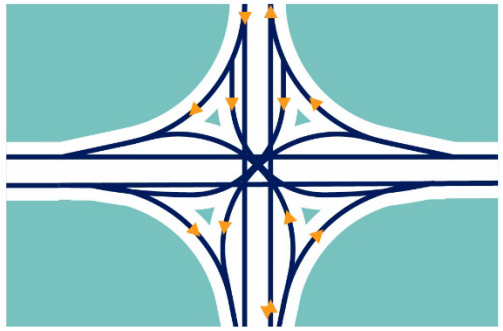
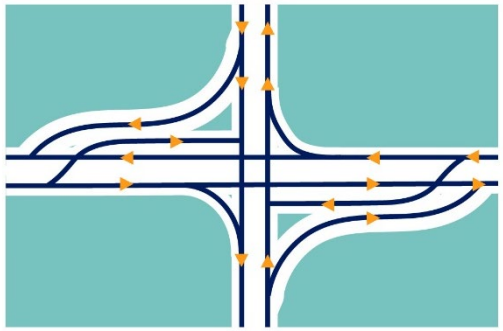
THE PROCESS

Intersection Alternatives Development Process

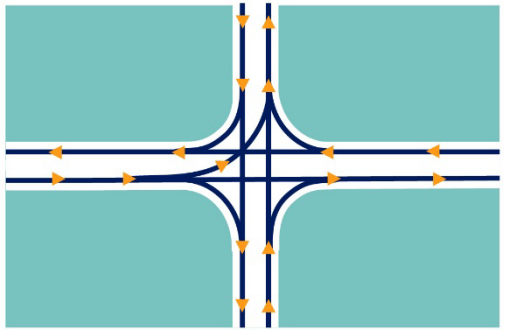
Early Concepts



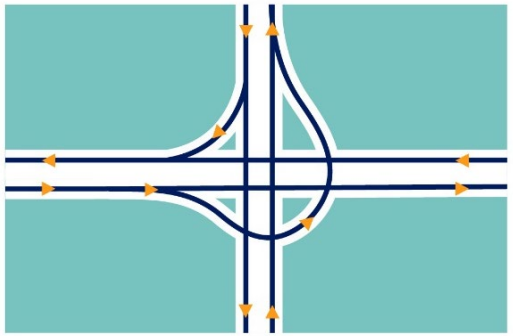
Single Point Urban Interchange



Continuous Flow Intersection



Flyover Left Turn Mid



Flyover Left Turn

At the May 2018 public meeting, the project team presented early concepts for the Highway 41 and Highway 17 intersection including: improvements to the existing intersections, overpasses, and road widening options.

Intersection Alternatives Considered

• At Grade Restricted Crossing U-Turn (RCUT) with Quadrant roads	• Diverging diamond interchange
• Echelon Intersection with southbound rights and eastbound lefts on a bridge	• Grade separate four lanes of US 17 – quadrant roads
• Continuous flow intersection	• Grade separate four lanes of US 17 - two quadrant roads
• Grade separation US 17 with options	• Grade separate US 17 at SC 41 with RCUT at grade
• Diamond interchange	• Grade separate four lanes of US 17 from east of Hamlin to west of Porchers Bluff
• Single point urban interchange	• Grade separation of US 17 at SC 41 / Extend SC 41 to Billy Swails / Roundabouts at Hamlin & Brickyard to eliminate lefts

Traditional Road Widening

Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- Traditional ground-level roadway intersections will not work regardless of the extent of roadway widening
- Would require **six thru-traffic lanes in each direction** and safely turning left would be **impossible** due to the number of thru-traffic lanes that the turning vehicle would be required to cross
- Widening Highway 17 to six thru-traffic lanes traveling in each direction would make it very difficult for pedestrian crossings.

Alternative Explanation Design:

- Widen the Highway 17 roadway to six thru-traffic lanes traveling in each direction with three additional turning lanes at certain intersections.

Alternative Dropped from Further Consideration

Restricted Crossing U-Turn Intersection with Quadrant Roads

Alternative Not Viable Because:

- A Restricted Crossing U-Turn Intersection is not viable because it would still result in operation failures for right-turns off of Highway 17 Southbound and left-turns off of the intersecting roadway.

