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SECTION 1

Purpose and Need for the Project

The purpose and need describes the reason why the project is being considered. The supporting information regarding the needs for the Interstate 94 (I-94) East-West Corridor Study has been updated since the 2016 Final Environmental Impact Statement (EIS) to reflect current conditions. After analyzing the updated information, WisDOT and FHWA determined that the originally identified purpose and need factors for the project remain the same as stated in the 2016 Final EIS. This Supplemental Draft EIS has the following updates:

- Existing traffic data were updated with 2019 numbers.
- The traffic forecasts were updated with a horizon (design) year of 2050.
- The crash analysis was updated and uses crash data from 2015 to 2019.
- Demographic information (population, jobs, and business) was updated with most recently available Census data.
- This Supplemental Draft EIS focuses on and discusses the Southeastern Wisconsin Regional Planning Commission's (SEWRPC's) most recent regional land use and transportation plan, *VISION 2050: A Regional Land Use and Transportation Plan for Southeastern Wisconsin—SEWRPC Planning Report No. 55.*

The I-94 East-West Corridor Study, described in this Supplemental Draft EIS, builds upon the previous studies, and focuses on I-94 from 70th Street to 16th Street. Text from the previous environmental documentation serves as the base for the Supplemental Draft EIS with updates where necessary.

1.1 Description of the Project

1.1.1 Location and Termini

The I-94 East-West Corridor Study is in central Milwaukee County, Wisconsin, and includes 3.5 miles of I-94 from 70th Street (west terminus) to 16th Street (east terminus). See **Exhibit 1-1**.

At the outset of the I-94 East-West Corridor Study, the east terminus for the study was set as 25th Street to match the west limit of the previously constructed Marquette Interchange Project. In June 2013, the Wisconsin Department of Transportation (WisDOT) and the Federal Highway Administration (FHWA) determined that the east terminus for the I-94 East-West Corridor Study would be extended farther east to accommodate alternatives that would tie back into I-94 near 16th Street, rather than 25th Street. The transition area between the reconstructed west segment of the Marquette Interchange and existing I-94 was 16th Street to 25th Street.

The I-94 east-west freeway is one of the busiest routes in southeastern Wisconsin. It serves as a vital link to Milwaukee, the western suburbs, and Madison, and is also part of a major east-west interstate route serving national, regional, and local traffic for trips within and through the study area.

The I-94 East-West Corridor contains the following seven interchanges:

- Service interchanges along I-94:
  - 68th Street/70th Street
  - Hawley Road
  - General Mitchell Boulevard
  - 35th Street
  - 25th/26th/28th Street
- Service interchange along Wisconsin State Highway 175 (WIS 175)[1]:
  - Bluemound Road/Wisconsin Avenue/Wells Street
- System interchange[2]:
  - Stadium Interchange (I-94/WIS 175/Brewers Boulevard)

At each interchange, the project limit extends north/south until each crossroad ties into the existing alignment. The termini for the study generally match the termini for two previously completed studies of the southeastern Wisconsin freeway system: the Zoo Interchange study, west of the I-94 East-West Corridor, and the Marquette Interchange study to the

*A **service interchange** connects a freeway to arterial or collector roads. A service interchange has an at-grade intersection with the nonfreeway crossroad that has some type of traffic control (stop signs, traffic signals, or yield conditions at roundabout intersections) that may require drivers to either stop or yield to other traffic or pedestrians.*

Example of typical urban service interchange (Interstate 43 [I-43]/Interstate 894 [I-894] at 60th Street)

*A **system interchange** connects two or more freeways. The traffic within system interchanges moves freely without stopping.*

System interchange example (Marquette Interchange)

[1] US 41 in the study area was redesignated as a state highway (WIS 175) in 2015 when US 41 was redesignated as Interstate 41 (I-41). As a result of the conversion, I-41/US 41 in the Milwaukee area has been rerouted along I-894 and U.S. Highway 45 (US 45). In addition, Miller Park Way was renamed Brewers Boulevard in early 2021.

[2] The current Stadium Interchange was designed and built to function as a system interchange in anticipation of planned freeway development. However, because US 41 (now WIS 175) was never fully developed as a freeway and the route does not function as a freeway for an appreciable distance north and south of the interchange, the interchange is not technically classified as a system interchange by FHWA. Throughout this document, the existing Stadium Interchange is generally referred to as a system interchange. FHWA's classification of the type of interchange, as it pertains to the existing interchange, has no bearing on the proposed design of the updated interchange. The proposed Stadium Interchange design, as part of the 2016 Final EIS preferred alternative, is referred to as a "hybrid" interchange. This term can also be synonymous with a high-level service interchange. Because previous project documentation referred to the current Stadium Interchange as a system interchange, and the proposed design as a "hybrid" interchange, and since the terminology has no bearing on the proposed design as part of the preferred alternative in the Supplemental EIS, the terminology has been retained in the Supplemental EIS.

east. The east terminus of the Zoo Interchange study serves as the west terminus for the I-94 East-West Corridor Study (70th Street). The west terminus of the Marquette Interchange study was 25th Street, and the transition area between the reconstructed west segment of the Marquette Interchange and existing I-94 generally included 16th Street to 25th Street. WisDOT and FHWA extended the east terminus for the I-94 East-West Corridor to 16th Street.

1.1.2 Project History

WisDOT completed building this portion of I-94 in the early 1960s. In 1966, SEWRPC completed a regional transportation plan for the year 1990. The original transportation plan recommended several new freeway links, many of which were never constructed. For example, a once-planned outer beltway would have connected I-94 in southern Milwaukee County to I-94 in Waukesha County and to U.S. Highway 41 (US 41)/U.S. Highway 45 (US 45) in Washington County. In Milwaukee County, the planned Park West Freeway and Stadium Freeways were never completed. As a result, the existing freeway system now carries more traffic than initially projected.

In 1991, WisDOT began analyzing long-term improvements to the following three I-94 system interchanges in Milwaukee County: the Zoo Interchange, the Stadium Interchange, and the Marquette Interchange. By 1995, the three interchange studies merged into one study, the I-94 East-West Corridor Study, which evaluated 10 highway and transit alternatives, including light-rail transit and bus options, in the I-94 East-West Corridor.

WisDOT, in collaboration with FHWA and the Federal Transit Administration (FTA), completed a Draft EIS/Major Investment Study (MIS) for the original I-94 East-West Corridor Study in October 1996. The Draft EIS/MIS project termini were Interstate 794 (I-794) and the I-94/Wisconsin State Highway 16 (WIS 16) Interchange in Waukesha County. WisDOT developed a draft locally preferred alternative (LPA) that included all the transportation components of the Draft EIS/MIS, such as the following:

- Reconstructing the Marquette Interchange with design and safety improvements
- Reconstructing I-94 to modern design standards between downtown Milwaukee and Waukesha
- Adding special-purpose lanes for carpools and buses on I-94
- Expanding bus transit service in the Milwaukee metropolitan area
- Establishing light-rail transit in Milwaukee County

The Milwaukee County Board accepted the LPA by endorsing further study funded entirely with federal and state funds. The Waukesha County Board supported studying the reconstruction and modernization of I-94, including adding high-occupancy vehicle (HOV) lanes and expanding bus service, but opposed constructing light rail. The Waukesha County Board also supported preliminary engineering, completing the Final EIS, and separating the study of transportation improvements so that each improvement could advance independently. With Milwaukee and Waukesha counties favoring different elements of the draft LPA, local consensus was not possible. As a result, federal agencies ended the study process, and the LPA did not advance to the design phase.

With the development of the draft LPA, the MIS process was completed for the I-94 East-West Corridor in Milwaukee and Waukesha counties. On June 26, 2000, FHWA published a *Federal Register* notice terminating the environmental process at the Draft EIS/MIS phase and announced that WisDOT, FTA, and FHWA would not complete a corridor-wide Final EIS and Record of Decision (ROD). In addition, FHWA indicated that it was unlikely that the various components of the LPA would proceed on the same schedule, but the information from the Draft EIS/MIS could lead to environmental analysis for individual components of the LPA. WisDOT and FHWA have since advanced two elements of the previous LPA: the

Marquette Interchange (reconstruction completed in 2008) and the Zoo Interchange (construction began in 2013). The other elements of the LPA have not been implemented.

In 2003, SEWRPC completed a regional freeway system planning study, *A Regional Freeway System Reconstruction Plan for Southeastern Wisconsin*, at the request of WisDOT. The study identified segments of the freeway system that would require reconstruction within the next 30 years and recommended how to rebuild various freeway segments. The study discussed whether the freeway segments should be rebuilt in kind, with minor redesign, with substantial redesign, or with additional traffic lanes. The study recommended reconstructing I-94 with 8 travel lanes (4 in each direction), new pavement with full shoulders, new bridges with additional vertical clearance, improved entrance ramps for better operations, and improved vertical alignment (fewer dips and rises in the road) to accommodate safer stopping sight distances. The study also recommended reconstructing the Stadium Interchange as a service interchange.

In 2006, SEWRPC completed *A Regional Transportation System Plan for Southeastern Wisconsin: 2035—SEWRPC Planning Report No. 49* (SEWRPC 2006).[3] The plan recognized that 127 miles of freeway widening proposed in the plan, and in particular the 19 miles of widening in the City of Milwaukee (including I-94 between the Zoo and Marquette interchanges), will undergo preliminary engineering and environmental documentation by WisDOT.

In fall 2011, Wisconsin's Transportation Projects Commission approved the I-94 corridor for study. FHWA published a Notice of Intent to prepare an EIS for the I-94 East-West Corridor in the *Federal Register* on May 18, 2012. An updated Notice of Intent was published in the *Federal Register* on August 28, 2013, to reflect the new east terminus (16th Street). On November 14, 2014, a Notice of Availability of Draft EIS was published in the *Federal Register.* On February 12, 2016, a Notice of Availability of Final EIS was published in the *Federal Register*, and the ROD was issued on September 9, 2016. This ROD was rescinded on October 11, 2017, due to the project not being funded in the Wisconsin state budget. In July 2020, Wisconsin Governor Tony Evers announced that WisDOT would seek federal approval to move forward with the I-94 East-West Corridor project. In April 2021, WisDOT announced it would undertake a Supplemental EIS on the project. A Notice of Intent to prepare a Supplemental EIS was published in the *Federal Register* on June 15, 2021.

