Downtown Minneapolis Freeway Study

I-35W/I-94 COMMONS AND SURROUNDING AREA

May 2007

CH2MHILL

Table of Contents

Downtown Minneapolis Freeway Study

FINAL REPORT

Executive Summary

Study Catalysts and Background

The Minnesota Department of Transportation (Mn/DOT) led the Downtown Minneapolis Freeway Study to address long-term needs at the complex convergence of I-35W and I-94 near Downtown Minneapolis. As many as 500,000 vehicles per day pass through the Study Area, which is bounded by these limits (see ***Exhibits ES-1 and ES-2***):

- I-35W from 28th Street on the south to University Avenue/4th Street on the north
- I-94 from Highway 55 on the west to Riverside Avenue on the east.

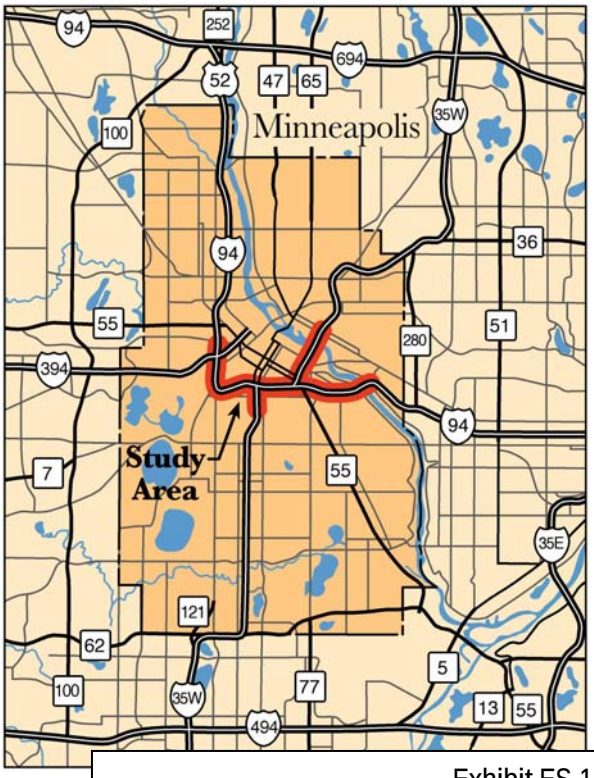


Exhibit ES-1
Downtown Minneapolis Freeway Study Area

Mn/DOT initiated the study based on a number of catalysts, which make the findings and recommendations especially timely. These catalysts, noted on ***Exhibit ES-2***, include:

- **Other Connected Freeway Improvement Projects**—The need for new concept designs for these complex urban freeway segments stems in part from plans for connected improvements. This includes reconstruction of the I-35W/Trunk Highway 62 Crosstown Commons and other improvements on I-35W extending from 46th Street into downtown, including new access proposed at Lake Street.
- **Replacement of the I-35W Mississippi River Bridge**—At the beginning of the study, the need to replace this bridge was considered a catalyst based its condition and design. However, a recent separate study concluded that the bridge is in good condition and could remain in place with regular maintenance until 2020 or later.
- **I-94 Lowry Tunnel**—The Lowry Tunnel is an unusual land bridge structure that is often considered a bottleneck.
- **Preservation/Replacement of Major Infrastructure**—The study area includes more than $1 billion worth of freeway infrastructure that must be maintained or improved. Making planned improvements, rather than simply replacing infrastructure, will maximize value.
- **Safety**—There are more freeway crashes here than in any other place in Minnesota, with an average of 3-4 crashes per day (2002-2004). The afternoon peak-hour crash rate is 15 times the Metro average and the annual crash costs exceed $22 million, not including the costs of delay.
- **Managed Lanes and Bus Rapid Transit**—Special lanes for High-Occupancy Vehicles (HOVs) and Bus Rapid Transit (BRT) are included in the proposed I-35W improvement projects described above. Connecting the planned managed lanes to local streets, as well as other possible managed lane improvements were important objectives of the Downtown Freeway Study.

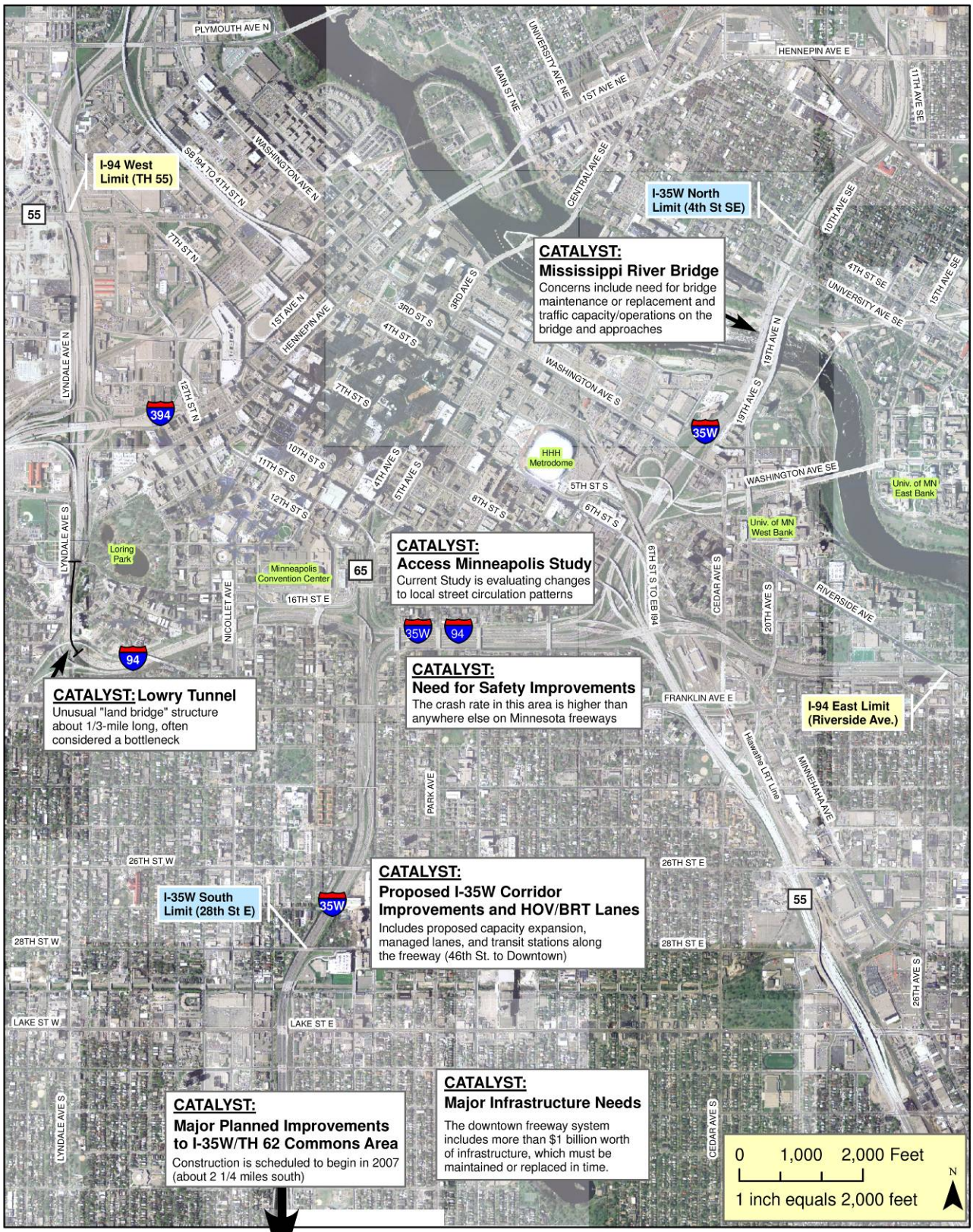


Exhibit ES-2

CH2MHILL SEH Edwards and Kelcey

Downtown Minneapolis Freeway Study

Study Area Overview and Catalysts

- **Access Minneapolis Study (10-year plan)—** The City of Minneapolis has concurrently been working on a transportation plan that has relevance to Downtown Minneapolis Freeway Study, primarily due to proposed changes in local street traffic patterns.

Study Findings and Recommendations

The study process included four steps: (1) evaluate existing conditions; (2) develop a range of long-term freeway improvement visions; (3) use these visions to evaluate refinements and shorter-term possibilities; and (4) identify potential projects and priorities. This process yielded the following findings and plan/program recommendations:

Technical Findings

1. **Significant transportation problems must be addressed.** I-35W and I-94 in the downtown Minneapolis area present some of the most compelling and complex transportation improvement needs found in Minnesota, including more congestion and crashes than anywhere else in the state.
2. **The central Minneapolis area is heavily served by the freeway system.** About 60 percent of the freeway trips in the Study Area are linked to local origins or destinations, which include high concentrations of employment, housing, retail, and entertainment.
3. **Potential projects can be guided by long-term vision scenarios.** The Downtown Freeway Study Area includes several locations where improvements must be considered, and facilitated through development and of long-term visions.
4. **Given the local context of I-94 and I-35W, there is some limited opportunity to add capacity, largely within existing right-of-way**. Significant safety and operational improvements can be made within existing right-of-way. Significant new capacity would require more reconstruction and some right-of-way acquisition, particularly along I-94.
5. **The I-94 Lowry Tunnel is the major control on the expansion of I-94**. Any long-term visions to expand and significantly improve I-94 operations and capacity must also include expansion of I-94 at the Lowry Tunnel. While the challenges are considerable, conceptual designs suggest tunnel widening can be accomplished without need to acquire adjacent buildings.
6. **Transit and managed lanes provide for efficient use of the constrained urban freeway corridors**. Expected traffic demands, coupled with limited space for freeway expansion, demonstrate the need to plan for transit and other high-occupancy vehicle use, particularly on I-35W.
7. **Setting priorities for preservation and project development will be critical to making progress**. Much of the Downtown Minneapolis freeway infrastructure will require reconstruction within the next 20 years. Complete infrastructure replacement (in kind) would cost about $1-2 billion (2006). Practically speaking, a long-term program of freeway improvement projects is needed that can fit an ultimate vision.

Plan/Program Recommendations

1. **Mn/DOT and its partners should continue toward completion of current project construction and planning efforts.** Current efforts include construction for the I-35W/TH 62 Crosstown project and design for the improvement of I-35W from 46th Street to Downtown Minneapolis.
2. **The Vision Scenarios and the list of potential Downtown Minneapolis Freeway projects should be used as guidance for additional planning, program development, and project development efforts.** The Vision Scenarios serve as guidance for more planning and design, which must be completed to support any project development decisions.
3. **The I-35W/I-94 Central Interchange, south of Downtown Minneapolis, should be the first priority for additional design studies and potential project development.** Further study for this interchange should strive for designs that work with and without future Lowry Tunnel expansion.
4. **The next highest priority for design study in the coming years is to address decision-making on expansion of the Lowry Tunnel, including possible capacity additions on I-94 and connecting roadways.** In addressing I-94, both long-term expansion and short-term adjustments should be considered and coordinated with other designs—for example, adjustments to ramps and parallel streets along I-94.
5. **Other priorities for design studies concern the I-35W Mississippi River bridge and the adjacent Industry Square Interchange (I35W/ 4th St./Washington Ave.).** Current studies do not indicate a need for a near-term I-35W Mississippi River bridge replacement. Future studies of the Industry Square area, including the Washington Ave.and 4th St. interchanges, should consider the priorities and visions of both the City of Minneapolis and the Central Corridor LRT.
6. **All future study plans should be developed to incorporate consideration of project impacts, capital costs, and potential mitigations/enhancements.** Planning for these studies should consider study governance and partnerships, stakeholder/public involvement and the approach to context-sensitive design.
7. **Mn/DOT should take the lead role to encourage and coordinate various future studies of the Downtown Minneapolis Freeway System.** While Mn/DOT's leadership and coordination role should continue, various studies may be led by different agencies as appropriate.

The study has helped to confirm the value of the Downtown Minneapolis Freeway System, which provides access to Minnesota's highest concentrations of employment, housing, retail, and entertainment (as noted in Finding 2, about 60 percent of all freeway trips in the Study Area are linked to local origins or destinations). Further, given the extreme traffic volumes and the number of crashes, the potential benefits of an improved system are tremendous.

Supporting Documentation and Development of Visions

Sections 1 and 2 of this Final Report provide more information about the freeway system improvement concepts developed during the study. Technical details are also discussed within four Technical Memoranda, which support three long-term geometric Vision Scenarios. The Vision Scenarios provide a range of specific concepts to improve the entire Downtown Minneapolis Freeway System. Development of these visions included efforts to carefully define existing conditions, obtain input from local Focus Groups, establish future performance goals and forecasts, and establish Vision Scenario context and objectives. These long-term visions provide a progressive and realistic range of long-term geometric concepts. In addition, they illustrate a few reasonable options at the most significant structures (the I-94 Lowry Tunnel and the I-35W Mississippi River bridge) and also look at various concepts for managed lanes.

