

FEASIBILITY STUDY

**Widening of US 74 (Independence Boulevard)
From I-485 (Charlotte Outer Loop) to Idlewild Road**

Mecklenburg County

Division 10

U-2509



**Prepared by the
Program Development Branch
N. C. Department of Transportation**

Lynnise M. Hawes

**Lynnise M. Hawes, P.E.
Feasibility Studies Engineer**

Derrick W. Lewis

**Derrick W. Lewis, P.E.
Feasibility Studies Unit Head**

10/12/10
Date

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I. General Description

This feasibility study describes the proposed widening of US 74 (Independence Boulevard) from I-485 (Charlotte Outer Loop) to Idlewild Road. The project location is shown on Figure 1. As part of the study, several different cross-sections were investigated, the details of which are as follows:

- ◆ Six-lane divided curb and gutter boulevard section on 200 feet of right of way.
- ◆ Six-lane divided curb and gutter superstreet section on 200 feet of right of way.
- ◆ Eight-lane divided curb and gutter expressway with a barrier separated transit/High Occupancy Vehicle zone in the median on variable width right of way.
- ◆ Ten-lane divided curb and gutter expressway section with a barrier separated transit zone in the median on variable width right of way.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost, and to identify potential problems that may require consideration in the planning and design phases.

II. Background

The purpose of this project is to improve the traffic safety and operations along US 74 (Independence Boulevard).

US 74 (Independence Boulevard) is designated as a principal arterial in the North Carolina Statewide Functional Classification System and as a freeway-expressway in the November 2004 Mecklenburg-Union Metropolitan Planning Organization thoroughfare plan. US 74 is also part of the Charlotte to Wilmington Strategic Highway Corridor. On the 2004 Strategic Highway Corridor Vision Plan, US 74 is designated as an expressway facility. Existing US 74 within the project limits varies from a six-lane divided section to a four-lane divided section with pavement widths varying from 80 feet to 120 feet from edge of pavement to edge of pavement.

The following Transportation Improvement Program (TIP) projects are located within the project corridor:

- R-3329: New multi-lane freeway from I-485 (Charlotte Outer Loop) to US 74 (Monroe Bypass) on new location.
- U-209B: Add additional lanes and safety improvements along US 74 (Independence Boulevard) from NC 24-27 (Albemarle Road) to Idlewild Road. Construct interchanges with Sharon Amity Road and Idlewild Road.

There are several existing bridges within the project study area. Please see Table 1 for detailed information on these structures.

III. Traffic and Safety

There are existing traffic signals located at the following intersections within the project study area:

- US 74 (Independence Boulevard) and Idlewild Road
- US 74 and Buick Drive/ Conference Drive
- US 74 and E. W. T. Harris Boulevard
- US 74 and Margaret Wallace Road
- US 74 and Village Lake Drive
- US 74 and Sardis Road North
- US 74 and SR 3474/SR 3168 (Sam Newell Road)
- US 74 and Windsor Square Drive
- US 74 and Matthews-Mint Hill Road

The current year Average Daily Traffic (ADT) along US 74 (Independence Boulevard) is estimated to range from 52,100 vehicles per day (vpd) to 64,700 vpd. With no improvements, the traffic volume along US 74 during the 2035 design year is estimated to range between 65,300 vpd to 82,800 vpd. With the proposed improvements, the traffic volume along US 74 during the 2035 design year is estimated to range between 79,400 vpd to 98,600 vpd. Truck traffic is estimated to make up approximately 7 percent of the daily traffic.

The existing segment of US 74 operates at a level of service (LOS) F under current traffic volumes. With the proposed boulevard and superstreet alternatives, US 74 is projected to operate at a LOS F in the current year and 2035 design year. With the proposed expressway alternatives, US 74 is projected to operate at a LOS D or better.

Between 2004 and 2007, 1,341 crashes were reported along US 74. The crash rate for US 74 is 379.62 crashes per 100 million vehicle miles (crashes/100MVM) traveled. This rate is lower than the statewide rate of 413.81 crashes/100MVM for four or more lanes divided with no control access urban U.S. route. There were 452 non-fatal injury crashes, 887 property damage only crashes, and 2 fatal crashes. The most prevalent types of crashes were Rear End (60%), Angle (15%), and Sideswipe (10%).

