FAST 2.0

Freeway, Arterial, Street, and Tactical Transit

AIRPORT BUS RAPID TRANSIT (BRT) MEMO

May 2025

Introduction

FAST 2.0 Transit Study

NCDOT and Triangle regional partners are continuing efforts to improve roads for public transportation with the Freeway, Arterial, Street and Tactical (FAST) Transit Study. Known as FAST 2.0, the study will make recommendations to create a more timely and efficient public transportation system in the Triangle region (Durham, Orange, Wake, Chatham, and Johnston Counties). The FAST 2.0 regional network frames out a larger, long-term network for transit in the study area, by including many of the major thoroughfares within the study area, as shown in Figure 1.

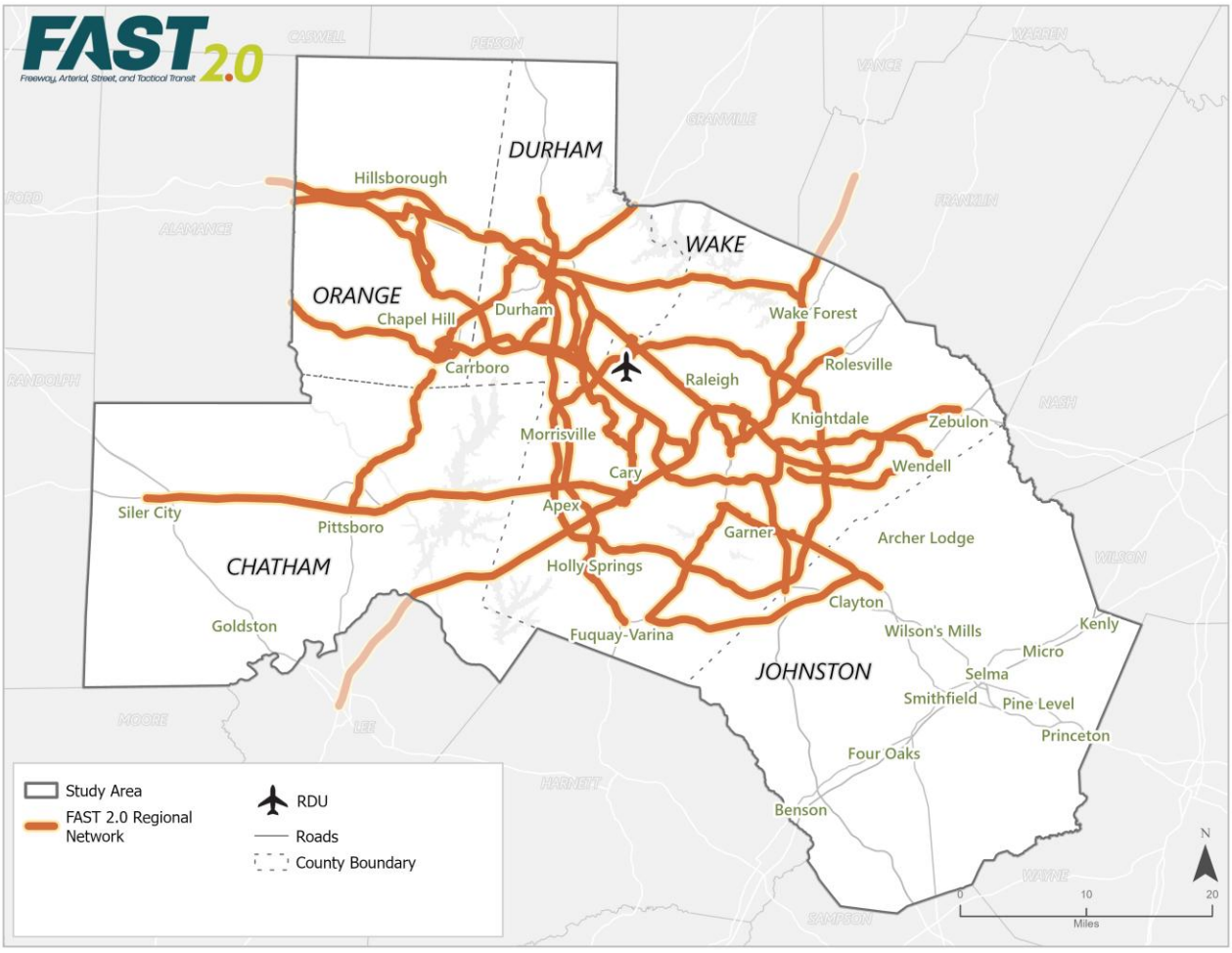

Figure 1: FAST 2.0 Regional Network

The study will include a high-level review of existing and planned transit routes/corridors in the Triangle region and identify a set of infrastructure improvements that could provide transit with faster and more reliable service. The infrastructure improvements will be better defined for a set of priority corridors, including direct access from I-40 to Raleigh-Durham International Airport (RDU), as shown in Figure 2.

