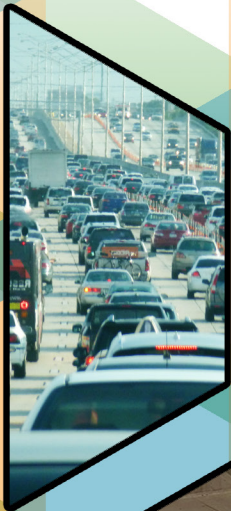




MIAMI-DADE
SMART
PLAN
DEMONSTRATION
PROGRAM

EVALUATION CRITERIA & MONITORING



SMART Plan Demonstration Program Evaluation Criteria and Monitoring

Submitted September 11, 2020 for fulfillment of:

TPO GPC Work Order #GPC VII-09

Prepared for: Miami-Dade Transportation Planning Organization



Prepared by: WSP USA Inc.



The Miami-Dade TPO complies with the provisions of Title VI of the Civil Rights Act of 1964, which states: No person in the United States shall, on grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. It is also the policy of the Miami-Dade TPO to comply with all of the requirements of the Americans with Disabilities Act.

For materials in accessible format please call (305) 375-4507.

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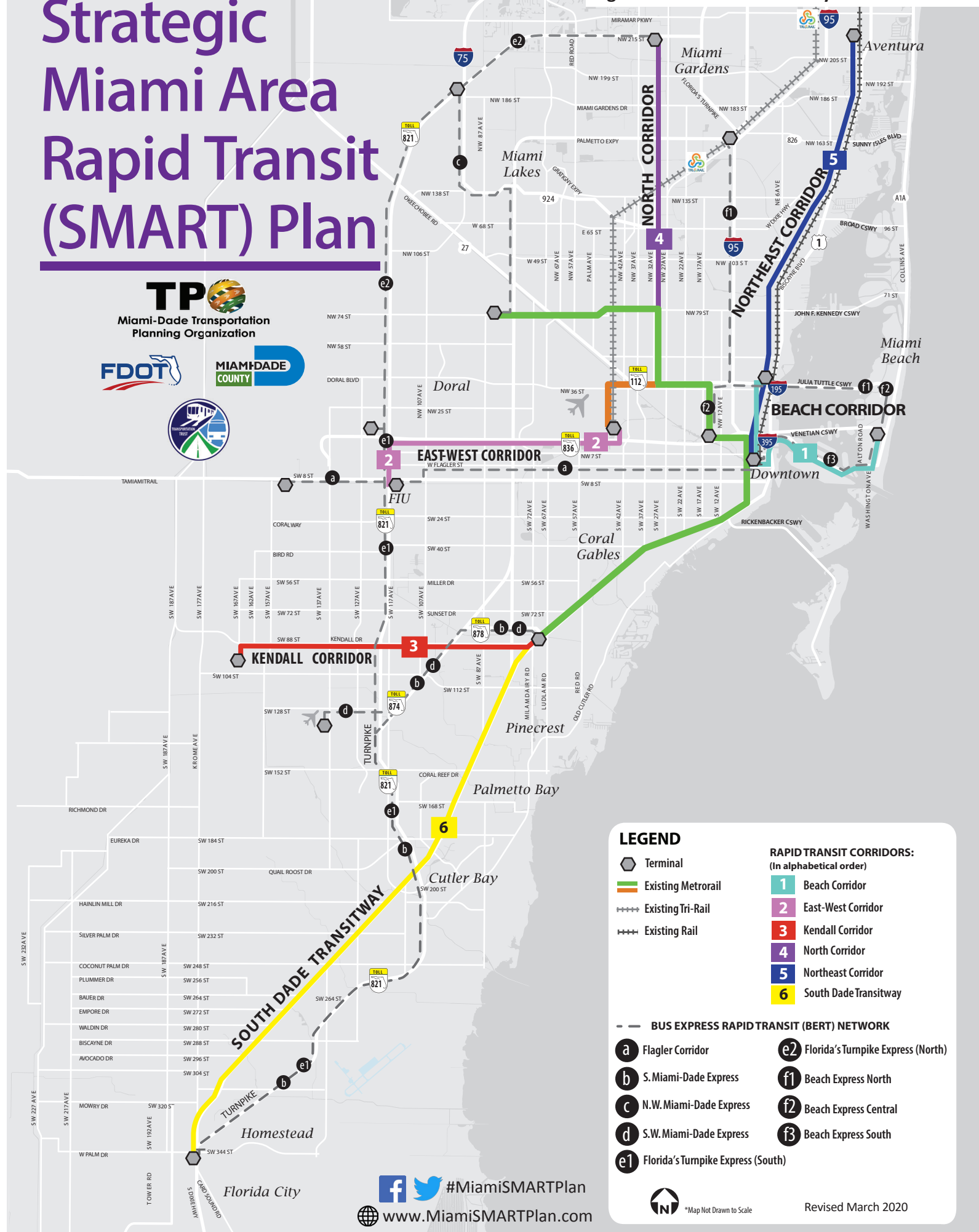
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Strategic Miami Area Rapid Transit (SMART) Plan

TP
Miami-Dade Transportation
Planning Organization



Figure 1: Miami-Dade County SMART Plan



1 – Background

Miami-Dade County is home to a complex transportation system which must meet the needs of 2.6 million residents, many thousands of commuters from neighboring counties, and more than 16.5 million visitors per year from around the world. Transit is essential in meeting these needs, as it is the most efficient way to move people through the densely developed area within the Urban Development Boundary.

The Strategic Miami Area Rapid Transit (SMART) Plan shown in Figure 1 is a comprehensive program which identifies six corridors proposed for advancement towards a more complete rapid transit system. The SMART Plan also contains a network of corridors throughout the county for the implementation of Bus Express Rapid Transit (BERT) service. The Citizens Independent Transportation Trust (CITT) has committed to collaborate with the County, the community, municipalities, transportation partners, and the private sector to develop a funding strategy to use People's Transportation Plans (PTP) funds to implement the SMART Plan.

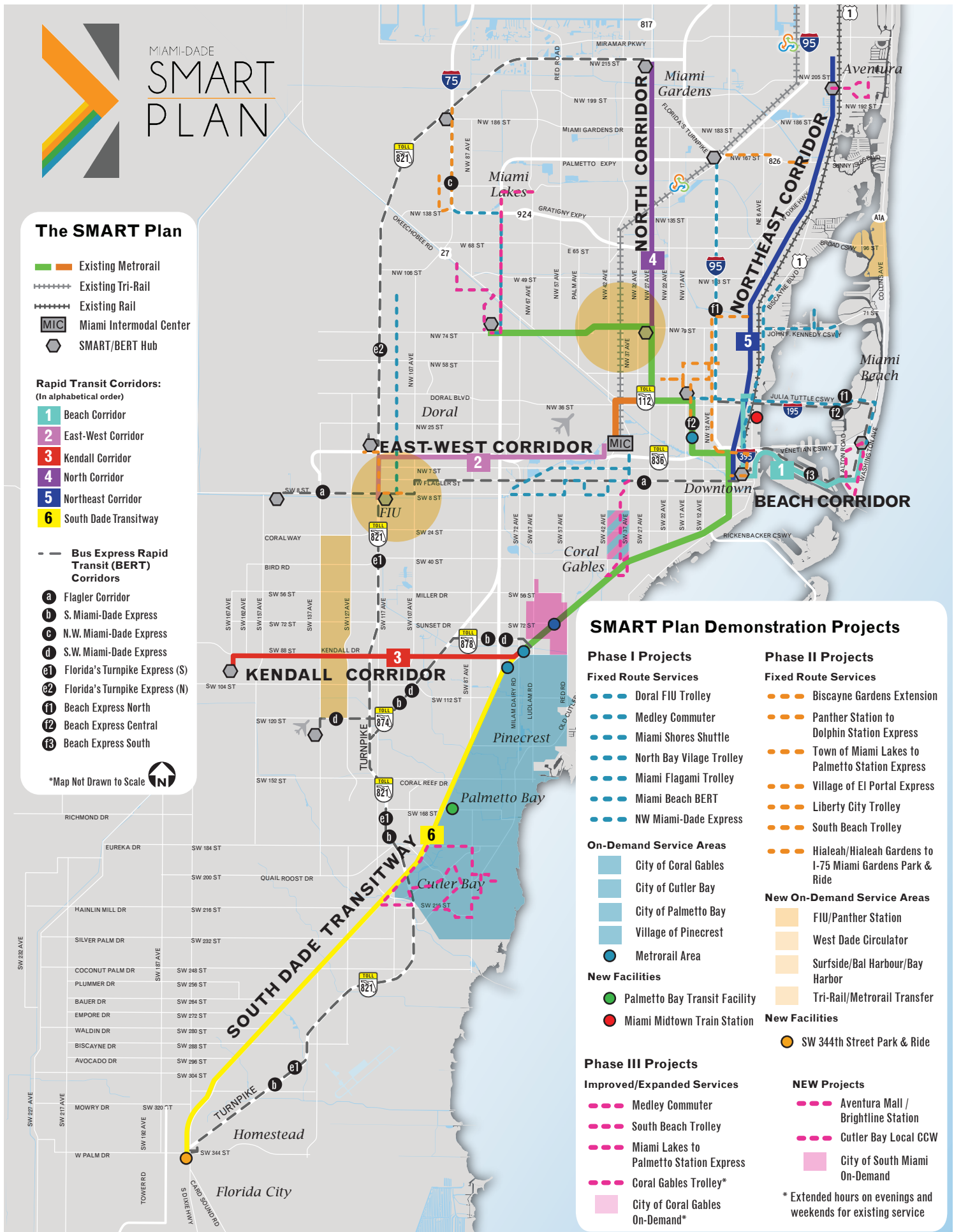
The Miami-Dade County Department of Transportation and Public Works (DTPW) operates the 18th largest transit system in the United States, operating four primary modes: motorbus (Metrobus), heavy rail (Metrorail), automated guideway (Metromover), and demand-response service (Special Transportation Services or STS). Miami-Dade County also contains 27 municipalities who operate their own circulators, some operating in cooperation with DTPW or another municipality. The TPO seeks to encourage synergy between these systems by empowering municipalities to improve their transit in ways that also support the SMART Plan. Therefore, pursuant to Resolutions No. 14-18 and No. 29-18, the Miami-Dade Transportation Planning Organization (TPO), in partnership with the Florida Department of Transportation (FDOT), DTPW, CITT, South Florida Regional Transportation Authority (SFRTA), and numerous local municipalities have coordinated to create **the SMART Plan Demonstration Program**. This program seeks to advance elements of the SMART Plan through demonstration projects conceptualized by project-sponsoring entities such as municipal governments and transit agencies.

This program of projects, shown in Figure 2, includes a mixture of local, regional, state and federal funding. Projects considered for this program, are based on pilot projects with a duration of up to three years, with a commitment to continue the project if deemed successful by the project sponsor. The TPO SMART Demonstration Program includes new transit service, new stations, and temporary transit facilities. Project sponsors can apply for initial project funding, which is supported through the TPO's list of Program Priorities.

The purpose of the SMART Demonstration Program **Evaluation Criteria & Monitoring Study** is to establish common criteria to monitor, evaluate, and assess the success of the projects which compose the SMART Demonstration Program.

To achieve this goal, the study team set out to evaluate best practices at the local, state, and national levels. Based on this research, the team developed an evaluation process which accounts for both qualitative and quantitative ways that a project contributes to the transit system. A monitoring program was developed to evaluate the success of implemented SMART Demonstration projects, and test evaluations were performed for each type of project currently in operation. This study documents that process.

Figure 2: SMART Plan Demonstration Program



The following SMART Demonstration projects advanced in **Phase I (FY 2019)**:

- City of Miami Flagami Trolley – **Service Began July 2018**
- Doral FIU Trolley Service – **Service Began September 2018**
- Coral Gables Flex Service – **Service Began January 2019**
- Pinecrest Transitway Circulator – **Service Began January 2019**
- North Bay Village SMART Feeder Route – **Area Service Began July 2019**
- Palmetto Bay Transit Service – **Service Began July 2019**
- Palmetto Bay Transit Facility – **Opened July 2019**
- Medley Central Commuter Route – **Winter 2020**
- Cutler Bay Express Service – **Fall 2020**
- Civic Center Metrorail Station Area On-Demand – **Fall 2020**
- South Miami Metrorail Station Area On-Demand – **Fall 2020**
- Dadeland North Metrorail Station Area On-Demand – **Fall 2020**
- Dadeland South Metrorail Station Area On-Demand – **Fall 2020**
- NE Corridor Demonstration Station (Capital Funding) – **FY 2022**
- NE Corridor Demonstration Train Service – **FY 2023**
- Miami Shores SMART Feeder Route (**discontinued via agency consensus**)

The following projects were approved under **Phase II (FY 2020)**:

- City of Miami Beach South Beach Trolley Service – **Service Began January 2018, adjusted 2019**
- City of Miami Liberty City Trolley Service - **Service Began August 2019**
- Biscayne Gardens Transit Extension
- Tri-Rail/Metrorail Transfer Station On-Demand Service
- West Dade Circulator On-Demand Service
- SW 344th Park and Ride Station (Construction)
- Panther Station to Dolphin Station Express Service
- Town of Miami Lakes Express Service to Palmetto Metrorail Station
- Surfside/Bal Harbour/Bay Harbor On-Demand Service
- Village of El Portal Express Service
- FIU/Panther Station On-Demand Service – **Service Began September 2020**
- City of Hialeah/Hialeah Gardens to I-75 Miami Gardens Park-and-Ride
- West Miami On-Demand Service – **Service Began August 2020**

Projects in service during 2019 were able to provide more than half a million trips during the calendar year. Those projects are highlighted in Figure 3.

Future dates indicate the planned opening schedule before the onset of the Covid-19 pandemic.

