

## 2.0 ALTERNATIVES CONSIDERED

This Supplemental Draft Environmental Impact Statement (SDEIS) evaluates potential changes to the Central Corridor Light Rail Transit (LRT) Project since the publication of the Alternatives Analysis and Draft Environmental Impact Statement (AA/DEIS) in April 2006 and selection of the Locally Preferred Alternative (AA/DEIS LPA) by the Metropolitan Council in June 2006. This SDEIS also discloses new information developed during the preliminary engineering (PE) process.

**Section 2.1** provides an overview of the alternatives considered for the Central Corridor LRT Project and the process used to select them.

**Section 2.2** presents a description of the AA/DEIS LPA that was selected for the Central Corridor LRT Project. This section also discusses the process of developing and examining numerous design alternatives developed since adoption of the AA/DEIS LPA. These design considerations responded to conditions that existed within the corridor, technical, operational, and financial constraints, and major infrastructure requirements that were not fully documented in the AA/DEIS.

**Section 2.3** provides a description of the design alternatives selected for evaluation in this SDEIS and as adopted by the Metropolitan Council on February 27, 2008. This section also presents a comparison of effects between the AA/DEIS LPA and the design alternatives adopted by the Metropolitan Council as part of the scoping of key project elements early in the PE process.

### 2.1 AA/DEIS Alternatives and Recommendations

#### 2.1.1 Alternatives Analysis

The Central Corridor Transit Study (Transit Study) was initiated in 1999. The Transit Study process was done in two parts: 1) a feasibility study for commuter rail, which was completed in 2001, and 2) an Alternatives Analysis/Draft Environmental Impact Statement for baseline, LRT and bus rapid transit (BRT) in the corridor, which was completed in 2006. The Transit Study identified a multi-modal package of transportation improvements. These improvements are intended to address future travel demand and meet the goals of the community, which include economic opportunity, community and environmental benefits, and transportation and mobility improvements.

A review of existing and projected future conditions resulted in the development and adoption of a purpose statement by the Central Corridor Coordinating Committee (CCCC). Goals and objectives were established in response to the identified problems and needs. They were based on adopted long range plans, federal major investment planning criteria, public outreach efforts, and agency coordination. These goals and objectives are summarized in Chapter 1.

The development of alternatives in the Transit Study began with a universe of alternatives. It evaluated potential transit technologies, alignments, and station locations in the Central Corridor LRT Study Area. Potential alternatives were screened on their ability to satisfy project goals and objectives. After the first level of evaluation, the universe of alternatives was reduced to 19 options. These options were then evaluated in a Screen I Evaluation, which yielded nine alternatives for a Screen II Evaluation. Evaluation criteria included cost effectiveness, mobility and accessibility, and community and environmental benefits. The Screen II Evaluation applied the same evaluation parameters, with an increased level of

detail, to the nine build alternatives retained from Screen I. Resulting alternatives from the Screen II Evaluation were evaluated in the AA/DEIS (see Section 2.1.2, below).

The Central Corridor LRT Project development process was recorded in the following documents: Universe of Alternatives Memorandum (July 2000), Technical Memorandum 2: Screen I Evaluation (September 2000), and Technical Memorandum 3: Screen II Evaluation (January 2002).

### 2.1.2 Alternatives Evaluated in the AA/DEIS

Based on the Screen II Evaluation results, the CCCC determined on February 15, 2001, that three build options would be retained for advancement in the project development process. The initiation of the AA/DEIS for the Central Corridor began with a formal scoping process, which provided an opportunity for regulatory agencies and the public to respond to the concept of proposed transit in the Central Corridor LRT Study Area and to identify issues of concern. The scoping process was officially initiated on June 5, 2001, with publication in the Federal Register of the Notice of Intent (NOI) to prepare an EIS. The Notice of Availability of the Central Corridor Scoping Booklet was published in the Minnesota Environmental Quality Board (EQB) Monitor on June 11, 2001. The comment period closed on July 20, 2001. Four scoping meetings were held, consisting of one agency meeting and three public meetings.

The alternatives presented during scoping included LRT and BRT on University Avenue and LRT on Interstate 94 (I-94). A No-Build Alternative and a Baseline Alternative were also included in the scoping process. A more detailed description of the alternatives is outlined below:

- **No-Build Alternative**—This alternative included roadway and bus system improvements along the University Avenue and I-94 corridors as specified in the appropriate agency Transportation Improvement Programs (TIPs) and 2030 Transportation Policy Plan for which funding has been committed. The current transportation and transit facilities and services, with minimal modifications or expansions, form the basis for the No-Build Alternative.
- **Baseline Alternative**—This alternative serves as a basis for comparison to the build alternatives as part of the FTA's New Starts Process. It is also designed to do the "best that can be done" to improve transit service in the Central Corridor LRT Study Area without a major capital investment. Low capital cost infrastructure and bus transit improvements for the Central Corridor included bus operations, intelligent transportation systems (ITS) techniques, travel demand management (TDM), and other system improvements. Bus operation strategies that build upon existing transit services and facilities provide connectivity within the Central Corridor LRT Study Area. ITS uses the latest technology for more effectively managing transportation systems. TDM strategies help reduce congestion by encouraging the use of alternative modes of transportation rather than driving alone.
- **University Avenue LRT Alternative**—This alternative provided LRT service between downtown St. Paul and downtown Minneapolis and to the University of Minnesota (U of M), primarily in exclusive lanes in the center of University Avenue. 16 station locations exclusive to the Central Corridor and the cumulative effects to five stations shared with Hiawatha LRT and the Northstar commuter rail were analyzed. This included feeder bus improvements to provide local and regional access to the proposed LRT system.

- **University Avenue BRT Alternative**—This alternative provided BRT service between downtown St. Paul and downtown Minneapolis and to the U of M, primarily in an exclusive guideway in the center of University Avenue. Up to 16 station locations exclusive to the Central Corridor and the cumulative effects to five stations shared with Hiawatha LRT and the Northstar commuter rail were analyzed. This alternative included feeder bus improvements to provide local and regional access to the proposed BRT system.
- **I-94 LRT Alternative**—This alternative provided LRT service between downtown St. Paul and downtown Minneapolis and to the U of M, primarily in barrier-separated exclusive lanes in the median of I-94. Up to 17 station locations exclusive to the Central Corridor and the cumulative effects to five stations shared with Hiawatha LRT and the Northstar commuter rail were analyzed. This included feeder bus improvements to provide local and regional access to the proposed LRT system.

Alternative alignments for LRT and Busway/BRT through the U of M, State Capitol, and downtown St. Paul were suggested during scoping. Project partners including the U of M, St. Paul's Capitol Area Architectural and Planning Board (CAAPB), and the City of St. Paul advocated minor changes in the alignment or affirmed their preference for specific alignments. Additional analysis was undertaken to satisfy concerns and to respond to comments received. Through the scoping process, alignments and alternatives that were not prudent or reasonable and did not satisfy requirements of the purpose and need were not carried forward for additional analysis in the AA/DEIS. Scoping results are included in the Scoping Summary Report (December 7, 2001). Two build alternatives were selected for evaluation in the AA/DEIS in addition to a No-Build and Baseline Alternative. The build alternatives included: University Avenue LRT and University Avenue BRT.

## 2.2 Description of the AA/DEIS Locally Preferred Alternative and Proposed Revisions

### 2.2.1 AA/DEIS LPA

After publication of the AA/DEIS and completion of the public hearings, the Metropolitan Council adopted the AA/DEIS LPA for the Central Corridor (June 28, 2006, Metropolitan Council Resolution No. 2006-15). As shown on Figure 2-1 AA/DEIS Locally Preferred Alternative, the AA/DEIS LPA is 11 miles in length, of which 9.8 miles consists of new alignment and 1.2 miles use the existing Hiawatha LRT alignment in downtown Minneapolis.

The AA/DEIS LPA is described in detail below:

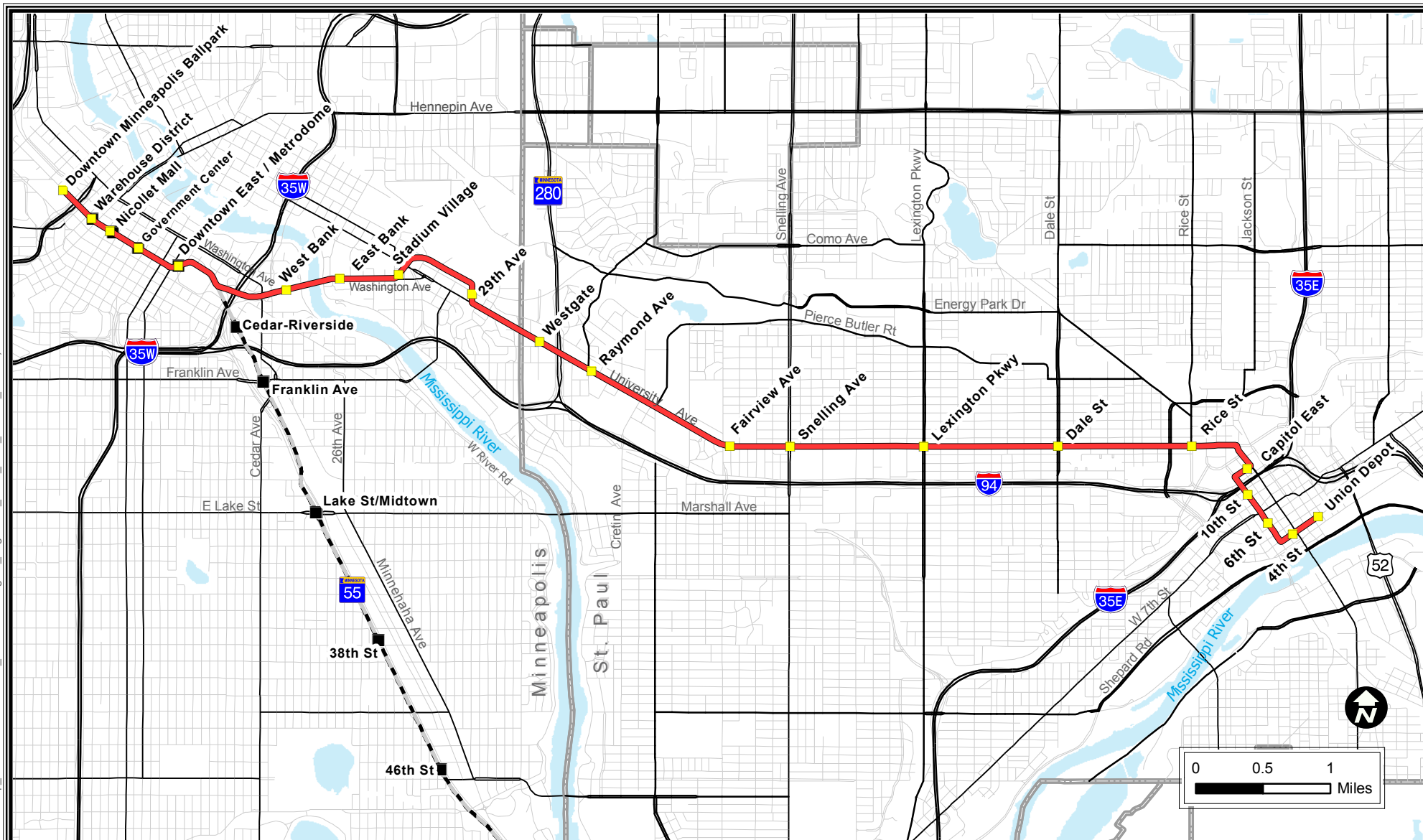
#### **Downtown Minneapolis**

The Central Corridor LRT was proposed to connect with the Hiawatha LRT at-grade just east of the Downtown East/Metrodome Station.

