

LeeTran



# Bus Stop Accessibility Study and Transition Plan

July 29, 2022

*Prepared by*



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## 1.0 INTRODUCTION

Lee County Transit (LeeTran) is interested in improving access to and from, security at, and operations of LeeTran's bus stops, Park-and-Ride and Transfer Stations. To accomplish this objective and to ensure compliance with the Americans with Disabilities Act (ADA), LeeTran retained Alfred Benesch & Co (formerly Tindale Oliver) to conduct a comprehensive inventory and assessment of each bus stop, transfer station and park-and-ride facility.

The detailed information collected from the inventory will be used to develop a system-wide set of prioritized accessibility and safety improvements needed at each facility. From this inventory, order-of-magnitude costs and a phased implementation plan based on available funding estimates will be prepared. Consideration for low-cost/short-term improvements and opportunities to “piggy-back” recommended improvements with other programmed capital projects by LeeTran or other agencies will be considered.

This report details the data collection process, accessibility requirements considered during the assessment, development of a bus stop inventory and database, and steps used to analyze the data and prepare the implementation plan, including the process to prioritize the recommended accessibility improvements. A separate appendix document has also been prepared that includes a one-page summary of data collected and analysis results for each bus stop.

## 2.0 INVENTORY PROCESS

This section describes the process used to develop the master bus stop inventory database, including accessibility attributes collected, field data collection effort, 2019 annual passenger activity at each bus stop, and quality control measures used during the data collection and review process.

### INVENTORY ATTRIBUTES

Prior to the field data collection process, a bus stop data collection framework plan was prepared to confirm the inventory format and attributes to be collected. The attributes align primarily with the data required to evaluate the accessibility of a bus stop using the ADA Accessibility Guidelines (ADAAG).

As summarized below, four categories of inventory attributes were identified for field collection. A more detailed explanation of bus stop and accessible route standards used to guide the data collection effort is provided in Section 3.

#### **General attributes**

1. Bus stop code
2. Bus stop name
3. Longitude/Latitude
4. Travel Direction
5. Trip Generators
6. Photographs—photographs of the bus stop looking northbound, southbound, eastbound, and westbound.

#### **Location attributes**

1. Stop location (e.g., in a travel-thru lane vs. in a right-turn lane)
2. Relation to nearest intersection
3. Potential safety hazards or safety violation

#### **Bus stop attributes**

1. Bus stop sign (sign height, mounting, bus routes, finishing, and character height)
2. Boarding and Alighting (B&A) Area presence and characteristics (condition, slope, material, obstructions, barriers to having a B&A area, etc.)
3. Shelter (condition, wheelchair maneuverability, distance from curb, and connection)

#### **Accessible route**

1. Curb type and height
2. Marked crosswalks
3. Curb ramps (slope, surface, detectable warning)
4. Sidewalk (width and connection)
5. Other amenities present (e.g., bench, trash can, bike rack, newspaper rack, garbage can, etc.)

## FIELD DATA COLLECTION PROCESS

Once the bus stop accessibility attributes were confirmed, a comprehensive checklist of each attribute was prepared and developed into a software application specifically configured for this study. First, a field data questionnaire was created and then used to configure the application (see Appendix A) to easily enable surveyors to enter data, answer consistent questions, and confirm that the required data items were collected at each bus stop. The application's interface was accessed by the surveyors using tablets and smartphones with wireless connectivity and built-in GPS. By using the most up-to-date mobile technology, surveyors could determine the bus stop's GPS coordinates, input data with prompted questions, and take photographs using a single tool. Finally, the application allowed the collected data to be exported into a database format for quality analysis and quality control (QA/QC).

Primary equipment used by each surveyor to conduct the inventory are illustrated in **Figure 2.1** and includes:

- Mobile tablet or smartphone
- Smart level
- Measuring wheel
- Tape measure
- Safety vest

**Figure 2.1: Field Data Collection Equipment**



Following development of the software application, the inventory process was completed by Benesch (formerly Tindale Oliver) staff trained to conduct ADA bus stop assessments. Field data collection occurred from July 27, 2021, to October 15, 2021, and again, in April 2022.

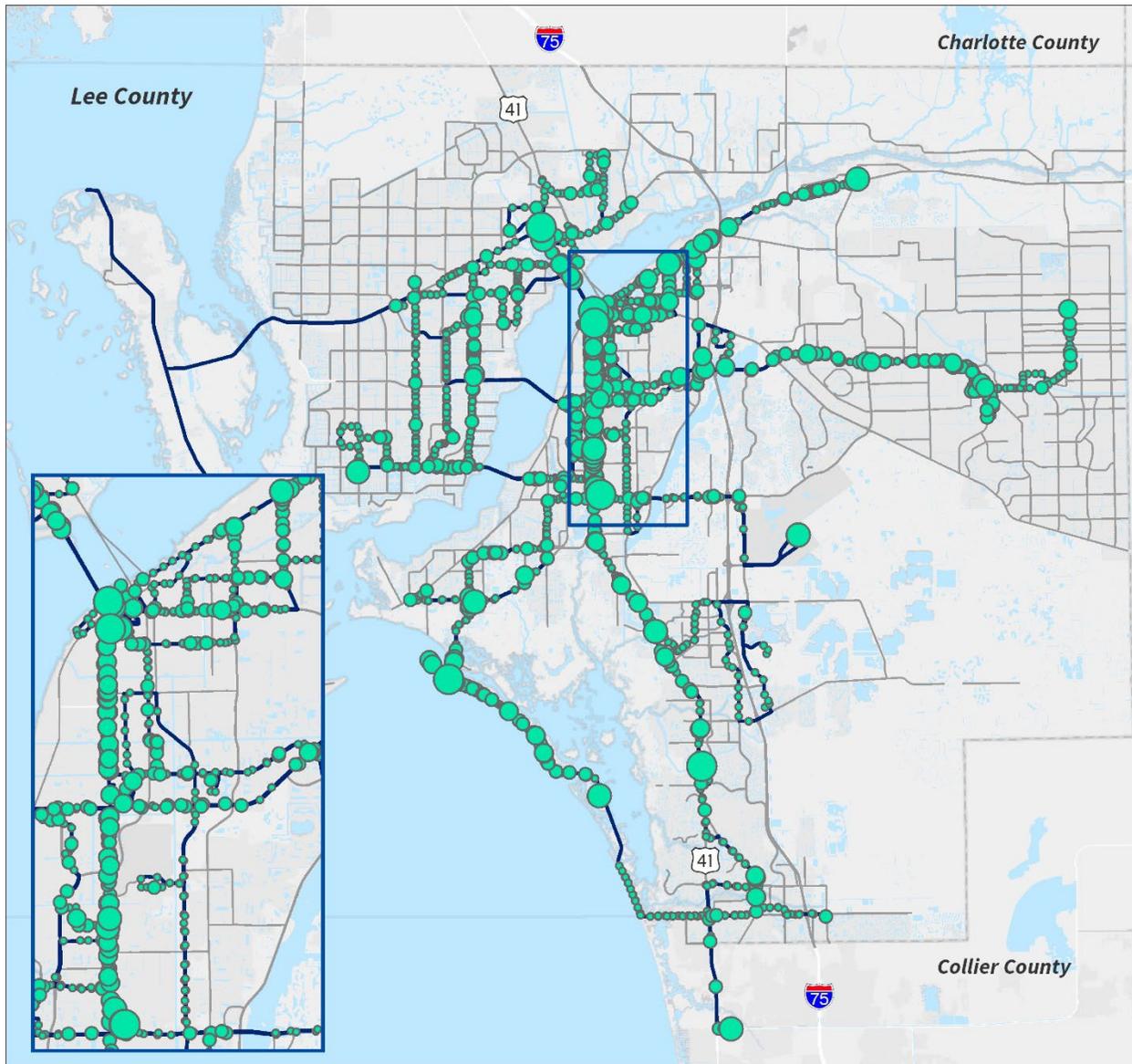
## QUALITY CONTROL MEASURES

During the data collection process, QA/QC measures were continuously conducted by the project team to ensure that data collected were complete and accurate. As the database was compiled, records with missing or incorrect data were corrected by matching the record to its corresponding photographs. Corrected information in the database was marked to reveal any discernable patterns of incorrect information. Data elements with significant errors were closely analyzed to determine the source of the error (e.g., data entry mistakes, programming errors). Elements such as the presence of benches or shelters could be corrected by viewing the photographs, and elements that require measurement, such as slope or width, were determined in the field.

A key component in prioritizing bus stop improvements is understanding the level of passenger activity at each bus stop. The ridership data collected by LeeTran during fiscal year 2019 determined that there was a total ridership of 887,231. The ridership data covers 100% of the fixed route runs for each route.

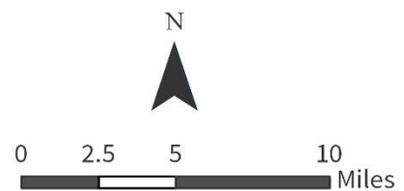
**Map 2-1** illustrates bus stop activity for LeeTran's entire service area (Fiscal Year 2019). **Map 2-2** illustrates bus stop activity at LeeTran's transfer center for the entire service area.