Figure 3: SMART Plan Demonstration Projects in Service 2019

Summary Statistics

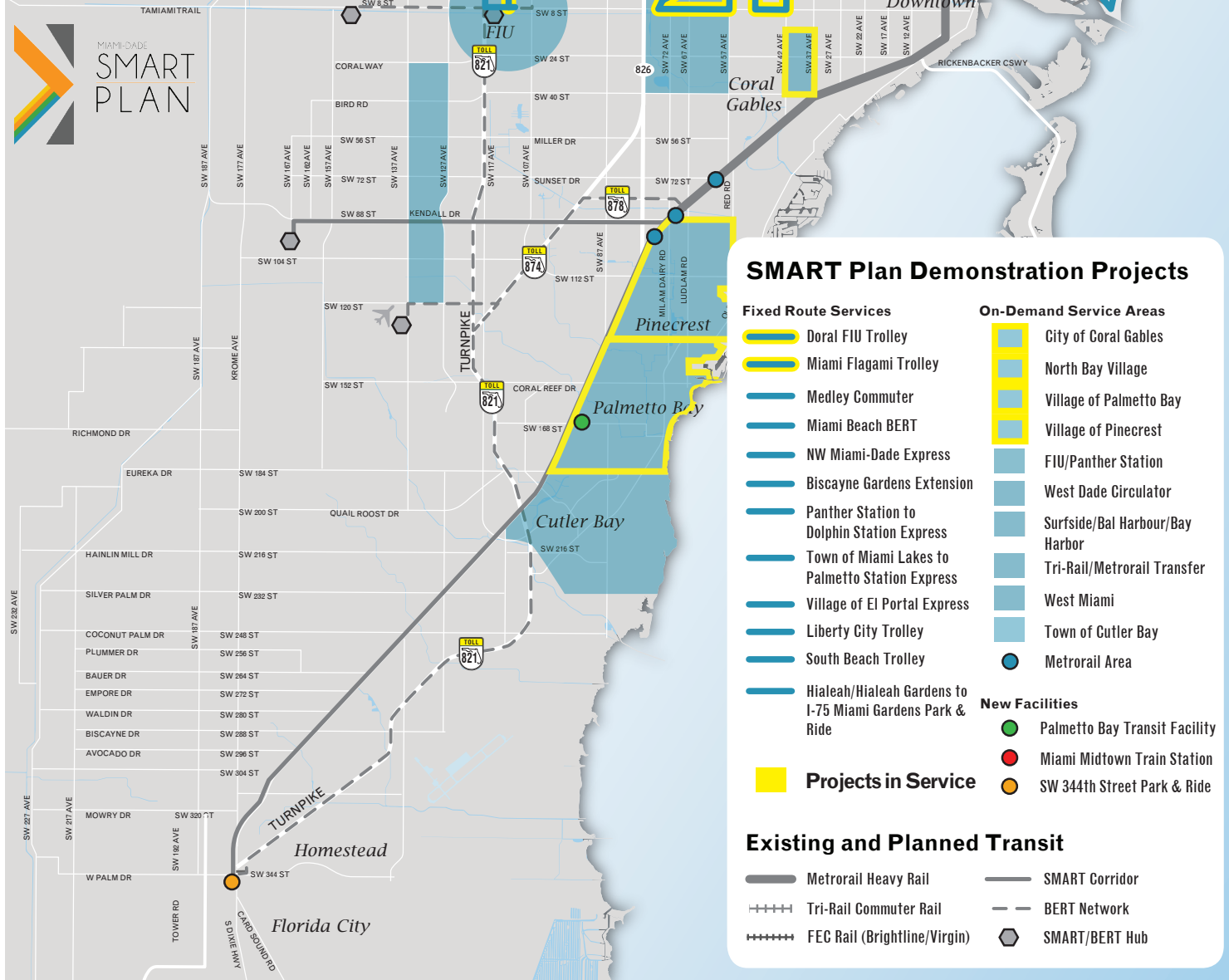
January - November 2019

Route in Service	Average Monthly Ridership
City of Coral Gables On-Demand Service	8,297
Village of Pinecrest On-Demand Service	1,677
Village of Palmetto Bay On-Demand Service	1,481
North Bay Village On-Demand Service	698
City of Miami Flagami Trolley	20,541
City of Doral/FIU Trolley	14,312

Over 500,000 trips served in 2019



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2 - Literature Review

The Literature Review provides insight into the state of the industry regarding evaluation processes at local, state, and nationwide levels to assess the success of transit projects similar to those implemented in the first two phases of the SMART Demonstration program. At the federal and international level, several research reports were reviewed, including the summary of an International Conference by the Transportation Research Board (TRB), and multiple reports by the Transit Cooperative Research Program (TCRP) and the National Cooperative Highway Research Program (NCHRP). At the state level, the literature review summarizes numerous documents from FDOT including the State Park-and-Ride Guide, specific procedures found in the State Management Plan, and a report on Best Practices in Evaluating Transit Performance. Local FDOT documents from District 6 were also reviewed. Best practices were also drawn from standards established in other cities, such as Washington D.C. and San Diego.

The Literature Review is separated into three sections:

- **Guidelines and Manuals (Federal and State Level)**
 - NCHRP Report 708 - A Guidebook for Sustainability Performance Measurement for Transportation Agencies
 - TCRP Report 118 Bus Rapid Transit Practitioner's Guide
 - FDOT State Park-and-Ride Guide
 - FDOT State Management Plan
 - FDOT D6 Transportation Alternative Program (TAP) Selection and Prioritization Criteria/Ranking Form
 - FDOT D6 – Modal Development Office (MDO) Transit Service Development Grant Score Sheet
- **Best Practices in Evaluation and Monitoring**
 - Performance Measurements of Transportation Systems: Summary of the Fourth International Conference
 - National Case Study Washington Area Metropolitan Transit Authority (Washington, D.C.)
 - FDOT – Best Practices in Evaluating Transit Performance
 - NCHRP Results Digest 361 – State DOT Public Transportation Performance Measures: State of the Practice and Future Needs
 - Evaluating Public Transit Benefits and Costs – Best Practices Guidebook – VTPI
- **Other Background Research (Local Examples)**
 - Smart Feeder/Shuttle Bus Service: Consumer Research and Design
 - Transit Benefit Analysis Example (Spreadsheet)
 - Transportation Project Evaluation Criteria and Rankings – San Diego
 - Commonwealth of Virginia Office of the Secretary of Transportation – SMART Scale

The findings which were utilized as a basis for the Performance Framework have been color coded to indicate which Performance Measure they correspond to:

Performance Measure Criteria	
Commuter Experience	Convenience
Rider Satisfaction	Attractive Amenities
Return on Transit Investment	Safe Environment
Connection to SMART / BERT	Facility Demand and Use

Guidelines and Manuals

NCHRP Report 708 - A Guidebook for Sustainability Performance Measurement for Transportation Agencies

Date: 2011

Authors/Sponsoring Agency: National Cooperative Highway Research Program (NCHRP)

Overview: This report was designed as a guidebook for transportation agencies to allow them “to quickly find the information and resources needed to implement and evaluate sustainability.”

Key Takeaway: The report postulates that the basic principles of sustainability revolve around “meeting human needs for the present and future while: preserving and restoring environmental and ecological systems, fostering community health and vitality, promoting economic development and prosperity, and ensuring equity between and among population groups and over generations.” The report does not include specific performance measures to evaluate sustainability. Instead it emphasizes that sustainability performance measures should reflect certain sustainability goals. Goals that are expanded upon in the in-depth analysis below.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Safe Environment
- Performance Measure: Return on Transit Investment

In-depth Analysis:

This guidebook highlights that many transportation agencies are recognizing the importance of sustainability—in terms of concern for the environment, community health and vitality, and economic development, now and into the future. At the same time, these agencies often struggle to apply sustainability in their core activities.

This guidebook provides a flexible framework through which transportation agencies can apply the concepts of sustainability through performance measurement. It lays out background on sustainability definitions and issues, offers theory on how to apply sustainability, lists performance measurements for sustainability and provides detailed references and resource material.

This guide aims to help the agencies and their partners to establish and use sustainability performance measures to evaluate programs and gauge the effectiveness of these strategies in implementing sustainability.

It starts by providing an overview of the basics of sustainability, explains how these basics relate to the work of transportation agencies, and orients any user to the principles of sustainability. Then it discusses how to take a practical, phased approach to implementing performance measurement and offers questions to assess how the agencies can take advantage of the data and processes they may already have in place. The guidebook also the general, applicable framework that the agencies can use to design their performance measurement system with a step-by-step explanation of how to use each of the components of the framework to fit the agency’s needs. The guidebook also provides a checklist to make sure the agency’s goals, objectives, and measures are consistent with the principles of

sustainability and that the approach they have designed will give them the information they need, with examples and additional resources.

The guidebook recognizes the challenges faced by agencies in establishing transportation sustainability goals, and to address that it recommends a set of goals with definitions as a starting point for the agencies.

Sustainability Goal	Definition
Safety	Provide a safe transportation system for users and the general public.
Basic Accessibility	Provide a transportation system that offers accessibility that allows people to fulfill at least their basic needs.
Equity/Equal Mobility	Provide options that allow affordable and equitable transportation opportunities for all sections of society.
System Efficiency	Ensure that the transportation system's functionality and efficiency are maintained and enhanced.
Security	Ensure that the transportation system is secure from, ready for, and resilient to threats from all hazards.
Prosperity	Ensure that the transportation system's development and operation support economic development and prosperity.
Economic Viability	Ensure the economic feasibility of transportation investments over time.
Ecosystems	Protect and enhance environmental and ecological systems while developing and operating transportation systems.
Waste Generation	Reduce waste generated by transportation-related activities.
Resource Consumption	Reduce the use of nonrenewable resources and promote the use of renewable replacements.
Emission and Air Quality	Reduce transportation-related emissions of air pollutants and greenhouse gases.

Source: NCHRP Report 708 (page 19)

TCRP Report 118 Bus Rapid Transit Practitioner's Guide

Date: March 2007

Authors/Sponsoring Agency: The Transit Cooperative Research Program (TCRP) of the Federal Transit Administration in cooperation with the Transit Development Corporation

Overview: This guide aims to help transportation practitioners plan, implement, and assess bus rapid transit (BRT) systems.

Key Takeaway: The analysis parameters in Chapter 5 are highly informative regarding BRT, but very few examples can be applied across modes. The most pertinent performance criteria mentioned in this guidebook are ridership growth, travel time estimations, service frequencies, and ridership benefits.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Rider Satisfaction
- Evaluation Criteria: Ridership Growth

In-depth Analysis: In chapter 3 they analyze the performance of several BRT around the world, and they highlight two notable metrics that could be used to evaluate demonstration projects: (1) ridership growth and (2) prior mode. When tracking ridership growth, they denote the percent ridership gain, the time period (in months/years) of that gain, the percentage reduction in travel time and the percentage of riders that are new transit riders. They also evaluate when during the week, the greatest change occurs by comparing the rates during the work week and weekend. To track mode change, they track the percentage of BRT riders that used the bus, rail, drove, walked, did not make the trip and other. The study found a large portion of the BRT riders were new riders. This is an important finding and distinction to denote since the objective support the existing network particularly along the SMART Plan Corridors. In the exhibit below (3-1) Miami experiences an 85 percent ridership growth in the span of five years of which 50% were from new transit trips. Additionally, the ridership growth rate was about twice as much on weekend versus weekdays (exhibit 3-2)

EXHIBIT 3-1 Ridership Experience with BRT

Location	% Corridor Ridership Gain	Time Period	Maximum % Reduction in Travel Time	% BRT Ridership that is New Transit Trips
Los Angeles	40	3 years	25	>30
Miami	85	5 years	30	>50
Brisbane (Australia)	60	2 years	NA	>45
Vancouver (BC)	30	2 years	16	>25
Boston	100	18 months	20-30	>30
Oakland	20*	1 year	17	>30*

* Offset to secular decline

SOURCE: CBRT (1)

EXHIBIT 3-2 Ridership Growth over Time: South Miami-Dade Busway Corridor

Time Period	1st Quarter 1996	3rd Quarter 2003	% Change
Average weekday	7,600	13,000	+70
Average weekend (Saturday + Sunday)	6,000	15,000	150

SOURCE: South Miami-Dade Busway Corridor Case Study (2)

FDOT State Park-and-Ride Guide

Date: June 1st, 2012

Authors/Sponsoring Agency: Florida Department of Transportation Transit Office

Overview: This guide provides a standard process and the necessary information required for the FDOT and any other Florida agencies to plan, implement, and manage Park-and-Ride facilities.

Key Takeaway: FDOT standard for vehicle utilization at a Park-and-Ride facility is seen as meeting a satisfactory level of operation when utilization is between 60% and 80% and total vehicles is over 20.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measures: Parking Demand and Use
 - Evaluation Criteria: Park-and-Ride Utilization

In-depth Analysis:

The management of existing Park-and-Ride facilities includes the inventorying, evaluating, and reporting on existing facilities, all of which is covered in chapter eleven of the guide. This chapter provides facility inspection procedure, performance data collection methods, data collection variables, and the criteria used to evaluate said data.

Assessment	Performance Measure	Suggested Operating Standard	Potential Corrective Actions
Unsatisfactory operation	Parked vehicles percent utilization	<10 vehicles <10%	Close Dispose
Marginal operation	Parked vehicles percent utilization	10-20 vehicles 10-60%	Added transit service Added transit amenities Added promotion Improve access Improve security
Operating deficiency	Complaints	Number based on nature of complaints	Based on nature of complaints
	Accidents/traffic safety	>1 per year	Traffic engineering measures
	Pavement conditions	Unsatisfactory	Patch, repave or reconstruct
	Signing conditions	Unsatisfactory	Replace, add new signs
	Illegal parkers	>3 per month	Increase enforcement
	Security	>1 incident per year	Increase enforcement
Satisfactory operation	Parked vehicles percent utilization	>20 vehicles 60-80%	NA
Over utilized	Parked vehicles percent utilization, Facility size	>80% >30 spaces	Modify geometrics, striping Expand Construct on new site

The parked vehicle percent utilization measure is collected twice a year when a district Park-and-Ride office, or delegate, counts the number of vehicles using the lot (including bicycles). For joint use lots it is important to only look at spots that are eligible for use by the Park-and-Ride vehicles. Number of total vehicles should be looked at in addition to percent of utilization when assessing Park-and-Ride facilities, to gain a more complete picture. *“For example, low utilization values can be produced at a large facility even though a large number of vehicles are parking there.”*

FDOT State Management Plan

Date: February 2016

Authors/Sponsoring Agency: Florida Department of Transportation

Overview: This plan provides procedural guidelines for FDOT FTA grant application, review, and reporting process. 5310 formula grants assist private nonprofit groups in meeting the transportation needs of older adults and people with disabilities. 5311 formula grants are specifically for rural areas with fewer than 50,000 residents. These grants reduce the burdens transit agencies bear.

Key Takeaway: This manual contains three relevant monitoring systems that can serve as good guidelines for evaluating transportation projects. The first one is the district evaluation criteria which is intended to rate project proposals for 5310 Grant programs. They attribute more points to projects that address the gaps in service in disenfranchised areas where there are high potentials for increasing ridership. The second one is transit specific and consists of a set of quantitative values that provide general performance indication, effectiveness, and efficiency measures. The third monitoring system is specifically for commuter assistance programs and is mostly quantitative. The purpose is to evaluate how much usage the program is getting and to what extent it is helping achieve the goal of reducing single-occupancy vehicles (SOVs), vehicle trip, commuter cost and parking need.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Convenience
 - Evaluation Criteria: Reliability
- Performance Measure: Return on Transit Investment
 - Cost per Passenger Trip

In-depth Analysis:

For the Section 5310 Program, district evaluation criteria, the Federal Transit Administration (FTA) provides a scoring worksheet out of one hundred points to evaluate projects submitted by grant applicants. It is broken down into four broad categories:

Category	Focus
Service Efficiency and Effectiveness	This category corresponds to 28% of the total score and focuses on the service schedule, capacity, and expenses.
Extent to which the community (seniors and persons with disabilities) is served	This category represents 19% of the total score and focuses on the ridership, reach and effectiveness of this project in serving seniors and persons with disabilities.
Need	This category represents the largest share of the total score at 35% and it focuses on measuring the increase in service, total reduction of vehicle mileage, ridership to capacity ratio and the financial need.
Fiscal & Managerial Capability	This category represents 18% of the total score and focuses on the fiscal and grant management. This section would have to be adapted to the project being evaluated.

Transit systems are required to publicly report performance data through newspapers. There are three main components to this metric, which are themselves broken down into specific Indicators/measures:

Components	Indicator / Measure
General Performance Indicators	1. Passenger trips 2. Revenue miles 3. Total operating expense 4. Operating revenue 5. Vehicles operated in maximum service 6. Base Fare
Effectiveness Measures	Evaluates the schedule of the services and the average frequency of delays due to equipment problems
Efficiency Measures	The goal is to measure the efficiency of transporting riders by studying the quotient of the operating expense divided by the sum of passenger trips while keeping the modes consistent

The commuter assistance programs are required to monitor and report their performance annually to the District office.