The visions are based not only on long-term performance goals, but also on engineering and fiscal feasibility, and on the study team's expertise with similar major urban freeways. As an example of the practical options considered, Vision Scenario 1 does not show any expansion of the Lowry Tunnel—thus creating a concept design at the realistic "low end" of the potential visions. Such approaches, which do not always expand basic freeway capacity, would thus also not significantly reduce congestion.

Long-Term Vision Scenarios and Potential Projects

The full range of Vision Scenarios provides valuable insight on how the most significant freeway operational problems might be solved—to reduce congestion and crashes at key locations. At the high end of that range, the project design team explored conceptual designs for the Lowry Tunnel that suggest widening of the tunnel can be accomplished without need to acquire adjacent buildings. The related higher-end freeway improvement vision concepts provide for more complete capacity expansion, but are still not considered highly ambitious given the potential future capacity needs. As noted in Finding 4 (above), significant safety and operational improvements can be made within existing right-of-way while new capacity would require more reconstruction and some right-of-way acquisition, particularly along I-94.

The long-term Vision Scenarios developed in the Study are based not only on long-term performance goals, but also on engineering and fiscal feasibility, and on the study team's expertise with similar major urban freeways.

Perhaps most important, the Vision Scenarios help to illustrate how major improvements might be developed over time—as a series of projects.

Perhaps most important, the Vision Scenarios help to illustrate how major improvements might be developed over time—as a series of projects. This is particularly important because a major full expansion, as represented by the visions, would cost considerably more than $1 billion—most likely, more than $2 billion when all expected costs are added up. Furthermore, an entire vision could not feasibly be constructed as one project. But by using the visions as the basis (as "master plans"), the Study identified potential

minor improvements (typically strategic lane additions) that could be implemented for as little as several hundred thousand dollars. More significant investments would involve major structures and some roadway realignments (for example, at the Central Interchange of I-35W and I-94 immediately south of downtown). As a result, significant projects that might build substantially toward parts of the Vision Scenarios would typically cost hundreds of millions of dollars (preliminary major project concepts for the Central Interchange yielded possible costs of $360 million to $440 million).

Next Steps

Clearly, the scale and complexity of the projects needed to substantially improve the Downtown Minneapolis Freeway System is extraordinary. While relatively simple projects (sometimes informed by the Study's results) might be implemented within a few years, several more years of additional planning and design will be needed to develop any major improvements and to obtain funding. Going forward, Mn/DOT is committed to working with stakeholders to develop transportation improvements projects that that can address major needs—infrastructure, mobility, and safety—while being compatible with the surrounding area.

Acknowledgements

The Downtown Minneapolis Freeway Study required significant discussions among Mn/DOT project management staff, consulting team members, City of Minneapolis staff, and members of an Advisory Committee—particularly at two Feasibility Workshops (February and July 2006). The Study's Technical Memoranda and other documents provide more information about these major workshops, local Focus Group meetings, and other meetings. The following provides a list of many (but not all) who contributed throughout the study process:

- **Mn/DOT Leadership Team**—Jerome Adams, John Griffith, and Tom O'Keefe
- **Additional Mn/DOT Project Management Team Members**—Jim Aswegan, Brian Isaacson, Brian Kary, Jim Kranig, Jim Rosenow, and Nick Thompson
- **Regular Advisory Committee Agencies/Participants**—Many agencies participated in an advisory capacity, with the most regularly involved individuals noted below:
  - **City of Minneapolis Engineering and Planning Staff**—Lisa Cerney, Anna Flintoft, Steve Hay, and Jon Wertjes
  - **City of Richfield**—Mike Eastling
  - **City of Bloomington**—Jim Gates
  - **Metropolitan Council**—Mark Filipi and Connie Kozlak
  - **Hennepin County**—Jim Grube
  - **Federal Highway Administration (FHWA)**—Tim Anderson and Jim McCarthy

Consultant Team—The Study's consultant team was led by CH2M HILL, Inc., and also included SEH, Inc.; Edwards & Kelcey, Inc.; Wilbur Smith Associates; and CNA Engineers, Inc. Other specialty subconsultants were also involved in the Feasibility Workshops.

FINAL REPORT - SECTION 1

Study Background and Technical Findings

Section 1 of this report summarizes the background for the Downtown Minneapolis Freeway Study and discusses the seven main technical findings listed below.

Downtown Minneapolis Freeway Study – Background and Technical Findings (Summary)

Mn/DOT led completion of the Downtown Minneapolis Freeway Study from late 2005 to early 2007. The purpose of the Study was to coordinate several transportation planning and design issues that converge where I-35W and I-94 overlap in downtown Minneapolis. The study process included four main steps: (1) evaluate existing conditions; (2) develop/brainstorm a range of long-term visions; (3) use these visions to evaluate refinements and shorter-term possibilities; and (4) identify potential projects and priorities. Based on the technical studies (documented in detail in technical memoranda), these seven points summarize the findings:

1. Significant transportation problems must be addressed. I-35W and I-94 in the downtown Minneapolis area present some of the most compelling and complex transportation improvement needs found in Minnesota, including more congestion and crashes than anywhere else in the state.
2. The central Minneapolis area is heavily served by the freeway system. About 60 percent of the freeway trips in the Study Area are linked to local origins or destinations, which include Minnesota's highest concentrations of employment, housing, retail, and entertainment.
3. Potential projects can be guided by long-term vision scenarios. The Downtown Freeway Study Area includes several locations where improvements must be considered, with or without major capacity expansions. Further planning will be facilitated through development and use of long-term geometric visions depicting a range of possible improvements.
4. Given the local context of I-94 and I-35W, there is some limited opportunity to add capacity, largely within existing right-of-way. Significant safety and operational improvements can be made within existing right-of-way through relocation and consolidation of ramps, improvements to ramp geometry, and elimination of freeway weaving. Significant new capacity (adding continuous lanes on both interstates) is also recommended, but would require more reconstruction and some right-of-way acquisition, particularly along I-94.
5. The I-94 Lowry Tunnel is the major control on the expansion of I-94. Any long-term visions to comprehensively expand and significantly improve I-94 operations and capacity must also include expansion of I-94 at the Lowry Tunnel. While the engineering and community challenges are considerable, conceptual designs suggest tunnel widening can be accomplished without need to acquire adjacent buildings.
6. Transit and managed lanes will provide for efficient use of the constrained urban freeway corridors. Expected traffic demands, coupled with limited space for freeway expansion, demonstrate the need to plan for transit and other high-occupancy vehicle use, particularly on I-35W. The primary benefit of such lanes is to serve downtown employment and other commerce. Managed lane designs must be well integrated with other freeway and street improvements.
7. Setting priorities for preservation and project development will be critical to making progress. Much of the Downtown Minneapolis freeway infrastructure will require reconstruction within the next 20 years. Complete infrastructure replacement (in kind) would cost about $1-2 billion (2006). Practically speaking, a long-term program of freeway improvement projects is needed that can fit an ultimate vision.

1.1 Study Background–Needs, Objectives, and Process

The I-35W/I-94 Downtown Minneapolis Freeway Study addresses the need for a coordinated and strategic plan for some of Minnesota's most important and complex freeway segments. The Study Area is defined as the freeway corridors along I-35W and I-94, including connecting ramps, and is bounded by these limits (see the Executive Summary, Exhibits ES-1 and ES-2):

- I-35W from 28th Street (south limit) to 4th Street Southeast (north limit)
- I-94 from Trunk Highway 55/Olson Memorial Highway (west limit) to Riverside Avenue (east limit)

Downtown Minneapolis Looking Northwest

The Downtown Minneapolis Freeway System infrastructure includes more than 80 bridges and 12 interchanges along about 7-8 miles of freeway. This extremely complex part of the highway system is at the convergence of five freeway legs and a major arterial highway (see Exhibit ES-1): I-35W (to the north and south), I-94 (east and northwest), I-394 (west), and Trunk Highway 55 (Hiawatha Avenue) to the southeast. (The photo shows interchange features at the convergence of I-35W, I-94, and TH 55.) Overall, this Study Area carries as many as 500,000 vehicles per day (VPD). Some freeway segments in the Study Area, such as I-94 westbound, often experience five or more hours of severe congestion per day (speeds at or below 20 mph). Furthermore, all Downtown Freeway segments will typically experience several hours of congestion (speeds at or below 45 mph) each day, particularly in the afternoon and evening hours. For more information on traffic conditions, see Section 1.2, Finding 1.

Originally designed and built in the 1960s, the Downtown Minneapolis Freeway System no longer provides the intended levels of mobility or safety. The Minnesota Department of Transportation (Mn/DOT) and the Federal Highway Administration (FHWA) put a high priority on maintaining or improving freeway operations—a major challenge with aging infrastructure, difficult site constraints, and extremely high traffic demand.

Some freeway segments in the Study Area often experience five or more hours of severe congestion per day.

Maintaining or improving freeway operations is major challenge, with aging infrastructure, difficult site constraints, and extremely high traffic demand.

Study Objectives and Process

Several catalysts for the Study are described in the Executive Summary and are shown in Exhibit ES-2. These catalysts are:

- Other Connected Freeway Improvement Projects[1]
- Need to replace/repair the I-35W Mississippi River Bridge
- Lowry Tunnel—considered a bottleneck

[1] These other projects include the I-35W/Highway 62 Crosstown Commons project (to commence construction in 2007) and proposed I-35W improvements from 46th Street to Downtown Minneapolis.

- Preservation/replacement of infrastructure
- Safety—Highest Minnesota freeway crash rate
- Managed lanes and bus rapid transit (BRT)
- Access Minneapolis Study (a 10-year local transportation plan)

To address these catalysts and other issues, the Study followed this basic four-step process:

1. Evaluate existing conditions, to understand major problems and set goals.
2. Develop/brainstorm a range of long-term visions.
3. Use these visions to evaluate refinements and shorter-term possibilities.
4. Identify potential projects and document the major findings and transportation plan/program recommendations.

The study team was led by national and local consultants with expertise on many urban freeways, including the Downtown Minneapolis System. Working closely with Mn/DOT and other stakeholders, the team followed the study process to identify key questions and choices for future performance, and to give a glimpse of the Study Area's future. To document the results in detail, the team produced a series of four Technical Memos (TMs), or interim reports, as follows:

The study team, led by national and local consultants, identified key questions and choices for future performance—to give a glimpse of the Study Area's future.

- **TM No. 1—Existing Conditions.** The first TM provides a substantial record of the many challenges that characterize the Downtown Freeway Study Area—physically, operationally, and as described by a range of stakeholders (including special Focus Group input, received at three meetings held June 2006).
- **TM No. 2—Performance Goals and Planning Framework.** TM No. 2 defines goals for future freeway performance, with sensitivity to the area's existing and future context. This document also established the range of future improvement visions.
- **TM No. 3—Travel Demand Forecasts.** TM No. 3 evaluates existing travel demand and applies a 2030 travel demand forecast to various freeway capacities and configurations (using the computer-based Twin Cities Regional Travel Model).
- **TM No. 4—Evaluation of Vision Scenarios and Identification of Potential Projects.** The final TM presents and evaluates comprehensive visions for an improved Downtown Freeway System and it identifies potential projects.

This Final Report briefly summarizes the substantial content presented in the TMs, as structured into seven findings (Section 1.2) and seven plan/program recommendations (Section 2.2).

Stakeholder Input

The Downtown Minneapolis Freeway Study required significant discussions among Mn/DOT project management staff, consulting team members, City of Minneapolis staff, and members of an Advisory Committee—particularly at two Feasibility Workshops (February and July 2006). In addition to the Mn/DOT and Minneapolis representatives, the Advisory Committee included representatives of the City of Richfield, the City of Bloomington, the Metropolitan Council, Hennepin County, and the FHWA.

Also, to obtain early stakeholder input (years before any major project decisions), Mn/DOT and the City of Minneapolis worked together to conduct three Focus Group meetings (June 2006). Focus Group members included representatives of surrounding Minneapolis neighborhoods, surrounding communities, businesses, and public agencies. Several issues and potential future solutions were discussed throughout these meetings, such as:

To obtain early public input, Mn/DOT and the City of Minneapolis worked together to conduct three Focus Group meetings (June 2006).

- **Neighborhood Issues**: aesthetics, noise, cut-through traffic, and Neighborhood Connections were important considerations
- **Alternative Modes of Transportation**: Comments centered on providing transit and other modal options such as bicycle/pedestrian, Light-Rail Transit, bus routes, and employer incentives for transit use.
- **Safety/Freeway Operations and Need for Improvements**: Main concerns in this area included weaving issues, poor traffic flow, and management of crashes.