#### **University of Minnesota and Prospect Park**


The LRT was proposed to run in the median of 3rd Street and 4th Street. It would have connected to Washington Avenue and then run in a tunnel under Washington Avenue through the East Bank campus of the U of M. It would then connect with the U of M Transitway at-grade, and proceed to University Avenue along 29th Avenue SE in Prospect Park.

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- DEIS Station
- DEIS LPA
- HLRT Station
- - - Hiawatha Light Rail

**Figure 2-1**  
**DEIS Locally Preferred Alternative**

 **Metropolitan Council** Central Corridor  
Light Rail Transit

## **University Avenue**

The LRT was proposed to run at-grade in the median between 29th Avenue SE and Robert Street near the State Capitol.

## **State Capitol Area and Downtown St. Paul**

The LRT was proposed to run at-grade on Robert Street, Columbus Street, Cedar Street, and 4th Street, and terminate in front of the Union Depot.

## **Trackway**

Light rail vehicles (LRVs) were proposed to operate on standard gauge railroad embedded track. The proposed system would be double-tracked throughout, providing a separate track for eastbound and westbound trains. Generally, a cross-section of at-grade double tracks for LRT alignment requires 28 feet of right-of-way. The minimum vertical clearance is approximately 14 feet from top of rail. Crossovers to allow trains to cross from the eastbound to the westbound tracks were proposed to be provided at regular intervals for special operations. Because of the overall urban characteristics of the alignment, the tracks would be embedded (level with roadway pavement) for most of the alignment.

## **Vehicles**

The vehicles proposed for operations on this corridor would be consistent with those operated by Metro Transit on the Hiawatha LRT line. Train control would use current Metro Transit design and operations criteria.

## **Stations**

Sixteen new stations and five shared stations with the existing Hiawatha LRT were proposed. Passenger boarding was proposed to occur at designated station sites. LRT stations would vary in spacing and configuration, depending on their location and function. Boarding platforms would be approximately 200 feet long to accommodate two-car trains. They would be 14 inches above the top of rails to allow for level boarding with a low-floor vehicle. Each station would consist of either one center-loading platform approximately 18 to 30 feet wide located between the tracks, or two side-loading platforms, each approximately 12 feet wide, located on the side of the tracks. Generally, each platform would be furnished with a canopy and windscreen for weather protection, signs, seating, trash receptacles, and self-service fare equipment. Station platforms were proposed to be expanded to 300 feet to accommodate three-car trains in the future.

## **Downtown Minneapolis**

The Central Corridor LRT was proposed to share stations with the Hiawatha LRT in downtown Minneapolis. The Hiawatha LRT runs on 5th Street South with stations at the following locations:

- Minneapolis Multi-modal Station (5th Street South/5th Avenue North)
- Warehouse District Station (Hennepin Avenue at 1st Avenue North)
- Nicollet Mall Station
- Government Center Station (between 3rd and 4th Avenue South)
- Downtown East/Metrodome Station

### University of Minnesota and Prospect Park

- West Bank Station—Depressed center platform near existing bus stop on Washington Avenue
- East Bank Station—Depressed center platform in front of Coffman Union on Washington Avenue
- Stadium Village Station—Depressed center platform
- 29th Avenue SE Station—Two side platforms on northwest quadrant of 29th Avenue SE and University Avenue

### University Avenue

- Westgate Station—Split side platforms
- Raymond Avenue Station—Center platform between Carleton and LaSalle streets
- Fairview Avenue Station—Two side platforms on west side of intersection
- Snelling Avenue Station—Split side platforms
- Lexington Parkway Station—Split side platforms
- Dale Street Station—Split side platforms
- Rice Street Station—Center platform on west side of intersection

### Capitol Area and Downtown St. Paul

- Capitol East Station—Two side platforms on Columbus Street, west of Robert Street
- 10th Street Station—Two side platforms in median between 11th and 10th Streets at Cedar Street
- 6th Street Station—Two side platforms between 7th and 6th Streets at Cedar Street
- 4th Street Station—Two side platforms between Robert and Minnesota streets
- Union Depot Station—Center platform with potential expansion in front of the Union Depot.

### **Fare Collection**

Fare collection systems were proposed to use current Metro Transit design and operations criteria.

### **Power System**

Traction power substations (TPSS) were proposed to be located at regular intervals along the proposed LRT line. Most TPSS would be located near LRT stations. The TPSS would generally be single-story buildings approximately 40 feet by 20 feet on about a 4,000-square-foot limited access site. They would transform and rectify the utility three-phase alternating current to the direct current LRT electrification voltage. The power would then be distributed to the trains through an overhead contact system (OCS).

### **Traffic Control**

Active devices, including traffic signals, railroad-type flashers, and bells were proposed to control traffic at locations where the proposed Central Corridor LRT crossed public streets.

In low-speed areas, including downtowns, intersection traffic signals would be used. Traffic and pedestrian signals, signs, and markings would generally be in accordance with the current *Manual on Uniform Traffic Control Devices* (MUTCD).

### **Yard and Shop**

The Hiawatha LRT Operations and Maintenance facility were proposed for expansion to accommodate additional trains from the Central Corridor LRT. The facility would then be used as storage and for servicing and maintaining the LRVs. It would also be where LRT administrative staff would report for work and where trains would enter and leave revenue service. Vehicles would be cleaned and repaired inside and outside daily. They would also be inspected and serviced according to a fixed inspection and maintenance schedule to help ensure operational safety and reliability.

An additional maintenance/storage facility near the eastern terminus of the proposed LRT line was also proposed as part of the AA/DEIS LPA. The facility was proposed to include storage for 10 to 12 cars and vehicle washing and cleaning equipment.

*The Reevaluation for Hiawatha Avenue (TH55) Light Rail Transit Final Environmental Impact Statement*, August 12, 1999, defined and evaluated the impacts of the proposed Hiawatha LRT Yard and Shop Facility in Minneapolis. Additionally, the Record of Decision (ROD) for the Hiawatha LRT (April 26, 2000) included the yard and shop facility in the definition of the federal action, and specified mitigation measures for the facility. The findings and commitments identified in the Hiawatha LRT ROD are therefore incorporated by reference into the Central Corridor AA/DEIS. The implementation of LRT in the Central Corridor would not require physical expansion (that is, no additional right-of-way would be required at the existing maintenance facility) of the existing yard and shop property. Only covered storage tracks added to the current building would be required.

### **Accessibility**

The AA/DEIS LPA was proposed to be designed to be fully compliant with the Americans with Disabilities Act (ADA). The LRVs would be fully accessible with level boarding from accessible platforms (equipped with ramps and elevators) and include provisions for wheelchair space on all cars.

### **Operating Hours and Frequency**

The Central Corridor was proposed to operate from 5:00 a.m. to 12:30 a.m. seven days a week. Frequency would vary between 7.5 minutes during peak hours to 10 minutes during off-peak hours and weekends. The standard operating plan would be modified to accommodate special events (for example, evening or weekend cultural or sporting events).

The AA/DEIS LPA included the components of the Baseline Alternative. The bus system associated with the Baseline Alternative would be restructured to coordinate and interface with the proposed LRT service. Details of the AA/DEIS LPA bus and transit operating plans are described in Section 2.3.2 of the AA/DEIS.

### **2.2.2 Proposed Revisions to the AA/DEIS LPA**

Subsequent to the completion of the AA/DEIS for the Central Corridor LRT Project, several unresolved policy questions and design element options have arisen which required additional study. These design considerations responded to changed conditions within the corridor, technical, operational, and financial constraints, and major infrastructure requirements that were not fully documented in the AA/DEIS.

### 2.2.2.1 Key Issue Development and Coordination

Key issues affecting implementation were identified by the Metropolitan Council and other key project stakeholders. These key issues represented engineering constraints, operational issues, concerns of project stakeholders, and FTA comments. To address the key project issues, the Metropolitan Council and project partners formed issue resolution teams comprised of representatives from the cities of St. Paul and Minneapolis, Ramsey and Hennepin counties, CAAPB, the State Department of Administration, MnDOT, and the U of M, as well as other interested stakeholders. The issue resolution teams provided opportunities for key stakeholder participation in refining and resolving each issue, developing design options, and assessing the level of complexity and need for additional environmental review and disclosure during the SDEIS process. Chapter 11 Public and Agency Coordination describes in detail the public and agency outreach and coordination undertaken during the early stages of PE, which was a critical component of the key issues resolution process.

Nine Key Project Elements were identified as having the potential to result in significant social, economic, and environmental impacts due to changes from the AA/DEIS LPA, or as lacking the appropriate level of disclosure in the AA/DEIS. Details of these Key Project Elements are included in Section 2.2.2.2. Remaining project issues were resolved and resulted in no potential for significant impacts from the AA/DEIS LPA, or in minor modifications being addressed during PE, which will be documented in the Final Environmental Impact Statement (FEIS). In summary, the focus of this SDEIS will be on the Key Project Elements. The remaining key issues are resolved or still under study with project stakeholders and will be documented in the FEIS.

### 2.2.2.2 SDEIS Key Project Elements

The goal of this SDEIS is to assist the Metropolitan Council, resource agencies, and key project partners in understanding and resolving critical project elements within the context of the National Environmental Policy Act (NEPA). It provides an opportunity to document and disclose local decision-making related to project elements that are currently being refined as more detailed information is available through the PE effort. The SDEIS is of limited scope and focuses on changes and new information from the AA/DEIS. For each of the changes from the AA/DEIS, the SDEIS describes the change and the reasons for the change and compares the impacts to those of the original proposed action.

An NOI to prepare an SDEIS for the Central Corridor LRT Project was published in the *Federal Register* (Federal Register / Vol. 73, No. 37 / Monday, February 25, 2008/ p. 10090-10091) as well as the Minnesota Environmental Quality Board (EQB) Monitor on February 25, 2008. The Key Project Element changes include:

1. **Hiawatha/Central Connection:** Alternative alignments connecting to the existing Hiawatha LRT tracks are evaluated.
2. **University of Minnesota Alignment (tunnel vs. at-grade and stations):** The AA/DEIS LPA included a tunnel, primarily under Washington Avenue, as the preferred alignment alternative through the U of M. The SDEIS examines the impacts of an at-grade alignment alternative through the East Bank of the U of M campus, as well as an alignment change through this segment of the line, largely because of the new TCF Bank Stadium presently under construction on the AA/DEIS LPA alignment.