After the 2016 ROD was issued, SEWRPC completed its most recent regional land use and transportation plan, *VISION 2050: A Regional Land Use and Transportation Plan for Southeastern Wisconsin—SEWRPC Planning Report No. 55* (SEWRPC 2016). SEWRPC reviewed and updated the plan in 2020 (SEWRPC 2020a). Although VISION 2050 forecasts a lower growth rate for the population and households in Milwaukee County compared with the 2035 plan, it forecasts higher increases in regional population, households, and urban development. VISION 2050 forecasts a 23 percent increase in vehicle miles traveled (VMT) between 2010 and 2050, which is a larger average annual increase (0.6 percent) than the 2035 plan (0.4 percent). VISION 2050 includes widening I-94 between 70th Street and 16th Street in the fiscally constrained transportation plan (2021 to 2025) and the transportation analysis. See Section 1.4.1, Land Use and Transportation Planning, for additional information.

The I-94 East-West Corridor Study, described in this Supplemental Draft EIS, builds upon the previous studies, and focuses on I-94 from 70th Street to 16th Street. Text from the previous environmental documentation serves as the base for the Supplemental Draft EIS with updates where necessary.

[3] SEWRPC conducted an interim review and update of the regional transportation plan in 2014.

1.2 Summary of the Purpose and Need for the Project

The purpose of the project is to address the deteriorated condition of I-94, obsolete roadway and bridge design, existing and future traffic demand, and high crash rates in the I-94 East-West Corridor from 70th Street (west terminus) to 16th Street (east terminus) in order to maintain it as a key link in the local, regional, state, and national transportation network. The configuration of the study area freeway system is functionally deficient in the following areas:

- Eight locations do not meet minimum standards for decision sight distance.
- Numerous locations have substandard shoulder widths.
- Sixteen bridges do not meet minimum vertical clearance standards.
- None of the interchanges meet design criteria for minimum spacing requirements between interchanges.
- Twelve locations do not meet minimum ramp spacing standards.
- Eleven locations have left-hand entrances or exits.
- Eighteen locations have substandard ramp taper rates.
- Ten entrance/exit ramps have inadequate acceleration/deceleration lengths.

Additionally, the horizontal alignment is substandard along most of the study corridor, and there are several segments of the corridor where the existing design speed is less than the minimum recommended design speed based on stopping sight distance.

The most notable functional deficiencies are the closely spaced service interchanges and the combination of left- and right-hand entrance and exit ramps, which are contrary to driver expectations and result in major safety and operational problems, such as traffic weaving and congestion. When combined, all of the identified functional deficiencies create substandard conditions throughout the I-94 East-West Corridor, resulting in a substantially higher-than-average crash rate in many locations. Most segments of I-94 have crash rates that are over two times higher than the statewide average for similar urban freeways.

Current traffic volumes result in congestion and delays for all users of I-94. Anticipated development and redevelopment adjacent to I-94 will add additional traffic to the already congested freeway segment. By 2050, WisDOT and FHWA expect the level of service to be E or F, on a scale of A through F, for a majority of I-94 based on the traffic projections.

1.3 Purpose of This Project

The I-94 East-West Corridor project would accomplish the following:

- Maintain a key link in the local, state, and national transportation network. Sections 1.4.1, Land Use and Transportation Planning, and 1.4.2, System Linkage and Route Importance, describe the project in the context of the regional transportation planning process and the role of I-94 in the local, regional, and national transportation network.

The purpose of the I-94 East-West Corridor project is to address the deteriorated condition of I-94, obsolete roadway and bridge design, existing and future traffic demand, and high crash rates.

- Address the obsolete design of I-94 to improve safety and decrease crashes. Section 1.4.3 describes the crash history in the corridor, and Section 1.4.4 describes outdated design aspects in the study corridor.
- Replace deteriorating pavement. Section 1.4.4.1 describes the poor condition of the pavement on I-94. Most of the original pavement from the 1960s construction is still in place. Although there have been three pavement overlays, each has a shorter life span than the previous overlay. Section 1.4.4.2 describes the condition of the bridges in the study area.
- Accommodate existing and future traffic volumes at an acceptable level of service. Section 1.4.5 describes current congestion on I-94 during the morning and afternoon rush hours and how congestion will worsen in the future.

The project would neither require nor preclude other future transportation improvements identified in the regional transportation plan. The project would provide a safer and more efficient transportation system in the I-94 East-West Corridor while minimizing impacts to the natural, cultural, and built environment to the extent feasible and practicable.

1.4 Need for the Project

A combination of factors, including the following, demonstrates the transportation improvement need in the I-94 East-West Corridor:

- Regional land use and transportation planning
- System linkage and route importance
- High crash rates
- Existing freeway conditions and deficiencies
- Existing and future traffic volumes

The remainder of Section 1.4 discusses these factors in more detail. The need for improvements sets the stage for developing and evaluating possible improvement alternatives.

1.4.1 Land Use and Transportation Planning

SEWRPC, created by state statute in 1960, is the official planning agency for southeastern Wisconsin, which includes Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha counties.

SEWRPC's principal responsibility is to prepare an advisory comprehensive plan for the physical development of the region, including a regional land use plan, which is the basis of all other plan elements, including transportation. SEWRPC conducts regional planning under the guidance of various technical coordinating and advisory committees with representatives from state and federal agencies; local planning, transportation, and public works departments; transit providers and service groups; private utilities; and environmental organizations. Implementing plan recommendations, including the determination as to whether and how they are implemented, and determining the degree of implementation is the responsibility of local, state, or federal governments based on additional planning, programming, and engineering/environmental studies, such as those conducted by WisDOT.

The following is a summary of adopted regional plans relevant to the I-94 East-West Corridor.

1.4.1.1 VISION 2050: A Regional Land Use and Transportation Plan for Southeastern Wisconsin—SEWRPC Planning Report No. 55 (2nd Edition) (SEWRPC 2020a)

SEWRPC's 2035 regional plan, referenced in the 2016 Final EIS, was replaced by *VISION 2050: A Regional Land Use and Transportation Plan for Southeastern Wisconsin*, which SEWRPC adopted in July 2016. This regional plan included expanding I-94 in the study area to 8 lanes of traffic (4 lanes in each direction).

The recommendations presented in VISION 2050 are intended to shape and guide land use development and transportation improvements, including public transit, arterial streets and highways, freight, and bicycle and pedestrian facilities, to the year 2050. In addition, VISION 2050 includes a fiscally constrained transportation plan that includes the public transit and arterial highway elements of VISION 2050 that may be expected to be implemented given existing and reasonably expected future funding and the current limitations on state and federal funding.

On June 17, 2020, SEWRPC adopted the 2020 review and update to VISION 2050 (SEWRPC 2020a). The 2020 update assessed the region's progress in implementing the original VISION 2050 recommendations, the performance of the transportation system, year 2050 forecasts underlying the plan, and changes in recent years that impact the plan.

Land Use Plan Element

The first regional land use plan was adopted in 1966 with updates adopted in 1977, 1992, 1997, 2006, and 2016 (current plan, reviewed and updated in 2020). The land use plan is based on an extensive database and inventory of the region's physical characteristics and has been maintained and updated by SEWRPC for more than 50 years. Physical characteristics pertinent to transportation demand[4] include existing and future land use, growth and development trends/locations, and housing and employment trends. The 2050 regional land use plan is based on an *intermediate growth scenario*[5] with increases in population growth in certain areas due to development around rapid transit stations and new developments in other parts of the region.

Table 1-1 presents growth projections for Milwaukee County based on an intermediate growth scenario as outlined in VISION 2050. Although the VISION 2050 forecasts a lower growth rate for the population and households in Milwaukee County compared with the 2035 plan, and a modest increase in urban development, it forecasts a regional population increase of 16.5 percent, an increase in households of 21.5 percent, and almost 10 percent increase in urban development regionally. The forecast increase in employment in Milwaukee County is considerably higher than in the 2035 forecast.

SEWRPC uses population, household, employment, and urban land use projections, along with other factors, to assist in developing its year 2050 traffic forecast. SEWRPC projects that VMT will increase by 20 percent in the region between 2010 and 2050, which is a larger average annual increase than the 2000 to 2035 forecast average annual increase. VMT is an output of SEWRPC's regional travel demand model. It is used as one check of the model's accuracy. The 2050 traffic forecast used for this I-94 East-West Corridor Study is based on SEWRPC's 2050 traffic forecast. See the technical memorandum titled *IH-94 E/W Corridor Peak Hour Traffic Volume Development Methodologies*, available on the project website, for more information on how WisDOT uses SEWRPC's traffic forecast to assess future traffic conditions for this study.

[4] Transportation Demand refers to the amount and type of travel people would choose under specific conditions, taking into account factors such as the quality of transport options available and their prices.

[5] SEWRPC projected regional population using three growth scenarios: high, intermediate, and low. The intermediate population growth scenario is considered the most likely to be achieved, whereas high and low population growth scenarios are intended to identify a plausible range for population growth.

Table 1-1. Milwaukee County Growth Projections from VISION 2050

Growth Indicators	Percent Increase (2010–2050)
Population	7.0
Households	10.3
Employment	9.3
Vehicles Miles Traveled[a]	20.0

Source: SEWRPC 2020a.

[a] Data are for the region.

1.4.1.2 Transportation Plan Element

Similar to the land use plan, SEWRPC adopted the first regional transportation plan in 1966, with updates adopted in 1978, 1994, 1997, 2006, and 2016 (current plan, reviewed and updated in 2020). Based on population, household, employment growth, and other data from the regional land use plan, the transportation plan forecasts traffic growth and transportation demand in the region. It also analyzes the ability of existing transportation facilities to address forecasted traffic demand and meet air-quality conformity requirements. Traffic forecasts reflect predicted growth patterns, number and types of trips made, routes taken, travel times, and other factors such as transit use. SEWRPC's regional traffic model has been in place for more than 50 years and estimates future traffic demand. SEWRPC updates the model regularly[6] to reflect changing trends. A transportation project must be listed in the regional transportation plan before it can be constructed. However, inclusion in the plan does not mean the project will ultimately be constructed.

