Regional Transitway Guidelines

Twin Cities Region

Publication no. 35-12-006

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Table of Metropolitan Council Actions on Transitway Guidelines

Action	Date
Original Adoption	February 2012
Amended Section 6.1 – added references to new state law relating to light rail vehicle design.	February 2015
Amended Section 5.1 – added guideline language on light rail transit noise mitigation.	March 2016

1. INTRODUCTION

1.1. GUIDELINES PURPOSE

The purpose of the Regional Transitway Guidelines is to provide technical guidance, based in best practices, that supports the development and operation of transitways in a way that is **consistent**, **equitable**, and **efficient**, and delivers an **effective**, **integrated**, and **user-friendly** transit system throughout the Twin Cities region. Several important developments in the metro area transit system led to the Regional Transitway Guidelines process:

- **The region's growing transitway system.** The region's transitway system is growing quickly and the region has learned a great deal from the implementation of the first commuter rail and light rail lines. Those lessons will help to guide the implementation of future transitways. This is important for leveraging future investments, for proceeding efficiently through planning and design (not reinventing the wheel each time), and for achieving the regional goal of doubling ridership by 2030.

- **Multiple agencies involved in transitway implementation.** There are multiple agencies involved in planning and implementing transitways in the Twin Cities region. Local governments, particularly counties and regional railroad authorities, play a lead role in the planning of transitway corridors and recommending locally preferred alternatives. The Minnesota Department of Transportation (MnDOT), Metropolitan Council and Metro Transit, Counties Transit Improvement Board (CTIB), counties, and cities are involved in the funding, design, and construction of transitway facilities and services. There are also several agencies involved in transitway operations. As the region moves toward implementation of multiple transitway corridors, it is important that the assumptions used to plan transitways and the decisions made to implement them are consistent and equitable throughout the region.

- **The region is taking initial steps to implement BRT.** The region is implementing its first bus rapid transit (BRT) corridors in which a family of services will operate. These corridors also have the flexibility to be implemented in phases as ridership develops over time. While this can be beneficial from a funding perspective, it can lead to confusion about what constitutes BRT service and BRT facilities and the appropriate timing of implementation in phases.

- **Better alignment of transit, land use planning and sustainable communities.** The Metropolitan Council is in the process of developing a new model for transitway development, through the HUD Sustainable Communities Grant / Corridors of Opportunity initiative, by aligning transit planning and engineering with land use planning, affordable housing, workforce development and economic development. The Transitway Guidelines will clarify transit planning and engineering factors and demonstrate their linkage to land use initiatives in transitway corridors. The Metropolitan Council's Guide for Transit-Oriented Development is a companion document to the Transitway Guidelines and addresses land use planning guidance.

The document is organized with the guidelines highlighted in callout boxes. The text following the highlighted guideline provides additional explanation and supporting documentation related to that guideline.

1.2. GUIDELINES DEVELOPMENT PROCESS

The Transitway Guidelines were developed based on existing practices, best practices in other regions, and input from stakeholder groups including the Transitway Guidelines Advisory Committee, the Transitway Guidelines Technical Committees, and Metropolitan Council and Metro Transit senior staff.

The Transitway Guidelines address four transitway modes: (1) Commuter Rail, (2) Light Rail Transit (LRT), (3) Highway BRT, and (4) Arterial BRT. Where BRT is used in the document, the guidelines apply to both Highway and Arterial BRT. Where guidelines are unique to one or the other, the terminology Highway BRT or Arterial BRT is used. More detail on the definitions of these modes can be found in the long-range Transportation Policy Plan (TPP). The Transitway Guidelines currently do *not* directly address Express Bus with Transit Advantages, Dedicated Busway, or Streetcar modes. However, transitway projects in planning stages where these modes are being considered can use the general information in the Transitway Guidelines as a basis for decision-making.

During the development of the Transitway Guidelines, several topics of discussion were raised that are not included in this document. These topics may be addressed in the Transitway Guidelines in the future as the need for them and the technical basis is more developed. These topics include:

- Modes not addressed including Dedicated Busway, Express Bus with Transit Advantages, and Streetcar
- Findings from the *Arterial Transitway Corridor Study* to be completed in early 2012
- Additional detail on the relationship between land use and transitways, specifically focusing on transit-oriented development or redevelopment along transitway corridors

The Metropolitan Council will periodically amend the Transitway Guidelines as best practices evolve over time. Stakeholder agencies will be notified when an update is planned and will be involved in the amendment process. Stakeholder agencies are encouraged to share information about new best practices with Council staff as they become known.

More information on the initial development of the Transitway Guidelines can be found in the Transitway Guidelines Technical Report. A list of additional resources is provided at the end of this document.

1.3. DEVIATIONS FROM THE GUIDELINES

The Regional Transitway Guidelines are meant to guide transitway project implementation in a consistent, equitable, and efficient manner throughout the Twin Cities region. As such, proposed deviations from the Transitway Guidelines that have significant cost and/or operation implications should be scrutinized by the regional funding partners to ensure that development of transitways is consistent across similar projects.

Guideline 10.10 Deviations from Transitway Guidelines addresses the process for assessing deviations from the Transitway Guidelines.

Deviations from the Regional Transitway Guidelines that have significant cost and/or operation implications should trigger discussion with funding partners (e.g., the Metropolitan Council, MnDOT, CTIB, and Regional Railroad Authorities).

The Regional Transitway Guidelines should apply whenever investments are being studied, planned, and made in a transitway corridor identified as such in the Transportation Policy Plan. In general, the Transitway Guidelines are intended to establish a baseline for transitway facilities and services while providing flexibility to lead agencies in managing the broad array of issues that must be balanced during the planning and design process. The Transitway Guidelines provide parameters for decisions relating to planning, designing, building and operating transitways. While some of the Transitway Guidelines set clear thresholds, there will be times when greater flexibility is needed than is found in the guidance. Issues that arise which have significant cost and/or operation implications should trigger discussion and negotiation between the lead agency and funding partners, including Metropolitan Council, CTIB and others. The lead agency, in consultation with technical and policy advisory groups, is responsible for initiating discussions and negotiations with the funding partners as to the need for a deviation and whether a deviation is warranted. Where appropriate, local land use authorities and/or transit operating agencies may also need to be involved in these discussions.

2. SERVICE OPERATIONS GUIDELINES

The Transitway Guidelines are important to frame the region's expectations for service levels during the development phase of a transitway project, to ensure that transitway service meets the greatest number of travel demands in a corridor in a cost-effective manner, and to provide consistent service design across transitways. The service operations guidelines are summarized in Table 2-1. These guidelines should be considered collectively when making service operation decisions for transitways.

2.1. SERVICE AND NETWORK DESIGN DEFINITIONS

Transitway travel time, access, service frequency and span, and reliability make transitway service attractive. Based on these factors, transitway service can be categorized into one of two groups: all-day frequent service or commuter express service. Within these categories, there are five transitway service types defined in Table 2-1 and the remaining Service Operations Guidelines (and some guidelines in other topic areas) specify the expectations for these service types. The five transitway service types are:

- **Arterial BRT (all-day frequent service)**
- **Highway BRT station-to-station (all-day frequent service)**
- **Highway BRT express (commuter express service coordinated with Highway BRT station-to-station service)**
- **LRT (all-day frequent service)**
- **Commuter Rail (commuter express service)**

The primary objective of service operations on a transitway is to be fast and reliable. There are two types of transitways: frequent service operates bi-directionally all day; commuter express service primarily operates in the peak travel direction during peak periods. Transitways have four dimensions of convenience (speed, reliability, availability/frequency and access) that each play an important role in how a transitway functions. Differences in speed and access between transitway modes are the result of the service and network design and strongly impact service operations. Speed is determined by transit advantages such as runningway and technology, fare collection and station spacing. Access is also defined by station spacing. Various transitway modes trade-off varying levels of speed, frequency, and access, but the reliability of a transitway is a constant that cannot be compromised. Speed, frequency, and access need to be coordinated or balanced within the "family of transit services" in a corridor.

Table 2-1 includes service and network design definitions for the various transitway services. These services are defined as follows:

- Arterial BRT service is defined as a single route within a coordinated corridor defined by neighborhood scale infrastructure. It provides service 7 days a week, 16 hours a day, and at least every 10 minutes during peak periods with lower frequencies during mid-day, evenings, and weekends.

- Highway BRT station-to-station service is defined as a coordinated set of routes that stop at all or most stations in the Highway BRT corridor, which is defined by stations and runningway infrastructure. It provides service 7 days a week, 16 hours a day, and at least every 10 minutes during peak periods with lower frequencies during mid-day and evenings. Weekend frequency is based on demand.
- Highway BRT express service is defined as express routes coordinated with station-to-station service, using at least one corridor station, the Highway BRT runningway and park-and- ride facilities. It provides at least 30-minute service during the peak periods in Transit Market Areas 1 and 2 (from the Transportation Policy Plan, Chapter 7) with at least three peak period trips in Transit Market Areas 3 and 4.
- LRT service is defined as a single route with stations, track, and infrastructure. It provides service 7 days a week, 18 hours a day, and at least every 10 minutes during peak periods with lower frequencies during mid-day, evenings, and weekends.
- Commuter Rail service is defined as a single route with associated stations, track (typically owned by others), and infrastructure. It provides at least 30-minute peak period service.

These definitions are meant to help frame the understanding of which services are and are not included in the transitway and the subsequent guideline discussions. For instance, an express bus route that is not coordinated with station-to-station service but runs in a BRT corridor would not be a Highway BRT express service and should operate within other guidelines established for standard express service in the region.

2.2. ROUTE STRUCTURE

The structure of routes in a transitway is important to allow for both service planning flexibility and customer convenience and plays an important role in overall service delivery. Appropriate transitway services include the trunk and branch portions of the transitway, as long as all segments meet the guidelines for service frequency, span, facilities, and runningway. Local tails are strongly discouraged on all bus transitway services except Highway BRT express.

A transitway route has several components. The *trunk* is the segment of the transit route served by all trips on that route. A *branch* is a segment of the transit route that is served by some, but not all, trips on that route. Branches are forks in the main trunk of the route. A *tail* is that portion of an express route where the bus operates as a local route segment traveling through neighborhoods with frequent local stops. LRT and Commuter Rail never have branches or tails because trains cannot turn off the rail corridor onto local streets. The trunk portion of a transitway offers the highest frequency of service with stations and a runningway that meet transitway minimums. The frequency of service on route branches must satisfy transitway minimums, but route branches do not necessarily have to meet the same level of service as the trunk portion. Local tails through neighborhoods are strongly discouraged on transitway services except Highway BRT express. Local tails should not be identified as BRT service since the service characteristics and facilities would not meet the minimum requirements for a premium service.

2.3. COORDINATION OF TRANSIT SERVICE

It is important to coordinate transfers between transit services to increase accessibility and improve the function of the transit network. In all instances, transitway operations should work together with connecting local services at stations. In transitways where different service types operate in conjunction with each other, these services should be coordinated to facilitate convenient and reliable transfers.

To allow for reliable connections, the waiting time between a transitway and a route that is designed to make a connection should be five to 15 minutes.

In order for a connection to be a priority, a significant portion of riders should be making the transfer.

Transitways need to be coordinated with other services sharing the same right-of-way. For example, Commuter Rail schedules need to mesh with freight and Amtrak or other passenger rail, and the trip times for Highway BRT station-to-station service must be planned in conjunction with Highway BRT express and other express service at common stops. In addition, it is important to coordinate different local tails on Highway BRT express.

The relationship between Arterial BRT and local service can vary depending on the individual corridor. In some cases, Arterial BRT functions as an overlay to the local service, with Arterial BRT serving as the primary service and the local service playing a supporting role. In other areas, Arterial BRT may completely replace local service, depending on the bus stop spacing and route geography. Investments made in runningway or amenities for an Arterial BRT service will also benefit local services.

2.4. COMPLEMENTARY AND COMPETING ROUTES

Transitway service planners should identify existing or planned transit routes that compete with transitway service and consider consolidation.

Transitways offer higher travel speeds but fewer access points than local service. Whether an existing route is duplicative or an enhancement depends on the travel patterns in the transitway corridor. A complementary route can serve the same *locations* as the transitway but has a significant difference in travel time, frequency, and/or accessibility. However, a competing route serves the same *market* as the transitway and has no significant difference in travel time, frequency, and/or accessibility. For example, in the Central Corridor transitway, the planned LRT service competes against existing Route 50 limited stop service, but the existing Route 94 express service is complementary because the travel time between downtown Minneapolis and downtown St Paul is much faster and there is only one stop in between the downtowns. A transitway project that does not offer a significant improvement in travel time compared to the existing service should be reconsidered.

2.5. MINIMUM FREQUENCY

Minimum frequency thresholds are meant to establish a consistent service expectation regarding how often the service operates for customers throughout the transitway network. Transitway service frequencies should consistently meet minimum thresholds identified in Table 2-1 to allow customers to establish and maintain service frequency expectations for each type of service.

Frequency refers to the average frequency of service in a corridor for all routes and relates to the amount of time a passenger must wait for the next vehicle trip. Frequencies typically vary for peak periods, mid-day (weekday and weekend), and evening (weekday and weekend). The service frequency guidelines are based on existing services in the region, federal Small Starts and Very Small Starts requirements, and research from other transit systems. The frequency guidelines for Arterial BRT and LRT are consistent with Metro Transit's Hi-Frequency Network standards. These standards help emphasize the "use without a schedule" concept that allows a level of confidence for the transit rider that the wait for the next bus/train will not be significant.

It is important to understand that frequency guidelines on Highway BRT station-to-station and Arterial BRT can be achieved by combining the frequencies of coordinated routes on a mainline trunk. For example, the Arterial BRT guideline of 10-minute service during peak periods can be satisfied either by an Arterial BRT route that operates every 10 minutes or by a combination of 20-minute local and 20-minute Arterial BRT services that results in a combined 10-minute frequency at Arterial BRT stations. The Highway BRT station-to-station peak guideline is 10-minutes combined service and the off-peak guideline is 15-minute combined service.

The minimum frequency guidelines outlined in Table 2-1 refer to the average time between trips, which may not be evenly spaced. For example, service on a 10-minute frequency would provide six trips within an hour. Service planning should strive to achieve a balanced frequency with combined services, when possible. Service levels on the fringe of a time period may differ slightly from the guideline. These guidelines apply primarily to the peak direction of service. The availability of reverse commute service depends on market demand and is not included in these guidelines.

2.6. MINIMUM SPAN OF SERVICE

Minimum span of service thresholds establishes a consistent service expectation regarding the days of the week and hours of the day service is available for customers throughout the transitway network. Transitway service span should consistently meet minimum thresholds identified in Table 2-1 to allow customers to establish and maintain expectations for the days and hours of operation for each type of service.

Span of service refers to the length of time service is provided including the number of hours per day and the number of days per week. The guidelines for minimum span of service are based on existing services in the region, federal Small Starts and Very Small Starts requirements, and research from other transit systems. The span of service guidelines for Arterial BRT, Highway BRT, and LRT are consistent with Metro Transit's Hi-Frequency Network standards.

The Transitway Guidelines recommend that Arterial BRT, Highway BRT, and LRT should operate seven days a week. Weekend service on Highway BRT express and Commuter Rail depends on market demand and availability of local service in the same general corridor. The Transitway Guidelines in Table 2-1 are minimum levels of service. Ridership, passenger loading standards, and service connectivity will help determine span above minimum levels of service.

2.7. TRAVEL TIME

> **Transitway travel times should be competitive with travel times for pedestrian, bicycle, auto, local bus, and/or express bus modes, depending on the travel markets served. Travel times should at least meet thresholds identified in Table 2-1.**
>
> **Transitway projects in the planning phases that do not offer a significant improvement in travel time compared to existing service in the corridor should be reconsidered. For new transit markets, the primary comparison mode should be auto travel times, but comparable local routes in other corridors could also be used to determine travel time competitiveness for frequent, all-day service options. For existing express markets, existing transit travel times should be the primary comparison mode.**

One of the main attractions for transitway service is faster average travel time, in comparison to traditional local and express buses. Research of other BRT systems in the U.S. found that the average travel time for BRT service was 18 percent faster than on local service operating in the BRT corridor *after* implementation of BRT. The same research found that the average travel time for BRT was 24 percent faster than the local service operating in the corridor *before* BRT was implemented.

All forms of transit compete against the single-occupant vehicle (SOV). All transit service should have a competitive travel time but transitways need to be even more competitive. Appendix G of the Transportation Policy Plan includes travel time competitiveness guidelines for local and express bus. It states that local bus travel time should not exceed 2.0 times average auto time, while express bus travel time should not exceed 1.35 times average auto time. Service planners should use these guidelines as benchmarks to measure travel time on transitways.

2.8. AVERAGE PRODUCTIVITY

> **Transitway average productivity should be identified during service planning and design and monitored during operation. It should meet or exceed minimum thresholds identified in Table 2-1 to ensure each line's level of service is appropriately matched to the demand of the travel market(s).**

Productivity, or the number of passengers served per hour, is an indicator of how effectively a transitway is performing. Appendix G of the Transportation Policy Plan includes an average and a minimum guideline for LRT and regular bus service. The minimum productivity is intended to be a general guideline but individual hours will not be held rigidly to it. Average productivity thresholds are 20 passengers per in-service hour for Arterial BRT, Highway BRT, and Highway BRT express bus. Average productivity thresholds are 70 passengers per hour for LRT and Commuter Rail (see Table 2.1).

2.9. MAXIMUM ACCEPTABLE LOADING PER TRANSITWAY VEHICLE

Transitway service plans should be designed to limit the number of standees to the maximum thresholds identified in Table 2-1, if any, for any time during daily operations.

Maximum acceptable loading guidelines outline a desired range of passengers per vehicle and an acceptable amount of standees. These guidelines help determine whether a bus or train is overloaded and if an appropriate level of frequency is being provided on a transitway. Appendix G of the Transportation Policy Plan includes load standards during peak and off-peak times for express bus, local bus, and LRT by transit market area.

Because loading standards are based on the number of seats, a higher load factor may be acceptable for Arterial BRT and Highway BRT station-to-station than shown in Table 2-1 if the transitway vehicles are not designed to maximize seating capacity. Commuter transitway modes, such as Highway BRT express and Commuter Rail should not have passengers standing due to the long average trip length or traveling conditions. Commuter Rail can have a 200 percent loading guideline for special events.

2.10.TRANSITWAY MARKET AREAS

Transitway service types should be appropriately matched to transit market demand areas established in the Transportation Policy Plan and listed by mode in Table 2-1.