Alternative Design Explanation:

- A Restricted Crossing U-Turn intersection restricts left turns at the main intersection, but allows drivers to make that same left turn movement downstream using a u-turn
- A quadrant road would act as a connector road allowing for left turns to be made outside of the main intersection

Echelon Interchange

Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- An Echelon Interchange is not viable because it would require Highway 17 to be widened to five thru-lanes in each direction.

Alternative Design Explanation:

- An Echelon Interchange would use a half flyover bridge to elevate Highway 17 southbound and eastbound of the intersecting roadway, while Highway 17 northbound and the westbound of the intersecting roadway would remain at ground-level.

Continuous Flow Intersection

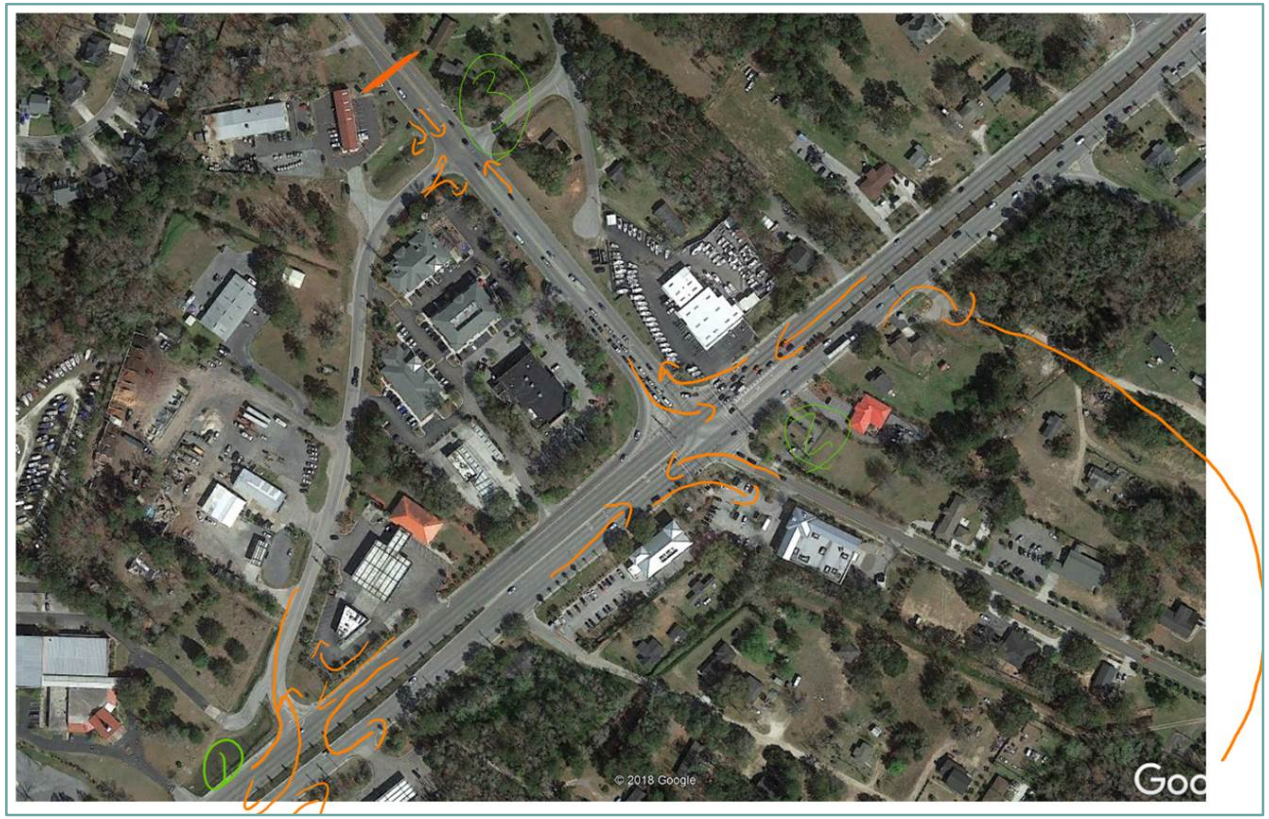
Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- A Continuous Flow Intersection is not viable because it would still result in traffic operation failures during the morning peak traffic hour
- Requires significant widening of old Highway 41, which would potentially impact a cemetery

Alternative Design Explanation:

- A Continuous Flow Intersection makes vehicles that are trying to turn left against opposing traffic, crossover through the opposing direction thru-traffic and into the left turning lane before entering the intersection. This traffic movement (crossover displaced left turn) eliminates left turns across the main intersection, but still allows drivers to make left hand turns.
- A Continuous Flow intersection is a ground-level roadway rather than an interchange bridge.