“(a) Number of commuters requesting assistance

(b) Number of commuters switching from single occupant vehicles

(c) Number of agency vans in service, and other coordinating agency vans that are participating in the rideshare-matching program (where applicable)

(d) Number of vehicle trips eliminated for all commuters participating in the commuter assistance program

(e) Number of vehicle miles eliminated for all commuters participating in the commuter assistance program

(f) Number of employer contacts and employers participating

(g) Description of major accomplishments

(h) Number of parking spots saved / parking needs reduced

(i) Amount of commuter costs saved”

These measures are all quantitative and there are no additional documents provided or referred to in this report that provide benchmarks to guide the analysis of these results however, they define each term in an attachment located in the appendix of this manual.

FDOT D6 Transportation Alternative Program (TAP) Selection and Prioritization Criteria/Ranking Form

Date: 2019

Authors/Sponsoring Agency: Florida Department of Transportation District 6

Overview: This document provides guidance for the application process for FDOT D6 TAP. TAP is a grant program for non-motorized forms of transportation projects. TAP funding is limited to no more than \$1 million to any single project in any single application cycle and no more than three applications per department can be submitted.

Key Takeaway: During the Miami-Dade County review process, there is a county agency project evaluation. This evaluation gives the project a score from 1 to 100. Out of these 100 points 15 points are for *“intermodal transportation linkages improvements, including those that provide access to transit stations and/or facilities.”* This includes the SMART Plan. Another 15 points are for *“mobility enhancement or community development for disadvantaged groups (i.e. children, the elderly, the poor, those with limited transportation options, and the disabled).”*

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Connection to SMART Corridors and BERT Network
 - Evaluation Criteria: Service to/from SMART/BERT stations
- Performance Measure: Expansion of Mobility Options
 - Evaluation Criteria: New Service

In-depth Analysis: There are 9 project categories that are eligible to receive TAP funding. Two of those are *“construction of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act (ADA) of 1990”* and *“construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs.”*

The project evaluation process has two-steps. Both FDOT and the TPO evaluate the project on a 100-point scale system. However, each one has its own set of criteria. The focus is on safety for cyclists and pedestrians, transportation link and mobility of disadvantaged groups. The Miami Dade TPO awards 15 points out of 100 based on the level of prioritization by the three TPO Committees.

FDOT D6 – Modal Development Office (MDO) Transit Service Development Grant Score Sheet

Date: 2020

Authors/Sponsoring Agency: Florida Department of Transportation District 6 Modal Development Office

Overview: This score sheet contains fourteen questions that help determine the eligibility, completeness, and importance of a Service Development Grant Project application. It has been formulated by FDOT's Modal Development Office.

Key Takeaway: The office prioritizes projects that are part of an existing plan such as the TDP, increase the amount of services, mitigate congestion, or provide connectivity and reduce the amount of demand. This scoring sheet is worth seventy-eight points and there are fourteen questions.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Connection to SMART Corridors and BERT Network
- Performance Measure: Convenience
 - Evaluation Criteria: Expansion of Mobility Options

In-depth Analysis: There are fourteen elements in this score sheet that consist of a mixture of binary, scaled and categorical questions. Each of the response options excluding the first question have a numerical value attached to them and the lowest possible score if the application is eligible is eleven out of seventy-eight. Below are the most pertinent questions to this study.

- The first question seeks to identify **if the project is referenced in the agency's transit development plan (TDP) or any other formal study** to determine its eligibility for these grants. If the answer is no, the project is deemed ineligible.
- The **project purpose** is the most important category amounting to twenty points. There are three types of projects (1) New Services (18-20pts), (2) Existing Services (8-12pts), (3) Planning (2-4pts). The projects may consist of (a) Implementing/Improving Technology, (b) Implementing Routes, (c) Improving Operations, (d) Improving Maintenance, or (e) Improving Marketing/Consumer Information.
- The **schedule** criteria rates on a scale of one to five the extent to which the schedule is realistic and achievable as well as how detailed the event timeline, marketing strategy and evaluation element of the project are in the application.
- The **clear and measurable objectives** are also rated on a scale of one to five. This evaluates how the applicant plans to measure their objectives, the data of existing condition prior to project implementation and the standards they set for themselves (ex. number of passenger, changes in headway, etc.).
- The location of the service gets ranked on a scale of one to five depending on the **level of congestion** with five meaning that there are high levels of congestion in the intended service area.
- This criterion awards one to five points to a project depending on the **extent to which they provide regional connectivity between two or more services** provided or multi-modal projects in the region to complete regional trips.
- This criterion awards another set of one to five points to a project proposal depending on the **amount of demand reduction** for paratransit it might result in.

Best Practices: Evaluation and Monitoring

Performance Measurements of Transportation Systems: Summary of the Fourth International Conference

Date: May 18-20th, 2011

Authors/Sponsoring Agency: National Academies of Sciences, Engineering, and Medicine – Transportation Research Board

Overview: This document summarizes the performance measures presented at the fourth international conference used by different agencies to evaluate transportation systems.

Key Takeaway:

Breakout Session 4-B (*Measuring Transportation System and Mode Performance*) indicated that surveys are a preferred way to gather customer preferences and made a distinction between stated preferences and revealed preferences.

Breakout Session 4-C (*Measuring Service Quality, Effectiveness, and Efficiency at the Program, Project, or Service Levels*) identified three major core goals, which include improving transportation choices, and increasing transit mode share through improved safety and customer satisfaction

Breakout Session 5-B (*Incorporating Economic Impact Yardsticks into Transportation Investment Decision Making and Performance Management*) identified Market Access Expansion as an essential goal.

Relevant Performance Measures and Evaluation Criteria:

- Evaluation Criteria: Rider Satisfaction (via Survey)
- Performance Measure: Commuter Experience
 - Evaluation Criteria: Customer Satisfaction
 - Evaluation Criteria: Peak Period Ridership
- Performance Measure: Convenience
 - Evaluation Criteria: Expansion of Mobility Options
- Performance Measure: Safe Environment
 - Evaluation Criteria: Site Based Survey of Rider Experience

In-depth Analysis:

During the breakout session 4-C of titled “*Measuring Service Quality, Effectiveness, and Efficiency at the Program, Project, or Service Levels*”, they provide examples of measure used by the Quality of Life (QoL) Study conducted by the Regional Transportation District (RTD) of Denver, Colorado to evaluate the FastTrack goals, which are as follows:

Goal 1: establish a proactive plan that balances transit needs with future regional growth—meeting future transportation needs, providing opportunities for development near transit, and environmental sustainability;

Goal 2: increase transit mode share at peak times— transit usage, travel safety and security, and customer satisfaction; and

Goal 3: improve transportation choices and options—system mobility and travel choices and accessibility.

National Case Study Washington Area Metropolitan Transit Authority (Washington, D.C.)

Date: July 2014

Authors/Sponsoring Agency: Created by FDOT to be included in Best Practices in Evaluating Transit Performance report

Overview: The Washington Area Metropolitan Transit Authority (Metro) serves the Washington, D.C. metropolitan region. Metro is one of the largest transit providers in the country. The office of Performance was created to increase the use of performance information throughout the agency.

Key Takeaway: The Office of Performance created quarterly Vital Signs reports that provides analysis on 10 key performance indicators that address 4 major goals: safety, security, service reliability, and customer satisfaction.

Within the Customer Satisfaction KPI, dissatisfaction was found to be due to: Reliability, Safety & Security, Comfort (both on-board and at facilities), Customer Service, and clear announcements.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Customer Satisfaction
- Performance Measure: Convenience
 - Evaluation Criteria: Expansion of Mobility Options
 - Evaluation Criteria: Reliability
 - Reported Metric: On-Time Performance
- Performance Measure: Safe Environment
- Performance Measure: Attractive Amenities

In-depth Analysis: The [Metro Vital Signs](#) report tracks the performance of the Metrobus and Metrorail services using the goals and Key Performance Indicators (KPI's)

Goal	Indicators
Build and maintain a premier safety culture and system	1. Customer and employee injury rates
Meet or exceed customer expectations by consistently delivering quality service	2. On-time performance
Improve regional mobility and connect communities	3. Customer satisfaction
	4. Operating expense on budget
	5. Connecting Communities
	6. Crime rates
	7. Escalator availability
Ensure financial stability and invest in our people and assets	8. Capital funds invested
	9. Meet board-established service criteria

The performance analysis presented in the Vital Signs report is intended to answer two primary questions that aid Metro in the assessment of its performance and help determine where changes in policy are required: viz. Why did performance change? and What actions are being taken to improve performance?

FDOT – Best Practices in Evaluating Transit Performance

Date: July 2014

Authors/Sponsoring Agency: Florida Department of Transportation, Office of Freight, Logistics and Passenger Operations, Transit Office

Overview: This study provides the best practices to evaluate transit performance based on a review of different methodologies applied nationally and guidelines on adoption and implementation by agencies. It is broken up into three sections. The first being a literature review that has both national case studies. A review of best practices for transit agencies and an overview of Moving Ahead for Progress in the 21st Century (MAP-21) requirements relevant to transit performance measurement. The second is practice and performance measures used by Florida transit agencies. The final part is a performance measure toolbox that was developed based on the analysis from the previous two parts.

Key Takeaway: This report reviews the policies, standards and practices of transit evaluation and provides guidelines and key metrics and indicators to incorporate in transit performance evaluations. It also emphasizes the importance of initially defining an agency's goals and objectives before selecting performance measurements.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Return on Transit Investment
 - Evaluation Criteria: Route Productivity
 - Evaluation Criteria: Cost per Passenger Trip
- Performance Measure: Convenience
 - Evaluation Criteria: Reliability

In-depth Analysis:

This study evaluated notable practices from Florida transit agencies considered for the case studies. Below is a general summary of notable practices:

- Transit agencies provide linkage of performance measures to goals and objectives that are consistent with county and local strategic transportation plans.
- Large and medium-sized agencies use technological software to facilitate an organized and simple data collection process.
- Transit agencies have a designated office or staff that consolidate collected data and report performance measures from each agency division (safety, maintenance, finance, and so on).
- Transit agencies report performance measures primarily to comply with statutory and funding requirements.
- Transit agencies are currently collecting data and reporting measures related to safety and asset management used to comply with MAP-21 changes.
- Large transit agencies do not necessarily use more performance measures than medium-sized and small transit agencies

Based on the evaluation, this report identified five broad categories of performance metrics: service effectiveness, service efficiency, labor utilization, vehicle utilization and asset management, and safety and security.

- **Service Effectiveness:** ability to meet the demand for transit services given existing resources,

- **Service Efficiency:** ability to provide service outputs such as passenger trips within the constraints of service inputs such as revenue hours and revenue miles,
- **Labor Utilization:** how well agency resources are used, specifically human resources,
- **Vehicle Utilization and Asset Management:** ability to maintain physical conditions of vehicles and other agency assets in a state of good repair.
- **Safety and Security:** ability to provide the highest practical level of safety and security for all modes of transit to protect passengers, employees, revenues, and property.

These metrics are used as the five criteria in the performance measure toolbox which provides performance measure that the user can use to track progress towards achieving certain goals. The toolbox is meant to be customizable to needs of a specific project. The user can select the criteria and measures most important to that project and set target goals with those measures. While all the criteria are useful service effectiveness is particularly relevant and is shown in the table below.

Service Effectiveness			
Sample Goal	Measure	Formula	Purpose
Improve quality of service and customer satisfaction	Average headway (in minutes)	$[(\text{Directional route miles} / (\text{Revenue miles} / \text{Revenue Hours})) / (\text{Vehicles operated in maximum service})] * 60$	Temporal access – how frequently transit service is provided
	Average Trip Length	Passenger miles / Passenger trips	Service mobility
	On-time performance	On-time sampling / Total samplings	Reliability of service
	Revenue miles per hour	Revenue miles / Revenue hours	Service mobility, average system speed
Increase market share of transit	Passenger trips per capita	Transit boardings / Service area population	Transit utilization within the service area
	Passenger trips revenue hour	Transit boardings / Revenue hours	Resource consumed in providing service
	Passenger trips per revenue mile	Transit boardings / Revenue miles	Supply of revenue service provided based on the level of demand
	Passenger trips per VOMS	Transit boardings / Annual vehicles operated in maximum service	Supply of service provided based on the level of demand during peak hours
	Vehicle miles per capita	Vehicle miles / Service area population	Supply of service provided based on the demand within the service area

NCHRP Results Digest 361 – State DOT Public Transportation Performance Measures: State of the Practice and Future Needs

Date: September 2011

Authors/Sponsoring Agency: NCHRP

Overview: The purpose of this digest is “to provide more information on performance measures and performance managements approaches that can be used by state DOTs in relation to public transportation programs.”

Key Takeaway: The report shows that state DOT decision-making can be better supported if there is a more effective use of transit performance measures. Surveys and interviews conducted in the report show that many state DOTs use transit performance measurements to better gauge effectiveness and distribute funds. Some of the more common performance measures will be expanded upon below.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Return on Transit Investment
 - Evaluation Criteria: Cost per passenger trip
 - Evaluation Criteria: Route Productivity
- Performance Measure: Convenience
 - Evaluation Criteria: Reliability

In-depth Analysis:

A web survey was used to understand what transportation agencies are doing around the United States to improve efficiency and effectiveness of their transportation systems. The survey showed multiple state DOTs use numerous transit performance measures in order to provide clarity and help track efficiency and effectiveness of transit agencies in their state. Commonly used performance measure categories are ridership, availability, internal cost and efficiency, quality, asset management, and community measures. More information about these categories is as follows:

Measures	Definition	Examples
Ridership Measures	The level of riders using a service or services within a particular transit system.	1.Total ridership, or ridership by mode or service type 2.Passenger trips 3.Passenger miles 4.Ratio of ridership growth to population growth 5.Passengers per capita 6.Number of riders at park-and-ride lot
Availability Measures	The availability of transit services provided by a transportation agency.	1.Total service hours provided versus total hours needed to meet transit demand 2.Average days per week that transit service is available
Internal Cost and Efficiency Measures	Internal utilization of resources, cost, and other measures of efficiency.	1.Passengers per vehicle mile 2.Passengers per vehicle hour 3.Total operating cost per passenger 4.Operating expense per vehicle revenue mile 5.Fuel economy (miles per gallon)
Quality Measures	Factors that affect the quality of service experiences by transit riders, which	1.On-time performance by mode 2.Rate of injuries and/or fatalities involving transit vehicles 3.Ratings of public transportation system

	encompasses speed, safety, reliability, and comfort.	
Measures	Definition	Examples
Asset Management Measures	The maintenance of the physical components of the public transportation agency.	1.Age of fleet by vehicle type 2.Percent of vehicle useful life remaining 3.Number of mechanical failures 4.Distance between vehicle failures
Community Measures	Impacts, both economic and environmental, to communities served by transit.	1.Percent of non–single-occupant vehicle commuters 2.Number of auto vehicle trips reduced 3.Energy savings 4.Percentage of fleet vehicles transitioned to clean or alternative fuels

In order to help state DOTs select appropriate performance measures, this digest provides a list of characteristics of good performance measures. These measures should be trackable over time, should have a storytelling potential, should be meaningful for types of service measured, should have a relation to Statewide Public Transportation Goals, and should be calculable from data that are readily available statewide.

