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APPENDIX B BUS RAPID TRANSIT



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The last few years have seen increased interest in improved frequency bus service in Grand Forks. Much of this interest ties back to community sustainability and livability initiatives being developed locally and championed by the City of Grand Forks. Livable Grand Forks has been on the forefront of pushing more sustainable transportation options for the community. As part of the TDP update process, the Grand Forks City Council asked for additional information on Bus Rapid Transit (BRT) systems.

Through the efforts of Livable Grand Forks, BRT a high-capacity, high-frequency specialized bus route, in Grand Forks has been previously discussed, and concepts developed for BRT development between perceived major generators and as a redevelopment tool. A BRT corridor was conceptually identified between downtown to UND via University Avenue or Dyke Avenue, with an expansion option to the Alerus Center. This corridor is shown later in this report in Figure 2.

The discussion included in this section contains additional information on BRT to provide additional guidance for Grand Forks decision-makers:

- » Key features of BRT and the variations that exist across BRT systems.
- » Where BRT is currently in operation and the cities that are in the process of planning or constructing new systems.
- » Capital and operations and maintenance costs of BRT and how they vary by route and system.
- » List of funding sources that can be used for planning, constructing, and/or operating BRT.
- » Considerations for BRT in Grand Forks

WHAT IS BUS RAPID TRANSIT?

BRT is a type of transitway that has been increasing in popularity around the world. BRT stations have many of the same features and benefits as light rail stations. The largest difference between BRT and light rail is that BRT uses a bus on roadways rather than a train on tracks, thus significantly decreasing the cost.

BRT FEATURES

Per the Institute for Transportation & Development Policy, five key features define BRT.¹ These features include dedicated right-of-way, busway alignment, off-board fare collection, intersection treatments and platform-level boarding.

Dedicated Right-of-Way

BRT can operate in a dedicated right-of-way similar to light rail transit (LRT). The use of a dedicated right-of-way reduces conflicts and interference with other traffic and modes, allowing BRT systems to achieve higher average speeds and increased system reliability.

Busway Alignment

The BRT alignment within a shared corridor can be either center running or side running in a shoulder or adjacent to a curb. Center running alignments have the benefit of reducing conflicts with driveways, turning vehicles, deliveries and other sources of potential congestion.

Off-Board Fare Collection

Off-board fare collection is one of the elements that provides the greatest time savings with BRT implementation. By moving the collection of fares from on-board to advance payment at the station, boarding

¹ <https://www.itdp.org/library/standards-and-guides/the-bus-rapid-transit-standard/what-is-brt/>

times can be reduced significantly. Enforcement is often conducted through barrier-controlled systems or through proof-of-payment.

Intersection Treatments

Intersection treatments to improve BRT operations can include turn prohibitions and advanced signal timing applications. The use of transit signal priority, or TSP, can provide early truncation of conflicting red movements or extension of coordinating green movements to provide better progression for BRT buses through a corridor.

Platform-Level Boarding

Level or near-level boarding can also provide significant time savings in the boarding and alighting of passengers with the implementation of a BRT system. By reducing the vertical differential between the station and the BRT bus floor, less time is needed to deploy ramps and lifts for passengers with certain disabilities and mobility challenges.

Other Features

BRT systems often provide a number of other features to improve the user experience. Dedicated stops are limited to maintain speeds. Station amenities such as seating, lighting, and heating can provide comfort and security. Multimodal trips can be better accommodated with bike racks located at the station. Real-time next bus information utilizes GPS transponders in the buses and dynamic messaging boards to display future bus arrivals, which can improve perceived wait times for transit users.

