

Table 5-7. Build Opening Year (2022) and Design Year (2032) Queue Summary

SR 442 Intersection	Signal Control	Movement	Available Storage (ft.)	AM 95 th Percentile Queue (ft.) ⁵		PM 95 th Percentile Queue (ft.) ⁵	
				2022	2032	2022	2032
I-95 SB Ramps	Signal	SBL ¹	1,400	75	150	350	650
		SBR ²	250	0	0	0	0
		WBL ³	120	0	25	50	125
		WBT	-	0	125	25	200
		EBT	-	0	75	0	475
		EBR	-	0	0	0	0
I-95 NB Ramps	Stop	NBL ¹	1,400	0	175	25	125
		NBR ²	210	0	0	0	0
		EBL ³	120	0	25	0	25
Old Mission Rd	Signal	SBL ⁴	-	75	275	100	375
		SBR ³	240	50	700	50	375
		EBL ³	620	75	425	50	400
		WBR ³	620	75	425	50	250

1. Storage measured from the stop bar to the painted nose of the gore
2. Storage measured from the painted nose for channelization to the painted nose for the through movement
3. Storage measured from the stop bar to the end of taper
4. Through lane converts into an SBL and hence available storage is not listed
5. An assumed 25-foot per vehicle was used to calculate the 95th % queue length

5.4 Safety Analysis

The proposed improvement at the I-95 and SR 442 southbound ramp terminal intersection is a low-cost, short-term improvement that requires no ROW acquisition. The historical crash data and crash rate presented in Section 3.5 does not show a historical crash problem within the AOI.

Federal Highway Administration (FHWA) Crash Modification Factors (CMFs) were reviewed to quantify safety benefits of converting a stop-controlled intersection to a traffic signal-controlled intersection. A CMF (included in **Appendix D**) of 0.716 value is recommended for converting a stop sign to a signal-controlled intersection. The safety analysis was performed by applying CMFs to the existing crashes to estimate crash reduction and does not include the safety performance functions (SPFs) or the empirical-Bayes (E-B) method as this IOAR includes minor modifications to the existing interchange. The safety analysis summarized in **Table 5-8** shows a total crash reduction of approximately 0.06 (28%) crashes per year is estimated due to the proposed improvement. These numbers were calculated by comparing the crash frequencies before and after the implementation of the proposed improvement at the I-95 and SR 442 southbound ramp terminal intersection.

Table 5-8. Crash Reduction

Location	Total Crashes	Crash Frequency (crashes/year)	CMF	Proposed Crash Frequency (crashes/year)	Reduction in Crashes (crashes/year)
1.SR 442 west of I-95 Off-Ramp	0	0.0		-	
2.I-95 SB Off-Ramp	3	0.6			
3.SR 442 /SB Ramp Intersection	1	0.2	0.72*	0.14	0.06
4.I-95 SB On-Ramp	0	0.0			
5.SR 442/NB Ramp Intersection	3	0.6			
6. I-95 NB On-Ramp	3	0.6			
7. I-95 NB Off-Ramp	3	0.6			
8.btw SR 442 NB Ramp Intersection and Old Mission Rd	7	1.4		-	
9.SR 442/Old Mission Rd	0	0.4			
Total	22	4.4			

* CMF value is rounded to 0.72. 0.716 CMF was used in calculations.

5.5 Year of Failure

While the proposed improvements are anticipated to work through the IOAR Design Year of 2032, a preliminary year of failure analysis was performed to provide an approximation of when the improvements will begin to experience failing conditions. A year of failure analysis was conducted for the PM peak hour as this is the critical hour for the I-95 at SR 442 southbound ramp terminal intersection.

To determine the year of failure for the PM peak hour conditions, straight line interpolation of volumes between 2032 and 2042 was performed for critical movements. The Southbound movement traffic volumes was kept the same value due to low growth. Each year beyond 2032 was analyzed in Synchro for the I-95 and southbound ramp terminal intersection. The year of failure for the critical PM peak hour at the I-95 and SR 442 southbound ramps is projected to be between 2036 and 2037.

Additionally, the low volume northbound left-turn movement at the I-95 and SR 442 northbound ramp intersection operates at LOS F in the Design Year. However, this movement is not anticipated to cause back-ups to the I-95 mainline. The failure of this movement is primarily due to proposed new land use developments to the west of the interstate. As mentioned in section 4.2.3, the proposed land use developments are currently in early planning stages. It should be noted that this IOAR is a short-term solution to solve existing deficiencies at the I-95 and SR 442 southbound ramp intersection. As mentioned in earlier sections, the need for improvements at the I-95 and SR 442 northbound ramp intersection and the I-95 and SR 442 interchange will be monitored closely at the time of the approval of the comprehensive land use amendments due to land use changes west of the interstate and required improvements and studies will be part of those approvals through FDOT, DEO and local agencies. Results for the year of failure are included in **Appendix D**.