IV. Description of Alternatives

It is proposed to widen US 74 (Independence Boulevard) from I-485 (Charlotte Outer Loop to Idlewild Road. The project location is shown on Figure 1.

ALTERNATIVE 1: This section along US 74 is from Matthews-Mint Hill Road to Wallace Lane, a distance of approximately 4.8 miles. The costs below include the replacement of Bridge Nos. 187 and 188 over McAlpine Creek and the extension of existing Culvert No. 198 at Irvins Creek.

Cross-section: Six-lane divided curb and gutter section, 108 feet from face to face of curb, with 12-foot travel lanes, a 32-foot depressed grass median, and 15-foot berms on 200 feet of right of way. This alternative is to provide the minimal widening needed to result in a simple six lane boulevard section through the project limits.

With this proposed cross-section, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and Intelligent Transportation Systems (ITS) devices, is estimated to be \$28,300,000.

Right-of-way.....	\$0
Utility Relocation.....	\$2,300,000
Construction.....	\$25,000,000
<u>ITS devices.....</u>	<u>\$1,000,000</u>
Total Cost (Alternative 1).....	\$28,300,000

ALTERNATIVE 2: This section along US 74 is from Matthews-Mint Hill Road to Wallace Lane, a distance of approximately 4.8 miles. The costs below include the replacement of Bridge Nos. 187 and 188 over McAlpine Creek and the extension of existing Culvert No. 198 at Irvins Creek.

Cross-section: Six-lane divided curb and gutter superstreet section, 106 feet from face to face of curb, with 12-foot travel lanes, a 30-foot raised grass median, and 15-foot berms on 200 feet of right of way. This alternative is to widen and upgrade the existing facility into a constant six lane superstreet section in order to maximize the safety and operational benefits with minimal additional costs.

With this proposed cross-section, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$38,300,000.

Right-of-way.....	\$0
Utility Relocation.....	\$2,300,000
Construction.....	\$35,000,000
<u>ITS devices.....</u>	<u>\$1,000,000</u>
Total Cost (Alternative 2).....	\$38,300,000

ALTERNATIVE 3: This section along US 74 is from I-485 (Charlotte Outer Loop) to Wallace Lane, a distance of approximately 5.4 miles. The costs below include the replacement of Bridge Nos. 187 and 188 over McAlpine Creek, the extension of existing Culvert No. 198 at Irvins Creek, a new bridge over Campbell Creek, new dual bridges over US 74 at the junction with Village Lake Drive extension, a new bridge over US 74 at the junction with SR 3474/SR 3168 (Sam Newell Road), and a new bridge over US 74 at the junction with Matthews-Mint Hill Road.

Cross-section: Ten-lane divided expressway gutter section, 200 feet from edge of gutter to edge of gutter, with three 12-foot general purpose travel lanes, one 12-foot auxiliary lane, and one 12-foot concurrent flow High Occupancy Vehicle (HOV) lane per direction, a 32-foot two lane Bus Rapid Transit (BRT) zone, 2-foot concrete barriers, 4-foot paved shoulders adjacent to the HOV lanes, 10-foot outside paved shoulders, and 4-foot expressway gutters on 250 feet of right of way. Please see Figure 3 for more detailed information.

Cross-section at Transit Stations: The cross-section at the transition station is the same except that the 32-foot BRT zone increases to 84 feet wide with 12-foot BRT bypass lanes, and 12-foot BRT station lanes, and a 20-foot transit area on 280 feet of right of way. Please see Figure 2 for transit station location information and Figure 3 for detailed cross-section information.

Option A: This option includes a modified interchange at the junction of US 74 and Sardis Road North and includes new dual bridges over US 74 at the junction with Sardis Road North.

With this alternative, it is anticipated that there will be zero (0) residences and twenty-seven (27) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$207,500,000.

Right-of-way.....	\$60,000,000
Utility Relocation.....	\$10,200,000
Construction.....	\$136,300,000
<u>ITS devices.....</u>	<u>\$1,000,000</u>
Total Cost (Alternative 3, Option A).....	\$207,500,000

Option B: This option includes a single point urban interchange at the junction of US 74 and Sardis Road North and includes new bridge over US 74 at the junction with Sardis Road North.

With this alternative, it is anticipated that there will be zero (0) residences and twenty-five (25) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$227,900,000.