The report identifies the following challenges for state DOT use of transit performance measures:

- Lack of data to support transit performance measurement/monitoring.
- Lack of technical resources to support transit performance measurement/monitoring.
- Connection between transit performance and decision-making for funding allocations.
- Lack of state DOT influence over transit agency decision-making.
- Accounting for variations in transit agency types and purposes.

The report identifies the following best practices for state DOT use of transit performance measures:

- Choose transit performance measures that can be consistently evaluated over time.
- Select measures that are meaningful to the type of transit service being provided and the purpose of the transit service.
- Choose measures that show progress toward goals.
- Seek input from other state DOTs, transit agencies, and other partners when identifying measures.
- Develop data partnerships with these entities.
- Make use of national research and studies when identifying measures.
- Cooperate and coordinate with transit agencies.
- Transit performance measures can be used formally or informally. They can be used to support qualitative evaluations.
- Consider hiring a staff person to focus on performance measurement.
- Tie transit performance measurement to funding decisions.
- The report concludes that several states have successfully incorporated transit performance measures into external reporting.

Evaluating Public Transit Benefits and Costs – Best Practices Guidebook – VTPI

Date: September 9th, 2019

Authors/Sponsoring Agency: The Victoria Transport Policy Institute

Overview: This is a policy framework guidebook that establishes a framework to evaluate holistically the cost and benefits of a transit service. The Victoria Transport Policy Institute is a Canadian think tank that seeks to improve transportation planning and policies.

Key Takeaway: There are four overarching categories of criteria: improved transit service, increased transit travel, reduced automobile travel and transit-oriented development. These criteria home in on the indirect positive impact of transit that are not generally factored in benefits and costs analysis.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Convenience
- Performance Measure: Commuter Experience
 - Evaluation Criteria: Reduce congestion through peak period ridership

In-depth Analysis:

This guidebook contains a variety of best practices for evaluating transit, including Economic Evaluation, which reduces the decision-making process to a question of financial costs and benefits. Service Quality Evaluation focuses on how transit is perceived by the users, and includes the recommendation to base this analysis on **Ease**, Effectiveness, Comfort, and Aesthetics. The guidebook also looks at indirect travel impacts, including the reduction of VMT due to transit use.

Potential Costs and benefits are grouped into 4 categories:

	Improved Transit Service	Increased Transit Travel	Reduced Automobile Travel	Transit-Oriented Development
Metrics	Service Quality (speed, reliability, comfort, safety, etc.)	Transit Ridership (passenger-miles or mode share)	Mode Shifts or Automobile Travel Reductions	Portion of Development with TOD Design Features
Benefits	- Improved convenience and comfort for existing users. - Equity benefits (since existing users tend to be disadvantaged). - Option value (the value of having an option for possible future use). - Improved operating efficiency (if service speed increases). - Improved security (reduced crime risk)	- Mobility benefits to new users. - Increased fare revenue. - Increased public fitness and health (by stimulating more walking or cycling trips). - Increased security as more non-criminals ride transit and wait at stops and stations.	- Reduced traffic congestion. - Road and parking facility cost savings. - Consumer savings. - Reduced chauffeuring burdens. - Increased traffic safety. - Energy conservation. - Air and noise pollution reductions.	- Additional vehicle travel reductions (“leverage effects”). - Improved accessibility, particularly for non- drivers. - Reduced crime risk. - More efficient development (reduced infrastructure costs). - Farmland and habitat preservation.
Costs	Higher capital and operating costs, and therefore subsidies. Land and road space. Traffic congestion and accident risk imposed by transit vehicles.	Transit vehicle crowding.	Reduced automobile business activity.	Various problems associated with more compact development.

The study makes the argument that many secondary benefits of transit are overlooked or undervalued. Examples include parking cost savings provided by shifts driving to public transit, and vehicle ownership cost savings provided by TOD that allows households to reduce vehicle ownership. The benefits provided by high quality transit services (convenient, comfortable, integrated, and affordable) and transit-oriented development tend to be particularly large because they leverage additional reductions in automobile travel. As a whole, this guidebook details the various elements of Transit Impact, Demand and Impact Categories that are not generally well accounted for and emphasizes the indirect positive impact of transit infrastructures. It highlights the many errors made when comparing transit to automobile transportation.

Other Background Research

Smart Feeder/Shuttle Bus Service: Consumer Research and Design

Date: February 2006

Authors/Sponsoring Agency: Y.B. Yim, Avishai (Avi) Ceder/Journal of Public Transportation

Overview: This is a study of the short-haul feeder market in a suburban community in the San-Francisco Bay Area to develop a smart shuttle network that would help provide access to express transit.

Key Takeaway: A key metrics mentioned in this study is the willingness to pay and willingness to wait for shuttle services.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Convenience
 - Evaluation Criteria: Typical Waiting Time

In-depth Analysis: To gain a better understanding of potential Smart shuttle users the authors of this paper conducted a phone survey of 400 respondents that lived within a two-mile radius of the Castro Valley BART station. The survey results were broken into four categories: demographic characteristics, willingness to use the smart shuttle service, willingness to pay for the service, and attributes that would enhance the shuttle service.

Respondents were asked to list the three most important attributes in order the three most important attributes of the shuttle to them. These were, in order of importance, cost, overall travel time (including wait time), and on-time reliability of the service. The respondents willingness to pay and willingness to wait are captured in the charts below.

Figure 1. Willingness to Pay for the Shuttle Service

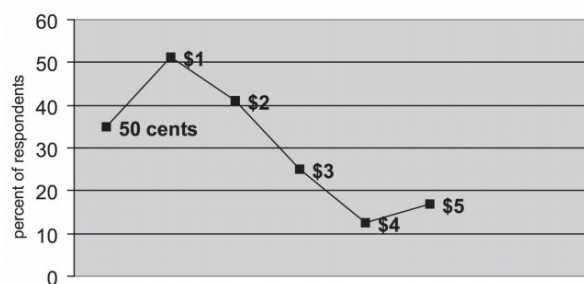
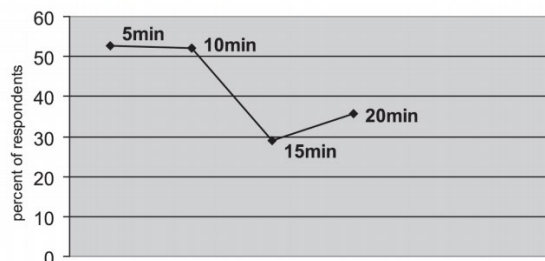


Figure 2. Willingness to Wait for a Shuttle Ride



Transit Benefit Analysis Example (Spreadsheet)

Date: June 8th, 2004

Authors/Sponsoring Agency: Victoria Transport Policy Institute

Overview: This spreadsheet calculates the cost and benefits of transit projects. It contains basic values that represent the cost and benefits for a city with a half-million population.

Key Takeaway: Several transit related input variables based on Ridership, Costs, Revenues, Trip details, Mobility, and corresponding vehicular impacts such as Congestion, Safety, Pollution, etc. are used to create the cost benefit analysis. Our review of the structure of this table revealed that high route productivity is the primary factor to generate the benefits identified such as congestion reduction, job growth, reduced parking need, and reduced roadway construction costs.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Return on Transit Investment
 - Route Productivity: Route Productivity

In-depth Analysis:

This workbook contains seven related sheets.

- 1) Data Inputs (This data feeds the calculations on the other sheets. Input values can be modified to reflect a particular situation)
- 2) Benefits of Existing Transit Services
- 3) Benefits from Bus Ridership Incentives
- 4) Cost/Benefits for New Bus Routes
- 5) Cost/Benefits for New Rail Routes
- 6) Cost/Benefit for Transit Oriented Development
- 7) Qualitative Analysis.
 - There is a total of twenty-eight factors in the qualitative analysis with a default weight value of one. Each factor must be evaluated on a scale of minus five (very bad) to five (very good).

Transportation Project Evaluation Criteria and Rankings – San Diego

Date: October 2011

Authors/Sponsoring Agency: SANDAG 2050 Regional Transportation Plan

Overview: This document describes the process for developing evaluation criteria for prioritizing projects as part of San Diego's 2050 Regional Transportation Plan (RTP).

Key Takeaway: Transit Services Evaluation Criteria include:

- Serves Travel Needs: Serves Congested Areas, Serves Peak-Period Trips, Provides Time Competitive/Reliable Transit Service, Peak-Period Ridership
- Develops Network Integration: Links High-Frequency Transit Services, Serves Smart Growth Areas
- Addresses Sustainability: Cost Effectiveness, GHG Emissions, Provides Accessibility to Low-Income/Minority/Senior Areas, Provides Accessibility to Reservations, Access to Jobs.

Each Evaluation Criteria is scored to a unique scale (some 1-5, 1-10, yes/no, etc.). These scales may be relative to the highest performing project. Criteria are then grouped into focus areas which are weighted to a fixed percent of the total score. This score determines the ranking of the projects.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Commuter Experience
 - Evaluation Criteria: Peak Period Ridership
 - Evaluation Criteria: Connection Between Employment and Residential Areas
- Performance Measure: Return on Transit Investment
 - Evaluation Criteria: Cost per Passenger Trip
- Performance Measure: Connection to SMART Corridors and BERT Network
- Performance Measure: Convenience
 - Evaluation Criteria: Reliability

In-depth Analysis:

This document includes information on the formulation of criteria to prioritize transportation projects based on goals. The three goals against which these modes are evaluated are: Serves Travel Needs, **Develops Network Integration**, and Addresses Sustainability. For each goal, there are criteria and a score range based on the metrics described in each criterion.

Criteria and Metrics for Transit Services:

1. Serves Congested Areas: (10-0) Percentage of highway corridor or arterial with Level of Service E or F in 2050.
2. Serves Peak Period Trips: (5-0) Total potential trips per station/stop
3. Provides Time Competitive / Reliable Transit Service: (10-0) Percentage of route located in priority treatment
4. Peak Transit Ridership: (10-0) Percentage of average transit utilization of route during peak period
5. Links High Frequency Transit Services: (15-0) Total number of route connections with high frequency transit routes

6. Serves RCP Smart Growth Centers: (10-0) Scores are based on the combined total number of parts A and B and are normalized to a maximum of 10 points
7. Cost-Effectiveness: (20-0) Cost per passenger mile traveled
8. Greenhouse Gas Emissions: (10-0) Change in CO2 emissions with and without project
9. Provides Accessibility for seniors/low income: (4-0) Range of proportion of low-income/minority/senior (75+) population including federally recognized Indian reservations served relative to the total population.
10. Access to Jobs: (5-0) Range of total number of jobs served per mile

Commonwealth of Virginia Office of the Secretary of Transportation – SMART Scale

Date: February 21st, 2019

Authors/Sponsoring Agency: Commonwealth Transportation Board

Overview: This is a method to score and select eligible transportation projects that will be funded by the Virginia's House Bill 1887. There are seven factor area metric categories that guide the measures of development. The scoring focus is on the size of the problem rather than the outcome of the project.

Key Takeaway: The SMART Score evaluates projects based on safety, congestion mitigation, accessibility, economic development, environmental quality, and land use factors and does a quotient of the benefit score over the requested funds.

Relevant Performance Measures and Evaluation Criteria:

- Performance Measure: Expansion of Mobility Options
 - Access to Multimodal Choices
- Performance Measure: Connection to SMART Corridors and BERT Network
 - Intermodal Access and Efficiency

In-depth Analysis:

Virginia's SMART SCALE is about picking the right transportation projects for funding and ensuring the best use of limited tax dollars. Transportation projects are scored based on an objective outcome based process that is transparent to the public and allows decision-makers to be held accountable to taxpayers. Once projects are scored and prioritized, the Commonwealth Transportation Board (CTB) has the best information possible to select the right projects for funding. The Official SMART Score is the quotient of the Benefit Score over the Requested Funds.

This process includes five overarching steps. The preliminary step requires project sponsors to determine their eligibility prior to beginning the SMART SCALE applications process. Once that is established, the responsible agency, i.e. regional entities, submits applications for the projects. Applicants are limited in the number of applications they may submit for evaluation and scoring, based on predetermined population thresholds. The submitted projects are screened against the needs identified in Virginia's long-range transportation plan – VTrans2040, which evaluates the state's needs at four scales focused on key travel markets and safety needs. Once it has been determined that a project meets an identified need, the project is evaluated and scored. A scoring evaluation team takes the project and begins collecting additional data required for evaluating each of the five factors – Safety, Congestion Mitigation, Accessibility, Economic Development, Environmental Quality, and Land Use.

After the data has been collected for each project sufficient to evaluate each factor, measure values are calculated and weighted according to the area type where the project is located. After factor totals have been weighted and summed, the Final Score is determined by dividing the total factor score by the SMART SCALE cost. Projects are then ranked and provided to the Transportation Board for funding consideration. The final step in the prioritization process includes programming of selected projects.

3 – Study Advisory Group

3.1 – Study Advisory Group Composition

Throughout the development of this study, the study team provided opportunities for communication, coordination, and input from partner agencies. Invitations to join the Study Advisory Group (SAG) were extended to representatives from all SMART Demonstration projects, including both project sponsors and operators. Representatives from these agencies and municipalities met three times throughout the development of this study to review the progress of work and provide feedback to the study team. The composition of the Study Advisory Group is shown on the following table:

Applicant/Operator	SAG Representative	Project Name
DTPW	Eric Zahn – DTPW Service Planning and Scheduling Section Supervisor	NW Miami-Dade Express Panther Station to Dolphin Station Express SW 344 th Park-and-Ride Station Biscayne Gardens Transit Extension On-Demand Services: Civic Center, Dadeland North Station, Dadeland South Station, South Miami Station, West Dade Circulator All other DTPW operated projects indicated below
Cutler Bay / DTPW	Alfredo Quintero Jr. – Public Works Director Yenier Vega – Stormwater Utility Manager	Cutler Bay On-Demand Service
City of Miami	Jon Tristan Jackson – Transportation Analyst Alan Dodd – Resilience & Public Works Director	Miami Flagami Trolley City of Miami Liberty City Trolley Service
City of Miami / City of Miami Beach / DTPW	Jon Tristan Jackson – Transportation Analyst Alan Dodd – Resilience & Public Works Director Milos Majstorovic – Transportation Manager	Miami Beach BERT
Miami Beach	Milos Majstorovic – Transportation Manager	City of Miami Beach South Beach Trolley Service
FIU / DTPW	Brenda Dome – Director, Parking & Transportation Services	FIU/Panther Station On-Demand Service Panther Station to Dolphin Station Express Service
El Portal	Christia Alou – Village Manager	Village of El Portal Express Service
Miami Lakes	German Cure – Strategic Planning Michael Zayas-Morales – Transportation Planning Manager	Town of Miami Lakes Express Service to Palmetto Metrorail Station
Hialeah Gardens / Hialeah / DTPW	Debora Storch – Principal Planner Yiselis Rodriguez	City of Hialeah/Hialeah Gardens to I-75 Miami Gardens Park-and-Ride
Hialeah		Tri/Metrorail Transfer Station On-Demand Service
Medley / DTPW	Jorge Corzo – Town Engineer	NW Miami-Dade Express Medley Commuter
Doral	Marc O’Keefe – Transportation Analyst Brenda Dome – Director, Parking & Transp. Services	City of Doral FIU Trolley
Pinecrest	David Mendez – Public Works Director	Pinecrest On-Demand Service
North Bay Village	Jose Olivo – Public Works Director	North Bay Village On-Demand Service
Coral Gables	John Kowalchik – Assistant Parking Director Elizabeth Gomez – Data Collection	Coral Gables On-Demand Service
Palmetto Bay	Dionisio Torres – Public Works Director	Palmetto Bay On-Demand Service Palmetto Bay Transit Facility (Park-and-Ride)

Note: Operator denoted in *italics* when different than the applicant

3.2 - Input from the Study Advisory Group

3.2.1 – SAG Meeting 1: Kick-Off Meeting

October 29, 2019 - TPO Conference Room, Stephen P. Clark Government Center

SAG Members in Attendance: Alfredo Quintero (Cutler Bay), Brenda Dome (FIU), Deborah Storch (Hialeah), Yiselis Rodriguez (Hialeah), German Cure (Miami Lakes), John Kowalchik (Coral Gables), Lynda Westin (Miami Beach), Mark Spanioli (Pinecrest), Raymond Freeman (FDOT D6), Rita Carbonell (Doral)

Overview: The study team introduced the goals and intended methodology of the study. Conversations were held to explore the data available from the project participants, understand how they currently evaluate transit projects, and better understand how they define success.

