

1.0 PURPOSE

The Transit Service Guidelines outline principles designed to provide services that are comfortable, convenient and easy to use for customers and to ensure that services are designed to be reliable, timely, safe and efficient. The guidelines define the conditions that require action when standards are not met but allow flexibility to respond to varied customer needs and community expectations in an accountable, equitable and efficient manner. Due to the sustaining and projected growth in the Charlotte region, markets and customer expectations are ever-changing and growing. Thus, CATS must be responsive to these changes to retain current customers and achieve and sustain ridership growth.

2.0 CATS SERVICE GUIDELINES

The adopted service guidelines are in the following areas:

- Travel Markets
- Transit Coverage
- Transit Infrastructure Requirements
- Service Modes
- Bus Stop Design Standards
- Bus Stop Location and Spacing
- Bus Stop Amenities
- Service Monitoring System
- New Transit Services
- Load Standards
- On-time Performance
- Duplication of Service
- Route Directness
- Route Patterns
- Service Frequency and Span
- Vehicle Assignment

The service guidelines are intended to be applied to two primary areas of focus: the evaluation of existing services and the evaluation of proposals for new services. As an example, the service guidelines can be applied in the following situations: restructuring service to eliminate lower-productivity segments or branches or adjusting service frequency to better reflect the demand for service. Routes that do not meet standards are not automatically eliminated. These guidelines call for the elimination of unproductive routes only as a last resort when it has been determined that no cost-effective actions are available to improve the productivity of the service.

The guidelines for evaluation of existing routes are not intended to preclude changes to routes that meet these minimum standards. In many cases, it may be possible to improve the productivity of routes that meet the minimum standards by making changes to headways or trip times. These guidelines should not be used to prevent changes to improve the efficiency of existing routes, as long as the changes meet the route design standards.

The evaluation of new service proposals will take place as proposals are received or needs identified. New service proposals will be evaluated based on the most recent information



available regarding system standards. Decisions regarding implementation of new routes will be made through the service planning process and by the Service Development Review Committee, in consultation with the Transit Services Advisory Committee.

2.1 Travel Markets

Public Transportation cannot reasonably serve all person trips within a region. However, transit can compete effectively for market share in many situations.

To guide decisions on resource allocation and to provide a basis for measuring performance over time, CATS has identified those markets where it will seek to be competitive. The selected local travel markets are consistent with the CATS Mission and will support attainment of the CATS Vision and the goals of the 2025 Transit/Land Use Plan as amended and updated by the Metropolitan Transit Commission (MTC).

- **Travel Markets:** CATS will identify and consider the Metropolitan Transit Commission Travel Markets Policy when service changes or reductions are proposed.

2.2 Transit Coverage

The purpose of these guidelines is to provide convenient access to transit service in all areas exceeding a minimum density. It is very difficult to provide effective transit services in low-density areas. This guideline supports the land-use goal of encouraging higher densities in coordination with transit services. Census block group and Traffic Analysis Zone (TAZ) data will be used to measure residential and employment density. The coverage area will be one-half mile (about a 10-minute walk) around the bus route.

Residential and Employment Density: In order for an area within Mecklenburg County to be considered for CATS fixed route services, the area must meet a residential density of at least three dwelling units per acre and/or an employment density of three employees per acre. For areas that do not meet this threshold, CATS will explore the feasibility of alternative modes of transit such as microtransit and additional first mile / last mile solutions.

2.3 Transit Infrastructure Requirements

Buses can do substantial damage to parking lots and roadways that are not built to accommodate the weight of a bus. This needs to be considered in the planning for bus services.

All bus routes should be planned to operate over streets that meet the following



minimum standards:

- Intersections with minimum turning radius of 30 ft;
- Pavement composition sufficient to support the axle loads of a bus
- Minimum lane width of 11 ft;
- Overhead clearance of 13 feet; and,
- With the exception of traffic calming humps, buses shall avoid curb to curb speed bumps unless traveling in low-speed environments (such as shopping centers)

2.4 Service Modes

CATS provides multiple service types consisting of light rail, fixed route bus service, streetcar, paratransit service, and vanpool.