3. **Potential Additional Stations at Hamline, Victoria, or Western:** The impact of adding a station to the Central Corridor LRT Project at Hamline, Victoria, or Western avenues in the City of St. Paul is being evaluated.
4. **Capitol Area Alignment/Stations:** Potential changes to the alignment and location of stations within St. Paul's Capitol Area Architectural and Planning Board (CAAPB) area are documented and disclosed.
5. **Downtown St. Paul alignment/station modifications:** Alternative means of accessing St. Paul's Union Depot, including potential impacts to LRT station location and alignment, are documented and disclosed.
6. **Traction power substations:** The AA/DEIS discussed the need for TPSS as part of LRT operations, but did not identify the number or potential location of substations. The SDEIS documents and discloses this information.
7. **Three-car train requirement:** The impacts of potential three-car train operations on the Central Corridor LRT Study Area are evaluated.
8. **Vehicle maintenance facility:** The impacts of constructing a storage and maintenance facility to serve the operational needs of the Central Corridor LRT Project are documented and disclosed.
9. **Washington Avenue Bridge:** The need for, and impacts of, modifications and/or improvements required to the Washington Avenue Bridge for LRT purposes are documented and disclosed.
10. **Other key project elements** determined through the on-going decision-making process to have potential significant impacts to human and natural environments

#### 2.2.2.3 Development of Key Element Design Options to the AA/DEIS LPA

Engineering alternatives were developed to optimize design, operations, and cost-effectiveness, and to respond to community needs and concerns. These alternatives were addressed with the key issue resolution teams, as well as at public and informational meetings. Figure 2-2 illustrates the design options considered in refinement of the AA/DEIS LPA.

Alternatives developed for each of the Key Project Elements are described below:

##### **No. 1 – Hiawatha LRT/Central Corridor LRT Connection**

LRT operational issues at the Central Corridor LRT junction with the Hiawatha LRT connection have required evaluation of different connection options to optimize operations. More than 30 alternatives were originally identified. These alternatives were evaluated against preliminary design criteria such as vertical grade requirements, horizontal curves, track superelevation, and roadway realignments. The application of these criteria eliminated many of the original alternatives.

A review process with Central Corridor LRT Project designers and stakeholders identified four alignment alternatives that achieved the operational and technical requirements needed for a successful and constructible connection to the Hiawatha LRT.

The four alternatives are described below. All alternatives share the AA/DEIS alignment east of Cedar Avenue, whereby Central Corridor LRT displaces the inside traffic lanes on the Washington Avenue Bridge over the Mississippi River. As a result, two eastbound traffic lanes and two westbound traffic lanes on the bridge will be reduced to one eastbound traffic lane and one westbound traffic lane. West of the Washington Avenue Bridge, the Central

Corridor LRT continues center running at-grade, displacing the inside traffic lanes through the U of M West Bank campus, under the 19th Avenue Bridge and under the Cedar Avenue Bridge. Figure 2-2 identifies the four alternatives.

*Alternative 301-AA/DEIS Derived Alternative*

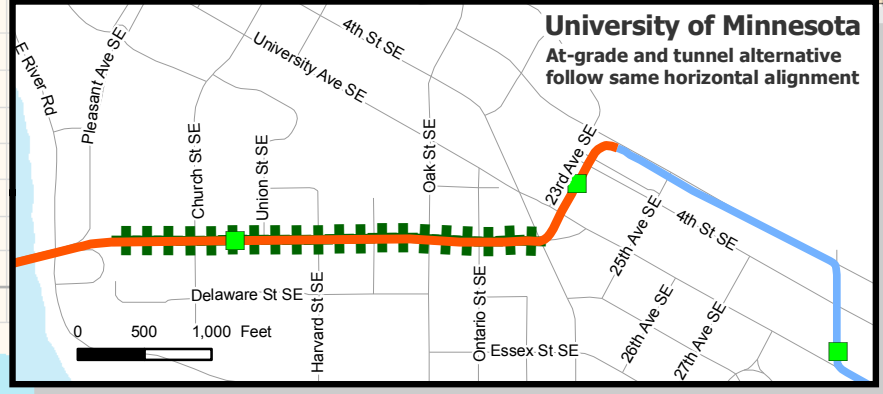
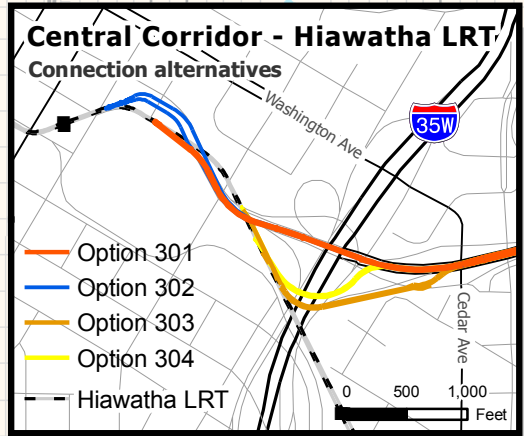
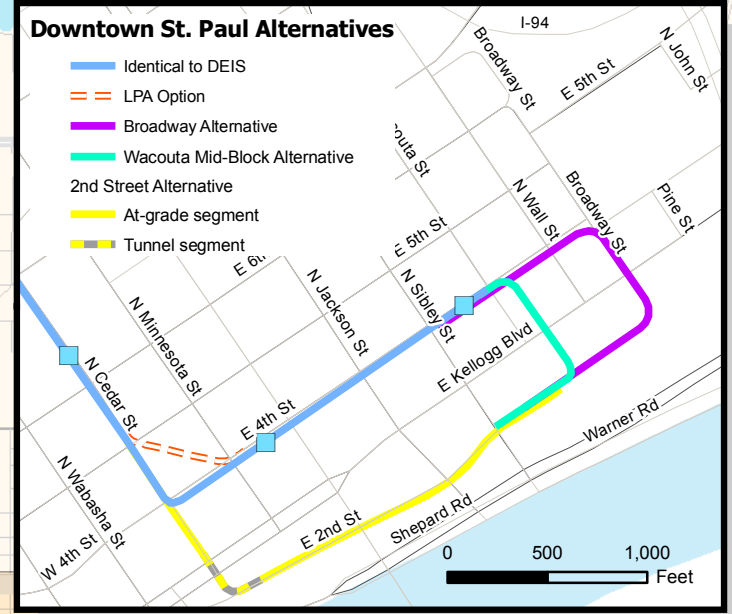
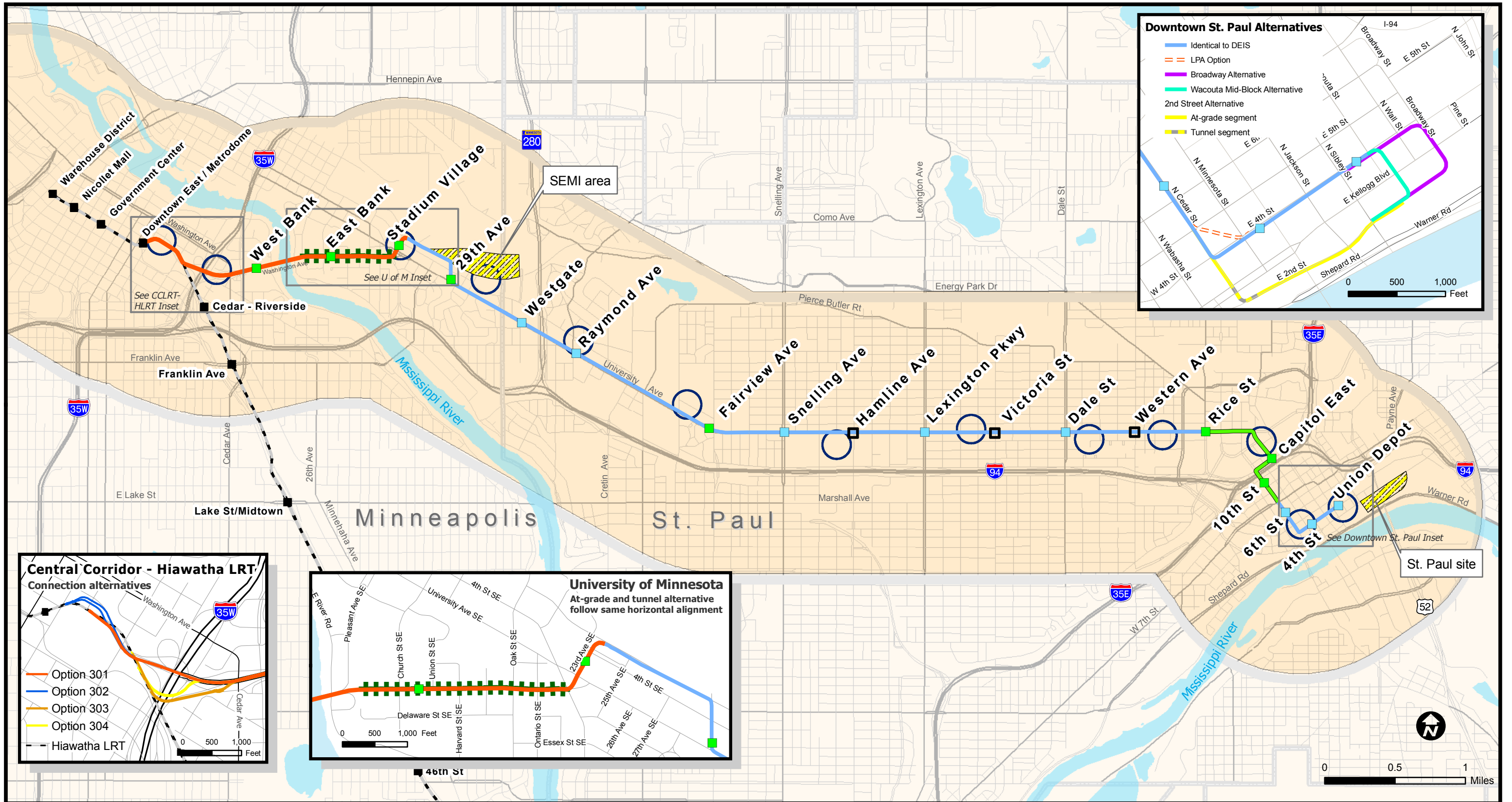
West of Cedar Avenue, Alternative 301 continues to displace the inside lane of 3rd/4th Street South at-grade by crossing under I-35W, under Hiawatha LRT, and under 11th Avenue. It connects with Hiawatha LRT at-grade east of the Hiawatha LRT Metrodome Station, in the vicinity of Norm McGrew Place between 3rd Street and 4th Street. Central Corridor LRT track centers will be widened sufficiently to extend around existing bridge piers supporting the various bridges along the Central Corridor LRT alignment. This alternative would not provide for a pocket/storage track to store vehicles for special events.

*Alternative 302-AA/DEIS Modified for Full Bi-Directional Operation*

West of Cedar Avenue, Alternative 302 continues to displace the inside lanes of 3rd/4th Street South, crossing under I-35W, under Hiawatha LRT, and under 11th Avenue. Central Corridor LRT track centers will be widened sufficiently to extend around the existing bridge piers supporting the various bridges along the Central Corridor LRT alignment.

