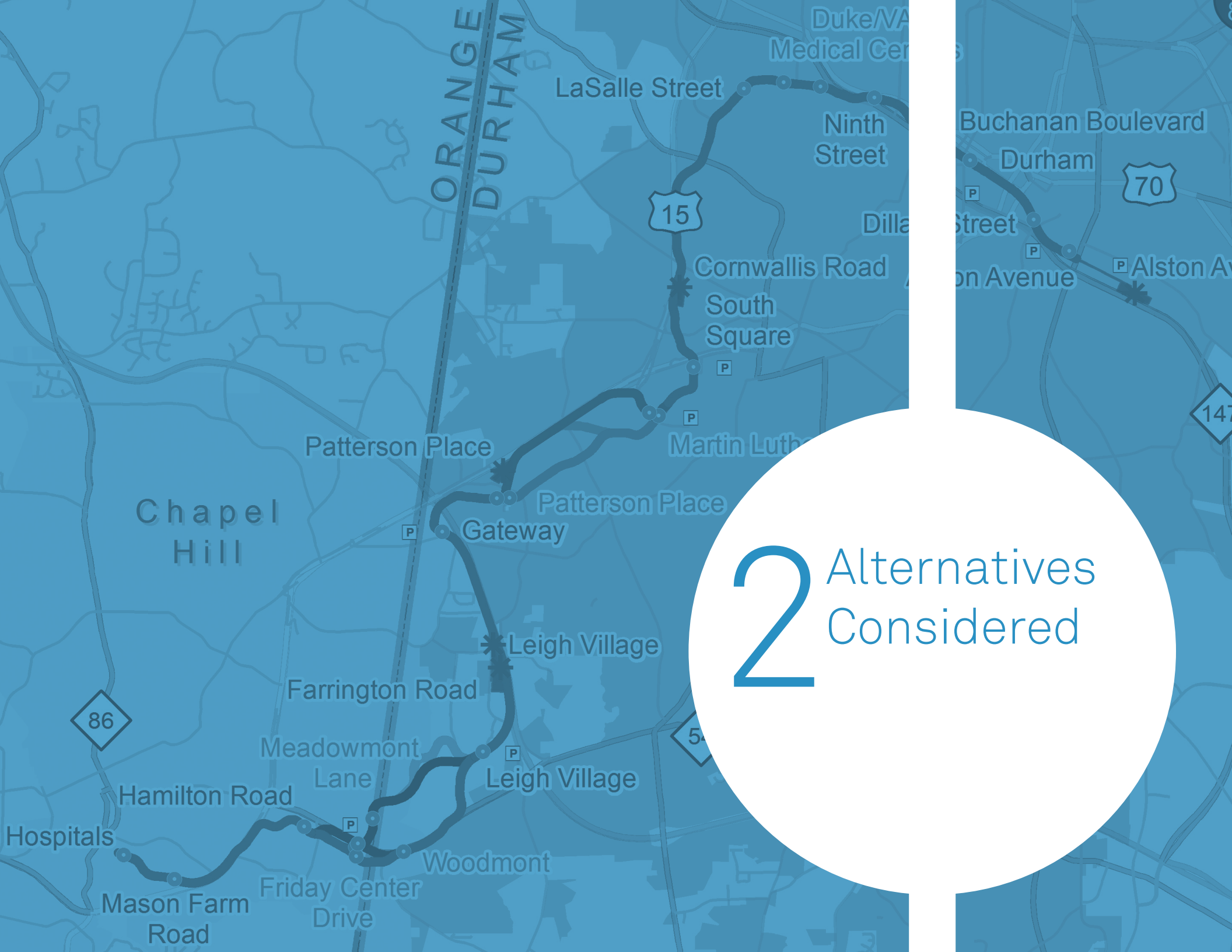

2 Alternatives Considered

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2 Alternatives Considered

Triangle Transit, in cooperation with the Federal Transit Administration (FTA), prepared this Draft Environmental Impact Statement (DEIS) to evaluate the NEPA Preferred and Project Element Alternatives within the Durham-Orange (D-O) Corridor, between Chapel Hill and Durham. This chapter describes the development of the alternatives considered in this DEIS.

The project alternatives evaluated in detail in this DEIS were derived from a lengthy planning process that is summarized in DEIS section 2.1.

Alternatives Considered

40 C.F.R. § 1502.14 - Considered the heart of the Environmental Impact Statement. This chapter includes a discussion of the reasonable range of alternatives considered throughout the planning process as a means to address the needs identified in the Purpose and Need (DEIS chapter 1).

2.1 Planning History

Planning for high-capacity transit in the Triangle region began more than 20 years ago, and a number of studies have been conducted to advance major transit investments in the area, including extensive coordination with stakeholders and members of the public to develop, evaluate, and refine the range of alternatives (**Figure 2.1-1**).

The key studies, white papers, and reports that identified the need for high-capacity transit in the region and defined the D-O Corridor are summarized in the sections below, chronologically represented on **Figure 2.1-1** and incorporated into this DEIS by reference. As shown on **Figure 2.1-2**, the blue boxes illustrate recommendations for development of transit options within the D-O Corridor based on the previous studies identified in **Figure 2.1-1**. The *US 15-501 Major Investment Study* (MIS) also resulted in corridor preservation as represented by the light blue box in the same figure. The gray boxes illustrate the major reports prepared during project planning phases. The four major planning studies are discussed below. The last study prior to the preparation of this DEIS is the Alternatives Analysis (AA). The AA built on the public and stakeholder outreach and results of these prior studies and provides additional detail summarizing each study and the outcomes.

2.1.1 US 15-501 Major Investment Study (MIS) (1998 and 2001)

The *US 15-501 MIS* was a multi-phased effort that included extensive public involvement to evaluate fixed-guideway transportation alternatives in the D-O Corridor. The first phase was published in 1998 followed by the second phase in 2001. Several transportation corridors and transit technologies including light rail transit (LRT), diesel multiple units train, bus, and busway/mixed traffic (similar to bus rapid transit [BRT]) were evaluated based on criteria that included transportation and mobility effectiveness, potential for community and environmental impacts, costs (capital and operations and maintenance), and public input. A preference for a specific transit technology was not identified and was deferred for a future study. However, a transportation corridor (Corridor A), reserved for the purpose of fixed-guideway transit between Chapel Hill and Durham, was adopted as a result of this study due to its long-term capacity and operating efficiency, higher potential for interconnection with the planned regional rail system from Durham to Raleigh, and the potential to influence land development decisions. This transit corridor continues to be protected and preserved for transit use by local governments, and is included in this DEIS as one of the NEPA Preferred and Project Element Alternatives.

Figure 2.1-3 and **Figure 2.1-4** show the corridors evaluated in the Phase I MIS and the recommended transit corridor identified in the Phase 2 MIS, respectively.

2.1.2 Regional Transit Vision Plan (2008)

In 2006, the Durham-Chapel Hill-Carrboro (DCHC) Metropolitan Planning Organization (MPO) and Capital Area MPO (CAMPO) appointed stakeholders throughout the Triangle region to collaborate on restructuring the vision for a regional transit system. Between 2007 and 2008, system-wide planning and analysis for future fixed-guideway transit corridors was conducted through a cooperative regional planning effort led by the Special Transit Advisory Committee (STAC). The STAC issued the *Regional Transit Vision Plan* in May 2008. The *Regional Transit Vision Plan* provides a framework for DCHC MPO and CAMPO on future transit investments and funding options in the Triangle region.

Public comments were accepted by the STAC throughout the development of this plan, and light rail transit was recommended from the University of North Carolina at Chapel Hill (UNC) to downtown Durham via Duke University Medical Center defining what is now known as the D-O Corridor, which is represented by the green line with white dots extending from Chapel Hill to Durham in **Figure 2.1-5**. The results of the

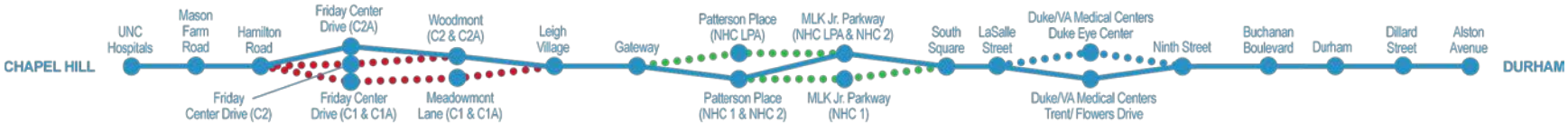
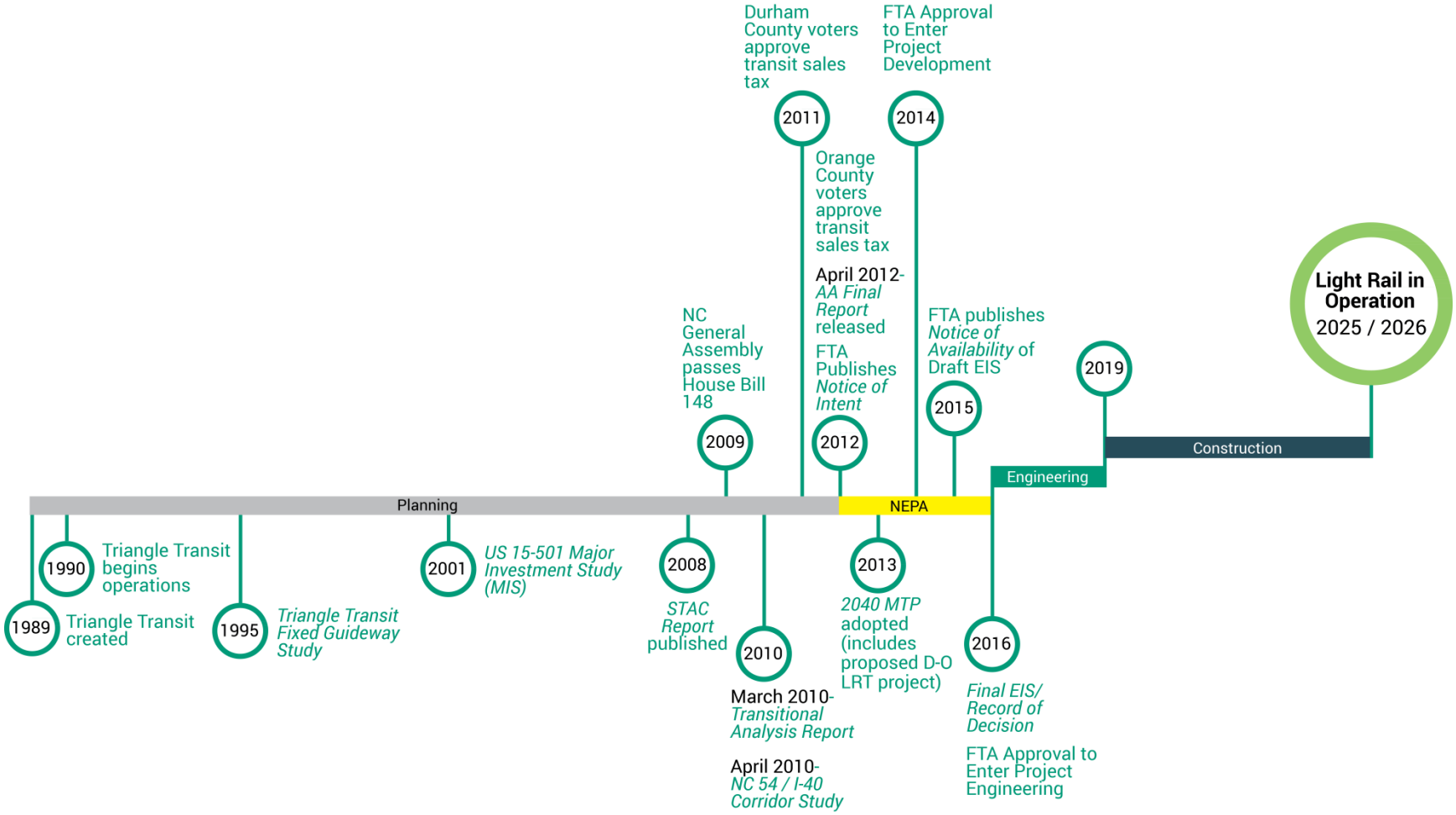


Figure 2.1-1: D-O Corridor History and Timeline



Source: Triangle Transit 2015.

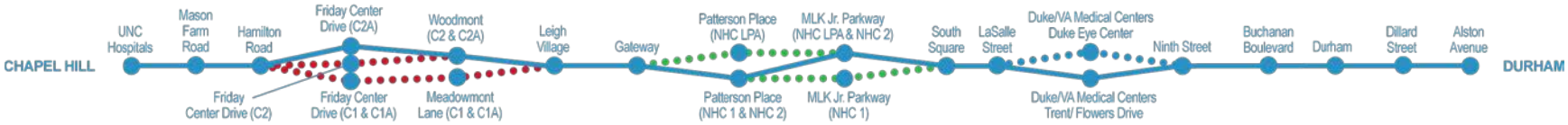
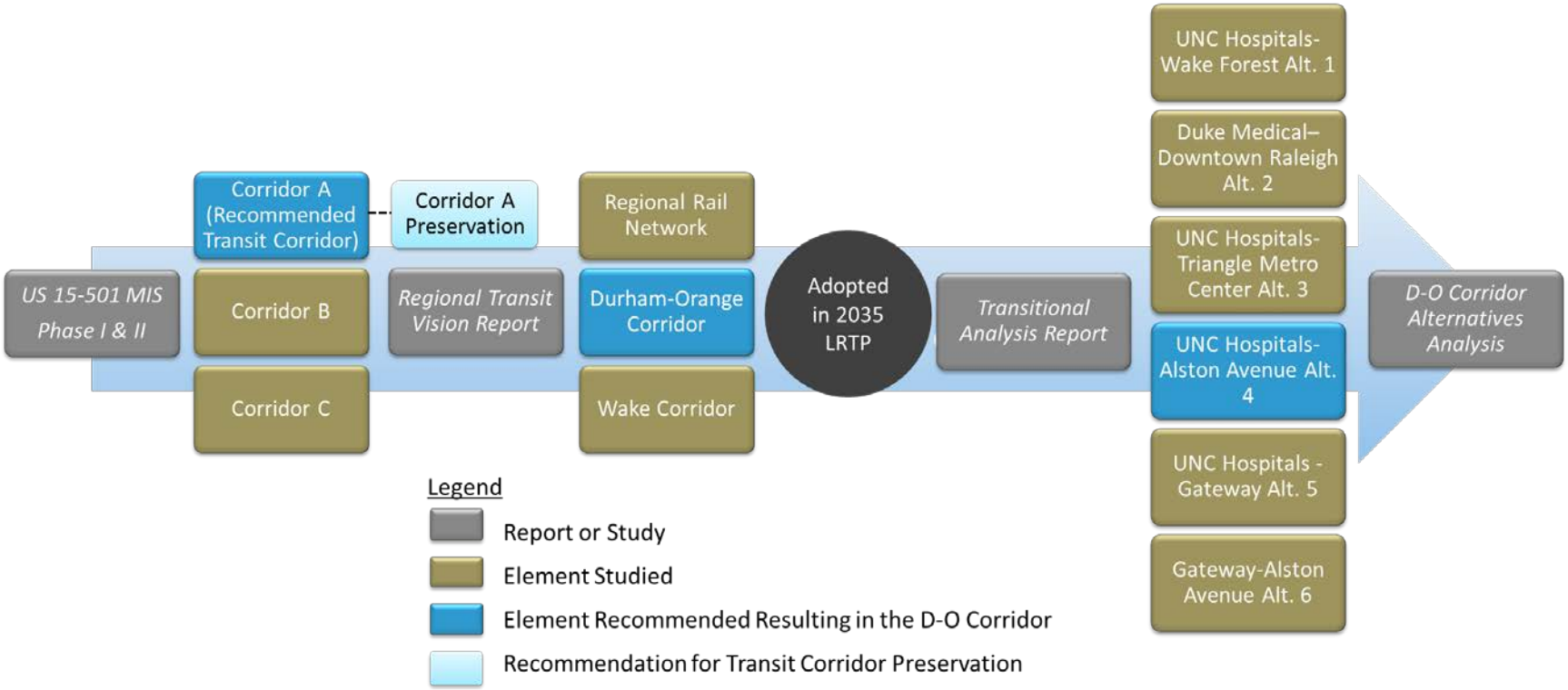


Figure 2.1-2: D-O Corridor Development



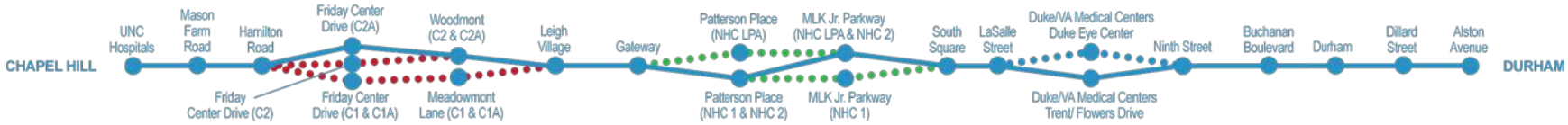
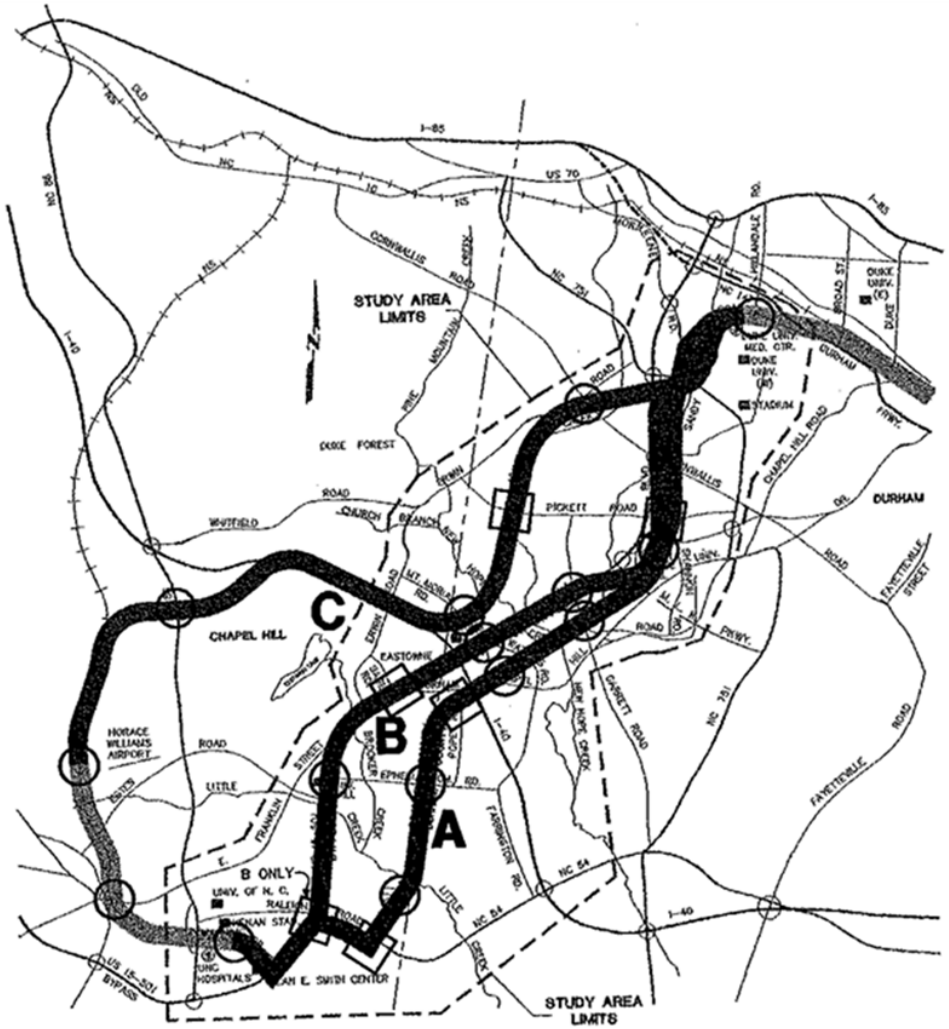


Figure 2.1-3: US 15-501 Phase I MIS: Corridors A, B, and C



Source: *US 15-501 Major Investment Study Phase I Report* (HNTB North Carolina, P.C. 1998).