The TPP outlines the types of local and express services appropriate for the various Transit Market Areas in the region. The most recent Transit Market Areas can be found in the Chapter 7 of the Transportation Policy Plan and a more thorough explanation can be found in Appendix G of the Transportation Policy Plan. Using local bus as the benchmark, the same guideline for Arterial BRT, Highway BRT station-to-station, and LRT is recommended: these services are appropriate for market areas 1, 2, and 3. Highway BRT express is similar to express service in terms of market-area characteristics. Highway BRT express is best suited for market areas 2, 3, and 4. Non-downtown Commuter Rail stations are generally only appropriate in market areas 3, 4, and 5 per Chapter 3. Station Spacing and Siting Guidelines, but a market-area specific analysis may be done to justify the viability of a station within market area 2

Table 2-1 – Service Operations Transitway Guidelines

	Local Service (Benchmark)	All-Day Frequent Service			Express Service (Benchmark)	Commuter Express Service	
	Local Bus/Limited Stop	Arterial Bus-Rapid Transit (BRT)	Highway Bus-Rapid Transit (BRT) Station-to-Station	LRT	Express Bus	Highway Bus-Rapid Transit (BRT) Express	Commuter Rail
2.1. Service definition and network design	A single route defined by frequent stops (1/8-1/4 mile) and basic infrastructure	A single route within a coordinated corridor defined by neighborhood-scale infrastructure	A coordinated set of routes that stop at all or most stations in the Highway BRT corridor and all associated stations and runningway infrastructure	A single route and all associated stations, track and infrastructure	A single route with transit advantages	Express routes coordinated with station-to-station service, using at least one corridor station, runningway, and park-and-rides	A single route and all associated stations and infrastructure
2.2. Route Structure	Branches and short lines are acceptable and are an important part of the route structure.	Short lines are acceptable. Branches are acceptable if each branch meets all Arterial BRT guidelines. Tails operating as local service through neighborhoods are strongly discouraged.	Branches and short lines are acceptable. Local tails are discouraged.	Short lines are acceptable. Branches are unlikely but could be acceptable if justified by ridership.	Short lines, branches, and local tails are acceptable.	Short lines, branches, and local tails are acceptable.	Short lines are acceptable. Branches are most likely the result of two rail lines sharing a common section.
2.3. Transit Services Coordination	Transfers with connecting services	Coordination with local service in the same right-of-way; transfers with connecting services	Coordination with express bus in same highway corridor; transfers with connecting services	Coordination with other rail services in corridor; transfers with connecting services	Transfers with connecting services and local tails	Coordination with station-to-station in same highway corridor; transfers with connecting services and local tails	Coordination with other rail services; transfers with connecting services
2.5. Minimum Frequency[4]	Varies by transit market area served and route type	*WEEKDAY* Combined frequency for the station-to station and local services should be 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late *WEEKEND* Combined frequency for the station-to-station and local services should be15-min. day/evening, 30- to 60-min. early/late	*WEEKDAY* Combined frequency for the station-to-station and express services should be 10-min. peak period and 15-min. midday[1] *WEEKEND* Frequency based on demand	*WEEKDAY* 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late *WEEKEND* 15-min. day/evening, 30- to 60-min. early/late	30-min. in transit market areas 1 and 2. 3 trips each peak period in transit market areas 3 and 4	30-min. in transit market areas 1 and 2. 3 trips each peak period in transit market areas 3 and 4	30-min. peak period. Off-peak frequency to be determined as needed.
2.6. Minimum Span of Service	Varies by transit market area served and route type	7 days a week, 16 hours a day	7 days a week, 16 hours a day	7 days a week, 18 hours a day			Weekdays, 5 trips each peak period
2.7. Travel Time	Baseline	Should be at least 20% faster than local bus	Should be at least 20% faster than local bus	Should be at least 20% faster than local bus	Not more than 35% slower than auto	Not more than 35% slower than auto.	Not more than 35% slower than auto; Competitive with express bus.
2.8. Average Productivity	20 passengers per in-service hour	20 passengers per in-service hour	20 passengers per in-service hour	70 passengers per in-service hour	20 passengers per in-service hour	20 passengers per in-service hour	70 passengers per in-service hour
2.9. Maximum Loading Guidelines[2]	Peak Period 125% Off-Peak 100%	Peak Period 125% Off-Peak 100%	Peak Period 125% Off-Peak 100%	200% Peak Period and Off-Peak	100% Peak Period and Off-Peak	100% Peak Period and Off-Peak	100% Peak Period and Off-Peak 200% Special Events
2.10. Market Area	1,2,3	1,2,3	1,2,3	1,2,3	2,3,4	2,3,4	3,4,5[3]

Competing Routes
Transitways offer higher travel speeds but fewer access points. Therefore, routes that serve the same locations but have significant differences in travel time, frequency, or accessibility may be complementary to a transitway, depending on a corridor's travel patterns. Other routes serving the same market as the transitway in the same manner are considered to be competing routes and should be considered for consolidation. A transitway project that does not offer a significant improvement in travel time compared to the existing service should be reconsidered.

1 These frequencies apply only to the combined frequency of coordinated routes on the mainline trunk portion of the transitway.

2 Loading guidelines are based on a standard vehicle design maximized for seating capacity. Higher load factors may be acceptable if vehicles are specifically designed to have a higher ratio of standees to seats.

3 A market-area specific analysis may be done to justify the viability of a commuter rail station within market area 2.

4 Frequency is expressed as the number of trips per hour and the trips may not necessarily be evenly spaced. Peak period is the 1 to 3 hour period of highest ridership in the AM and PM. Midday is 9:00am-3:00pm. Evening is 6:30pm-9:00pm. Early is 5:00am-6:00am and Late is 9:00pm-1:30am. Service levels on the fringe of these periods may differ slightly from the standard. These guidelines apply primarily to the peak direction of service; the availability of reverse commute service depends on market demand.

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3. STATION SPACING AND SITING GUIDELINES

The station spacing and siting guidelines are summarized in Table 3-1. Table 3-1 also includes benchmark information for local transit service and express bus as provided in Appendix G of the Transportation Policy Plan. These guidelines should be considered collectively when planning and designing transitway station locations.

A transitway station is a place on a transitway where scheduled vehicles stop during every trip. Guideline 3.2. Transit Station Types describes types of transitway stations. This section, as well as Chapter 4. Station and Support Facility Design Guidelines, provide guidelines for station design.

3.1. PRIMARY STATION MARKET ANALYSIS FACTORS AND METHODS

The identification of transitway station areas should be based on travel demand demonstrated through rigorous market analysis of existing and planned future conditions.

The following are primary market analysis factors to be considered in the identification of station areas on transitways and Table 3-1 identifies the appropriate factors for each transitway mode:

- **Major travel patterns (including location of major activity centers)**
- **Population and employment density**
- **Auto ownership**
- **Trip purpose (e.g., commuters, students, shoppers, other)**
- **Existing transit ridership**
- **Commuter market analysis (geographic market area, existing and future demand, and facility and service competition or reinforcement)**

The Regional Travel Demand Forecast Model incorporates the adopted comprehensive plans of local communities in the transitway corridor. Communities in transitway corridors are encouraged to complete station area plans that reflect the principles of transit-oriented development and incorporate these plans into their adopted comprehensive plans.

Station-area market analysis is a critical element of transitway planning and implementation. Proper analysis ensures the region will make wise investments by choosing station locations that provide high levels of transit service to key transit markets with high travel demand.

The Regional Travel Demand Forecast Model, maintained by the Metropolitan Council, is the preferred method for developing transitway travel demand forecasts, including the performance of market analysis (see Guideline 10.7. Transitway Travel Demand Forecasting). If a transitway station's ridership demand is primarily dependent on a park-and-ride customer market, the transitway's station market analysis should also include the commuter market analysis. Information on transit-oriented development principles is available in the Metropolitan Council's Guide for Transit-Oriented Development.

3.2. TRANSIT STATION TYPES

The station type will be dependent on the transit mode, geographic conditions, and the service plan for the transitway corridor. Types of stations include online, inline, and offline and are illustrated in Figure 3-1 – Transitway Station Types.

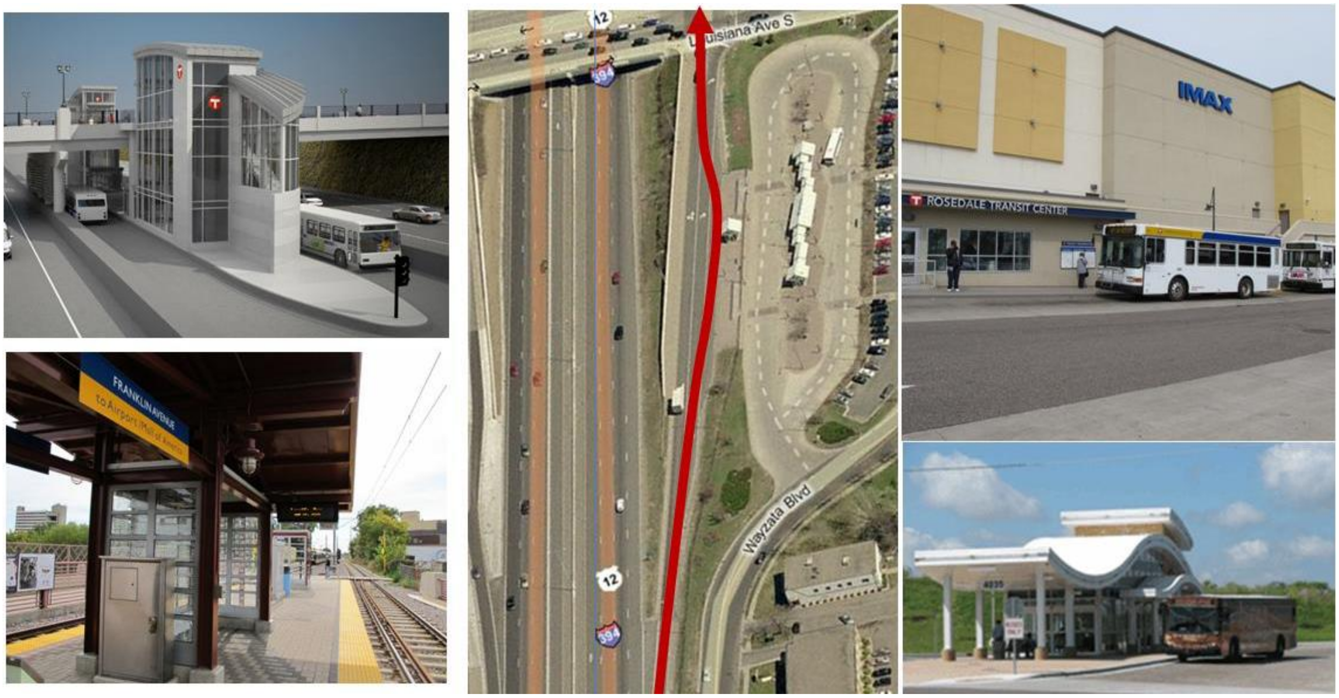
- **All rail stations should be online stations.**
- **Online or inline stations are preferred for Highway and Arterial BRT.**
- **Hybrid inline-offline stations should be implemented for Highway BRT service where online stations are not feasible, with the inline configuration provided for the inbound direction of travel.**
- **For all modes, end-of-line stations may be offline.**

Station design will vary considerably depending on the transit mode and the location of the station. Stations are generally categorized into three types, based on their impacts to service operations. These three categories are shown in Figure 3-1 and include:

- Online – Online stations are located within the vehicle runningway and the transitway vehicle can access the station without leaving the runningway. Examples of online stations in the region include all LRT and Commuter Rail stations, the I-35W & 46th Street BRT station, and the Apple Valley Transit Station on Cedar Avenue.
- Inline - Inline stations are located adjacent to the vehicle runningway, typically along freeway interchange ramps. Although they require the transitway vehicle to exit the primary runningway, they provide easy access to a station and immediately return to the runningway. Few or no turns are required. Examples include the I-35W BRT stations at 66th Street and future stations at 82nd Street and 98th Street.
- Offline - Offline stations require transitway vehicles to exit the runningway and require several turning movements resulting in potential traffic delays that impact transitway service speed and reliability, especially during peak travel times. Examples of current offline transitway stations are Cedar Grove Transit Station and Burnsville Transit Station.

Figure 3-1 – Transitway Station Types

Online **Inline** **Offline**



3.3. TRANSPORTATION SITE LOCATION FACTORS

Transitway stations should be sited to maximize convenience and minimize travel times for transitway passengers and vehicles under existing and planned future conditions.

The following are factors to be considered in the identification of station site location on transitways and Table 3-1 identifies the primary and secondary factors for each transitway mode:

- **Access to the station**
- **Impacts on the existing road and bicycle/pedestrian network**
- **Park-and-ride lot need**
- **Railroad trackway operational impact**

Siting an individual transitway station is of paramount importance. If a station is poorly sited, it will not generate high travel demand, even if market analysis forecasts high demand levels.

The Transitway Guidelines identify four key transportation-related site location factors: access to the station for transit vehicles and customers, impacts on existing road network, inclusion in the Park-and-Ride Plan, and railroad trackway operational impacts. The factors are identified as primary or secondary factors for each mode in Table 3-1. In addition to considering these factors, the lead agency is responsible for coordinating with all affected transportation authorities, as identified in Guideline 10.3. Lead Agency Candidates and Responsibilities.

Access to the Station

For all transitway modes, access to the station for transit vehicles and customers is a primary factor in siting an individual station. It is critical to ensure that customers and transit vehicles, including those specific to the mode and those connecting for transfers, have safe and convenient access to the station. Convenient access will ensure efficient transit operations for all modes, and is critical in providing fast, reliable service on the transitway. Types of access that should be considered when siting a station and selecting the station type include transitway, connecting roadways that support transit transfers or customer access, sidewalks, and trails. Some types of access are considered primary for one mode and secondary for another depending on the market the transitway is intended to serve. See Table 3-1 for details.

Impacts on the Existing Road and Bicycle/Pedestrian Network

The siting of transitway stations should include analysis of traffic impacts on the existing road and bicycle/pedestrian network to understand the ease of access and safety of transit customers and other travelers. Results should include level of service, average delay per vehicle, and crash information for all modes on key roadways and intersections (including bicycle/pedestrian crossings) used by the transitway vehicle and customers.

Park-and-Ride Lot Need

Highway BRT express and Commuter Rail customers and some Highway BRT station-to-station and LRT customers access stations using park-and-ride lots. Local transfer connections are often fewer at Highway BRT express or Commuter Rail stations, with the customer base instead driving a personal vehicle to access the transitway. Personal vehicles need to be accommodated at stations to encourage transitway ridership, which is usually done through a park-and-ride lot.

Park-and-ride demand for a station should be analyzed. According to Guideline 10.7. Transitway Travel Demand Forecasting, the regional travel demand forecast model is the preferred method for developing transitway travel demand forecasts; however, the methodology outlined in Section 5.3 of the Park-and-Ride Plan may be appropriate, especially for estimating park-and-ride demand at Highway BRT express or Commuter Rail stations. Use of this method for estimating park-and-ride demand should be vetted through Metropolitan Council travel demand forecasting staff. Additionally, the reasons for using this kind of rule-based method should be documented. In general, the amount of parking provided is inverse to the density of surrounding land uses; i.e., less parking is provided in areas with higher population and employment densities.

Trackway Operation Impacts

For LRT and Commuter Rail, it is important to consider trackway operation impacts at proposed stations. Potential trackway operation considerations at stations include the number of tracks available and their ability to provide access to station platforms, the presence or absence of track signal sightlines, the location of adjacent roadway crossings, and the location of adjacent track crossovers as needed to manage two-way train operations, including freight traffic sharing railroad track use with Commuter Rail, among others.

3.4. LAND USE SITE LOCATION FACTORS

Transitway stations should be sited to fit with and enhance the neighborhoods surrounding them today and in the future.

Land use significantly contributes to the success of station siting and generating high travel demand. Both existing and planned land uses should be considered when siting a station with priority for implementation on those stations serving existing uses. Land use factors that should be considered include, but are not limited to, the following:

- **Land availability**
- **Land type and costs (e.g., public right-of-way, joint-use, private, etc.)**
- **Mix of land uses and compatibility with transportation functions**
- **Development plans including comprehensive and station-area plans**
- **Available infrastructure and the cost of providing additional infrastructure including bicycle and pedestrian infrastructure (e.g., sidewalks, bicycle-pedestrian overpass/underpass, etc.)**
- **Proximity to affordable housing**
- **Proximity to employment**
- **Size of and proximity to transit-dependent, low-income, and minority populations**

The relative importance of each of these factors may vary depending on the transit mode and the geographic location. Both existing and planned land uses should be considered in the planning and siting of transit stations in a transitway corridor. However, priority for implementation should be given to those stations supporting existing conditions because future conditions are speculative. Future conditions are reflected in the travel demand forecasts but the implementation of future conditions is dependent on the real estate market, local financial incentives, local land use guidance, and local/regional infrastructure improvements. Communities are encouraged to complete station area plans that can be incorporated into local adopted comprehensive plans and will then be reflected in the forecasts for the transitway corridor. Local land use authorities need to be involved in station planning and siting. The staged implementation of stations is discussed in Guideline 3.9. Staged Development of Stations.

This guideline supports the vision and principles of the Corridors of Opportunity initiative currently underway in the region. The Corridors of Opportunity vision is to develop transitway corridors that will guide the region’s growth, vitality, and competitiveness by creating distinctive places and strengthening local assets. This will, in turn, increase transit ridership and expand access to jobs, affordable housing, and essential services for residents of all incomes and backgrounds.

Implementation of the Regional Transitway Guidelines should support these policies. More information about the Corridors of Opportunity initiative is available at: http://www.metrocouncil.org/planning/COO/index.htm/. The Regional Transitway Guidelines also support the U.S. Department of Housing and Urban Development’s (HUD) six Livability Principles established through the Partnership for Sustainable Communities. More information about the Partnership for Sustainable Communities is available at: http://www.sustainablecommunities.gov/.

In addition to considering these factors, the lead agency is responsible for coordinating with all affected land use authorities, per Guideline 10.2. Coordination of Agencies and Stakeholders. Information on transit-oriented development is available in the Metropolitan Council's Guide for Transit-Oriented Development.

3.5. MINIMUM DAILY BOARDINGS FOR TRANSITWAY STATION OPENING YEAR FORECAST

Travel demand at each station should be substantial in the station's projected year of opening. The recommended minimum daily boardings for each mode are identified in Table 3-1. Since transit travel speed, travel time reliability, and access are foundational characteristics of transitways, it is important to seek a balance between the number of stations and the transit travel time in the transitway corridor.

Stations provide the important function of giving travelers access to and from a transitway. Each station also increases travel time, risk of travel time variability, and operational costs due to the slowing, stopping, and restarting required for a transit vehicle to serve a station. Because travel speed, travel time reliability, and access are foundational characteristics of transitways, the Transitway Guidelines seek to strike a balance among them.

