



AIRPORT EXCHANGE PLATFORM 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.

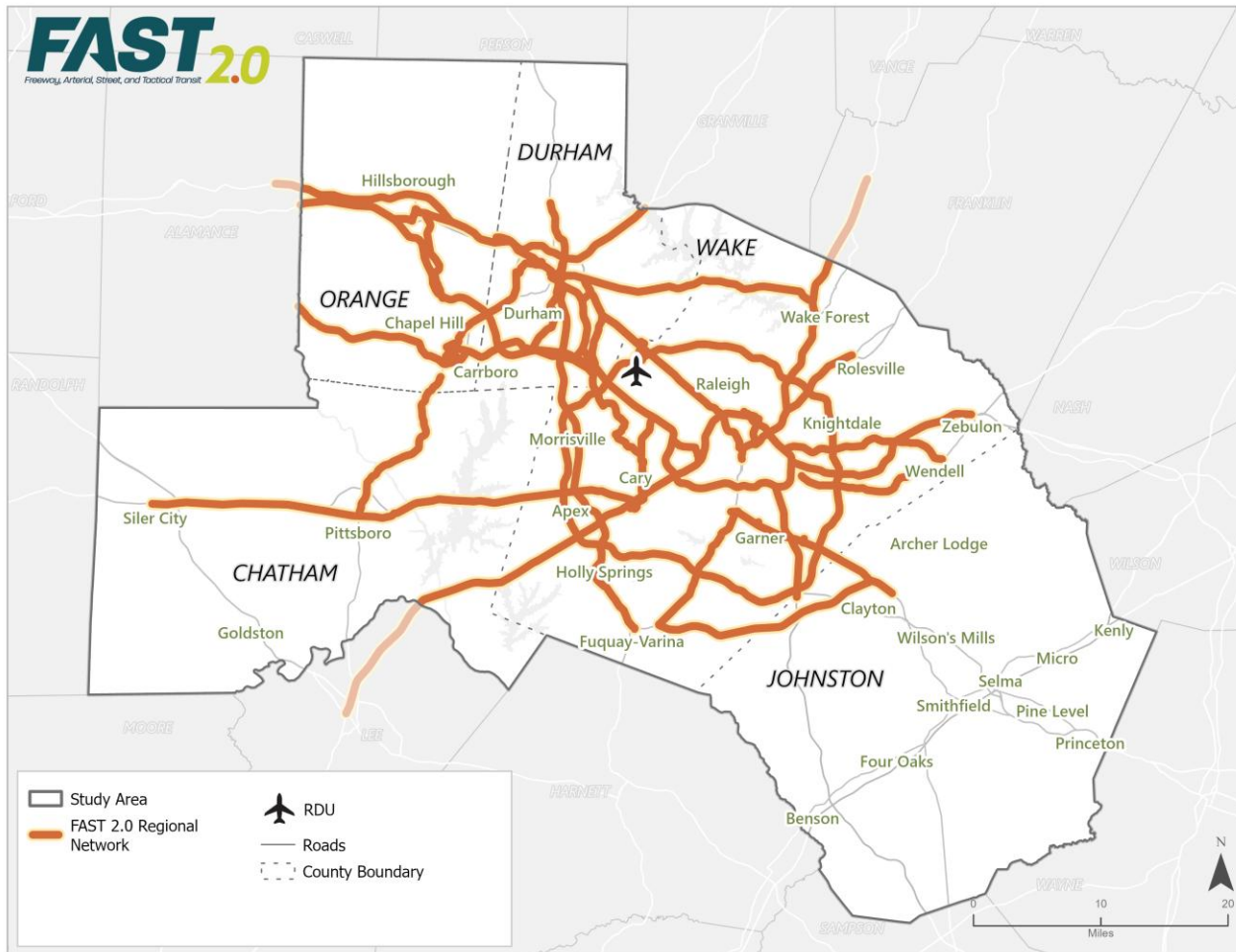


Figure 1: FAST 2.0 Regional Network

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.