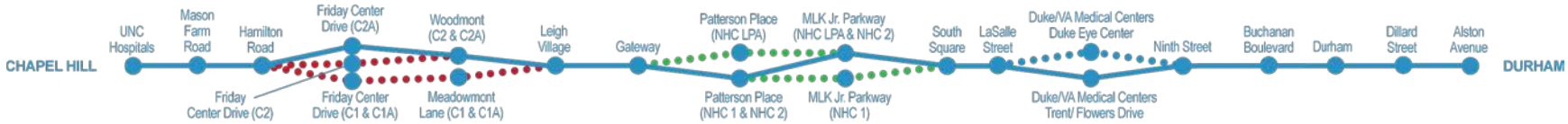
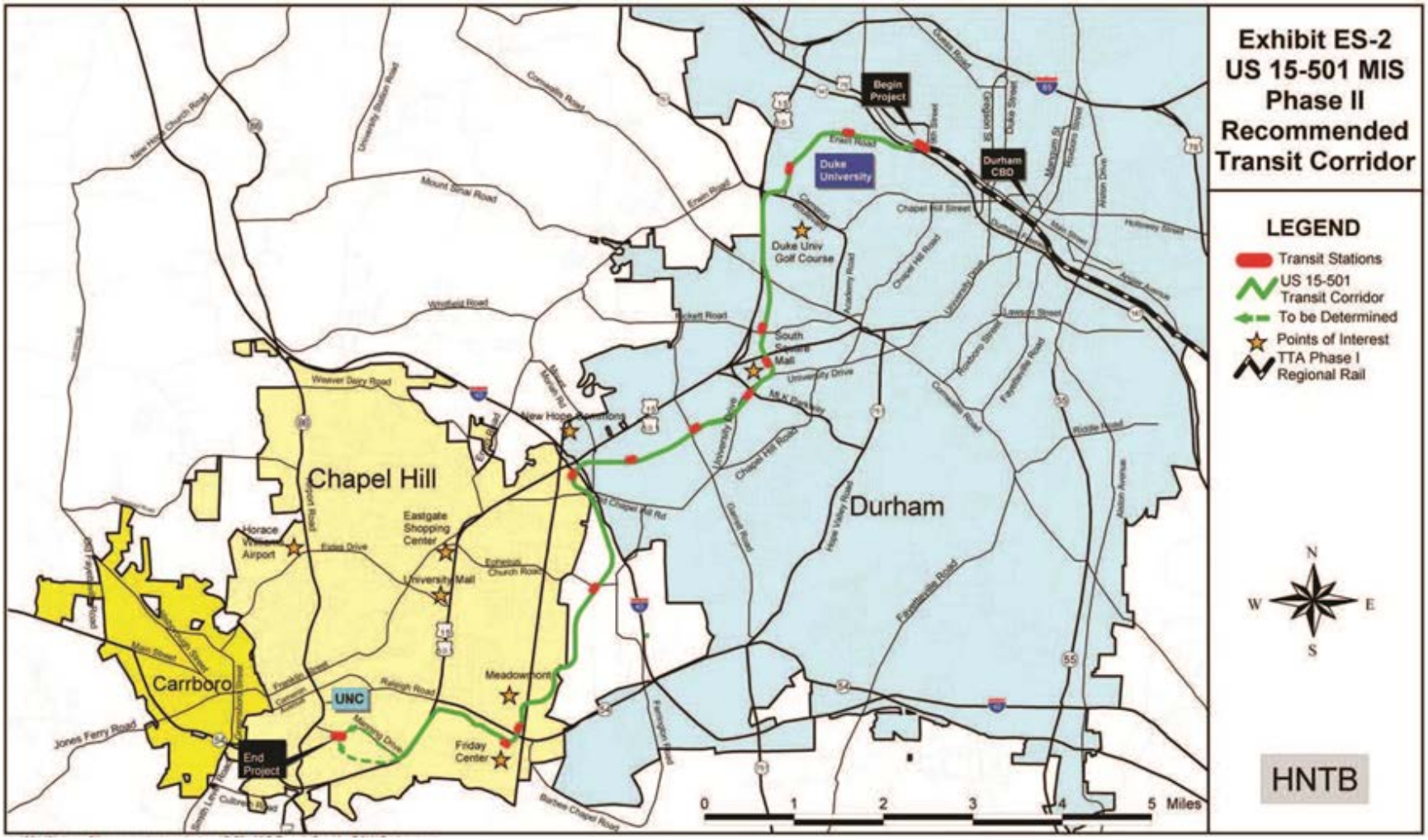


Figure 2.1-4: US 15-501 Phase II Recommended Transit Corridor



Source: *US 15-501 Major Investment Study Phase II Report* (HNTB North Carolina, P.C. 2001).

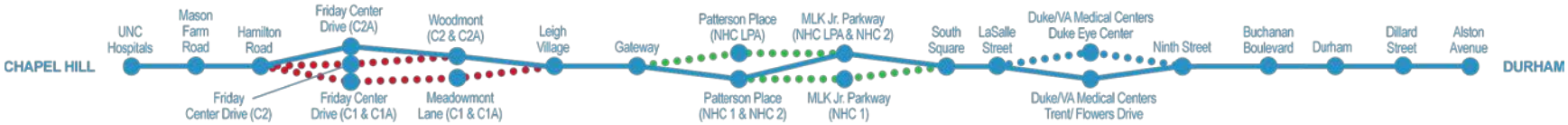
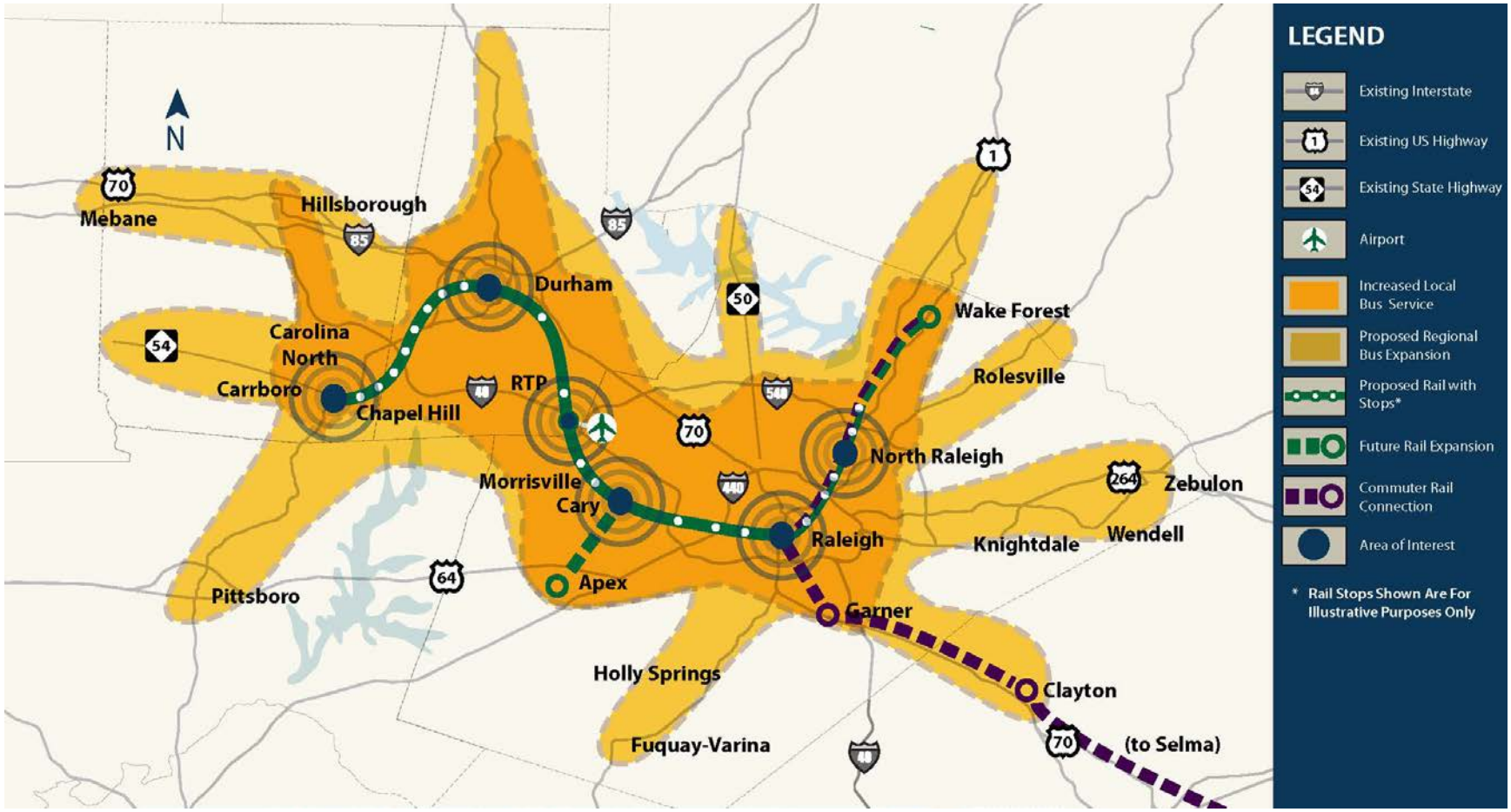
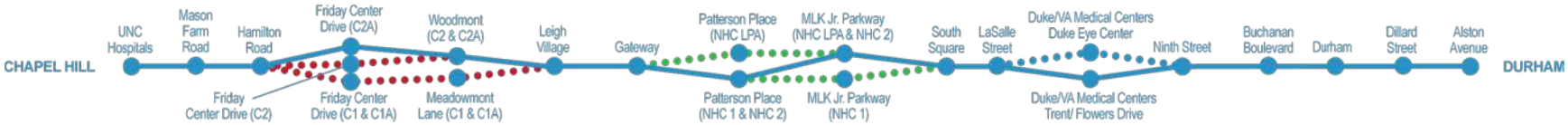


Figure 2.1-5: Regional Transit Vision Map



Source: *Regional Transit Vision Plan* (Triangle Transit 2008).



Regional Transit Vision were the basis for the *2035 Long Range Transportation Plan* (LRTP) for transit in the Triangle region (CAMPO and DCHC MPO 2009).

2.1.3 2035 LRTP (2009) and 2040 Metropolitan Transportation Plan (MTP) (2013)

In April 2009 the *2035 LRTP* was jointly adopted by DCHC MPO and CAMPO. The *2035 LRTP* identified transportation corridors in the Triangle region for major investments in fixed guideway transit over the next 30 years. The D-O Corridor was identified as one of three future rail transit corridors in the Triangle region (Regional Rail Network [Durham-Wake Corridor], D-O Corridor, and Wake Corridor). Four years later, in April 2013, the DCHC MPO and CAMPO jointly adopted the updated *2040 MTP*. The *2040 MTP* assumes significant expansion of the region's transit network with revenues from the recently approved sales tax referenda and vehicle registration fees, and includes the light rail from UNC Hospitals in Chapel Hill to Alston Avenue in east Durham in its transit network.

2.1.4 Transitional Analysis Report (2010)

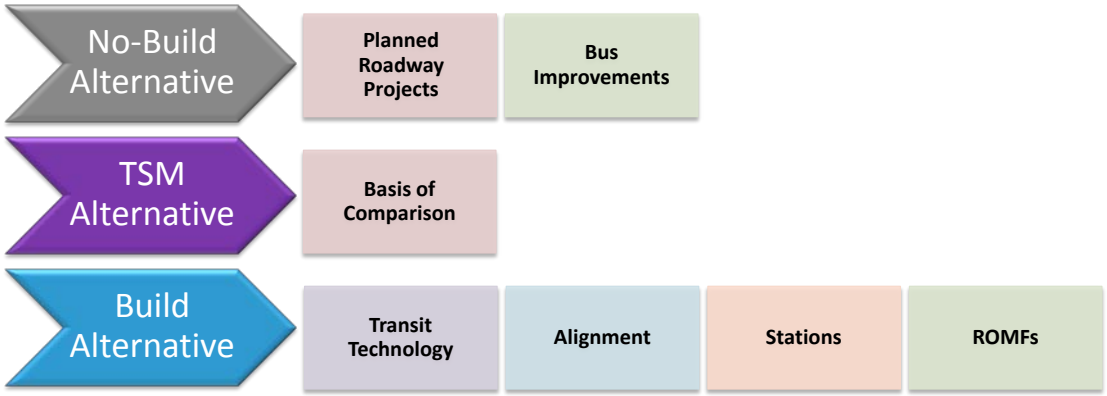
The *Transitional Analysis Report* (AECOM 2010) is a system-level study that analyzed and prioritized fixed guideway transit corridors listed in the adopted *2035 LRTP* (Regional Rail Network, D-O Corridor, and Wake Corridor) (**Figure 2.1-6**). Through this analysis, Alternative 4 was identified as a high priority corridor for high-capacity transit improvements in the D-O Corridor due to its high performance in the analysis for mobility, socioeconomics, cost effectiveness and public sentiment (**Figure 2.1-7**). This report also recommended that the D-O Corridor (Alternative 4) be evaluated in greater detail through an AA.

2.1.5 Alternatives Analysis Final Report (April 2012)

The D-O Corridor AA summarized the purpose and need for the proposed fixed-guideway transportation project and communicated a locally preferred alternative (LPA) for three elements as illustrated in the graphic below:

- Alignment within the corridor (where the project goes)
- Transit technology (e.g., traditional bus, BRT, light rail, commuter rail)
- Stations (proposed locations)

As a component of the Triangle Regional Transit Program, the AA documents developed for the Durham-Orange, Durham-Wake, and Wake corridors provided a comprehensive analysis of expanded bus and rail networks across Durham, Orange, and Wake counties.



Three alternatives and their component elements were evaluated during the AA.

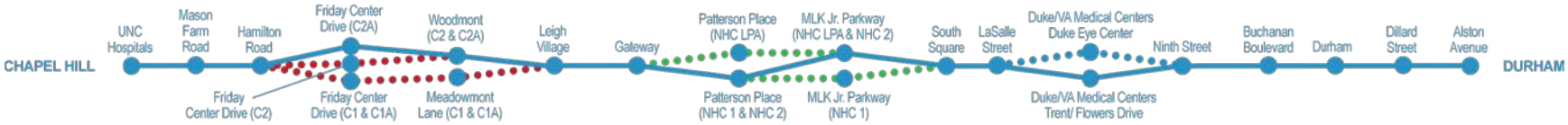
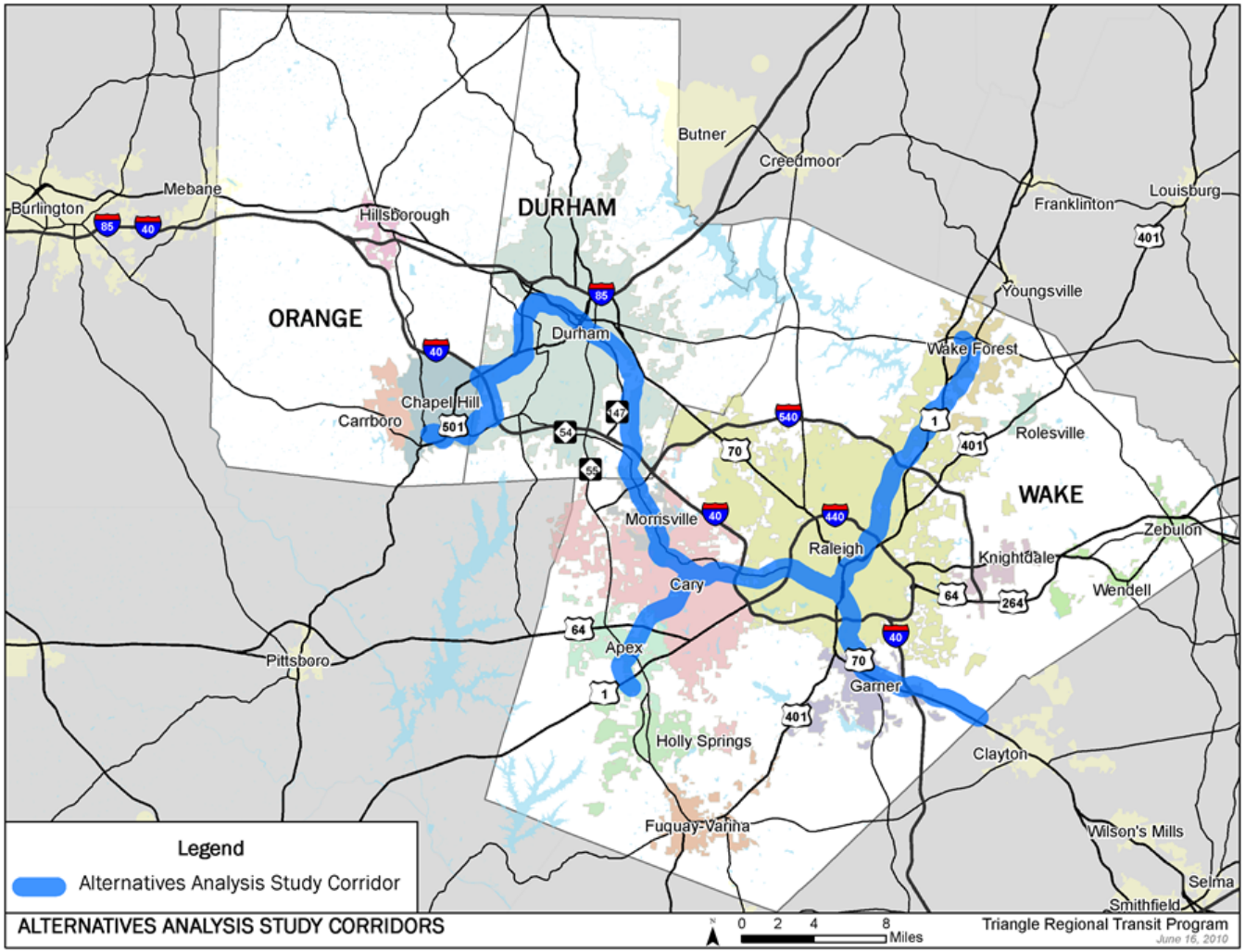


Figure 2.1-6: Transitional Analysis Report Corridors (Derived from 2035 LRTP)



Source: *Transitional Analysis Report* (AECOM 2010).