The current light rail network consists of the LYNX Blue line which operates along an 18.9 mile fixed guideway. The Blue line currently serves 26 stations, including 11 park-and-ride locations.

The fixed route bus network includes specifically numbered bus routes that pick up and drop off passengers at regularly scheduled stops and intervals along a defined route. Bus routes are broken down into four categories based on service type and frequency:

- High Frequency Bus Routes – Frequent bus routes that have a minimum headway of 15-minutes or better
- Common / Local Routes – Bus routes that provide all day service on weekdays and weekends
- Neighborhood / Connector Routes – Feeder routes that provide neighborhood connections to other fixed routes within the CATS network
- Express Routes – Peak hour, weekday only commuter routes that typically provide limited stop service between two key destinations

The current streetcar network consists of the CityLYNX Gold Line which operates along a four-mile alignment and serves 17 stations.

The Special Transportation Services (STS) provides complementary fixed-route paratransit services to individuals who cannot access fixed-route bus services or rail stations. The STS service area includes areas up to $\frac{3}{4}$ of a mile on either side of the following fixed route bus service types:

- High Frequency Bus Routes
- Common / Local Routes
- Neighborhood / Connector Routes



CATS vanpool consists of a shared CATS vehicle intended for carpool services. Vanpool service is typically supplied to a group of 5 to 15 commuters who share similar commuting patterns.

2.5 Bus Stop Design Standards

The bus stop is the first point of contact with the transit system for customers, therefore it is important to incorporate designs that improve the overall customer experience while waiting for services provided through CATS. Bus stop designs shall include, at minimum, an accessible boarding pad that meets requirements established by the 2010 American with Disabilities Act (ADA). Design types for bus stops are broken down as follows:

Standard Stop – Functions as the default stop systemwide and can be applied at many intermediate points along bus routes. Standard stops may have varying levels of amenities including benches and shelters.

Mobility Hubs – Functions as enhanced bus stops that help connect passengers to various modes of mobility including other bus routes, bicycle & scooter services, rideshare programs, and on-demand services, among others. Mobility hubs are located primarily along High Frequency bus routes and at other major transfer destinations within the CATS service area.

More information on each bus stop design and recommended amenity type can be found in the CATS Bus Stop Guidelines document, as established through the Envision My Ride plan, and the Charlotte Land Development Standards Manual.

New Bus Stops

The necessary infrastructure (such as sidewalks) must be in place or constructed/planned by other agencies to consider a new bus stop installation. The integration of the necessary infrastructure and amenities in newly developed or redeveloped areas should be coordinated with the development. New stop installations and necessary infrastructure requirements shall be determined through the City of Charlotte's Unified Development Ordinance (UDO) and other land development policies as established by local jurisdictions within the CATS service area. CATS shall work with private landowners and developers, to the extent practicable, to leverage the construction or the monies to offset the construction costs of necessary infrastructure and bus stop amenities.

Accessibility Requirements

When establishing new bus stops, CATS will select locations that are accessible to all customers, including customers who use mobility devices. CATS will work with the jurisdiction that is responsible for the street and/or sidewalk (if applicable) to include accessibility improvements to the stop within the jurisdiction's ADA transition plan.



When installing amenities at existing bus stops, the amenities will be accessible to individuals with disabilities in accordance with the 2010 ADA Standards for Accessible Design as amended.

Design standards for bus stops, including accessibility requirements, can be found in the Charlotte Land Development Standards Manual.

2.6 Bus Stop Location and Spacing

Bus stops provide critical connection points between the multimodal network and bus routes, and proper location is critical to ensure safe and efficient connections.