Diamond Interchange

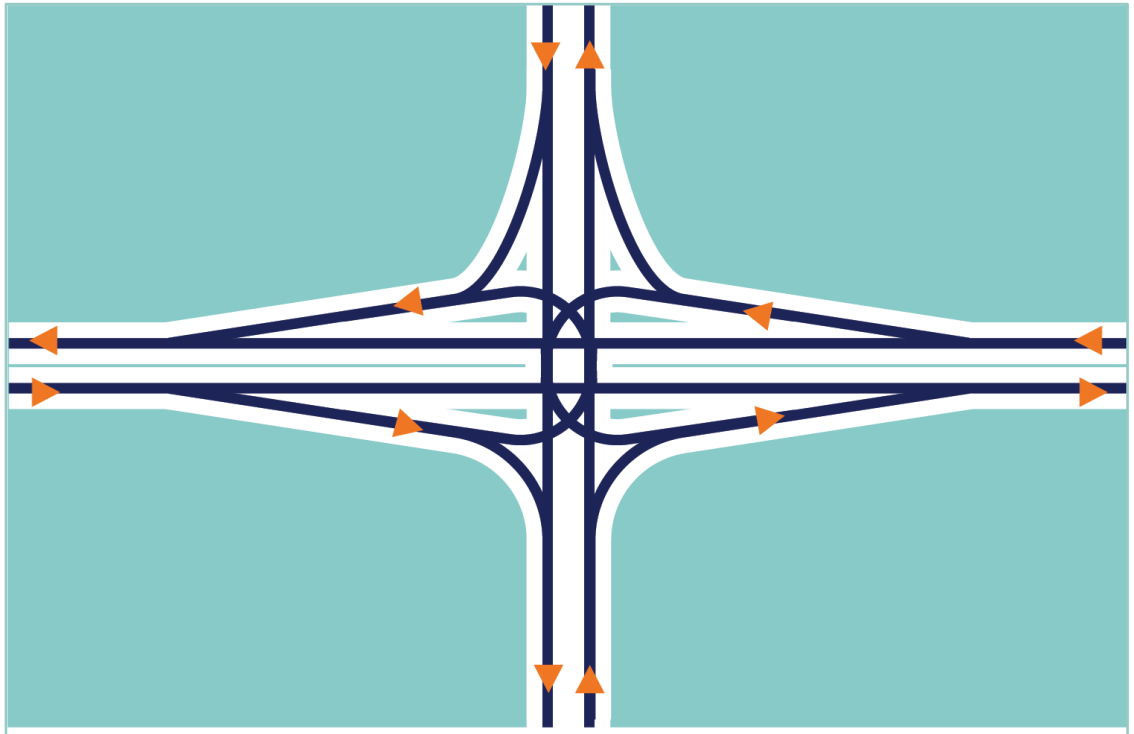
Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- A Diamond Interchange is not viable because it would still result in traffic operation failures for right-turns off of Highway 17 Southbound and left-turns off of the intersecting roadway

Alternative Design Explanation:

- A Diamond Interchange would use an overpass bridge to elevate both directions of Highway 17 over the intersecting roadway that would continue to operate as a ground-level roadway.
- There would be on- and off-ramps connecting the ground-level intersecting road to Highway 17.