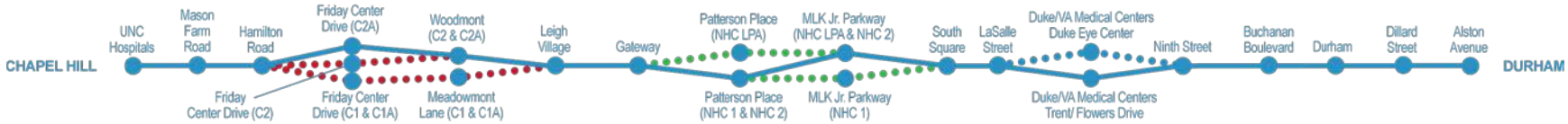
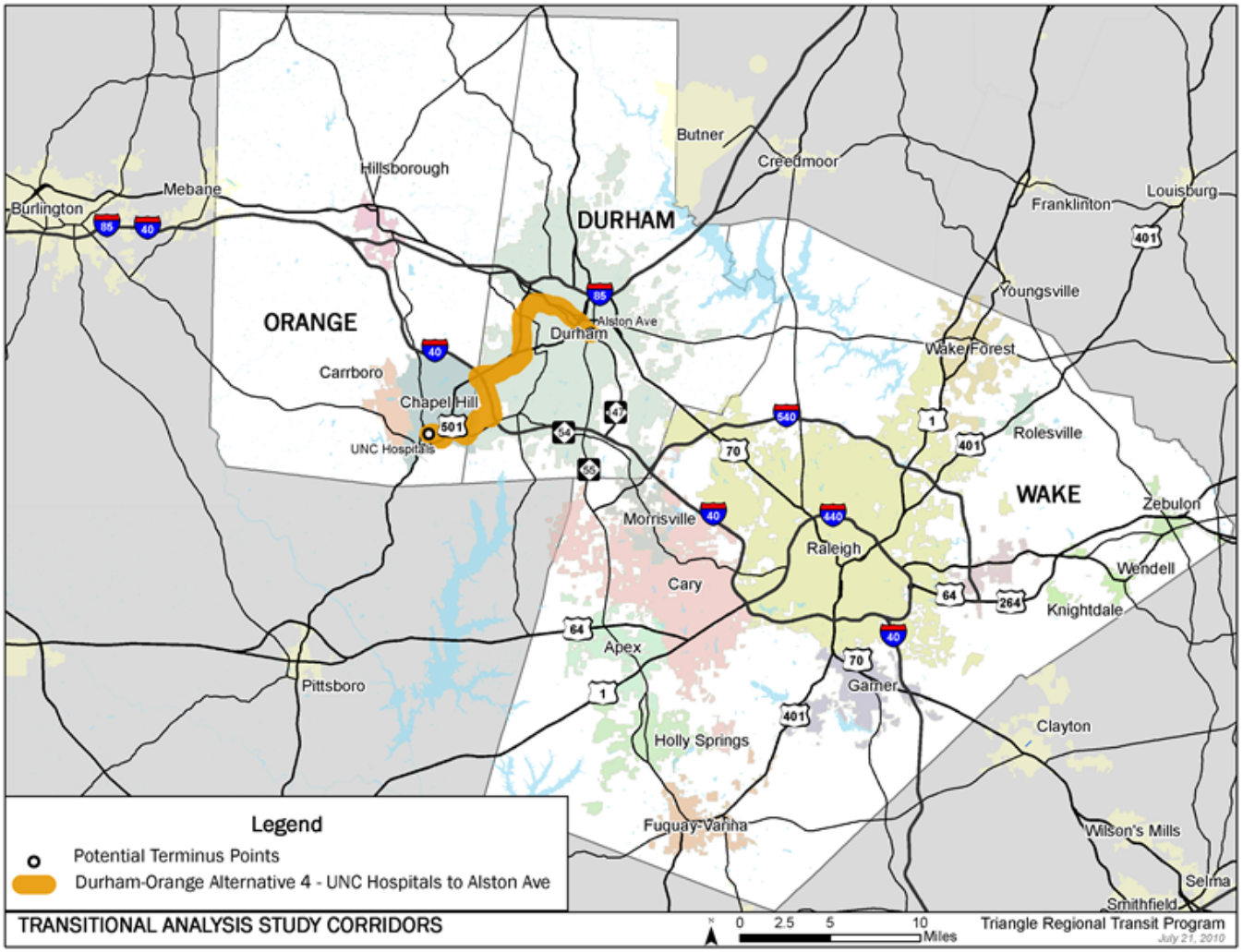
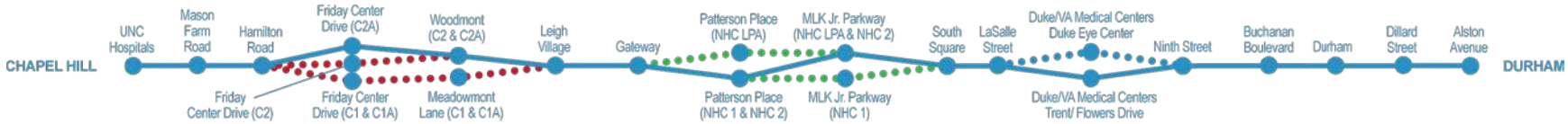


Figure 2.1-7: Durham-Orange Alternative 4 – UNC Hospitals to Alston Avenue

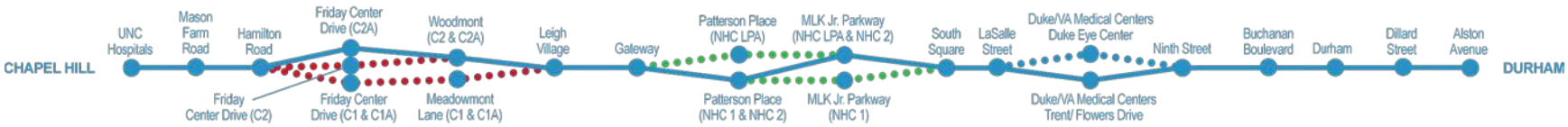


Source: *Transitional Analysis Report* (AECOM 2010).



In April 2012, Triangle Transit released the *AA Final Report* on the D-O Corridor. The alternatives evaluated in the AA for the D-O Corridor included the No Build, the Transportation System Management (TSM), and several build alternatives, including a variety of alignments, station locations within the D-O Corridor, and transit technologies, such as BRT and light rail transit. These alternatives were evaluated based on their ability to meet the project's Purpose and Need. DEIS section 2.2 discusses the development of the build alternatives in more detail as described in the AA.

The AA concluded by identifying the locally preferred alternative (LPA), the most promising alternative for further analysis. The LPA identified light rail transit as the only technology that satisfied the draft Purpose and Need from the AA for premium transit service in the D-O Corridor by enhancing mobility, increasing connectivity through expanding transit options between Durham and Chapel Hill, and supporting compact development and economic growth. On February 8, 2012, the DCHC MPO Transportation Advisory Committee (the MPO's policy board) unanimously adopted the light rail transit alignment as the LPA for further study through Project Development and the National Environmental Policy Act (NEPA).



2.2 Development of the Build Alternatives

The selection of a build alternative is based on four key decisions: transit technology, alignment, station locations, and Rail Operations and Maintenance Facility (ROMF) location. This section provides a brief description of the various alternatives that were considered in the AA and refined through the NEPA process based on technical analysis and public and stakeholder input, as well as a summary of the iterative process that was used to select the alternatives carried forward for evaluation in this DEIS.

What are Reasonable Alternatives?

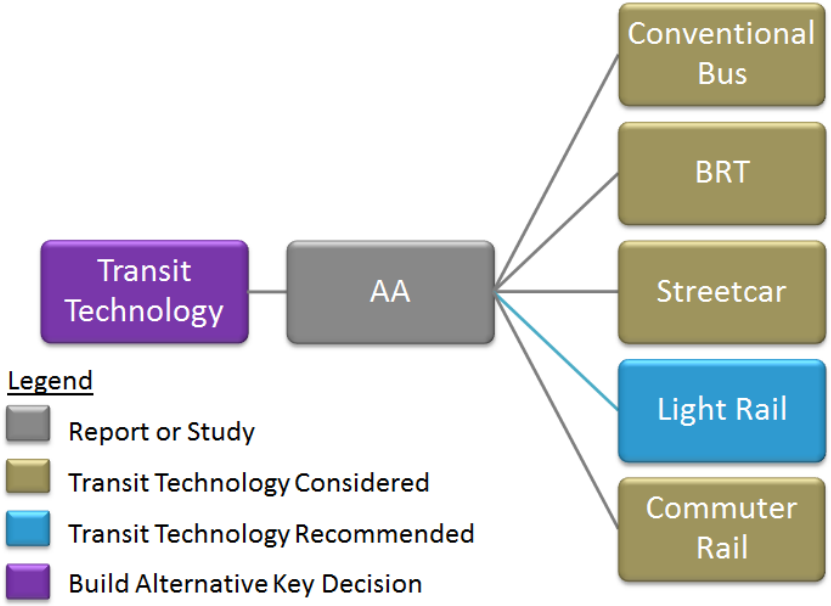
Alternatives that support the project's Purpose and Need and are practical or feasible from the technical and economic standpoint using common sense.

The discussion defines all "reasonable alternatives" considered throughout the planning process. Alternatives that did not pass the reasonableness standard were eliminated from further consideration. A brief discussion of reasons for eliminating these alternatives from further detailed study is also included.

2.2.1 Transit Technology

As part of the AA process, a range of transit technologies was evaluated to determine how well each would meet the project's Purpose and Need. **Figure 2.2-1** provides a comparison between conventional bus, BRT, streetcar, light rail, and commuter rail.

Streetcar and commuter rail were eliminated from further consideration because they do not serve the length of trips typically taken in the D-O Corridor. Streetcar lines are typically less than 3 miles in length and serve trips that are less than 1 mile, while commuter rail is typically between 20 and 80 miles in length and serves trips that are 15 miles or more. BRT was eliminated due to lower ridership and lower potential to attract/shape new development in the region. Details of the technology analysis are included in chapter 5 of the *AA Final Report*.



The transit technology analysis, during the AA, resulted in light rail as the preferred form of transit for the D-O Corridor.

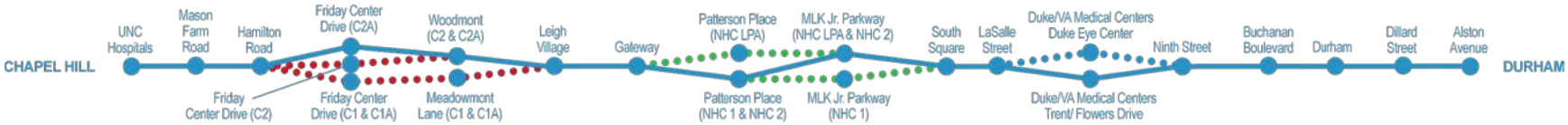
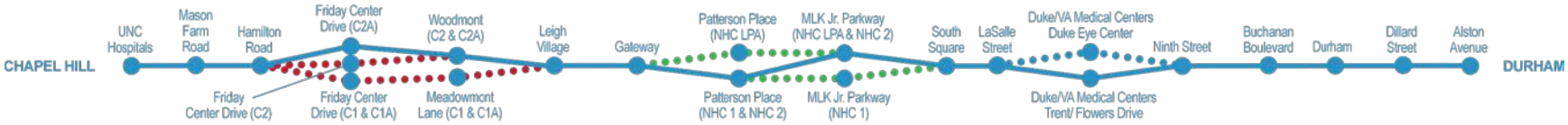


Figure 2.2-1: Transit Technologies Considered in the AA

Typical Characteristics	CONVENTIONAL BUS	BUS RAPID TRANSIT	STREETCAR	LIGHT RAIL TRANSIT	COMMUTER RAIL TRANSIT
Service type	Regional, urban	Regional, urban	Urban, circulator	Regional, urban	Regional, interurban
Stop/Station spacing	1/10 to 1/4 mile	¼ to 2 miles	¼ mile	¼ to 2 miles	2 to 10 miles
Vehicles per Set	1	1	1-2	1-4	3-12
Seated Capacity per Vehicle	40, (65 if articulated = 2-segment bus)	40, (65 if articulated = 2-segment bus)	30-44	32-90	Standard 56-88, Bi-level train: 124-136
Guideway	Mixed traffic	Exclusive right-of-way, dedicated travel lane in-street	Usually mixed traffic; rarely in dedicated lane	Fixed-guideway or dedicated travel lane in-street	Fixed guideway, completely separate from auto traffic
Power Supply	Diesel or Alternative Fuel	Diesel or Alternative Fuel	Electric with overhead catenary wire	Electric with overhead catenary wire	Electric, diesel-electric, or dual-mode
Suspension	Rubber tire on pavement	Rubber tire on pavement	Steel wheel on steel rail	Steel wheel on steel rail	Steel wheel on steel rail
Operating Speed	14-45 mph	20-65 mph	8-35 mph	22-55 mph	30-79 mph
Route Length & Maximum Grade	Varies, 10-13%	2-40 miles, 10-13%	2-10 miles	5-20 miles, 7%	20-80 miles, 3% to 4%
Capital Cost per Mile	< $1 million	$16-60 million	$30-60 million	$80-125 million	$8-50 million (dependent on whether or not extra track is needed)

Source: *Alternatives Analysis Final Report* (Triangle Transit 2012).



Through the AA process, light rail was selected as the alternative that best meets the Purpose and Need due to higher forecasted ridership and its ability to attract/shape development in a compact manner. As a result, light rail is evaluated as the transit technology in this DEIS, while conventional bus is evaluated in this DEIS as part of the No Build Alternative.

2.2.2 Alignment

Once the technology was selected as part of the AA process, numerous light rail alignments in the D-O Corridor were evaluated as detailed in the *AA Final Report*. The identification of D-O Corridor alignment alternatives began with the base transit corridor, identified in the *US 15-501 MIS Phase II Report* (HNTB North Carolina, P.C. 2001), which had been adopted into the joint DCHC MPO/CAMPO *2035 LRTP*, as shown on **Figure 2.2-2**. Triangle Transit and its study partners reexamined sections of the base transit corridor to determine whether different alignments would better address the proposed D-O LRT Project's purpose and need, avoid or minimize environmental impacts, and/or address public and stakeholder concerns.

Each of the alignment screening results for all sections of the corridor is discussed in detail in the *AA Final Report*. Following the AA, NEPA Scoping was initiated with the Notice of Intent (NOI) in April 2012. DEIS chapter 9 discusses the NEPA Scoping process and resulting comments and responses. **Table 2.2-1** shows the alignment alternatives studied, origination of the alignment alternative, and its corresponding reference in this DEIS. As shown in **Table 2.2-1,** the AA studied multiple alignments crossing Little Creek and New Hope Creek (NHC), which were refined through NEPA Scoping with stakeholder and public input.

2.2.3 ROMF

The ROMF includes a complex of train washing and maintenance buildings, storage tracks, employee parking, and a stormwater pond. The facility would be equipped to perform daily cleaning and repair activities on the light rail vehicles as they enter and leave revenue service. To ensure operational safety and reliability, scheduled service and maintenance inspections would be performed in this facility. The desirable size for a ROMF site is 15 to 25 acres.

As part of the AA, the Leigh Village, Farrington Road, Patterson Place, and Cornwallis Road ROMF alternatives were identified based on size, immediate access to the light rail alignment and adjacent roadways, land use compatibility, and potential for adverse environmental effects. The Alston Avenue ROMF Alternative was not initially considered as a potential ROMF site by Triangle Transit. However, due to a request from the City of Durham and after initial evaluation by Triangle Transit to ascertain the reasonableness of this site, the Alston Avenue ROMF Alternative was carried forward for further study in this DEIS.

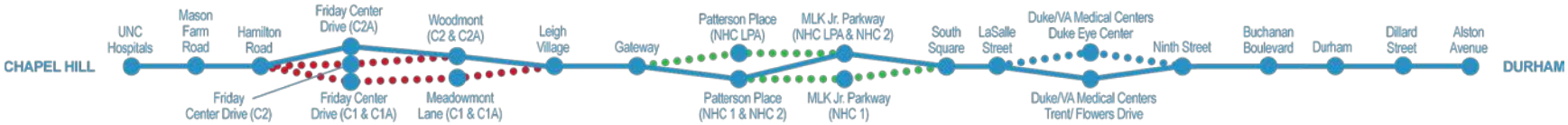
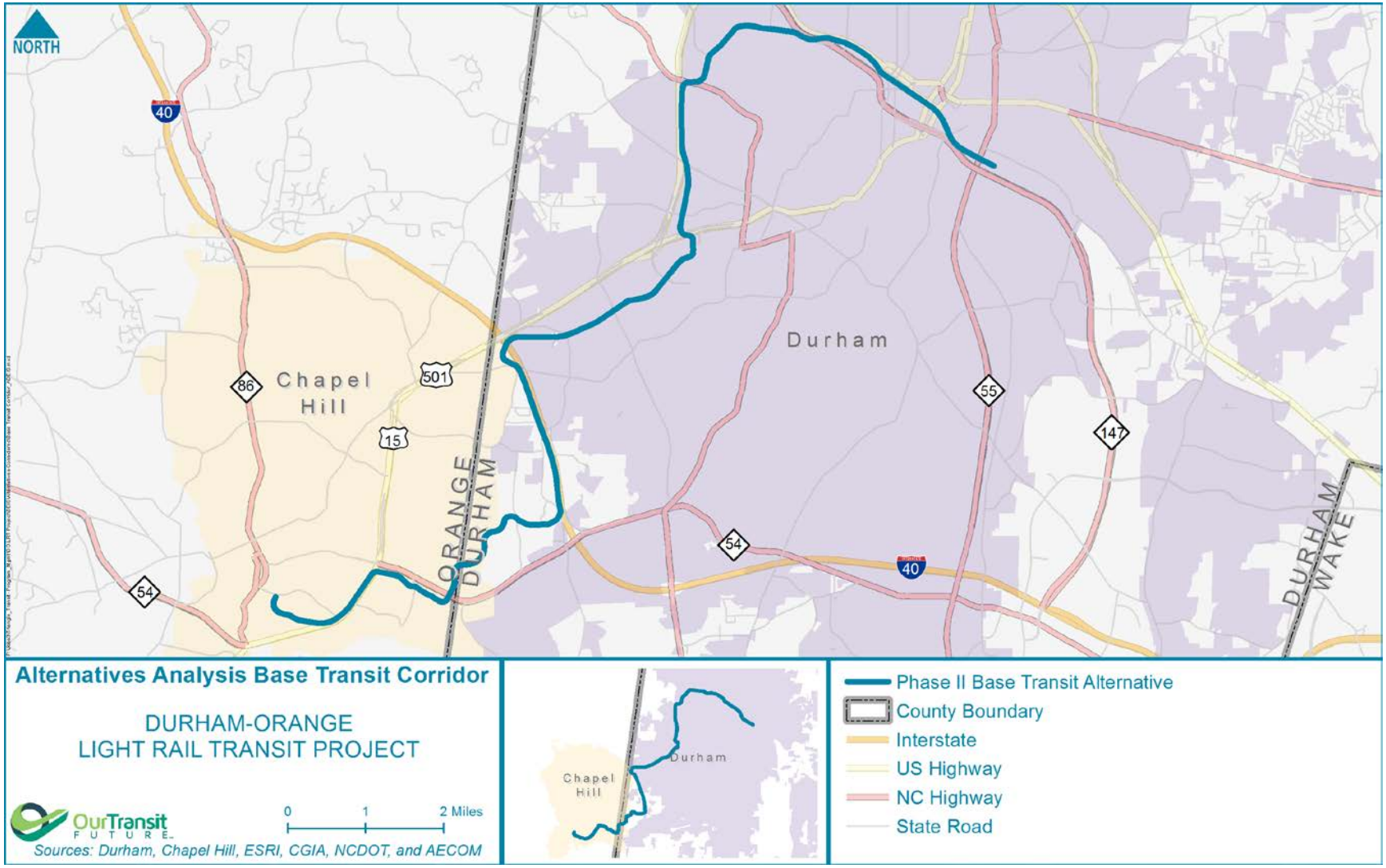


Figure 2.2-2: Durham-Orange Base Transit Corridor Evaluated during AA



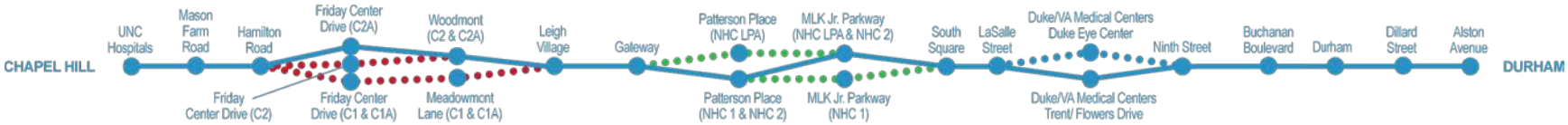


Table 2.2-1: Alignment Alternatives Evaluated during AA and Scoping Being Considered in this DEIS

Alignment Alternative as Stated in AA	Origination	Reason for Development	Location	Referenced in DEIS
Base Transit Corridor	MIS, AA	Identified through extensive planning process and stakeholder input	Throughout Corridor	Common segments of NEPA Preferred and Project Element Alternatives; impacts included in the NEPA Preferred Alternative
Finley Golf Course – LRT	MIS, AA	Developed from coordination with project stakeholders; Provide access/service to East 54 development and Friday Center	Little Creek	C1, C1A, and C2
Hamilton Road – LRT	AA	Developed from coordination with project stakeholders; Provides access/service to East 54 development and Friday Center	Little Creek	C2A, impacts included in the NEPA Preferred Alternative
Alternative C1 – LRT	AA	Developed for travel time efficiency, Provide access to Meadowmont; Most direct route to Leigh Village	Little Creek	C1
Alternative C1A – LRT	MIS, AA, Scoping	Original base transit corridor in MIS; Evaluated and dismissed in AA due to engineering constraints and longer travel times; Added for study in DEIS per agency scoping comments from US Army Corps of Engineers (USACE), US Fish and Wildlife Service (USFWS), and NC Water Resources Commission; Avoidance of impacts to USACE property and environmentally sensitive areas	Little Creek	C1A
Alternative C2 – LRT	AA, Scoping	Developed from coordination with project stakeholders (UNC and Chapel Hill); Follows existing transportation corridor (NC 54); Potential for Transit Oriented Development (TOD), Minimize impact to USACE property	Little Creek	C2
Alternative C2A – LRT	AA, Scoping	Developed from coordination with project stakeholders (UNC and Chapel Hill); Follows existing transportation corridor (NC 54); Potential for TOD; Minimize impact to USACE property; Minimize impacts to Finley Golf Course	Little Creek	C2A, impacts included in the NEPA Preferred Alternative

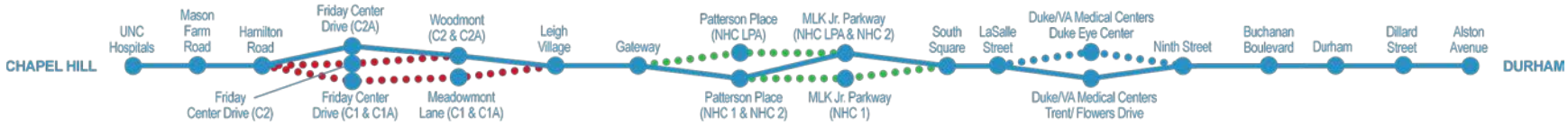
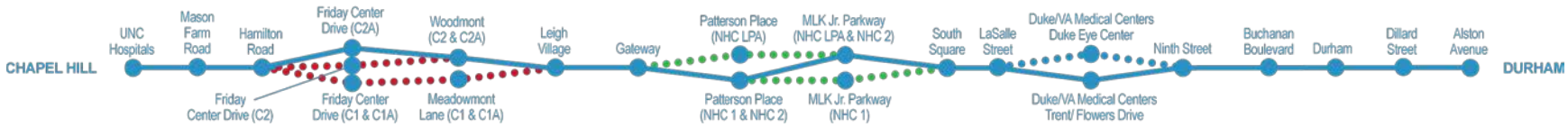


Table 2.2-1: Alignment Alternatives Evaluated during AA and Scoping Being Considered in this DEIS

Alignment Alternative as Stated in AA	Origination	Reason for Development	Location	Referenced in DEIS
New Hope Creek LPA Alignment – LRT	MIS, AA	Original base transit corridor; Most direct route; Avoids direct impacts to businesses on US 15-501; Recommended in the AA	New Hope Creek	NHC LPA
New Hope Creek 1 – LRT	Scoping	Minimize impacts to New Hope Creek by using existing transportation rights-of-way; Developed with input from New Hope Creek Corridor Advisory Committee	New Hope Creek	NHC 1
New Hope Creek 2 – LRT	Scoping	Balancing impacts to New Hope Creek and businesses on US 15-501; Developed in response to scoping comments from agencies and public; Developed with input from New Hope Creek Corridor Advisory Committee	New Hope Creek	NHC 2, impacts included in the NEPA Preferred Alternative



2.3 Alternatives Retained for Detailed Study

The alternatives at the start of the NEPA process included the No Build Alternative, TSM Alternative, and Build Alternative. These alternatives were outlined in the NOI issued in 2012 to initiate the project NEPA Scoping.