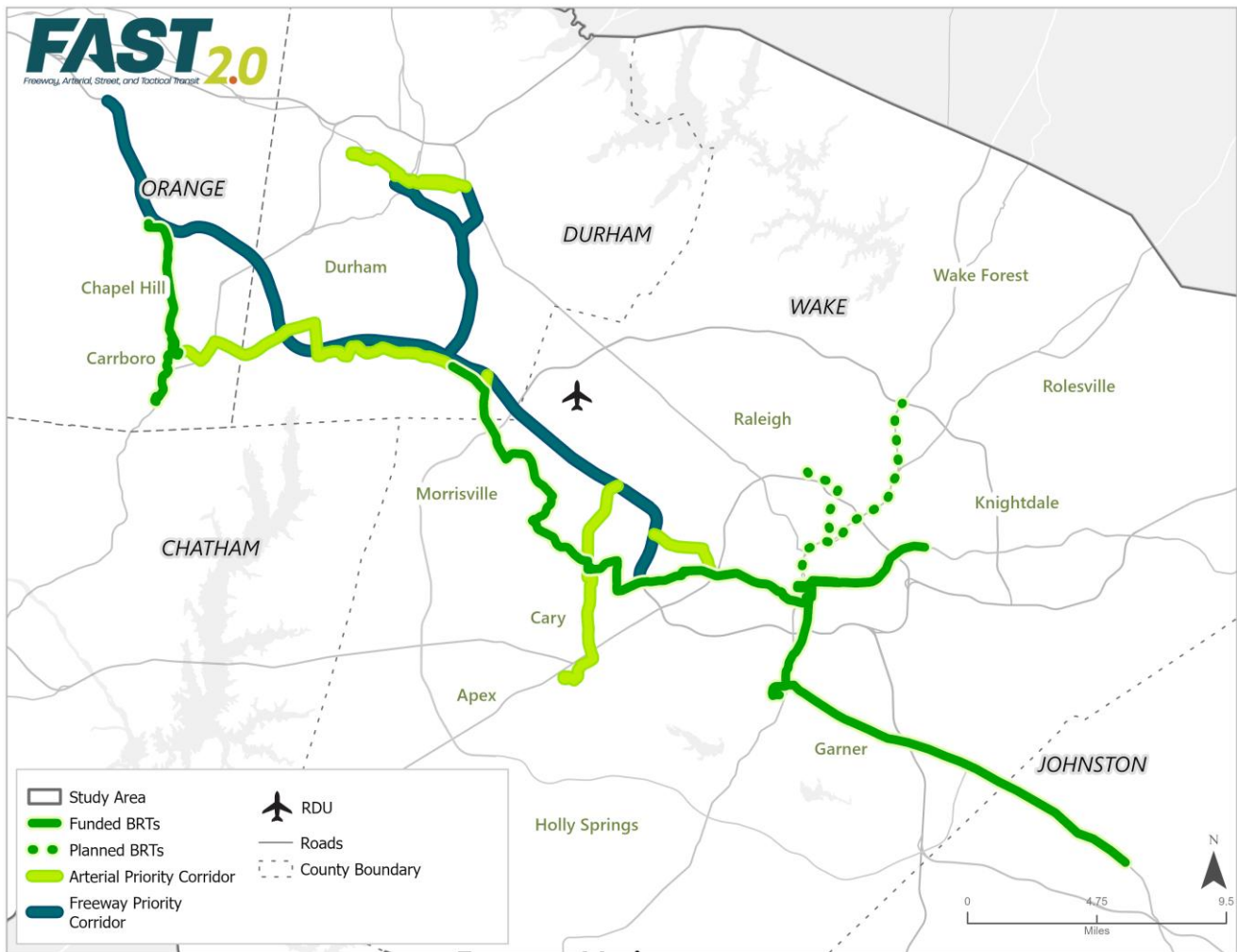


Figure 2: FAST 2.0 Priority Corridors

Purpose of the Memo

This memo provides an overview of the conceptual siting and design of a new regional transit airport exchange platform (APE) to directly connect the Triangle region's transit service to RDU, located in the approximate center of the Triangle region, directly on top of I-40, as shown on Figure 3. A cost estimate for the APE will be included in further stages of the FAST 2.0 project.