Diamond Interchange

Diverging Diamond Interchange

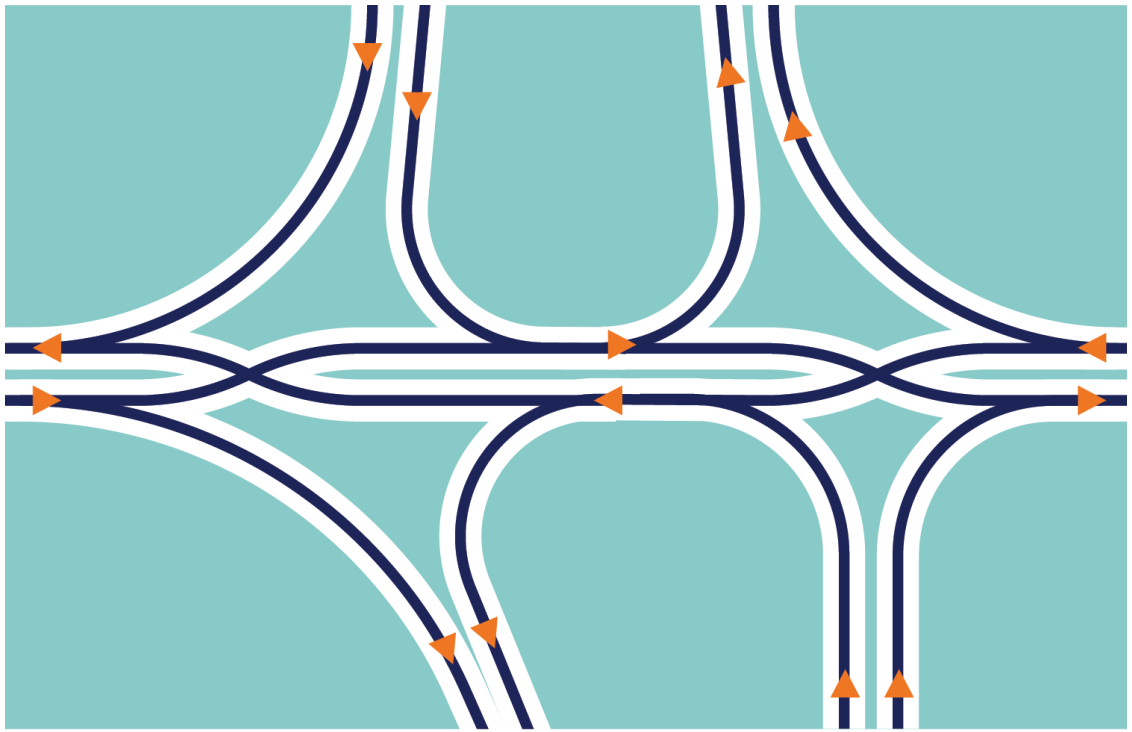
Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- A Diverging Diamond Interchange is not viable because it would cause severe property impacts and access issues

Alternative Design Explanation:

- A Diverging Diamond Interchange is a two-direction interchange that elevates half of an intersection using an overpass bridge and on/off ramps. Drivers navigate the diverging diamond interchange as a one-way street crossing to the opposite side of the interchange and then back again.
- There are free-flowing traffic lanes below the interchange operating on a ground-level roadway.



Diverging Diamond Interchange (DDI)

Alternative Dropped from Further Consideration

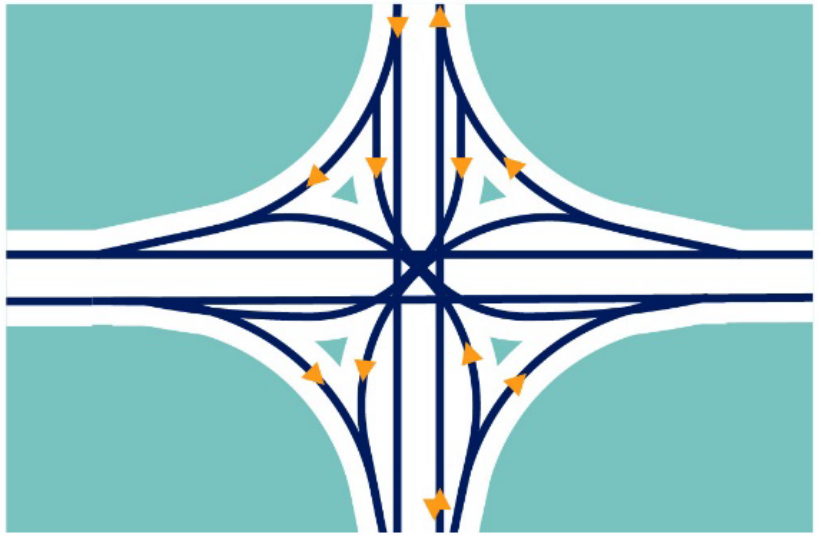
Single Point Urban Interchange

Alternative Not Viable Because:

- A Single Point Urban Interchange is not viable because it would result in operation failures for right-turns off of Highway 17 Southbound and left-turns off of the intersecting roadway

Alternative Design Explanation:

- With a Single Point Urban Interchange, Highway 17 through-traffic would be free flowing under an interchange bridge that would function as an elevated intersection for Highway 17 and the intersecting roadway.
- There would be on and off ramps to provide drivers access to this elevated intersection.