Prior to the passage of the transportation authorization bill entitled Moving Ahead for Progress in The 21st Century Act (MAP-21), the TSM Alternative was used as a basis of comparison between the No Build Alternative and the Build Alternative. The TSM was originally evaluated as part of the AA for the proposed D-O Corridor and recommended for advancement into the DEIS as a basis of comparison, despite not fully addressing the Purpose and Need for the proposed corridor or garnering support from local stakeholders and members of the public. However, due to changes to FTA regulations related to the current transportation law (49 C.F.R. § 611 [2013]) designed to streamline the NEPA process, it is no longer necessary to evaluate the TSM Alternative in the DEIS, and as such it has been removed from consideration.

This DEIS evaluates the following alternatives:

- No Build Alternative (section 2.3.1)
- NEPA Preferred Alternative (section 2.3.2.2)
- Project Element Alternatives (section 2.3.2.3)

The No Build Alternative serves as the basis of comparison for the NEPA Preferred and Project Element Alternatives.

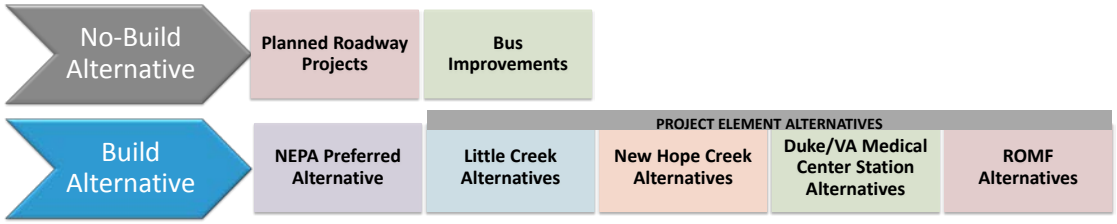
As described in DEIS section 2.2.2, the majority of the proposed D-O LRT alignment and the alignment alternatives crossing New Hope Creek and Little Creek were identified during the AA process and subsequently refined during NEPA scoping in response to public and agency comments. As a result, the following alignments crossing Little Creek and New Hope Creek are evaluated in this DEIS one of each creek crossing is included in the NEPA Preferred Alternative.

- Four potential crossings of Little Creek between Hamilton Road and the proposed Leigh Village Station (Alternatives C1, C1A, C2, and C2A)
- Three potential crossings of New Hope Creek and Sandy Creek between Patterson Place and South Square (Alternatives NHC LPA, NHC 1, and NHC 2)

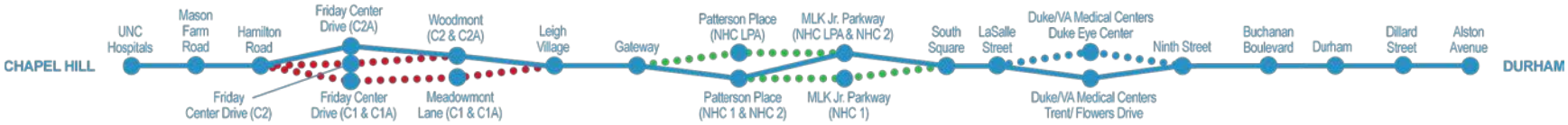
In addition, station alternative locations are being studied for the Duke/VA Medical Centers Station: Duke Eye Center and Trent/Flowers Drive. One station alternative location is included in the NEPA Preferred Alternative.

Also, to serve the proposed project, five alternative locations are under study for the ROMF. One ROMF alternative location is included in the NEPA Preferred Alternative.

- Leigh Village ROMF
- Farrington Road ROMF



For this DEIS, the benefits and consequences of the NEPA Preferred and Project Element Alternatives are compared to the No Build condition.



- Patterson Place ROMF
- Cornwallis Road ROMF
- Alston Avenue ROMF

Each of these alternatives is discussed in the following sections.

2.3.1 No Build Alternative

This section defines the No Build Alternative, which is the no-action alternative under study in this DEIS. Federal regulations require that a No Build Alternative be evaluated in an Environmental Impact Statement (40 C.F.R. § 1502.14 [2014]). The No Build Alternative includes the existing and planned transportation programs and projects scheduled to be built and implemented before forecast year 2040 and contained in the 2040 MTP, excluding only the Triangle Transit's Regional Rail program (D O LRT Project and a commuter rail line between Durham and Raleigh) and related bus transit modifications. The regional rail project, the D-O LRT Project, and associated bus improvements are excluded from the No Build to provide a fair basis of comparison for the Build Alternative. By excluding commuter rail from the Build Alternative, the Build Alternative demonstrates independent utility and only accounts for the proposed project-related ridership, benefits, and impacts.

That is, the No Build Alternative predicts the transportation system that is planned to exist in 2040. The No Build Alternative will be used as the baseline against which the other alternatives will be compared for the extent of environmental and community impacts.

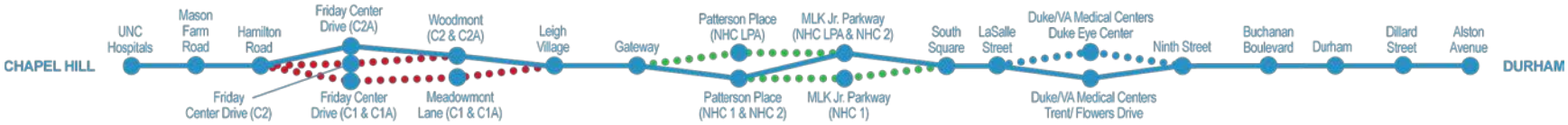
The proposed No Build Alternative would include:

- The existing highway network
- Highway projects that North Carolina Department of Transportation (NCDOT) has scheduled in the State Transportation Improvement Program
- Highway projects listed in appendix M
- Existing transit routes and schedules as of September 2013
- Other new bus services to which Triangle Transit, Durham Area Transit Authority (DATA), and Chapel Hill Transit (CHT) have committed, some of which have already been implemented
- New bus services to serve areas that would be developed by forecast year 2040, with the exception of the proposed rail transit improvements and related bus transit modifications
- Routine replacement of existing transit facilities and equipment at the end of their useful life
- Projects contained in the following local plans:
  - *Town of Chapel Hill Greenways Master Plan* (2013)
  - *Duke University Illustrative Master Plan Update, the 2024 Plan* (2013)
  - *Durham Comprehensive Bicycle Transportation Plan* (Greenways Incorporated Team 2006)
  - *DurhamWalks! Pedestrian Plan* (The Louis Berger Group 2006)
  - *Durham Trails and Greenways Master Plan* (2011)
  - *UNC Campus Master Plan* (2007)

2.3.2 NEPA Preferred and Project Element Alternatives

This section describes the NEPA Preferred and Project Element Alternatives and includes a description of the alternative alignments, station locations, and ROMF alternatives evaluated in this DEIS. Seventeen stations are proposed.

- UNC Hospitals
- Mason Farm Road
- Hamilton Road
- Friday Center Drive
- Meadowmont Lane or Woodmont



- Leigh Village
- Gateway
- Patterson Place
- Martin Luther King Jr. Parkway
- South Square
- LaSalle Street
- Duke/VA Medical Centers (two alternatives)
- Ninth Street
- Buchanan Boulevard
- Durham
- Dillard Street
- Alston Avenue

Five alternative locations for the ROMF have been identified for evaluation, and one site will be selected to serve the proposed D-O LRT Project (**Figure 2.3-1**).

2.3.2.1 Light Rail Technology

Light rail would operate in a dedicated guideway within new or existing right-of-way. It would generally operate in an exclusive guideway or on existing roadways alongside other traffic in a dedicated travel lane. For a portion of the alignment, light rail would operate in shared lanes with buses.

Light rail vehicles would be electrically powered by an overhead contact system using poles to support overhead wires. A light rail vehicle would have a passenger capacity of 40 to 60 seated and up to 125 with standees per vehicle (capacity varies depending on vehicle specifications), and can be linked to operate as multiple-car trains to increase passenger capacity. Light rail would provide frequent, all-day service and passengers would board quickly with off-board fare payment, multiple doors, and level boarding platforms at designated station stops. Typical station spacing would be one-quarter mile to two miles.

At-Grade: Typically refers to an intersection of two roadways, or a rail line and a roadway that are at the same level (on the ground).

Elevated: Railway with the tracks above the surface or above street level on a viaduct or other structure.

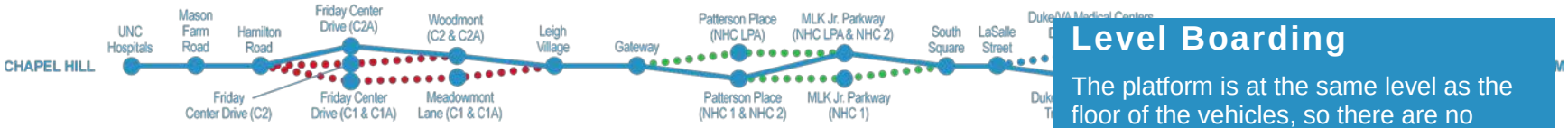
In the D-O Corridor, the light rail guideway would include two tracks throughout (double-tracked), providing separate tracks for westbound and eastbound trains. Where the track surface may be driven on by rubber-tired vehicles, such as in median-running alignments, the rails would be embedded in a concrete slab. Where the track surface is not required to be drivable, such as in between at-grade crossings on exclusive alignment, the light rail tracks would be on ballast (crushed stone used in typical railroad track beds) with concrete ties.

Generally, the required width (cross-section) for an at-grade, double-track light rail alignment is 28 feet for embedded track and 30 feet for ballasted track. The amount of right-of-way needed would vary along the alignment due to the local topography. Right-of-way requirements would increase in station areas, where additional space is needed for station platforms.

Example of Light Rail on Embedded Track

Typical Light Rail Stations

A light rail station is a designated stop for boarding and exiting the light rail vehicles. Seventeen stations are proposed along the NEPA Preferred and Project Element Alternatives. Station design would comply with the Americans with Disabilities Act requirements, including level boarding of the



Level Boarding

The platform is at the same level as the floor of the vehicles, so there are no steps or ramps required to enter the vehicles from the platform

light rail vehicles. The station platforms for loading and unloading passengers would be 270 feet long, which would accommodate a three-car train (three light rail vehicles connected to each other).

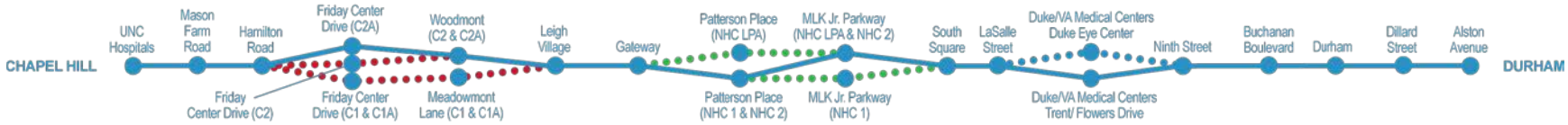
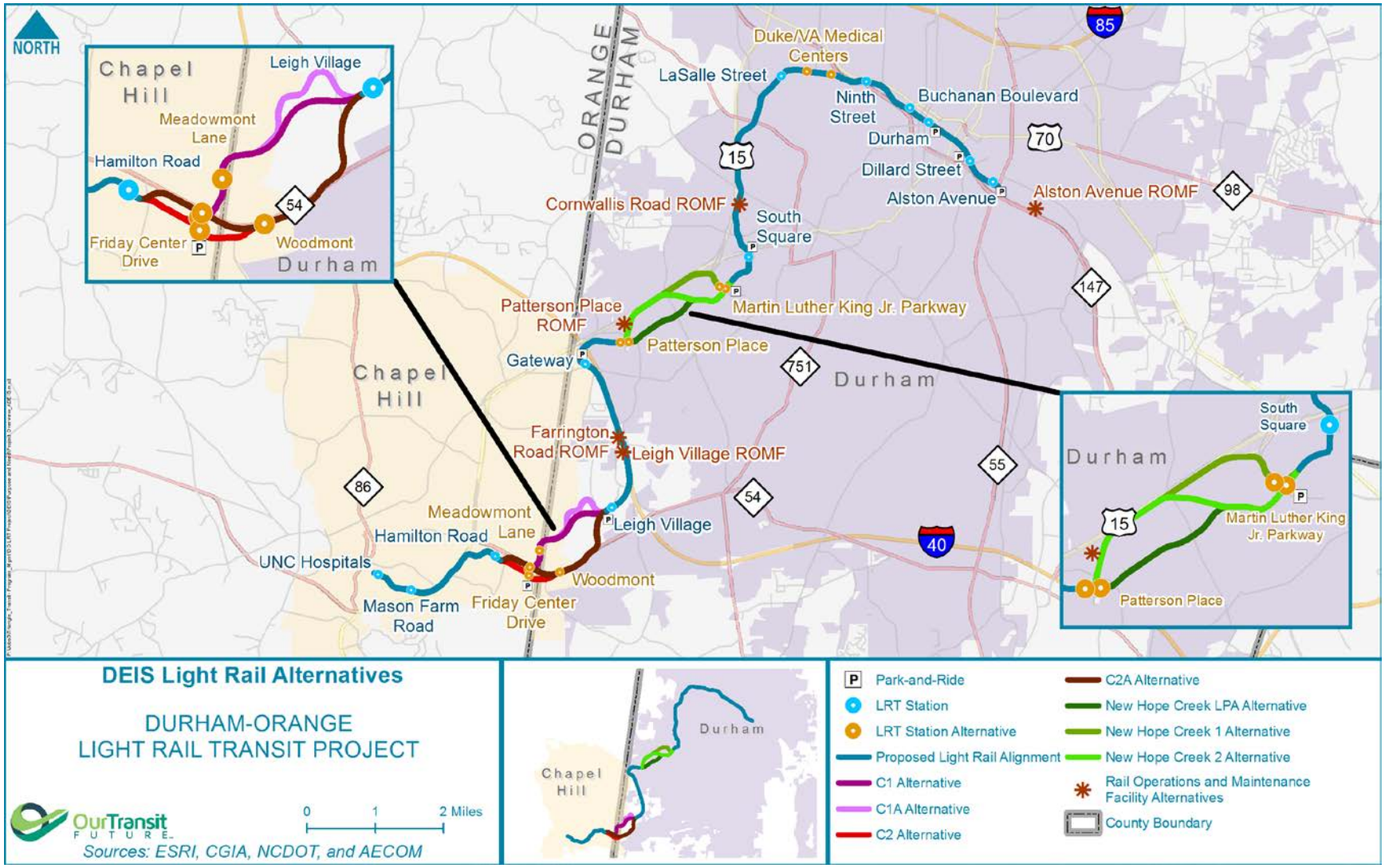
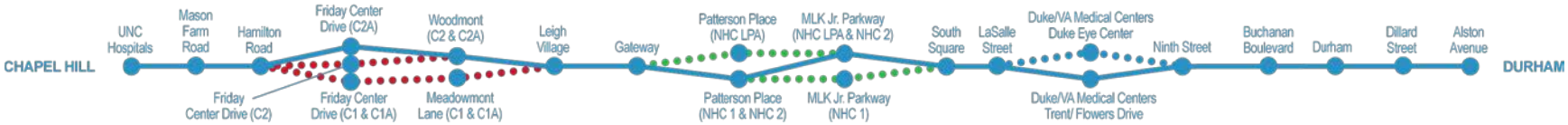


Figure 2.3-1: NEPA Preferred and Project Element Alternatives Evaluated in this DEIS





Weather protection for patrons would be provided by canopies covering portions of the platform. Typical transit patron amenities at each station would include bench seating, leaning rails, windscreens, trash receptacles, and artwork integrated into the station amenities. Station elements would also include lighting, closed-circuit television cameras, emergency telephones, information kiosks, variable message signs, and public address systems. Transit patrons would purchase rides prior to boarding from ticket vending machines located at each station.

Typical Park-and-Ride Station

Stations would be designed to accommodate safe and convenient bicycle access from surrounding street and trail networks. Bicycle parking would be located near primary access points to the station platform.

Typical Aerial Station

There are two basic types of station platforms: center platforms designed for passenger boarding and deboarding on both sides of the platform, and side platforms for boarding and deboarding from only one side of the platform. The type of platform selected depends upon the station function, layout, site constraints, and track operation requirements. Conceptual designs for each alternative station are included in appendix L.

Parking is proposed at several stations as described in DEIS section 3.3. The number of parking spaces proposed varies and are based on forecasted ridership and land availability. Stations with park-and-ride facilities would include bus bays for connecting feeder bus routes and “kiss-and-ride” spaces for passenger pick-up and drop-off.

Walk-up stations would be accessed primarily by pedestrians, bicyclists, and passengers transferring from bus service. In general, automobile parking would not be provided at walk-up stations. Proposed station locations are shown on **Figures 2.3-2** to **2.3-5**.