The Study's Technical Memoranda and other documents provide more information about these meetings.

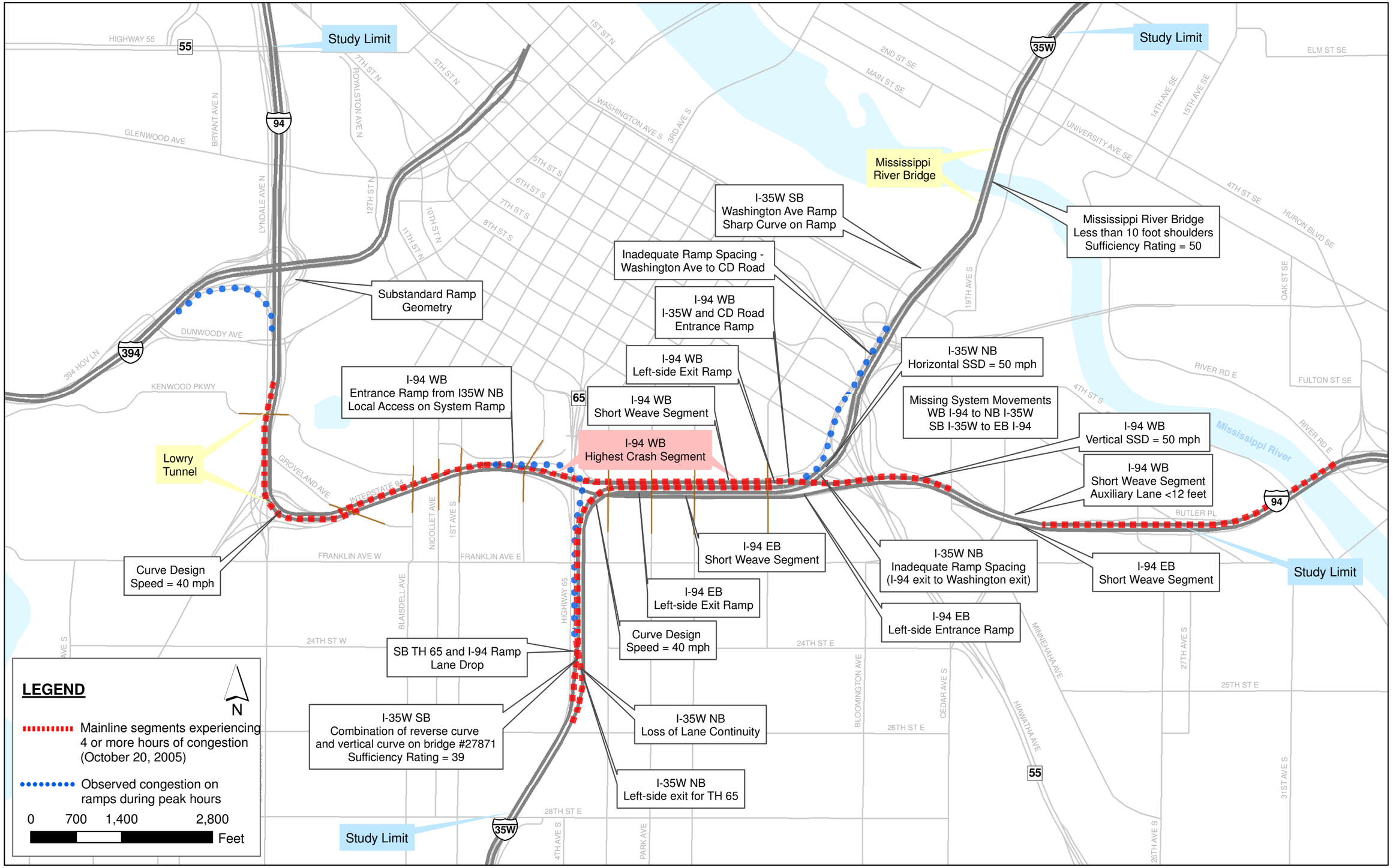
1.2 Technical Findings

The process of developing vision scenarios and identifying potential projects and priorities, as summarized above, yielded the following seven findings. These findings often relate directly to the recommendations presented in Section 2.2 of this Final Report.

***Finding 1*: Significant transportation problems must be addressed.** *I-35W and I-94 in the downtown Minneapolis area present some of the most compelling and complex transportation improvement needs found in Minnesota, including more congestion and crashes than anywhere else in the state.*

Exhibit 1-1 provides a summary of the existing conditions, emphasizing the operational and engineering design problems found in the Study Area. The Downtown Minneapolis Freeway System currently carries traffic volumes far in excess of the practical design capacity (congestion issues are discussed in Section 1.1, above). Moreover, with expected growth (regional and in the Study Area), traffic on I-94 and I-35W will increase, with congestion spreading throughout the day and the potential for crashes also increasing. While the traffic forecasts in this study use the Metropolitan Council's 2030 plan for transit development, increased employment and population will continue to produce more traffic demand on Twin Cities freeways.[2]

[2] Input from residents and other stakeholders at the June 2006 Focus Group meetings indicated a strong demand for multiple modes and choices. As described further in Technical Finding No. 6, managed lanes and transit are necessary components for future planning and design.



CH2MHILL SEH Edwards and Kelcey

Downtown Minneapolis Freeway Study

Exhibit 1-1

Study Area Engineering Issues Map

The crash history in the Study Area (especially on I-94 westbound) ranks it among the worst, if not the worst, performing freeway area in the state.[3] The combination of high traffic volumes, closely spaced entrances and exits, and travel demand patterns contribute to more than 1,000 crashes per year on mainline segments (2002 data; about 250 additional crashes were on ramps). When adjusted for vehicle miles traveled, Study Area crash rates are 145 percent higher than averages for the entire Twin Cities freeway system. Some segments in fact have crash rates 5 to 8 times higher than the Metro average crash rate, which presents a remarkable risk considering the high volumes. For instance, during the afternoon peak period (from about 3:00 to 7:00 PM), the westbound segment of I-94 between I-35W and I-394 has a crash rate of 8.14 crashes per million vehicle miles (MVM) versus a Metro average crash rate of 0.96 crashes per MVM.

The combination of problems shown on Exhibit 1-1 illustrates the importance of freeway segments near the Lowry Tunnel, which is a critical factor in addressing Study Area problems. For example, the Lowry Tunnel is one factor that makes the following three segments among the highest priority problems found in the Study Area:

1. I-94 westbound from 11th Avenue to Hennepin Avenue,
2. I-35W northbound from 26th Street to westbound I-94, and
3. I-394 eastbound from Penn Avenue to I-94.

The Study Area exhibits very complex traffic operations. The most effective design approaches look closely at how each lane is used.

See Finding No. 5 below for more information about the Lowry Tunnel and related freeway operations. Also please note: While Lowry Tunnel issues comprise very important topics and findings, the need to understand and address operational problems independent of the tunnel is equally important. The Study Area exhibits very complex traffic operations, as related to vehicles entering, exiting, merging, and diverging throughout the system. Nothing can be addressed comprehensively or cost effectively through either capacity expansion alone or through interchange reconfigurations alone. The most effective design approaches look closely at how each lane is used—especially where weaving between lanes is found. Along I-94 westbound upstream of the Lowry Tunnel, for example, the congestion and crash issues are substantially related to lane imbalance (overloading to the right) and weaving from the I-35W northbound entrance, to the exit at Hennepin/Lyndale, and to get lined for I-394 (on the right) beyond the Lowry Tunnel.

***Finding 2*: The central Minneapolis area is heavily served by the freeway system.** *About 60 percent of the freeway trips in the Study Area are linked to local origins or destinations, which include Minnesota's highest concentrations of employment, housing, retail, and entertainment.*

The major scale and prosperity of Downtown Minneapolis Study Area continues to be fueled by its growing employment base, its strong residential building trend, and its service, retail, and tourism business. The City's 10-Year *Access Minneapolis* Transportation Plan and Minneapolis Community Planning and Economic Development (CPED) department document the importance of Downtown Minneapolis' connectivity to Minneapolis neighborhoods and the

[3] This is also among the most costly issues in the state, with the annual estimated cost for crashes adding up to about $22 million (Mn/DOT analysis)—not including significant additional costs for delays caused by crashes. The serious injury and fatality crash rates are comparable to, or lower than, other metropolitan area freeways. In 2002, records indicate 44 of the crashes resulted in moderate injuries, 4 serious injuries, and 1 fatality (most fatal crashes do not occur on freeways).

greater Twin Cities Metropolitan Area. Downtown Minneapolis' top 12 employers comprise nearly 25 percent of all downtown employees, and new growth in professional service firms has helped reduce Class A office vacancy rates to approximately 14 percent, representing considerable absorption of office vacancy. Professional businesses such as law firms, advertising agencies, and financial services are filling the vacancies, and in Downtown Minneapolis, comprised about one-third of the Twin Cities' Metro Area office space absorption by the end of 2005.

The boom in housing construction since 2000 has increased downtown's residential population to nearly 31,000, representing a 33 percent increase since the 2000 U.S. Census, and includes more than 10,000 housing units planned, approved, under construction, or built primarily in the Mill District/Mississippi Riverfront, and North Loop neighborhoods. To service the new population, "neighborhood-serving retail" developments including mixed use service/retail/residential developments as well as large grocers and urban format "big box" retailers are being approved or considered for downtown locations. Finally, the growth in tourism and special event venues also contributes to local employment, retail, and housing growth, including 90,000 average daily visitors to Downtown Minneapolis, 300,000 annual conventioneers, 1.5 million annual overnight hotel stays, the most heavily-used stadium currently operating in the U.S. (Metrodome), and the second largest number of theater seats per capita in the U.S., including more than 400,000 patrons seated for the new Guthrie Theater alone.

The growth and development of the Study Area, along with strong growth trends throughout the Twin Cities, demonstrate need for quality transportation systems—using all modes. Maintaining and improving service on I-94 and I 35W near Downtown Minneapolis is critical to the region's economy; but it is perhaps more important to the vibrancy, image, and further development of the immediate area.

These facts, along with strong growth trends throughout the Twin Cities, demonstrate need for quality transportation systems—using all modes, to serve the State's highest concentrations of economic and residential development. Further, considering the scale of the area, it is not surprising that most trips on the Downtown Freeway System (about 60 percent) have local origins or destinations.[4] Some examples of major destinations, besides the Downtown core, include the University of Minnesota, the Hennepin Avenue entertainment district (including the Target Center), the Metrodome area, and the major commercial and industrial corridors (for example, the University, Washington, and Hiawatha Avenue corridors). Clearly, the long-term quality of transportation service on I-94 and I-35W in the Study Area is critical to the region's economy; but it is perhaps more important to the vibrancy, image, and further development of the immediate area.

[4] Based on the Metropolitan Council's Regional Travel Demand Model, which further shows about 30 percent of weekday freeway traffic tied to the "core" downtown area, about 30 percent tied to other nearby surrounding destinations, and about 40 percent passing through.

***Finding 3*: Potential projects can be guided by long-term vision scenarios.** *The Downtown Freeway Study Area includes several locations where improvements must be considered, with or without major capacity expansions. Further planning will be facilitated through development and use of long-term geometric visions depicting a range of possible improvements.*

The development of three long-term Vision Scenarios was the key Study activity to help identify and prioritize potential future projects. The general performance goals for all Vision Scenarios were to:

- Improve safety and trip reliability.
- Prioritize movements/connections.
- Provide advantages to transit; consider managed lanes.
- Minimize adverse impacts; consider/allow for enhancements.
- Anticipate future project development needs.