Single Point Urban Interchange

Overpass Bridge Alternative 1

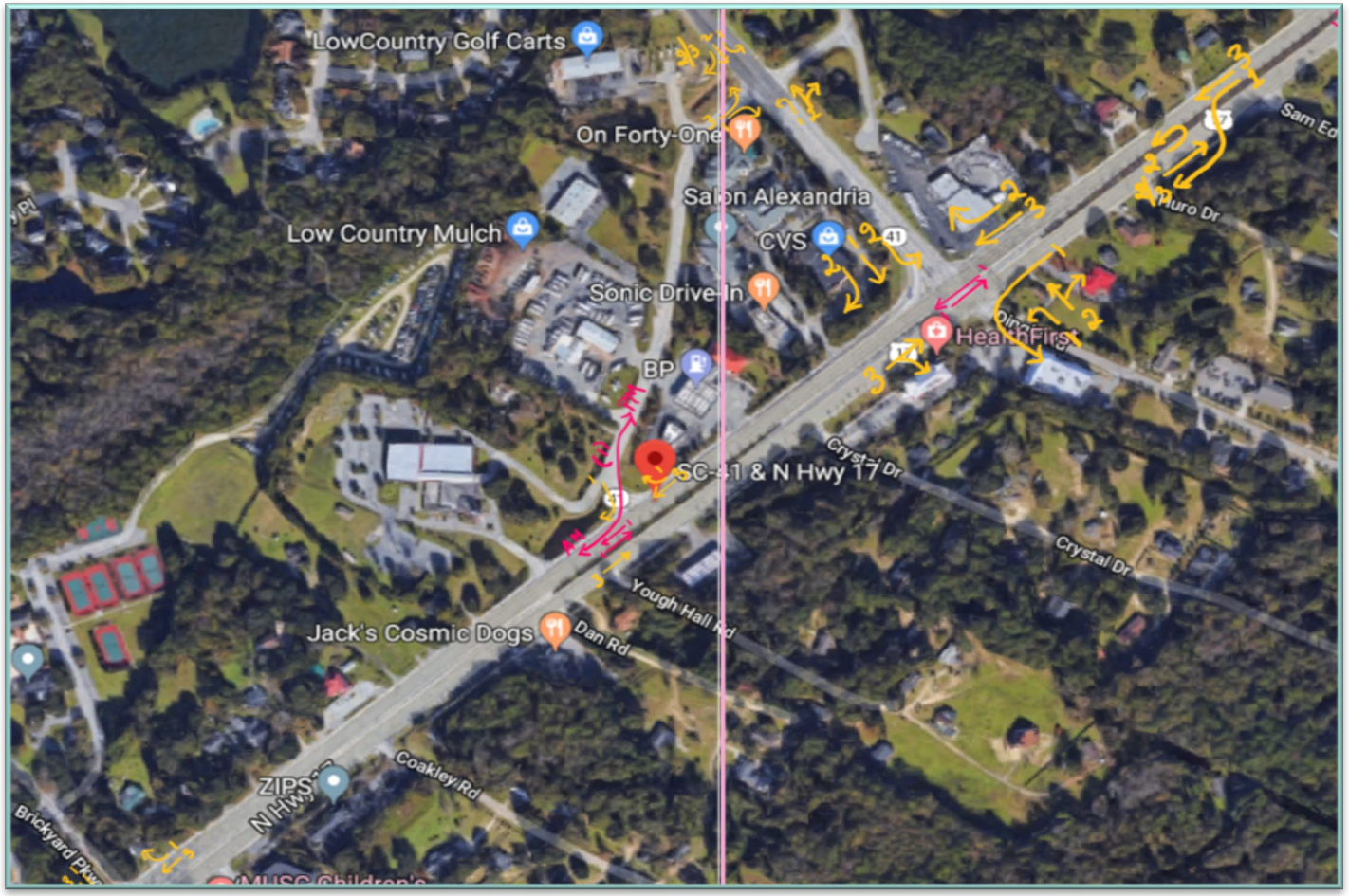
Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- Results in numerous lanes and access issues
- High costs for multiple bridges

Alternative Design Explanation:

- Two-lane bridge over Highway 17 at the Hamlin Road and Brickyard Parkway intersection with one lane in each direction.
- Bridge from Highway 17 to old Highway 41 with reversible lanes to serve the eastbound left-turns and southbound right-turns.
- Bridge at Highway 17 and Highway 41 with two peak traffic lanes and one off-peak traffic lanes).