West of 11th Avenue, westbound and eastbound Central Corridor LRT tracks take diverging alignments. Westbound Central Corridor LRT continues along the south inside edge of 3rd Street, under Hiawatha LRT to an at-grade connection with northbound Hiawatha LRT east of the Metrodome Station, in the vicinity of Norm McGrew Place between 3rd Street and 4th Street. West of 11th Avenue, eastbound Central Corridor LRT continues along the north edge of 4th Street South, to an at-grade connection with southbound Hiawatha LRT east of the Metrodome Station, again, in the vicinity of Norm McGrew Place between 3rd Street South and 4th Street South. An integral part of Alternative 302 is the realignment/reconstruction of a segment of Hiawatha LRT between Chicago Avenue and 11th Avenue. Additionally, modification to the existing Hiawatha LRT Bridge over 3rd Street South may be required. This alternative would not provide for a pocket/storage track to store vehicles for special events.

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**Legend**

<b>CCLRT Station</b>	<b>CCLRT Design Status</b>	<b>Hiawatha LRT Station</b>
Identical to DEIS (Blue square)	Identical to DEIS (Blue line)	Hiawatha LRT (Black dashed line)
Changed from DEIS - Resolved (Green square)	Changed from DEIS - Resolved (Green line)	Potential Maintenance Facility Site (Hatched yellow)
Changed from DEIS - Unresolved (Orange square)	Changed from DEIS - Unresolved (Orange line)	Traction power substation (Blue circle)
Potential Station (Black square)	Tunnel Alternative/Transit-Pedestrian Mall Area (Green dashed line)	General vicinity: .1 mi radius

**Figure 2-2**  
**Central Corridor LRT**  
**Development of Design Options**

Central Corridor  
 Light Rail Transit

Data Sources: LMIC, Metropolitan Council, Mn/DOT

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*Alternative 303-At Grade Crossing with 4th Street; South Connection over I-35W*

West of the Cedar Avenue Bridge, Alternative 303 crosses 4th Street South at-grade with a traffic signal, and then passes beneath Ramp A (eastbound 4th Street exit to Cedar Avenue). West of Ramp A, Central Corridor LRT runs on retained cut/fill along the south side of Ramp B (I-35W northbound exit to eastbound Washington Avenue). Central Corridor LRT then uses a new bridge structure over Ramp B and I-35W to a connection with Hiawatha LRT in the segment between I-35W and 11th Avenue. Crossover connections from westbound Central Corridor LRT to northbound Hiawatha LRT and from southbound Hiawatha LRT to eastbound Central Corridor LRT are made using No. 8 crossovers (a pair of switches that connects two parallel rail tracks, allowing a train on one track to cross over to the other). Between the new I-35W overpass and 11th Avenue, where the Hiawatha LRT and Central Corridor LRT connection takes place, the existing bike trail is displaced from its current location along the north side of the Hiawatha LRT tracks. A new route for the displaced bike trail would need to be identified as part of future design activities related to this alternative. West of the connection between Hiawatha LRT and Central Corridor LRT, in the approximate location of the displaced bike trail, a pocket/storage track is created to provide LRV storage and staging options. West of 11th Avenue, Central Corridor LRT shares the existing double-track configuration with Hiawatha LRT.

*Alternative 304-Grade Separated Crossing over 4th Street; South Connection over I-35W*

West of the Cedar Avenue Bridge, the profiles for eastbound and westbound Central Corridor LRT under Alternative 304 diverge upward from the at-grade profile of 3rd/4th Street. The trackway climbs on retained fill until the Central Corridor LRT profile has elevated sufficiently to develop height for a new bridge structure to cross over 4th Street South, Ramp B, and I-35W to a connection with Hiawatha LRT, in the segment between I-35W and 11th Avenue. Crossover connections from westbound Central Corridor LRT to northbound Hiawatha LRT, and from southbound Hiawatha LRT to eastbound Central Corridor LRT, are made using No. 8 crossovers. Between the I-35W overpass and 11th Avenue, where the Hiawatha LRT and Central Corridor LRT connection takes place, the existing bike trail is displaced from its current location along the north side of the Hiawatha LRT tracks. A new route for the displaced bike trail would need to be identified as part of future design activities related to this alternative. West of the connection between Hiawatha LRT and Central Corridor LRT, in the approximate location of the displaced bike trail, a pocket/storage track is created to provide LRV storage and staging options. West of 11th Avenue, Central Corridor LRT shares the existing double-track configuration.

This alternative, like all the other Hiawatha LRT/Central Corridor LRT Connection alternatives, requires an additional traction power substation (TPSS) near the Metrodome.

**No. 2 – University of Minnesota Alignment- East Bank**

The AA/DEIS LPA included a tunnel through the U of M's East Bank and Stadium Village. Since publication of the AA/DEIS, the U of M has developed plans for and is currently constructing a new football stadium (TCF Bank Stadium) located in the path of the AA/DEIS LPA. With the commencing of preliminary engineering, it was recognized there was a need to develop a new tunnel alignment through the U of M's East Bank campus. Various alternative tunnel alignments and options were developed and are discussed below as proposed changes to the AA/DEIS LPA.

As the project development process evolved during PE, the Metropolitan Council and the project stakeholders recognized the need to develop alternatives that would work within local financial constraints. An at-grade alignment through the U of M's East Bank was

developed as an option that could deliver a cost-effective solution. At-grade alignments resulting from this process are discussed below. The AA/DEIS did not discuss an at-grade LRT alternative through the U of M's East Bank. This is an important proposed change to note to the AA/DEIS LPA.

Working together, the project partners developed alignment alternatives through the U of M's East Bank campus to meet the dual constraints posed by stadium construction and by cost. Many at-grade and tunnel alternatives were developed to meet these needs. After the alternatives were evaluated for cost-effectiveness and constructability, one shortened and realigned tunnel alignment and two at-grade LRT alignments merited further analysis. The two at-grade alternatives include an LRT alignment on Washington Avenue with automobile traffic remaining, and an alignment that would eliminate automobile traffic and turn Washington Avenue into a transit/pedestrian mall. The alignment alternatives are described below.

#### *Shortened and Realigned Tunnel Alternative*

Numerous tunnel alternatives were developed with the project partners during PE. The alternatives were evaluated for cost-effectiveness and constructability. An optimized tunnel alternative was ultimately selected for further evaluation and is described here.

The west tunnel portal transition, approximately 750 feet long, would begin approximately 100 feet east of the eastern end of the Washington Avenue Bridge structure and end approximately 75 feet west of Church Street. Moving west to east along the length of this transition segment, Central Corridor LRT would transition from running at-grade with Washington Avenue to a tunnel section approximately 25 feet lower than the grade of Washington Avenue.

The U of M East Bank Station platform would be located in the west tunnel portal transition segment, approximately 15 feet below existing grade, between the existing pedestrian bridges connecting Northrop Mall to the Coffman Union Mall. Vertical circulation, connecting the mall and street levels to the East Bank Station platform, would include elevators and stairs at both ends of the station platform.

The east tunnel portal transition, approximately 600 feet long, would begin approximately 75 feet east of Oak Street and end approximately 75 feet west of Huron. Moving west to east along the length of this transition segment, LRT would transition from a tunnel section, approximately 25 feet lower than the grade of Washington Avenue, to running at-grade with Washington Avenue. Between Oak Street and Huron Boulevard there would be two lanes of eastbound traffic on the south side of Washington Avenue and one lane of westbound traffic on the north side of Washington Avenue straddling the tunnel portal transition.

Eastbound and westbound Central Corridor LRT would travel at-grade across Huron Boulevard and University Avenue, and continue running at-grade along the east side of 23<sup>rd</sup> Avenue through the Stadium Village Station. The U of M is planning a multi-modal transit facility adjacent to the Stadium Village Station.

East of the Stadium Village Station platform, Central Corridor LRT would run at-grade, along the south side of the U of M Transitway, crossing at-grade with 25th Avenue and 27th Avenue on its way to 29th Avenue. East of 29th Avenue, Central Corridor LRT would run at-grade along the center median of University Avenue.

### *At-Grade LRT Alignment with Traffic Alternative*

This at-grade alternative would allow all vehicular traffic to stay on Washington Avenue. It would provide one lane of traffic in each direction on Washington Avenue. Modifications include:

- Union Street would be modified to provide southbound right turn only access to Washington Avenue;
- Harvard Street south of Washington Avenue would be converted to one-way southbound;
- Walnut Street will be closed to through traffic north of the hotel parking lot and converted to one-way southbound south of Washington Avenue;
- A southbound right turn lane would be added on Oak Street;
- The left turn lane from westbound Washington Avenue to southbound Oak Street would be extended for the entire block between Oak Street and Ontario Street; and
- Ontario Street would be converted to right-in and right-out on the north and south legs of the intersection.

The East Bank Station would be an at-grade, split-platform station located at Union Street. The Stadium Village Station would be an at-grade station located at the proposed U of M multi-modal facility on the north side of University Avenue.

### *At-Grade LRT Alignment with Transit/Pedestrian Mall Alternative*

Central Corridor LRT would travel at-grade down the center of Washington Avenue from the Washington Avenue Bridge to Huron Boulevard. Washington Avenue would be closed to all vehicle traffic, except buses and emergency vehicles, from Pleasant Avenue to Oak Street. Eastbound traffic from the Washington Avenue Bridge would be diverted to East River Road. Westbound traffic on Washington Avenue from Pleasant Street would be allowed. One lane of traffic in each direction would be provided from Oak Street to Huron Boulevard. The East Bank Station would be an at-grade, split-platform station located at Union Street. The Stadium Village Station would be an at-grade station located at the proposed U of M multi-modal facility on the north side of University Avenue. Eastbound and westbound Central Corridor LRT would travel at-grade across Huron Avenue, University Avenue, and continue running at-grade along the east side of 23rd Avenue through the Stadium Village Station and to the U of M Transitway.

### **No. 3 – Future Infill Stations at Hamline Avenue, Victoria Street, or Western Avenue**

Residents and stakeholders, including the City of St. Paul and Ramsey County, have expressed an interest in adding stations to the AA/DEIS LPA at Hamline Avenue, Victoria Street, and Western Avenue to increase access to neighborhoods and businesses along University. The request for additional stations and inclusion in the analysis was made at numerous public meetings held during development of the SDEIS (see Appendix F – Public Outreach). The locations of these potential stations would reduce the station spacing from approximately one mile to a half mile along University Avenue in this portion of the Study Area. The alternatives include providing the sub-grade infrastructure necessary for the future construction of these stations. Construction of the station would occur when warranted by ridership and funding considerations.

The anticipated platform configuration for these stations would be split-side. The Hamline Avenue Station would have a westbound platform between Albert Street and Hamline

Avenue and an eastbound platform between Syndicate Street and Hamline Avenue. The Victoria Street Station would have a westbound platform between Milton Street and Victoria Street and an eastbound platform between Avon Street and Victoria Street. The Western Avenue Station would have a westbound platform between Arundel Street and Western Avenue and an eastbound platform between Farrington Street and Western Avenue.

#### **No. 4 – Capitol Area Alignment and Stations**

In the Capitol Area, two primary changes from the AA/DEIS LPA are proposed. These changes include moving the alignment on University Avenue north of the Capitol from center-running to south side-running at approximately Marion Street. This change includes a proposed relocation of the Rice Street Station from the west side of the Rice Street/University Avenue intersection to the east side, and moving the Capitol East Station to Robert Street and the alignment from Columbus Avenue to 12th Street. A more detailed description of these changes and the engineering, environmental, and planning considerations that informed them follows.

