

3.8.5 Mitigation

3.8.5.1 Geology

No significant impacts to the geological resources of the region are predicted. No mitigation will be required.

3.8.5.2 Soils

Long and short term impacts related to soils will be compensated for through proper engineering design; incorporating techniques such as soil modification, appropriate choice of fill material, use of non-corrosive sub-grade materials, and design of drainage structures capable of conveying estimated peak flows, and best management practices for erosion control during and following construction.

3.8.5.3 Biotic Resources and Wildlife

Since no substantial impacts to biotic resources and wildlife, no mitigation will be required.

3.9 WATER RESOURCES

Water resources including groundwater, surface water, jurisdictional wetlands, floodplains and floodways were assessed within the study area. In this section, regulations pertaining to water resources are summarized, the presence and characteristics of water resources are presented, and expected short-term and long-term impacts to these resources are assessed.

3.9.1 Legal and Regulatory Framework

While there is some overlap in applicability, for purposes of organization, policies related to water resources are organized under the categories of stormwater, groundwater, surface water, floodplains, and wetlands in this section.

3.9.1.1 Stormwater

EPA National Pollution Discharge Elimination System Phase I Stormwater Rules

In 1972 the National Pollution Discharge Elimination System (NPDES) program was established under the authority of the Clean Water Act (CWA) then delegated to the Department of Environment and Natural Resources (DENR) Division of Water Quality (DWQ) for implementation in North Carolina. Phase I of the program was established in 1990 and focuses on site and operations planning to reduce pollutant sources. Under Phase I of the NPDES, the following activities are regulated:

- Industrial facilities that fall into one of ten categories,
- Construction activities that disturb five or more acres of land, and
- Municipal separate storm sewer systems (MS4s) serving populations of 100,000 or more.

Depending on their Standard Industrial Classification (SIC) code, industrial facilities are required to obtain a general or individual NPDES permit. These permits require the industrial facilities to develop site-specific stormwater pollution prevention plans. There are several industrial facilities in the study area that are required to have an individual or general permit under Phase I of the NPDES.

Requirements for construction activities were strengthened by Phase II of the NPDES and are described in the next section. Requirements of NPDES related to construction activities for NCDOT are addressed through their sediment and erosion control program.

Charlotte is one of the six local governments in North Carolina with a MS4 serving a population of 100,000 or more (according to the 1990 census). Charlotte is, therefore, required to implement a stormwater management program that includes public education, illicit discharge detection and elimination, storm sewer system and land use mapping, and analytical monitoring.⁶²

EPA National Pollution Discharge Elimination System Phase II Stormwater Rules

Phase II of the NPDES program was signed into law in 1999. This regulation builds on Phase I by requiring smaller communities and public entities that own and operate MS4s to obtain a NPDES permit for stormwater discharges. Phase II regulations apply where the MS4 is located in an urbanized area as designated by the most recent Decennial Census, or when the community or public entity is designated by the NPDES permitting authority. The NPDES permitting authority in North Carolina is the Environmental Management Commission.

Under Phase II of the NPDES program, construction projects that disturb one acre or more are subject to NPDES requirements. The NCDOT addresses stormwater on their roadways and facilities through the sediment and erosion control program under the Division of Land Resources. Under their NPDES permit, NCDOT addresses all NPDES requirements and implements Best Management Practice (BMP) retrofits.⁶³

The Environmental Management Commission (EMC) has designated municipal spheres of influence (MSIs) within North Carolina that are subject to the Phase II regulations. Municipal spheres of influence are defined as either within an area that is considered urbanized under the decennial census, or the potential extraterritorial jurisdiction (ETJ) of a Phase II municipality. Extraterritorial jurisdictions typically extend between one and three miles beyond the municipal boundary. If the combination of area covered by Phase II municipalities, their potential ETJ, and urbanized areas totals at least 85 percent of the entire county, then Phase II requirements also apply to all new development in the entire county. This provision is applicable to Mecklenburg County.

The NPDES Phase II permit requires the implementation of a stormwater management program outlining the management practices and measurable goals that will be implemented in the following specific areas:

- Public education and outreach,
- Public participation and involvement,
- Illicit discharge detections and elimination,
- Construction site runoff control,
- Post construction site runoff control, and
- Pollution prevention for municipal operations.⁶⁴

An annual report is required in which the achievement of stormwater management goals as included in the plan, additional goals achieved in that year, and new measures to be undertaken in the upcoming year are listed.

Charlotte Stormwater Control

The City of Charlotte established a series of ordinances applicable to stormwater: the *Stormwater Ordinance*, (no date) *Stormwater Pollution Ordinance*, (1995) and *Post-Construction Ordinance*, (adoption pending). In the *Stormwater Ordinance*, obstructing storm water is restricted and fees for stormwater services are established.⁶⁵ The purpose of the *Stormwater Pollution Ordinance* is to protect water quality by limiting the type and amount of pollutants entering the stormwater system. Illegal and accidental discharges and penalties are established in the ordinance.⁶⁶ The *Post-Construction Ordinance* is currently in draft stages. According to the City of Charlotte, “The purpose of the Post - Construction Ordinance is to control and manage stormwater runoff and associated negative water quality impacts resulting from post-construction stormwater discharges through the use of a combination of structural and non-structural best management practices.” The draft regulation includes buffers around streams, open space requirements, volume control requirements, and structural BMPs.⁶⁷

3.9.1.2 Surface Water

Section 404 of the Clean Water Act

Surface waters and wetlands fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE) through section 404 of the Clean Water Act (33 USC 1344). Section 404 of the Clean Water Act requires regulation of discharges into “waters of the United States,” including lakes, rivers, streams, and wetlands.

Section 401 Water Quality Certification Process

Surface waters and wetlands fall under the jurisdiction of the NCDWQ within the NCDENR through the Section 401 Water Quality Certification Process (NC General Statutes Chapter 143 Article 21, Part 1). The Section 401 Water Quality Certification Permit ensures that discharges would be in compliance with applicable state water quality standards.

North Carolina – Water Supply Watershed Protection Act

The North Carolina General Assembly adopted the *Water Supply Watershed Protection Act*, in 1989.⁶⁸ Under the resulting Water Supply Watershed Protection Rules, adopted in 1992, all local governments having land use jurisdiction within water supply watersheds are required to adopt and implement water supply watershed protection ordinances, maps, and a management plan. There are no water supply watersheds inside the study area.

Mecklenburg – Charlotte Water Supply Watershed Overlay Districts

Special requirements are established for water supply watershed districts in the City of Charlotte and Mecklenburg County, however, as previously noted, the study area does not fall within any water supply watersheds.⁶⁹

Mecklenburg-Charlotte Stream Buffer Rules

To improve water quality, Mecklenburg County, the City of Charlotte, and other municipalities enacted a Surface Water Improvement and Management (S.W.I.M.) program. The program was enacted in three phases and some plans

include efforts to control pollution from sediment and bacteria, enhanced enforcement of water supply watershed protection requirements, and the establishment of vegetative creek buffers.⁷⁰ Of particular importance to this project is the buffer requirement.⁷¹

Under the stream buffer ordinances established in Charlotte and Mecklenburg County, buffers are required for streams that drain at least 100 acres. Buffers are defined for three zones, the stream side, managed use, and upland zone. Two tables are included in the ordinance that describe the total width of the buffer zone based on drainage area and provide a description of each buffer zone. Those tables are reproduced here as Table 3-31 and Table 3-32. Specific notes regarding methods of calculation and other provisions are included in the ordinance but are not reproduced here.⁷²

Table 3-31: S.W.I.M. Stream Buffer Widths

| Drainage Area Designation | Stream Side Zone | Managed Use Zone | Upland Zone | Total width of Buffer on each side of Stream |
|---------------------------|------------------|------------------|---|--|
| > 100 acres | 20 feet | None | 15 feet | 35 feet |
| > 300 acres | 20 feet | 20 feet | 10 feet | 50 feet |
| > 640 acres | 30 feet | 45 feet | 25 feet plus 50% of the area of the FEMA fringe beyond 100 feet | 100 feet plus 50% of the FEMA fringe beyond 100 feet |

Source: Mecklenburg County Land Use and Environmental Services Agency. *Part 8: S.W.I.M. (Surface Water Improvement and Management) Stream Buffers*. Accessed 14 July 2005. Available: <http://www.co.mecklenburg.nc.us/Departments/LUESA/Water+and+Land+Resources/>

Table 3-32: S.W.I.M. Stream Buffer Descriptions

| Characteristics | Stream Side Zone | Managed Use Zone | Upland Zone |
|--------------------|---|--|--|
| Function | Protect the integrity of the ecosystem | Provide distance between upland development and the stream side zone | Prevent encroachment and filter runoff |
| Vegetative Targets | Undisturbed (no cutting or clearing allowed) – If existing tree density is inadequate, reforestation is encouraged | Limited clearing – Existing tree density must be retained to a minimum of 8 healthy trees of a minimum 6 inch caliper per 1000 square feet – If existing tree density is inadequate, reforestation is encouraged | Grass or other herbaceous ground cover allowed – Forest is encouraged |
| Uses | Very restricted – permitted uses limited to: flood control structures and bank stabilization as well as installation of utilities and road crossings with stabilization of disturbed areas as specified in Section 12.806.2 | Restricted – Permitted uses limited to: all uses allowed in the Stream side Zone, as well as storm water BMPs, bike paths, and greenway trails (not to exceed 10 feet in width) | Restricted – Permitted uses limited to: all uses allowed in the Stream Side and managed Use Zones, as well as grading for lawns, gardens, and gazebos and storage buildings (non-commercial and not to exceed 150 sq feet) |

Source: Mecklenburg County Land Use and Environmental Services Agency. *Part 8: S.W.I.M. (Surface Water Improvement and Management) Stream Buffers*. Accessed 14 July 2005. Available: <http://www.co.mecklenburg.nc.us/Departments/LUESA/Water+and+Land+Resources/>

Dillons Twins Lakes and Lake Jo, Stewart Creek, Irwin Creek, Little Sugar Creek, Briar Creek, and Edwards Branch have 100-foot buffers. A tributary to Little Sugar Creek and tributaries to Briar Creek have 50-foot buffers. Other tributaries to Little Sugar Creek, Stewart Creek, Irwin Creek, and a tributary to Campbell Creek that fall within the study area have 35-foot buffers (Figure 3-35).⁷³

City of Charlotte Soil Erosion and Sedimentation Control Ordinance

The City of Charlotte's Erosion Control Program originated from a State action, which granted local government authority to enforce the Sedimentation Pollution Control Act of 1973 and specifically the erosion control requirements. The ordinance strengthens the City's and County's ability to address two primary objectives: (1) Hold developers and contractors responsible for maintaining erosion control on their projects, and (2) Protect environmentally sensitive areas from sediment damage. The ordinance acts to identify critical areas, or areas vulnerable to erosion; limit the time of exposure from land-disturbing activity; limit exposed areas; control surface water; control sedimentation; and manage stormwater runoff.⁷⁴

River Basin Water Quality Plans and Programs

Basinwide water quality planning is a non-regulatory watershed-based approach to restoring and protecting the quality of North Carolina's surface waters. Basinwide plans are developed by the DWQ for each of the 17 major river basins located in the State. Each plan is revised at five-year intervals. The study area falls within the Catawba River Basin. The first basinwide plan for the Catawba River Basin was completed in 1995. The third cycle of the basinwide plan was completed in September 2004.

The primary goals of basinwide planning are to:

- Identify water quality problems and restore full use to impaired waters;
- Identify and protect high value resource waters;
- Protect unimpaired waters while allowing for reasonable economic growth;
- Develop appropriate management strategies to protect and restore water quality;
- Assure equitable distribution of waste assimilative capacity for dischargers; and
- Improve public awareness and involvement in the management of the State's surface waters.⁷⁵

The study is contained entirely within DWQ watershed subbasin 03-08-34. General information about the water quality in the subbasin is included Section 3.9.3.

3.9.1.3 Groundwater

Groundwater quality is protected by North Carolina statute under the Groundwater Classifications and Standards established in North Carolina Administrative Code (NCAC) Subchapter 2L. Classifications of groundwater quality and corresponding standards for protection, corrective actions, monitoring and notification are established in three sections.⁷⁶

Mecklenburg County finalized groundwater regulations in October of 2004. In the regulations a fee-funded groundwater quality program is established for the

protection and preservation of groundwater through the identification of contamination sites, drinking water wells and collection of data; investigation of contaminated sites; and protection of drinking water supplies.⁷⁷

3.9.1.4 Wetlands

Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Section 404 of the Clean Water Act

This policy, as described under the surface waters section, is also applicable to wetlands.

Section 401 Water Quality Certification Process

This policy, as described under the surface waters section, is also applicable to wetlands.

Wetlands Executive Order and DOT Order 5660.1A

There are several policies that are applicable to wetlands, including the Wetlands Executive Order and DOT Order 5660.1A. Under the Wetlands Executive Order:

[E]ach agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative, and (2) that the action includes all practicable measures to minimize harm to wetlands which may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors.⁷⁸

This policy is applicable to all wetlands, not just those on publicly owned land. The DOT order implements the Wetlands Executive Order. Some of the provisions in the DOT order include limiting transportation agencies' reliance on economic factors in determining what alternatives are "practicable," requiring early review of proposals for new construction in wetlands to agencies and potential public involvement.⁷⁹

Any action that proposes to place fill into these areas falls under the jurisdiction of the USACE under Section 404 of the Clean Water Act (33 USC 1344). Wetlands that are determined to be isolated and not covered by Section 404 are covered by policies set out in the NCDENR "Redbook." These policies will not be discussed in detail as no jurisdictional wetlands were identified in the study area.⁸⁰

3.9.1.5 Floodplains and Floodways

Federal regulations pertaining to floodplains and floodways are the *National Flood Insurance Act* of 1968, as amended and the *Flood Disaster Protection Act* of 1973, as amended. Under these regulations, a program for extended coverage of flood insurance is established, provisions for dissemination of information regarding flood-prone areas are made, requirements for State and local agencies to adjust land uses for areas prone to floods through floodplain ordinances are made, and requirements to purchase insurance for projects assisted by Federal funding that may be at risk of flood hazards are established.⁸¹

In the City of Charlotte, rules pertaining to floodplains are set out in the *Floodplain Regulations of Charlotte, North Carolina*. The general purpose of this ordinance is to, “promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas.” This purpose is accomplished through several provisions. Included in the provisions are restrictions of land uses in areas prone to floods; control of the alteration of floodplains, stream channels, and natural protective barriers; control of filling, grading, dredging and other development; and prevention or regulation of the construction of flood barriers that may unnaturally divert flood waters.⁸²

3.9.2 Method

Rather than using the study area delineated using a one-half mile buffer of the streetcar corridor, an area described as the “water resources study area” and consisting of a 200-foot buffer of the streetcar corridor was used in the field investigation of water resources. A site visit was conducted to assess stream conditions using DWQ’s Stream Classification Forms. Geographic Information System (GIS) data were used to determine what water resources are within the water resources study area. Data were also obtained from the NCDWQ web page at <http://h2o.enr.state.nc.us/> and the Mecklenburg County web page at <http://www.co.mecklenburg.nc.us>. While information pertaining to specific water resources within the water resources study area refers to the area encompassed by the 200-foot buffer of the streetcar corridor, general information pertaining to the basin refers to a larger geographic area.

3.9.3 Existing Conditions and Resources

In this section the surface water, groundwater, and floodplains and floodways within the water resources study area are described.

3.9.3.1 Surface Waters

The water resources study area is located in the Catawba River Basin, which extends from the eastern slopes of the Blue Ridge Mountains southeast to the state line near Charlotte. The basin covers 3,279 square miles and encompasses all or part of Alexander, Avery, Burke, Caldwell, Catawba, Gaston, Iredell, Lincoln, McDowell, Mecklenburg, Union, and Watauga counties.

Forests dominate the northern mountainous counties, and smaller hills give way to a rolling terrain near the state line. As the basin enters the Inner Piedmont, land use shifts from forest to agricultural and urban uses. Water quality in the Catawba River and its tributaries reflect the changes in land use within the basin. Many of the tributaries in the northern portion of the basin have Good to Excellent water quality and are classified as trout waters by the DWQ. Water quality decreases in the southern portion of the basin as agricultural and urban discharges increase. The study area is located in the southern portion of the basin within the Charlotte Metropolitan Area. Urban runoff has negatively affected the water quality in and around the Charlotte Area.

Overview of Subbasin 03-08-34

The Catawba River Basin is subdivided into nine subbasins. The water resources study area lies entirely within subbasin 03-08-34. According to the basinwide plan, the region containing subbasin 03-08-34 is the most heavily urbanized region of the basin and the state. Only 52 percent of the subbasin is forested, which is the smallest percentage of all subbasins in the Catawba River Basin. An

overview of the characteristics of the subbasin is provided in 3-33. Creeks in the study area generally flow in a southerly direction.

Nine streams are located within the limits of the study area. Streams found within the study area include two unnamed tributaries (UT) to Irwin Creek, Irwin Creek, three UTs to Little Sugar Creek, Little Sugar Creek, one UT to Briar Creek, and Briar Creek (Figure 3-35). Stewart Creek, Edwards Branch, and Campbell Creek drain the study corridor, but do not cross the water resources study area.

Table 3-33: Overview of Subbasin 03-08-34

| Land and Water Area | |
|--|-------------------------------|
| Total area: | 324 mi ² |
| Land area: | 317 mi ² |
| Water area: | 7 mi ² |
| Population Statistics | |
| 2000 Estimated Population | 408,821 people |
| Population Density: | 1,231 persons/mi ² |
| Land Cover (Percent) | |
| Forest/Wetland: | 52 |
| Surface Water: | 2 |
| Urban: | 32 |
| Agriculture: | 13 |
| Counties^a | |
| Gaston and Mecklenburg | |
| Municipalities^b | |
| Belmont, Charlotte, Huntersville, Matthews, Mint Hill, Mount Holly and Pineville | |

^a The only county that is located in both the subbasin and the study area is Mecklenburg.

^b The only municipality located in both the subbasin and the study area is Charlotte.

Source: North Carolina Department of Environment and Natural Resources, Division of Water Quality, Basinwide Planning Program. *September 2004 Catawba River Basinwide Water Quality Plan*. Available: <http://h2o.enr.state.nc.us/basinwide/>.

Figure 3-35: Surface Waters in the Water Resources Study Area (Beatties Ford)

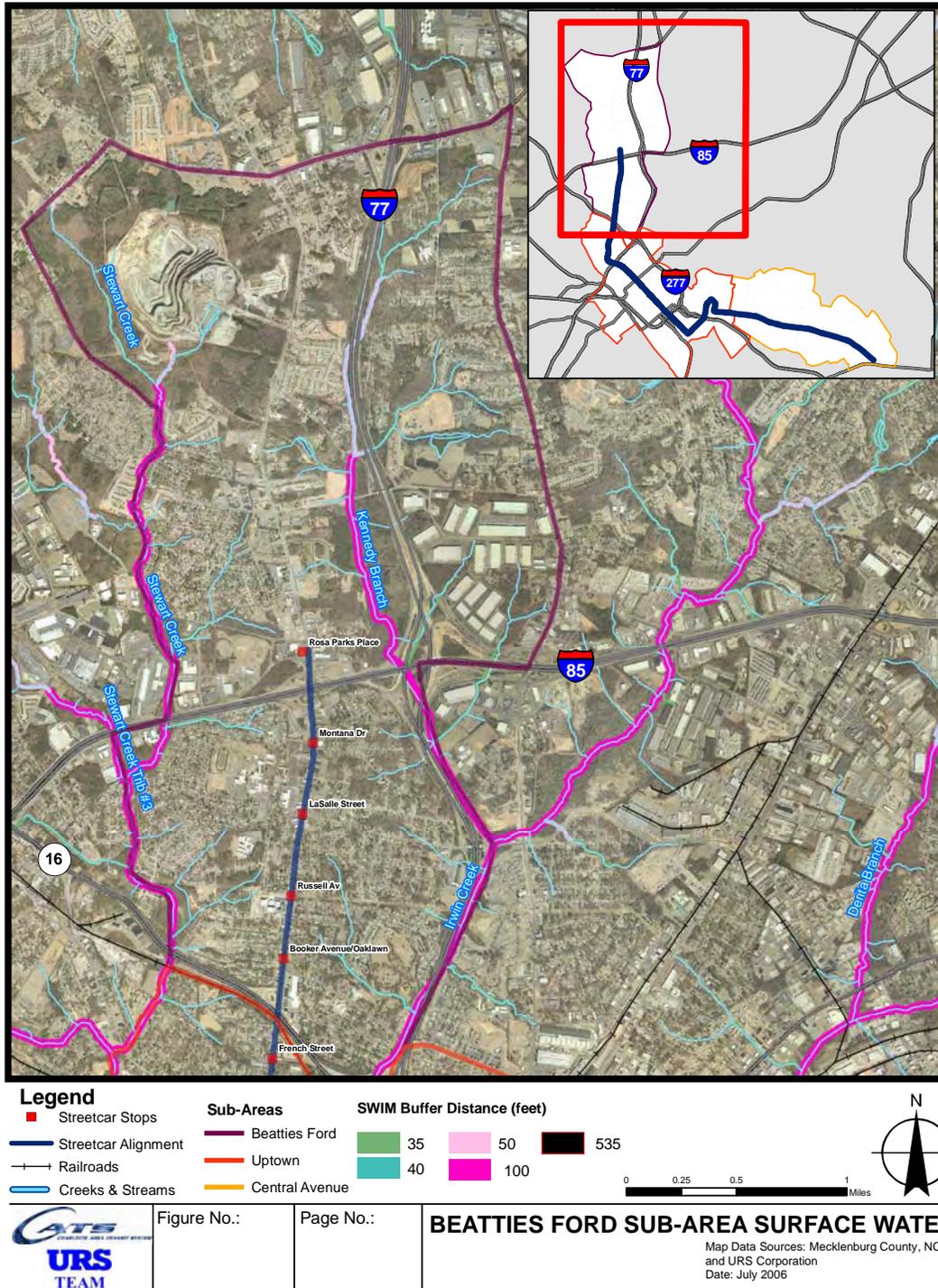


Figure 3-36: Surface Waters in the Water Resources Study Area (Center City)

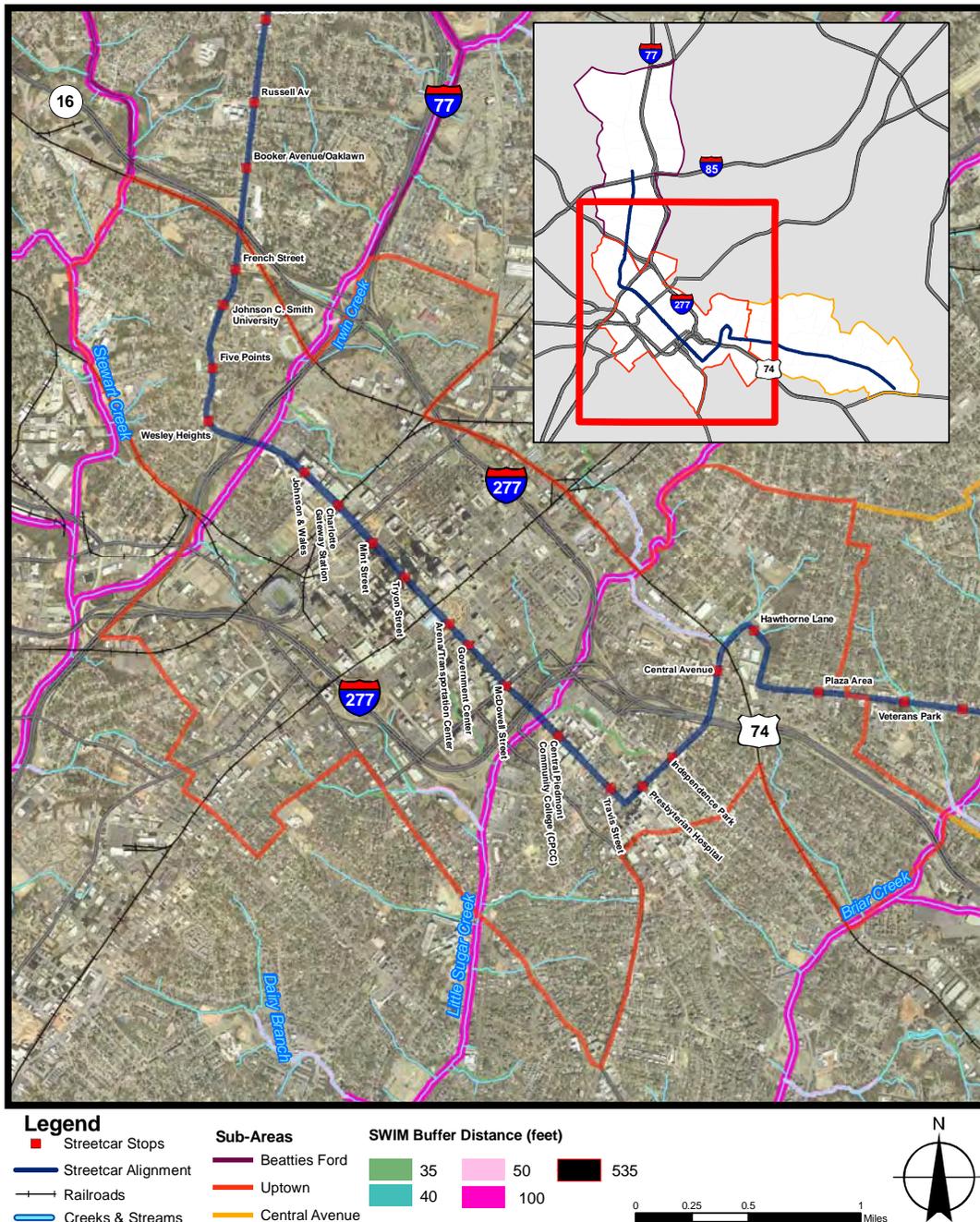
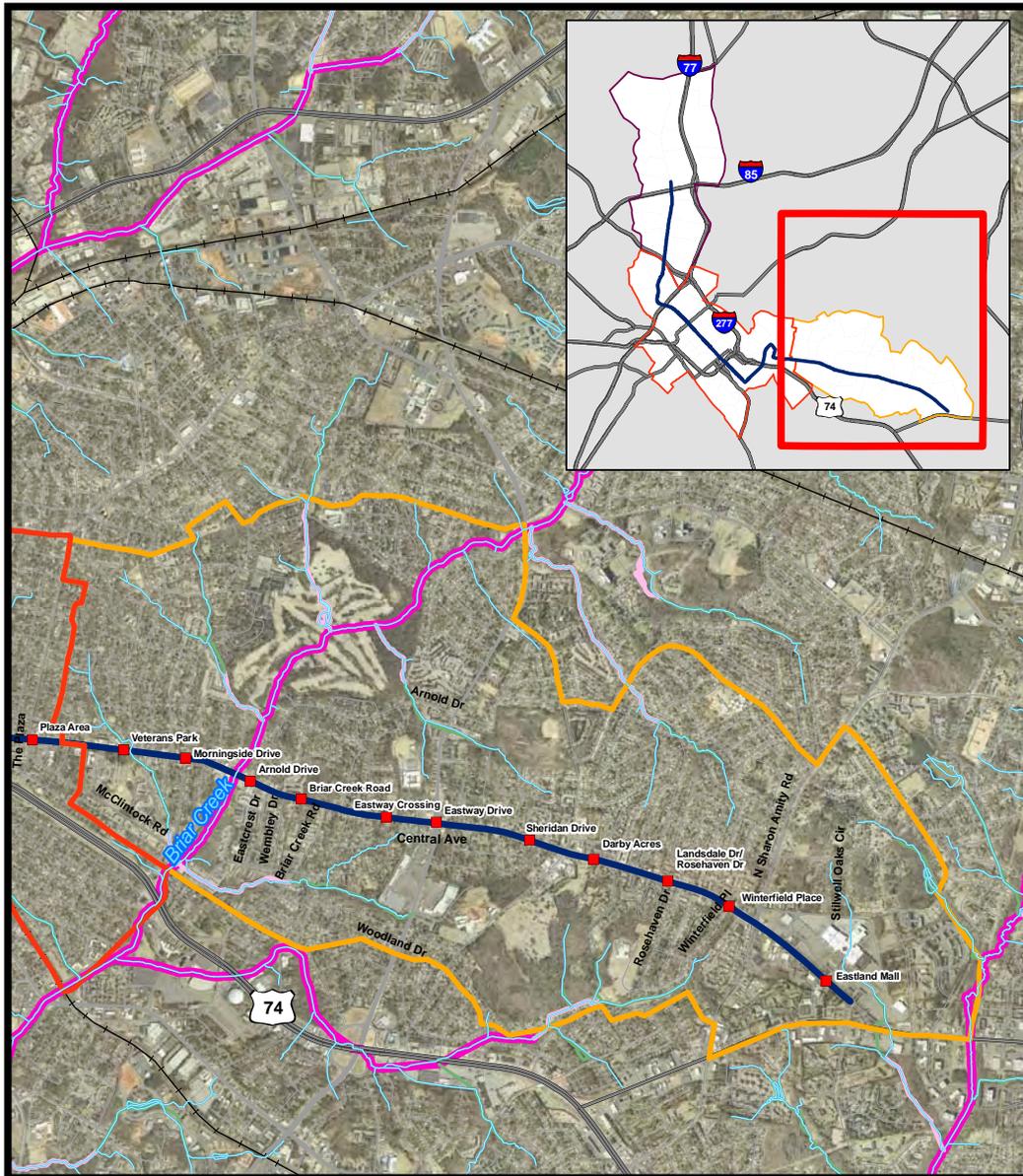


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UPTOWN SUB-AREA SURFACE WATER
 Map Data Sources: Mecklenburg County, NC;
 and URS Corporation
 Date: July 2006

Figure 3-37: Surface Waters in the Water Resources Study Area (Central)



Legend

- Streetcar Stops
- Streetcar Alignment
- Railroads
- Creeks & Streams

- Sub-Areas**
- Beatties Ford
 - Uptown
 - Central Avenue

- SWIM Buffer Distance (feet)**
- 35
 - 40
 - 50
 - 100
 - 535

0 0.25 0.5 1 Miles



Figure No.:
 Page No.:

CENTRAL SUB-AREA SURFACE WATER

Map Data Sources: Mecklenburg County, NC;
 and URS Corporation
 Date: July 2006

Prior to field investigations, US Geological Survey (USGS) topographic and National Wetland Inventory (NWI) maps of the water resources study area were examined to determine areas where stream crossings may be present. The entire 200-foot corridor was then walked during field investigations and all drainages were examined. An expanded area within the I-277 loop was reviewed via aerial photographs but was not field verified. Drainages were evaluated using the DWQ guidelines.⁸³

Five of the nine streams were assessed at the time of the field visit. The alignment has changed since that time, and now includes four additional stream crossings (UT2 to Irwin Creek, UT1 to Little Sugar Creek, UT2 to Little Sugar Creek, and UT3 to Little Sugar Creek). Due to the location of the water resources study area within the existing roadway alignment and the urban nature of the project, impacts to these streams are expected to be minimal, if any. Stream forms for the four additional streams have not been completed.

Stream 1 is a UT to Irwin Creek which runs under Beatties Ford Road within the water resources study area. This channel is approximately two feet wide at the streambed and the substrate consists of trash, concrete blocks, and clay. Stream 1 is open on the east side of Beatties Ford Road and flows into a long culvert on the west side of the road.

Irwin Creek (Stream 2) runs under West Trade Street within the water resources study area. It has a bed width of 25 feet. The substrate consists mostly of sand, silt, and clay with some gravel.

Little Sugar Creek (Stream 3) flows under Elizabeth Avenue within the water resources study area. The stream is only open on the west side of the road and flows into a culvert on the east side. The bed of the stream is approximately 25 feet wide, and the substrate consists of boulder-sized and gravelly rip rap, silt, and clay.

Stream 4 is a UT to Briar Creek which crosses Central Avenue just south of a military reserve. The creek is only open on the south side of the road and flows into a culvert on the north side. Within the water resources study area, the stream bed is approximately ten feet wide with a gravel substrate with some silt and clay.

Briar Creek (Stream 5) crosses under Central Avenue within the study area. The streambed width is eight feet with a gravel substrate intermixed with some sand. The west bank appears to be lined with six inch and greater rocks.

UT2 to Irwin Creek flows northwest across Cedar Street before entering Irwin Creek. UT1 to Little Sugar Creek flows south under US-74, UT2 flows southeast under South Kenilworth Avenue, and UT3 flows west under South Kings Drive before entering Little Sugar Creek.

Status of Assessed Waters in Subbasin 03-08-34

Waters are classified by the NCDWQ according to their best-intended uses. The DWQ rates waters for five use categories: aquatic life, recreation, fish consumption, water supply, and shellfish harvesting. Waters are classified as 'Supporting' if data and information used to assign a use support rating meet the criteria for that use category. If these criteria are not met, then the waters are categorized as 'Impaired'. Waters with inconclusive data and information are labeled as 'Not Rated', and when there is no data available, the waters are

labeled as 'No Data'. Additional information regarding the classification system is available in Appendix III of the September 2004 basinwide plan for the Catawba River Basin.⁸⁴ Determining how well a waterbody supports its designated use is an important method of interpreting water quality data and assessing water quality.

Charlotte-Mecklenburg Storm Water Services collects water samples from Charlotte-Mecklenburg lakes and streams on a regular basis to identify and eliminate pollution problems and to assess the overall quality of Mecklenburg County's surface waters. Additionally, samples of fish and other aquatic life are also routinely collected.

The 303d list is a State list of waters that are not meeting water quality standards or have impaired uses. Listed waters must be prioritized, and a management strategy or total maximum daily load (TMDL) must be developed. Irwin Creek and Little Sugar Creek are both listed on the 303d list. This listing is primarily due to wastewater discharges and urban runoff. Problems include turbidity, impaired biological integrity, fecal coliform, industrial point sources, municipal point sources, and urban runoff/storm sewers.⁸⁵

Water quality stressors identified in the subbasin were urban runoff, poor habitat, and potential wastewater discharges. Declines in bioclassifications for Little Sugar Creek between basinwide planning periods may have been attributed to drought. It was noted in the 2004 basinwide plan that Irwin Creek and Little Sugar Creek (as well as other streams in the Sugar Creek watershed but not the water resources study area) receive a large amount of both point and nonpoint pollution from urban areas, severely impacting stream health. Sand/silt substrate, severe bank erosion, and disturbed or nonexistent riparian vegetation are common attributes of the habitat found in these streams. There are also elevated levels of fecal coliform bacteria and turbidity indicating impairment by urban runoff and wastewater discharges. Water quality has remained low but stable over the planning cycle. Total Maximum Daily Loads are used to limit the pollutants entering the water bodies.⁸⁶

According to the latest basinwide plan, there are over 50 NPDES permitted dischargers in subbasin 03-08-34. The largest NPDES permitted discharger is the Charlotte/Mecklenburg Utilities District. This source discharges to Irwin Creek and Little Sugar Creek as well as a stream outside of the water resources study area.⁸⁷

Surface Water Classifications

Under the Water Quality Standards Program, all surface waters in North Carolina are assigned primary and supplemental classifications. Primary classifications refer to the best use of the water and supplemental classifications provide protection to sensitive or highly valued resource waters.

All tributaries draining the project study area are classified as Class C (Table 3-34). The Class C rating is used to describe freshwaters protected for aquatic life propagation and maintenance of biological integrity (including fishing and fish), wildlife, secondary recreation, agriculture, and any other usage except for primary recreation or as a source of water supply for drinking, culinary, or food processing purposes. Primary classifications not applicable to the water resources study area are those for water supply watersheds (WS), primary recreation and Class C uses (B and SB) and those for commercial shellfish

harvesting (SA). Supplemental classifications not applicable to surface waters in the water resources study area include those for swamp waters (Sw), trout waters (Tr), high quality waters (HQW), outstanding resource waters (ORW), and nutrient sensitive waters (NSW).⁸⁸ In addition to these classifications, the US Department of the Interior (USDOI) and the US Department of Agriculture (USDA) maintain a list of designated rivers, as well as rivers that may be eligible for Wild and Scenic Rivers designation. None of the creeks within the water resources study area are designated as or are eligible to be Wild and Scenic Rivers.

The DWQ classifies stream segments according to their highest supportable use. All tributaries that are not listed carry the same stream classification as the stream into which they flow. The name, classification, and index number for each creek in the water resources study area is shown in Table 3-34.

Table 3-34: Creeks Draining the Water Resources Study Area

| Creek Name | Classification | Index Number |
|--|----------------|--------------|
| Dillons Twins Lake and Lake Jo (connecting stream to Irwin Creek) | C | 11-137-1-1 |
| Stewart Creek | C | 11-137-1-2 |
| Irwin Creek | C | 11-137-1 |
| Little Sugar Creek | C | 11-137-8 |
| Briar Creek | C | 11-137-8-2 |
| Edwards Branch | C | 11-137-8-2-1 |
| Campbell Creek | C | 11-137-9-1 |

Source: NCDWQ website, <http://h2o.enr.state.nc.us/bims> and North Carolina Division of Water Quality, September 2004 Basinwide Water Quality Plan. Available: <http://h2o.enr.state.nc.us/basinwide/>.

3.9.3.2 Groundwater

The water resources study area is located in the Piedmont Physiographic Province. The region is characterized by gently rolling, well-rounded hills and long low ridges with a few feet of elevation difference between the hills and valleys. Most of the information for this section was taken from the USGS report, *Preliminary Hydrogeologic Assessment and Study Plan for a Regional Groundwater Resource Investigation of the Blue Ridge and Piedmont Provinces of North Carolina*, (USGS report). As noted in the report, there is limited information available regarding the groundwater system in the Piedmont province.⁸⁹ In this section, a brief description of policy pertaining to groundwater, characteristics of the Piedmont Physiographic Province, and some information pertaining to groundwater quality and levels is provided.

Characteristics of the Piedmont Physiographic Province

In the USGS report, characteristics of the Piedmont Province were described generally. A complex, two-part regolith-fractured crystalline rock aquifer system underlies most of this province. Due to its porosity, which ranges from 35 to 55 percent, the regolith provides the bulk of the water storage of the system. There is a transition zone at the base of the regolith where saprolite grades into unweathered bedrock. The transition zone is considered a potential conduit for rapid groundwater flow, and therefore, a potential conduit for rapid movement of contaminants to nearby wells or streams that cut through it.⁹⁰

While groundwater systems are most often described in terms of aquifers, according to the USGS report, the complex geology and secondary porosity and permeability of the bedrock makes hydrologic terranes a more useful method of describing the characteristics of the system. Four terranes were identified: (1) massive or foliated crystalline rocks mantled by thick regolith, (2) massive or foliated crystalline rocks mantled by thin regolith, (3) metamorphosed carbonate rocks, and (4) sedimentary rocks of the Mesozoic basins. The USGS provides further technical details about the characteristics of each terrane and should be referred to by readers interested in more information.⁹¹

Water Levels and Quality

While groundwater quality in the crystalline-rock terranes of the province are generally suitable for drinking and other purposes, groundwater in the Piedmont Province has not traditionally been used as a large source because of readily available surface water supplies and the perception that groundwater in the Piedmont Province occurs in a complex, generally heterogeneous environment. However, small communities and rural populations in the province depend on groundwater supplies. Groundwater pumped from aquifers in the Piedmont supplied about 30 percent of the population within the province. The number of people supplied by groundwater in the Piedmont remained fairly constant between 1960 and 1980 at about 47 to 48 percent. Between 1980 and 1990 there was a 15.6 decrease in the portion of the population served by groundwater. This decrease was attributed to an increase in the population in urban areas, including Charlotte, that are served from surface water supplies. According to the USGS report, "Municipal and industrial water supplies in the two provinces [Blue Ridge and Piedmont] are derived almost exclusively from surface-water sources. The potential for future development of surface water becomes limited, however, as the most suitable sites for reservoirs become inhabited or are used for other purposes, as land purchase and development costs increase, and as environmental concerns regarding surface-water impoundments cause delays in approval of necessary permits." The average quantity of available groundwater in storage in the Piedmont is calculated to be 0.73 million gallons per acre, but, the water storage in specific areas may vary.⁹²

According to the USGS report, as the population has grown, so has the number of real and potential sources of groundwater contamination. As mentioned, the transition zone may serve as a conduit for the movement of contaminants. According to the USGS report, "Because the distance from the point where water enters the terrestrial part of the hydrologic cycle in the Piedmont to where water discharges to a stream commonly is less than half a mile, contaminants entering the ground-water system and moving through the transition zone can rapidly become dispersed to surface-water bodies." The USGS lists the following water-quality problems related to human activity:

- Discharge from septic tanks;
- Petroleum products leaking from storage tanks;
- Improper handling and (or) transport of industrial chemicals;
- Improperly constructed water-supply wells;
- Agricultural activities;
- Highway de-icing salts; and,
- Infiltration of contaminated surface water from lakes and streams as a result of nearby pumping from wells.

Specific problems noted in the Mooresville Region, in which the water resources study area falls, include growth-oriented issues and the fate and transport of chlorinated solvents in the bedrock and the effects of poor well construction.⁹³

According to the NCDENR, Division of Environmental Health (DEH), Public Water Supply (PWS) Section (NCDEH website, <http://www.deh.enr.state.nc.us/>); one public water supply well is located within the water resources study area. This well is classified as a Transient Non-Community public water supply well.

3.9.3.3 Jurisdictional Wetlands

Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Any action that proposes to place fill into these areas falls under the jurisdiction of the USACE under Section 404 of the Clean Water Act (33 USC 1344).

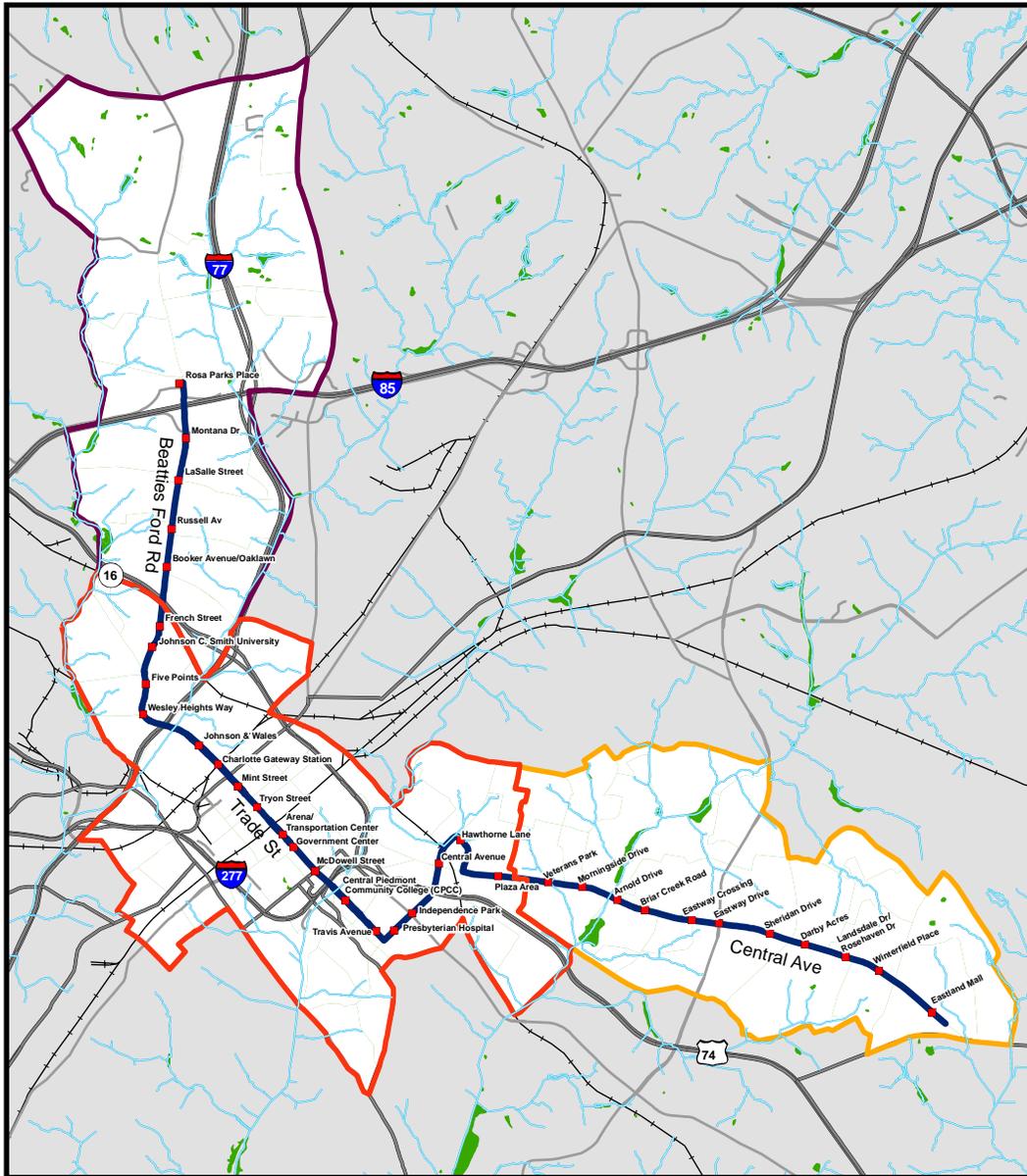
Review of the USFWS NWI maps of Charlotte East and Derita Quadrangles indicated a total of four wetlands within the water resources study area.^{94, 95} Three of the four are designated stream channels within the water resources study area (Irwin Creek, Little Sugar Creek, and Briar Creek). The fourth designated wetland is a small pocket located adjacent to South McDowell Street (Figure 3-38). Irwin Creek and Little Sugar Creek have been classified as R2UBHx (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Excavated). Briar Creek is classified as R2UBH (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded). The small wetland is classified as PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated).

The water resources study area was evaluated for the presence of wetlands. USACE wetland criteria were used to evaluate topographically low areas, areas having hydric soils, and areas with poorly drained soils.⁹⁶ No wetlands were identified during field investigations. Since no wetlands were identified within the water resources study area, Section 404 of the Clean Water Act, as it pertains to wetlands, does not apply.

