MetropolitanPlanningCouncil

Federal Transit Administration
Docket No. FTA -2010-0009

U.S. Dept. of Transportation
1200 New Jersey Ave. SE
Docket Operations, M-30
West Building Ground Floor, Room W12-140
Washington, DC 20509

July 30, 2010

Ms. Day:

The Metropolitan Planning Council (MPC) would like to submit the attached comments in response to the Federal Transit Administration's (FTA) advance notice of proposed rulemaking for the New Starts and Small Starts project justification criteria.

In the subsequent pages, MPC presents a methodology, guided by the six Livability Principles, to evaluate transit investments. MPC developed the methodology to assist in identifying and evaluating the best opportunities for potential bus rapid transit (BRT) corridors in Chicago. The study currently underway is a blueprint for how FTA could measure broader quantifiable benefits in New Start or Small Start proposals.

In addition to this methodology focused on siting BRT corridors, MPC encourages FTA to consider the potential impact of transit investments on the future development of a community. A transit investment can spur economic development, promote investment, increase access to jobs, and catalyze activity. A possible negative consequence can be that existing affordable housing becomes unaffordable and new housing is also priced out-of-reach as property values increase near the transit. For this reason, it is important to consider how a community proposes to ensure long-term affordability for existing and new homes along the transit corridor and adjacent to particular stations.

MPC believes that FTA should measure benefits beyond reduced travel time and cost effectiveness. Encouraged by the interagency partnership of the Dept. of Transportation (DOT), Housing and Urban Development (HUD), and Environmental Protection Agency (EPA), MPC sees an opportunity for the federal government to better coordinate regional investments to achieve its broader housing, economic, and environmental goals. Rather than evaluating transit projects in isolation as stand-alone efforts, FTA should encourage applicants to understand that transit is part of a complex system and should fund projects that best demonstrate and quantify those benefits. A truly integrated service will realize many benefits beyond saved time and other costs.

Please let us know if you have any questions.
Sincerely,

Peter Skosey
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Bus Rapid Transit Corridor Screening and Prioritization in Chicago

INTRODUCTION

Over the past six months, the Metropolitan Planning Council (MPC) has developed a holistic approach to analyzing potential bus rapid transit (BRT) routes, with an initial focus on the Chicago Transit Authority (CTA) bus system and service area (see Figure 1, below). The assessment of BRT went beyond traditional evaluation of transit projects by quantitatively and substantively capturing the intent of DOT, EPA, and HUD's six Livability Principles through a series of measurable and objective criteria. For purposes of the evaluation of this study, BRT is defined as having pay-before-you-board stations, at-grade boarding, dedicated lanes, and signal prioritized intersections. The study is examining the effects of true BRT services to the surrounding communities, not express bus with elements of BRT. The study is currently underway with a final report expected in the fall of 2010.

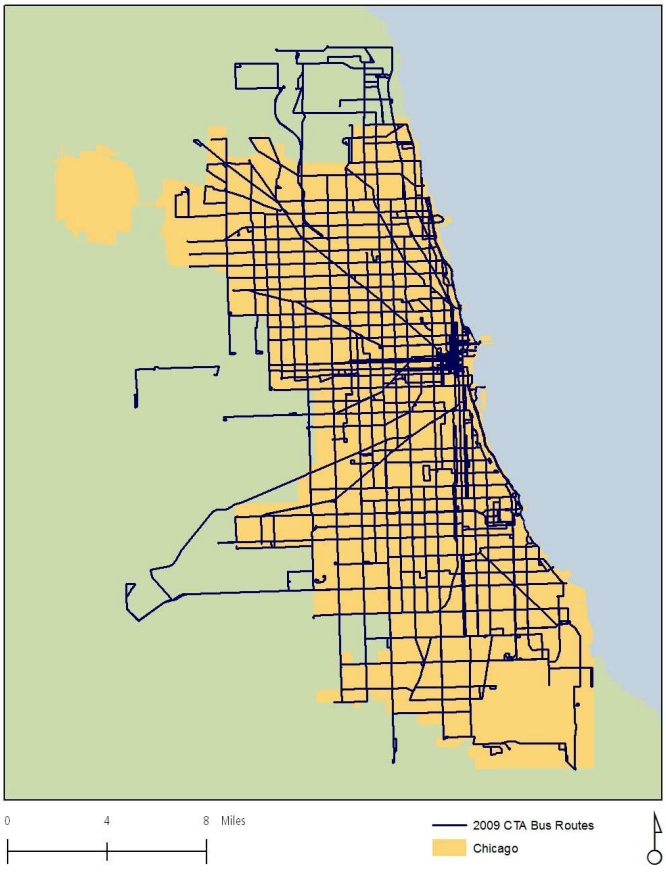

Figure 1: 2009 CTA Bus Routes (Source: Metropolitan Planning Council)

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The *Bus Rapid Transit Corridor Screening and Prioritization* study (herein "study") had two primary objectives:

1. Identify and prioritize the most suitable corridors in Chicago for BRT
2. Design an objective and holistic approach to transit planning incorporating the six Livability Principles that could be used for other transit modes in the Chicago region and elsewhere

This study was divided into four phases as shown in Table 1, below.