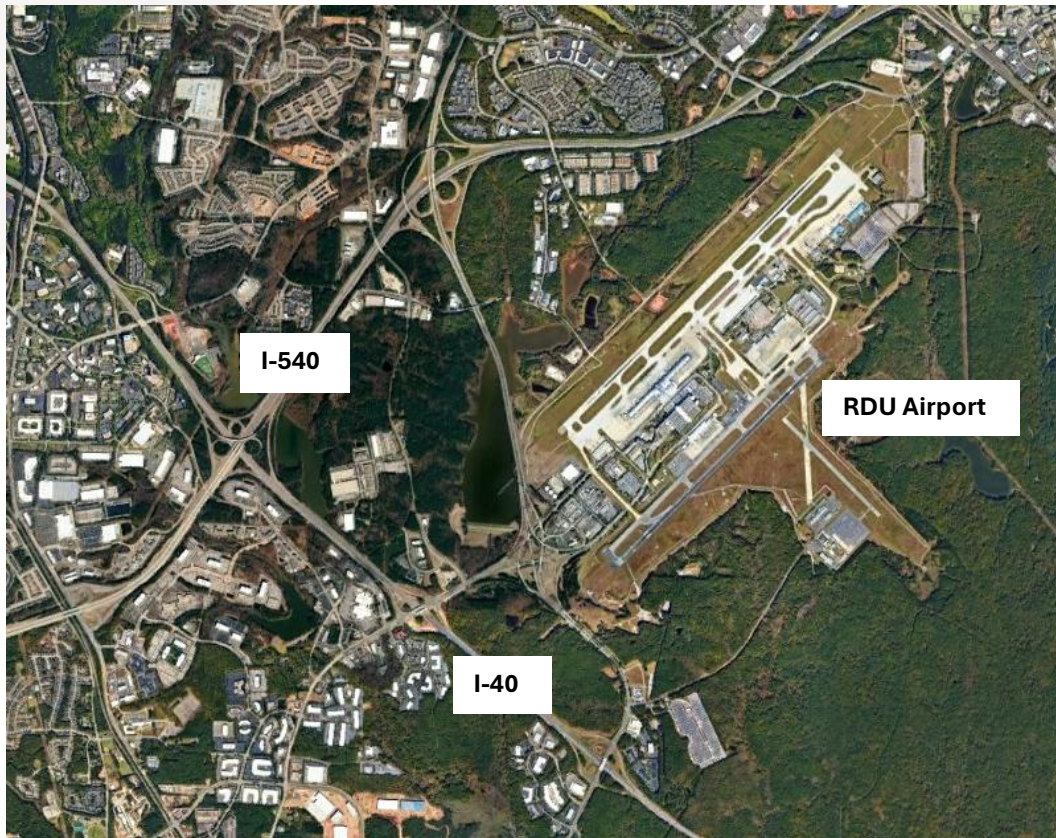


Figure 3: RDU

Overview of the Project

The proposed APE is a critical transit infrastructure project designed to provide a direct bus-based connection between the Triangle region's transit services and RDU. By facilitating seamless travel for passengers between RDU and regional transit systems, the APE will improve accessibility, reduce travel times, and support the Triangle region's broader transportation goals of enhancing transit infrastructure and supporting service. The project aims to create a modern, efficient, and user-friendly APE that is strategically located to maximize convenience and accessibility.

It will serve as a vital link between the regional transit system and RDU, providing a direct link for passengers from municipal downtowns, regional mobility hubs, and arterial BRT service to RDU. The design of the station will prioritize ease of use, with clear signage, comfortable waiting areas, and an efficient transfer point with RDU. By enhancing access to RDU, the APE will support regional tourism and business travel.

Project Background

Context and Need for the Airport Transit Platform Exchange

The Triangle region has previously worked on a plan to create a commuter rail line to connect major destinations in the region. One element of the commuter rail planning that was never completed was the provision of a direct transit connection to RDU. This direct connection has been identified as a necessity by the public and championed by the business community. The region has moved away from commuter rail and is now planning for a regional transit

system to connect major destinations with bus-based service: shuttles, regional buses, express buses, and BRT. The region has a robust transportation system for cars and the FAST 2.0 Transit Study aims to identify infrastructure improvements that would provide transit an advantage or priority over vehicular traffic, such as dedicated transit lanes, transit signal priority, etc.

The new APE will address the need for a direct bus link between regional transit and RDU, thereby improving the overall transportation network and meeting the needs of the public and business community. GoTriangle currently provides two services to RDU. Route 100 directly connects RDU to the GoTriangle Regional Transit Center and downtown Raleigh. The RDU shuttle provides direct service between the GoTriangle Regional Transit Center and RDU. The goal of the APE is to provide a direct interface with RDU for all regional transit routes to provide a one-seat rider from the region's downtowns.