Bus Stop Location

In general, bus stops should be located at either the near-side or far-side of an intersection (as opposed to mid-block locations). Advantages of a far-side stop include reduced delay from a bus idling at a red signal after serving a stop, better visibility of pedestrians for other drivers, and minimizing conflicts with right-turning vehicles. However, far side stops can also create the potential for vehicles to queue behind a stopped bus into the intersection. Bus stops should be placed to minimize operational difficulties such as lane changes and weaving maneuvers of approaching vehicle

Locations for bus stops along a route should also consider the following:

- Provide stops at major generators (For example: employment centers, residential areas with 500+ units, retail centers, public education centers, major medical facilities).
- Provide bus stops at transfer locations.
- To the extent possible, provide bus stops at signalized intersections where there are designated crossings.
- Provide intermediate stops based on the density and fixed route type that serves the area:

Bus Stop Spacing

Stop spacing should be thoroughly considered when creating new routes, modifying existing routes, or when evaluating performance issues along a route. Adequately spaced bus stops across the transit system enhance accessibility in general. Recommended spacing standards for fixed route bus routes are as follows:

Service Type	Spacing Guidelines
High Frequency	4 stops per mile (every 1,320 feet)
Common / Local	4-6 stops per mile (every 850-1,320 feet)
Neighborhood / Connector	4-6 stops per mile (every 850-1,320 feet)



Express

Limited stops at key destinations

More information on stop location and spacing recommendations can be found in the Envision My Ride: Bus Stop Guidelines document.

Relocation and Removal of Stops, Benches, and Shelters

CATS aims to be responsive to requests for bus stop adjustments where passenger safety, comfort, and convenience are not compromised. When a request is made to remove or relocate a bus stop, cooperation with requesting residents or owners of residences or businesses that are adjacent to bus stops is appropriate when ridership levels and the availability of a reasonable alternative location affords reasonable accommodation of CATS riders. CATS will review each request with the internal Bus Stop Committee to explore the feasibility of each request.

Where stops are located at intervals that do not meet the targeted spacing thresholds as identified above, requests to remove or relocate stops may be accomplished through consolidation of adjacent stops at an appropriate location. Consolidation of stops may have the positive result of improving travel time and resolving adjacency issues.

It is CATS' policy to not remove or relocate bus stops, bus benches or bus shelters when such action would negatively impact passenger convenience, safety or comfort. CATS policy prohibits bus stop removal or relocation where such requests have the appearance of being motivated by bias based on the ethnicity, income level or social status of passengers using the bus stop location.

2.7 Bus Stop Amenities

The bus stop is the first point of contact with the transit system for customers. A bus stop with inadequate amenities could hinder and deter passengers from accessing the transit network. The following section establishes amenity guidelines for facilities based upon various metrics including ridership, land use, equity, and accessibility.

Placement of amenities should be based upon factors that consider equity in distribution throughout the service area and factors that consider the benefit to the user and site-related constraints. Greater consideration should be given to stops on high frequency bus routes due to a generally higher level of demand. Bus stop amenities will be rolled out based on a scoring system that determines the appropriate stop level design, as defined in Section 5: Bus Stop Design Types. Minimum scoring criteria for each stop design are as follows:

		Mobility Hubs
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	Type A	Type B	Type C	Enhanced Stop Pair	Mobility Plaza	Mobility Center
Minimum Score	---	15	25	50	55	65

Scoring criteria for amenities are based on multiple factors including ridership, frequency of service, employment and population density, equity, and other measures. The table below shows the evaluation criteria for each metric:

