EXECUTIVE SUMMARY

I. INTRODUCTION

A. Background

This document presents a summary of the US 15-501 Phase II Major Investment Study (MIS), focusing on the selection of a preferred transit alignment, transit technology and decisions made by the Study's Policy Oversight Committee. This document serves as a companion to the Phase II Major Investment Study report, which describes the process and recommendations in more detail.

In the US 15-501 Phase I MIS, reasonable and feasible transit/highway alternative combinations and a general level of investment have been identified. The Phase II MIS focuses on a refined transit alternative analysis, including more detailed engineering studies and additional public involvement input.

B. Study Area Context

US 15-501 is primary north-south highway route in North Carolina, extending from the Virginia State line south to the South Carolina State line. Within the Triangle region, US 15-501 is a four- to six-lane expressway connecting the Town of Chapel Hill and the City of Durham, with major interchanges at NC 54 and Franklin Street in Chapel Hill; and at I-40, US 15-501 Business, NC 147 (Durham Freeway), and I-85 in Durham. The Phase II MIS Study Area has been refined to include areas adjacent to Corridor "A" from the Phase I Study. Exhibit ES-1 illustrates the study area for this phase of the project.

C. Project History

In 1993-1994, the City of Durham, the Town of Chapel Hill, NCDOT, and private property owners in the US 15-501 corridor participated in the US 15-501 Corridor Study which focused on identifying areas of congestion and methods to improve mobility within the corridor. A Corridor Master Plan was developed. The study recommended the following multi-modal improvements: 1) upgrading US 15-501 to a controlled access facility (i.e., urban freeway), 2) preserve right of way for a future transit corridor, and 3) investigate TDM strategies. The Triangle Transit Authority's (TTA's) Triangle Fixed Guideway Study (February, 1995) and Draft Environmental Impact Statement (DEIS) (April, 2001) determined a need for rail or bus transit fixed guideway between Durham and Chapel Hill as part of the second phase of their regional rail system.

The US-15-501 Phase I MIS, completed in November of 1998, recommended that the following alternatives to be carried forward for future study:

- No-Build Alternative
- Travel Demand Management Strategies (TDM) such as bus preferential treatment (i.e., signal pre-emption), pricing programs to reduce fares such as employee subsidies, overall increased bus service, and employer based strategies - including staggered work hours and telecommuting.

Exhibit ES-1

- Enhanced bus service.
- Widening US 15-501 at- grade from Franklin Street in Chapel Hill to I-40 to 8 lanes, and upgrading US 15-501 to a 6-lane freeway from I-40 to US 15-501 Business in Durham.
- Construction of "circulation roads" at the US 15-501 / I-40 interchange to provide some congestion relief on 15-501 itself by providing alternative routes for local trips.
- HOV Lanes within the US-15-501 Corridor.
- Pedestrian and bicycle facility improvements including a sidewalk and dedicated bicycle lanes along Old Durham-Chapel Hill Road from US 15-501 to University Drive.

The Policy Oversight Committee also recommended that more detailed evaluation of rail and busway technologies was necessary before a final decision could be made. The POC recommended that these technologies continue to be evaluated for fixed guideway in Phase II of the US 15-501 MIS.

II. EVALUATION PROCESS

During the scoping process of the Phase II MIS, the transit technologies to be evaluated were defined as:

- TTA's Phase I Technology: a diesel multiple unit (DMU) that may or may not be a Federal Railroad Administration (FRA) compliant vehicle;
- Busway (i.e., fixed guideway with completely dedicated right-of-way);
- Busway / Mixed Traffic (BMT): a hybrid of on-street operation and exclusive busway; and
- "Lighter" rail technology than TTA Phase I, such as light rail or "lighter" DMU.

The TTA Phase I 9th Street Station was assumed to be the interface between the TTA Phase I and Phase II transit study, and Corridor "A" of the Phase I MIS was selected for further study in Phase II .