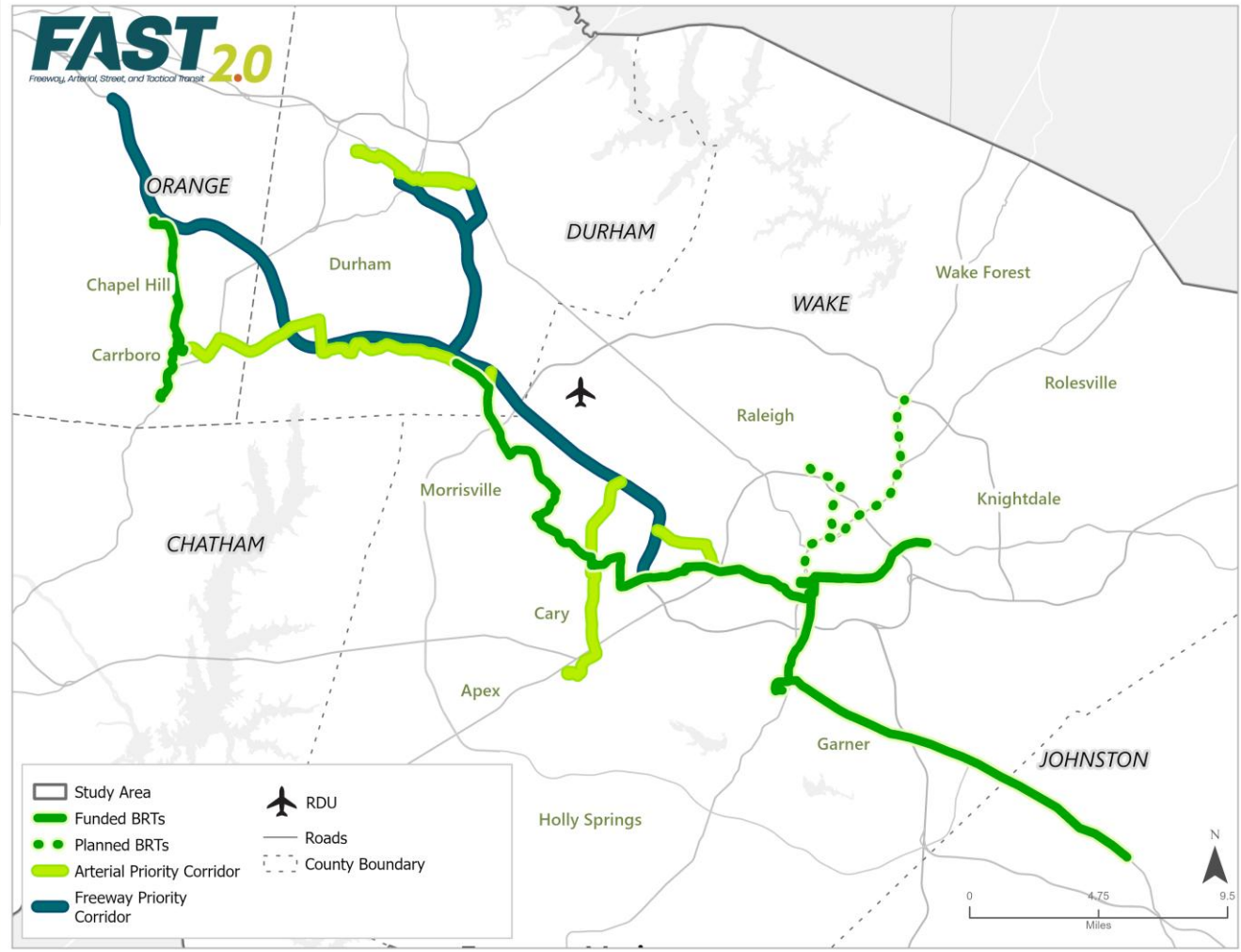

Figure 2: FAST 2.0 Priority Corridors

Purpose of the Memo

This memo accompanies the Airport Platform Exchange (APE) conceptual siting and design memo and describes route alignments and transit operating characteristics for conceptual Airport Bus Rapid Transit (BRT) service to directly connect the Triangle region downtowns and major destinations to the RDU. The conceptual operating characteristics, vehicle fleet requirements, and resulting annual costs are included for each alternative.

Proposed Service

Route Alignments

Multiple FAST 2.0 alignments from Durham, Cary, Chapel Hill, and Raleigh were analyzed. All proposed alignments would enhance existing transit service along major arterials and freeways throughout the Triangle to the APE, as shown in Figure 3.