Category	Criteria	Scoring
Ridership	Boardings Bus Priority Corridor	1 point per average weekday daily boarding 50 points if on a Bus Priority Corridor and has at least 15 daily boardings
Wait Time	Transfers Frequencies	5 points if stop is a transfer location between two Bus Priority Corridors or LYNX Light Rail
Rider Profile	Equity Populations Reliant Populations	10 points if stop is in predominantly minority and/or low-income area (as defined by CATS) 10 points if stop is in area with higher than average elderly or persons with disability
	Human Service Facility	10 points if one or more of the following existing or planned facilities, are within 1,320 feet of the stop: Medical facility, hospital, dialysis clinic, social security office, or County service center
Activity Generator	Activity Destinations	5 points if one or more of the following existing or planned facilities, are within 1,320 feet of the stop: Public library, public school, recreation center, senior center, or supermarket/pharmacy
	Major Employer	5 points if within 1,320 feet of the stop: is an existing or planned job center with more than 50 jobs
	Operator Relief	5 points if the stop is assigned as an official relief/layover point

More information on the bus stop and amenity scoring system can be found in the CATS Bus Stop Guidelines document.

3.0 Service Monitoring System

CATS will regularly calculate Passengers per Revenue Hour for all bus routes and identify targeted thresholds based on service type. CATS will monitor routes that fall below targeted thresholds and make changes to the service as needed. Routes falling between targeted thresholds should be subject to a more detailed analysis that examines performance by route segment and time of day and makes appropriate recommendations. Routes consistently falling below targeted thresholds will be considered for conversion to microtransit as detailed below.



Micro Transit Conversion: When a route fails to carry targeted passengers per hour for two or more consecutive quarters, that route, where feasible, will be a candidate for conversion to micro-transit service. Where two or more adjacent routes both fail to meet targeted passengers per hour, conversion to micro-transit operation becomes more feasible and potentially cost-effective. Should the conversion result in overall savings to CATS, then saved hours should be reinvested in improved bus service in other parts of the bus system network.

New Route Candidates: Any micro-transit zone performing above targeted passengers per hour thresholds for more than three consecutive quarters will be a candidate for conversion to a fixed route. Candidate zones will be analyzed for trip origins and destinations to determine any potential route patterns. If there is sufficient clustering of the zone trips, the candidate zone may be viable for route conversion and a new service will be considered at the next practical programmed service change.

3.1 New Transit Services

Proposals for new service come from a variety of sources including: the 2025 Transit/Land Use Plan as amended and updated by the MTC, customers, employees, and reviews of system performance. New service proposals are reviewed during the service change process and are implemented based upon customer need and resource availability.

- **Performance Evaluation:** All new services will be subject to performance evaluations and will be expected to meet the performance standards for their service type within two years of implementation.
- **New Employment Shuttles:** New shuttle services in employment areas may require a financial contribution from business community stakeholders of up to 100 percent of the annual operating cost.
- **Bus Services Outside of Mecklenburg County:** CATS will follow the Metropolitan Transit Commission Financial Policies (MTC-01) regarding financial contribution for bus services outside of Mecklenburg County.

3.2 Load Standards

The objective of load standards is to balance passenger comfort and safety with operating cost.

- **Load Standards:** CATS standard load factors for its bus services in regular service are:
 - 115% of seated capacity for all bus service modes



CATS has a goal to not exceed its standard load factors on a regular basis per trip on a given route. If a service is consistently above the seated capacity, CATS will make adjustments that may include adding additional service at the next scheduled service change, if funding is available. If the standing load compromises safety in any way, CATS will implement additional service to meet the demand.

Rail Vehicle Loading Standards

Vehicle Load Standard	Load Factor*	Passengers Per Vehicle	Acceptable Application
Service Standard	221%	150	Peak Hour Service
Maximum	285%	194	Special Events

* Load factor as percent of seated capacity

CityLYNX Gold Line Vehicle Loading Standards

Vehicle Load Standard	Load Factor*	Passengers Per Vehicle	Acceptable Application
Service Standard	242%	131	Peak Hour Service
Maximum	317%	171	Special Events

* Load factor as percent of seated capacity

- **Wheelchair Boardings:** CATS will analyze wheelchair boardings annually, and make necessary schedule adjustments. Trippers will be utilized if particular trips continually are not able to provide service to all wheelchair boardings on a given fixedroute services.