Table 1: Study Phases

Phase	Phase Name	Level of Analysis
I	Preliminary Route Screening	Existing CTA Bus Routes
II	Segment Analysis	Street Segments
III	Corridor Analysis	Potential BRT Corridors
IV	Prioritization	BRT Corridors

Through the succession of each phase, a percentage of vetted routes/segments/corridors passed into the subsequent phase until a small list of corridors exhibiting maximum community benefit was identified and prioritized. Each phase represents a finer level of analysis. The Livability Principles were most extensively incorporated into the BENEFITS ANALYSIS in PHASE II. Each criterion of the BENEFITS ANALYSIS is directly related to one or more of the six Livability Principles and is used to measure the potential for community development benefits via a BRT system.

PHASE I – PRELIMINARY ROUTE SCREENING

PHASE I-PRELIMINARY ROUTE SCREENING removed Lake Shore Drive segments of some routes, circulators, special routes, and discontinued routes. Routes with significant service overlap were consolidated. The purpose of PHASE I was to remove routes that would provide the least benefit for BRT routes.

Lake Shore Drive route segments were removed from the analysis. This study did not deny the potential for enhanced transit along Lake Shore Drive; however, the purpose of this study was to prioritize a small number of arterial routes providing maximum community benefit, not the robust system of supporting routes that a highway would require.

Most circulators are routes that provide service within and directly adjacent to downtown Chicago and were eliminated. Downtown congestion and transit potential has been identified and addressed in other studies and proposals. The unique challenges of providing a downtown circulator system are outside the scope of this study.

Special routes are identified as seasonal routes, temporary routes, short-run feeder routes, or routes that provide service for a limited customer base (e.g. providing circulator service for a university) and were eliminated. This study only examined core routes of the CTA service area.

PHASE II – SEGMENT ANALYSIS

The routes passing PHASE I varied not only in the physical structure of the roadway, but also in surrounding land uses and densities. Evaluating the entire length of a route would have misrepresented the sections most suitable for BRT; therefore, the study reduced routes into smaller geographical units – street segments. The extents of a street segment are defined by intersections with other streets and are typically 300 to 600 feet in length. An example of street segments can be found in Figure 2, below.

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Figure 2: Street Segments Example (Source: Metropolitan Planning Council)

The purpose of PHASE II was to establish a new corridor based on continuous lengths of segments that consistently showed greatest potential for BRT corridors. Each street segment was then scored through a two part process: RIGHT-OF-WAY CONSTRUCTABILITY and the BENEFITS ANALYSIS.

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PHASE II PART 1- RIGHT-OF-WAY (ROW) CONSTRUCTABILITY

The segments were first analyzed in the ROW CONSTRUCTABILITY ANALYSIS to assess if roadway width was sufficient to accommodate dedicated BRT lanes. Each street segment has an ROW width value attributed to its extents. Acceptable ROW width for BRT was evaluated under two scenarios: Scenario 1 considered BRT operating uni-directionally (i.e. either with BRT running on one dedicated lane on each of two parallel streets or with BRT running one-way in the direction of peak flow). Scenario 2 considered a bi-directional setup (i.e. BRT operating with two dedicated lanes per street).

If a segment had insufficient ROW width under both scenarios, it was eliminated from the BRT analysis, with one exception. The exception to elimination was contingent on the segment with insufficient ROW width being within a contiguous series of segments with sufficient ROW widths. An example can be seen in Figure 3, below.