Preliminary engineering identified the need to accommodate a steep grade beginning at the apex of the Capitol, on University Avenue, and continuing down Robert Street. To accommodate the maximum grade allowable for LRT operations, it had been identified during the AA/DEIS planning process that a shallow cut in University Avenue would have to be made to achieve a gradient slope in which LRT could operate. However, doing so would pose substantial challenges to maintaining optimal traffic operations, particularly at the intersection of Robert Street and University Avenue.

A solution identified in PE was to transition LRT from center- to side-running along University Avenue at some point prior to entering the shallow cut behind the Capitol. Doing so would allow the LRT to operate with minimal interference to vehicular traffic operations along University Avenue and particularly at the intersection of Robert Street and University Avenue. At this location, the LRT would be able to move through the intersection of Robert Street and University Avenue outside the flow of vehicular traffic and thereby not need to be controlled by the traffic signal at this location. This would optimize LRT operations and eliminate the need for the train to stop on a steep slope.

Transitioning the LRT from center- to side-running operations at Rice Street was not feasible due to the high volumes of vehicular traffic at this location. Two potential transition points were identified—at Marion Street or at Martin Luther King Boulevard near the north face of the Capitol.

Traffic analyses were conducted of the two potential LRT operating transition points. It was determined that transitioning the LRT from center- to side-running operations at Martin Luther King Boulevard would have greater impacts on traffic operations and potential right-of-way takings (University Avenue right-of-way narrows east of Rice Street) than making this transition at Marion Street. For this reason, the Marion Street location was identified as the preferred point of transition. This required the relocation of the Rice Street Station. The Rice Street Station is proposed to be located just east of the intersection of Rice Street and University as a side-platform station on the south side of University Avenue.

In addition to accommodating side-running operations to meet engineering challenges, other planning factors entered into the consideration to relocate the Rice Street Station. Planning factors included meeting the overall vision for future development as expressed by the CAAPB, providing optimized connections to the bus transit network, and providing consistency with the City of St. Paul's *Central Corridor Development Strategy* by providing a direct connection to the Leif Erickson lawn from the station. *The Central Corridor*



*Development Strategy* recommends station locations where transit riders can begin and/or end their trip in a green space that is part of a larger network of open space and small parks in the Capitol area. Relocating the Rice Street Station to the east side of the intersection of Rice Street and University Avenue as a side-platform station solves engineering challenges and satisfies planning considerations.

Since development and publication of the AA/DEIS, the State of Minnesota built the Freeman Office Building at 625 Robert Street and the Agriculture/Health Lab building at 601 Robert Street. When developing this building, the State of Minnesota recognized an opportunity to relocate the Capitol East Station from its AA/DEIS location along Columbus Street to a location directly in front of the Freeman Building on Robert Street. The building site plan reserved right-of-way in front of its entrance to accommodate an LRT station location. In addition, the State of Minnesota closed Columbus Street at Robert Street as part of their overall traffic flow and security plans in the Capitol Area. To accommodate this new development, the proposed LRT alignment was shifted to continue along Robert Street past Columbus Avenue, turning to head west on 12th Street to Cedar Street, and then to continue south on Cedar Street into downtown St. Paul.

### **No. 5 – Downtown St. Paul Alignment and Stations**

Prior to the start of preliminary engineering, the Metropolitan Council entered into a funding agreement with RCRRRA to study three future extensions that would provide access to the St. Paul Union Depot concourse level. The inclusion of these alternatives was consistent with the on-going coordination between this SDEIS and the development of the Union Depot Environmental Assessment (the draft Environmental Assessment was not published at the time the SDEIS was prepared). The three alignments that were developed to make the connection to the St. Paul Union Depot are: Wacouta Mid-block, Broadway, and 2nd Street.

The City of St. Paul has also expressed a desire to pursue redevelopment of the 4th and Cedar Street block. This would result in a realignment of the Central Corridor LRT to cut diagonally across the block with a station located on this diagonal. The diagonal station would replace two stations from the AA/DEIS LPA—the 6th Street and 4th Street Stations. The alternatives are described below:

#### *Diagonal at 4th/Cedar Street Alternative*

Following the selection of the AA/DEIS LPA, an option was proposed that would eliminate the tight horizontal curve and utility impacts at 4th/Cedar Streets associated with the AA/DEIS LPA alignment. Beginning at 7th and Cedar Streets, the Diagonal Option alignment would continue south on Cedar Street to a point south of 5th Street, where it would turn southeast into the block bounded by 4th and 5th streets and by Cedar and Minnesota streets. The alignment would continue diagonally across the block, emerging onto 4th Street at Minnesota Street. The alignment would run to a terminal station at Union Depot. It would provide for a new station on the diagonal, which would replace two AA/DEIS LPA stations—the 6th Street and 4th Street stations.

#### *Wacouta Mid-Block Alternative*

This alternative would follow the AA/DEIS LPA alignment to the station in front of Union Depot and continue east to a point just east of Wacouta Street, where it would turn south, crossing over Kellogg Boulevard on a structure, and then turn west to the Union Depot concourse area.

### *Broadway Alternative*

This alternative would follow the AA/DEIS LPA alignment to the station in front of Union Depot and continue east to Broadway Street, where it would then turn south on Broadway Street crossing Kellogg Boulevard at-grade and enter the Union Depot property. The alignment would then turn west to the concourse area of Union Depot.

### *2nd Street Alternative*

Beginning at 7th and Cedar Streets, this alternative would continue south on Cedar Street to a point just north of 4th Street, where a transition to a below-ground alignment would begin. The alignment would run in an open-cut section to a point north of Kellogg Boulevard, where the tunnel portal would be located. The alignment would cross under Kellogg Boulevard in a tunnel and continue under Kellogg Park, then turn east to meet the 2nd Street viaduct at the roadway level. The alignment would continue along the 2nd Street viaduct, crossing under Robert Street. At Robert Street, the alignment would run on a new structure over Jackson Street to a point where the alignment would meet the existing structure on Sibley Street. The alignment would continue on existing structure to a terminal station at the concourse area of Union Depot.

## **No. 6 – Traction Power Substations (TPSS)**

The AA/DEIS disclosed the need for TPSS, but did not disclose the number of required TPSS or the proposed locations for these system elements. During the early stages of PE, the number of TPSS was studied. The analysis showed that 13 TPSS would be required at approximately one-mile intervals along the Central Corridor LRT Study Area to supply electrical power to the traction networks and to the passenger stations. One additional TPSS would also be required for operations at the proposed Vehicle Maintenance and Storage Facility site. TPSS do not generate electricity. They convert existing electrical current to an appropriate type (AC to DC) and level to power LRT vehicles. The TPSS sites would be approximately 45 feet wide by 80 feet long and accommodate structure and access.

The proposed general locations for the TPSS are shown in Figure 2-2. The proposed locations were sited to minimize impacts to the surrounding properties; however, the locations are subject to change during final design. TPSS sites are selected to meet balance of safety, reliability, cost and operational efficiency requirements.

Typically, TPSS are spaced less than one mile apart. A distance greater than one mile compromises the ability to safely deliver and return power from a traveling train. TPSS spacing must also consider overlaps in the overhead contact system. For optimal safety, performance, and cost-effectiveness, the overlaps in the overhead conductor should not occur at critical locations, which include hills, curves, bridges, tunnels, and the passenger stations.

## **No. 7 – Three-Car Train Operations**

The AA/DEIS for the Central Corridor LRT Project presumed the operations of and systems requirements for two-car trains. Since publication of the AA/DEIS, local planning considerations required review of this assumption.

As part of preparations to enter into PE and continuing into the earlier phases of the PE process, ongoing analyses were conducted to refine future LRT ridership forecasts and the operating plans that are dependent upon these forecasts. The result of this process was a confirmation that two-car trains would meet forecast 2014 operating demands. By 2030, forecasts indicate the line would be approaching capacity and exceeding capacity in the eastbound direction through the U of M.

Although Central Corridor LRT will operate initially with two-car trains, there are compelling reasons to reconsider AA/DEIS assumptions and analyze the impacts of designing for and constructing a system that would accommodate three-car trains. These reasons include the plan for Hiawatha LRT to transition from two- to three-car trains in the near future, potentially even prior to Central Corridor LRT entering revenue service. One of the lessons learned from the Hiawatha LRT is the difficulty of retrofitting two-car stations and system components for three-car train operations while under revenue service. Although it was acknowledged that Central Corridor LRT will operate under typical conditions with two-car trains, the ability to accommodate special operations with three-car trains, potentially to serve special events at the U of M and elsewhere, was a compelling potential benefit of the proposed approach. Finally, with Hiawatha LRT transitioning to three-car trains, a truly inter-operable system with universal accommodations for three-car trains is desired. The physical impacts of building three-car platforms are evaluated in this SDEIS.

### **No. 8 – Vehicle Maintenance and Storage Facility**

The AA/DEIS identified an expansion of the existing Franklin Avenue Yard and Maintenance Facility to accommodate storage, service, and maintenance of Central Corridor LRT vehicles. However, with expansion of Hiawatha LRT to three-car operations in the near future, the Franklin facility will be utilized and occupied by Hiawatha operations. The Franklin facility will not have the capacity to meet all the needs to store and perform light maintenance for Central Corridor vehicles, so the need to explore siting and construction of a maintenance and storage facility for the Central Corridor LRT was identified in early phases of PE.

Two sites were identified as potential locations for a new vehicle maintenance and storage facility for the Central Corridor LRT Project. The proposed vehicle maintenance and storage facility will require approximately 25 acres of land. The Southeast Minneapolis Industrial (SEMI) site is located east of the proposed Stadium Village Station, north of the 29th Avenue Station, west of Highway 280, and north of University Avenue near the University of Minnesota campus. The St. Paul site is located east of the Union Depot between 4th Street and Warner Road.

Some of the features and functions required at the service and inspection facility are:

- Storage yard for the fleet of Central Corridor LRT vehicles
- Train make-up and yard dispatch
- Circulation and lead tracks
- Service and inspection shops, interior and exterior cleaning, light maintenance, and repairs
- Support facilities such as parts storage, building mechanical and electrical space, administration and records offices, employee locker and wash rooms, conference and training rooms, and lunch and vending rooms
- Parking for employees and visitors

### **No. 9 – Washington Avenue Bridge**

The AA/DEIS identified the need for minor modifications to the bridge to allow for LRT operations. The evaluation of the Washington Avenue Bridge continues at the time of SDEIS publication.

The Metropolitan Council is studying the modifications necessary for converting the lower bridge deck from four lanes of vehicular traffic to a combination of two vehicular lanes and two LRT tracks. The upper deck would continue to be used for pedestrian traffic. The main girders and key connections of the structure will be checked for strength under an extreme loading combination and for fatigue under repetitive loading. The results of this study are still being evaluated. Final details will be published in the forthcoming FEIS.

The following indicates what is known about required modifications to the Washington Avenue Bridge:

- Modifications to the existing structure to enable LRT operations can be made without entailing total reconstruction of the bridge;
- Modifications would ensure that the bridge's current designation as a "fracture-critical" bridge will be removed and that the structural redundancies necessary to make the bridge non-fracture critical are made; and
- Modifications made would not substantially alter the existing profile and aesthetic characteristics of the bridge.