As the regional population and employment continues to grow, the need to enhance the transit infrastructure becomes increasingly critical. The current regional transit options to RDU are limited and could be greatly improved with the introduction of the APE and other transit infrastructure improvements along the region's major arterials and interstates.

While transfers between different regional transit routes could occur at the APE, the intent is to facilitate direct transfers for passengers between the regional transit services and RDU.

Stakeholders Involved

The FAST 2.0 Transit Study stakeholders include RDU, RTA, Research Triangle Foundation, local and regional transit agencies, county governments, metropolitan/transportation planning organizations, and NCDOT, as shown in Figure 4. At the beginning of the study, stakeholder involvement was primary aimed at the RDU executive leadership team, to understand the needs of RDU and any restrictions on the placement or design of the APE. After receiving input from RDU staff, the draft siting location and conceptual design were shared with the full FAST 2.0 Transit Study stakeholders for review and comment.

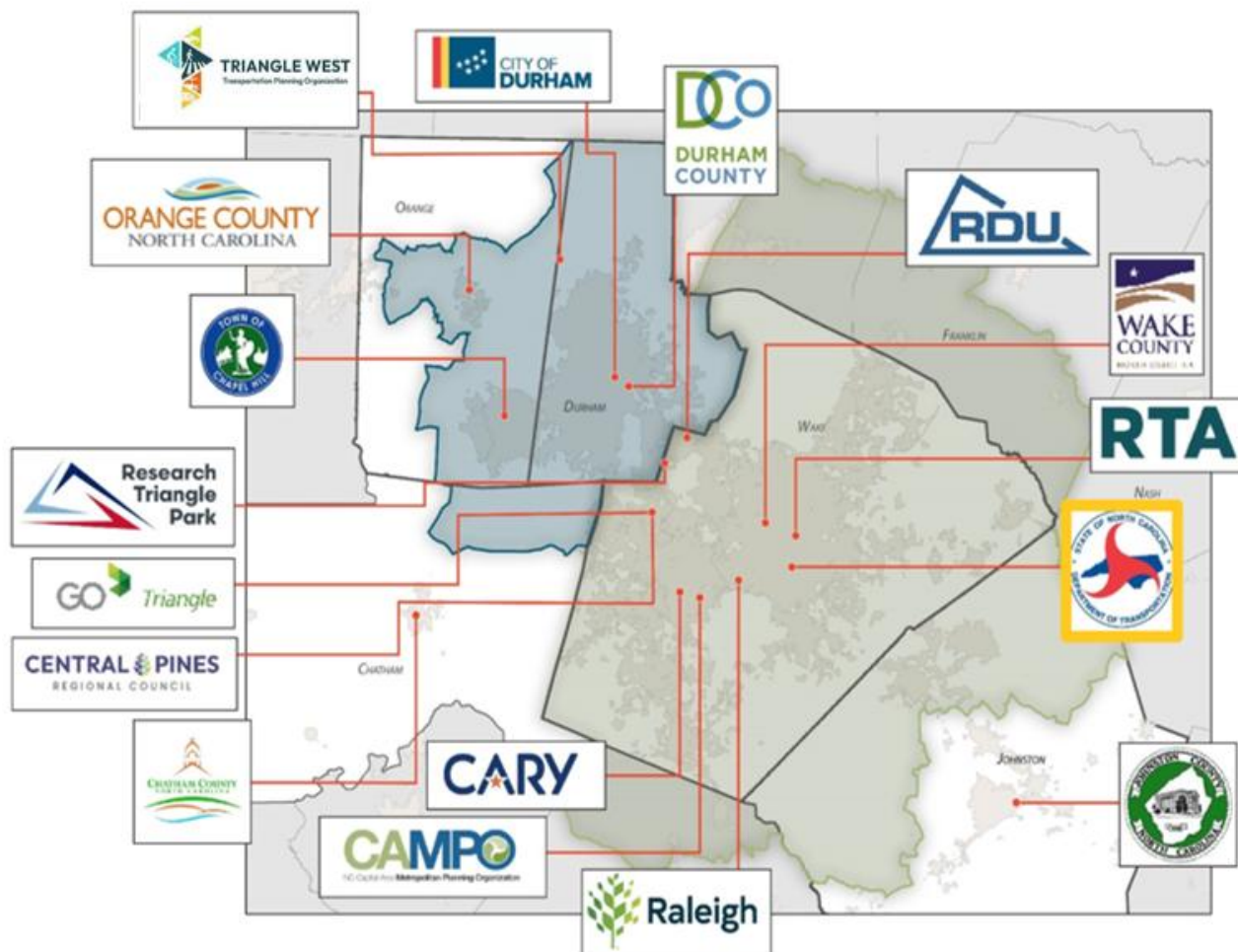


Figure 4: FAST 2.0 Regional Partners

Siting and Design Requirements

The following siting and design requirements were identified as important elements by the project team and RDU staff input that should be considered to ensure the APE is functional. They include:

- Minimize Delays for Regional Buses Leaving I-40
- Consider Scalability of the Site: BOSS & DMSS
- Site the Exchange Station on Top of I-40
- Ensure Site is Seen as “Regional” by Key Partners
- Avoid Siting the Exchange Station Below the Extended Runway Lines
- Connect to RDU Terminals with Autonomous Shuttles
- Minimize Total Travel Time Between Exchange Station and Airport
- Minimize Required Walking/Pedestrian Travel Distance for Patrons

Minimize Delays for Regional Buses Leaving I-40

Minimizing delays for regional buses leaving I-40 is crucial for maintaining efficient transit operations and ensuring timely service for passengers. The design should incorporate direct transit access ramps (DAR) that allow regional buses to bypass general traffic congestion. These ramps should be strategically placed to provide direct and unobstructed routes from I-40 to the APE. Additionally, the ramps should serve both the existing Bus on Shoulder System (BOSS) lanes, located on the outside shoulder and the proposed Dynamic Median Shoulder System (DMSS) lanes, located on the inside shoulder; buses can use these lanes under certain conditions to avoid congestion along I-40 as shown in Figures Figure 5, Figure 6, and Figure 7. The FAST 2.0 Suite of Options memo provides more information about BOSS, DMSS, and DAR.