Right-of-way.....	\$53,800,000
Utility Relocation.....	\$9,800,000
Construction.....	\$163,300,000
ITS devices.....	\$1,000,000
<u>Total Cost (Alternative 3, Option B).....</u>	<u>\$227,900,000</u>

ALTERNATIVE 4: This section along US 74 is from I-485 (Charlotte Outer Loop) to Wallace Lane, a distance of approximately 5.4 miles. The costs below include the replacement of Bridge Nos. 187 and 188 over McAlpine Creek, the extension of existing Culvert No. 198 at Irvins Creek, a new bridge over Campbell Creek, new dual bridges over US 74 at the junction with Village Lake Drive extension, a new bridge over US 74 at the junction with SR 3474/SR 3168 (Sam Newell Road), and a new bridge over US 74 at the junction with Matthews-Mint Hill Road.

Cross-section: Ten-lane divided expressway gutter section, 200 feet from edge of gutter to edge of gutter, with three 12-foot general purpose travel lanes, one 12-foot auxiliary lane, and one 12-foot concurrent flow HOV lane per direction, a 32-foot Light Rail Transit (LRT) zone, 2-foot concrete barriers, 4-foot paved shoulders adjacent to the HOV lanes, 10-foot outside paved shoulders, and 4-foot expressway gutters on 250 feet of right of way. Please see Figure 3 for more detailed information.

Cross-section at Transit Stations: The cross-section at the transition station is the same except that the 32-foot LRT zone increases to 52 feet wide with 16-foot LRT station lanes, and a 20-foot transit area on 250 feet of right of way. Please see Figure 2 for transit station location information and Figure 3 for detailed cross-section information.

Option A: This option includes a modified interchange at the junction of US 74 and Sardis Road North and includes new dual bridges over US 74 at the junction with Sardis Road North.

With this alternative, it is anticipated that there will be zero (0) residences and twenty-seven (27) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$203,500,000.

Right-of-way.....	\$60,000,000
Utility Relocation.....	\$10,200,000
Construction.....	\$132,300,000
ITS devices.....	\$1,000,000
<u>Total Cost (Alternative 4, Option A).....</u>	<u>\$203,500,000</u>

Option B: This option includes a single point urban interchange at the junction of US 74 and Sardis Road North and includes new bridge over US 74 at the junction with Sardis Road North.

With this alternative, it is anticipated that there will be zero (0) residences and twenty-five (25) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$222,900,000.

Right-of-way.....	\$53,800,000
Utility Relocation.....	\$9,800,000
Construction.....	\$158,300,000
<u>ITS devices.....</u>	<u>\$1,000,000</u>
Total Cost (Alternative 4, Option B).....	\$222,900,000

ALTERNATIVE 5: This section along US 74 is from I-485 (Charlotte Outer Loop) to Wallace Lane, a distance of approximately 5.4 miles. The costs below include the replacement of Bridge Nos. 187 and 188 over McAlpine Creek, the extension of existing Culvert No. 198 at Irvins Creek, a new bridge over Campbell Creek, new dual bridges over US 74 at the junction with Village Lake Drive extension, a new bridge over US 74 at the junction with SR 3474/SR 3168 (Sam Newell Road), and a new bridge over US 74 at the junction with Matthews-Mint Hill Road.

Cross-section: Eight-lane divided expressway gutter section, 168 feet from edge of gutter to edge of gutter, with three 12-foot general purpose travel lanes, one 12-foot auxiliary lane per direction, a 32-foot two lane BRT/HOV transit zone, 2-foot concrete barriers, 4-foot inside paved shoulders, 10-foot outside paved shoulders, and 4-foot expressway gutters on 250 feet of right of way. Please see Figure 3 for more detailed information.

Cross-section at Transit Stations: The cross-section at the transition station is the same except that the 32-foot BRT/HOV zone increases to 84 feet wide with 12-foot BRT bypass/HOV lanes, 12-foot BRT station lanes, and a 20-foot transit area on 250 feet of right of way. Please see Figure 2 for transit station location information and Figure 3 for detailed cross-section information.

Option A: This option includes a modified interchange at the junction of US 74 and Sardis Road North and includes new dual bridges over US 74 at the junction with Sardis Road North.

With this alternative, it is anticipated that there will be zero (0) residences and twenty-seven (27) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$195,500,000.