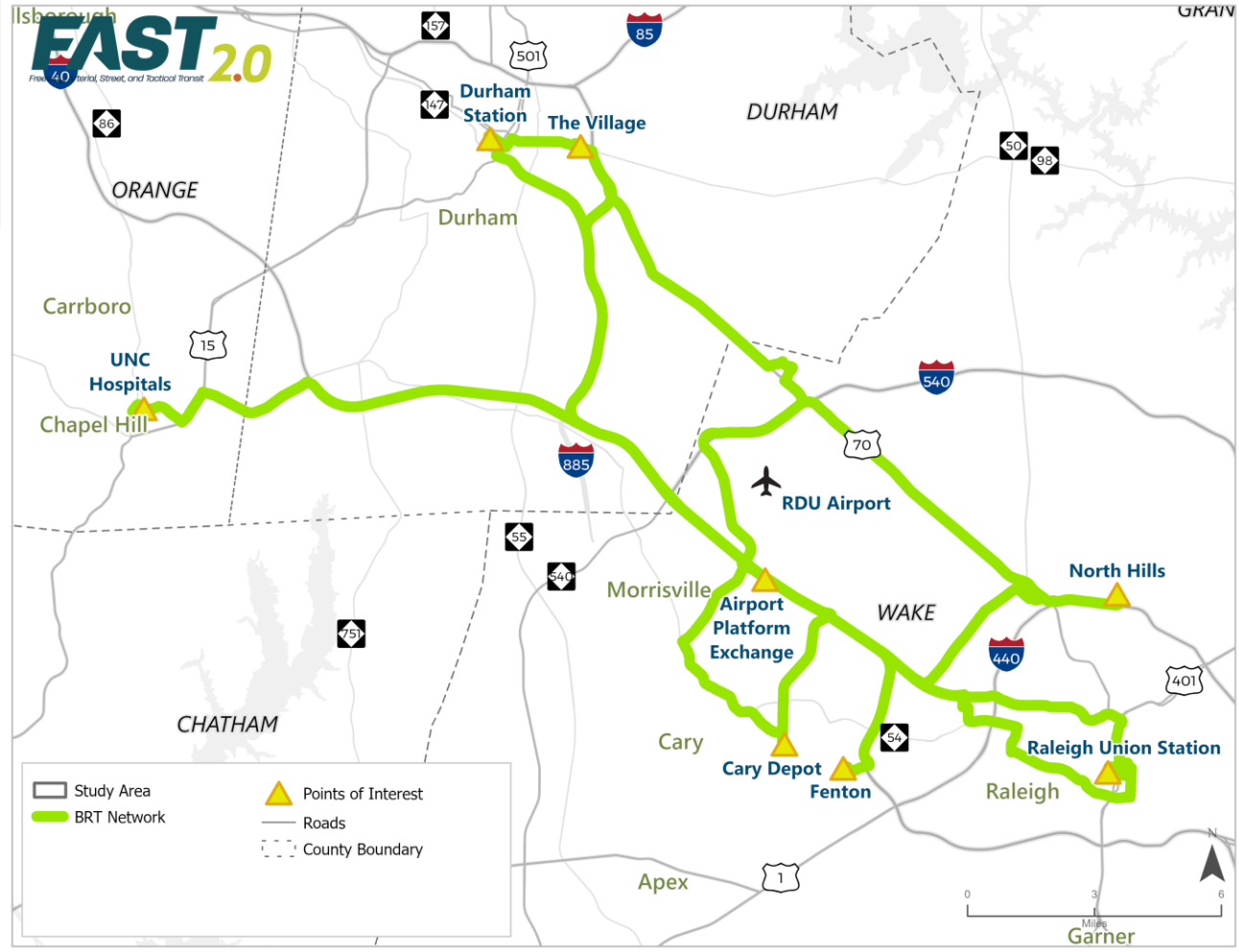

Figure 3: FAST 2.0 Airport BRT Route Alignments

Durham to RDU BRT Alternatives

Three alternatives for Durham to the APE service were explored, as shown in Figure 4. Alternatives 1 and 2 begin at Durham Station in downtown Durham. Durham Station is the central transfer center for all GoDurham routes and several GoTriangle routes. Alternative 3 begins at the Village Transit Center, a transit and commercial hub in East Durham.

- Alternative #1 (Blue) has the fastest travel time, using the Durham Freeway from downtown to I-40, making no stops in between.
- Alternative #2 (Green) uses the existing GoDurham Route 3 corridor along NC-98 to the Village Transit Center and then to the APE via I-885 to I-40.
- Alternative #3 (Orange) begins at the Village Transit Center and follows US-70, making multiple stops in the Brier Creek neighborhood. The APE is accessed via I-540 and Aviation Pkwy.

Figure 4: Durham to RDU BRT Routing Alternatives

Raleigh to RDU BRT Alternatives

There were four alternatives explored between Raleigh and RDU, as shown in Figure 5. Alternatives 1 and 2 begin at Raleigh Union Station and serve GoRaleigh Station in downtown Raleigh. Alternatives 3 and 4 begin in the North Hills neighborhood and do not serve downtown.

- Alternative #1 (Blue) follows the Western BRT corridor, using Western Blvd from downtown Raleigh to the North Carolina State Fairgrounds via NC State University. From the Fairgrounds, the service follows I-40 to the APE.
- Alternative #2 (Orange) is the fastest of the downtown alternatives, using Wade Ave out of downtown to I-40, serving the Ridgewood Shopping Center and Meredith College.
- Alternative #3 (Green) begins at the North Hills Shopping Center and uses I-440 to serve Crabtree Valley Mall, an outer-lying hub for GoRaleigh routes. The route continues south on Edwards Mill Rd to connect to I-40.
- Alternative #4 (Red) begins at the North Hills Shopping Center and uses I-440 and US-70 to the APE. Similar to alternative #3, service is provided to Crabtree Valley Mall, and additionally, Pleasant Valley.