Overpass Bridge Alternative 2

Alternative Dropped from Further Consideration

Alternative Design Explanation:

- Four-lane overpass bridge that extends from before the Hamlin Road & Brickyard Parkway intersection to past the Winnowing Way and Porchers Bluff intersection.
- Ground-level Restricted Crossing U-Turn intersection at the Highway 41 and Highway 17 intersection.
- Introduce roundabouts at the Hamlin Road & Brickyard Parkway intersection and the Winnowing Way & Porchers Bluff Road intersection to eliminate left turns.
- Will use access roads to create new alignment that would allow for quadrant roadway.

Alternative Not Viable Because:

- Results in multiple access issues
- Bridge would cost in excess of $30 million
- Traffic weaving issues at ramp entrance/exit points

Overpass Bridge Alternative 3

Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- Results in multiple access issues
- Bridge would cost in excess of $30 million
- Traffic weaving issues at ramp entrance/exit points
- Significant Environmental Justice impacts to the Seven-Mile community

Alternative Design Explanation:

- Four-lane overpass bridge that extends from before the Hamlin Road & Brickyard Parkway intersection to past the Winnowing Way and Porchers Bluff intersection.
- Ground-level Restricted Crossing U-Turn intersection at the Highway 41 and Highway 17 intersection.
- Introduce roundabouts at the Hamlin Road & Brickyard Parkway intersection and the Winnowing Way & Porchers Bluff Road intersection to eliminate left turns.
- Use access roads to create new alignment that would allow for two quadrant roadway.

Overpass Bridge Alternative 4

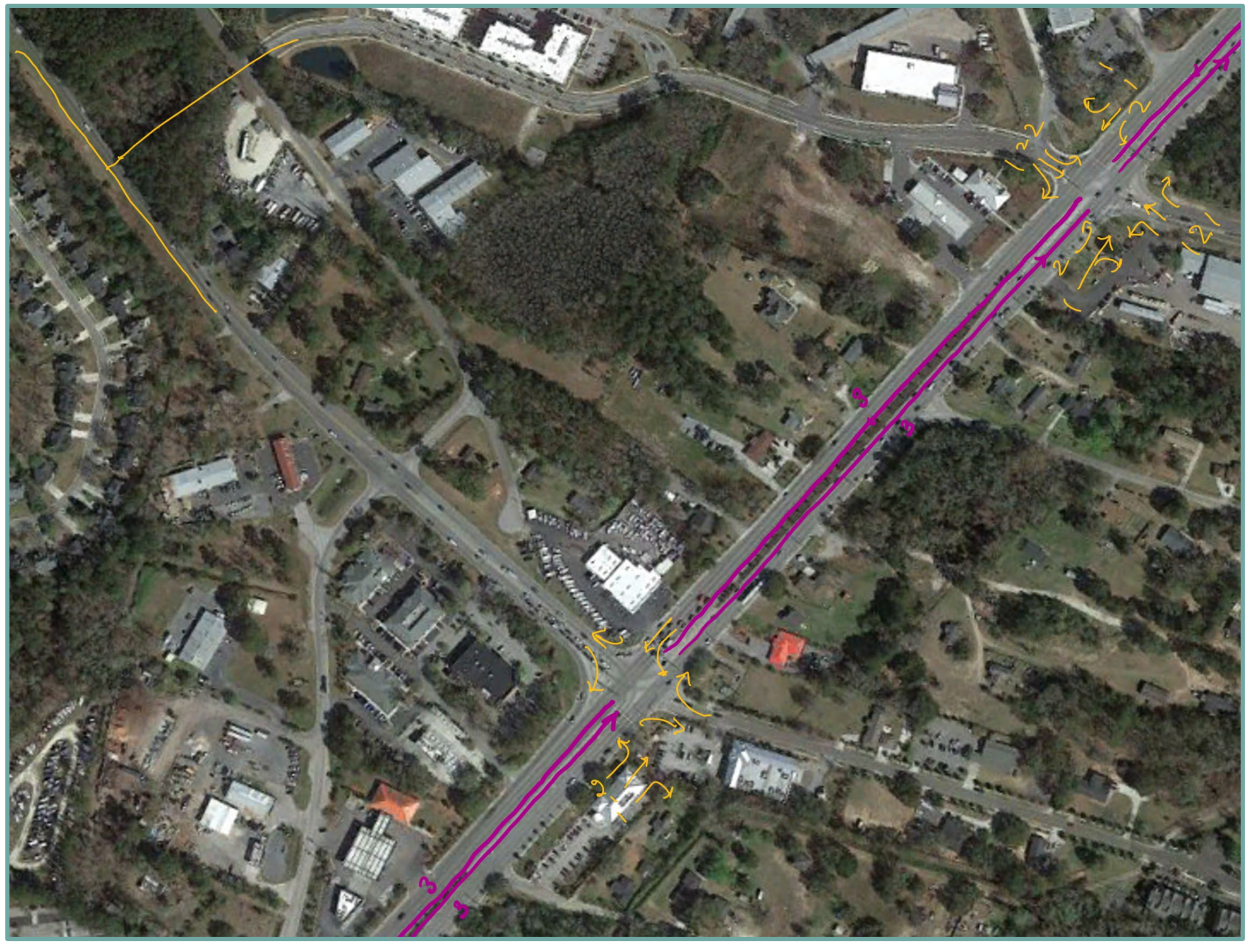
Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- Bridge would cost in excess of $30 million
- Creates traffic weaving issues at the ramps' entrance/ exit points

