

NCDOT STIP Project U-4700

Proposed Interchange / Intersection Alternatives Memo

Most of the U-4700 corridor was designed using a Best Fit Alignment following the typical sections described above.

Multiple options were considered at several intersection and interchange locations, listed in the table below. NCDOT recommendations are in ***bold italics***.

Table 1: Interchange Alternative Locations

Location	Alternatives Considered
13 th Street SW	July 2016: Interchange at 13 th Street SW presented July 2017 / October 2017 (revised January 2018): <i>Interchange design shifted to 2nd Avenue SW</i>
Clement Boulevard	July 2016: Interchange design presented July 2017 / October 2017: <i>Superstreet design proposed</i>
Grace Chapel Road	July 2016: Three alternatives presented – flyover, trumpet interchange, reverse Superstreet intersection July 2017: The Superstreet design is modified October 2017 (revised January 2018): <i>Flyover design proposed</i>
Alex Lee Boulevard	July 2016: Superstreet intersection presented July 2017: Trumpet interchange presented October 2017 (revised January 2018): <i>Tight diamond interchange proposed</i>
Falls Avenue	July 2016 / July 2017: Three alternatives presented – tight diamond interchange, partial clover interchange, and superstreet intersection. October 2017 (revised January 2018): <i>Tight diamond interchange proposed</i>

NOTE: Alternatives ***bolded and italicized*** are recommended by NCDOT

13th Street SW & 2nd Avenue SW

Table 2: 13th Street SW & 2nd Avenue SW Alternatives Considered

Location	Alternatives Considered	Figure
13 th Street SW	July 2016: Interchange at 13 th Street SW proposed	1
2 nd Avenue SW	July 2017 / October 2017: Interchange design shifted to 2 nd Avenue SW	2
2 nd Avenue SW	January 2018: 2nd Avenue Interchange side street improvements reduced	3

NOTE: Alternative **bolded and italicized** is recommended by NCDOT



Figure 1: 13th Street SW interchange design, July 2016 public hearing



Figure 2: 2nd Avenue SW interchange design, July and October 2017 public meetings



Figure 3: (Recommended) 2nd Avenue SW interchange design, January 2018

Table 3: 13th Street SW & 2nd Avenue SW Alternatives Stream and Wetland Impacts

Alternative	Stream Impacts (lf)	Wetland Impacts (ac)	Notes
13th St SW Interchange	0	0	Shifting the interchange improves access to downtown Hickory, providing a more direct connection from US 321 to 1 st and 2 nd Avenues SW, which are primary routes through downtown Hickory. A section of 1 st and 2 nd Avenues SW will be converted from one-way to two-way, consistent with Hickory's long-term plan for the pair. Residential and business impacts are anticipated to be slightly higher. NCDOT proposes additional pedestrian connectivity to address potential EJ concerns.
2 nd Avenue SW Interchange	220	0	
2nd Ave SW Interchange	0	0	

Clement Boulevard

Table 4: Clement Boulevard Alternatives Considered

Location	Alternatives Considered	Figure
Clement Boulevard	July 2016: Half clover interchange design presented	4
	July 2017 / October 2017: <i>Superstreet design proposed</i>	5

NOTE: Alternative ***bolded and italicized*** is recommended by NCDOT



Figure 4: Half clover interchange design, July 2016 public hearing



Figure 5: (Recommended) Superstreet intersection design, July and October 2017 public meetings

Table 5: Clement Boulevard Alternatives Stream Impacts

Alternative	Stream Impacts (lf)	Wetland Impacts (ac)	Notes
Interchange	1,110	0.1	A superstreet intersection was determined to be sufficient following the traffic forecast update. The recommended superstreet intersection reduces relocations to approximately 30 businesses and eliminates a proposed culvert extension.
<i>Superstreet</i>	<i>860</i>	<i>0.1</i>	