The guidelines in Table 3-1 recommend minimum daily boardings per station for the forecast year of transitway opening that range from 50 or more for Arterial BRT to 300 or more for LRT. The guidelines include a minimum of 200 for Highway BRT express and Commuter Rail, which is consistent with current requirements for an express bus stop as stated in Chapter 5 of the Park-and-Ride Plan.

Highway BRT stations may serve more than one transitway mode, including station-to-station and express BRT. If service for multiple modes is planned, the minimum daily boardings for the station's opening year forecast should be the total for the two or more modes (e.g., Highway BRT station-to-station minimum is 100 or more, Highway BRT express is 200, minimum for a station serving both modes with both modes opening at the same time would be 300 or more boardings).

3.6. AVERAGE STATION SPACING FOR THE LINE (OUTSIDE THE MINNEAPOLIS/ST. PAUL CENTRAL BUSINESS DISTRICTS)

Transitway access should be balanced over the length of a line to ensure the line delivers the speed and travel-time reliability that drives the line's market competitiveness. The average station spacing for each mode is identified in Table 3-1.

Average station spacing is defined as the average distance between stations when considering all stations on a transitway. Some stations may be closer together and some may be further apart than the average spacing. The length of a line is defined by the line's service operating plan in the year of opening; the length of the line and station spacing to be averaged should include all through-routed services outside the Minneapolis and St. Paul central business districts (CBDs). This guideline is based on consideration of station spacing in this region and in other regions and acknowledgment of the effect the number of stations has on transitway travel-time competitiveness. This guideline seeks to support balanced levels of access and mobility on transitways.

3.7. MINIMUM SPACING BETWEEN TWO STATIONS (OUTSIDE THE MINNEAPOLIS/ST. PAUL CENTRAL BUSINESS DISTRICTS)

Transitway access should be balanced within a line to ensure each line is accessible to key transitway markets and delivers the speed and reliability that drives the line's market competitiveness. The minimum station spacing for each mode is identified in Table 3-1.

Minimum station spacing is defined as the minimum distance between any two stations. All stations, in combination, along a particular corridor should meet or exceed the average spacing guideline; however, individual stations along a particular corridor could meet only the minimum station spacing guideline. The recommended Transitway Guidelines do not address station spacing within CBDs where station design is project specific and based on street network capacity and land use. This guideline allows closer station spacing to provide more frequent transitway access where demand warrants and is paired with average station spacing for the overall transitway to support balanced levels of access and mobility on transitways.

3.8. MINIMUM DISTANCE BETWEEN MINNEAPOLIS/ST. PAUL CENTRAL BUSINESS DISTRICTS AND NEXT STATION

Highway BRT and Commuter Rail stations should be sited to complement the transit system already serving the Minneapolis and St. Paul central business districts. The minimum distance between Minneapolis/St. Paul CBD and next station for each mode are identified in Table 3-1.

Three modes are intended to serve markets with trip origins outside the Minneapolis and St. Paul CBDs. The modes are Highway BRT station-to-station, Highway BRT express, and Commuter Rail. To support these modes and minimize competition with other transit services, transitway stations should be located between one (Highway BRT station-to-station) and seven miles or more (Commuter Rail) from the Minneapolis or St. Paul CBDs. This guideline is based on consideration of station spacing in the region, acknowledgment of the effect the number of stations has on transitway travel-time competitiveness, and acknowledgement that the existing transit system generally provides competitive travel times within five miles of the Minneapolis and St. Paul CBDs (15- to 30-minute travel times). This guideline seeks to support balanced levels of access and mobility on transitways.

3.9. STAGED DEVELOPMENT OF STATIONS

Some stations should be planned for but built after initial construction of the larger transitway.

To be included in initial planning/alternatives analysis, a station should be supported by land use densities that are included in the city's comprehensive plan as evidenced by the station's forecast travel demand meeting the minimum ridership threshold for the planning horizon year.

To be included in the Draft Environmental Impact Statement (DEIS)/preliminary/final design, a station should be included in an approved station-area master plan, which should be adopted as part of the city's comprehensive plan and zoning ordinance, and the station's forecast travel demand should meet the minimum daily boardings threshold for the planning horizon year. The DEIS should distinguish between those stations that are expected to meet ridership thresholds by opening year and those expected to meet ridership thresholds by the planning horizon year. The latter should be identified as potential future stations.

To be included in construction, there should be:

- **Progress toward realizing the planned land development for the station area as evidenced by activities such as land assembly, developer interest, development agreements, and/or construction of municipal infrastructure;**
- **Evidence that enough development will be in place within five years of opening to achieve the minimum daily boardings threshold at the station; and**
- **Evidence that cost savings are significant when the station is constructed concurrently with the runningway.**

A station may also be included in construction when there is a significant low-income and/or transit-dependent population within ½ mile of the station and a master station-area plan has been approved (i.e., adopted as part of the city's comprehensive plan and zoning ordinance) even though development has not yet occurred.

Stations included in the final design may be added as infill stations after construction of the line when the above conditions for construction are met without meeting the evaluation criteria in Table 3-1. Proposed infill stations that are not included in the final design will be evaluated based on the evaluation criteria shown in Table 3-1.

Local communities along transitways are strongly encouraged to complete station area land use plans that reflect best practices in transit-oriented development planning and design. These plans are important for achieving increased ridership and improved access to jobs, affordable housing and essential services for residents of all incomes and backgrounds. However, the actual timing of development is influenced by many economic factors. This guideline provides direction for deciding which stations should be included in initial transitway construction and which should be phased in at a later date as development occurs.

Staging the development of transitway stations provides communities, corridors, and the region with opportunities to ensure appropriate access is provided and protect mobility and the significant investment required to implement transitways while proving travel demand is imminent. It should be noted that environmental documentation would need to be revisited for stations added three or more years after the transitway's opening.

There are several conditions that may occur in the future that are not addressed by these guidelines including stations that outgrow their planned design, stations that do not perform well, the need for multiple infill stations, joint use facilities, and intermodal hubs. It is recognized that planning is based on professional due diligence and adaptations may need to be made in the future as changes occur or unique circumstances arise.

3.10. ADDITION OF NEW STATIONS

Justification for stations not included in the final design for a transitway should consider the guidelines above to protect the balance between access and mobility and the substantial investment required to implement transitways. Other considerations may vary based on the transitway, but should include the following:

- **Inter-station competition on the transitway**
- **Market-area overlap with other transit services including express bus**
- **Impacts on transitway travel time and service reliability**
- **Capital and operating costs**

As noted previously, local communities are encouraged to develop land use plans for future stations areas and incorporate these plans into their comprehensive plan. Station area plans are important for achieving increased ridership and improved access to jobs, affordable housing and essential services for residents of all incomes and backgrounds. However, it is recognized that development will occur over time and will be affected by many economic factors. The intent of this guideline is to provide direction for those circumstances where development may occur at a different time of different location than initially anticipated in the city's comprehensive planning process.

Table 3-2 presents an example of the additional analysis done for a Commuter Rail station; relevant analysis factors may vary by station and transitway mode.

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Table 3-1 – Station Spacing and Siting Guidelines Summary

	Local Service (Benchmark)	All-Day Frequent Service			Express Service (Benchmark)	Commuter Express Service	
	Local Bus/Limited Stop	Arterial Bus-Rapid Transit (BRT)	Highway Bus-Rapid Transit (BRT) Station-to-Station	Light Rail Transit (LRT)	Express Bus	Highway Bus-Rapid Transit (BRT) Express	Commuter Rail
3.1 Primary Station Market Analysis Factors and Methods **For all types of transitway service, communities are encourages to complete station area plans that reflect the principles of transit-oriented development and incorporate these plans into their adopted comprehensive plans.*	Population and employment density	Major travel patterns (including location of major activity centers), population and employment density, auto ownership, and trip purpose (e.g., commuters, students, shoppers, other), existing transit ridership; regional travel demand forecast model or similar resource	Major travel patterns (including location of major activity centers), population and employment density, auto ownership, and trip purpose (e.g., commuters, students, shoppers, other), existing transit ridership; regional travel demand forecast model or similar resource for stations without a park-and-ride; Commuter Market Analysis: Park-and-ride Plan Chapter 5 for park-and-ride-based stations	Major travel patterns (including location of major activity centers), population and employment density, auto ownership, and trip purpose (e.g., commuters, students, shoppers, other), existing transit ridership; regional travel demand forecast model or similar resource for stations without a park-and-ride; Commuter Market Analysis: Park-and-ride Plan Chapter 5 for park-and-ride-based stations	Commuter Market Analysis: Park-and-ride Plan Chapter 5	Commuter Market Analysis: Park-and-ride Plan Chapter 5; or Regional Travel Demand Forecast Model if part of corridor wide analysis	Commuter Market Analysis: Park-and-ride Plan Chapter 5; and/or Regional Travel Demand Forecast Model
3.3 Transportation Site Location Factors	<u>Primary</u>: Access to, and visibility of, stop for transit vehicle and customers via existing walk, trail, and transit transfer connections	Online or inline stations preferred. <u>Primary</u>: Access to, and visibility of, station/stop for transit vehicle and customers via existing walk, trail, and transit transfer connections	Online or inline stations preferred. <u>Primary</u>: Maximize operational speed, access, and visibility of station for transit vehicle on BRT runningway (online, inline or offline station) and customer access via existing walk, trail, and transit transfer connections, and existing highways <u>Secondary</u>: Park-and-ride lot need based on commuter market analysis (e.g., Park-and-ride Plan Chapter 5)	Stations should be online. <u>Primary</u>: Access to, and visibility of ,station for customers via existing walk, trail, and transit transfer connections and impacts on existing road network <u>Secondary</u>: Park-and-ride lot need based on commuter market analysis (e.g., Park-and-ride Plan Chapter 5)	Online or inline stations preferred. <u>Primary</u>: Park-and-ride lot need based on commuter market analysis (e.g., Park-and-ride Plan Chapter 5); Access to and visibility of station for transit vehicle and customers via existing highways; presence of a major travel corridor serving a major regional activity center <u>Secondary</u>: Access to station for customers via existing walk, trail, and transit transfer connections	Online or inline stations preferred. <u>Primary</u>: Park-and-ride lot need based on commuter market analysis (e.g., Park-and-ride Plan Chapter 5); Access to and visibility of station for transit vehicle via BRT runningway (on-line vs. off-line station) and customers via existing highways <u>Secondary</u>: Access to station for customers via existing walk, trail, and transit transfer connections	Stations should be online. <u>Primary</u>: Park-and-ride lot need based on commuter market analysis (e.g., Park-and-ride Plan Chapter 5); Access to and visibility of station for customers via existing highways; Trackway operational impacts <u>Secondary</u>: Access to station for customers via existing walk and transit transfer connections
3.5 Minimum Daily Boardings for Transitway Opening Year Forecast	N/A	50 or more boardings per station	100 or more boardings per station	300 or more boardings per station	200 or more boardings per station	200 or more boardings per station	200 or more boardings per station
3.6 Average Station Spacing for the Line (outside Minneapolis/St. Paul Central Business Districts)	1/4 to 1/8 mile	1/4 mile to 1/2 mile	2 miles	1 mile	5 miles/market specific	5 miles/market specific	7 miles or longer
3.7 Minimum Spacing between Two Stations (Outside Minneapolis/St. Paul Central Business Districts)	1/8 mile or longer	1/8 mile or longer	1/2 mile or longer	1/2 mile or longer	4 miles or longer/market specific	4 miles or longer/market specific	5 miles or longer
3.8 Minimum Distance between Minneapolis/St. Paul Central Business Districts and Next Station	N/A	N/A	1 mile or longer	N/A	5 miles or longer/market specific	5 miles or longer/market specific	7 miles or longer/market competitiveness analysis

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Table 3-2 – Example Infill Station Impact Analysis for Commuter Rail Station

Infill Commuter Rail Station Screening Criteria		
Service Reliability	Pass/Fail: Delay impact of platform design/access, signal placement of track alignment required	
New Market Attractiveness	-1 pt/minute schedule delay impacting new market attractiveness	
New Rail Customers	+10% = 5 pts percentage growth of overall ridership	
Existing Customer Impact	Each 10% of existing customers = -1 pts/3 min added per trip	
Service Consolidation	1 pt/10% of existing transit service replaced; adjacent transit options; travel time; location; & fare	
Other Criteria (to be determined)		
Scoring	0 or more = Pass	
	-1 or lower = Fail	
Cost and Funding Considerations		
Frequency/Capacity/Span of Service	Yes/No: Service level to meet demand	
Regional Operating Cost	Service cost to meet demand (crews and maintenance)	
Capital Cost	Construction and easements	
Regional Funding Opportunity Cost	Other projects advancement impacted	

4. STATION AND SUPPORT FACILITY DESIGN GUIDELINES

Station siting and station design guidelines should be considered collectively when making station and support facility design decisions for transitways. A transitway station is a place on a transitway where scheduled vehicles stop during every trip. Three types of transitway stations have been defined as described in Guideline 3.2. Transit Station Types. A transitway station may be included in one or more of the categories. For example, the I-394 Louisiana Avenue station is an inline station for inbound trips, but offline for outbound trips. All rail stations should be online stations. Online or inline stations are preferred for highway and arterial BRT. Hybrid inline-offline stations should be implemented for Highway BRT service where online stations are not feasible, with the inline configuration provided for the inbound direction of travel. For all modes, end of line stations may be offline.

Since the design of stations and support facilities is an engineering-intensive activity often directed by specific design practices, standards, and/or regulations, more specific detail behind these guidelines is provided in the Station and Support Facility Design Guidelines User Guide.

4.1. PRINCIPLES OF TRANSITWAY STATION AND SUPPORT FACILITY DESIGN

Transitway stations and support facilities should fit in with and enhance the neighborhoods surrounding them today and in the future. Transitway stations and support facilities should be functional, attractive, cost-effective, and generally consistent by transitway mode across the region. Station and facility designers should work to:

- **Provide an attractive, informative environment for passengers at stations that is consistent with local community context, transitway identity, and passenger waiting times**
- **Integrate with the surrounding land uses, which may include forming a nucleus for transit-oriented development at stations**
- **Promote a safe and secure environment by designing all elements to enhance passive security by maintaining visibility to and within the station and station area**
- **Implement an interdisciplinary approach to station and facility design that incorporates advancements in technology**
- **Achieve a functional, cost-effective outcome that balances aesthetics with funding availability**

All stations and station areas should be planned and designed using best practices for transit-oriented development and transit station design as described in the Metropolitan Council's Guide for Transit-Oriented Development and the principles of the Corridors of Opportunity initiative.

It is the intent of the Regional Transitway Guidelines to support better alignment of transit and land use planning. Information about the region's Corridors of Opportunity initiative, including its vision, principles, and the most up-to-date project deliverables, is available on the Council's website. The

Regional Transitway Guidelines are also intended to support the U.S. Department of Housing and Urban Development's (HUD) six Livability Principles established through the Partnership for Sustainable Communities. More information about the Partnership for Sustainable Communities is available at http://www.sustainablecommunities.gov/.

Stations serving specialized facilities such as Union Depot in St. Paul, the Minneapolis Interchange, and major event and sports venues (e.g., the Capitol Complex, Target Field, Mall of America, University of Minnesota TCF Bank Stadium, Xcel Energy Center) require special considerations. National expertise or guidelines are likely most appropriate.

For all other stations, consistency across the transitway system includes such elements as system signs, maps, structural elements, materials, and power systems. Other elements that may be custom and responsive to site-specific conditions and neighborhood context may include kiosks, pavement patterns, handrails, bike racks, benches, and retaining walls.

Coordination with and engagement of local land use authorities in station planning and siting, as well as station design, is very important. Coordination with local land use authorities, partner implementation and affected agencies, stakeholders, and the general public are critical responsibilities of the organization leading transitway planning and design, including stations and support facilities, as identified in Guideline 10.2. Coordination of Agencies and Stakeholders.

4.2. TRANSITWAY STATION FACILITIES

One of the primary functions of transitway stations is providing passengers access to the transitway. To accomplish this function, all transitway stations should include:

- **Facilities that support access for customers of all ages and abilities**
- **Facilities that support access for pedestrians and people using wheelchairs or bicycles, including providing bicycle parking**
- **Station platform(s)**
- **Waiting shelters for all public transit routes serving the station**
- **Provision for short-term pick-up/drop-off areas for transit passengers.**

Some stations may also serve as transit transfer, transit layover, and/or park-and-ride locations. The major factors to consider when identifying these additional facilities to provide at each station are existing and future:

- **Passenger demand**
- **Market needs**
- **Transit service plans (transitway and other public transit services)**
- **Capital and operating costs**
- **Available right-of-way**
- **Consistency with surrounding development and land use**

Transitway station access is discussed in more detail in the Station and Support Facility Design Guidelines User Guide.

All transitway stations must serve people arriving or leaving by foot, in wheelchairs, on bicycles, and being dropped-off or picked-up by a car and the elements listed in this Guideline are essential to this role of a transitway station. All transitway stations should be ADA compliant. Some stations may also provide access for transit transfers, transit layover, and/or park-and-ride locations but the provision of additional facilities depends on the considerations listed above. Additional guidance relating to transfer locations, including boarding and wait times, is in Guideline 4.3. Enclosures at Transitway Station. Guidance on identifying parking need is in Guideline 3.3. Transportation Site Location Factors. Discussion of platform configurations (e.g., center, split, offset) as well as a hierarchy of station circulation and related elements is included in the Stations and Support Facility Design Guidelines User Guide.

4.3. ENCLOSURES AT TRANSITWAY STATIONS

All transitway stations should include sheltered waiting areas. Some transitway stations may also include one or more enclosures when justified. Enclosures should be reserved for high volume stations or when station equipment requires protection from the elements.

When making the decision between shelter or enclosure at high volume stations, the following should be considered:

- **Presence of circulation systems like elevators or escalators that provide access to transitway boarding platforms, such as at stations located in freeway medians**
- **Stations located within multiuse buildings, such as an airport terminal**
- **Transit transfer points with a total of 500 or more boardings per day**
- **Site conditions, including spatial constraints like available right-of-way**

Radiant heat and passive cooling should be used in all passenger waiting areas at transitway stations. Where heat and/or air conditioning is required for equipment operation, geo-thermal or other environmentally responsible options should be considered taking into account both capital and long-term operating and maintenance cost. Non-waiting spaces in enclosures such as stairways or overpasses should be vented but not heated or cooled.

Shelters are passenger waiting areas that are bolted or affixed to a concrete pad or have foundations. Figure 4-1 illustrates a sheltered passenger waiting area at a Hiawatha LRT station. Guidelines 4.2. Transitway Station Facilities, 4.4. Transitway Station Sizing, and 4.5. Transitway Station Design and Components address sheltered passenger waiting areas.