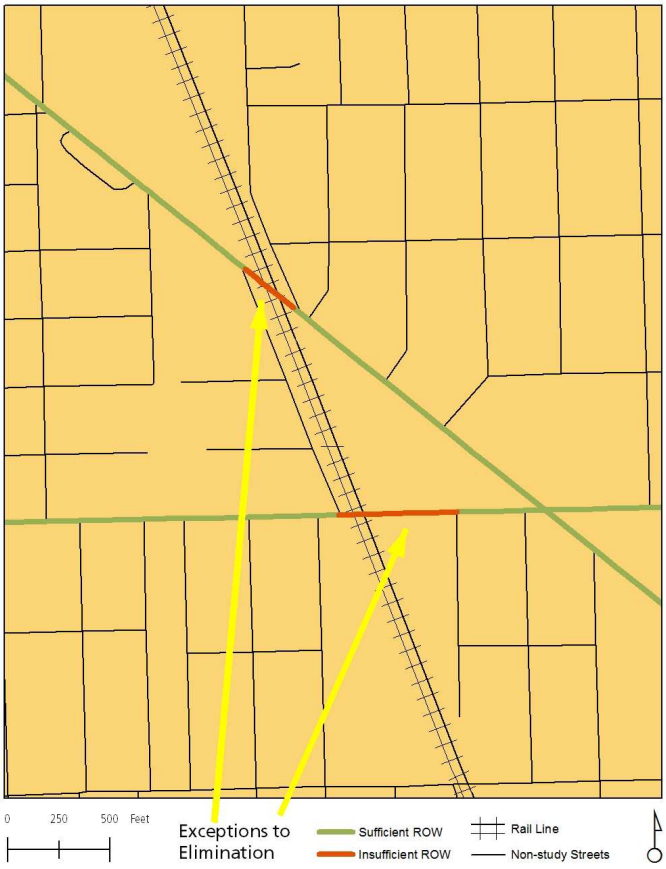

Figure 3: Exception to Elimination for Insufficient ROW (Source: Metropolitan Planning Council)

The remaining segments (i.e. segments that had sufficient ROW under Scenario 1 or Scenario 2) that did not score within the top percentage of remaining segments were eliminated from the study.

PHASE II PART 2 - BENEFITS ANALYSIS

After the ROW CONSTRUCTABILITY ANALYSIS, the remaining segments were analyzed in the BENEFITS ANALYSIS. The BENEFITS ANALYSIS, which most extensively integrated the Livability Principles, is not BRT specific and can be used for other types of transportation investments. The Benefits Analysis used 14 quantitative proxies for the Livability Principles, to score each street segment. The 14 criteria in the BENEFITS ANALYSIS are:

1) CONNECTIVITY TO COMMUNITY SERVICES
2) CONNECTIVITY TO EDUCATIONAL INSTITUTIONS
3) CONNECTIVITY TO ENTERTAINMENT
4) CONNECTIVITY TO FOOD STORES
5) CONNECTIVITY TO MAJOR MEDICAL FACILITIES
6) CONNECTIVITY TO MAJOR OPEN SPACE
7) CONNECTIVITY TO RETAIL
8) EMPLOYMENT/JOB ACCESS
9) EXISTING TRANSIT RIDERSHIP
10) EXISTING TRANSIT TRAVEL TIME
11) INFILL DEVELOPMENT POTENTIAL
12) POPULATION
13) POPULATION NOT SERVED BY RAIL, and
14) TRANSPORTATION COSTS.

Table 2, below, outlines the rationale, metric, and corresponding main Livability Principle for each criterion.

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Table 2: Benefits Analysis Criteria

Criterion	Rationale for Selection	Study Measure	Main Corresponding Livability Principles
1) Connectivity to Community Services	BRT will help facilitate the movement of residents, students, tourist, and employees to community service destinations.	Number of community destinations within a half-mile of street segments.	3) Enhance Economic Competiveness 6) Value Communities and Neighborhoods
2) Connectivity to Educational Institutions	BRT will help facilitate the movement of residents, students, tourist, and employees to educational institutions.	Number of educational institutions within a half-mile of street segments.	3) Enhance Economic Competiveness 6) Value Communities and Neighborhoods
3) Connectivity to Entertainment	BRT will help facilitate the movement of residents, students, tourist, and employees to entertainment destinations.	Number of entertainment destinations within a half-mile of street segments.	6) Value Communities and Neighborhoods
4) Connectivity to Food Stores	BRT will help facilitate the movement of residents, students, tourist, and employees to grocery, produce, and other types of food stores.	Number of food stores within a half-mile of street segments.	6) Value Communities and Neighborhoods
5) Connectivity to Major Medical Care	BRT will help facilitate the movement of residents, students, tourist, and employees to medical destinations.	Number of hospitals within a half-mile of street segments.	3) Enhance Economic Competiveness 6) Value Communities and Neighborhoods
6) Connectivity to Major Open Space	BRT will help facilitate the movement of residents, students, tourist, and employees to recreational destinations.	Number of community level parks (over 25 acres) and forest preserves within a half-mile of street segments.	6) Value Communities and Neighborhoods