**Map 2-1: Fiscal Year 2019 Ridership Levels (Entire Service Area)**

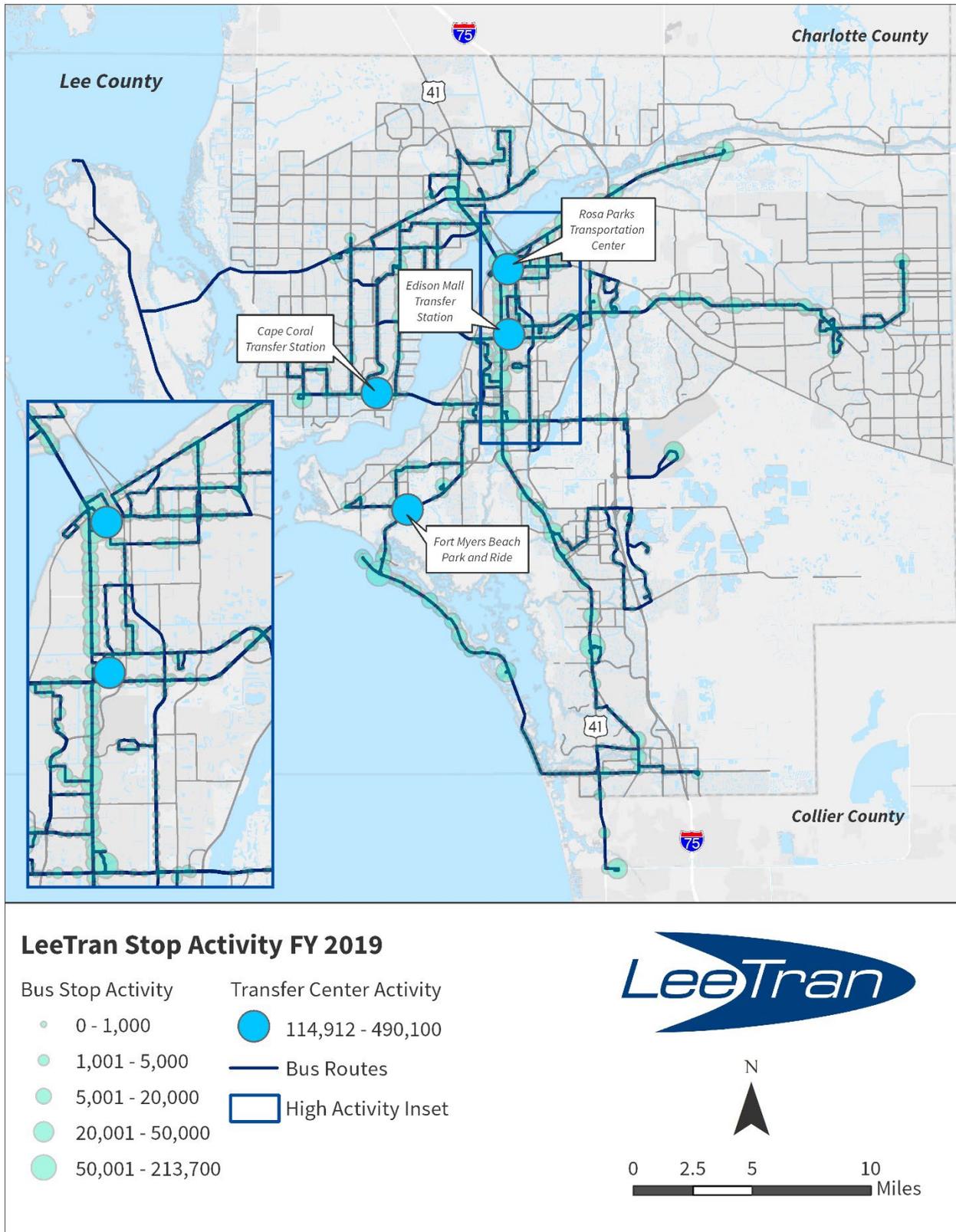


**Bus Stop Activity FY 2019**

- 0 - 1,000
  - 1,001 - 5,000
  - 5,001 - 20,000
  - 20,001 - 50,000
  - Greater than 50,000
- Bus Routes
  - High Activity Inset



**Map 2-2: Fiscal Year 2019 Transfer Center Ridership Levels (Entire Service Area)**



### 3.0 ACCESSIBILITY REQUIREMENTS

Six major elements related to bus stops primarily impact their accessibility and/or compliance with ADA requirements:

- Boarding /alighting areas
- Bus stop shelters
- Bus stop signs
- Accessible routes and sidewalks
- Curb ramps
- Obstructions

Two primary regulatory documents were used to determine specific design and infrastructure requirements for these elements related to accessibility—ADAAG and the Florida Department of Transportation’s (FDOT) *Accessing Transit Design Handbook for Florida Bus Passenger Facilities* (Version III, 2013), referred to hereinafter as the *Accessing Transit Handbook*.

Many standards that would apply to bus stops located in dense urban environments are not necessarily applicable to bus stops located in suburban or rural locations where curbs and sidewalks may not be present. Currently, some of LeeTran’s bus stops located in more suburban or rural areas have no more than a single bus stop sign staked in the grass. In these cases, LeeTran will be required to install only a raised B&A area and not necessarily a sidewalk connecting the bus stop to the surrounding area. At locations where there is no expectation of a sidewalk and the shoulder of the roadway may be considered the only usable pedestrian pathway, the B&A area will be required only to connect to the shoulder of the roadway to be considered compliant.

#### BOARDING AND ALIGHTING AREAS

B&A areas are critical for passengers to safely access, enter/exit the bus, and operate a wheelchair lift.

##### *B&A Area Standards*

Minimum width and length of paved B&A areas, as well as surface qualities, are regulated by ADAAG/FDOT. Many standards for sidewalk surfaces also apply to B&A areas, including the following:

- The clear area of the B&A area must be no less than 8’ parallel and 5’ perpendicular to the curb or street/roadway edge and connected to the nearest accessible route.
- The cross slope of the B&A area (perpendicular to the curb) must be less than or equal to 2%.
- The running slope (parallel to the curb) of the B&A area must match the slope of roadway.
- The B&A area must provide a firm, stable, slip-resistant surface.
- A raised 6” curb at B&A area. ADAAG does not require a raised curb to be present at a B&A area. However, the absence of a raised curb could cause the bus’s wheelchair lift or ramp to have a non-complaint slope.

- It was noted during the field assessment that detectable warnings and handrails were located at B&A areas. ADAAG does not require these elements at a B&A area, and their presence may be confusing to a patron with disabilities.

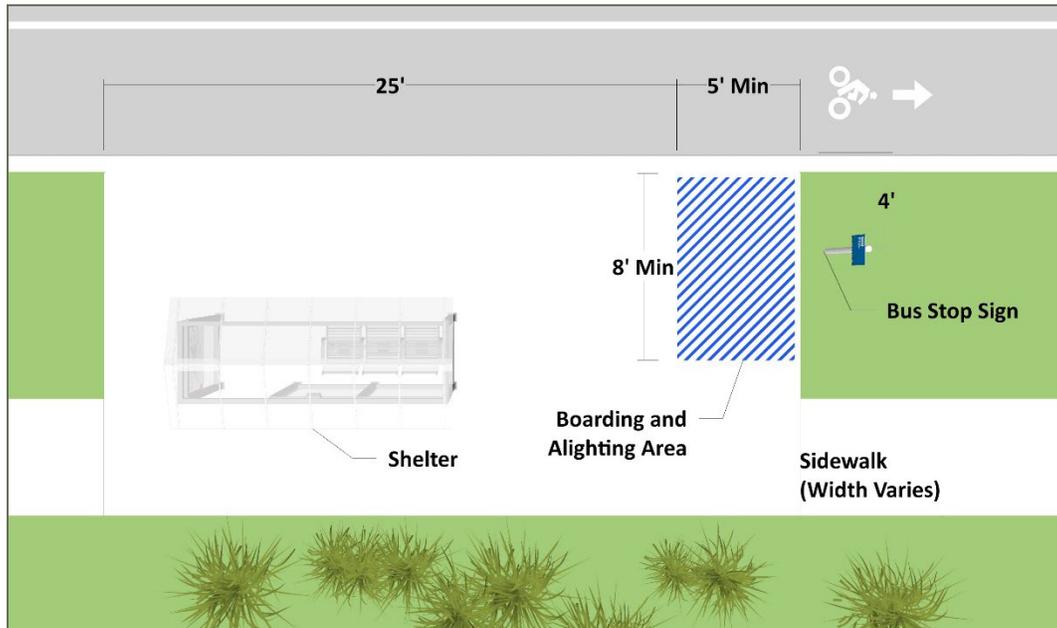
**Figure 3.1: Handrails and Detectable Warning Present at Bus Stop #10019**



In addition to the ADAAG/FDOT standard 5'x 8' dimensions, the Lee County Land Development Code (LDC) outlines the requirements for bus stops in Sec. 10-441, Sec. 10-442, and Sec. 10-296. These standards apply to residential area with more than 100 dwelling units or to any commercial or industrial areas. If there is an existing bus stop within 0.25 mile of a vehicular entrance via the pedestrian network, it is required that a bicycle storage rack, a raised curb along with a 30' wide by 8' feet deep concrete boarding and alighting area to be installed.

Figure 3.1 illustrates some of these standards in the context of an urban bus stop with a continuous curb, Figure 3.2 illustrates the layout of these standards in the context of a suburban bus stop, and Figure 3.3 illustrates the layout of these standards in the context of a rural bus stop.