Alternative Design Explanation:

- Overpass bridge at Highway 17 and Highway 41 with a ground-level Restricted Crossing U-Turn intersection.
- Extend Winnowing Way to create a quadrant roadway
- Introduces roundabouts at Hamlin Road and Brickyard Parkway eliminating left-turns off of Highway 17.



Overpass Bridge Alternative 5

Alternative Dropped from Further Consideration

Alternative Design Explanation:

- Overpass bridge that extends from before the Hamlin Road & Brickyard Parkway intersection to past the Winnowing Way and Porchers Bluff intersection.
- Introduce roundabouts at the Hamlin Road & Brickyard Parkway intersection and the Winnowing Way & Porchers Bluff Road intersection to eliminate left turns
- Incorporate improvements to the old Highway 41 intersection.

Alternative Not Viable Because:

- Results in multiple access issues
- Bridge would cost in excess of $30 million
- Traffic weaving issues at ramps entrance/exit points

Overpass Bridge Alternative 6

Alternative Dropped from Further Consideration

Alternative Not Viable Because:

- Bridge would cost in excess of $30 million
- The extension of Highway 41 would have significant Environmental Justice impacts to the Seven-Mile community

Alternative Design Explanation:

- Incorporates an overpass bridge at the intersection of Highway 17 and Highway 41
- Extends Highway 41 to Billy Swails Boulevard
- Introduces roundabouts at Hamlin Road and Brickyard Parkway eliminating left-turns off of Highway 17

Intersection Alternatives Matrix

No Direct Effects/ Positive Improvements | Minor Impacts | Moderate Impacts | Major Impacts

Alternative Considered	Are there impacts to properties and businesses?	How significant is the cost?	Does this improve traffic flow?	Is this alternative viable?
Traditional Road Widening				X
Restricted Crossing U-Turn Intersection				X
Echelon Interchange				X
Continuous Flow Intersection				X
Diverging Diamond Interchange				X
Diamond Interchange				X
Single Point Urban Interchange				X
Overpass Bridge Alt 1				X
Overpass Bridge Alt 2				X
Overpass Bridge Alt 3				X
Overpass Bridge Alt 4				X
Overpass Bridge Alt 5				X
Overpass Bridge Alt 6				X

Why didn’t these alternatives work?

- High costs and logistics of multiple bridges
- Numerous lanes and access issues throughout
- Many of these alternatives would create unsafe weaving movements between lanes
- Significant impacts to homes, businesses, cultural resources

WHAT WE FOUND

Intersection Alternatives Analysis Findings

What We Found: Alternatives Findings Summary

- By 2045, there will be **freeway level traffic volumes** on Highway 17.
    - By 2045, approximately 90,000 cars per day will travel on Highway 17.
- The intersection design concept **must eliminate left turns** off of Highway 17 on Brickyard Parkway and Hamlin Road
- The Brickyard Parkway and Hamlin Road intersection will **NOT be able to accommodate** anticipated future traffic volumes without intersection improvements
- Need to **improve regional connections** with Billy Swails Boulevard to help reduce traffic volumes on Highway 17
- The extension of Winnowing Way will **divert most traffic** traveling from Highway 17 North to Hamlin Road along Billy Swails