Criterion	Rationale for Selection	Study Measure	Main Corresponding Livability Principles
7) Connectivity to Retail	BRT will help facilitate the movement of people to retail locations helping to provide an alternative mode of travel to these destinations.	Total annual retail sales at pedestrian-oriented businesses within a half-mile of street segments. Automobile related businesses such as gas stations and auto dealers were omitted.	3) Enhance Economic Competiveness 6) Value Communities and Neighborhoods
8) Employment/Job Access	Employees adjacent to the BRT lines are another major group of potential users of the line.	Total employment at all businesses within a half-mile of street segments.	3) Enhance Economic Competiveness
9) Existing Transit Ridership	Bus ridership demonstrates existing demand for transit along the study routes.	Average passenger flow by street segment (controlling for direction) during the AM peak period.	1) Provide more Transportation Choices
10) Existing Transit Travel Time	Travel time reduction is a main function of BRT. It is important to identify corridors where this function will be maximized.	Average passenger speed by street segment (controlling for direction) during the AM peak period.	1) Provide more Transportation Choices
11) Infill Development Potential	BRT is a major public investment that can help spur infill development, thus helping to maximize city services, reduce the environmental impact of human development, and encourage walkable communities.	Area of properties with potential for redevelopment (defined by the Chicago Metropolitan Agency for Planning) and vacant properties within a half-mile of street segments.	4) Support Existing Communities

Criterion	Rationale for Selection	Study Measure	Main Corresponding Livability Principles
12) Population	Residents adjacent to BRT lines are the major source of potential users.	Total residential population within a half-mile of street segments.	1) Provide more Transportation Choices 4) Support Existing Communities
13) Population Not Serviced by Rail	Residents not currently served by rail transit have a particular and pressing need for transit service operating on a dedicated right-of-way.	Residential population within a half-mile of street segments that also live beyond a half-mile radius of fixed guideway transit (CTA and/or Metra rail).	1) Provide more Transportation Choices and 2) Promote Equitable, Affordable Housing
14) Transportation Costs	BRT can help make housing more affordable by reducing transportation costs associated with housing location.	Average household transportation costs as a percentage of household income within a half-mile of street segments. Data from the Center for Neighborhood and Technology's H+T Index.	2) Promote Equitable, Affordable Housing

RANKING THE BENEFITS ANALYSIS CRITERIA

Unlike the CONSTRUCTABILITY ANALYSIS, which eliminated segments with insufficient ROW width, the BENEFITS ANALYSIS used a scoring methodology to eliminate segments that provided the least "benefit." The criteria in the BENEFITS ANALYSIS were scored using Microsoft Excel's "percent rank" function. Using this method, each street segment was ranked by its performance in each criterion relative to the performance of all study corridors. The main benefit of the ranking method was that it eliminated the need to establish thresholds, which could be arbitrary. Although not as accurate as functions found in statistical software, the "percent rank" tool is simple and readily available to potential users of the methodology, enhancing the ability to replicate this approach.

The ranking method is illustrated in Table 3, which presents a hypothetical list of segments and the corresponding surrounding population. Segment A has the highest surrounding population and a corresponding percent rank of 100 percent. Segment T with the lowest surrounding population received a percent rank of zero.

Table 3: Ranking Method Example

Segment	Surrounding Population	Absolute Rank	Percent Rank
A	33,821	1	100.00%
B	23,404	2	94.73%
C	22,539	3	89.47%
D	22,099	4	84.21%
E	22,063	5	78.94%
F	21,931	6	73.68%
G	21,471	7	68.42%
H	21,171	8	63.15%
I	18,736	9	57.89%
J	17,174	10	52.63%
K	16,423	11	47.36%
L	16,195	12	42.10%
M	14,564	13	36.84%
N	14,387	14	31.57%
O	13,192	15	26.31%
P	12,226	16	21.05%
Q	10,837	17	15.78%
R	9,985	18	10.52%
S	7,086	19	5.26%
T	5,267	20	0.00%

Next an overall score was developed for each segment based on the results of the individual scores from each criterion of the BENEFITS ANALYSIS. The overall score, expressed as a percentage, was determined by the summation of each weighted individual criterion score. The weighting of each criterion should reflect regional priorities and goals. For example, a region that has prioritized providing better transit access to food stores should place a higher weighting on the CONNECTIVITY TO FOOD STORES criterion than on others.

Street segments that did not score within the top percentage of remaining segments were removed from the study. Like the ROW CONSTRUCTABILITY ANALYSIS, some exceptions were made for segments that scored poorly in the BENEFITS ANALYSIS, but were adjacent to a continuous series of segments that scored well.

The remaining segments demonstrating strong performance in both the BENEFITS ANALYSIS and the ROW CONSTRUCTABILITY ANALYSIS were used to establish the corridors for analysis in PHASE III. Corridors were established from long contiguous groups of these strong performing segments. Short isolated segments were removed from the study.

There is merit to examining all street segments, regardless of ROW, to determine whether the need for additional transit enhancements. Although, the remainder of this study focuses on prioritizing BRT components, the data and BENEFITS ANALYSIS can be used at a later date to plan appropriate transit investments along other high-priority, but insufficiently wide, corridors.

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PHASE III – CORRIDOR ANALYSIS

The purpose of PHASE III was to evaluate the study corridors established in PHASE II based on connectivity to existing transit and the level of complexity at intersections.