**Figure 3.2: Layout of B&A Area and Standards (Urban Bus Stop)**

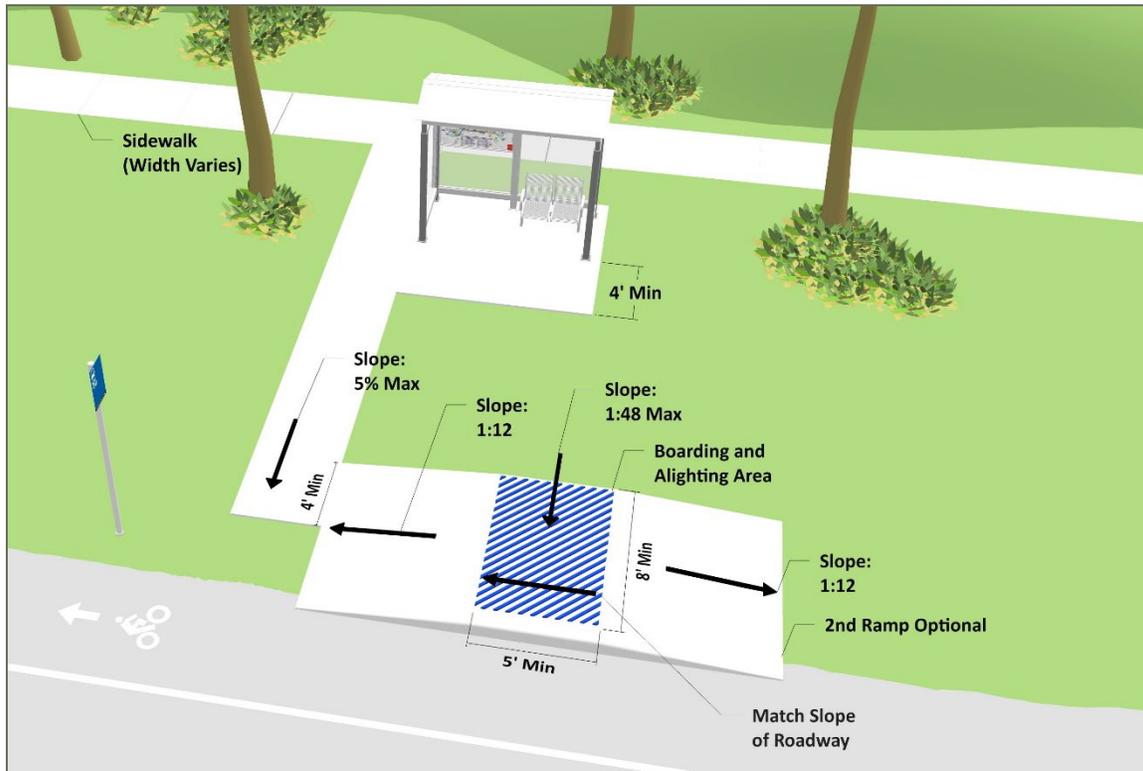


Source: FDOT *Accessing Transit Handbook*

**Figure 3.3 Example of a Compliant Urban Bus Stop**

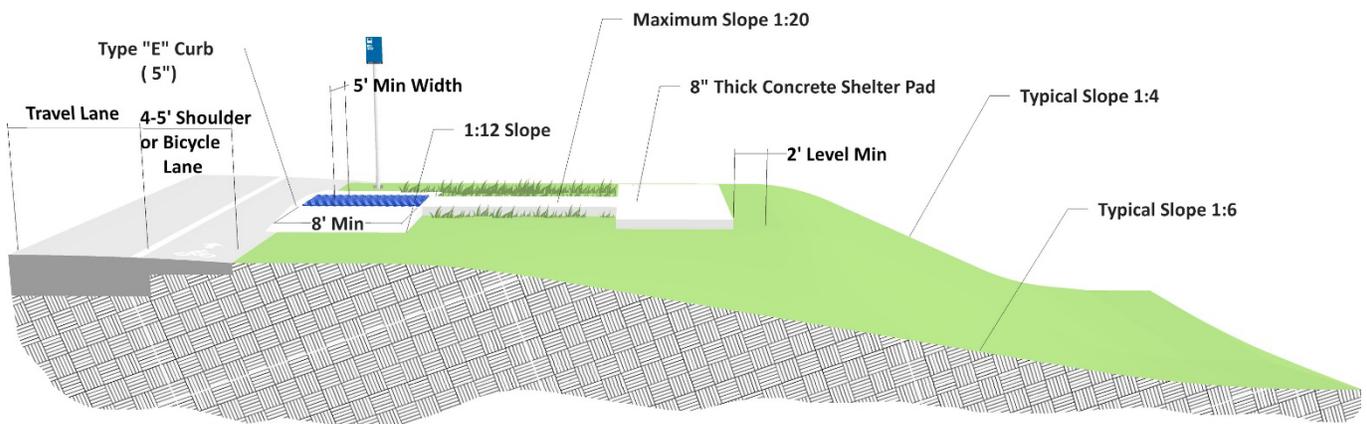


**Figure 3.4: Layout of B&A Area and Standards (Suburban Bus Stop)**



Source: FDOT Accessing Transit Handbook

**Figure 3.5: Layout of B&A Area and Standards (Rural Bus Stop)**



Source: FDOT Accessing Transit Handbook

## BUS STOP SHELTERS

Bus stop shelters provide a comfortable waiting area for passengers and help protect them from natural elements such as sun, rain, and heavy wind. However, if placed improperly at a bus stop, shelters can impede accessibility to the accessible path and/or B&A area.

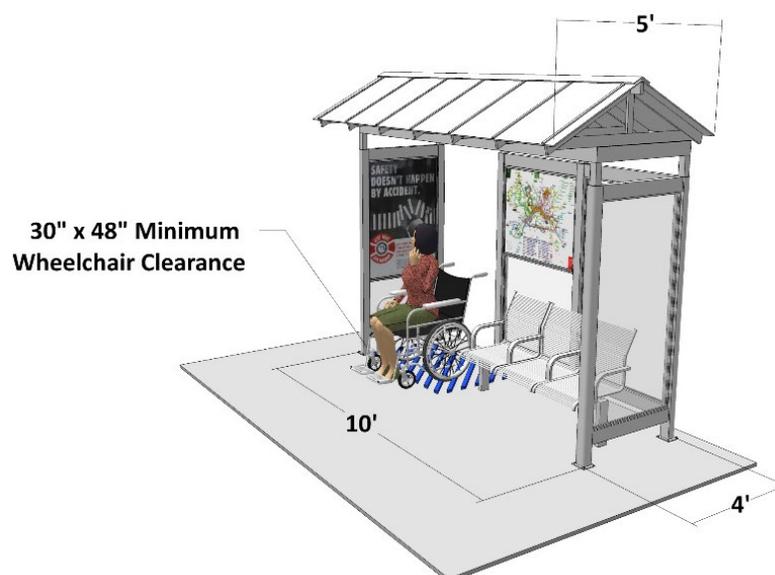
### *Bus Stop Shelter Accessibility Standards*

The design and function of a bus stop shelter can vary considerably based on its function, ridership levels, agency design standards, and other factors. However, important considerations are in place related to how shelter placement and design can affect accessibility to and within the shelter itself, as well as the accessible path and B&A area. Accessibility standards for bus stop shelters include the following:

- A clear and level floor space of 30" wide by 48" deep within the shelter and 36" minimum approach to the clear area to be accessible for persons in wheelchairs.
- Placement that does not obstruct the B&A area or that blocks access to the accessible path. When a shelter is located on the street side of a sidewalk, a minimum 4' pedestrian pathway should be maintained on three sides of the shelter. In areas with high pedestrian volumes, a 6' sidewalk on one side of the shelter is preferred.

Figure 3.6 illustrates the typical dimensions of a bus shelter, including required wheelchair clearance space.

**Figure 3.6: Bus Shelter Typical Dimensions**



Source: FDOT *Accessing Transit Handbook*

## BUS STOP SIGNS

Bus stop signs are important because they identify the location of an active bus stop, but they also are critical for showing passengers the correct area for boarding the bus and serve as a guide to bus operators for positioning the bus for safe B&A. Bus stop signs must follow particular standards set by ADAAG/FDOT for placement and visibility.

### *Bus Stop Sign Standards*

Bus stop signs providing route designations, bus numbers, and other access information must be designed for use by transit riders with vision impairments. The general ADAAG/FDOT standards for bus stop sign placement and visibility are as follows:

- The bottom of the sign should be at least 7' above ground level; however, it may be placed as low as 40" above ground level and should not be located closer than 2' from the curb face. Placement of the sign is critical so that both bus operators and passengers can identify and read the sign and the sign is not an obstruction to passing vehicles.
- Characters and the background of the sign should have a non-glare finish, making the sign clear and visible in bright sunlight or headlights.
- Minimum character height must be visible to the passenger and should comply with ADAAG/FDOT standards, as detailed in **Table 3-1**.
- Other signs sharing the mount location also should be properly mounted.
- Suggested for all bus stops but required for bus stops that serve more than one route, the bus stop sign must also include the bus route number(s) that provide services to the stop.

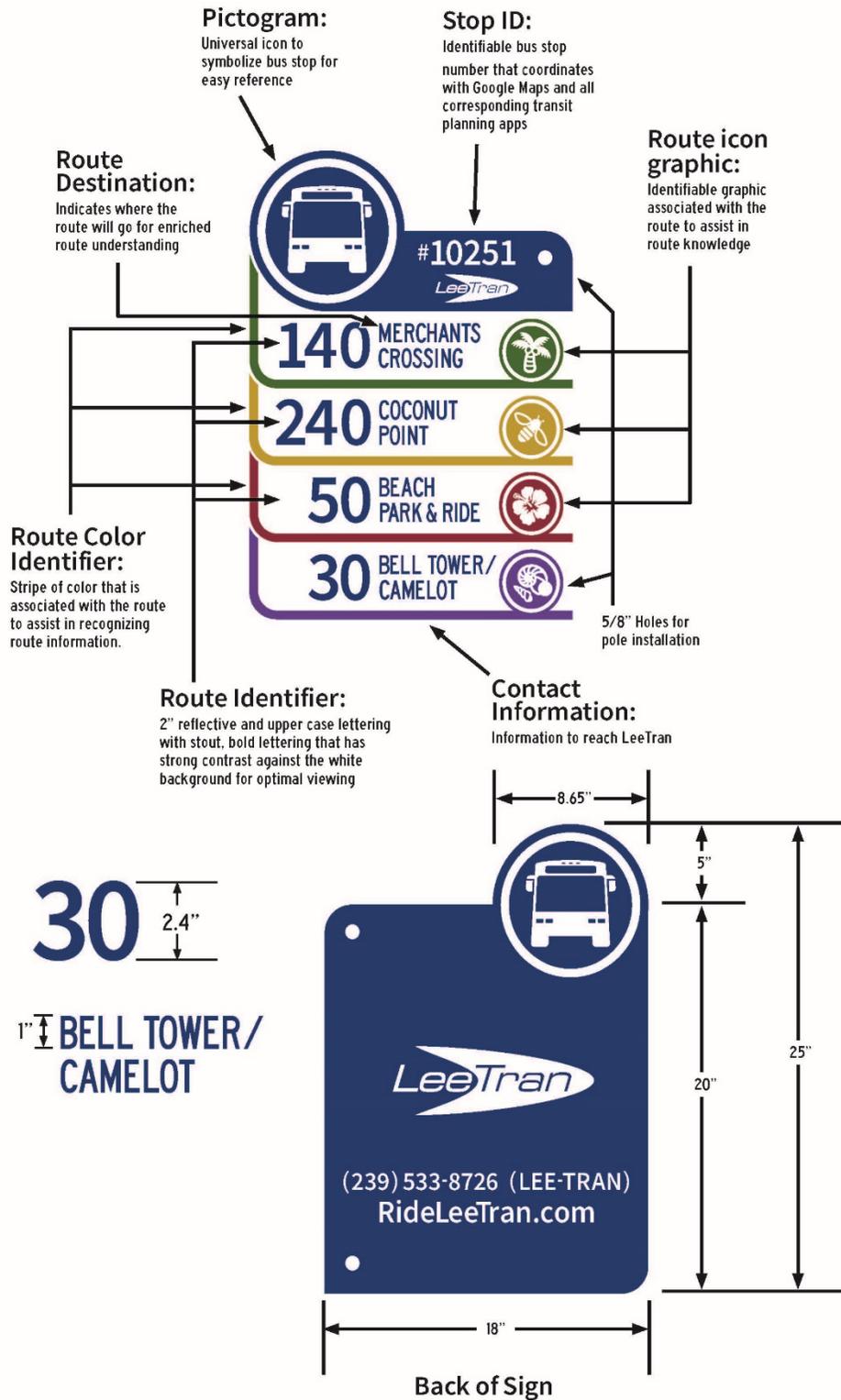
**Table 3-1: Bus Stop Sign Visual Character Height Standards**

Height to Finished Floor or Ground from Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
40" to less than or equal to 70"	Less than 72"	5/8"
	72" and greater	5/8" plus 1/8" per foot of viewing distance above 72"
Greater than 70" to less than or equal to 120"	Less than 180"	2"
	180" and greater	2", plus 1/8" per foot of viewing distance above 180"
Greater than 120"	Less than 21'	3"
	21' and greater	3", plus 1/8" per foot of viewing distance above 21'

Source: FDOT *Accessing Transit Handbook*

The LeeTran bus stop sign shown in **Figure 3.7** meets these requirements. All bus stops that require updated or relocated signage because of this study must meet applicable ADA requirements.

**Figure 3.7: ADA-Compliant LeeTran Bus Stop Sign**



## ACCESSIBLE ROUTES AND SIDEWALKS

Accessible routes and sidewalks leading to and from the bus stop are critical for all passengers, particularly those with disabilities.