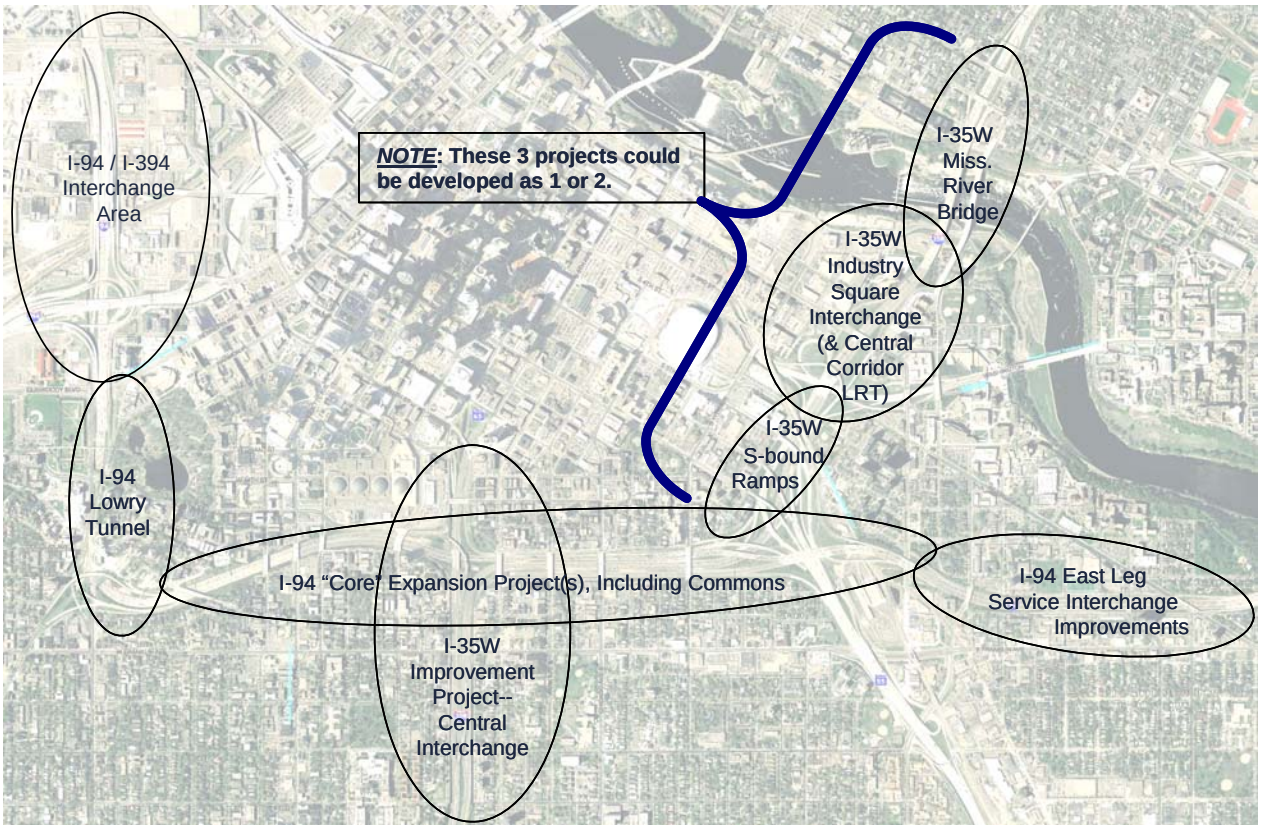
The goals referenced throughout concept development and refinement were to:

- Develop a progressive and realistic range.
- Respect existing major infrastructure and geometry.
- Explore a range of options at significant structures (the I-94 Lowry Tunnel and the I-35W Mississippi River Bridge).

Exhibit 1-2 presents general recommended priorities in the Downtown Freeway Study Area. For example, the top priority should be to transition development of planned projects for the I-35W corridor to the south into the Downtown Study Area. Several long-proposed projects are being considered in this area; as such, they represent additional justifications for improvements in the Central Interchange area of I-35W and I-94 (along with major congestion and crash issues—see Finding 1 and Exhibit 1-1). Exhibit 1-2 addresses these potential priorities in general, to provide an overall framework. More specific guidance on project development priorities is presented in Section 2.2.

The three Vision Scenarios described below can and will be used to identify configurations and important issues in the development of projects. These geometric highway design visions were developed to provide a progressive and realistic range. In addition, they were developed and organized to illustrate a few reasonable options at the most significant structures (the I-94 Lowry Tunnel and the I-35W Mississippi River bridge). All Vision Scenarios include managed lanes (for bus rapid transit and HOV use) extending south from the Downtown Minneapolis exits area along I-35W toward Lake Street and beyond.

The three Vision Scenarios are geometric highway design proposals developed to provide a progressive and realistic range, to guide further project development. All three visions include new managed lanes on I-35W, which directly connect to Downtown Minneapolis streets (for bus rapid transit and HOV use).



Potential Projects and Priorities

While continued design study for the entire Downtown Minneapolis Freeway System is a priority, the generally recommended priority for project development is as follows:

1. I-35W Improvement Project and I-94 Central Interchange – Long-proposed projects south of the Downtown Minneapolis study area make the Central Interchange a high priority for project development. Consideration of design alternatives should include potential improvements both with and without expansion of the Lowry Tunnel.

2. I-35W North of the I-94 Commons – Project development could be consider separate projects for the Mississippi River Bridge, I-35W Industry Square interchange and accommodation of the Central Corridor LRT and I-35W CD road; these three might also be combined into one project.

3. I-94 Interchanges and Potential Capacity Expansion, Including the Lowry Tunnel – A decision to expand the Lowry Tunnel (or to not expand it) will influence the nature and priority of I-94 projects, including adjustments to ramps, the use of a parallel street network, the addition of basic I-94 mainline lanes (a potential regional issue), and improvements at Cedar/Riverside. As decisions are made for the Lowry Tunnel's future, the potential for long-term improvements to the north, around the I-394 interchange, will also become more clear.

Exhibit 1-2
Potential Project Areas

This managed lane is planned as part of the project development processes for the TH 62 Crosstown improvement project and the Lake Street Access project. Further, all visions include managed lane concepts connecting across the Mississippi River along I-35W, and which connect to the local street system south of the River.

Vision Scenarios 1 to 3 are displayed in ***Exhibits 1-3 to 1-5***, respectively. When viewing these conceptual computer-based layouts, it is important to understand the *functional* color scheme used: Yellow—Interstate (I-35W and I-94) and inter-connecting ramps; Blue—Major connecting arterials (TH 65/Downtown, TH 55, and 3rd/4th/Washington); Green—local; Red—managed lanes; Light Blue—Light Rail (existing/solid and possible or proposed/dashed); Orange—Bridges; Purple—Tunnels. This color scheme and other approaches used on the graphics helps one to more easily review and understand the Vision Scenarios as complete and integrated concepts.

- **Vision Scenario (VS) 1: Consolidate Access; No Tunnel Expansion (Exhibit 1-3)**—This vision proposes the least amount of freeway expansion, primarily because it assumes no expansion of the I-94 Lowry Tunnel. VS 1 is configured to limit physical impacts and potential costs. To meet that goal, operational problems on the freeway system are addressed by limiting access which in turn results in less connectivity between freeways and local streets.

- **Vision Scenario 2: Distribute Access; Strategically Expand I-94 Westbound (Exhibit 1-4)**—Major operational problems are addressed with more expansion while also providing more connections than VS 1. Expansion of the Lowry Tunnel to four lanes in only the I-94 westbound direction is a reasonable "minimal scale" tunnel proposal reflected in the conceptual design (as noted previously, I-94 westbound approaching the tunnel is a major focus for potential improvements). In addition, an optional "symmetrical" expansion of the Tunnel (expanding also I-94 Eastbound) can be considered—see Finding No. 5 for more information. Note also that Vision Scenario 2 includes the addition of the now-missing I-35W/I-94 system connections (I-35W southbound to I-94 eastbound and I-94 westbound to I-35W northbound).

- **Vision Scenario 3: Distribute Access; Replace and Fully Expand Tunnel; Focus Geometric Improvements at Strategic Locations (Exhibit 1-5)**—Unlike VS 1 & 2, this scenario includes the addition of one continuous lane in both directions on I-94. This is enabled by complete replacement of the Lowry Tunnel and expansion to five lanes of traffic (versus the current three) in each direction. Importantly, the design team found that Vision Scenario 3 depicts the level of system expansion needed to achieve long-term Downtown Freeway System capacity goals.

The design team found that Vision Scenario 3 depicts the level of system expansion needed to achieve long-term Downtown Freeway System capacity goals. However, continued examination of the three scenarios, and other ideas, should result in design proposals that will blend vision concepts together. For more related discussion, see Findings 4, 5, and 7.

The range of ultimate project design possibilities is much larger than the three Vision Scenarios. Continued examination of these scenarios, and other ideas, should result in design

INSERT EXHIBITS 1-3 to 1-5 (Vision Scenarios) – THREE 11 x 17s

proposals that will blend vision concepts together. For more related discussion, see Findings 4, 5, and 7.

***Finding 4*: Given the local context of I-94 and I-35W, there is some limited opportunity to add capacity, largely within existing right-of-way.** *Significant safety and operational improvements can be made within existing right-of-way through relocation and consolidation of ramps, improvements to ramp geometry, and elimination of freeway weaving. Significant new capacity (adding continuous lanes to both interstates) is also recommended, but would require more substantial reconstruction and some right-of-way acquisition, particularly along I-94.*

The Study Area context is a critical factor to effectively understand and compare the Vision Scenarios, including the goals set forth by the design team to develop the concepts. As discussed in Finding 2, the context includes an area of tremendous scale, prosperity, and growth. It also includes neighborhoods, residents, business people, and visitors with great diversity—culturally and economically. Furthermore, the environment (including the freeways themselves), represent an important history—with many buildings near the freeways on the National Register of Historic Places or potentially eligible for listing.[5]

Over the long-term, Vision 3 offers the highest and most complete potential function within the range studied. Vision Scenarios 1 and 2 have potential for less impact to adjacent areas; but they are partial solutions compared to Vision 3. The range of visions thus helps identify realistic potential steps and design options to address long-term needs while anticipating and respecting constraints, both physical and financial.

Another important factor in the Study Area's context is mobility itself. With the freeways centrally located as they are, motorists have come to expect congestion, especially during peak daily travel periods. Considering this context, the project team selected the boundary between stable and unstable traffic flow as the target performance level for forecasted 2030 traffic volumes (in traffic engineering terms, the level-of-service D/E boundary). This would be an improvement over today's peak-period conditions, but is still moderately congested. Selecting a higher goal (e.g., level-of-service C or D) is not considered reasonable given the context and would encourage design concepts with bigger footprints, greater impacts, and higher costs.

To meet the performance target noted above, the design team found that adding one continuous lane to both freeways would be sufficient. This would yield six continuous lanes on I-35W through the central (commons) part of the Study Area and eight continuous lanes along I-94. Because good local access and connectivity between routes are also long-term goals, more lanes would also be needed on some segments for weaving or merging. Such a full expansion vision is represented by Vision Scenario 3 and would result in some property acquisition at least along I-94, particularly between I-35W and the Lowry Tunnel.

[5] As part of the Study, The 106 Group (a historic resources consulting firm based on the Twin Cities) developed: *Downtown Minneapolis Freeway Study: A Historic Context*, which was presented and discussed at the second major study workshop, on July 26, 2007. This presentation and other studies identify several known or potential historic sites and districts based on the National Register, local designations, or related criteria. Before any major project development could be completed, additional efforts must be implemented to identify such resources and to address potential impacts and mitigations.

Vision Scenarios 1 and 2 have potential for less impact to adjacent areas than Vision 3, while providing significant operational benefits. But they are partial solutions compared to Vision 3, because they could not deliver the performance that would meet the long-term forecast/target. Thus, Visions 1 and 2 help us understand the probable context of freeway expansion in stages and at strategic locations. They also help identify realistic potential steps and design options to address long-term needs while anticipating and respecting constraints, both physical and financial (see Finding 7 for information about potential capital costs). Over the long-term, Vision 3 offers the highest and most complete potential function within the range studied, while also being scaled to fit the local context and to be feasible in the foreseeable future.

***Finding 5*: The I-94 Lowry Tunnel is the major control on the expansion of I-94.** *Any long-term visions to comprehensively expand and significantly improve I-94 operations and capacity must also include expansion of I-94 at the Lowry Tunnel. While the engineering and community challenges are considerable, conceptual designs suggest tunnel widening can be accomplished without need to acquire adjacent buildings.*

The I-94 Lowry Tunnel is a major operational and physical obstacle—a contributor to many of the congestion, safety, and crash-related problems observed along both I-94 westbound and I-394/I-94 eastbound. The compounding operational factors include the tunnel's location between major I-94 system interchanges (with I-35W and I-394), and near local land-service ramps (Hennepin/Lyndale and others). When human factors of driving through a curved tunnel with narrow shoulders are also considered, the Lowry Tunnel segment makes clear the limitations of the existing three-lane roadways in each direction. Not surprisingly, any long-term vision to expand and significantly improve I-94 must also include an expansion of the Lowry Tunnel. As described above in Finding No. 1 (with reference with Exhibit 1-1), three operational segments tend to drive the need for a Lowry Tunnel expansion:

Operational factors include the tunnel's location between major system interchanges and near local land-service ramps. When human factors are also considered, the Lowry Tunnel segment makes clear the limitations of the existing three-lane roadways in each direction.

1. **I-94 westbound from 11th Avenue to Hennepin Avenue**—Several high-demand exit and entrance ramps are clustered in this area, upstream of the tunnel, contributing to overuse of the right lane, typically during the PM peak period. This creates a high density of vehicles traveling at low speeds compared to fewer vehicles traveling at higher speeds in the left lanes. This lane imbalance and speed difference is a major contributor to crashes upstream of the tunnel, and it continues into the tunnel too as vehicles to the right are setting up for I-394.