3.9.3.4 Floodplains and Floodways

Mecklenburg County, in cooperation with the Federal Emergency Management Agency (FEMA) and the USACE, developed Digital Flood Insurance Rate Maps (FIRMs) for Mecklenburg County. According to the FIRM maps for Mecklenburg County, the floodways and floodplains of Stewart Creek, Irwin Creek, Little Sugar Creek, Edwards Branch and Briar Creek fall within the water resources study area (Figure 3-39).⁹⁷

Figure 3-38: NWI Mapping



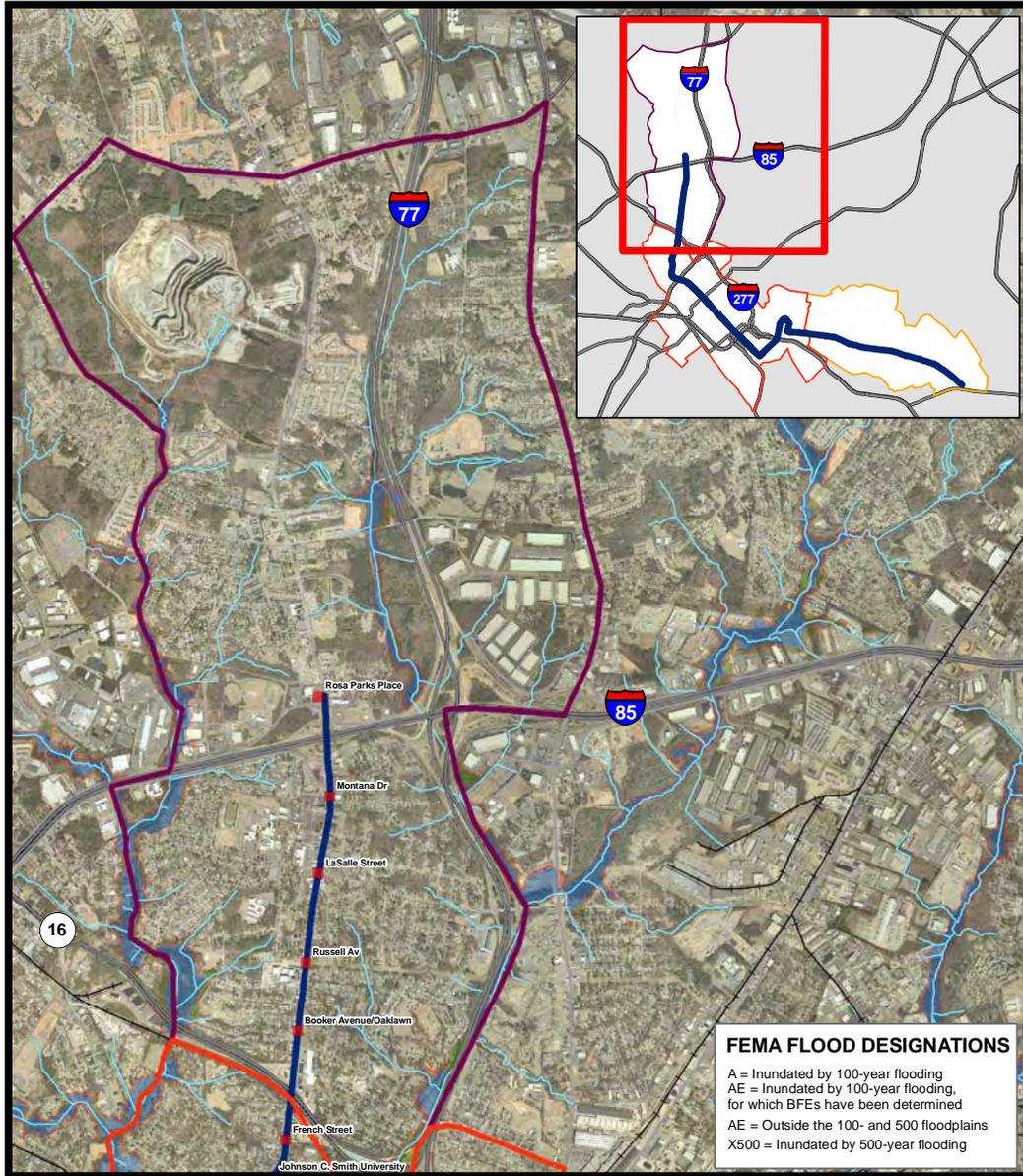
| | | | |
|-------------------|-----------------------|------------------|--|
| Legend | | Sub-Areas | |
| ■ Streetcar Stops | — Streetcar Alignment | ■ Beatties Ford | |
| — Railroads | — Creeks & Streams | ■ Uptown | |
| | | ■ Central Avenue | |
| | | ■ Wetlands | |



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|-------------|-----------|

Wetlands
 Map Data Sources: Mecklenburg County, NC;
 USFWS NWI; and URS Corporation
 Date: July 2006

Figure 3-39: Floodplains and Floodways in the Study Area (Beatties Ford)



FEMA FLOOD DESIGNATIONS
 A = Inundated by 100-year flooding
 AE = Inundated by 100-year flooding, for which BFEs have been determined
 AE = Outside the 100- and 500 floodplains
 X500 = Inundated by 500-year flooding

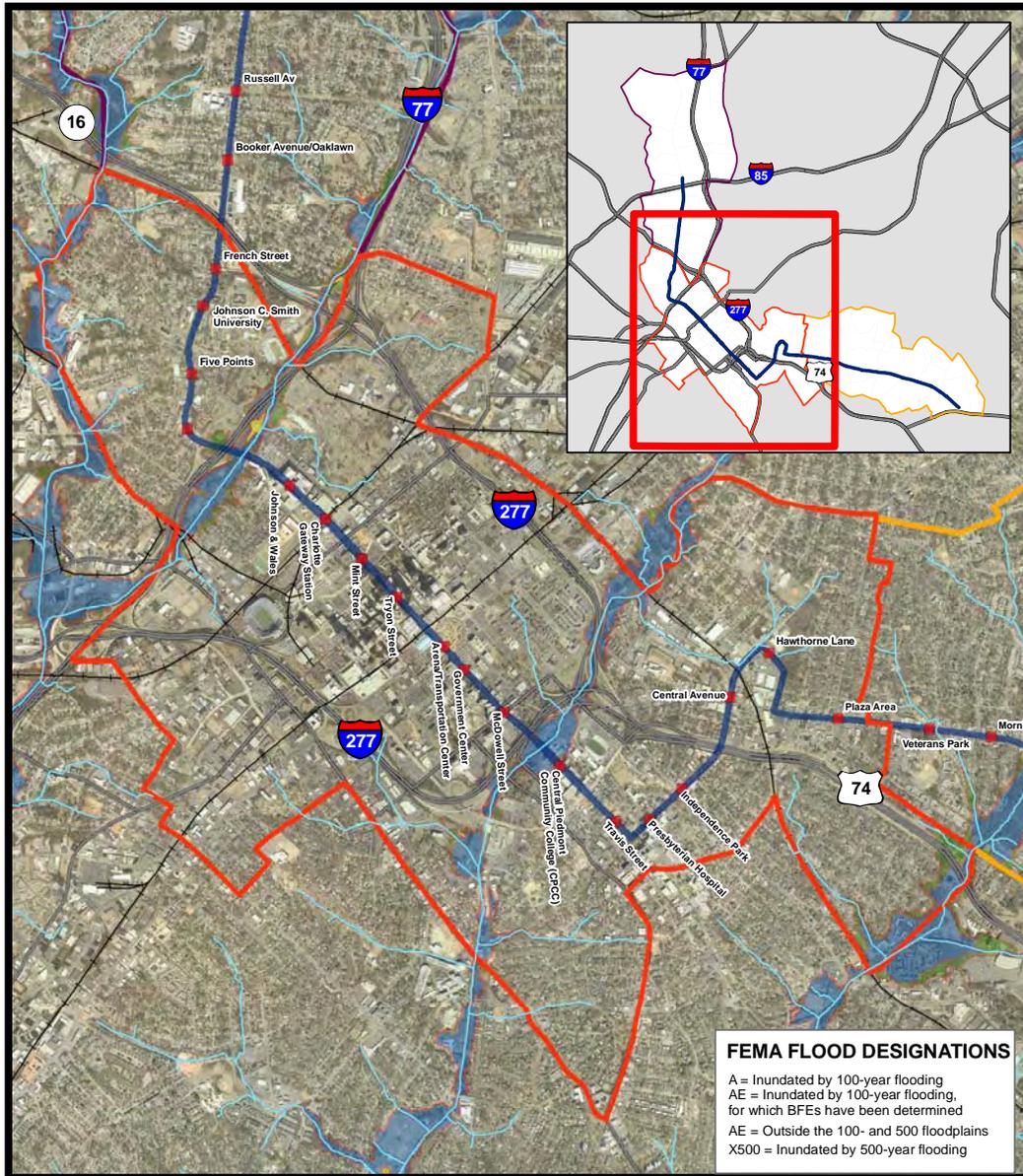
| | | | |
|--------------------|------------------|-------------------|--------|
| Legend | Sub-Areas | Flood Zone | |
| ■ Streetcar Stops | ■ Beatties Ford | ■ A | ■ X500 |
| — Streetcar | ■ Uptown | ■ AE | ■ X |
| — Railroads | ■ Central Avenue | | |
| — Creeks & Streams | | | |



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BEATTIES FORD FLOOD ZONE
 Map Data Sources: Mecklenburg County, NC;
 FEMA; and URS Corporation
 Date: July 2006

Figure 3-40: Floodplains and Floodways in the Study Area (Center City)

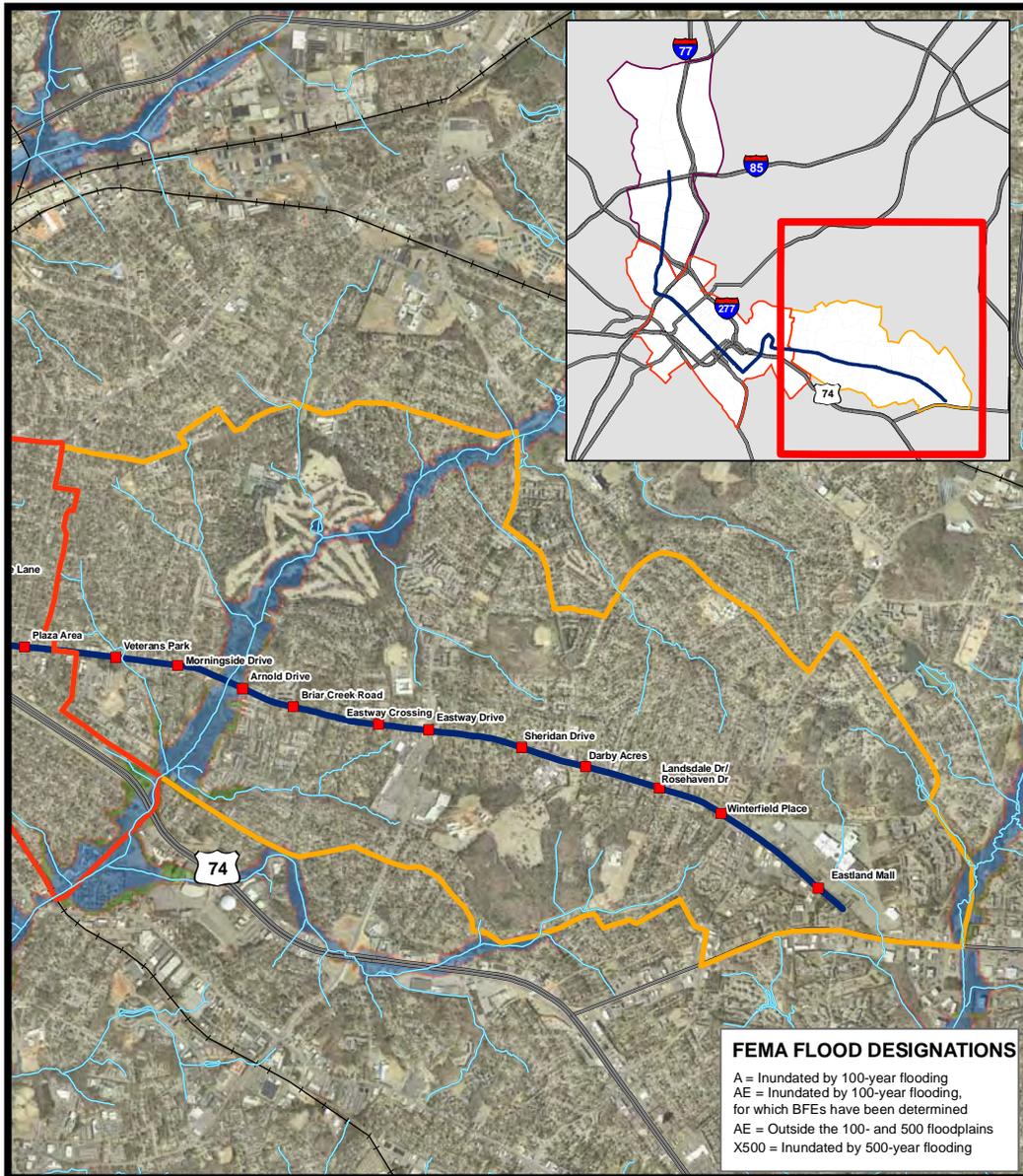


| | | | | | | | |
|--|--|--|--|---|--|---|---------------------------|
| <p>Legend</p> <ul style="list-style-type: none"> ■ Streetcar Stops — Streetcar — Railroads — Creeks & Streams | <p>Sub-Areas</p> <ul style="list-style-type: none"> — Beatties Ford — Uptown — Central Avenue | <p>Flood Zone</p> <table border="0"> <tr> <td> A</td> <td> X500</td> </tr> <tr> <td> AE</td> <td> X</td> </tr> </table> | A | X500 | AE | X | <p>0 0.25 0.5 1 Miles</p> |
| | | | A | X500 | | | |
| AE | X | | | | | | |
| <p>UPTOWN FLOOD ZONE</p> <p>Map Data Sources: Mecklenburg County, NC; FEMA; and URS Corporation Date: July 2006</p> | | | | | | | |



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Figure 3-41: Floodplains and Floodways in the Study Area (Central)



FEMA FLOOD DESIGNATIONS
 A = Inundated by 100-year flooding
 AE = Inundated by 100-year flooding,
 for which BFES have been determined
 AE = Outside the 100- and 500 floodplains
 X500 = Inundated by 500-year flooding

Legend

- Streetcar Stops
- Streetcar
- Railroads
- Creeks & Streams

Sub-Areas

- Beatties Ford
- Uptown
- Central Avenue

Flood Zone

- A
- AE
- X500
- X

0 0.25 0.5 1 Miles



Figure No.:

Page No.:

CENTRAL AVENUE FLOOD ZONE

Map Data Sources: Mecklenburg County, NC;
 FEMA; and URS Corporation
 Date: July 2006

3.9.4 Environmental Impacts and Benefits

3.9.4.1 Short-term Impacts and Benefits

No-Build and TSM Alternatives

No short-term impacts would result from the No-Build or TSM alternatives.

Build Alternative

Surface Waters

Land disturbing activities will be temporary and minimal by nature, and will occur at locations currently covered by impervious surface. Erosion hazard constitutes the greatest potential short term impact from construction activities of this nature. The topography of the region and soil properties underlying the alignment may lead to any or all of these issues.

Groundwater

Of the risks to project area groundwater identified in Section 3.9.1.3, the potential exists for spills, leaks, or other unintentional discharges of petroleum or other chemicals. No impacts to groundwater are predicted to result from implementation of this project.

Floodplains/Floodways

No impacts to flood areas are predicted to result from implementation of this project.

Water Quality

No impacts to water quality are predicted to result from implementation of this project.

Wetlands

No wetlands were identified within the water resources study area. No impacts to wetlands are predicted to result from implementation of this project.

3.9.4.2 Long-term Impacts and Benefits

No-Build and TSM Alternatives

The No Build and TSM Alternatives assume that the Charlotte transportation system would develop as currently planned without providing public transportation in the form of a streetcar service. Under the No Build Alternative or the TSM Alternative, no construction would take place; therefore, no impacts to water resources would result.

Build Alternative

The design of the project is on existing pavement within the existing travel lanes and construction activities will be limited to the travel lane area. Project design does not include increases to the area of impervious surface or expansion of the footprint of the existing transportation network. No significant long term impacts to the water resources of the region are predicted.

3.9.5 Mitigation

3.9.5.1 Surface Waters

Long and short term impacts related to surface waters will be compensated for through proper engineering design and best management practices for erosion control during and following construction.

3.9.5.2 Groundwater

No impacts to groundwater are predicted to result from this project. Spills, leaks, or other unintentional discharges of petroleum or other chemicals will be avoided through proper construction engineering and adherence to best management practices for materials control. No mitigation will be required.

3.9.5.3 Floodplains/Floodways

No impacts to flood zones are predicted to result from implementation of this project. No mitigation will be required.

3.9.5.4 Water Quality

No impacts to flood zones are predicted to result from implementation of this project. No mitigation will be required.

3.9.5.5 Wetlands

No impacts to flood zones are predicted to result from implementation of this project. No mitigation will be required.

3.10 ENERGY

An energy analysis estimating total energy consumption using Btus is a part of the energy analysis. This will require information on the engineering, construction, and expected travel demand and will be updated in future phases of the project.

3.10.1 Environmental Impacts and Benefits

3.10.1.1 Long-term Impacts and Benefits

No-Build and TSM Alternatives

The No-Build and TSM alternatives would not substantially affect energy supply or use within the region over the long term. However, as transit demand increases, the energy demand will also increase. Since the both the No-Build and TSM alternatives include transit, they will both have a positive long-term benefit on energy conservation in the region.

Build Alternative

The streetcar project would not substantially affect energy supply or use within the region. The streetcar would be powered with electricity which is clean and efficient relative to the diesel-fueled buses of the existing transit system. Relative to the No-Build and TSM alternatives, the Build alternative will have a greater long-term positive affect on energy conservation in the region because the electrically powered streetcar will replace diesel powered buses and reduce auto trips thereby reducing fuel consumption.

3.10.1.2 Short-term Impacts and Benefits

Implementing the Build Alternative would require the expenditure of energy for the relatively short period of construction. Gasoline and diesel fuel would be consumed in operating equipment at the construction site. Other energy sources (e.g., electricity, natural gas, oil) would be consumed locally during the production and transport of construction materials, such as concrete and asphalt.

Applicable federal, state, and local guidelines and regulations would be followed in developing construction plans for the streetcar project. Construction plans and phasing would be reviewed to ensure the most efficient use of construction equipment and to establish the most effective means of transporting materials needed for project development. As the cost of energy is a significant factor in the cost of project development, it is anticipated that the project bidding process would stimulate low energy use as a function of project costs.

3.11 HISTORIC, ARCHAEOLOGICAL, AND CULTURAL IMPACTS

3.11.1 Legal and Regulatory Framework

Section 106 of the National Historic Preservation Act (NHPA) of 1996, as implemented by 36 CFR 800 *Protection of Historic Properties*, protects those properties that are listed or determined eligible for inclusion in the National Register of Historic Places (NRHP). In addition, Section 4(f) of the Department of Transportation Act of 1996 provides protection for special properties, including significant historic sites and all archeological sites on, or eligible for, inclusion on the NRHP.

3.11.2 Method

The preparation of this historic, archeological and cultural impacts assessment required repeated field visits to Charlotte, primary source research and, to an unusual degree, the use of secondary source materials primarily consisting of previous inventories and reports. This assessment was researched and prepared by URS senior architectural historian Marvin A. Brown, who meets the Secretary of Interior's Standards as an architectural historic and historic principal investigator.

3.11.2.1 Archaeological Resources

All reasonable precautions have been taken to identify archaeological sites of potential significance to minimize damaging these resources. Still, because archaeological resources by their very nature are hidden beneath urban development, their extent and condition are unknown. Clearing, grubbing, excavation, and other construction actions have the potential to damage or destroy any archaeological resources that may remain intact. However, construction activities generally would be confined to areas disturbed by previous street construction, utility installations, and other types of urban development and any adverse effects are expected to be limited.

3.11.2.2 Historic Resources

A reconnaissance-level survey was conducted in Charlotte in early March 2005. On January 24, 2006, Willie Noble of CATS, Marvin Brown, and Brian Piascik of URS met with Renee Gledhill-Earley of the North Carolina State Historic Preservation Office (HPO) to discuss the results of the reconnaissance-level inventory and to establish an Area of Potential Effect (APE) for the project. The

APE was established as the buildings immediately fronting the streetcar alignment. On April 25, 2006, as a follow-up to the January meeting, Mr. Brown met with Sarah McBride of the HPO to review in detail the findings of the reconnaissance-level survey and to determine the necessary scope of work of a subsequent intensive-level historic architectural survey of the APE. Intensive-level fieldwork for the project, already commenced in mid-March, 2006, was supplemented after the meeting by field visits in mid-May and early June.

It was agreed at the April meeting that the assessment would include, in an abbreviated fashion, a project description and purpose statement, a methodology, a physical environment description, and a summary of findings. The assessment was determined not to require a background historic context and architectural history of Charlotte, as these have been reported on in depth in numerous earlier reports and publications. The report was to include National Register assessments of the resources to be reported on at the intensive level. The resources that were already listed in the Register or that had Determinations of Eligibility (DOEs) were to be reported on in summary fashion. The assessments of the resources that were listed as Charlotte-Mecklenburg Historic Landmarks (CMHLs) were also to be brief and were to largely rely upon the detailed reports previously prepared for these resources, which are on file at the offices of the Charlotte-Mecklenburg Historic Landmarks Commission in Charlotte. Those resources that had not been designated as National Register-listed or -eligible or as CMHLs would require more in-depth field assessment and research. All individual assessments were to contain the information necessary to determine whether they merit continued National Register listing or eligibility or should be determined eligible for such listing. The information was to include resource histories and descriptions, a photograph or photographs and, where not already established, National Register boundaries. As numerous buildings at the northeast corner of the Elizabeth Historic District have been moved or demolished within the past year, the boundaries of the district at this corner were to be reassessed in the report.

Primary and secondary source research for the assessment was conducted at the following repositories: the Charlotte-Mecklenburg Public Library, the Charlotte-Mecklenburg Historic Landmarks Commission, and the Mecklenburg County Courthouse in Charlotte (and on-line); the North Carolina Collection at the University of North Carolina in Chapel Hill; the North Carolina HPO, the North Carolina Archives and State Library, and the design library at North Carolina State University in Raleigh; and the fire insurance maps of the Sanborn Map Company on-line. Particularly fruitful repositories of primary sources were the tax records and maps of Mecklenburg County (easily accessible on-line at <<http://maps2.co.mecklenburg.nc.us/website/realestate/viewer.htm>>); the city directories and vertical files in the Robinson-Spangler Carolina Room at Charlotte's public library; and the Sanborn Company maps (accessible on-line, with a Wake County library card, at <http://www.sanborn.com/products/fire_insurance_maps.htm>). Particularly useful secondary sources include three reports prepared for other CATS rail projects by Frances Alexander and Richard Mattson in 2005 and the many reports, histories, and resource assessments previously prepared by and for, or otherwise reproduced on, the website of the Charlotte-Mecklenburg Historic Landmarks Commission, which are sited at the bibliography at the close of this report and which can be accessed on-line at <<http://www.cmhpf.org/>>.

3.11.3 Existing Conditions and Resources

3.11.3.1 Archaeological Resources

Since the streetcar rails are designed to be constructed at a depth up to 12 inches within the surface of existing roadways, no archaeological resources have been identified as potential impacts of the projects.

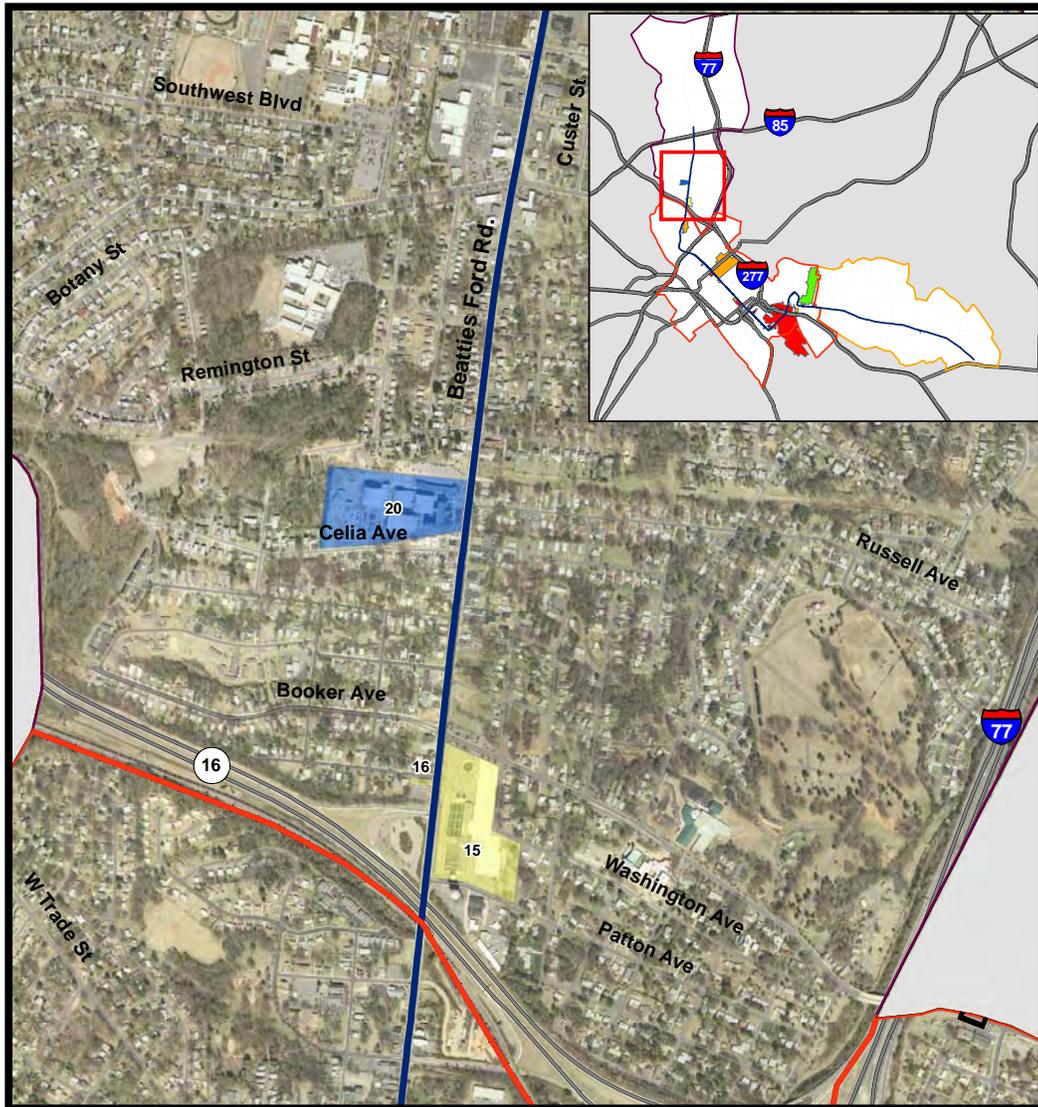
3.11.3.2 Historic Resources

Following the completion of reconnaissance- and intensive-level inventories and associated research, URS prepared a report, *Draft Intensive-Level Historic Architectural Survey CATS Center City Streetcar*, which assesses the National Register eligibility of 28 potential historic architectural properties within the project's Area of Potential Effect. All but five of these resources are listed in the National Register, have been determined eligible for National Register listing, or are recommended as eligible for National Register. Separated by their status, they are listed in this section and shown in Figures 3-43 through 3-48.

Resources Previously Listed in the National Register that Appear to Continue to Merit Listing

- Charles R. Jonas Federal Building/United States Post Office and Courthouse [URS #1] (401 West Trade Street)
- First Presbyterian Church [URS #2] (200 West Trade Street)
- Mecklenburg County Courthouse [URS #3] (700 East Trade Street)
- (Former) East Avenue Tabernacle Associated Reformed Presbyterian Church [URS #4] (926 Elizabeth Avenue)
- Elizabeth Historic District [URS #5] (Roughly bounded by Central Avenue, Seaboard Coast Line Railroad, Bascom Street, East Fifth Street, Kenmore Avenue, Park Drive, and East Independence Boulevard)

Figure 3-42: Historic Resources Map (Beatties Ford)



Legend

- Streetcar Alignment
- Railroads
- Sub-Areas**
- Beatties Ford
- Uptown
- Central Avenue

Historic Architectural Resources

- National Register (NR)-listed resources
- Resources Determined Eligible for NR listing
- Charlotte-Mecklenburg historic landmarks recommended as NR-eligible
- Charlotte-Mecklenburg historic district recommended as NR-eligible
- Other resources recommended as NR-eligible
- Other resources recommended as not NR-eligible

N
 0 550 1,100 2,200 Feet

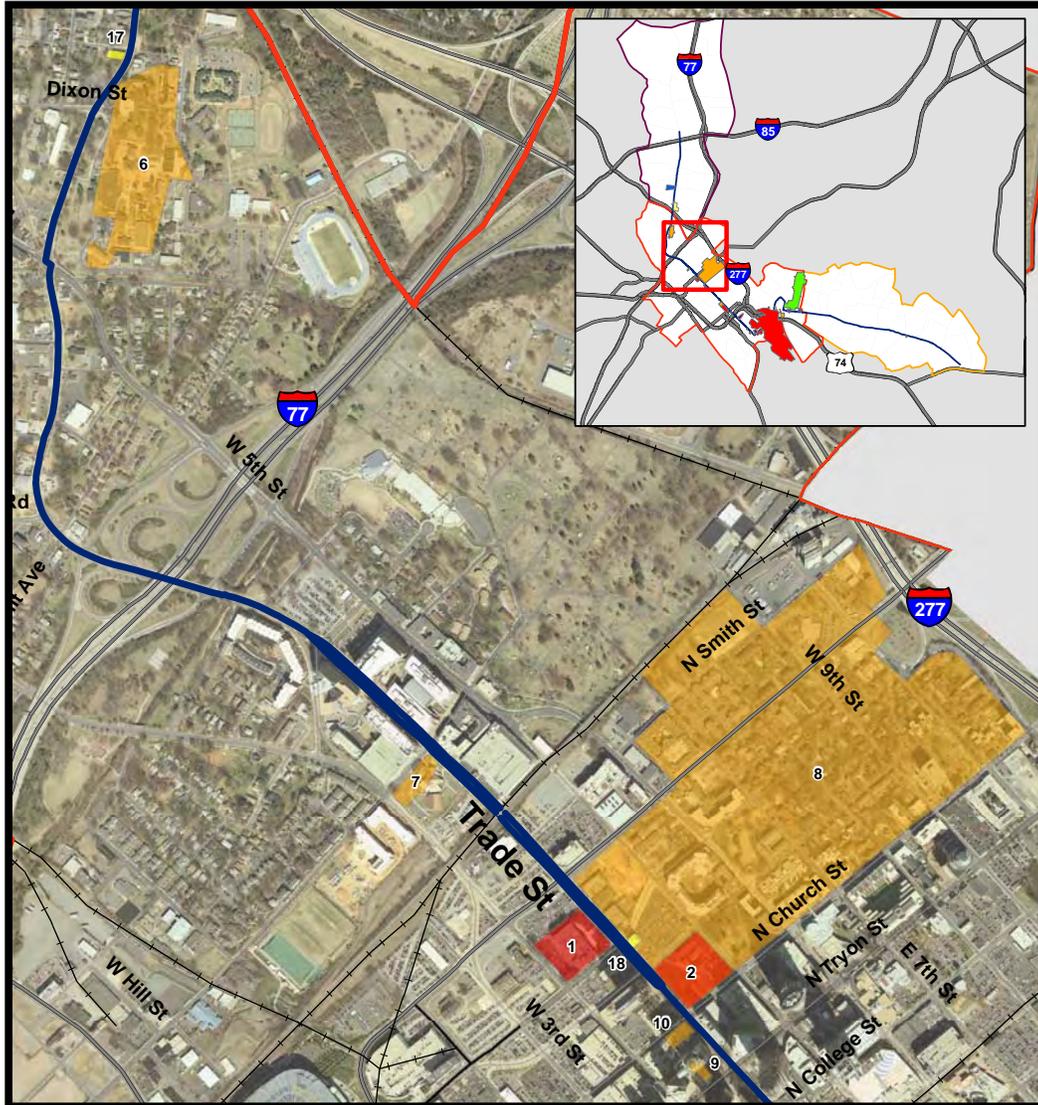


Figure No.:
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**BEATTIES FORD ROAD:
 HISTORIC RESOURCES**

Map Data Sources: Mecklenburg County, NC;
 and URS Corporation
 Date: July 2006

Figure 3-43: Historic Resources Map (Center City – West Trade)



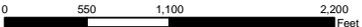
| | | | | |
|--|--|--|--|---|
| Legend | | Historic Architectural Resources | |   |
| <ul style="list-style-type: none">  Streetcar Alignment  Railroads | <ul style="list-style-type: none">  National Register (NR)-listed resources  Resources Determined Eligible for NR listing  Charlotte-Mecklenburg historic landmarks recommended as NR-eligible  Charlotte-Mecklenburg historic district recommended as NR-eligible  Other resources recommended as NR-eligible  Other resources recommended as not NR-eligible | Sub-Areas <ul style="list-style-type: none">  Beatties Ford  Uptown  Central Avenue | | |

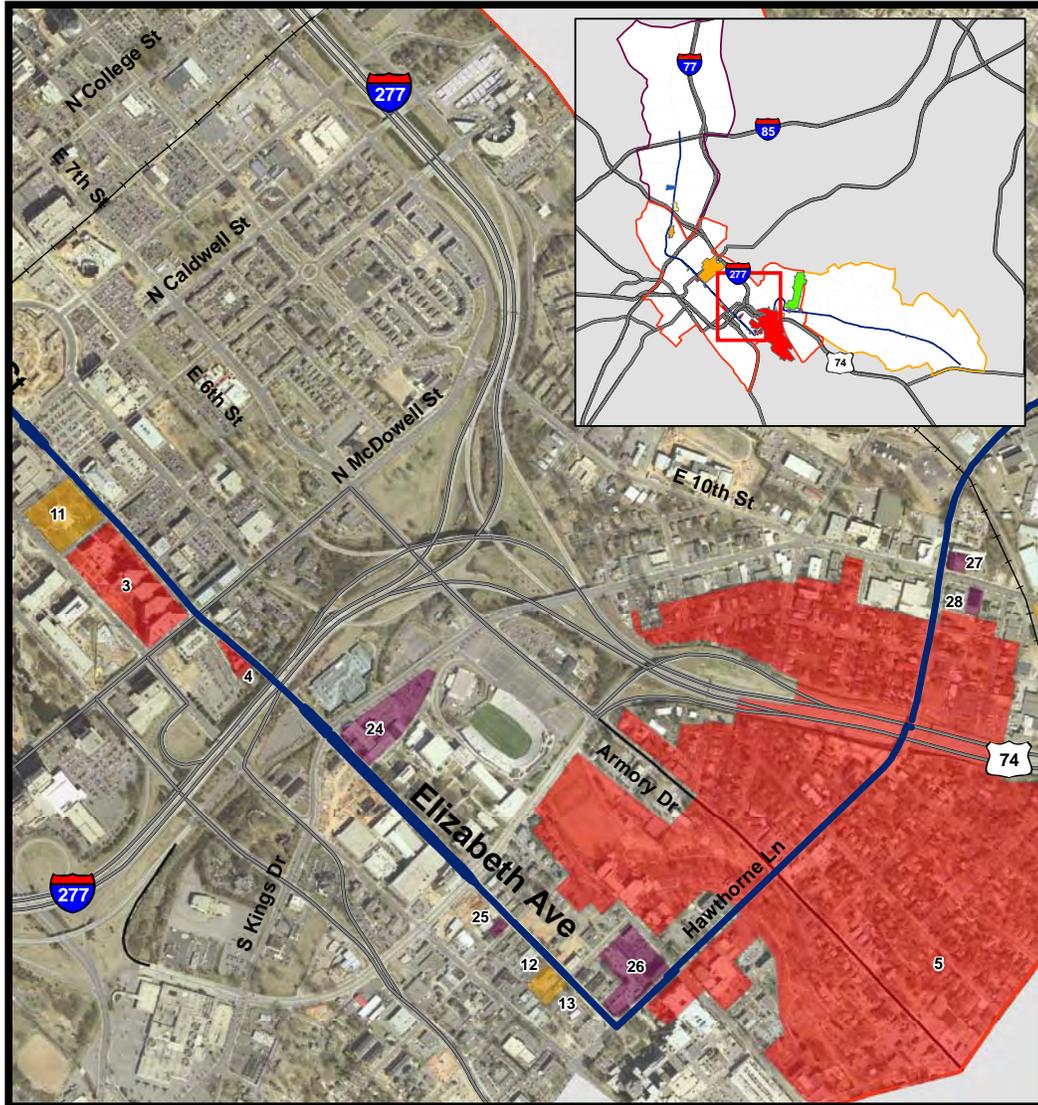


Figure No.:
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**UPTOWN-WEST:
 HISTORIC RESOURCES**

Map Data Sources: Mecklenburg County, NC;
 and URS Corporation
 Date: July 2006

Figure 3-44: Historic Resources Map (Center City – East Trade)



Legend

- Streetcar Alignment
- Railroads
- Sub-Areas**
- Beatties Ford
- Uptown
- Central Avenue

Historic Architectural Resources

- National Register (NR)-listed resources
- Resources Determined Eligible for NR listing
- Charlotte-Mecklenburg historic landmarks recommended as NR-eligible
- Charlotte-Mecklenburg historic district recommended as NR-eligible
- Other resources recommended as NR-eligible
- Other resources recommended as not NR-eligible

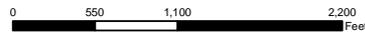


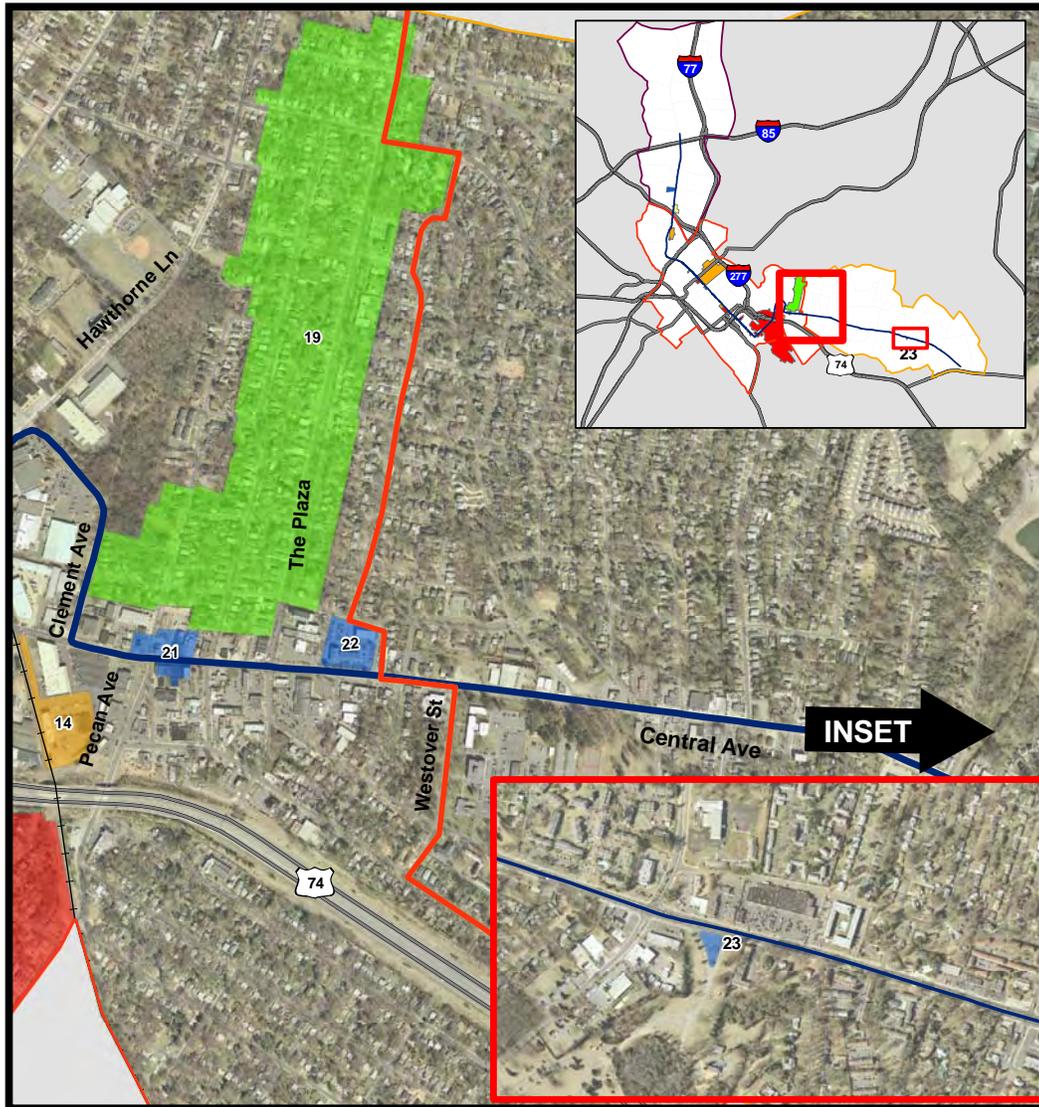
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**UPTOWN-EAST:
 HISTORIC DISTRICT**

Map Data Sources: Mecklenburg County, NC;
 and URS Corporation
 Date: July 2006

Figure 3-45: Historic Resources Map (Central Avenue)



Legend

- Streetcar Alignment
- Railroads
- Sub-Areas**
- Beatties Ford
- Uptown
- Central Avenue

Historic Architectural Resources

- National Register (NR)-listed resources
- Resources Determined Eligible for NR listing
- Charlotte-Mecklenburg historic landmarks recommended as NR-eligible
- Charlotte-Mecklenburg historic district recommended as NR-eligible
- Other resources recommended as NR-eligible
- Other resources recommended as not NR-eligible



Figure No.:

Page No.:

**CENTRAL AVENUE:
 HISTORIC RESOURCES**

Map Data Sources: Mecklenburg County, NC;
 and URS Corporation
 Date: July 2006

Resources Previously Determined Eligible for Listing in the National Register that Appear to Continue to Remain Eligible

- Johnson C. Smith University Historic District [URS #6] (East side of Beatties Ford Road, north of Martin Street)
- West Avenue Presbyterian Church/Mount Moriah Primitive Baptist Church [URS #7] (747 West Trade Street)
- Fourth Ward Historic District [URS #8] (West Trade Street at south, West Eleventh Street at north, North Church Street at east, and North Smith Street and railroad tracks at west)
- (Former) First National Bank Building [URS #9] (112 South Tryon Street)
- Wachovia Bank and Trust Company Building [URS #10] (129 West Trade Street)
- Charlotte City Hall [URS #11] (600 East Trade Street)
- Medical Office Building [URS #12] (1530 Elizabeth Avenue)
- R.C. Biberstein House [URS #13] (1600 Elizabeth Avenue)
- Cole Manufacturing Company [URS #14] (1318 Central Avenue)

Charlotte-Mecklenburg Historic Landmarks Recommended as Eligible for National Register Listing

- Charlotte Water Works/Vest Station [URS #15] (East side of Beatties Ford Road between Oakland and Patton Avenues)
- Excelsior Club [URS #16] (921 Beatties Ford Road)
- (Former) Grand Theatre/Pharr Building [URS #17] (333 Beatties Ford Road)
- Builders Building [URS #18] (312 West Trade Street)

Charlotte Local Historic Districts Recommended (in part) as Eligible for National Register Listing

- Plaza-Midwood Historic District [URS #19] (Northeast of junction of Clement Avenue and south side of Hamorton Place)

Other Resources Recommended as Eligible for National Register Listing

- (Former) West Charlotte High School [URS #20] (1415 Beatties Ford Road)
- Central Avenue Commercial Historic District [URS #21] (1501-1521 and 1500-1518 Central Avenue)
- (Former) Midwood School/Lawyers Road School [URS #22] (1817 Central Avenue)
- World War II Veterans Memorial [URS #23] (South side of Central Avenue east of Norland Road)

Other Resources Recommended as Not Eligible for National Register Listing

- (Former) Central High School [URS #24] (Northeast corner of Elizabeth Avenue and North Kings Drive)
- House [URS #25] (1430 Elizabeth Avenue)
- Hawthorne Medical Center (Demolished) [URS #26] (301 Hawthorne Lane)

- (Former) First Methodist Protestant Church [URS #27] (1203 Central Avenue)
- (Former) Queens Pie Company Building [URS #28] (1212 Central Avenue)

3.11.4 Environmental Impacts and Benefits

3.11.4.1 Short-term Impacts and Benefits

Archaeological Resource

All reasonable precautions have been taken to identify archaeological sites of potential significance to minimize damaging these resources. Still, because archaeological resources by their very nature are hidden beneath urban development, their extent and condition are unknown. Clearing, grubbing, excavation, and other construction actions have the potential to damage or destroy any archaeological resources that may remain intact. However, construction activities generally would be confined to areas disturbed by previous street construction, utility installations, and other types of urban development and any adverse effects are expected to be limited.

Historic Resources

Construction-related impacts, such as effects from noise, vibration, and deteriorated air quality, were analyzed. Short-term impacts during project development would be associated with:

- Physical disturbance due to construction activities;
- Noise and vibration of construction and operation; and
- Construction of the guideways and stations.

Impacts generally would be confined to the project corridor, almost entirely in existing streets. Ancillary facilities and landscaping, as well as any necessary relocation of utilities may extend beyond this corridor, but have not been identified at this stage of project development. However, construction activities would largely be confined to previously disturbed areas.

Typical construction noise levels in 50 feet of the construction site for various pieces of construction equipment are presented in Section 3.7 Noise and Vibration. Noise and vibration levels associated with implementing the Streetcar project would not be uncommon for the urban environment of the project area; therefore, construction noise and vibration is not expected to have any substantial effects. However, vibration could reach a level that potentially could damage loosely attached architectural embellishments or older elements of sensitive historical structures to a distance of about 50 feet beyond the construction right-of-way. None of the historical buildings in the corridor would be directly affected by construction ground disturbance, and none are likely to be affected by construction vibration or noise.

3.11.4.2 Long-term Impacts and Benefits

CATS is involved in ongoing coordination with the HPO to determine project impacts within the APE. The HPO is concerned with potential degradation of the visual environment in the vicinity of historic resources from the location and design of electrical substations. Siting of the substations depends on many factors, but can be somewhat flexible to avoid and minimize impacts to visually

sensitive resources. Efforts will be made to position substations away from historic resources and to locate them with compatible land uses such as in parking garages and on commercial properties.

Presently, CATS is working on developing a draft map of all TPSS locations to be delivered to the State Historic Preservation Office in April 2007. Once HPO has the opportunity to review the map they will provide a letter making a conditional determination that, pending review of the preliminary engineering design plans, the project will have no effect on historic resources within the APE.

3.11.5 Mitigation

3.11.5.1 Archaeological Resource

If archaeological resources are discovered, they would be evaluated and investigations would be conducted to recover information from any significant sites.

3.11.5.2 Historical Resources

No adverse visual, air quality, noise, and vibration impacts on historic resources are anticipated to be associated with construction activities. Nevertheless, efforts will be made to design project elements to be compatible with existing visual characteristics and standard measures to abate noise would be included in the construction specifications. If any unforeseen impacts are identified during subsequent stages of project implementation, CATS will engage the HPO for possible revision of the determination of effect and to identify potential mitigation measures.

3.12 PARKLANDS

In this section, parklands located within the study area are examined for potential environmental impacts and benefits of the project and a discussion of any necessary mitigation measures is presented.

3.12.1 Legal and Regulatory Framework

49 USC 303: Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f)) declares a national policy to preserve, where possible, "the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Projects can only cross these special lands if there is no feasible and prudent alternative, and the sponsoring agency demonstrates that all possible planning to minimize harm has been accomplished. Visual resource mitigation may be required in certain instances as part of these plans.⁹⁸

3.12.2 Method

Neighborhood, community parks, and preserves were identified using the Mecklenburg County Geographic Information System (GIS) and information from the Mecklenburg County Parks and Recreation Department. The National Parks Service and the North Carolina Division of Parks and Recreation were also consulted. A half mile buffer of the streetcar centerline was used to identify the parklands that may potentially be impacted by the project. In addition, field visits were conducted to inventory park resources along the streetcar alignment.

3.12.3 Existing Conditions and Resources

In this section, parklands (including greenways), recreation centers, and wildlife/waterfowl refuges that may potentially be impacted by the project are identified. The National Parks Service and the North Carolina Division of Parks and Recreation indicate no federal or state parks are located within the study area. The majority of the parks described in this section are maintained by the Mecklenburg County Park and Recreation Department.

3.12.3.1 Study Area Parklands

Mecklenburg County and the City of Charlotte have numerous parks, open spaces, and recreation facilities. A total of 37 of these facilities, including three parks are within a half-mile of the streetcar alignment (see Figure 3-46 through 3-48). Table 3-35 identifies each facility by name, location, type of resource, and size.

Directly on the streetcar line, there are two educational institutions with open space and four parks. Johnson C. Smith University and Central Piedmont Community College (CPCC) campuses include open space and athletic facilities, however, these campuses are generally only available for student use. Frazier Park, St. Mary’s Chapel, Independence Park, and Veteran’s Park are parks located directly on the streetcar alignment. Other recreational areas near the alignment that are potential destinations for streetcar riders include the Five Points Park, the Mecklenburg County Aquatic Center, Old Settler’s Cemetery, “The Green,” Ray’s Splash Planet, Marshall Park, Little Sugar Greenway, and Briar Creek Greenway. These parkland resources are described in the following section.

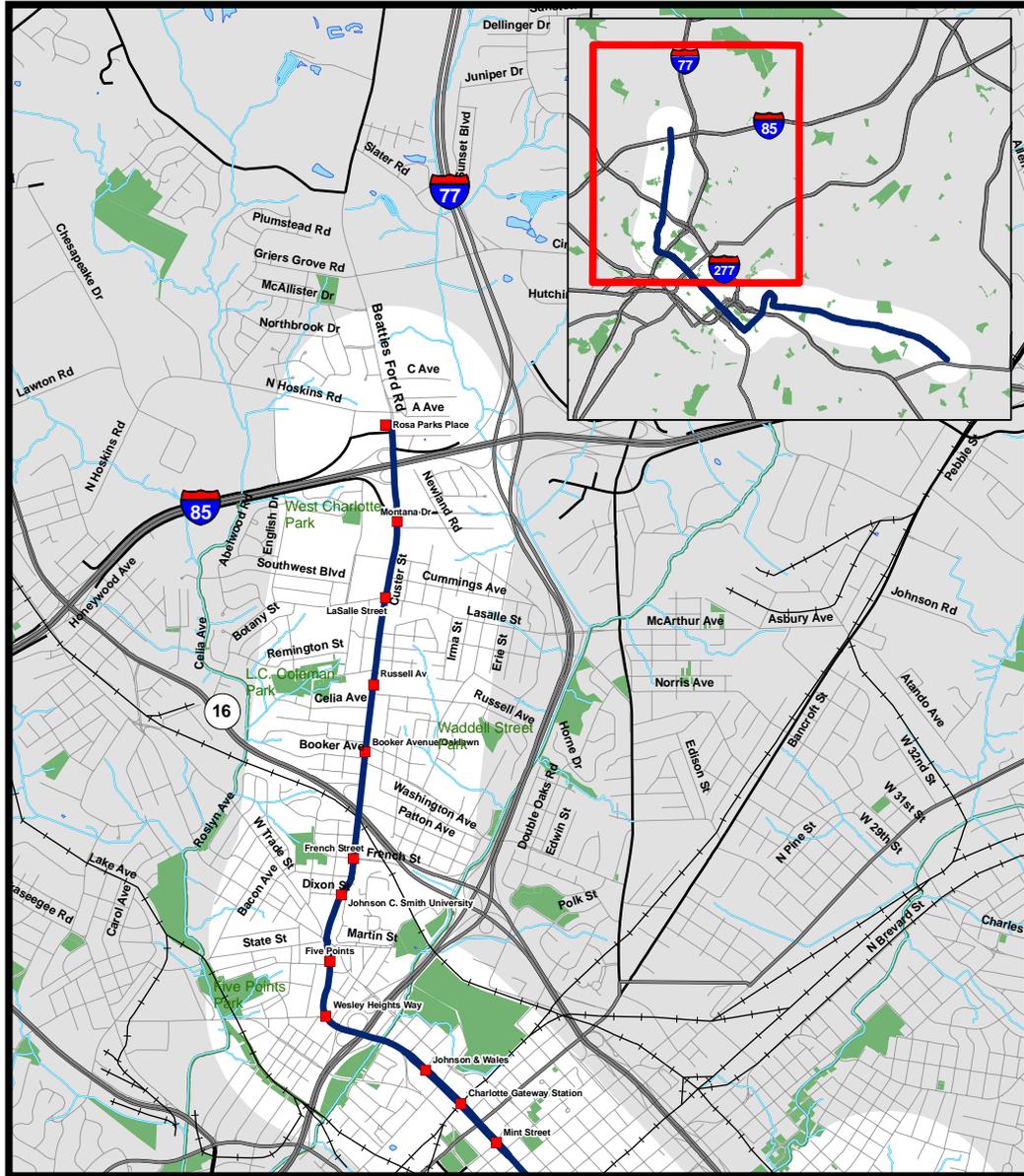
Table 3-35: Parks within a Half-Mile of the Streetcar

| Park | Location | Type | Acres |
|-----------------------------|----------------------|-------------------|--------------|
| Aquatic Center | 800 E 2nd St | Special Facility | 4.1 |
| Briar Creek Greenway | No Address | Greenways | 0.0 |
| Biddleville Park | 500 Andrill Ter | Neighborhood Park | 3.2 |
| Five Points Park | 200 French St | Neighborhood Park | 9.2 |
| Fourth Ward Park | 301 N Poplar St | Neighborhood Park | 2.9 |
| Frazier Park | 1200 W 4th St Ext | Neighborhood Park | 16.4 |
| First Ward Center | 610 E 7th St | Recreation Center | 0.0 |
| First Ward Park | 301 N McDowell St | Neighborhood Park | 2.7 |
| Grady Cole Center | 310 N Kings Dr | Special Facility | 3.2 |
| Hawthorne Center | 345 Hawthorne Ln | Recreation Center | 0.0 |
| Independence Park | 300 Hawthorne Ln | Neighborhood Park | 24.0 |
| Irwin Center | 329 N Irwin Av | Recreation Center | 15.0 |
| JCSU Track | 100 Beatties Ford Rd | Special Facility | 9.6 |
| Kilborne District Park | 2600 Kilborne Dr | District Park | 48.1 |
| L.C. Coleman Park | 1501 McDonald St | Neighborhood Park | 17.8 |
| Lincoln Heights Park | No Address | Neighborhood Park | 0.0 |
| Little Sugar Creek Greenway | No Address | Greenways | 0.0 |
| Little Peoples Park | 1120 Harrill St | Neighborhood Park | 1.0 |
| Marshall Park | No Address | District Park | 0.0 |
| Memorial Stadium | 310 N Kings Dr | Special Facility | 6.7 |
| Merry Oaks Center | No Address | Recreation Center | 0.0 |

Table 3-35: Parks within a Half-Mile of the Streetcar (continued)

| Park | Location | Type | Acres |
|------------------------------------|---------------------|-------------------|--------------|
| Morgan Park | 1509 Baxter St | Neighborhood Park | 2.0 |
| Ninth Street Park | 417 W 9th St | Neighborhood Park | 1.0 |
| Old Settler's Cemetery | No Address | Special Facility | 0.0 |
| Phillip O. Berry Recreation Center | 440 Tuckaseegee Rd | Recreation Center | 0.0 |
| Ray's Splash Planet | 215 N. Sycamore St. | Special Facility | 0.0 |
| Seversville Park | 540 S Bruns Ave | Neighborhood Park | 10.8 |
| Staff Annex | 1418 Armory Dr | Special Facility | 0.0 |
| Staff Office | 1900 Park Dr | Special Facility | 0.0 |
| St Mary's Chapel/Thompson Park | 1129 E 3rd St | Special Facility | 3.0 |
| St Pauls Ray Of Hope Center | 1401 Allen St | Recreation Center | 0.0 |
| The Green | No Address | Special Facility | 0.0 |
| Thompson Park | 1129 E 3rd St | Neighborhood Park | 3.3 |
| Third Ward Park | 1001 W 4th St | Neighborhood Park | 1.0 |
| Veterans Park | 2136 Central Av | Neighborhood Park | 19.0 |
| West Charlotte Center | 2401 Kendall Dr | Recreation Center | 0.0 |
| West Charlotte Park | 2401 Kendall Dr | Neighborhood Park | 3.2 |
| Wesley Heights Greenway | No Address | Greenways | 6.4 |

Figure 3-46: Parklands in the Study Area (Beatties Ford)



Legend

- Streetcar Stops
- Study Area (1/2 Buffer)
- Streetcar Alignment
- Parks
- Railroads
- Ponds & Lakes
- Creeks & Streams

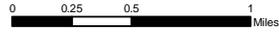
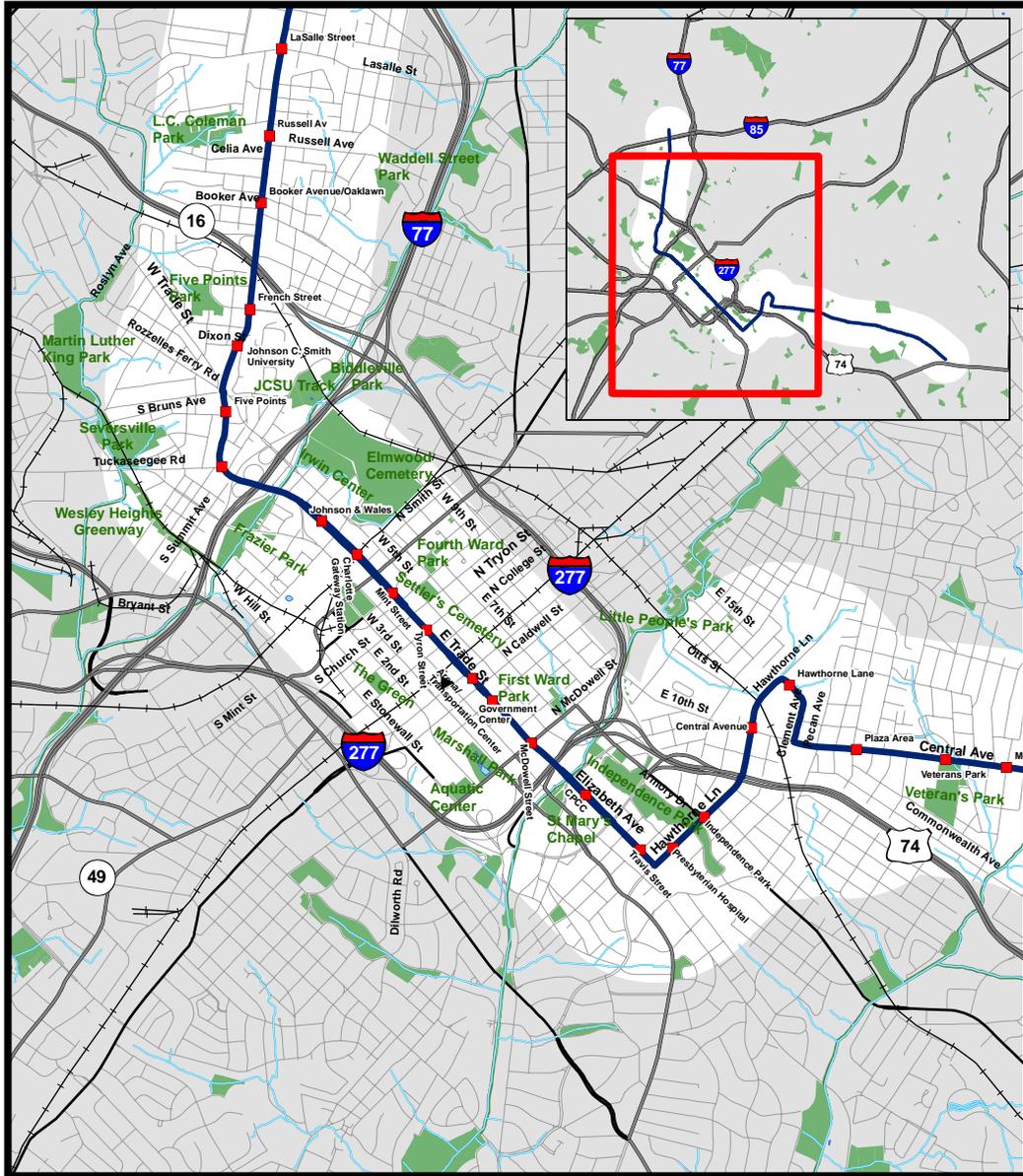


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**BEATTIES FORD ROAD SUB-AREA:
 PARKLANDS**
 Map Data Sources: Mecklenburg County, NC;
 CATS; ESRI Inc.; and URS Corporation
 Date: June 2006

Figure 3-47: Parklands in the Study Area (Center City)



Legend

- Streetcar Stops
- Streetcar Alignment
- Parks
- Ponds & Lakes
- Creeks & Streams
- Study Area (1/2 Buffer)
- +— Railroads

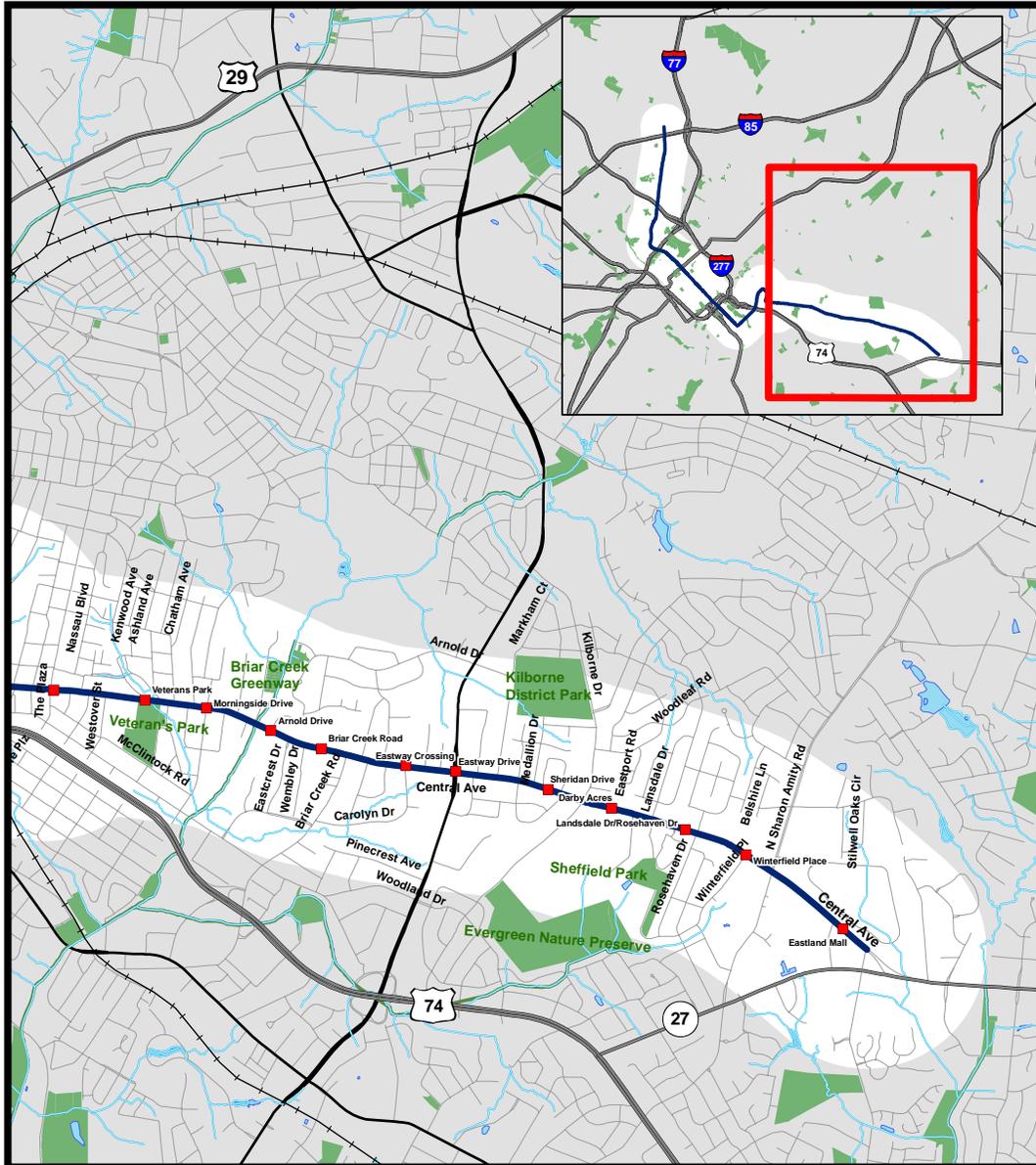


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UPTOWN SUB-AREA: PARKLANDS

Map Data Sources: Mecklenburg County, NC;
 CATS; ESRI Inc.; and URS Corporation
 Date: June 2006

Figure 3-48: Parklands in the Study Area (Central Avenue)



Legend

- Streetcar Stops
- Streetcar Alignment
- Railroads
- Study Area (1/2 Buffer)
- Parks
- Ponds & Lakes
- Creeks & Streams

0 0.25 0.5 1 Miles



Figure No.:
 Page No.:

CENTRAL AVENUE SUB-AREA: PARKLANDS
 Map Data Sources: Mecklenburg County, NC;
 CATS; ESRI Inc.; and URS Corporation
 Date: June 2006

3.12.3.2 Parks along the Streetcar Alignment and Potential Destination Parks

The Mecklenburg County Aquatic Center

The Mecklenburg County Aquatic Center is located at 800 East Second Street. It is a state-of-the-art indoor aquatic and exercise facility. Resources include an Olympic size pool, a kid's pool, and shower. The exercise equipment includes free weights and aerobic machinery. The entire facility is approximately 4.1 acres. It is in close proximity to Marshall Park and government buildings. The Mecklenburg County Aquatic Center is a destination location within a five to ten minute walk from the Government Center streetcar stop.