#### **No. 10 – Other Key Project Elements Determined Through the On-Going Decision-Making Process to Have Potential Significant Impacts to Human and Natural Environments**

The AA/DEIS LPA was identified as part of an extensive and coordinated effort to meet future travel demand as well as community goals in the Central Corridor. Early stages of this process involved scoping of many alternative alignments as well as alternative modes. One of the alternative alignments, designated BNSF North, analyzed a northerly alignment through the U of M campus, using what is known as the "Dinkytown trench" and crossing the Mississippi River on the #9 railroad bridge, which is currently dedicated for pedestrian/bicycle traffic only (this northerly alignment is shown on Figure 2.2-1 (page 2-22) in the AA/DEIS. This alignment alternative was screened from further analysis during Scoping in 2001, because it was determined that it did not best meet the project purpose and need. Key evaluating criteria used in this determination included ridership, cost, bus network connectivity, community impacts and right-of-way impacts. A description of the Scoping process and results are included in the Scoping Summary Report (December 7, 2001).

As part of Minnesota rules soliciting public comment on the proposed scope of an SDEIS, the U of M submitted a letter requesting the scope of the Central Corridor LRT SDEIS be expanded to include the northern alignment alternative. Prior to submission of this letter, the U of M engaged a consultant to conduct a Northern Alignment Feasibility Study, in keeping with the U of M's desire to identify a feasible northerly alignment of the Central Corridor LRT. A brief summary of the feasibility study process, findings and Metropolitan Council action on the results is included in the following section. A copy of the Feasibility Study and various supporting documentation and written correspondence can be found in Appendix G of this SDEIS.

*It is important to note that SDEIS preparation did not necessitate re-scoping per DOT NEPA implementing regulations (23 C.F.R. 771.130(d)), particularly in cases where "a supplemental EIS may be required to address issues of limited scope, such as the extent of proposed mitigation or the evaluation of location or design variations for a limited portion of the overall project" (23 CFR 771.130 (f)). The Notice of Intent (NOI) for the CCLRT SDEIS (Federal Register / Vol. 73, No. 37 / Monday, February 25, 2008) makes it clear that: "The SDEIS will evaluate potential changes to the Central Corridor LRT Project since the*

*publication of the April 21, 2006 AA/DEIS and disclose new information that is being developed during the preliminary engineering process...The SDEIS is not intended to repeat all the analyses contained in the project's AA/DEIS. Most analyses would be limited to the study area corresponding to key project elements currently identified and outlined..." in the NOI (p. 10090-1009).*

#### Summary of U of M Northern Alignment Alternative Feasibility Study

The Northern Alignment Alternative Feasibility Study (Feasibility Study, May 19, 2008), completed by the U of M at their expense, documents the U of M's efforts to define a feasible northerly Light Rail Transit alignment for the Central Corridor LRT. The alignment, as defined by the U of M and their consultant, and its characteristics, including capital costs, travel times, ridership, and CEI were presented to the Central Corridor Management Committee and to the Metropolitan Council over the course of several meetings occurring in April and May 2008. Upon consideration of the Feasibility Study at these presentations including discussions with technical staff, the Central Corridor Management Committee (CCMC) passed a resolution at their meeting of May 28, 2008 recommending the Metropolitan Council reaffirm its action of February 27, 2008 (see section 2.2.3) and direct the CCPO to "proceed with PE and make application to the Federal Transit Administration to move the CCLRT Project into Final Design with, among other features, a University of Minnesota at-grade Transit/Pedestrian Mall on Washington Avenue."

The Metropolitan Council acted upon the CCMC recommendation at their meeting, also on May 28, 2008. The resolution that the Council unanimously passed was based on the following factors and uncertainties related to the Northern Alignment: 1) lower ridership, 2) a higher estimated Cost-Effectiveness Index, 3) significant outstanding environmental issues, 4) design and construction challenges, 5) operations and maintenance, and 6) commercial railroad safety and operations issues. The May 28, 2008 Resolution, a summary of a CCPO review of the Feasibility Study, and a copy of the Feasibility Study is included in Appendix G.

Of particular importance in the context of the SDEIS are significant outstanding environmental issues related to and resulting from the Northern Alignment, as identified in the U of M's Feasibility Study.

#### Significant Outstanding Environmental Issues of the Northern Alignment:

The Feasibility Study identifies resources and potential impacts for each of four key environmental areas including cultural resources, park and recreational resources, environmental justice, and hazardous/regulated materials. Key impacts related to the Northern Alignment as defined in the Feasibility Study are summarized as follows:

- Cultural Resources: Demolition and reconstruction of the National Register of Historic Places (NRHP)-eligible Northern Pacific Railroad Bridge # 9 over the Mississippi River.
- Park and Recreational Resources: Temporary impacts resulting from closure of bicycle/pedestrian-only trail crossing on existing Bridge #9 while bridge is demolished and reconstructed. Uncertainty as to ability to reconstruct and restore bicycle/pedestrian trail to its intended use planned for construction in 2009 in the Dinkytown trench as issues related to multi-modal compatibility in the trench (LRT, future roadway, bicyclists/pedestrians, and freight rail) have not been addressed.
- Environmental Justice: Demolition of four units of Section 8 subsidized housing developed to serve low-income households.

- Hazardous and Regulated Materials: The Northern Alignment, as defined in the Feasibility Study, would be constructed adjacent to a Minnesota Superfund site and bisect a Minnesota voluntary investigation and cleanup (VIC) site, which is presently used for recreational purposes (U of M ball fields).

The most important consideration is that the impacts identified (direct impacts to a historic resource, 4(f) bike/pedestrian trail, and Section 8 housing) can be avoided under the Washington Avenue at-grade alternative. It is important to note, that the City of Minneapolis (the owner of Bridge #9 with jurisdiction over the bicycle/pedestrian trail presently upon it) voted for the resolution to recommend the Metropolitan Council reaffirm the selection of Washington Avenue as the preferred alignment for the Central Corridor LRT.

In addition to the environmental issues noted above, significant concerns regarding engineering and design assumptions were raised by project stakeholders reviewing the Feasibility Study. As part of establishing the practicability of the Northern Alignment Alternative, a thorough examination of risks and uncertainties was undertaken and is summarized below:

- Bridge 9 Replacement:: Concerns included the potential for a request by the US Coast Guard to provide a broader navigable channel as part of bridge reconstruction. This would have resulted in a longer bridge span and increased cost. Also, re-use of the existing Bridge 9 cofferdam was identified as a risk because the condition of this structure was unknown and may not be sufficient for reuse.
- West Bank Trench: The Northern Alignment would have required construction of a long, deep trench adjacent to 19th Avenue and the U of M Law School. There was uncertainty as to the ability to construct this trench in a cost-effective manner while allowing safe and efficient access to the LRT tracks for maintenance activities and not impairing the function of nearby adjacent structures (buildings and roadway).
- Railroad Alignment: The Feasibility Study indicated that the Northern Alignment would run in the “Dinkytown Trench” and relocate the existing freight rail to a single track in the middle of the trench to accommodate LRT, future Granary Road, and the City of Minneapolis Bike/ Pedestrian trail. Major risks and uncertainties were identified that would be associated with this proposal including:
  - Conflicts with a transload rail yard now under construction at the eastern end of the Dinkytown Trench.
  - Property acquisition from the owner of the ROW within the Dinkytown Trench (BNSF) and the operator of the rail service (Minnesota Commercial Railroad (MNNR)).
  - Horizontal bridge clearance issues, specifically that there was insufficient clearance for LRT maintenance at the bridge piers.

In recognition of the substantial engineering and environmental challenges identified in the Northern Alignment Feasibility Study, on June 13, 2008, the Regents of the U of M passed a *Resolution Related to Central Corridor Light Rail Transit* in which the regents support the Metropolitan Council May 28, 2008 decision to refine the scope of the SDEIS to include an at-grade transit/pedestrian mall through the U of M. The resolution states that: “The University will pursue the Washington Avenue at-grade alignment with a transit/pedestrian mall alternative...” and that “(t)he University will continue to work cooperatively with project partners to achieve the realization of...a timely advancement of the CCLRT line.” A copy of the resolution is included in Appendix G.

### 2.2.3 Central Corridor Management Committee and Metropolitan Council Decision

As described earlier in Section 2.2.2.1 of this document, the Metropolitan Council and project partners formed issue resolution teams comprised of representatives from the cities of St. Paul and Minneapolis, Ramsey and Hennepin counties, CAAPB, the State Department of Administration, MnDOT, and the U of M, as well as other interested stakeholders to address key project issues. The issue resolution teams provided opportunities for key stakeholder participation in refining and resolving each issue, developing design options, and assessing the level of complexity and need for additional environmental review and disclosure during the SDEIS process.

As a result of this effort, Ramsey County passed a resolution on February 12, 2008, accepting the termination of the Central Corridor LRT project at the Union Depot Headhouse. However, the resolution encouraged retaining two alignments, using either Wacouta Street or Broadway connecting to the concourse level as future extensions. On January 17, 2008, the CAAPB passed an action approving the alignment and station changes within their statutory jurisdiction. The City of St. Paul authored the *Central Corridor Development Strategy*, which proposed the Diagonal at the 4th/Cedar Street Alternative in downtown St. Paul. This Development Strategy was adopted on October 24, 2007, by the City Council and is a part of the city's Comprehensive Plan.

In addition, the Metropolitan Council held seven information meetings and four listening sessions in the Central Corridor LRT Study Area. The Metropolitan Council also consulted with several advisory committees representing the project partners and community and business groups. A full description of the public outreach effort is described in Chapter 11.

After extensive community involvement and agency coordination, on February 27, 2008, the Central Corridor Management Committee unanimously approved an option that was forwarded to the Metropolitan Council for action. The Council's action was to refine the scope of the approximately 11-mile Central Corridor linking downtown St. Paul and downtown Minneapolis and thereby set the scope of the project for inclusion in the SDEIS. The action came after the project staff, working collaboratively with the key issue resolution teams, developed multiple scenarios for improving cost efficiency, addressing community needs, and identifying engineering solutions.

Table 2-1 provides a comparison of the physical and operating characteristics of the AA/DEIS LPA with changes adopted by the Metropolitan Council and evaluated in this SDEIS.