Enclosures are built on foundations. The Northstar stations and I-35W & 46th Street Station illustrated in Figure 4-2 are examples of stations that include sheltered and enclosed passenger waiting areas; the I-35W & 46th Street Station enclosure also protects stairs and elevators. Enclosures can provide passenger comfort but can also incur higher construction and operating and maintenance costs, especially when heated and cooled. Because most transitway services operate at high frequency (such as light rail and bus rapid transit services) or during short periods of the day (such as commuter rail), high volumes of passengers should use enclosed passenger waiting areas for them to yield significant benefits. Because shelters or enclosures with radiant heat and passive cooling are typically feasible, other kinds of enclosures may be provided as a local betterment.

Figure 4-1 – Sheltered Passenger Waiting Areas (Hiawatha LRT)

Figure 4-2 – Sheltered and Enclosed Passenger Waiting Areas (Northstar and I-35W & 46th Street Station)

4.4. TRANSITWAY STATION SIZING

Transitway station circulation systems, waiting areas, and queuing areas should be sized based on the projected number of patrons during peak 15-minute intervals in the year of opening. Parking capacity, sheltered space, and platform length should be sized based on other considerations as described below.

- **The number of bicycle parking spaces should be based on anticipated ridership and spatial constraints. Bicycle racks are preferred to lockers except where substantial space and bicycle demand exists.**
- **Waiting shelters shield transit customers from snow, wind, rain and sun and should be sized based on average peak hour, per-vehicle passenger volumes projected for the station and accounting for typical wait time. Shelters should provide 3.5- to 5-square feet per person. At Commuter Rail stations, a minimum of one shelter should be provided on each outbound platform, and a minimum of two shelters on each inbound platform.**
- **In general, LRT platforms should accommodate three-car trains (270 feet) and Commuter Rail platforms should accommodate five-car trains (425 feet) with expansion capability for longer trains (600 feet minimum, or longer to accommodate special service, as required by the railroad). Highway BRT platforms should be sized to accommodate two articulated buses or over the road coaches (120 feet). Arterial BRT platforms should accommodate one articulated or two standard buses (60 to 80 feet) depending on the vehicle to be used for the service. Platform sizing for all modes is discussed in more detail in the Station and Support Facility Design Guidelines User Guide.**
- **Where parking is identified as a need per Guideline 3.3, park-and-ride lots may be surface lots or multi-level structures. Surface lots are generally preferred for cost reasons, but the type, size, and footprint of the parking facility should be evaluated to achieve the best balance between available space, cost, and funding. As discussed in Guideline 3.3, the Metropolitan Council's Park-and-Ride Plan provides design guidance for park-and-ride lots; parking areas should be sized based on the market analysis methodology provided in Chapter 5 of the plan. In general, the amount of parking provided at stations is inverse to the density of surrounding land uses; i.e., less parking is provided at stations with higher surrounding population and employment densities.**

The staged development of station facilities should be considered when planning, designing, and constructing stations. Staged development is discussed in more detail in Chapter 3. Station Spacing and Siting Guidelines.

Capacity standards for sizing facilities are discussed in Section 6 of the Central Corridor Light Rail Transit (CCLRT) Design Criteria. This section states facilities should be sized to meet level of service C or better capacity standards projected for peak 15-minute intervals in the year of opening, gives recommended circulation system dimensions, and notes that "pedestrian paths, plazas, ramps, and queuing areas shall be sized in accordance with the level-of-service capacity standards contained in

Pedestrian Planning and Design by J. Fruin . . . site elements such as fare vending machines ... shall be located and sized so that queues or areas of congregation do not block pedestrian flow."

4.5. TRANSITWAY STATION DESIGN AND COMPONENTS

Transitway stations, enclosures, and shelters should be consistent with accepted architectural and site design standards, including best practices for transit-oriented development. Standard components to be included at every transitway station include:

- **Lighting**
- **Heating**
- **Security features**
- **Blast-resistant litter receptacles**

Ticket vending machines or comparable technology should be provided at all rail stations, and all BRT stations should be constructed to support the inclusion of ticket vending machines.

Materials used in transitway stations, enclosures, and shelters should be attractive, sustainable, and cost-effective for the life of the investment. Cost considerations should include both the capital investment and life-cycle costs. All materials should be low-maintenance; easy to repair and replace; difficult to remove, deface, or damage; environmentally friendly and cost-effective.

Transit stations generally should not include public restrooms unless the station is part of a larger, multi-use building or a major transfer point requiring routine daytime wait times of one hour or more. Where public restrooms are provided, stations should be staffed for security and maintenance.

Other amenities, which may or may not be appropriate to provide, include:

- **Seating**
- **Concessions and newspaper vending**
- **Acoustic treatments**

Additional information on transitway station design and amenities is included in the Station and Support Facility Design Guidelines User Guide.

Some transit stations will serve both transitway passengers and passengers using interconnecting local bus routes. Facilities for both should be considered in the planning and design of the transit station and associated bus shelters and facilities. Both the local street level and the transitway platform level should be considered equally important when designing two-level stations.

Transitway station design and material selection need to consider on-going maintenance needs such as the ability to accommodate snow removal equipment and snow storage requirements. The provision of snow removal, litter removal, cleaning, and maintenance should be incorporated in early planning stages with agency roles and responsibilities clearly defined in interagency agreements to avoid complications once operational.

A number of accepted policies exist for use in station design including, but not limited to:

- Americans with Disabilities Act (ADA)
- National Environmental Policy Act (NEPA)
- Title VI of the Civil Rights Act of 1964
- FRA, FTA and AREMA regulations
- State and local regulations and guidance including the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD)
- Metropolitan Council's Park-and-ride Plan
- Metropolitan Council's Guide for Transit-Oriented Development

Access to restrooms should be provided for transit operators at stations which function as layover facilities and at terminal stations. Where stations are located within a multi-use building or qualify as an assembly area according to the State Building Code, public restrooms may be provided. Evaluation criteria include the number of passengers and routine wait times of one hour or more. Public restrooms may be considered as a local betterment at any transit station.

4.6. LANDSCAPING, STREETSCAPING, AND PUBLIC ART

Landscaping (plant materials), streetscaping (hardscape), and/or public art should be provided at transitway stations to create quality public spaces and complement the surrounding area. In addition to meeting the guideline regarding station design and components, landscaping, streetscaping and public art design should:

- **Provide clear sight lines which do not impede visibility for waiting transit passengers, transit vehicles in the runningway, or other transportation modes intersecting the transit runningway**
- **Avoid creating areas of concealment**
- **Avoid interference with pedestrians, bicycle, bus, and auto paths – this should include integrating all public art into functional station elements to avoid creating unanticipated physical obstacles in station areas**

Consistent with Federal Highway Administration (FHWA) guidelines, the cost of landscaping and streetscaping should be no more than five percent of the above-ground construction cost (i.e., the percentage should not be associated with the cost of underground utility relocation). Consistent with FTA guidelines, the cost of public art included at stations and in all other areas of a project should be within one-half percent to five percent of the project construction budget, depending on the funding source, with larger percentages typically associated with lower cost projects.

Additional information on transitway station landscaping, streetscaping, and public art is included in the Station and Support Facility Design Guidelines User Guide.

This guidance is consistent with the region's Corridors of Opportunity initiative to "create distinctive places and strengthen local assets."

Streetscaping (hardscape) and/or public art is an acceptable alternative to landscaping (plant materials) in many circumstances. It is best to integrate all landscaping, streetscaping, and public art into the functional elements of the station where possible. The station railing at the 50th Street LRT station on the Hiawatha line (see Figure 4-3) is an example of effective public art as an integral station element. Landscaping that assists in passive cooling or wind blockage is another example.

Figure 4-3 – Decorative Railing at 50th Street Hiawatha LRT Station

Where plant materials are used, those appropriate to Minnesota climate and soil conditions, including tolerance to sand/salt used to clear paths during winter, are preferred. Plantings that require no additional irrigation other than rainfall once the material is established are also preferred. Short- and long-term irrigation needs for all natural plant materials should be considered. Irrigation, an alternate engineered irrigation system, or an interagency agreement regarding watering is required where irrigation is essential to the life of the plants.

The region currently spends between one-half and one percent of a station's cost on public art. Funds spent on landscaping, streetscaping, and/or public art should be appropriate to the overall costs of the transit project and adequate to meaningfully benefit the station area. Above the stipulated level provided in the project funding agreements, additional landscaping, streetscaping, and/or public art will likely be considered a local betterment.

4.7. TRANSITWAY PASSENGER INFORMATION

One of the primary functions of transitway stations is the provision of transit information. Transit information and wayfinding information within and to stations should be provided at all transitway stations. Signage should seamlessly guide passengers to and through the station and its functions, including passengers who are not familiar with the transit system, who have disabilities, who are non-English speakers, and/or who are non-readers. Wayfinding information to major, permanent civic attractions should also be provided at all transitway stations.

Transitway station signage should incorporate the transitway branding scheme (see Chapter 9. Identity and Branding Guidelines). Placement and general content of information should be consistent within station areas when possible.

Real-time schedule information should be provided at high-volume stations whenever site conditions allow.

Transit information elements include weatherproof transitway route maps, schedule information, and rider alerts for all transit routes serving the station. Types of signage include static, variable, or real-time.

Station areas should include wayfinding information to platform entrances and exits, bicycle parking areas, bus drop off, short-term pick-up/drop- off, and, where provided, park-and-ride facilities. Station areas may also include wayfinding signs directing passengers to nearby public facilities that are major, permanent civic attractions in proximity to the station. Examples include city halls, the State Capitol, museums, and other nearby transit facilities. Where budget permits, wayfinding signs may also include other major civic attractions such as parks, recreational trails, stadiums, and public event centers close to the station. Wayfinding within the station area to businesses or other types of attractions may be included as a local betterment.

4.8. PEDESTRIAN AND BICYCLE ACCESS

Special attention should be given to providing convenient and safe bicycle and pedestrian access to and through transitway stations including improved bicycle and pedestrian facilities and roadway modifications where appropriate. Pedestrian and bicycle paths should be designed to provide the most direct route, paved, clearly marked, lighted, and buffered to improve bicycle and pedestrian experiences and discourage people from crossing tracks or roadways in other than designated areas. Mid-block crossings between stations and street intersections should be avoided. At-grade crossing should be utilized where feasible.

Grade-separated bicycle/pedestrian crossings may be considered where there is no technically feasible at-grade crossing option, the benefits to the broader transportation system are shown to be significant, or the grade-separation is required by the runningway's owning entity (e.g., railroad). Evaluation criteria should include:

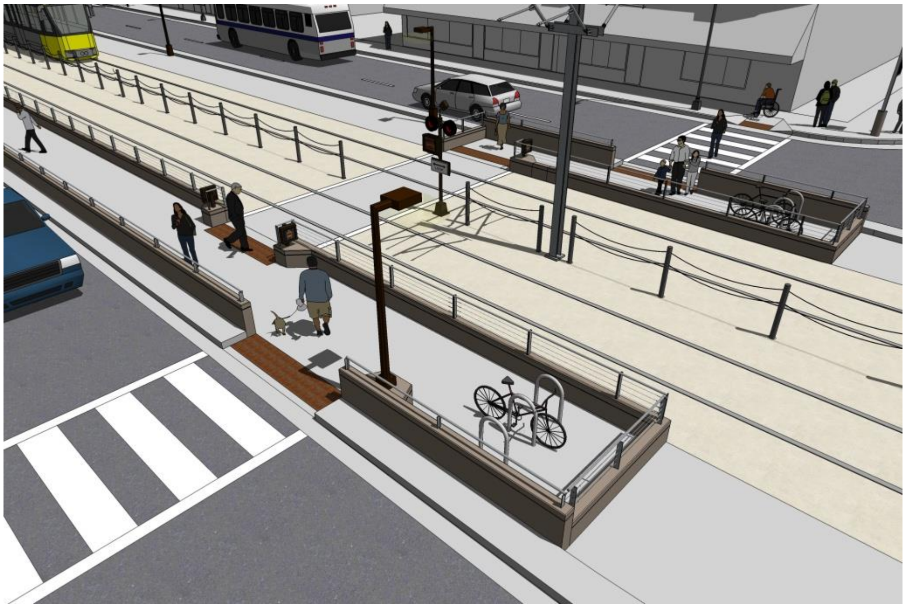
- **High pedestrian volumes**
- **High number of pedestrian or bicycle crashes**
- **Long pedestrian crossing distances**
- **Presence of poor sight distance to see crossing transit patrons**
- **Roadway average daily traffic volumes of more than 35,000 and 80th percentile speeds documented at more than 40 mph**
- **Distance of greater than 600 feet to the nearest alternative safe crossing (i.e., controlled intersection or existing under/overpass)**
- **Potential to coordinate with adjacent facilities such as a bike trail or sidewalk system**

Additional information on pedestrian and bicycle access, including grade-separated crossings, is included in the Station and Support Facility Design Guidelines User Guide.

The provision of high quality, safe and convenient pedestrian and bicycle facilities at transitway stations and connecting stations to surrounding land uses is a critical element of station design and transit-oriented development. Pedestrian and bicycle facilities should be given a high priority during the planning and design of transit stations and surrounding land uses. Safe and convenient pedestrian and bicycle access also should be given a high priority when planning and designing all roadways in the vicinity of a transit station.

Improved bicycle and pedestrian facilities include features such as more visible crossings using pavement treatments, colors, or markings; pedestrian refuge medians; roadway curb extensions; intersection countdown timers; or passive crossing control (e.g., "z-type" crossings on University Avenue as illustrated in Figure 4-4). Roadway modifications include features such as adjusted intersection traffic signal timings to accommodate bicycles/pedestrians; additional traffic signals; elimination of conflicting turn movements such as free-right turn movements; and intersection modifications to provide more convenient and safer bicycle and/or pedestrian crossings.

Figure 4-4 "Z-type" Pedestrian Crossing at Unsignalized Intersection



Source: CCLRT Project Office

Pedestrian/bicycle overpasses/underpasses will typically be open during transitway service hours only unless the overpass/underpass is part of a multiuse facility (e.g., trail, sidewalk system, or building). Special conditions will apply when an overpass/underpass connects to a building as buildings may be locked during non-business hours, which may restrict the availability of any overpass/underpass for transit patrons. Overpass/underpass hours of availability should be considered early in the transitway design process.

Overpasses should be constructed with protective guardrails and fencing. In determining whether an overpass should be covered or enclosed, factors to consider include the following:

- Volume of use
- Snow removal requirements and constraints (e.g., requirements to carry snow off an overpass rather than plow it off)
- Length and climate conditions of the facility to be overpassed (e.g., wind shear over a river or freeway)

Per Guideline 4.3. Enclosures at Transitway Station, enclosed overpasses should be vented but not heated or cooled. Overpasses and underpasses should include lighting that achieves required illumination levels for the safety and comfort of station users.

If an at-grade crossing is feasible or where functional and maintenance needs do not indicate a cover or enclosure is necessary, provision of a grade-separated crossing or enhancement with a cover or enclosure may be a local betterment.

4.9. TRANSITWAY STATION SAFETY AND SECURITY

Transitway stations should be designed to promote a safe, secure, and comfortable environment for patrons. The design process should include:

- **Consideration of the application of the principles of crime prevention through environmental design**
- **Conducting a design review and hazard, threat, and vulnerability analysis**
- **Provision of surveillance and communications equipment for both deterrence and emergency response**

The lead agency should also coordinate transitway emergency response planning, including maintenance of access to transitway stations.

More information on the design and function of safety and security elements is included in the Station and Support Facility Design Guidelines User Guide.

Important elements of safety for consideration at stations include:

- The use of slip-resistant materials to account for rainy or snowy conditions
- The use of tactile warning strips along the platform's boarding edge

The principles of crime prevention through environmental design include natural surveillance (transparent design, lighting and location near positive activities), natural access control (design of entry points and flow), natural territorial reinforcement (site and landscape design), and maintenance.

During the station design process, an evaluation should be conducted to identify any elements which might inadvertently compromise the overall safety and security of the station area. Consistent with the requirements of both FTA and FRA, the evaluation should be completed by the transit operator and should include a detailed risk assessment to pinpoint the possibility of hazards and potential areas of vulnerability within the station. The methodology should identify potential hazards related to persons (employees, passengers, pedestrians, and members of the general public), trains, buses, equipment, autos, and first responder vehicles.

Station surveillance and communications equipment should include public address systems, closed circuit television, and emergency telephones. Public address systems include both speakers and signs able to convey information to persons with disabilities in compliance with ADA requirements. Closed circuit television cameras should record activity on platforms and at ticket vending machines. Emergency telephones should be provided on or near platforms and near elevators on every level of structured parking for communication with the central operations center and emergency services. Public telephones should not be provided at stations.

Emergency response coordination should be established and maintained by the lead agency using a documented plan developed with the concurrence of all agencies with jurisdiction over facilities adjacent to or connecting with transitway stations.

4.10.TRANSITWAY SUPPORT FACILITIES

The need for transitway support facilities should be identified during planning and design to ensure that adequate facilities are provided. Support facilities should address daily vehicle storage and cleaning, major vehicle maintenance, central system control, and/or runningway maintenance. Exterior materials should be selected based on attractiveness, durability, and low-maintenance needs. Interior material selection should focus on durability and low-maintenance needs. Acoustics should be carefully considered and designed to ensure the facility is buffered from surrounding, non-industrial land uses including residential and commercial areas.

The size and functions of transitway support facilities will be determined by the specific program identified for each support facility. Other elements of transitway runningways, including power substations and traffic signals, are discussed in the Chapter 5. Runningway Guidelines.

4.11.LOCAL BETTERMENTS

Transitway station and support facility enhancements beyond the base elements described will likely be considered local betterments that require a local commitment of funding for capital, operations, and maintenance. Local betterments may be included in the transitway project when the enhancement is consistent with and complements the station or support facility's community context, adds to passenger comfort and/or interest, and funding of its added costs, including, construction/installation, operation, maintenance, repair, and refurbishment/replacement, has been negotiated and implemented through an interagency agreement.

The base elements described in the Transitway Guidelines are intended to meet the basic functional and aesthetic needs of transit users in a regionally consistent manner so that users know what to expect wherever they are travelling in the region. The Transitway Guidelines provide flexibility for additional station elements to meet unique community or corridor needs. The funding of these elements is subject to negotiation with the funding agencies.

Local betterments are improvements to typical transitway designs that a local community desires which go beyond the necessary functions of the transitway facility and typical level of amenities provided at transitway stations and add significant capital, operating, and/or maintenance cost. Examples of local betterments may include public restrooms at stations and park-and-rides; enhanced landscaping, streetscape, or public art; enhanced wayfinding to business or other attractions outside the station area; grade-separated bicycle/pedestrian crossings where an at-grade crossing is feasible; or enhanced components, materials, and/or finishes at stations.