NOTE: Impacts are calculated using a 25-foot buffer on slope stakes of the preliminary designs unless otherwise noted

Table 6: Clement Boulevard Stream Impacts (LF) by Alternative

Map ID	Stream Impact (lf) by Alternative	
	Interchange	<i>Superstreet</i>
Frye Creek	375	<i>125</i>
SB	735	<i>735</i>

Table 7: Clement Boulevard Stream Impacts (LF) by Stream for Recommended Alternative

Detailed Stream Information for Recommended Alternative							
Map ID	Stream Name	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Classification	Impacts (lf)	Figure Number
Frye Creek	Frye Creek	12	12-15	12	Perennial	735	14A
SB	UT to Catawba River	7-9	5	24	Perennial	125	14C

Grace Chapel Road

Table 8: Grace Chapel Road Alternatives Considered

Location	Alternatives Considered	Figure
Grace Chapel Road	July 2016: Three alternatives presented – trumpet interchange, flyover, reverse Superstreet intersection	6-8
	July 2017: A traditional Superstreet intersection alternative is added	9
	October 2017: Flyover design proposed with additional Wolfe Road connector*	8
	December 2017: Flyover design with bridge proposed	10
	January 2018: <i>Flyover design with minimized impacts</i>	11

NOTE: Alternative **bolded and italicized** is recommended by NCDOT

* NCDOT recommends adding the Wolfe Road connector to any alternative selected. Therefore, the Wolfe Road connector has been added to the graphics and calculations for all alternatives considered at this location.



Figure 6: Trumpet interchange design, July 2016 public hearing (plus Wolfe Rd connector)



Figure 7: Reverse Superstreet intersection design, July 2016 public hearing



Figure 8: Flyover design, July 2016 public hearing (plus Wolfe Rd connector)



Figure 9: Superstreet design added to alternatives, July 2017 public meeting (plus Wolfe Rd connector)



Figure 10: Revised flyover design, October 2017 public meeting with additional bridge over stream