NETWORK INTEGRATION evaluated the connectivity of each study corridor to existing rail transit and supports the 'Promote More Transportation Choices' Livability Principle. This criterion counted stations within 330 feet (half a standard Chicago city block) from the proposed BRT corridor. Corridors that did not establish connections to existing rail transit were removed from the analysis.

INTERSECTION COMPLEXITY evaluated intersections where signal prioritization would unacceptably impact automobile traffic. These were intersections where three or more streets crossed. An example of a complex intersection is shown is Figure 4, below. A BRT system could stop at these intersections and wait for the appropriate signal phase; however, a multitude of complex intersections would overtly impact system reliability. Corridors exceeding a maximum number of complex intersections were also removed from the analysis.

Figure 4: Example of a Complex Intersection (Source: Metropolitan Planning Council)

PHASE IV – TRAVEL DEMAND ANALYSIS

The purpose of the PHASE IV analysis was to prioritize the remaining corridors that passed PHASE III screening. This study used the Chicago Metropolitan Agency for Planning's (the region's Metropolitan Planning Organization) travel demand model to evaluate the PROJECTED RIDERSHIP and PROJECTED TRAVEL TIME SAVINGS for the remaining corridors. The corridors were prioritized equally on projected ridership and projected travel time savings. Any corridor significantly lower than its counterparts on either metric was removed from the analysis.

SUMMARY OF RELATIONSHIP BETWEEN LIVABILITY PRINCIPLES AND STUDY STRUCTURE

Provide more transportation choices.

Develop safe, reliable and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.

Adherence to this principle is a function of BRT. BRT provides similar advantages to other types of fixed guideway transit – pay-before-you-board stations, dedicated right-of-way, and signal prioritization – that facilitate a faster and more reliable transit alternative and increase the accessibility of destinations throughout the street grid. The metrics of the BENEFITS ANALYSIS attempted to maximize the benefit of BRT by prioritizing segments in areas of high community destinations, population, employment, and retail activity.

The CONNECTIVITY TO COMMUNITY SERVICES, CONNECTIVITY TO EDUCATIONAL INSTITUTIONS, CONNECTIVITY TO ENTERTAINMENT, CONNECTIVITY TO FOOD STORES, CONNECTIVITY TO MAJOR MEDICAL FACILITIES, CONNECTIVITY TO MAJOR OPEN SPACE, and CONNECTIVITY TO RETAIL criteria were used to score street segments that provided the highest connectivity and access to important community destinations.

Similarly, the EMPLOYMENT/JOB ACCESS criterion highlighted street segments that had the highest surrounding employment. Street segments that served community destinations and employment centers best provided users with a lower cost and lower environmental impact transit alternative.

The INFILL DEVELOPMENT POTENTIAL criterion scored street segments by the highest development potential. BRT can potentially spur infill development in these areas promoting public health and environmental sustainability through dense, walkable communities.

The EXISTING TRANSIT TRAVEL TIME criterion coarsely measured which street segments had the highest potential for travel time reduction, translating to a reduction in transportation costs. The EXISTING TRANSIT RIDERSHIP criterion measured which street segments had the highest transit passenger flows, helping to maximize the potential ridership of a BRT system and the intent of this Livability Principle.

PROJECTED TRAVEL TIME SAVINGS and PROJECTED RIDERSHIP provided finer measures by projecting travel-time savings and ridership under a BRT system scenario, respectively. These measures prioritized corridors for travel time savings and ridership under BRT helping to maximize reduced transportation costs and reduced environmental impact.

The POPULATION NOT SERVED BY RAIL criterion scored segments higher if areas did not have many transportation alternatives. Additionally, the TRANSPORTATION COSTS criterion measured which segments had the highest transportation costs. POPULATION NOT SERVED BY RAIL and TRANSPORTATION COSTS criteria maximized street segments that had poor transportation choices.

Finally, NETWORK INTEGRATION ranked study corridors by measuring integration with the existing transit system ensuring greater mobility for potential users of a BRT system.

Promote equitable, affordable housing.

Expand location- and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.

Again, NETWORK INTEGRATION assessed the ability of a study corridor to integrate with the existing fixed guideway transit system (and potentially a BRT network in the future) translating into higher mobility and reduced transportation costs for all potential users of the system.

The POPULATION NOT SERVED BY RAIL criterion measured populations of the city that did not have walking access to a fixed guideway transit station. Providing BRT in these areas offers the possibility for increasing mobility and providing an efficient alternative to existing modes of travel.

The TRANSPORTATION COSTS criterion provided a measure of BRT's potential for reducing the cost of transportation, helping to reduce a household's total expenditure. Reducing transportation costs can also be components of CONNECTIVITY TO COMMUNITY SERVICES, CONNECTIVITY TO EDUCATIONAL INSTITUTIONS, CONNECTIVITY TO ENTERTAINMENT, CONNECTIVITY TO FOOD STORES, CONNECTIVITY TO MAJOR MEDICAL CARE, CONNECTIVITY TO MAJOR OPEN SPACE, CONNECTIVITY TO RETAIL, and EMPLOYMENT/JOB ACCESS criteria. Improved access to these destinations via transit can help reduce automobile related transportation costs.