The regional transportation plan evaluates street and highway capacity expansion (freeway and surface arterial) and makes recommendations to address the residual traffic volumes and congestion that may not be alleviated by recommended land use, public transit, bicycle and pedestrian, systems management, and demand management measures. Thus, adding capacity is only considered after all other regional plan elements are considered but would still not alleviate congestion. Based on SEWRPC's 2020 review and update to VISION 2050, the arterial street and highway element of the regional transportation plan totals 3,669 route-miles. Approximately 92 percent, or 3,371 of these route-miles, are recommended to be resurfaced and reconstructed to their same capacity. Approximately 233 route-miles, or 6 percent of the year 2050 arterial street and highway system, are recommended for widening to provide additional through-traffic lanes, including 68 miles of existing freeways. The remaining 65 route-miles, or about 2 percent of the total arterial street mileage, are proposed for new arterial roads. Thus, the plan proposes about an 8 percent expansion of freeway and surface arterial capacity over the next 30 years.

The fiscally constrained transportation plan in VISION 2050 includes projects that can be funded with existing and reasonably expected revenues, given existing and reasonably expected restrictions on the use of those revenues for specific types of projects or services. Widening I-94 between 70th Street and 16th Street was considered a committed project in 2021 to 2025 at the time VISION 2050 was completed (2016) and was included in the fiscally constrained transportation plan. As part of the 2020 update, the VISION 2050 fiscally constrained plan anticipated that the reconstruction and widening of I-94 between 70th Street to 16th Street would be completed and open to traffic between 2026 and 2030. The transit

[6] SEWRPC's existing base model was developed in 2001 and is continually updated to reflect new developments or anticipated roadway projects.

plan in VISION 2050 recommends that commuter bus routes continue to use I-94[7]. All routes would continue to provide service along their existing routes (see Section 3.3.1.1).

The 2050 regional land use and transportation plan recommends 68 miles of freeway widening (including I-94 between the Zoo and Marquette interchanges). This includes about 17 miles of freeway reconstruction including widening as part of the reconstruction of I-94 between 70th Street and 16th Street in Milwaukee County and I-43 between Silver Spring Drive and WIS 60. Thus, about 25 percent of the recommended 68 miles of freeway capacity expansion that include an additional lane in each direction may be considered as committed projects. The plan acknowledged that the remaining recommended freeway widening will undergo preliminary engineering and environmental studies by WisDOT, which will consider alternative alignments and impacts, including a No-build option.

VISION 2050 states that postponing reconstruction of freeways beyond their service life and not adding capacity on highly congested segments will have the following negative impacts:

- Costly emergency repairs and inefficient pavement maintenance due to unnecessary, and increasingly ineffective, repaving projects
- Increased traffic congestion and travel delays, along with decreased travel reliability
- Increased crashes due to traffic congestion, antiquated roadway design, and deteriorating roadway condition

As mentioned previously, VISION 2050 anticipates the reconstruction and widening of I-94 between 70th Street and 16th Street will be completed and open to traffic between 2026 and 2030. Because the plan defers to a more detailed study by WisDOT and FHWA regarding capacity expansion on this segment of I-94 (and other segments), consistency with the regional plan is not a factor used to evaluate alternatives described in Section 2 of this Supplemental Draft EIS. Nonetheless, the regional plan recommendations demonstrate the need for the project and are an important factor in developing alternatives.

1.4.1.3 A Transportation Improvement Program for Southeastern Wisconsin: 2021-2024 (December 2020) (SEWRPC 2020b)

SEWRPC is the federally designated metropolitan planning organization (MPO) that ensures air-quality conformity in the seven-county southeastern Wisconsin region. In accordance with the 1990 Clean Air Act Amendments, proposed highway improvements must be included in an approved Transportation Improvement Program (TIP) and the adopted regional transportation plan to be in conformance with the State Implementation Plan (SIP) for air quality.

The TIP lists all arterial highway, public transit, and other transportation improvement projects proposed to be carried out by state and local governments over a 4-year period in the seven-county region. The TIP indicates the transportation-system improvement priorities of state and local governments in southeastern Wisconsin by their programming of projects to be undertaken in each of the next 4 years. Transit, arterial highway, and other improvement projects to be implemented in the next 4 years with U.S. Department of Transportation (USDOT) funding should be included in the TIP.

The I-94 East-West Corridor Project is included in the 2021-2024 TIP as Project Number 56: "Implementation of the Preferred Alternative resulting from the NEPA processes' Record of Decision for

[7] As of August 2022, MCTS continues to have a "temporary suspension" of Freeway Flyer routes that use I-94 due to operational challenges from the COVID-19 pandemic (MCTS 2022). Route 44U continues to operate and uses I-94 in the study area, but only operates during fall and spring university semesters.

reconstruction and modernization of IH 94 (East-West freeway) from 70th St to 16th St in the City of Milwaukee." The project was amended in July 2021 to reflect an increase in preliminary engineering and other project costs in 2021 and a decrease in preliminary engineering costs in 2022.

The Wisconsin Department of Natural Resources (WDNR) is the state agency responsible for developing the SIP. The SIP documents how WDNR intends to meet its obligations to protect and enhance air quality statewide. The SIP consists of many parts, each requiring approval by the U.S. Environmental Protection Agency (USEPA). Prior to USEPA approval, there must be a public availability period and public hearing. Most parts of the SIP apply to all sources of air pollution in Wisconsin, whereas some "source-specific" parts of the SIP may apply only to a single regulated entity.

In December 2018, FHWA and the FTA determined SEWRPC's VISION 2050 to be in conformance with the transportation planning requirements of Titles 23 and 49 United States Code (USC), the Clean Air Act Amendments, and related regulation. FHWA and FTA also approved the regional emissions analysis prepared for the 2050 regional transportation plan, which the 2021-2024 TIP serves to implement. The December 5, 2018, USDOT conformity determination is at the back of VISION 2050, located here: https://www.sewrpc.org/SEWRPCFiles/Vision2050/assessment-of-conformity-tran-improvement-program-Dec-2018.pdf. Concurrence on this determination from the FHWA, FTA, WDNR, and WisDOT is also at the link above.

1.4.1.4 U.S. Department of Transportation's Bicycle and Pedestrian Accommodation Policy

The *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations* (USDOT 2010) notes that the establishment of well-connected walking and bicycling networks is an important component for livable communities and their design should be a part of federal-aid project developments, such as the I-94 East-West Corridor project. Additionally, FHWA provides guidance, *Federal Highway Administration Bicycle and Pedestrian Planning, Program, and Project Development* (FHWA 2019), to describe federal legislative and policy direction related to safety and accommodation for bicycling and walking. Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. Design standards are included in the American Association of State Highway and Transportation Officials (AASHTO) design manuals.

I-94 and the system and service interchange ramps in the study area are exempt from USDOT's bicycle and pedestrian accommodation policy because bicycles and pedestrians are prohibited on these roadways per Wisconsin law (Wis. Stat. 346.16). However, any local roadways reconstructed as part of the project would be subject to USDOT's bicycle and pedestrian accommodation policy.

Although bicycle and pedestrian accommodations are not part of the project purpose and need, per Wisconsin State Statute 84.01(35), WisDOT shall give due consideration to pedestrian and bicycle facilities, where practicable and consistent with USDOT policy, as part of the alternatives development process discussed in Section 2 of the Supplemental Draft EIS. Considerations for bike and pedestrian accommodations are included as part of reconstruction activities at cross streets, interchanges, overpasses, and underpasses along the study corridor. See Sections 2.2 and 3.3.2.5 for additional information regarding bicycle and pedestrian accommodations.

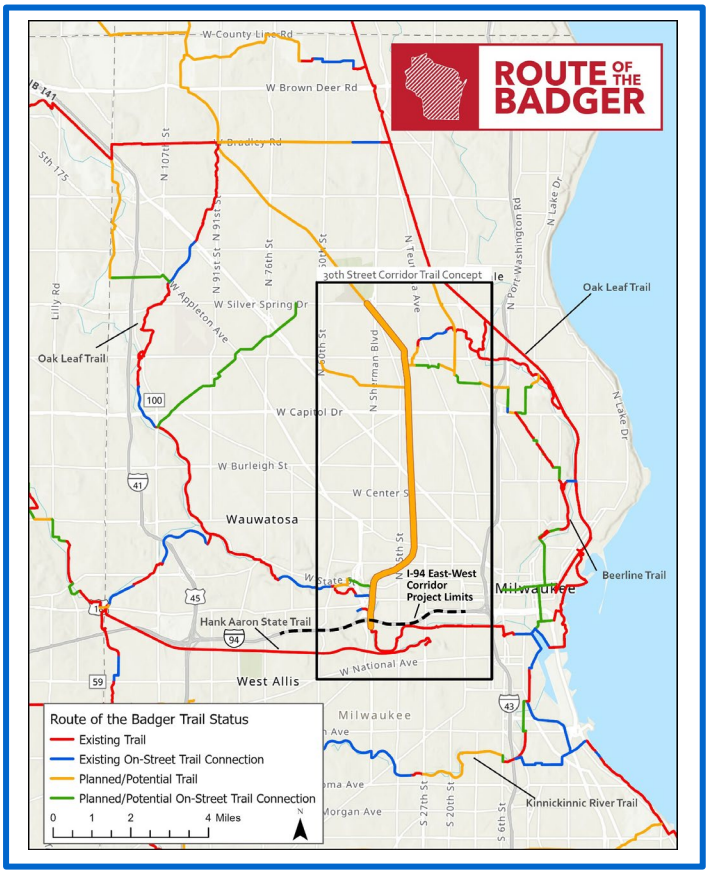
1.4.1.5 Menomonee Valley 2.0 Comprehensive Area Plan (City of Milwaukee 2015)

In June 2015, the City of Milwaukee adopted the *Menomonee Valley 2.0 Comprehensive Area Plan* (City of Milwaukee 2015). The plan notes that the planned reconstruction of I-94 would provide an opportunity to improve interstate and local street connections into and out of the Valley. The plan also hopes to build upon I-94 reconstruction to improve bike and pedestrian access between Clybourn Street, Marquette University, Avenues West, and the Valley. In addition, an I-94 Valley Gateway is viewed as a priority project as part of the plan. The plan recommends that the City of Milwaukee work with WisDOT to shape a new freeway design to significantly improve access, aesthetics, and connections to and from the Valley.

1.4.1.6 30th Street Corridor Shared-Use Trail Preliminary Feasibility Study (Rails to Trails Conservancy 2020)

This study analyzed the feasibility of a shared-use trail paralleling the rail line (also known as a "rail-with-trail") along the 30th Street rail corridor as part of the Route of the Badger initiative. The rail corridor is roughly 6.7 miles, extending from Silver Spring in the north to the Hank Aaron State Trail just south of the I-94 East-West Corridor at American Family Field. The corridor would cross I-94 near the existing Menomonee River crossing on the east end of the Stadium Interchange. The study found that a shared-use trail project along the 30th Street rail corridor is feasible and that various on-street connections are possible to fill gaps where the corridor is narrow or obstructed..