The desire for these kinds of improvements, whether requested by local communities or required by local zoning and design requirements, should be acknowledged by the lead organization and reflected early in the station design process. Early coordination should include a local commitment to fund the added cost of design, construction, ongoing maintenance and repair, and periodic refurbishment and/or replacement of the betterment. Cost participation for betterments should be negotiated during the design process and implemented through interagency agreement. Early coordination with local land authorities regarding station siting and design issues is very important.

5. RUNNINGWAY GUIDELINES

These guidelines should be considered collectively when making runningway decisions.

A runningway is the linear component of the transit system that forms the right-of-way reserved for the horizontal and vertical clearance requirements of transitway vehicles and ancillary structures or equipment required to operate the transit vehicles; it is sometimes called the guideway. While the runningway incorporates the space needed to operate transit, it should be differentiated from right-of-way, which incorporates the potentially larger area needed to implement the project. For example, right-of-way would include additional property that may be needed for sidewalks, driveways, light poles, landscaping, and stations. Station and Support Facilities are discussed in Chapter 4. Station and Support Facility Design Guidelines. Since the design of runningways is directed by specific design practices, standards, and/or regulations, more detail is provided in the Runningway Guidelines User Guide.

5.1. LIGHT RAIL TRANSIT RUNNINGWAYS

Light Rail Transit runningways should serve LRT only. They will generally be at-grade and double track with crossovers and storage tracks provided as needed to support efficient operations.

Ballasted track is lower cost and preferred, with embedded track used where tracks are within urban streets including at vehicle and/or pedestrian crossing locations. Direct fixation track is preferred in tunnels and on bridges.

Lane striping, pavement color, pavement texture, and/or barriers (including intertrack or side fencing, for example) may be appropriate to guide, discourage, or prevent access to runningways in areas not designated as a legal crossing and should be used where needed.

"Severe" and certain "Moderate" noise impacts identified through the National Environmental Policy Act (NEPA) process should be considered for mitigation if they meet the criteria for reasonableness, feasibility and cost effectiveness.

LRT runningways are the linear components of the transit right-of-way containing rail trackage designed for LRT vehicles as well as ancillary facilities such as traction power substations and signal bungalows. Elements of LRT runningway operations and maintenance to be addressed during planning and design include but are not limited to, safety, security, communications and central control, system compatibility, contingency planning, periodic repairs and replacement, and snow removal.

General guidelines for considering noise impacts mitigation include:

- Reasonableness: noise mitigation provides at least a 5 dB reduction in project noise.
- Feasibility: noise mitigation is practical from engineering, operations and safety standpoints and may also take other factors into account such as community input and visual impacts.
- Cost effectiveness: the standard cost per benefited receptor is approximately what it would cost to build a 10' high noise wall.

5.2. COMMUTER RAIL RUNNINGWAYS

Commuter Rail runningways will generally be at-grade and double track, with single track used only where adequate sidings are provided and its use supports the service-operating plan.

Ballasted track is lower cost and preferred, with embedded or direct fixation track used at vehicle and/or pedestrian crossing locations.

Intertrack or side fencing should be used where needed. Grade-separated crossings may be considered where benefits to the broader transportation system, including freight movements, are shown to be significant.

Commuter Rail runningways are the linear component of the transit right-of-way containing rail trackage designed for Commuter Rail vehicles and ancillary facilities such as train signal systems. Commuter Rail runnningways will often make use of existing freight and inter-city passenger rail runningways, which will direct Commuter Rail planning and design. Consistent with Guideline 10.2. Coordination of Agencies and Stakeholders, the transitway lead organization is responsible for coordinating with all project stakeholders, including railroads.

For any grade separations, designers should exhaust practical options for changes to a crossing roadway/trail's grade before exploring changes to the railroad. Cost sharing for additional grade separations benefitting the broader transportation system should be negotiated among benefitting organizations, including any transit authority.

Elements of Commuter Rail runningway operations and maintenance to be addressed during planning and design include but are not limited to, integrated freight-commuter rail operations, safety, security, communications and central control, system compatibility, contingency planning, and periodic repairs and replacement.

5.3. HIGHWAY BRT RUNNINGWAYS

Highway BRT runningways include bus-shoulder lanes and managed lanes. These lanes are dedicated or partially dedicated to public transit, accommodate public transit under all roadway conditions, and provide transit with a travel-time advantage under congested roadway conditions.

Highway BRT runningways should be full-sized lanes designed to support traffic traveling at posted speeds of 45 miles per hour or greater. Sizing Guidelines for these lanes should be as follows:

- **Full-sized Highway BRT managed lanes should be 12 feet plus buffers**
- **Full-sized Highway BRT bus-shoulder lanes should be 10 to 12 feet, with 10 feet being minimum, 11.5 feet being minimum on structures, and 12 feet being desirable in areas of new construction or reconstruction**

Highway BRT runningways generally should provide one lane in each direction positioned as median, curb, or "dynamic" shoulder lanes.

Highway BRT runningways may be barrier separated or indicated by surface striping, markings, color, and/or signage.

Highway BRT runningway pavement should be designed and maintained to deliver the desired ride quality.

Highway BRT runningways are lanes within freeways or other multi-lane highways designed to support traffic traveling at speeds of 45 miles per hour or greater. Highway BRT runningways include bus-shoulder lanes like those on Cedar Avenue (Dakota CSAH 23) and managed lanes like those on I-35W South. Full-sized lanes widths do not include the width of gutters where a curbed section is used. Consistent with Chapter 10. Project Development, Leadership, and Oversight Guidelines, the transitway lead organization is responsible for coordinating with all project stakeholders, including road authorities.

Lane dedication for Highway BRT runningways may be permanent (e.g., bus-only lanes or HOV lanes), partial (e.g., priced lanes or lanes shared with turning vehicles and/or incident management), or limited to certain hours of the day (e.g., priced dynamic shoulder lanes). Elements of Highway BRT runningway operations and maintenance to be considered during planning and design include but are not limited to, enforcement strategy, support infrastructure, snow removal, and periodic repairs and replacement.

Roadway shoulders where buses operate under congested conditions only (i.e., bus-only shoulders) are not a type of Highway BRT runningway; this approach is an operating strategy for situations where provision of, or operations in, a runningway is not feasible.

5.4. ARTERIAL BRT RUNNINGWAYS

Arterial BRT generally operates in mixed traffic, but can include dedicated lanes. Arterial BRT runningways provide transit with travel-time advantages under congested roadway conditions.

Arterial BRT runningways should be full-sized lanes (10-12 feet) designed to support traffic traveling at posted speeds of less than 45 miles per hour.

Features that provide transit with a travel-time advantage include station configurations, traffic control measures, and dedicated lanes.

Where feasible, dedicated transit lanes on Arterial BRT routes typically include one lane in each direction positioned as median or curb lanes; these lanes are typically not barrier separated from general traffic lanes.

Whenever possible, Arterial BRT runningway pavement should be designed and maintained to deliver the desired ride quality.

Arterial BRT runningways are roadways designed to support traffic traveling at posted speeds of less than 45 miles per hour. Arterial BRT runningways may include any full-sized lane(s) provided to regularly accommodate public transit buses under all roadway conditions. Full-sized lanes widths do not include the width of gutters where a curbed section is used. Arterial BRT typically operates in mixed traffic but preferential features on the runningway that provide transit with a travel-time advantage should be pursued. These may include, but are not limited to:

- Station configurations including use of curb extensions and/or stations located at the far-side of intersections
- Traffic control measures including traffic signal priority and/or special traffic signal phases
- Dedicated lanes including queue jump lanes at intersections and bus lanes running with or opposite to the general traffic direction. Lane dedication may be permanent (e.g., Minneapolis Marquette and 2nd Avenues), partial (e.g., shared with turning vehicles) or limited to certain hours of the day (e.g., peak hours). Within one-way streets, BRT operates best opposite the flow of general traffic. Dedicated lanes may be designated using pavement treatments such as striping, markings, color, and/or signage.

Where Arterial BRT runningways are adjacent to a bicycle lane or recreational trail, separation should be accomplished following the guidelines of local jurisdictions, such as the Minneapolis Bike Master Plan and the St. Paul Central Corridor Bicycle and Pedestrian Plan.

Consistent with Guideline 10.3. Lead Agency Candidates and Responsibilities, the transitway lead organization is responsible for coordinating with all project stakeholders, including road authorities.

Elements of Arterial BRT runningway operations and maintenance to be considered during planning and design include but are not limited to, enforcement strategy, support infrastructure, snow removal, and periodic repairs and replacement.

5.5. BICYCLE/PEDESTRIAN ACCESS

Transitway intersections should be designed to provide safe, efficient transitway crossings for all rail and roadway transportation modes. Special attention should be given to providing convenient and safe at-grade accommodations for pedestrians or bicyclists crossing transitway runningways. Grade-separated bicycle/pedestrian crossings may be considered where there is no technically feasible at-grade crossing option, where benefits to the broader transportation system are shown to be significant, or where required by the runningway's owning entity (e.g., railroad).

Where there is no technically feasible at-grade bicycle/pedestrian crossing option, evaluation criteria that should be considered when assessing the need for grade-separated crossings include:

- **High pedestrian volumes**
- **High number of pedestrian or bicycle crashes**
- **Long pedestrian crossing distances**
- **Presence of poor sight distance to see crossing transit patrons**
- **Roadway average daily traffic volumes of more than 35,000 and 80th percentile speeds documented at more than 40 miles per hour**
- **Distance of greater than 600-feet to the nearest alternative "safe" crossing (i.e., controlled intersection or existing under-/over-pass**
- **Potential to coordinate with adjacent facilities such as a bike trail or sidewalk system**

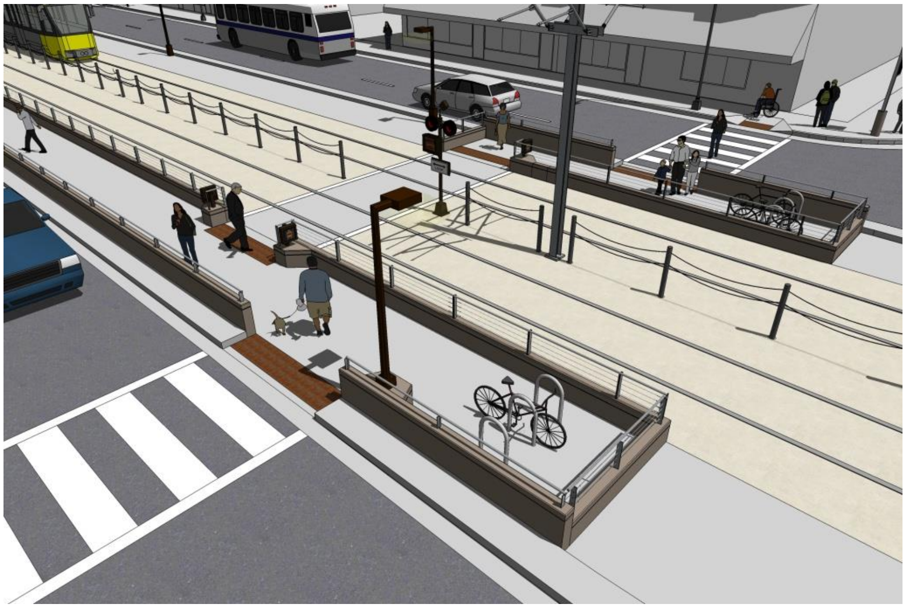
The provision of high quality, safe and convenient pedestrian and bicycle facilities at transitway stations and connection stations to surrounding land uses is a critical element of best practices of transit station design and transit-oriented development. These facilities should be given a high priority during the planning and design of transit stations and surrounding land uses. Safe and convenient pedestrian and bicycle access also should be given a high priority when planning and designing all roadways in the vicinity of a transit station. All pedestrian facilities should be ADA compliant.

In general, bicycle and pedestrian crossings should be located at signalized street intersections whenever possible. Mid-block crossings between stations and street intersections should be avoided. At-grade bicycle and pedestrian crossing features may include, but are not limited to:

- Improved bicycle and pedestrian facilities such as more visible crossings using pavement treatments, colors, markings, and/or warning signals/signage; pedestrian refuge medians; roadway curb extensions; intersection countdown timers, or crosswalks with passive crossing control (e.g., "z-type" crossings proposed on University Avenue, Figure 5-1)
- Roadway modifications such as adjusted intersection traffic signal timings, additional traffic signals, elimination of conflicting turn movements – especially free-right turn movements, and other intersection modifications that improve convenience and safety for pedestrians and bicyclists.

If an at-grade crossing is feasible, provision of a grade-separated bicycle/pedestrian crossing may be a local betterment.

Figure 5-1 "Z-type" Pedestrian Crossing at Unsignalized Intersection



Source: CCLRT Project Office

6. VEHICLE GUIDELINES

It is important to note that these Transitway Guidelines are not meant to be overly prescriptive, but rather provide a basis for understanding the elements important to vehicle decision making in an industry where technology, styling, and vendors are evolving quickly. The Transitway Guidelines should be considered collectively when making vehicle decisions for transitways.

6.1. LRT AND COMMUTER RAIL VEHICLES

The vehicles for LRT and Commuter Rail must be compatible with the existing rail and infrastructure systems and must adhere to current state and federal law.

Future vehicle purchases will consider compatibility with the existing rail and infrastructure systems as the factor of utmost importance. Effective January 1, 2015, Minnesota Statute 473.4056 established that all light rail vehicles must meet or exceed the standards established in the Americans with Disabilities Act. The statute also established that all vehicles must include two dedicated spaces for wheelchair users in each car and seating for a companion adjacent to each of the wheelchair-dedicated spaces.

6.2. BUS RAPID TRANSIT VEHICLE SIZING AND CAPACITY REQUIREMENTS

When determining the vehicle sizing and seating requirements for BRT station-to-station service, it is important to consider the service type and characteristics. Important considerations should include:

- **Passenger load standards/peak loads**
- **Passenger trip lengths (time and distance)**
- **Ridership demand at end of vehicle life**
- **Service characteristics (speed, maneuvering)**
- **Interior organization of vehicle features such as seats, wheelchair securements, fare-collection equipment, and bicycles**

This guideline is a tool for bus rapid transit (BRT) planners and implementers to understand the important considerations when sizing and configuring a vehicle for BRT station-to-station service. There is no “ideal” BRT vehicle that will fit the needs of every corridor in the region. In addition, a guideline recommending a specific vehicle configuration would limit the flexibility of those vehicles for use on other corridors or as characteristics of the corridor change. All vehicles should be ADA compliant. Table 6-1 summarizes vehicle types and their passenger loads and appropriate service types. BRT station-to-station vehicles would match with options associated with local service but a more detailed analysis of service type using the considerations listed above should be done in addition to the guidance in the following sections.

Vehicle type should be determined and purchased according to service types and passenger loads. Interlined and start-up services may provide exceptions.

Table 6-1 – Metropolitan Council Fleet Management Procedure: Vehicle Type Determination Chart

Vehicle Type	Passenger Loads*	Service Type	Minimum Vehicle Life
Commuter Coach	Min: 30 Max: 57	Express with a one-way trip length greater than 15 miles AND duration greater than 30 minutes	14 years
Articulated Diesel Transit Bus	Min: 30 Max: 58 (Express) Max: 73 (Urban Local)	Express, Local	12 years
Articulated Hybrid Transit Bus	Min: 44 Max: 73	Local	12 years
40' Hybrid Transit Bus	Min: 29 Max: 48	Local	12 years
40' Diesel Transit Bus	Min: 20 Max: 38 (Express) Max: 48 (Local)	Express, Local	12 years
30' Transit Bus	Min: 13 Max: 26	Medium-Volume Local; Low-Volume Express	12 years

*Peak loading pattern

6.3. PASSENGER BOARDING ON BRT VEHICLES

Boarding on BRT service should be as quick and convenient as possible for all passengers. All vehicles should be ADA compliant. Important considerations should include at a minimum:

- **Location of wheelchair access and type of securement**
- **Location and quantity of bicycle storage**
- **Boarding demand at each station**
- **Opportunity for level boarding**
- **Number and width of doors**
- **Fare-collection technology (on-board or off-board)**
- **Interior organization of seating and other features**

The disability community prefers wheelchair securements to be as close to the wheelchair-loading door and as easily navigable as possible. In addition, wheelchair securement technology is rapidly changing, increasing the speed and ease of boarding. Innovation in wheelchair securements should be explored for transitway vehicles. The same concepts apply to bicycle storage, but it is also important to ensure that bicycles do not interfere with passenger movements and do not negatively affect the ability to serve demand for space in the vehicle. Other region examples exhibit the need for multiple-door boarding and off-board fare collection, and the need for space provided by an articulated bus when considering on-board bicycle storage.

Passenger boarding speed and convenience is related to demand at each station. Boarding at low-demand stations may be quick and convenient with limited improvements over existing service while higher-demand stations may require additional amenities to improve boarding speeds (such as multiple-door boarding or wider doors). The organization of seating and interior features and opportunity for level boarding also affects the passenger boarding process.

6.4. CUSTOMER COMFORT AND SAFETY ON BRT VEHICLES

BRT station-to-station vehicles should create a safe, secure and comfortable environment for passengers and drivers. Important considerations should include at a minimum:

- **Natural and artificial lighting**
- **Window size, number, type, tint**
- **Color scheme**
- **Seating arrangement, style, and standing stanchions and handles**
- **Opportunity for off-board fare collection**

BRT vehicles should be designed to ensure the safety of both passengers and drivers during transport and during boarding and alighting. Vehicles should be designed to create a sense of personal security and personal comfort for passengers. Visibility, lighting, and easy access to and from the vehicle are important aspects to consider.

BRT station-to-station vehicles should feel similar to LRT vehicles (LRVs) in the interior. The level of investment in these corridors warrants a higher-quality design inside vehicles with improved, distinctive features, and a distinctive feel. For example, LRVs use fixed windows that do not open and the interior is climate-controlled at all times. This approach reduces interior noise and provides a consistent climate for passengers in the vehicles.

6.5. INTERIOR AND EXTERIOR STYLING OF BRT VEHICLES

The exterior and interior of BRT vehicles should portray the sleek, modern, and premium experience of BRT station-to-station service. This can be accomplished through a combination of styling and branding/paint scheme options.

The styling of both the interior and exterior of BRT vehicles is closely tied to the aesthetics at a snapshot in time and the identity and branding of the vehicle. As vehicle technology evolves at a rapid pace, it would be difficult to maintain a distinctively more modern look for vehicles operating BRT service over other vehicles in the regional fleet. In many cases, regional providers are already operating BRT-style vehicles on regular bus service. In order to maintain a distinctive look, BRT vehicles should portray the characteristics of the service using a combination of styling options that are available at the time of purchase and branding/paint schemes developed for the service.