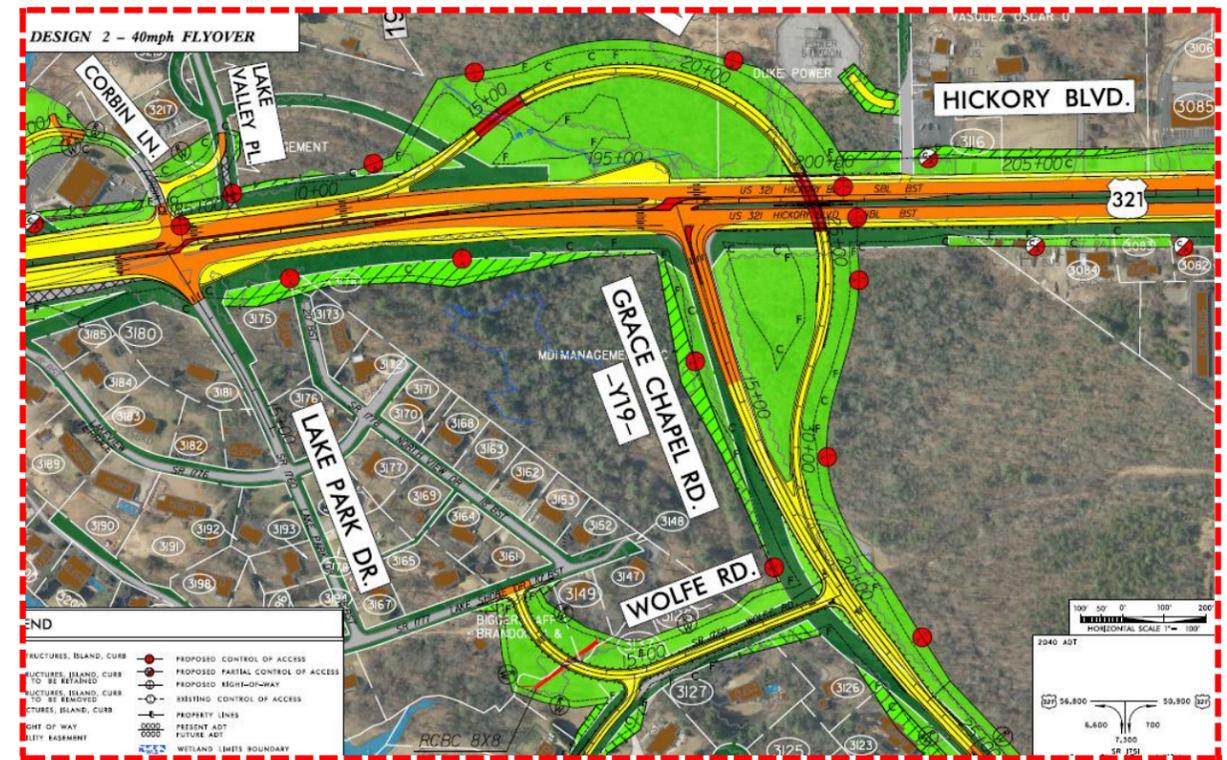


Figure 11: (Recommended) Revised flyover design, October 2017 public meeting with additional bridge over stream and increased slopes

Table 9: Grace Chapel Road Alternatives Stream Impacts (LF)

Alternative	Stream Impacts (lf)	Wetland Impacts (ac)	Notes
Superstreet/ Reverse Superstreet	950	0	NCDOT recommends the flyover because of substantial public opposition to the other options. The revised design improves access to properties west of US 321
Trumpet	1,100	0	
Flyover with Fill Slopes	1,300	0	
Flyover with minimized impacts (modified Jan 2018)	930	0	

NOTE: Impacts are calculated using a 25-foot buffer on slope stakes of the preliminary designs unless otherwise noted

Table 10: Grace Chapel Road Alternatives Stream Impacts (LF) by Quadrant

Stream Impact (lf) by Quadrant			
Alternative	West of US 321	North of Grace Chapel Road	Wolfe Road Connection
Superstreet/Reverse Superstreet	320	80	550
Trumpet	500	50	550
Flyover with Fill Slopes	670	80	550
Flyover with minimized impacts (modified Jan 2018)	300 (SC)	80 (SQQ and SRR)	550 (SRR)

Table 11: Grace Chapel Road Alternatives Stream Impacts (LF) by Stream

Map ID	Stream Impact (lf) by Alternative			
	Trumpet	Superstreet/ Reverse Superstreet	Flyover with Fill Slopes	Flyover with Additional Bridge
SC	500	310	670	300
SQQ	30	50	40	40
SRR	570	590	590	590

Table 12: Grace Chapel Road Detailed Stream Impacts for Recommended Alternative

Detailed Stream Information for Recommended Alternative							
Map ID	Stream Name	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Classification	Impacts (lf)	Figure Number
SC	UT to Catawba River	5	5	0.5	Perennial	300	14D
SQQ	UT to Catawba River	5	5	0.5	Intermittent	40	14D
SRR	UT to Catawba River	10	10	2	Perennial	590	14D

Alex Lee Boulevard

Table 13: Alex Lee Boulevard Alternatives Considered

Location	Alternatives Considered	Figure
Alex Lee Boulevard	July 2016: Superstreet intersection proposed	12
	July 2017: Trumpet interchange proposed	13
	October 2017: Tight diamond interchange proposed	14
	January 2018: <i>Tight diamond interchange revised</i>	15

NOTE: Alternative ***bolded and italicized*** is recommended by NCDOT



Figure 12: Superstreet design, July 2016 public hearing



Figure 13: Trumpet interchange design, July 2017 public meeting



Figure 14: Tight diamond interchange design, October 2017 public meeting



Figure 15: (Recommended) Tight diamond interchange design, October 2017 public meeting, revised January 2018