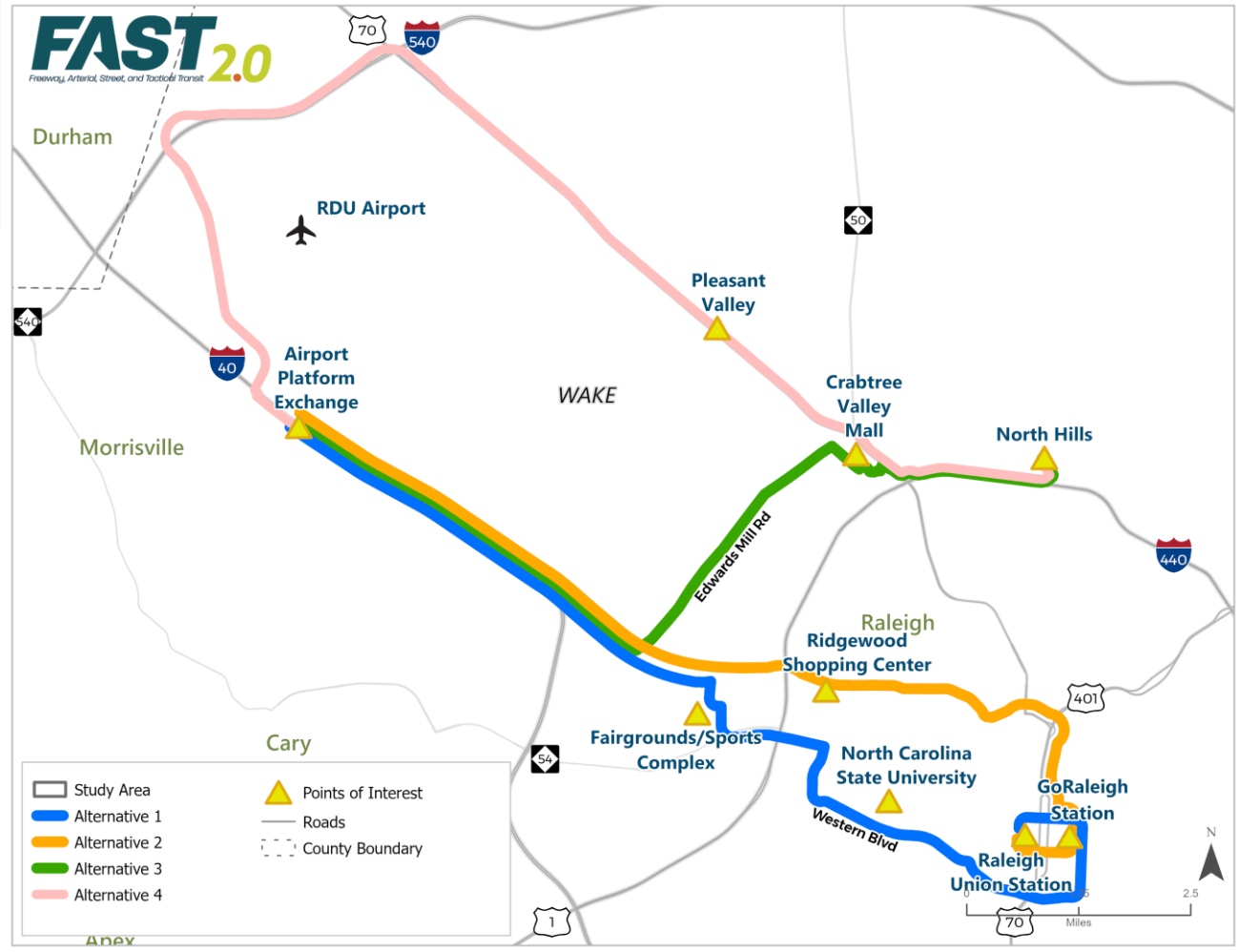

Figure 5: Raleigh to RDU BRT Routing Alternatives

Chapel Hill to RDU BRT Alternatives

Service between Chapel Hill and the APE initially considered routing from Chapel Hill UNC Hospitals and the Eubanks Park and Ride, both locations along the Chapel Hill Transit NS BRT. Upon further discussions, service from the Eubanks Park and Ride was deemed too remote and eliminated; only service from downtown was advanced, as shown in Figure 6.

- Alternative #1 (Blue) begins at UNC Hospitals and serves campus via Manning Dr. Routing continues east via NC-54 and I-40 before reaching its destination.