Typical Walk-Up Station

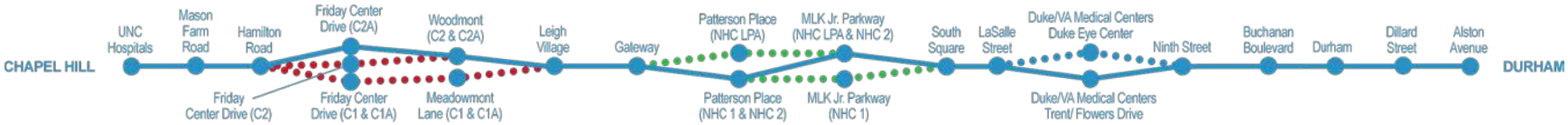
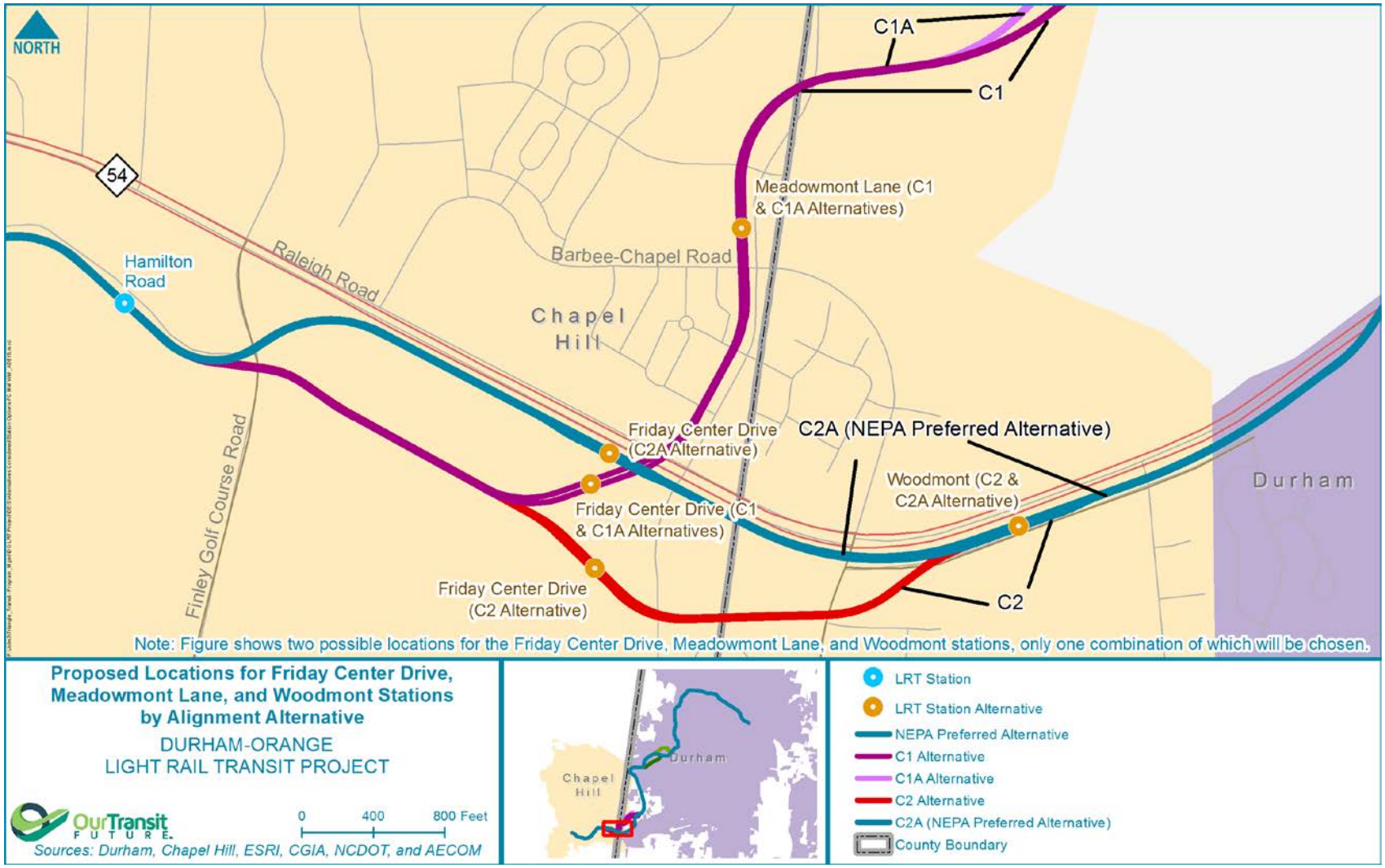


Figure 2.3-2: Locations for Friday Center Drive and Meadowmont Lane (C1-C1A)/Woodmont (C2-C2A) Stations by Alignment Alternative



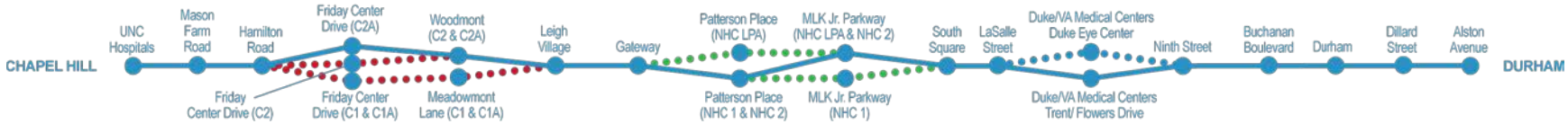
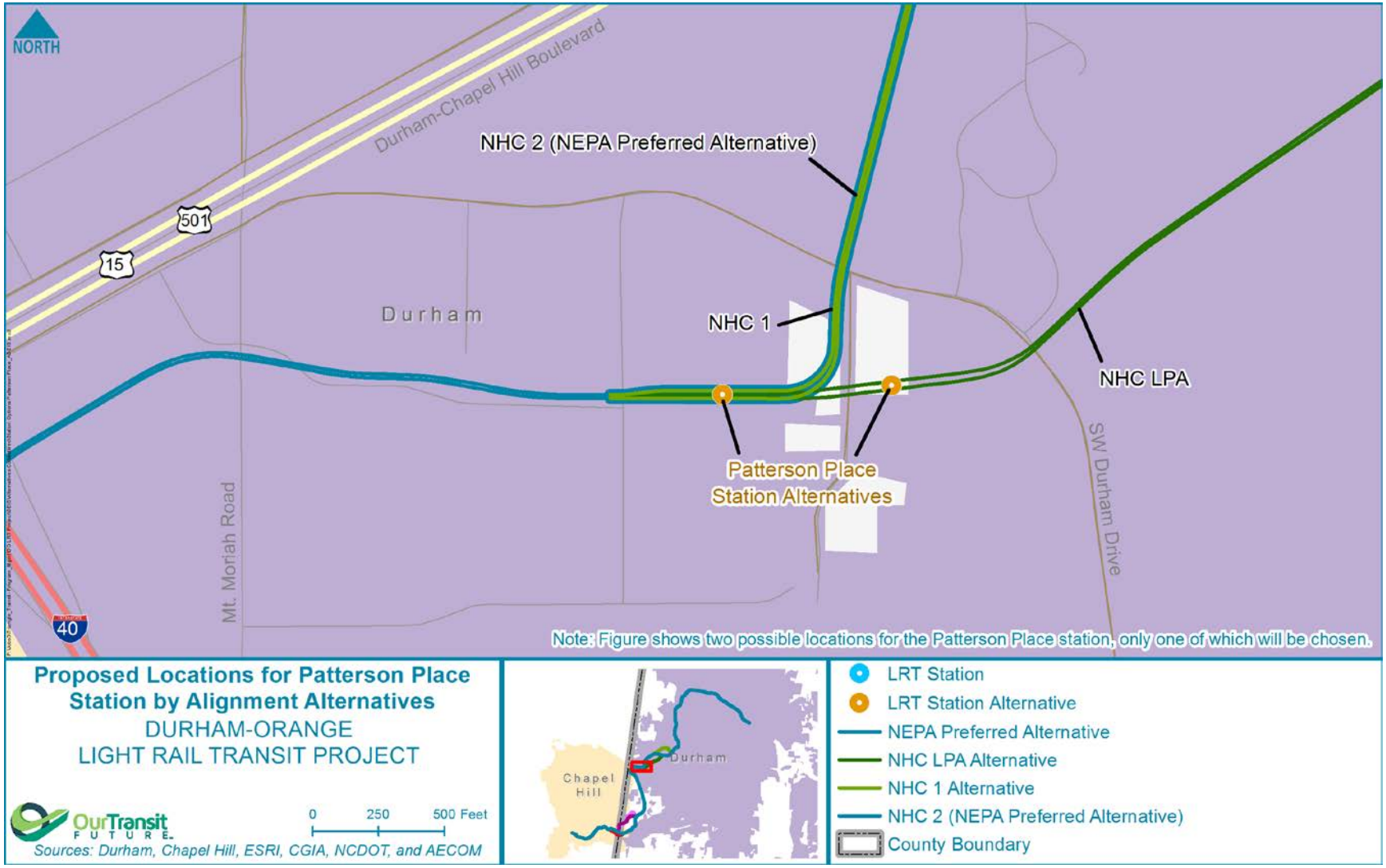


Figure 2.3-3: Proposed Locations for Patterson Place Station by Alignment Alternative



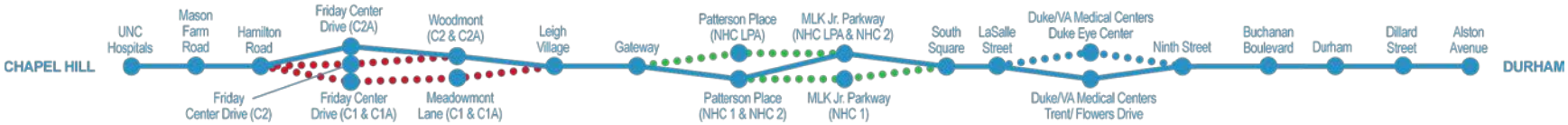
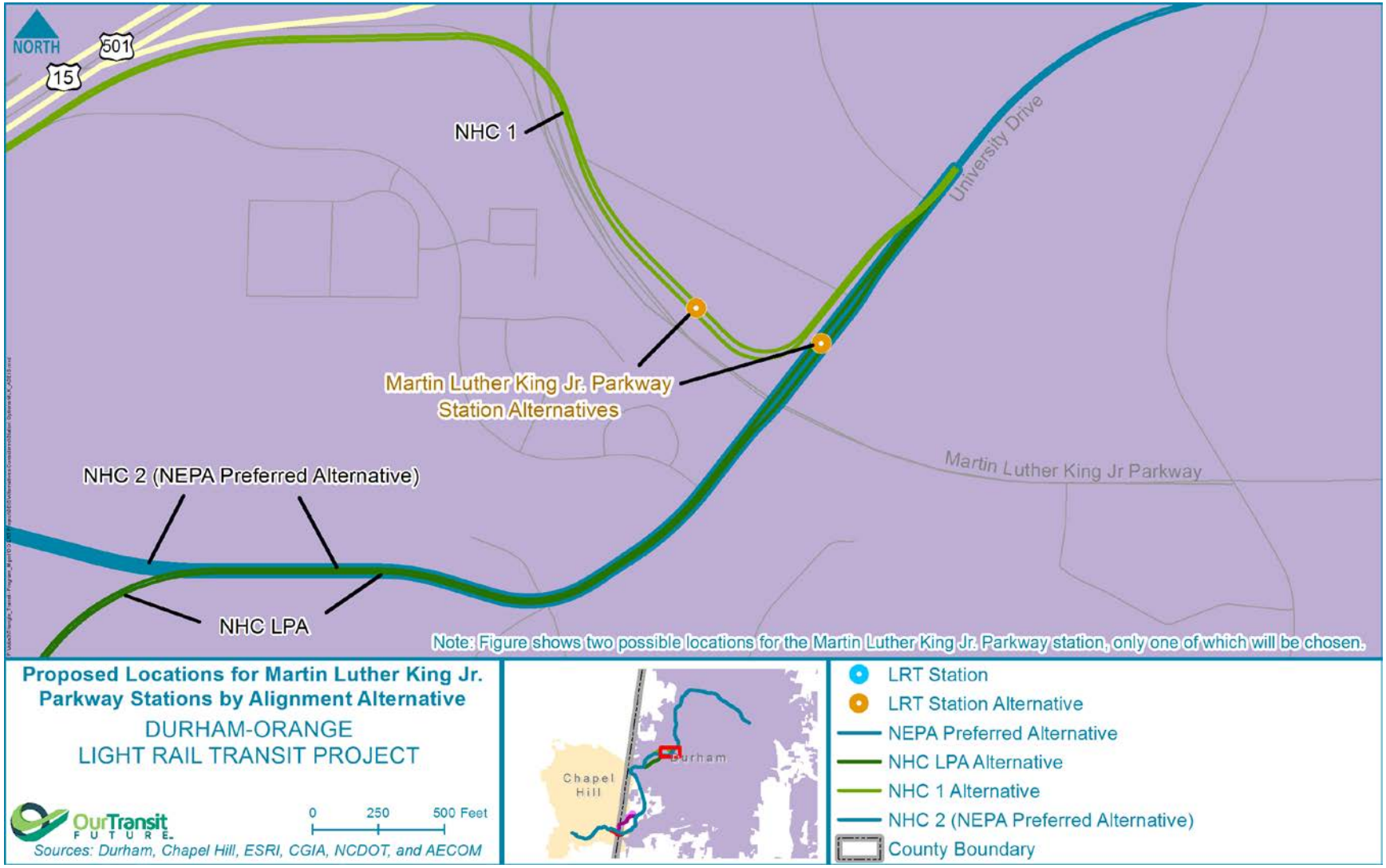


Figure 2.3-4: Proposed Locations for Martin Luther King Jr. Parkway Station by Alignment Alternative



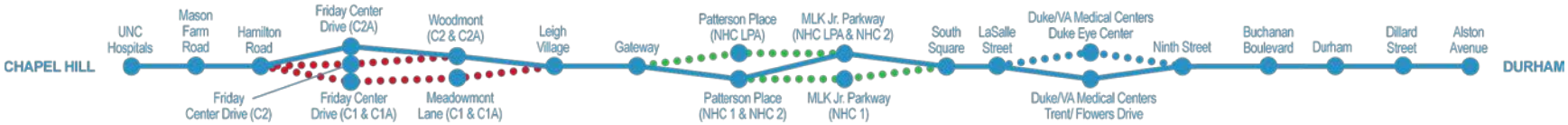
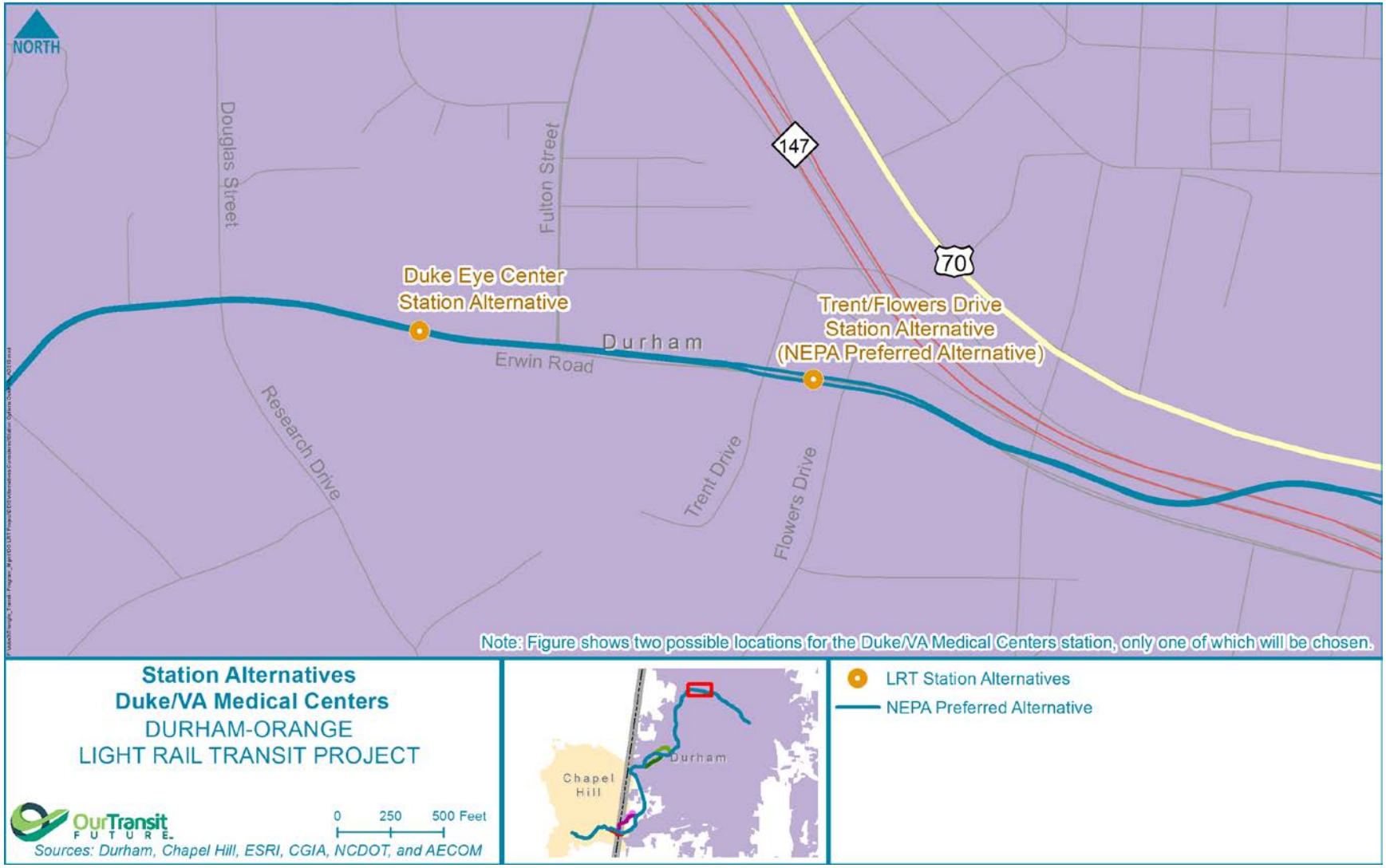
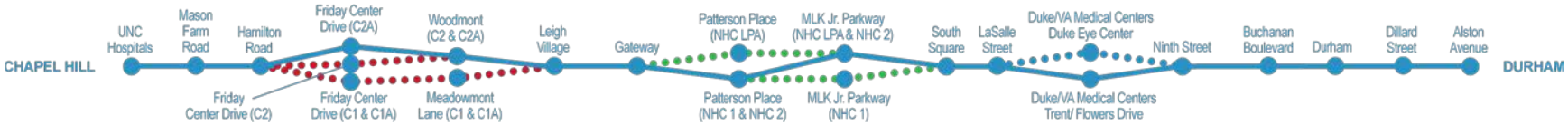


Figure 2.3-5: Station Alternatives for Duke/VA Medical Centers Station





Examples of typical station amenities include ticket vending machines, transit system maps, canopy, and benches.

2.3.2.2 Alignment of the NEPA Preferred Alternative

The NEPA Preferred Alternative would generally follow NC 54, I-40, US 15-501, and the North Carolina Railroad (NCRR) Corridor in downtown Durham and east Durham, as shown on **Figure 2.3-6**. The alignment would begin at UNC Hospitals, parallel Fordham Boulevard, proceed east along NC 54, travel north along I-40, parallel US 15-501 before turning east toward the Duke University campus along Erwin Road, and then follow the NCRR Corridor parallel to NC 147 through downtown Durham, before reaching its eastern terminus near Alston Avenue. The alignment would consist of at-grade alignment, cut and fill sections, and elevated structures.

Cut Section: Area where soil is excavated to lower the existing ground prior to construction of the trackway

Fill Section: Area where soil is added to build up or raise the existing ground prior to construction of the trackway

Cutting and filling are techniques used to create a smooth, level ground surface for installation of the tracks.

The NEPA Preferred Alternative includes C2A in the Little Creek section of the alignment, and NHC 2 in the New Hope Creek section of the alignment.

A detailed description of the NEPA Preferred Alternative is provided below and **Table 2.3-1** includes details on the type of alignment, an example street cross section, and the locations of at-grade crossings. **Figure 2.3-7** presents the D-O LRT project alignment configurations. The route begins in Chapel Hill at UNC Hospitals, ends at Alston Avenue, and reflects the NEPA Preferred Alternative presented in appendix L Basis of Engineering Design.

- **UNC Hospitals to Hamilton Road** – The alignment would begin in Chapel Hill at the proposed UNC Hospitals station on the southern portion of the UNC campus, near the UNC Dogwood Parking Deck, southwest of the intersection of East Drive and Mason Farm Road. The alignment would continue through Odum Village to Mason Farm Road, where a station is proposed. It would parallel Mason Farm Road and the west side of Fordham Boulevard (US 15-501) on aerial structure and cross to the east side of Fordham Boulevard near Old Mason Farm Road. The alignment would turn east and stay on the south side of Raleigh Road (NC 54) and follow the edge of the Finley Golf Course to Prestwick Road, where the Hamilton Road Station is proposed.