3.3 On-Time Performance

To ensure that transit riders have confidence that the service will perform reliably in accordance with the public timetables prepared and distributed by CATS, on-time performance standards have been established. A vehicle is considered “late” when it arrives five minutes or more after the scheduled time. A vehicle is considered “early” if it departs one minute or more prior to the scheduled time. All other trips are considered “on time”.

- **On-Time Performance:** CATS bus routes that achieve an on-time performance score of 80 percent or less over a course of two service changes will be reviewed and remedial action to improve performance will be put in place at the next service change.



CATS will monitor Rail services for on-time performance. Any trips that are consistently early or late will be identified and schedule adjustments will be made at the next service change.

3.4 Duplication of Service

Service duplication occurs when two or more bus routes serve the same roadway. Duplication of service can sometimes be needed or unavoidable due to the presence of activity centers or the lack of alternate routing options. When services share the same street segment CATS will do the following:

- **Duplication of Service**: If two services use the same street, schedules should be adjusted to maximize frequency on the shared alignment.

3.5 Route Directness

CATS will design bus routes to operate as directly as possible to and from major destinations to minimize passenger travel time. Routes shall operate on major arterial streets as much as possible. When a deviation exists or is being considered, the gain in convenience to those passengers who are boarding or alighting during the deviation must be balanced against the additional travel time for the passengers traveling through.

Directness:

1. To the extent possible, bi-directional service shall be provided on the same street.
2. Express service shall be routed in the most direct manner possible.
3. Deviations from the basic route alignment to serve activity centers will be made only when they have the potential to attract new riders equal to or exceeding the route performance evaluation standard for the corresponding route category.
4. Additional time to operate route deviations should not exceed five minutes (one-way) or 10 percent of the one-way run time, whichever is less.
5. No mid-route loops shall be operated.
6. Terminal loops shall not exceed 25 percent of a route's total length for routes that exceed 30 minutes in one-way travel time.

3.6 Route Patterns

It is sometimes more efficient to provide service to a certain area with one route having several branches than to operate several different routes. In addition, some bus trips on a route may not go to the end of the line due to very low ridership in that



area at a particular time of day, also known as a turnback. These service designs can result in a route network that is difficult for current and potential customers to understand and utilize. Therefore, to provide a user-friendly service and to encourage maximum use of the system by all current and potential riders, standards for branches and turnback's shall be set.

Route Patterns:

- No route shall have more than two distinct branches.
- No route shall have more than one turn around on a given branch.

When two routes are interlined, each route shall be treated as a separate route for the application of this standard.

3.7 Service Frequency and Span

Service frequency is established to provide a sufficient number of vehicles to accommodate passenger volume at the most crowded location(s), during a given time period. On high ridership routes, the frequency of service provided is a function of demand and peak period loads. Frequency of service provided is also a function of Operator and vehicle availability. Service span refers to the hours that service is provided and defines the minimum period of time that service will operate at any point in the system.

Headways/ Frequency: As resources become available, CATS will strive to provide at least 15-minute peak service on high frequency routes and at least 30-minute service on Common/local routes and Neighborhood / Connector routes. Express and Regional Express services will have a minimum of three trips in each peak direction. For light rail services, CATS will strive to operate at a frequency of 7.5 minutes or better during the peak periods and at least 30 minutes during the off-peak periods. Streetcar service will operate a frequency of 15 minutes or better during peak periods and at least 30 minutes during off-peak periods.

Service Span: CATS Fixed Route Services will operate between 5:00 a.m. and 1:30 a.m.

Exceptions will be based on ridership and productivity.

3.8 Vehicle Assignment

CATS vehicles shall be assigned to specific service types according to the following guidelines. Exceptions to this may take place based upon operational and scheduling practices to maintain optimal efficiency.

Vehicle Assignment: Fleet types should be assigned based on the service type it



isintended to serve when feasible.