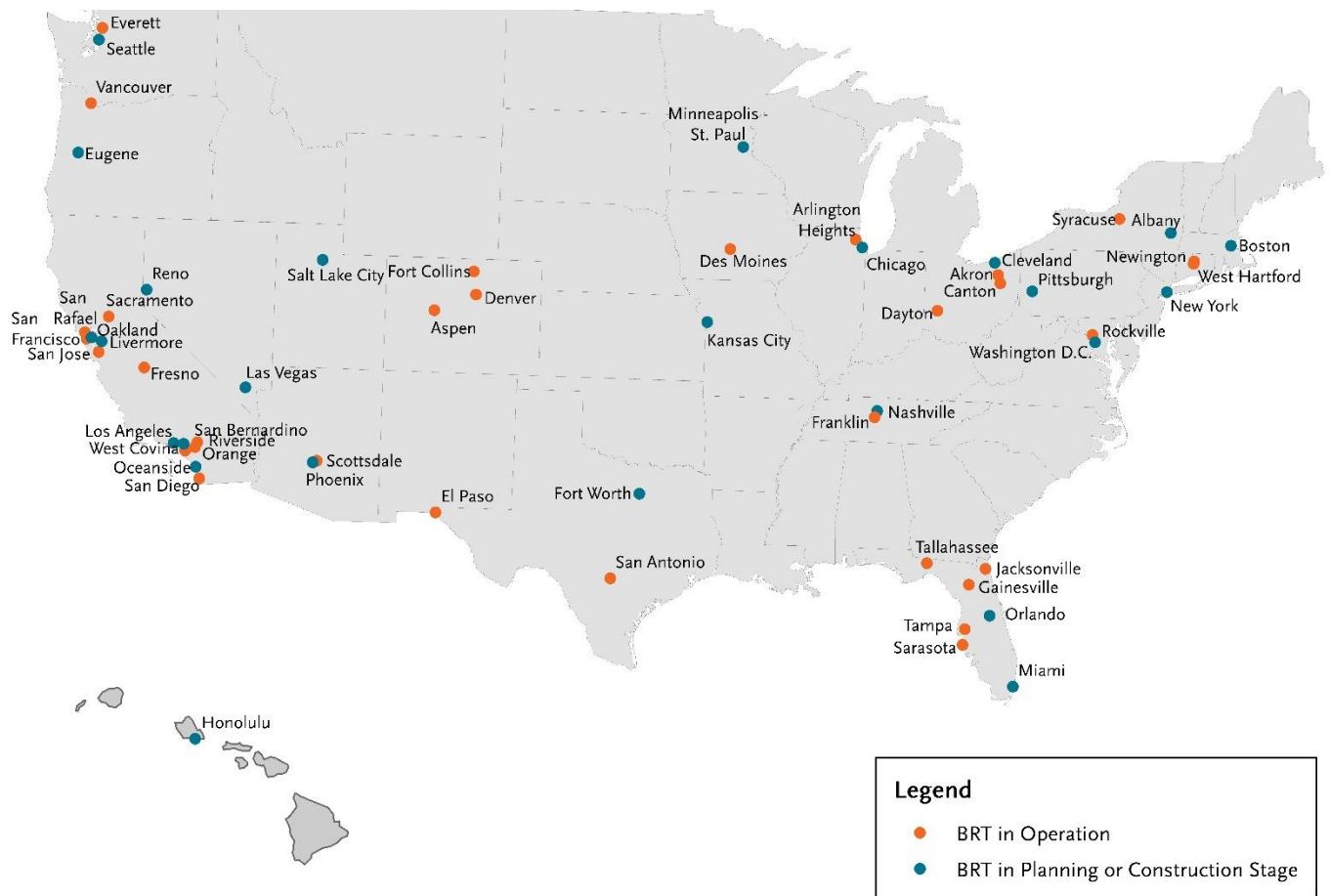
BRT VARIATIONS

One of the bigger benefits of BRT is its flexibility in implementation. BRT can operate exclusively in its own guideway with LRT-like station amenities or it can operate in shared lanes with as many amenities as are necessary and financially feasible. The shared lane versions of BRT often are referred to as “arterial” or “corridor” BRT. Even with shared lanes, they can provide significant travel time benefits by utilizing greater stop spacing, off-board fare collection, and near-level or level boarding. Other amenities can also provide an improved user experience.

WHERE IS BRT CURRENTLY LOCATED?

Per the National BRT Institute, there are approximately 62 BRT routes currently operating in the United States² with an additional 61 routes in planning stages or under constructions.

Figure 1: BRT Locations



HOW MUCH DOES BRT COST?