The 30th Street rail corridor follows the Glendale Line, a rail line that parallels 30th Street for a significant portion. The southern segment of the trail, from North Avenue to the Hank Aaron State Trail on Selig Drive, would pass through Miller Valley and provide a connection to American Family Field via mostly off-street trail, crossing I-94 near the Menomonee River before connecting to Hank Aaron State Trail. A trail within this rail corridor would provide a vital connection to the Oak Leaf Trail, the Hank Aaron State Trail, and a future extension of the Beerline Trail.



1.4.2 System Linkage and Route Importance

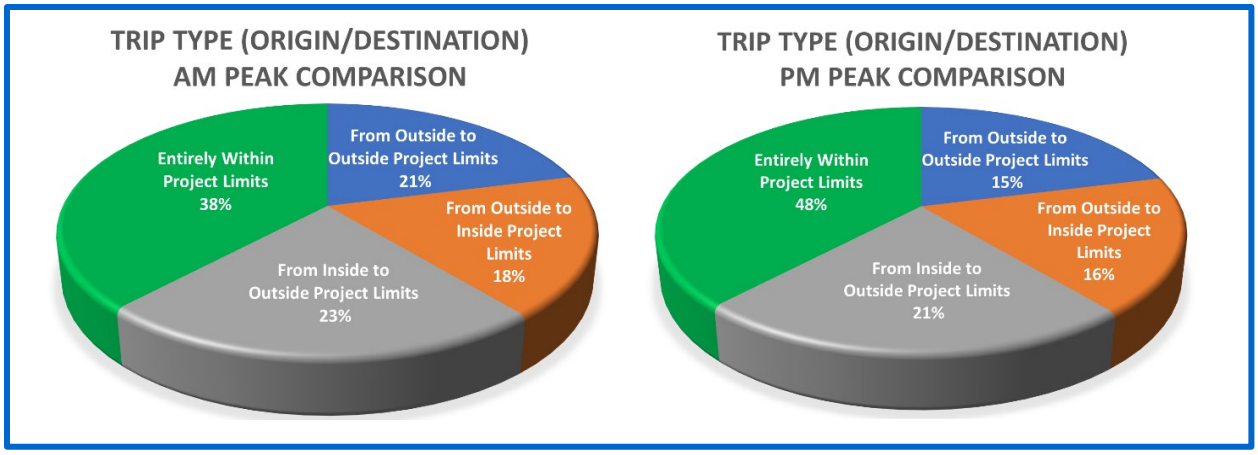
I-94 is a major east-west freeway link across the northern United States, connecting Detroit, Chicago, Milwaukee, Madison, St. Paul, Minneapolis, and Billings, Montana.

I-94 is part of the National System of Interstate and Defense Highways. According to AASHTO's *A Policy on Design Standards Interstate System* (2016), "The Dwight D. Eisenhower National System of Interstate and Defense Highways (Interstate) is the most important highway system in the United States. It carries more

traffic per mile (kilometer) than any other comparable national system and includes the roads of greatest significance to the economic welfare and defense of the nation. The highways of this system are to be designed in keeping with their importance as the backbone of the nation's highway systems. To this end, they are designed to provide safety and mobility for predicted growth in traffic." In 2018, Wisconsin's interstate system (including the southeastern Wisconsin freeway system) composed less than 1 percent of the state roadway miles, yet carried 22 percent of all VMT (WisDOT 2019).

I-94 is also a designated federal and state, "long truck route," allowing longer commercial vehicles to use the freeway. I-94 is also a designated "backbone" route in WisDOT's *Connections 2030 Long-Range Multimodal Transportation Plan* (WisDOT 2009). Backbone routes are high-level multilane (or planned multilane) divided highways that provide connections between major statewide regions and economic centers and tie them to the national transportation network.

I-94 serves travelers within the study area, those traveling to and from the study area, and those traveling through the study area. A 2019 peak-period traffic study (Street Light 2019) shows that 38 to 48 percent of trips on I-94 in the I-94 East-West Corridor were trips that started and ended within the project limits (70th Street to 16th Street)—that is, trips in which the vehicle entered I-94 somewhere within the project limits and the same vehicle exited I-94 within the project limits. The study also determined that 21 to 23 percent of the trips on I-94 originated from within the project limits and traveled beyond the project limits, whereas 16 to 18 percent of trips on I-94 originated outside the project limits and ended within the project limits. Finally, 15 to 21 percent of travelers were merely moving through the study area (that is, trips began and ended outside the project limits). This indicates that a substantial majority (79 to 85 percent) of travelers during peak periods began or ended (or both) their freeway trips in the study corridor.



The I-94 East-West Corridor is the critical link between the Marquette and Zoo interchanges, effectively connecting Milwaukee County's eastern and western freeway systems. In addition to serving long-distance travelers and regional and national freight movement, the study area freeway system is an important commuter route for many of the approximately 453,000 employees who work in Milwaukee County (U.S. Census Bureau 2019). The I-94 East-West Corridor is adjacent to, or provides a connection to, the following local destinations (**Exhibit 1-2**):

- Downtown Milwaukee
- Downtown West Allis
- Port of Milwaukee
- Potawatomi Hotel and Casino

- Menomonee Valley Industrial Center
- United States Department of Veterans Affairs (VA) campus, including the Northwestern Branch, National Home for Disabled Volunteer Soldiers National Historic Landmark (NHL), and Clement J. Zablocki VA Medical Center
- Molson Coors Beverage Company (Miller Brewery)
- Summit Place Office Complex
- American Family Field
- Marquette University
- State Fair Park (Pettit National Ice Center, Milwaukee Mile, and Exposition Center)
- Milwaukee County Zoo
- Milwaukee County Research Park
- Milwaukee Regional Medical Center

In the seven-county region, 26 percent of the population, 27 percent of jobs, and 35 percent of businesses are located within a 5-mile radius of the Stadium Interchange (Milwaukee 7 Economic Development Partnership n.d.).

1.4.3 High Crash Rates

WisDOT measures highway safety by the frequency and severity of crashes and maintains a database of crashes that occur on the state highway system. WisDOT uses the information to develop statewide average crash rates for highways. WisDOT and FHWA used Wisconsin statewide averages for 6-lane freeways with an annual average daily traffic (AADT) greater than 90,300 vehicles per day (vpd) as the basis to evaluate the I-94 East-West Corridor. Crash rates are expressed as crashes per 100 million VMT and include all reported crashes that cause a fatality, injury, or property damage.

From 2015 to 2019, the average statewide crash rate for 6-lane freeways with an AADT greater than 90,300[8] vpd was 107 crashes per 100 million VMT. This rate does not include deer-related crashes. **Table 1-2** and **Exhibit 1-3** summarize the crash rates for I-94 in the study area compared with the statewide average for similar roadways. All segments in the I-94 East-West Corridor (I-94 from 70th Street to 16th Street) have crash rates higher than the statewide average. Most crash rates in the I-94 East-West Corridor are one to two times the statewide average, several sections are two to three times the statewide average, and one section is over three times the statewide average.

Crash rates for system and service interchange ramps were not included in **Table 1-2**. Ramp crash rates cannot be compared directly to mainline crashes due to design differences. In addition, WisDOT does not have an average statewide crash rate for ramps.

[8] In 2015, WisDOT conducted a statistical analysis to develop groups of roadway segments with similar characteristics (e.g., number of lanes, volumes, posted speed, access, and median type) in order to compare crash rates. WisDOT used the number of lanes and AADT to define freeway peer groups. 90,300 vpd is the threshold WisDOT chose for differentiating between 6-lane freeway segments.

Table 1-2. High Crash Rate Locations

Crash Rate	Applicable Area
1 to 2 times the statewide average	• Eastbound I-94 between WIS 175/Brewers Boulevard and 16th Street • Westbound I-94 between 16th Street and 35th Street • Westbound I-94 between Hawley Road and 70th Street
2 to 3 times the statewide average	• Eastbound I-94 between 70th Street and General Mitchell Boulevard • Westbound I-94 between 35th Street and Hawley Road
Over 3 times the statewide average	• Eastbound I-94 between General Mitchell Boulevard and WIS 175/Brewers Boulevard

Note: The statewide crash rate for 6-lane freeways with an AADT greater than 90,300 vpd is 107 crashes per 100 million VMT.

On the I-94 East-West Corridor (I-94 from 70th Street to 16th Street), there were approximately 2,300 crashes (not including deer or other animal crashes) from 2015 to 2019, or roughly 1.3 crashes per day. Approximately 21 percent of the crashes resulted in injuries, and 4 crashes were fatal.

On the study area freeway system and entrance/exit ramps, the following are the most common types of crashes:

- Rear-end crashes (63 percent)
- Single-vehicle off-road crashes (15 percent)
- Sideswipe crashes (18 percent)

Rear-end and sideswipe crashes are often indicators of congestion, as well as inadequate acceleration/deceleration lanes, weaving, and substandard ramp spacing. High occurrences of rear-end crashes on a freeway are typically the result of peak-hour congestion in which drivers are stuck in "stop-and-go" traffic and move much slower than the average freeway speed. As a result of congestion, the probability of rear-end crashes is increased, as drivers may be forced to slow and brake suddenly based on what vehicles ahead of them are doing (for example, changing lanes or letting other drivers merge).

The presence of both left- and right-hand entrance and exit ramps is also a contributing factor to these types of crashes. In general, off-road crashes by single vehicles usually indicate tight curves with inadequate banking and narrow shoulders.

Crashes within the I-94 East-West Corridor contribute to traffic congestion on I-94, which leads to increased travel times within the study area. The extent of the congestion depends on the severity of the crash and the number of lanes affected.

1.4.4 Existing Freeway Conditions and Deficiencies

1.4.4.1 Pavement Condition

Since WisDOT constructed I-94 in the early 1960s, the original concrete pavement has worn and cracked. Water enters pavement cracks and rusts the wire-mesh reinforcement (commonly used in the era when I-94 was constructed) that holds the slabs of concrete together (**Exhibit 1-4**). Water also runs through the cracks to the gravel base under the pavement and can wash out the finer gravel material. The erosion leaves a void beneath the pavement and decreases pavement stability. Water trapped within existing cracks expands when it freezes, widening the cracks. Freeze-thaw cycles and heavy trucks also add to pavement stress.