The placement of the APE waiting area should be in close proximity to the direct transit access ramps to minimize the distance buses need to travel off I-40. This ensures a quicker transition to the station and allows buses going to other points after RDU to maintain schedule adherence.



Figure 5: Existing Bus on Shoulder System (BOSS) Lanes



Figure 6: Dynamic Median Shoulder System (DMSS) lanes



Figure 7: Direct Transit Access Ramp from DMSS lanes

Consider Scalability of the Site: BOSS & DMSS

The design should consider the scalability of the site to accommodate future growth and expansion. This involves planning for flexible and adaptable infrastructure that can support increased passenger volumes and additional transit and autonomous shuttle services. The design should incorporate direct transit access ramps to connect to both existing BOSS lanes along I-40 as well as the planned DMSS lanes to provide efficient and scalable transit operations.

Site the Exchange Station on Top of I-40

RDU staff stated at initial meetings that the APE placement should minimize use of airport property. Siting the APE on top of I-40 can provide several benefits, including maximizing land use efficiency and enhancing connectivity. The design should consider structural and engineering requirements to ensure that the APE can be safely and effectively built on top of the I-40. This may involve elevated platforms, bridges, and support structures to accommodate the

station's infrastructure. The placement should prioritize ease of access for buses and passengers, with dedicated entry and exit points to facilitate smooth transitions between I-40 and the station.

The ultimate design should consider features such as noise dampening systems to minimize the impact of I-40's traffic and RDU's flights on the station environment. These measures will help to create a comfortable and quiet environment for passengers. Additionally, the design should consider the use of green spaces and landscaping, and/or indoor elements, to enhance the aesthetic appeal of the station and provide a pleasant environment for passengers.

Ensure Site is Seen as “Regional” by Key Partners

Ensuring that the site is seen as a "regional" hub by key partners, specifically the major transit agencies in the region (Chapel Hill Transit, GoDurham, GoCary, GoRaleigh, and GoTriangle) is vital for garnering support and recognition for the project. The proposed location should be easily accessible for buses coming from North, South, East, and West of RDU without adding unnecessary travel to regional routes. Placement of the APE on top of I-40, on the southwestern edge of RDU, provides the best intersection with existing and planned regional transit routes.