The cost of BRT systems largely varies depending on the location of the project, the length of the project, if it has dedicated right-of-way and the number of stations. Three examples of mixed-traffic BRT projects and three examples of dedicated right-of-way BRT projects are provided below to provide perspective on the cost of constructing BRT.

² <http://db.nbrti.org/>

CAPITAL COSTS

Mixed-Traffic BRT

The cost of mixed-traffic BRT projects has varied widely over the last two decades of their implementation. Past projects have included varying levels of amenities in station design, fare collection systems and whether new branded BRT buses were included in their implementation. For planning purposes, one should assume a range of \$1 to \$4 million per mile for BRT in mixed traffic.

Table 1: Examples of Mixed-Traffic BRT Capital Costs

Location	Corridor	Year Opened	Capital Cost	Corridor Length	Cost per Mile	# of Stations
Los Angeles, CA	Wilshire-Whittier	2000	\$5 million	26 miles	\$192,000	30
Los Angeles, CA	Ventura Metro	2000	\$3.3 million	16 miles	\$206,000	15
St. Paul, MN	A Line	2016	\$25 million	9.5 miles	\$2.6 million	20

Dedicated Right-of-Way BRT

The cost of dedicated right-of-way BRT projects has also varied widely. Past projects have included widely varying levels of amenities and have experienced wide variation in the complexity of their implementation. For planning purposes, one should assume a range of \$25-50 million per mile for BRT operating in a dedicated right-of-way.

Table 2: Examples of Dedicated Right-of-Way BRT Capital Costs

Location	Corridor	Year Opened	Capital Cost	Corridor Length	Cost per Mile	# of Stations
Los Angeles, CA	Orange Line	2005	\$324 million	14.5 miles	\$22.3 million	18
Cleveland, OH	HealthLine	2008	\$200 million	6.8 miles	\$29.4 million	36
St. Paul, MN	Gold Line	2023 (planned)	\$420 million	9.1 miles	\$46 million	15

OPERATIONS AND MAINTENANCE COSTS

Operations and maintenance costs of BRT routes vary depending on several factors. Some of these factors include:

- » Dedicated right-of-way
- » Length of the corridor
- » Number of stations
- » Travel speeds
- » Frequency
- » Station amenities
- » Labor rates

Some examples of operations and maintenance costs for BRT systems across the country include the following:³

Table 3: Examples of BRT Operations and Maintenance Costs

Location	O&M Cost per Revenue Mile	O&M Cost per Revenue Hour
Cleveland, OH	\$11.07	\$103.73
Los Angeles, CA	\$13.01	\$200.44
Eugene, OR	\$13.19	\$158.34
Kansas City, MO	\$9.59	\$110.75

HOW IS BRT FUNDED?

BRT systems are widely varied in their design and implementation. The way in which the systems are financed are as, if not more, varied due to many available funding sources and the opportunity to implement BRT projects jointly with other corridor improvements.

FEDERAL

Several federal funding sources are available for BRT. These include the Capital Investment Grant program (FTA Section 5309), Bus and Bus Facilities Competitive Grants (FTA Section 5339 b and c), TIGER Grants, Urbanized Federal Formula Funds (FTA Section 5307), Bus and Bus Facilities Formula Funds (FTA Section 5339), Congestion Mitigation Air Quality Program funds and Surface Transportation Block Grant Program.

Capital Investment Grant Program (FTA Section 5309)

The Capital Investment Grant program is split into four different categories based on project parameters and overall budget: New Starts, Small Starts, Core Capacity and Programs of Interrelated Projects.

- » New Starts projects are new fixed guideway projects or extensions with a total estimated capital cost of \$300 million or more. The minimum federal request is \$100 million with a maximum federal share of 60 percent Section 5309 money or 80 percent federal money overall.
- » Small Starts projects are smaller fixed guideway projects or corridor-based BRT projects with a total estimated capital cost of less than \$300 million. The maximum federal request is \$100 million with a maximum federal share of 80 percent.
- » Core Capacity projects are investments in existing fixed guideway systems to improve system capacity by no less than 10 percent. The maximum federal share is 80 percent.
- » The Program of Interrelated Projects is comprised of at least two of the previous three categories with logical connectivity between them.