Summary of Input:

The parameters and limitations of Freebee (a popular local on-demand responsive service, which is being used for numerous SMART Demonstration Projects) were discussed. Information included the flexibility of the system to operate larger vehicles in places like Monroe County, and the limitation of not being able to operate on roads with speed limits above 35mph.

FDOT shared that a surprising metric has emerged in Monroe County, which is a major decrease in the number of Driving Under the Influence (DUI) arrests in locations with new on-demand responsive service. Beyond that, FDOT expressed the desire to serve primarily as a facilitator, leaving determinations of performance management for transit services to transit operators included in the SAG.

Pinecrest reported positive ridership numbers on their existing Freebee service, with high ridership indicated from high schools. As a result, Pinecrest supplemented their agreement to allow for school trips and increased the fleet to accommodate this service with local funds.

Cutler Bay remarked that their primary goal and biggest challenge was getting people to work. This service brings residents directly to and from the transitway, from any point within a two-mile radius.

Miami Beach proposed calculating greenhouse gas reductions and exploring the links between SMART Demonstration projects and other first-and-last mile technologies like rental bikes and scooters. Discussion also explored how density influences the needs and expectations related to a transit service.

Miami Lakes reported very strong ridership, with uneven demand which favors evening entertainment trips. This has caused a shift in operating hours towards the evening, and extended hours on Saturday.

Doral discussed the Freebee service which they use to supplement their robust trolley system, and the geo-fencing which excludes industrial areas due to travel restrictions on certain roads. Doral also shared that 10 passengers per hour per vehicle has been the metric for success per their Public Transportation Grant Agreement (PTGA) with FDOT.

3.2.2 – SAG Meeting 2: Preliminary Evaluation Criteria Endorsement

February 18, 2020 - TPO Conference Room, Stephen P. Clark Government Center

SAG Members in Attendance: Marc O’Keefe (Doral), Alan Dodd (City of Miami), Milos Majstorovic (Miami Beach), Brenda Dome (FIU) **Via Phone:** John Kowalchik (Coral Gables), Alfred Quintero (Cutler Bay), Yenier Vega (Cutler Bay), David Mendez (Pinecrest), German Cure (Miami Lakes), Eric Zahn (DTPW)

Overview: The study team presented info on the status of SMART Demonstration Projects already in operation, and then presented the preliminary Performance Measures and their associated Evaluation Criteria to the SAG for comment. While some changes were suggested for incorporation, the performance framework was generally endorsed by the SAG.

Summary of Input:

Performance Measure	Evaluation Criteria	Remarks
Improve Commuter Experience	Reduce peak period congestion by converting single passenger vehicle trips	Miami Beach: Peak periods are different - we have multiple in Miami Beach. Need to include broad definition of peak - also evaluate 'non-peak'. Can we measure travel time savings?
	On Demand: Driver rating	Questions regarding how well this indicates an Improved Commuter Experience. A rider satisfaction survey would be better.
	Trolley: Connect employment areas with rapid transit stops	City of Miami: include residential areas in this metric as well
	Improve or create new direct connection between residential and employment areas	No Comments
Rider Satisfaction	Customer service feedback/complaints	Miami Beach: Recent Miami Beach resident survey inquired about trolleys, included questions which track reliability and frequency. Also, 311 typically only gets negative, very specific feedback. We track satisfaction in-house through the trolley app, website, internal phone numbers, voicemails, email, etc. City of Miami: We get some feedback on the City website. Doral: Doral considered using 311 as a tool, but it was decided it would be better to hear directly from residents/riders due to long hold times for 311 calls. Suggest online surveys may be preferred.
	Ridership Growth	No Comments
Return on Transit Investm	Subsidy per passenger trip	DTPW: Back out the measure a bit more - measure passengers per hour on a broader scale - probably more useful. Suggest route productivity.
Expand Mobility Options	New service type / new service area / new connectivity	No Comments

Performance Measure	Evaluation Criteria	Remarks
FLM to SMART Corridor	Total trips to/from SMART/BERT stations	Consensus: Simplify to service frequency
Convenience	Waiting Time	An active discussion took place exploring potential measurements, including headways, time between on-demand request and actual ride, and the question of how to measure actual experienced wait times. No conclusion was reached, but the discussion introduced ideas for further research.
	Abandoned Trips	Multiple operators agreed that the team should measure missed trips instead of abandoned trips – however the study team noted that “abandoned trips” is the name of a freebee reported metric. Further research into the calculation of that metric will follow.
	PROPOSED NEW CRITERION	Frequency of service during course of day (peak-period-only services limit ability of passengers to get back during day)
Amenities	Lighting, Seating, Cleanliness, Restrooms, Public art, Refreshments, etc.	No Comments
Safe Environment	On-Site rider survey	No Comments
	Security personnel / cameras	City of Miami: Safety measures could be included for vehicles/routes
Parking Demand / Usage	Parking use vs average park-and-ride facility	No Comments
Total Boardings / Alightings	Total Count	No Comments

3.2.6 – SAG Meeting 3:

May 14, 2020 – Meeting held digitally in response to the SARS-CoV-2 outbreak

SAG Members in Attendance: Rita Carbonell (Doral), Jon Jackson (City of Miami), Milos Majstorovic (Miami Beach), John Kowalchik (Coral Gables), Yenier Vega (Cutler Bay), Maria Herrera-Mendoza (Cutler Bay), David Mendez (Pinecrest), Michael Zayas-Morales (Miami Lakes), Melinda Parrott (FIU)

Overview: After conducting one-on-one interviews which helped fine-tune the evaluation criteria, the study team presented the refined performance framework and reporting requirements for additional comments and approval.

Summary of Input: The Study Advisory Group approved of the performance framework as presented with the only change being to change the evaluation criterion “Subsidy per Passenger Trip” into “Cost per Passenger Trip.” This helps focus on the total cost of the service provided, rather than weighting results according to how projects are funded

3.3 – One-on-One Interviews with Stakeholders

3.3.1 – Meeting with Jason Spiegel, Freebee Managing Partner

March 3, 2020 – Freebee offices, 2312 N. Miami Avenue

While Freebee is not a part of the SAG, they are a key partner in the delivery of on-demand transit service in Miami-Dade County, including Phase 1 SMART Demonstration Program services for Coral Gables, North Bay Village, Palmetto Bay and Pinecrest; and they are serving Phase 2 SMART Demonstration services for Miami Lakes.

This meeting was held to better understand the data handling capabilities of the Freebee system and establish the degree to which Freebee was willing to work in coordination with the TPO to streamline data reporting processes for project sponsors. Freebee agreed to on-going data sharing on a quarterly basis.

At this meeting, the study team learned that Freebee has a very robust data collection system that can meet and exceed all the needs of the SMART Demonstration Program. Freebee can isolate or group metrics, create calculations, and develop custom data reports. Freebee also has the ability to precisely track when people alighting at a transit stop, as opposed to using a radius which may capture trips to neighboring properties or exclude trips to part of an oddly shaped transit facility.

The study team also learned that all freebee vehicles are operated with the help of an in-vehicle iPad, which makes surveying riders much easier.

When asked about the best measures available to evaluate the convenience of a trip, Mr. Spiegel pointed out that the freebee system already measures waiting times and abandoned trips (defined as any unfulfilled trip request), and that door-to-station travel times could be used as well.

3.3.2 – Meeting with Eric Zahn, DTPW Service Planning and Scheduling Section Supervisor

March 12, 2020 – Meeting held digitally in response to the SARS-CoV-2 outbreak

At this meeting, the study team coordinated data sharing capabilities with DTPW. DTPW indicated that they are still in procurement for On-Demand services at Metrorail stations, and still developing an Inter-Local Agreements (ILA's) regarding the routes and On-Demand Services.

DTPW indicated that they have the flexibility to adjust timing of peak periods in their data reporting, as special peak periods can be used for timeframes such as lunch, or school release. Tracking rider boardings and alightings was also discussed, with automated personnel counters showing ~70% accuracy.

Mr. Zahn suggested that a good way to calculate waiting time is by estimating it as half of the headway, which represents a passenger arriving at a random time. For the commuter experience category, it may be possible to calculate time savings for passengers on express buses, but more exploration is needed to determine how this comparison would be conducted. Regarding reliability, DTPW typically uses on-time performance as their measurement. When there is a service disruption, the estimated number of missed trips can be calculated by subtracting the number of boardings on that run from the average number of boardings on a per-run basis.

3.3.3 – Meeting with Milos Majstorovic, City of Miami Beach Transportation Manager

April 27, 2020 – Meeting held digitally in response to the SARS-CoV-2 outbreak

At this meeting, the study team worked with Miami Beach staff to understand the details of their data collection systems. Topics of discussion included:

- Mystery Rider Program, which measures performance and includes assessments for trolley stop amenities, reliability, cleanliness, and interior/exterior vehicle appearance, customer service, safety, and vehicle maintenance.
- Existing ridership reporting formats
- Resolution of ridership data (hourly)
- Service costs
- Rider surveys
- Ability to gather more information

4- Performance Framework

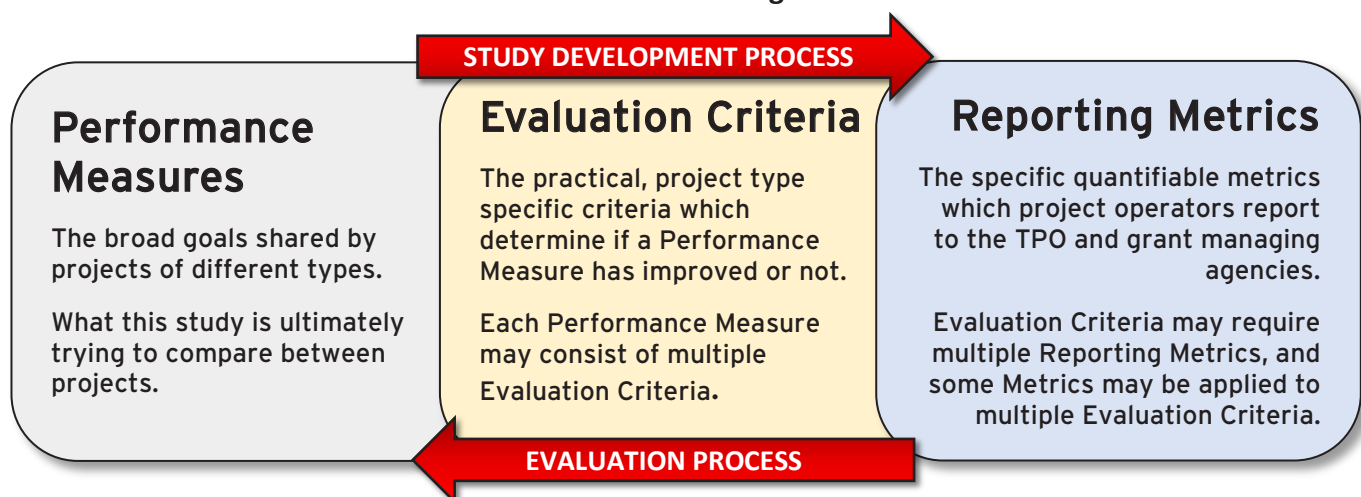
The need for the SMART Plan was formulated in February 2016 with the adoption of MPO Resolution #06-16, which established the fundamental goals of the SMART Plan by declaring *“Rapid Transit Corridor Projects are highest priority and should be advanced in order to provide a comprehensive mobility network that increases regional mobility, reduces congestion, and considers the transportation needs of all residents within the County”*. The performance framework aims to ultimately support these goals by using them to define project success, further sub-dividing them into specific measures according to project type.

While this study does not directly address future projects, the existing projects provide a clear delineation of project types and establishes a framework which can be used for future projects in the program. Projects which provide transit service fall into one of two categories: Fixed Route Service, or On-Demand Responsive Service. Transit facility projects also fall into two categories, with some projects fitting both: Rapid Transit Stations, and Park-and- Ride Facilities.

Since these projects depend on a shared funding source to address similar problems in different ways and to different degrees, a system must be developed to compare them against one another. This creates a challenge as the same metric may have different significance to different projects: for example, using reduction in vehicle-miles traveled when comparing a park-and-ride versus a trolley route. Based on existing park-and-ride facilities and express transit routes in Miami-Dade County, one park & ride user may reduce car travel by 60 vehicle-miles per day compared to just a few miles for one trolley user. Conversely, the increased mobility from a new trolley route may empower numerous residents to adopt a car-free lifestyle, compared to a potentially lesser number of people from implementation of a park & ride.

The solution to this challenge is to evaluate projects through both **qualitative and quantitative** lenses. While each project has their own unique objectives, they all aim towards same ultimate goals: **to improve mobility for residents, alleviate congestion, and support the SMART Plan**. Projects can therefore be evaluated according to a Performance Framework which is conceptually illustrated in figure 4. The Framework judges how well each project achieves a set of Performance Measures through corresponding Evaluation Criteria, which are quantified through the analysis of specific Reporting Metrics.

Figure 4: Structure of Performance Framework



4.1 - Performance Measures

In this section we will explore the logical progression to determine the Evaluation Criteria and Reporting Metrics, beginning with Performance Measures. Transit provides many benefits to the community, but for the purpose of this study, the specific attributes which support the SMART Plan are targeted for improvement. The selection of these performance measures was based on research highlighted in the literature review, and discussions with the study advisory group.

The Performance Measures are grouped into transit services and facilities, which are color coded throughout this document to help keep track of the associated Evaluation Criteria, Reporting Metrics, and the research which supports their inclusion. Transit services, which include all fixed routes and on-demand responsive services, are colored with “cool” colors ranging from purple to green. Facilities, which include all park-and-ride and potential terminals are colored with “warm” colors ranging from yellow to red.

4.1.1 - Transit Service Performance Measures

Commuter Experience

This performance measure seeks to benefit all users of the transportation system during peak periods, not just transit riders. In MPO Resolution #06-16, reducing congestion is included as one of the primary purposes of the Rapid Transit Corridor Projects which now make up the SMART Plan. By improving the commuter experience, a demonstration project helps to achieve one of the underlying goals of the SMART Plan.