6.6. INTERIOR NOISE ON BRT VEHICLES

BRT station-to-station vehicles should strive to achieve interior noise levels similar to LRT. Primary sources of interior noise from buses include heating, ventilating, and air conditioning systems, fare-collection equipment, door and window build type, overall build quality, and engine noise.

Vehicle-related noise levels inside LRT vehicles are lower than those inside buses in the regional transit fleet. Much of the noise inside buses comes from the engine, mechanical components (HVAC, fare box), and wind noise from open or leaky windows and doors. LRVs have less engine noise, fewer mechanical components, and more secure doors and windows. The rail guideway for LRT is also a contributing factor behind the reduced interior vehicle noise, but the quality of the ride for BRT as it relates to guideway is often outside the scope of the vehicle specifications.

6.7. FEATURE INTEGRATION ON BRT VEHICLES

Features of the BRT station-to-station vehicles (customer information technology, security systems, etc.) should be integrated into the design of the bus as much as possible.

Outfitting BRT vehicles with technology that is integrated into the original design of the vehicle rather than becoming a post-delivery add-on is important. This requires the technology features of a vehicle to be known and clearly articulated during the design of the original specifications. When technology features are integrated into the design of the vehicle, it illustrates to the customer that technology and customer information are important components of the service and creates a premium feel, similar to LRT.

6.8. PROPULSION TECHNOLOGY FOR BRT VEHICLES

BRT vehicle propulsion should be assessed on an individual basis for each transitway and vehicle purchased for the transitway in the region. Important considerations for the propulsion technology assessment include:

- **Compatibility with existing support infrastructure and staff expertise**
- **Life-cycle cost of propulsion technology and associated operating costs (including any costs for associated support facilities)**
- **Operating characteristics of service**
- **Externalities such as affect on environment, land uses immediately adjacent to transitway, and noise**

The analysis of vehicles in this region and other regions illustrated that propulsion technology has a significant effect on vehicle capital costs. The technology can also have a significant effect on support infrastructure and maintenance and staff training. Depending on service characteristics, hybrid technology can reduce fuel consumption and have an effect on operating costs. There can also be environmental and perception benefits associated with hybrid vehicle technology. However, standard diesel propulsion technology is becoming cleaner, quieter, and more efficient. It is impossible to determine what propulsion technologies will be in the future and it is difficult to recommend a one-size-fits-all technology for BRT transitways around the region. Thus, the recommendation is to do an analysis of different considerations related to vehicle propulsion for each implementation of BRT vehicles including funding availability and local support.

6.9. COST CONSIDERATIONS FOR BRT VEHICLES

Cost assumptions for BRT station-to-station vehicle purchases should be developed collaboratively, with parties responsible for the following:

- **Transitway development**
- **Initial vehicle funding**
- **Vehicle procurement, operations, repair, and replacement**

These cost assumptions should be developed early in the transitway planning process and collaboratively revisited as the transitway progresses through development.

Vehicles may also include opportunities for enhancements above agreed on vehicle designs. The desire to include such enhancements, called local betterments, should be coordinated with the funding and operating partner agencies in the earliest stage of the development process. Early coordination should include the local entity requesting the betterment and specific discussion about commitments to fund the incremental costs of the betterment, including any associated incremental costs such as facility needs, ongoing repair and maintenance, training, and/or replacement.

Technical information and regional expertise verified the wide range of factors that affect vehicle costs including: propulsion technology, styling options, availability of replacement parts, order quantity, testing requirements, procurement timeline, warranty information, customization options for component feature selection, evolving technology, fleet integration, and emission standards. Given the uncertainty of many of these factors for the BRT fleet, it is difficult to identify specific cost guidelines for BRT vehicles. Instead, it is recommended that the discussion about vehicle costs be a collaborative effort between the funding and operating partner agencies to identify vehicle options that align with the Transitway Guidelines and are acceptable to the stakeholders.

Similarly, if the stakeholders cannot come to consensus on an acceptable vehicle, local betterments may need to be addressed early in the transitway process. Vehicle betterments can have significant effects on other transitway components and may need to be coordinated with other betterments, as determined by the collaborative partners.

6.10. BRT VEHICLE INTEGRATION AND COMPATIBILITY

BRT station-to-station vehicles do not need to be integrated with the standard fleet. Branding schemes may preclude the use of standard fleet vehicles on BRT transitways for daily BRT operations. To the extent possible, BRT station-to-station vehicles should be compatible across transitways for ease of through-routing, potential cost savings, and flexibility in reallocating vehicles with changing service plans and passenger loads.

No recommendations are made requiring that BRT vehicles be the same as the regular fleet because it is too restrictive and would limit the branding options to distinguish the vehicle.

7. FARE-COLLECTION SYSTEMS GUIDELINES

These guidelines should be considered collectively when making fare collection system decisions for transitways.

7.1. PROVEN AND RELIABLE FARE-COLLECTION SYSTEM METHODS AND TECHNOLOGIES

Transitway fare-collection systems should be modern, be consistent with best practices from comparable transitways in the region, and use proven technologies.

Fare-collection systems are continuously evolving to incorporate new technologies and methods to improve efficiency, reliability, and convenience for the customer while ensuring fares are collected and appropriate information is available for transit provider decision-making. To support these performance characteristics, transitway fare-collection systems should clearly convey efficiency through innovation and incorporate best practices from comparable transitways. To ensure expected benefits are achieved from fare-collection investments, fare-collection system components should be proven reliable with long-term viability.

7.2. FARE-COLLECTION SYSTEM SUPPORTS CUSTOMER CONVENIENCE

Transitway fare-collection systems should support equal accessibility for customers of all ages and abilities, whether frequent or occasional riders, by providing fare products at a variety of prices that are easy to use. Methods for payment should be well communicated, consistent, and predictable and provide a seamless experience for customers using multiple transit modes in the region. While meeting the other fare-collection system guidelines, transitway fare-collection system should do the following:

- **Provide options to customers at the level of their preferred investment in fare payment products (i.e., single ride, multiple ride, or period pass).**
- **Provide consistent and predictable systems that enable customers of all ages and abilities pay their fare and do not require customers to know how to pay their fare before entering a transitway station.**
- **Use images and words to convey key fare-collection information such as cost to ride, fare media accepted, fare-collection location and mechanism, and the fare-validation or enforcement process.**

Transitways are intended to provide service that emphasizes customer accessibility and convenience. To achieve these performance objectives, the transitway fare-collection systems should meet the needs of both frequent and occasional customers. The primary customer needs in terms of fare payment vary according to customer financial resources, transit riding experience, and language, physical, and cognitive abilities.

According to Guideline 10.2. Coordination of Agencies and Stakeholders, it may be desirable to have a communications and marketing committee while planning, designing, constructing, or operating a transitway corridor. The purpose of this group would be to deliver an effective and comprehensive rider communication/education effort during the start-up of the transitway service. The committee's efforts should include providing information on fare payment.

7.3. FARE-COLLECTION SYSTEM SUPPORTS SERVICE REQUIREMENTS

Transitway fare-collection systems should support service requirements by integrating with the region's existing fare-collection system, supporting changes in fare policy, and supporting efficient boarding time, fare validation, and reliable travel times that are competitive with comparable travel modes.

The operation of fare-collection systems is a key consideration. Along with reliability and convenience, transitways are intended to provide service that is fully integrated with the rest of the regional transit system. Regional fare policy will be periodically updated by the Metropolitan Council to address changes in the regional operating environment, transit service levels, or new services. Recent changes included a fare increase, introduction of new fare media, and the creation of fares for new services such as Hiawatha LRT in 2005 and Northstar Commuter Rail in 2009. The fare-collection system should offer flexibility to respond to these types of changes.

7.4. FARE-COLLECTION SYSTEM SUPPORTS ACCURATE AND COMPLETE DATA RECORDING AND PROCESSING

Transitway fare-collection systems should provide accurate, detailed revenue and ridership data commensurate with data provided by other comparable services and existing transit provider expectations. Ridership data collected using fare-collection systems is used along with other ridership data for the analysis of service efficiency and effectiveness, and for federal reporting.

Passenger fares comprise a significant portion of transit funding within the region, so it is critical that fare-collection systems are accurate, complete and secure. The fare-collection and validation systems are also presently the primary ridership data source for transit service development and analysis, as well as annual reporting required by federal funding regulations. While emerging technologies may allow the primary source of ridership data to change in the future, transitway fare-collection systems should continue to be a rich data source to measure, improve, and enhance transitway service and corroborate other ridership data collection techniques into the future. Revenue data should be provided at an expected level of detail comparable to other agency components and existing standards.

7.5. FARE-COLLECTION SYSTEM FITS WELL IN THE REGION

Transitway fare-collection systems should be a good fit for the region. In evaluating fit and making fare-collection system decisions, the Metropolitan Council will work with project partners to identify and evaluate factors including, but not limited to, a system's ability to meet the guidelines listed above, as well as its relationship to existing fare-collection methods in the region, in the corridor, capital and operating costs (including enforcement costs, if any), passenger characteristics, customer convenience, transitway operations performance, system flexibility/adaptability, vehicle and/or station's ability to accommodate fare-collection equipment, estimated travel-time impacts, customer perception, and driver interaction requirements.

Transitway fare-collection systems should build on the strengths of the region's existing transit fare-collection system and it should be acknowledged when selecting any new fare-collection system that the decision sets direction in the region for a considerable timeframe. For these reasons, the region should perform a detailed analysis when preparing to select a fare-collection system for a transitway. The analysis should carefully evaluate a system's ability to meet the guidelines provided above, as well as the following factors:

- Relationship to existing fare-collection methods in the region – a number of fare-collection methods are in use in the region today. The region should identify and evaluate functional similarities and differences between any proposal and existing fare-collection methods.
- Existing fare-collection methods in the corridor – customers will benefit and find transitway service easier to use if fare-collection methods within a transitway corridor are reasonably consistent and well communicated. For example, if all but one station within a corridor warrants installation of ticket vending machines, consider installing ticket vending machines at all stations in the corridor.
- Capital and operating costs – operating costs should include enforcement costs for any scenarios where a vehicle's driver is unable to effectively monitor fare collection for all riders.
- Passenger characteristics – including share of frequent and occasional/special event riders, express and station-to-station riders, Go-To card and cash users, etc. of total riders and new riders.
- Customer convenience – including forms of payment accepted by the proposed fare-collection system (e.g., cash, inexact change, credit card) and availability of nearby transit fare retail outlets (e.g., Cub Foods, CVS, etc).
- Transitway operations performance – the fare-collection method should be considered as one of the factors with potential to enhance operational efficiencies and passenger conveniences on transitways (e.g., boarding and overall transit travel times can be reduced when fare-collection changes are implemented on routes with regularly high volumes of cash paying customers).

- System flexibility/adaptability – transitway ridership demands vary throughout the day and year. System flexibility is an important consideration in managing costs and meeting customer expectations. The region should identify and evaluate opportunities for flexible use of potential fare-collection methods.
- Vehicle and/or station's ability to accommodate fare-collection equipment – fare-collection equipment requires space, power, and security on vehicles and/or at transitway stations. The region should identify and evaluate transitway vehicle and/or stations' ability to meet these requirements for potential fare-collection systems.
- Estimated travel-time impacts – the transitway travel-time impacts of different fare-collection methods vary. Boarding volumes per station per trip are also a travel time factor that may influence fare-collection decisions. The region should identify and evaluate estimated travel-time impacts for potential fare-collection methods.
- Customer perception – the region is working to develop broad understanding of the transit system among the general public. The region should identify and evaluate how transit patrons will perceive potential fare-collection methods as compared to existing fare-collection methods in the region.
- Driver interaction requirements – customer-driver interactions regarding fare collection often increase transit station dwell times and place substantial knowledge demands on the driver. The region should identify and evaluate anticipated driver interaction requirements for potential fare-collection methods.

8. TECHNOLOGY AND CUSTOMER INFORMATION GUIDELINES

It is important to note that the Transitway Guidelines are not meant to be overly prescriptive, but rather provide a basis for understanding the elements important to decision-making in a quickly evolving industry. The guidelines should be considered collectively when make technology and customer information decisions for transitways.

8.1. AUTOMATIC VEHICLE LOCATION (AVL)

The regional AVL system, or a system that is compatible and can communicate with it, should be provided on all transitway vehicles.

AVL is a critical system for many other technology systems in these guidelines. It is considered a base infrastructure upon which other features and applications can be integrated and built upon. AVL technology is used to monitor the location of transit vehicles in real time through the use of global positioning system (GPS) devices or other location monitoring methods. Information about the vehicle location is transmitted to a centralized control center. Transitway technology features and applications utilizing AVL technology include automatic passenger counters, transit signal priority (TSP), and real-time customer information systems.

8.2. AUTOMATIC PASSENGER COUNTERS (APCS)

Automatic passenger counters should be provided on all station-to-station transitway vehicles. APCs should be provided on a sample of other transitway vehicles.

APCs provide valuable information on ridership, station demand, and vehicle loads for service planning and data collection analysis. When coupled with AVL data, APC data assists service deployment decision-making at specific stations and specific trips. APC data could also be used to determine real-time busloads for use in conditional-based TSP. In the absence of fare boxes on buses and trains, APCs also assist in ridership data collection and verification.

8.3. COMMUNICATIONS LINK

Proven communication systems that are compatible and coordinated with regional transit control center communication systems should be provided on all bus-rapid transit (BRT) service to link vehicles and stations.

Communication between systems and personnel is critical to transit service operation and safety. Common or compatible systems are required for operations to ensure proper service coordination and public safety. Communications technology implementation can be complex and often involves the coordination of different jurisdictions, agencies, and technologies. Collaboration between transit providers is essential to ensure that the communication systems implemented are viable and sustainable. An analysis of the corridor should look at all existing and potential communication systems and the effort and characteristics required for implementation.

8.4. TRANSIT SIGNAL PRIORITY COORDINATION AND VIABILITY

TSP implementation needs to be a collaborative effort between transit providers who will utilize the technology on their vehicles and local road authorities who will utilize the technology at their signal controls. Before the implementation of TSP in a corridor:

- **An analysis should be done to determine the potential viability of and coordination required for the use of TSP in that corridor.**
- **Approval should be sought by the implementing agency from coordinating parties such as cities, counties, MnDOT, and transit providers. Formal action may be necessary when appropriate.**
- **Ongoing operation and support roles and responsibilities should be identified and established.**

TSP implementation is complex and often involves the coordination of different jurisdictions, agencies, and technologies. Collaboration between transit providers and local road authorities is essential to ensure that the system implemented is viable and sustainable. Agency collaboration may include the development of an operational plan for TSP, such as a concept of operations, prior to deployment of any TSP system. Analysis of the corridor should look at all potential TSP intersections and the effort and characteristics required for implementation. Long-term maintenance also needs to be addressed and coordinated. Formal approval (i.e. memorandum of understanding, etc.) from cooperating agencies may be necessary. Any operation and support roles need to be identified early, in planning stages of TSP implementation, to allow for proper planning of staff and resources within agencies.

8.5. TRANSIT SIGNAL PRIORITY COMPATIBILITY

The TSP technology used in a corridor should be compatible for use by transit service providers operating in that transitway. A regional TSP system (or systems) that can be compatible with limited additional resources is preferred and implementing agencies should explore maximum compatibility across the region, when feasible.

TSP technology will continue to evolve as it becomes more established. There are a variety of TSP systems available today and there are a variety of traffic control systems implemented throughout the Twin Cities region. The relationship between TSP technology and traffic control technology is essential for proper operation of the system. Ideally, a regional TSP system will be developed that is consistent or compatible with all potential applications in the region. This would reduce overall TSP system costs and eliminate the need for coordinating multiple technologies among transit providers. However, there may be significant barriers to the implementation of a consistent or compatible system.

These barriers include the need for cooperation and coordination between multiple jurisdictions and agencies, sole sourcing to a particular vendor or common TSP approach, “hidden” costs associated to other traffic signal system upgrades, and signal retiming required to make TSP fully functional. Some barrier examples:

- Planned TSP corridor goes through two jurisdictions. One jurisdiction may have a traffic signal system and field hardware that is able to support the TSP system. The other may have an outdated system or require system or hardware upgrades. The result to TSP is that this may prohibit implementation or significantly reduce overall TSP system functionality.
- Traffic signals in the TSP corridor may not be currently timed to provide sufficient timing to provide enough advantage to transit vehicles for granted TSP requests without significant cost and time to complete the needed signal retiming.
- Intersections within the traffic system may be operating at capacity with limited options for providing priority to the transit vehicle in terms of extended green or early green.

8.6. TRANSIT SIGNAL PRIORITY CHARACTERISTICS

When implementing a TSP system on a transitway, the following should be standard characteristics:

- **Optimal signal timing and transit scheduling for person throughput**
- **Minimal cross traffic delays, unless otherwise agreed upon by cooperating traffic authority**
- **Safe operation for all modes**
- **Conditions for TSP operation agreed upon by coordinating agencies**

Transit signal priority implementation can occur in a variety of forms. It can range from full priority over signal controls to a conditional-based system where transit vehicles only request signal priority when certain conditions are met. It is important to optimize the standard timing of signals along a transitway and synchronize that timing with transit schedules to ensure the maximum number of roadway users (*person* throughput) are benefiting from the timing. This will help limit or provide agreed upon justification for any limited potential associated cross traffic delays that could result from TSP requests and will limit the number of requests being made by the TSP system. In some cases, optimized signal timing incorporating person throughput strategies may negate the need for TSP, or the number of intersections requiring TSP implementation. In addition, the priority for a TSP system should be conditional-based to limit the disruption (number of requests) of the signal timing system. Conditional-based use may include when transit vehicles are running late, peak-hour only use, or only locations where allowing transit vehicles to proceed through would allow users to be picked up at a far side stop to reduce delay. Conditions for TSP operation should be developed as part of an operational plan, such as a concept of operations, for any TSP deployment.

8.7. TRAFFIC SIGNAL PRE-EMPTION

Traffic signal pre-emption will only be used when specifically agreed to by project stakeholders and in compliance with state and federal laws, regulations, and guidance.

Rail systems may require the use of signal pre-emption due to the different physical characteristics of rail systems and rules or regulations governing their operation.