In the project area, WisDOT first resurfaced I-94 in 1975 and 1976. Resurfacing restored the roadway's smooth riding surface but did not address the cracks in the concrete or the voids in the underlying gravel

base. WisDOT resurfaced I-94 in the project area again in 1997 and 1998. The westbound lanes received a third overlay in 2011, and the eastbound lanes received a third overlay in 2012. In general, each highway resurfacing has a shorter life span than the previous resurfacing because the original pavement, still in place after 50 years, provides a less effective base as the concrete continues to crack and deteriorate (**Exhibit 1-5**). In fact, during the 2011 to 2012 resurfacing, WisDOT replaced over 5,000 square yards of the original pavement (out of roughly 190,000 square yards of pavement on I-94 in the study area), and the 1997 to 1998 resurfacing included replacing over 1,300 square yards of the original pavement because of its deterioration. Based on WisDOT's experience with other highways, resurfacing the study area freeway system again would not be cost effective. It has been nearly 10 years since the last resurfacing, and ride quality and the underlying base of I-94 continues to deteriorate.

SEWRPC projected the remaining pavement life of southeastern Wisconsin freeways as a part of the 2003 plan *A Regional Freeway System Reconstruction Plan for Southeastern Wisconsin* (SEWRPC 2003). The analysis estimated that the I-94 pavement in the study area would reach the end of its life expectancy[9] between 2006 and 2010. The analysis took place prior to the 2011 to 2012 resurfacing.

1.4.4.2 Bridge Condition

There are 34 bridges in the I-94 East-West Corridor, 17 of which carry I-94 traffic. The other bridges are on cross streets spanning over I-94, on the Stadium Interchange ramps, and along WIS 175 and Brewers Boulevard. The structural condition of the study area freeway system's bridges is a factor in the need for the project. The condition of the bridges has deteriorated over the years due to age, heavier than expected traffic, road salt, freeze-thaw cycles, and water entering cracks in the bridges. At some specific locations, bridge clearances (the vertical distance from pavement to the lowest portion of the bridge above the roadway) are below current criteria. Taller vehicles strike the bridges, causing additional and accelerated deterioration.

Bridge Types

Most highway bridges in Wisconsin are concrete or steel girder bridges. In the I-94 East-West Corridor, there are the following 6 types of bridges: steel girder (22 bridges), concrete girder (6), voided slab (2), haunched slab (1), steel "K" frame (1), and concrete rigid frame (2).

Girder bridges have a deck, the concrete surface on which vehicles drive. The deck is supported by concrete or steel girders that lie horizontally under the deck. Vertical concrete piers or columns that are anchored in the ground support the girders. When the deck wears out, it can be removed and replaced. The girders, which typically last longer than the decks, remain in place (**Exhibit 1-6**).

Voided slab bridges carry I-94 over General Mitchell Boulevard. A voided slab bridge is not a continuous slab of concrete. The concrete has cylindrical "voids" similar to a box girder but thinner (**Exhibit 1-6**). A haunched slab bridge carries I-94 over Hawley Road. A haunched slab bridge is made of continuous concrete, and its slab is tapered so that the concrete is thicker over the bridge piers than between them (**Exhibit 1-6**). The deck on a slab bridge is a part of the bridge's weight-bearing structure, which makes it difficult to replace the deck on a slab bridge without replacing the entire slab structure.

[9] Life expectancy in the SEWRPC analysis was based on pavement condition, total traffic, truck traffic, construction history, and the number and timing of resurfacings.

The Zablocki Drive bridge over I-94 (cemetery access road) is a steel "K" frame bridge that has a concrete deck supported by a steel frame. Concrete rigid-frame bridges carry I-94 over Yount Drive. With this type of bridge, the substructure and superstructure are a single piece of concrete (**Exhibit 1-6**).

Deterioration

Since this portion of I-94 opened to traffic, 18 bridges along I-94 have received new decks and others have received a concrete or asphalt overlay. The superstructures of two bridges (27th Street and 26th Street over I-94) were replaced in 2006. Overlays typically provide a smooth driving surface and, in some cases, slow down the rate of deterioration by sealing out water. The main deterioration on the bridges occurs beneath the overlays.

The bridges in the I-94 East-West Corridor were constructed using reinforced concrete. Reinforced concrete consists of concrete with steel reinforcing bars, also referred to as rebar, placed in the concrete for added tensile strength. When the steel rebar is exposed to air and road salt, it rusts. The deicing salts used on roads in Milwaukee County contain chlorides that accelerate the formation of rust. When the salt-laden water from the roadway enters cracks in the concrete, it eventually causes the rebar steel to rust and weaken. The rust on the rebar expands and exerts pressure on the concrete that cracks from within, creating a spall, or pothole, on the top or bottom of the bridge. As the process continues, the spalls become larger, resulting in more concrete chipping and falling off the bridge and steel rebar losing its overall strength (**Exhibit 1-7**).

When spalls on the top of the bridge deck occur, an overlay of concrete or asphalt is needed. The overlay restores a smooth driving surface and offers some protection to the rusted steel rebar. As the overlay deteriorates, however, the steel rebar in the deck will once again continue to rust. The extent of the additional deterioration is not immediately visible and may become severe before a pothole reappears on the deck surface. The extensive deterioration results in reduced load-carrying capacity for the bridge, which can lead to weight restrictions on the bridge and eventually require repair or replacement. New bridges have improved concrete, joints, and rebar.

Another factor contributing to bridge deterioration is that the bridges in the study area are carrying more traffic than they were originally designed to carry. When I-94 was designed, a more extensive freeway system was planned for southeastern Wisconsin. Eliminating several segments of the planned southeastern Wisconsin freeway system in the 1970s resulted in I-94 carrying more traffic than anticipated in a 1957 traffic analysis and forecast completed by the Milwaukee County Expressway Commission (Milwaukee County Expressway Commission 1957).

Existing Bridge Condition Ratings

FHWA maintains the National Bridge Inventory (NBI), which is a comprehensive database of structural and appraisal data collected by each state for all bridges in the United States. The inventory includes each bridge's structural and functional properties. One of the appraisal ratings, the Structural Evaluation Appraisal Rating, was used to evaluate the condition of the bridges in the I-94 East-West Corridor. The rating takes into account the condition of the bridge's girders and piers, in addition to the bridge's safe load level and the amount of traffic carried by the bridge (FHWA 1995). The functional deficiencies of the study area bridges are documented later in this section.

I-94 bridges were inspected in 2017 and 2018. Structural Evaluation Appraisal Ratings range from 0 to 9, with 9 being "superior to present desirable criteria" and 0 being a closed bridge. Many of the bridges in the study area have ratings of 5 or 6, defined as "somewhat better than minimum adequacy to tolerate being left in place as is" and "equal to present minimum criteria." Over the next several years, several of

the bridges would likely decline to a rating of 4 based on WisDOT's experience with bridge deterioration.[10] **Table 1-3** lists bridges in the study area by their Structural Evaluation Appraisal Rating.

The deterioration is the result of rusted rebar, which reduces the bridge's load-carrying capacity and causes concrete to spall and chip. Use of the bridges by higher-than-expected traffic volumes, in combination with their outdated design, has hastened the deterioration. If any Modernization Alternative were implemented, bridges in the corridor would be rebuilt regardless of their condition.

In 2018, WisDOT added high-friction surface treatment to the I-94 bridge pavement in the Stadium Interchange. In 2020, WisDOT began rehabilitating 22 bridges along I-94 in the study area by repairing concrete and columns, and rehabilitating or replacing bearings on select bridges (Project ID 1060-11-73). This would maintain the safety of the bridges and lengthen the life of the bridges until they can be replaced as part of the I-94 East-West Corridor project.

Table 1-3. Structural Evaluation Appraisal Ratings

Rating	Location
5	I-94 over Hawley Road; Westbound I-94 over General Mitchell Blvd; Eastbound I-94 over General Mitchell Blvd; Westbound I-94 over Yount Drive; 25th Street over I-94; Bluemound Road over WIS 175; 35th Street over I-94; Westbound I-94 over Northbound WIS 175; Westbound I-94 over 68th Street; Eastbound I-94 over 68th Street; Westbound I-94 over 64th Street; Eastbound I-94 over 64th Street; Wisconsin Avenue over WIS 175
6	Eastbound I-94 over Yount Drive; Eastbound I-94 over 44th Street; Eastbound I-94 over Canadian Pacific Railroad; Westbound I-94 over Canadian Pacific Railroad; I-94 over 32nd Street; 27th Street over I-94; Westbound I-94 to Southbound WIS 175 ramp over land; Westbound I-94 to Southbound WIS 175 ramp over Eastbound I-94; Southbound WIS 175 over Westbound I-94; Southbound WIS 175 over Eastbound I-94; Southbound WIS 175 to Eastbound I-94 ramp over 44th Street; Southbound WIS 175 to Eastbound I-94 ramp over Menomonee River; Southbound WIS 175 over Northbound WIS 175 to Westbound I-94 ramp; Southbound WIS 175 over land; Southbound WIS 175 over I-94; Northbound WIS 175 to Westbound I-94 over Eastbound I-94; Westbound I-94 over 70th Street; 26th Street/St. Paul Avenue over I-94; Southbound WIS 175 over Selig Drive; Northbound WIS 175 over Selig Drive; Wells Street over WIS 175
7	Eastbound I-94 over 70th Street; Eastbound I-94 over Northbound WIS 175
8	Frederick Miller Way over WIS 175

1.4.4.3 Freeway Design Deficiencies

Overview

New and reconstructed freeways must meet the minimum values for 10 controlling design criteria, such as vertical clearance, lane and shoulder widths, and sight distance. Design criteria developed for the controlling elements are based on AASHTO's *A Policy on Geometric Design of Highways and Streets, 7th Edition* (2018), AASHTO's *A Policy on Design Standards—Interstate System* (2016), and WisDOT's *Facilities Development Manual* (FDM 2022). The documents are the basis for evaluating the study area freeway system for acceptability, function, and safety. Design criteria in WisDOT's FDM govern design of the alternatives. The FDM guidelines generally meet or exceed AASHTO criteria. However, where the FDM does not address AASHTO criteria, the AASHTO criteria govern.