Marshall Park

Marshall Park is a passive open space with park benches and shaded areas. It includes a lake and fountain. This park is near the Mecklenburg Aquatic Center and is surrounded by Government Center and Charlotte Mecklenburg Schools office buildings. Government employees and persons from other nearby offices often use this park. Marshall Park occasionally will serve as a destination location when it hosts events such as Earth Day. It is a five to ten minute walk from the Government Center streetcar stop.

The Green

The Green is a passive open space owned by Wachovia Bank. It hosts many musical and other cultural events. The park is above a parking garage surrounded by offices, condominiums, retail stores, and is across the street from the Charlotte Convention Center. The Green is artfully arranged with an innovative interactive walkway, diverse public art, including a sprayground with a fountain where children play. It is a destination location and is a five to seven minute walk from the Arena/Transportation Center streetcar stop.

Old Settler's Cemetery

Old Settler's Cemetery is a cemetery where many of Charlotte's important historical figures are buried. Today, it serves as a tourist destination and a passive open space for nearby residents and office workers as well as a dog park. Old Settler's Cemetery has many shaded areas, park benches, and quaint walkways. Old Settler's Cemetery is near Discovery Place, fine restaurants, condominiums, and major office buildings, like Bank of America. It is a five minute walk from the Tryon Street streetcar stop.

Frazier Park

Frazier Park is located on 1200 West 4th Street Ext., just inside the I-277 loop. The park is located between the Wesley Heights and Johnson & Wales streetcar stops. It connects with the Irwin Greenway, along Irwin Creek up to Ray's Splash Planet and Elmwood Cemetery. Frazier Park is 11.9 acres and includes a soccer/flag football field, two full court basketball courts, two tennis courts, greenway trails along Irwin Creek, and a playground. It also has a memorial for young children who died in Charlotte. Frazier Park is an active park hosting office tournaments for flag football and soccer for nearby Center City workers.

Ray's Splash Planet

Ray's Splash Planet is located at 215 N. Sycamore Street, about one-half mile from Frazier Park along the Irwin Creek Greenway. The facility includes a water park, fitness center, dance/aerobic room, cardiovascular theater, freeweights,

resistant equipment, and party rooms. Outside is a large open space for various activities and picnicking. Ray's Splash Planet is a ten minute walk from the Johnson & Wales streetcar stop. It is one of Mecklenburg County's most popular destination recreation centers. The park is near Elmwood Cemetery and Irwin Elementary School.

St. Mary's Chapel/Thompson Park

St. Mary's Chapel/Thompson Park is located on 1129 3rd Street, west of the I-277 loop. The CPCC streetcar stop would be in close proximity to the park, approximately a five minute walk. Its facilities consist of beautifully shaded areas with park benches, a kiosk, and a Vietnam Memorial. It also has a quaint church called St. Mary's Chapel that hosts many weddings. St. Mary's Chapel/Thompson Park is also adjacent to the planned Little Sugar Greenway which will be Charlotte's signature greenway and is anticipated to be a major destination for both tourists and residents.

Independence Park

Independence Park is located at 300 Hawthorne Lane. The park is anticipated to have a streetcar stop at one of the park's entrances. Independence Park is 24 acres with a baseball field, two basketball courts, two tennis courts, a rose garden, hiking trails, walking trails, a playground, volleyball court, and picnic areas.

Veteran's Park

Veteran's Park is located at 2136 Central Avenue, near The Plaza area. A streetcar stop is planned for the park. The park is 19 acres and includes a basketball court, spray ground, baseball field, softball field, 6 tennis courts, 3 volleyball courts, 9-hole disk golf course, 2 outdoor shelters, indoor shelter, and a playground. It is a popular park which draws many nearby residents.

Briar Creek Greenway

Briar Creek Greenway is the latest Mecklenburg County Park and Recreation Department greenway. It is a five minute walk from the Arnold Drive streetcar stop. The greenway provides walkways and trails connecting to Merry Oaks Center, a popular neighborhood park and the Charlotte Country Club. It is a passive park with benches and shaded areas.

Five Points Park

Five Points Park is within a five minute walk from the French Street streetcar stop. It is located at 200 French Street. The park is 9 acres with a basketball court, two tennis courts, walk trails, a playground, and picnic areas.

3.12.3.3 Planned Parks

In the *Center City 2010 Vision Plan*, city planners question how to make Charlotte into a memorable city through its transit and parks. In the planning study, it recommends tying neighborhoods through the development of open spaces and a connection to regional parks. The plan also advocates the concept of "urban parkways" with green streets which are two lane vehicular streets with wide landscaping zones. This green space connectivity along with its distinct neighborhoods and their histories, unique architecture would create a uniquely Charlotte "sense of place." Historically, Charlotte has been referred as the "City of Trees".

Recommendations in the *City Center 2010 Vision Plan* for additional open space, parks, and recreation in Center City provides an opportunity for improved quality of life for Center City residents with the opportunities for open space to run, play, read, skate, or just enjoy the outdoors. Proposed park locations in Center City have not been finalized but could include the addition of park lands in Center City, specifically in the Third Ward.

The Little Sugar Greenway which crosses the streetcar alignment will provide a connection to a number of other parks that are not adjacent to the alignment or included in the study area.

3.12.4 Environmental Impacts and Benefits

3.12.4.1 Short-term Impacts and Benefits

Short-term impacts to parklands adjacent to the streetcar alignment are expected to occur during implementation of the project. The presence of construction activities (e.g., roadways torn up, temporary barriers, signs, etc.) and various forms of equipment (trucks, tractors, jackhammers, concrete cutters, etc.) would detract from the recreational and aesthetic qualities of some parkland resources. Construction activities may also temporarily impact access to parklands.

3.12.4.2 Long-term Impacts and Benefits

The project is located entirely within the urbanized area of the City of Charlotte. Construction of the project is on existing right-of-way or within previously disturbed urban areas. Acquisition of additional right-of-way is limited to areas adjacent to the right-of-way for minor road widening associated with transit stops and for placement of traction power substations (TPSS). One TPSS is required for approximately every one half mile of streetcar guideway to power the vehicles. Where possible the TPSS structures will be located within existing buildings or parking structures, otherwise new structures measuring approximately 15 feet wide by 24 feet long will be constructed. There will be no TPSS directly impacting parklands.

Additionally, a vehicle maintenance facility (VMF) will be constructed to store and maintain the streetcars when they are not in operation. The VMF is in an area that is not substantially disruptive to existing land uses or any parkland. The construction and operation of the streetcar is not expected to affect any natural areas including parklands, wildlife habitat or protected species. Therefore, no substantial impacts to the parklands identified in the study boundary are anticipated. Rather, the high quality, high capacity streetcar system would provide enhanced access to parklands for Charlotte residents and visitors. Improved access to parklands could help bolster tourism by providing enhanced access to destination parks such as the Mecklenburg County Aquatic Center while also improving community health and fitness by enhancing access to recreational areas.

3.12.5 Mitigation

The entire streetcar alignment will be on existing right-of-way within urbanized areas of the City of Charlotte. Therefore, the streetcar is not expected to substantially impact study area parkland resources. Hence, no mitigation is needed for the streetcar project to offset negative impacts to parklands.

3.13 ECONOMIC IMPACTS

3.13.1 Legal and Regulatory Framework

In Charlotte, the *Economic Development Strategic Framework 2005-2010* (Strategic Framework) identifies the vision for economic development in the city and identifies relevant economic development trends and actions the City of Charlotte can take in order to attain their vision. The economic development vision for the City of Charlotte is "...to attain a vision for Charlotte of being the most prosperous and livable city for all citizens through quality economic development." The three primary goals set by the City of Charlotte to attain this vision are: (1) quality job growth, (2) tax base expansion, and (3) increased personal income. The five focus areas of the Strategic Framework are: (1) business attraction and retention; (2) transit corridor and business district revitalization; (3) small business/entrepreneurial development; (4) workforce development; and (5) hospitality, cultural and tourism assets.⁹⁹

3.13.2 Method

Existing conditions and resources in the study area are described using information available from the City of Charlotte and Mecklenburg County economic development and budget offices, data from the Charlotte Chamber of Commerce, and the State Employment Securities Commission (ESC). This information is used to describe current economic conditions through factors such as employment, employment sectors and special economic activities. Based on this information, a qualitative assessment of how the Build, No-Build and TSM alternatives might impact the Study Area economy is performed.

3.13.3 Existing Conditions and Resources

According to the Strategic Framework, "Charlotte has enjoyed a 'golden age' of seemingly unlimited economic growth during the last fifteen years." This golden age was characterized by increases in jobs, increases in new business firms and investments, increases in the tax base and increases in the population. The popularity and economic position of Center City also increased, as the city gained NBA and NFL franchises, established museums in Center City and residents moved closer to work and entertainment options.¹⁰⁰

Challenges facing Charlotte identified in the Strategic Framework include globalization of the economy which impacts the regional manufacturing base, attracting people in the 25 to 44 age group to replace retiring baby-boomers, a likely slow-down in growth of the banking industry as merger activity decreases, potential threats to the hub status of the Charlotte Airport as US Airways faces financial problems, and maintaining environmental quality and development standards in the face of continued growth so that the area remains attractive to businesses and families.¹⁰¹

In this section, current and projected economic conditions in Charlotte are described through characteristics of employment, employment sectors, and special economic activities.

3.13.3.1 Employment

According to the Strategic Framework, Mecklenburg County accounts for three out of every five jobs in a multi-county, two-state region. A challenge facing Charlotte will be to attract workers in the 25 to 44 age group to replace retiring

baby-boomers. According to the Strategic Framework, “The shortage in the quality and quantity of available labor will be one of the most significant constraints on economic growth.”¹⁰² Information pertaining to current and projected employment in the study area and associated geographies was provided in Section 3.13.4 and is summarized here. Additional information is presented at the sub-area level in Table 3-36 and TAZ level in Figure 3-49.

Table 3-36: Current and Projected Employment

| Geographic Area | 2000 | 2030 | Growth 2000-2030 | |
|--|---------|---------|------------------|----------------|
| | | | Absolute Growth | Percent Growth |
| Mecklenburg County ^a | 529,672 | 948,291 | 418,619 | 79.0 |
| Study Area ^b | 95,674 | 151,650 | 55,976 | 58.5 |
| Beatties Ford Road Sub-Area ^b | 4,454 | 7,547 | 3,093 | 69.4 |
| Center City Sub-Area ^b | 83,378 | 129,711 | 46,333 | 55.6 |
| Central Avenue Sub-Area ^b | 7,842 | 14,392 | 6,550 | 83.5 |

^a Source: Mecklenburg-Union Metropolitan Planning Organization. *2030 Long Range Transportation Plan*. June 2005.

^b Source: Charlotte Area Transit System.

According to the data shown in Table 3-36 Mecklenburg County as a whole is expected to have a higher rate of increase in employment between 2000 and 2030 compared to the study area. Although the Center City sub-area is expected to have the lowest percent-increase in employment in the study area, it is expected to remain the center of employment.

The total labor force, employed population, unemployed population and unemployment rate are provided in Table 3-37 for Charlotte and surrounding geographies. Note that the difference in employment in Mecklenburg County compared to the employment shown in Table 3-38 is due to different data sources rather than a decrease in employment between 2000 and 2005. The unemployment rates for Charlotte and Mecklenburg County are slightly lower than those for the region and State of North Carolina as a whole.

Table 3-37: Civilian Labor Force Estimates for 2005

| Geographic Area | Labor Force | Employed | Unemployed | Rate |
|--------------------------------|-------------|-----------|------------|------|
| North Carolina | 4,332,710 | 4,105,734 | 226,976 | 5.2 |
| Charlotte-Gastonia-Concord MSA | 795,694 | 754,579 | 41,115 | 5.2 |
| Mecklenburg County | 430,061 | 409,047 | 21,014 | 4.9 |
| Charlotte | 329,085 | 313,295 | 15,790 | 4.8 |

Source: *Civilian Labor Force Estimates*. Employment Security Commission of North Carolina. Available: <http://www.ncesc.com/lmi/laborStats/laborStatMain.asp?init=true>. Accessed: 5 July 2006.

Figure 3-49: Current and Projected Employment at the TAZ Level

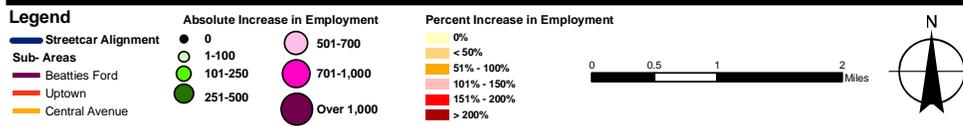
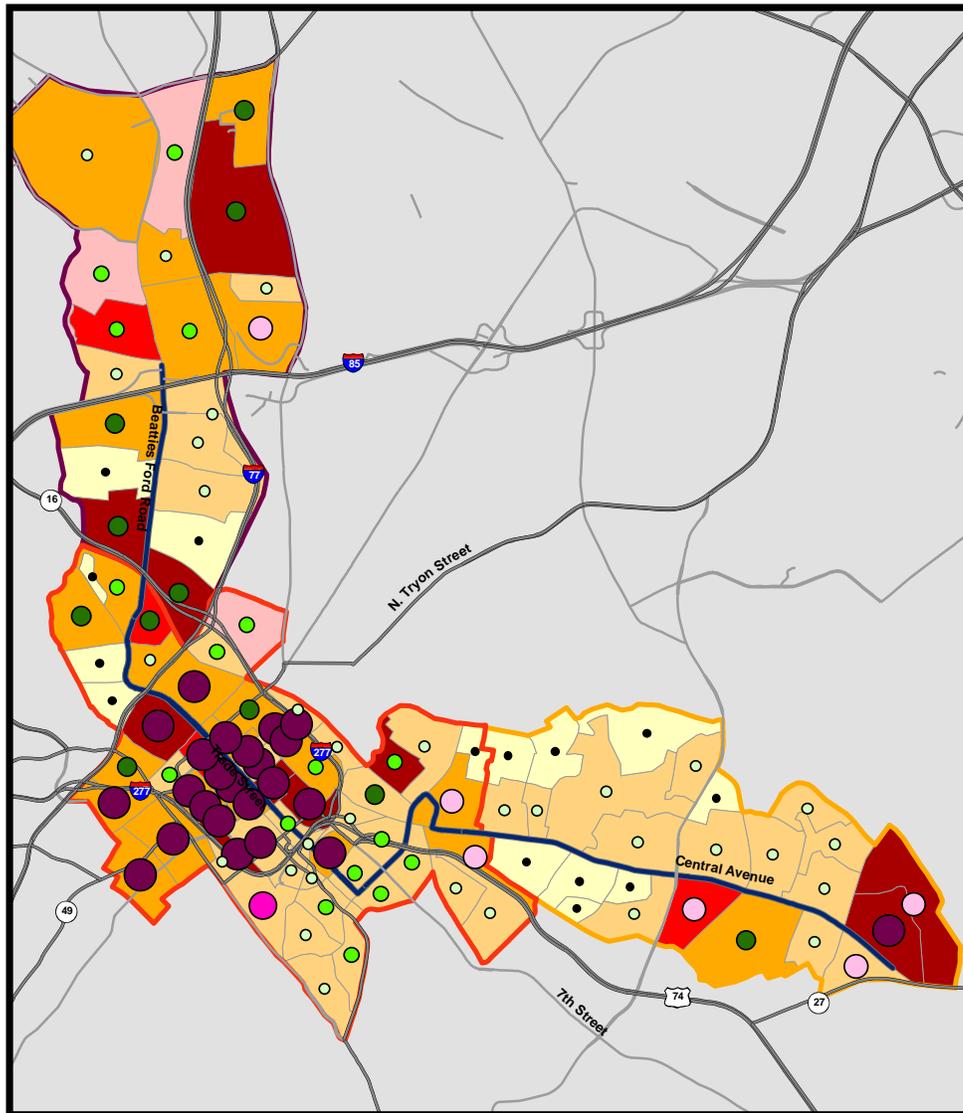


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**EMPLOYMENT GROWTH PROJECTION
 by TAZ, 2000-2030**
 Map Data Sources: Mecklenburg County, NC;
 CATS; ESRI and URS Corporation
 Date: July 2006

3.13.3.2 Employment Sectors and Employers

Information regarding sectors of employment and employers in the area is provided in this section. In 2005, the estimated annual average employment for all industries was 520,835 in Mecklenburg County and 719,849 for the Charlotte-Gastonia-Concord MSA. Average 2005 wages were estimated at \$49,140 for Mecklenburg County and \$44,460 for Charlotte-Gastonia-Concord MSA. These are both higher than the state-wide average wage per employee of \$35,932. In Table 3-38 year 2005 employment and wage data for North Carolina, the Charlotte-Gastonia MSA and Mecklenburg County are shown. The top three employment sectors for North Carolina are Manufacturing, Health Care and Social Assistance, and Retail Trade. The top three in the Charlotte-Gastonia-Concord MSA are Retail Trade, Manufacturing, and Local Government. The top three employment sectors in Mecklenburg County are Retail Trade, Finance and Insurance, and Health Care and Social Services.

Table 3-38: Year 2005 Employment and Wage Data by Employment Sector

| Industry | North Carolina | | Charlotte-Gastonia-Concord MSA | | Mecklenburg County | |
|--|---------------------------|----------------------------------|--------------------------------|----------------------------------|---------------------------|----------------------------------|
| | Annual Average Employment | Average Annual Wage Per Employee | Annual Average Employment | Average Annual Wage Per Employee | Annual Average Employment | Average Annual Wage Per Employee |
| Total Federal Government | 61,638 | \$52,260 | 6,309 | \$56,732 | 5,246 | \$58,864 |
| Total State Government | 170,766 | \$37,024 | 10,519 | \$33,956 | 6,648 | \$36,192 |
| Total Local Government | 415,340 | \$34,164 | 74,007 | \$39,468 | 46,021 | \$43,108 |
| Agriculture Forestry Fishing & Hunting | 29,328 | \$25,635 | 2,213 | \$30,846 | 858 | \$34,141 |
| Mining | 3,499 | \$58,788 | 351 | \$53,409 | 171 | \$60,185 |
| Utilities | 14,383 | \$64,553 | 2,803 | \$68,000 | 1,823 | \$74,796 |
| Construction | 232,326 | \$35,088 | 49012 | \$41,849 | 32,220 | \$45,294 |
| Manufacturing | 569,308 | \$42,703 | 74,444 | \$47,919 | 34,966 | \$55,726 |
| Wholesale Trade | 170,524 | \$51,171 | 43,324 | \$53,259 | 35,231 | \$55,685 |

Table 3-38: Year 2005 Employment and Wage Data by Employment Sector (cont.)

| Industry | North Carolina | | Charlotte-Gastonia-Concord MSA | | Mecklenburg County | |
|---|---------------------------|----------------------------------|--------------------------------|----------------------------------|---------------------------|----------------------------------|
| | Annual Average Employment | Average Annual Wage Per Employee | Annual Average Employment | Average Annual Wage Per Employee | Annual Average Employment | Average Annual Wage Per Employee |
| Retail Trade | 450,486 | \$23,099 | 79,542 | \$25,341 | 53,999 | \$27,092 |
| Transportation and Warehousing | 136,571 | \$37,845 | 35,402 | \$42,337 | 30,067 | \$43,541 |
| Information | 78,013 | \$54,055 | 25,439 | \$63,817 | 23,766 | \$65,469 |
| Finance and Insurance | 142,751 | \$64,405 | 53,574 | \$87,692 | 50,367 | \$90,779 |
| Real Estate and Rental and Leasing | 50,132 | \$33,487 | 11,643 | \$42,402 | 9,645 | \$45,070 |
| Professional and Technical Services | 162,927 | \$53,577 | 36,990 | \$60,317 | 32,038 | \$63,098 |
| Management of Companies and Enterprises | 63,407 | \$79,249 | 21,353 | \$108,823 | 19,738 | \$113,883 |
| Administrative and Waste Services | 225,671 | \$24,462 | 51,903 | \$28,163 | 40,804 | \$29,341 |
| Educational Services | 344,234 | \$34,131 | 44,419 | \$34,324 | 27,600 | \$36,398 |
| Health Care and Social Assistance | 488,681 | \$36,187 | 72,978 | \$41,764 | 47,669 | \$45,238 |
| Arts Entertainment and Recreation | 50,017 | \$25,015 | 10,755 | \$41,511 | 7,501 | \$39,755 |
| Accommodation and Food Services | 313,509 | \$12,803 | 56,436 | \$14,738 | 41,031 | \$15,941 |
| Other Services Ex. Public Admin | 98,537 | \$23,387 | 20,416 | \$24,773 | 15,276 | \$25,648 |

Table 3-38: Year 2005 Employment and Wage Data by Employment Sector (cont.)

| Industry | North Carolina | | Charlotte-Gastonia-Concord MSA | | Mecklenburg County | |
|-----------------------|---------------------------|----------------------------------|--------------------------------|----------------------------------|---------------------------|----------------------------------|
| | Annual Average Employment | Average Annual Wage Per Employee | Annual Average Employment | Average Annual Wage Per Employee | Annual Average Employment | Average Annual Wage Per Employee |
| Public Administration | 220,236 | \$37,086 | 25,037 | \$41,202 | 14,852 | \$46,469 |
| Unclassified | 12,531 | \$27,116 | 1,820 | \$31,822 | 1,222 | \$34,938 |
| Total/Average | 3,857,059 | \$35,932 | 719,849 | \$44,460 | 520,835 | \$49,140 |

Source: Employment Security Commission of North Carolina, 2005

Total employment growth for all industries in the Mecklenburg County between 2002 and 2012 is projected to be about 30 percent. The Professional and Business Services sector is projected to see the highest growth rate at 43 percent. The Natural Resources and Mining and Manufacturing sectors are the only industry groups expected to have a decline in employment between 2002 and 2012. Projected employment and growth between 2002 and 2012 by employment sector are shown in Table 3-39.

Table 3-39: Mecklenburg County Projected Growth by Employment Sector 2002-2012

| Major Industry Group | Total Employment 2002 | Total Employment 2012 | Percent Growth 2002-2012 |
|-------------------------------------|-----------------------|-----------------------|--------------------------|
| Natural Resources and Mining | 2,251 | 1,952 | -15.3 |
| Manufacturing | 41,220 | 41,014 | -0.5 |
| Goods-Producing | 74,702 | 83,621 | 11.9 |
| Government | 23,726 | 28,337 | 19.4 |
| Trade, Transportation and Utilities | 115,078 | 139,828 | 21.5 |
| Information | 20,823 | 26,484 | 27.2 |
| Other Services (except Government) | 14,942 | 19,279 | 29.0 |
| Construction | 31,231 | 40,655 | 30.2 |
| Services-Providing | 432,861 | 574,668 | 33.8 |
| Education and Health Services | 65,287 | 87,441 | 33.9 |
| Financial Activities | 57,085 | 79,402 | 39.1 |
| Leisure and Hospitality | 42,901 | 60,611 | 41.3 |
| Professional and Business Services | 93,019 | 133,286 | 43.3 |
| Total | 1,015,126 | 1,316,578 | 29.7 |

Source: The Employment Security Commission of North Carolina, North Carolina Occupational Trends, Projections 2002-2012, <http://eslmi23.esc.state.nc.us/projections/>. Accessed 5 July 2006.

More banking resources are headquartered in Charlotte than in all other U.S. cities except New York, however, the diversity of employers in Charlotte extends beyond financial institutions.¹⁰³ The 25 largest employers in Mecklenburg County are shown in Table 3-40. Many of these employers are also headquartered in the County, including Wachovia Corporation, the County's largest employer. According to the Charlotte's Economic Development Office (EDO), in 2005, the total number of new and expanded firms in Charlotte, as reported by the Charlotte Chamber of Commerce, is projected to equal or exceed the 2004 number, but not match the 2003 post-recession high. According to the EDO, "While the 2004 and 2005 numbers won't approach the 2003 high, these numbers continue to show a very positive trend for Charlotte and Mecklenburg County."¹⁰⁴

Table 3-40: Top 25 Largest Employers in Mecklenburg County

| Company | Employment |
|--|------------|
| Wachovia Corporation ^a | 18,967 |
| Carolinas Healthcare System ^a | 15,257 |
| Charlotte-Mecklenburg Schools ^a | 15,134 |
| Bank of America ^a | 13,000 |
| City of Charlotte ^a | 5,838 |
| US Airways | 5,749 |
| Duke Energy Corporation ^a | 5,400 |
| Mecklenburg County ^a | 5,373 |
| Presbyterian Healthcare/Novant Health ^a | 5,166 |
| Excel Staffing Services of Charlotte, Inc. | 4,500 |
| Lowe's | 4,062 |
| Ruddick/Harris Teeter ^a | 3,867 |
| UNC at Charlotte ^a | 3,764 |
| Bi-Lo | 3,210 |
| YMCA of Greater Charlotte ^a | 2,838 |
| Bell-South Telecommunications | 2,760 |
| U.S. Postal Service | 2,618 |
| Belk, Inc. ^a | 2,500 |
| Compass Group ^a | 2,500 |
| Family Dollar Stores, Inc. ^a | 2,500 |
| Wal-Mart Stores, Inc. | 2,256 |
| Adecco | 2,000 |
| Food Lion, Inc. | 1,945 |
| Time Warner Cable | 1,800 |
| IBM | 1,750 |

Source: *Largest Employers 2005*. Charlotte Chamber of Commerce. Available: http://www.charlottechamber.com/content.cfm?category_level_id=347&content_id=1738. Accessed: 5 July 2006.

^a Headquartered in Mecklenburg County

3.13.3.3 Special Economic Activities

Two of the focus areas identified in the Strategic Framework relate to the Center City Streetcar; transit corridor and business district revitalization, characterized generally in this section as transit oriented development (TOD); and hospitality, cultural, sports and tourism assets.

Transit Oriented Development

According to a presentation given by the Director of the Charlotte-Mecklenburg Planning Commission at the 3rd Annual Transit and Land Use Summit, Charlotte's definition of transit oriented development (TOD) is "A compact neighborhood with housing, jobs and neighborhood services within easy walking distance of a transit station."¹⁰⁵ One of the five focus areas described in the Strategic Framework is Transit Corridor and Business District Revitalization. According to the Strategic Framework, "The City will take a lead role in redeveloping land around transit stations, in distressed business districts and other in-fill redevelopment opportunities. It will form partnerships with private developers to leverage City resources and grow the tax base." In the Strategic Framework it is noted that distressed areas close to Center City can become vibrant economic centers with commitment from both the City of Charlotte and private partners. It is also noted that the City of Charlotte targets redevelopment around current and future transit corridors to leverage the City's commitment to invest in mass transit.

Several areas within the study area are included among the key locations identified for redevelopment in the Strategic Framework; the Belmont neighborhood, West Trade Street and the Eastland neighborhood. The solicitation of private sector redevelopment of City-owned land around the new arena is also recommended. A market analysis with recommended revitalization strategies was conducted for the West Trade/Beatties Ford Road Corridor in 2001. The subject area extends from I-77 to Cindy Lane and is also part of the Center City Streetcar corridor in the Center City and Beatties Ford Road sub-areas. Among the goals identified in the analysis for revitalization of this corridor were to close the development gap between the Gateway village development in Center City and the Johnson C. Smith University campus. Another goal was to improve the perception and appearance of the West Trade/Beatties Ford Road corridor by creating a new entrance to the corridor. It is noted in the analysis that one amenity of the corridor is that it is a pedestrian-friendly shopping environment due to the narrow street, the closeness of physical structures to sidewalks and streets, and the small scale of structures. According to an interview of shoppers along Beatties Ford Road, 70 percent indicated that convenience was what they liked about shopping along the corridor.¹⁰⁶ Other action items included in the Strategic Framework fall under the need to recognize and provide for current and future infrastructure and to continue and expand existing programs for revitalization.¹⁰⁷

As described in Table 3-7, there has been a flurry of development activity in the study area. Two projects were noted in a presentation at the 2005 3rd Annual Transit and Land Use Summit, as exemplifying economic development opportunities in the Center City Streetcar and Southeast Light Rail Corridor. The Elizabeth Avenue development project includes 250,000 square feet of retail space, 340,000 square feet of office space and 810 residential units. The project included a \$13 million dollar public investment including a public/private

partnership to fund 1,000 parking spaces. In the Central Avenue sub-area, the Plaza Central projected was noted as exemplifying economic development opportunities. The project included commercial rehabilitation and re-tenancing as well as six new residential projects proposed or under construction. Projects cited in Center City as exemplifying Center City's growth as a cultural, entertainment and residential center include the new arena, ImaginOn, EpiCenter, residential projects including The Vue and The Park, and the Ritz Carlton Hotel.¹⁰⁸

Another presentation given at the 3rd Annual Transit and Land Use Summit identified the market for Transit Oriented Development (TOD) in Charlotte. In the presentation it was noted that the national trend is a movement toward aging baby-boomers and young generation-X-ers, with fewer families with children and more singles and childless couples. According to two large-scale employment-based surveys conducted by Robert Charles Lesser & Co., LLC, it is estimated that one-third to one-half of the market is interested in more urban environments. The ability to walk from home to destinations such as shops was one of the amenities that attracted people to an urban environment. Fifty-seven percent of those surveyed were interested in living in-town in Charlotte.¹⁰⁹

Hospitality, Cultural, Sports and Tourism Assets

Another of the five focus areas described in the Strategic Framework is Charlotte's Hospitality, Cultural, Sports and Tourism Assets. According to the Strategic Framework, "The City will continue its leadership role in developing hospitality, cultural, sports and tourism related infrastructure and partner with other organizations to market Charlotte and manage these capital facilities." It is noted that as more facilities, such as Discovery Place, Blumenthal Performing Arts Center, the new arena, Bank of America's Stadium and Charlotte Convention Center cluster in Center City, Center City life becomes increasingly vibrant, diverse and attractive to tourists and convention attendees.¹¹⁰

3.13.4 Environmental Impacts and Benefits

3.13.4.1 Short-term Impacts and Benefits

No-Build and TSM Alternatives

There would be no short-term impacts associated with the No-Build and TSM alternatives.

Build Alternative

In the short term, the regional and local economy would experience beneficial impacts in the form of increased local production of materials, services, and labor. Local benefits from construction activity would depend on the magnitude of the expenditures and the ability of local suppliers and the local labor pool to fulfill the demand for construction goods and services. The magnitude of local economic benefits also would be related to the length of the construction period, as expenditures and construction-related employment would occur throughout this period.

Potentially adverse economic effects associated with the construction phase of the project would be short-term and related primarily to the disruption of commercial activity due to impeded access and the diversion of traffic. In most cases, only minor effects would be experienced by area businesses, as the majority of construction activity would be in existing rights-of-way. Small and

marginal businesses would likely be affected to a greater degree than larger businesses, as the viability of these types of enterprises is more sensitive to small variations in the level of commerce.

Businesses beyond the immediate construction zone could also be affected due to lane closures and traffic detours. Construction disturbances also are likely to have a greater effect on businesses that rely on truck deliveries and shipments, timely deliveries of goods, and a constant movement of trucks into and out of their premises (e.g., industrial properties, including manufacturers and distributors) than businesses that rely on pedestrian traffic. However, the loss of any direct access, including on- and off-site parking and inconveniences to pedestrian and vehicle circulation to the site, could result in some temporary loss of business patronage during the construction activity.

3.13.4.2 Long-term Impacts and Benefits

No-Build and TSM Alternatives

The No-Build and TSM alternatives are not likely to have a substantial impact on the economy in the study area. While the Center City Streetcar would facilitate some of the drivers of economic growth including the attraction of Center City for workers between ages 25 to 44 and tourists, transit-oriented development and revitalization of identified priority areas such as the West Trade Street and Beatties Ford Road corridor, these goals are underway and still possible without the project. In addition, TOD projects around the Southern corridor would continue and would help the economy of the study area and city as a whole.

Build Alternative

Implementation of the project would have a number of long-term economic impacts related to its ongoing operation and maintenance expenditures and facilitation of other economic drivers.

One potential negative impact of the Build Alternative could be the displacement of some businesses. This impact is assessed further in Section 3.3.

The operation and maintenance of the streetcar would represent a cost to the City of Charlotte but would also funnel money into the City through the collection of fares and the creation of jobs. The cost-effectiveness of the project is discussed in more detail in Section 5.3, Cost Effectiveness.

It is expected that the Build Alternative would have a positive economic impact by facilitating some of the drivers of economic growth and helping to overcome some of the challenges of economic growth identified in Section 3.13.3. The attraction of workers between the ages of 25 and 44 was noted among the challenges to maintaining positive growth trends in employment. It was also pointed out that demographic trends indicate a growth in the number of singles and couples without children and that this group, in part, composes the market for TOD. The project is expected to help facilitate dense urban land use patterns in the study area and increase its walk-ability. This trend will likely facilitate the attraction of workers in the desired age group to the study area. This attraction would result in an increased employment pool and an increased tax base.

Data on employers and employment sectors shows that Charlotte and the surrounding region have a varied economy, with employment growth expected in all sectors with the exceptions of Natural Resources and Mining and

Manufacturing. While the Build-Alternative would not have a substantial impact on employers or employment sectors; it would serve many of the area's largest employers in the study area, including Wachovia Corporation, Bank of America, US Airways, Duke Energy Corporation, Presbyterian Healthcare, Ruddick, Bell-South and Adecco; and could serve as another amenity attracting business to the study area.

It is expected that the Build Alternative would have a positive impact on ongoing special economic activities. Transit oriented development is a focus area of the Strategic Framework. While there has already been a trend of increased development, especially in the Center City sub-area, the implementation of a viable transit system such as the Center City Streetcar is a key component of TOD and continued development. While TOD would likely take place in the South Corridor under the No-Build and TSM alternatives; TOD would likely fail in other corridors, including the Center City corridor without the implementation of transit amenities.

The Center City Streetcar could be an additional amenity the city could offer to potential visitors to support the focus area identified in the Strategic Framework of hospitality, culture, sports and tourism assets. While strides have already been made in developing attractions such as museums and stadiums to the study area, ease of access to these amenities afforded by the streetcar would add to the attraction of the city and facilitate this goal of the Strategic Framework.

The Center City Streetcar would also help meet some of the specific goals identified for the West Trade/Beatties Ford Road corridor. Specifically, it was noted that the development gap between Johnson C. Smith University and Gateway Village should be bridged. The streetcar would connect these two areas and facilitate the potential for development in this area.

In general, it is expected that the Build Alternative would have a positive impact on the economy in the study area. The Center City Streetcar would add to the quality of life in the study area, making it an attractive place to live and thereby increasing the employment pool; it would serve major employers in the study area; and it would facilitate goals identified in the Strategic Framework including supporting TOD and focusing on hospitality, cultural, sports and tourism assets.

3.13.5 Mitigation

Impacts from construction activities should be temporary and not substantial in nature, as the construction would be staged and restricted to the designated alignment and streetcar stops. Deliveries of construction materials would be controlled to minimize disruptions to surrounding areas. Various other measures would be implemented, as appropriate, to further minimize the possibility of short-term impacts associated with construction activities, including:

- Restricting construction activities to off-peak hours;
- Confining heavy construction vehicle operations to the location of the alignment itself to minimize noise or other intrusions on adjacent streets;
- Maintaining at least one entrance into businesses at all times where there are multiple entrances; and,
- Controlling demolition activities.

Mitigation of adverse impacts during construction also would include planning with business owners and managers to provide increased signage where appropriate, and coordination and timing of temporary closures, when necessary. Property owners would be notified of access restrictions in advance, and CATS would ensure that the contractor/developer of the streetcar system coordinate such restrictions with property owners to the maximum extent feasible within the constraints imposed by project budget and schedule. A public information and notification program would advise area residents of traffic detours. Temporary paths to facilitate pedestrian movements to and through the area, and channelization, detour/guide signs, and temporary traffic signals are among the tools available to help maintain travel patterns. In addition, construction offices would be set up in the project area. A mitigation coordinator would be located in the office to provide information to business owners and the concerned public on the progress of construction and mitigation measures being enacted.

3.14 SECONDARY AND CUMULATIVE EFFECTS

3.14.1 Legal and Regulatory Framework

The purpose of this section to the extent reasonable and practical is to assess the potential secondary and cumulative impacts that may result from the incremental effects of the Center City Streetcar Project and other past, present, and future development activities in the same geographic region. Secondary impacts are those effects that may result from activities induced by the action. For example, providing improved public transportation alternatives to an urban environment could induce higher density residential and commercial development. This, in turn, could induce changes in population, travel patterns, and economic conditions, which could consequently have cumulative impacts on air quality, ecosystems, protected species, water quality, quality of life, or other aspects of the natural and human environment.

The Council on Environmental Quality (CEQ) for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) defines "secondary effects" (also referred to as "indirect effects") as "impacts on the environment, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."¹¹¹ The CEQ regulations further state that secondary effects "...may include growth-inducing effects and other effects related to induced changes in the patterns of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." The CEQ defines "cumulative impacts" as those "...which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions."¹¹² Cumulative impacts are typically the result of several events or actions overtime.

3.14.2 Method

The analysis of the secondary and cumulative impacts associated with this project was conducted using the latest guidance available from federal and state regulatory agencies. These include:

- North Carolina Department of Transportation (NCDOT)/North Carolina Department of Environment and Natural Resources (NCDENR's) Revised *Draft Secondary and Cumulative Impact Assessment Guidance*:

Integrated NEPA/SEPA/401 Eight-Step ICE Assessment Process (May 2003).

- CEQ Guidance *Considering Cumulative Effects Under the National Environmental Policy Act*. (1997).
- NCDOT's *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina*. (November 2001).
- North Carolina Wildlife Resource Commission's *Guidance Memorandum to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality*. (August 2002).

The assessment of secondary and cumulative effects is identified as a requirement under the National Environmental Policy Act (NEPA) of 1969, the North Carolina Environmental Policy Act (SEPA), and under the Council on Environmental Quality (CEQ) regulations implementing NEPA.

The Secondary and Cumulative Impacts Assessment (SCIA) follows a sequential process that includes the following steps:

- identifying the study area for analysis;
- reviewing the population, employment, land use plans, transportation plans, and natural resources in the study area;
- the identification of secondary and cumulative impacts;
- an analysis of the secondary and cumulative impacts; and
- mitigation techniques for the identified secondary and cumulative impacts.

3.14.3 Existing Conditions and Resources

Recently completed and planned transit and development projects to consider in the assessment of cumulative impacts are described in this section.

3.14.3.1 Transit Projects

In consideration of the cumulative impacts of the project, both existing and planned transit services were considered. Existing services are described in Section 1, and include rail lines, 30 local bus routes using the Trade Street/Elizabeth Avenue corridor, three bus routes using the Central and Beatties Ford Road corridors, the Gold Rush Circulator shuttle service, and the CTC and GTC. Planned services are described in Section 1 and include transit facility improvements in the five corridors described in the 2025 Corridor System Plan

3.14.3.2 Development Projects

The development climate in Charlotte has been positive throughout recent years. In particular, Center City has thrived as the home to several large financial institutions. The corporate presence coupled by capital investments and planning by city officials has led to a vibrant downtown that has had several large-scale projects come to fruition in recent years. Additionally, as growth has pushed outward from Center City, adjacent areas have also experienced an increase in development pressure and growth.

Strengths supporting development and challenges to development in Center City were highlighted in the *Center City 2010 Vision Plan*. According to the plan, strengths include the corporate presence and involvement in downtown, reemerging residential communities, community interest in Center City, and the

city's regional focus. Challenges Center City faces are the lack of financing opportunities to spur development, the tendency to use suburban patterns for urban development, and the need for a variety of housing types and costs.¹¹³ A snapshot of development trends in Center City provided by the Center City Partners was that, in 2005 there were "...more than 40 development projects announced, breaking ground, undergoing renovation or reaching completion." According to the source, "These projects represent an investment of over \$1.6 billion of development activity, encompassing more than 6,000,000 square feet of office, residential, retail, entertainment and institutional space in Center City."¹¹⁴

Section 3.2.3.2 Land Use and Development, gives a detailed description of major development projects within the study area and highlights areas that have potential for future development and redevelopment. Additionally, development projects are summarized in Table 3-8.

3.14.4 Environmental Impacts and Benefits

3.14.4.1 Short-term Impacts and Benefits

Development of a project in an urban environment can have a variety of impacts during the construction period, depending on the size and scope of the project. Although they are short term in nature, construction impacts may be disturbing or disruptive to the use of or access to a community facility as well as to the ability of community services to fulfill their functions.

Potential construction period impacts of the Build Alternative are addressed in the short-term impacts and benefits portions throughout Chapter 3 of this EA. When considered together with other construction projects in the study area, cumulative impacts are possible. However, because of the phased construction approach that will be implemented in block-by-block stages, the magnitude of the cumulative impacts can be largely mitigated through advanced planning and coordination with the appropriate construction permitting agency or municipality.

Table 3-41: Overview of Direct, Secondary, and Cumulative Effects

| Impact Type | No-Action Future Conditions (Conditions without the Proposed Action) | | Impacts of the Proposed Action (Incremental Effect of the Proposed Action) | | | Cumulative Effect (Future Conditions with the Proposed Action) |
|--|---|-------------------------|---|------------------------------------|--------------------------------------|---|
| | Other Past/ Present Actions | Other Future Actions | Direct Impacts | Secondary Effects | | |
| | | | | Encroachment Alteration Effects | Effects Related to Induced Growth | |
| Habitat and Wildlife | Negl | Negl | Negl | Negl | Negl | Negl |
| Vegetative Communities | Negl | Negl | Negl | Negl | Negl | Negl |
| Threatened and Endangered Species | Negl | Negl | Negl | Negl | Negl | Negl |
| Water Quality | Negl | Negl | Negl | Negl | Negl | Negl |
| Community Cohesion | Negl | Negl | Low | Negl | Pos | Pos |
| Vehicular Travel Patterns | Negl | Negl | Low | Low | Low | Low |
| Other Travel Patterns ^a | Low | Pos | Pos | Pos | Negl | Pos |
| Economic Impacts | Pos | Pos | Low | Low | Pos | Pos |
| Hazardous Materials | Low | Low | Low | Unp | Unp | Unp |
| Historic/Cultural Resources | Mod | Unp | Low | Negl/Unp | Negl/Unp | Negl/Unp |
| Noise | Low | Low | Mod | Mod | Mod | Mod/Unp |
| Aesthetics/Visual | Negl | Negl | Mod | Negl | Negl | Low/Negl |
| KEY: Low = Low Adverse Effect Mod = Moderate Adverse Effect High = High Adverse Effect NA = Not Applicable Pos = Positive Effect Negl = Negligible Effect Unp (Unpredictable)= Adverse effect is possible but likelihood and magnitude are unpredictable | | | | | | |

^a Other travel patterns includes pedestrian, bicycle and transit.

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3.14.4.2 Long-term Impacts and Benefits

A summary of the direct, secondary and cumulative effects expected to be associated with the project is provided in Table 3-41. First, direct impacts of the project, such as those associated with construction, are presented. Secondary and cumulative impacts of the project are indicated in the final columns of the tables. Expected direct, secondary and cumulative impacts are summarized under several different conditions in the table. In the second and third columns, expectations of what future conditions in the study area might be like if the project is not constructed, such as under the No-Build or TSM alternatives, are summarized. Impacts from other past actions and current actions are separated from impacts of potential future actions in the study area (other than the project). When considering the impact of past actions, only actions since Charlotte has been considered an urban area were taken into account. In the proceeding columns, expectations of what future conditions in the study area might be like if the project is constructed are summarized. Please refer to the Center City Streetcar Project Secondary and Cumulative Impact Assessment Technical Report for a more detailed description of long term impacts and benefits.

3.14.5 Mitigation

3.14.5.1 No-Build and TSM Alternatives

No mitigation is warranted if the No-Build Alternative or the TSM Alternative is selected.

3.14.5.2 Build Alternative

Detailed mitigation of potential impacts that will occur as a result of implementing the Build Alternative is discussed throughout Chapter 3 in each respective impact section. General direction for assessing consequences and mitigation development is provided in the *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina, Volume II: Practitioners Handbook*.¹¹⁵ Portions of this guidance document applicable to the project are summarized below.

Mitigation Techniques for Effects Related to Encroachment-Alteration

Encroachment-alteration secondary/cumulative effects, although often distant in time and space from the project, are similar to many direct project effects and can be addressed with similar mitigation strategies. As with direct effects, in many cases these strategies involve altering one of the following aspects of the project or plan within the control of the CATS:

- Facility type
- Facility alignment
- Facility design features
- Techniques used during construction
- Facility maintenance

Mitigation Techniques for Induced Growth

Project-induced growth can be mitigated to some extent through a variety of land use control techniques implemented by local municipalities. In addition to managing residential and commercial growth induced by a transportation project, a local jurisdiction may also choose among strategies designed to mitigate the environmental and social effects related to induced growth.

Specific regulations are designed to protect vital resources and work to guide the path and intensity of development. These policies can limit impacts on notable features

related to induced growth. There are several examples of where resource management in North Carolina has been implemented. General categories include:

- Stream buffers where development is regulated to protect the quality and quantity of water resources, prevent flooding, and promote water-related tourism and recreation.
- Coasts where development areas are delineated and development is permitted only under special circumstances in critical areas.

North Carolina law makes provision for the use of performance standards in local zoning and subdivision regulations. Performance standards can define uses as of right or the standards required for obtaining a conditional use permit. Performance standards encompass the following types of regulation:

- Regulation of height, bulk, setback, lot size and other dimensional features.
- Regulation of uses within zones and standards that define and distinguish uses.
- Specification of site design features such as off-street parking, impervious surface, vegetative cover removal, landscaping and screening, and signage.
- Specifications of standards for noise and pollutant emissions allowed in manufacturing or agricultural activities.
- Standards for community appearance or historic preservation with review and limited enforcement powers vested in a planning agency or special commission.

A technique for preservation of green space, habitat, or other important resource areas that is seeing increasing use is the acquisition of land or development rights by government agencies, non-profit groups, or other private initiatives. These groups purchase or accept donations of land and pledge to keep the land permanently undeveloped. Development rights can also be purchased while the underlying title and use is retained by a landholder through the use of conservation easements. These easements, once written into a deed, can permanently prevent development on a parcel regardless of future ownership. Carefully planned acquisitions can work to focus growth and protect notable features from growth-related impacts.

Another mitigation technique is Context Sensitive Design. "Context sensitive design (CSD) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSD is an approach that considers the total context within which a transportation improvement project will exist."¹¹⁶

A major goal of context-sensitive design is to allow for local public input early in the design process so that costly delays and revisions can be avoided. Examples of context sensitive design and flexible standards include deviation from the standard length of an acceleration or deceleration lane to protect a notable feature, modifying the design of an arterial that passes through a downtown area to allow for a boulevard that would better fit with the local context, and inclusion of special materials or design features to allow the facility to fit the scale and style of its surroundings.