Pre-emption is defined as the transfer of the normal control (operation) of traffic signals to a special signal control mode for the purpose of servicing railroad crossings and emergency vehicle passage. It is also used in some transit applications, upon agreement with local jurisdictions and in compliance of the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD). This guideline recognizes that there may be rare special cases where the use of traffic signal pre-emption technology is needed for a specific project or transitway corridor to increase transit speed and reliability. In addition, the use of signal pre-emption along rail systems may be required by rules or regulations. Rail vehicles operate differently than bus vehicles and require longer stopping distances and increased safety precautions. In some cases, pre-emption may be the appropriate system for achieving required operating parameters. Impact of the transit vehicle pre-empting the signal when an opposing emergency vehicle requests service needs to be considered. This is a potential conflict, resulting in emergency vehicle delay that would not occur if transit signal priority were employed.

8.8. REAL-TIME CUSTOMER INFORMATION SYSTEM

Implementers of real-time customer information technology should deploy systems that supply/receive real-time data in a format compatible and able to be shared with all transit providers.

Real-time customer information can be disseminated to the public through a variety of means including, but not limited to, **pre-trip** (website), **en-route** (dynamic message signs or wireless web), **on the platform** (dynamic message signs), and **on-vehicle** (next stop information). The following are types of information provided: real-time bus/rail departure, park-and-ride space availability, and transit/car comparison travel times. Real-time customer information (the information used by transit users) should be accessible across all technology platforms, which requires real-time data (the information used by providers as the basis for real-time customer information) to be compatible and be able to be shared across various technology platforms and providers.

8.9. TECHNOLOGY NEEDS OR BENEFITS ASSESSMENT

The implementation of a technology requires a process for identifying the appropriate solution. At a minimum, there are key steps in the process that should be addressed during each assessment.

- **The first step is identifying the need for, or benefit of, a technology solution and establishing the outcome goals of implementation**
- **The second step is exploring technology solutions that exist and are operational in the region today**
- **If no existing solutions adequately address the need, the third step is exploring new technologies and determining their viability and sustainability in addressing the need for or providing an added benefit to the transitway system**

Technology needs assessments are primarily focused on emerging technologies or areas of need, but they should also be considered when implementing existing technologies. The needs assessment should ensure that a technology solution can adequately address an area of need, that solutions that capitalize on existing infrastructure are considered to reduce costs and increase interconnectivity, and that any new technologies introduced to the region are a viable and worthwhile investment. Other technology assessments may not directly address an identified need within the system, but may provide worthwhile benefits that would enhance or improve the system if implemented. An assessment similar to the needs assessment should address the potential benefits, existing technologies, and other factors.

8.10. TECHNOLOGY IMPLEMENTATION VIABILITY CONSIDERATIONS

At a minimum, technology viability, as discussed in Guideline 8.9., should consider the following:

- **Relative costs of potential technology solutions including initial capital investment and ongoing operations, support, and maintenance, including staff time and staff training**
- **Costs from all levels of the technology's implementation including vehicle costs, station costs, road infrastructure costs, technology system costs, agency resource costs, and other areas as identified in the needs assessment**
- **Advantages of each technology solution in addressing the need for or potential benefits of the technology**
- **Potential barriers to implementation of the technology solution**
- **Expected useful life of the technology solution**
- **Relationships to other technologies, including other required technology systems or required changes to other technology systems**

Technology viability is an essential analysis because technology is dynamic and constantly changing and adapting. As such, considerations like costs, advantages, barriers, and useful life are also constantly changing and should be reviewed periodically for technology. To reduce risk and ensure ongoing system viability, technology for large scale or fleet-wide deployment needs to be commercially available, sustainable, and maintainable. Planned implementations need to consider its relation to other corridors, similar existing implementations, and impacts to other systems and stakeholders. Barriers may include coordination with other agencies or technologies and may significantly limit the viability of some technology solutions.

8.11. OTHER TECHNOLOGY FEATURES FOR TRANSITWAYS

The following technology features should be included on transitways, in addition to previous guidelines, if supporting infrastructure exists:

- **Real-time Information Systems:**
  - **Real-time schedule information should be provided at high-volume stations through dynamic message signs (or similar technologies)**
  - **Real-time park-and-ride space availability information should be provided at major park-and-ride facilities**
  - **Real-time transit travel time to general traffic travel-time comparison information should be considered for implementation near major park-and-ride facilities where transit advantages are provided**
- **Security and safety systems should be incorporated into station and vehicle designs**

Transitways are premium, high-demand corridors where customers will benefit from enhanced amenities. Real-time customer information at stations and park-and-rides is an emerging technology that enhances the customer experience. However, this technology may not be appropriate at every station or park-and-ride along a transitway. The characteristics of the service and facility may require additional analysis about the value of the technology at lower-volume facilities. In such cases, alternatives should be investigated to provide guidance to customers on how to obtain real-time information from other sources (for example, smart phones), if possible.

See Chapter 4. Station and Support Facility Design Guidelines for safety and security systems at transitway stations. There are existing fleet policies for security systems on buses. Guidelines and policies for these systems provide more detail on what is, and is not, expected to be included on transitway vehicles and facilities.

9. IDENTITY AND BRANDING GUIDELINES

These guidelines should be considered collectively when making identity and branding decisions for transitways.

9.1. INTEGRATED BRANDING AND IDENTITY SCHEME

The branding and identity scheme that is developed for Light Rail Transit (LRT) and Highway Bus Rapid Transit (BRT) station-to-station services will be integrated and reflected on all system components including stations, vehicles, signage, and customer information.

The integration of the branding scheme is important for customer clarity. It will reinforce the message that LRT and Highway BRT station-to-station services are **premium** modes that offer a similar level of transit service and transit facilities. Research indicates that transitway services should be branded everywhere they serve, even if other services exist at the same location. A balance needs to be struck between transitway services and other services, when present.

The branding and identity scheme includes the line name, system name, system colors, maps, and other components that may be developed to unite the LRT and Highway BRT station-to-station services.

While Arterial BRT may be branded separately from Highway BRT and LRT, it should be branded with equal importance and distinction. Many proposed Arterial BRT corridors are the strongest existing transit markets and will continue to have high potential for increased ridership and increased high-density development.

9.2. LINE NAMES

LRT and Highway BRT line names will be colors and selected by the Metropolitan Council with input from the impacted communities through the corridor policy advisory committee. All line names need to be distinct from one another, fit within the regional transitway system, and allow for line through-routing. Commonly known, simple colors are preferred (red, blue, green, orange, etc.).

Commuter Rail lines should be given a unique name chosen by the lead agency in consultation with partnering agencies. Commuter Rail line names should not be colors, but Commuter Rail lines should be represented on transit system maps using a unique line type and color that visually reinforces Commuter Rail service as integrated with the rest of the transit system, specifically with LRT and Highway BRT.

Community input in corridor naming decisions is an important component of the branding process. At the same time, naming decisions need to be weighed against regional context and system-wide integration. For LRT and Highway BRT station-to-station, community input on which color name will be used to identify a line should be sought, recognizing that the name may be limited by color names already planned or in use. The Metropolitan Council will generally assign line names once a locally preferred alternative is adopted for a transitway.

Commuter Rail lines also represent significant regional investments and should be identified uniquely in the system. Their market is more localized (thus, less regional) than LRT and BRT and as a result, community involvement can play a more significant role in identifying a line name. National practice indicates that Commuter Rail names are usually tied to the communities they serve, specifically the outbound endpoints, or to a unique corridor name, like a geographic feature (valley, river, coast, etc.).

Arterial BRT lines should be identified as a premium service, but the details behind the service are not developed enough at this time to specify the role of branding in the regional transit system. The Arterial BRT corridors should not be branded with the color-coded line system because the service attributes are different from LRT and Highway BRT station-to-station services. However, a line-naming scheme specific to Arterial BRT could be developed and added to the Transitway Guidelines after the Arterial Transitway Corridors Study is complete and more is known about how the service will interact with local bus and other transitway services.

9.3. STATION AND SIGNAGE BRANDING

The most important aspects of the branding and identity at transitway stations are the system brand, line identity, and station name. These aspects should be included at each station. Transitway/system brands take precedence over provider brand. Though less important, provider brands may be present because they are important for customer information and other transit services.

System brand elements for all LRT and Highway BRT services should be consistent and visible at all stations.

Branding at stations can be complicated due to the number of messages that need to be communicated to the customer. Most importantly, signage at stations needs to communicate location and what transit services are provided at that station. Signs at each platform should indicate which direction the transit service is heading (inbound/outbound, eastbound/westbound). Information about the line(s) served by the station and the geographic location of the station needs to be prominent. In addition, information needs to be provided about connecting transit routes and any other transit services that are provided at that station.

Transitway stations should be distinct and appealing in their design, and their design should become a part of the overall branding of the transitway system. It is expected that there will be consistency in the architectural design of stations along an individual transitway corridor, but that each corridor may have its own architectural character. More information about station design is provided in Chapter 4: Station and Support Facility Design Guidelines.

9.4. VEHICLE BRANDING

The most important aspects of branding on transitway vehicles are the system brand, line name/route identity, and where to find additional service information. These aspects should be included on each vehicle. System and transitway brands take precedence over provider brands on each vehicle. BRT vehicles should have a unique paint scheme, using the regional system colors, that distinguishes them from regular route and express buses in the region.

LRT and Commuter Rail are branded, in part, by the vehicle that provides the transit service. Buses providing Highway BRT station-to-station or Arterial BRT service will likely also have some unique characteristics that will distinguish them from other buses in the transit system. However, the most important distinguishing element for buses will likely be the branding.

The most important information needed on transit vehicles are the type of service (system brand), the line or route (primarily through changeable message signs), and where users can go to get more information (customer information). The last component is important because transit vehicles move throughout the region and, essentially, act as marketing mechanisms for transit services. The unique design or look of transitway vehicles is intended to draw in potential new transit users who may not be familiar with where additional transit information is available.

9.5. STATION NAMING

Transitway station names should be selected based on the criteria listed below. Station names will be selected by the Metropolitan Council with input from the lead agency and impacted communities.

- **The name should reflect local geography (major cross-street or landmark).**
- **The name should be easy for the general public to recognize, particularly potential customers who are not familiar with the region and/or the corridor.**
- **The name should be distinct from the names of other stations to the extent feasible so that the name does not create confusion for potential customers or emergency responders.**
- **The name should be succinct and the use of two names for one station should be avoided.**
- **When station naming rights are sold, the name must continue to have a clear link to a nearby landmark or regionally recognizable destination. If a station name is sold, the sale should be for a period of at least 20 years and the price should be based on market exposure.**

The primary purpose of a station name is to provide a geographic reference for customers to know where to access the transit system for boarding and alighting. However, stations also have the potential to become a focal point for a neighborhood, a business district, and/or an emerging transit-oriented development. Names reflecting these and other aspects of local geography can help create distinctive places and strengthen local assets. There may be an opportunity to generate revenue by selling the name of a station to a nearby enterprise. Regional guidelines are needed in order to provide consistency throughout the transitway system, to ensure that station names are not confusing or duplicative, and to ensure that customer service remains a priority when stations are named. Priority should be given to names that have a clearly and broadly understood geographic reference.

9.6. CUSTOMER INFORMATION

Signage, maps, and schedules for transitway service should reinforce the unique and premium quality of the services. Signs, system maps, and schedules should be simple and easy to understand.

All materials prepared to support LRT and BRT services should be coordinated with the system-branding framework (system logo, system colors, graphical elements, etc.). Information technology, such as real-time passenger information signs, should also be designed to support the transitway branding framework. If multiple providers are operating service along a transitway, all services should be incorporated into the transitway's marketing and customer information materials. Provider/operator logos should be incorporated into these materials but should not be a dominant feature.

9.7. ADVERTISING

Station, shelter, and vehicle designs should not preclude the potential for advertising. Customer information requirements should always be given priority over advertising. BRT vehicles should only include advertising if it does not interfere with the vehicle brand, which is an integral element in distinguishing it from regular bus service.

Advertising at stations, shelters, and vehicles are all potential sources of revenue. Thus, it is important that the opportunity for generating advertising revenues should not be precluded in the design of stations, shelters, or vehicles. However, wrapping of BRT vehicles should be avoided in early stages of implementation, as it would likely interfere with Guideline 9.4. Vehicle Branding. The same would apply to rail vehicles; however, they are less likely to be confused with other services in the region so more flexibility would be appropriate. Issues such as visibility, ease of maintenance, and appropriate content should also be considered when designing stations and shelters and making decisions on proposed advertising.

10. PROJECT DEVELOPMENT, LEADERSHIP, AND OVERSIGHT GUIDELINES

It is important to note that the Transitway Guidelines are not intended to be prescriptive, but rather to provide a consistent basis for planning, designing, constructing, and operating Commuter Rail, LRT, and BRT services in the metropolitan area. The guidelines should be considered collectively when making project development, leadership, and oversight (PDLO) decisions for transitways.

10.1. PROJECT DEVELOPMENT PROCESS

State and federal funds may only be used for transitway development if the transitway is part of the regional Transportation Policy Plan (TPP) adopted by the Metropolitan Council.

Project development should follow the principles of professional due diligence for large capital projects and of likely funding partners, including potential federal partners, to ensure the project will be eligible for funding from all likely sources.

The locally preferred alternative (LPA) is reviewed and approved by the Metropolitan Council and amended into the TPP.

All transitway projects need to be developed using a planning and design process that carefully evaluates alternatives and weighs costs, benefits, and impacts. Many agencies and stakeholders will need to coordinate throughout the project development process. The complexity of the process and level of National Environmental Policy Act (NEPA)/Minnesota Environmental Policy Act (MEPA) review should be reflective of the size, complexity, and any potential controversy of the project. While similar evaluation criteria and a similar project development process may be used, federal agency review and involvement is only required when federal funding is being used for the project.

The roles and responsibilities for individual project partners can change throughout a transitway project development process, but it is important to ensure that the process followed is consistent with existing or future funding requirements. For example, although local municipalities (e.g. regional railroad authority, city) often initiate projects in the early phases, such as scoping or Alternatives Analysis (AA), and often do so with local funds, a project development process must be used that is consistent with likely funding sources, including federal, state, and local sources.

10.2. COORDINATION OF AGENCIES AND STAKEHOLDERS

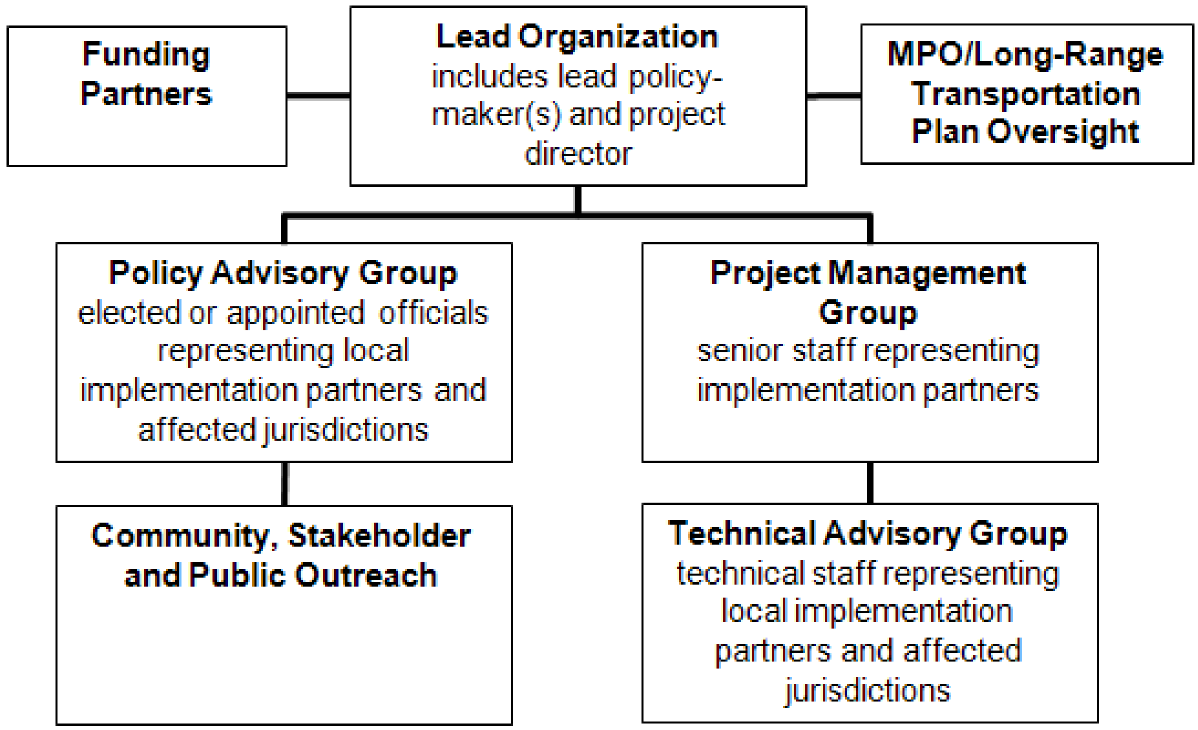
All major transitway capital investment projects should have a coordination structure that reflects the following functions:

- **Coordination with, and reporting to, funding partners**
- **Coordination with the Metropolitan Council and MnDOT**
- **A clearly identified lead agency determined by Metropolitan Council with input from funding partners and the Commissioner of Transportation**
- **Coordination with the elected/appointed officials of the implementation partners (policy advisory group) (for design and construction of LRT projects, Minn. Stat. 473.3994 Subd. 10 requires a corridor management committee)**
- **Coordination with the management and technical staff of the implementation partners (technical advisory group and/or project management group)**
- **Effective outreach to, and involvement of, external stakeholders and the general public**

When both a county that is a member of the Counties Transit Improvement Board (CTIB) and CTIB are represented on the policy advisory group, the lead agency should request that CTIB appoint a member to the policy advisory group who represents an area outside the geographic boundaries of the transitway project.

All transitway projects will likely have multiple agencies and stakeholders involved in planning, design, and construction. Therefore, a clearly defined means of interagency coordination, stakeholder outreach, and decision-making will be needed. Figure 10-1 illustrates typical project leadership and oversight roles and relationships in a transitway development process. Each project and each stage in the project development process may have different needs for coordination and interagency involvement. For example, it is useful to have an interagency marketing/communications team that supports start-up and ongoing operations. It is also often useful to have an interagency team that coordinates land development and land use planning activities and should include the appropriate local land use authorities.