Rider Satisfaction

To members of the public, rider satisfaction is the ultimate determinant of success for any transit project, and the literature review revealed that rider/customer satisfaction is used as a performance indicator in many transit agencies across the world. Therefore, while satisfaction is a highly subjective measure, some basic quantifiable metrics will be established to reflect a rational interpretation of rider experience.

Return on Transit Investment

Because transit is a subsidized public service, this term does not reflect a financial return – but rather, the amount of mobility that can be provided per dollar invested. This aligns with a recommended goal for Economic Viability found in the Literature Review of NCHRP report 708. The more efficiently transit service can be delivered, the more money is left on the table for other transit services. Because the SMART Plan is a county wide system with multiple corridors drawing from many shared funding sources, the ability to provide efficient transit service in one location enhances the transit ecosystem in Miami-Dade as a whole.

Connection to SMART Corridors and/or the BERT Network

A transit project must support the SMART Plan to be eligible for SMART Demonstration Program funding. One of the stated goals of the SMART Plan is to increase regional mobility – and to do so, a project must connect to one of the SMART Corridors or the BERT Network. For transit services, this means providing first and last mile transit to and from a rapid transit station which connects long-distance routes to destinations beyond the typical walking distance from the station. This Performance Measure also supports the SMART Plan goal of increasing regional mobility.

Convenience

Transit service must be convenient to result in sustained use. Components of convenient transit include stations close to a rider's home and their destination, with vehicles that have predictable, short wait times, and fast travel times. A route with high ridership and low convenience is likely the only way for those riders to reach their destination – an indicator that the service provided is necessary but can be improved.

4.1.2 - Facility Performance Measures

Amenities

One of the components of a successful transit system is its ability to attract choice riders, which are potential riders who have other means of travel but choose to take transit because of the time savings and convenience. For choice riders who may not otherwise use transit, providing amenities can have a significant impact on shifting their mode-choice towards transit.

Facility Demand and Use

The ultimate measure of a successful transit facility is how much it is used. However due to high land values in Miami-Dade County, right-sizing transit facilities is essential to the fiscal prudence of the projects. For that reason, this performance measure does not simply look for maximum capacity, but rather the balance between demand and use.

For Park-and-Ride projects, providing robust parking options at transit stations allows residents to travel to the transit system with their own vehicle from any distance, park, and ride. Although it is to a limited degree and for a limited number of riders, this extends the capture area of the rapid transit system, which contributes to the ultimate purpose of the SMART Plan.

4.2 - Evaluation Criteria

Evaluation Criteria were developed for each of the Performance Measures identified by the study team before being selected and endorsed by the SAG. These criteria were developed to assess a variety of multimodal capital improvement projects, including but not limited to:

- Traditional bus service
- Express bus service
- Fixed route circulator service
- On-demand transit service
- Transit stations
- Transit facilities such as park-and-ride lots

The measurements and reporting procedure for these criteria is discussed in section 5: Monitoring Program.

The relationship between the Performance Measures and the Evaluation Criteria is shown in figure 5:

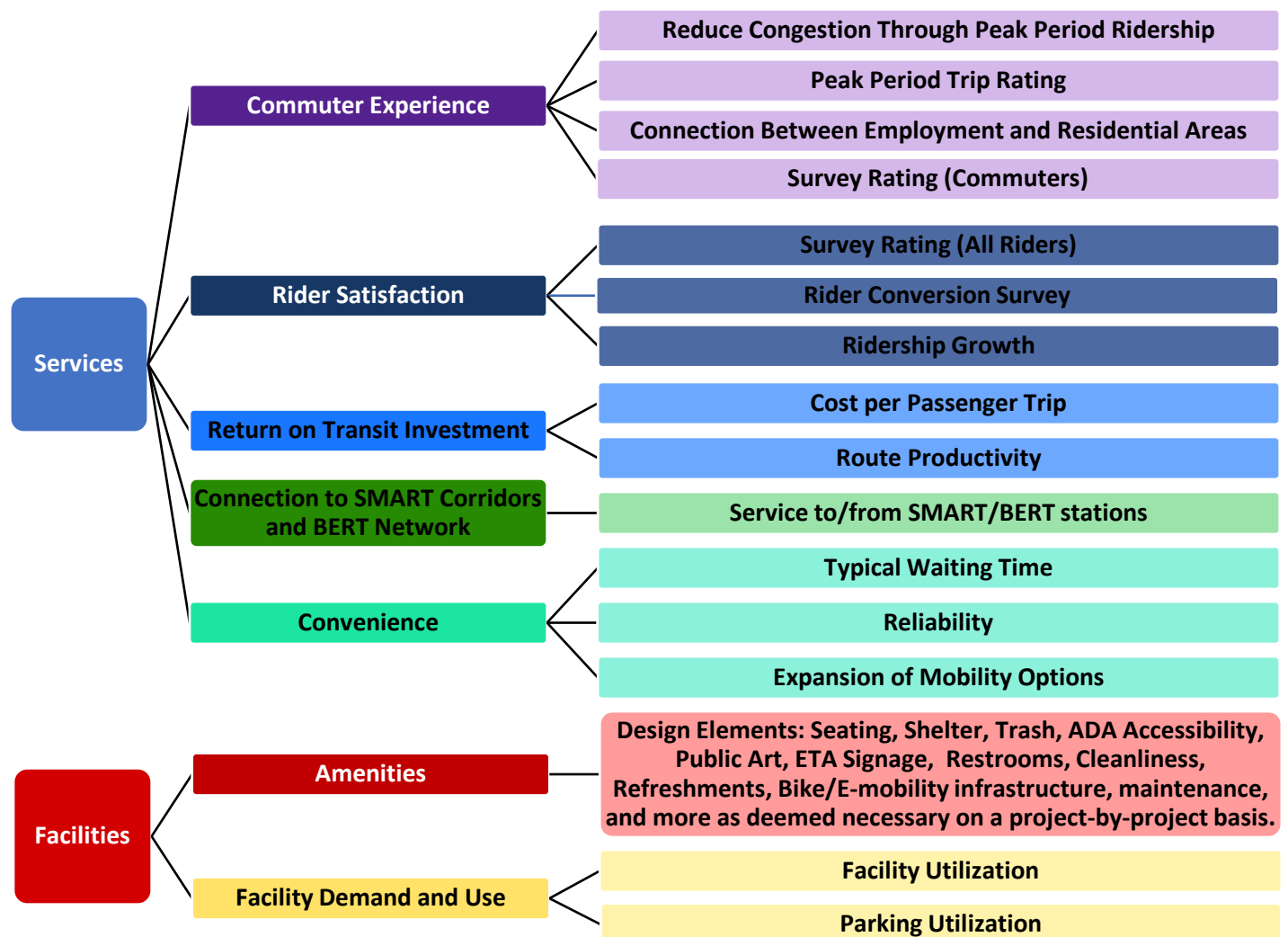


Figure 5: Relationship between Performance Measures and Evaluation Criteria

4.2.1 - Performance Measure: Commuter Experience

Performance Measure	Project Type	Evaluation Criteria
Commuter Experience	ALL	Reduce Congestion Through Peak Period Ridership (Convert single passenger private vehicle trips to transit)
	On-Demand	Peak Period Average Trip Rating
	ALL	Connection Between Employment and Residential Areas Including via Rapid Transit Stops
	ALL	Survey Rating (Commuters)

Reduce Congestion Through Peak Period Ridership

One of the stated SMART Plan goals is to reduce congestion. One of the most effective ways to alleviate problematic congestion is by converting single passenger vehicle trips into transit trips during the peak period. By providing a positive experience for the transit rider, we can improve the commuting experience for everyone, not only the rider themselves. For this reason, one of the Evaluation Criteria for the Commuter Experience is the ability to reduce congestion through peak period ridership.

Peak Period Average Trip Rating (On-Demand Response)

On-Demand transit services have a focus on rider experience, and services ask riders to rate every trip on a 1-5 scale. Because this data is logged for each individual trip, the average peak period rating can be isolated and used as an evaluation criterion for on-demand services.

Connection Between Employment and Residential Areas

A transit service cannot improve the commuter experience if it does not provide a connection between a commuter's home and place of work. Although mixed-use neighborhoods have been re-gaining popularity after falling out of favor since the advent of the suburbs, and many people do live in commercial areas and/or work in residential areas, it is still true that peak period congestion is typically most problematic between areas of high residential density and major employment centers. For this reason, a simple examination of whether a transit service provides a connection between employment and residential areas is used as another Evaluation Criterion.

Survey Rating

On-Demand services typically offer smart phone apps which make it fast and easy to administer brief survey questions to riders, and most existing fixed route transit service providers engage in annual rider surveys. Because these survey tools are pre-existing and would not place an unreasonable burden on project participants, the first evaluation criterion is based on a survey question directly asking riders how they rate their commuting experience compared to driving. For fixed route services, this question should be added to existing surveys such as the annual DTPW TDP survey, or municipal rider surveys to enable more direct insight to the commuter experience. This information can be cross-referenced with a question on which routes the survey taker utilizes, to determine exactly which route these ratings apply to.

4.2.2 - Performance Measure: Rider Satisfaction

Performance Measure	Project Type	Evaluation Criteria
Rider Satisfaction	ALL	Survey Rating (All Riders)
	ALL	Rider Conversion Survey
	ALL	Ridership Growth

Survey Rating

The simplest way to measure rider satisfaction is by directly asking riders through a survey, so a rider survey was easily selected as the first evaluation criterion for rider satisfaction. However, modern psychological studies have shown that people do not always accurately communicate their judgements and/or internal emotional states. For that reason, additional evaluation criteria are required to reach a reliable conclusion about rider satisfaction.

Rider Conversion Survey

A rider who is satisfied with their transit experience will be more likely to choose transit over private vehicles for future trips. Therefore, when a rider indicates on a survey that their transit trip is replacing a private vehicle trip, this indicate strong rider satisfaction.

Ridership Growth

When considering the factors that indicate rider satisfaction, there is none more universal than the fact that when people like something, they use it more often. Therefore, ridership growth was selected as an additional evaluation criterion.

4.2.3 - Performance Measure: Return on Transit Investment

Performance Measure	Project Type	Evaluation Criteria
Return on Transit Investment	ALL	Cost per Passenger Trip
	ALL	Route Productivity (Passengers per service hour)

Cost per Passenger Trip

No matter what unique properties a transit route has, and no matter what benefits it aims to achieve, transit requires ridership to make an impact. The return on a transit investment scales up or down in relation to total transit ridership, making the cost per trip the most logical evaluation criterion to measure Return on Transit Investment.

Route Productivity

Different modes have different costs based on the scale of the service, so it is appropriate to account for overall route productivity. If a route provides many trips, but at a high cost, it is likely that efficiencies can be developed to reduce that cost. Route productivity is measured in passengers per service hour.

4.2.4 - Performance Measure: Connection to SMART Corridors and BERT Network

Performance Measure	Project Type	Evaluation Criteria
Connection to SMART Corridors and BERT Network	ALL	Service to/from SMART/BERT Stations

Service to/from SMART/BERT Stations

The presence of service connecting to SMART Corridors and the BERT Network acts as the Evaluation Criterion for this Measure.

4.2.5 - Performance Measure: Convenience

Performance Measure	Project Type	Evaluation Criteria
Convenience	ALL	Typical Waiting Time
	ALL	Reliability
	ALL	Expand Mobility Options

A transit lifestyle may be more convenient than car ownership due to cost, parking, and maintenance. However, on a trip-by-trip basis, a private vehicle travels with you, and goes directly from your origin to your destination, making it more convenient. Therefore, for the purpose of this study, the convenience of a transit route is best measure by the ability of that route to mitigate the built-in inconveniences of public transit.

Typical Waiting Time

One inconvenience of public transit when compared to private vehicles is the need to wait for the transit vehicle to reach the rider at the beginning of a trip. A transit route with short waiting times negates this issue, so a service with short wait times satisfies this criterion.

Reliability

The inconvenience of a long wait can be avoided when a vehicle arrives as scheduled. If a vehicle is early, late, or does not arrive at all, this can cause a cascade of inconvenience. Thus, reliability was selected as the second evaluation criterion. This is supported in the literature review by the case study from the Washington Area Metro Transit Authority, which identified service reliability as the primary source of dissatisfaction.

Expand Mobility Options

Expanding mobility means providing more transit options to more people. By expanding first and last mile mobility, SMART Demonstration projects bring new riders to the SMART Corridors who otherwise would have had no choice but to use a car. This supports the SMART Plan goals of increasing regional mobility and considering the transportation needs of all residents. Therefore, the expansion of mobility options acts as the third evaluation criterion.

4.2.6 - Performance Measure: Amenities

Performance Measure	Project Type	Evaluation Criteria
Amenities	ALL	Design Elements: Seating, Shelter, Trash, ADA Accessibility, Public Art, ETA Signage, Restrooms, Cleanliness, Refreshments, Bike/E-mobility infrastructure, maintenance, and more as deemed necessary on a project-by-project basis.

Design Elements

Amenities create a significant draw towards transit, especially among choice riders. Enhanced amenities like clean restrooms, refreshments, and public art installations create additional attractiveness and contribute to a favorable outlook towards transit. Small and large stations can equally benefit from installing bike racks, bike charging stations and shared e-mobility infrastructure which cater to the persisting problem of last-mile connectivity. All these amenities retain their attractiveness only if they are cleaned and maintained at regular intervals. For this reason, the evaluation criteria for amenities includes not only the availability of quality facilities and services offered on and off-board, but also their state of cleanliness, ease of use and state of upkeep.

4.2.7 – Performance Measure: Facility Demand and Use

Performance Measure	Project Type	Evaluation Criteria
Facility Demand and Use	Facilities	Facility Utilization
	Park-and-Ride	Parking Utilization

Facility Utilization

For a transit facility to be successful, it must be used by riders boarding transit vehicles. Understanding how a new transit facility influences ridership is important to the overall health of the transit system. Not only does this help in assessing the accuracy of ridership projections on which the project was based, but it also informs other SMART Plan projects still in development.

Parking Utilization

Parking utilization should be monitored to evaluate the effectiveness of the Park-and-Ride lot in increasing the catchment area of the station, and to understand how many riders would have not taken transit otherwise. This supports the SMART Plan goal of reducing congestion, as every car parked is one more car off the road during peak periods. Parking utilization can also be used to gauge travel behavior, by categorizing the users into long-term customers (monthly pass holders) and incidental customers, parking between office hours or not (trip purpose), and overnight parking (shift workers). This can provide valuable insight useful in designing future park-and-ride facilities.

5 - Monitoring Program

This monitoring program uses the performance framework outlined in the previous section to qualitatively and quantitatively evaluate the success of SMART Demonstration Program projects. Specific reported metrics are assigned to each evaluation criterion, and reporting requirements are customized by project type, including the flexibility to adjust peak periods, a need introduced by SAG members at the second SAG meeting. These requirements attempt to balance the need for robust and timely data with the desire to minimize burden on SMART Plan project participants.

5.1 - Reporting Metrics

Based on the Evaluation Criteria, specific reportable metrics had to be determined which could be reasonably gathered and transmitted to the TPO by project owners and operators. This data is to be collected and reported at different time frames: quarterly, annually, or once at service opening, with the additional requirement of providing updates to the TPO when a change occurs.