Right-of-way.....	\$60,000,000
Utility Relocation.....	\$10,200,000
Construction.....	\$124,300,000
<u>ITS devices.....</u>	<u>\$1,000,000</u>
Total Cost (Alternative 5, Option A).....	\$195,500,000

Option B: This option includes a single point urban interchange at the junction of US 74 and Sardis Road North and includes new bridge over US 74 at the junction with Sardis Road North.

With this alternative, it is anticipated that there will be zero (0) residences and twenty-five (25) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$214,900,000.

Right-of-way.....	\$53,800,000
Utility Relocation.....	\$9,800,000
Construction.....	\$150,300,000
<u>ITS devices.....</u>	<u>\$1,000,000</u>
Total Cost (Alternative 5, Option B).....	\$214,900,000

In addition to the widening of US 74, the following proposed improvements are recommended and included in the costs shown above:

- W. T. Harris Boulevard/Margaret Wallace Road/Village Lake Drive
 - Proposed US 74 northbound on/off ramps along existing W. T. Harris Boulevard from US 74 to the proposed Village Lake Drive extension, a distance of approximately 0.3 miles. The proposed cross-section shall be a two-lane divided curb and gutter section, 52 feet from face to face of curb, with 20-foot travel lanes and an 8-foot raised grass median on 100 feet of right of way.
 - Proposed reconfiguration of Margaret Wallace Road. The new cross-section shall be a three-lane curb and gutter section, 40 feet from face to face of curb, with 12-foot travel lanes on 100 feet of right of way for approximately 0.2 miles.
 - Proposed US 74 southbound on/off ramps on new location for approximately 0.1 miles. The proposed cross-section shall be a two-lane divided curb and gutter section, 52 feet from face to face of curb, with 20-foot travel lanes and an 8-foot raised grass median on 100 feet of right of way.
 - Proposed service road on the east side of US 74. The proposed cross-section shall be a two-lane shoulder section, 32 feet from edge of pavement to edge of pavement, with 12-foot travel lanes and 8-foot shoulders (4 feet of which are paved) within the existing US 74 right of way for approximately 0.3 miles.

- Sardis Road North (Option A)
 - Proposed Sardis Road North extension on new location from Crown Point Drive to approximately 0.2 miles east of US 74, a distance of approximately 0.4 miles. The proposed cross-section shall be a four-lane divided curb and gutter section, 83 feet from face to face of curb, with 12-foot travel lanes, 4-foot bicycle lanes, a 23-foot raised grass median, 15-foot berms, and 5-foot sidewalks on 120 feet right of way.
 - Proposed Boyd Drive extension on new location from Sardis Road North extension to Hayden Way, a distance of approximately 0.3 miles. The proposed cross-section shall be a two-lane shoulder section, 32 feet from edge of

pavement to edge of pavement, with 12-foot travel lanes and 8-foot shoulders (4 feet of which are paved) on 100 feet of right of way.

- Proposed US 74 northbound on ramp on new location from Sardis Road North extension to US 74, a distance of approximately 0.3 miles. The proposed cross-section shall be a one-lane curb and gutter section, 24 feet from face to face of curb on 100 feet of right of way.
- Proposed US 74 northbound on/off ramp on new location from US 70 to Boyd Drive extension, a distance of approximately 0.2 miles. The proposed cross-section shall be a two-lane divided curb and gutter section, 52 feet from face to face of curb, with 20-foot travel lanes and an 8-foot raised grass median on 100 feet of right of way.
- Proposed US 74 southbound on/off ramp along existing Unnamed Street to Krefeld Drive extension, a distance of approximately 0.3 miles. The new cross-section shall be a two-lane divided curb and gutter section, 52 feet from face to face of curb, with 20-foot travel lanes and an 8-foot raised grass median on 100 feet of right of way.
- Proposed Krefeld Drive extension on new location from Unnamed Street to the end of existing Krefeld Drive, a distance of approximately 0.3 miles. The proposed cross-section shall be a two-lane curb and gutter section, 28 feet from face to face of curb, with 12-foot travel lanes on 100 feet of right of way.
- Proposed US 74 southbound on/off ramp along existing Crownpoint Executive Drive for approximately 0.1 miles. The new cross-section shall be a two-lane divided curb and gutter section, 52 feet from face to face of curb, with 20-foot travel lanes and an 8-foot raised grass median on 100 feet of right of way.
- Sardis Road North (Option B)
 - Proposed Sardis Road North extension on new location from Crown Point Drive to approximately 0.2 miles east of US 74, a distance of approximately 0.4 miles. The proposed cross-section shall be a four-lane divided curb and gutter section, 83 feet from face to face of curb, with 12-foot travel lanes, 4-foot bicycle lanes, a 23-foot raised grass median, 15-foot berms, and 5-foot sidewalks on 120 feet right of way.
 - Proposed Boyd Drive extension on new location from Sardis Road North extension to Hayden Way, a distance of approximately 0.3 miles. The proposed cross-section shall be a two-lane shoulder section, 32 feet from edge of pavement to edge of pavement, with 12-foot travel lanes and 8-foot shoulders (4 feet of which are paved) on 100 feet of right of way.