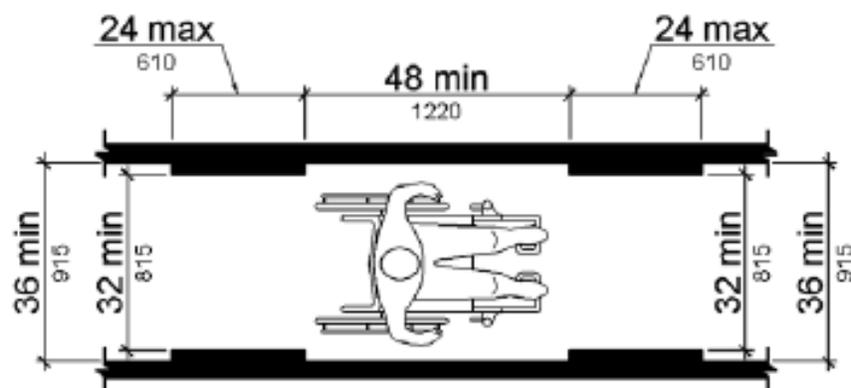
### *Accessible Route Standards*

An accessible route must be sufficiently wide, continuous, and an unobstructed path enabling passengers to access the bus stop and surrounding activity centers. The following are the specific guidelines for accessible routes and sidewalks set by ADAAG/FDOT:

- Surface must be firm, stable, and slip-resistant (wet or dry).
- Must be a 36" minimum wide continuous unobstructed path.
- Must have a 32" minimum width at doorways.
- Must have 60" x 60" passing spaces at 200' intervals.
- Running slope (parallel to direction of travel) must be less than or equal to 5% (>5% = ramp).
- Cross slope (perpendicular to direction of travel) must be less than or equal to 2%.
- Changes in level between 1/4" and 1/2" must be beveled at 1:2 slope.
- Changes in level greater than 1/2" are not allowed or must be ramped.
- Gaps in gratings must be no greater than 1/2" wide and openings must be aligned perpendicular to travel.

Figure 3.6 illustrates the standards for providing a clear width of an accessible route.

**Figure 3.8: Clear Width of an Accessible Route**



Source: Department of Justice, *2010 ADA Standards for Accessible Design*, Chapter 4, Section 4.03

## CURB RAMPS

Curb ramps provide a means of easily and safely accessing sidewalks from a crosswalk or other surface and should be provided wherever a curb is encountered along the path to transit services and facilities. These are particularly critical for passengers with disabilities who require wheelchairs.

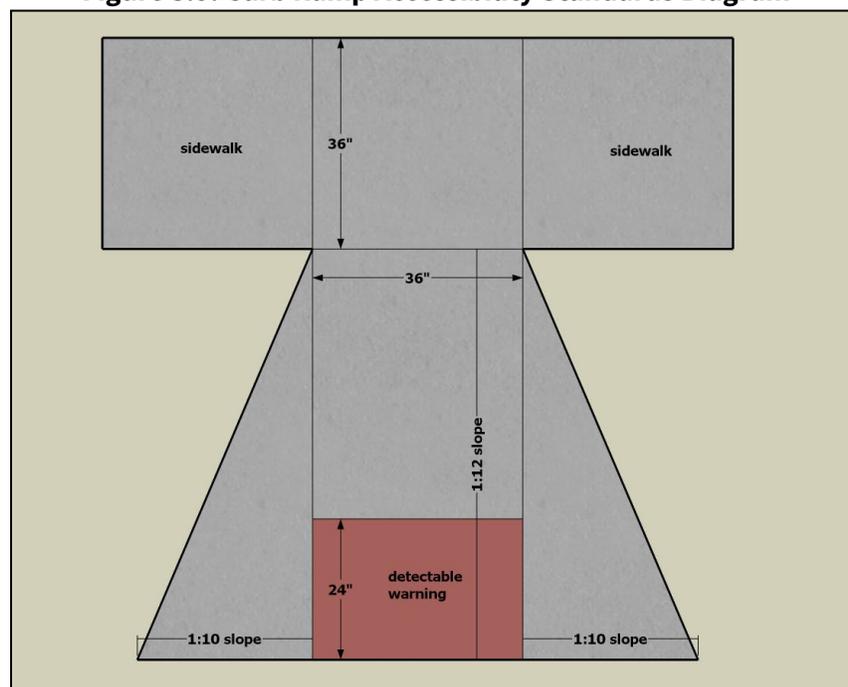
### Curb Ramp Standards

ADA-compliant curb ramps (at all curbs along accessible routes) must be provided at all crosswalks, marked and unmarked, and should not interfere with free access to the bus stop. Particular standards limit the minimum width and maximum slope of the curb ramp to ensure accessibility. The following are the standards for curb ramps required by ADAAG/Florida Administrative Code (FAC).

- Maximum ramp segment slope permitted is 1:12 (8.3%).
- Maximum cross slope permitted is 1:48 (2%).
- Detectable warnings are required at curb ramps leading to a street and along flush transitions at street crossings.
- Detectable warnings must extend the full width of ramp and be 24" in depth.
- Curb ramps must have a 36" long landing at top of slope.
- Ramped portion must be at least 36" wide. The exception is curb ramps that are part of an egress, which must be not less than 44" wide.
- Curb ramps must have detectable warnings in truncated domes with pattern and characteristics defined by regulations, including contrasting color.

Figure 3.9 illustrates a number of these standards.

**Figure 3.9: Curb Ramp Accessibility Standards Diagram**



### OBSTRUCTIONS

Infrastructure such as shelters, benches, garbage cans, utility boxes, and leaning rails should be placed in a manner as to not interfere with the sidewalks or the B&A area. Not only can these

obstructions prevent passengers from using the path, they also can present a potential safety concern.

The field data collection included an assessment of bus stop infrastructure such as benches, garbage cans, advertisement structures, etc., to determine if they present an obstruction. Based on the data collected, the difficulty level of removing an obstruction can be assessed and could range from moving a bench out of the path to redesigning the accessible path around fixed infrastructure such as a utility pole.

**Figure 3.10** illustrates an example obstruction observed during the field data collection effort where a bench is obstructing the boarding and alighting area. This obstruction greatly decreases the accessibility of the bus stop and poses a safety concern for patrons with disability.

**Figure 3.10: Example LeeTran Boarding and Alighting Area Obstruction**



## 4.0 IMPLEMENTATION PLAN PROCESS

### IMPLEMENTATION PLAN PROCESS STEPS

The improvement needs identified from the field data collection process should be reviewed and organized into categories based on which agency would be responsible and the relative ease/cost in which they can be addressed. The development of the phased implementation plan considers several steps, including the following:

**Step 1:** Identify the entity responsible for the improvement (LeeTran or other).

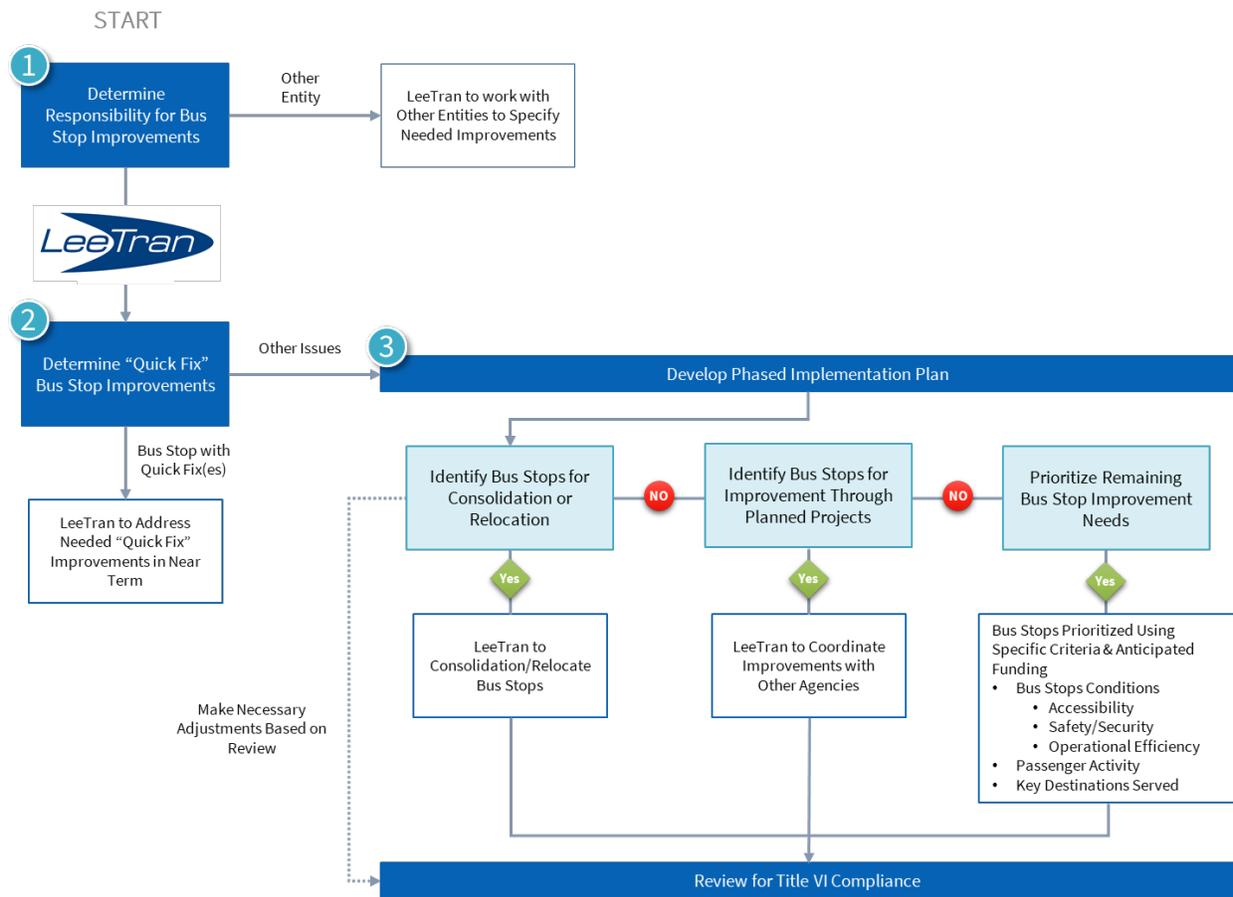
**Step 2:** Determine improvements that should be addressed immediately (short-term improvements).

**Step 3:** Categorize and prioritize improvements that are LeeTran's responsibility through:

- Determining whether stops can be removed, consolidated, or relocated.
- Determining whether improvements can go with other projects.
- Prioritizing the remaining bus stop improvements based on the following:
  - Severity of accessibility, safety/security, and operational efficiencies
  - Passenger activity levels
  - Key destinations served
  - Presence of critical hazards

**Figure 4.1** illustrates the step-by-step process used to prioritize bus stop improvements to be included in the phased implementation plan. The steps are discussed in the remainder of this section.

**Figure 4.1: Bus Stop Accessibility Implementation Plan Process**



**Step 1: Identify Responsible Entity**

The first step in developing the phased implementation plan is to determine which improvements are the responsibility of LeeTran versus other agencies. Although many of the identified potential bus stop improvements will need to be addressed by LeeTran, a number of the recommended improvements may fall under the responsibility of FDOT, Lee County and other municipalities as well as private entities.

Based on the responsible entities identified for each type of improvement, as presented in **Table 4-1**, improvements identified as the responsibility of an entity other than LeeTran will need to coordinate with those entities to specify the needed improvements and determine the best course of action to complete them in an appropriate timeframe.