Bus and Bus Facilities Competitive Grants (FTA Section 5339 b and c)

The Bus and Bus Facilities Competitive Grants program provides federal money to replace, rehabilitate and purchase buses. A sub-program encourages the transition to low and zero-emission vehicles. The construction of bus-related facilities is an allowable expenditure. The maximum federal share is 80 percent.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

These elements of the Section 5339 program are highly competitive and are focused on systems with existing rail or BRT systems, or systems which projects further into project development.

³ 2014 National Transit Database (NTD) Agency Profiles (<https://www.transit.dot.gov/ntd/2014-transit-profiles-top-50-agencies>)

TIGER Grants

TIGER, or Transportation Investment Generating Economic Recovery, is a discretionary grant program for surface transportation projects. The program was initially conceived to provide stimulus for projects that were ready to implement (“shovel ready”) but lacked complete construction funding. The highly successful and popular program has now gone through its eighth round of funding. Projects that are innovative, multimodal, and multijurisdictional often score better for TIGER funding. There is also limited other federal programs for which these projects can qualify.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

TIGER Grant funding is fiercely competitive at the national level. The City of Grand Forks has previously submitted TIGER Grants for other regional needs such as a grade separation at 42nd and Demers. Additionally, TIGER Grant funds are most often secured for projects which are “shovel ready”. The current BRT proposal locally is truly just a concept with many additional project development hurdles incomplete. ***The likelihood of TIGER funding for BRT locally is limited.***

Urbanized Federal Formula Funds (FTA Section 5307)

The Urbanized Federal Formula Funds are distributed to urbanized areas based on population and the extent of the existing transit service. The funding supports public transportation capital, planning and maintenance spending. The maximum federal share is 80 percent. Grand Forks uses all 5307 funding on current transit service.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

CAT currently utilizes all of its Section 5307 funds for operations and maintenance of the current fixed route and dial-a-ride systems. Very little additional capacity is available to CAT to fund BRT out of its Section 5307 apportionments.

Bus and Bus Facilities Formula Funds (FTA Section 5339)

The Bus and Bus Facilities Formula Funds can be used for the same purposes as the Competitive Grants program but are distributed based on formula rather than through a competitive grant. The maximum federal share is 80 percent.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

Currently CAT applies for capital funding needs through a total available statewide and urban systems pool of Section 5339 funds of around 2.1 million dollars. ***Given the steep capital investment required by BRT and the long list of existing CAT capital needs Section 5339 funds is not a feasible funding option for BRT locally.***

Congestion Mitigation Air Quality Program

The Congestion Mitigation Air Quality program, or CMAQ, provides funding for air quality projects or other related projects that would improve a region’s air quality. All states receive a minimum share of CMAQ funding even if they do not have nonattainment or maintenance areas. Transit capital expenditures are an allowable expense.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

CMAQ apportioned to North Dakota are rolled into the overall statewide program of urban transportation system needs. These funds annually are less than \$10.0 million. NDDOT would be averse to steering these statewide dollars towards a BRT system.

Surface Transportation Block Grant Program

Surface Transportation Block Grant Program funds are apportioned to states and metropolitan planning organizations (MPOs) using a formula based on the extent and use of the highway system. Transit capital expenditures are an allowable expense.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

The City of Grand Forks is able to access approximately \$2.7 million in STP funds. While these funds would be eligible to support BRT, the feasibility and likelihood of investing STP funds in BRT are limited and likely unwise.

STATE

State funding can also be used to fund the construction and/or operation of BRT systems. Since there are no BRT systems being planned or in operation in North Dakota, transitway funding sources do not currently exist. Some state funding sources that have been used elsewhere to fund BRT include:

- » The General Fund
- » Special Legislative Appropriations
- » Motor Vehicle Sales Tax
- » State Infrastructure Bank
- » State Trunk Highway Funds

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

State funding for transportation in North Dakota is passed through to cities through the Highway Users Fund. These funds are currently used by the City of Grand Forks for operations and maintenance of the current street system.

LOCAL

Local funding sources can also be used to fund the construction and/or operation of BRT. Some potential local funding sources for BRT include general obligation bonds or a property tax levy.