Some reported metrics are used in calculations with multiple evaluation criteria, so in this section the metrics are presented without direct association with an evaluation criterion – information on those relationships is contained in the next section, 5.2 - Reporting Requirements.

Facilities

Reported Metric	Schedule
Design Review Design Elements: Seating, Shelter, Trash, ADA Accessibility, Public Art, ETA Signage, Restrooms, Cleanliness, Refreshments, Bike/E-mobility infrastructure, maintenance, and more as deemed necessary on a project-by-project basis.	At service opening, updated when changed
Total Monthly Staff Hours (sample case: 2 guards x 8 hours per day x 30 days = 480 Staff Hours)	
Ridership of Connecting Routes	Quarterly
Average Daily Occupancy (Park-and-Rides ONLY)	

Transit Services

Reported Metric	Schedule
Service Area Map	At service opening, updated when changed
Service Schedule (with Average Headway for fixed-route services)	
Survey (3 questions): - How would you rate your experience commuting on [PROJECT NAME], <u>compared to driving</u>? - Overall, how would you rate your experience riding on [PROJECT NAME]? - Have your transit trips on [PROJECT NAME] replaced private vehicle trips?	Annually
Ridership - Monthly (count) - Daily (count) - Hourly (When accurate hourly ridership cannot be obtained due to insufficient or faulty equipment, manual counts averaged over a few days will be accepted.)	Quarterly
Operating Costs (monthly)	
On-Time Performance	
Hourly Average Trip Ratings (On-Demand Service ONLY)	
Average “Ride Request to Selection” Time (On-Demand Service ONLY)	
Average “Ride Request to Pick up” Time (On-Demand Service ONLY)	

5.2 - Reporting Requirements

5.2.1 - On-Demand Services

On-Demand services typically generate extensive data reports on a regular basis. Project sponsors may provide the entire data report to the TPO or may provide specific elements to satisfy the reporting requirements. Based on a review of existing data reports and direct consultation with an existing on-demand service provider for multiple SMART Demonstration projects in Miami-Dade County, the following reporting requirements have been established to address all evaluation criteria:

Schedule	Reporting Metric	Evaluation Criteria
At service opening, updated when changed	Service Area Map	Expansion of Mobility Options
		Service to/from SMART/BERT Stations
Annually	Survey Question: How would you rate your experience commuting on on-demand service, compared to driving?	Survey of Commuter Experience
	Survey Question: Overall, how would you rate your experience riding on on-demand service?	Survey of Rider Satisfaction
	Survey Question: Have your transit trips on [PROJECT NAME] replaced private vehicle trips?	Rider Conversion
Quarterly	Ridership (Hourly)	Reduce Congestion Through Peak Period Ridership (Convert single passenger private vehicle trips to transit)
	Hourly Average Trip Ratings	Peak Period Average Trip Rating
	Ridership (Monthly)	Ridership Growth
	Operating Costs	Cost per Passenger Trip
	Service Schedule	Route Productivity
	Ridership (Daily)	
	Average time from Ride Request to Selection	Typical Waiting Time
	Average time from Ride Request to Pickup	
	On-time performance	Reliability

5.2.2 - Fixed-Route Trolley Services

Trolley services are typically operated by municipalities, and data availability varies by system. Based on communications with existing project participants, the following reporting requirements have been established to address all evaluation criteria:

Schedule	Reporting Metric	Evaluation Criteria
At service opening, updated when changed	Service Area Map	Expansion of Mobility Options
		Connection Between Employment and Residential Areas Including via Rapid Transit Stops
	Route Map	Service to/from SMART/BERT Stations
Annually	Survey Q: How would you rate your experience commuting on trolleys, compared to driving?	Survey of Commuter Experience
	Survey Q: Overall, how would you rate your experience riding on trolleys?	Survey of Rider Satisfaction
	Survey Question: Have your transit trips on [PROJECT NAME] replaced private vehicle trips?	Rider Conversion
Quarterly	Ridership (Hourly)	Reduce Congestion Through Peak Period Ridership
	Ridership (Monthly)	Ridership Growth
		Cost per Passenger Trip
	Operating Costs	Route Productivity
	Service Schedule	
	Ridership (Daily)	
	Average Headway	Typical Waiting Time
	On-Time Performance	Reliability

5.2.3 - Fixed-Route Bus Services

DTPW has a robust data reporting system in place, with multiple report types providing information on ridership, reliability, service characteristics, and more. After a review of these reports, and direct consultation with the DTPW Service Planning and Scheduling Section staff, the following reporting requirements have been established to address all evaluation criteria:

Schedule	Reporting Metric	Evaluation Criteria
At service opening, updated when changed	Service Area Map	Expansion of Mobility Options
		Connection Between Employment and Residential Areas Including via Rapid Transit Stops
	Average Headway	Typical Waiting Time
	Route Map	Service to/from SMART/BERT Stations
Annually	Survey Q: How would you rate your experience commuting on buses, compared to driving?	Survey of Commuter Experience
	Survey Q: Overall, how would you rate your experience riding on buses?	Survey of Rider Satisfaction
	Survey Question: Have your transit trips on [PROJECT NAME] replaced private vehicle trips?	Rider Conversion
Quarterly	Ridership (Hourly)	Reduce Congestion Through Peak Period Ridership
	Ridership (Monthly)	Ridership Growth
		Cost per Passenger Trip
	Operating Costs	Route Productivity
	Service Schedule	
	Ridership (Daily)	
	On-Time Performance	Reliability

5.2.4 - Facilities (Stations & Park-and-Rides)

Existing transit facility data is typically generated by the service provider. Future SMART Transit facilities aspire to be increasingly multi-modal, which means future evaluations may require aggregating data from multiple service providers, such as SFRTA, DTPW, Municipalities, and private operators. However, all existing facilities in the SMART Demonstration Program operate as park-and-rides or transit stations – based on these project types and the data available from them, the following reporting requirements have been established to address all evaluation criteria:

Schedule	Reporting Metric	Evaluation Criteria
At facility opening, updated when changed	Design Review	Design Elements: Seating, Shelter, Trash, ADA Accessibility, Public Art, ETA Signage, Restrooms, Cleanliness, Refreshments, Bike/E-mobility infrastructure, maintenance, and more as deemed necessary on a project-by-project basis.
Quarterly	Average Daily Occupancy	Parking Utilization
	Ridership increase on routes which serve the transit facility	Facility Utilization

5.3 – Performance Framework and Monitoring Program Summary

The complete performance framework and monitoring program are summarized in the following table, showing the relationship between performance measures and evaluation criteria, as well as the data collection guidelines, reported metrics, and schedule.

Transit Service Projects

Performance Measure	Type	Evaluation Criteria	Reporting Metric	Schedule
Commuter Experience	ALL	Reduce Congestion Through Peak Period Ridership (Convert single passenger private vehicle trips to transit)	Hourly Ridership	Quarterly
	On-Demand	Peak Period Avg Trip Rating	Hourly Average Trip Ratings	Quarterly
	Fixed Route	Connection Between Employment and Residential Areas Including via Rapid Transit Stops	Service Area Map	At initiation, updated when changed
	ALL	Survey (Commuters)	Survey Q: How would you rate your experience commuting on [INSERT], compared to driving? Answers: 5-point scale (A lot better, a little better, neutral, a little worse, a lot worse)	Annually
Rider Satisfaction	ALL	Survey (All Riders)	Survey Q: Overall, how would you rate your experience riding on [INSERT]? Answers: 5-point scale (Great, Good, Neutral, Room for Improvement, Bad)	Annually
	ALL	Survey (All Riders)	Survey Q: Have your transit trips on [PROJECT NAME] replaced private vehicle trips?	Annually
	ALL	Ridership Growth	Monthly Ridership (Total Passenger Trips)	Quarterly
Return on Transit Investment	ALL	Cost per passenger trip	Operating Costs (monthly if possible) Monthly Ridership	Quarterly
	ALL	Route Productivity (Passengers/service hr.)	Service Schedule Daily Ridership	Quarterly
Connection to SMART Corridors and BERT Network	ALL	Service to/from SMART/BERT stations	Service Area Map	At initiation, updated when changed
Convenience	ALL	Typical Waiting Time	Fixed Route: Average Headway /2 On-Demand: (Ride request to pick-up) minus (ride request to selection) /2* *Dividing by 2 accounts for riders' ability to predict wait times and request rides in advance of need.	Bus: At initiation Other: Quarterly
	ALL	Reliability	On-Time Performance	Quarterly
	ALL	Expansion of Mobility Options	Service Area Map	At initiation

Facilities

Performance Measure	Type	Evaluation Criteria	Reporting Metric	Schedule
Amenities	ALL	Design Elements: Seating, Shelter, Trash, ADA Accessibility, Public Art, ETA Signage, Restrooms, Cleanliness, Refreshments, Bike/E-mobility infrastructure, maintenance, and more as deemed necessary on a project-by-project basis.	Design Review	At facility opening, updated when changed
Facility Demand and Use	Park-and-Ride	Parking Utilization	Average Daily Occupancy	Quarterly
	ALL	Facility Utilization	Ridership increase on routes which serve the transit facility	Quarterly

6 – Determining Success

The Performance Framework establishes a method of evaluation which assists transit agencies in monitoring projects and determining what measures should be used to determine if a project is successful, or if a service needs to be revised to better capture the needs of the community. Throughout the development of this study, the goal was to establish uniform thresholds for success based on information from the literature review, best practices, and input from the SAG.

Baseline thresholds for success were established, but this process showed how important the unique context of a project was to its success. One municipality may institute a new trolley route with the hope of spurring economic activity and providing new service, while a different municipality may prioritize de-congesting the roadway during peak periods. Another differentiating factor which emerged in this process was the scale or funding level for a project. While we account for differences in project cost through the Performance Metric “Return on Transit Investment”, small scale projects may face greater challenges to achieve success for some of the Evaluation Criteria. Therefore, it may not be possible for all projects to achieve success for all evaluation criteria.

The complete evaluation matrix, including thresholds for success, is included in the appendix of this report.

6.1 - Thresholds for Successfully Satisfying Evaluation Criteria

Given the flexible nature of the demonstration program, we must not create guidelines which would exclude new, innovative projects. Therefore while thresholds for success have been established for existing projects, future applicants to the SMART Demonstration Program will need to declare their goals and challenges so that thresholds can be adjusted to appropriate levels in coordination with TPO staff.

The following list illustrates each Evaluation Criterion and explains why the **threshold (in bold)** was chosen.

Performance Measure: Commuter Experience

Peak Period Ridership

To show that riders are using the new transit route to commute, we must look at how ridership compares during peak and off-peak hours. If ridership along the new transit route is greater during the peak period than non-peak periods, that shows that it is most likely being used as a means of commute. Therefore for this Evaluation Criterion, the threshold for success is **Average peak period ridership greater than non-peak ridership**. Peak hours may be adjusted on a project by project basis at the request of SAG members such as Miami Beach, who communicated at the second SAG meeting that some areas host industries which do not abide to the 9-5 work schedule. Some SAG members indicated noon peak periods, and peak periods in the evening for tourist and entertainment-based areas.

Peak Period Average Trip Rating

Driving through traffic is unpleasant, and transit service which frees people from this burden is a positive experience. It can reasonably be assumed that people will give higher ratings for a trip when that trip frees them from this negative experience. Therefore for this Evaluation Criterion, the threshold for success for on-demand response transit services is **to have peak period average trip rating greater than non-peak average trip rating**.

Connection Between Employment and Residential Areas

Representatives from Cutler Bay indicated at the first SAG meeting that getting people to work was their primary concern. While many people travel to a “third place” such as a gym, café, or other gathering place before or after work, the commute always involves home and a place of employment. Residential and commercial areas are typically clearly indicated on land use and zoning maps, so for this Evaluation Criterion, the threshold for success of a fixed-route transit service is **to provide a connection between at least one employment area and one residential area, as shown on the service area map**.

Survey Rating (Commuters)

A direct survey of riders gives the clearest indication of how they qualitatively experience the service, although this does not account for a discrepancy between stated preferences and revealed preferences. The survey question of “*How would you rate your experience commuting on [INSERT PROJECT NAME], compared to driving?*” will be presented with a five (5) point scale for answers, ranging from a lot better to a lot worse, with neutral being the middle score of three (3). Based on this question for this Evaluation Criterion, the threshold for success is **to have a positive average rating, meaning greater than three (3)**.

Performance Measure: Rider Satisfaction

Survey Rating (All Riders)

The survey question of “Overall, how would you rate your experience riding on [INSERT PROJECT NAME]?” will be presented with a five (5) point scale for answers, ranging from great to bad, with neutral being the middle score of three (3). Therefore for this Evaluation Criterion, the threshold for success is **to have a positive average rating, meaning greater than three (3).**

Rider Conversion Survey

The survey question of “Have your transit trips on [PROJECT NAME] replaced private vehicle trips?” will be asked by each transit service provider. For this Evaluation Criterion, the threshold for success is **to show that trips have been converted from private vehicles to transit.**

Ridership Growth

FDOT’s most recent iteration of the Florida Transportation Plan (FTP) reports that Florida is expected to grow by 700 residents per day over the next 25 years, with 61% of that growth happening in 10 heavily developed counties, including Miami-Dade. This population growth may distort the correlation between ridership growth and Rider Satisfaction. To ensure the accuracy of this Evaluation Criterion, the threshold for success is **to have ridership growth greater than population growth for the given period.**

Performance Measure: Return on Transit Investment

Cost per Passenger Trip and Route Productivity

The SMART Demonstration Program seeks to explore new possibilities, so the expectation for a successful project is to out-perform existing transit. Therefore for the Evaluation Criterion of Cost per Passenger Trip, the threshold for success is **cost per passenger trip less than the Miami-Dade County (DTPW) average bus cost per passenger trip (per most recent NTD Report), which is \$7.02 at the time of this report’s publication.**

Similarly, for the Evaluation Criterion of Route Productivity, the threshold for success for fixed-route services is **productivity greater than the average Miami-Dade County (DTPW) bus route productivity (per most recent NTD Report), which is 24.9 passengers per hour at the time of this report’s publication.**

Based on the Public Transportation Grant Agreement (PTGA) Doral has established with FDOT, the threshold for success for On-Demand Responsive services is **10 passengers per vehicle per hour.**

Performance Measure: Connection to SMART Corridor / BERT Network

Service to/from SMART Corridors and/or BERT Network Stations

To support the SMART Plan, a transit route must connect to at least one SMART Corridor or BERT Network Route. Therefore for this Evaluation Criterion, the threshold for success is **to provide service to at least one SMART Corridor or BERT Network station, as shown on the service area map**

Performance Measure: Convenience

Typical Waiting Time

As shown in the literature review study *“Smart Feeder/Shuttle Bus Service: Consumer Research and Design”*, rider willingness to wait typically falls off after 10 minutes. Therefore for this Evaluation Criterion, the threshold for success is **to provide a typical waiting time of 10 Minutes or less, calculated as half of the typical headway for fixed route service, and for on-demand services calculated as half of the time between ride selection and pick-up**. For on-demand services, this accounts for rider’s ability to predict vehicle arrival times and request rides in advance of need.