**Table 4-1: Responsible Entity for Bus Stop Improvements**

Description	Responsible Entity
Replace sign at stop	LeeTran
Refurbish shelter	Public/Private Entity with responsibility
Install lighting for shelter	Public/Private Entity with responsibility
Install other lighting sources	Public/Private Entity with responsibility
Pave new B&A area	Entity/jurisdiction in which bus stop is located
Resurface B&A area	Public/Private Entity with responsibility
Pave new connecting path	Public/Private Entity with responsibility
Pave new sidewalk	Public/Private Entity with responsibility
Resurface sidewalk	Entity/jurisdiction in which bus stop is located
Pave new curb ramp	Entity/jurisdiction in which bus stop is located
Resurface curb ramp	Entity/jurisdiction in which bus stop is located
Relocate bus stop	Public/Private Entity with responsibility

As shown in **Table 4-1**, LeeTran is not responsible for a number of infrastructure items that are primarily implemented and maintained by other jurisdictions; it is responsible for only the infrastructure pertaining to its bus stop directly, such as bus stop signs, shelters, and B&A areas. Sidewalks and curb ramps are maintained by other jurisdictional entities; however, LeeTran is responsible for installation of a connecting path from the B&A area to the sidewalk if one is present. In some cases, where a sidewalk would be expected and the shoulder of the roadway cannot be used as the accessible path, we recommended the installation of a sidewalk from the B&A area to the nearest intersection.

### *Step 2: Determine Short-Term Improvements*

The second step in developing the phased implementation plan is to determine which improvements are short-term and can be completed with minimal effort and/or cost by LeeTran. For purposes of this analysis, a short-term improvement consists of the following:

- Addition, replacement, or modification of a bus stop sign
- Cost estimate less than or equal to \$1000
- Other minor or partial improvements, such as an obstruction or accessibility issue caused by an official or third-party bench or trash can

The modification or removal of third-party amenities is not LeeTran’s responsibility; however, having non-compliant amenities/infrastructure associated with LeeTran’s bus stops could cause issues, and, as such, it is recommended that they be remediated. As previously noted, bus stops that serve more than one route are required to have signs that display the bus routes that serve that stop. Although this attribute was not assessed for all bus stops, in locations where bus route identification signs are missing, they should be (re)mounted.

### *Step 3: Categorize and Prioritize Remaining Improvements*

#### **Bus Stops Identified for Removal, Consolidation, or Relocation**

It is possible that LeeTran's system has some bus stops with identified issues that can be consolidated (i.e., grouping two or more stops into a single stop) or eliminated altogether. The decision to consolidate or eliminate stops can be based on factors such as existing passenger activity levels, spacing between bus stops, placement/location of bus stop, and/or severity of needed improvements. For this effort, the possibility of consolidating stops considered three specific criteria:

- *Bus stop spacing and ridership* – Bus stop spacing distance of 1/4 mile, with less than 300 annual passenger boarding and alighting ridership were considered. Stops that are spaced more closely were reviewed to determine if consolidation may be feasible without negatively impacting passenger walk access to LeeTran service.
- *Nearby Trip Generators* – The number of nearby trip generators was used to determine if consolidation is recommended for each bus stop.
- *Bus Stop Conditions Priority Scoring* – The stage of the prioritization process that considered bus stop conditions (i.e., accessibility, safety/security, operational efficiency) was used to help determine the timing of the bus stops being proposed for consolidation (i.e., immediate, near-term, long-term).

Other bus stops met some of these criteria for stop consolidation; however, relocating the bus stop, as described below, either away from another nearby stop or closer to an obvious trip generator was instead recommended.

It should be noted that this effort also included identifying bus stops that LeeTran may want to consider relocating, based on safety/security or operational efficiency issues identified during the inventory process. Scenarios warranting possible relocation include the following:

- Bus stop located just over crest of a hill
- Bus stop located just after curve in a street
- Boarding and alighting area is located at a drainage culvert
- Waiting passengers hidden from view of oncoming traffic
- Stopped bus straddles crosswalk or obstructs curb ramp
- Bus stop discharges passengers onto driveway apron
- Bus stop discharges passengers onto roadway
- Bus stops are spaced close together
- Bus stop blocks a driveway when at a stop
- A stopped bus straddles the crosswalk or obstructs a curb ramp
- Landscaping obstructing the view of the stop
- Waiting passengers are hidden from view of oncoming traffic
- Misc. safety/security issues

## Improvements Completed in Conjunction with Other Planned Projects

There may be bus stop improvements identified through this assessment process that can be completed in conjunction with various types of planned transportation projects, such as roadway widening and transportation enhancements being implemented by FDOT, Lee County, and/or various municipalities. It should be noted that if a road is being altered, which would include repaving, then all ADA issues associated with the bus stops, sidewalks, curb ramps, pedestrian signals, and pedestrian crossings adjoining the improved roadway must be rectified by the agency completing the roadway improvements.

### *Prioritized List of Remaining Improvements*

The remaining bus stop improvements that are LeeTran’s responsibility are prioritized into a multi-year phased implementation plan using a series of criteria to help guide LeeTran in addressing the more significant improvements needed. This prioritization process is necessary in recognition of LeeTran financial and staff resources. The prioritization process helps to rate the conditions at each stop and assess the severity of the needs to determine which improvements should be implemented first based on several factors, including bus stop condition, accessibility, safety/security, operational efficiency, bus stop activity and Title VI assessment.

The prioritization criteria were weighted to ensure that the relative importance of each is considered in preparing the phased implementation plan. **Table 4-2** presents the prioritization weighting factors for each criterion, developed in cooperation with LeeTran staff.

**Table 4-2: Prioritization Weighting Factors**

Criteria	Weighting Factor
Accessibility/Safety	<b>50%</b>
Passenger Activity	<b>35%</b>
Title VI	<b>15%</b>

*Note: Bus stop conditions weighting factor is a sum of Accessibility and safety/security factors.*

## Bus Stop Conditions

The initial assessment of the remaining bus stop improvement needs focused on issues with the bus stops related to three major characteristics: accessibility, safety/security, and operational efficiency. To conduct this analysis, three steps were followed to guide the prioritization of bus stops related to these three major characteristics. As part of the inventory process, information on multiple data elements was collected to support the evaluation of the accessibility, safety/security, and operational efficiency of each bus stop. This information was used to determine a score for each bus stop and to determine whether the overall condition assessment of each characteristic falls into one of three rating ranges: High, Medium, or Low. These ratings account for the fact that there are two factors that could drive the scores—the relative number of deficiencies present at the stop and the relative nature

of those deficiencies (i.e., how critical they are compared to the deficiencies in other elements). Given these two factors, the meaning of each rating range is as follows:

- High – the stop has many critical deficiencies, a combination of critical and less-critical deficiencies, or all its elements are deficient to some degree.
- Medium – the stop has very few critical deficiencies or a greater number of less-critical deficiencies.
- Low – the stop has no deficiencies or very few less-critical deficiencies.

### **Accessibility**

This category addresses how accessible and available the bus stop is to passengers. This is completed by determining how easy or difficult it is to navigate through the assessment of obstructions within the accessible path or sidewalks, presence of infrastructure such as curb ramps, B&A area or bus stop signs, and compliance of that infrastructure. An overall accessibility score was developed for each bus stop using the following elements related to accessibility:

- Bus stop location
- Presence of a controlled pedestrian crossing
- Presence of a curb and compliant curb ramp
- Ability to maneuver a wheelchair through the shelter
- Bench/amenity obstruction
- Presence and compliance of a sidewalk
- Presence and compliance of B&A area
- Presence and compliance of the bus stop sign

Each of these elements was reviewed for its level of accessibility and provided a positive score if it is accessible and a zero or negative score based upon its level of non-compliance. The scores were developed based upon an analysis of the data collected in the master inventory and translated into an accessibility rating scale from low to high based on the relative scores assigned.

### **Safety/Security**

Similar to the accessibility score, an overall safety/security score was developed for each bus stop using seven elements related to safety/security. This category rates how safe or secure passengers are based on the location of the bus stop and whether the passengers/pedestrians would be visible to oncoming traffic or potential hazards at the bus stop such as steep swales or guide wires. The following elements were used to develop the safety/security score:

- Bus stop location
- Presence of a controlled pedestrian crossing
- Presence of detectable warnings on the curb ramp

- Presence of marked crosswalk(s)
- Landing area in a safe location
- Presence of lighting
- Presence of other potential safety or security hazards

Each of these elements was assessed for its level of safety/security and provided a positive score if no or relatively low safety/security issues were observed and a zero or negative score if more significant safety/security issues were determined. The scores were developed based on an analysis of the data collected in the master inventory and translated into a safety/security rating scale from low to high based on the relative scores assigned.

### **Operational Efficiency**

This category rates each bus stop by its effectiveness to facilitate timely and efficient operation of the transit system. The following five elements were used to develop the score:

- Bus location when stopped (e.g., right-turn lane, curb lane, parking lane, etc.)
- Bus stop in relation to nearest intersection (e.g., near side, far side, mid-block, etc.)
- Presence of controlled pedestrian crossing
- Potential hazards
- Presence and compliance of a sign at the bus stop

Each of these elements was assessed and provided a positive score if no or relatively low operational issues were observed and a zero or negative score if more significant operational issues were determined. The scores were developed based upon an analysis of the data collected in the master inventory and translated into an operational rating scale from low to high based on the relative scores assigned.

### **Bus Stop Activity**

For the analysis purposes, we used the 2019 ridership data collected by LeeTran for each bus stop. This data was collected for Boarding and Alighting. Bus stop activity is considered an important criterion in establishing the relative “necessity” of each stop due to the level of passenger use—the higher the bus stop activity, the more important it is to address potential issues when also factoring in the severity of deficiencies.

### **Title VI Assessment**

The phased implementation program was reviewed to determine compliance with Title VI of the Civil Rights Act of 1964. As a federally funded transit system, LeeTran must ensure that the services and programs are in compliance with Title VI requirements, as described below:

No person in the United States shall, on the ground of race, color, or national origin, be excluded from participating in, or denied the benefits of, or be subjected to