Techniques for Systems Planning Stage

Many of the techniques previously outlined are applicable to transportation systems planning as well as to project development. As noted above, comprehensive planning, resource preservation regulations, and other techniques meant to shape growth when integrated with the planning of transportation systems will minimize the likelihood of secondary/cumulative effects on notable features and conflicts with community goals. Additional techniques applicable to transportation systems planning include comprehensive performance measures and promoting regional coordination; these techniques are discussed below.

Comprehensive Performance Measures

Traditionally in the planning of transportation systems, the assessment of need for a transportation project has been based in part on measures of mobility in the existing transportation system. These measures focus on efficient movement. Mobility measures typically do not provide linkage to land use conditions in the vicinity of projects. This disconnect can lead to the potential for conflict with notable features or goals later in the process. Evaluating projects with performance measures related to accessibility will help better connect transportation needs, land use considerations, and concerns regarding sustainability. Such measures include:

- Potential Transit Ridership
- Vehicle Miles Traveled (VMT) or Vehicle Hours Traveled (VHT)
- Accessibility to Jobs and Commercial Centers
- Impact on Jobs/Housing Balance

Promoting Regional Coordination

Early coordination on a regional level is the best method for evaluation and mitigation of secondary/cumulative effects. Regional coordination is especially important in controlling induced growth because a variety of uncoordinated local regulatory responses may work to intensify effects in the least regulated areas.

3.15 HAZARDOUS MATERIALS

The objective of the hazardous materials assessment was to evaluate whether there is a Recognized Environmental Condition on the project corridor, or whether such Recognized Environmental Condition is likely to occur in the future due to onsite or nearby activities or problems. Under American Society for Testing and Materials (ASTM) standard E1527, a Recognized Environmental Condition is defined as:

The presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.¹¹⁷

The presence of a Recognized Environmental Condition has the possibility to adversely impact costs and schedules initiated to complete a transportation improvement project. Therefore, the identification of a Recognized Environmental Condition that could adversely impact the project corridor provides valuable information for project planning and design.

A detailed description of the hazardous materials analysis is described in a separate technical memorandum.

3.15.1 Legal and Regulatory Framework

3.15.1.1 Comprehensive Environmental Response Compensation and Liability Act (CERCLA)

Under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) provisions are established for cleaning up sites where wastes may have been released or disposed of in the past. Liable parties under CERCLA may be current owners and operators, former owners and operators who owned the site when hazardous substances were disposed of, generators or persons who arranged for disposal or treatment of hazardous substances, and transporters. Transportation agencies may be liable under CERCLA in acquiring and operating contaminated row or other facilities and in the disposal of wastes generated in transportation system operations.¹¹⁸

3.15.1.2 Resource Conservation and Recovery Act (RCRA)

The Resource Conservation and Recovery Act (RCRA), provides control of hazardous wastes through the establishment of requirements on the transport, storage, and disposal of hazardous wastes.¹¹⁹

3.15.1.3 North Carolina Hazardous Waste Rules

In North Carolina, the hazardous waste management program is administered by the hazardous Waste Section of the Division of Waste Management. According to the branch, the rules "...define hazardous waste, establish a management system for that waste from generation to final destination, require registration and reporting by generators, and establish permitting procedures for hazardous waste treatment, storage and disposal facilities." The program implements RCRA and establishes additional requirements for the State of North Carolina.¹²⁰

The Superfund Section of the Divisions of Waste Management is responsible for the implementation of the Federal policy established under CERCLA. In addition, the branch enforces The North Carolina Inactive Hazardous Sites Response Act of 1987 (N.C.G.S. 130A-310 et seq). Under this act, a program was established to protect the public and the environment from uncontrolled and unregulated hazardous wastes sites that are not addressed by other environmental programs.¹²¹

3.15.2 Method

3.15.2.1 ASTM Database Search

The methodology used for this investigation and risk assessment generally follows American Society for Testing and Materials (ASTM) E 1527 Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process. Project analysts reviewed information gathered from a listing of Federal ASTM Standard Records, Federal ASTM Supplemental Records, State of North Carolina ASTM Standard Records, and State of North Carolina ASTM Supplemental Records through Environmental Database Resources, Inc. (EDR) to evaluate whether activities on, or near, the project corridor have the potential to create a Recognized Environmental Condition on the subject property. This information is reported as received from EDR, which in turn reports information as it is provided in various government databases. It is not possible to verify the accuracy or completeness of information contained in these

databases. However, the use of and reliance on this information is a generally accepted practice in the conduct of environmental due diligence. The databases searched are summarized below:

Federal ASTM Standard Records

- The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database identifies hazardous waste sites that require investigation and possible remedial action to mitigate potential negative impacts on human health or the environment.
- The Resource Conservation and Recovery Information System (RCRIS) lists RCRA-regulated hazardous waste generators. Both Large- and Small-Quantity Generators are included in this list. A RCRA small-quantity generator (SQG) is defined as a facility that generates less than 1,000 kilograms (kg) per month of hazardous waste or less than 1 kilogram per month of acutely hazardous waste. A RCRA large-quantity generator (LQG) is defined as a facility that generates greater than 1,000 kg per month of non-acutely hazardous wastes or greater than 1 kg per month of acutely hazardous wastes.
- The Emergency Response Notification System (ERNS) List contains reported spill records of oil and hazardous substances.

State of North Carolina ASTM Standard Records

- The Leaking Underground Storage Tank (LUST) List contains information pertaining to confirmed and suspected releases from underground storage tanks.
- The Underground Storage Tank (UST) List contains State underground storage tank (UST) sites which list USTs regulated under Subtitle I of RCRA.
- The Inactive Hazardous Sites Inventory (IHSI) List is the state-equivalent priority list of uncontrolled or abandoned hazardous waste sites.

ASTM Supplemental Records

- In addition to the ASTM Standard Records identified above, the following ASTM Supplemental Records were also included in the Hazardous Materials Assessment.
- The Incident Management Database (IMD) List contains information on known groundwater and/or soil contamination incidents.
- The Drycleaners List identifies potential and known drycleaning sites, active and abandoned, that the Dry-cleaning Solvent Cleanup Program has knowledge of and entered into the database.
- The Brownfield List provides information as to if a brownfield site is an abandoned, idled, or underused property where the threat of environmental contamination has hindered its redevelopment. All of the sites listed in the inventory are working toward a brownfield agreement for cleanup and liability control.
- The US Brownfield List includes brownfield properties addressed by Cooperative Agreement Recipients and brownfield properties addressed by Targeted Brownfields Assessments.
- The Hazardous Materials Information Reporting System (HMIRS) List contains hazardous material spill incidents reported to the Department of Transportation.
- The Material Licensing Tracking System (MLTS) List is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements.

- The Toxic Chemical Release Inventory System (TRIS) List identifies facilities which release toxic chemicals to the air, water, and land in reportable quantities under SARA Title II Section 313.
- The Section 7 Tracking Systems (SSTS) List identifies establishments which, Under Section 7 of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended (92 Stat. 829), must register and submit a report to the Environmental Protection Agency by March 1st of each year.
- The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)/Toxic Substances Control Act (TSCA) Tracking System (FTTS) List identifies administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA, and Emergency Planning and Community Right-to-Know Act (EPCRA).
- The Hazardous Substance Disposal Site (HSDS) List contains locations of uncontrolled and unregulated hazardous waste sites.
- The Aboveground Storage Tank (AST) List identifies facilities with aboveground storage tanks that have a capacity greater than 21,000 gallons.

3.15.2.2 Focus Maps

Three corridor sub-areas (Beatties Ford Road, Central Avenue, and Trade Street) of the study area were divided into the Focus Maps shown in Appendix A and defined as follows:

- Focus Map 1 - includes the length of corridor and a 0.25-mile radius that extends from I-85 to North Hoskins Road.
- Focus Map 2 - includes the length of corridor and a 0.25-mile radius that extends from Brookshire Freeway (NC16) North to I-85.
- Focus Map 3 - includes the length of corridor and a 0.25-mile radius that extends from Graham Street to Brookshire Freeway (NC16) North.
- Focus Map 4 - includes the length of corridor and a 0.25-mile radius that includes I-277 from North Brevard Street to I-77.
- Focus Map 5 - does not contain any portions of the project corridor.
- Focus Map 6 - includes the length of corridor and a 0.25-mile radius that extends along I-277 from South Boulevard to Morehead Street.
- Focus Map 7 - includes the length of corridor and a 0.25-mile radius that along the southeast portion of the I-277 loop.
- Focus Map 8 - includes the length of corridor and a 0.25-mile radius that extends from Logie Avenue to East 7th Street.
- Focus Map 9 - includes the length of corridor and a 0.25-mile radius that extends from Norland Road to Logie Avenue.
- Focus Map 10 - includes the length of corridor and a 0.25-mile radius that extends from North Sharon Amity Road to Norland Road.
- Focus Map 11 - does not contain any portions of the project corridor.
- Focus Map 12 - does not contain any portions of the project corridor.
- Focus Map 13 - does not contain any portions of the project corridor.
- Focus Map 14 - includes the length of corridor and a 0.25-mile radius that extends from Reddman Road to North Sharon Amity Road.
- Focus Map 15 - does not contain any portions of the project corridor.

The Environmental Database Resources, Inc. (EDR) database searches included the four corridor sub-areas as well as a 0.25-mile radius extending from the existing roadway centerline within the project study corridor.

3.15.2.3 Site Ranking

The sites identified by the EDR database search were ranked based on the potential risk for the site to impact the project during construction and/or operation. The determination of the ranking was based on the understanding that the construction and/or operation of the Center City Streetcar will occur primarily at ground level of roadways with shallow subsurface excavation for utilities or related buildings. The ranking was further established by assessing the general nature of the record listing and the number of record listings for a particular site. The rankings were given a designation of H (High), M (Medium), and L (Low) according to the following criteria:

High

A high ranking indicates site areas where environmental record findings suggest a higher potential for project impact. Examples include, but are not limited to, open LUST files, recent hazardous materials spills or ERNS listings, and/or inclusion on the Federal CERCLIS database. A high ranking does not necessarily indicate that the project corridor will be adversely impacted; however, further investigation should be conducted to evaluate the most current information available in order to more accurately assess the potential. Further investigation would possibly involve the review of the most current available project files through government offices, a specific site reconnaissance, a thorough site-specific review of available historical documents and contact with site owners for current site status. Following the site-specific assessment for each of the "high" risk sites, additional site investigation work (including sampling and testing) may be necessary to further define the potential site-specific concerns.

Medium

A medium ranking indicates site areas where environmental record findings suggest a moderate potential for project impact. Examples include, but are not limited to, sites that may have been investigated for regional groundwater problems, but lack specific site information; are listed as RCRA CORRACTS or TSD facilities; or are located near landfill sites. A medium ranking does not necessarily mean that the named site facility, or address will present a known problem for project construction or operation, but should be included in more site-specific review. This review could include specific site reconnaissance and reviews of the most current project files through government offices. Following the site-specific assessment for each of the "medium" risk sites, additional site investigation work (including sampling and testing) may be necessary to further define the potential site-specific concerns.

Low

A low ranking indicates site areas where environmental record findings suggest a low potential for project impact due to the nature of the reported finding and adequate documentation from government agencies regarding site closure, or where identified incidents were small in nature and addressed at the time of the incidents. Examples include, but are not limited to, a small quantity or conditionally exempt RCRA generator or a UST site with no reported release incidents.

3.15.2.4 Impact Evaluation

Potential impacts relative to contaminated and hazardous materials can occur in two forms. The costs and scheduled implementation of the Build Alternative can be directly

affected by the presence of potential contaminated and hazardous materials sites. The hazardous materials assessment was done to assess whether any project elements would adversely affect the clean-up of environmentally sensitive areas, such as a Superfund site. These are construction-related issues. In addition, the continuous, long-term activities and day-to-day operations associated with a project once completed would have the potential to create environmental impacts. An assessment was made of the potential for project elements and operations to affect or impact environmental conditions over the long-term.

3.15.3 Existing Conditions and Resources

3.15.3.1 ASTM Primary Record Search

The EDR database review revealed 450 sites located within 0.25-mile radius extending from the existing roadway centerline of the project corridor. The number of sites for each Focus Map ranked according to Low, Medium, or High as well as the total number of sites for each Focus Map is shown in Table 3-42.

Table 3-42: Database Records Within 0.25-mile of the Project Corridor

| Focus Map | Number of Low Sites | Number of Medium Sites | Number of High Sites | Total Number of Sites ^a |
|--------------|---------------------|------------------------|----------------------|------------------------------------|
| Focus Map 1 | 3 | 0 | 1 | 4 |
| Focus Map 2 | 6 | 2 | 5 | 13 |
| Focus Map 3 | 32 | 5 | 15 | 52 |
| Focus Map 4 | 17 | 5 | 13 | 35 |
| Focus Map 5 | 0 | 0 | 0 | 0 |
| Focus Map 6 | 59 | 15 | 33 | 107 |
| Focus Map 7 | 90 | 5 | 40 | 135 |
| Focus Map 8 | 36 | 1 | 10 | 47 |
| Focus Map 9 | 10 | 5 | 7 | 22 |
| Focus Map 10 | 9 | 0 | 5 | 14 |
| Focus Map 11 | 3 | 0 | 2 | 5 |
| Focus Map 12 | 0 | 0 | 0 | 0 |
| Focus Map 13 | 0 | 0 | 0 | 0 |
| Focus Map 14 | 13 | 0 | 3 | 16 |
| Focus Map 15 | 0 | 0 | 0 | 0 |
| Total | 278 | 38 | 134 | 450 |

^a Multiple incidents, listed under different regulatory programs, may have occurred at any particular site. Therefore, these numbers do not reflect the absolute magnitude of discreet locations.

Summary tables for Focus Maps 1 through 15 were developed by identifying the 450 sites which are considered to have the potential to impact the Center City Streetcar Project corridor. The tables include site-specific information including the site name, site location, and the type of record associated with each site based on the environmental database records. These tables are included in the separate hazardous materials technical memorandum.

3.15.3.2 ASTM Supplemental Record Search

The supplemental databases listed in the Methodology section are used for reporting purposes and do not indicate a recorded release or spill. Therefore, the sites are identified to have a low potential to create a Recognized Environmental Concern for the project corridor. A copy of the complete EDR database is included in the separate hazardous materials technical memorandum. In Table 3-43 the supplemental database listings are summarized by Focus Map.

Table 3-43: Supplemental Federal and State of North Carolina Listings

| Focus Map # | HMIRS | MLTS | TRIS | SSTS | FTTS | HSDS | AST |
|--------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------|
| Focus Map 1 | | | | | | | |
| Focus Map 2 | | | | | | | |
| Focus Map 3 | | | | | | 3 | |
| Focus Map 4 | | | 1 | | | 2 | 2 |
| Focus Map 5 | | | | | | | |
| Focus Map 6 | 1 | 1 | | 2 | 1 | 7 | 15 |
| Focus Map 7 | | 1 | | | 1 | 2 | 3 |
| Focus Map 8 | 24 | | | 1 | | | 1 |
| Focus Map 9 | | | | | 1 | | 1 |
| Focus Map 10 | | | | | | | |
| Focus Map 11 | 2 | | | | | | |
| Focus Map 12 | | | | | | | |
| Focus Map 13 | | | | | | | |
| Focus Map 14 | 1 | | | | | | |
| Focus Map 15 | | | | | | | |
| Total | 28 | 2 | 1 | 3 | 3 | 14 | 22 |

3.15.3.3 Orphan Summary List

The Orphan Sites list, which is a list of sites that have not been geo-coded based on a lack of sufficient data regarding their exact location, was reviewed. A summary of orphan sites by Focus Map is presented in Table 3-44. A copy of the complete EDR database is included in the separate hazardous materials technical memorandum.

Table 3-44: Orphan Site Listings

| Focus Map # | IMD | Drycleaner | Brownfield | US Brownfield | CERCLIS | LUST | UST | RCRIS Generator | ERNS | SHWS |
|--------------|-----|------------|------------|---------------|----------|-----------|-----------|-----------------|------|------|
| Focus Map 1 | | | | | | 2 | 4 | 4 | | |
| Focus Map 2 | | | | | | 9 | 4 | 9 | | |
| Focus Map 3 | | | | | | 8 | 9 | 4 | | |
| Focus Map 4 | | | | | 1 | 11 | 8 | 3 | | |
| Focus Map 5 | | | | | | 1 | 2 | 1 | | |
| Focus Map 6 | | | | | | 19 | 8 | 1 | | |
| Focus Map 7 | | | | | | 14 | 8 | 5 | | |
| Focus Map 8 | | | | | | 4 | 1 | 1 | | |
| Focus Map 9 | | | | | | 1 | 1 | 1 | | |
| Focus Map 10 | | | | | | 3 | 2 | 1 | | |
| Focus Map 11 | | | | | | 3 | 0 | 3 | | 1 |
| Focus Map 12 | | | | | | 3 | 1 | 1 | | |
| Focus Map 13 | | | | | | 6 | 1 | 2 | | |
| Focus Map 14 | | | | | | 6 | 2 | 2 | | |
| Focus Map 15 | | | | | | 6 | 2 | 0 | | |
| Total | | | | | 1 | 96 | 53 | 38 | | |

Due to lack of sufficient data, the direct impact that the Orphan Sites may have on the project corridor is not able to be determined. Further investigation should be conducted to evaluate the exact location of the recorded orphan sites in order to more accurately assess the potential risk.

3.15.3.4 Environmental Impacts and Benefits

The findings of the contamination screening and evaluation are based on preliminary information only and are not intended to replace more detailed studies such as individual site assessments and subsurface soil and groundwater investigations. Rather, the screening is intended to be a guide for identifying potential contamination in the project corridor. Other technical studies may be required to determine the existence of site contamination prior to right-of-way acquisition, utility relocation, or construction of stormwater treatment facilities. Potential contamination sites may extend beyond those identified in this report because of limited historical and regulatory information, illegal dumping practices, and a lack of compliance with storage tank registration and hazardous waste generator programs. Finally, the identification of a site in this report does not necessarily indicate that the site contains contamination, but only that there is the potential for contamination to occur.

3.15.3.5 Short-term Impacts and Benefits

No-Action Alternative

Potential impacts associated with the construction of planned facilities, such as roadways planned on new alignment and the South Corridor Light Rail line, will be documented during the environmental studies for those projects.

TSM Alternative

Expansion of bus services would not require construction. No additional short-term hazardous material impacts beyond those associated the No-Action alternative are expected.

Build Alternative

The results of the survey for contaminated and hazardous materials in the project corridor indicate there are sites of known or suspected concern. Implementation of transportation improvements could result in the disturbance and release of contaminated or hazardous materials during construction activities on or near these sites.

3.15.3.6 Long-term Impacts and Benefits

No-Action Alternative

The No-Action Alternative includes the transit and roadway improvement projects already planned or programmed for implementation by the year 2030. No known long-term impacts would be associated with existing facilities or services beyond the normal loss of fugitive fuels and oils that are washed from roadways during storm events. Potential impacts associated with planned facilities, such as roadways planned on new alignment and the South Corridor Light Rail line, will be documented during the environmental studies for those projects, TSM Alternative.

TSM Alternative

The TSM Alternative includes the transit, roadway and multi-modal improvement projects under the No-Action scenario and expanded bus service in the corridor. It is not expected that any additional long-term hazardous materials impacts beyond those for the No-Action alternative would result from expanded bus service.

Build Alternative

In the long-term, operation of Center City Streetcar and supporting sites and properties developed as part of the Center City Streetcar Project would not result in a serious releases of contaminated or hazardous materials on a continuous basis. Activities at the maintenance facility would include the handling and use of volatile and hazardous substances such as lubricants, oils, greases and solvents on a day-to-day basis, and accidental releases would be possible. Historic and current rail transit operations indicate that active streetcar trackbeds potentially would sustain an accumulation of petroleum hydrocarbons from the use of lubricants and some heavy metals deriving from the operation of steel wheels on steel rails. This would come as a result of normal and customary practices and the degree of hazard and magnitude of accumulations would not represent a public health concern. There are no indirect or cumulative impacts expected to be associated with any of the three alternatives.

3.15.4 Mitigation

For all sites identified within the corridor ranked low for severity of potential impact, the data accumulated will be revisited prior to project right-of-way acquisition and construction and an updated review of agency files and public records will be conducted to determine if there has been any substantial change in the status since the report was prepared. For those sites ranked with a moderate to high expected severity of impact, a further review of records will be conducted to determine the status of any contamination assessments or remedial actions taking place at those sites. A Phase II Site Assessment, including, at a minimum, soil and water sampling, will be conducted. The resulting mitigation requirements would depend upon the nature, extent, and mobility of the contaminants in addition to the construction activity and ultimate use for a particular site.

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⁹² See endnote 89.

⁹³ See endnote 89.

⁹⁴ U.S. Geological Survey (USGS). 1991. Charlotte East Quadrangle, North Carolina (map scale 1:24,000) 7.5 Minute Series. Washington DC.

⁹⁵ U.S. Geological Survey (USGS). 1993. Derita Quadrangle, North Carolina (map scale 1:24,000) 7.5 Minute Series. Washington DC.

⁹⁶ Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

⁹⁷ Mecklenburg County, North Carolina. "Water and Land Resources, Flood Maps." Available: <http://www.charmeck.org/Departments/LUESA/Water+and+Land+Resources/Programs/Floodplains/Flood+Maps.htm>.

⁹⁸ Washington State Department of Transportation. Environmental Services: Section 4(f) Guidance. 2002. http://www.wsdot.wa.gov/environment/compliance/Section4f_guidance.htm.

⁹⁹ *Economic Development Strategic Framework 2005-2010*. Presented by the Economic Development Office. 25 July 2005. Available: <http://www.charmeck.org/Departments/Economic+Development/EDO+Library/Home.htm>.

¹⁰⁰ *Economic Development Strategic Framework 2005-2010*. Presented by the Economic Development Office. 25 July 2005. Available: <http://www.charmeck.org/Departments/Economic+Development/EDO+Library/Home.htm>.

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¹¹¹ Code of Federal Regulations: Title 40, volume 31 (40CFR1508.8). Revised 1 July 2005. <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi> (accessed 14 February 2006).

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CHAPTER 4 TRANSPORTATION CONSEQUENCES

4.1 TRANSIT

The CATS Center City Streetcar Corridor is a key recommendation of the 2025 Corridor System Plan for the Charlotte Region. It will serve as a distributor system for commuters using transit to reach Center City, the Region's primary employment and commercial center, which is home to national corporations such as Bank of America, Wachovia Corporation, and Duke Energy Corporation. These companies are some of the largest employers in the Charlotte area. The Center City area which is defined as all of the area within the I-227 loop is expected to grow to approximately 114,000 employees by the year 2030.

The Center City Streetcar is planned to extend approximately ten miles from Beatties Ford Road just beyond I-85, through Center City on Trade Street/Elizabeth Avenue, to Plaza-Midwood via Hawthorne Lane, to Eastland Mall via Central Avenue. The Center City Streetcar will establish an east-west transit spine that links all five rapid transit corridors in Center City and provide easy movement between the existing Charlotte Transportation Center and the proposed Charlotte Gateway Station, facilitating a connection between regional and inter-regional services. The Center City Streetcar also will connect major trip generators that include Central Piedmont Community College, Johnson & Wales University, Johnson C. Smith University, the Blumenthal Performing Arts Center, government offices, Charlotte Bobcats Arena, and Presbyterian Hospital.

The desire to live closer to work and interest in urban living has created an increase in residential development in the Center City and surrounding neighborhoods. The streetcar will better connect these neighborhoods and support higher densities that are encouraged by Transit Oriented Development.

4.1.1 Service

The Center City Streetcar is anticipated to serve 34 stations from Rosa Parks Place, adjacent to the County Health Department to Eastland Mall. Its ten mile alignment will take approximately 45 minutes in service travel time to complete. Average distance between stations is planned at 1/3 mile, yet stations will be more closely spaced in Center City, because of the employment and commercial densities. The streetcar average speeds are anticipated to average 14 miles per hour (mph) with a maximum speed of 30 mph. Thirteen vehicles will be utilized to operate at 7.5 minute frequency during peak periods. Midday is programmed at 10 minutes, off-peak at 15 minutes, Saturday, and Sundays and holidays at 20 minutes.

The streetcar system is intended to enhance transit service on the two of the busiest routes in the CATS system. Routes 7 and 9 which serve Central Avenue and Beatties Ford Road respectively, currently offer 10 minute frequencies during peak service periods. The streetcar offers greater capacity at the same frequency of service and will allow CATS to accommodate expected growth in ridership without increasing operating cost.

4.1.2 Market/Ridership/User Benefits

According to the regional travel demand model, the Metrolina region is expected to reach 9.7 million person trips by the year 2030. Daily trips to Center City are anticipated to increase from 290,030 to 650,000 trips during the same time period. These Center City Charlotte trips are an anticipated, 124 percent increase. Most of these trips would be home-based work trips and result from the commutes of 114,000 employees projected for the Center City Area.

The streetcar will also become a major transit connector to persons who seek access to regional institutions, such as Johnson and Wales University, Johnson C. Smith University, Blumenthal Performing Arts Center, Charlotte Bobcats Arena, Central Piedmont Community College, Presbyterian Hospital, various government offices, and others.

The streetcar is anticipated to increase Charlotte's transit market by serving a larger catchment area. Bus stops have a catchment area of $\frac{1}{4}$ mile and a premium transit service such as a streetcar has a catchment of a $\frac{1}{2}$ mile.

The streetcar is anticipated to bring more transportation user benefits than a conventional bus. Important user benefits are categorized as mobility improvements, cost effectiveness, and local financial commitment.

Mobility improvements are evaluated by estimating the utilization of the system and also projecting the number of low income households and the total employment that will have access to the facility. Utilization is derived by dividing the transportation system user benefits for all users of the transit system by passenger miles traveled on the project. The second reflects the number of low-income households and total employment within one half mile of a station or stop of the project

Cost effectiveness is the incremental cost of the project divided by hours of travel-time savings. It is reported in units of dollars per hour. Cost is defined as the estimated annualized capital cost plus annual operating and maintenance costs. Transportation system user benefit is defined as all annual travel-related benefits in terms of hours saved by all users of the transportation system including both existing and new riders.

In 2005, transit ridership for the proposed streetcar route on conventional buses is 10,191 daily riders. By 2030, daily riders are expected to reach 14,206 on conventional buses. The streetcar is expected to increase ridership to nearly 16,000 daily riders for the same alignment.

The Center City Streetcar catchment area (1/2 mile from each access point) is expected to have significant growth in employment between 2000 and 2030, by adding 45,131 jobs. Jobs in the streetcar catchment will increase from 77,307 to 122,442.

4.1.3 Farebox Revenues

The Center City Streetcar fares will be the same as the CATS conventional bus fares. CATS' base fares are \$1.20 per boarding. These fares generate 51 cents per boarding, because some passengers use bus passes or other discount rates. Bus transfers also reduce the base fare average per boarding because of its lower price. The methodology to compute farebox revenue entails multiplying the average fare per boarding, 51 cents by the total annual boardings, 5,012,062. Farebox revenue for the Center City Streetcar is estimated to be \$2,556,121 per year (does not include the cost of inflation).

As a potential alternative, it may be desirable to implement a small fare free zone in Center City. A fare free zone is a defined area in which a passenger transportation system does not charge patrons in order to use its services. All trips that begin and end within the fare free zone are at no cost. Patrons who travel outside the fare free zone pay the system's standard fare. These zones are usually near university or downtown areas. Fare free zones are generally one of many transportation demand management measures to encourage transit use, where parking is limited and/or traffic congestion heavy.

Fare free zones increase ridership, but can decrease farebox revenue. The decreases in revenue are a result from fewer paying customers which also drop the farebox recovery rates.

A center city fare free zone for the streetcar is expected to increase annual ridership to 5,661,217 and bring farebox revenue to \$2,110,222.

Benefits of fare free zones include:

- Lessen demand for parking
- More land availability (from fewer needed parking spaces)
- Reduce traffic congestion
- Increase accessibility options (with fare free incentive)

An important factor to consider about fares is the recovery rate when compared to operating costs. Generally, public transit systems do not generate farebox revenue beyond 25-45 percent of total operating costs, but the farebox recovery ratio is a significant statistic that speaks to a system's efficiency and effectiveness. According to the National Transit Database, the national average in the US is 27 percent for farebox recovery while the CATS system is closer to 21 percent.

Without the fare free zone in Center City the farebox recovery ratio for the Streetcar system is estimated at 38 percent, which is significantly higher than the system average. It is also higher than the national average. This is partly due to the fact that the corridor in general has a high propensity for transit. Routes 7 and 9, the existing services are also above the system farebox recovery average. But the efficiencies provided by the streetcar from an operating cost standpoint as well as encouraging higher ridership will help the overall system farebox recovery.

The introduction of the fare free zone in Center City would reduce the farebox recovery of the streetcar system to 31.4 percent. However, this is a ratio that is still above the system average.

4.2 ROAD NETWORK

The Center City Streetcar will operate in mixed traffic serving 34 stop locations, along a ten mile alignment. Its design will have minimal impacts on the Charlotte's streetscape and adjacent properties. This alignment will preserve the wide sidewalks that are essential to the Center City core area, and will provide an efficient and convenient system between Rosa Parks Place and Eastland Mall. Along Beatties Ford Road and Central Avenue, the streetcar will run entirely along curbside. Higher traffic volumes and speeds in these corridors, make a curbside option more attractive because the streetcar will be operating in the slower curbside travel lane. Curbside service will also avoid impacts to the recently planted median strip on Central Avenue. On Trade Street, the Center City Streetcar will have median stops at many of the Center City locations in order to preserve wide sidewalks.

4.2.1 Grade Crossings, Intersections and Roadways

The proposed Center City Streetcar alignment follows existing roadways such as Beatties Ford Road, Trade Street/Elizabeth Avenue, Hawthorne Lane, and Central Avenue. The following provides a description of the roadways the streetcar alignment will follow as well as the roadways the streetcar alignment will intersect.

Beatties Ford Road

Within the study area, Beatties Ford Road is a two-way, north-south, minor arterial with a posted speed limit of 35 miles per hour. Beatties Ford Road includes sidewalks on both sides of the street, however, no on street parking is provided. The Beatties Ford Road typical section varies within the study area and is summarized below.

The section of Beatties Ford Road between Rosa Parks Place and LaSalle Street is four-lanes with a center lane for left-turning vehicles. Between LaSalle Street and Brookshire Freeway (NC 16) southbound ramp/French Street, Beatties Ford Road consists of four lanes with left-turn lanes provided at the intersections with LaSalle Street and southbound onto Brookshire Freeway. The Beatties Ford Road southbound left turn onto the Brookshire Freeway serves as a lane drop for southbound Beatties Ford Road. From the Brookshire Freeway southbound ramp/French Street and Mill Road, Beatties Ford Road is marked for one lane southbound and two lanes northbound. The southbound lane dropped at the Brookshire Freeway southbound ramp is then reintroduced along Beatties Ford Road between Mill Road and Dixon Street which results in four lanes being maintained to the Rozzelles Ferry Road/5th Street intersection. Beatties Ford Road then turns into Trade Street south of Rozzelles Ferry Road/5th Street.

The land use is generally commercial with some residential mixed with commercial between LaSalle Street and the Brookshire Freeway/French Street. Between French Street and Rozzelles Ferry Road, land use is mostly institutional due to the Johnson C. Smith University campus.

Bus stops are located at approximately two-block intervals along Beatties Ford Road and are served by the CATS Bus Route 7. The route currently operates on 15 minute peak and 20 minute off-peak intervals.

The following is a brief description of major cross streets that intersect Beatties Ford Road in the study area.

- **Rosa Parks Place** is a two-lane, two-way, east-west local street located just north of I-85, with a posted speed of 25 miles per hour. Rosa Parks Place terminates with Beatties Ford Road to the east and North I-85 Service Road to the west.
- **I-85** is an eight-lane, two-way, north-south interstate highway with a posted speed limit of 60 miles per hour.
- **LaSalle Street** is a two-lane, two-way, east-west local street providing access between I-77 and Beatties Ford Road. The posted speed on LaSalle Street is 30 miles per hour.
- **Booker Avenue/Oaklawn Avenue** is a two-way, east-west, local street which is named Booker Avenue west of Beatties Ford Road, and Oaklawn Avenue to the east of Beatties Ford Road. Booker Avenue is a two-lane, two-way, local street with a posted speed limit of 25 miles per hour. Oaklawn Avenue is a four-lane, two-way, local street with a posted speed limit of 35 miles per hour.
- **Brookshire Freeway (NC 16)** is a four-lane, two-way, north-south freeway with a posted speed limit that varies from 50-55 miles per hour. Access to Brookshire Freeway from Beatties Ford Road is via a partial cloverleaf interchange. The Brookshire Freeway northbound ramps intersect Beatties Ford Road at a 'T' intersection north of the freeway. The Brookshire Freeway southbound ramps intersect Beatties Ford Road across from French Street, forming a four-legged intersection.

- **Dixon Street** serves as an entrance to Johnson C. Smith University to the east of Beatties Ford Road. On the west side of Beatties Ford Road, Dixon Street is a two-lane, two-way, local street with a posted speed limit of 30 miles per hour.
- **JC Smith Pedestrian Bridge** spans Beatties Ford Road near the main entrance to the University. Depending on the timing of streetcar implementation, there may be some issues with the clearance under the bridge for the overhead catenary system. Due to very low usage, the University plans to dismantle the bridge as a part of their efforts to expand and improve its main entrance and the related surface pedestrian facilities.
- **Rozzelles Ferry Road/5th Street** is a four-lane, two-way, east-west collector street with a posted speed limit of 35 miles per hour, which is named Rozzelles Ferry Road to the west of Beatties Ford Road and 5th Street to the east of Beatties Ford Road.

Trade Street

Trade Street was an important Native American trading path prior to the founding of the City of Charlotte in 1768 and has remained a primary thoroughfare all through the city's history. The intersection of Trade Street and Tryon Street is the center of Charlotte's Center City, and is a city landmark called "The Square". Charlotte's Center City is classified as the area within I-77 and I-277. Trade Street begins at Johnson C. Smith University on the west and ends at McDowell Street on the east where it becomes Elizabeth Avenue.

Trade Street, to the west of Charlotte's Center City, between Rozzelles Ferry Road and I-77 is a four-lane, two-way minor arterial, with left-turn lanes provided adjacent to the I-77 interchange. At I-77, the roadway widens to three through lanes eastbound and two through lanes westbound. The posted speed limit along Trade Street is 40 miles per hour. Trade Street includes sidewalks on both sides of the street, however, no on-street parking is provided.

The majority of land uses along Trade Street, west of Center City are commercial. Bus stops are located at approximately two-block intervals that are served by CATS Bus Route 7 – Beatties Ford Road. Buses run at approximately 9 minute peak and 20 minute off-peak intervals.

The following is a brief description of major cross streets that intersect Trade Street prior to entering the area inside the I-277 loop.

- **I-77** is a six-lane, two-way, north-south interstate highway with a posted speed limit of 55 miles per hour.

Trade Street between I-77 and I-277, is a part of Charlotte's Center City grid roadway system, which consists mostly of a four-lane undivided facility with two lanes eastbound and two lanes westbound. There are however, several areas where raised planted medians or left turn lanes are provided.

The section of Trade Street from I-77 to the Trade-4th Connector Street is classified as a principal arterial. From the Trade-4th Connector Street to I-277, Trade Street is classified as a collector Street. The posted speed limit along Trade Street is 35 miles per hour. Trade Street includes sidewalks on both sides of the street, with intermittent on street parking provided.

The majority of land uses along Trade Street, within Center City are commercial. This portion of Trade Street is serviced by the CATS Gold Rush Circulator Service Red Line Route, which runs at approximately 7 minute peak and 12 minute off-peak intervals.

The following is a brief description of major cross streets or grade separations that intersect Trade Street within the Charlotte Center City area.

- **Norfolk Southern Railroad** passes over Trade Street near the Gateway Center area of Center City. In addition to freight rail service, the overpass will be utilized by the North Commuter Rail Line. The bridge also represents a low clearance area for streetcar implementation, which is addressed in the conceptual design.
- **Graham Street** is a four-lane, two-way, north-south principal arterial.
- **Mint Street/Pine Street** is a three lane, one-way, southbound local street.
- **Poplar Street** is a two-lane, one-way, northbound local street.
- **Church Street** is a two-lane, one way, southbound minor arterial street.
- **Tryon Street** is a four-lane, two-way, north-south collector street.
- **College Street** is a three-lane, one-way, northbound minor arterial.
- **LYNX Light Rail Line** is a north-south 9.6 mile corridor east of I-77, which will run from the CATS Transportation Center to the south near I-485, while providing 15 stations.
- **Brevard Street** is a two-lane, one-way, southbound minor arterial adjacent to the CATS Transportation Center.
- **Caldwell Street** is a two-lane, two-way, north-south minor arterial.
- **Davidson Street** is a four lane, two-way, north-south local street.
- **Alexander Street** is a short one-way, north-south local street.
- **McDowell Street** is a two-lane, two-way, north-south principal arterial.

Elizabeth Avenue

After crossing McDowell Street, Trade Street becomes Elizabeth Avenue. Elizabeth Avenue is a two-way, east-west collector street with a posted speed limit of 35 miles per hour. From McDowell Street to Kings Drive it has two lanes in each direction. From Kings Drive to Hawthorne Lane, Elizabeth Avenue is currently marked for one lane westbound and two lanes eastbound. Opposite of the Elizabeth Avenue termination is the main entrance of Presbyterian Hospital.

The City of Charlotte is implementing a streetscape improvement project which entails the widening of sidewalks, the addition of bike lanes, curbside parking and moving existing above-ground utilities underground. The project also includes the construction of the rails for the CATS Center City Streetcar in order to avoid retrofitting rails in the future. Upon completion of the streetscape project, Elizabeth Avenue will become a two lane, two-way minor arterial. This constitutes a reduction in capacity for the roadway.

The majority of land uses along Elizabeth Avenue are commercial and institutional. Bus stops are located at approximately two-block intervals that are served by the CATS Bus Route 39. Buses operate on approximately 30 minute peak and 60 minute off-peak intervals.

The following is a brief description of major cross streets that intersect Elizabeth Avenue within the study area.

- **I-277** is an interstate highway loop around Center City Charlotte with a posted speed limit of 55 miles per hour. I-277 is a six to eight-lane, two-way facility which forms a grade separation with Elizabeth Avenue.
- **Kings Drive** is a four lane, divided, two-way, north-south minor arterial.
- **Independence Boulevard** is a four lane, two-way, east-west local street where crossing Elizabeth Avenue.
- **Hawthorne Lane** is a four lane, two-way, north-south collector street.

Hawthorne Lane

Hawthorne Lane is a north-south, collector street, which runs from the south at 4th Street to the north at Parkwood Avenue. Hawthorne Lane south of Elizabeth Avenue is a four lane, two-way, facility with a posted speed limit of 35 miles per hour. There are sidewalks on both sides of the street with commercial land use on the west and institutional land use on the east. Bus stops are located at approximately two-block intervals that are served by the CATS Bus Route 20. Buses operate on approximately 30 minute peak and 60 minute off-peak intervals.

Hawthorne Lane between Elizabeth Avenue and Central Avenue is a four-lane, two-way, north-south collector street with a posted speed limit of 35 miles per hour. There are sidewalks along both sides of the street with very large trees lining the both sides of the street south of Independence Boulevard. The land uses along Hawthorne Lane are mixed between commercial and multi-family residential on the west and institutional and multi-family residential on the east between Elizabeth Avenue and Park Drive. Land use between Park Drive and 7th Street consists of Park/open space, with predominantly single-family and multi-family residential between 7th Street and Central Avenue. Bus stops are located at approximately two-block intervals that are served by the CATS Bus Route 39. Buses operate on approximately 30 minute peak and 60 minute off-peak intervals.

Hawthorne Lane, north of Central Avenue is a two-lane, two-way, north-south collector street with sidewalks on both sides of the street. Land use along this portion of Hawthorne Lane consists mostly of commercial and industrial, before transitioning to Park/Open space and ultimately residential as Hawthorne Lane ends at Parkwood Avenue. Mid-block is a bridge, passing over Hawthorne Lane to accommodate CSX ROW. The conceptual design must address the underpass' low clearance.

The following is a brief description of major cross streets that intersect Hawthorne Lane within the study area.

- **5th Street** is a two-lane, two-way east-west local street with a posted speed limit of 25 miles per hour.
- **7th Street** is a three-lane, two-way east-west, minor arterial with one lane in each direction and an interchangeable center turn lane. The posted speed limit is 35 miles per hour.
- **Independence Boulevard** is a six-lane, two-way east-west, expressway which forms a grade separation with Hawthorne Lane. Independence Boulevard also includes two-lane, two-way HOV lanes within the median.

Central Avenue

Central Avenue is an east-west minor arterial, which begins at the Kings Drive/7th Street intersection (western terminus). The streetcar alignment crosses Central Avenue at Hawthorne and then enters the roadway at Clement Avenue. Central Avenue continues to the east where it ends at Albemarle Road. Between 7th Street and The Plaza, Central Avenue consists of sidewalks on both sides of the street with four lanes serving two-way traffic and turn lanes are provided at major intersections. The posted speed limit is 35 miles per hour with the land use generally commercial in this area.

Between The Plaza and Albemarle Road, Central Avenue widens to a four-lane, two-way, with left and right-turn lanes at major intersections. Bicycle lanes and sidewalks are on both sides of Central Avenue between Cyrus Drive and Sharon Amity Road. The land uses along Central Avenue include mostly commercial and multi-family residential uses. The CATS Bus Route 9 operates the Central Avenue corridor on 8 minute peak and 20 minute off-peak interval.

The following is a brief description of major cross streets that intersect Central Avenue in the study area.

- **Pecan Avenue** is a two-lane, two-way, local street with a posted speed limit of 25 miles per hour.
- **Thomas Avenue** is a two-lane, two-way, local street with a posted speed limit of 25 miles per hour.
- **The Plaza** is a two-lane, two-way major arterial with a posted speed limit of 35 miles per hour near the project limits.
- **Morningside Drive** is a two-lane, two-way, local street with a posted speed limit of 25 miles per hour.
- **Eastcrest Drive** is a two-lane, two-way, local street with a posted speed limit of 30 miles per hour which terminates at a "T" intersection on the south side of Central Avenue.
- **Briar Creek Road** is a two-lane, two-way, collector street with a posted speed limit of 35 miles per hour which terminates as a "T" intersection on the south side of Central Avenue.
- **Eastway Drive** is a four-lane, two-way principal arterial with a posted speed limit of 45 miles per hour.
- **Norland Road/Kilbourne Drive** is a two-lane, two-way, minor arterial. North of Central Avenue, the roadway is named Kilbourne Drive and has a posted speed limit of 35 miles per hour; south of Central Avenue, the roadway is named Norland Road and has a posted speed limit of 25 miles per hour.
- **Sharon Amity Road** is a four-lane, two-way, principal arterial, with a raised median to the north of Central Avenue and a center lane for left-turning vehicles to the south of Central Avenue. The posted speed limit is 45 miles per hour.
- **The Eastland Mall West Entrance** is a two-lane, two-way private street. The entrance is one of three Central Avenue entrances into Eastland Mall.

4.2.2 System Performance and Congestion

Traffic analysis for the streetcar project was completed in two distinct phases. City traffic engineers performed the analysis of roadway segments and intersections within Center City (within the I-277 loop) as a part of their work on other Center City transportation initiatives. The streetcar consultant conducted the traffic analyses for the rest of the streetcar alignment. Two documents were prepared as a result of the traffic analysis: The *Traffic Impact Analysis for Proposed Streetcar Alternatives along Trade Street* which covers the segments within the I-277 loop and the *Center City Streetcar Corridor Travel Analysis* which covers the rest of the alignment. The analyses examine the 2004 Existing Conditions as well as the 2030 No Build Alternative and 2030 Build Alternative.

The 2004 Existing Conditions were analyzed in order to evaluate the capacity conditions of the existing roadway. The 2030 No Build Alternative assumes that the Center City Streetcar project would not be constructed and that there are currently no roadway improvements projects planned or programmed as part of the NCDOT 2006-2012 TIP that would affect this project. The 2030 No Build Alternative analysis serves as a baseline condition from which the impacts of changes in traffic patterns due to the proposed project can be measured. The 2030 Build Alternative represents future traffic flow conditions in the study area with the Center City Streetcar Corridor in place. This alternative includes all the roadway improvement projects included in the 2030 No Build Alternative and the improvements by the Center City Streetcar Corridor project team's recommendations as discussed in further detail under the 2030 Build Alternative portion of Section 4.2.3. To keep the analysis conservative, 2030 traffic volumes were not adjusted to reflect the potential of reduction in traffic attributable to increased transit ridership in the corridor. The traffic volumes used for the 2030 Build Alternative are the same as those under the 2030 No Build Alternative. Analysis will be performed on arterial segments and major intersections along the streetcar corridor for all three scenarios.

4.2.3 Arterial Capacity Analysis

VISSIM was used to determine the impacts of transit service on the existing roadway grid network in Center City Charlotte. Measures of effectiveness reported from VISSIM for Arterial Analysis include Travel Time and Average Speed. Travel Time is the amount of time the average vehicle takes in traversing a portion of the network. Average Speed is the speed the average vehicle can expect to maintain along each segment. Average Speed is then correlated to 2000 *Highway Capacity Manual* (HCM) Level of Service based upon the Urban Street Class. The section of the Streetcar corridor analyzed within the I-277 loop would be classified by HCM as a Class IV Urban Street.

For the rest of the corridor, the *2002 Quality/Level of Service Handbook*, issued by the Florida Department of Transportation was approved by the Charlotte DOT and used to analyze the Streetcar Corridor sections of arterials located outside of Center City Charlotte. According to the Handbook, average travel speed is typically the service measure used to determine Level of Service for a signalized segment of roadway. Use of "Table 4-1 Generalized Annual Average Daily Volumes for Urbanized Areas", which is included in the handbook is recommended in order to account for traffic volume as a variable in the determination of Level of Service by means of the volume to capacity ratio calculation by roadway Class. The Handbook classifies the Streetcar alignment along Beatties Ford and Central Avenue as Class II corridor. The calculation of the volume to capacity ratio is the ratio of the traffic demand or Average Annual Daily Traffic and the capacity or the volume the number of lanes can service. As set forth in the 2000 edition of the HCM, the volume to capacity ratio ranges from 0.0 to 1.0 with 1.0 indicating that the traffic demand is fully utilizing the capacity provided by the facility. Given the volume to

capacity ratio, the Level of Service can be determined. Six levels of service – from A to F – are directly related to the volume. Level of Service A represents no congestion; Level of Service E represents long delays; and Level of Service F represents excessive delays.

2004 Existing Conditions analysis included existing conditions along Beatties Ford Road, Trade Street, Elizabeth Avenue, Hawthorne Lane and Central Avenue and assumed that the Center City Streetcar project would not be constructed.

The 2004 Existing Conditions analysis for Center City included the entire length of Trade Street. Morning peak traffic along this section of Trade Street has, by direction, the highest approach volume of any time of day. As a result, evening peak hour traffic was not analyzed. Analysis for westbound Trade Street resulted with an average speed of 14.98 miles per hour which would correlate to an HCM Level of Service C. Analysis for eastbound Trade Street resulted with an average speed of 15.59 miles per hour which would correlate to an HCM Level of Service C.

Outside the I-277 loop, the analysis included 27 arterial segments within the study area. The analysis shows that for the 2004 Existing Conditions, the traffic demand on Beatties Ford Road, Trade Street, Hawthorne Lane and Central Avenue (west of Morningside Drive) is well below the routes' capacities. The one section in which traffic demand is approaching or currently exceeds roadway capacity is on Central Avenue between Morningside Drive and Sharon Amity Road.

A summary of the results of the arterial capacity analyses for the 2030 Build Alternative is provided in Table 4-1 and Table 4-2.

Table 4-1: Arterial Capacity Analysis 2004 Existing Conditions within I-277 Loop

| Segment | | Average Speed (mph) | Level of Service |
|-----------------|-----------------|------------------------|---------------------|
| From | To | | |
| Trade Street | | | |
| McDowell Street | Cedar Street | 14.98 | C |
| Cedar Street | McDowell Street | 15.59 | C |

Source: Charlotte Department of Transportation

Table 4-2: Arterial Capacity Analysis 2004 Existing Conditions outside I-277 Loop

| Segment | | Average Annual Daily Traffic (vpd) | Level of Service | V/C Ratio |
|---|---|------------------------------------|------------------|-----------|
| From | To | | | |
| Beatties Ford Road | | | | |
| Hoskins Rd. | I-85 | 29,800 | D | 0.86 |
| I-85 | Service Road NB | 27,700 | D | 0.80 |
| Service Road NB | Lasalle St. | 17,000 | C | 0.49 |
| Lasalle St. | Oaklawn Ave. | 12,000 | C | 0.35 |
| Oaklawn Ave. | Brookshire Fwy. SB ramps/ French St. | 16,700 | C | 0.48 |
| Brookshire Fwy. SB ramps/ French St. | Dixon St. | 10,200 | C | 0.40 |
| Dixon St. | Rozzelles Ferry Rd. | 10,200 | C | 0.30 |
| Trade Street | | | | |
| Rozzelles Ferry Rd. | Wesley Heights Rd. | 15,900 | C | 0.46 |
| Wesley Heights Way | I-77 SB ramps | 21,600 | C | 0.63 |
| I-77 SB ramps | I-77 NB ramps | 23,100 | C | 0.67 |
| I-77 NB ramps | Johnson and Wales Wy. | 22,000 | C | 0.64 |
| Hawthorne Lane | | | | |
| Elizabeth Av. | 5 th St. | 11,900 | C | 0.34 |
| 5 th St. | 7 th St. | 11,900 | C | 0.34 |
| 7 th St. | Bay St. | 9,500 | C | 0.28 |
| Bay St. | Sunnyside Ave. | 9,500 | C | 0.28 |
| Sunnyside Ave. | Central Ave. | 9,500 | C | 0.28 |
| Central Avenue | | | | |
| Hawthorne Ln. | Pecan Ave. | 29,000 | D | 0.84 |
| Pecan Ave. | Thomas Ave. | 29,000 | D | 0.84 |
| Thomas Ave. | The Plaza | 29,000 | D | 0.84 |
| The Plaza | Club Rd. | 23,700 | C | 0.69 |
| Club Rd. | Morningside Dr. | 23,700 | C | 0.69 |
| Morningside Dr. | Briar Creek Rd. | 33,200 | E | 0.96 |
| Briar Creek Rd. | Eastway Dr. | 34,500 | F | 1.00 |
| Eastway Dr. | Norland Dr. | 31,300 | D | 0.91 |
| Norland Dr. | Rosehaven Dr. | 36,800 | F | 1.07 |
| Rosehaven Dr. | Sharon Amity Rd. | 36,800 | F | 1.07 |
| Sharon Amity Rd. | Reddman Rd. | 23,200 | C | 0.67 |

Source: *Center City Streetcar Corridor Traffic Analysis (2006)*

2030 No Build Alternative conditions assume that the Center City Streetcar project would not be constructed and that there are currently no roadway improvements projects planned or programmed as part of the NCDOT 2006-2012 TIP that would affect this project. The 2030 No Build Alternative analysis serves as a baseline condition from which the impacts of changes in traffic patterns due to the proposed project can be measured.

The 2030 No Build Alternative analysis for inside the I-277 loop included Trade Street as a corridor from Graham Street to Brevard Street. Morning peak traffic along this section of Trade Street has, by direction, the highest approach volume of any time of day. As a result, evening peak hour traffic was not analyzed. Analysis for Trade Street as a corridor resulted with an average speed of 14.86 miles per hour for westbound and 15.40 miles per hour for eastbound, which correlates to an HCM Level of Service C for both. Analysis for westbound Trade Street from Graham Street to Brevard Street resulted with an average speed of 10.9 miles per hour which would correlate to an HCM Level of Service D. Analysis for eastbound Trade Street from Brevard Street to Graham Street resulted with an average speed of 12.0 miles per hour which would correlate to an HCM Level of Service D.

The 2030 No Build Alternative analysis for outside I-277 Loop included 27 arterial segments and shows that the roads analyzed within the study area would be congested with several segments failing to serve the future traffic demand by the year 2030. Segments where traffic demand would exceed capacity include segments of Beatties Ford Road north of I-85, Trade Street near I-77 and the majority of Central Avenue. Central Avenue where traffic demand is below the roadway's capacity includes the segments from The Plaza to Morningside Drive and from Sharon Amity Road to Reddman Road.

A summary of the results of the arterial capacity analyses for the 2030 No Build Alternative is provided in Table 4-3 and Table 4-4.