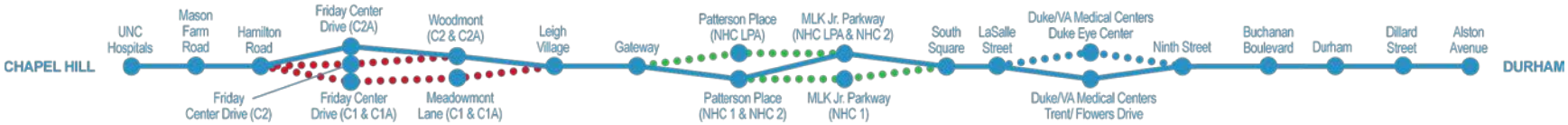
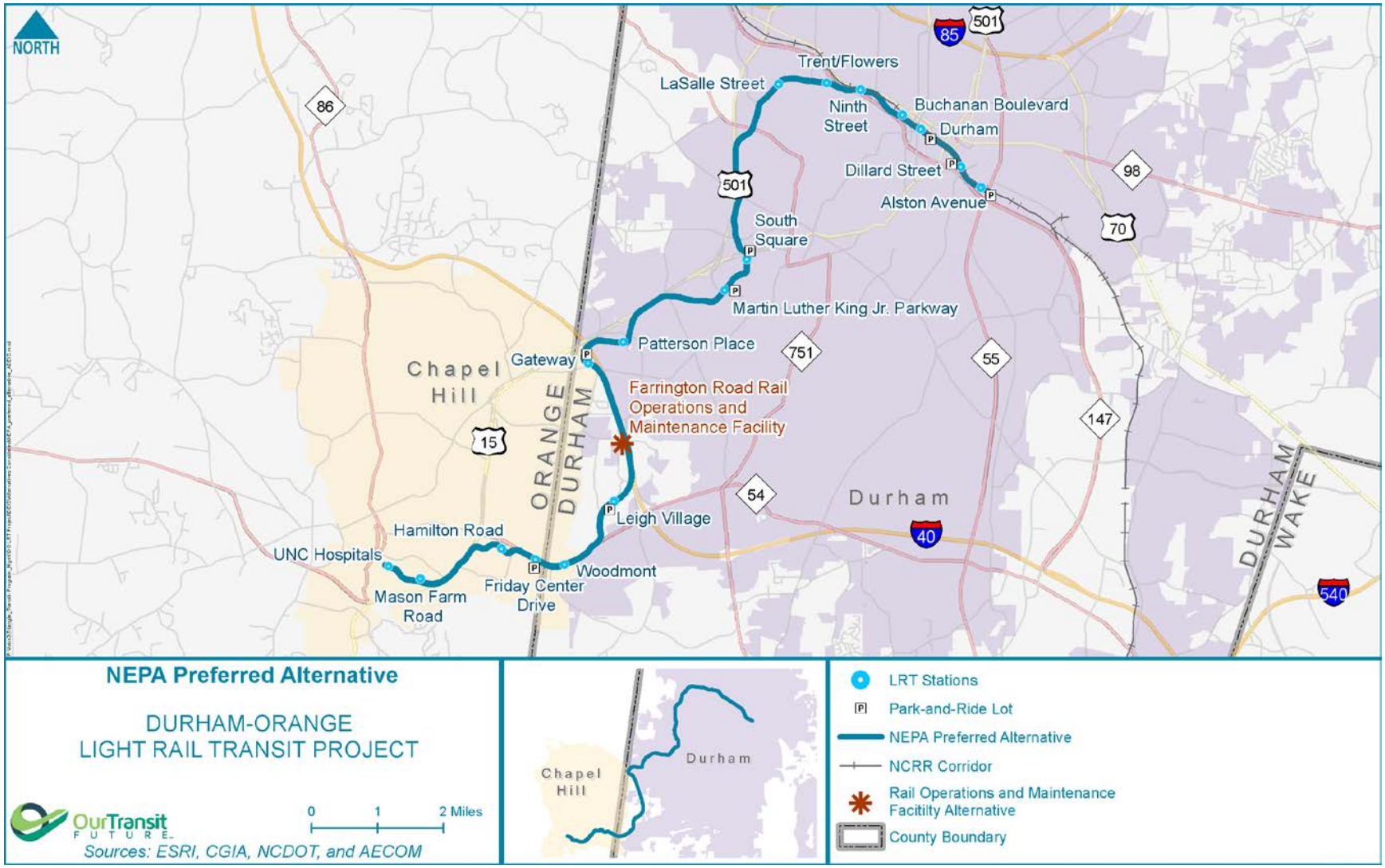


Figure 2.3-6: NEPA Preferred Alternative



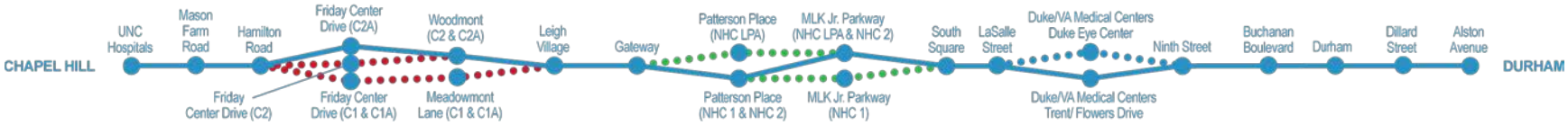
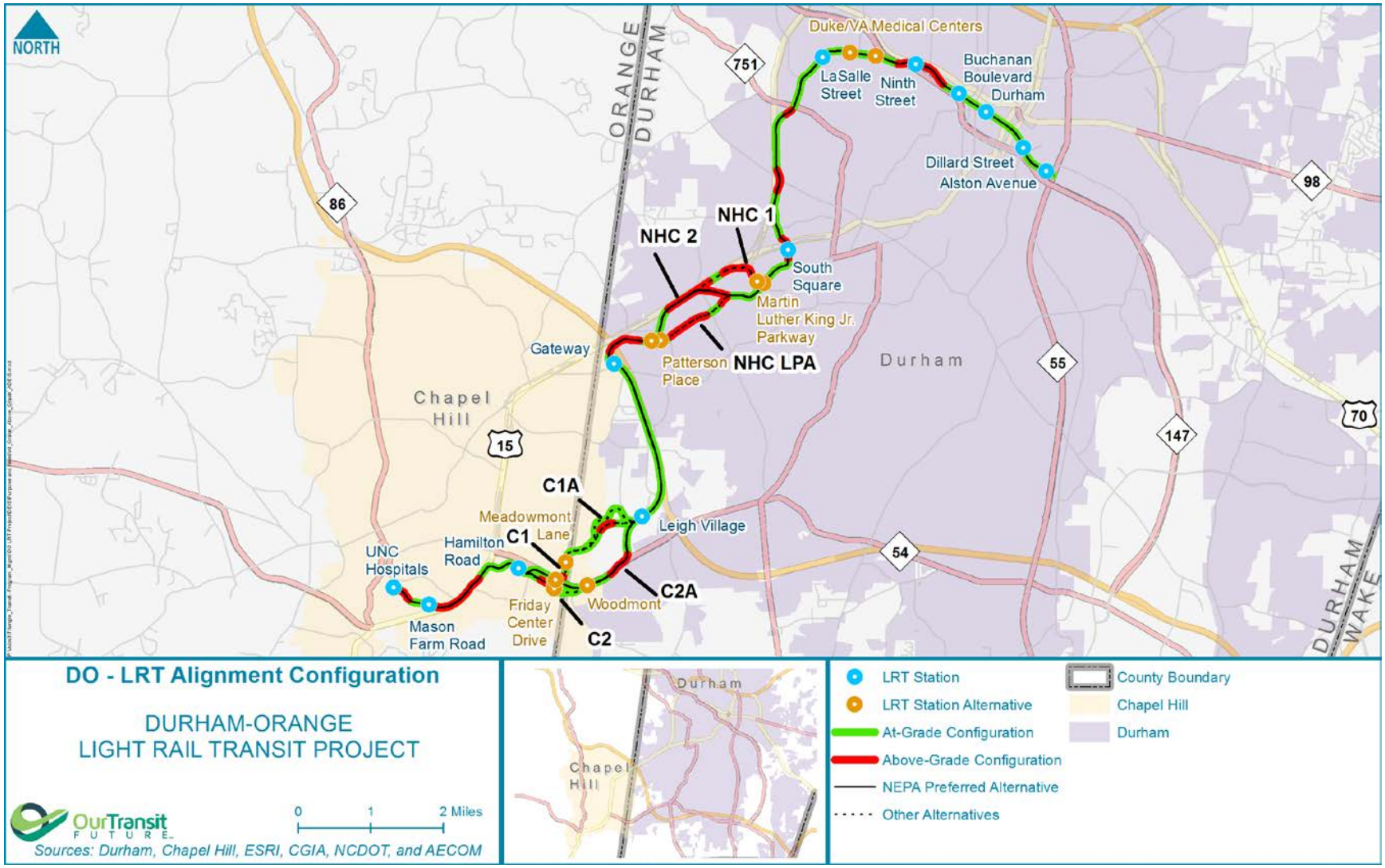
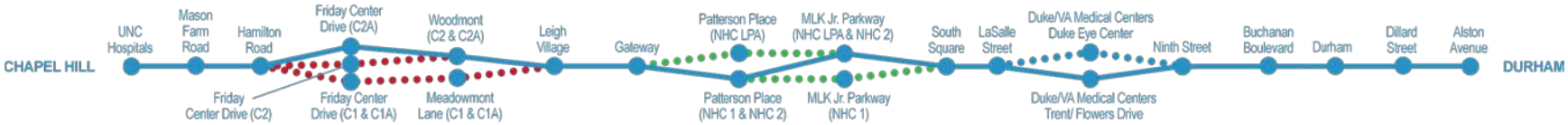
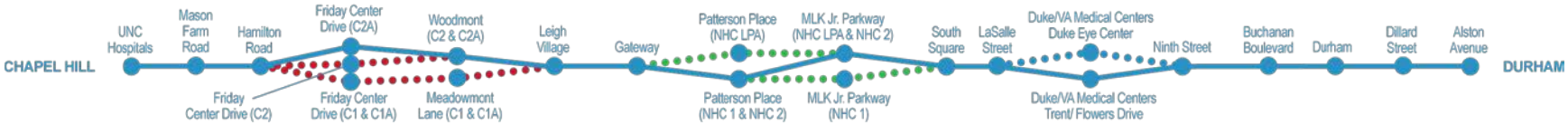


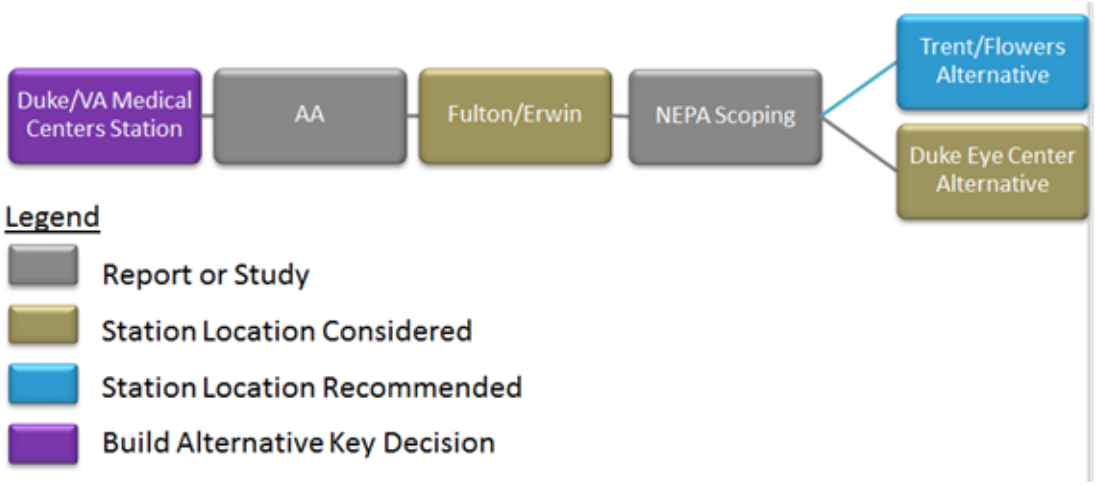
Figure 2.3-7: D-O LRT Project Alignment Configuration





- **Hamilton Road to Leigh Village** –The NEPA Preferred Alternative includes C2A for this segment.
  - *Alternative C2A*. The alignment would follow Prestwick Road until crossing Finley Golf Course Road. It then would turn slightly north and continue along the south side of NC 54 in NCDOT right-of-way to the proposed Friday Center Drive Station, west of Friday Center Drive. It then would continue in the NC 54 right-of-way to the proposed Woodmont Station east of Barbee Chapel Road. The alignment would cross Little John Road and Downing Creek Parkway, and then cross over to the north side of NC 54 on an elevated structure to George King Road. The alignment would travel through USACE property and low density residential development to the proposed Leigh Village Station.
- **Leigh Village to Patterson Place** – From the proposed Leigh Village Station, the alignment would travel north along the west side of I-40 within the Interstate right-of-way to the proposed Gateway Station near Old Chapel Hill Road and Pope Road. The alignment would turn east to cross over I-40 on an elevated structure and follow McFarland Drive through the Patterson Place development. The location of the Patterson Place Station would depend on the alignment in the next segment.
- **Patterson Place to Martin Luther King Jr. Parkway** – Between Patterson Place and Martin Luther King Jr. Parkway, the NEPA Preferred Alternative includes NHC 2.
  - *Alternative NHC 2*. A station is proposed at Patterson Place east of Witherspoon Boulevard. East of the proposed station, the alignment would turn north toward Southwest Durham Drive at Sayward Drive and continue adjacent to US 15-501 on aerial structure across New Hope Creek. At Garrett Road, the elevated alignment would turn east and continue on an elevated structure to a commercial area and Sandy Creek before returning to ground level. The alignment would then follow the property line between Springfield Apartments and Laurel Trace Apartments and then transition to the median of University Drive at Ivy Creek Boulevard. A station is proposed in the median of University Drive east of Martin Luther King Jr. Parkway.
- **Martin Luther King Jr. Parkway to NC 147** – From Martin Luther King Jr. Parkway, the alignment would continue east in the median of University Drive. The alignment would turn north and continue along the east side of Shannon Road where it would be elevated. An elevated South Square Station is proposed along Shannon Road just south of Durham-Chapel Hill Boulevard. The alignment would cross over Durham-Chapel Hill Boulevard and then continue north at grade along the east side of US 15-501. The alignment would then cross over Cornwallis Road and return to ground level. The alignment would continue to follow US 15-501 and Duke Forest until turning east at Cameron Boulevard and transitioning into the median of Erwin Road. A station is proposed at LaSalle Street. The Duke/VA Medical Centers. The alignment would continue along the median of Erwin Road to Anderson Street where it would transition to the north side of Erwin Road before crossing over NC 147.
  - *Trent/Flowers Drive*. The proposed Duke/VA Medical Centers Station included in the NEPA Preferred Alternative is located in the median of Erwin Road between Trent Drive and Flowers Drive.
- **NC 147 to Alston Avenue** – After crossing NC 147, the alignment parallels the NCRR Corridor on the south side west of Ninth Street where an elevated station on retained fill is proposed.





The NEPA Preferred Duke/VA Medical Centers Station: Trent/Flowers Drive is based on analysis and stakeholder and public input during the AA, Scoping, and Project Development phase.

Because of ongoing coordination with both NCRR and the City of Durham, the alignment would continue east in a combination of aerial and at-grade conditions, diverting away from the NCRR Corridor where practicable and remaining at least 40 feet away from the nearest future railroad track as identified by NCRR. This is a refinement of the alignment through this area compared to what was studied in the AA. The end-of the-line station would be located just west of Alston Avenue. Additional stations in this segment are proposed east of Buchanan Boulevard, east of Chapel Hill Street (Durham Station), east of Dillard Street.

From the Ninth Street Station, the LRT remains elevated crossing Ninth Street and Swift Avenue and shifts away from the NCRR corridor, crossing Campus Drive elevated then touching back to grade west of Buchanan Boulevard. After a proposed station east of Buchanan Boulevard, the alignment transitions back to the southern edge of the NCRR corridor where it crosses Gregson Street, Duke Street and Chapel Hill Street at grade. The Durham Station is proposed east of Chapel Hill Street adjacent to the Durham Transportation Center. From Chapel Hill Street east, the alignment runs within the current Pettigrew Street, requiring Pettigrew Street to shift south and converting it to a one-way eastbound street to Dillard Street. Pettigrew Street is proposed to revert to two-way traffic east of Dillard Street and adjacent to the Dillard Station. In the AA, the proposed location for the Alston Avenue terminus station was just east of Alston Avenue. Triangle Transit determined that a station on the east side of Alston Avenue is infeasible due to the required 40-foot spacing between the light rail track and nearest future railroad track, space constraints imposed by the Pettigrew Street bridge over Alston Avenue, and the City of Durham water tower east of Alston Avenue. Therefore, the proposed location for the Alston Avenue Station was moved to just west of Alston Avenue approximately 1,200 feet from the location described in the AA. On May 21, 2015, the NCRR Board of Directors agreed to permit NCRR management to enter into lease negotiations with Triangle Transit based on this refined alignment.

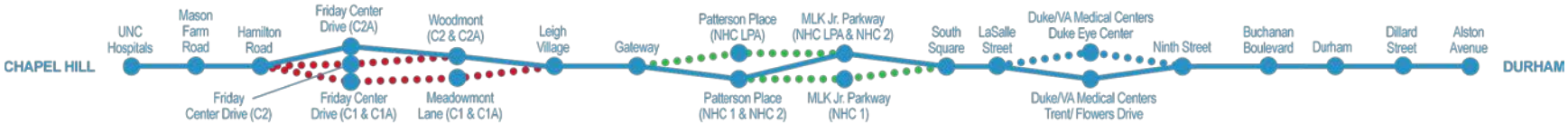
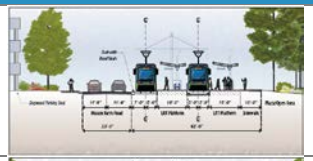
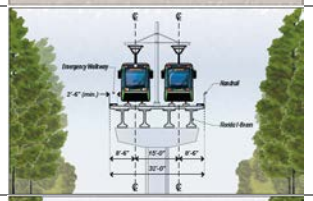
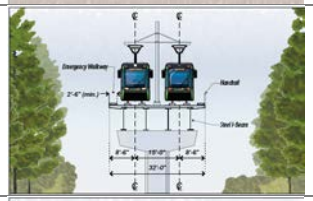
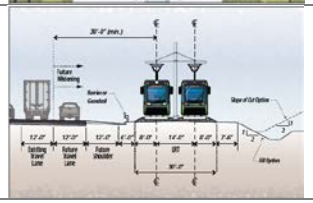


Table 2.3-1: Summary of Alignment Characteristics and Location of At-Grade Interfaces between the Light Rail Alignment and Roadway Network [a]

Project Limits	From	To	Type of Alignment	Example of Street Cross Section	Location of At-Grade Interfaces
UNC Hospitals to Hamilton Road	UNC Hospitals Station (A-01)	Hibbard Drive (A-01)	Side-running (south of Mason Farm Road)		East Drive
	Hibbard Drive (A-01)	West of Mason Farm Road Station (A-02)	Elevated		--
	West of Mason Farm Road Station (A-02)	East of Mason Farm Road Station (A-03)	Side-running (north of Mason Farm Road)		Baity Hill Drive
	East of Mason Farm Road Station (A-03)	North of Old Mason Farm Road (A-04)	Elevated (west of Fordham Boulevard, crossing to east of Fordham Boulevard)		--
	North of Old Mason Farm Road (A-04)	Hamilton Road Station (B-02)	Side-running (east of Fordham Boulevard), transitioning to exclusive right-of-way, transitioning to side-running) (south of Prestwick Road)		--