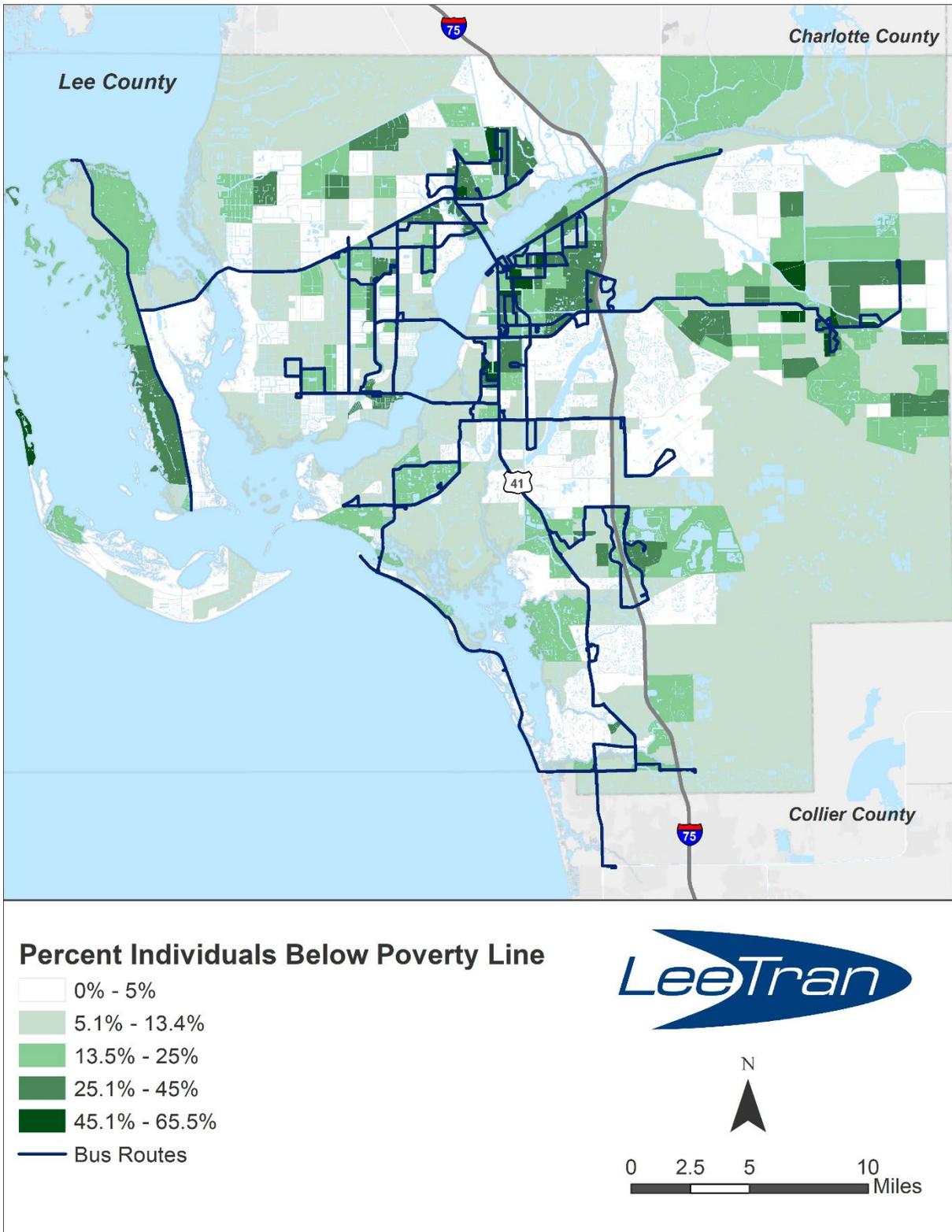
discrimination under any program or activity receiving Federal financial assistance. The grantee must ensure that federally supported transit services and related benefits are distributed in an equitable manner. (Source: FTA Triennial Review Workbook, FY 2008)

To review Title VI compliance, a GIS-based analysis of LeeTran's service area was completed to assess the comparative nature and distribution of the proposed bus stop improvements with regard to both minority and non-minority portions of the service area.

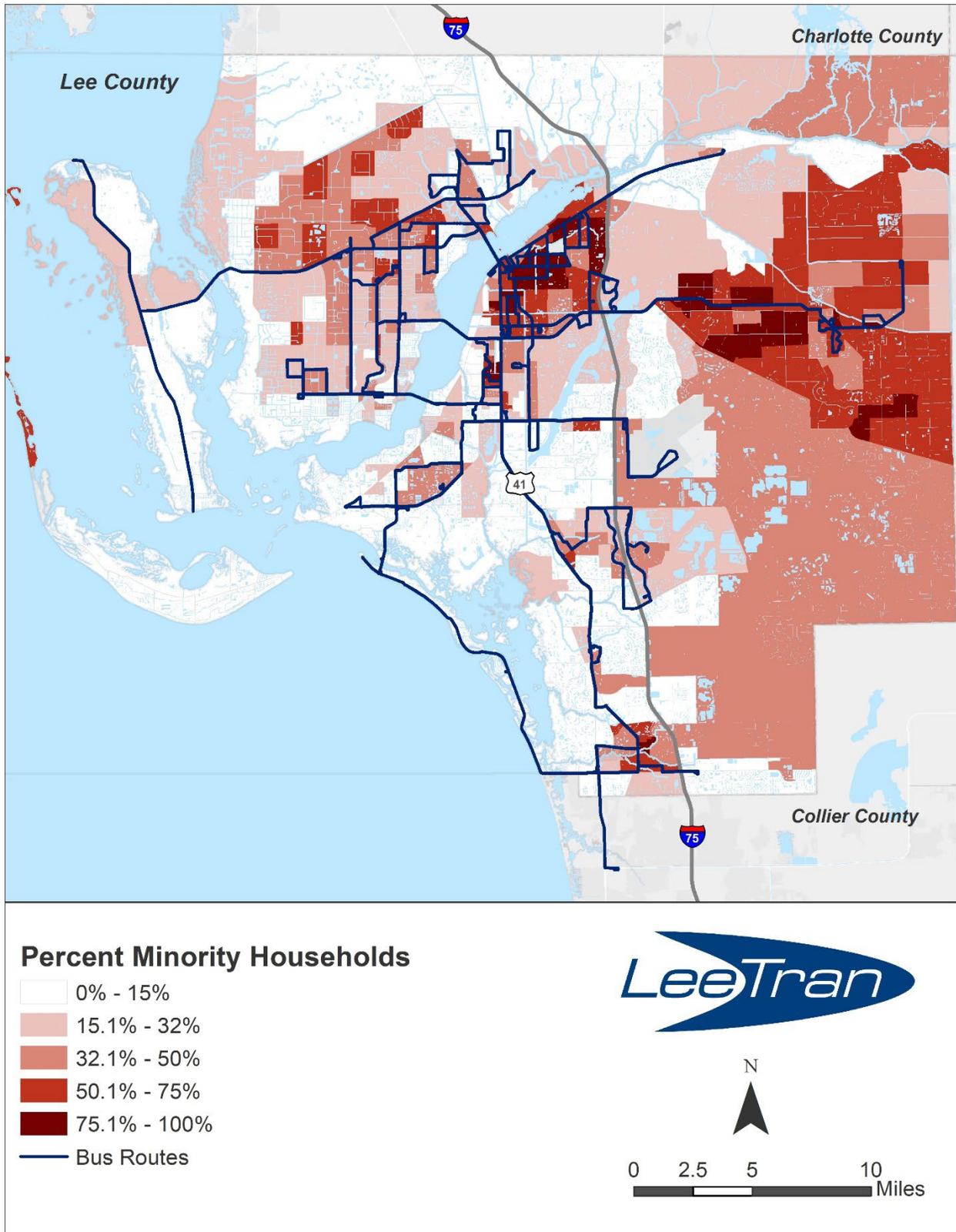
Estimates from the 2019 American Community Survey (ACS) 5-year estimates were used to identify and compare the proportion of the population that is minority (county-wide and by Census block group). The assessment was extended to include low-income communities as defined by the proportion of individuals with an income below the poverty level on the block group level. Areas with incomes below the poverty level and/or the percent minority populations higher than the county average were selected as Title VI areas. A further analysis was completed on the disabled population of Lee County at a census tract level to understand the level of service that population receives from LeeTran. **Map 4-1, Map 4-2, and Map 4-3** illustrate the resulting Title VI areas within Lee County.

Based on this analysis, 47.5 percent of the bus stops are located in low-income areas, 51.1 percent are located in Title VI minority areas, and 47.9 percent are located in areas with higher than County average percent of individuals with disabilities. The implementation plan calls for improvements to be made to 85.6 percent of bus stops; 43.9 percent of these bus stops are located in areas with higher than average (14.7%) disabled population. Based on this review, it was concluded that the implementation program is in compliance with Title VI requirements.

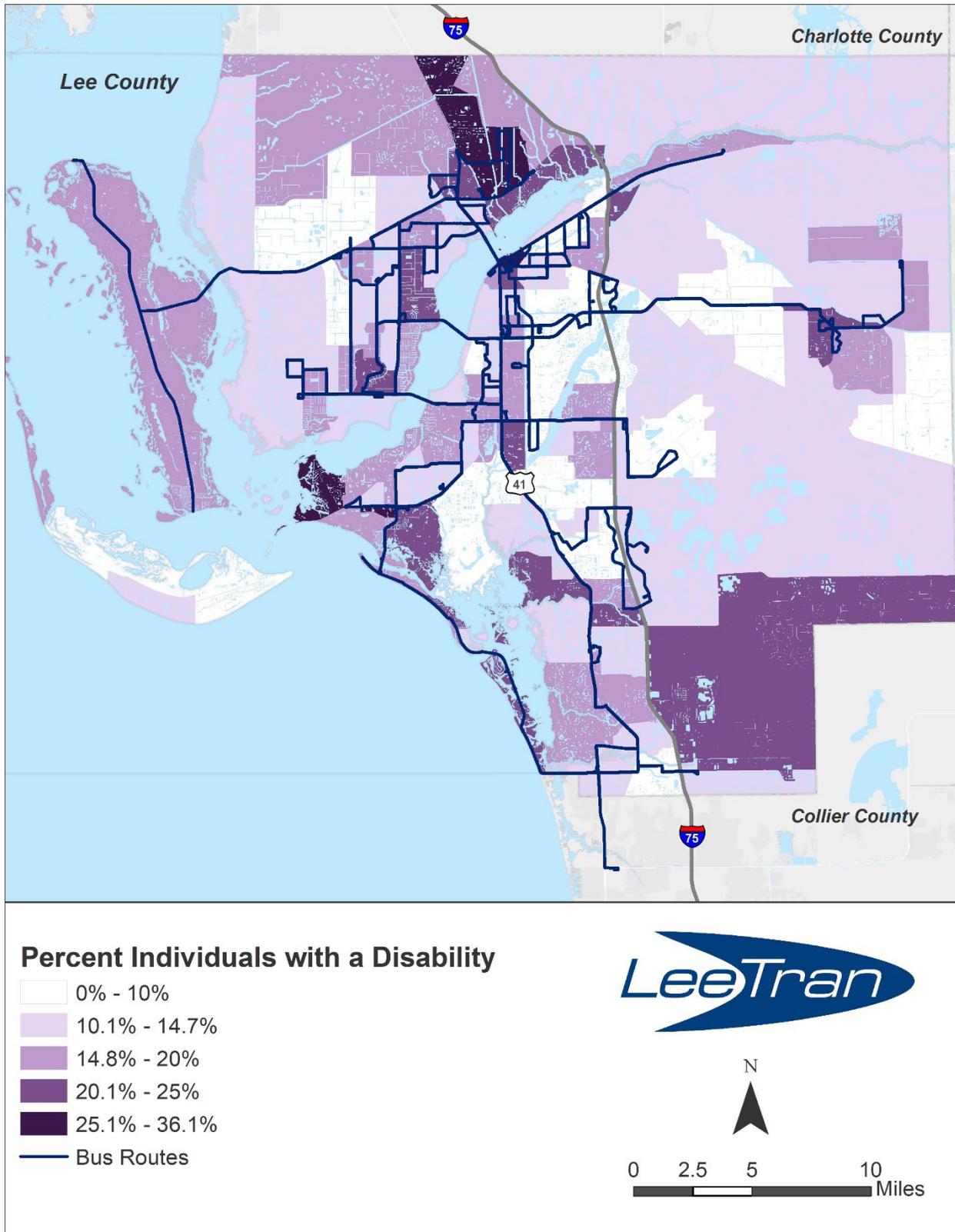
**Map 4-1: Lee County Low-Income (by Block Group)**



**Map 4-2: Lee County Minority Population (by Block Group)**



**Map 4-3: Lee County Population with Disability (by Census Tract)**



## 5.0 DATA ANALYSIS RESULTS

Following the data collection and quality control stages, attributes collected for each bus stop were compiled into individual summary forms, with definitions. The summary forms, sorted by bus stop code; rank; and cost, provided under separate covers in Appendix B and C. The individual data elements were then analyzed to determine the number of bus stops that had deficiencies, the proposed recommendations to mitigate the barriers to accessibility, and the associated cost estimates to mitigate the accessibility issues. Shown below are the results of the analysis.