Table 4-3: Arterial Capacity Analysis 2030 No Build Alternative within I-277 Loop

| Segment | | Average Speed (mph) | Level of Service |
|--|----------------|------------------------|---------------------|
| From | To | | |
| Trade Street | | | |
| Graham Street | Brevard Street | 10.9 | D |
| Brevard Street | Graham Street | 12.0 | D |
| Entire Trade Street Corridor westbound | | 14.86 | C |
| Entire Trade Street Corridor eastbound | | 15.40 | C |

Source: Charlotte Department of Transportation

Table 4-4: Arterial Capacity Analysis 2030 No Build Alternative outside I-277 Loop

| Segment | | Average Annual Daily Traffic (vpd) | Level of Service | V/C Ratio |
|--------------------------------------|--|------------------------------------|------------------|-----------|
| From | To | | | |
| Beatties Ford Road | | | | |
| Hoskins Rd. | I-85 | 40,800 | F | 1.18 |
| I-85 | Service Road NB | 44,000 | F | 1.28 |
| Service Road NB | Lasalle St. | 33,800 | E | 0.98 |
| Lasalle St. | Oaklawn Ave. | 23,600 | C | 0.68 |
| Oaklawn Ave. | Brookshire Frwy. SB ramps/ French St. | 25,000 | C | 0.72 |
| Brookshire Frwy. SB ramps/French St. | Dixon St. | 20,600 | D | 0.81 |
| Dixon St. | Rozzelles Ferry Rd. | 20,600 | C | 0.60 |
| Trade Street | | | | |
| Rozzelles Ferry Rd. | Wesley Heights Rd. | 24,000 | C | 0.70 |
| Wesley Heights Way | I-77 SB ramps | 31,700 | D | 0.92 |
| I-77 SB ramps | I-77 NB ramps | 38,900 | F | 1.13 |
| I-77 NB ramps | Johnson and Wales Wy. | 41,400 | F | 1.20 |
| Hawthorne Lane | | | | |
| Elizabeth Ave. | 5th St. | 14,900 | C | 0.43 |
| 5th St. | 7th St. | 14,900 | C | 0.43 |
| 7th St. | Bay St. | 11,900 | C | 0.34 |
| Bay St. | Sunnyside Ave. | 11,900 | C | 0.34 |
| Sunnyside Ave. | Central Ave. | 11,900 | C | 0.34 |
| Central Avenue | | | | |
| Hawthorne Ln. | Pecan Ave. | 38,500 | F | 1.12 |
| Pecan Ave. | Thomas Ave. | 35,800 | F | 1.04 |
| Thomas Ave. | The Plaza | 35,800 | F | 1.04 |
| The Plaza | Club Rd. | 31,500 | D | 0.91 |
| Club Rd. | Morningside Dr. | 31,500 | D | 0.91 |
| Morningside Dr. | Briar Creek Rd. | 44,000 | F | 1.28 |
| Briar Creek Rd. | Eastway Dr. | 45,800 | F | 1.33 |
| Eastway Dr. | Norland Dr. | 35,300 | F | 1.02 |
| Norland Dr. | Rosehaven Dr. | 41,400 | F | 1.20 |
| Rosehaven Dr. | Sharon Amity Rd. | 41,400 | F | 1.20 |
| Sharon Amity Rd. | Reddman Rd. | 26,100 | D | 0.76 |

Source: *Center City Streetcar Corridor Traffic Analysis (2006)*

2030 Build Alternative conditions assume that the Center City Streetcar project would be constructed and that there are currently no roadway improvements projects planned or programmed as part of the NCDOT 2006-2012 TIP that would affect this project. The City, however, will be completing the Elizabeth Avenue streetscape project that will reduce the roadway from four lanes to two lanes between Kings Drive and Hawthorne Lane.

Additional improvements assumed with the 2030 Build Alternative, include the following changes:

Beatties Ford Road:

- No changes between Rosa Parks Place and Dixon Street
- Two lanes with a center left-turn lane between Dixon Street and Rozzelles Ferry Road

Trade Street:

- Two lanes with a center left-turn lane between Rozzelles Ferry Road and Wesley Heights Way
- No changes between Wesley Heights Way and Johnson and Wales Way

Hawthorne Lane:

- Two lanes with a center left-turn lane between Elizabeth Avenue and 7th Street (Per City of Charlotte Road diet project)

Central Avenue:

- No changes between Hawthorne Lane and Reddman Road

The 2030 Build Alternative analysis within the I-277 loop included Trade Street from Graham Street to Brevard Street and for Trade Street as a corridor. Morning peak traffic along this section of Trade Street has, by direction, the highest approach volume of any time of day. As a result, evening peak hour traffic was not analyzed. Analysis for Trade Street as a corridor resulted with an average speed of 14.69 miles per hour for westbound and 14.90 miles per hour for eastbound, which correlates to an HCM Level of Service C for both. Analysis for westbound Trade Street from Graham Street to Brevard Street resulted with an average speed of 10.9 miles per hour which would correlate to an HCM Level of Service D. Analysis for eastbound Trade Street from Brevard Street to Graham Street resulted with an average speed of 11.5 miles per hour which would correlate to an HCM Level of Service D.

The 2030 Build Alternative analysis for the alignment outside I-277 was performed for the Center City Streetcar Corridor along Beatties Ford Road, Trade Street, Hawthorne Lane, and Central Avenue. The 2030 Build Alternative analysis included 27 arterial segments and shows that the roads analyzed within the study area would be congested with several segments failing to serve the future traffic demand by the year 2030.

On Beatties Ford Road, between Rosa Parks Place and Brookshire Freeway, the roadway cross-section is unchanged, with the analysis resulting with the v/c ratios remaining the same as under the 2030 No Build Alternative. Between Brookshire Freeway and Wesley Heights Way, Beatties Ford Road was reduced from four through lanes to two through lanes plus a center median/left-turn lane as needed. The arterial analysis for the 2030 Build Alternative indicates that traffic demand will exceed the roadway capacity on this segment of Beatties Ford Road as well.

On Trade Street west of I-77, the roadway cross-section is unchanged and the v/c ratio will remain the same as under the 2030 No Build Alternative, except for the segment of Trade Street between Rozzelles Ferry Road and Wesley Heights Way.

On Hawthorne Lane, between Elizabeth Avenue and 7th Street the roadway cross-section is reduced from four lanes to two lanes with a center median/left-turn lane. Due to the reduction in capacity, the v/c ratios will increase, however, the traffic demand will still remain below the route's capacity.

On Central Avenue, the change in roadway capacity is negligible between the 2030 No Build Alternative and the 2030 Build Alternative and the v/c ratios remain essentially the same. All sections, except the segment of Central Avenue between The Plaza and Morningside Drive and the segment between Sharon Amity Road and Reddman Road, will have traffic demand exceeding capacity.

A summary of the results of the arterial capacity analyses for the 2030 Build Alternative is provided in Table 4-5 and Table 4-6.

Table 4-5: Arterial Capacity Analysis 2030 Build Alternative within I-277 Loop

| Segment | | Average Speed | Level |
|--|----------------|---------------|------------|
| From | To | (mph) | of Service |
| Trade Street | | | |
| Graham Street | Brevard Street | 10.9 | D |
| Brevard Street | Graham Street | 11.5 | D |
| Entire Trade Street Corridor westbound | | 14.69 | C |
| Entire Trade Street Corridor eastbound | | 14.90 | C |

Source: Charlotte Department of Transportation

Table 4-6: Arterial Capacity Analysis 2030 Build Alternative outside I-277 Loop

| Segment | | Average | Level | V/C |
|--------------------------------------|--------------------------------------|----------------------------|------------|-------|
| From | To | Annual Daily Traffic (vpd) | of Service | Ratio |
| Beatties Ford Road | | | | |
| Hoskins Rd. | I-85 | 40,800 | F | 1.18 |
| I-85 | Gilbert St. | 44,000 | F | 1.28 |
| Gilbert St. | Lasalle St. | 33,800 | E | 0.98 |
| Lasalle St. | Oaklawn Ave. | 23,600 | C | 0.68 |
| Oaklawn Ave. | Brookshire Frwy. SB ramps/French St. | 25,000 | C | 0.72 |
| Brookshire Frwy. SB ramps/French St. | Dixon St. | 20,600 | F | 1.26 |
| Dixon St. | Rozzelles Ferry Rd. | 20,600 | F | 1.26 |
| Trade Street | | | | |
| Rozzelles Ferry Rd. | Wesley Heights Rd. | 24,000 | F | 1.47 |
| Wesley Heights Way | I-77 SB ramps | 31,700 | D | 0.92 |
| I-77 SB ramps | I-77 NB ramps | 38,900 | F | 1.13 |
| I-77 NB ramps | Johnson and Wales Wy. | 41,400 | F | 1.20 |
| Elizabeth Avenue | | | | |
| McDowell Street | Independence Blvd. | 24,000 | F | 1.47 |
| Independence Blvd. | Hawthorne Lane | 31,700 | D | 0.92 |

Table 4-6: Arterial Capacity Analysis 2030 Build Alternative outside I-277 Loop (Cont.)

| Hawthorne Lane | | | | | |
|----------------|------------------|------------------|--------|---|------|
| | Elizabeth Ave. | 5th St. | 14,900 | D | 0.91 |
| | 5th St. | 7th St. | 14,900 | D | 0.91 |
| | 7th St. | Bay St. | 11,900 | D | 0.73 |
| | Bay St. | Sunnyside Ave. | 11,900 | D | 0.73 |
| | Sunnyside Ave. | Central Ave. | 11,900 | D | 0.73 |
| Central Avenue | | | | | |
| | Hawthorne Ln. | Pecan Ave. | 38,500 | F | 1.12 |
| | Pecan Ave. | Thomas Ave. | 35,800 | F | 1.04 |
| | Thomas Ave. | The Plaza | 35,800 | F | 1.04 |
| | The Plaza | Club Rd. | 31,500 | D | 0.91 |
| | Club Rd. | Morningside Dr. | 31,500 | D | 0.91 |
| | Morningside Dr. | Briar Creek Rd. | 44,000 | F | 1.28 |
| | Briar Creek Rd. | Eastway Dr. | 45,800 | F | 1.33 |
| | Eastway Dr. | Norland Dr. | 35,300 | F | 1.02 |
| | Norland Dr. | Rosehaven Dr. | 41,400 | F | 1.20 |
| | Rosehaven Dr. | Sharon Amity Rd. | 41,400 | F | 1.20 |
| | Sharon Amity Rd. | Reddman Rd | 26,100 | D | 0.76 |

Source: *Center City Streetcar Corridor Traffic Analysis (2006)*

4.2.4 Intersection Capacity Analysis

At intersections, the Level of Service is used to measure delay. Six levels of service – from A to F – are related to vehicle delay. Level of Service A represents no congestion; Level of Service E represents long delays; and Level of Service F represents excessive delays with vehicles having to wait several signal cycles to clear an intersection. The capacity of a roadway is usually limited by the capacity of its intersections, therefore the major intersections along the Center City Streetcar corridor where analyzed for the 2004 Existing Conditions, the 2030 No Build Alternative and the 2030 Build Alternative.

2004 Existing Conditions within I-277 Loop were not analyzed; however outside I-277 Loop 2004 Existing Conditions were analyzed in order to evaluate the capacity conditions of the existing major intersections along the streetcar corridor. The 2004 Existing Conditions analysis included 22 signalized intersections and one unsignalized intersection within the study area. Of the 22 signalized intersections, traffic flow with minimal congestion (v/c ratio less than 0.85) occurred at 19 intersections, traffic flow with moderate congestion (v/c ratio between 0.85 and 0.94) occurred at two intersections, and traffic flow with severe congestion (v/c ratio 0.95 or greater) occurred at one intersection.

At the Unsignalized intersection of Trade Street at the I-77 southbound ramps, traffic on the cross street has long delays during the PM peak hour, which suggests the intersection should be monitored to determine whether a traffic signal is warranted.

A summary of the results of the intersection capacity analyses for the 2004 Existing Conditions is provided in Table 4-7.

Table 4-7: Intersection Capacity Analysis 2004 Existing Conditions outside I-277 Loop

| Major Street Cross Street | | AM Peak Hour | | | PM Peak Hour | | |
|------------------------------|---|--------------------|---------------------|--------------|--------------------|---------------------|-----------|
| | | Delay (seconds) | Level of Service | V/C Ratio | Delay (seconds) | Level of Service | V/C Ratio |
| Beatties Ford Rd. | | | | | | | |
| | I-85 SB ramps | 31.1 | C | 0.94 | 17.6 | B | 0.65 |
| | I-85 NB ramps | 8.0 | A | 0.65 | 11.4 | B | 0.65 |
| | LaSalle St. | 10.9 | B | 0.52 | 18.1 | B | 0.66 |
| | Booker Ave./Oaklawn Ave. | 6.2 | A | 0.52 | 11.8 | B | 0.64 |
| | Brookshire Frwy NB ramps | 9.4 | A | 0.49 | 28.7 | C | 0.67 |
| | Brookshire Frwy SB ramps/ French St. | 3.4 | A | 0.53 | 5.2 | A | 0.34 |
| | Dixon St. | 1.9 | A | 0.25 | 3.1 | A | 0.35 |
| | Rozzelles Ferry Rd./5 th St. | 13.6 | B | 0.34 | 13.8 | B | 0.55 |
| Trade St. | | | | | | | |
| | I-77 SB ramps | 25.0 | C | N/A | 94.0 | F | N/A |
| | I-77 NB ramps | 18.6 | B | 0.51 | 9.9 | A | 0.40 |
| Hawthorne Ln. | | | | | | | |
| | Elizabeth Ave. | 17.7 | B | 0.48 | 13.2 | B | 0.38 |
| | 5 th St. | 14.7 | B | 0.42 | 16.9 | B | 0.32 |
| | 7 th St. | 21.5 | C | 0.68 | 21.5 | C | 0.70 |
| Central Ave. | | | | | | | |
| | Pecan Ave. | 11.3 | B | 0.62 | 7.6 | A | 0.49 |
| | Thomas Ave. | 2.5 | A | 0.40 | 4.5 | A | 0.44 |
| | The Plaza | 17.7 | B | 0.48 | 21.2 | C | 0.60 |
| | Morningside Dr. | 6.4 | A | 0.40 | 7.8 | A | 0.49 |
| | Eastcrest Dr. | 2.8 | A | 0.36 | 4.3 | A | 0.41 |
| | Briar Creek Rd. | 9.7 | A | 0.63 | 22.1 | C | 0.72 |
| | Eastway Dr. | 39.6 | D | 0.85 | 49.8 | D | 0.90 |
| | Kilbourne Dr/Norland Rd. | 29.1 | C | 0.60 | 40.0 | D | 0.81 |
| | Sharon Amity Rd. | 48.6 | D | 0.80 | 66.3 | E | 0.99 |
| | Eastland Mall west entrance | 1.7 | A | 0.38 | 5.7 | A | 0.42 |

Source: Center City Streetcar Corridor Traffic Analysis (2006)

2030 No Build Alternative conditions assume that the Center City Streetcar project would not be constructed and that there are currently no roadway improvements projects planned or programmed as part of the NCDOT 2006-2012 TIP that would affect this project. The City of Charlotte proposes modifications to the intersection of Elizabeth Avenue and Hawthorne Lane, which consists of providing one through lane shared with left-turning movements and an exclusive right-turn lane for the eastbound approach, providing one through lane shared with both left and right-turning movements for the westbound approach and no changes for the northbound and southbound Hawthorne Lane approaches. The 2030 No Build Alternative analysis serves as a baseline condition from which the impacts of changes in traffic patterns due to the proposed project can be measured.

The 2030 No Build Alternative analysis for conditions within the I-277 Loop were analyzed in order to evaluate the capacity conditions of the intersections of Church Street, Tryon Street and College Street with Trade Street. Morning peak traffic along this section of Trade Street has, by direction, the highest approach volume of any time of day. As a result, evening peak hour traffic was not analyzed. VISSIM reported a Peak Hour Delay of 28.6 seconds for the Church Street/Trade Street intersection, 12.9 seconds for the Tryon Street/Trade Street intersection and 19.7 seconds for the College Street/Trade Street intersection resulting with HCM equivalent Levels of Service of C, B and B respectively.

The 2030 No Build Alternative analysis for conditions outside I-277 Loop were analyzed in order to evaluate the capacity conditions of the major intersections along the streetcar corridor. The 2030 No Build Alternative analysis included 23 signalized intersections within the study area. Of the 23 intersections analyzed, traffic flow with minimal congestion (v/c ratio 0.85 or lower) occurred at 10 intersections, traffic flow with moderate congestion (v/c ratio between 0.85 and 0.94) occurred at five intersections, and traffic flow with severe congestion (v/c ratio 0.95 or greater) occurred at eight intersections.

A summary of the results of the intersection capacity analyses for the 2030 No Build Alternative is provided in Table 4-8 and Table 4-9.

Table 4-8: Intersection Capacity Analysis 2030 No Build Alternative within I-277 Loop

| Major Street Cross Street | AM Peak Hour | |
|------------------------------|--------------------|------------------|
| | Delay (seconds) | Level of Service |
| Trade Street | | |
| Church Street | 28.6 | C |
| Tryon Street | 12.9 | B |
| College Street | 19.7 | B |

Source: Charlotte Department of Transportation

Table 4-9: Intersection Capacity Analysis 2030 No Build Alternative outside I-277 Loop

| Major Street Cross Street | AM Peak Hour | | | PM Peak Hour | | |
|---|--------------------|---------------------|--------------|--------------------|---------------------|--------------|
| | Delay (seconds) | Level of Service | V/C Ratio | Delay (seconds) | Level of Service | V/C Ratio |
| Beatties Ford Rd. | | | | | | |
| I-85 SB ramps | 43.8 | D | 1.01 | 23.6 | C | 0.81 |
| I-85 NB ramps | 37.1 | D | 0.98 | 19.8 | B | 0.91 |
| LaSalle St. | 33.4 | C | 0.88 | 21.8 | C | 0.88 |
| Booker Ave./Oaklawn Ave. | 58.3 | E | 0.97 | 36.3 | D | 0.96 |
| Brookshire Frwy NB ramps | 18.1 | B | 0.64 | 48.5 | D | 0.71 |
| Brookshire Frwy SB ramps/ French St. | 14.5 | B | 0.88 | 9.5 | A | 0.53 |
| Dixon St. | 13.9 | B | 0.56 | 6.7 | A | 0.64 |
| Rozzelles Ferry Rd./5 th St. | 125.8 | F | 1.10 | 95.5 | F | 1.08 |
| Trade St. | | | | | | |
| I-77 SB ramps | 6.0 | A | 0.48 | 7.1 | A | 0.68 |
| I-77 NB ramps | 28.0 | C | 0.79 | 13.2 | B | 0.61 |
| Hawthorne Ln. | | | | | | |
| Elizabeth Ave. | 20.9 | C | 0.77 | 13.9 | B | 0.53 |
| 5 th St. | 10.2 | B | 0.49 | 9.9 | A | 0.37 |
| 7 th St. | 27.2 | C | 0.76 | 26.8 | C | 0.87 |
| Central Ave. | | | | | | |
| Pecan Ave. | 39.7 | D | 1.03 | 28.0 | C | 0.87 |
| Thomas Ave. | 5.5 | A | 0.58 | 14.3 | B | 0.64 |
| The Plaza | 41.0 | D | 0.91 | 45.0 | D | 0.84 |
| Morningside Dr. | 12.0 | B | 0.54 | 10.2 | B | 0.58 |
| Eastcrest Dr. | 12.0 | B | 0.62 | 8.7 | A | 0.62 |
| Briar Creek Rd. | 29.7 | C | 0.82 | 35.6 | D | 0.89 |
| Eastway Dr. | 61.2 | E | 1.00 | 60.2 | E | 1.04 |
| Kilbourne Dr/Norland Rd. | 34.1 | C | 0.81 | 51.5 | D | 0.98 |
| Sharon Amity Rd. | 97.4 | F | 1.15 | 77.8 | E | 1.06 |
| Eastland Mall west entrance | 8.2 | A | 0.39 | 11.0 | B | 0.42 |

Source: Center City Streetcar Corridor Traffic Analysis (2006)

2030 Build Alternative conditions assume that the Center City Streetcar project would be constructed and that there are currently no roadway improvements projects planned or programmed as part of the NCDOT 2006-2012 TIP that would affect this project.

Additional improvements assumed with the 2030 Build Alternative, include the following changes:

Beatties Ford Road at Brookshire Freeway (NC 16) Southbound Ramps/French Street

- **Eastbound:** One exclusive left-turn lane
One through lane shared with right-turning movements
- **Westbound:** No change
- **Northbound:** No change
- **Southbound:** One exclusive left-turn lane

Beatties Ford Road at Dixon Street

- ***Eastbound: No change***
- ***Westbound: No change***
- ***Northbound: One exclusive left-turn lane***
One through lane shared with right-turning movements
- ***Southbound: One through lane shared with right-turning movements***

Beatties Ford Road at Rozzelles Ferry Road

- **Eastbound:** One exclusive left-turn lane
Two through lanes (one shared with right-turning movements)
- **Westbound:** No change
- **Northbound:** Two exclusive left-turning lanes
One through lane shared with right-turning movement
- **Southbound:** One exclusive left-turn lane
One through lane
One exclusive right-turn lane

Hawthorne Lane at Elizabeth Avenue (same as 2030 No build Alternative)

- **Eastbound:** One through lane shared with left-turning movements
One exclusive right-turn lane
- **Westbound:** One through lane shared with left and right-turning movements
- **Northbound:** One exclusive left-turn lane
One through lane
One exclusive right-turn lane
- **Southbound:** One exclusive left-turn lane
One through lane shared with right-turning movements

Hawthorne Lane at 5th Street

- **Eastbound:** No change
- **Westbound:** No change
- **Northbound:** One exclusive left-turn lane
One through lane shared with right-turning movements
- **Southbound:** One exclusive left-turn lane
One through lane shared with right-turning movements

Hawthorne Lane at 7th Street

- **Eastbound:** No change
- **Westbound:** No change
- **Northbound:** One exclusive left-turn lane
 One through lane shared with right-turning movements
- **Southbound:** One exclusive left-turn lane
 One through lane shared with right-turning movements

These improvements fall within the existing right-of-way and do not require widening.

The 2030 Build Alternative analysis within the I-277 conditions were analyzed in order to evaluate the capacity conditions of the intersections of Church Street, Tryon Street and College Street with Trade Street. Morning peak traffic along this section of Trade Street has, by direction, the highest approach volume of any time of day. As a result, evening peak hour traffic was not analyzed. VISSIM reported a Peak Hour Delay of 27.8 seconds for the Church Street/Trade Street intersection, 12.6 seconds for the Tryon Street/Trade Street intersection and 20.1 seconds for the College Street/Trade Street intersection resulting with HCM equivalent Levels of Service of C, B and C respectively.

The 2030 Build Alternative analysis for outside the I-277 loop conditions were analyzed in order to evaluate the capacity conditions of the major intersections along the streetcar corridor. The 2030 Build Alternative analysis included 23 signalized intersections within the study area. Of the 23 intersections analyzed, traffic flow with minimal congestion (v/c ratio 0.85 or lower) occurred at nine intersections, traffic flow with moderate congestion (v/c ratio between 0.85 and 0.94) occurred at seven intersections, and traffic flow with severe congestion (v/c ratio 0.95 or greater) occurred at seven intersections.

A summary of the results of the intersection capacity analyses for the 2030 Build Alternative Conditions is provided in Table 4-10 and Table 4-11.

Table 4-10: Intersection Capacity Analysis 2030 Build Alternative within I-277 Loop

| Major Street Cross Street | | AM Peak Hour | |
|------------------------------|----------------|--------------------|------------------|
| | | Delay (seconds) | Level of Service |
| Trade Street | | | |
| | Church Street | 27.8 | C |
| | Tryon Street | 12.6 | B |
| | College Street | 20.1 | C |

Source: Charlotte Department of Transportation

Table 4-11: Intersection Capacity Analysis 2030 Build Alternative

| Major Street Cross Street | AM Peak Hour | | | PM Peak Hour | | |
|---|--------------------|---------------------|--------------|--------------------|---------------------|--------------|
| | Delay (seconds) | Level of Service | V/C Ratio | Delay (seconds) | Level of Service | V/C Ratio |
| Beatties Ford Rd.¹ | | | | | | |
| I-85 SB ramps | 43.8 | D | 1.01 | 23.6 | C | 0.81 |
| I-85 NB ramps | 37.1 | D | 0.98 | 19.8 | B | 0.91 |
| LaSalle St. | 33.4 | C | 0.88 | 21.8 | C | 0.88 |
| Booker Ave./Oaklawn Ave. | 58.3 | E | 0.97 | 36.1 | D | 0.96 |
| Brookshire Frwy NB ramps | 17.9 | B | 0.64 | 48.7 | D | 0.71 |
| Brookshire Frwy SB ramps/ French St. | 12.2 | B | 0.84 | 9.8 | A | 0.53 |
| Dixon St. | 19.4 | B | 0.79 | 13.0 | B | 0.85 |
| Rozzelles Ferry Rd./5th St. | 45.3 | D | 0.90 | 46.5 | D | 0.93 |
| Trade St.² | | | | | | |
| I-77 SB ramps | 6.0 | A | 0.48 | 7.8 | A | 0.68 |
| I-77 NB ramps | 28.0 | C | 0.79 | 12.6 | B | 0.61 |
| Hawthorne Ln.³ | | | | | | |
| Elizabeth Ave. | 42.8 | D | 0.90 | 19.7 | B | 0.67 |
| 5th St. | 12.8 | B | 0.56 | 17.0 | B | 0.55 |
| 7th St. | 34.1 | C | 0.84 | 31.0 | C | 0.91 |
| Central Ave.⁴ | | | | | | |
| Pecan Ave. | 35.4 | D | 1.03 | 26.9 | C | 0.88 |
| Thomas Ave. | 5.8 | A | 0.58 | 14.0 | B | 0.64 |
| The Plaza | 47.5 | D | 0.93 | 43.3 | D | 0.87 |
| Morningside Dr. | 12.1 | B | 0.54 | 10.2 | B | 0.58 |
| Eastcrest Dr. | 12.0 | B | 0.62 | 8.7 | A | 0.62 |
| Briar Creek Rd. | 30.3 | C | 0.82 | 34.7 | C | 0.89 |
| Eastway Dr. | 61.3 | E | 1.00 | 60.2 | E | 1.04 |
| Kilbourne Dr./Norland Rd. | 34.2 | C | 0.81 | 51.5 | D | 0.98 |
| Sharon Amity Rd. | 97.4 | F | 1.15 | 77.8 | E | 1.06 |
| Eastland Mall west entrance | 8.2 | A | 0.39 | 10.7 | B | 0.42 |

Source: Center City Streetcar Corridor Traffic Analysis (2006)

4.2.5 New or Altered Intersection Signalization

There are five intersections that will require signalization to accommodate streetcar movements and two where it will be necessary to add a streetcar only phase to the signal intersections. These changes will have little or no impact on the level of service at the intersection.

- At the intersection of Beatties Ford Road and Rosa Parks Place, a new signal with a 20-second exclusive phase for the streetcar (red phase for southbound Beatties Ford Road and east bound Rosa Parks) is required in order to execute the left turn streetcar movement from the northbound Beatties Ford Road approach into the neighborhood transit center. The return movement, being the right turn from the neighborhood transit center onto southbound Beatties Ford Road, would also require exclusive phasing. With estimated maximum 7.5-minute headways (eight trips/hour) in each direction and at 20 seconds of maneuver time per trip, the all-red signal phase would average 13.4 seconds per cycle.
- At the intersection of Beatties Ford Road and the northbound I-85 Ramp, the Streetcar alignment would need a 20-second exclusive phase for each trip (all-red vehicular phase) to execute the lane change from the curbside lane to the center lane from the northbound Beatties Ford Road approach. With estimated 7.5-minute headways (eight trips/hour) and at 20 seconds of maneuver time per trip, the all-red signal phase would average 4.0 seconds per cycle for a cycle length of 90 seconds.
- A potential site for a streetcar maintenance facility would be located down the access road at the intersection of Beatties Ford Road and Cemetery Street. This intersection is currently unsignalized and would require a new signal with a 20-second exclusive phase for the streetcar (red phase for northbound and southbound Beatties Ford Road) to execute the left turn streetcar movement from the westbound access road onto southbound Beatties Ford Road. Given the frequency of streetcar maintenance, the exclusive phase would only be required during off-peak hours.
- At the intersection of Trade Street and Wesley Heights Way, the Streetcar alignment would need a 20-second exclusive phase for each trip (all-red vehicular phase) to execute the lane change from the left turn lane to the curbside lane from the northbound Trade Street approach. With estimated 7.5-minute headways (eight trips/hour) and at 20 seconds of maneuver time per trip, the all-red signal phase would average 6.7 seconds per cycle. (An alternative concept that could be used in order to transition the streetcar from the center lane to the curbside lane would be to utilize a lane drop at the I-77 southbound loop. This could be achieved by either paint-striping or eradication of pavement. Paint-striping could then be used to transition the northbound streetcar and through traffic approaching Wesley Heights Way from the currently proposed left turn lane to the currently proposed through lane and ultimately avoiding the use of exclusive phasing for the streetcar. This concept could reduce driver delay as well as reduce the potential for driver confusion. The engineering drawings currently do not reflect this configuration).
- At the intersection of Hawthorne Lane and the entrance to the Barnhardt Industrial site, the Streetcar alignment would need a 20-second exclusive phase for each trip (all-red vehicle phase) to execute the left turn movement from the westbound Barnhardt Industrial site entrance onto southbound Hawthorne Lane. Currently the intersection of Hawthorne Lane and the Barnhardt Industrial site driveway is stop controlled, however under build conditions, the Barnhardt Industrial site driveway would be extended to Clement Avenue and become a part of the streetcar mainline corridor. There is also the potential for the streetcar maintenance facility to be located within the Barnhardt

Industrial site, which would increase the frequency of streetcars for this intersection. Given the uncertainties of this particular site, this intersection should be reevaluated in a subsequent phase of this study based upon the determination of the streetcar maintenance facility.

- At the intersection of Central Avenue and Clement Avenue, the Streetcar alignment would need a 20-second exclusive phase for each trip (all-red vehicular phase) to execute the left turn movement from the southbound Clement Avenue approach onto Central Avenue. With estimated 7.5-minute headways (eight trips/hour) and at 20 seconds of maneuver time per trip, the all-red signal phase would average 6.7 seconds per cycle. Clement Avenue is a local street providing access to the Barnhardt Industrial site, which will be the location of the proposed streetcar vehicle maintenance facility. Currently the intersection of Central Avenue and Clement Avenue is stop controlled, with Clement Avenue terminating at Central Avenue.
- At the intersection of Central Avenue and The Plaza, the Streetcar alignment would need a 20-second exclusive phase for each trip (all-red vehicular phase) to execute the left turn movement from northbound The Plaza approach onto Central Avenue. With estimated 7.5-minute headways (eight trips/hour) and at 20 seconds of maneuver time per trip, the all-red signal phase would average 6.7 seconds per cycle for a cycle length of 150 seconds. The right turn movement from the eastbound Central Avenue approach onto The Plaza pocket track would have an exclusive right-turn lane and would not require any additional all-red time.
- At the intersection of Central Avenue and the Eastland Mall west entrance, the Streetcar alignment would need a 20-second exclusive phase for each trip (all-red vehicular phase) to execute the left turn movement from the eastbound Central Avenue approach into the platform at Eastland Mall, which is adjacent to the CATS Eastland Community Transit Center. With estimated 7.5 minute headways (eight trips/hour) and at 20 seconds of maneuver time per trip, the all-red signal phase would average 7.3 seconds per cycle for a cycle length of 165 seconds.

Existing signalized intersections where pedestrian signal phasing time is required or could be increased due to the Streetcar project (split platforms and median platforms) include the following intersections:

- Beatties Ford Road and Montana Drive/Gilbert Drive
- Beatties Ford Road and LaSalle Street
- Beatties Ford Road and Booker Avenue
- Beatties Ford Road and Brookshire Freeway SB ramp/French Street
- Beatties Ford Road and Dixon Street
- Trade Street and Wesley Heights Way
- Trade Street and Clarkson Street
- Trade Street and Mint Street
- Trade Street and Tryon Street
- Trade Street and Charlotte Transportation Center
- Trade Street and Davidson Street
- Trade Street and McDowell Street
- Hawthorne Lane and 5th Street
- Hawthorne Lane and 7th Street

- Hawthorne Lane and Central Avenue
- Central Avenue and The Plaza
- Central Avenue and Morningside Drive
- Central Avenue and Briar Creek Road
- Central Avenue and Eastway Drive

Proposed mid-block signals are required in order for pedestrians to access split platforms and median platforms along the streetcar corridor. Pedestrian phases will only be required when actuated. Proposed mid-block signals are at the following locations:

- Along Beatties Ford Road, between Saint Paul Street and Russell Avenue
- Along Beatties Ford Road/Trade Street, between Rozzelles Ferry Road and Bruns Avenue
- Along Central Avenue, between Masonic Drive and Arnold Drive
- Along Central Avenue, between Timberhollow Drive and Kilbourne Drive
- Along Central Avenue, between Evergreen Cemetery Drive and Progress Lane
- Along Central Avenue, between Lansdale Drive and Wollow Park Drive
- Along Central Avenue, between Glen Hollow Apartments Drive and Winterfield Place

Proposed signalized intersections are required in order for pedestrians to access split platforms and median platforms along the streetcar corridor. Pedestrian phases will only be required when actuated. Proposed signalized intersections for pedestrian crossing are at the following intersections:

- Trade Street and Wilkes Place to serve the proposed Charlotte Gateway Station
- Central Avenue and Veterans Park/Landis Avenue
- Central Avenue and Carolyn Drive

4.2.6 Traffic Analysis Findings

Conclusions regarding the impact of the Center City Streetcar on local travel conditions can be determined by comparing the 2030 No Build Alternative with the 2030 Build Alternative. The 2030 No Build Alternative conditions assume that the Center City Streetcar project would be not be constructed and that there are currently no roadway improvement projects planned or programmed as part of the NCDOT 2006-2012 TIP that would affect this project. The 2030 Build Alternative includes various roadway and intersection modifications such as a reduction in the number of lanes along Beatties Ford Road south of the Brookshire Freeway, Trade Street near the I-77 ramps and Hawthorne Lane. Center City Streetcar impacts on existing arterial roadway capacity and intersection vehicular capacity is summarized below.

Arterial capacity analysis conducted for the 2030 No Build Alternative indicate adequate capacity for the 2030 travel demand for most roadway segments while some would be congested under both the 2030 No Build and 2030 Build Alternatives. On some sections of Beatties Ford Road and Trade Street north of I-77, the arterial capacity is impacted for the 2030 Build Alternative. The section of Beatties Ford Road near the I-85 ramps would be over capacity for both the 2030 No Build Alternative and 2030 Build Alternative. Along Beatties Ford Road between the Rozzelles Ferry Road and Brookshire Freeway, and along Trade Street north of I-77, the corridor cross-section narrows from four through-lanes for the 2030 No Build Alternatives to two through-lanes for the 2030 Build Alternative. This section of the City Center Streetcar corridor would not be over capacity for the 2030 No Build Alternative, but becomes over capacity for the 2030 Build Alternative due to the reduction in number of lanes. Brookshire Freeway to I-77 is an existing alternative route which may be used to avoid this over capacity

section of Beatties Ford Road. Integration of the Center City Streetcar (2030 Build Alternative) on Trade Street without reducing the number of lanes does not have a large impact on motor vehicular operation when compared to the 2030 No Build Alternative. The arterial capacity analysis for Hawthorne Lane indicates that the corridor would continue to have adequate capacity for the 2030 travel demand even though the typical cross-section of Hawthorne Lane would be reduced to two through lanes and a center median/left-turn lane for the 2030 Build Alternative. The arterial capacity analysis for the Central Avenue portion of the streetcar corridor indicates the corridor would be over capacity for both the 2030 No Build and 2030 Build Alternatives. The cross-section on Central Avenue would be the same for the 2030 No Build and 2030 Build Alternatives, retaining four through-lanes and a center median/left-turn lane along the corridor.

Intersection capacity analyses for the 2030 No Build Alternative indicate adequate capacity for the 2030 travel demand for most intersections while some would be congested during peak travel periods for both the 2030 No Build and Build Alternatives. Capacity analyses for intersections along Beatties Ford Road would be virtually the same for the 2030 No Build and 2030 Build Alternatives. Intersections along Trade Street within the Center City Charlotte area, which were assumed to be most affected by the City Center Streetcar included Church Street, Tryon Street and College Street. Capacity analysis for these intersections resulted with the 2030 Build Alternative delay being slightly higher, though not significantly higher than the 2030 No Build Alternative. Capacity analyses for the intersections along Hawthorne Lane indicate that the intersections would be minimally impacted and would provide adequate capacity under the 2030 Build Alternative. Capacity analysis for the intersections along Central Avenue indicate that the intersections will continue to provide adequate capacity during the peak travel periods for both the 2030 travel demand, although four intersections would be severely congested during peak travel periods for both the 2030 No Build and 2030 Build Alternatives.

Additional intersections will need to be analyzed in order to ensure the network and those intersections utilized during the interim construction phase will operate at an acceptable Level of Service.

A comparison of the 2030 No Build and 2030 Build Alternative arterial and intersection analysis indicates that the operation of the Streetcar system will not have a significant impact on roadway capacity or operations.

4.3 PEDESTRIAN AND BICYCLE ANALYSIS

The objective of this section is to evaluate the effect of the Center City Streetcar Corridor project on pedestrian and bicycle travel conditions in the study corridor. Design features that affect pedestrians and bicyclists crossing signalized intersections were analyzed using the "Pedestrian and Bicycle Level of Service Methodology for Crossings at Signalized Intersections" developed by the Charlotte Department of Transportation (CDOT). Level of Service (LOS) is assessed by comfort and safety for pedestrians crossing at signalized intersections which are influenced by crossing distance, roadway allocation (crosswalks, bicycle lanes) traffic signal characteristics, corner radius dimensions, and any other elements which may conflict with turning vehicles. Vehicle volumes and speeds are factors which are important but not dealt with directly. The presence of the traffic signal, its phasing, and/or physical characteristics of the intersection is an indirect method to deal with vehicle volumes and speeds.

Existing conditions along the corridor for bicycle and pedestrian circulation at intersections range from LOS B to LOS F depending on the width of the roadway, volume of vehicle turning movements and the basic provisions for cyclists and pedestrians at each intersection.

Existing conditions of Pedestrian and Bicycle LOS along Trade Street, inside the I-277 loop and Elizabeth Avenue until Hawthorne Lane, show that pedestrian conditions are average or better on most streets, while bicycling conditions were below average on all streets. 2030 No Build and Build scenario information was not available for the study area, however, pedestrian and bicycling conditions are expected to improve because the City of Charlotte has adopted plans, policies, and guidelines that embrace Smart Growth and Transit Oriented Development principles which encourage walking and biking.

Under the 2030 No Build Alternative, all of the 23 signalized intersections analyzed have a pedestrian Level of Service rating of D or better. The pedestrian analysis results show a Level of Service of B at one intersection, a Level of Service of C at 15 intersections, and a Level of Service of D at seven intersections. All of the intersections with ratings of Level of Service D have at least one intersection leg with five or more lanes, resulting in intersections that are difficult for pedestrians to cross. The intersections of Central Avenue at Eastway Drive and Central Avenue at Sharon Amity Road are among the more difficult for pedestrians to cross because they are major intersections with six or more lanes on each intersection leg. Pedestrian Level of Service ratings of D are for these types of intersections.

Under the 2030 No Build Alternative, the Center City Streetcar Corridor would not be compatible with bicycle travel, as under the 2004 Existing Conditions. The bicycle analysis results show that there would be a Level of Service of E at five intersections and a Level of Service of F at 17 intersections indicating that the travel conditions would continue to be unsuitable for bicycle travel. Only one intersection, Central Avenue at Kilborne Drive/Norland Road, would have a rating better than Level of Service C for bicycle travel. This poor Level of Service for bicycle travel along the Center City Streetcar Corridor is primarily due to the signal timing, competition for space with motorists, and posted speed limits of 35 miles per hour or higher on Beatties Ford Road, Hawthorne Lane, and Central Avenue.

4.3.1 Streetcar Impacts

Although the streetcar in this analysis does not have a significant impact on pedestrian or bicycle circulation in the study corridor, the streetcar may have positive cumulative impacts with implementation of city plans, like the Transportation Action Plan that aims to build over 625 miles of new sidewalks by 2030 and the Draft Urban Street Design Guidelines that guide the construction of easier, safer, and more enjoyable pedestrian facilities. Table 4-12 and Table 4-13 list the ratings and LOS for each of the intersections outside of the I-277 loop.

Future level of service Information about the Center City portion of the alignment (Trade Street and Elizabeth Avenue) was not available for this analysis. Generally, because of the urban environment the pedestrian level of service is very good at the intersections but bicycle level of service is predominantly poor. Sidewalks are wider in this area and all of the signalized intersections have pedestrian phases incorporated into their signal timing. There are slower traffic speeds along these streets which support bicycle travel, but restricted street geometry and the sheer volume of traffic make it difficult for cyclists. As mentioned, the *Center City Vision Plan* addresses many of these issues related to pedestrian and bicycle level of service and includes a project listing to support these initiatives.

**Table 4-12: Pedestrian and Bicycle Level of Service Analysis
 2030 No Build Alternative**

| Major Street Cross Street | | Pedestrian Analysis | | Bicycle Analysis | |
|------------------------------|--|---------------------------|------------------|------------------|------------------|
| | | Score | Level of Service | Score | Level of Service |
| Beatties Ford Rd. | | | | | |
| | Rosa Parks Pl. ⁵ | Unsignalized Intersection | | | |
| | I-85 SB ramps | 43 | D | 14 | F |
| | I-85 NB ramps | 41 | D | 9 | F |
| | LaSalle St. | 49 | D | 11 | F |
| | Booker Ave./Oaklawn Ave. | 55 | C | 10 | F |
| | Brookshire Freeway NB ramps | 60 | C | 25 | E |
| | Brookshire Freeway SB ramps/French St. | 59 | C | 9 | F |
| | Dixon St. | 64 | C | 8 | F |
| | Rozzelles Ferry St./ 5 th St. | 59 | C | 20 | E |
| Trade St. | | | | | |
| | I-77 SB ramps | 66 | C | 16 | F |
| | I-77 NB ramps | 59 | C | 20 | E |
| Elizabeth Ave. | | | | | |
| | Kings Dr. | | | | |
| | Independence Blvd. | | | | |
| Hawthorne Ln. | | | | | |
| | Elizabeth Ave. | 57 | C | 12 | F |
| | 5 th St. | 72 | C | 18 | F |
| | 7 th St. | 65 | C | 9 | F |
| Central Ave. | | | | | |
| | Pecan Ave. | 67 | C | 19 | E |
| | Thomas Ave. ⁶ | 72 | C | 18 | F |
| | The Plaza | 47 | D | 3 | F |
| | Morningside Dr. ⁷ | 73 | C | 18 | F |
| | Eastcrest Dr. | 81 | B | 18 | F |
| | Briar Creek Rd. | 68 | C | 22 | E |
| | Eastway Dr. | 42 | D | 12 | F |
| | Kilbourne Dr/Norland Rd. | 56 | C | 55 | C |
| | Sharon Amity Rd. | 38 | D | 8 | F |
| | Eastland Mall west entrance | 47 | D | 9 | F |

Source: Center City Streetcar Corridor Traffic Analysis (2006)

**Table 4-13: Pedestrian and Bicycle Level of Service Analysis
 2030 Build Alternative**

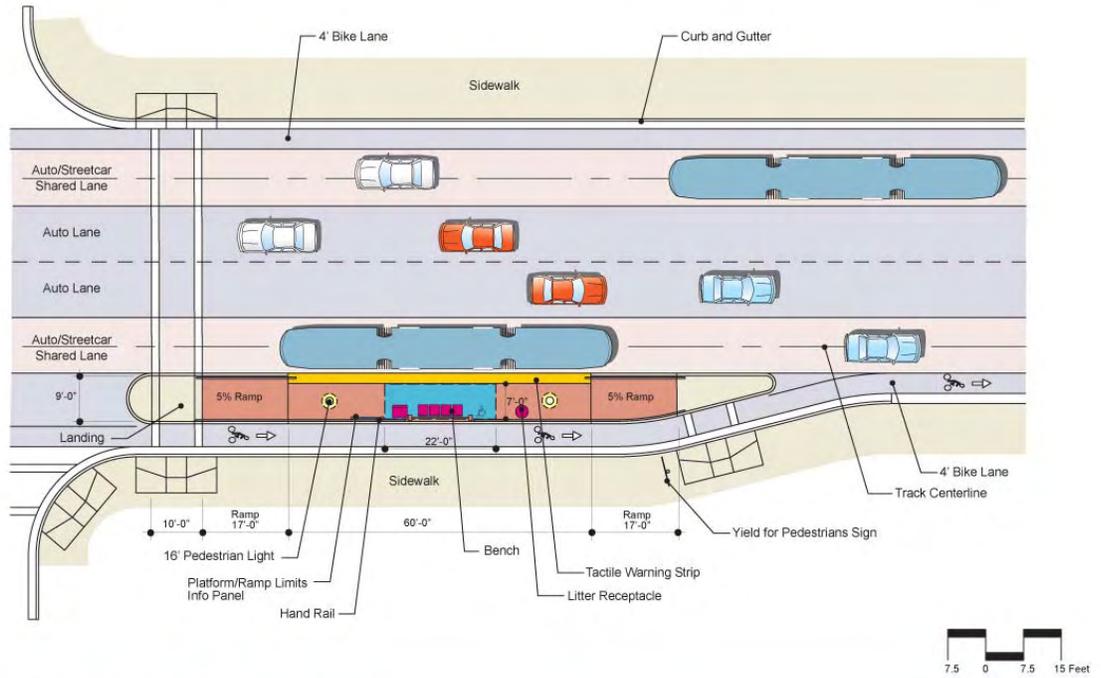
| Major Street Cross Street | | Pedestrian Analysis | | Bicycle Analysis | |
|------------------------------|--|---------------------|------------------|------------------|------------------|
| | | Score | Level of Service | Score | Level of Service |
| Beatties Ford Rd. | | | | | |
| | Rosa Parks Pl. | 61 | C | 20 | E |
| | I-85 SB ramps | 43 | D | 14 | F |
| | I-85 NB ramps | 41 | D | 9 | F |
| | LaSalle St. | 49 | D | 11 | F |
| | Booker Ave./Oaklawn Ave. | 55 | C | 10 | F |
| | Brookshire Freeway NB ramps | 60 | C | 25 | E |
| | Brookshire Freeway SB ramps/French St. | 58 | C | 9 | F |
| | Dixon St. | 69 | C | 10 | F |
| | Rozzelles Ferry St./ 5th St. | 56 | C | 22 | E |
| Trade St. | | | | | |
| | I-77 SB ramps | 66 | C | 16 | F |
| | I-77 NB ramps | 59 | C | 20 | E |
| Elizabeth Ave. | | | | | |
| | Kings Dr. | | | | |
| | Independence Blvd. | | | | |
| Hawthorne Ln. | | | | | |
| | Elizabeth Ave. | 62 | C | 12 | F |
| | 5th St. | 77 | B | 20 | E |
| | 7th St. | 70 | C | 12 | F |
| Central Ave. | | | | | |
| | Pecan Ave. | 67 | C | 19 | E |
| | Thomas Ave. ⁸ | 72 | C | 18 | F |
| | The Plaza | 50 | D | 4 | F |
| | Morningside Dr. ⁹ | 73 | C | 18 | F |
| | Eastcrest Dr. | 81 | B | 18 | F |
| | Briar Creek Rd. | 68 | C | 22 | E |
| | Eastway Dr. | 42 | D | 12 | F |
| | Kilbourne Dr./Norland Rd. | 56 | C | 55 | C |
| | Sharon Amity Rd. | 38 | D | 8 | F |
| | Eastland Mall west entrance | 47 | D | 9 | F |

Source: Center City Streetcar Corridor Traffic Analysis (2006)

The design philosophy for the streetcar includes maintaining or improving the provisions for pedestrians and cyclists along the corridor. In Center City much of the alignment utilizes the median lane for the streetcar. This configuration has fewer conflicts with cyclists in the curbside lane and also requires median platforms at stop locations. As an ancillary benefit, streetcar platforms can double as refuge islands for pedestrians crossing Elizabeth Avenue and Trade Street.

On Central Avenue and Beatties Ford Road where the alignment uses the curbside lane, the streetcar stop design preserves sidewalk widths and also makes provisions to maintain the continuity of bicycle lanes where they have been installed or there are plans for them. Figure 4-1 depicts the design and Figure 4-2 shows a similar design already in place in Portland, OR.

Figure 4-1: Bike Lane on Streetcar Alignment in Portland (OR)



Typical CurbSide Platform with Bike Lane @ Street Level
 Trade Street - Streetcar Stops

June 2006



Figure 4-2: Bike Lane on Streetcar Alignment in Portland (OR)



4.3.2 Access to Stations

The Center City Streetcar will serve 34 stop locations from Rosa Parks Place, near the County Health Department, to Eastland Mall. The average spacing for stops will be 1/3 mile from each other along the alignment. In terms of accessibility to a station, there is a ¼ mile buffer to assess a distance a person would walk to a conventional bus stop and ½ mile buffer for premium transit stop or station, such as streetcar

A spatial analysis from the Center City Streetcar alignment was performed using Geographic Information Systems software and socioeconomic data (2000 and 2030) from the region's Metropolitan Planning Organization to determine the level of accessibility to the streetcar project. The ½ mile buffer analyses indicate that 40,695 persons would have access to streetcar in 2000 and 69,521 in 2030. The same geospatial methods show that 77,307 employees have access in 2000 and 122,442 in 2030. Both analyses illustrate a favorable accessibility to potential patrons to the streetcar system.

4.4 PARKING

A review of the parking inventory along the CATS Center City Streetcar alignment was performed using aerial photography, CADD files, and street maps. The following is a summary of the parking inventory review as it relates to existing parking and potential impacts on parking due to the CATS Streetcar alignment.

Beatties Ford Road Corridor

The Beatties Ford Road section of the CATS Streetcar alignment begins at the interchange of Interstate 85 (and Beatties Ford Road and travels south to the beginning of Trade Street, just west of Interstate 77 (I-77). There is no existing on-street parking along the entire Beatties Ford Road section of the CATS Streetcar alignment; thus the CATS Streetcar alignment should not impact existing parking along the Beatties Ford Road corridor.

Trade Street Corridor

The Trade Street section of the CATS Streetcar alignment begins just west of I-77 and travels southeast to McDowell Street where it becomes Elizabeth Avenue and continues southeastward to Hawthorne Lane. There appears to be existing parking along the Trade Street corridor and some impacts to surface-street parking along the corridor. In many places along Trade Street, parking impacts are avoided with median running service of the streetcar. The Elizabeth Avenue streetscape projects will reduce the width of the roadway from 4 to 2 travel lanes. There will be some widening of sidewalks and the potential for additional on-street parking, but the streetcar should have no impact on the existing parking and will not preclude new spaces added as a result of the streetscape project. Table 4-14 shows the number of spaces per segment of Trade Street and Elizabeth Avenue.

Table 4-14: Surface Parking Impacts

| From: | To: | Existing Spaces | | Spaces Eliminated | |
|--------------------|--------------------|-----------------|------------|-------------------|------------|
| | | East-bound | West-bound | East-bound | West-bound |
| Trade Street | | | | | |
| Irwin St. | Cedar St. | 10 | 21 | 0 | 0 |
| Cedar St. | Norfolk So. RR | 7 | 14 | 0 | 0 |
| Norfolk So. RR | Wilkes Pl. | 3 | 0 | 0 | 0 |
| Wilkes Pl. | Graham St. | 4 | 5 | 0 | 0 |
| Graham St. | Pine St. | 0 | 0 | 0 | 0 |
| Pine St. | Poplar St. | 2 | 4 | 0 | 0 |
| Poplar St. | Church St. | 7 | 4 | 0 | 0 |
| Church St. | Tryon St. | 0 | 0 | 0 | 0 |
| Tryon St. | College St. | 0 | 0 | 0 | 0 |
| College St. | Brevard St. | 0 | 0 | 0 | 0 |
| Brevard St. | Caldwell St. | 0 | 5 | 0 | 0 |
| Caldwell St. | Davidson St. | 0 | 5 | 0 | 0 |
| Davidson St. | Alexander St. | 0 | 0 | 0 | 0 |
| Alexander St. | Myers St. | 9 | 1 | 0 | 0 |
| Myers St. | McDowell St. | 0 | 4 | 0 | 0 |
| Elizabeth Avenue | | | | | |
| McDowell St. | Kings Dr. | 0 | 0 | 0 | 0 |
| Kings Dr. | Independence Blvd. | 0 | 0 | 0 | 0 |
| Independence Blvd. | Torrence St. | 0 | 2 | 0 | 0 |
| Torrence St. | Travis Av. | 9 | 11 | 0 | 0 |
| Travis Av. | Hawthorne Ln. | 4 | 6 | 0 | 0 |
| Total | | 55 | 82 | 0 | 0 |

Source: Field Survey URS 2006.

Hawthorne Lane Corridor

The Hawthorne Lane section of the CATS Streetcar alignment begins the intersection of Elizabeth Avenue and Hawthorne Lane and travels northwest to the terminus of the US 74 overpass just south of Sunnyside Avenue. There appears to be no existing parking along the entire Hawthorne Lane section of the CATS Streetcar alignment; thus the CATS Streetcar alignment should not impact existing parking along the Hawthorne Lane corridor.