Enhance economic competitiveness.

Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services, and other basic needs of workers as well as providing expanded business access to markets.

CONNECTIVITY TO COMMUNITY SERVICES, CONNECTIVITY TO EDUCATIONAL INSTITUTIONS, CONNECTIVITY TO ENTERTAINMENT, CONNECTIVITY TO FOOD STORES, CONNECTIVITY TO MAJOR MEDICAL FACILITIES, CONNECTIVITY TO MAJOR OPEN SPACE, CONNECTIVITY TO RETAIL, and EMPLOYMENT/JOB ACCESS criteria ranked street segments based on the highest potential access to each respective metric focus. A BRT system can provide an economic boost to the focus areas of these measures by reducing the need for parking and providing employees, students, customers with an efficient alternative to accessing these destinations.

The POPULATION criterion gave higher ranks to street segments that had the most adjacent population – maximizing the number of people that can access and patronize destinations along the system.

Moreover, the INFILL DEVELOPMENT POTENTIAL criterion points to segments with a greater preponderance of infill sites. The addition of proximate BRT service will provide an additional boost to land values and will catalyze redevelopment, increased density, and job creation. By identifying BRT corridors and, in a later studies, station sites, it is possible to identify appropriate sites for targeted investment in affordable housing, which would help offset displacement effects from increases in land value (see the Coordinate Policies and Leverage Investment Livability Principle).

EXISTING TRANSIT TRAVEL TIME identifies corridors where poor reliability and long travel time are constraining users of the system. NETWORK INTEGRATION helps improve timely access to destinations by better connecting transit alternatives. PROJECTED TRAVEL TIME SAVINGS prioritizes routes that will provide customers, students, and employees the greatest time savings to their respective destinations.

Support existing communities.

Target federal funding toward existing communities – through such strategies as transit-oriented, mixed-use development and land recycling – to increase community revitalization, improve the efficiency of public works investments, and safeguard rural landscapes.

The INFILL DEVELOPMENT POTENTIAL criterion identified vacant and underutilized properties where BRT can encourage development. Beyond the focus of this study, land use planning, zoning, and incentives around BRT station areas will ultimately determine the impact of BRT.

From a broader perspective, the existing CTA bus service area (the study focus area) was confined to established communities, rather than greenfield sites. BRT can encourage new development and increase quality of life in these existing communities. Station areas, in particular, will serve existing dense nodes of mixed-use activity, and potentially spur the densification of new nodes. Again, having identified the likely property value effects from transit expansion, subsequent planning will be necessary to ensure that low-income and working individuals and families – often those most dependent on transit access – are not displaced by rising property values.

The POPULATION and EMPLOYMENT/JOB ACCESS criteria will target the BRT transit investment into areas with dense population and employment, respectively. Further, the POPULATION NOT SERVED BY RAIL criterion will target and reinforce existing communities that do not have rail transit service.

Coordinate policies and leverage investment.

Align federal policies and funding to remove barriers to collaboration, leverage funding and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy.

This principle was outside the scope of this screening and prioritization study; however, federal funding is an incentive that can encourage better coordination of different departments, agencies, and levels of government. A follow-up analysis to determine the relationship between priority BRT corridors and existing federal, state or local investment would demonstrate:

1) The ability of BRT to enhance the value or performance of past investments, from spurring market reactivation of EPA-funded brownfield sites to better connecting a ready workforce with both training and employment opportunities;

2) The ability of BRT to provide a connective framework to be used for coordinated investment in the future. For example, future housing investments should align with a newly planned BRT route, to maximize livability benefits and minimize resident displacement due to increasing property values.,

Once corridors are established, and travel demand and travel time estimated, it will be possible to assess the environmental impacts of specific BRT investments. Carbon emissions, fuel savings, urban heat island effects, and other environmental indicators can be accurately measured once priority corridors are established. Additionally, future investments in streetscaping, tree planting, stormwater management, and green infrastructure can be made to address those impacts, further leveraging the environmental benefits of BRT.

Value communities and neighborhoods.

Enhance the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods – rural, urban or suburban.

Connectivity to Community Services, Connectivity to Educational Institutions, Connectivity to Entertainment, Connectivity to Food Stores, Connectivity to Major Medical Facilities, Connectivity to Major Open Space, Connectivity to Retail, Population, Employment/Job Access, and Infill Development criteria assigned the highest rank to street segments that had a high density of community destinations, potential for infill development, residents and employees, and retail. BRT, coupled with transit-oriented development, can reinforce and increase high densities that promote walkable neighborhoods.