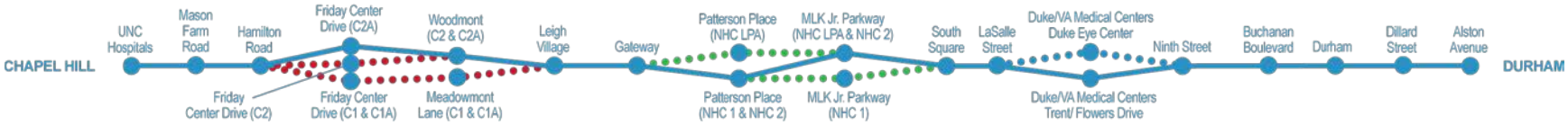
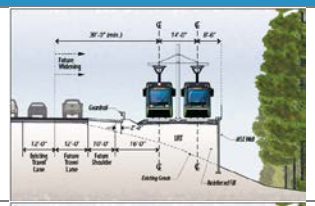
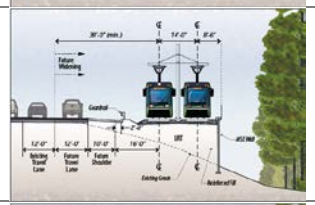
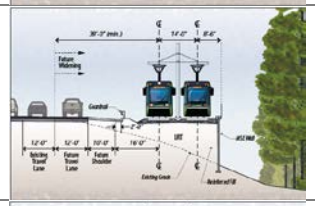
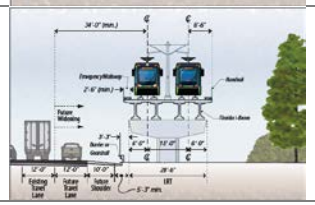


Table 2.3-1: Summary of Alignment Characteristics and Location of At-Grade Interfaces between the Light Rail Alignment and Roadway Network [a]

Project Limits	From	To	Type of Alignment	Example of Street Cross Section	Location of At-Grade Interfaces
Hamilton Road to Leigh Village	Hamilton Road Station (B-02)	Friday Center Station (C2A-01)	Side-running (south of Prestwick Road), transitioning to exclusive right-of-way, transitioning to side-running (south of NC 54)		Finley Golf Course Road The Exchange at Meadowmont driveway
	Friday Center Station (C2A-01)	Woodmont Station (C2A-02)	Side-running (south of NC 54)		Friday Center Drive Barbee Chapel Road
	Woodmont Station (C2A-02)	East of Downing Creek Pkwy (C2A-03)	Side-running (south of NC 54)		Little John Road Downing Creek Parkway
	East of Downing Creek Parkway (C2A-03)	Leigh Village Station (C2A-05)	Elevated (crossing NC 54), transitioning to side-running (north of NC 54, east of relocated George King Drive), transitioning to exclusive right-of-way		George King Road (realigned)

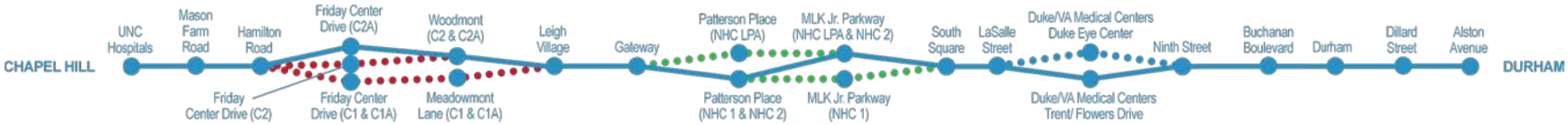
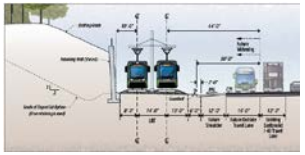
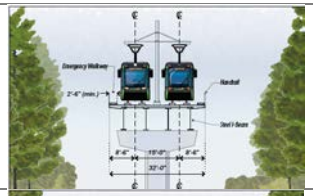
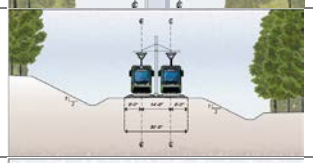
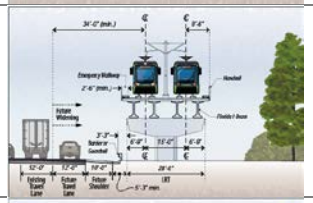


Table 2.3-1: Summary of Alignment Characteristics and Location of At-Grade Interfaces between the Light Rail Alignment and Roadway Network [a]

Project Limits	From	To	Type of Alignment	Example of Street Cross Section	Location of At-Grade Interfaces
Leigh Village to Patterson Place	Leigh Village Station (C2A-05)	Gateway Station (D-04)	Exclusive right-of-way, then exclusive guideway (within I-40 right-of-way)		NS Connector Road/EW Street C (new road) Farrington Road Pope Road/Old Chapel Hill Road
	Gateway Station (D-04)	West of Patterson Place Station (D-05)	Exclusive right-of-way, then elevated over I-40, Mt. Moriah Road, and McFarland Drive, then side-running (north of McFarland Drive)		Witherspoon Boulevard
Patterson Place to Martin Luther King Jr. Parkway	West of Patterson Place Station (D-05)	US 15-501 (D2-07)	Side-running (west of Sayward Drive), then exclusive right-of-way until south of US 15-501		Southwest Durham Drive
	US 15-501 (D2-07)	Ivy Creek Boulevard (D2-09)	Elevated, south of US 15-501, then turns south over Garrett Road, returns to ground in exclusive right-of-way to enter median of University Drive		Ivy Creek Boulevard/University Drive
	Ivy Creek Boulevard (D2-09)	Martin Luther King Jr. Parkway Station (D2-11)	Median running		Martin Luther King Jr. Parkway

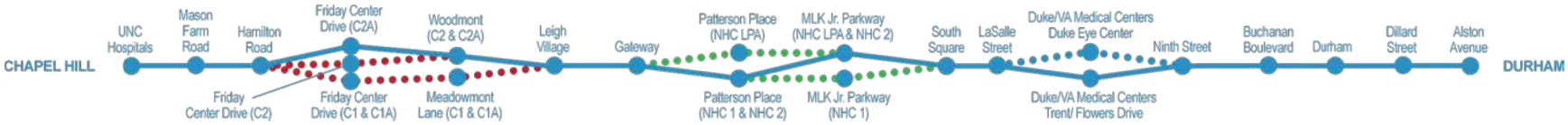
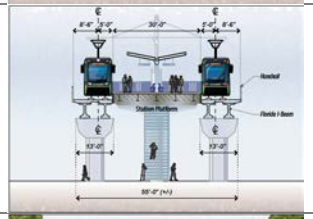
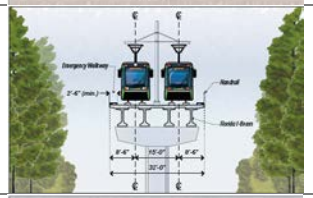
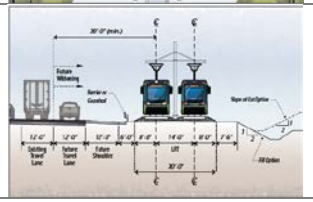


Table 2.3-1: Summary of Alignment Characteristics and Location of At-Grade Interfaces between the Light Rail Alignment and Roadway Network [a]

Project Limits	From	To	Type of Alignment	Example of Street Cross Section	Location of At-Grade Interfaces
Martin Luther King Jr. Parkway to NC 147	Martin Luther King Jr. Parkway Station (D2-11)	Shannon Road (D-11)	Median running		Westgate Drive
	Shannon Road (D-12)	South Square Station (D-12)	Transition from median running to side-running (east of Shannon Road) and elevating to above-ground station		Shannon Road/University Drive
	South Square Station (D-12)	South of Cornwallis Road (D-12)	Elevated over Durham Chapel Hill Boulevard, returning to ground in exclusive right-of-way to side-running in exclusive right-of-way (east of US 15-501)		Pickett Road Western Bypass
	South of Cornwallis Road (D-12)	North of Cornwallis Road (D-13)	Elevated over Cornwallis Road		--
	North of Cornwallis Road (D-13)	Cameron Boulevard/ Erwin Road (D-15)	Side-running (east of US 15-501) to exclusive right-of-way on Duke University property, to elevated, to at-grade in exclusive right of way		--

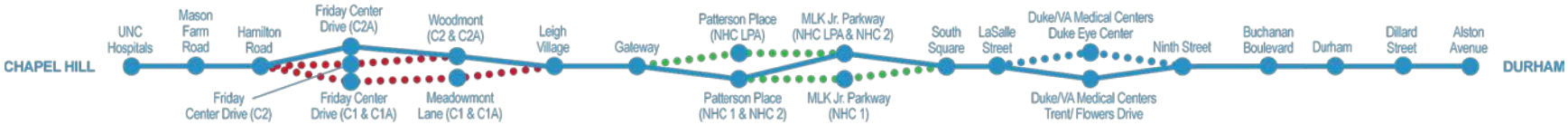
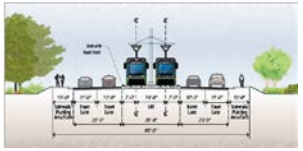
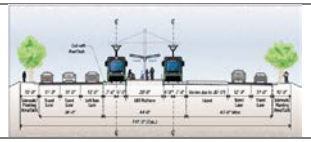
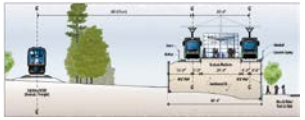


Table 2.3-1: Summary of Alignment Characteristics and Location of At-Grade Interfaces between the Light Rail Alignment and Roadway Network [a]

Project Limits	From	To	Type of Alignment	Example of Street Cross Section	Location of At-Grade Interfaces
Martin Luther King Jr. Parkway to NC 147 (continued)	Cameron Boulevard (E-1)	LaSalle Street Station (E-4)	Median-running		Cameron Boulevard Center for Living Drive Towerview Road/Moreene Road LaSalle Street Downing Street
	LaSalle Street Station (E-4)	Duke/VA Medical Centers Station (E-07)	Median-running		Douglas Street/Research Drive Eye Center Drive Fulton Street Emergency Drive Trent Drive
	Duke/VA Medical Centers Station (E-07)	Anderson Street (E-8)	Median-running, transitioning to side running (north of Erwin Road)		Flowers Drive Anderson Street
	Anderson Street (E-8)	Ninth Street Station (F-01)	Side-running (north of Erwin Road) to elevated over NC 147, then elevated on retained fill in exclusive right-of-way south of NCRR Corridor		--

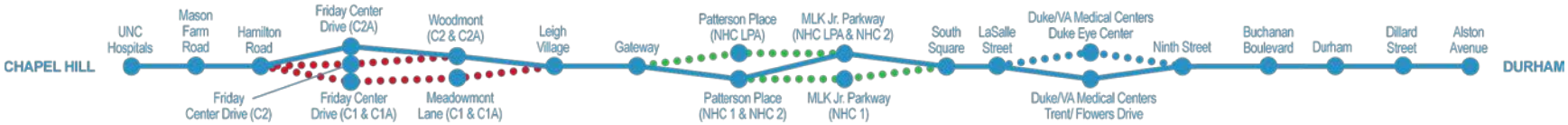
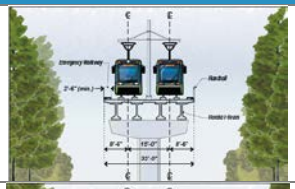
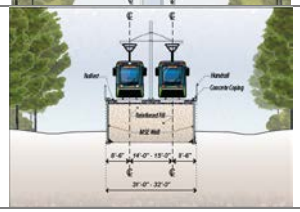
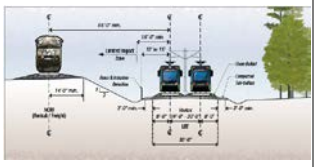
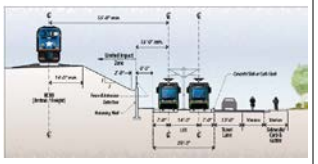
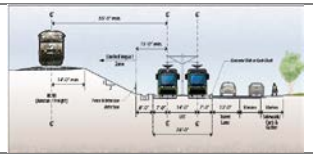
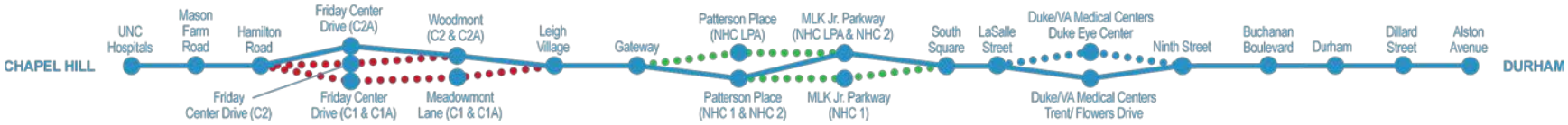


Table 2.3-1: Summary of Alignment Characteristics and Location of At-Grade Interfaces between the Light Rail Alignment and Roadway Network [a]

Project Limits	From	To	Type of Alignment	Example of Street Cross Section	Location of At-Grade Interfaces
NC 147 to Alston Avenue	Ninth Street Station (F-01)	East of Campus Drive (F-02)	Elevated over Erwin Road, Swift Avenue, Powe Street and Campus Drive south of Pettigrew Street		--
	East of Campus Drive (F-02)	Buchanan Boulevard Station (F-02)	Elevated, transitioning to exclusive right-of-way north of NC 147 corridor to Buchanan Boulevard Station		South Buchanan Boulevard
	Buchanan Boulevard Station (F-02)	Durham Station (F-03)	Exclusive right-of-way south of NCRR Corridor		Wilkerson Avenue Gregson Street Duke Street West Chapel Hill Street
	Durham Station (F-03)	Dillard Street Station (F-05)	Exclusive transit lane adjacent to auto lane		Blackwell Street Mangum Street Roxboro Street Dillard Street
	Dillard Street Station (F-05)	Alston Avenue Station (F-06)	Side-running (north of East Pettigrew Street)		Fayetteville Street Grant Street

[a] Letters and numbers in () indicate the appropriate sheet number in appendix L *Basis for Engineering Design: Vol. 1 and 2*



2.3.2.3 Project Element Alternatives

Little Creek Alternatives

In addition to the NEPA Preferred Alternative, Project Element Alternatives were also studied in this DEIS for the crossing of Little Creek, but are not recommended based on the DEIS impact and benefit analysis and public and stakeholder comments. A detailed description of the Little Creek Alternatives is provided below and reflects the alternative as presented in appendix L and **Figure 2.3-8**.

- **Hamilton Road to Leigh Village** – Four NEPA Preferred and Project Element Alternatives are being considered for this segment. In addition to the NEPA Preferred Alternative (C2A), the Little Creek alternatives include C1, C1A, and C2.
  - *C1 Alternative* would follow the property line between Finley Golf Course and The Exchange at Meadowmont to the existing Friday Center parking lot where an elevated station is proposed. The alignment would turn north and cross over NC 54 on an elevated structure and follow Meadowmont Lane to the proposed Meadowmont Lane Station at West Barbee Chapel Road. The alignment would cross Meadowmont Lane at Green Cedar Lane and then continue northeast through Jordan Game Lands (USACE property), crossing George King Road to the proposed Leigh Village Station.
  - *C1A Alternative* would follow the same alignment as Alternative C1 to Green Cedar Lane, turn north to avoid the USACE property, cross Park Bluff Drive and Iron Mountain Road, and tie back into Alternative C1 prior to reaching the proposed Leigh Village Station.
  - *C2 Alternative* would follow the property line between Finley Golf Course and The Exchange at Meadowmont to the existing Friday Center park-and-ride lot where a station is proposed. The alignment would continue east and cross Friday Center Drive and Barbee Chapel Road to the south of the Courtyard by Marriott hotel. It then would turn slightly north, cross Stancell Drive, and continue along the south side of NC 54 in NCDOT right-of-way to the proposed Woodmont Station east of Barbee Chapel Road. The alignment would then follow the C2A alignment to the proposed Leigh Village Station.

New Hope Creek Alternatives

In addition to the NEPA Preferred Alternative, Project Element Alternatives were also studied in this DEIS for the crossing of New Hope Creek, but are not recommended based on the DEIS impact and benefit analysis and public and stakeholder comments. A detailed description of the New Hope Creek (NHC) alternatives is provided below and reflects the alternative as presented in appendix L and **Figure 2.3-9**.

- **Patterson Place to Martin Luther King Jr. Parkway** – Between Patterson Place and Martin Luther King Jr. Parkway, three alternatives are being considered. In addition to the NEPA Preferred Alternative (NHC 2), the NHC alternatives being evaluated include NHC 1 and NHC LPA.
  - *NHC LPA Alternative*. A station is proposed at Patterson Place east of Sayward Drive. The alignment would continue east, cross over New Hope Creek approximately 1/3 mile south of US 15-501 on elevated structure, and return to ground level prior to crossing Garrett Road. The alignment would join the same alignment as the NEPA Preferred Alternative (NHC 2) following the property line between Springfield

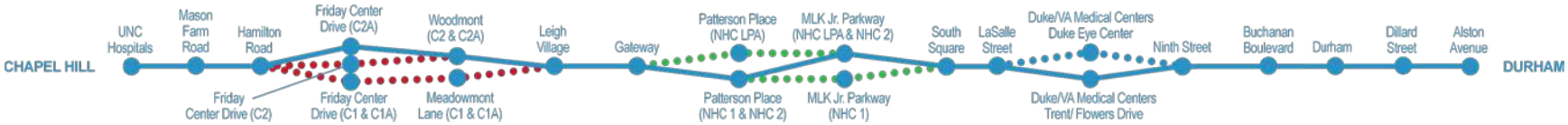
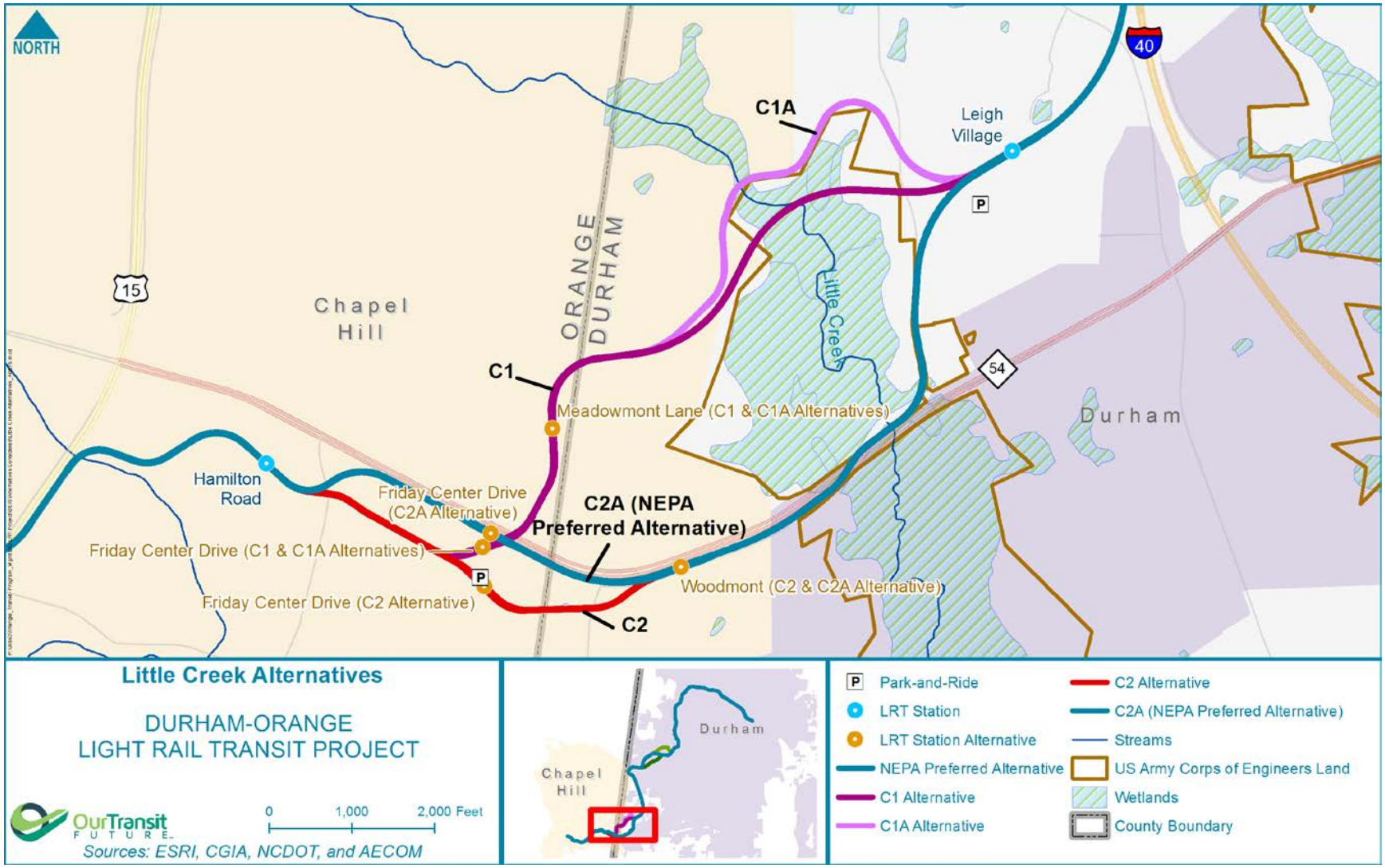