Central Avenue Corridor

The Central Avenue section of the CATS Streetcar alignment begins the intersection of Pecan Avenue and Central Avenue and travels east to the Eastland Mall at Sharon Amity Road. There appears to be no existing parking along the entire Central Avenue section of the CATS Streetcar alignment except between the intersections of Pecan and Plaza, where parking is allowed on the north side of Central Avenue during off-peak hours only. The alignment of the streetcar will require the elimination of parking in this area.

4.5 FREIGHT MOVEMENTS

The Center City streetcar will not have any impacts on freight movements. Existing infrastructure separates the streetcar alignment from commercial railways.

4.5.1 Railroads

The Center City Streetcar will not have any significant impact on any railroad right-of-way, because of existing infrastructure.

There are five locations where the streetcar intersects with railroad right-of-way, but there are no significant impacts, because in most cases existing grade separations mitigate any potential right-of-way conflicts. The five intersecting locations are:

1. On Beatties Ford Road near the Brookshire Freeway an existing grade separation will separate the streetcar from the CSX railway. A proposed vehicle maintenance facility will be constructed adjacent the commercial railway, yet the facility's design and setbacks will prevent any potential ROW issues.
2. At Gateway Center, the proposed commuter rail crosses above the Center City Streetcar alignment. An existing grade separation will prevent any significant ROW impacts.
3. On the intersections of College and Brevard, the South Light Rail Line will cross the Center City Streetcar alignment, yet an existing grade separation will prevent any potential ROW conflicts.
4. On Hawthorne Lane, north of Central Avenue, CSX passes above the Center City Streetcar alignment. An existing bridge separates the streetcar alignment from the CSX railway line.
5. On Central Avenue near Pecan Street, there is an at-grade rail crossing.

4.5.2 Trucking and Deliveries

The Center City Streetcar is planned to run curbside along Beatties Ford Road and Central Avenue. The primary goal of the conceptual design is to site streetcar stops such that driveways and other access points are not negatively impacted. This design is to allow deliveries at curbside. Along Trade Street, the streetcar is designed to be median running, so that it will not interfere with trucking and deliveries.

In terms of trucking and deliveries to an industrial site, there will be one site in where the streetcar impacts a commercial establishment. The proposed vehicle maintenance facility at Barnhardt industrial site will require a redesigning of loading and unloading docks, as well as the redesign of its parking facility.

¹ Beatties Ford Road is analyzed with four through lanes from I-85 to Brookshire Freeway (NC 16) and two through lanes from Brookshire Freeway (NC 16) to Rozzelles Ferry Road.

² Trade Street is analyzed with two through lanes from Rozzelles Ferry Road to Wesley Heights Road and four through lanes at the I-77 northbound ramps.

³ Hawthorne Lane is analyzed with two through lanes between Elizabeth Avenue and Central Avenue.

⁴ Central Avenue is analyzed with four through lanes throughout the study area.

⁵ Eastbound approach movements are controlled by a stop sign.

⁶ PM peak period shown; AM and PM have different Level of Service due to prohibited left turns during AM peak period.

⁷ PM peak period shown; AM and PM have different Level of Service due to prohibited left turns during AM peak period.

⁸ PM peak period shown; AM and PM have different Level of Service due to prohibited left turns during AM peak period.

⁹ PM peak period shown; AM and PM have different Level of Service due to prohibited left turns during AM peak period.

CHAPTER 5 EVALUATION

The intent of the investment for the Center City Streetcar Corridor is to upgrade services in CATS' most productive corridor in terms of ridership and then also, to support the five regional corridors in the long range plan. Ridership on the Gold Rush Red Line, Route 7 – Beatties Ford Road and Route 9 – Central Avenue comprise three of the four most utilized bus routes in the CATS system. Service on these routes is expected to increase in intensity within the next three to five years with service frequencies of 5 minutes on Routes 7 and 9 and even higher frequencies on the Red Line. The implementation of streetcar in this corridor will increase capacity to a point where the existing frequencies or even lower frequencies (10 minutes versus 7.5 minutes) could be sufficient to meet demand with a net savings in operational cost.

As outlined in Chapter 1 of the Environmental Assessment, the purpose and need also illustrates that the implementation of the streetcar potentially increases the viability of the CATS regional corridors because the streetcar reduces the need for an automobile in the Uptown area. If employees or visitors do not need an automobile to make trips to restaurants and other services then they will be more inclined to use transit to get to the Uptown area.

To date, only a preliminary assessment of how the Center City Streetcar Corridor performs according to the FTA New Starts Evaluation Criteria has been completed. Further assessment will be undertaken when the Final Rule for the Small Starts Program is published by FTA. This section contains the information compiled to date about the effectiveness and efficiencies of the streetcar Build Alternative. New regional travel demand model runs and additional information about the Baseline Alternative will be completed during future phases of the project.

5.1 APPROACH

CATS is currently using the FTA New Starts templates to determine which of their projects should be submitted to FTA for funding under the New Starts or Small Starts programs. Information from this exercise is included in the following sections. A more complete evaluation will be included in an update of this document during future phases of the project's development.

5.2 EFFECTIVENESS

In order to receive New Starts funding from the FTA, all major transit investment projects must be rated according to a comprehensive set of evaluation criteria, which include: mobility improvements, environmental benefits, operating efficiencies, cost effectiveness, transit supportive land use and future patterns, and other factors. These performance measures are combined with an evaluation of the financial plan for the project. Other factors may include environmental justice considerations and equity issues; opportunities for increased access to employment for low income persons; livable communities initiatives and local economic development initiatives. These evaluation criteria are discussed below and in the following sections. Cost effectiveness is addressed in Section 5.3; other factors are addressed in Section 5.4.

5.2.1 Ridership

Forecasts of future daily ridership have been estimated for the project using both the regional travel demand model and an off-model travel estimation technique. The off-model technique was used because the regional model traditionally under-reports mid-day and non-home-based non-work trips. The off-model forecast

showed that the streetcar will have much higher productivity/ridership especially during the midday period. This includes non-home based non-work trips taken typically by workers to other services and visitors to the Center City area.

In addition, on-board counts conducted in 2005 for CATS Route 7 and 9, and the Gold Rush Red Line exceed the aggregate ridership forecasted by the regional travel demand model. It was determined that an off-model forecast was necessary to develop a more accurate picture of potential ridership since CATS passenger counts have grown significantly in the short time since the original baseline network was developed for the regional mode. The assumptions for the off-model process are outlined in the *Alternate Streetcar Ridership Estimate technical memorandum* (October 2006). It is important to note that these are preliminary forecasts for ridership and reflect a level of detail commensurate with the stage of planning/conceptual design currently being undertaken. Table 5-1 shows the daily boarding estimates for the regional travel demand model and the off-model forecasts.

Table 5-1: Estimated Ridership for the Center City Streetcar Corridor by Forecast Method

| Source | Total Daily Ridership Estimates 2030 |
|---------------------------------------|---|
| Regional Travel Demand Model | 8,950 |
| Off-Model Forecast | 15,950 |
| Off-Model Forecast (w/ Farefree Zone) | 17,800 |

The off-model forecast strongly supports the potential for higher ridership on the streetcar facility. These are riders that will take advantage of moderately shorter travel times but also are utilizing the streetcar because they travelled to the Uptown area via other transit corridors and do not have access to a car for the mid-day and non-home based trips.

5.2.2 Mobility Improvements

Transportation System User Benefits

The regional travel demand model indicates that the streetcar will generate 1,699 hours of transportation system user benefits (TSUB) on a daily basis and over 530,000 hours annually. This figure was generated using SUMMIT software tool that is distributed by the FTA, and is essentially the aggregated amount of time saved across all of the trips taken regionally on all modes of travel. The streetcar probably will not have a significant impact on the travel time for motorists primarily because it generally serves very short trips, but the software is intended to account for such travel time savings attributable to the streetcar facility.

New model runs for both the Baseline and Build alternatives will be conducted during future phases of the project.

Since ridership on the streetcar is estimated to be significantly higher than the regional model projection, there is some question as to the true travel time savings attributable to the streetcar based on the higher ridership estimate. CATS plans to

work with FTA to address the issue that streetcar facilities, in general, have not performed well in the SUMMIT calculation. Two potential avenues for addressing this issue would be adjusting the regional model methodology to better reflect streetcar ridership or to establish a procedure to apply the SUMMIT calculation to the off-model ridership projection.

Low Income Households Served

Low income households served is defined as the estimated number of low income households served by the New Starts investment, which are households below the poverty level located within ½ mile of boarding points located directly on the project. Using the FTA procedure, the Center City Streetcar Corridor serves approximately 2,523 low-income households which constitute 16.9% of total number of households within ½ mile of the streetcar boarding points.

Employment Served

Employment near stations is measured by the estimated number of jobs located within ½ mile of stations located directly on the transit project corridor. Employment along the corridor is comprised of approximately 61,675 jobs, which constitutes nearly two thirds of the jobs within the study area and over 10% of the jobs in Mecklenburg County.

5.2.3 Environmental Benefits

Air Quality Savings

The net reductions in regional VMT for the Build Alternative was derived from ridership forecasts based on ridership results from Spring 2006. Comparing the highway network assignments of the No-Build and Build Alternatives provided an estimate of the reduction in regional VMT due to mode shift. The resulting net VMT reductions were used as the basis of the regional air quality analysis.

Year 2030 emission rates for CO and NO_x were estimated using the EPA MOBILE6.2 model with selected parameters adjusted to reflect assumed conditions in the study area. Mobile emission rates were obtained from the North Carolina Department of Environment and Natural Resources, Division of Air Quality. Table 5-2 summarizes the results of the Year 2030 regional air quality analysis for the No-Build and Build Alternatives. The project includes a TSM alternative; however, at the time of this analysis, the TSM alternative was being revised. The analysis shows the net reduction in regional VMT for the Build Alternative relative to the No-Build Alternatives, along with the estimated pollutant emission factors and the corresponding differences in regional emissions.

Table 5-2: 2030 Regional Air Quality Impact Analysis and Results

| Project Alternative | Daily VMT Reduction ¹ (veh-mi) | Carbon Monoxide (CO) | | Nitrogen Oxides (NOx) | |
|---------------------|---|----------------------------|-----------------------------|----------------------------|-----------------------------|
| | | Emission Factor (g/veh-mi) | Emission Reduction (kg/day) | Emission Factor (g/veh-mi) | Emission Reduction (kg/day) |
| No-Build | 0.00 | 7.3 | 0.00 | 0.7 | 0.00 |
| TSM ² | - | 7.3 | - | 0.7 | - |
| Build | 119,603 | 7.3 | 873.10 | 0.7 | 83.72 |

Source: URS Corp., October 2006

- Notes: 1. Net reduction in VMT relative to the No-Build Alternative.
 2. TSM Alternative VMT assessment not available during analysis.

Energy Consumption Benefits

Change in energy consumption is measured in BTUs, comparing the build alternative to the baseline alternative. (This analysis will be completed during future phases of the project).

5.2.4 Operating Efficiencies

Operating efficiencies for the streetcar are measured in operating cost per passenger mile for the streetcar corridor and then its impact on the overall CATS system. Using the regional model generated statistics; the streetcar will cost approximately 70 cents per passenger mile and it will be replacing bus service in the baseline alternative that operates at 72 cents per passenger mile. The streetcar generates a higher number of passenger miles at a slightly lower annual cost, which suggests that in addition to encouraging more riders they are willing to ride longer distances.

This analysis does not include the passenger miles generated by the ridership estimated in the off-model procedure. A 50-60% increase in ridership will translate into a higher number of potential passenger miles and improve the streetcar's performance under this measure. This will be calculated in the updated environmental assessment during future phases of the streetcar project.

A comparison of the change in system-wide operating cost per passenger mile in the forecast year for the project to the baseline alternative shows a small decrease in cost per passenger mile. For the baseline alternative, system-wide costs per passenger mile was approximately 65.7 cents, while the build alternative was estimated at 64.3 cents. Incrementally, this is not a substantial change but it is in line with other projects in the New Starts pipeline.

5.3 COST EFFECTIVENESS

The cost effectiveness rating for a project is calculated by dividing the total annualized capital cost plus the annual operating cost by the annual transportation system user benefits (TSUB) calculated for the project above and beyond the baseline alternative. The regional travel demand model indicates that the streetcar will generate 1,699 hours of TSUB on a daily basis. Using the standard annualization factor (305) for operating costs and the most conservative fully allocated capital cost for the build alternative and the baseline alternative the annualized incremental cost

per TSUB for the streetcar is estimated at \$39.77. To achieve a medium rating in cost effectiveness the project would need to be at \$22.99/TSUB. If a New/Small Starts application is prepared for the project in the future, the following assumptions could be applied to the streetcar project to reduce its annualized incremental cost/TSUB.

- New TSM assumptions – Convert the 21 buses in the capital cost calculation to articulated buses; re-align the baseline alternative to add .15 mile bus road around the Barnhardt Vehicle Maintenance Site which would increase capital and operating costs will decrease the annual incremental cost per TSUB to \$35.12;
- Convert annualization factor for operating costs and TSUB to 313.7 which is the FTA approved number for CATS (FTA Standard is 305); the annualized incremental cost per TSUB moves to \$34.15;
- Operating cost of build alternative in the corridor is actually \$60,000 less than the TSM (not based on model generated statistics) the annualized incremental cost per TSUB is reduced to \$30.84;
- Each special event at the Arena, Stadium and Performing Arts Center potentially creates a potential estimated additional 31 hours of TSUB – annualized to 145 days per year the annualized incremental cost per TSUB decreases to \$30.59;
- New model run with modest changes to the TSM performance to make it more consistent with the build – estimate additional 25 TSUB hours per day the annualized incremental cost per TSUB moves to \$30.16;
- Reduce fleet size to 15 vehicles – Annualized capital cost down to \$21,161,000 (fleet spare ratio lowered from 20% to 15% since this is not a commuter service) the annualized incremental cost per TSUB is lowered to \$29.90;
- Use Site 18 for VMF – Annualized capital cost \$21,021,000 the annualized incremental cost per TSUB drops to \$29.65; and
- Off model ridership estimate shows 30% increase in TSUB over model generated estimate. – Additional 505 hours of TSUB daily. The annualized incremental cost per TSUB moves to \$22.97.

All of these potential changes in assumptions are subject to FTA approval and in some cases, more in-depth analysis.

5.4 EQUITY

5.4.1 Introduction

Regulatory Requirements

Title VI of the 1964 Civil Rights Act (Title VI) and related statutes provide that no person shall, on the grounds of race, color, age, religion, sex, national origin, or handicap/disability, be excluded from participation in, or be denied the benefits of, or be otherwise subject to discrimination under any program of the federal, state, or local government.

On February 11, 1994, President Clinton signed Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations (59 FR 7629). EO 12898 was designed to supplement Title VI, EO 12250 and the resulting promulgated regulations for the United States Department of Transportation (USDOT) (49 CFR Part 21), all of which prohibit discriminatory practices in programs receiving Federal financial support. The thrust of EO 12898 is to identify and address, as appropriate, disproportionately high adverse human health or environmental effects of each agency's programs, policies, and activities on minority populations and low-income populations.

Specifically, EO12898 mandates that all federal agencies provide a strategy to implement the EO, which charges each federal agency with responsibility of,

“conduct[ing] its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin” (59 FR 7629, Section 2-2).

This order also requires that each agency,

“whenever practicable and appropriate, . . . collect, maintain and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding facilities or sites expected to have a substantial environmental, human health, or economic effect on the surrounding populations, when such facilities or sites become the subject of a substantial Federal environmental administrative or judicial action. Such information shall be made available to the public, unless prohibited by law; and (c) Each Federal agency, whenever practicable and appropriate, shall collect, maintain, and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding Federal facilities that are . . . (2) expected to have a substantial environmental, human health, or economic effect on surrounding populations. Such information shall be made available to the public, unless prohibited by law. . .” (59 FR 7629, Section 2-3(b)).

In response to the mandates of EO 12898, the USDOT developed a Final Environmental Justice Strategy (60 FR 125: 33896) and a proposed USDOT Order titled, Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The analysis contained in this technical memorandum is consistent with that outlined in the USDOT Final Strategy and proposed Order.

Purpose

The purpose of this assessment is to determine whether the project will have disproportionate high and adverse impacts to low-income, minority, or other populations protected by Title VI and described as protected populations in this

document. A dual purpose is to determine whether protected populations will receive an equitable distribution of benefits.

5.4.2 Method

Study Area Delineation

For purposes of this assessment, the study area was delineated by including all U.S. Census blocks intersecting a one-half mile buffer of the Center City Streetcar corridor. The blocks were identified using a geographic information system (GIS) mapping tool and data from the U.S. Census Bureau.

Data Collection

Data was collected from the 2000 U.S. Census for each block composing the study area. For some parameters, data is only available at the larger geographic unit of block groups. Data was collected for each block group that had a component block in the study area. Data was collected for a total of 764 blocks and 48 block groups.

Public Involvement

Public involvement efforts throughout the project development process were aimed at including populations of diverse races, income status and physical ability. An Advisory Board with three subgroups was formed; one for the Trade Street/Elizabeth Avenue corridor, another for the Central/Hawthorne Avenue corridor, and a third for the Beatties Ford Road corridor. Members of the Advisory Board represented varying incomes, diverse races, neighbourhoods throughout the study area, and groups such as Programs for Accessible Living (PAL), Metrolina Association for the Blind (MAB), and Latin America Coalition. Public meeting notices were posted in *LaNoticia*, a Spanish newspaper. A Spanish interpreter was also available at all public meetings with the exception of the last (due to a lack of demand). Meeting locations were chosen based on accessibility requirements of the Americans with Disabilities Act (ADA). Meeting attendees represented diverse races and income levels (as determined by visual observation and knowledge of the individuals).

5.4.3 Identification of Protected Populations

In order to assess potential impacts to populations protected by EO12898 and Title VI, low-income, minority, and transit-dependent populations in the study area were identified.

According to the USDOT Order on Environmental Justice (62FR18377), an individual is considered to have a low-income if their median household income is at or below the poverty guidelines, as set by the Department of Health and Human Services (DHHS). The DHHS poverty guidelines are available on-line at <http://aspe.hhs.gov/poverty/figures-fed-reg.shtml>. In 1999 the poverty guideline for a four-person family was \$16,700. According to the DHHS, "The best approximation for the number of people below the HHS poverty guidelines in a particular area would be the number of persons below the Census Bureau poverty thresholds in that area." For this reason the U.S. Census poverty threshold was used to calculate low-income individuals. Poverty levels used by the U.S. Census Bureau are available on-line at <http://www.census.gov/hhes/poverty/threshld/thresh99.html>. In 1999 the weighted average threshold for a four-person household was \$17,029.

In *FHWA Actions to Address Environmental Justice in Minority and Low-income Populations* (Order 6640.23) the US Department of Transportation provides clear definitions of the four minority groups addressed by the EO12898. These groups are:

- Black – a person having origins in any of the black racial groups of Africa;
- Hispanic – a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
- Asian American – a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands; and
- American Indian and Alaskan Native – a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition.¹

Children, elderly, people living in households with no vehicles available and people with low incomes are considered transit-dependent. Disabled populations are also considered transit-dependent, however, it is difficult to quantify the number of disabled individuals in a block or block group because a person with multiple disabilities (e.g., mentally impaired, physically impaired, hearing impaired, or visually impaired), would be counted multiple times.

Low-Income Populations

Since data quantifying low-income populations are only available from the 2000 U.S. Census at the block group level, data was collected for low-income populations in the study area at the block-group level.

In order to determine where there are high concentrations of low-income populations in the study area, the data at the block-group level was compared to a larger-area geographic unit, called a threshold. Both countywide and citywide data were used as thresholds to determine if any of the block groups would qualify as having large concentrations of low-income populations.

County-wide, the portion of the population that is low-income is 9.2 percent. City-wide, the portion of the population that is low-income is 10.6 percent. In most of the study area, there is a higher percentage of low-income individuals compared to the city and county. Those block groups with the highest percentage of low-income individuals are concentrated around the Trade Street corridor.

Minority Populations

Data quantifying minority populations was collected for each block in the study area. In order to determine where there are high concentrations of minority populations in the study area, the data at the block level was compared to a larger-area geographic unit, called a threshold. Both countywide and citywide data were used as thresholds to determine if any of the blocks would qualify as having large concentrations of low-income populations.

County-wide, the portion of the population that is minority is 38.9 percent. City-wide, the portion of the population that is minority is 44.9 percent. The total portion of the population in the study area that is minority is 67.8 percent. Based on the

county parameter, 332 out of 764 blocks in the study area had an above-threshold minority population, as did the study area as a whole. Based on the city parameter, the study area as a whole, and 319 blocks in the study area are considered to have an above-threshold minority population.²

While there are scattered areas around the Trade Street corridor where the percentage of minority individuals is above the city and county thresholds, the highest concentrations of minority individuals occur around the Beatties Ford Road corridor and the eastern-most portion of the Central Avenue corridor.

Other Protected Populations

For purposes of this assessment, transit dependent populations were considered to include children, the elderly, zero-car households, and low-income populations. These categories are not mutually exclusive and the different types of data are not consistent by one type of population unit (i.e., some information is by individual, some by family, and some by household). Therefore, it was not possible to correlate data to obtain an accurate composite number of transit-dependent individuals for each block group. Instead, the four separate indicators of transportation dependency are shown in Table 5-3.

Whether a substantial transportation-dependent population is located in a block group was determined using data for Mecklenburg County as a threshold value. This criterion resulted in the following threshold values for transit dependency:

- The population of children within a block group is above threshold if it is greater than 25.1 percent of total block group population,
- The population of elderly individuals (above age 64) within a block group is above threshold if it is greater than 8.6 percent of total block group population,
- The percentage of occupied housing units (rented and owned) in a block group with no vehicles available is above threshold if it is greater than 6.9 percent of total occupied housing units in the block group, and
- The percentage of low-income individuals in a block group is above threshold if it is greater than 9.2 percent of the block group population.

All but one populated block group in the study area was found to have an above-threshold transit-dependent population measured by at least one indicator. The study area as a whole was found to have an above-threshold population of each transit-dependent group.

Table 5-3: Indicators of Transit Dependency

| Census Block Group | Percentage of Block Group Consisting of | | | | Substantial Concentration of | | | |
|--------------------|---|-----------------|-----------------------|--------------|------------------------------|----------------|---------------------|------------|
| | Children (< 18)* | Elderly (> 64)* | Zero Car Households** | Low Income** | Children (< 18) | Elderly (> 64) | Zero Car Households | Low Income |
| 01-1 | 2.8 | 11.7 | 27.7 | 29.0 | | X | X | X |
| 02-1 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 03-1 | 1.2 | 24.2 | 64.8 | 41.9 | | X | X | X |
| 04-1 | 3.9 | 28.0 | 49.4 | 25.7 | | X | X | X |
| 05-1 | 1.5 | 18.6 | 29.0 | 18.6 | | X | X | X |
| 05-2 | 48.3 | 2.4 | 21.2 | 48.4 | X | | X | X |
| 05-3 | 13.5 | 6.2 | 15.7 | 17.6 | | | X | X |
| 06-1 | 39.2 | 2.8 | 5.6 | 32.9 | X | | | X |
| 06-2 | 11.7 | 5.4 | 33.7 | 59.2 | | | X | X |
| 08-1 | 38.1 | 6.2 | 39.8 | 33.5 | X | | X | X |
| 08-2 | 45.6 | 2.1 | 57.0 | 73.7 | X | | X | X |
| 10-1 | 19.8 | 9.3 | 4.8 | 9.4 | | X | | X |
| 10-2 | 15.8 | 7.1 | 11.9 | 15.9 | | | X | X |
| 10-3 | 15.0 | 7.4 | 9.3 | 16.0 | | | X | X |
| 11-1 | 20.3 | 8.6 | 15.6 | 22.3 | | X | X | X |
| 11-2 | 8.3 | 10.0 | 6.4 | 5.4 | | X | | |
| 12-1 | 25.6 | 6.5 | 7.0 | 14.7 | X | | X | X |
| 12-2 | 21.3 | 9.2 | 13.2 | 6.0 | | X | X | |
| 12-3 | 17.4 | 14.3 | 7.4 | 5.3 | | X | X | |
| 16.02-1 | 22.3 | 16.1 | 14.5 | 15.6 | | X | X | X |
| 16.02-2 | 19.4 | 9.6 | 17.7 | 16.2 | | X | X | X |
| 17.01-1 | 18.8 | 13.4 | 19.9 | 23.9 | | X | X | X |
| 17.01-2 | 30.1 | 2.5 | 13.7 | 19.3 | X | | X | X |
| 17.02-1 | 22.5 | 6.4 | 10.8 | 9.9 | | | X | X |
| 17.02-3 | 18.9 | 17.3 | 6.1 | 9.7 | | X | | X |
| 18-5 | 29.6 | 3.5 | 12.8 | 16.5 | X | | X | X |
| 19.08-2 | 19.1 | 10.3 | 7.3 | 2.0 | | X | X | |
| 19.08-3 | 20.3 | 12.9 | 10.5 | 4.5 | | X | X | |
| 24-1 | 13.1 | 5.5 | 2.9 | 9.5 | | | | X |
| 24-3 | 11.4 | 11.2 | 7.0 | 11.0 | | X | X | X |
| 25-1 | 15.0 | 4.9 | 8.8 | 8.6 | | | X | |
| 25-2 | 7.8 | 14.2 | 7.3 | 34.3 | | X | X | X |
| 26-1 | 27.1 | 12.7 | 56.0 | 43.5 | X | X | X | X |
| 26-2 | 3.9 | 8.1 | 4.0 | 0.0 | | | | |
| 27-1 | 16.8 | 22.9 | 3.6 | 1.9 | | X | | |
| 41-1 | 37.8 | 6.6 | 37.2 | 20.5 | X | | X | X |
| 41-2 | 21.8 | 13.9 | 16.8 | 22.0 | | X | X | X |
| 45-1 | 42.0 | 5.6 | 37.3 | 31.2 | X | | X | X |
| 45-4 | 28.2 | 12.8 | 35.8 | 35.9 | X | X | X | X |
| 46-1 | 18.0 | 32.3 | 9.6 | 24.4 | | X | X | X |
| 46-2 | 28.5 | 13.9 | 24.2 | 21.5 | X | X | X | X |
| 47-1 | 15.9 | 7.4 | 29.8 | 34.8 | | | X | X |
| 48-1 | 24.4 | 13.6 | 33.8 | 19.5 | | X | X | X |
| 48-2 | 23.8 | 23.3 | 27.0 | 24.1 | | X | X | X |
| 48-3 | 25.2 | 22.2 | 22.7 | 19.1 | X | X | X | X |
| 49-1 | 38.1 | 3.4 | 13.5 | 16.3 | X | | X | X |

Table 5-4: Indicators of Transit Dependency (Cont.)

| Census Block Group | Percentage of Block Group Consisting of | | | | Substantial Concentration of | | | |
|--------------------|---|-----------------|-----------------------|--------------|------------------------------|----------------|---------------------|------------|
| | Children (< 18)* | Elderly (> 64)* | Zero Car Households** | Low Income** | Children (< 18) | Elderly (> 64) | Zero Car Households | Low Income |
| 54.01-1 | 28.1 | 8.9 | 8.6 | 11.5 | X | X | X | X |
| 54.01-2 | 23.9 | 14.8 | 15.2 | 13.9 | | X | X | X |
| Study Area | 21.9 | 11.2 | 18.0 | 18.4 | X | X | X | X |
| County | 25.1 | 8.6 | 6.9 | 9.2 | | | | |

Source: *U.S. Census Bureau. American Fact Finder. "Summary File 1." Available: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=datasets_1&_lang=en. Accessed: February 2006.

**U.S. Census Bureau. American Fact Finder. "Summary File 3." Available: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=datasets_1&_lang=en. Accessed: February 2006.

5.4.4 Impacts to Protected Populations

Agencies are to consider whether there will be disproportionately high or adverse impacts to protected populations, and, in the case of transit projects, whether there is an equitable distribution of benefits.

Evaluation criteria that can be used in the determination are listed in Table 5-5. Potential impacts of each alternative to protected populations are assessed in this section. The three alternatives assessed are the No-Build Alternative, TSM Alternative, and the Build Alternative.

No-Build or TSM Alternatives

Both the No-Build and TSM alternatives are essentially the same, except more intense bus service levels would be implemented on existing bus routes (CATS Routes 7 and 9) that serve the project area. Under the No-Build alternative transit headways would remain the same, while under the TSM alternative transit service would be increased by reducing headway times.

The transportation service provided by the Center City Streetcar is expected to be a positive impact on transit-dependent populations. The lack of the streetcar service, associated with the No-Build and TSM alternatives, could be viewed as a negative impact. However, there would be no disproportionately adverse impacts to protected populations under the No-Build and TSM alternatives.

Build Alternative

Expected impacts to protected populations as a result of the Build Alternative are presented in Table 5-5.

Table 5-5: Potential Impacts of the Build Alternative to Protected Populations

| Criteria | Assessment |
|---|--|
| Involvement of protected populations in the project-development process | Efforts were made to include minority, low-income and other transit-dependent populations in the project development process. |
| Fare | Fares have not yet been determined, but may vary. For example, there may be a fare-free zone. |
| Siting of stops | Streetcar stops are well distributed throughout the project corridor, including 9 stops in the area with the highest minority population (Beatties Ford Rd) and 9 stops in the area with the highest low-income population (Trade St). |
| Siting of VMF (Vehicle Maintenance Facility) | Two potential sites are being considered for the VMF. The first site is located between Brookshire Freeway (NC 16), French Street and Beatties Ford Road. The second site is located between Hawthorne Lane, Central Avenue, Clement Street and CSX Railroad. There is a higher concentration of both low-income and minority populations in the area surrounding the first site compared to the second. It is more likely that any potential negative impacts associated with the VMF would disproportionately impact protected populations if the first site is chosen. While a VMF would be consistent with the planned/zoned land uses for either site, it could cause some negative impacts to surrounding residents in the form of noise and visual/aesthetics. Public input during the project indicated that both neighborhoods were amenable to the implementation of the VMF at their respective site. |
| Amenities (e.g., furniture and maintenance at stops) | The siting and distribution of amenities will be consistent throughout the service area and will serve areas with protected populations. |
| Air quality | It is expected that, overall, air quality would improve under the Build Alternative as vehicle miles traveled would be reduced and there would be less use of diesel-fueled buses. This would be a benefit impact for all populations (including protected) in the study area. |
| Noise | <p>As reported in the 2006 technical memorandum, "Noise and Vibration Baseline Assessment," there are receptors sensitive to track and station noise and vibration distributed throughout the length of the corridor. Most of the noise sensitive receptors are located in areas that are heavily minority and residential (along Beatties Ford Road and Central Avenue). Many of the noise sensitive receptors in those areas that are heavily low-income are non-residential, or uses such as churches, parks, hospitals, and playgrounds.</p> <p>There are "above-threshold" minority and low-income areas around each of the five options investigated for the operations and maintenance facility, but two of the sites have a higher concentration of nearby minority populations than others – French Street and I-77.</p> |

Table 5-5: Potential Impacts of the Build Alternative to Protected Populations (Cont.)

| Criteria | Assessment |
|--|---|
| Impacts to ecology | According to the 2006 "Natural Resources" technical memorandum, "The construction and operation of the streetcar is not expected to affect any natural areas, wildlife habitat or protected species." Since ecological impacts are not anticipated, there would not be a disproportionately negative impact to protected populations. |
| Impacts to water resources | Substantial or long-term impacts are not expected to be associated with the project and would not disproportionately impact protected populations. |
| Access | Stops are expected to be sited at approximately equal distances throughout the corridor. The streetcar is expected to be within walking-distance of individuals living within a half-mile of stops, this is further than the quarter-mile generally used for buses. |
| Changes in geographic service area | The streetcar is expected to be within walking-distance of individuals living within a half-mile of stops, this is further than the quarter-mile generally used for buses. This effectively doubles the population with access to transit in the corridor. |
| Changes in travel times and reliability | Travel times and reliability will be improved with additional transit service throughout the corridor. |
| Changes in frequency or hours of service | The frequency and hours of transit service will be improved by the streetcar throughout the corridor. |
| Changes in Traffic | Changes in traffic patterns are not likely within the corridor |
| Relocations | No relocations would result from implementation of the project |
| Economic impacts | The project is expected to have a positive economic impact in the study area as it will facilitate TOD, help attract workers to the study area and serve some of the major employment centers. The magnitude of development along the streetcar alignment, both short and long range, is quantified in the Development Study. |
| Impacts to historic/archaeological resources | Potential impacts to historic/archaeological resources will be determined through ongoing coordination with SHPO. |
| Construction impacts | Construction of the project will take place in phases and mostly within existing road right-of-ways with limited disturbance to the surrounding area. |

5.4.5 Conclusion

Overall, the Center City Streetcar is expected to have a positive impact on transit-dependent and other protected populations in the study area. The project is expected to provide improved transit service and increased accessibility and mobility to protected populations in the study area. Considerable efforts were made to involve protected populations in the project development process through public involvement and outreach activities. Efforts have also been made to

disperse the siting of stops and equally distribute amenities such as street furniture throughout the project corridor. While, overall, protected populations will benefit from the Build Alternative, there could be some disproportionate impacts to protected populations associated with a VMF at a location between Brookshire Freeway (NC 16), French Street and Beatties Ford Road. While some negative impacts in the form of noise and visual changes could be associated with the VMF; a VMF at this site is consistent with planned land uses and would not represent a substantial negative or disproportionate impact. On the other hand, the lack of streetcar services, as with the No-Build and TSM alternatives, could be viewed as a negative impact to transit-dependent populations in the study area that would benefit from the streetcar.

5.5 FINANCIAL FEASIBILITY

Local sales tax revenue for the CATS system generated from the ½ cent sales tax gives the City the financial support necessary for developing the transit system outlined in the Region's Long Range Transportation Plan. There is a significant amount of financial planning still required to establish priority and the scheduling for system implementation. How the streetcar fits into this process is still being determined.

Some implementation and funding scenarios have been addressed as part of the *Implementation Plan* (October 2006) but will have to be further analyzed during subsequent phases of the project. These scenarios examine staged implementation of the streetcar by varying the segment of the facility that will be implemented first.

5.6 SUMMARY AND SIGNIFICANT TRADE-OFFS

Implementation of the Center City Streetcar Corridor will improve the overall operations of the CATS system and benefit its most productive transit corridors. Three of the four most utilized routes would be replaced by premium transit service that will be more reliable and have higher capacity than existing bus service or short range bus service improvements. This section describes four issues concerning the streetcar's conceptual design that were addressed.

5.6.1 Operational Trade-offs

Ten Minutes versus 7.5 minutes

In addition to the difference in the peak vehicle requirement, providing 7.5 minute service during peak periods rather than 10 minute frequencies will produce an increase of approximately 8,000 additional revenue hours annually. Waiting time for users of the system will decrease on average 1.25 minutes given the increase in frequency.

While ten minute frequencies will offer adequate capacity, it is anticipated that ridership demands may exceed 120% of seated volume during some runs during the peak periods, which is the current service standard threshold for CATS bus service. The threshold is set by CATS to serve as an indicator for possible service increases. If volumes exceed the 120% seated capacity with enough regularity then CATS will need to increase services. It is expected that with the introduction of rail services to the CATS system, a new set of service standard thresholds will be established that allow for a higher volume to seated capacity ratio on light rail and streetcar services.

Ten Minute Service with 30 Minutes Supplemental Bus Service

As an alternative to providing 7.5 minute service on the streetcar, it is possible to supplement streetcar service with additional bus service on the same alignment. By providing 30 minute frequencies on both Route 7 and 9 along Beatties Ford Road and Central Avenue, then combined with 10 minute service on the streetcar, CATS would effectively provide 7.5 minute frequencies by offering six streetcars per direction per hour (10 minute service) and two buses per hour (30 minute service). It should be noted, however, that two buses would be added into service based on their own schedule (twice an hour) and would be staggered with the streetcar service rather than creating 7.5 minute service that is more evenly distributed during the hour.

The operational analysis indicates that the Center City Streetcar will improve CATS service in its system's most productive corridor. The increase in capacity afforded by the streetcar technology will give CATS the ability to accommodate projected growth in ridership, maintain system service standards and improve the system's farebox recovery rate. With service increases eminent on its existing bus service in the corridor, the streetcar operation will provide equivalent service without the need to increase costs, if not operate at a lower overall cost.

Based on current travel patterns and ridership projections, it is recommended that CATS implement streetcar services in two primary areas – Center City and the CATS Route 9 alignment. Considering the aggregate utilization on the Gold Rush Red Line and both Route 7 and 9, the bulk of the ridership of the streetcar will occur between the CTC and the Pease Lane stop near CPCC. Peak loads on existing transit service in the corridor are occurring in these two locations. In addition, the Gold Rush Red Line service is operated with lower capacity rubber-tired trolleys that routinely have "crush loads" and leave behind passengers. Considering the project growth, the capacities offered by the streetcar technology at equivalent frequencies or even slightly lower frequencies should be sufficient. The initial streetcar segment to be constructed should include these areas.

The full-build alignment should be operated at no longer than a 10-minute frequency for the bulk of the day on weekdays and 20-minute service during off-peak periods. This level of service will provide ample capacity on the alignment, but it does represent a reduction in the frequency currently provided on the existing bus service, which is seven to eight minutes. The improved travel time provided by the streetcar service as well as other perceivable improvements in system reliability should sufficiently overcome ridership issues with a 2-3 minute reduction in frequency.

Enhanced service between 6 and 9:30 AM and 2:30 and 6 PM to 7.5-minute frequency should be considered to avoid the appearance of degradation in service to existing transit users or if CATS decides to implement a fare-free zone in Center City. Additional, ridership brought on by the fare-free zone may require the additional capacity during rush hours.

CATS should also be cognizant that maintaining frequency of service in transit corridors is a point of emphasis for the Federal Transit Administration in their review of New (Small) Start projects. Therefore, if CATS pursues federal funding for the project, increased capacity provided by the streetcar projects will not necessarily offset the issue of decreased frequency of service.

The primary concern about increasing service to 7.5 minute frequency is the increased capital cost for additional vehicles and the increased operating cost eliminates the cost savings of the 10 minute level of service. A potential solution would be to introduce bus service with 30 minute frequency to the alignment. Adding the bus service to 10 minute streetcar service will be equivalent to 7.5 minute service. Operating costs for this service plan will be much less than the 7.5 minute streetcar service. The supplemental bus service would be provided by extending the Route 7 and 9 routes in from the Rosa Parks and Eastland Mall, respectively. This will create an ancillary benefit by eliminating the transfer for some passengers at these facilities.

Providing higher capacity streetcars at lower levels of frequency is a trade-off for higher frequency buses. The preferred operating plan balances the capital investment of the streetcar and taking advantage of its higher capacity by offering service that will reduce overall operating expenses within the corridor. The savings in bus service can be re-allocated to other parts of the service area or applied to the bottom line savings.

5.6.2 Low Bridge Clearances

There is a 17.5-foot clearance requirement between the top of rail and the contact wire, when operating a streetcar in a mixed traffic environment. Any reduction will violate National Electric Safety Code (NESC) and necessitate avoidance measures. The 17.5-foot clearance requirement is based on allowing 16.5 feet for the maximum height of a large truck and one-foot minimum clearance to the live contact wire. The one-foot allowance assumes dynamic displacement of the vehicle under operating conditions, including tolerances for sag, installation and maintenance of the track and OCS. Typically, an additional six inches would be required between the contact wire and the bottom of the bridge structure. This brings the required clearance between an existing bridge structure and the proposed top of rail to 18 feet.

Along the proposed Trade Street portion of the streetcar route, there exist six locations where aerial structures have been built over the roadway. In each case the minimum clearance is below the required 18 feet. The locations and minimum clearances include:

- Beatties Ford Road - Johnson C. Smith University Pedestrian Bridge (16.2');
- Trade Street - Interstate 77 (15.2');
- Trade Street - Norfolk Southern Railroad (15.1');
- Trade Street - Bank of America Pedestrian Bridge (16.7');
- Trade Street - South Corridor LRT (14.9'); and
- Elizabeth Avenue - Interstate 277 (15.2').

Eight general methods were identified to avoid the insufficient bridge clearance. Each method of avoidance has implications to cost, operations, construction impact, and safety. The eight methods are presented below and brief description of the implications and risks are included in the *Bridge Clearance Technical Memorandum* (July 2005).

- Eliminate the bridge.
- Reconstruct the bridge to the required elevation.
- Lower the profile of the tracks.
- Reroute the streetcar alignment.
- Sectionalize the OCS and apply for a variance in the NESC.
- Operate the streetcars in exclusive lanes under the bridges.
- Truncate the Overhead Catenary System under the bridges.
- Utilize “trolley-pole”.

In almost every instance where low clearances effect the streetcar operations and alignment, CATS will be applying for a variance in the NESC code. To enhance safety, an electrical sectionalization of the OCS will be employed. This approach would only electrify the OCS wire when the streetcar is present at the underpass. The infrastructure required for sectionalization does have a minor capital cost consideration but avoids major reconstruction of the bridge and/or the road, and keeps all existing traffic lanes open.

The bridge underpass at the CSX crossing of Hawthorne Lane (north of Central Avenue) is the sole exception. At this location, the road surface will be lowered to accommodate the height of the streetcar itself. The sectionalization approach will also be necessary since the full clearance required by NESC cannot be achieved without major reconstruction of the overpass.

5.6.3 Plaza Area Alignment Options

A major issue confronting the design of the streetcar was an at-grade crossing of CSX freight railroad on Central Avenue just west of the Plaza. At-grade crossings are feasible but generally are not preferred especially when the two sets of tracks are operated by different entities. Grade limitations for bridging the crossing were exorbitantly expensive and would negatively impact the land uses on either side of Central Avenue for a substantial distance in each direction. The solution was to identify another alignment that either crossed under the CSX facility or crossed over at a point where a bridge was more financially feasible.

The initial solution was an alignment south of Central Avenue that parallels Independence Boulevard and bridges the CSX line near Pecan Avenue. In addition to avoiding the at-grade crossing on Central Avenue, the alignment had minimal right of way impacts, supported new development and was less costly than building a bridge over the CSX line on Central Avenue. The alignment required additional structural changes to the Hawthorne Lane bridge over Independence Boulevard and provided access to a potential vehicle maintenance facility (VMF) site near Lamar Avenue.

As part of the VMF site assessment, a new alignment in the Plaza area was identified. The alignment continues on Hawthorne Lane north of Central Avenue, passes under the CSX line and provides access to another potential VMF site at the Barnhardt Manufacturing facility. The alignment also provides access to a potential transit oriented development site and rejoins Central via Clement Avenue. Once the VMF site assessment identified Barnhardt Manufacturing site as one of the top preferred sites, a cost comparison between the northern and southern alignments in the Plaza area was conducted.

The comparison showed that the primary disadvantage of the northern alignment was the increased run times required because of the increased length of track. However, the capital cost of the road construction under the CSX bridge and additional length of the facility was offset by the savings in structures and right-of-way associated with the southern alignment.

5.6.4 Trade Street Alignment Alternatives

A major decision point in the development of the streetcar design concept was to determine the preferred streetcar alignment through Center City. A three-tiered analysis was employed, each at an increasing level of detail to evaluate the trade-offs among the alignment options. The results of these three stages are summarized below, along with a description of the preferred streetcar alignment. More detail information is included in the *Alignment Definition Report* (April 2006)

Tier 1 Analysis

The Tier 1 analysis identified alternatives for more detailed examination, using the following four objectives as the basis for comparison:

- Provides the most benefits to surrounding land uses and development;
- Provides the best fit within the framework of the streetcar system;
- Minimizes negative transportation / environmental impacts; and
- Presents the fewest problems in terms of constructability.

This evaluation was conducted on the five east-west thoroughfares between Third and Sixth Streets. Specific performance measures were developed for each of the objectives, and were reviewed by the Working Session Group. Scores relative to “high”, “medium”, and “low” rankings were established for each measure, and equal weighting was used for all criteria.

Based on the Tier 1 rating system described earlier, Third, Fifth and Sixth Streets (and any alignment options utilizing these streets) were eliminated from further analysis. Therefore, the following three alternatives were advanced for further consideration under Tier 2 examination:

- Trade Street (bi-directional / curb-running);
- Trade Street (bi-directional / median-running); and
- Fourth Street / Trade Street couplet (curb-running).

Following stakeholder input received at the Center City Transit Workshop, a fourth option, Trade Street / Fifth Street couplet (curb-running) was reinstated for Tier 2 analysis:

Tier 2 Analysis

After the Tier 1 (“Basic Screening”) analysis was conducted to determine the streets in Center City most favorable to streetcar service, a more detailed assessment was performed on the four alternatives (described earlier) that advanced to this next stage of evaluation.

A series of objective criteria was developed, and a relative ranking (1st, 2nd, 3rd, 4th) was assigned to each alternative under each performance measure. All criteria were weighted equally to determine a final ranking of alternatives.

The Tier 2 analysis addressed many of the same impacts studied as part of the Tier 1 analysis, but provides a more in-depth examination of these impacts and also evaluates several additional aspects of the proposed streetcar service. The following eleven evaluation criteria were used:

- Access and traffic impacts;
- Existing on-street parking;
- Redevelopment opportunities;
- Platforms and pedestrian environment;
- Streetcar operations;
- Bridge clearances;
- Potential utilities impacts;
- Relative capital costs;
- Ease of construction;
- Flexibility of streetcar; and
- Compatibility with Light Rail Transit.

Based on evaluation using these eleven specific performance measures, the Trade Street (median-running) alternative ranked the highest among the four options studied. Although this evaluation weighted all criteria equally, a separate scoring compilation was created using only five highly critical criteria, as determined by the Team:

- Capital costs;
- Utility impacts;
- Streetcar operations;
- Ease of construction; and
- Platforms and pedestrian environment.

The Trade Street (median-running) alternative ranked the highest in this scenario as well, followed by the Trade Street (curbside) option and the Trade Street / Fourth Street couplet.

Tier 3 Analysis

Results from the Tier 2 investigation illustrate that a median alignment on Trade Street convincingly outranks the other alternatives when considering the stated performance measures; nevertheless, issues associated with this alignment must still be addressed. Though operating the streetcar primarily on a median alignment through Center City is preferred, alternative platform locations might better address the unique challenges and concerns at specific stops. Combining a median alignment with some of the best qualities of the curbside alternative on Trade Street may optimize a preferred alignment.

The purpose of the Tier 3 analysis was to confirm the Trade Street (median) option as the preferred alignment, by conducting a detailed analysis to compare the impacts of median and curbside platforms at individual stop locations. Special attention was given to widening requirements, parking displacement, tree displacement, and sidewalk impacts. This assessment resulted in stop-by-stop recommendations for each of the potential stop locations.

The examination of potential streetcar stop alternatives in the Tier 3 analysis indicates that in most cases, median platforms are preferred primarily due to the ability to maintain existing sidewalk widths. However, the unique conditions and the urban design surrounding the Trade Street/Tryon Street intersection provide strong support for a curbside alternative in this area.

The proposed alternatives for each stop location are as follows:

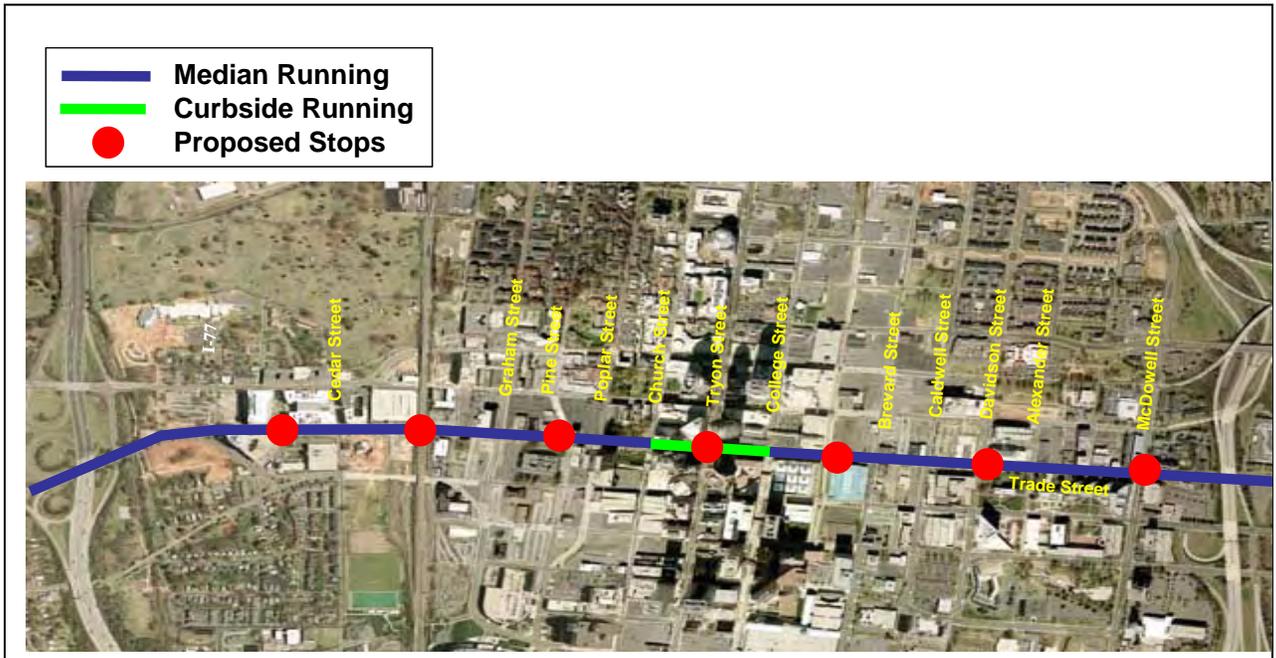
- **Johnson & Wales:** Median
- **Charlotte Gateway Station:** Median
- **Mint/Pine Street:** Split Median
- **Tryon Street:** Median to Curbside Shift
- **Arena/Transportation Center:** Narrow Median
- **Government Center:** Narrow Median

(A median stop at McDowell Street is also proposed, but this stop location was not examined in detail as part of this analysis due to its proximity to the Elizabeth Avenue section, where the alignment previously has been defined.)

Preferred Streetcar Alignment

Ultimately, a streetcar alignment was selected that would operate on Trade Street through Center City. Streetcars would operate in the median travel lanes through most of Center City, except for the area near The Square (Trade Street and Tryon Street), where unique design features would be utilized to shift to a curb-running alignment to take advantage of the distinctive urban design opportunities associated with curbside stops in this area. Graphic depictions of the overall alignment and each recommended stop location are provided on the following pages.

Figure 5-1: Preferred Center City Alignment



¹ US Department of Transportation. Federal Highway Administration. *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. Washington, D.C.: 1998. <http://www.fhwa.dot.gov/legregs/directives/orders/6640_23.htm> (31 August 2004).

² U.S. Census Bureau. *American Fact Finder*. "Summary Table 1." Available: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=datasets_1&_lang=en. Accessed: February 2006.

CHAPTER 6 PUBLIC INVOLVEMENT

6.1 GENERAL APPROACH TO INVOLVING THE PUBLIC

6.1.1 Meeting Forums

Public involvement techniques were aimed at including all interested and/or potentially affected individuals. Involvement took place in six forums: (1) sub-area Advisory Board meetings, (2) sub-area public meetings, (3) public meetings, (4) small group meetings, (5) community workshops, and (6) interviews. Three sub-areas were developed, corresponding with the three segments of the Center City Streetcar corridor: (1) the Beatties Ford Road sub-area, (2) the Trade Street sub-area, and (3) the Central/Hawthorne Avenue sub-area. Full inclusion was established by using meetings focused on both a small geographic scale (sub-area meetings), a larger geographic scale (corridor-wide meetings), small groups (advisory board meetings, small group meetings), large groups (public meetings, community workshop), and by holding meetings at various times of day and at different locations.

Information specific to the Center City Streetcar was also posted on the CATS website beginning in November of 2005. Announcements of meetings, summaries of previous meetings, project descriptions, and the ability to submit comments are some of the features of the site.ⁱ

6.1.2 Notification Forums

Notification of upcoming meetings was provided through the mailing of postcards and personal letters; direct telephone contact; advertisements in local newspapers (i.e., Charlotte Observer, The Charlotte Post); postings on websites, brochures and bulletin boards; notification on the local government cable channel bulletin board, and through press releases to local newspapers, radio and television stations. Meeting notifications were also posted on the City of Charlotte and CATS websites. The method of notification for each meeting is included in the meeting summaries in Table 6-1.

Notice of project information and updates was provided at each of the meeting forums, through the CATS website, and through the project's newsletter, *Center City Transitions*.

6.1.3 Comments

Comments were accepted at each of the five forums, through the CATS website, and through written comments, emails, or telephone calls to the CATS project team.

6.2 PUBLIC INVOLVEMENT TIMELINE

A timeline of each public involvement opportunity is included in Table 6-1. The complete meeting summaries and newsletters are included in Appendix B.