- High Frequency Routes = 40-foot low floor or larger
- Common / Local Routes = 40-foot low floor
- Connector Routes = 30-foot low floor or smaller
- Microtransit = Cutaway style vehicles, vans, or other small vehicle types
- Express Service = 40-foot suburban and coach buses

Summary of Changes

- Added in/modified titles for five sections (as highlighted below):



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- Travel Markets
- Transit Coverage
- Transit Infrastructure Requirements
- Service Modes
- Bus Stop Design Standards
- Bus Stop Location and Spacing
- Bus Stop Amenities
- Route Monitoring System
- New Transit Services
- Load Standards
- On-time Performance
- Duplication of Service
- Route Directness
- Route Patterns
- Service Frequency and Span
- Vehicle Assignment

2.1 Travel Markets

- Referenced MTC-05 policy to provide further definition
- Updated language to reflect the 2022 MTC Adopted Envision My Ride plan

2.2 Transit Coverage

- Provides further definition for density
- Introduces microtransit as a service mode for areas that do not meet targeted employment and population density goals

2.3 Transit Infrastructure Requirements

- New section that details ideal operational conditions for standard 40' or larger vehicles including lane width, turning radius, overhead clearance, and roadway design

2.4 Service Modes

- New section that details current and future service modes
- Breaks down bus routes based on frequency classes as identified in Envision My Ride as follows:
 - High Frequency Bus Routes
 - Common/Local Routes
 - Neighborhood/Connector Routes
 - Express Routes

2.5 Bus Stop Design Standards

- New section that details new bus stop design standards as identified in the Envision My Ride plan
- Bus stops broken down as follows:
 - Standard stop – Default stop that features, at minimum, an ADA boarding pad
 - Mobility hubs – Enhanced bus stops located primarily along high-frequency bus routes and major activity centers
- Provides reference to the Envision My Ride Bus Stop Guidelines document for more detail on stop level design types
- Provides guidance on ideal conditions for the installation of new bus stops
 - References to the Charlotte Unified Development Ordinance (UDO) and other land



development policies

- References the 2010 American with Disabilities Act (ADA) Standards for Accessible Design
- References the Charlotte Land Development Standards Manual for the location of the revised 2022 CATS Details

2.6 Bus Stop Location and Spacing

- New section that notes the ideal location for the placement of bus stops
- Updates bus stop spacing guidelines for bus route types as follows:

Service Type	Spacing Guidelines
High Frequency	4 stops per mile (every 1,320 feet)
Common / Local	4-6 stops per mile (every 850-1,320 feet)
Neighborhood / Connector	4-6 stops per mile (every 850-1,320 feet)
Express	Limited stops at key destinations

- New section that details the process for requests to remove or relocate a bus stop
- Details the role of the CATS Bus Stop Committee to review feasibility of requests
 - Includes language that CATS policy prohibits bus stop removal or relocation where such requests have the appearance of being motivated by bias on the basis of the ethnicity, income level or social status of passengers using the bus stop location.

2.7 Bus Stop Amenities

- New section that details new amenity rollout strategy as identified in the adopted Envision My Ride plan
- Details new scoring metric to identify ideal amenity types for bus stop locations

3.0 Bus Route Monitoring System

- Updates route monitoring strategy with language that notes CATS will monitor routes falling below 15 passengers per hour and adjust as needed
- Includes language for the potential conversion to microtransit should a route have 10 or less passengers per hour
- Includes language for the potential conversion of a microtransit route to a fixed route service should an area continuously average 10 or more passengers per hour

3.1 New Transit Services

- Notes the Envision My Ride plan
- Updates Employment Shuttle financial contribution for businesses and stakeholders to up to 100 percent of the annual operating cost

3.2 Load Standards

- Notes that CATS has a goal not to exceed load factors on a regular basis per trip on a given route

3.7 Service Frequency and Span

- Updated to include frequency thresholds as identified in the adopted Envision My Ride plan



3.8 Vehicle Assignment

- Updates vehicle sizes for service types as identified in the adopted Envision My Ride plan

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