Case studies of the alternative evaluation process for other systems in the United States and Canada were reviewed to evaluate how other municipalities made similar initial decisions on a particular type of transit technology to use for their system. Transit systems of particular interest included cities that:

- Were implementing "new start" transit systems;
- Had comparable urban characteristics;
- Had reached their transit technology decision via a formal MIS process in the last few years; and
- Contained a transit corridor resembling the corridor from Durham to Chapel Hill in terns of length, number of stations, ridership and land use patterns.

III. PROJECT ALTERNATIVE DEVELOPMENT

Initial screening and reviewing of concepts from project stakeholders occurred during the Fall of 2000 through a series of Station Area Planning workshops held at Duke University and the University of North Carolina Chapel Hill (UNC). Alternatives were then selected for further refinement and evaluation by the project Technical Committee and Policy Oversight Committee. Public input was solicited throughout the development of the concepts with two series of public workshops held both in Durham and in Chapel Hill in September 2000 and January 2001. The final 10 Build Alternatives are listed and briefly described in Table ES-1. This evaluation of the alternatives included engineering concept drawings, travel demand projections, capital and operating cost estimates, identification of environmental and community impacts and evaluation of the input from the public, policy leaders and the project's Technical Committee.

TABLE ES-1 US 15-501 Phase II MIS Alternatives

No-Build
No-Build 2025 Base 2025 Land Use Assumes TTA Phase I Regional Rail System
TSM
Durham-Chapel Hill-Carrboro MPO 2025 Transportation Plan Intensive Bus Service Assumes TTA Phase I Regional Rail System
DMU Alternative 1
"Western" Alignment in Duke Area Refined Phase I MIS Corridor "A" Alignment Southern UNC Alignment
LRT Alternative 1 / Bus Alternative 1
Erwin Road Alignment / TTA Phase I Coal Spur Station Refined Phase I MIS Corridor "A" Alignment Southern UNC Alignment
LRT Alternative 2
Erwin Road Alignment Refined Phase I MIS Corridor "A" Alignment Southern UNC Alignment Extension of TTA future Phase I Technology
LRT Alternative 3 / Bus Alternative 3
"Western" Alignment in Duke Area Refined Phase I MIS Corridor "A" Alignment Southern UNC Alignment
Bus Alternative 2
Erwin Road Alignment / TTA Phase I Coal Spur Station Refined Phase I MIS Corridor "A" Alignment BMT "Diamond Lanes" Manning Drive Alignment
Bus Alternative 4
"Western" Alignment in Duke Area Refined Phase I MIS Corridor "A" Alignment BMT "Diamond Lanes" Manning Drive Alignment
BMT Alternative 1
5-lane Erwin Road Alignment / TTA Phase I Coal Spur Station Cameron Boulevard/Academy Road/University Drive Corridors Less Guideway Alternative BMT "Diamond Lanes" Manning Drive Alignment
BMT Alternative 2
7-lane Erwin Road Alignment / TTA Phase I Coal Spur Station Cameron Boulevard / US 15-501 / Exclusive Busway/ University Drive Corridor More Guideway Alternative BMT "Diamond Lanes" Manning Drive Alignment

IV. SUMMARY OF ALTERNATIVES EVALUATION

Table ES-2 presents a comparison for each of the evaluation criteria analyzed in this phase of the study. All cost estimates are in 2001 FY dollars unless noted otherwise. For the purposes of this study, the capital cost of the No-Build is assumed to be $0 and all Build Alternative cost estimates are relative to the zero-cost No-Build Alternative.