Table 6-1: Public Involvement Activity Timeline

| Date | Type | Details |
|-------------------|---|---|
| 09/23/04 | Small Group meeting | Federal Transit Administration (FTA) Quarterly Meeting |
| 10-11/04 | Interviews | 23 business representatives 4 government agency representatives 15 neighborhood representatives |
| 11/10/04-11/18/04 | Public Notice | 1,500 postcards 42 personal letters 30 direct calls |
| 11/22/04 | Small Group Meeting | Transit Summit |
| Fall 2004 | Center City Transitions issued | News Letter |
| 11/18/04 | Community Workshop | 80 attendees total, 56 on sign-up sheet |
| 12/08/04 | Small Group Meeting | Interview with the Charlotte Business Journal |
| 12/08/04 | Small Group Meeting | Center City Partners Planning and Development Committee |
| 12/15/04 | Small Group Meeting | Hospitality Tourism Association (HTA) |
| 12/16/04 | Small Group Meeting | Eastside Community Development Corporation (Eastside CDC) |
| 01/03/05 | Small Group Meeting | City Council Presentation |
| 01/26/05 | Small Group Meeting | Media Day |
| 01/27/05 | Small Group Meeting | Eastside Community Development Corporation (Eastside CDC) |
| 02/01/05 | Advisory Board Meeting Trade Street Sub-Area | 11 Advisory Board participants |
| 02/02/05 | Advisory Board Meeting Hawthorne/Central Avenue Sub-Area | GHA |
| 02/03/05 | Advisory Board Meeting Beatties Ford Road Sub-Area | GHA |
| 03/08/05 | Small Group Meeting | Northwest Community Development Corporation (NW CDC) |
| 03/22/05 | Small Group Meeting | Council Patsy Kinsey District Meeting |
| 03/29/05 | Small Group Meeting | Council James Mitchell District Meeting |
| 03/31/05 | Small Group Meeting | Federal Transit Administration (FTA) Quarterly Meeting |
| 04/11/05 | Public Notice | 1,403 mailed notices & other media |
| 04/12/05 | Small Group Meeting | Transit Initiative Conference |
| 04/13/05 | Small Group Meeting | Center City CDOT's Transportation Study |
| 04/14/05 | Small Group Meeting | Transportation Services Advisory Committee (TSAC) |

Table 6-1: Public Involvement Activity Timeline (Cont.)

| Date | Type | Details |
|-------------|---|---|
| Spring 2005 | Center City Transitions issued | Newsletter |
| 04/19/05 | Advisory Board Meeting Trade Street Sub-Area | GHA |
| 04/20/05 | Small Group Meeting | Dr. Dorothy C. Yancey, President of Johnson C. Smith University |
| 04/21/05 | Advisory Board Meeting Beatties Ford Road Sub-Area | GHA |
| 04/26/05 | Sub-Area Meeting Hawthorne/Central Avenue | 63 attendees |
| 04/28/05 | Sub-Area Meeting Trade Street | 15 attendees |
| 04/28/05 | Small Group Meeting | Council Nancy Carter District Meeting |
| 05/04/05 | Sub-Area Meeting Beatties Ford Road | 40 attendees |
| 05/25/05 | Small Group Meeting | Metropolitan Transit Commission (MTC)-Streetcar Briefing |
| 06/09/05 | Small Group Meeting | Programs for Accessible Living (PAL) |
| 06/10/05 | Public Notice | 1,462 mailed notices & other media |
| 06/14/05 | Advisory Board Meeting Hawthorne/Central Avenue Sub-Area | GHA |
| 06/15/05 | Advisory Board Meeting Trade Street Sub-Area | GHA |
| 06/16/05 | Small Group Meeting | Merry Oaks Neighborhood Association |
| 06/16/05 | Advisory Board Meeting Beatties Ford Road Sub-Area | GHA |
| 06/16/05 | Small Group Meeting | Federal Transit Administration (FTA) Quarterly Meeting |
| 06/20/05 | Small Group Meeting | Metrolina Association for the Blind (MAB) |
| 06/21/05 | Sub-Area Meeting Trade Street | 70 attendees |
| 06/22/05 | Sub-Area Meeting Hawthorne/Central Avenue | 35 attendees |
| 06/23/05 | Sub-Area Meeting Beatties Ford Road | 35 attendees |
| 06/28/05 | Small Group Meeting | Center City Chamber Luncheon |
| 06/28/05 | Small Group Meeting | Bus Operations Department (BOD) 2 presentations |
| 06/29/05 | Small Group Meeting | Bus Operations Department (BOD) |
| 06/30/05 | Small Group Meeting | Bus Operations Department (BOD)-4 presentations |

Table 6-1: Public Involvement Activity Timeline (Cont.)

| Date | Type | Details |
|-------------|---|--|
| Summer 2005 | Center City Transitions issued | Newsletter |
| 07/09/05 | Small Group Meeting | Cluster 1 Neighborhood Meeting |
| 07/19/05 | Small Group Meeting | Center City Chamber Luncheon |
| 07/21/05 | Small Group Meeting | Center City Transportation Open House |
| 08/03/05 | Small Group Meeting | Charlotte Mecklenburg Planning Commission Streetscape Committee |
| 08/05/05 | Small Group Meeting/Interview | Interview with News 14 |
| 09/08/05 | Small Group Meeting | Federal Transit Administration (FTA) Quarterly Meeting |
| 09/08/05 | Small Group Meeting | Programs for Accessible Living (PAL) |
| 09/09/05 | Public Notice | 1,567 mailed notices & other media |
| 09/20/05 | Advisory Board Meeting Trade Street Sub-Area | GHA |
| 09/20/05 | Small Group Meeting | Charlotte East Area Panel |
| 09/21/05 | Advisory Board Meeting Hawthorne/Central Avenue Sub-Area | GHA |
| 09/22/05 | Small Group Meeting | Eastside Community Development Corporation (Eastside CDC) |
| 09/22/05 | Advisory Board Meeting Beatties Ford Road Sub-Area | GHA |
| 09/27/05 | Public Meeting | 100 attendees |
| 10/06/05 | Small Group Meeting | Bank of America/Senior Vice President of Corporate Real Estate |
| 10/13/05 | Small Group Meeting | North Carolina Department of Transportation-Raleigh (NCDOT) |
| 11/05 | Website established | |
| 12/08/05 | Small Group Meeting | Northwest Corridor Community Development Corporation Annual Meeting (NW CDC) |
| 12/15/05 | Small Group Meeting | Federal Transit Administration (FTA) Quarterly Meeting |
| 01/12/06 | Small Group Meeting | Art In Transit Committee |
| 01/19/06 | Small Group Meeting | Charlotte Center City Partners (CCCP) |
| 01/26/06 | Small Group Meeting | Eastside Community Development Corporation (Eastside CDC) |
| 02/08/06 | Small Group Meeting | Bank of America/Senior Vice President of Corporate Workplace & Security |
| 02/10/06 | Small Group Meeting | Kiwanis Club of Central Charlotte |
| 03/03/06 | Small Group Meeting | North Carolina Department of Transportation-Raleigh (NCDOT) |

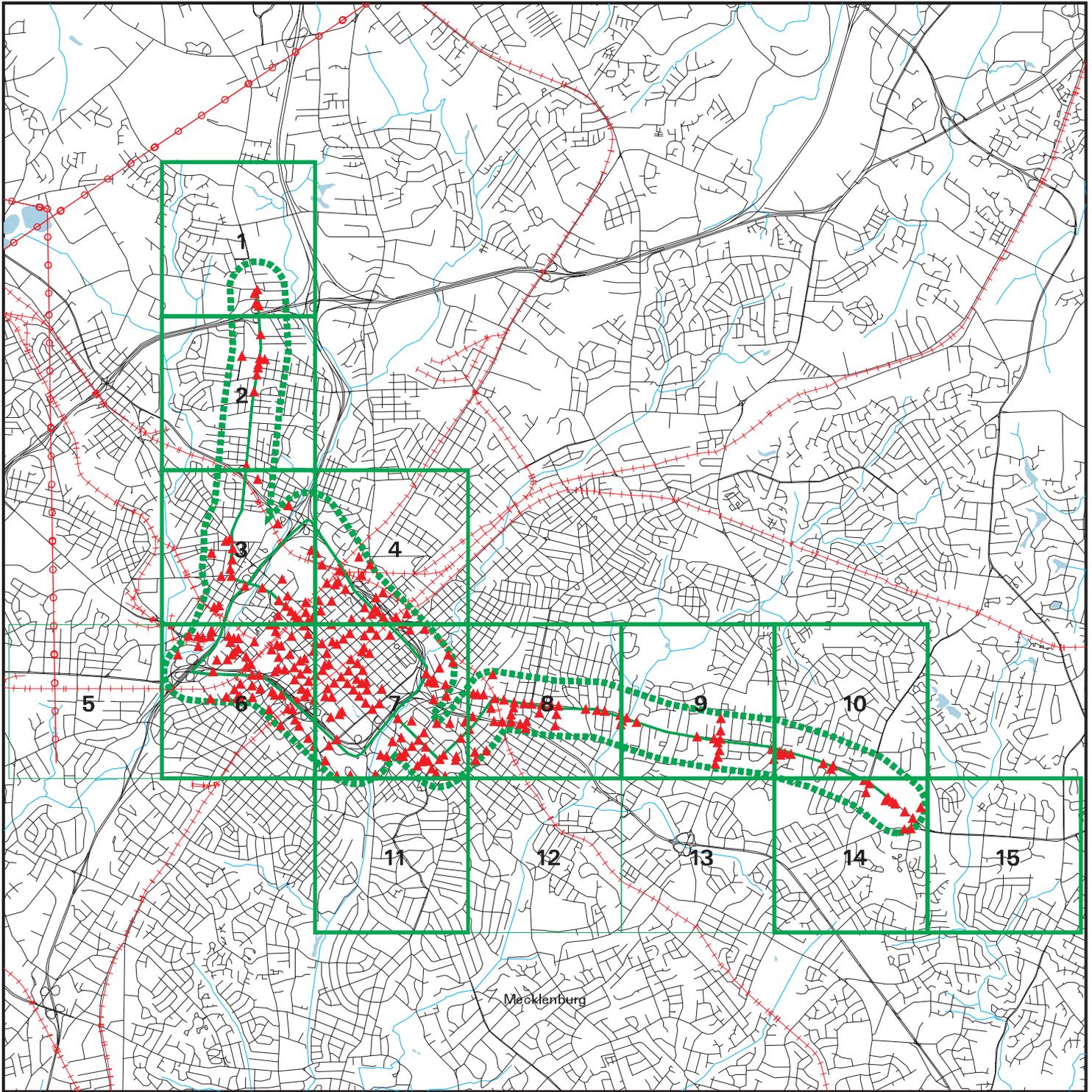
Table 6-1: Public Involvement Activity Timeline (Cont.)

| Date | Type | Details |
|-------------|---|--------------------|
| 03/07/06 | Advisory Board Meeting Trade Street | GHA |
| 03/08/06 | Advisory Board Meeting Hawthorne/Central Avenue | GHA |
| 03/09/06 | Advisory Board Meeting Beatties Ford Road | GHA |
| 03/16/06 | Public Meeting | CMGC |
| 06/28/06 | MTC Meeting | CMGC |
| 07/11/06 | Advisory Board Meeting Trade Street | GHA |
| 07/12/06 | Advisory Board Meeting Central Avenue | GHA |
| 07/13/06 | Advisory Board Meeting Beatties Ford Road | GHA |
| 07/18/06 | Public Meeting | CMGC |
| 07/26/06 | MTC Meeting | CMGC (LPA Adopted) |
| Fall 2006 | Center City Transitions issued | Newsletter |
| Winter 2006 | Center City Transitions issued | Newsletter |

ⁱ Charmeck.org. *Charlotte Area Transit System*. Available: <http://www.charmeck.org/Departments/CATS/Rapid+Transit+Planning/Center+City/Home.htm>. Accessed: 14 February 2006.

Appendix A
Hazardous Materials

Key Map



EDR DataMap – Environmental Atlas

Charlotte Center City Streetcar Project

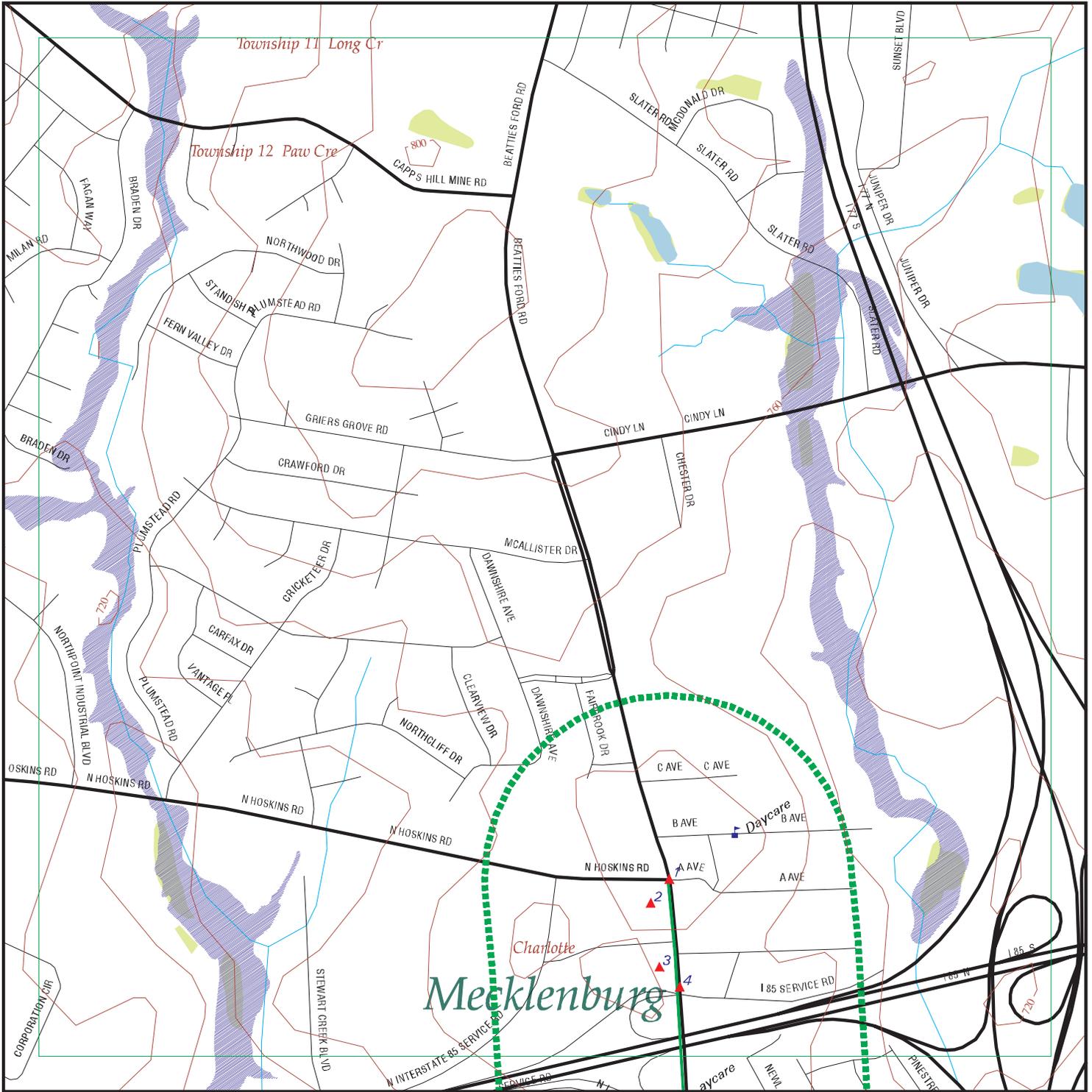
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- | | | | | |
|-------------------|----------------|-------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Federal DOD Sites | | | | |



Scale in Miles

Focus Map 1



EDR DataMap – Environmental Atlas

Charlotte Center City Streetcar Project

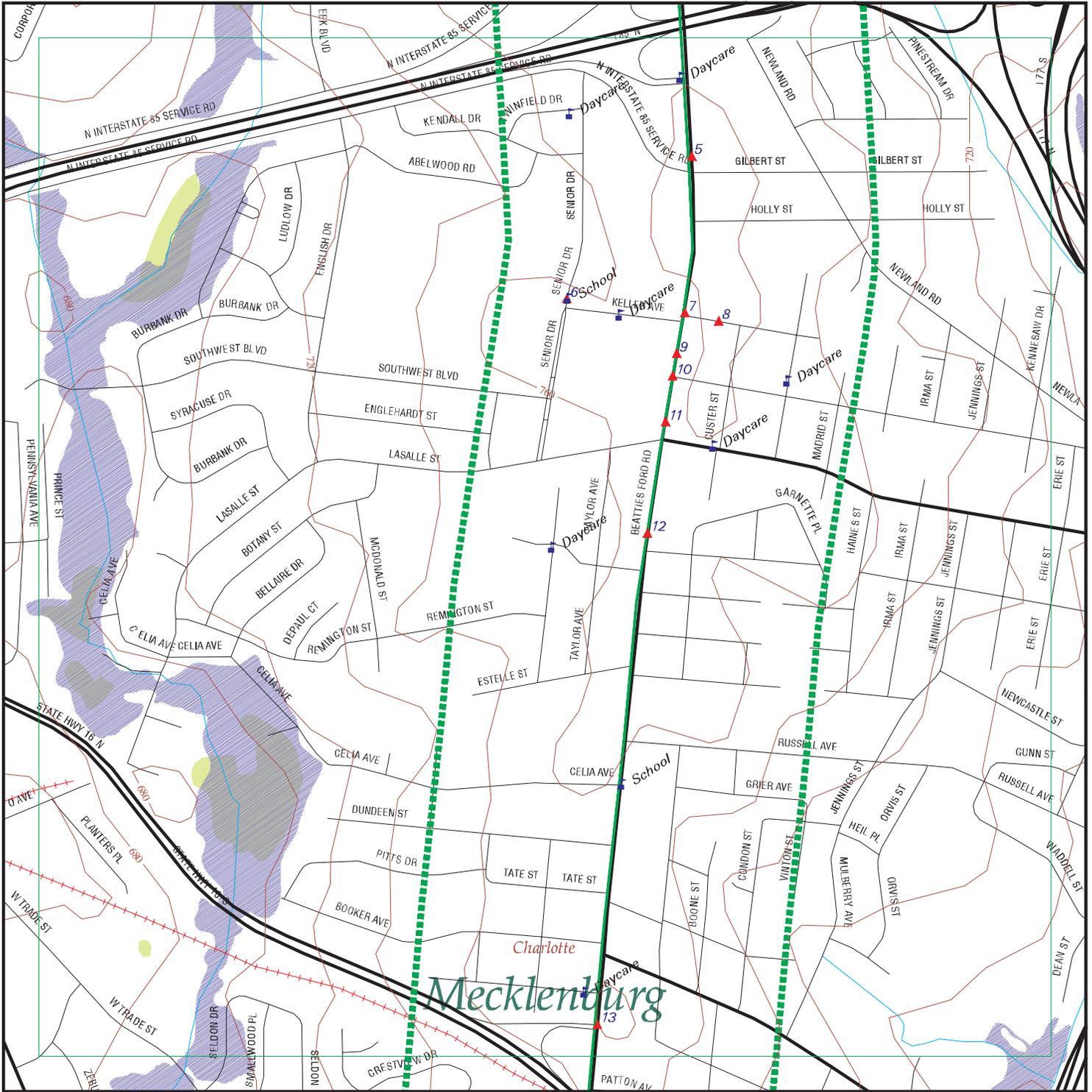
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

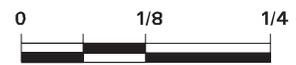
Focus Map 2



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

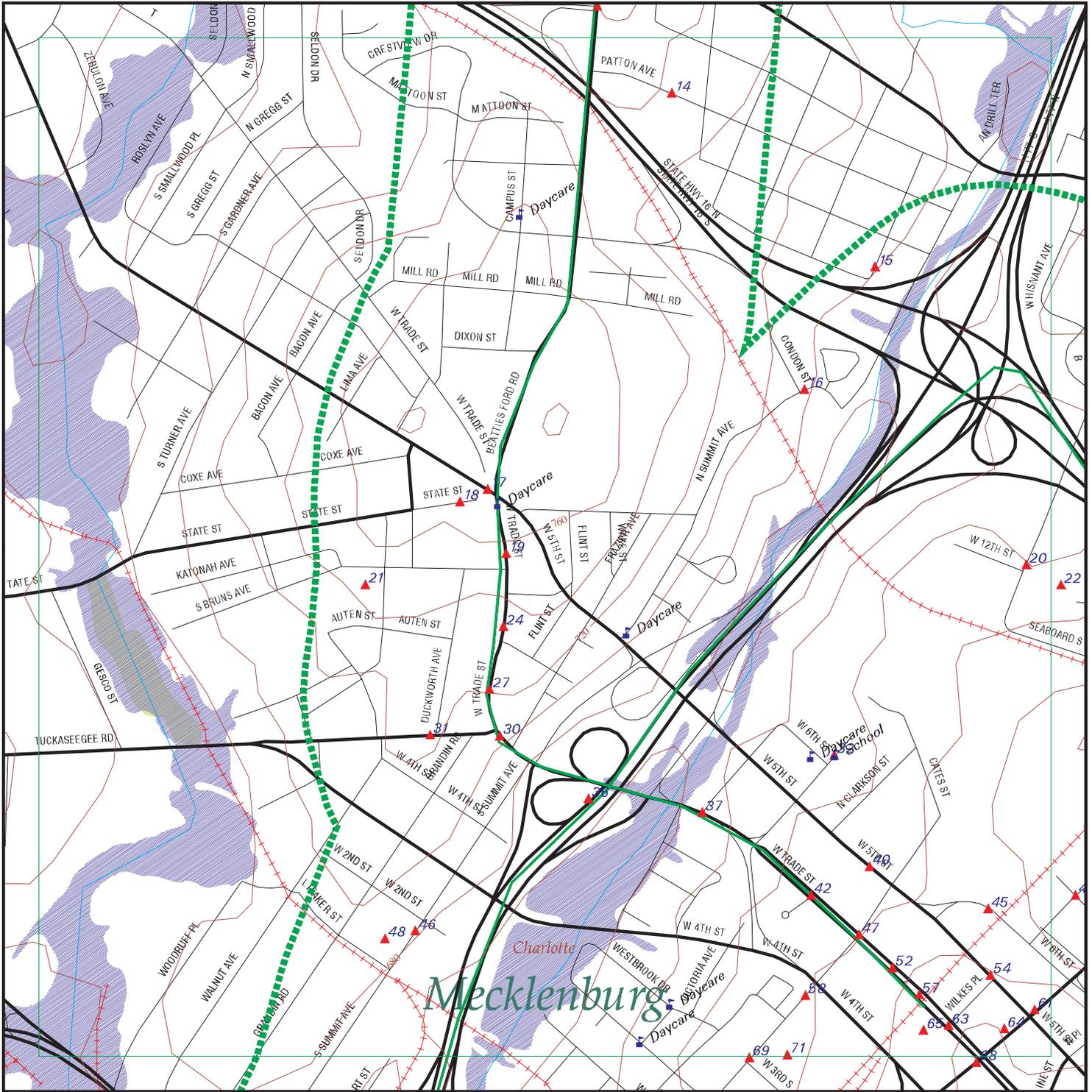
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| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

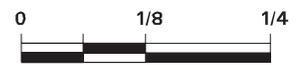
Focus Map 3



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

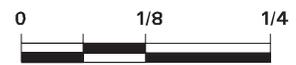
Focus Map 4



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

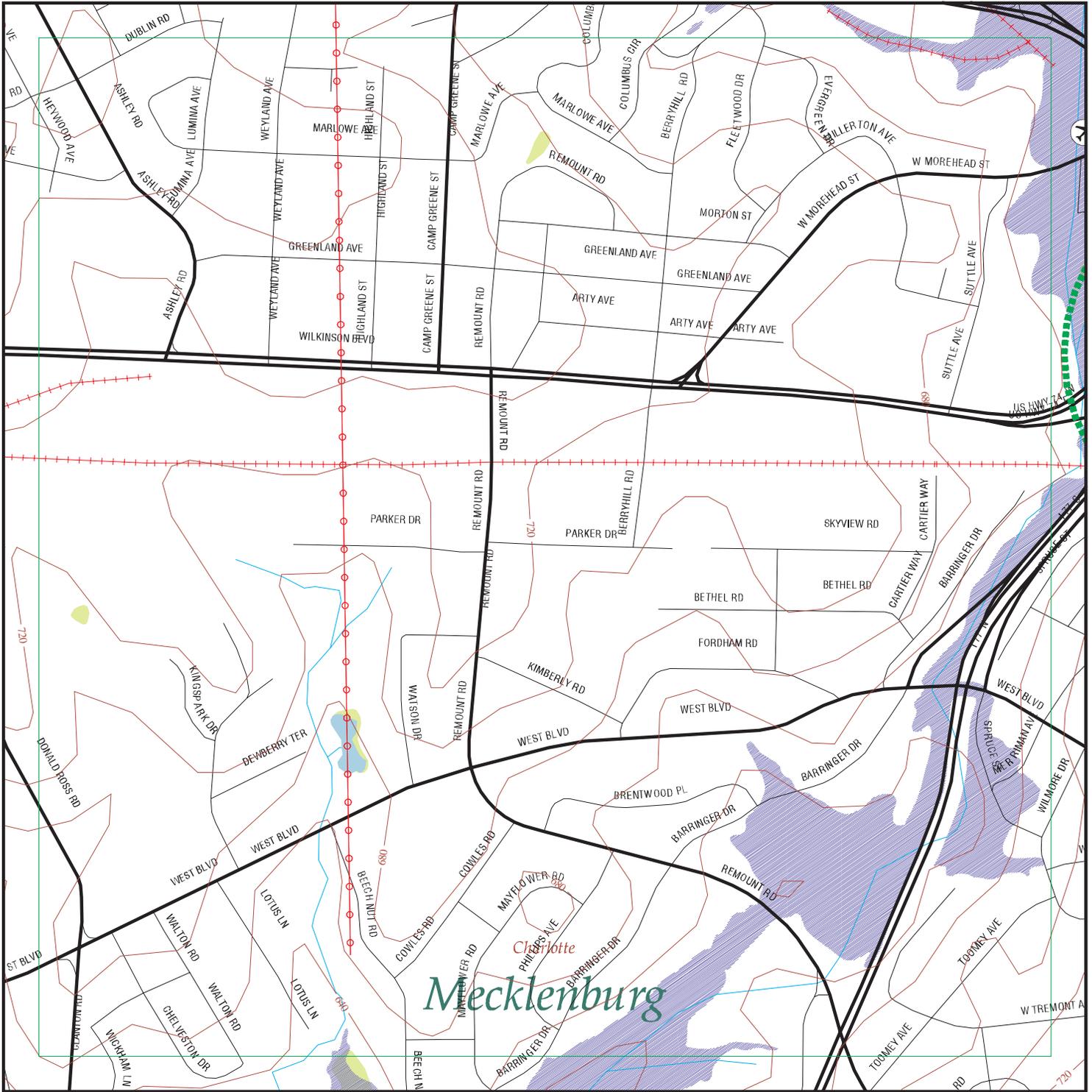
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

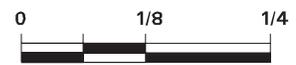
Focus Map 5



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

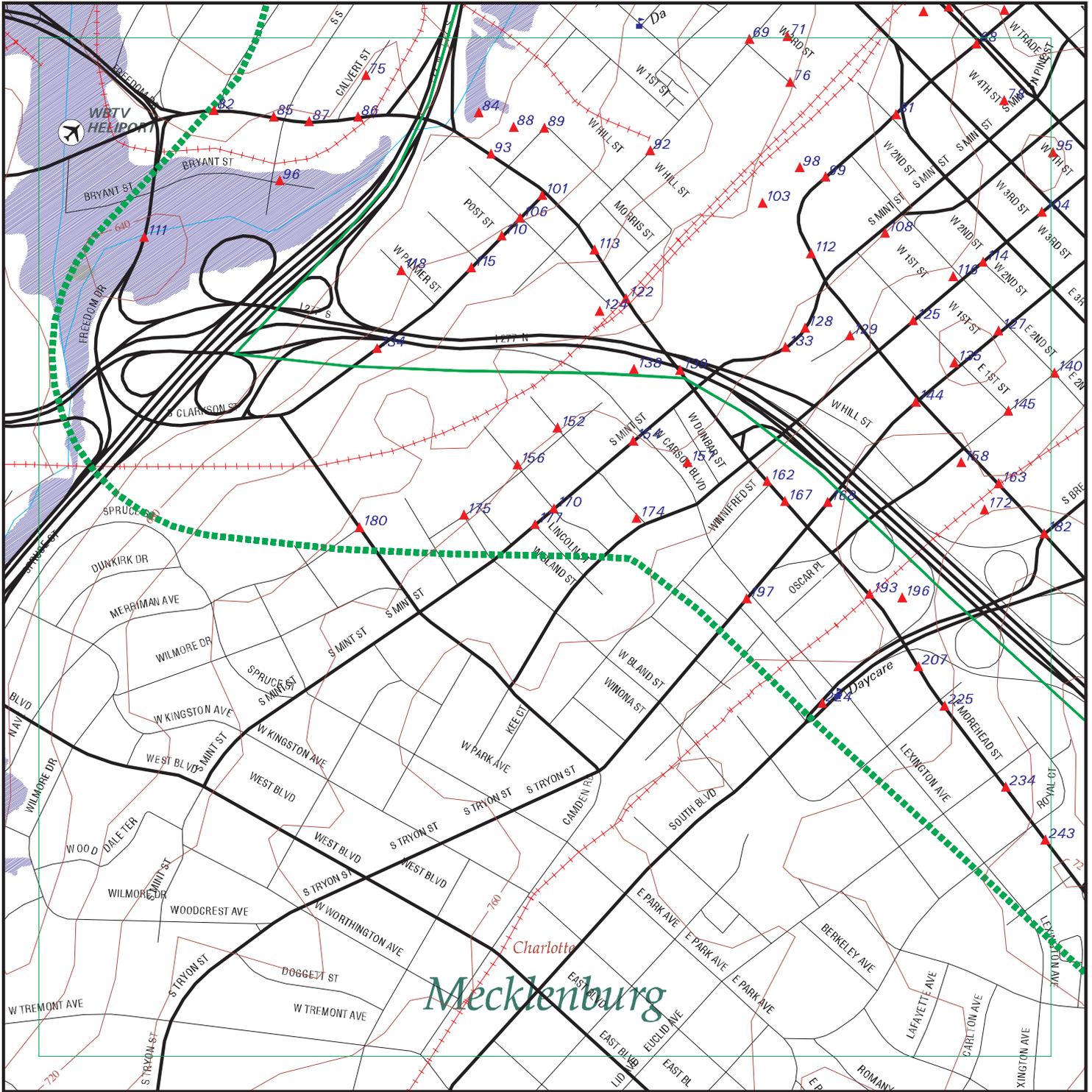
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

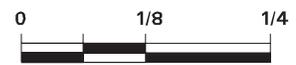
Focus Map 6



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

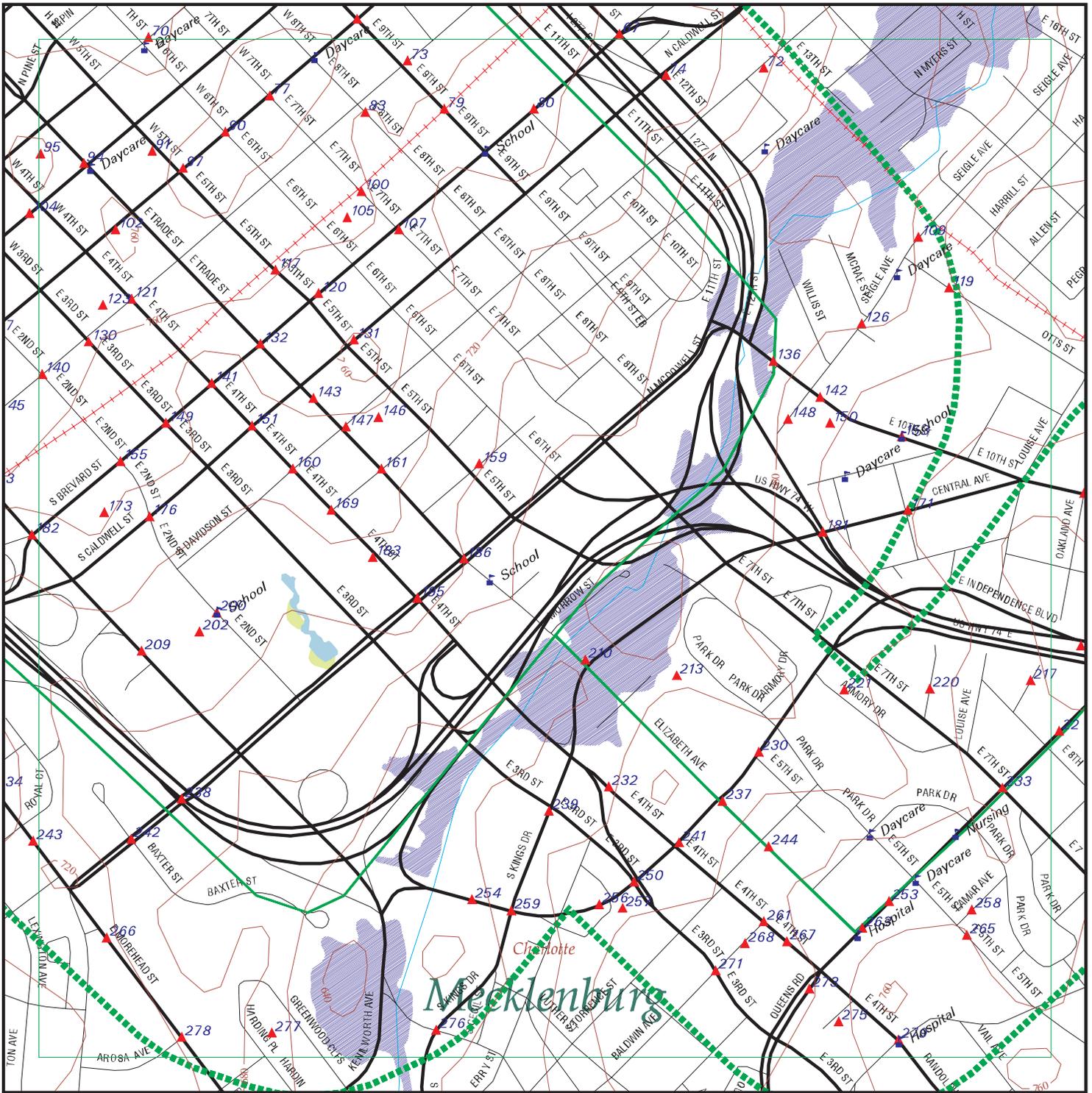
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

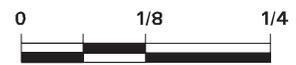
Focus Map 7



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

Legend

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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

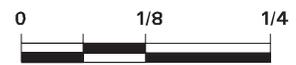
Focus Map 8



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

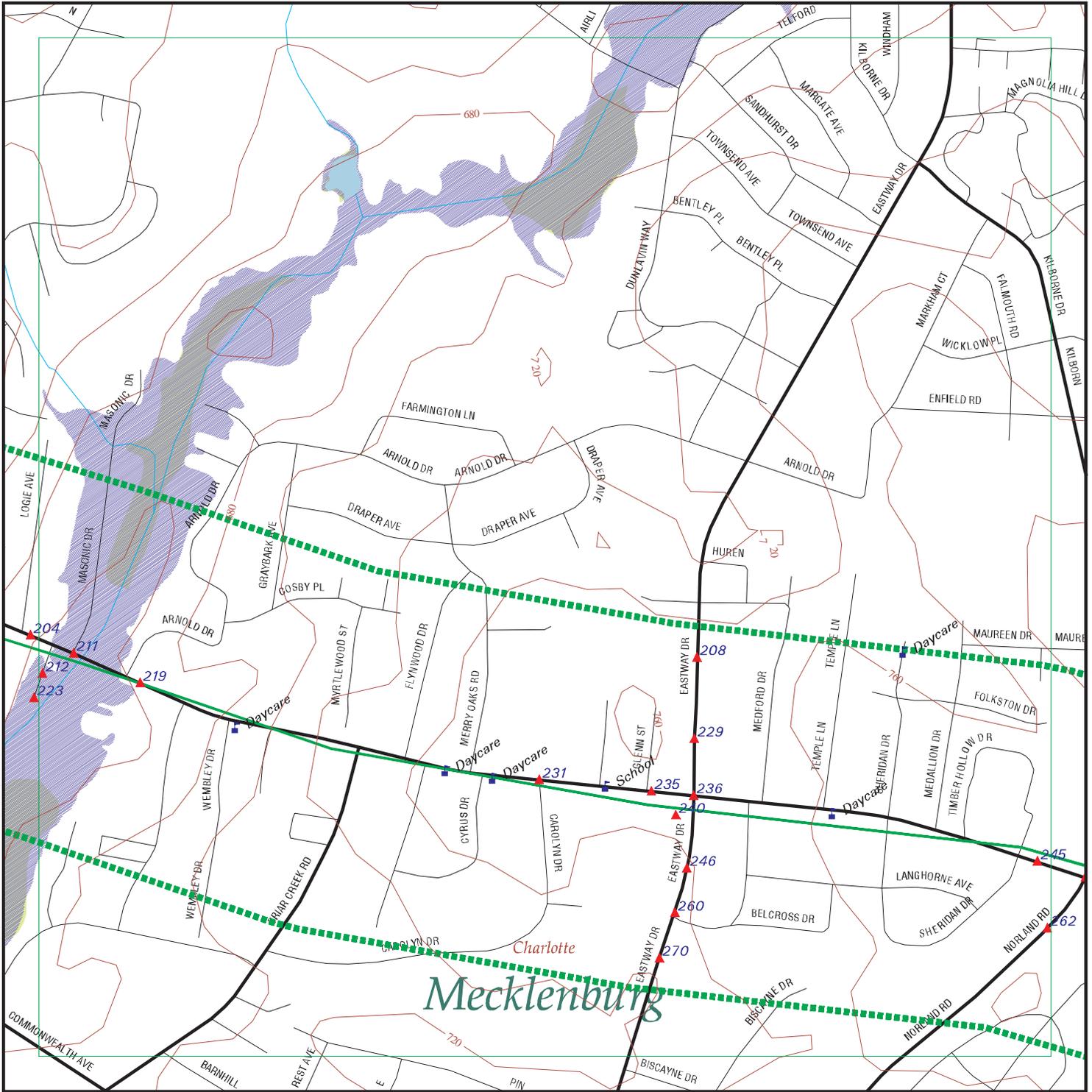
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

Focus Map 9



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

Legend

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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

Focus Map 10



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

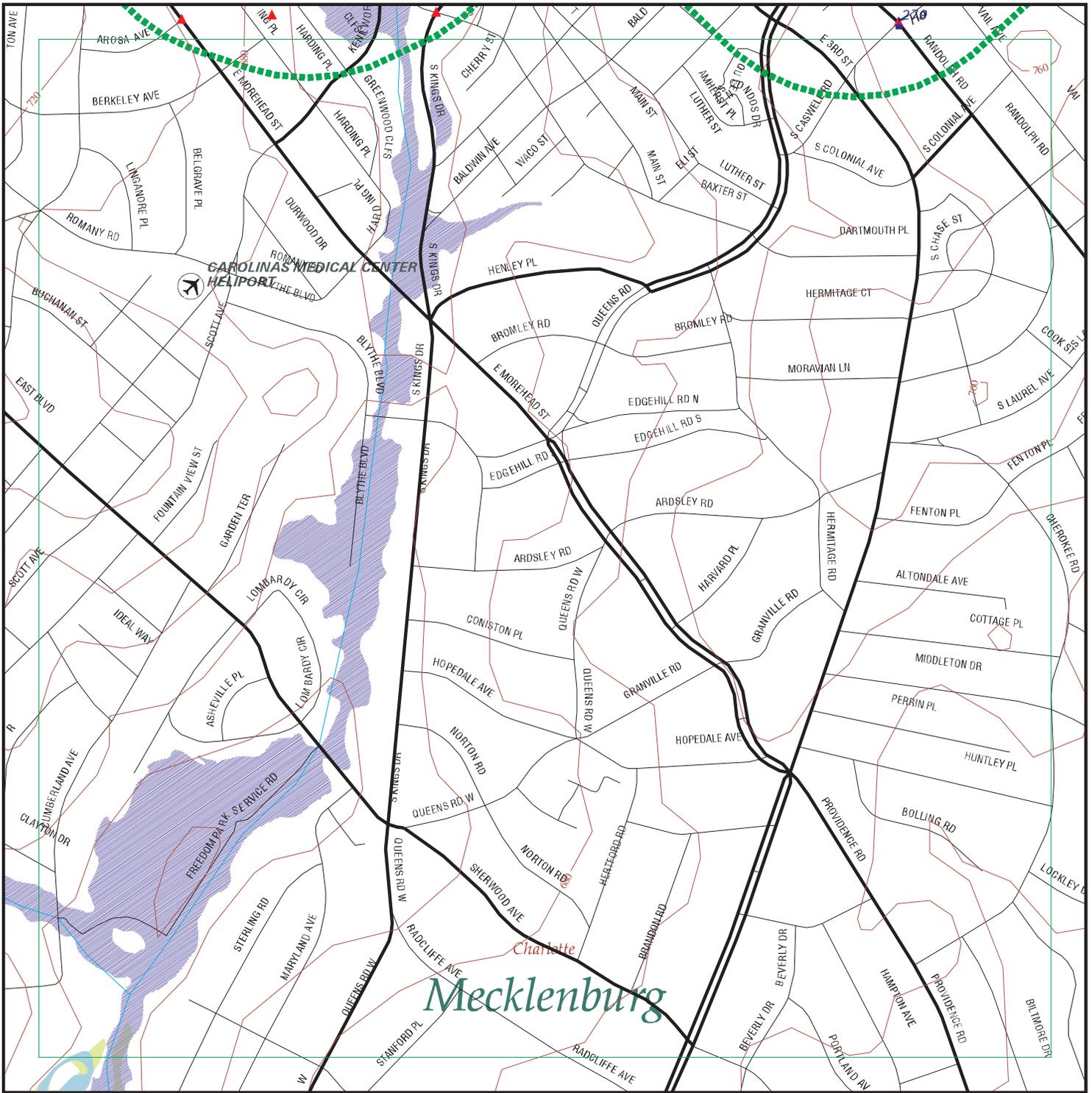
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

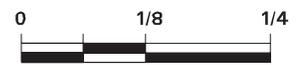
Focus Map 11



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

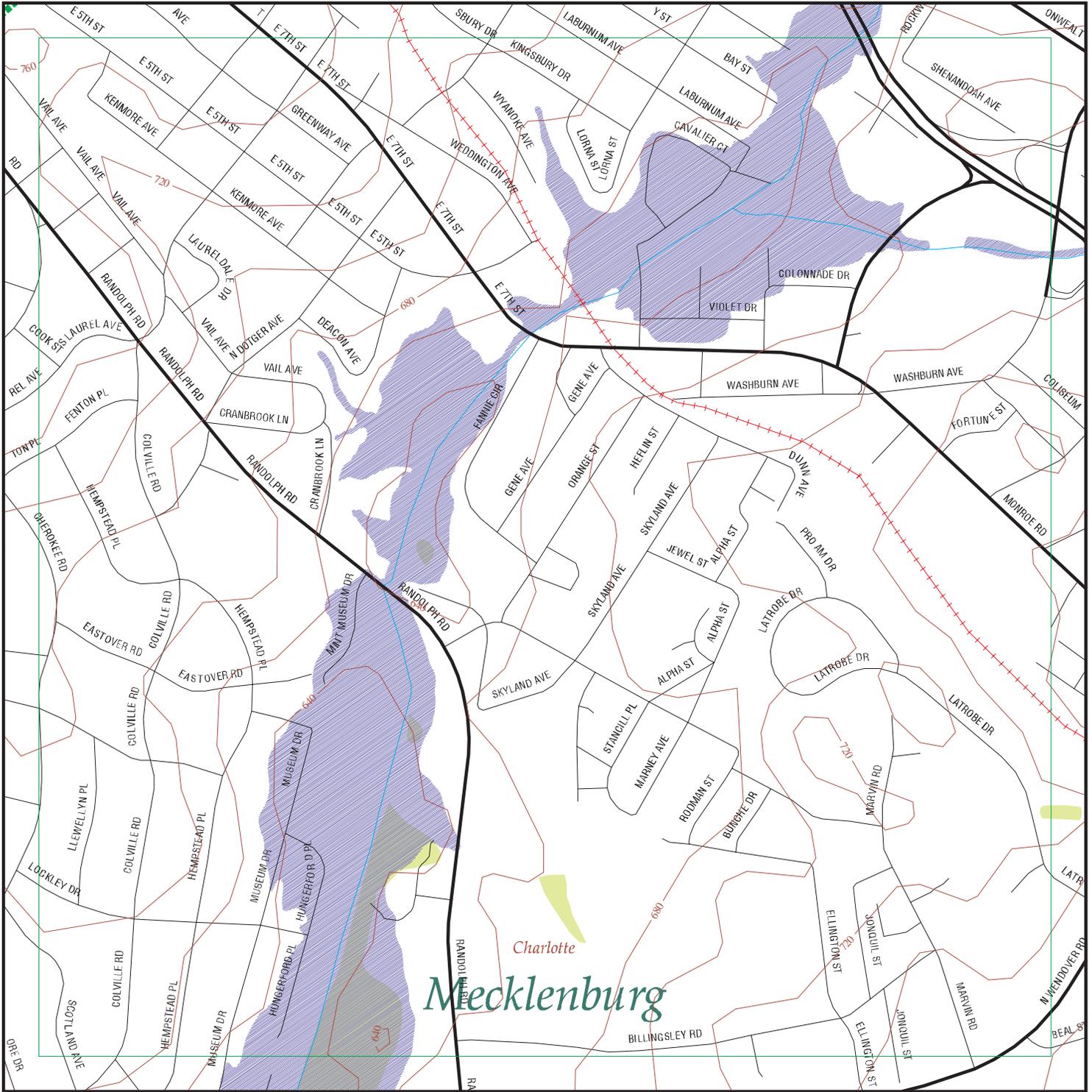
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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

Focus Map 12



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

Legend

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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

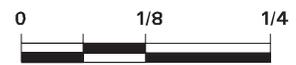
Focus Map 13



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

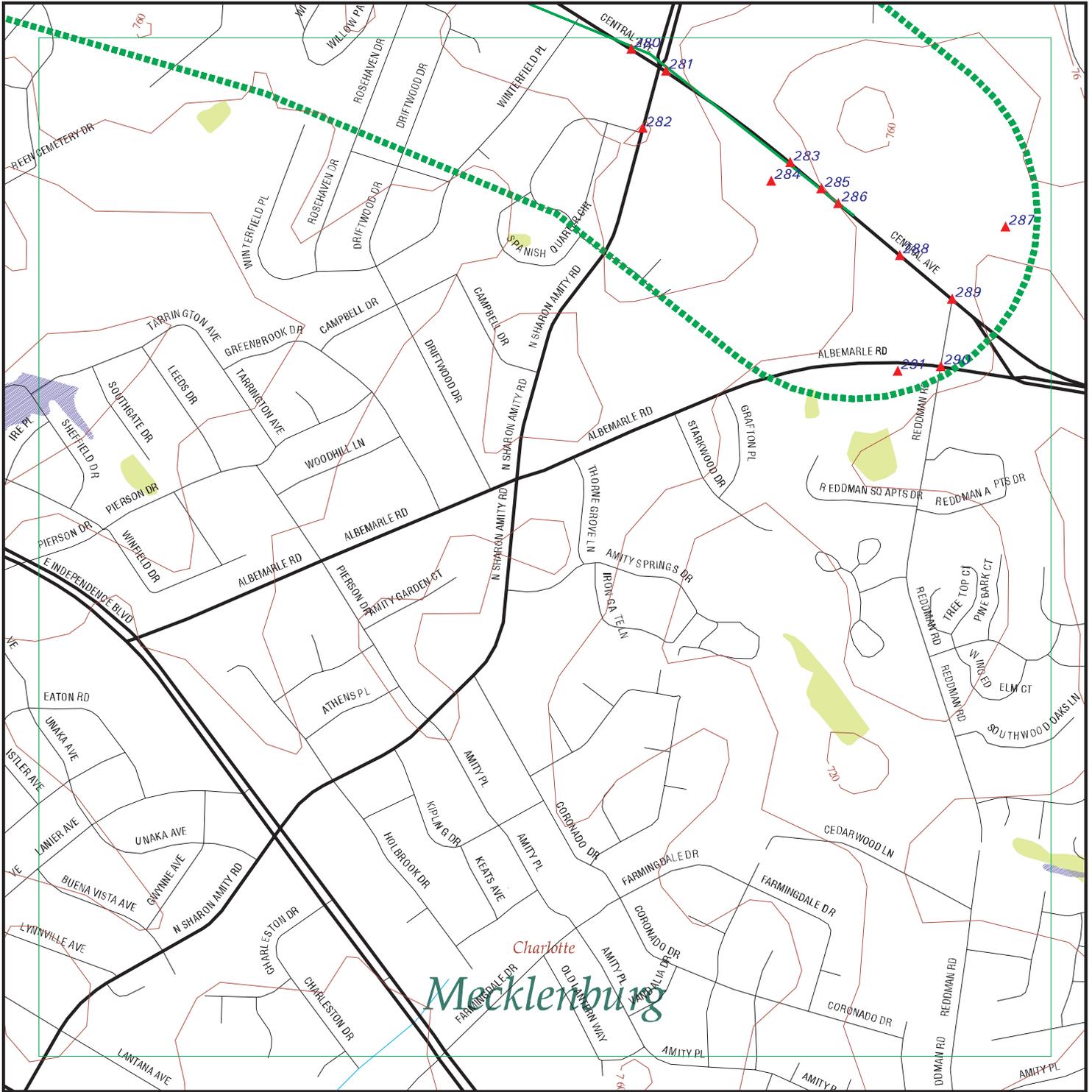
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| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

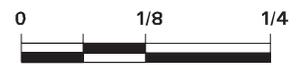
Focus Map 14



EDR DataMap – Environmental Atlas Charlotte Center City Streetcar Project

Legend

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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

Focus Map 15

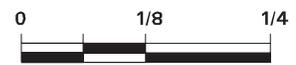


EDR DataMap – Environmental Atlas

Charlotte Center City Streetcar Project

Legend

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|---------------|--------------------|-------------------|-------------------------|--------------|
| Roads | Waterways | Powerlines | Water | Listed Sites |
| Major Roads | Railroads | Pipelines | Superfund Sites | |
| Contour Lines | Study Boundary | Fault Lines | Indian Reservations BIA | |
| Wetlands | 100-Yr Flood Zones | Federal DOD Sites | | |



Scale in Miles

Appendix B
Public Involvement Materials

Appendix B-1
Advisory Board Meeting Summaries

CATS Center City Streetcar Project

Meeting: Charlotte Center City Streetcar Project
Advisory Board Meeting – Trade Street Sub-Area Group
Gantt Huberman Architects, PLLC
February 1, 2005
6:00pm – 7:00pm

| | | |
|-----------------|-----------------|---------------------------------------|
| Team Attendees: | Willie A. Noble | Charlotte Area Transit System (CATS) |
| | Kiera Terrell | CATS |
| | Stan Leinwand | CATS |
| | Dave Dickey | URS Corporation (URS) |
| | Brain Piascik | URS |
| | Brock LaForty | URS |
| | Brett Wallace | URS |
| | Harvey Gantt | Gantt Huberman Architects, PLLC (GHA) |
| | Grace Mayfield | GHA |

I. Introductions

Harvey Gantt opened the meeting with introductions, and welcomed participants. He stated the purpose of the Advisory Board was to act as a sounding board for the Trade Street Streetcar leg. While their input and comments would be given every consideration, the meeting was off-the-record.

Willie A. Noble introduced his team and stated CATS has been charged with reviewing alternate routes for the Streetcar Project.

Dave Dickey introduced the URS team and stated the Advisory Board is a sounding board for ideas and concepts concerning the Trade Street Streetcar project.

II. Agenda

Dave Dickey led the discussion session.

A. Update on current work progress

- Dave Dickey informed the Advisory Board that the public meetings scheduled for the following week had been postponed.
- CATS has requested a review of alternate routes in addition to the Trade Street options

B. Design and Cost Issues

- URS' design philosophy to install the a streetcar system that will have minimal impact from construction and to minimal impact from cost

CATS Center City Streetcar Project

C. Alternative Options

- The Streetcar team is currently looking at 3rd, 4th, 5th and 6th Streets as couplets
- Early analysis is implying a 4th and Trade Streets couplet has merit

D. Potential Stops

- Two Multi-modal Centers (Graham Street and the Transportation Center)
- Presbyterian Hospital
- Johnson C. Smith University
- CPCC stop located near Elizabeth and Kings
- Elizabeth stop in Grubb Properties Development

III. Question and Answer Session

Question: What is the rationale for creating a couplet on 4th and Trade Streets?