2. **I-35W northbound from 26th Street to I-94 westbound** —The one-lane flyover ramp from I-35W northbound to westbound I-94 currently carries enough traffic demand to justify up to three lanes of traffic. Because most of this traffic merges into three lanes on I-94 through the tunnel (already difficult as described above), congestion on the referenced ramp is created that backs up south on to the I-35W mainline. Vehicles in this queue end up in the middle-right lane of I-35W, traveling at slower speeds than those in

the lanes on either side. This creates a hazardous situation resulting in many I-35W crashes.

3. **I-394 eastbound from Penn Avenue to I-94**—Proceeding on I-94 eastbound through the Lowry Tunnel, the left two lanes are effectively the only through lanes for I-94, which alone sees enough traffic to demand three lanes. The third (right) lane of the Lowry Tunnel eastbound is a continuation of the on-ramp from I-394 and thus enters I-94 as an added lane. Traffic demand on the I-394 ramp could justify two full lanes. Therefore, similar to I-94 westbound, we see five lanes of potential travel demand in a three lane tunnel. The consequences of this situation are the extended queue of vehicles in the right lane of I-394 (often backing up west of Penn Avenue) and a complicated weaving section immediately after the tunnel. This weaving includes traffic exiting to I-35W southbound, which must weave with traffic from the Lyndale/Hennepin Avenue on-ramp, causing congestion over that segment of I-94 eastbound.

I-94 Capacity Improvements in Downtown Minneapolis: A Major Technical and Policy Issue

Several icons of the Twin Cities are in close proximity to the Lowry Tunnel. This includes buildings such as the Walker Art Center and the Basilica of St. Mary, open spaces at Loring Park and the Minneapolis Sculpture Garden, and high-profile streets such as Hennepin and Lyndale Avenues. This important civic and cultural area is potentially impacted by any reconstruction or expansion of the tunnel. However, the design team found that tunnel expansion concepts, providing up to five lanes in each direction are potentially feasible with no building acquisitions.[6] As discussed previously, each Vision Scenario suggests a different outcome for the Lowry Tunnel:

- Vision 1—No tunnel expansion.
- Vision 2—Partial tunnel expansion, along one side (or both sides), keeping the existing curved middle wall and allowing for only up to four lanes in each direction.[7]
- Vision 3—Complete tunnel replacement, providing for five lanes in each direction in a completely new, and less curved, Lowry Tunnel.

The decision to move ahead with a Lowry Tunnel Expansion could be as much a policy issue as it is an engineering issue. One important policy topic, for example, is whether an I-94 expansion might be continuous much beyond the immediate Downtown Minneapolis area.

Exhibit 1-6 illustrates the Vision 2 and Vision 3 tunnel expansion/replacement concepts. While preliminary studies suggest these concepts are feasible, the decision to move ahead could be as much a policy issue as it is an engineering issue. Such a project would require extensive community involvement and coordination across governmental units, including the

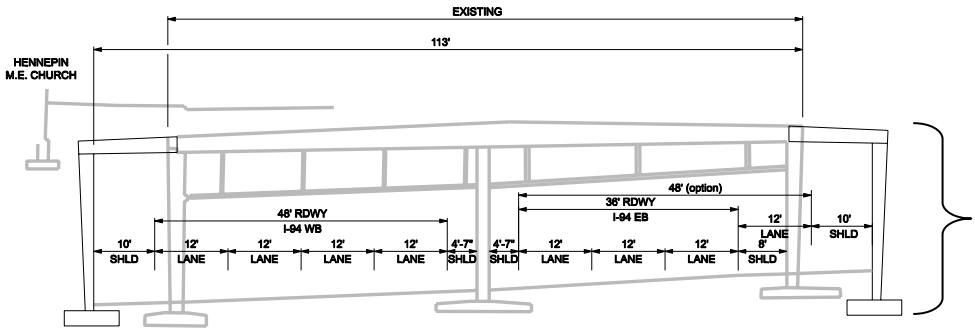
[6] The potential to avoid acquisitions is based on a very limited engineering design analyses, at a feasibility level. The demolition and replacement of the Lowry Tunnel would be a major undertaking with many impacts to consider beyond the footprint, including soil stability, vibration, maintenance of traffic, utilities, and many other factors which were not identified or addressed in any detail for this study.

[7] Widening the tunnel along its west side would require the complete replacement of the equipment room and fan ventilation room, with a complete conversion to jet fans. The east side widening should allow the existing emergency ventilation equipment to remain intact. Another factor with partial tunnel expansion (one or both sides) is keeping the existing horizontal curve, thus leaving more limitations than Vision 3 on the potential future freeway capacity and operations.

Existing Lowry Tunnel Looking South

East (Downtown)

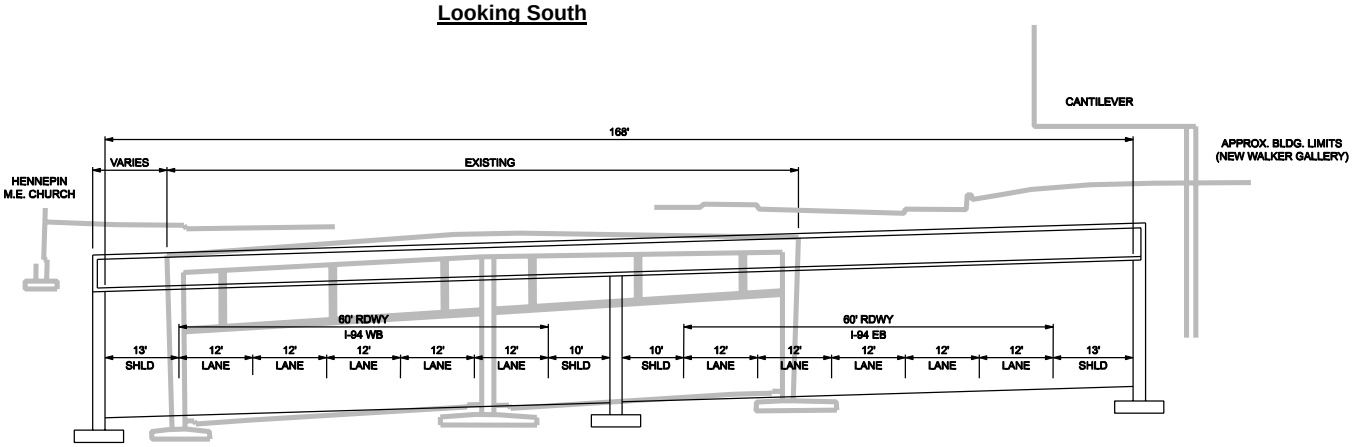
West (I-394)



Vision Scenario 2

Option – Minor Expansion also along west side

Vision Scenario 2 Expansion Concept Looking South



Vision Scenario 3 Expansion Concept Looking South

CH2MHILL SEH Edwards and Kelcey

Downtown Minneapolis Freeway Study

Exhibit 1-6

Lowry Tunnel Picture and Expansion Concept Drawings

City of Minneapolis, Hennepin County, and the State of Minnesota. One important policy topic, for example, is whether an I-94 expansion might be continuous much beyond the immediate Downtown Minneapolis area (see also Section 2.2, Recommendation 4).

Technology Advancements with Potential to Enhance the Feasibility of Tunnel Expansion

Highway planners have long considered the Lowry Tunnel a bottleneck which could not be removed. Using the technology available in the early 1960s and the traffic forecasts of the time, a tunnel design that fit needs while avoiding impacts to adjacent buildings was developed and constructed. In the approximately 45 years since construction of the original Lowry Tunnel, technology has advanced on several fronts which make expansion and modification more feasible.

New construction techniques allow work to occur closer to the existing building foundations than was possible in the 1960s. For example, during the construction of the Leif Erickson Tunnel in Duluth, the use of tie backs and tangent pile walls allowed tunnel construction immediately adjacent to an apartment building. Other examples include: improved methods for predicting the frequency and amplitude of vibrations during construction, the use of "jet" fans to force air and smoke through tunnels (requiring less space than older methods), and the use of composite materials to strengthen concrete and enable the expansion of existing or future structural spans. With such technology advancements, a range of potential improvements to the Lowry Tunnel has become feasible and warrant consideration.

***Finding 6*: Transit and managed lanes will provide for efficient use of the constrained urban freeway corridors.** *Expected traffic demands, coupled with limited space for freeway expansion, demonstrate the need to plan for transit and other high-occupancy vehicle use particularly on I-35W. The primary benefit of such lanes is to serve downtown employment and other commerce. Managed lane designs must be well integrated with other freeway and street improvements.*

Managed freeway travel lanes must be part of both short- and long-term problem solving in the Downtown Study Area. As previously noted, more transportation capacity (all modes) is demanded and will be needed to support growing business, residential, retail, and entertainment functions (see Finding No. 2). This increasing demand for capacity clearly includes need for increased transit access for Downtown Minneapolis, which has seen significant investment over the last decade. Combined, all findings in this Final Report continue to support continued planning for managed lanes on the freeway system, although the topic was not the main subject of the study. Support is also evident from the early success of the I-394 MnPASS project and recommendations to continue the implementation of MnPASS lanes on I-35W from Burnsville to Lake Street in Minneapolis, including the Crosstown Commons project (construction will be underway by mid 2007). These projects represent the first implementation steps toward a long-term MnPASS system vision identified by Mn/DOT in 2005. Additionally, modifications to I-35W's access at Lake Street will include provisions for planned BRT/HOV lane construction on the freeway.

Planning for managed lanes through MnPASS's long-term system vision also includes managed lanes on I-35W from the I-94 Common section north through Minneapolis to TH 10. In previous planning, managed lanes on I-94 were not included in the 2005 MnPASS recommendations, although a subsequent freeway capacity evaluation identified the need to examine both managed and unrestricted travel lanes.

Increasing demand for transportation capacity clearly includes need for increased transit in Downtown Minneapolis, which has in fact seen significant investment over the last decade.

But perhaps too often, transportation debates focus on highway improvements versus managed lanes or transit improvements. The needs of, and planning for, the Downtown Minneapolis area prove that a balanced investment in all modes is needed.

Continuity of managed lanes "through" the Downtown Commons on I-35W or I-94 is more difficult to rationalize or achieve given the relative lower demand for through trips compared to those with local origins and destinations and the relative high level of need for general purpose (unrestricted) lanes in this complex and constrained area. Nevertheless, the design team did investigate one such concept in some detail, involving through-routing of managed lanes along I-94. This Vision 3 variation (not shown in this report) involved too many significant changes to the existing system's geometrics and was thus considered much less adaptable to the existing infrastructure and the related goal to minimize impacts. Furthermore, as discussed during the July 2006 Feasibility Workshop, the shifting of I-94 to the inside of the Downtown Commons (as proposed in the variation) is not necessary to provide for substantially improved operations. Furthermore, the through-routed managed lanes along I-94 are of minimal importance given that most Study Area transit trips either begin or end in Downtown Minneapolis. There are many technical difficulties in extending managed lanes through complex system interchange areas, which often result in high additional costs and more impact with little additional benefit. Still, the study findings on managed lanes are not based on extensive analyses and should be followed with significant additional planning for all functional routes and modes—freeway, local arterials, managed lanes (BRT, HOV, etc.), and other transit (bus/rail). Perhaps too often, transportation debates focus on highway improvements versus managed lanes or transit improvements. The needs of, and planning for, the Downtown Minneapolis area prove that balance among all modes is the best approach. And again, additional studies are needed, to determine where and when managed lanes should become part of the system to be most feasible and cost effective.

***Finding 7*: Setting priorities for preservation and project development will be critical to making progress.** *Much of the Downtown Minneapolis freeway infrastructure will require reconstruction within the next 20 years. Complete infrastructure replacement (in kind) would cost about $1-2 billion (2006). Practically speaking, a long-term program of freeway improvement projects is needed that can fit an ultimate vision.*

A massive amount of infrastructure is represented by this Study Area, including 87 bridges and three tunnels (Lowry, Portland, and Hiawatha). Because the study area is large and very complex, an exercise to rigorously estimate the cost of the Vision Scenarios is not particularly helpful for the following reasons:

- At this level of study, the geometric improvement visions (see Finding 3) represent general scenarios, guidance, and potential master plans—not proposed projects.
- An area of this size and magnitude would be approached for improvement through several different projects which would be done in different timeframes. Additionally, total expansion of the Downtown Freeway System may not be realized within a manageable or predictable timeframe, nor with completely predictable overall features. Therefore, potential total construction costs for the entire Study Area have limited relevance compared to more detailed analyses of proposed projects, which will come later.