Avoid Siting the Exchange Station Below the Extended Runway Lines

To ensure safety, traveler comfort, and compliance with aviation regulations, the exchange station should not be sited below the extended runway lines of RDU, as approximately shown in Figure 8. The design should prioritize areas that are outside the critical zones affected by aircraft operations. This includes considering factors such as noise pollution, air quality, and potential disruptions caused by airport activities. The APE's placement should ensure a comfortable environment for passengers, minimizing exposure to noise and other disturbances associated with airport operations.

Connect to RDU Terminals with Autonomous Shuttles

RDU is in discussions with autonomous vehicle vendors to complement the existing park and rider shuttle fleet. Connecting the exchange station to RDU terminals with autonomous shuttles can provide a modern and efficient transit solution. The use of autonomous vehicles can reduce travel time, enhance safety, and provide a convenient transit option for passengers.

The design should prioritize direct and unobstructed routes for autonomous vehicles, minimizing travel time between the exchange station and airport terminals. The design should incorporate dedicated guideway and transit lanes, transit signal priority, and other infrastructure to support autonomous shuttle operations. Real-time information systems should be integrated to provide passengers with up-to-date information on vehicle schedules and availability.

Future collaboration with technology providers and transportation authorities will be essential to ensure that the design meets all operational and safety requirements. This includes charging stations, maintenance facilities, and communication systems to ensure seamless connectivity.

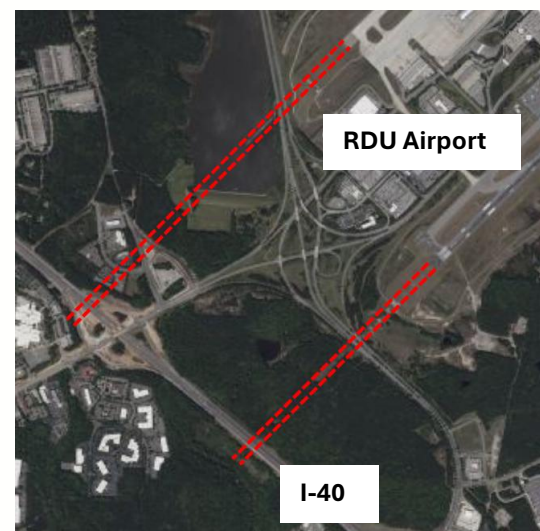


Figure 8: Extended RDU Runway Lines

Minimize Total Travel Time Between Exchange Station and Airport

Minimizing the total travel time for the autonomous shuttles between the APE and RDU terminals is essential for enhancing passenger convenience and efficiency. The design should prioritize locations that can provide direct and unobstructed routes between the APE and RDU terminals. This may involve dedicated guideways and transit lanes, transit signal priority, and an efficient interface between the RDU property and the APE. Additionally, the APE should be equipped with real-time information systems that provide passengers with up-to-date information on transit schedules and travel times.

Minimize Required Walking/Pedestrian Travel Distance for Patrons

The design should minimize the required walking and pedestrian travel distance for patrons to enhance accessibility and convenience. This involves strategically placing key amenities and transit connections within close proximity to each other. The layout should prioritize direct and unobstructed pathways, with clear signage and wayfinding to guide passengers between the regional buses and autonomous shuttle. Accessibility features such as should be incorporated to ensure that the APE is fully accessible to people with disabilities.

Weather protection is another important consideration for minimizing pedestrian travel distance. The design should include covered walkways, shelters, and/or indoor waiting areas to protect passengers from adverse weather conditions. Comfortable seating and well-lit areas will also enhance the overall pedestrian experience, making the station a more pleasant and welcoming environment.

Site Analysis

Location Description

The proposed site for the APE is strategically located above I-40, within NCDOT right-of-way, along the RDU property frontage. This location will maximize accessibility and convenience for passengers by allowing regional transit service to leave I-40 with a direct transit access ramp, quickly pick-up/drop-off passengers on the APE and return to I-40 with a direct transit access ramp.

RDU will be able to use the existing airport campus shuttle system as well as the planned future autonomous shuttle system to move passengers between the APE and the two terminals. The on-airport shuttle system concept is noted, but this memo does not include any detailed design.

Existing Conditions

A high-level existing conditions analysis, along I-40, in the vicinity of the Airport Boulevard and Aviation Parkway interchanges, included consideration of land use, traffic patterns, geographic location, flight path restrictions, environmental factors, and existing/planned infrastructure. This analysis was based on readily available digital information (GIS mapping, environmental features, traffic counts, etc.), conversations with RDU and NCDOT staff, and review of planned projects in the area. This information was used as data to evaluate the siting and design requirements.