Response: It is primarily a question of due diligence. The couplet analysis will provide a greater defense for placing the streetcar on Trade Street.

Comment: There was concern that 4th Street was too big and too fast.

- The rationale for considering 4th Street was to connect the two transportation centers on either side of the Multi-modal Center.

Comment: Central Piedmont Community College's approved traffic plan is to replace the median with two lanes of traffic and add bike lanes on Elizabeth Street to accommodate the campus.

Question: Is there a preference between curb running and median lane travel?

Response: Parking would be impacted on Trade Street with either system, although more likely with a curb running streetcar. Planted medians are beautiful; would prefer to keep them. Delivery drop-offs and pick-ups would have to be reviewed.

Question: What will happen with parking on Trade Street?

Response: On-street parking can invigorate Trade Street and surrounding neighborhoods.

- It is worth discussing eliminating parking on Trade Street
- Parking cut-outs may be an alternate to save some parking

CATS Center City Streetcar Project

- Eliminating parking on Trade would dispose of approximately 100 parking spaces
- On-street parking helped bring Tryon Street back to life. Be mindful to hinder the growth of Trade Street by eliminating all parking options.

Question: Can the streetcar be curb running in some areas and median running in others?

Response: Yes. The streetcar may alternate between the two loading options, where necessary. However, this could also confuse auto drivers from a driver expectancy perspective.

IV. Potential Stops

- Stops should remain on Trade Street for safety reasons
- There will be two mandatory stops at the two Multi-modal Centers
- Johnson C. Smith University and Presbyterian Hospital may be initial terminus points
- Potential stops reviewed included:
 - ❖ Travis and Elizabeth (in Elizabeth redevelopment area)
 - ❖ Kings and Trade (at CPCC)
 - ❖ McDowell and Trade Streets
 - ❖ Davidson and Trade Sts.
 - ❖ In addition to the Trade Street discussion the group also discussed potential stops along 4th Street in case a couplet configuration became the preferred alternative. Couplet stop locations included:
 - ❖ On Alexander St.
 - ❖ 4th and Davidson
 - ❖ Between Tryon and Church Streets.
 - ❖ A stop near Trade and Tryon Streets
 - ❖ A stop between Graham and Tryon Streets (maybe near Mint and Poplar)
 - ❖ A stop at Johnson & Wales University (at the Doubletree)
 - ❖ A stop at Sycamore and Trade Streets near I-77

CATS Center City Streetcar Project

- ❖ A stop west of I-77 near the Bo Jangles
- ❖ Rozelle Ferry (5 Points) and Trade Streets
- ❖ A stop at 5th and Trade to accompany the pending development on West Trade Street
- ❖ Future stops may include Montgomery and Bruns Street

V. Future discussion topics

- Potential turn-around locations
- Pedestrian and rider safety issues
- Bridge clearance issues
- The Streetcar Loop in Center City
- Further parking options

The meeting adjourned at 7:07pm.

CATS Center City Streetcar Project

Meeting: Charlotte Center City Streetcar Project
Advisory Board Meeting – Hawthorne/Central Avenue Sub-Area Group
Gantt Huberman Architects, PLLC
February 2, 2005
6:00pm – 7:00pm

| | | |
|--------|-----------------|---------------------------------------|
| Hosts: | Willie A. Noble | Charlotte Area Transit System (CATS) |
| | Jerry Roberson | CATS |
| | Kiera Terrell | CATS |
| | Dave Dickey | URS Corporation (URS) |
| | Brain Piascik | URS |
| | Brett Wallace | URS |
| | Harvey Gantt | Gantt Huberman Architects, PLLC (GHA) |
| | Grace Mayfield | GHA |

I. Introductions

Harvey Gantt opened the meeting with introductions, and welcomed participants. He stated the purpose of the Advisory Board was to act as a sounding board for the Trade Street Streetcar leg. While their input and comments would be given every consideration, the meeting was off-the-record. The meeting was designed to last one hour, but the team would stay as long as needed.

Willie A. Noble introduced his team and encouraged an interactive dialogue between the Advisory Board and the design team.

Dave Dickey introduced the URS team and outlined the following topics of discussion.

II. Agenda

A. Update on current work in progress

- Dave Dickey informed the Advisory Board that the public meetings scheduled for the following week had been postponed.
- CATS has requested a review of alternate routes in addition to the Trade Street options

B. Design and Cost Issues

- URS' design philosophy is to install a streetcar system that will have minimal impact from construction and minimal environmental impact by working within the existing right of way

C. Alignment Options

CATS Center City Streetcar Project

- Dave outlined alignment types as curb and median running routes

D. Potential Stops

- Dave listed proposed stops along the lines as:
 - Eastland Mall would be a terminus point
 - Presbyterian Hospital

E. CSX crossings and the approach to center city

- This is likely to become a major issue in the routing of the connection from Presbyterian Hospital to Central Avenue.

III. Questions and Answer session

Question: Are Amendment One dollars available to fund this project?

Response: The project is being built to Federal Transit Standards (FTA) so that we could apply for those funds in the future. Amendment One funding is also an option. Willie Noble added that funds from the local ½ cent tax are currently set aside to finance the conceptual engineering for the streetcar project.

Question: Will the Trade Street alternate study delay the project completion date?

Response: No. The study will not negatively impact the schedule of the project.

Comment: There were no concerns regarding the routing of the Central-Hawthorne Corridor. It will run through Plaza-Midwood and it will end at Eastland Mall

A. There was excitement due to the potential for further economic development along the corridor

Question: Is there a preference between curb running and median lane travel? There is a four-lane option available for Central Avenue.

Response: Yes, the team will evaluate curb running and median lane running against a large set of criteria to determine the option that best suits the environment.

Comments:

- Curb running would be more attractive for economic development.
- There is a concern that median running streetcars would stop in the passing lane
- Curbside feels more comfortable because sidewalk boarding is perceived to be safer. It also works better for the handicapped.

CATS Center City Streetcar Project

Question: Will buses run along with Streetcar?

Response: The Streetcar would likely replace some of the buses on Central Avenue due to increased rider-ship and the ability to move more people via streetcar.

Comment: Concern was expressed about another designated right of way so close to Independence Blvd. It will require public input.

Question: Would residents be opposed to widening the roads and taking away a lane for transit?

Response: The initial reaction may be negative but promoting the economic development and the positive environment along the corridor would eventually convince residents to support a transit lane.

Comment: There was concern about the negative impact of eliminating the left turn lane to accommodate the streetcar.

Question: Would residents be opposed to lowering the speed limit to help calm traffic?

Response: In general, residents would not be opposed to lowering the speed limit to help calm traffic. It was noted that changing the environment in order to change the behavior of the drivers would be most effective.

Question: How will the streetcar cross the CSX railroad crossings?

Response: CATS will try to avoid crossing at-grade, if possible.

- Bridge structure on Central would require a change in right of way
- It may be necessary to hug Independence to cross CSX; this may cut costs if we are able to share the expense with the Southeast Corridor transit system

IV. Potential Stops

- Typically there are a couple of block between stops
- The stops would be close to the corners of intersections as opposed to between blocks
- Additional stops reviewed included:
 - ❖ The Plaza and Central Avenue
 - ❖ Between Morningside Drive and Briar-Creek Greenway
 - ❖ Eastcrest Drive
 - ❖ Briarcreek Road

CATS Center City Streetcar Project

- ❖ Merry Oaks and Eastway Drive
- ❖ The Sheridan Shopping Center west of Kilbourne
- ❖ A stop west of Lansdale and east of Winterfield
- ❖ A stop at Eastland Mall

V. Future discussion topics:

- Potential turn-around locations at Eastland Mall and Presbyterian Hospital
- Trees along Hawthorne may need a lot of pruning to accommodate the hot wire that runs the streetcar
- What the new shelter designs will look like?
- Costs needs to be cohesive for optimal funding

The meeting adjourned at 7:07pm.

CATS Center City Streetcar Project

Meeting: Charlotte Center City Streetcar Project
Advisory Board Meeting – Beatties Ford Road Sub-Area Group
Gantt Huberman Architects, PLLC
February 3,, 2005
6:300pm – 7:30pm

| | | |
|-----------------|-----------------|---------------------------------------|
| Team Attendees: | Willie A. Noble | Charlotte Area Transit System (CATS) |
| | Jerry Roberson | CATS |
| | Kiera Terrell | CATS |
| | Stan Leinwand | CATS |
| | Linda Murdaugh | CATS |
| | Brian Piascik | URS Corporation (URS) |
| | Brock LaForty | URS |
| | Harvey Gantt | Gantt Huberman Architects, PLLC (GHA) |
| | Grace Mayfield | GHA |

I. Introductions

Harvey Gantt opened the meeting with introductions, and welcomed participants. He stated the purpose of the Advisory Board was to act as a sounding board for the Beatties Ford Road Streetcar leg. While their input and comments would be given every consideration, the meeting was off-the-record.

Willie A. Noble introduced his team and special guest, John Howard, of the Planning Commission who has been assigned the Streetcar Project.

Brian Piascik introduced the URS team and described the goals for the design and the engineering work and environmental studies required.

II. Agenda

Brian Piascik led the discussion session.

- A. Update on current work progress
 - Brian Piascik informed the Advisory Board of CATS request to review alternate routes in addition to the Trade Street options
- B. Design and Cost Issues
 - The Streetcar system will be developed within the current right of ways, minimizing disruption to current traffic and businesses and eliminating right of way acquisitions costs.
- C. Alignment Options

CATS Center City Streetcar Project

- Brian spent some time explaining the options of alignment – curbside versus Central Avenue. A heavy discussion ensued with a consensus placed on curbside.

D. Potential Stops

- Johnson C. Smith University
- The end of the line has not yet been determined
- Project Team is fairly certain that phase one will end at Johnson C. Smith Univ.

III. Questions and Answer session

Comment: It is important to maintain and improve the streetscape in order to keep the streetcar beautiful for the long term.

Comment: Curb running supports the idea of beautiful streetscape.

Question: Is the cost of the project comparable to the Light Rail Transit system?

Response: We are still in the conceptual design stages of this project and do not have cost figures at this time.

Question: There was concern about the heavy truck movement to and from Brookshire Freeway and I-85. How will they co-exist?

Response: The same as they do currently. Truck traffic will not be impacted.

Question: How is the Streetcar powered?

Response: The Streetcar is electric and will operate with an overhead wire 18' above the street.

Comment: There was concern expressed about the safety of the power lines being on the street.

Question: How will the elderly cross a road that has a streetcar on it?

Response: Streetlight control buttons can be placed to safely assist the elderly across busy streets.

Question: What is the timetable for the Streetcar to reach the Beatties Ford Road corridor?

Response: it is not clear when the extensions of the Trade Street Streetcar system will be completed.

CATS Center City Streetcar Project

Question: What happens when the electrical lines freeze in the winter?

Response: This line is a hot line and doesn't freeze easily.

Question: Is there an opportunity for site visits to completed systems?

Response: Site visits are not within our current budget.

Question: Is there a preference between curb running and median lane travel?

Response: Curb running would leave the new turning lane in place on Beatties Ford Road.

Question: Will it be safe to make left turns onto Beatties Ford Road if the Streetcar uses the middle lane?

Response: Traffic will need to turn right onto Beatties Ford Road until a U-turn can be safely made in designated turning lanes to go in the opposite direction.

Question: What happened to the original streetcar in Charlotte?

Response: People favored their cars, which significantly reduced streetcar ridership. This decline eliminated the use of streetcars. New technology, increased population and traffic issues have caused a resurgent interest in the streetcar and other public transportation options.

Comment: The system of previous years used the curb lane.

Question: Will the stops be programmed into the streetcar or will you have to pull a cord to notify the driver of a stop?

Response: The streetcar will stop at every stop.

Comment: What is the maintenance plan for the streetcar? How often does the system breakdown?

Response: There will be a good, comprehensive maintenance plan in place for the streetcar system. Breakdown experience is different from system to system and is heavily dependent on age of the vehicle, local weather patterns and maintenance practices.

IV. Potential Stops

- Stops should remain on Beatties Ford Road for safety reasons
- Potential stops reviewed included:
 - ❖ Five Points (CMC Medical Center)

CATS Center City Streetcar Project

- ❖ Dixon Street
- ❖ French Street
- ❖ Booker/Oaklawn Streets
- ❖ Russell Avenue (near Northwest School of the Arts High School)
- ❖ LaSalle Avenue
- ❖ Holly Street (near the Library)
- ❖ Rosa Parks Place (NW Meck. Medical Facility)

V. Future discussion topics

- Potential turn-around locations: Cindy Lane is the preferred turn around point
- Potential stops if the line is extended out to Cindy Lane
- The end of the line will need to be discussed in depth
- Pedestrian and rider safety issues
- Bury the utility lines along Beatties Ford Road for beautification
- Potential issues with the bridge spanning I-85, specifically the possibility that it cannot accommodate the streetcar.
- Project includes a maintenance facility site evaluation and the group was informed about the public works storage lot just south of Brookshire Freeway and north of French Street as a possible location.

The meeting adjourned at 7:47pm.

**SUMMARY OF ADVISORY GROUP MEETING
TRADE STREET CORRIDOR**

Date: April 19, 2005

To: Mr. Harvey Gantt

From: Ms. Grace Mayfield

Re: Charlotte Center City Streetcar Project
Advisory Board Meeting – Trade Street/Elizabeth Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Team Attendees:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialist; Charlotte Area Transit System
Mr. Stan Leinwand; Charlotte Area Transit System
Ms. Linda Murdaugh, Coordinator Assistant; Charlotte Area Transit System
Mr. Howard Landers; City of Charlotte
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Brain Piascik, Transportation Planner; URS Corporation
Mr. Harvey Gantt; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Advisory Board Participants

Seven Advisory Board participants attended the meeting. All participants were informed of the Community Meeting scheduled for Thursday, April 28, 2005, at the Carole Hoeffner Center at 6:30pm.

II. Introduction

Mr. Harvey Gantt opened the meeting with greetings and introductions. He restated the purpose of the Advisory Board as being a sounding board for the Trade Street Streetcar leg. He thanked everyone for their continued support and invited all present to attend and bring friends to the Community meeting scheduled for next Thursday, April 28, 2005 at the Carole Hoeffner Center.

Mr. Willie A. Noble introduced his team and recapitulated the information from the February 1, 2005 Advisory Board Meeting. He, too, invited all to attend the Community meeting next Thursday, April 28, 2005.

Mr. Dave Dickey introduced the URS team and thanked all for attending. He re-oriented the participants to the boards on the wall and on the table. He, too, invited all to attend the Community meeting Thursday, April 28, 2005.

III. Agenda – Mr. Dickey led the discussion session

A. Update since the last Advisory Board meeting

- 1) CATS and URS studied couplet options running along Trade and 4th Streets as well as Trade and 5th Streets.
- 2) The investigations focused on curb or median running Streetcars with special attention focused on curb cuts and the difficulties of linking multiple cars, causing traffic issues along the corridors.
- 3) Considerations for the two 'end of line' conditions had been reviewed and were ready for discussion with the Advisory Board.

B. Design Issues

URS' stated CATS 2025 Plan envisioned the first phase of the Center City Streetcar Project to run out to The Plaza.

End of line conditions were discussed for Presbyterian Hospital and Johnson C. Smith University. The 2025 Plan indicates the east terminus for the first phase would be Central and The Plaza. The west terminus is shown as Johnson C. Smith University.

The East terminus point options include:

1. Turning left onto Hawthorne at Presbyterian Hospital looping around 5th Street back to Elizabeth Avenue.
2. Turning right onto Hawthorne at Presbyterian Hospital looping around 4th Street back to Elizabeth.
3. Central and The Plaza options included:
 - a. A loop around Commonwealth to The Plaza to Central Avenue

b. Following Hawthorne Avenue to a designated rail lane hugging the north side of Independence Avenue looping around The Plaza back to Central Avenue.

The challenges facing the East terminus locations include the inability to cross the CSX tracks at grade in the Elizabeth Community. This difficult situation could push back the project completion date as well increase the budget by a considerable amount.

Major Elizabeth Avenue tenants such as Grubb Properties and Central Piedmont Community College support traffic calming designs along Elizabeth Avenue.

The West end of the first phase is Johnson C. Smith University. The west end terminus option is to provide a sleeve or "Y" configuration turn-around point in a three lane cross section along Beatties Ford Road.

Boards were presented to display the transit stops along the Elizabeth/Trade Street Corridor that the Advisory Board selected in the February 1, 2005 meeting. Computer graphics were shown to introduce how the Streetcar would run along Trade Street with existing vehicular traffic.

Phase one is expected to be complete in 2009. Dave Dickey reminded the Advisory Board that crossing the CSX lines will remain a major issue for the Streetcar until it is resolved.

All stops will have shelters to protect from the elements and provide riders with a safe place to wait for the next Streetcar.

IV. Question and Answer session

Comment: It will be important to have a signal at every stop for the disabled or physically challenged riders.

Response: Every consideration is being made to accommodate the disabled and physically challenged riders.

Comment: It will be important to graphically show the Public how the Streetcar running using the couplet option would impact their neighborhood.

Comment: Will the buses be moved off Trade Street?

Response: That is unclear at this time. It is not likely that ALL bus traffic will be removed from Trade Street.

Comment: People evaluating this information will ask for information not shown in the drawings. Please try to include the warmth of the human scale in future presentations. Currently the information is very technical and has more engineering aspects than rider-ship vantage points.

V. Future discussion topics

- End of line turn-around options
- CSX crossing issues
- The Streetcar Loop in Center City

The meeting adjourned at 7:37pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
BEATTIES FORD ROAD CORRIDOR**

Date: April 21, 2005

To: Mr. Harvey Gantt

From: Ms. Grace Mayfield

Re: Charlotte Center City Streetcar Project
Advisory Board Meeting – Beatties Ford Road Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Team Attendees:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Jerry Roberson, Assistant Project Manager; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialist; Charlotte Area Transit System
Mr. Stan Leinwand; Charlotte Area Transit System
Ms. Linda Murdaugh, Assistant Coordinator; Charlotte Area Transit System
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Brain Piascik, Transportation Planner; URS Corporation
Mr. Harvey Gantt; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Advisory Board Participants

Nine Advisory Board Members attended the meeting. Two participants were new and were representatives of Johnson C. Smith University. All present were invited to attend the Community meeting scheduled for May 4, 2005 at Johnson C. Smith University's Grimes Lounge at 6:30pm.

II. Introduction

Mr. Harvey Gantt opened the meeting with introductions, and welcomed participants. He reminded all present to attend the Community Meeting scheduled for Wednesday, May 4, 2005. He encouraged the Advisory Board members to bring their neighbors and friends.

Mr. Willie A. Noble reiterated his gratitude to the participants of the Advisory Board and introduced his team. He reminded the members that the project will

proceed within FTA funding guidelines. He, too, invited everyone to the Community Meeting mentioned earlier.

Mr. Dave Dickey reintroduced the project and its impact to the Beatties Ford Road Corridor. He invited everyone to the community Meeting to be held on Wednesday, May 4, 2005 in Johnson S. Smith University's Grimes Lounge.

III. Agenda

Mr. Dickey led the discussion session.

A. Update on current work progress

- Turn-around options at the terminus point at Johnson C. Smith University is currently being investigated. The Pocket option seems to work best on Beatties Ford Road.
- Though the decision to run the streetcar on the couplet alignment has not yet been resolved but it has little impact on the Beatties Ford Road corridor.

B. Alignment Options

- The following three alignment options, along with their pros and cons, are available along the Beatties Ford Road corridor

1. Median Running Option:

Pro – less impact on the curb cuts along Beatties Ford Road

Con – more utilities would have to be moved underground which would be costly.

2. Curb Running Option:

Pro – this option is comparable to existing bus service

Con – The streetcar would run in the turning lane, posing some challenges for right turning vehicles.

3. Three-Lane Option:

Pro – pedestrian friendly environment, promoting traffic calming and reduction. This could also maintain the planted median.

Con – the elderly would still have to cross one lane of traffic to board the streetcar.

D. Potential Stops

- Johnson C. Smith University is definitely a terminus point for Phase I.
- Stops are approximately 1200-1500 feet apart along this corridor.

IV. Questions and Answer session

Question: What's the structural integrity of I-85 overpass at Beatties Ford Road?

Response: The Willie J. Stratford Bridge currently cannot withstand the weight of a streetcar.

Comment: Computer generated pictures are better than the aerial drawings. More photo quality pictures would be helpful.

Question: In the three-lane option, what is the distance on Beatties Ford road that cars will have to exclusively travel behind the streetcar?

Response: Cars will travel behind the streetcar without being able to pass the vehicle one quarter mile near Johnson C. Smith University. This inconvenience will occur for a short period of time while the streetcar loads and unloads passengers.

Question: Are the end-of-the line schemes prioritized?

Response: Not really. They are not ranked.

Question: A strong appeal for CATS to send 3-5 selected members of the Beatties Ford Road Community to experience the ride on the new Portland streetcar system was made by one Advisory Board member.

Response: Mr. Willie Noble clearly stated CATS Streetcar budget simply does not allow for research of that kind. Mr. Gantt recommended videotaping the streetcar experience in Portland and suggested showing the video at the next Advisory Board meeting. This seemed to be widely accepted.

Comment: Please interview the people riding the streetcar so that members of the Advisory Board could hear from the riders.

Comment: It was suggested that we not show all the pictures on the board. One Advisory Board member pointed out that the construction picture may alarm the community unnecessarily regarding lengthy demolition and construction processes.

V. Future discussion topics

- Further study on alignment options
- Turn-around options at Johnson C. Smith University
- Timetable for implementation of the streetcar along this corridor

The meeting adjourned at 7:42pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
HAWTHORNE/CENTRAL AVENUE CORRIDOR**

Date: June 14, 2005

To: Dave Dickey

From: Harvey Gantt

Re: Charlotte Center City Streetcar Project
Advisory Board Meeting – Hawthorne/Central Avenue Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Team Attendees:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Stan Leinwand, Transit Planner/Urban Design; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialists; Charlotte Area Transit System
Ms. Linda Murdaugh, Coordinator Assistant; Charlotte Area Transit System
Mr. Corey Bell; Center City Streetcar Corridor Intern; Charlotte Area Transit System
Mr. Dave Dickey, Vice President; URS Corporation
Mr. James Williams. Planner/Landscape Architect; Neighboring Concepts
Mr. Harvey Gantt, FAIA; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Presentation by CATS/URS Team

Willie Noble opened the meeting with greetings and introductions. The Advisory Board was encouraged to attend and bring neighbors and other concerned citizens to the Sub-Area Public Meeting scheduled for Wednesday, June 22, 2005 at 6:30pm in the Activity Room located in the Eastland Mall.

He thanked everyone for coming out to this very important Streetcar Advisory Board meeting. He then introduced Dave Dickey of URS Corporation who also thanked everyone for attending.

Following introductions, Noble, Dickey, Stan Leinwand and James Williams made presentations. The following is a general description of the presentation.

A. Update on current work in progress

- Willie Noble reviewed again the project scope, the agenda, and updated the group on current work. He noted that no decision had been made regarding the Trade Street Corridor couplet options.
- Stan Leinwand described the agenda and framework for next weeks' Sub-Area Public Meeting.
- He also solicited opinions and ideas on the streetscape, amenities to be located at each stop, and street furniture along the Hawthorne/Central Avenue corridor.
- James Williams' presentation focused on land use ¼ mile radius around each stop, connectivity, traffic calming techniques, station types and development potential. He is currently working with CDOT to address concerns of the surrounding neighborhoods. Land use evaluations and possible changes will not extend into existing single family neighborhoods. The focus will be on areas along the Central Avenue corridor including:
 - Veterans Parks
 - Morningside
 - Briar Creek (The Plummer Property)
 - Eastway

B. Alignment Options

- Dave Dickey reviewed the alignment options discussed in previous Advisory Board meetings. He also noted that CATS is investigating a curb-running alignment option for the Hawthorne/Central Avenue corridor in consideration of maintaining the existing landscaped median.

C. Streetscape Options

- Leinwand presented an overall look at the amenities and street furniture possibilities along the Hawthorne/Central Avenue corridor. The presented styles were Traditional, Contemporary and Historic.
- Streets furniture was described as benches, bollards, lights, trash receptacles, clocks, bike racks and tree planters located along streets that help define its character.

- Examples of street furniture were presented from many Charlotte areas, including:
 - Tryon Street
 - The Government Center Area
 - The Southpark Area
 - CPCC-Elizabeth Avenue Area
 - Gateway Village Area
- Noble made it clear that it is not in the budget to do extensive streetscaping. Trade Street will be awarded most of the streetscaping budget but there will be some funds for the extensions.
- Noble mentioned CATS' "Art in Transit" program where local artists are selected and contracted to provide public art at stops along the CATS transit lines.

II. Questions/Answer with Advisory Board

Question: What is CATS redevelopment geography? How far around the stop or down the street will redevelopment occur?

Response: CATS will focus on one quarter mile radius from the transit stops. The bulk of the streetscape budget will be awarded to Trade Street.

Question: Will "ped-head" (pedestrian-head) signals and detectable warning signals be present at each stop?

Response: Pedestrian signals will be present at most stops.

Question: How would you incorporate culture into a corridor with street furnishings?

Response: The CATS Art in Transit Program artists would try to incorporate the culture of the neighborhood into the art work that would present at designated stops.

Question: Will shelters be covered?

Response: Yes, the shelters will be covered.

Question: Can we partner with the planners of the proposed Greenway to revise Veterans Park?

Response: Yes, we should be able to work with developing plans for the Greenway to improve the Old National Guard Base.

Question: Will the telephone poles in the middle of the sidewalk (visual pollution) be removed?

Response: The Center City Streetcar Project will not bury existing utility lines. There is a petition to City Council to make improvements due to poles and wiring.

Question: Can you e-mail the information out so that we may distribute the information more effectively.

Response: Yes.

Question: Can the presentation be presented in Spanish so that Latino riders can feel more in tune?

Response: Yes. All the literature is offered in Spanish and interpreters will be available subsequent meetings. Many efforts have been made to engage the Latino community in this pre-conceptual process.

Comments:

- Street furniture, i.e., lamp post, benches, receptacles, need to be placed in a straight line. Misaligned placement poses dangers for the vision impaired.
- Please allow for adequate spacing of street furniture for the disabled.
- If the streetscape furniture varies too much there may be no unifying theme along the transit line.
- There is concern as the Plummer Property seeks rezoning it may have a negative impact on the streetcar route.
- Due to poor walk-ability along Central Avenue near Eastland Mall, please provide a safe ramp or pedestrian way to and from the proposed Transit Center.

- Chain pharmacies like Eckerds, and other “faux-pedestrian” entrances, are not preferred along the Hawthorne/Central Avenue corridor. Stores need to be approachable and pedestrian friendly.
- It is important that CATS remain in communication with CDOT as re-zoning is considered for the 13 acres between the Renfro and Plummer properties.
- Eastland Mall needs to be more pedestrian friendly. Please pull it more toward the street.

The meeting adjourned at 7:35pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
TRADE STREET CORRIDOR**

Date: June 15, 2005

To: Dave Dickey

From: Harvey Gantt

Re: Charlotte Center City Streetcar Project
Advisory Board Meeting – Trade Street Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Team Attendees:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Stan Leinwand, Transit Planner/Urban Design; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialists; Charlotte Area Transit System
Ms. Linda Murdaugh, Coordinator Assistant; Charlotte Area Transit System
Mr. Corey Bell; Center City Streetcar Corridor Intern; Charlotte Area Transit System
Mr. Howard Landers; Transportation Planner; Charlotte Department of Transportation
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Francis Reiner; Senior Urban Designer; HNTB
Mr. Harvey Gantt, FAIA; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Presentation by CATS/URS Team

Willie Noble opened the meeting with greetings and introductions. The Advisory Board was encouraged to attend and bring neighbors and other concerned citizens to the Sub-Area Public Meeting scheduled for Tuesday, June 21, 2005 at 11:30am in the St. Francis Auditorium located in the Main Branch of the Public Library 301 N. Tryon Street. He thanked everyone for attending and being active participants as Advisory Board Members. He then introduced Dave Dickey of URS Corporation.

Following introductions, Noble, Stan Leinwand, Fran Reiner made presentations. The following is a general description of the presentations.

A. Update on current work in progress

- Willie Noble reviewed again the project scope, the agenda and updated the group on current work. He noted that no decision had been made regarding the Trade Street corridor couplet alternatives.
- Stan Leinwand described the agenda and framework for next weeks' Sub-Area Public Meeting.
- Following a Power Point Presentation, there will be five break-out sessions designed to address concerns on a smaller block-by-block scale along the Trade Street corridor. The five segments were identified as important areas within the I-77 and the 277 loop. There will be facilitators and a recorder located in each break-out session.

B. Streetscape Options

- Fran Reiner encouraged the public to express their interest and concerns on the two major components of the Trade Street corridor:
 1. Building development – land use along Trade Street
 2. Physical appearance – street furniture and amenities
- What's the great idea about Trade Street? Trade Street has the ability to become a "great southern street". It could have open spaces and small parks with lush landscaping. He then introduced the concept of reactivating the green space in front of City Hall on Trade Street.
- Side streets will have some connectivity to Trade Street in that they may have some of the streetscape features to create a visual connection.
- Leinwand introduced three types of street furniture:
 1. Historic
 2. Traditional (combination with historical and contemporary)
 3. Contemporary
- He stated Howard Landers is working on a way-finding system for Center City Charlotte

II. Question/Answers with Advisory Board

Question: What is the reaction of the Advisory Board if the street furniture were to be the same throughout the corridor and matches up with what's used on Tryon Street?

Answer: We don't want a homogenized theme. We'd want something different and unique for each neighborhood.

Question: The Streetcar Team posed the question is there such a thing as too many trees?

Answer: An Advisory Board member replied, 'yes, when site lines are blocked as driver's approach intersections or when a street is too narrow and the tree canopies block sunlight.

Question: Has CATS investigated the development of the Multi-modal station? Could they investigate restaurants overlooking the Multi-modal station?

Response: The Center City Streetcar Project will have very little to do with the development of the Multi-modal station.

Questions: Are funds allocated for the concepts of lighting and street furniture?

Response: Yes, CATS has funds for these design components.

Question: Will CATS bury the utility lines along the Trade Street corridor?

Responses: It is not part of Center City Streetcar Project budget to bury utility lines.

Question: Will there be outdoor cafes in Third Ward? Will the type of street furniture depend upon the type of foot traffic on the street?

Response: Yes. The street furniture will have to take into account the type of businesses along the corridor. A great southern street is certainly capable of developing establishments that may have sidewalk cafes.

Question: Are their competing philosophies of wide sidewalks and building out to the curb?

Response: No. A Charlotte Center City Planners study focused on three types of streets and sidewalks varying in size and width. The buildings will still have an urban setting. The buildings will be taller to offer the street a

'landscaped room' feeling. Charlotte has uniqueness with its tree-lined streets.

Question: What if all the furniture was the same along the corridor which gains CATS the ability to gain volume discount?

Response: There was no opposition to this idea but all seemed in favor of representing their neighborhoods' uniqueness.

Question: What will happen when a streetcar breaks down?

Response: Streetcars will be transported to the maintenance facility for repairs.

Question: If buses and streetcars operate on the same street, how will buses pick up their passengers?

Response: The buses will accommodate its passengers. If necessary, there are buses that load passengers from both sides of the bus.

Comments:

- The amenities and features designed to make each neighborhood uniquely identifiable is very pleasing.
- Trade Street currently does not have a planned streetscape but we are encouraged to use the amenities we do possess.
- Please square the corners from 4th Street to Trade (i.e., eliminate the connectors). It isolates everyone in the area.
- It should be noted that the handicapped are strongly opposed to the median running streetcar. There is a consistent pattern of *not* delivering on promises to the handicapped.
- CATS will spend time educating the handicapped on the many safety options designed to keep all riders safe.

The meeting adjourned at 7:30pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
BEATTIES FORD ROAD CORRIDOR**

Date: June 16, 2005

To: Dave Dickey

From: Harvey Gantt

Re: Charlotte Center City Streetcar Project
Advisory Board Meeting – Beatties Ford Road Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Hosts:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Stan Leinwand, Transit Planner/Urban Design; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialists; Charlotte Area Transit System
Ms. Linda Murdaugh, Coordinator Assistant; Charlotte Area Transit System
Mr. Corey Bell; Planning/Urban Designer Intern; Charlotte Area Transit System
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Chris Ogunrinde, AIA; Neighboring Concepts
Ms. Kelly Miller; Neighboring Concepts
Mr. Luke Volkmar; Neighboring Concepts
Mr. Harvey Gantt, FAIA; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Presentation by CATS/URS Team

Willie Noble opened the meeting with greetings and introductions. After thanking all for attending, he encouraged the Advisory Board members to be open in their feedback. He reminded everyone of the Sub-Area Public Meeting scheduled for Thursday, June 23, 2005 at 6:30pm to be held at Northwest School of the Arts located on Beatties Ford Road. He then introduced Dave Dickey of URS Corporation.

Dave Dickey thanked everyone for attending then spoke briefly about the conceptual design process. Noble added that 10% of design process will be complete at the conclusion of this phase.

Following brief statements, Noble, Stan Leinwand and Chris Ogunrinde made presentations. The following is a general description of the presentations.

A. Update on current work in progress

Stan Leinwand gave an overview of next weeks' Sub-Area Public Meetings. His presentation focused on the streetscape amenities, which includes shelters, benches, trash receptacles and lighting. He briefly described the Power Point presentation which will review the history of the Streetcar in Charlotte and provide a description of the technology to be used with the new streetcar system.

Chris Ogunrinde presented concepts on the land use one quarter mile around the stops. The streetcar is a catalyst for economic development. The connectivity of the stops, sidewalks and pedestrian safety all play integral roles in the planning process of the streetcar.

Willie Noble mentioned the "Art in Transit" program where local artists are selected and contracted to provide public art at stops along the CATS transit lines.

II. Question/Answers with Advisory Board

Question: We have historical and traditional amenities in the area of Johnson C. Smith University, will we maintain that design or will CATS increase the amenities that are already present?

Response: We will listen to all opinions and strive to preserve as much possible. We will continue to work with the community on these decisions.

Question: Will CATS increase the existing streetscape to the cross streets that connect to Third Ward Park?

Response: It is possible. We will discuss these elements more in depth at the Sub-Area Public Meeting.

Question: When will the streetcar actually be in service?

Response: The Streetcar is scheduled to run from Johnson C. Smith University to Presbyterian Hospital or Central and The Plaza in 2009.

Question: Will there be a stop located between West Trade (at the BoJangles) and Gateway Village?

Response: The technology of a stop in that area is challenging but this work is underway.

Question: What accessible features are at each stop?

Response: Pedestrian signs to get people across the street will be located at each stop.

Question: Will these features only be installed at intersections where the streetcar stops?

Response: Where there are no intersections, we will accommodate safe street crossing.

Comments

- Please dignify the icons we've had all our lives by continuing the historic theme of amenities. It spans over time.
- Please consider brightening the I-77 bridge area so that it may become more pedestrian-friendly.
- There is concern of how to mix young urban college students with the "sophisticated urban street people" and the existing elderly of Biddleville.
- The pedestrian scope project is a different project and is already underway for the Beatties Ford Road corridor.
- There is concern about crossing the street at some stops, for example Dixon Street and Beatties Ford Road.
- Please do not put things in the middle of the sidewalk; it's obtrusive to the visually impaired.

The meeting adjourned at 7:30pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
TRADE STREET CORRIDOR**

Date: October 31, 2005

To: Dave Dickey

From: Harvey Gantt

Re: Charlotte Center City Streetcar Project
September 20, 2005 Advisory Board Meeting
Trade Street Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Attendance List:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Stan Leinwand, Transit Planner/Urban Design; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialists; Charlotte Area Transit System
Mr. James ; Transportation Planner; Charlotte Department of Transportation
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Paul Pattison; URS Corporation
Mr. Chad Chandler; URS Corporation
Mr. Dan Thilo; Charlotte Department of Transportation
Mr. Harvey Gantt, FAIA; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Presentation by CATS/URS Team

Willie Noble opened the meeting with greetings and introductions. The Advisory Board was encouraged to attend and bring neighbors and other concerned citizens to the Public Meeting scheduled for Tuesday, September 27, 2005 at 6:30 pm to be held in the new location of the Council's Chambers at the Government Center. He thanked everyone for attending and being active participants as Advisory Board Members.

He informed the Advisory Board of the major milestone the Streetcar Project experienced since the June meetings. It has been determined that bi-directional operation on Trade Street will best suit the Center City Streetcar Project. The Key Business Executives (KBE) concurred with these findings. Furthermore, the

Streetcar will operate a hybrid alignment, that is, curb-running and median running operations.

Noble explained the third phase of the project had been renamed. Formerly known as 'the circulator or spider', the new name for the third phase will be referred to as 'the spokes'. There will be four spokes emanating from the Trade Street Streetcar. Each of the spokes is designed to connect surrounding downtown neighborhoods with Center City. The five spokes are:

- i. 1st ward to Belmont
- ii. 2nd Ward to Midtown
- iii. Third Ward
- iv. Fourth Ward (on Graham Street)

He also explained that CATS is investigating numerous sites for the location of a maintenance facility. CATS would need a two and one-half acre site to accommodate a facility for the streetcar system. The maintenance facility will be designed to park, house cars, clean and repair streetcars. The facility will be designed specifically for streetcars and will not be designed to accommodate light rail vehicles. It would be desirable if this facility could be accessed within a quarter-mile distance of the main line of track.

It is still not determined which of the two extensions, Hawthorne/Central Avenue and Beatties Ford Road will be built first.

Conversations with landowner, Monty Richie, are progressing. Monty Richie is the land owner who may assist the Streetcar project in its dilemma of cross the CSX lines on the Hawthorne/Central Avenue corridor.

Noble then explained in detail CATS intention to apply for Small Starts funding. Congress recently passed a new program for the funding of transit projects that are less capital intensive. The Center City Streetcar Project is in great shape to apply for these funds. There are currently four criteria for Smart Starts qualifications:

1. Streamline process for applying for a shorter timeframe for response
2. Cost effectiveness
3. Land use
4. Local economic development.

Noble stated Ron Tober is committed to positioning CATS to be among the first applicants for Smart Starts funds. He noted the maximum amount of funds for which CATS may apply from the Small Starts Program is \$250 million. Regulations for the program have not yet been completed but will be implemented by the end of 2006. CATS' application will be submitted for process in 2006.

He reviewed the process of the Public Meeting scheduled for September 27, 2005. The meeting will be held in Council's Chambers where a 25-30 minute Power Point presentation will take place followed by a question and answer session immediately following the presentation. The public will then be invited to visit three break-out rooms that will have boards displaying all three phases of the project. Mr. Noble then introduced Dave Dickey of URS Corporation.

Mr. Dickey informed the Advisory Board that the public meeting will be the forum for unveiling the draft for the conceptual design for all three phases of the Center City Streetcar Project. He introduced a new Trade Street stop near Davidson. He confirmed that the Streetcar will be curbside running on Beatties Ford Road and Central Avenue. The Streetcar will be median running in the area of Johnson & Wales University.

He then introduced many of the boards which will be present to display the conceptual design to date. Many comments and questions were raised regarding the display boards and the type of information that would be depicted in the final presentation. Many of those questions and comments are shown below.

Harvey Gantt recapitulated the purpose and role of the Advisory Board's role in the process of bringing the streetcar back to Charlotte. He asked that all Advisory Board members please attend the public meeting and bring as many interested neighbors and friends as they would like.

II. Question/Answers with Advisory Board

Question: Is it possible to use the light rail facility for maintenance on the streetcars?

Answer: No. The light rail maintenance facility is designed to accommodate the repair and maintenance of the light rail vehicles for the South Corridor and possibly the Northeast Corridor as well.

Question: Will Trade Street (Phase I) be operational before the extensions have been installed?

Answer: Yes. The Red Line will be up and running before construction begins on either extension in Phase II.

Question: Being that we only parallel the CSX tracks ¼ mile, how likely is it that the Phase 1 will go out to Plaza-Midwood in the first Phase? Can't we go over the tracks?

Response: There will be no structure erected on Central Avenue to transport the streetcar over CSX tracks. However, a new bridge over the CSX is being explored and it is still likely that Phase I could make it out to Plaza-Midwood.

Questions: What if the Southeast Transit line wants to use Trade Street?

Response: Trade Street cannot accommodate everything. If the Southeast Transit line wants to use Trade Street, then we will have to reconsider where the Streetcar will run. The Southeast light rail line is one year out from making that decision. We will not wait, we will proceed.

Question: Can the maintenance facility be built along the 'Spoke' configuration route, though it is the last phase?

Responses: Yes, the maintenance facility can be located along the 'Spoke' route. CATS is investigating several sites throughout the transit corridors that may accommodate this type of facility.

Question: Is the Streetcar project working with the West Corridor Project?

Response: Yes. The Streetcar and West Corridor are sharing information and collaborating.

Question: Will there be audible announcement on the streetcar?

Response: Yes, there will likely be audible announcements on the streetcar.

Question: What amenities are different at a streetcar stop then a bus stop?

Response: There are no steps on a streetcar. There are extra wide doors and a level bridge plate designed to accommodate wheelchairs and strollers. There will likely be fare-boxes on the platforms where passengers will pre-pay their fare to board the streetcar.

Question: What is the decision regarding a traffic circle at CPCC?

Response: The traffic operations study concluded that the proposed roundabout does not work well from the streetcar standpoint. The streetcar would operate better through the roundabout as apposed to

deflecting around the roundabout. As a result, the proposed statue/green space in the middle of the roundabout concept would conflict with the better streetcar alignment.

Question: How long does it take to run from one end of the line to the other?

Response: That has yet to be determined. The streetcar will stop at every stop whether someone is waiting to board or exit the streetcar or not.

Question: Will there be a new signal re-introduced at Pease Lane and Elizabeth Streets?

Response: The signal at Pease Lane will return as a pedestrian signal only.

Comments:

- Hawthorne will continue the road diet from Elizabeth.
- Please illustrate the end points better for next week's Public Meeting.
- Please show the audible signals and traffic signals at next week's Public Meeting.
- Color contrasting might help the public read the boards better.

The meeting adjourned at 7:50pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
HAWTHORNE/CENTRAL AVENUE CORRIDOR**

Date: October 31, 2005

To: Dave Dickey

From: Harvey Gantt

Re: Charlotte Center City Streetcar Project
September 21, 2005 Advisory Board Meeting
Hawthorne/Central Avenue Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Team Attendees:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Jerry Roberson; Assistant Project Manager; Charlotte Area Transit System
Mr. Stan Leinwand, Transit Planner/Urban Design; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialists; Charlotte Area Transit System
Ms. Linda Murdaugh, Coordinator Assistant; Charlotte Area Transit System
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Chris Ogunrinde; Partner; Neighboring Concepts
Mr. Eric Orozco; Planner/Landscape Architect; Neighboring Concepts
Mr. Harvey Gantt, FAIA; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Presentation by CATS/URS Team

Willie Noble opened the meeting with greetings and introductions. The Advisory Board was encouraged to attend and bring neighbors and other concerned citizens to the Public Meeting scheduled for Tuesday, September 27, 2005 at 6:30pm in Council's Chambers located in the Government Center.

He updated the Advisory Board on the latest developments regarding the Trade Street operations for phase one. He informed the Board that the Center City Streetcar will operate bi-directionally on Trade Street. Now that CATS has established how and where the streetcar will operate, it will finalize the conceptual design and prepare to apply for federal funding through the Federal Transit Administration's (FTA) Small Starts program. The Small Starts program is a federally funded program created for projects for like the Center City Streetcar Project. Designed to encourage cities to expand and improve their existing transit

programs, Small Starts is ideal for low-cost improvement projects like the streetcar.

Noble then introduced Dave Dickey of URS Corporation who encouraged Advisory Board Members to attend next Tuesday's Open House to review the Conceptual Design phase of the project. He reviewed the format of the Public Meeting which would include a 25-minute Power Point presentation followed by a question and answer session. The public will then be invited to visit three break-out rooms that will have boards displaying all three transit corridors along the project. The CATS team will be present to answer any questions and will be seeking feedback from all who attend either by answering questions or filling out comment cards.

Dickey informed the Advisory Board that CATS has not finalized the end of the line for the Hawthorne/Central Corridor. It is still unclear as to whether the line will end at Presbyterian Hospital or Plaza-Midwood. However, he did mention that an additional stop will be added to the Trade Street corridor as suggested by the Key Business Executives (KBE). The additional stop will be located at McDowell Street, and the Alexander Street stop will be moved to the west near Davidson Street.

Willie Noble explained the process of how the funding through Small Starts program will be installed. The Small Starts program doesn't have regulations in place to date. CATS is poised to apply immediately for these funds when the regulations are implemented. They are working with a Community Streetcar Coalition to prepare the application. There are three criteria that FTA will be looking for in all applications:

- i. Cost effectiveness of the project
- ii. Land use surrounding the project
- iii. Local economic development potential associated with the project

CATS anticipates the Center City Streetcar Project will be used a model project for East Coast projects applying for FTA funding. Charlotte was recently mentioned in all the transit expansion workshops in a nationwide transit convention in Salt Lake City, Utah.

Dave Dickey showed the Advisory Board Members the boards that will be displayed in the break-out sessions in the public meeting. He mentioned that the third phase of the project, formerly referred to as the "circulator" has been renamed the "Spokes" portion of the project. There are four spurs that will take originate in the Uptown area:

- i. First Ward to the Belmont area

- ii. Second Ward to the Midtown area
- iii. Third ward to the Morehead area
- iv. Fourth Ward to the Graham Street area

He displayed a board showing three alternatives that may be possible for the end of the line that may loop around at the Plaza-Midwood terminus point. He also stated that stops were designed to occur between traffic lights. There is one exception along the Trade Street corridor; Johnson and Wales University's stop is at the traffic light.

Stan Leinwand interjected that the names for the stops on the boards are 'placeholders' only. Official names will be assigned through a naming process at CATS.

Chris Ogundrinde of Neighboring Concepts reviewed boards that graphically displayed the streetcar stops. The boards depicted areas that had potential for redevelopment or future opportunities for redevelopment surrounding the stops. He pointed out areas that lacked sidewalks and expressed the desire to fit sidewalk improvements in the streetcar project budget. He showed how bike lanes maneuver around the loading platforms of the streetcar. Please note the boards show future development opportunities and be out as far as twenty years.

Willie Noble ended the meeting with an updated calendar stating we will come back to the public in early 2006 with the completed conceptual design. Immediately following those meetings CATS will prepare their application for FTA funding. He noted CATS will get this right the first time; there is no room for errors in this new process.

II. Questions/Answer with Advisory Board

Question: Will there be an audible button with lights around it for the handicapped?

Response: Yes, there will be audible buttons with lights for the handicapped.

Question: Will the sidewalks be torn up to accommodate loading platforms for board the streetcar?

Response: Yes. The sidewalks will be reconstructed to accommodate the 4" differential in the platform and sidewalk needed to board the streetcar.

Question: Was the 'spurs' or 'spoke' plan created after the original plan was implemented?

Response: There was always a last phase to the project, it was once referred to as the 'circulator'. The 'spoke' plan is the 'circulator' plan further developed.

Question: Were there political conversations that took place that sparked the 'circulator' plan to spread out to a 'spoke' plan?

Response: No, there was no political input in regards to improving the circulator plan. Further research showed that a closed loop plan did not meet the needs of the citizens.

Question: Are there accessible pedestrian signals?

Response: Yes, we are doing all we can to address the required ADA design requirements. If we are to receive federal funding, we would have to be ADA compliant.

Question: The audible voices on the buses are loud. Will the streetcar audible features be quieter?

Response: Yes. The volume on the audible features of the streetcar can be lowered.

Question: Will ALL the stops have the assistance aides for the handicapped?

Response: Yes, the system will be uniform from one end to the other.

Question: Is there a price break for which we must follow to qualify for the federal funding?

Response: Yes. Small Starts project cannot exceed \$250M. FTA will only fund a portion of the total cost of the project.

Comments:

- One Advisory Board member likes the streetcar stop that will take place in front of her property.
- Citizens of the Central Avenue area doubt that the streetcar will actually be built.
- Lansdale is misspelled on the map.

- Please note: ADA compliance is not federally controlled or required. The city would have to make the choice to be compliant. Federal dollars would not require all that is needed to make the streetcar accessible.
- Please improve the graphic spacing of the wording on the boards.

The meeting adjourned at 7:35pm.

End Memo

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**SUMMARY OF ADVISORY GROUP MEETING
BEATTIES FORD ROAD CORRIDOR**

Date: October 31, 2005

To: Dave Dickey

From: Harvey Gantt

Re: Charlotte Center City Streetcar Project
September 22, 2005 Advisory Board Meeting
Beatties Ford Road Sub-Area Group
Gantt Huberman Architects, PLLC
6:30pm – 7:30pm

Hosts:

Mr. Willie A. Noble, Senior Project Manager; Charlotte Area Transit System
Mr. Jerry Roberson; Assistant Project Manager, Charlotte Area Transit System
Mr. Stan Leinwand, Transit Planner/Urban Design; Charlotte Area Transit System
Mrs. Kiera Terrell, Public Information Specialists; Charlotte Area Transit System
Ms. Linda Murdaugh, Coordinator Assistant; Charlotte Area Transit System
Mr. Dave Dickey, Vice President; URS Corporation
Mr. Chris Ogunrinde, Partner; Neighboring Concepts
Ms. Kelly Miller; Neighboring Concepts
Mr. Harvey Gantt, FAIA; Gantt Huberman Architects, PLLC
Ms. Grace Mayfield; Gantt Huberman Architects, PLLC

I. Presentation by CATS/URS Team

Willie Noble opened the meeting with greetings. The Advisory Board members were encouraged to attend the Public Meeting scheduled for Tuesday, September 27, 2005 at 6:30pm at the new location of Council's Chamber's in the Government Center.

In his opening remarks, Noble informed the Advisory Board members that the streetcar will operate bi-directionally on Trade Street. CATS, CDOT and Key Business Executives agreed that this would be the most efficient operation of the streetcar through Center City Charlotte.

He stated, the federal government passed a long awaited transportation bill where funding will be available from the Federal Transit Administration (FTA) for small transportation projects. The program, named the Small Starts program, is

designed to fund smaller transit capital investments. The funding break down for the Center City Streetcar Project will look like this:

- 50% of the funding would be federal funding through Small Starts funds
- 25% of the funds will come from local funding
- 25% of the funds will be state funds

The Small Starts Program under the FTA has not completed its regulation process but CATS will have some input on the regulatory process. Currently, there are only three cities that are in a position to apply for these funds. Charlotte is in an outstanding position to receive federal funding. CATS will apply for these funds in 2006. At that time, 10% of the design process will be completed.

Willie Noble then introduced Dave Dickey of URS Corporation. Mr. Dickey thanked everyone for attending then provided an overview of the presentation boards that will be on display in the public meeting. He stated that the primary objective of the public meeting is to provide feedback on the proposed final alignment. The streetcar team is looking for feedback as to whether the proposed concept is well received by the public. If the answer is positive, then CATS can go into the next design phase with the confidence that they are meeting the community's needs for this project.

The next public meeting will be held in mid-January 2006. At that time, CATS will present a cost estimate for the project and confirmed timeline for engineering design and installation of the streetcar. The buy-in at the time will signal full support from the community.

Chris Ogunrinde presented boards that showed the stops, potential redevelopment sites and the sidewalks within one quarter mile of the stops. The streetcar is a catalyst for economic development. The connectivity of the stops, sidewalks and pedestrian safety all play integral roles in the planning process of the streetcar.

II. Question/Answers with Advisory Board

Question: Will this budget allow for the Beatties Ford corridor to extend out to Cindy Lane?

Response: No, funding is based off the conceptual design that is currently in place. The Beatties Ford Road tracks are designed to stop at Rosa Parks Drive near I-85.

Question: Does better ridership and lower cost advance the argument that Beatties Ford Road corridor would be built first?

Response: In determining priority, affordability will be a criterion. Both extensions want to be accelerated but this cannot be determined in the conceptual design phase. The project is phased due to economical constraints.

Question: When will the streetcar actually be in service?

Response: Phase 1 of the Streetcar is scheduled to run from Johnson C. Smith University to Presbyterian Hospital or Central and The Plaza in 2009.

Question: What areas are being considered for the maintenance facility?

Response: There is some state owned land near I-77 that CATS is looking into purchasing for future use. The most attractive area identified today is acreage located near I-277 off Cedar Street. However, other sites are also being considered.

Question: What accessible features are at each stop?

Response: Pedestrian signs to get people across the street will be located at each stop. Ramps and pavement texture changes will also assist those who are visually challenged.

Question: Has CATS incorporated the city approved pedestrian-scape plan for the Beatties Ford Road corridor?

Response: No, not yet. CATS will investigate that report at the appropriate time.

Question: Will there be cameras on the streetcar for security?

Response: Yes, it is likely that cameras will be on the streetcar.

Question: Will federal funds be available from Homeland Security for the security component of the project?

Response: CATS is not sure about that will look into the possibilities.

Question: Will the streetscape be consistent throughout the project?

Response: Yes, it is the intent of CATS to make sure the streetscape is consistent throughout the project.