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CONCLUSIONS

This study demonstrates that the Livability Principles can be quantitatively and substantively included in making transit investment decisions. Traditional travel time savings metrics are still included in the analysis; however, these metrics are augmented by considerations to the Livability Principles as recommended by DOT, EPA, and HUD. The result is a prioritized list of corridors that maximize both the transportation benefits of transit enhancement and the "livability benefits" expressed in the metrics of this study.

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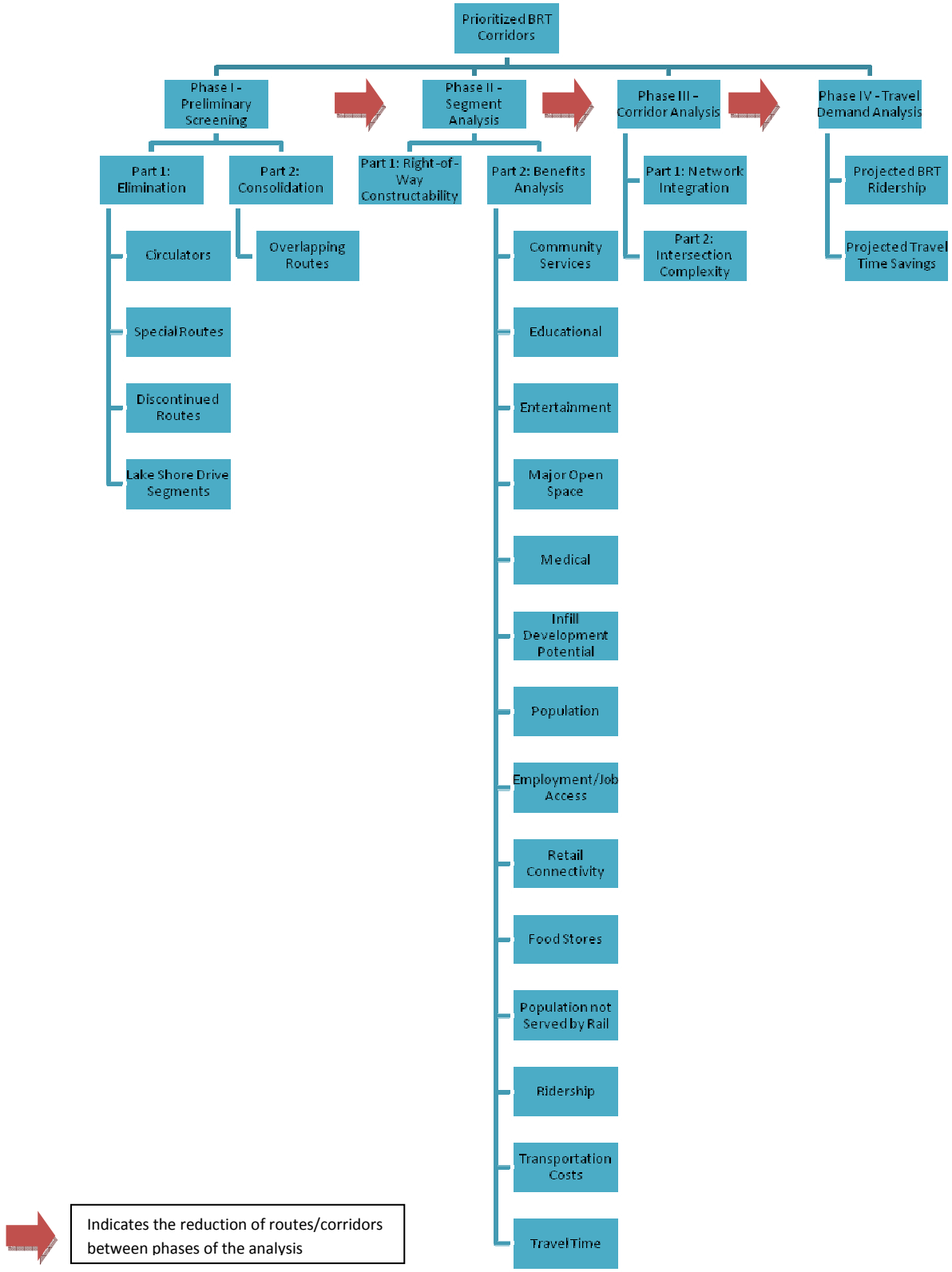
STUDY HIERARCHY