Because the study area is large and very complex, an exercise to rigorously estimate the cost of the Vision Scenarios is not particularly helpful. Nevertheless, the study team used a range of technical methods to assess the value of the existing infrastructure and, ultimately, to get an idea of potential improvement costs.

Nevertheless, the study team used a range of technical methods to assess the value of the existing infrastructure and, ultimately, to get an idea of potential improvement costs. This exercise was conducted in some detail with reference to the existing system—for example, to quantify freeway lanes on bridges versus roadway lanes and to account for special infrastructure such as tunnels, sheet piling, site cleanup, temporary bridges, box culverts, signals, retaining walls, and noise walls. ***Table 1-1*** summarizes the results of this exercise, which again was only completed to estimate the value of the existing infrastructure—to provide a benchmark value for the Downtown Freeway System.

Table 1-1. Summary of Capital Cost Values for Existing Infrastructure

Inventory Item	Estimated Value
Roadway	$276,000,000
Tunnels	$223,000,000
Bridges	$273,000,000
Construction Staging	$80,000,000
Major Utilities	$80,000,000
Roadway Lighting	$29,000,000
Signal System	$7,000,000
Overhead Sign Bridges	$8,000,000
Sheet Piling	$10,000,000
Retaining Wall	$13,000,000
Noise Wall	$4,000,000
Hazardous Materials	$8,000,000
Infrastructure Value	$1,000,000,000

Table 1-1 shows that the value of existing Downtown Freeway infrastructure is approximately $1 billion. While this baseline figure must not be considered a "cost estimate," the value is informative as an indicator of the level of investment required over time to maintain what is already built.

Considering costs for similar urban freeway projects (such as the Marquette Interchange, now being constructed in Milwaukee, WI), major improvements to the Downtown Minneapolis Freeway infrastructure can also be estimated, very generally, at $25 million per freeway lane mile which equates to a total cost of $1.1 billion, which is similar to the inventory shown in Table 1-1. However, such figures still represents only a potential cost to re-build the existing freeway system and do not include

right-of-way, delivery costs, and appropriate risk factors, which could be in the range of 50 to 75 percent at this level of study. Additional costs should also be anticipated for project amenities (see Section 2.2, Recommendations 6). As a result, the potential cost for major improvements to the entire Downtown Freeway System should be expected to be more than $2 billion when all expected costs are added up.

Practically speaking, it is not feasible to develop major improvements to the entire Downtown Minneapolis Freeway System in a single project. Multiple projects would be needed ranging in cost from perhaps just a few million dollars to major projects costing hundreds of millions. Section 2 of this report provides recommendations on how to proceed in manageable steps—to perhaps one day realize a long-term improvement vision through a series of projects.

With an entire vision having the potential to cost more than $2 billion, it is not feasible to develop major improvements to the entire Downtown Minneapolis Freeway System in a single project. Section 2 of this report provides recommendations on how to proceed in manageable steps.

FINAL REPORT - SECTION 2

Plan/Program Recommendations

Section 2 concludes the Final Report with recommendations for further Downtown Minneapolis Freeway planning and programming. As discussed in Section 1, the many compelling needs of the Study Area can only be fully addressed through significant additional planning and design efforts. Most of Section 2 is organized around the seven recommendations stated below.

Downtown Minneapolis Freeway System - Plan/Program Recommendations

The following recommendations are discussed in Section 2.2 of this Final Report:

1. **Mn/DOT and its partners should continue toward completion of current project construction and planning efforts.** These current efforts include the contract letting and construction for the I-35W/TH 62 Crosstown Commons project and design for the improvement of I-35W from 46th Street to Downtown Minneapolis.

2. **The Vision Scenarios and the list of potential Downtown Minneapolis Freeway projects should be used as guidance for additional planning, program development, and project development efforts.** The Vision Scenarios developed as part of this study include specific geometric concepts that can serve as guidance for more planning and design efforts, which must be completed to support any project development decisions.

3. **The I-35W/I-94 Central Interchange, south of Downtown Minneapolis, should be the first priority for additional design studies and potential project development.** This location exhibits some of the most significant operational and geometric design needs found in the area. A significant portion of this interchange will need to be reconstructed with the planned improvement project on I35W from 46th Street to Downtown Minneapolis. Further study efforts for this interchange should strive for designs that work with and without future Lowry Tunnel expansion.

4. **The next highest priority for design study in the coming years is to address decision-making on expansion of the Lowry Tunnel, including possible capacity additions on I-94 and connecting roadways.** In addressing I-94, both long-term expansion and short-term adjustments should be considered and coordinated with other designs—for example, adjustments to ramps and parallel streets along I-94.

5. **Other priorities for design studies concern the I-35W Mississippi River bridge and the adjacent Industry Square Interchange (I35W/4th St./Washington Ave.).** Current studies do not indicate the need for a near-term replacement of the Mississippi River bridge, though intense inspection efforts are ongoing. Some Industry Square conceptual designs are inconsistent with the City of Minneapolis' vision to focus access on 4th Street, while reducing access to and from Washington Avenue. The Central Corridor Light Rail Transit (LRT) project is planned for construction as soon as 2011, and the planned LRT alignment along 4th Street may also diminish opportunities to fully achieve the City's vision.

6. **All future study plans should be developed to incorporate consideration of project impacts, capital costs, and potential mitigations/enhancements.** Such studies should sometimes be broad in nature (addressing the entire Study Area) and sometimes project-specific. Planning for these studies should consider study governance and partnerships, stakeholder/public involvement and the approach to context-sensitive design.

7. **Mn/DOT should take the lead role to encourage and coordinate various future studies of the Downtown Minneapolis Freeway System.** While Mn/DOT's leadership and coordination role should continue, various studies may be led by different agencies as appropriate.

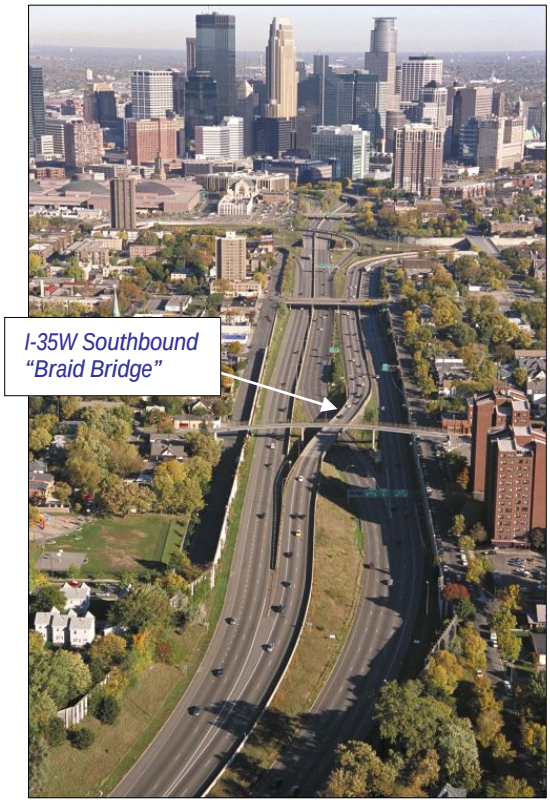
2.1 Turning Vision into Action

The Downtown Minneapolis Freeway Study has addressed the need for a coordinated and strategic master plan—a potential vision—for some of Minnesota's most important and complex freeway segments. The challenge now will be to take steps to move toward the vision, to implement improvement projects or to set forth policies and actions that can help realize the vision.

"Vision without action is merely a dream. Action without vision just passes the time. Vision with action can change the world." **Joel Barker (Futurist)**

Considering the Downtown Minneapolis Freeway System, one could find the scale and complexity of the Vision Scenarios, and the many choices they represent, too daunting to grasp for implementation. Further, potential costs for a full vision may appear unmanageable when we find they could easily range up to $2 billion.

But in fact, implementation issues are simplified when we realize that future construction along the Downtown Minneapolis freeways is a virtual certainty. Over time, this critical transportation infrastructure must be maintained if it is to remain open and serviceable. For example, pavement must be maintained or replaced, and bridges that are becoming structurally deficient must be repaired or replaced— including the I-35W Mississippi River Bridge and the I-35W southbound "Braid Bridge" shown here.



So over the many years represented by the long-term Vision Scenarios, the Downtown Freeways will *require* major investments, which means:

- ***The choice is not between doing nothing and implementing a new vision.***
- ***Instead, the choice is between spending over time to preserve the freeway we already have or spending over time to both preserve and upgrade the freeway.***

Section 2.2 provides a general plan to follow—strategies, priorities, goals, and actions for the coming years. It does not provide strict guidance on timing or sequencing. Nor does it prescribe any particular design features that might comprise future projects. Instead, the text below provides a framework to proceed toward the vision of an improved Downtown Minneapolis Freeway System—basically, how to take the first steps.

2.2 Plan/Program Recommendations

The planning and programming of major transportation projects in Minnesota follows a prescribed process, which is used to set priorities for project design and, ultimately, for funding and construction (see the text box). Although the visions and the potential major projects identified in the Downtown Minneapolis Freeway Study are not yet shown in such plans, the Study helps make it possible to get projects into the "pipeline" for further evaluation.

Mn/DOT's Highway Project Planning and Programming Process

The following briefly describes Mn/DOT's process for taking a project from planning to construction.

Transportation System Plan (20- to 25-year plan)—Because Twin Cities system-wide needs exceed the ability of Mn/DOT to fund corresponding projects, Mn/DOT and the Metropolitan Council periodically develop fiscally-constrained long-range transportation plans. Mn/DOT's *Transportation System Plan* and Met Council's *Transportation Policy Plan* identify expansion projects that could be reasonably completed by Mn/DOT during the course of a 20- to 25-year planning horizon. Mn/DOT's Metro District works with the Metropolitan Council and other stakeholders to further separate these planned investments into two additional implementation periods as noted below.

Highway Improvement Program (10-year plan)—Annually, Mn/DOT reviews the long-range transportation plan and system condition data to develop a fiscally-constrained list of all projects tentatively scheduled to begin construction 7 to 10 years later. The Highway Improvement Program identifies those major projects whose studies must be started well ahead of less complex projects in order to complete environmental reviews on schedule.

State Transportation Improvement Program ("STIP" – 4-year program)—Each year, Mn/DOT is required to prepare a fiscally-constrained list of all planned highway project expenditures for the next 3 years. Newly identified projects are typically identified for funding in the third year of the STIP. For major expansion projects, all preliminary design and environmental documentation should have been completed. Due to the length of time required to design an expansion project and purchase required right-of-way, final engineering design is typically underway before a project is included in the STIP. In addition, routine preservation and safety projects are identified. Depending on the size and phasing of the project, the funding may be allocated in more than one fiscal year.

The seven recommendations below are structured to advise on further planning and programming. Supporting details are covered in the Study's Technical Memoranda, as noted in Section 1.1.

Even though the Downtown Minneapolis Freeway System is characterized by great complexity and scale, the Final Report recommendations are organized to be easy to understand, yet specific enough to define next steps—including specific additional design studies and agency roles for implementation.

***Recommendation 1*: Mn/DOT and its partners should continue toward completion of current project construction and planning efforts.** *These current efforts include the contract letting and construction for the I-35W/TH 62 Crosstown Commons project and design for the improvement of I-35W from 46th Street to Downtown Minneapolis.*

A number of ongoing project development actions are already underway along the corridor. Recommendation 1 confirms the need to complete these current projects. The specific immediate-term actions include:

- **Construction of the I-35W / TH 62 Crosstown Commons Project**—This project includes a reconstruction and expansion of the I-35W/TH 62 commons area, including a new

general purpose lane on I-35W between TH 62 and 46th Street, a new high occupancy vehicle (HOV/BRT) lane, and additional capacity on TH 62 through the Commons Area. The Crosstown Commons project also includes local access modifications. Bids were received for this project on March 30, 2007 (the accepted bid was $288 million); construction is scheduled commence summer 2007. More information is available on the project web site: http://projects.dot.state.mn.us/crosstown.

- **I-35W Corridor Improvement Program and Lake Street Area Access Improvements (46th Street to Downtown Minneapolis)**—This proposed project includes the provision of new local service ramps to provide access to Lake Street to/from the north and includes the addition of a HOV/BRT lane in each direction, including transit stations in the freeway median at 46th St. and Lake Street.[1] This project area defines and, to some extent, provides the geometric and capacity baseline at the south limit of the Downtown Minneapolis Freeway Study (28th Street).