FUNDING OPTIONS LOCALLY AND STATEWIDE FOR CITIES AREA TRANSIT

Typically, BRT projects include a large local investment. If serious about BRT the City of Grand Forks would need to reevaluate its overall surface transportation investment strategy.

PROJECT RELATED FUNDING

BRT can also use funds that are generated based on the increased value of land surrounding the project or by funds generated as part of the project's operation.

Tax Increment Financing

Tax Increment Financing (TIF) is a funding mechanism that involves the creation of a special district to raise revenue for public improvements. The tax base is frozen at the level prior to BRT implementation and funds are raised by capturing all or a portion of additional assessed value in the district generated by private sector development.

Special Assessment Districts

A special assessment district is a funding mechanism that applies an additional property tax to properties within a certain distance of the BRT line that receive a benefit from the transitway. The tax is applied to existing and future properties within the district.

Joint Development

Joint Development occurs through a partnership between a public entity and a private developer to develop land adjacent to a transitway investment. This partnership is possible when a public entity owns land that can be leased to a private developer for a significant period. In exchange for the use of the land, the developer pays rent to the public entity. This revenue can then be bonded against to pay for a transit investment.

Developer Contributions

Developers can also provide funding for BRT through in-kind or monetary donations. Developers provide construction funding for a project if they anticipate that it will benefit their property value. Funding for developers is often used as gap funding or to better leverage other funding sources.

Fare Revenue

Fare revenue is a project funding source once a BRT line is in operation. Traditionally, farebox revenue is used to offset operating expenses, but it can also be bonded against to raise funding for capital expenses.