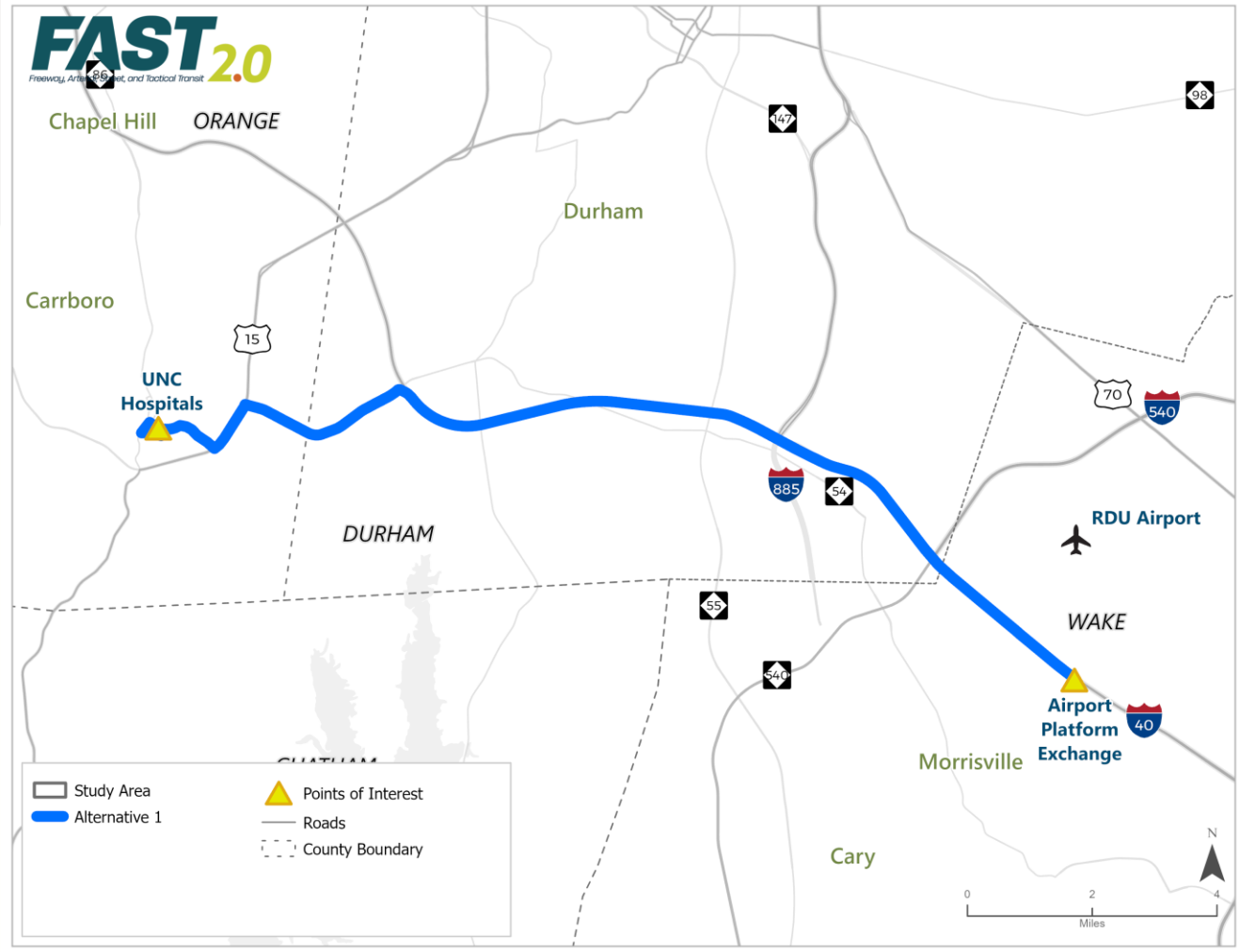

Figure 6: Chapel Hill to RDU BRT Routing Alternatives

Cary to RDU BRT Routing Alternatives

Of the four municipalities, Cary is the closest to the airport, making its alternative alignments some of the shortest. Three alternatives were explored between Cary and the APE, as shown in Figure 7. Two alternatives start at Cary Depot. Located in downtown Cary, Cary Depot is the primary transfer center for all GoCary routes and two GoTriangle routes. It also serves as the town's Amtrak station. The third alternative originates at Fenton, a mixed-use community.

- Alternative #1 (Blue) provides the quickest travel time between downtown Cary and the APE, mimicking much of GoCary's route 3 up Harrison Ave. The service would provide connections to the Harrison Pointe and Harrison Square shopping centers. The routing then follows I-40 to the APE.
- Alternative #2 (Orange) follows the Western Rapid Bus Extension on Chapel Hill Rd from Cary to Aviation Pkwy, serving Park West Village. The APE would be accessed by continuing north on Aviation Pkwy and entering the APE from the west on I-40 East.
- Alternative #3 (Green) is an express route from the Fenton development on Cary Towne Blvd to the APE via I-40.