Design Concept

This project is limited to the conceptual siting and design of the APE. However, this effort assumes the following general design concept elements that will be refined in future phases of the project.

Functional Requirements

The APE will be designed to accommodate high volumes of passengers and provide efficient, safe, and comfortable transit services. Key functional requirements include ample seating, clear signage, accessibility features, and integration with regional transit service and RDU facilities. The design will prioritize ease of use and convenience for all passengers and provide a pleasant and convenient environment for transferring between regional transit and the airport autonomous shuttle.

Passenger crowding will be optimized using spacious waiting areas, limited distance between bus/shuttle bays, and clear directional signage. This integration will ensure that passengers, including those with disabilities, can transfer quickly and easily between different modes of transportation. Additionally, the design will prioritize safety and security, with well-lit areas, surveillance cameras, and emergency response protocols.

Architectural Vision

The architectural vision for the APE emphasizes functionality, aesthetics, and sustainability. The design will feature modern, innovative elements that enhance the passenger experience while reflecting the Triangle Region and RDU's unique character. The station will serve as a landmark, seen by all drivers along I-40, showcasing the region's commitment to forward-thinking design and enhancing transit access to the airport.

Regional Transit Route Integration

The APE will be a critical element of the existing and planned regional transit network and enhance the overall connectivity of the Triangle region's transportation system. The design will prioritize ease of access and convenience for passengers. Collaboration with regional transportation authorities and transit agencies will be essential to ensure that the integration is successful.

Conceptual Design

The maps and diagrams developed for the FAST 2.0 study are highly conceptual in nature, are not for design purposes, and subject to further review and refinement in following phases. The design was prepared in a manner to verify the approximate siting location, identify a concept that is usable by transit vehicles and autonomous shuttles, and develop an initial cost estimate.

Future phases of the project will include more detailed analysis, refined site plans, architectural drawings, cost estimate, and visualizations to support the APE.

Proposed Siting Location

Figure 9 shows the three proposed siting locations, above I-40, that will require further environmental evaluation and discussion with RDU before identifying a single location:

1. Southeast of I-40/Airport Boulevard interchange
2. Northwest of I-40/Aviation Parkway interchange
3. Southeast of the I-40/Aviation Parkway interchange and adjacent to the RDU Park and Ride Lot 3

The airport platform exchange is primarily located within NCDOT right-of-way, though minimal acquisition of RDU property, or a permanent easement, would be required.