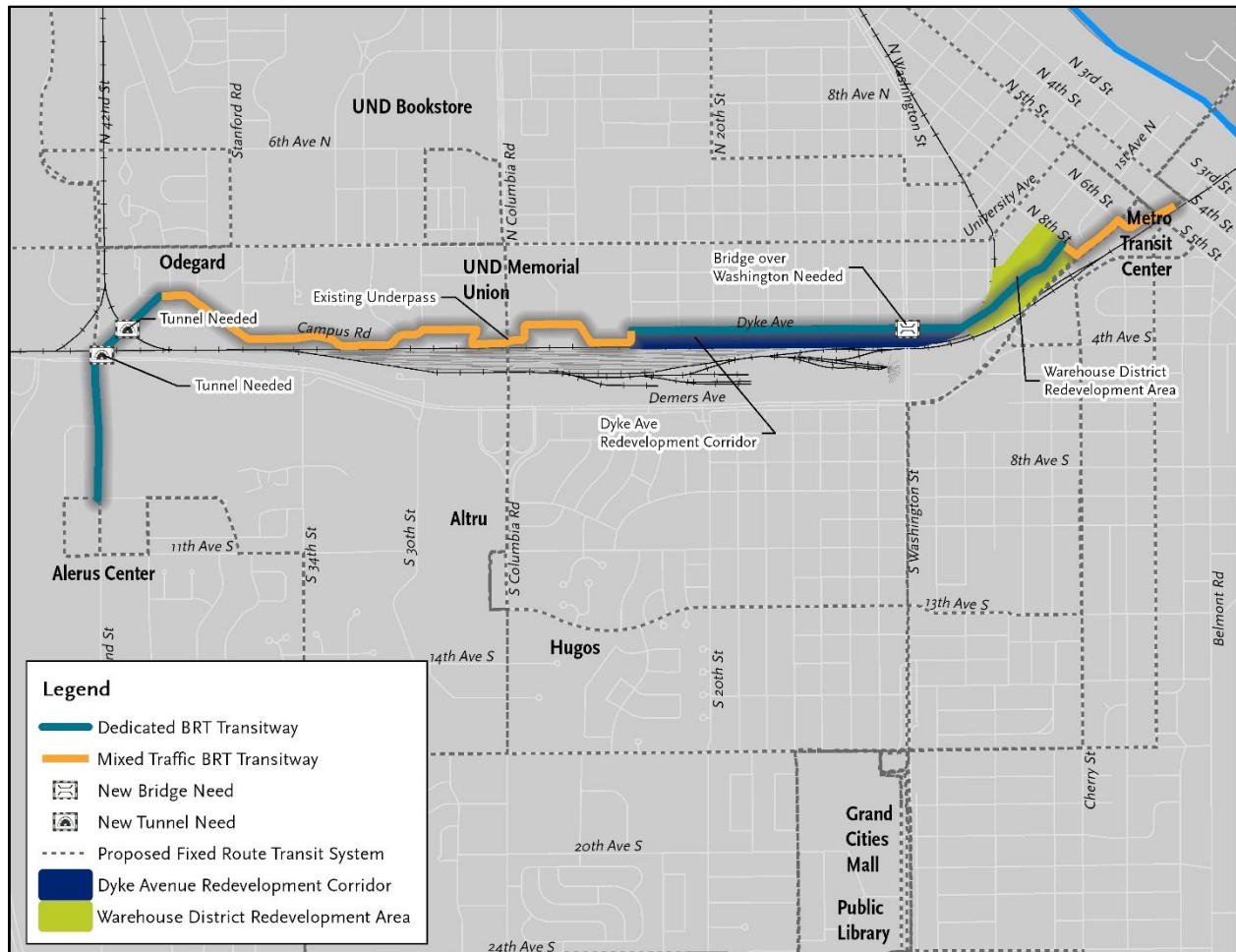
Advertising/Naming Rights

Advertising or naming rights can also provide additional funding once a BRT line is operational. The Cleveland Clinic and University Hospital purchased the naming rights for the BRT line in Cleveland. The transitway, originally called the Silver Line, was renamed the Health Line for \$250,000 annually for 25 years. Transit systems also have station sponsors that pay for naming rights to a specific station. U.S. Bank Stadium Station in Minneapolis is one example of station sponsorship. Metro Transit renamed this station in exchange for \$300,000 per year in advertising and promotions from the Vikings. Station sponsorships are also demonstrated elsewhere in the country, including Tampa, Portland and Seattle, where station sponsors contribute toward the operational costs of the transitway.

BRT IN GRAND FORKS

The proposed Grand Forks BRT route would reach approximately four miles, connecting downtown, UND and the Alerus Center along Dyke Avenue and 42nd Street. For higher speed operations, additional bridges and tunnels would likely be necessary.

Figure 2: Proposed BRT Transitway



BRT'S ECONOMIC DEVELOPMENT POTENTIAL

A study was recently completed for the National Institute for Transportation and Communities (<http://t4america.org/wp-content/uploads/2016/01/NATIONAL-STUDY-OF-BRT-DEVELOPMENT-OUTCOMES-11-30-15.pdf>) which evaluated the economic development benefits attached to BRT projects in 10 metros across the United States. While all the cities studied were significantly larger than Grand Forks, the study found positive impacts to the corridors served by BRT:

- » Within one-half mile of BRT, new office space increased by one-third and new multifamily apartment doubled in less than ten years.
- » BRT station areas fared better than other areas after the 2008 recession, finding again office space increased at a faster rate and filled with higher-wage jobs.

The same study found more success in economic development when BRT corridors are tied to improved station area planning, including higher urban densities and mixed uses as well as six key elements:

- » Accessibility, connecting people and jobs and serving areas where people want to go.
- » Growth and demand for redevelopment.
- » Positive physical conditions regarding the environment at and surrounding the station areas with no physical barriers to transit stations.
- » Positive social conditions that encourage people to ride transit.
- » Land available at the right size and right price for the needs of development.
- » Local government commitment to transit and urban development.

SUMMARY OF FEASIBILITY

The development of BRT in Grand Forks as originally envisioned is likely technically feasible. However, to support any potential future consideration for additional Federal funding substantial additional study is needed including a potential preliminary environmental document and alternatives analysis.

There is a large set of needs to improve the current fixed route system service operated by CAT that will be difficult to fund over the life the current TDP. Similar destinations envisioned to be “better connected” by BRT would be better served in the short term through improvements to the current fixed route system. More significant growth in ridership could be realized with increases in frequency of service in current CAT systems proposed for corridors such as University Avenue and 42nd Street.