Table ES-2 MATRIX OF KEY EVALUATION MEASURES

Criteria	Measure of Effectiveness	DMU Technology	Light Rail (LRT)			Exclusive Busway				Busway/Mixed Traffic (BMT)	
		DMU Alternative 1[1]	LRT[2] Alternative 1	LRT[2] Alternative 2	LRT[2] Alternative 3	Bus Alternative 1	Bus Alternative 2	Bus Alternative 3	Bus Alternative 4	BMT Alternative 1	BMT Alternative 2
Transportation Services/ Mobility											
Transit Coverage (change from No-Build)	Passenger Miles (per day)	62,252	67,178	67,985	97,085	85,317	88,951	79,416	77,596	32,433	65,693
	% of pop served by transit	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Transit Effectiveness	% Change in Auto VMT (per day)	+0.15%	+0.13%	+0.08%	+0.07%	+0.08%	(-0.05%)	(-0.02%)	+0.04%	+0.09%	+0.01%
Relative Traffic/Pedestrian Potential Conflicts between Alternatives (Safety)	Qualitative	Less	More	More	Less	Same	More	Less	More	More	Less
Modeling Forecasts											
Increase in Transit Ridership From No-Build	# Trips (Avg Weekday Linked Trips)	400 (A) 310 (B)	1,250	1,210	2,120	2,340	2,700	2,230	2,500	570	2,120
New Service Rail / Busway System Boardings	# Boardings (Avg Weekday Unlinked Trips)	8,030 (A) 5,640 (B)	15,950	16,910	15,830	10,330	9,420	9,520	9,030	7,450	11,210
Community Impacts											
Residential and Business Displacements	# Businesses	10	7	7	10	10	7	10	10	4	5
	# Residences	83	78	78	83	86	86	83	83	1	77
Neighborhoods Affected	# of Neighborhoods	9	9	9	9	8	8	9	9	2	7
Community-Sensitive Land Uses Affected	# of Land Uses	9	7	7	9	8	8	9	9	6	6
Relative Visual/Aesthetic Impacts between Alternatives	Qualitative	Equal	Equal	Equal	Equal	Equal	Equal	Equal	More	Less	Less
Environmental Impacts											
Historic Sites / Structures	# Sites / Structures	None	None	None	None	None	None	None	None	None	None
Wetlands	Estimated Acres	4.89	4.89	4.89	4.89	4.52	4.52	4.52	4.52	1.27	4.52
New River and Creek Crossings	# of Crossings	3	4	4	3	4	4	3	3	2	3

1. DMU Alternative 1(A) assumes 15 minute peak / 30 minute off-peak headways; DMU Alternative 1(B) assumes 7.5 minute peak / 15 minute off-peak headways.

Table ES-2 MATRIX OF KEY EVALUATION MEASURES (CONT'D)

Criteria	Measure of Effectiveness	DMU Technology	Light Rail (LRT)			Exclusive Busway				Busway/Mixed Traffic (BMT)	
		DMU Alternative 1[1]	LRT[2] Alternative 1	LRT[2] Alternative 2	LRT[2] Alternative 3	Bus Alternative 1	Bus Alternative 2	Bus Alternative 3	Bus Alternative 4	BMT Alternative 1	BMT Alternative 2
Financial Issues/Impacts											
Right-of-Way Cost	$ million	$82.6	$73.6	$73.6	$84.0	$80.0	$72.1	$85.6	$77.7	$11.5	$62.2
Utility Relocations Costs	$ million	$1.0	$1.4	$1.4	$1.1	$4.1	$4.2	$1.1	$1.1	$0.8	$4.3
Construction Cost	$ million	$187.3	$227.3 (E) $195.6 (D)	$220.8 (E) $189.1 (D)	$218.2 (E) $186.7 (D)	$133.5	$127.7	$149	$143	$54.9	$109.2
Vehicle Capital Costs	$ million	$35.9	$28.3 (E) $34.3 (D)	$28.3 (E) $34.3 (D)	$26.3 (E) $31.8 (D)	$12.1	$13.0	$11.3	$12.6	$14.5	$13.4
Total Capital Costs ROW, Utility Relocation, Construction and New Vehicle Costs (excludes new LRT / BMT Maintenance facility)	$ million	$306.8	$330.5 (E) $304.9 (D)	$324.1 (E) $298.4 (D)	$329.6 (E) $303.6 (D)	$229.7	$217	$247	$234.4	$81.7	$189.1
Transit Operating and Maintenance Costs	$ per year (FY 2000)	$52.3 (A) $56.0 (B)	$53.9	$53.6	$53.6	$54.1	$54.7	$53.5	$54.1	$54.7	$54.6
Transit Cost Effectiveness	Cost-Effectiveness Index (CEI)	$291.92 (A) $418.63 (B)	$103.26 (E) $104.71 (D)	$104.30 (E) $105.80 (D)	$60.07 (E) $60.85 (D)	$43.94	$37.73	$47.15	$41.73	$117.22	$44.45
	Cost/Transit User	$14.54 (A) $23.01 (B)	$8.09 (E) $8.21 (D)	$7.46 (E) $7.57 (D)	$8.04 (E) $8.15 (D)	$9.95	$10.81	$11.04	$11.55	$9.97	$8.41
Physical Data											
Miles of Improvements		14.0	13.9	14.1	14.1	13.9	14.1	14.0	14.0	15.0	14.9
Miles of Structures		2.5	2.5	2.4	2.5	2.1	1.85	2.5	2.4	0.4	1.6
At-Grade Intersections		24	37	37	26	27	43	26	32	62	47
Number of Stations		11	14	14	13	14	14	13	12	12	14

