIGN-BUILD	
Opportunities	**Obstacles**
☒ Allows for a balance of qualifications and cost in design-builder procurement ☐ Two-phase process can promote strong teaming to obtain "Best Value" ☒ Increased opportunity for innovation possibilities due to the diverse project team	☒ Need for DB qualifications can limit competition ☐ Lack of competition with past experience with the project delivery method ☐ Reliant on DB team selected for the project ☐ The gap between agency experience and contractor experience with delivery method can create conflict

Notes:

- DBB promotes a high level of competition in the marketplace and opens construction to all reasonably qualified bidders. However, there is no contractor input into the process, and DBB limits the ability to select a contractor based on qualifications. +
- The need for DB qualifications can limit competition. However, DB allows for a balance of qualifications and cost in design-builder procurement. DB also increases the opportunity for innovation possibilities due to the diverse project team. +