- SR 3474/SR 3168 (Sam Newell Road)
 - Proposed realignment of SR 3474 from Independence Pointe Parkway to approximately 250 feet north of Northeast Court, a distance of approximately 0.3 miles. The new cross-section shall be a three-lane curb and gutter section, 48 feet from face to face of curb, with 12-foot travel lanes and 4-foot bicycle lanes on 100 feet of right of way.

V. Community Issues

A detailed investigation was not conducted for this feasibility study, however no impacts to schools, parks, recreation areas, or community facilities are anticipated with this project.

Maps at the Survey and Planning Branch of the North Carolina State Historic Preservation Office were used to determine if any historic properties on the National Register of Historic Places (NRHP) or state study lists exist within the proposed project corridor. No properties within the project study area were found to be potentially historic properties.

VI. Natural Environment Issues

The following is a preliminary review of environmental issues that might have a potential impact to the project. The information obtained for the environmental screening is from a Geographic Information System (GIS) database. The purpose of the environmental screening is to identify potential environmental issues early in the process.

Stream Classification

The proposed project study area is located in the Catawba River Basin. US 74 (Independence Boulevard) crosses several water bodies in the project corridor. Campbell Creek, McAlpine Creek, and Irvins Creek have a stream classification of C. These water bodies will likely need to be surveyed and have the appropriate coordination with the North Carolina Department of Environment and Natural Resources (NCDENR) and the U.S. Army Corps of Engineers (USACE) during any environmental document study.

Wetlands

US 74 (Independence Boulevard) crosses wetlands associated with Campbell Creek, McAlpine Creek, and Irvins Creek. Permitting with the U.S. Army Corps of Engineers (USACE) will likely need to be obtained before construction of the project, and appropriate mitigation measures should be taken if deemed necessary. A portion of the project study area is located in a 100 and 500-year floodplains.