[10] The Zablocki Drive bridge over I-94 just west of General Mitchell Boulevard has a 10-ton weight limit, which is well below most bridges, and has a Structural Evaluation Appraisal Rating of 2. The bridge was designed and built with the 10-ton limit; it is not the result of deterioration. The bridge provides access to the VA Medical Center and the VA's Wood National Cemetery. The VA stated that the weight limit does not affect its use of the bridge. Therefore, this EIS does not list this bridge as deficient.

The following deficient freeway design criteria are discussed in this section:

- Horizontal Curves—Several curves on I-94 have a radius and superelevation that result in design speeds less than the recommended freeway design speed.
- Vertical Alignment—One study area location has an inadequate vertical grade.
- Stopping Sight Distance—There are several locations where existing design speed is less than the minimum recommended design speed based on stopping sight distance.
- Decision Sight Distance—There are eight locations that do not meet minimum standards for decision sight distance.
- Cross Section—The inside shoulder width along I-94 does not meet standards. Shoulder widths on all service interchange ramps and three ramps in the Stadium Interchange do not meet guidelines.
- Vertical Clearance—There are 16 bridges in the study area with inadequate vertical clearance.
- Ramp Spacing—There are 12 locations in the study area where minimum ramp spacing is not provided, causing unsafe weaving movements.
- Left-hand Entrances and Exits—There are 10 locations where left-hand ramps combined with closely spaced service interchanges create unsafe situations.
- Ramp Taper Rates—There are 18 locations where the ramp taper rate does not allow for adequate merging distance.
- Acceleration and Deceleration Lanes—There are 10 entrance and exit ramps that have inadequate acceleration and deceleration lengths.

Exhibit 1-8 gives an overview of the design deficiencies in the study area. There are numerous design deficiencies over the length of the I-94 East-West Corridor, and they are not concentrated in one area. Many of the design deficiencies are related to the interchanges, but there are also deficiencies between the interchanges where there are issues such as lane and shoulder width and steep grades.

Horizontal Curves

Design speed is the maximum safe speed that a driver can maintain over a specific section of highway. Factors such as highway type, topography, adjacent land use, and driver expectations affect design speed. According to AASHTO's *A Policy on Geometric Design of Highways and Streets* (2018), higher design speeds are closely related to the overall quality and safety of a roadway. To account for a wide range of vehicle speeds, the design speed is generally 5 miles per hour (mph) greater than the posted speed limit. Based on WisDOT and AASHTO policy, **Table 1-4** summarizes the recommended design speeds for the I-94 East-West Corridor. As noted in **Table 1-4**, some existing design speeds on I-94 and WIS 175/Brewers Boulevard are lower than the minimum recommended design speed. This is because freeway design standards have changed, and continue to do so, since the roadways were originally constructed. The standards change due to changing driver behavior, changes in vehicles driven, and continuing research of existing freeways. When the original freeways were built, no data were available showing which design features would cause safety issues.

On freeways, curves should be designed to allow the driver to negotiate the curves safely without reducing speed. A larger curve radius results in a more gradual curve and allows higher design speed. Another element that influences a vehicle's speed through a curve is the amount of banking, or superelevation, in the curve. Superelevation is the extent to which the roadway is banked to offset the tendency of vehicles to slide outward or overturn on a curve. A smaller curve radius requires more banking than a larger curve to ensure vehicle safety. Several curves in the study area freeway system

have a radius and superelevation that result in design speeds less than the recommended freeway design speed (**Table 1-4** and **Exhibit 1-9**). For example, the combination of a horizontal and vertical curve at the bottom of a hill between 32nd Street and 18th Street reduces sight distance. Sight distances are also limited by local street bridges passing over I-94. Improved sight distance allows drivers more time to react to roadway obstructions and make decisions on lane selection.

Existing I-94 Looking Eastbound at 27th Street.
The combination of a horizontal and vertical curve is evident in this photograph.

Table 1-4. Horizontal Alignment—Minimum Recommended Design Speeds and Existing Design Speeds

Location	Minimum Recommended Design Speed (mph)	Existing Design Speed (mph)
I-94 between 70th Street and Hawley Road	60	40–45
I-94 between Hawley Road and General Mitchell Boulevard	60	45
I-94 between General Mitchell Boulevard and Stadium Interchange	55–60	45–60
I-94 between Stadium Interchange and 35th Street	55	45–50
I-94 between 35th Street and 25th Street	55	40–65
I-94 between 25th Street and 16th Street	55	45
WIS 175 between Stadium Interchange and Wells Street	50–55	45
Brewers Boulevard between Stadium Interchange and Canal Street/Frederick Miller Way	50	45–55
Stadium Interchange Ramps:		
I-94 eastbound to WIS 175 northbound	40–50	30
I-94 eastbound to Brewers Boulevard southbound	40–50	30–35
I-94 westbound to WIS 175 northbound	40–50	30–40
I-94 westbound to Brewers Boulevard southbound	40–50	30
Brewers Boulevard northbound to I-94 eastbound	40–50	30
Brewers Boulevard northbound to I-94 westbound	40–50	30–35
WIS 175 southbound to I-94 eastbound	40–50	20–60
WIS 175 southbound to I-94 westbound	40–50	35

System interchange ramps connect one freeway to another. According to AASHTO, such ramps are typically designed to have speeds that are 50 to 85 percent of the freeway design speed. As a result, the minimum recommended design speed for each system interchange ramp in the Stadium Interchange is between 40 and 50 mph (**Table 1-4**).

Westbound I-94 exit at Hawley Road

Vertical Alignment

Vertical alignment refers to the grade or steepness of a roadway. Roadway grades have a direct correlation to the uniform operational speed of vehicles. Vehicle weight and the steepness of the roadway grade have a direct relationship with the ability of the driver to maintain uniform speed. Lack of uniform speed creates traffic conflicts, and crashes are often the result. WisDOT guidelines recommend a maximum freeway grade of 3 percent along flat terrain and 5 percent for ramps; however, in some situations, a ramp grade of up to 8 percent is acceptable, if the length of such grade is relatively short. The grade on I-94 from 25th Street to 16th Street is above WisDOT's maximum grade guidelines for flat terrain. In general, the flatter the road, the safer it is to drive.

However, WisDOT and AASHTO guidelines recommend a slight grade on freeways to ensure that water properly drains off the roadway. On a completely flat road, water tends to pond, increasing the risk of vehicles hydroplaning. AASHTO recommends a minimum 0.3 percent grade on roadways for drainage, with 0.5 percent being desirable. The eastbound I-94 exit ramp to northbound WIS 175 and northbound WIS 175/Brewers Boulevard through the Stadium Interchange each have a minimum vertical grade that is less than desirable, but not below the minimum acceptable grade.

Stopping Sight Distance

Stopping sight distance is the minimum distance required by a driver traveling at a given speed to stop a vehicle after sighting an object in its path.[11] Minimum stopping sight distance is based on the design speed of a roadway. On hill crests, sight is obstructed by the roadway between the driver and an object. At the bottom of a hill, sight is restricted at night because headlights do not fully illuminate the roadway ahead. On curves, a median barrier may reduce stopping sight distance. According to AASHTO criteria, the minimum stopping sight distance should be 495 feet for I-94 in the study area, based on the recommended design speed of 55 mph and 570 feet based on a recommended design speed of 60 mph. For the Stadium Interchange ramps, the minimum required stopping sight distance should be 305 to 425 feet, based on the minimum recommended design speeds of 40 to 50 mph. Most of the

[11] Stopping sight distance differs from vertical alignment or grade. Stopping sight distance can be inadequate even if the vertical alignment is adequate and vice versa. A crest in the road or median barriers can interfere with the driver's line of sight around a curve and affect stopping sight distance. Vertical grade measures the steepness of a roadway. A gradual transition to a steep grade may not affect the driver's line of sight.

Stadium Interchange ramps do not meet minimum stopping sight distance criteria. **Table 1-5** and **Exhibit 1-10** note the locations on the study area freeway system where the existing design speed is less than the minimum recommended design speed based on stopping sight distance.

Table 1-5. Stopping Sight Distance—Minimum Recommended Design Speeds and Existing Design Speeds

Location	Minimum Recommended Design Speed (mph)	Existing Design Speed (mph)[a]
I-94 west of the Stadium Interchange	55–60	30–70+
I-94 east of the Stadium Interchange	55	40–70+
I-94 through the Stadium Interchange	55	35–70+
Brewers Boulevard south of Stadium Interchange	50	35–65
WIS 175 north of Stadium Interchange	55	35–45
Stadium Interchange Ramps:		
I-94 eastbound to WIS 175 northbound	40–50	25–30
I-94 eastbound to Brewers Boulevard southbound	40–50	25–30
Brewers Boulevard northbound to I-94 eastbound	40–50	25
Brewers Boulevard northbound to I-94 westbound	40–50	25
I-94 westbound to WIS 175 northbound	40–50	25
WIS 175 southbound to I-94 westbound	40–50	25–40

[a] Based on stopping sight distance

Decision Sight Distance

Decision sight distance provides a driver sufficient time for safe decision-making. While stopping sight distance is the minimum distance required to bring a vehicle to a complete stop, decision sight distance gives a driver sufficient time to detect an object, recognize its threat potential, select an appropriate speed and path, and perform the required action safely and efficiently. The decisions most commonly occur prior to exits, major forks, and lane drops. The minimum decision sight distance is based on AASHTO and WisDOT design criteria.

The following areas do not meet AASHTO's or WisDOT's minimum design criterion for decision sight distance:

- The eastbound entrance to I-94 at 68th Street
- The westbound entrance to I-94 at 70th Street
- The eastbound entrance to I-94 at Hawley Road
- The westbound entrance to I-94 at Hawley Road
- The eastbound entrance to I-94 at General Mitchell Boulevard
- The westbound entrance to I-94 at General Mitchell Boulevard
- The eastbound entrance to I-94 at 35th Street
- The westbound entrance to I-94 at 35th Street

Cross Section

A roadway's cross section refers to the ditches, shoulders, median, and travel lanes that make up the roadway. The width of travel lanes and shoulders both inside and outside the travel lanes are key elements of freeway design. Through most of the study corridor, I-94 has three 12-foot lanes that conform to current WisDOT and AASHTO standards. As part of the construction completed in spring 2013, westbound I-94 was reconfigured to have four 11-foot lanes between the Marquette Interchange and 35th Street (3 mainline lanes and 1 auxiliary lane).