**Table 2-1 Physical and Operating Characteristics of Proposed Changes to the AA/DEIS LPA**

Characteristics	AA/DEIS LPA	Proposed Changes to AA/DEIS LPA
<b>Alignment Length</b>	11 miles (9.8 miles of new alignment, 1.2 miles on shared alignment) -At-grade alignment along entire corridor with the exception of a tunnel through the U of M's East Bank	11.1 miles (9.9 miles of new alignment, 1.2 miles on shared alignment) -At-grade alignment along entire corridor
<b>Stations</b>	16 new, 5 shared	15 new, 5 shared
Downtown St. Paul	-Union Depot -4th Street -6th Street	4 <sup>th</sup> and 6 <sup>th</sup> Street stations combined (4 <sup>th</sup> and Cedar Streets Station)
Capitol Area	-10th Street -Capitol East -Rice Street	Capitol East, location refined Rice Street, location refined LRT alignment refined (Robert Street to 12th Street)
Midway East	-Dale Street -Lexington Pkwy -Snelling Avenue	Infrastructure for proposed future infill stations at Hamline Avenue, Victoria Street, and Western Avenue
Midway West	-Fairview Avenue -Raymond Avenue -Westgate	No change
University/Prospect Park	-29th Avenue -Stadium Village -East Bank -West Bank	Stadium Village, at grade, location refined to facilitate U of M's plans for a multi-modal transit facility East Bank, at-grade
Downtown Minneapolis	-Downtown/ East/Metrodome -Government Center -Nicollet Mall -Warehouse District -Multi-modal Facility	No change
<b>Maintenance and Storage Facilities</b>	Existing Franklin Avenue Yard and Maintenance Facility	New facility in Downtown St. Paul
<b>Ancillary Facilities</b>	Total number and locations not disclosed	14 traction power substations/systems components
<b>Operating Characteristics</b>	7.5-minute peak	7.5-minute peak
	10-minute off-peak	10-minute off-peak
<b>Capacity Improvements</b>	2-car trains 2-car train station platforms	3-car trains (2030) 3-car train station platforms



## 2.3 Design Alternatives Evaluated In the SDEIS

This SDEIS has been prepared to assist decision-makers and the public in understanding how proposed changes to the LPA as described in the AA/DEIS may affect the physical, human, and natural environment. A comparative evaluation of the No-Build and Baseline Alternative against proposed changes to the AA/DEIS LPA is to reflect project benefits and impacts relative to key changes identified in this document.

### 2.3.1 No-Build Alternative

The No-Build Alternative includes roadway and bus system improvements along the University Avenue and I-94 corridors as specified in the appropriate agency TIPs and 2030 Transportation Policy Plan for which funding has been committed. The current transportation and transit facilities and services, with minimal modifications or expansions, form the basis for this alternative. Details describing the No-Build Alternative and all regionally constrained projects included are documented in Section 2.3.1 of the AA/DEIS.

Under requirements included in CFR 1502.14(d), the alternatives analysis in the EIS must include the alternative of no-action or no-build. This analysis provides a benchmark, enabling decision-makers to compare the magnitude of environmental effects of the action alternatives. It is also an example of a reasonable alternative outside the jurisdiction of the agency which must be analyzed. Inclusion of such an analysis in the EIS is necessary to inform the Congress, the public, and the President as intended by NEPA (Section 1500.1(a)).

### 2.3.2 AA/DEIS Baseline Alternative

The Baseline Alternative was submitted by the Metropolitan Council and approved by FTA on December 13, 2006. The Baseline Alternative was developed as part of the process for approval to enter PE and is included in the 2006 Central Corridor LRT New Starts Application.

This alternative serves as a basis for comparison to the Build Alternative as part of the FTA's New Starts Process. It is also designed to do the "best that can be done" to improve transit service in the corridor without a major capital investment. The Baseline Alternative provides a relatively low-cost range of improvements to the existing transit system designed to increase capacity and improve operations. The alternative includes all planned improvements included in the No-Build Alternative.

Baseline bus service has been designed within the corridor connecting St. Paul and Minneapolis at service headways consistent with proposed AA/DEIS LPA service. Travel demand model forecasts indicate the need for increased service headways, resulting in an equilibrated Baseline service operating at six-minute peak period service versus the original Baseline proposed 7.5 minute peak period headways. Additionally, equilibrated Baseline demand requires platooning of buses to meet the projected demand, resulting in the need to operate 17 additional trips per peak hour. Chapter 2 of the AA/DEIS describes the development of the original Baseline Alternative.

### 2.3.3 SDEIS Baseline Alternative

In consultation with FTA, refinements to service levels were undertaken to resolve inconsistencies between supporting feeder bus networks and the Baseline and Build Alternatives. These changes were reflected in the Baseline Alternative prepared for the 2006 New Starts application and approval for admission into PE.

To provide a fair comparison of the Baseline and Build Alternatives, select changes were made to the AA/DEIS Service Plan. Chapter 6 of the AA/DEIS defines service routes and levels for the Baseline and Build Alternative. Following is a list of changes made to the Baseline and Central Corridor LRT Alternative documented in this report. These changes resulted in a common/consistent feeder bus service level for each of these alternatives. Additionally, the Baseline service is proposed to operate at the same service frequencies as those proposed for the LRT service, 7.5 minute peak period and 10 minutes midday, evening, and on weekends.

**Baseline Alternative:**

- Route 16 – Modify AA/DEIS assumption of 10-minute all day service frequency to 20-minute peak period, 30-minute midday, evening, and weekend (same as Build LRT Alternative)
- Route 50 (new Baseline Service) – Modify AA/DEIS assumption of 15-minute peak/30-minute midday (no evening and weekend service) to 7.5-minute peak/10-minute midday, evening and weekends (same as Build LRT frequencies). Equilibrated Baseline assumed to operate 6-minute peak period headways
- Route 94B – Eliminate midday and weekend service
- Route 94C – Eliminate weekday midday, and evening service

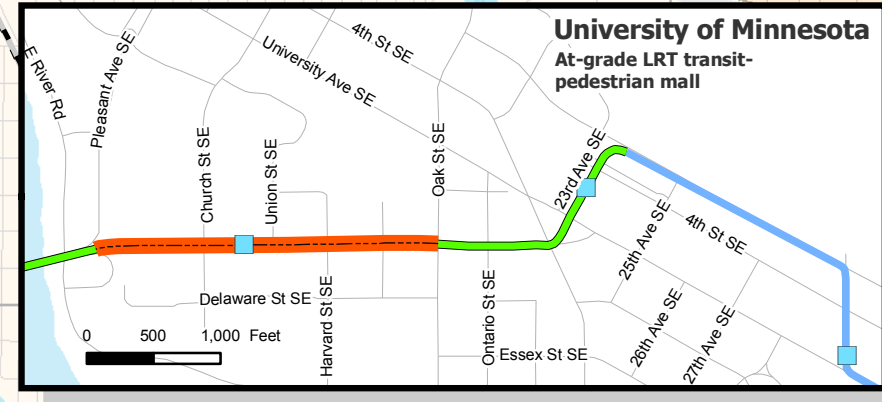
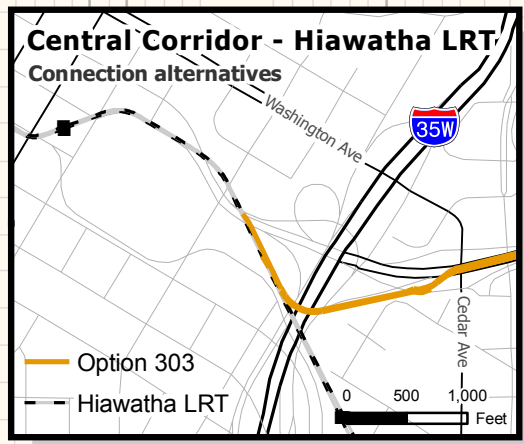
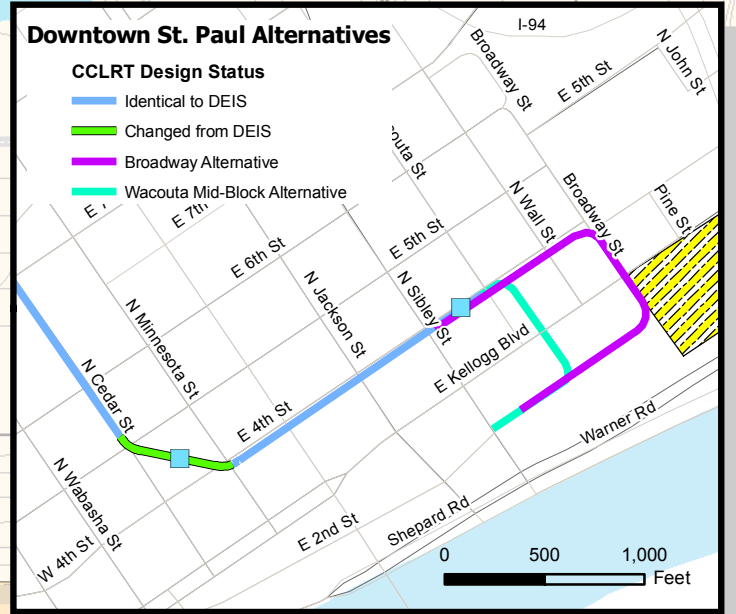
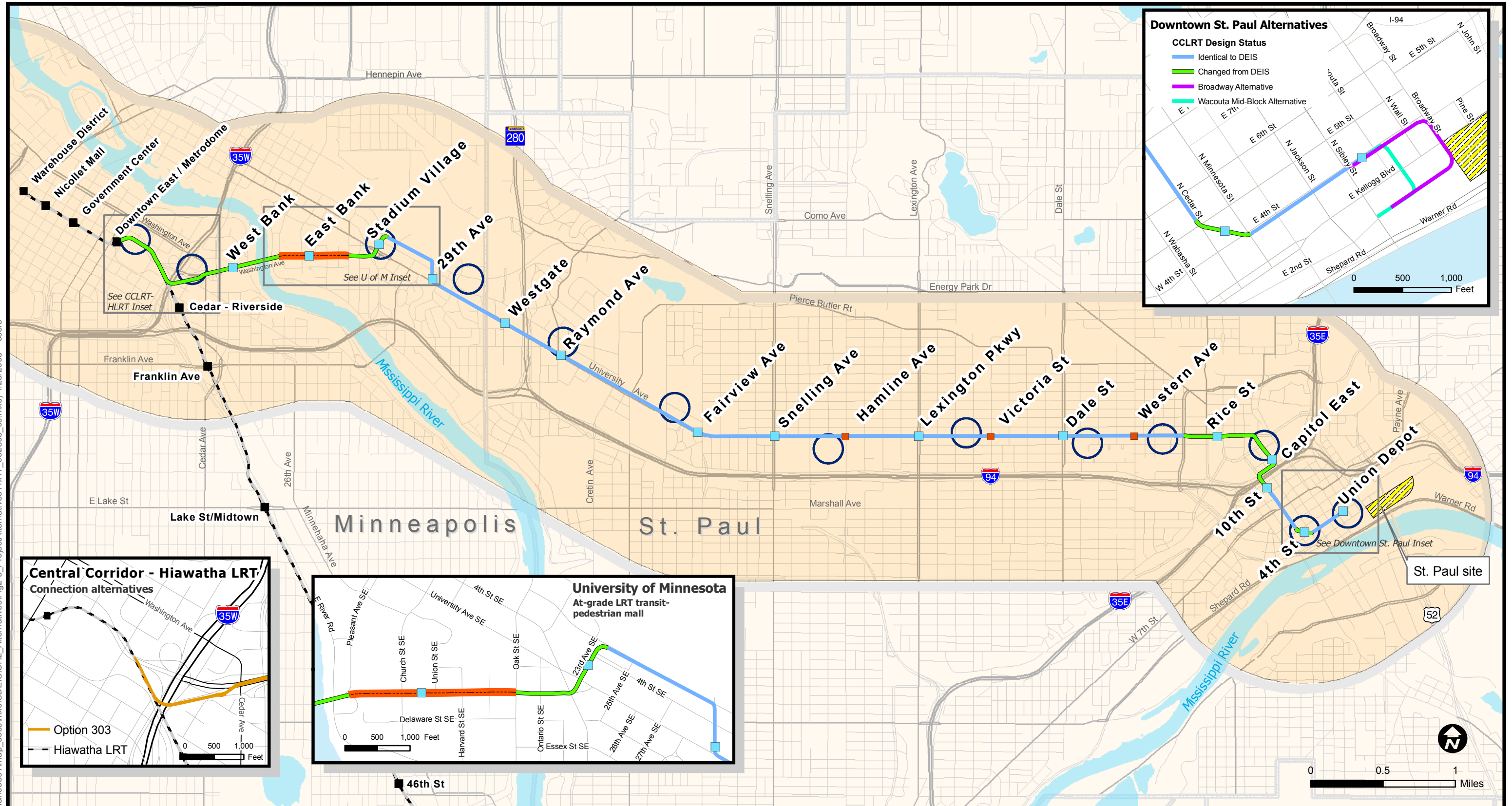
The Baseline Alternative uses the existing Route 50 limited stop service along University Avenue as the Baseline service. This route would stop at the same locations as the Build LRT Alternative station locations (including the revised downtown St. Paul alignment). The Baseline Alternative assumes a shorter headway of 6 minutes (7.5 assumed on Build LRT) during peak hours to account for peak loads on the Route 50 service. The Baseline Alternative requires 23 additional fleet vehicles over existing service. Supporting feeder bus service under the Baseline Alternative would operate identical alignments and service headways as assumed for the Central Corridor LRT Alternatives as described in this document.