1. DMU Alternative 1(A) assumes 15 minute peak / 30 minute off-peak headways; DMU Alternative 1(B) assumes 7.5 minute peak / 15 minute off-peak headways.
2. LRT Alternatives provide cost information for (E) electric vehicles and (D) diesel vehicles.

Note: Capital Cost of No-Build assumed to be $0; all alternative cost information is relative to No-Build.

V. OBSERVATIONS AND RECOMMENDATIONS

The merits and disadvantages of the various transit technologies were explored, considered and debated as part of the Phase II MIS Study. All build alternatives were fairly similar with respect to environmental / community impacts, and physical characteristics (miles of improvements, structure length, number of stations).

Although the DMU and LRT alternatives presented higher overall transit ridership, it was the exclusive busway options that attracted the highest number of "new transit" riders which directly reflects a corresponding decrease in auto trips. The cost effectiveness criterion applied to all the alternatives versus the No-Build Alternative (incremental cost per incremental new rider) shows that the Busway and Busway / BMT alternatives were more cost effective using the cost per "new rider" criteria. However, the total cost per rider was lower for the LRT alternatives. It appears that assumptions that were contained in the study's No-Build network may have overprojected the 2025 future base transit network in which this study used as a baseline to evaluate ridership and cost effectiveness of each alternative. The Policy Oversight Committee recommended a re-evaluation of the future base network and it's assumptions before finalizing a decision on the specific technology. The Policy Oversight Committee recommended that a re- evaluation of the future base network and its assumptions are necessary before finalizing a decision on the specific technology. The Policy Oversight Committee also recognized that the Busway and Busway / mixed traffic (BMT) technologies appear to be the most promising because: 1) of the flexibility of constructing a future transit system incrementally, and 2) were more cost effective when compared to other technologies based on the "new rider" cost effectiveness criteria.

These limited conclusions and recommendations on vehicle technology were based in part on modeling forecast results from the new Triangle Regional Travel Demand Forecasting Model (Version 5.0). Predicting transit ridership through modeling forecasts requires an iterative process of analyzing results, reassessing assumptions, and additional model runs. The modeling forecast results of the Phase II MIS Study reflect a single model run. Thus, the results should be viewed as an indication of potential ridership and not the final projected ridership. The study team recommends that further refinement of the regional model should be done prior to commencing the Environmental Impact Statement (EIS) phase of the project.

The Phase I MIS Corridor "A" was further refined in Phase II to encourage transit-friendly development consistent with future land use plans and projected development. In the Duke area, the consensus of the Policy Oversight and Technical Committees was that the benefits of a transit corridor along Erwin Road, which directly serves the University and Duke Medical Center, was more preferable to a "Western" Alignment along the NC 147 / NCRR corridor. The negative impact associated with the estimated 400 – 475 grave relocations in the path of the "Western" Alignment was a contributing factor in their decision. The Policy Oversight Committee recommends that the final determination of a transit corridor alignment within the UNC campus should await resolution through a cooperative process by the Town of Chapel Hill and the University. The recommended corridor for the Phase II MIS is presented in Exhibit ES-2.

The study team recommends adding the recommended Phase II transit corridor to the regional transportation plan and further recommends that the local governments consider this corridor when implementing local land use policies (i.e., zoning changes, establishment of public facilities, planning of parks and recreational facilities, and issuing building permits).

Exhibit ES-2