For shoulders, FHWA and WisDOT have adopted AASHTO's *A Policy on Design Standards—Interstate System* (2016) standard freeway lane widths of 12 feet and consideration of 12-foot paved shoulders where truck traffic exceeds 250 design hour volume (DHV) in the design year. Narrow inside shoulders result in disabled vehicles having to cross 3 lanes of traffic to reach a safe area on the outside shoulder. In addition, inside shoulders provide room for drivers to avoid crashes and for snow storage and emergency vehicle access. **Table 1-6** provides existing and recommended inside and outside shoulder widths along I-94 in the study area.

Table 1-6. Segments of Existing I-94 with Substandard Shoulder Widths

Location	Inside Shoulder Width (feet)	Outside Shoulder Width (feet)	Recommended Width (feet)[a]
I-94 eastbound			
70th Street to Hawley Road	2–12	10–12	12
Hawley Road to General Mitchell Boulevard	2–3	6–12	12
General Mitchell Boulevard to Stadium Interchange	2–4	10–12	12
Stadium Interchange to 35th Street	4–10	10	12
35th Street to 25th Street	2–9	4–10	12
25th Street to 16th Street	1–9	4–10	12
I-94 westbound			
16th Street to 25th Street	1–9	1–9	12
25th Street to 35th Street	2–9	1–9	12
35th Street to Stadium Interchange	4–8	1–10	12
Stadium Interchange to General Mitchell Boulevard	2–6	10	12
General Mitchell Boulevard to Hawley Road	2–4	2–12	12
Hawley Road to 70th Street	2–12	8–12	12

[a] For shoulders, FHWA and WisDOT have adopted AASHTO's *A Policy on Design Standards—Interstate Systems* (2016) standard freeway lane widths of 12 feet and consideration of 12-foot paved shoulders where truck traffic exceeds 250 DHV in the design year.

Per AASHTO criterion, when paved shoulders are provided on ramps, they should have a uniform width for the full length of the ramp. For one-way operation, the sum of the right and left shoulder widths is typically between 10 and 14 feet. A paved shoulder of 2 to 4 feet is desirable on the left, with the remaining width of 8 to 10 feet used for the paved right shoulder. The following three ramps in the Stadium Interchange do not meet the AASHTO criterion: Brewers Boulevard northbound to I-94 eastbound (4-foot right shoulder),

WIS 175 southbound to I-94 eastbound (4-foot right shoulder), and I-94 westbound to WIS 175 northbound (3-foot right shoulder).

None of the service interchange ramps meets the criterion. Each ramp currently has 2-foot shoulders on each side of the ramp.

According to WisDOT guidelines, single-lane freeway ramps should have a 22-foot width measured from face-of-curb to face-of-curb. The following are locations where curbed ramps are substandard; they have widths of less than 22 feet:

- Portion of I-94 eastbound entrance at 68th Street
- Portion of I-94 eastbound entrance at Hawley Road
- Portion of I-94 eastbound exit at General Mitchell Boulevard
- Portion of I-94 westbound entrance at 35th Street
- Portion of I-94 westbound entrance at Hawley Road

Vertical Clearance

Vertical clearance is the distance between a roadway and a bridge over it. Adequate vertical clearance is required to prevent taller vehicles, including military vehicles, from hitting bridges. Minimum vertical clearance requirements differ based on the type of roadway. Because interstate highways are part of the National Highway System, they require a minimum 16-foot clearance to accommodate oversized vehicles. WisDOT guidelines call for a 16-foot, 9-inch clearance for new or replaced bridges (when the superstructure is reconstructed) to allow for a 4- to 9-inch asphalt overlay in the future. Sixteen of the bridges in the study area do not meet the minimum vertical clearance criteria. **Table 1-7** lists the substandard locations and the minimum criteria.

I-94 westbound bridge over General Mitchell Boulevard. Due to the low clearance of this bridge, several trucks have crashed into the underside of the bridge and become stuck. The incidents have contributed to the deterioration of the bridge.

Table 1-7. Bridges with Inadequate Vertical Clearance

Location	Minimum Vertical Clearance Criteria	Existing Vertical Clearance
Mainline I-94		
Eastbound I-94 over General Mitchell Boulevard	14 feet (over arterial)	12 feet, 6 inches
Westbound I-94 over General Mitchell Boulevard	14 feet (over arterial)	12 feet, 8 inches
35th Street over I-94	16 feet (over freeway)	15 feet, 5 inches
26th Street/St. Paul Avenue over I-94	16 feet (over freeway)	14 feet, 10 inches
25th Street over I-94	16 feet (over freeway)	15 feet, 2 inches
Stadium Interchange		
Eastbound I-94 over northbound WIS 175	16 feet (over freeway)	14 feet, 5 inches
Westbound I-94 over northbound WIS 175	16 feet (over freeway)	13 feet, 10 inches
Southbound WIS 175 ramp to eastbound I-94 over westbound I-94	16 feet (over freeway)	13 feet, 11 inches
Southbound WIS 175 ramp to eastbound I-94 over westbound I-94 ramp to southbound Brewers Boulevard	16 feet (over freeway)	13 feet, 7 inches
Northbound Brewers Boulevard ramp to westbound I-94 over eastbound I-94	16 feet (over freeway)	14 feet, 4 inches
Southbound WIS 175 over northbound Brewers Boulevard to westbound I-94	16 feet (over freeway)	14 feet, 11 inches
Southbound WIS 175/Brewers Boulevard over I-94	16 feet (over freeway)	14 feet, 5 inches
Westbound I-94 ramp to southbound Brewers Boulevard over eastbound I-94	16 feet (over freeway)	14 feet, 7 inches
WIS 175		
Bluemound Road over WIS 175	16 feet (over freeway)	14 feet, 6 inches
Wisconsin Avenue over WIS 175	16 feet (over freeway)	15 feet, 6 inches
Wells Street over WIS 175	16 feet (over freeway)	14 feet, 7 inches

Interchange Configuration and Spacing

System interchanges are those that connect two or more freeways. Service interchanges, such as the Hawley Road interchange, are those that connect freeways with surface streets and cross roads. The service interchanges along I-94 and the Stadium Interchange each have numerous ramps that do not meet current design criteria.

Currently, none of the study area interchanges meets WisDOT or AASHTO design criteria for minimum spacing requirements between interchanges. WisDOT guidelines require 2 miles between interchanges in an urban setting, whereas the AASHTO criterion requires 1 mile. Over the 2.8-mile segment of I-94 between the 70th Street interchange and the 25th/26th/28th Street interchange, there are six interchanges—an average of more than 2 per mile.

Ramp Spacing

The risk of crashes increases when successive entrance and exit ramps are closely spaced or when through traffic is disrupted by lane changes while entering or exiting the freeway. A combination of factors creates dangerous weaving segments along I-94. AASHTO's minimum desired spacing between interchanges in an urban setting is 1 mile. WisDOT and AASHTO guidelines call for minimum 2,000-foot spacing for ramps between system interchanges and service interchanges, and 1,600-foot spacing between service interchange ramps to provide adequate weaving distance and space for signing (AASHTO 2016). WisDOT constructed I-94 prior to the development of the current design criteria; thus, the ramp spacing does not meet existing criteria in all locations. **Table 1-8** lists locations where the study area freeway system does not provide the minimum ramp spacing.

I-94, looking east from the Hawley Road Interchange

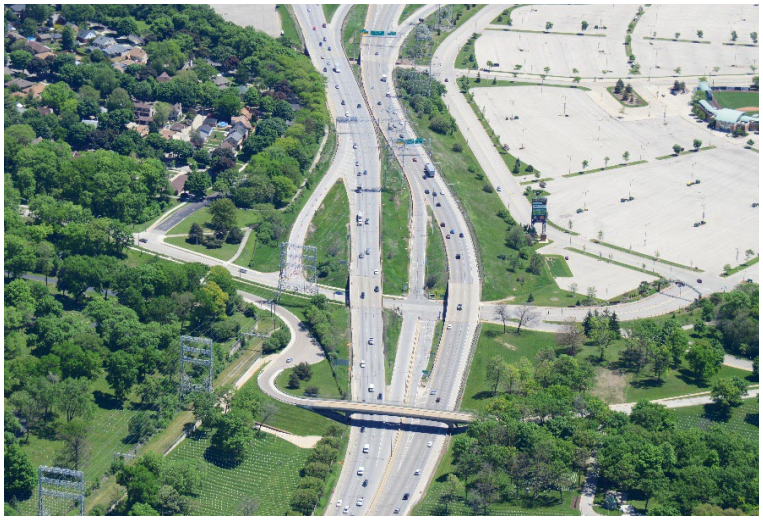
Table 1-8. Locations where Minimum Ramp Spacing Is Not Provided

Location	Minimum Ramp Spacing (feet)	Existing Spacing between Ramps (feet)
I-94 eastbound entrance from 68th Street to Hawley Road	1,600	1,050
I-94 eastbound entrance from Hawley Road to General Mitchell Boulevard	1,600	595
I-94 eastbound entrance from General Mitchell Boulevard to Stadium Interchange	2,000	850
I-94 eastbound entrance from Stadium Interchange to 35th Street	2,000	1,635
I-94 westbound entrance from St. Paul Avenue/28th Street to 35th Street	1,600	615
I-94 westbound entrance from 35th Street to Stadium Interchange	2,000	1,745
I-94 westbound entrance from Stadium Interchange to General Mitchell Boulevard	2,000	605
I-94 westbound entrance from Hawley Road to 68th Street	1,600	1,000
Brewers Boulevard northbound entrance from Frederick Miller Way/Canal Street to Stadium Interchange	2,000	1,660
Brewers Boulevard southbound entrance from Stadium Interchange to Frederick Miller Way/Canal Street	2,000	1,660
WIS 175 northbound entrance from Stadium Interchange to Wisconsin Avenue	2,000	760
WIS 175 southbound entrance from Wisconsin Avenue to Stadium Interchange	2,000	650

Left-hand Entrances and Exits

The Stadium Interchange and the General Mitchell Boulevard interchange were designed with left-hand entrances and exits. National design criteria call for all freeway entrances and exits to be on the right-hand side (AASHTO 2016). Left-hand entrance and exit ramps violate driver expectations. Reconstruction of the Marquette and Zoo interchanges eliminated all left-hand entrances and exits. The lack of left-hand entrances and exits at the major system interchanges on each end of this study corridor will create driver expectations of no left-hand entrances and exits within the study corridor. The following left-hand ramps in the Stadium Interchange and General Mitchell Boulevard interchange, combined with closely spaced service interchanges at Hawley Road, General Mitchell Boulevard, 35th Street, Bluemound Road/Wisconsin Avenue/Wells Street, and Frederick Miller Way/Canal Street, create unsafe situations in which drivers must weave across multiple lanes in a short distance to reach their exit:

- I-94 Eastbound
  - The right-hand entrance from Hawley Road to eastbound I-94 is approximately 0.1 mile from the left-hand General Mitchell Boulevard exit.
- I-94 Westbound
  - The left-hand entrance from General Mitchell Boulevard to westbound I-94 is approximately 0.3 mile from the right-hand exit to Hawley Road.