Figure 2.3-8: Little Creek Alternatives



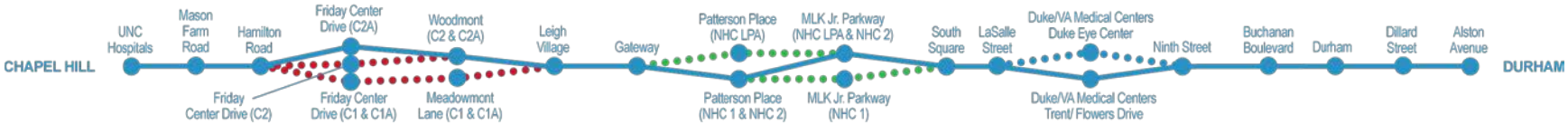
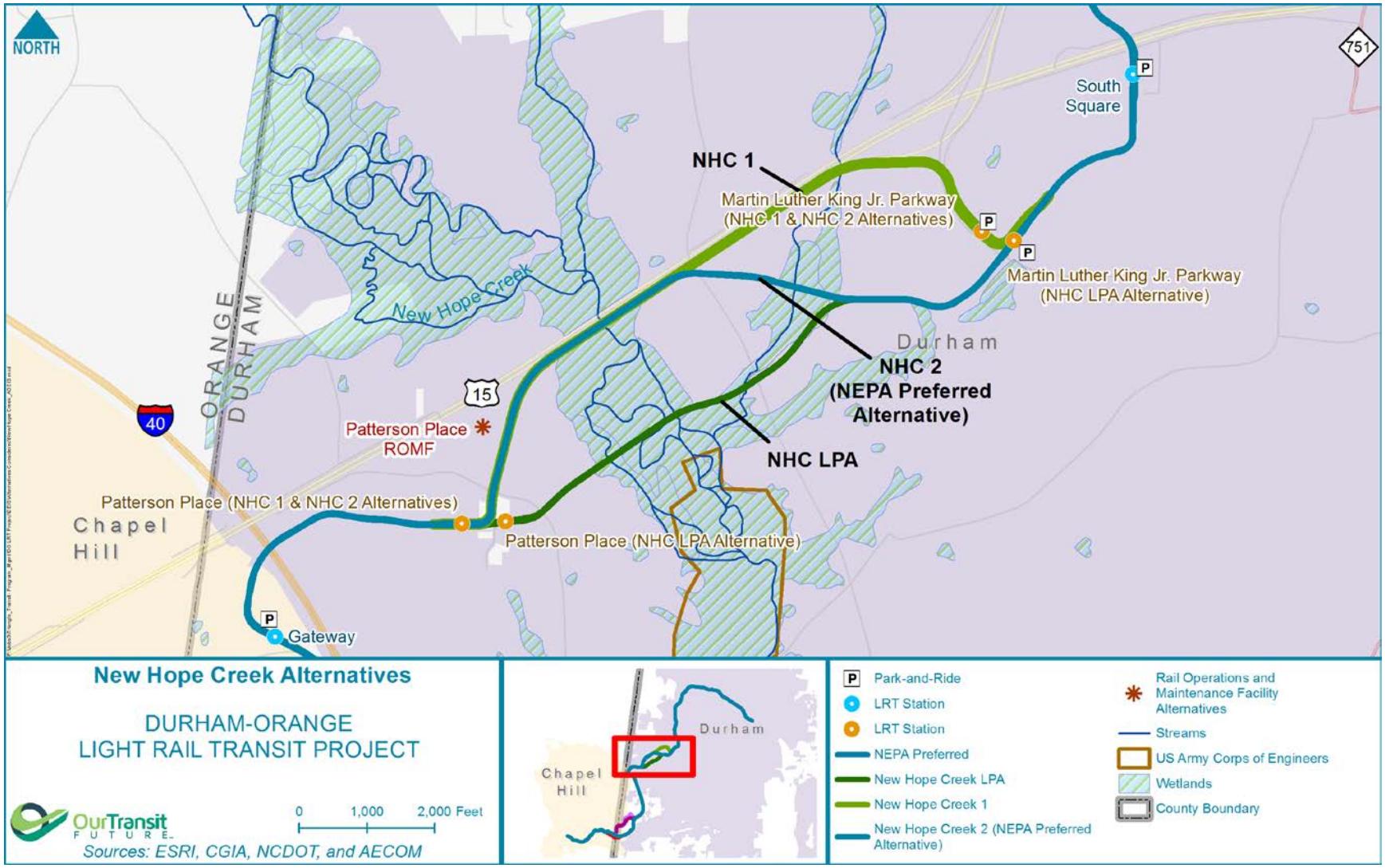
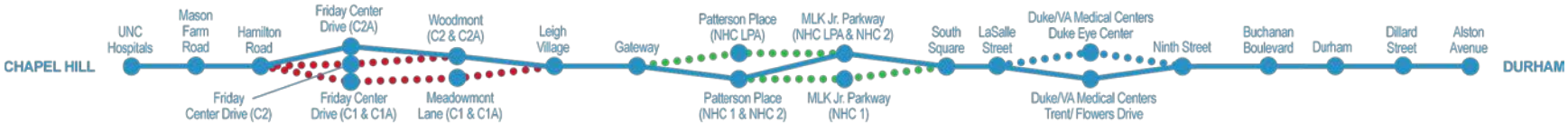


Figure 2.3-9: New Hope Creek Alternatives





Apartments and Laurel Trace Apartments and then transitioning to the median of University Drive at Ivy Creek Boulevard. A station is proposed in the median of University Drive east of Martin Luther King Jr. Parkway in the same location as the NEPA Preferred Alternative (NHC 2).

– *NHC 1 Alternative*. A station is proposed at Patterson Place east of Witherspoon Boulevard in the same location as the NEPA Preferred Alternative (NHC 2). The alignment would continue on the same alignment as the NEPA Preferred Alternative to just west of Garrett Road, where it would continue east along US 15-501 and return to ground level east of Garrett Road. Near Larchmont Road, the alignment would cross over Sandy Creek and Martin Luther King Jr. Parkway on elevated structure, traveling along the east side of Martin Luther King Jr. Parkway, and return to ground level at the proposed Martin Luther King Jr. Parkway Station. Under this alternative, the station would be located adjacent to Martin Luther King Jr. Parkway north of University Drive. At University Drive the alignment would turn northeast paralleling University Drive before transitioning to the median of University Drive at Westgate Drive, rejoining the NEPA Preferred Alternative (NHC 2).

Station Alternatives

Throughout the pre-planning and AA phase of the project, the D-O LRT Project team conducted a station area planning process. Through a series of workshops, meetings, and round table discussions, partners including Triangle Transit, local officials, and project team members developed, analyzed, and refined a number of station locations based on the alternatives considered.

Table 2.3-2 represents the result of this process with respect to stations being analyzed in this DEIS and summarizes their basic characteristics. Although 17 stations have been identified, the location of the stations along the alignment alternatives would depend on the selection of the alignment alternative. In addition, station alternatives are under study to identify the location of the Duke/VA Medical Centers Station. These station alternatives are located at:

- Duke Eye Center
- Trent/Flowers Drive

The Duke/VA Medical Centers Station alternatives were added during scoping due to traffic concerns expressed by the City of Durham, NCDOT, Duke, and the VA Medical Center. These concerns were associated with the originally proposed location of the Duke/VA Medical Centers Station at Fulton/Erwin as designated in the AA. As noted in DEIS section 2.3.2.2, the Trent/Flowers Drive location is included in the NEPA Preferred Alternative.

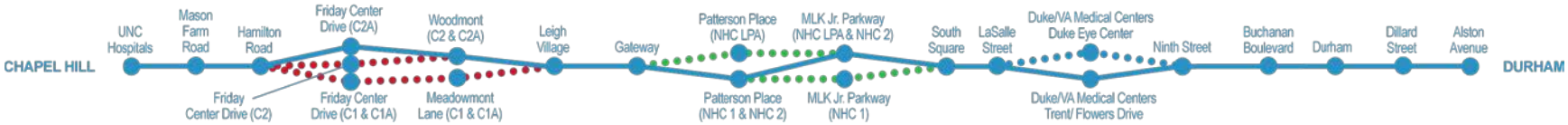
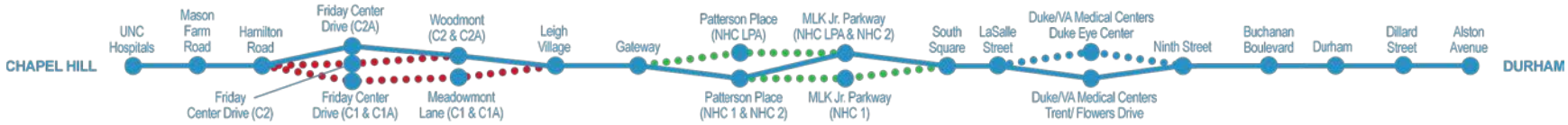


Table 2.3-2: Summary of Station Characteristics

	Station	Alignment or Station Alternative	Access Type	Platform Type
	UNC Hospitals	NEPA Preferred Alternative	Walk-up	Side
	Mason Farm Road	NEPA Preferred Alternative	Walk-up	Center
	Hamilton Road	NEPA Preferred Alternative	Walk-up	Side
	Friday Center	same station location - C1 / C1A	Park-and-ride	Center (elevated)
		C2	Park-and-ride	Center
		C2A (NEPA Preferred Alternative)	Park-and-ride	Center
	Meadowmont Lane	same station location - C1 / C1A	Walk-up	Center
	Woodmont	same station location - C2 / C2A (NEPA Preferred Alternative)	Walk-up	Center
	Leigh Village	NEPA Preferred Alternative	Park-and-ride	Center
	Gateway	NEPA Preferred Alternative	Park-and-ride	Center
	Patterson Place	NHC LPA	Walk-up	Center
		NHC 1 & NHC 2 (NEPA Preferred Alternative) - same station location	Walk-up	Center
	Martin Luther King Jr. Parkway	NHC LPA & NHC 2 (NEPA Preferred Alternative) - same station location		
		NHC 1	Park-and-ride	Center
	South Square	NEPA Preferred Alternative	Park-and-ride	Center (elevated)
	LaSalle Street	NEPA Preferred Alternative	Walk-up	Side (offset)
	Duke/VA Medical Centers Station	Duke Eye Center Station Alternative	Walk-up	Center
		Trent/Flowers Drive Station Alternative (NEPA Preferred Alternative)	Walk-up	Center
	Ninth Street	NEPA Preferred Alternative	Walk-up	Center (elevated)
	Buchanan Boulevard	NEPA Preferred Alternative	Walk-up	Center
	Durham	NEPA Preferred Alternative	Park-and-ride[a]	Center
	Dillard Street	NEPA Preferred Alternative	Park-and-ride	Center
	Alston Avenue	NEPA Preferred Alternative	Park-and-ride	Center

[a] Triangle Transit proposes to continue use of the existing leased spaces in the City of Durham parking structure located at the Durham Station.



Rail Operations and Maintenance Facility Alternatives

Only one ROMF would be built for the proposed project, selected from the NEPA Preferred and Project Element Alternatives. The ROMF would include areas to store, service, and maintain 17 light rail vehicles with the capacity for up to 26 light rail vehicles without needing to expand the facility. The ROMF also would hold equipment needed to maintain the stations and trackway. The facility would operate 24 hours per day, 7 days per week and would accommodate staff that report for work at the facility, such as train operators and mechanics.

As part of this DEIS, five sites for the ROMF are being evaluated: Farrington Road (NEPA Preferred Alternative), Leigh Village, Patterson Place, Cornwallis Road, and Alston Avenue, as shown on **Figure 2.3-1**. Additional detail regarding the evaluation of these alternatives is located in DEIS chapter 8.

Farrington Road ROMF (NEPA Preferred Alternative)

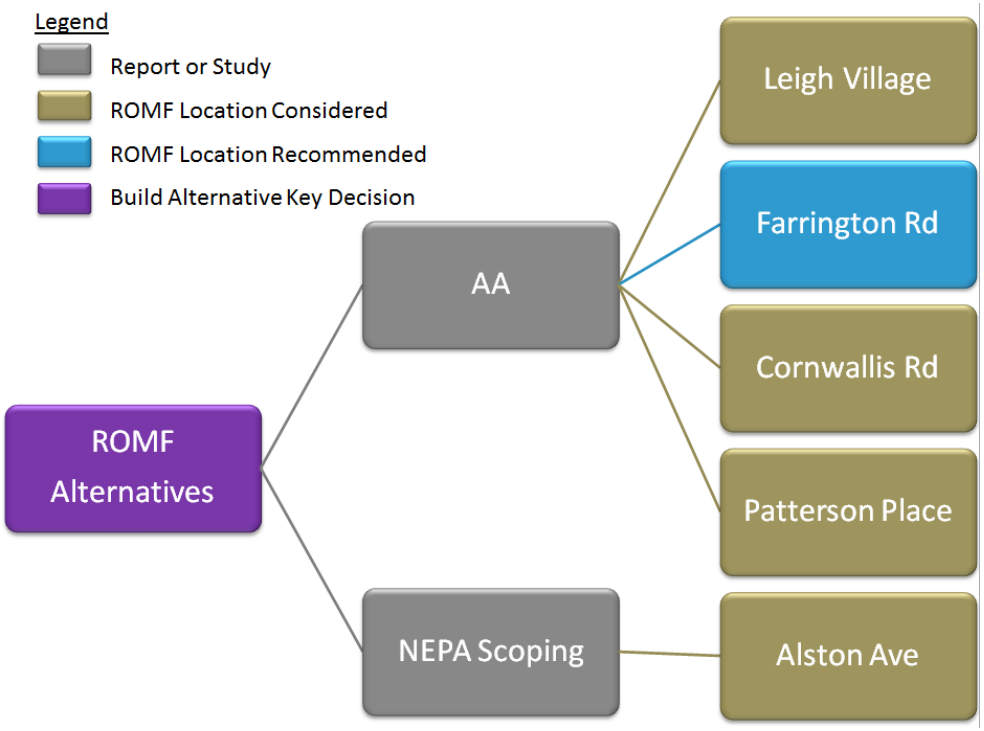
The Farrington Road ROMF site is an approximately 25 acre site located between Farrington Road and the I-40 corridor. The site is located along a long, straight section of the proposed track alignment, allowing for easy access to the ROMF yard using cross-overs. The Farrington Road ROMF site would work with all alignment alternatives.

Leigh Village ROMF

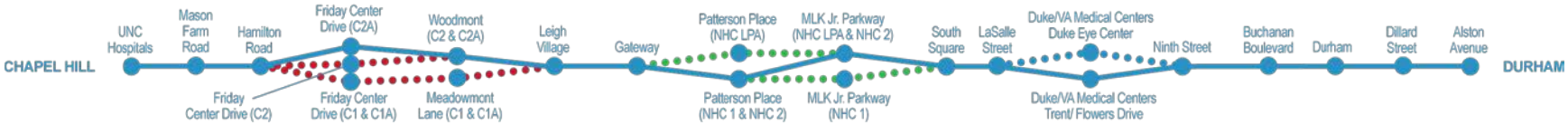
The Leigh Village ROMF is an approximately 21 acre site. Like the Farrington Road ROMF site, the Leigh Village ROMF site located in between Farrington Road and the I-40 corridor. However, the site is located slightly farther to the south. The Leigh Village site would work with all alignment alternatives.

Patterson Place ROMF

The Patterson Place ROMF is the smallest of the five sites at approximately 16 acres. The Patterson Place ROMF is not compatible with the NHC 1 and NHC 2



Four ROMF locations were identified during the AA, with an additional location added during Scoping based on input.



alignment alternatives because its location conflicts with the track alignment of these alternatives; meaning it would only work with NHC LPA alignment. Because the site is not directly adjacent to the NHC LPA alignment, an additional length of access track would be required.

Cornwallis Road ROMF

The Cornwallis Road ROMF site is approximately 20 acres and is east of the existing Western Bypass (which parallels 15-501) and south of Cornwallis Road. The Cornwallis Road site would work with all alignment alternatives.

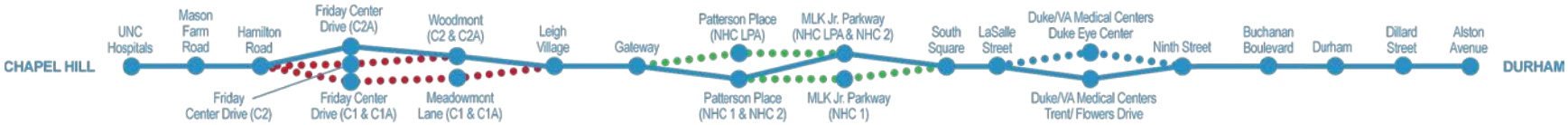
Alston Avenue ROMF Alternative

The Alston Avenue ROMF site is an approximately 19 acre site in east Durham, east of the Alston Avenue terminal site. The site is located between Bacon and Scoggins Streets, south of East Pettigrew Street, and north of NC 147. An additional length of access track would be required to connect this site with the terminus station.

2.3.3 Traction Power Substations

The NEPA Preferred and Project Element Alternatives also require traction power substations (TPSS) at approximately one-mile intervals along the light rail alignment to supply electrical power to the traction power networks. TPSSs do not generate electricity; rather, they change the electrical current to an appropriate level to power light rail vehicles. The proposed locations of the TPSSs are included in appendix L. As engineering continues, Triangle Transit will refine their locations. TPSSs can be co-located at stations where feasible and at the ROMF. Each TPSS would be in an enclosed structure and require approximately 0.03 acre of land.

A crossover connects two parallel rail tracks, allowing a train on one track to cross over to the other.



2.4 Transit Operating Plan

2.4.1 Proposed Service Plan

Proposed operating hours for the light rail service are generally from 5:30 a.m. to 12:00 midnight on weekdays and Saturdays, and 6:30 a.m. to 12:00 midnight on Sundays. Light rail service frequencies by period are shown in **Table 2.4-1**.

2.4.2 Operating Requirements

Triangle Transit estimates that 17 vehicles (cars) are required for operation of the proposed D-O LRT Project as shown in appendix K.1. Vehicles would operate with a combination of single and double vehicle train sets at 10-minute headways during the peak periods. This results in a 110-minute cycle time (round-trip time for a single train set), providing approximately 20 percent layover/recovery times. Three vehicles would be available as spares.

2.4.3 Supporting Bus Service

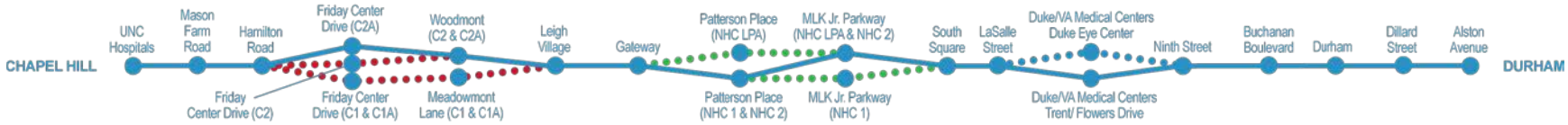
Along with the introduction of the proposed D-O LRT Project, Triangle Transit would implement several changes for DATA, and CHT routes in the corridor. (Duke Transit routes also operate in the transit corridor; however, no changes are proposed to Duke Transit routes.) Changes can be categorized as follows:

- Introduction of new feeder bus routes
- Modifications to the background bus network
- Elimination of duplicative bus service

Proposed changes to the bus network for the NEPA Preferred and Project Element Alternatives are listed and described in more detail in appendix K.1. Many existing bus routes would connect to light rail stations with little or no change to route alignments.

Table 2.4-1: NEPA Preferred and Project Element Alternatives Proposed Service Frequencies

Day of Week	5:30 - 9:00 a.m.	9:00 a.m. - 3:30 p.m.	3:30 - 7:00 p.m.	7:00 p.m. - Midnight
Weekdays	10 minutes	20 minutes	10 minutes	20 minutes
Saturdays	20 minutes	20 minutes	20 minutes	30 minutes
Sundays	30 minutes [a]	20 minutes	20 minutes	30 minutes

Source: Appendix K.1.

[a] Sunday Service would begin at 6:30 a.m.