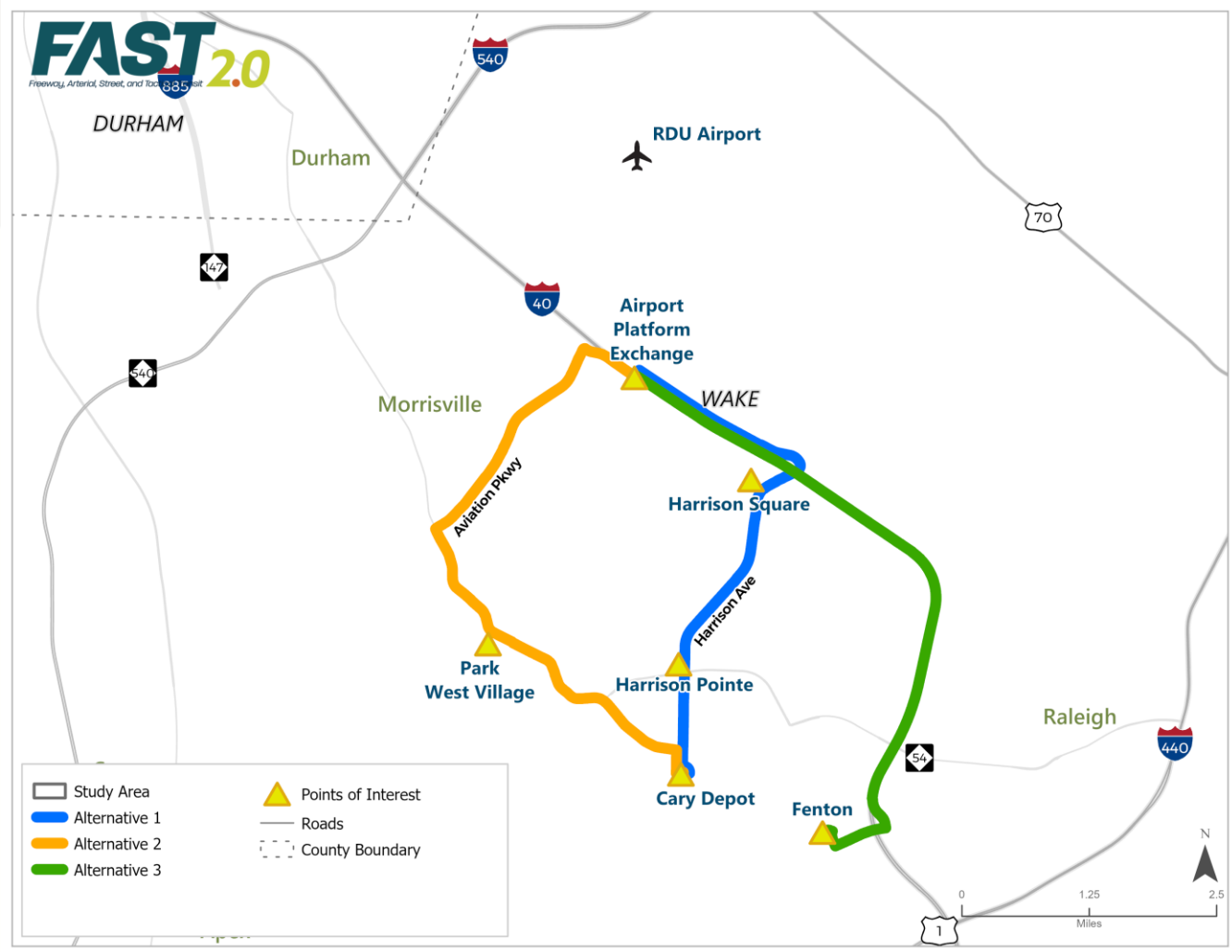

Figure 7: Cary to RDU BRT Routing Alternatives

Triangle Mobility Hub to RDU BRT Routing Alternatives

Also included in the BRT routing alternatives analysis is the Triangle Mobility Hub, GoTriangle's future transit hub in Research Triangle Park off of NC-54. The only viable alternative traverses I-40, west of the S Miami Blvd interchange in Research Triangle Park (RTP) to the APE as seen in Figure 8.