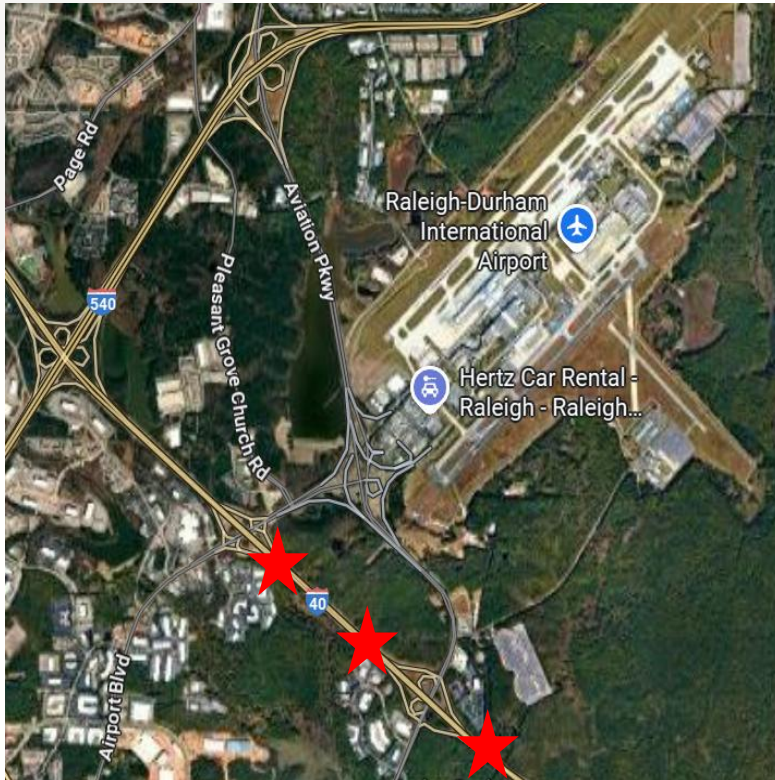


Figure 9: Proposed Siting Locations

Conceptual Design

The APE has several key elements of design as seen in Figure 10. Two types of ramps are utilized to allow bus access to the platform exchange: BOSS ramps and direct access ramps servicing both the eastern and western side. One unique aspect of the APE is the clockwise traffic movements. This allows the platform to be accessed by right door buses. The RDU shuttles would enter from a private airport entrance in the northern roundabout. It is recommended that there is a gate for this entrance to prevent other vehicles from entering RDU property outside of the APE. An elevated bus platform should be included for passengers to use to get from their bus to the RDU autonomous shuttle.

Design Concept

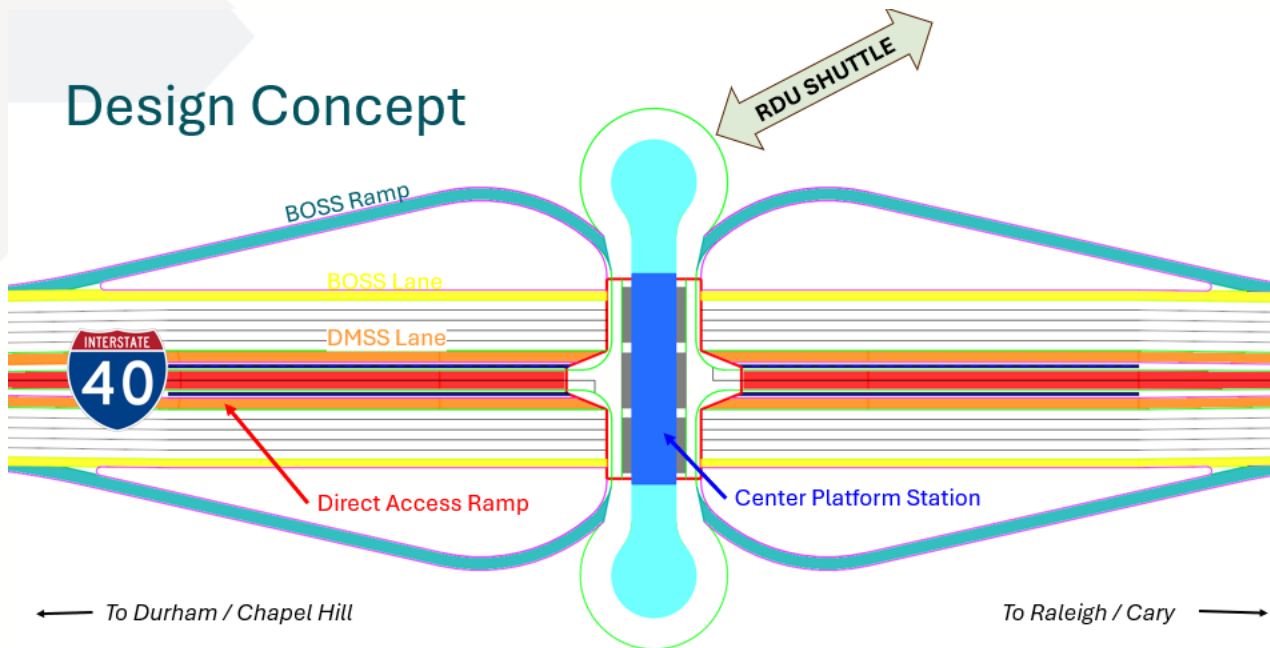


Figure 10: Key Elements of the APE

The APE design provides six (6) bus bays along the center platform with room for an enclosed waiting area. The enclosed waiting area would serve as an exchange station for passengers to connect among various transit routes and the RDU airport shuttle service. Access between transit/shuttle services would occur along the longitudinal elements of the station (the bridge over I-40). The roadway would be two lanes wide along the bridge (the inside lane would be the transit station bays, while the outside lane would be for clockwise circulation) and a single lane along the roundabouts. The station width along the bridge would be sufficient for waiting passengers for routes on both sides of the station, while still allowing for passenger movement in the center between bays and to access any amenities or services within the two roundabout bulbs. It should be noted that no passenger amenities are depicted in these visualizations.