Figure 10-1 – Typical Project Leadership and Oversight Functions



10.3. LEAD AGENCY CANDIDATES AND RESPONSIBILITIES

The lead agency is an important component of project delivery and coordination in all phases of transitway implementation. The following guidelines relate to lead agency candidates and responsibilities:

- **There must be a clearly identified lead agency for a major transitway capital investment projects. The lead agency must accept all of the responsibilities for delivering the transitway project. The lead agency has the option of delegating responsibilities to other agencies/entities but is responsible for ensuring that all necessary tasks are completed. The lead agency may change as a project progresses from one phase to the next.**
- **When multiple agencies are involved in transitway development, interagency agreements (or other similar formal agreements) are strongly recommended to clearly identify roles, responsibilities, authorities, deadlines, budgets, and funding sources.**
- **MnDOT is the lead agency for implementing Commuter Rail following selection of the LPA (MnDOT may delegate this authority).(Minn. Stat. 174.82)**
- **MnDOT or the Metropolitan Council/Metro Transit, at the discretion of the governor, is the lead agency for implementing light rail following selection of the LPA. (Minn. Stat. 473.3994, subd. 1a)**
- **The Metropolitan Council/Metro Transit is the preferred lead agency for implementing BRT following selection of the LPA but, with Council agreement, the lead agency may be a joint powers board, a county, or a city. MnDOT may be the lead agency on BRT projects requiring construction in trunk highway right-of-way.**
- **MnDOT, regional railroad authorities, joint powers boards, counties, cities or the Metropolitan Council may be the lead agency for transitway capital projects prior to the selection of a LPA.**

There are no legal precedents governing lead agency candidates for certain aspects of transitway development, including planning and BRT implementation. This was identified as a project implementation gap that should be addressed by the Transitway Guidelines given the importance of the role of the lead agency in project delivery and coordination. The lead agencies for Commuter Rail and LRT following selection of the locally preferred alternative (LPA) are established by legislation. For BRT or for earlier stages in the project development process for LRT and/or Commuter Rail, the Metropolitan Council and MnDOT are responsible for determining the lead agency in consultation with funding partners. The LPA is usually selected at the end of the Alternatives Analysis (AA) process and legally confirmed at the end of the Draft Environmental Impact Statement (DEIS) process. Metropolitan Council has the statutory responsibility for Commuter Rail development in a corridor after commencement of revenue service, including planning, design, acquisition, construction, and equipping of any improvement of a line. The responsibilities associated with the role of lead agency are significant and the agency desiring to assume this role should understand the full range of these responsibilities and the cost and staffing requirements necessary to fulfill this role. Coordination with all affected agencies is required and many tasks may be accomplished by partner agencies through interagency agreements. It should be noted that local land use authorities have the responsibility and authority for land use planning and regulation and, as such, need to be involved in issues related to land development.

10.4.FINANCIAL MANAGEMENT RESPONSIBILITIES

The lead agency is responsible for financial management of the transitway project including:

- **Securing funds**
- **Financial oversight and reporting**
- **Financial planning and budgeting**
- **Interagency coordination**
- **Accounting**
- **Cost estimating and cost control**
- **Any other aspects of financial management**

Financial management is extremely important and is often very complex on transitway projects due to exacting federal requirements and multiple funding sources and agencies. It is the responsibility of the lead agency to manage all financial aspects of the project or to enlist the assistance of partner agencies to provide these services through interagency agreements. Some examples of the most important elements of financial management include:

- Seeking funding for the project, including preparing and submitting grant applications
- Understanding and implementing all requirements of funding agencies including securing matching funds, monitoring and oversight, providing required reporting, ensuring legal requirements are met, and any other expectations of the funding agencies
- Ensuring that all legal requirements and funding agency requirements are met when procuring services, vehicles, materials, etc.
- Completing timely and accurate financial planning, including the preparation of financial management plans that may be required by funding agencies
- Completing timely and accurate cost estimates for construction, procurement, operations, and maintenance
- Managing all accounting functions, including budgeting and cash flow management
- Assessing financial risk and identifying strategies for addressing those risks
- Monitoring and managing costs to stay within budgets

10.5.TRANSIT OPERATOR SELECTION

The following guidelines relate to the selection of the transit operator for a transitway:

- **The transit operator for Commuter Rail located in whole or in part in the metropolitan area will be Metro Transit. (Minn. Stat. 473.4057 subd. 1)**
- **Metro Transit will be the transit operator for all LRT in the metropolitan area. (Minn. Stat. 473.4051 subd. 1)**
- **Metro Transit and Suburban Transit Providers will continue to operate BRT express services within their respective jurisdictions.**
- **Metropolitan Council will determine the transit operator for highway BRT station-to-station services with input from funding partners. The Metropolitan Council will directly operate these routes through Metro Transit, bid them competitively or award a sole source contract in the case of a Congestion Mitigation and Air Quality (CMAQ) grant or other special circumstances.**
- **Metro Transit will operate Arterial BRT within its jurisdiction.**

According to the agreed-upon funding formula for new rail and Highway BRT service, Highway BRT station-to-station service in both the Cedar Avenue and the I-35W South corridors will be funded by CTIB (50 percent) and Metropolitan Council (50 percent). Because Highway BRT services are not wholly within a Suburban Transit Provider's jurisdiction; and they are funded with regional funds; the CTIB has deferred transit operations to the Metropolitan Council. Therefore, the responsibility for the selection of a transit operator rests with the Metropolitan Council. The Metropolitan Council makes the determination of whether to competitively bid services based on the amount of service to be procured, and the anticipated benefits and costs of a competitive procurement, or to award a sole source contract.

10.6.TRANSIT SERVICE PLANNING

Metropolitan Council/Metro Transit will lead or delegate transit service planning for transitway service in the region, including Commuter Rail, LRT, Highway BRT station-to station, and Arterial BRT services.

Metro Transit and Suburban Transit Providers will continue service planning for BRT express and local services within their respective jurisdictions.

Metropolitan Council/Metro Transit and the affected Suburban Transit Provider(s) must coordinate closely when planning and operating services in BRT corridors to ensure that local, express and station-to-station services are well coordinated, not duplicative, transfers are timely, and stations are used efficiently.

Infrastructure corridor planning remains a local responsibility through selection of a LPA. After LPA selection, the lead agency is responsible for coordinating with the appropriate service providers for service planning to support facility planning. Close coordination between service and facility planning is critical for determining appropriate station locations and sizes and other facility needs within individual corridors.

10.7.TRANSITWAY TRAVEL DEMAND FORECASTING

The following guidelines relate to travel demand forecasting for transitway projects:

- **The Regional Transit Demand Forecast Model, maintained by the Metropolitan Council, is the preferred method for developing transitway travel demand forecasts. Exceptions should be justified and documented by the requesting agency and approved by Metropolitan Council forecasting staff.**
- **A project's lead organization is responsible for directing travel demand forecasting performed by consulting firms and for involving Metropolitan Council forecasting staff. Metropolitan Council forecasting staff has oversight responsibility for ensuring quality and defensible ridership forecasting. Council staff should be consulted during all stages of forecast development for any phase of a transitway project.**
- **The travel demand forecasting model should be validated on a corridor level against observed data before using it for forecasting. Forecasting input data for the base model should be based on the latest planning assumptions including:**
  - **The most recent adopted socio-economic data**
  - **Highway and transit networks in the adopted Transportation Policy Plan**
- **The presentation of ridership for transitway projects is an important aspect of overall project delivery, including presentation to decision-makers and the public. It is important that ridership results are presented in a manner that is clear and consistent, regardless of mode. At a minimum, the following ridership results should be separately presented for each mode:**
  - **LRT: Rides taken using the LRT service**
  - **Commuter Rail: Rides taken using the Commuter Rail service**
  - **BRT:**
    - **Rides taken using the BRT station-to-station services**
    - **Rides taken on local or express services that utilize a defined transitway runningway for at least 50 percent of the route and use at least one non-downtown transitway station**
  - **Local feeder service ridership should not be included in any transitway ridership figures.**

The Regional Transit Demand Forecast Model (Regional Model) is the preferred method for travel forecasting because the model:

- Reflects all geographic and trip markets

- Is sensitive to future development scenarios
- Can analyze trips by station/stop
- Can follow trips from origin to destination
- Can measure trip-based user benefits

There may be situations where a rule-based modeling tool is appropriate to use. The use of such models should be thought through carefully and the reasons for using a rule-based model should be justified and documented.

Consultation with Metropolitan Council staff should include, at a minimum, development of the proposed scope of work, review of modeling methodology prior to beginning any modeling work, review of no-build or baseline input assumptions, review of model validation prior to proceeding with forecasts, and review of draft forecasts prior to their presentation to project stakeholders, including policy makers and the general public. This consultation is meant to be part of a collaborative process. Staff will provide current guidance on the use and validation of the Regional Model. The Travel Demand Forecast User Guide can serve as a starting point for the forecasting process and consultation. When forecasting is complete, electronic copies of the developed model and all data should be sent to the Metropolitan Council.

Land use and socio-economic forecasts for the horizon year should be based on approved Metropolitan Council municipal totals and should be consistent with the latest planning assumptions and local comprehensive plans, including comprehensive plan amendments. Highway and transit networks should be consistent with the adopted TPP. Sensitivity tests of input data are worthwhile but not required. Service planning assumptions should be reviewed by appropriate transit agencies and Metropolitan Council staff.

The BRT ridership definition is intended to ensure that transitway ridership is calculated consistently for all transitways in the region. This definition includes all riders that benefit significantly from the transitway investment while ensuring that riders are not double-counted between feeder service and transitway service and that riders that do not benefit significantly from the transitway investment are excluded. The FTA does not have a formal definition of BRT ridership, since their measures primarily look at system-wide impact and user benefit calculations. However, the definition of utilizing the transitway runningway for at least 50 percent of the route is structured after FTA's definition of a fixed-guideway for major capital investment funding eligibility.

10.8. CAPITAL INVESTMENT CRITERIA

Any major transitway investment project that will seek funding through federal programs must use the appropriate federal process for the evaluation of capital investment.

Evaluation of all major transitway investment projects, whether funded with federal, state or regional funds, should consider at least the following quantitative factors for both opening year and the planning horizon year:

- **Ridership including total riders, new transit riders, and number of transit dependent riders**
- **Land use as measured by population, employment, and affordable housing units within ½ mile of stations**
- **Cost-effectiveness including annualized capital and operating cost/ride, passengers/service mile, passenger miles/service mile**
- **Transit travel-time savings over existing local bus service**
- **Congestion as measured by congested roadway miles in corridor**

Evaluation of all transitway projects should consider at least the following qualitative factors for both opening year and the planning horizon year:

- **Environmental benefits and impacts**
- **Economic development impacts, including regional competitiveness and benefit to local residents, businesses and communities**
- **Impacts on the well-being of elderly persons, persons with disabilities, and low-income and/or minority people and families**
- **Sustainability related to economic, environmental and equity (low-income people and families) concerns**
- **Extent of collaboration between regional and local leadership and stakeholders**
- **Innovative approaches**
- **Integration of the principles of the Corridors of Opportunity initiative**

The capital investment criteria are intended to provide a basis for a balanced, comparative evaluation of multiple transitway projects throughout the region. These criteria should also be used to evaluate the performance of transitways after construction to assess their effectiveness and provide input to future projects. Projects that seek to use specific funding sources will need to address the evaluation criteria required for those funding sources. The quantitative criteria identified here are intended to be relatively easy (and less costly and time consuming) to measure than more detailed federal criteria but to still provide sound technical guidance. The qualitative evaluation criteria are intended to weigh the commitment to transit-oriented development and sustainability principles in the respective transitway corridors and to better align transit and land use planning. These qualitative criteria are difficult to measure, but are important to increasing transit ridership and expanding access to jobs, affordable housing, and essential services for residents of all incomes and backgrounds.

10.9.PHASED DEVELOPMENT OF TRANSITWAYS

Transitways may be built in phases over time. For all modes, each phase should include the minimum elements identified in these guidelines for transitway service, station spacing and siting, stations and support facilities, runningways, vehicles, fare collection systems, technology and customer information, and identity and branding. The minimum elements are summarized in Table 10-1 – Minimum Elements from Transitway Guidelines.

Within our region, across the nation, and beyond, transitways of all modes are built in phases, sometimes called initial or minimum operable segments. Examples from within the region include Hiawatha LRT (Blue Line) and Northstar Commuter Rail. Hiawatha Phase I between downtown Minneapolis and Fort Snelling opened in June 2004, Phase II between Fort Snelling and the Mall of America opened in December 2004, and the American Boulevard station opened in December 2009. Northstar Phase I between downtown Minneapolis and Big Lake opened in November 2009, and a Ramsey Station is scheduled to open in late 2012. For each of the region’s examples, all transitway phases included or are positioned to include the minimum elements of transitways. The inclusion of minimum transitway elements is especially important for BRT projects due to their flexible nature to protect the transitway brand promise. Guideline 3.9. Staged Development of Stations provides additional, station-specific information.

Table 10-1 – Minimum Elements from Transitway Guidelines[3]

	Arterial BRT	Highway BRT[4]	LRT	Commuter Rail
Service Operations	*WEEKDAY* Combined frequency for Arterial BRT and local service should be 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late *WEEKEND* 15-min. day/evening, 30- to 60-min. early/late	*WEEKDAY* Combined frequency for station-to-station and express services should be 10-min. peak period and 15-min. midday *WEEKEND* Frequency based on demand	*WEEKDAY* 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late *WEEKEND* 15-min. day/evening, 30- to 60-min. early/late	*WEEKDAY* 30-min. peak period Off-peak frequency as needed At least 5 trips each peak period
Stations	Transitway stations justified by proven, documented demand that: • Achieve a functional, cost-effective outcome that balances aesthetics with funding availability • Are attractive and informative environment for passengers at stations that is consistent with local community context, transitway identity, and passenger waiting times • Achieve functional integration with the surrounding land uses, which may include forming a nucleus for transit-oriented development at stations • Balance travel time, access and station demand relative to travel markets at the time of implementation • Promote a safe and secure environment by designing all elements to enhance passive security by maintaining visibility to and within the station and station area • Implement an interdisciplinary approach to station and facility design that incorporates advancements in technology			
Runningway	Full-sized mixed-traffic lanes (10-12 feet) that provide transit with travel-time advantages under congested roadway conditions	Full-sized (12 feet) managed lanes or bus-shoulder lanes that provide transit with travel-time advantages under congested roadway conditions	Adequate, exclusive trackage for safe and reliable operation	Adequate trackage (or trackage rights) for safe and reliable operation
Vehicles	Sleek, modern, premium-styled buses appropriately sized and configured to service characteristics		Compatible with existing rail and infrastructure systems	
Fare Collection	Modern and proven fare collection systems that integrate well within the regional system and fit the needs of the region and transitway			
Technology	Automatic vehicle location (AVL) on all vehicles and automatic passenger counters (APC) on all LRT, Commuter Rail, and BRT station-to-station vehicles Real-time schedule information at all high-volume stations and real-time parking availability at major park-and-ride facilities			
	Proven communications link compatible and coordinated with regional transit control center		Compatible with existing rail systems technology and control centers	
Identity and Branding	TBD	Color line names for station-to-station services Unique system name Consistent signage and branding using regional transit system color scheme Unique vehicle designs distinguished from local bus		Unique line name that does not conflict with color lines or LRT/Highway BRT system name

10.10.DEVIATIONS FROM TRANSITWAY GUIDELINES

Deviations from the Regional Transitway Guidelines that have significant cost and/or operational implications should trigger discussion with funding partners (e.g., the Metropolitan Council, MnDOT, CTIB, and Regional Railroad Authorities).

The Regional Transitway Guidelines should apply whenever investments are being studied, planned, and made in a transitway corridor identified as such in the Transportation Policy Plan. In general, the Transitway Guidelines are intended to establish a baseline for transitway facilities and services while providing flexibility to lead agencies in managing the broad array of issues that must be balanced during the planning and design process. The Transitway Guidelines provide parameters for decisions relating to planning, designing, building and operating transitways. While some of the Transitway Guidelines set clear thresholds, there will be times when greater flexibility is needed than is found in the guidance. Issues that arise which have significant cost and/or operation implications should trigger discussion and negotiation between the lead agency and funding partners, including Metropolitan Council, CTIB and others. The lead agency, in consultation with technical and policy advisory groups, is responsible for initiating discussions and negotiations with the funding partners as to the need for a deviation and whether a deviation is warranted. Where appropriate, local land use authorities and/or transit operating agencies may also need to be involved in these discussions.

3 Guidelines are not provided for Dedicated Busway, Express Bus with Transit Advantages, or Streetcar. Dedicated Busway and Express Bus with Transit Advantages are transitway modes recognized in the Transportation Policy Plan (TPP). Streetcars are not yet recognized in the TPP because their application in the region requires additional study.

4 For Table 10-1, Highway BRT Station-to-station and Express services should be considered as part of a Highway BRT transitway as a whole but the various elements may apply differently by service type

11. REGIONAL TRANSITWAY GUIDELINES RESOURCE LIST

1. Transportation Policy Plan (TPP)

   http://www.metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan-(1).aspx

2. Regional Transitway Guidelines Technical Report

   http://www.metrocouncil.org/Transportation/Planning-2/Transit-Plans,-Studies-Reports/Transit-Transitways/Regional-Transitway-Guidelines/Regional-Transitway-Guidelines-Tech-Report-(1).aspx

3. Park-and-Ride Plan

   http://metrocouncil.org/Transportation/Planning-2/Transit-Plans,-Studies-Reports/Transit-Transitways/Park-and-Rides.aspx

4. Central Corridor Light Rail Transit (CCLRT) Design Criteria

   http://www.metrocouncil.org/Transportation/Projects/Furture-Projects/Regional-Transitway-Guidelines-By-Chapter.aspx

5. Northstar Corridor Rail Project Design Criteria

   http://www.metrocouncil.org/Transportation/Projects/Furture-Projects/Regional-Transitway-Guidelines-By-Chapter.aspx

6. Station and Support Facility Design Guidelines User Guide

   http://www.metrocouncil.org/Transportation/Projects/Furture-Projects/Regional-Transitway-Guidelines-By-Chapter.aspx

7. Runningway Guidelines User Guide

   http://www.metrocouncil.org/Transportation/Projects/Furture-Projects/Regional-Transitway-Guidelines-By-Chapter.aspx

8. Travel Demand Forecasting User Guide

   http://www.metrocouncil.org/Transportation/Projects/Furture-Projects/Regional-Transitway-Guidelines-By-Chapter.aspx

9. Corridors of Opportunity Initiative

   http://www.metrocouncil.org/Communities/Projects/Corridors-of-Opportunity.aspx

10. Partnership for Sustainable Communities

    http://www.sustainablecommunities.gov/

11. Transit-Oriented Development Resources

    http://www.metrocouncil.org/Communities/Services/Livable-Communities-Grants/Transit-Oriented-Development.aspx

12. Counties Transit Improvement Board Transit Investment Framework

    http://www.mnrides.org/

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ACKNOWLEDGMENTS

METROPOLITAN COUNCIL MEMBERS AND APPOINTMENT DATE (AS OF FEB 2012)

Susan Haigh – Chair	1/12/2011
Roxanne Smith – District 1	3/9/2011
Lona Schreiber – District 2	3/9/2011
Jennifer Munt – District 3	3/9/2011
Gary Van Eyll – District 4	3/9/2011
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