### ANALYSIS RESULTS

**Table 5-1, Table 5-2, Table 5-3, Table 5-4, and Map 5-1** summarize the results of the bus stop accessibility analysis performed for LeeTran. Many of the bus stops evaluated in this study did not have a stable, firm, and slip resistant B&A area. Examples include partially paved or dirt and grass boarding/ alighting areas, for which it is suggested that LeeTran pave a 5’x8’ B&A area to bring these stops into compliance with the ADA.

**Table 5-1: B&A Area Deficiencies**

Deficiency	Number of Instances <sup>1</sup>
No B&A area present <sup>2</sup>	9
B&A area not stable, firm, and slip resistant	800
Cross Slope > 2% (perpendicular to roadway)	687
Running slope > 2% (parallel to roadway) <sup>3</sup>	85
No raised curb	727

(1) A bus stop may have more than one deficiency listed in this table.

(2) Presence of a B&A area refers to a clear area in which a person in a wheelchair could potentially access a wheelchair lift or ramp, regardless of standardized dimensions, minimal slope, elevation changes, or connections to the surrounding area. Per ADAAG, the material does not have to be concrete, but must be a firm and stable surface.

(3) If the sidewalk or B&A area has a running slope that does not match that of the roadway and it has a slope that is greater than 2%, it would be considered a ramp and would therefore be non-compliant.

**Table 5-2: Accessibility of Amenities**

Deficiency	Number of Instances <sup>1</sup>
Official bench inaccessible <sup>2</sup>	59
Official bench is an obstruction <sup>3</sup>	4
Third party bench inaccessible <sup>2</sup>	431
Third party bench is an obstruction <sup>3</sup>	38
Trash can inaccessible <sup>2</sup>	62
Trash can is an obstruction <sup>3</sup>	8
Bus schedule inaccessible <sup>2</sup>	7

(1) A bus stop may have more than one of the deficiencies listed in this table.

- (2) An inaccessible amenity is one that is not adjacent or within reach/range of a level, firm, stable, and slip resistant surface.
- (3) An amenity that is considered an obstruction is one that is blocking access to the B&A or adjacent pedestrian infrastructure.

Most of the benches provided at LeeTran bus stops are not accessible and are suggested to be moved to an accessible location. As many of the benches are not secured to the ground, they have the potential to move over time due to bus patrons, maintenance staff, and out-of-control vehicles. As such, once positioned in an accessible location, LeeTran will need to be vigilant to ensure that these amenities remain accessible.

**Table 5-3: Signage**

Deficiency	Number of Instances
No bus stop sign present	2
Bus stop sign present, but not properly mounted	20
Missing Bus Routes <sup>1</sup>	157

(1) Route signage is required for stops that serve more than one route

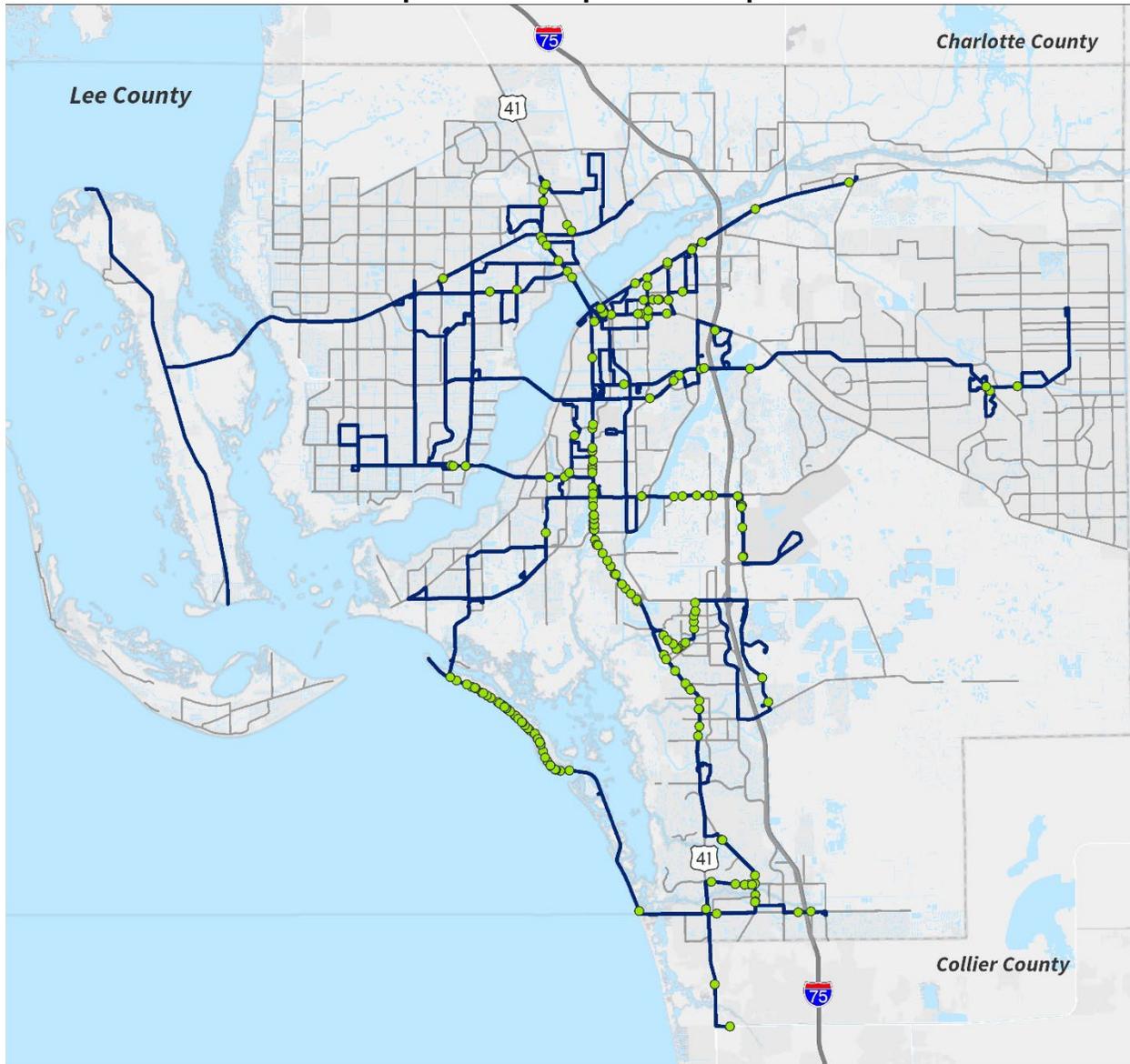
It should be noted that the locations with no signage were unable to be fully assessed, as the specific location of the bus stop was unknown. In those instances, the location was recorded as having “no bus stop sign present”. However, it is possible that these locations are no longer being used as bus stops, in which case there is no ADA violation since the bus stop does not exist. Where the bus stop signs were not properly mounted, it is suggested that LeeTran consider these quick-fix issues and remediate them as soon as possible.

**Table 5-4: ADA Compliance**

Description	Number of Instances
ADA-compliant	201

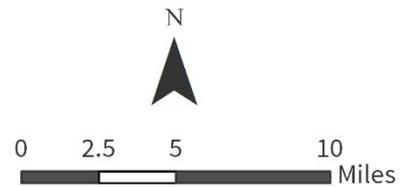
As shown in **Table 5-4** and **Map 5-1**, a total of 201 bus stops and their adjacent routes were found to be ADA-compliant. The B&A area, signage, and amenities were found to be accessible at additional bus stops; however, in some cases, barriers to accessibility were found in the connecting pedestrian infrastructure, thereby classifying the entire stop as non-compliant. It is important to note, as described in Section 4, that the mitigation of these barriers to accessibility are not fully the responsibility of LeeTran.

Map 5-1: ADA-Compliant Bus Stops



**LeeTran Bus Stop ADA Accessibility Study**

- Compliant Stops
- Bus Routes



## DEVELOPMENT OF IMPROVEMENT COSTS

To develop the Implementation and Financial Plan, unit costs for each type of improvement were developed. These unit costs are based on standard industry costs. The cost estimates are intended to reflect the order-of-magnitude costs for LeeTran’s overall bus stop improvement needs.

**It is important to note that the unit costs include across-the-board assumptions that will need to be reviewed prior to actual improvements being completed. For this reason, the improvement costs are referred to as “estimates of probable costs.”** Table 5-5 reflects the resulting estimate of probable costs to remediate noncompliant bus stops. Note that these costs are planning-level estimates; once the projects progress through design, the estimated construction costs will become more refined.

In addition, numerous bus stops were found to have potential safety/security or operational efficiency issues, such as stops located within 0.25 mile of another stop or stops located in front of or adjacent to a drainage ditch or retention pond. Relocation of the identified bus stops would provide many benefits, including correcting the potential safety hazards to passengers and/or increasing the overall operational efficiency of the bus stop. LeeTran staff should carefully review the stop consolidation and relocation recommendations to ensure that the change does not negatively impact disadvantaged patrons.