- **I-35W Mississippi River Bridge (Bridge No. 9340)**—This bridge, as referenced previously in this Final Report, is an important fracture-critical truss bridge spanning the Mississippi River that, based on its structural condition, will require a maintenance program and/or a plan for replacement. Mn/DOT's current direction, based on recent detailed studies, is to extend the life of the existing bridge and reduce the concerns regarding the structural behavior and remaining life of the main structural support system - the twin deck trusses that comprise the main spans crossing the river.

- **Other Factors**—As previously noted, the I-35W southbound bridge over the downtown exit roadway—the concrete box girder "Braid Bridge" (bridge no. 27871) is showing evidence of need for repair or replacement. Similarly, segments of pavement throughout the Downtown Freeway Study Area are in need of attention—some segments are already programmed for repair.

The information contained in this Final Report, and the supporting technical information, now provides a basis for further project development work that can compliment current planned/programmed projects.

The information contained in this Final Report, and the supporting technical information, now provides a basis for further project development work that can compliment the above-noted currently planned/programmed projects.

***Recommendation 2*: The Vision Scenarios and the list of potential Downtown Minneapolis Freeway projects should be used as guidance for additional planning, program development, and project development efforts.** *The Vision Scenarios developed as part of this study include specific geometric concepts that can serve as guidance for more planning and design efforts, which must be completed to support any project development decisions.*

The Vision Scenarios discussed in Section 1.2 of this Final Report (Finding 3; Exhibits 1-3 to 1-5) provide a "master plan" for how future freeway projects may be configured in the Downtown Minneapolis Freeway Study Area. In this way, the study serves as guidance

[1] The I-35W HOV/BRT design reserves the far left lane in each direction for HOV and BRT use and is a consistent transit accommodation in the TH 62 Crosstown Commons project and the design from 46th Street through Lake Street.

only; there should be no impression taken that project decisions have been made at this level of documentation.

In general, there are two levels of projects that might be pursued for the Study Area:

- **Reconstruction Projects** are envisioned as major projects, designed to build substantially toward a long-term Vision Scenario. Reconstruction projects will typically involve changes to roadway profiles, major new structures, and may or may not include the addition of new highway through-lane capacity and right-of-way acquisitions. As a result, significant reconstruction projects might cost hundreds of millions of dollars.

- **Accommodation Projects** are anticipated as opportunities that , unlike a reconstruction project, specifically do include the objective of limited financial investment and limited impacts. Such projects will typically be aimed at small but helpful changes to freeway function and may involve such measures as service interchange ramp adjustments or access changes—with no major changes to profile or major structural features. Such projects might sometimes be implemented for as little as several hundred thousand dollars, or even less (for examples, see the text box below).

Both large and small projects should be pursued and prioritized based on known problem areas, such as I-94 westbound and the Lowry Tunnel.

Priorities can also be based on coordination with other infrastructure projects—for example, major redevelopment projects or other transportation projects, like the Central Corridor Light Rail Transit project.

Examples of Downtown Minneapolis Freeway Accommodation Projects (High Value/Low Cost)

The study's Tech. Memo No. 4 includes a list of potential low-cost high-value "accommodation" projects. Two key examples of potential high-priority projects, from Mn/DOT's perspective, are these:

- Re-stripe lanes on I-94 westbound exiting the Lowry Tunnel and approaching I-394 westbound—This potential accommodation project would allow traffic exiting I-94 to I-394 to use both the middle and outside lanes through the Lowry Tunnel (rather than just the right lane).

- Re-stripe the I-35W southbound exits to Washington Ave. and to I-94 westbound and TH 55—This potential accommodation project would start at about University Avenue north of the Mississippi River and would make the right lane across river bridge an exit-only lane to Washington, with the next lane marked for the I-94 westbound exit.

These examples and other similar accommodation projects generally focus on the most efficient utilization of existing pavement and lanes, sometimes through proposals to use narrow shoulders for short segments. While they are not long-term solutions and do not provide continuous new capacity, prior experience has shown that such projects can sometimes provide high value freeway operational improvements with minimal costs and no impact to the adjacent community.

A variety of both large and small projects should be pursued for improvements to the Downtown Freeway System. The prioritization of projects will be best accomplished by considering a combination of factors based on known problem areas, such as I-94 westbound and the Lowry Tunnel. Priorities can also be based on coordination with other infrastructure projects—for example, major redevelopment projects or other transportation projects, like the Central Corridor Light Rail Transit project. While this Final Report

emphasizes only a few of the potential projects in the Study Area, more detailed guidance on many other potential projects is provided in Tech. Memo No. 4.

***Recommendation 3*: The I-35W/I-94 Central Interchange, south of Downtown Minneapolis, should be the first priority for additional design studies and potential project development.** *This location exhibits some of the most significant operational and geometric design needs found in the area. A significant portion of this interchange will need to be reconstructed with the planned improvement project on I35W from 46th Street to Downtown Minneapolis. Further study efforts for this interchange should strive for designs that work with and without future Lowry Tunnel expansion.*

Exhibit 2-1 shows a possible geometric plan for the improvement of the I-35W / I-94 Central Interchange, which is the first priority for a major design and reconstruction project. Improvements are needed at this location not only to address existing operational issues, but also to expand and transition the benefits of other planned system improvements along I-35W to the south (see also Recommendation 1). The other planned projects will deliver greater traffic demands to the Central Interchange because of new capacity in a managed lane (for Bus Rapid Transit) and new access at Lake Street. In turn, improvements to the Central Interchange will be needed to connect the benefits of these other planned projects to the very complex Downtown Freeway system.

The potential reconstruction layout shown in Exhibit 2-1 would reduce congestion and improve safety by properly assigning lanes on I-94 westbound (in the I-35W/I-94 Commons) upstream of the interchange. A new configuration would also connect traffic from I-35W northbound to I-94 westbound using an improved flyover ramp. The total combination of improvements would eliminate or greatly reduce the dangerous weaving that now occurs on I-94 westbound approaching the Hennepin/Lyndale exit. The concept design is also compatible with planned Lake Street area access improvements.

A major Central Interchange project offers the potential for substantial benefits, while recognizing that the added scale and complexity of a Lowry Tunnel expansion might be best managed separately.

One potential major benefit would be to eliminate or greatly reduce the dangerous weaving that now occurs on I-94 westbound approaching the Hennepin/Lyndale exit.

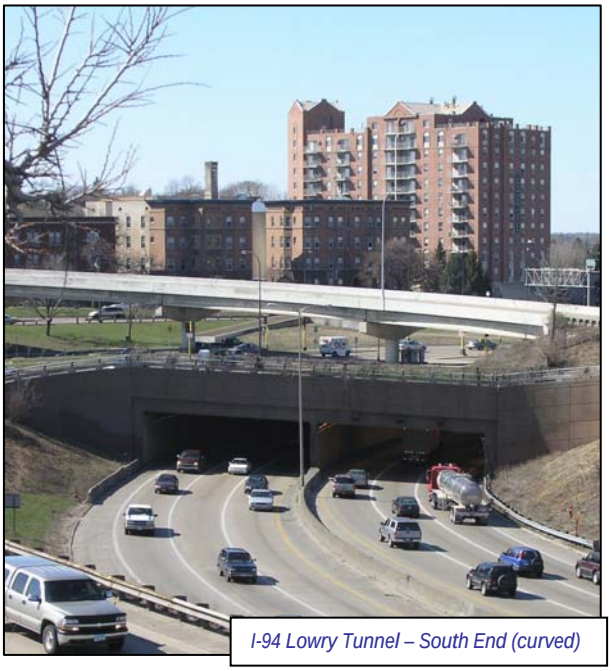
Because this proposed Central Interchange layout does not propose continuous expansion of I-94, including the Lowry Tunnel, it would not achieve the full vision for long-term safety and operational improvements. However, it offers potential for substantial benefits, while recognizing that the added scale and complexity of a Lowry Tunnel expansion might be best managed separately. As noted in Recommendation 4, complex design and community involvement issues for the Lowry Tunnel should not be used to preclude prior development of a major, potentially independent, Central Interchange project (see Recommendation 4 for more discussion).

INSERT EXHIBIT 2-1 – 11 x 17 LAYOUT

A Central Interchange project is a major reconstruction proposal, which would bring with it a major investment. Very preliminary estimates for layouts of scope similar to the one shown in Exhibit 2-1 indicate capital costs in the range of $350 million to $500 million. Additional design studies must be performed to determine if the scope of a Central Interchange project could be further reduced to retain more of the existing infrastructure while still achieving major benefits. Clearly such major investments should provide compatibility with a long-term system-wide vision, whatever the potential to achieve that vision either financially or technically. The basic problem with this area identified so far is the interrelated nature of all roadway grades/profiles and the many bridges in the Central Interchange area, which appear to make it difficult to "shrink" a well-designed project much more than shown in Exhibit 2-1.

***Recommendation 4*: The next highest priority for design study is decision-making on the expansion of the Lowry Tunnel, including possible capacity additions on I-94 and connecting roadways.** *In addressing I-94, both long-term expansion and short-term adjustments should be considered and coordinated with other designs—for example, adjustments to ramps and parallel streets along I-94.*

The I-94 Lowry Tunnel acts as a major control on the future expansion and design detailing for I-94 (see Section 1.2, Finding 5). It is an unusual structure not only because it is a land bridge (approximately 1,500 feet long); but also because it includes a horizontal curve and has many complex interchanging issues near each end. With Hennepin and Lyndale Avenues and other streets located above the Lowry Tunnel, it also presents many potential community and construction impact issues.



I-94 Lowry Tunnel – South End (curved)

There is no foreseeable reason to reconstruct the Lowry Tunnel based on structural criteria—it's built to last! However, the design team found that any long-term vision to comprehensively expand and significantly improve I-94 operations and capacity must also include an expansion of the Lowry Tunnel. While the engineering and community challenges are considerable, conceptual designs suggest tunnel widening can be accomplished without need to acquire adjacent buildings. The Vision Scenarios consider a range of tunnel configurations, from the existing Tunnel (Vision 1), to minimal expansion/modification on one or both sides (Vision 2), to complete replacement with a substantially expanded structure on an improved alignment (Vision 3).

The Downtown Freeway Study only began to identify the many engineering details and possibilities at this critical location, including the freeway system configurations available. These design proposals were based on the best engineering judgments available within the context of a limited design study that favored potentially the most cost-effective approaches. Further design studies are needed to identify and evaluate more possibilities and issues,

including structural design details, changes to ventilation and other emergency systems, and construction techniques and impacts (for example, partial structure replacement options, utilities, vibrations, and construction-period management of traffic). Significant volumes of additional information and decision-making (including stakeholder participation) will be needed to help resolve these and many other issues and to determine the most appropriate actions.

Significant volumes of additional information and decision-making (including stakeholder participation) will be needed to resolve the many complex issues associated with possible expansion of the Lowry Tunnel—to determine the most appropriate actions (see also Section 1.2, Finding 5). While these issues may be closely related to other freeway improvement projects, a tunnel expansion has the potential to be studied independently and thus not unduly delay or complicate other project development actions.

While an expansion of the Lowry Tunnel may be closely related to other freeway improvements, a tunnel expansion could also be developed independently and thus not unduly delay or complicate other projects. This is supported by the standards and regulations used to define major projects,[2] which indicate that one project is sometimes needed to clear the way for complimentary projects. As noted in Recommendation 3, the complex design and community involvement issues for the Lowry Tunnel should not preclude prior development of a Central Interchange project. Several other I-94 improvements are also possible and can deliver benefits without expanding the Lowry Tunnel; and should be considered and coordinated over time. For example, I-94 westbound could see improved operations through ramp or parallel streets adjustments. The recommended sequencing of projects, with some I-94 improvements preceding a Lowry Tunnel expansion, should deliver the most benefits over time. Over the very long term, Lowry Tunnel decisions raise interesting policy choices, including whether an I-94 expansion might be continuous much beyond the immediate Downtown Minneapolis area. Tunnel expansion also presents the potential to improve operations on I-394 eastbound, as the ramp connecting to I-94 eastbound is a capacity constraint, contributing to congestion and crashes on I-394 as far west as Penn Avenue (see also Section 1.2, Finding 5).

***Recommendation 5*: Other priorities for design studies concern the I-35W Mississippi River bridge and the adjacent Industry Square Interchange (I35W / 4th St. / Washington Ave.).** *Current studies do not indicate the need for a near-term replacement of the Mississippi River Bridge, though intense inspection efforts are ongoing. Some Industry Square conceptual designs are inconsistent with the City of Minneapolis' vision to focus access on 4th Street, while reducing access to and from S. Washington Avenue. The Central Corridor Light Rail Transit (LRT) project is planned for construction as soon as 2011, and the planned LRT alignment along 4th Street may also diminish opportunities to fully achieve the City's vision.*

Mn/DOT has completed a recent special study of the I-35W Mississippi River Bridge (bridge no. 9340). The steel truss spans that cross the river warrant special mention in this

[2] Federal Highway Administration regulations regarding logical termini for use in defining projects [23 CFR 771.111(f)] state, "in order to ensure meaningful evaluation of alternatives and to avoid commitments to transportation improvements before they are fully evaluated, the action evaluated shall: **Connect logical termini and be of sufficient length to address environmental matters on a broad scope; **Have independent utility or independent significance, i.e., be useable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and **Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements."