- Alternative #1 (Blue) utilizes a road next to the Park Point development which will extend into a direct access ramp onto I-40 and travels along I-40 to reach the APE.

Figure 8: Triangle Mobility Hub to RDU BRT Routing Alternatives

Operating Plan

The planning level operating model was developed with the following parameters.

Operating Speed

The operating speed assumptions vary by alternative and roadway section, as the service runs on multiple combinations of Interstates, US Highways, and State Roads, as shown in Table 1.

Table 1: Assumed Operating Speeds in mph

ORIGIN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Durham	41.2	37	34.5	
Raleigh	14.6	22.6	29.2	25.7
Chapel Hill	31.5			

Cary	24.9	25.3	29.7	
Triangle Mobility Hub	39.7			

Distance

Table 2 shows the roundtrip mileage to the APE for all alternatives.

Table 2: Roundtrip Mileage to Airport Platform Exchange

ORIGIN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Durham	33	35.8	40.2	
Raleigh	25.2	23.4	21.4	32.6
Chapel Hill	34.6			
Cary	10.8	13.4	13.8	
Triangle Mobility Hub	10.6			

Travel Time

Table 3 shows the estimated roundtrip travel time for each alternative in minutes. Each estimate includes layover time.

Table 3: Estimated Roundtrip Travel Time in Minutes to Airport Platform Exchange

ORIGIN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Durham	54	69	97	
Raleigh	76	68	47	84
Chapel Hill	78			
Cary	33	39	34	
Triangle Mobility Hub	22			

Layover and Recovery Time

An assumed layover time of twenty percent (20%) of the scheduled trip time was added to the travel time estimates for required driver breaks at the route origins. Additional layover time was included at each terminus to ensure adequate operator break time at the beginning and end of each cycle.

Span of Service Hours and Weekly Service Hours

Table 4 presents the span of service hours and weekly service hours.

Table 4: Span of Service and Weekly Service Hours

DAY OF WEEK	START	END	HEADWAY (MIN)	DAILY SERVICE SPAN (HRS)	DAYS PER WEEK	WEEKLY SERVICE SPAN (HRS)
AM Peak Hours	4:00 AM	10:00 AM	15	6	7	42
Mid-Day	10:00 AM	3:00 PM	30	5	7	35
PM Peak Hours	3:00 PM	7:00 PM	15	4	7	28
Evening	7:00 PM	1:00 AM	30	6	7	42
Total	**4:00 AM**	**1:00 AM**	**15-30**	**21**	**7**	**147**

Annual Revenue Hours and Miles

Table 5 shows the estimated annual revenue hours, revenue miles, and peak vehicles for each alternative.

Table 5: Annual Operating Model (Hours/Miles/Vehicles)

ORIGIN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Durham	40,698 hours 758,835 miles 5 peak vehicles	48,837 hours 823,221 miles 6 peak vehicles	56,977 hours 924,399 miles 7 peak vehicles	
Raleigh	48,837 hours 579,474 miles 6 peak vehicles	40,698 hours 538,083 miles 5 peak vehicles	32,558 hours 492,093 miles 4 peak vehicles	48,837 hours 749,637 miles 6 peak vehicles
Chapel Hill	48,837 hours 795,627 miles 6 peak vehicles			
Cary	24,419 hours 248,346 miles 3 peak vehicles	24,419 hours 308,133 miles 3 peak vehicles	24,419 hours 317,331 miles 3 peak vehicles	
Triangle Mobility Hub	16,279 hours 243,747 miles 2 peak vehicles			

Annual Operating Cost

Table 6 shows the estimated annual operating cost for each alternative, assuming service costs $250/service hour, based on existing GoTriangle cost model with an increase to account for inflation.

Table 6: Annual Operating Cost

ORIGIN	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Durham	$10,174,500	$12,209,250	$14,244,250	
Raleigh	$12,209,250	$10,174,500	$8,139,500	$12,209,250
Chapel Hill	$12,209,250			
Cary	$6,104,750	$6,104,750	$6,104,750	
Triangle Mobility Hub	$4,069,750			