DATA SOURCES

Data	Data Type	Metric(s)	Source	Date of Source
Chicago 2009 Bus Routes	GIS Polyline	• All	Chicago Transit Authority	2009
2000 Census Block Groups	GIS Polygon	• Employment/Job Access • Population • Population not Served by Rail • Transportation Costs	U.S. Census	2000
Community Food Services (NAICS 624110)	GIS Point	• Connectivity to Community Services	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Child Day Care Services (NAICS 624410)	GIS Point	• Connectivity to Community Services	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Other Individual and Family Services (NAICS 624190)	GIS Point	• Connectivity to Community Services	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
High Schools	GIS Point	• Connectivity to Educational Institutions	Illinois Board of Education Courtesy of Chicago Metropolitan Agency for Planning	2010

Data	Data Type	Metric(s)	Source	Date of Source
Higher Education Institutions	GIS Point	• Connectivity to Educational Institutions	Illinois Board of Higher Education Courtesy of Chicago Metropolitan Agency for Planning	2010
Libraries	GIS Point	• Connectivity to Educational Institutions	Illinois Board of Higher Education Courtesy of Chicago Metropolitan Agency for Planning	2010
Employment by Block Group	Database	• Employment/Job Access	Easy Analytic Software Inc. 2008 Demographic Estimates	2008
Concert Venues	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Landmarks	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Movie Theaters	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Museums	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Stadiums	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
State Theaters	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007

Data	Data Type	Metric(s)	Source	Date of Source
Zoos	GIS Point	• Connectivity to Entertainment	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Existing Bus Stops	GIS Point	• Existing Transit Ridership • Existing Transit Travel Time	Chicago Transit Authority	2009
Existing Transit Ridership Flow by Bus Stop	Database	• Existing Transit Ridership	Chicago Transit Authority	2009
Existing Transit Travel Speed by Bus Stop	Database	• Existing Transit Travel Time	Chicago Transit Authority	2009
Supermarkets and Grocery Stores (NAICS 44511)	GIS Point	• Connectivity to Food Stores	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Specialty Food Stores (NAICS 4452)	GIS Point	• Connectivity to Food Stores	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
City of Chicago Owned Vacant Properties	Database	• Infill Development Potential	City of Chicago Department of Community Development	2010
Properties with Potential for Infill Development	GIS Point	• Infill Development Potential	Chicago Metropolitan Agency for Planning	2008
Cook County Parcels	GIS Polygon	• Infill Development Potential	Cook County Assessor	2007

Data	Data Type	Metric(s)	Source	Date of Source
Major Hospitals	GIS Point	• Connectivity to Major Medical Care	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Cook County Forest Preserve	GIS Polygon	• Connectivity to Major Open Space	Cook County Forest Preserve via Natural Connections	2010
Chicago Community Level Parks (25 or more acres defined by National Recreation and Park Association)	GIS Polygon	• Connectivity to Major Open Space	Chicago Park District via Natural Connections	2010
Parks outside City of Chicago	GIS Polygon	• Connectivity to Major Open Space	Cook County Assessor's Office (Land Use Files)	2007
Metra Stations	GIS Point	• Network Integration • Population not Served by Rail	Metra	2010
Chicago Transit Authority Rail Stations	GIS Point	• Network Integration • Population not Served by Rail	Chicago Transit Authority	2010
Population by Block Group	Database	• Population • Population not Served by Rail	Easy Analytic Software Inc. 2008 Demographic Estimates	2008
Projected BRT Travel Times Savings	Database	• Projected BRT Travel Time Savings	Chicago Metropolitan Agency for Planning Travel Demand Model	2010

Data	Data Type	Metric(s)	Source	Date of Source
Projected BRT Ridership	Database	• Projected BRT Ridership	Chicago Metropolitan Agency for Planning Travel Demand Model	2010
Furniture and Home Furnishing Stores (NAICS 442)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Electronics and Appliance Stores (NAICS 443)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Building Material and Garden Equipment Supply Dealers (NAICS 444)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Beer, Wine, and Liquor Stores (NAICS 4453)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Convenience Stores (NAICS 44512)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Health and Personal Care Stores (NAICS 446)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Clothing and Clothing Accessories (NAICS 448)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Sporting Goods, Hobby, Book, and Music Stores (NAICS 451)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007

Data	Data Type	Metric(s)	Source	Date of Source
General Merchandise Stores (NAICS 452)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Miscellaneous Stores (NAICS 453)	GIS Point	• Connectivity to Retail	NAVTEQ Courtesy of the Illinois Department of Transportation	2007
Street Segment Right-of-Way	Database	• Right-of-Way Constructability	Chicago Department of Transportation	2009
Street Segments in City of Chicago	GIS Polyline	• All Benefits Analysis Criteria • Right-of-Way Constructability	Chicago Department of Transportation	2009
Street Segments outside City of Chicago	GIS Polyline	• All Benefits Analysis Criteria • Right-of-Way Constructability	Illinois Department of Transportation	2009
Transportation Costs as a Percentage of Household Income by Block Group	Database	• Transportation Costs	Center for Neighborhood and Technology's Housing and Transportation Affordability Index	2010