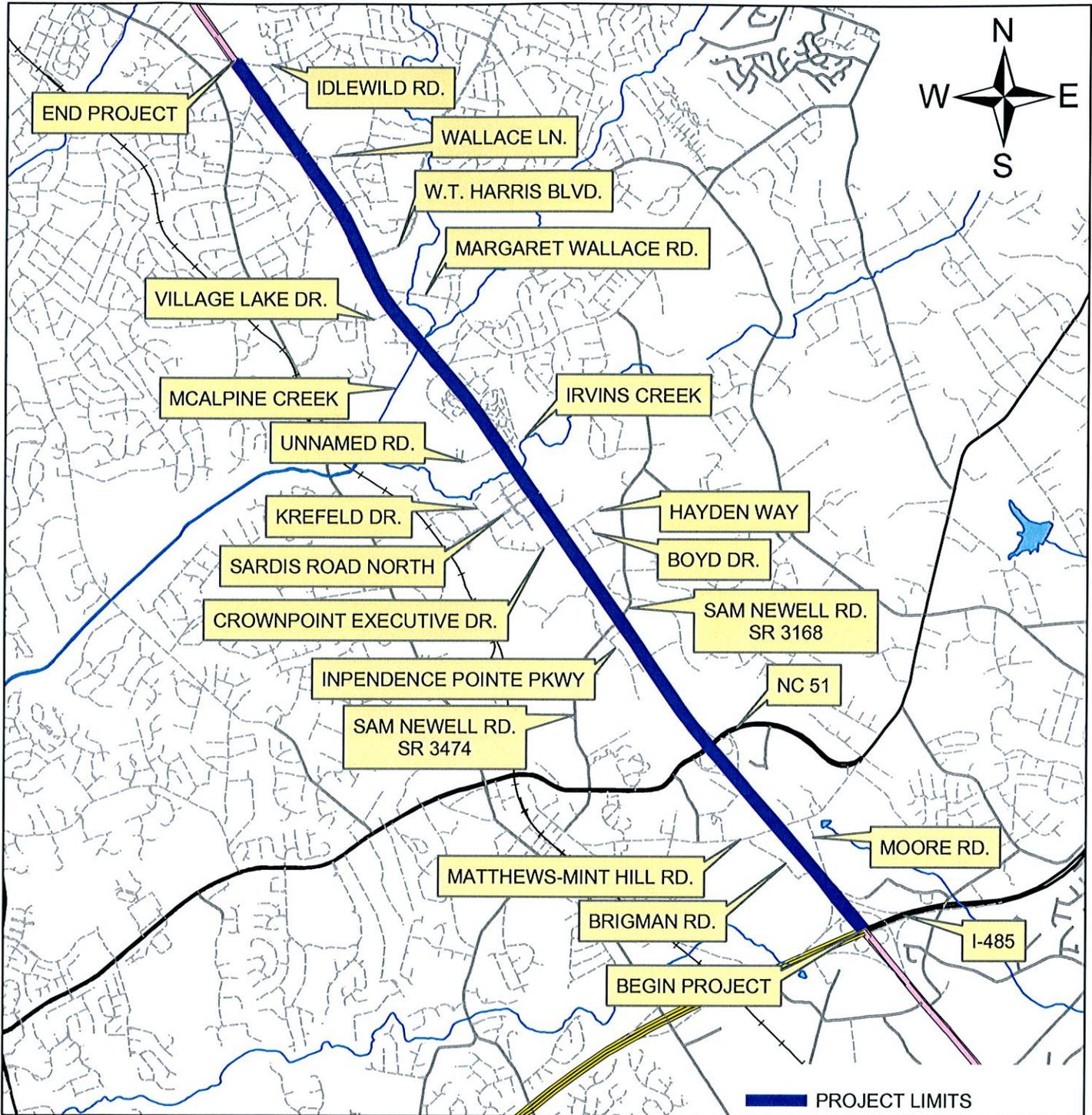
Threatened and Endangered Species

Eastern Shooting-Star was identified within the project study area.