**2.3.4 Design Alternatives Evaluated in the SDEIS**

As described in Section 2.2.3, the Metropolitan Council passed a resolution approving the project scope, which is being evaluated in this SDEIS. The approved project scope contains the Key Project Elements described in the NOI and forms the basis for the SDEIS to document and disclose changes since adoption of the AA/DEIS LPA. Figure 2-3 illustrates the alternatives under consideration for this SDEIS.

Table 2-2 summarizes the SDEIS Project Description. Each of the design alternatives described in the table includes a description of the proposed change to the AA/DEIS LPA. The alternatives described in the project description and their potential impacts to social, human and natural environments are the focus of the SDEIS.

Map Document: (N:\GIS\Proj\MetCouncil\65891\map\_docs\mxd\SEI\CH2\_Alternatives\Fig2-3\_ProjectAlternatives11x17\_032808\_cs.mxd) 4/28/2008 -- csers



**Legend**

<b>CCLRT Station</b>	<b>CCLRT Design Status</b>	<b>Hiawatha LRT Station</b>
■ Station	— Identical to DEIS	— Hiawatha LRT
■ Future infill station	— Changed from DEIS	▨ Potential Maintenance Facility Site
	— Transit-Pedestrian Mall	○ Traction power substation <i>General vicinity: .1 mi radius</i>

**Figure 2-3**  
**Central Corridor**  
**LRT Project Description**

Central Corridor  
 Light Rail Transit

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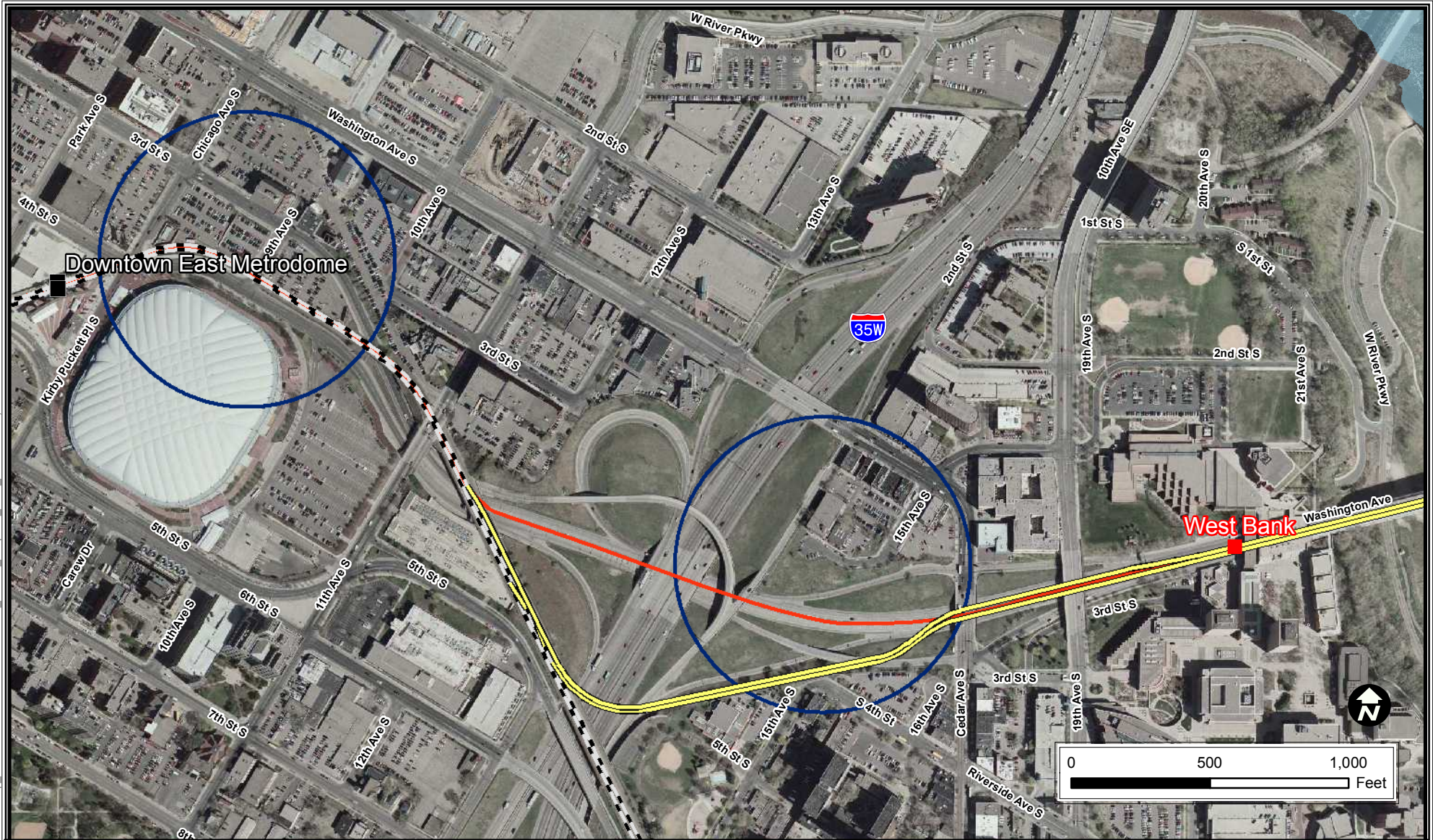
**Table 2-2 SDEIS Project Description Summary**

SDEIS Alternative	Proposed Changes to the AA/DEIS LPA
1. Hiawatha/Central Connection (See <b>Figure 2-4</b> )	The SDEIS will evaluate an engineering modification to optimize the connection of the Central Corridor LRT to the existing Hiawatha LRT in downtown Minneapolis, west of the proposed West Bank Station. The modification, option 303, would cross eastbound Washington Avenue with a new signal, then rise to cross I-35W on aerial structure and connect to Hiawatha on the existing bridge structure with cross-overs to provide full bi-directional movements. This option provides a storage track for special operations.
2. University of Minnesota Alignment (See <b>Figure 2-5</b> )	The SDEIS will evaluate an at-grade LRT alignment on Washington Avenue running from the Washington Avenue Bridge to Oak Street, which would function as a transit mall. This alternative would change the operation of this segment by excluding automobile traffic. Enhancements would be made to pedestrian and other transit facilities operating in this segment. Emergency vehicle access would be maintained. The Stadium Village Station would be located at the proposed U of M multi-modal center. The East Bank Station would be located on Washington Avenue at Union Street.
3. Future Infill Stations at Hamline, Victoria or Western (See <b>Figure 2-6</b> )	The SDEIS will evaluate three additional stations at Hamline Avenue, Victoria Street, and Western Avenue. The new stations respond to concerns of residents and stakeholders, including the City of St. Paul and Ramsey County, to increase access to the neighborhoods and businesses. The locations of these stations would reduce the station spacing from approximately one mile to one-half-mile along University Avenue in this portion of the Study Area. The SDEIS will evaluate implementation of each of these stations; however, the project as proposed would only include below grade infrastructure to allow for station construction at a future date.
4. Capitol Area Alignment and Stations (See <b>Figure 2-7</b> )	The SDEIS will evaluate engineering modifications to the alignment along University Avenue and Robert Street directly adjacent to the Capitol Area. Evaluation of these modifications to the AA/DEIS LPA is necessary to accommodate several new Capitol Area structures and grade constraints along University Avenue. The station at Rice Street has been modified to respond to roadway geometry and concerns about access and optimized bus connections.
5. Downtown St. Paul alignment/station modifications (See <b>Figure 2-8</b> )	<p>The SDEIS will evaluate and disclose two alignment alternatives that would extend the alignment disclosed in the AA/DEIS beyond the St. Paul Union Depot Headhouse. Both alignments would provide access to the St. Paul Union Depot concourse level where a future connection to a multi-modal terminal is being planned. The two alignment options considered for this connection include the Wacouta Mid-Block and Broadway extensions. Both these alternatives would be constructed to include a new connection to the maintenance and storage facility. Both alignments include a potential extension to the concourse level of the Union Depot when funding becomes available.</p> <p>The SDEIS will also evaluate an alignment and station option that would travel south on Cedar Street to a point south of 5th Street, where it then would turn southeast onto the 4th/Cedar Street block. The alignment would continue diagonally across the block, emerging onto 4th Street at Minnesota Street. This alignment consolidates two stations AA/DEIS station (6th Street and 4th Street) into one station on the diagonal through the block.</p>

Alternatives Considered

SDEIS Alternative	Proposed Changes to the AA/DEIS LPA
6. Traction Power Substations (Refer to <b>Figure 2-3</b> )	The SDEIS will evaluate and disclose the number and general location of substations required for operation of the Central Corridor LRT.
7. Three-Car Train Requirement	The SDEIS will evaluate and disclose the characteristics of three-car train operations and the physical impacts of constructing three-car platforms. The AA/DEIS disclosed an operating plan that included two-car train consists and platforms. This change responds to capacity and demand issues.
8. Vehicle Maintenance Facility (See <b>Figure 2-8</b> )	The SDEIS will evaluate and disclose the proposed location of a vehicle maintenance and storage facility in downtown St. Paul.
9. Washington Avenue Bridge	The SDEIS will evaluate and disclose the proposed modifications to the Washington Avenue Bridge to accommodate operation of the Central Corridor LRT on the existing structure.

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**Legend**

- DEIS Station
- DEIS Alignment
- SDEIS Alignment: Option 303
- HLRT station
- Hiawatha Light Rail
- Traction Power Substation  
General vicinity: .1 mi radius

**Figure 2-4**

**Hiawatha LRT and  
Central Corridor LRT  
Alternative Connections**



Central Corridor  
Light Rail Transit