

PD&E Study

For SR 9/I-95 at SR 804/Boynton Beach Boulevard Interchange and
SR 9/I-95 at Gateway Boulevard Interchange



Table 7-7: Build Alternatives: Survey Results

Alternative	SR 804/Boynton Beach Boulevard	Gateway Boulevard
Do Nothing (No-Build)	0	1
Alternative 1 – CDA	5	6
Alternative 2 – Streamlined CDA	6	4
Alternative 3 – SPUI	14	12

7.2 Safety

The conceptual design plans for the proposed interchange improvements along SR 9/I-95 at SR 804/Boynton Beach Boulevard and Gateway Boulevard interchanges were developed in accordance with the FDOT’s Design Standards, Plans Preparation Manual and FHWA’s Policy on Geometric Design of Highways and Streets. Adherence to these standards will foster enhancements in safety and efficient traffic operations along these corridors. As discussed under Section 3 of the report, a large proportion of the crashes experienced at the two study interchanges were associated with congested traffic operational conditions. In addition, it was determined that several high crash spots/segments along the corridor were concentrated at or near the interchanges. The improvements proposed for the study interchanges in conjunction with the improvements envisioned as part of the SR 9/I-95 Express Lanes project between Linton Boulevard and Indian Town Road will increase capacity along the mainline and at the interchanges. These capacity improvements will enhance traffic flow and reduce congestion related crashes along the corridor.

The proposed Build Alternatives for this PD&E Study will adequately address the predominant crash types observed within the study area and will reduce them significantly. Table 7-8 summarized the potential countermeasures identified for the study area crash types in Section 3.6.6 and identifies the Build Alternatives that address them.

Table 7-8: Potential Countermeasures Addressed by Build Alternatives

Crash Type	Potential Countermeasures	Build Alternatives
Rear-End	Decrease distance between interchange ramps along the arterial	Build Alternative 3 (SPUI)
	Improve signal visibility (e.g. replace signal bulbs, install advanced warning signs/flashers, etc.)	This should be incorporated into the preferred alternative during the design stage
	Improve roadway surface	This should be incorporated into the preferred alternative during the design stage
	Modify signal timing patterns (e.g. phasing, all red and clearance interval timings, etc.)	All three alternatives.
Angle	Decrease distance between interchange ramps along the arterial	Build Alternative 3 (SPUI)
	Improve signal visibility (e.g. replace signal bulbs, install advanced warning signs/flashers, etc.)	This should be incorporated into the preferred alternative during the design stage
	Increase capacity and enhance intersection operations	All three alternatives.
Left Turn	Remove permissive left turn phase (protected only)	All three alternatives
	Improve signal visibility (e.g. replace signal bulbs, install advanced warning signs/flashers, etc.)	This should be incorporated into the preferred alternative during the design stage
	Increase capacity and enhance intersection operations	All three alternatives.
Sideswipe	Improve lane alignment and markings	All three alternatives.
	Increase capacity and enhance intersection operations	All three alternatives.

Crash Reduction Analysis System Hub (CRASH) provided by the FDOT Safety Office summarizes anticipated Crash Reduction Factors (CRF) for specific roadway improvements based on the benefit-cost analysis (provided in Appendix M). The improvements proposed for SR 804/Boynton Beach Boulevard and Gateway Boulevard interchanges possess similar characteristics and therefore, similar CRFs are assumed. A summary of anticipated CRFs is provided in Table 7-9.

Table 7-9: Build Alternatives: Crash Reduction Factors

Improvement	Crash Reduction Factor (percent)							
	Fatal	Injury	PDO*	Rear-End	Angle	Left-Turn	Sideswipe	Total**
Add turn lane(s) & pavement resurfacing	3	47	21	49	20	53	-15	35
Modify both signal and channelization	50	33	13	6	30	66	4	24
Add turn bay	52	16	-1	5	6	21	20	10
Total	77	70	31	54	47	87	12	56

*Property Damage Only

**CRF = CRF1 + (1-CRF1)CRF2 + (1-CRF1)(1-CRF2)CRF3 + ...

The Build Alternatives may reduce rear-end crashes by approximately 54 percent, angle crashes by approximately 47 percent, left-turn crashes by approximately 87 percent, and sideswipe crashes by approximately 12 percent.

A high-level safety Benefit-Cost (B/C) analysis was prepared for each Build Alternative utilizing the FDOT Roadway

Design Benefit-Cost analyses spreadsheets. A summary of this analysis is provided in Table 7-10.

Table 7-10: Build Alternatives: Safety Benefit-Cost Analysis

Build Alternative	Total Project Cost	Annual Project Cost	Total CRF	Annual Safety Benefit	B/C Ratio*
SR 804/Boynton Beach Boulevard near SR 9/I-95					
Alternative 1 – CDA	\$59,743,624	\$3,867,500	55.54%	\$3,260,100	0.84
Alternative 2 – Streamlined CDA	\$39,072,333	\$2,479,500	55.54%	\$3,260,100	1.31
Alternative 3 – SPUI	\$72,948,467	\$5,039,000	55.54%	\$3,260,100	0.65
Gateway Boulevard near SR 9/I-95					
Alternative 1 – CDA	\$37,933,247	\$2,414,300	55.54%	\$6,166,600	2.55
Alternative 2 – Streamlined CDA	\$33,337,461	\$2,147,000	55.54%	\$6,166,600	2.87
Alternative 3 – SPUI	\$35,782,319	\$2,352,500	55.54%	\$6,166,600	2.62

*Refer to Benefit-Cost Spreadsheets

For the SR 804/Boynton Beach Boulevard interchange, Alternative 2 (Streamlined CDA) resulted a B/C ratio greater than 1.00 indicative that the safety benefits perceived are greater than the cost of the project. Similarly, for the Gateway Boulevard interchange, all three Build Alternatives (1, 2, and 3) resulted a B/C ratio that is greater than 1.00. Each Build Alternative’s spreadsheet detailing the analysis performed are provided in Appendix N.

7.3 Project Constructability and Maintenance of Traffic

A Traffic Control Plan will be developed during the Final Design Phase and implemented in consultation with local jurisdictions and the FDOT.

Construction of the proposed improvements will temporarily impact traffic movements. The extent of construction phase impacts will vary, depending upon whether the construction is at-grade along mainline SR 9/I-95 or on the bridge structures at the overpasses/cross streets near the ramp terminal interchanges.

Measures to be considered for implementation in the Traffic Control Plan will include, but not be limited to:

- Advance public notification to motorists of the nature, extent, and duration of any street closing and possible detour routes, if needed
- Detour signing placed in advance at strategic locations to notify motorists of alternate routing
- Use of warning signs and pavement markings
- Construction during off-peak times, whenever feasible, to minimize disruption to mainline SR 9/I-95, interchange ramps, intersecting roadways, access driveways, and business entrances
- Maintenance of at least one entrance to adjacent properties along the side streets
- Coordination of construction activities with other proposed roadway improvements in the area
- Concurrent utility relocations whenever possible to minimize disruptions
- Inclusion of measures within the construction contract specifications and plans to encourage responsible construction practices by contractors to avoid or minimize unforeseen impacts during construction
- Use of temporary pavement for potential temporary shift of lanes, if necessary