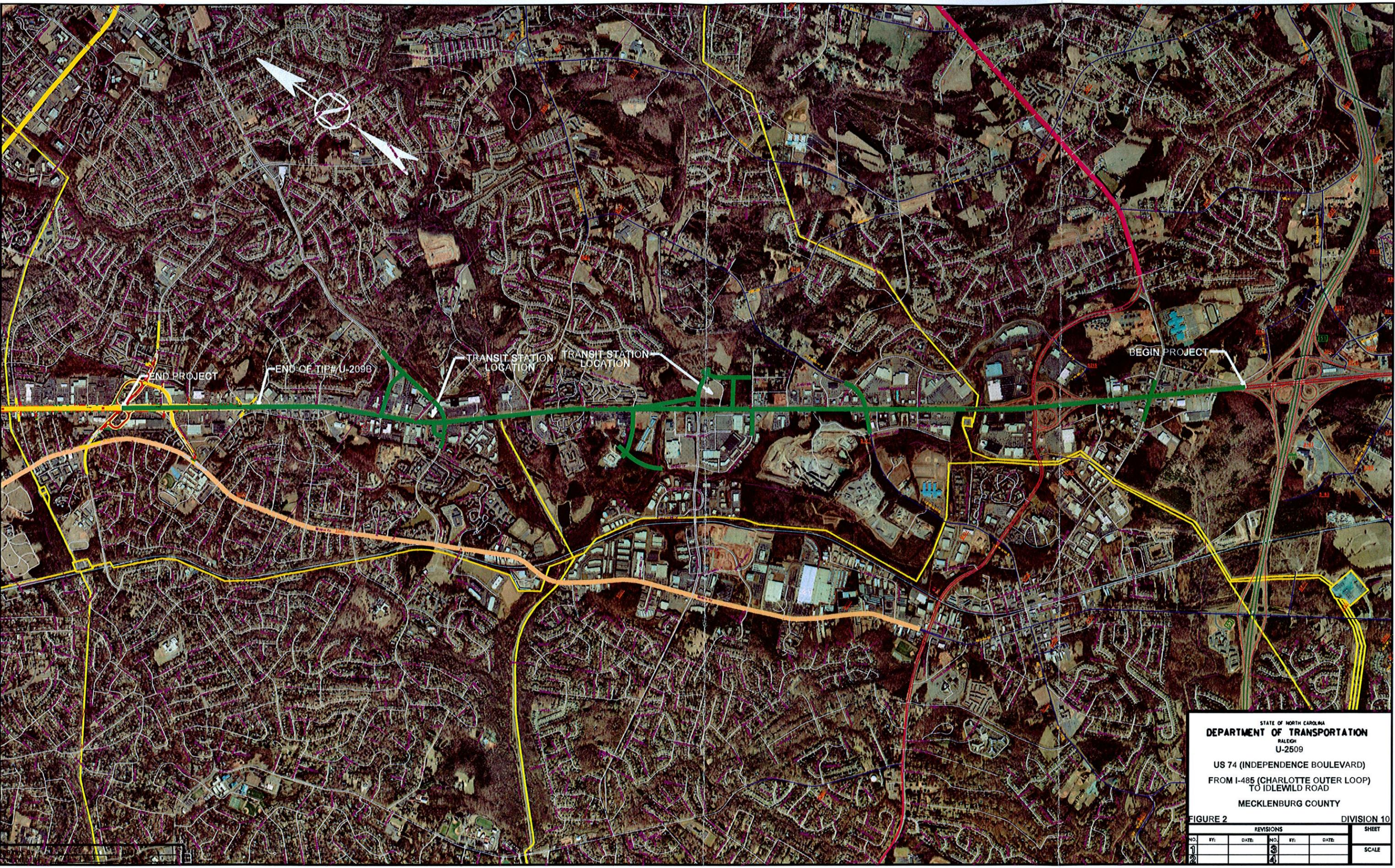
VII. Recommendations

ALTERNATIVES 1 & 2: It was found that the six-lane divided curb and gutter boulevard section (Alternative 1) and six-lane divided curb and gutter superstreet section (Alternative 2) would not be able to accommodate the projected 2035 design year traffic volumes at an acceptable level of service.

ALTERNATIVES 3, 4, & 5: It was found that both the eight and ten lane divided expressway sections with dedicated transit areas would be able to accommodate the projected 2035 design year traffic volumes. Depending on the ultimate configuration chosen, the anticipated costs of these options range from \$195,500,00 to \$227,900,00.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 PROGRAM DEVELOPMENT BRANCH
 U-2509R
 US 74 (INDEPENDENCE BOULEVARD)
 FROM I-485 (CHARLOTTE OUTER LOOP) TO IDLEWILD ROAD
 MECKLENBURG COUNTY
 DIVISION 10
 FIGURE 1



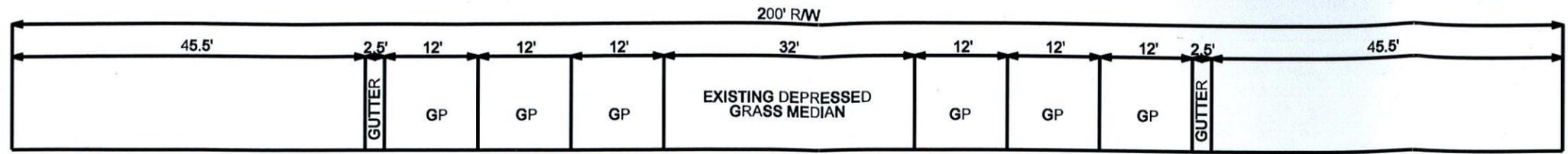
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 U-2509