Final Report because they reflect a structural design, known as "fracture critical" (meaning that the steel supports have little or no redundancy). The bridge is thus inspected and maintained regularly to ensure a high margin of safety. Longer-term, the bridge is not a feasible type for widening and it warrants serious consideration for replacement instead of decades of inspection and rehabilitation.

I-35W Mississippi River Bridge

In developing the long-term geometric Vision Scenarios, all concepts propose widening this bridge; therefore, more planning for a potential bridge replacement is needed (in this respect, the decision-making issues are similar to the Lowry Tunnel—see Recommendation 4). In the relative short-term term, Mn/DOT has developed several options to extend the life of the bridge and is preparing to implement necessary repair and rehabilitation actions to ensure a sound bridge through 2020 or later.

Segments of I-35W from the I-94 commons to Hennepin Avenue reflect other important issues, in addition to the Mississippi River Bridge. This area includes the planned Central Corridor LRT project and many local issues related to development or redevelopment (for example, near the Metrodome and in portions of the University of Minnesota campus). The high complexity of the area, sometimes called the Industry Square Interchange, is noteworthy. There is a need here to resolve many design issues and options—some of which should be addressed further in the next few years as the Central Corridor LRT is developed. To address the area's complex traffic issues and objectives, the Downtown Freeway Study proposed several design concepts which illustrate different ideas (see Exhibits 1-3 to 1-5). Some of the issues addressed include:

- **Significant Traffic Demands, Including Local Interchange Traffic**—The Industry Square Interchange area defines a significant gateway to Downtown Minneapolis, especially with reference to areas northeast of Minneapolis. High demand, combined with multiple on/off ramps and the Mississippi River crossing, are reflected in the area's complex interchanging. Future needs will also likely demand closely spaced interchange features and auxiliary lanes on the freeway (to provide choices and distribute traffic with minimal conflict).

The high complexity of the Industry Square Interchange is noteworthy. There is a need here to resolve many design issues and options—some of which should be addressed further in the next few years as the Central Corridor LRT project is developed.

- **I-35W Mississippi River Bridge and the Parallel 10th Avenue Bridge**—The I-35W bridge is part of the gateway concept noted above and is parallel to the 10th Avenue bridge, a local street river crossing located immediately to the east. Therefore, local design and construction

issues should consider interaction between these two bridges and the most effective uses for both river crossings.

- **Potential New Connections North of the River at Hennepin Avenue East—** The Study briefly addressed the potential to add ramps to Hennepin Avenue to serve I-35W southbound traffic with a new exit and to provide a new entrance to I-35W northbound (connections that are not currently possible). Such a new connection would slightly reduce traffic demand across the Mississippi River and provide more network flexibility.

- **Incorporation of Managed Lanes—** The Vision Scenarios (Exhibits 1-3 to 1-5) depict a range of possibilities for managed lanes in this area, crossing the I-35W Mississippi River Bridge and connecting to either: S. 2nd Street (Vision 1), S. Washington Ave. (Vision 2), or to S. 4th Street (Vision 3). These concepts illustrate the inherent difficulty of designing for the Industry Square area; they all reflect managed lanes connecting directly to local streets, which is operationally best and yet complex for design and decision making.

- **South Washington Avenue Traffic—** City of Minneapolis Staff advised during the study that some design concepts should look at reducing freeway interchange traffic pressure on S. Washington Avenue. This objective is best reflected by Vision Scenario 3 (Exhibit 1-5), which removes ramps to/from the south, but keep ramps connecting to the north. In general, high demand for interchanging traffic in the Industry Square area make redundancy and flexibility desirable, and the Downtown Freeway Study thus cannot make a firm recommendation against interchange connections at S. Washington Avenue. Significantly more detailed traffic studies will be necessary to guide project-level designs.

- **Freeway Access to S. 4th Street (the Central Corridor LRT route)—** Interchanging I-35W with S. 4th Street will have the added future challenge of designing for combined operations of traffic and LRT. This is another reason why the study could not easily eliminate all freeway interchanging with S. Washington Avenue.

- **Industry Square Area to I-94 Westbound—** As previously discussed in this Final Report, I-94 westbound is a major operational and capacity issue. Therefore, Several design concepts developed in the study look at ways to limit or simplify access to I-94 westbound. In the range of Industry Square interchange design concepts, only Vision 3 provides for this convenience which is noteworthy as Vision 3 is the only concept providing five lanes on I-94 westbound through the Lowry Tunnel (see Section 1.2, Finding 5 and Recommendation 4, above).

Feasible and flexible design concepts cannot easily eliminate all freeway interchanging with S. Washington Avenue. Significantly more detailed traffic studies will be necessary to guide project-level designs.

The City of Minneapolis has discussed many interesting objectives for the Industry Square Interchange area, including opportunities to enhance pedestrian and bicycle use on local streets and design concepts that might open lands for development (written comments on these topics are attached to Tech. Memo No. 4). As discussed further in Recommendation 6, Mn/DOT is committed to looking at such issues in further design. But at this point, design concepts are too conceptual to fully address and such issues.

***Recommendation 6*: All future study plans should be developed to incorporate consideration of project impacts, capital costs, and potential mitigations/enhancements.** *Such studies should sometimes be broad in nature (addressing the entire Study Area) and sometimes project-specific. Planning for these studies should consider study governance and partnerships, stakeholder/public involvement and the approach to context-sensitive design.*

The Downtown Minneapolis Freeway Study did not look in detail at the physical impacts of the Vision Scenarios. While potential building/property impacts were identified (see Exhibits 1-3 to 1-5), it is far too early in the design process to weigh such potential impacts. For the time being, it is most important to recall that the design team developed concepts only up to a scale to provide for improvements by 2030 over today's peak-period traffic congestion and safety problems—but still with moderate peak-period congestion (Section 1.2, Finding 4). Selecting a higher performance goal was not considered reasonable given the area's context and would encourage design concepts with bigger footprints, greater impacts, and higher costs. Vision Scenario 3 depicts the largest scale of expansion, with the potential to provide long-term performance improvements, while Visions 1 and 2 are biased toward limiting impacts and costs.

Considering this background, readers should understand that limiting potential impacts and costs, while providing maximum potential benefits, were fundamental goals for the Vision Scenarios. In this way, the study began to apply the principles of context-sensitive design or context-sensitive solutions (CSD/CSS). While these methods are constantly evolving, the basic goal of context-sensitivity is excellence in transportation design, considering a full range of inputs, including: transportation/mobility needs, awareness of community values, and project design response to stakeholder input (including transportation agencies, neighborhood groups, local units of governments, and the general public).[3] Some key examples of CSD/CSS approaches for completed Minnesota projects include the I-35W corridor in Duluth and the I-35E/I94 area in St. Paul—both of which are central urban freeways like the Downtown Minneapolis System.

Limiting potential impacts and costs, while providing maximum potential benefits, were fundamental goals for the Vision Scenarios. Additional context-sensitive design must consider a full range of inputs to address transportation/mobility needs, community values, and project design response to stakeholder input.

Many design details remain to be addressed in project development studies. However, the blueprint provided now allows such studies to be structured to further address either the entire Study Area or subareas where specific projects should be defined and developed. Mn/DOT recognizes that implementation of projects will require a major investment, not only of traditional resources, but also by many levels of government to balance competing and supporting interests. These interests have been noted throughout the study and include through traffic, service interchanging, freeway functions versus local street functions, and connectivity across the freeway. During the study, specific connections across the freeway were identified, to understand possible priorities for local

[3] While there are many CSD/CSS practice references, two of the most noteworthy publications are: *Flexibility in Highway Design* (FHWA, 1998) and *NCHRP Report 480—A Guide to Best Practices for Achieving Context Sensitive Solutions* (Transportation Research Board, 2002).

streets—including pedestrian and bicycle connections. The objectives for such connections are to strengthen connectivity between neighborhoods and other land uses on each side of the freeway and to provide more and better use of space above the freeways.

As related to such concepts, stakeholders at Focus Group meetings (June 2006) identified these issues:

- **Improve Transportation Function and the Area's Image**—Travel to and from the Downtown Minneapolis Study Area should be improved by reducing congestion and safety problems, which will add to the area's positive image. Without major improvements, congestion and crashes will increase further, adversely affecting the area's attractiveness and image.
- **Aesthetics** – Build interesting bridge, highway, and noise barriers, include green space, and maintain all facilities (highway, pedestrian, bicycle, gateway features, etc.).
- **Noise** – Reduce highway noise through construction of barriers and other highway design measures to shield neighborhoods from the freeway, such as barriers or cover sections.
- **Cut-Through Traffic** – Consider safety, noise, and operational concerns on local streets resulting from traffic using adjacent neighborhoods in order to avoid freeways congestion.[4]
- **Neighborhood Connections** – Provide connections between neighborhoods, specifically using land bridges accessible to pedestrians and bicyclists.

Mn/DOT looks forward to working with stakeholders to develop detailed design objectives and to implement special project features that respond to community values.

While it is far too early to make design decisions related to such factors, Mn/DOT looks forward to working with stakeholders to develop detailed design objectives and to implement special project features that respond to community values. Future concepts are thus expected to address all of the items above and more—possibly including public-private partnerships in this important and exciting Study Area.[5]

***Recommendation 7*: Mn/DOT should take the lead role to encourage and coordinate various future studies of the Downtown Minneapolis Freeway System.** *While Mn/DOT's leadership and coordination role should continue, various future studies may be led by different agencies as appropriate.*

Going forward, Mn/DOT will continue to take a proactive leadership role to refine design concepts, identify and prioritize potential projects, and to develop the most needed projects.

[4] Traffic modeling completed for the study generally shows that more freeway capacity will have the effect of reducing the use of local streets as alternatives to the Downtown Minneapolis Freeways.

[5] Public-private partnerships can allow for project development opportunities where private interests are leveraged in connection with a public project, such as a major urban freeway improvement project. In the Downtown Minneapolis Freeway Study Area, there is potential for development to occur in conjunction with freeway improvements—perhaps, for example, involving structures over or under the freeway corridors. Please note that none of the concept-level capital cost analyses completed for this study include costs for amenities, nor any offsets for public-private partnerships.

While Mn/DOT and FHWA will play major roles in technical decision-making for Downtown Freeway System projects, these agencies recognize the significance of interagency coordination and the leadership needed by many other agencies, groups, and individuals. In completing the study, several agencies worked together regularly to provide and coordinate input and to review products. These agencies included Mn/DOT, FHWA, the City of Minneapolis, Metropolitan Council, Hennepin County, Metropolitan Transit, the City of Richfield, and the City of Bloomington.

Because the Study Area is so complex, there have been many other related studies or projects underway, including studies of: the I-35W Mississippi River Bridge, the I-35W Bus Rapid Transit corridor, the Central Corridor LRT project, high-occupancy-toll lanes (expanding MnPass), and overall Minneapolis transportation planning issues (*Access Minneapolis*, a 10-Year plan, as noted in the Executive Summary). Many other projects and actions are also underway or planned for surrounding areas as previously noted. The future recommended process of developing Downtown Minneapolis Freeway projects and more detailed engineering designs should involve continued work in all these areas and more, with leadership provided by various agencies as appropriate.

Mn/DOT will continue to take a proactive leadership role to refine design concepts, identify and prioritize potential projects, and to develop the most needed projects. Through collaboration with others, projects can be developed that will serve long-term transportation needs while truly enhancing the Downtown Minneapolis Area.

As discussed in the above recommendations (3, 4, and 5), the anticipated highest project-development priorities concern: (1) the I-35W/I-94 Central Interchange, immediately south of Downtown Minneapolis; (2) further design studies and decision-making for the Lowry Tunnel area; and (3) further design studies and decision-making for the I-35W Mississippi River bridge and the Industry Square Interchange area. As further design studies get underway in the years ahead, Mn/DOT looks forward to significant work with many agencies, and with local residents and businesses. Through such further collaboration, projects can be developed that will serve long-term transportation needs while truly enhancing the Downtown Minneapolis Area.

Downtown Minneapolis Freeway Study

Jerome Adams
Project Manager
651.234.7611
Jerome.Adams@dot.state.mn.us

Tom O'Keefe
Area Manager
651.234.7725
Thomas.Okeefe@dot.state.mn.us

Doug Abere
Consultant Team Project Manager
651.688.8100
Douglas.Abere@ch2m.com