Reliability

Transit services which arrive earlier or later than scheduled can cause problems for riders who depend on the regularity of that service. While some flexibility must be allowed to accommodate real world conditions, a goal for on-time performance has already been established in Miami-Dade County. Therefore for this Evaluation Criterion, the threshold for success is **to have on-time performance better than 78%, the goal established in MDT10Ahead, the Miami-Dade County 2020 Transit Development Plan Major Update**.

Expansion of Mobility Options

Introducing a new transit mode to an area improves the general utility of transit, and the viability of transit as a primary form of transportation. Therefore for this Evaluation Criterion, the threshold for success is **to provide a new service type, a new connection, or service to a new area**.

Performance Measure: Amenities

Amenities

Not every station will provide the same amenities for rider comfort because stations are built to serve different purposes; one station may have the need for restrooms, while another benefits more from the presence of active transport options such as bike or scooter rentals, as suggested at the first SAG meeting by representatives from Miami Beach. To provide flexibility, a list of amenities has been developed based on existing transit stations and consultations with the Study Advisory Group. Therefore for this Evaluation Criterion, the threshold for success is **to have at least 70% of the identified amenities present at the station**.

Performance Measure: Facility Demand and Use

Parking Utilization

To arrive at an appropriately sized parking lot, demand projections and a subsequent cost-benefit analysis are typically performed. However, once the facility is in operation, real world observations of demand and usage override any calculations and help signal when it is appropriate to scale up projects which have been designed with that potential. The *“FDOT State Park-and-Ride Guide”* provides suggested operating standards for Park-and-Rides. Based on these standards, for this Evaluation Criterion, the threshold for success is **to show greater than 60% average daily occupancy of the Park-and-Ride lot.**

Facility Utilization

If a transit facility is being used, the ridership of the routes serving that station should show significant growth. Therefore for this Evaluation Criterion, the threshold for success is **to show overall ridership growth across the routes which connect to the transit facility.**

6.2 – Test Evaluation: South Beach Trolley

A test evaluation was performed on one on-demand service, one fixed-route service, and one park-and-ride facility to illustrate the complete evaluation process. These test evaluations were performed using existing data. Because some criteria will require new data collection efforts as a result of this study such as survey questions or customized data reporting, some fields are necessarily incomplete at this time.

Schedule	Evaluation Criteria	Reporting Metric	Results	Success?
At service opening, updated when changed	Connection Between Employment and Residential Areas	Service Area Map	Mixed-Use area	Yes
	Expansion of Mobility Options	Service Area Map	Improved existing trolley service	No
	Service to/from SMART/BERT Stations	Service Area Map	Serves future station location	Yes
Annually	Survey of Commuter Experience	Survey Question: How would you rate your experience commuting on the South Beach Trolley, compared to driving?	Question to be added to app	N/A
	Survey of Rider Satisfaction	Survey Question: Overall, how would you rate your experience riding the South Beach Trolley?	Question to be added to app	N/A
	Rider Conversion	Survey Question: Have your trips on the South Beach Trolley replaced private vehicle trips?	Question to be added to app	N/A
Quarterly	Reduce Congestion Through Peak Period Ridership	Ridership (Hourly) Peak Period: 11:00 AM - 6:00 PM	Jan '20: 81,848	Yes
	Ridership Growth	Ridership (Monthly)	Oct '18: 142,365 Oct '19: 160,330 Growth: 12.6%	Yes
	Cost per Passenger Trip	Ridership (Monthly)	Total (Oct '19): 160,330	\$2.53 per boarding
		Operating Costs	Total (Oct '19): \$405,927	Yes
	Route Productivity	Service Schedule	6:00 AM–11:59 PM	283 per hour
		Ridership (Daily)	2019 Average: 5,097	Yes
	Typical Waiting Time	Average Headway	Average Wait: ~10 minutes	Yes
	Reliability	On-Time Performance	Average OTP: 81%	Yes

6.3 - Test Evaluation: Coral Gables On-Demand Service

Schedule	Evaluation Criteria	Reporting Metric	Feb/Mar 2019	Success?
At service opening, updated when changed	Connection Between Employment and Residential Areas	Service Area Map	Coral Gables - Metrorail	Yes
	Service to/from SMART/BERT Stations	Service Area Map	Metrorail Station	Yes
	Expansion of Mobility Options	Service Area Map	Yes	Yes
Annually	Survey of Commuter Experience	Survey Question: How would you rate your experience commuting with Coral Gables Freebee, compared to driving?	Question to be added to app	N/A
	Survey of Rider Satisfaction	Survey Question: Overall, how would you rate your experience riding Coral Gables Freebee?	Question to be added to app	N/A
Quarterly	Peak Period Ridership	Ridership (Hourly)	Lunch Peak: 205 Evening Peak: 223	Yes
	Peak Period Average Trip Rating	Hourly Average Trip Ratings	Average Rating: 4.6 / 5	Yes
	Ridership Growth	Ridership (Monthly)	Feb: 6,777 March: 7,991 Growth: 18%	Growth: 18% Yes
	Cost per Passenger Trip	Ridership (Monthly)	8,300 monthly rides (Different time period)	\$2.40 per ride Yes
		Operating Costs	Yr. Operating Cost: \$419,000 Yr. Ad Revenue: \$180,000	
	Route Productivity	Service Schedule	10:00 AM – 10:00 PM	Yes
		Ridership (Daily)	277	
	Typical Waiting Time	Average time for: 1) Ride Request to Selection - 2) Ride Request to Pickup	Request to selection: 1.52m Request to pick up: 8.11m Wait time: 3.3 minutes = (8.11-1.52) / 2	Yes
	Reliability	On-time performance	Data to be provided in future customized reports)	N/A

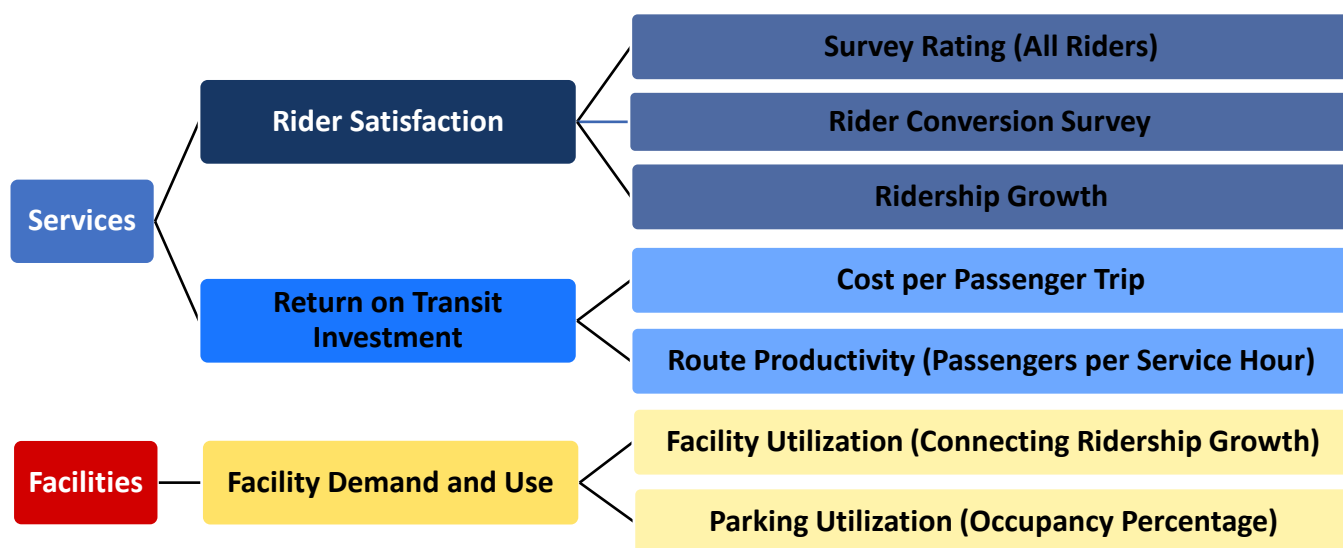
6.4 – Test Evaluation: Palmetto Bay Transit Facility (Park-and-Ride)

Schedule	Evaluation Criteria	Reporting Metric	Results	Success?
At facility opening, updated when changed	Design Elements: Seating, Shelter, Trash, Public Art, ETA Signage, Restrooms, ADA Accessibility, Cleanliness, Refreshments, Bike/E-mobility infrastructure, maintenance, and more as deemed necessary on a project-by-project basis.	Design Review	Seating, Trash, ETA Signage, Restrooms, ADA Accessible, Clean, Water Fountain, Bike Rack, regularly maintained.	Yes
Quarterly	Parking Utilization	Average Daily Occupancy	10-12 spaces per day	No
	Facility Utilization	Ridership Increase of Connecting Routes	Palmetto Express October: 173 / wk. Dec: 236 / wk. (excludes Dec. 21-31 due to winter holidays)	Yes

7 - Recommendations

The study has developed Performance Measures and Evaluation Criteria as part of a comprehensive framework which addresses multiple aspects of performance for transit services and facilities. This Performance Framework has been designed with multiple data collection/reporting timeframes. **It is recommended that performance evaluations take place on a quarterly basis** to assist the TPO and operating agencies to monitor projects and adjust supply to meet the changing demands of the project, may that be additional vehicles, additional service hours, or additional amenities for stations or facilities. While the purpose of these evaluations is to have up-to-date information on the performance of demonstration projects, it also assists agencies with decisions to continue funding of feasible projects.

It is recommended that a phased approach be used to roll-out these evaluations. The first phase should consist of three Performance Measures and their seven associated Evaluation Criteria:



Additionally, it is recommended that projects which apply for funding as a part of the SMART Demonstration Program provide the following:

1. Coordinate with the Miami-Dade TPO to include their project information in the list of program priorities
2. State their project goals and objectives, and how they correlate with the elements of the recommended Performance Framework.
3. Project sponsors must commit to collecting all data recommended in the Performance Framework
 - Fixed-Route services must have working APC devices or incorporate and request them as a part of their application.
 - On-Demand Responsive services must have robust data reporting including all datapoints indicated in this study
 - Park-and-Rides must describe the existing land use on their intended site and commit to regularly counting parking utilization.

8 – Conclusions

This SMART Demonstration Program consists of a suite of diverse projects including fixed transit routes, on-demand transit services, and transit facilities, all of which advance elements of a rapid transit system and provide for first-and-last mile connections to that system.

As part of the research performed during the study, it was concluded that there was no established or off-the-shelf analytical framework which could be applied to SMART Demonstration Program. This is most pronounced in relation to on-demand transit services, an emerging transit mode in the age of smart phones and electric mobility. A framework for technical evaluation was developed for these projects based on elements from the literature review, feedback from the study advisory group, and interviews with cutting edge mobility service providers. This framework presents a comprehensive suite of potential analytical tools for the individual projects which make up the SMART Demonstration program, targeted at serving the goals of the SMART plan.

Funding for these projects is provided through federal, state and local sources, and the program of projects is prioritized annually in the TPO's List of Program Priorities. State funding is mainly received through FDOT's Transit Service Development Program, Transit Corridor Program and the State Park-and-Ride Program, which receive annual applications. The next step towards implementation is working with FDOT within the current process for transit project applications and the TPO's List of Program Priorities to incorporate the recommendations of this study into the project implementation process.

Based on the recommendations provided in this study, the TPO can continue working to provide guidance to implementing agencies on the best way to monitor the performance of these projects so that they can be continually improved in response to changing transportation market demands.

Appendix - Complete Evaluation Matrix

Performance Measure		Evaluation Criteria	Reported Metric	Schedule	Threshold for Success
Routes	Commuter Experience This performance measure seeks to benefit all users of the transportation system during peak periods, not just transit riders	Reduce Congestion through Peak Period Ridership (Convert single passenger private vehicle trips to transit)	Hourly Ridership	Quarterly	Peak period ridership greater than non-peak ridership.
		On-Demand: Peak Period Average Trip Rating	Hourly Average Trip Ratings	Quarterly	Peak period average trip rating greater than non-peak measurement.
		Fixed Route: Connection Between Employment and Residential Areas Including via Rapid Transit Stops	Service Area Map	At initiation, updated when changed	Yes (Connect Employment and Residential Area)
		Commuter Satisfaction (via Survey)	Survey Q: How would you rate your experience commuting on [INSERT PROJECT NAME], compared to driving? Answers: 5 point scale (A lot better, a little better, neutral, a little worse, a lot worse)	Annually	Average rating better than neutral (3 out of 5)
	Rider Satisfaction The ultimate measurement of a high quality transit service	Rider Satisfaction (via Survey)	Survey Q: Overall, how would you rate your experience riding on [INSERT PROJECT NAME]? Answers: 5 point scale (Great, Good, Neutral, Room for Improvement, Bad)	Annually	Average rating better than neutral (3 out of 5)
		Rider Conversion	Survey Q: Have your transit trips on [PROJECT NAME] replaced private vehicle trips?	Annually	Trips converted from private vehicle to transit
		Ridership Growth	Monthly Ridership (Total Passenger Trips)	Quarterly	Ridership growth greater than population growth (FDOT Florida Transportation Plan)
	Return on Transit Investment This refers to the amount of mobility which can be provided per dollar invested	Cost per passenger trip	Operating Costs (monthly if possible) Monthly Ridership	Quarterly	Less than the Miami-Dade County (DTPW) average bus cost per passenger trip from most recently published NTD report (2018: \$361,470,574 / 51,469,756 = \$7.02)
		Route Productivity (Passengers per service hour)	Service Schedule Daily Ridership	Quarterly	Fixed Route: More than the Miami-Dade County (DTPW) average bus route productivity from most recently published NTD report (2018: 51,469,756 / 2,066,269 = 24.9 passengers per hour) On-Demand: 10 passengers per vehicle per hour
	Connection to SMART Corridors and BERT Network	Service to/from SMART/BERT stations	Service Area Map	Quarterly	Yes
Facilities	Convenience Transit service must be convenient to result in sustained use and attract choice riders	Typical Waiting Time	Fixed Route: Average Headway / 2 On-Demand: (Ride request to pick-up)-(ride request to selection)/2* *Dividing by 2 accounts for riders' ability to predict wait times and request rides in advance of need.	Bus: At initiation, updated when changed. Trolley: Quarterly On-Demand: Quarterly	10 Minutes or less (per "Smart feeder/shuttle bus service: consumer research and design")
		Reliability	On-Time Performance (When unavailable for on-demand service, unfulfilled trip requests will be used as a substitute)	Quarterly	Better than 78% (goal established in TDP Major Update)
		Expansion of Mobility Options	Service Area Map	At initiation, updated when changed	New Service Type or Area
	Amenities Amenities at a transit station reduce potential inconveniences and improves customer satisfaction	Design Elements: Seating, Shelter, Trash, ADA Accessibility, Public Art, ETA Signage, Restrooms, Cleanliness, Refreshments, Bike/E-mobility infrastructure, maintenance, and more as deemed necessary on a project-by-project basis.	Design Review	At initiation, updated when changed	Checklist: (Yes/No for each item)
	Facility Demand and Use Due to high land value, it is essential that transit facilities are located and sized for maximum utilization	Park-and-Ride: Parking Utilization	Average Daily Occupancy Percentage	Quarterly	Greater than 60% (FDOT State Park-and-Ride Guide)
		Facility Utilization	Ridership Increase of Connecting Routes	Quarterly	Existing Routes: Growth Yes/No New Routes: Exceed DTPW Standards Yes/No



**Miami-Dade Transportation
Planning Organization**