US 74 (INDEPENDENCE BOULEVARD)
 FROM I-485 (CHARLOTTE OUTER LOOP)
 TO IDLEWILD ROAD

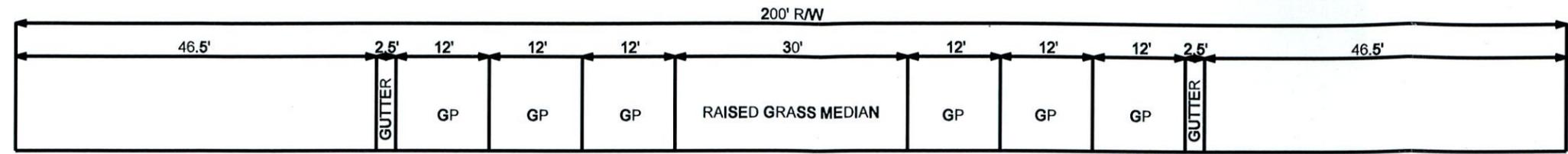
MECKLENBURG COUNTY

FIGURE 2 DIVISION 10

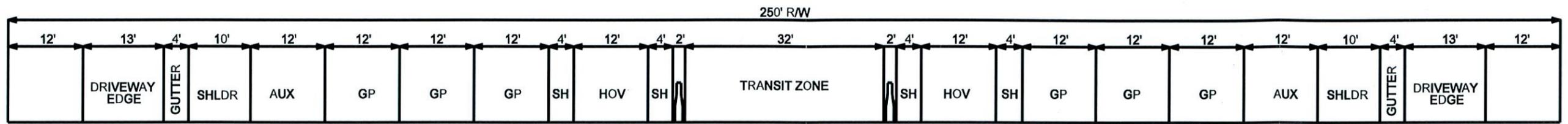
REVISIONS						SHEET
NO.	BY:	DATE:	NO.	BY:	DATE:	SCALE
1			3			
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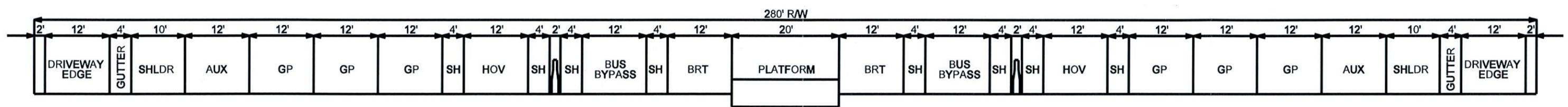
ALTERNATIVE 1



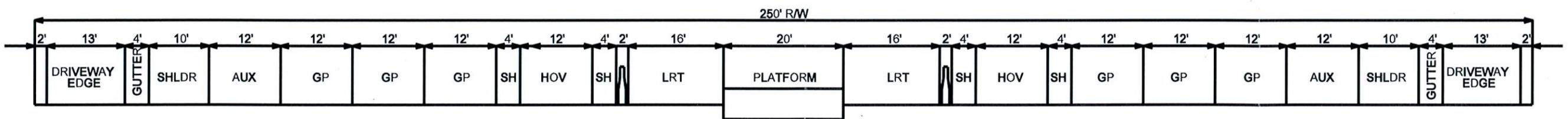
ALTERNATIVE 2



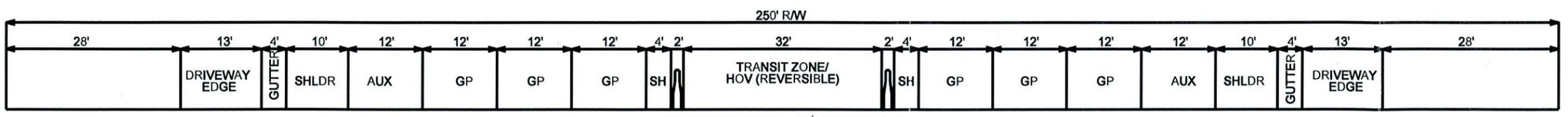
ALTERNATIVES 3 & 4 - OPTIONS A & B



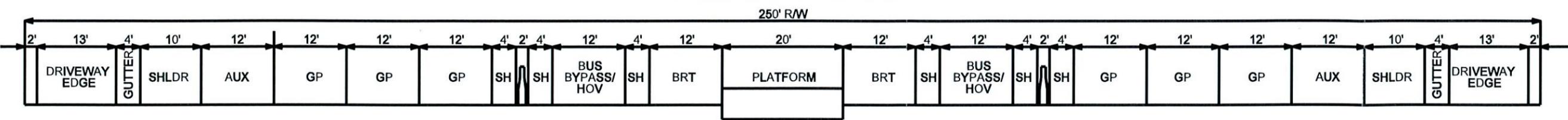
ALTERNATIVE 3 - OPTIONS A & B (BRT STATIONS WITH BY-PASS LANES)



ALTERNATIVE 4 - OPTIONS A & B (LRT STATIONS)



ALTERNATIVE 5 - OPTIONS A & B



ALTERNATIVE 5 - OPTIONS A & B (BRT STATIONS WITH BY-PASS LANES)