Table 14: Alex Lee Boulevard Alternatives Stream Impacts (LF)

Alternative	Stream Impacts (lf)	Wetland Impacts (ac)	Notes
Superstreet	0	0	An interchange was proposed to address public concerns and improve access from MDI and adjacent neighborhoods. The tight diamond interchange provides better access to adjacent neighborhoods and reduced impacts to businesses compared with the trumpet interchange. In addition, a new road was added to connect Sage Meadow Circle, Midway Sand Road, and the new interchange.
Trumpet	305	0	
Tight Diamond	140	0	
<i>Revised Tight Diamond</i>	<i>0</i>	<i>0</i>	

NOTE: Impacts are calculated using a 25-foot buffer on slope stakes of the preliminary designs unless otherwise noted

Table 15: Alex Lee Boulevard Alternatives Impacts (LF) by Stream

Map ID	Stream Impact (lf) by Alternative			
	Superstreet	Trumpet	Tight Diamond	<i>Revised Tight Diamond</i>
SD	0	305	140	<i>0</i>

Falls Avenue

Table 16: Falls Avenue Alternatives Considered

Location	Alternatives Considered	Figure
Falls Avenue	July 2016 / July 2017: Three alternatives presented – tight diamond interchange, partial clover interchange, and superstreet intersection.	16 - 18
	October 2017: Tight diamond interchange proposed (no change in design since 2016)	18
	January 2018: <i>Tight diamond interchange with minimized impacts</i>	19

NOTE: Alternative ***bolded and italicized*** is recommended by NCDOT



Figure 16: Partial cloverleaf alternative for Falls Avenue intersection presented at July 2016 public hearing



Figure 17: Superstreet alternative for Falls Avenue intersection presented at July 2016 public hearing



Figure 18: Tight diamond interchange design, July 2016 public hearing and October 2017 public meeting



Figure 19: (Recommended) Tight diamond interchange design, January 2018

Table 17: Falls Avenue Alternatives Impacts by Stream (LF)

Alternative	Stream Impacts (lf)	Wetland Impacts (ac)	Notes
Superstreet	970	0	The superstreet intersection has notable concerns regarding EMS response, community cohesion, and pedestrian connectivity. NCDOT recommends the tight diamond interchange because of access and connectivity benefits for residents and emergency vehicles.
Partial Clover	1,080	0	
Tight Diamond	1,170	0	
<i>Tight Diamond with minimized impacts</i>	845	0	

NOTE: Impacts are calculated using a 25-foot buffer on slope stakes of the preliminary designs unless otherwise noted

Table 18: Falls Avenue Alternatives Impacts by Quadrant (LF)

Alternative	Stream Impact by Quadrant			
	West of US 321, North of Falls Ave	East of US 321, North of Falls Ave	West of US 321, South of Falls Ave	East of US 321, South of Falls Ave
Superstreet	205	295	100	370
Partial Clover	225	305	180	370
<i>Tight Diamond with minimized impacts</i>	225 (Billy Branch)	255 (SP and Billy Branch)	90 (SO)	275 (SO)

Table 19: Falls Avenue Alternatives Impacts by Stream (LF)

Map ID	Stream Impact (lf) by Alternative			
	Superstreet	Partial Clover	Tight Diamond	<i>Tight Diamond with Retaining Wall</i>
SO	470	550	605	365
SP	160	165	180	180
Billy Branch	340	365	385	300

Table 20: Falls Avenue Recommended Alternative Impacts by Stream (LF)

Detailed Stream Information for Recommended Alternative							
Map ID	Stream Name	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Classification	Impacts (lf)	Figure Number
SO	UT to Gunpowder Creek	7-8	10-15	6	Perennial	365	14G
SP	UT to Billy Branch	3	5	3	Perennial	180	14H
Billy Branch	Billy Branch	7	6-7	6	Perennial	300	14H