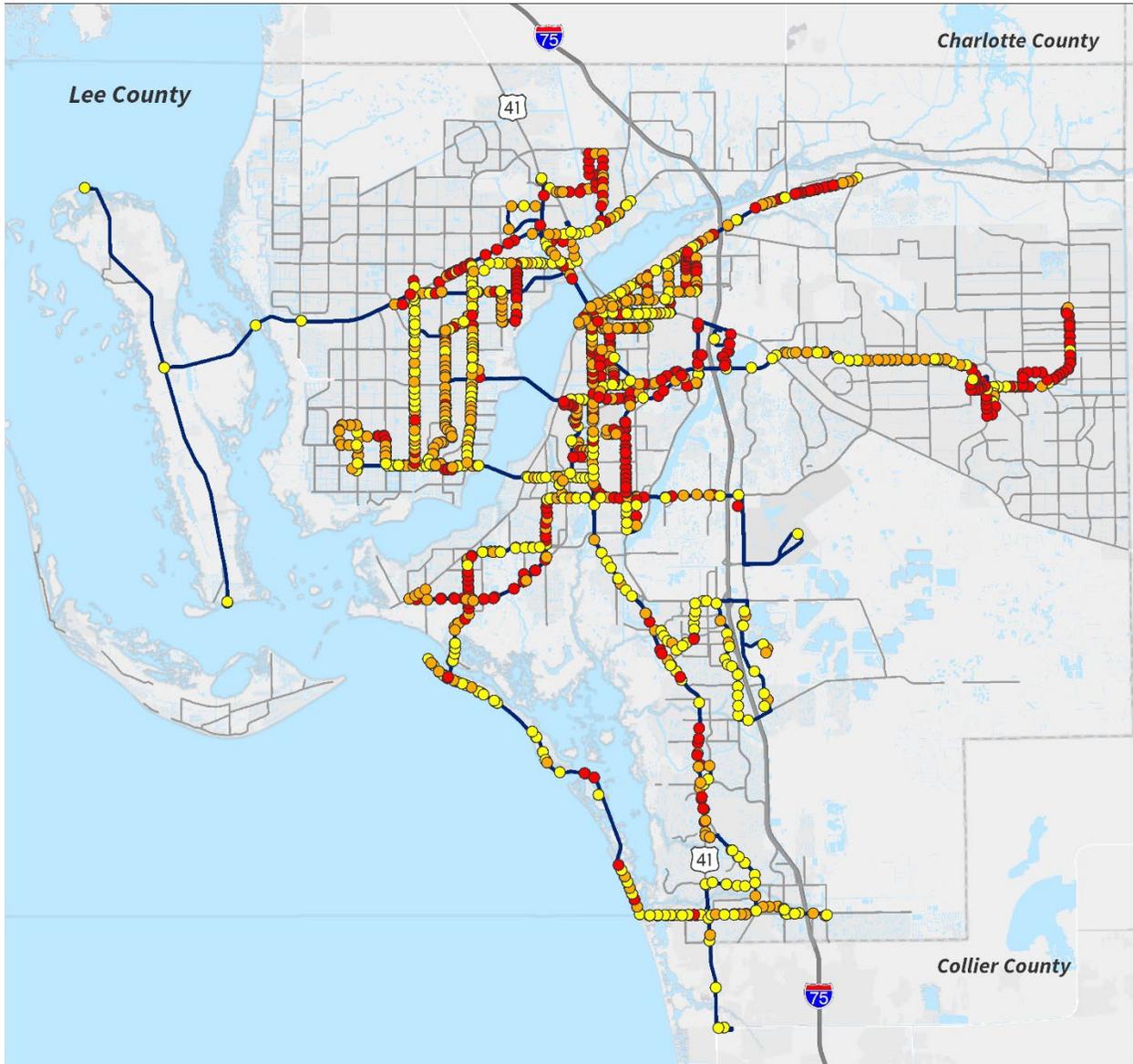
**Table 5-5: Probable Cost Estimates**

ESTIMATES OF PROBABLE COSTS	
Low (>10)*	\$1,843,800
Medium (10-15)	\$4,274,200
High (15+)	\$5,621,200
<b>Total Estimated of Probable Cost</b>	<b>\$11,739,200</b>
Short term improvements (<= \$1,000) **	\$69,200

*\*Cost estimates are grouped by overall priority score*

*\*\*short-term improvement cost estimates are also reflected in the total estimated cost.*

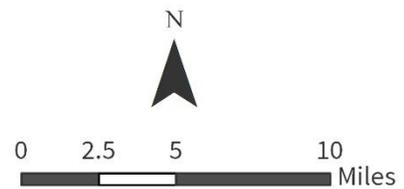
**Map 5-2: Bus Stop Prioritization**



**LeeTran Bus Stop ADA Accessibility Study**

**Prioritization Score**

- Low (<10)
- Medium (10.1 - 15)
- High (>15)
- Bus Routes



## IMPLEMENTATION AND FINANCIAL PLAN

Following development of the Improvement Plan, an Implementation and Financial Plan was developed to identify when the improvements should occur based on the relative priority of the improvements and anticipated level of funding that would be available. The Implementation and Financial Plan includes all improvements that are LeeTran's responsibility as well as those improvements that ultimately may be the responsibility of other entities.

Due to the nature of the short-term improvements, it is assumed that most of these improvements will be completed within the five-year plan, as provided in the attached Excel database.

As discussed previously, it would be ideal if LeeTran could take advantage of "piggy-backing" needed bus stop improvements with planned roadway widening or resurfacing projects. This would allow LeeTran to benefit either because the project directly addresses some or all needed accessibility improvements, or the project allows LeeTran to reduce its improvement costs due to concurrent construction activities. It is not known how much could potentially be saved by completing the bus stop improvements concurrent with planned n projects.

It should be stressed that the Implementation and Financial Plan will serve as a general guide for the planning of bus stop and facility improvements and that several factors will influence the timing for implementation of specific improvements and the overall cost of the program, including:

- Opportunities for partnering with other jurisdictions or organizations on implementing improvements.
- Specific site conditions at individual stops, including landscaping, utilities, and drainage, which could have a significant impact on the type of improvements required and the associated cost.
- Contracting opportunities, including awarding a unit-price contract for the implementation of improvements at multiple locations.
- Additional opportunities to relocate or consolidate individual bus stops.

On an annual basis, the list of needed improvements should be reviewed by LeeTran staff against the funding available to update the work program. As noted previously, this will involve development of more detailed cost estimates based on a comprehensive review of site conditions at individual bus stops.

### *Funding Plan for Needed Improvements*

Improvements to LeeTran's bus stops and shelters are funded through the following agencies:

- Federal Transit Administration
- Federal Highway Administration
- Florida Department of Transportation
- Local jurisdictions

An estimated total of approximately \$600,000 is projected to be available annually to support bus stop improvements over the next five years. To prepare a funding plan, costs for all improvements were calculated and then compared to the amount of funding projected to be available over the next five years. This comparison is shown below:

<b>Program Expenses – Total Program*</b>	\$11,739,200
<b>Anticipated Annual Improvement Funding:</b>	\$600,000

*\*Costs are planning-level estimates; once the projects progress through design, actual construction cost estimates will become more refined.*

The estimate of probable costs for the bus stop improvement program far exceeds the anticipated improvement budget, making it critically important to set priorities to achieve the best return on investment.

Due to the limited funding currently available for bus stop improvements, the focus of improvements is largely on the short-term, lower-cost improvements. However, as the improvement program progresses, high-ranking but more costly bus stop improvements are included in future years.

The phased Implementation Plan included in the spreadsheet is a guide only; the number of bus stops improved each year and the specific locations chosen for improvement may vary due to factors such as the actual cost of the improvement or potential right-of-way costs. As such, the improvements will need to be reviewed and a work program developed specifying the improvements that will be undertaken on an annual basis. It is envisioned that the effort could focus on implementation of improvements along specific corridors, which is anticipated to result in efficiencies in the improvement process.

The phased implementation plan, in coordination with the bus stop assessment database, identifies the type of improvements proposed to be undertaken for each of the first five years of the plan. The phased implementation plan and assessment database should be used in developing a specific action program for implementing the improvements on an annual basis.

## 6.0 BUS STOP RELOCATION & CONSOLIDATION

The following is a summary of recommended next steps for LeeTran to consider ensuring that the major goals of the Bus Stop Accessibility Study are achieved and maintained over time.

### BUS STOP AND FACILITIES STANDARDS

- Refer to the Accessing Transit Design Handbook concerning the concepts of accessibility, safety/security, and operational efficiency to guide the design of new bus stops and facilities, as well as improvements to existing bus stops and facilities.

### FUNDING FOR IMPROVEMENTS

- Seek additional funding for bus stop improvements.

### ANALYSIS TO DETERMINE JURISDICTIONAL RESPONSIBILITY

- Conduct an analysis to determine the specific improvements that fall within the responsibility of each respective jurisdiction (Lee County, cities, and FDOT).

### ADVISE ENTITIES RESPONSIBLE FOR IMPROVEMENT NEEDS

- Based on the results of the analysis, formally advise each jurisdiction of the specific improvement needs that are within their responsibility.
- Review and update standards as necessary (as ADAAG/Florida Accessibility Code requirements change, etc.).
- Continue to coordinate with FDOT and local jurisdictions on the development and implementation of strategies to implement accessibility improvements.

### BUS STOP RELOCATION

- Conduct a comprehensive review of stops that can be relocated, using the spacing standards, ridership, and bus stop inventory data.
- Continue to identify consolidation opportunities as part of roadway improvement reviews requested by other agencies, including FDOT, Lee County, and various cities.
- Review the list of bus stops identified for relocation and determine if they should be relocated or improvements made to correct any accessibility, safety/security, or operational efficiency issues, if feasible.

### LEETRAN TRAINING

- Review and discuss standards for bus stops and facilities on an ongoing basis to ensure that staff understand accessibility issues, requirements, and procedures.
- Review and discuss procedures and responsibilities for implementing new stops and updating the inventory on an ongoing basis.

## **DATABASE MAINTENANCE PROCEDURES**

- Finalize procedures and staff responsibilities for keeping the inventory up-to-date and ensuring that all new bus stops implemented follow LeeTran’s adopted standards.
- In the future, use the updated inventory to enable customer service, service planning, and scheduling staff to access information on each stop, including photographs, list of available amenities, conditions at bus stop, and list of planned improvements.

## **IMPLEMENTATION SCHEDULE FOR SHORT-TERM IMPROVEMENTS**

- Develop a schedule for maintenance staff to complete short-term improvements.

## **REVIEW IMPLEMENTATION AND FINANCIAL PLAN**

- Provide to LeeTran staff the specific phasing plan for use in updating the Implementation and Financial Plan on an annual basis, including developing a specific action program for implementing the improvements.
- Pursue mechanisms for increasing the efficiency with which improvements identified in the Implementation and Financial Plan are completed (i.e., pursuing unit price contracts, etc.).
- Conduct high-level coordination between LeeTran, FDOT, and local jurisdictions to ensure that necessary improvements are addressed.

## **UPDATE INVENTORY DATABASE REGULARLY**

- Update the inventory on a regular basis to reflect any revisions to routes and bus stops undertaken since completion of the initial inventory, including stops that are removed or relocated to address bus stop consolidation and/or relocation issues.

## **ANNUAL REVIEW OF PROGRESS**

- Review the progress of addressing improvements identified in the Implementation and Financial Plan on an annual basis.
- Coordinate with local jurisdictions, FDOT, and stakeholder groups on strategies for implementing improvements.
- Update the following year’s work program to reflect the new list of needed improvements.

## **REGULARLY REPORT PROGRESS OF IMPLEMENTATION**

- Regularly report the progress of implementing improvements to LeeTran project staff.
- Continue to coordinate with local jurisdictions, the development community, and stakeholder groups to advise them of the established standards and discuss strategies for implementing improvements.

## **REGULARLY UPDATE GIS ANALYSIS**

- Provide updated GIS information and the results of GIS analyses conducted for LeeTran bus stops to the local jurisdictions and FDOT.

## **EXPLORE FUTURE APPLICATIONS FOR INVENTORY INFORMATION**

- Explore future applications for making information from the inventory available to the public, including a list of amenities, conditions, and photographs for each bus stop, potentially tied to a system map and/or individual route maps and available via the Internet.
- Explore the feasibility of providing inventory information to the public via Google Transit.