Left-hand entrances and exits at General Mitchell Boulevard interchange (looking east)

- Stadium Interchange
  - The left-hand entrance from General Mitchell Boulevard to eastbound I-94 is approximately 0.15 mile from the right-hand exit to southbound Brewers Boulevard in the Stadium Interchange.
  - The left-hand entrance in the Stadium Interchange from southbound WIS 175 to eastbound I-94 is approximately 0.3 mile from the right-hand exit to 35th Street.
  - The right-hand entrance from 35th Street to westbound I-94 is approximately 0.3 mile from the left-hand southbound Brewers Boulevard exit in the Stadium Interchange.
  - The left-hand entrance in the Stadium Interchange from northbound Brewers Boulevard to westbound I-94 is approximately 0.1 mile from the right-hand exit to General Mitchell Boulevard.
  - The left-hand entrance in the Stadium Interchange from westbound I-94 to southbound Brewers Boulevard is approximately 0.3 mile from the right-hand exit to Frederick Miller Way/ Canal Street.

- The right-hand entrance from Frederick Miller Way/Canal Street to Brewers Boulevard northbound is approximately 0.3 mile from the left-hand exit to I-94 westbound in the Stadium Interchange.
- The left-hand entrance in the Stadium Interchange from eastbound I-94 to northbound WIS 175 is approximately 0.15 mile from the right-hand Wisconsin Avenue exit.
- The right-hand entrance from Wisconsin Avenue to WIS 175 southbound is approximately 0.1 mile from the left-hand I-94 eastbound exit in the Stadium Interchange.

According to WisDOT's FDM, FHWA research indicates that the use of right-hand entrances and exits compared with left-hand ramps may reduce crashes by 25 to 70 percent. Refer to Section 1.4.3, High Crash Rates, and **Exhibit 1-3** for additional information.

Ramp Taper Rates

Adequate merging distance is measured by a ramp's taper rate. According to WisDOT and AASHTO guidelines, the taper rate for a freeway entrance ramp should be 50 to 1 (50:1), which means the merge lane becomes 1 foot narrower for every 50 feet of length. The minimum WisDOT taper rate guideline for a freeway exit ramp is 15:1, whereas AASHTO taper rates vary between 10:1 and 30:1, depending on the divergence angle of the exit. **Table 1-9** lists locations with substandard ramp taper rates.

Table 1-9. Locations with Substandard Ramp Taper Rates

Location	Minimum Taper Rate Criteria	Existing Taper Rate
I-94 eastbound entrance from 68th Street	50:1	22.5:1
I-94 eastbound exit to Hawley Road	15:1	9:1
I-94 eastbound entrance from Hawley Road	50:1	46:1
I-94 eastbound entrance from General Mitchell Boulevard	50:1	13:1
I-94 eastbound exit to southbound Brewers Boulevard	15:1	7.5:1
I-94 eastbound entrance from 35th Street	50:1	25:1
I-94 eastbound exit to 26th Street/St. Paul Avenue	15:1	10:1
I-94 westbound entrance from 35th Street	50:1	22.5:1
I-94 westbound exit to 35th Street	15:1	7.5:1
I-94 westbound exit to southbound Brewers Boulevard	15:1	7:1
I-94 westbound exit to General Mitchell Boulevard	15:1	12:1
I-94 westbound entrance from General Mitchell Boulevard	50:1	22.5:1
I-94 westbound entrance from Hawley Road	50:1	34:1
I-94 westbound exit to 68th Street	15:1	10:1
I-94 westbound entrance from 70th Street	50:1	22.5:1
WIS 175 northbound entrance from I-94 westbound	50:1	32:1
WIS 175 northbound exit to Wisconsin Avenue	15:1	3:1
WIS 175 southbound entrance from Wisconsin Avenue	50:1	10:1

Acceleration and Deceleration Lanes

Ramp design includes careful consideration of adequate acceleration lanes on entrance ramps and deceleration lanes on exit ramps so that entering vehicles can accelerate to freeway speed before merging with freeway traffic and exiting vehicles can decelerate to a slowed or stopped condition at ramp intersections with crossroads. If there is a difference in speed between vehicles on the freeway and vehicles entering the freeway, crashes can occur from the resulting congestion as vehicles decelerate on the freeway to allow the vehicles to enter. The design of exit ramps should provide enough distance to safely decelerate on the ramp rather than on the freeway.

The required lengths of acceleration and deceleration lanes vary depending on the tightness of curves on the ramp. An entrance ramp that has a gradual curve allows drivers to accelerate on the ramp, and thus the length of the acceleration lane can be shorter than for an entrance ramp with tighter curves.

Table 1-10 lists entrance and exit ramps that have inadequate acceleration and deceleration lengths based on AASHTO freeway design criteria.

Table 1-10. Ramps with Inadequate Acceleration or Deceleration Lanes

Location	Minimum Lane Length Needed (feet)	Actual Acceleration/ Deceleration Lane Length (feet)
I-94 eastbound entrance from 68th Street	960	550
I-94 eastbound entrance from Hawley Road	670	415
I-94 eastbound exit to General Mitchell Boulevard	380	330
I-94 eastbound exit to Brewers Boulevard	350	160
I-94 eastbound entrance from 35th Street	960	790
I-94 eastbound exit to 26th Street	430	310
I-94 westbound exit to Brewers Boulevard	410	300
I-94 westbound entrance from General Mitchell Boulevard	960	575
I-94 westbound exit to Hawley Road	430	260
I-94 westbound entrance from Hawley Road	670	350

1.4.5 Traffic Volumes

This section describes the existing and projected future traffic volumes along the I-94 East-West Corridor.

The technical memorandum titled *IH-94 E/W Corridor Peak Hour Traffic Volume Development Methodologies* summarizes the process of developing forecasts of future traffic volumes on the I-94 East-West Corridor (Appendix B-1).

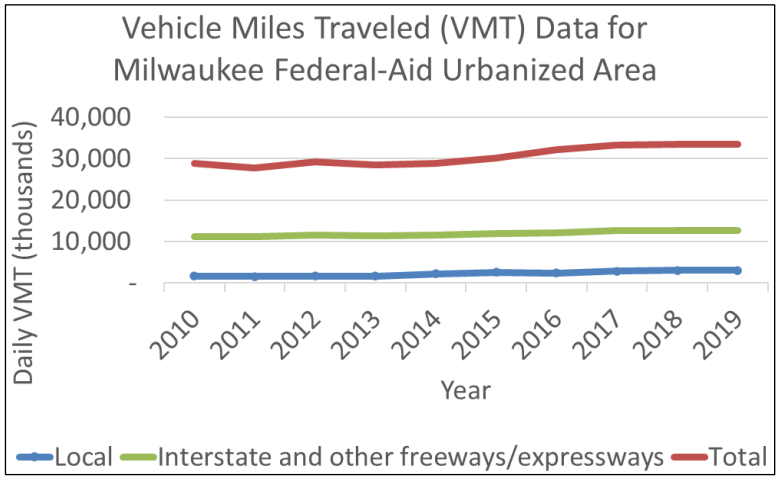
WisDOT used forecasts developed by SEWRPC for a variety of purposes on this project. SEWRPC's forecast represents 2050 as the horizon year. WisDOT's FDM recommends using a horizon year 20 years after construction as the "design year." At the beginning of this Supplemental EIS study, WisDOT estimated that the construction year would be 2025 and the design year would be 2050.

Following SEWRPC's submittal of the travel demand forecast, WisDOT reviews and accepts forecasts developed by the MPO, in this case SEWRPC, consistent with Chapter 9 of the WisDOT *Transportation Planning Manual* (https://wisconsindot.gov/Documents/projects/data-plan/plan-res/tpm/9.pdf).

After review and approval, WisDOT's project team uses the design year daily No-build forecast volumes for the purpose and need statement. In addition to the daily volume forecasts, WisDOT's project team used and applied SEWRPC peak-hour forecasts to be used in the various parts of the study for summarization within the EIS.

Traffic forecasts are projections of vehicles per day for an individual segment of a roadway and are for specific segments or corridors. WisDOT uses AADT for its traffic forecasts. AADT equals the sum of annual vehicles that drove on the segment divided by the number of days in the year.

VMT is a measure of the miles driven within a specified area and timeframe. From 2010 to 2019, total VMT in the Milwaukee Federal-Aid Urbanized Area increased by approximately 16 percent. VMT on interstates and freeways/expressways increased by approximately 13 percent during the same period. Traffic forecasts are much more specific and detailed than VMT estimates.



Source: FHWA Highway Statistics Series, Table HM-71 for years 2010-2019, https://www.fhwa.dot.gov/policyinformation/statistics.cfm

Traffic forecasts are different from VMT estimates because they indicate likely future roadway use at specific locations, whereas VMT measures aggregated driving patterns. WisDOT applies national best practices to produce traffic forecasts, which include using travel demand models, such as SEWRPC's travel demand model, where available, and regression techniques using historical traffic count information. WisDOT is continually reviewing the data and methods used to produce traffic forecasts that are valid and current. The reviews include comparisons and communication with peer agencies, as well as independent and original research.

Traffic volume is not the only factor that indicates roadway congestion, especially during heavy travel periods. Level of service is the measure of a roadway's congestion using rankings from A to F. The level of service characterizes the operating conditions on the roadway in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Freeway level of service is based on the number of vehicles per hour per lane, with level of service A exhibiting free-flow traffic and level of service F exhibiting severe congestion (forced or breakdown flow) that approaches gridlock (**Exhibit 1-11**). The 2018 AASHTO *A Policy on Geometric Design of Highways and Streets, 7th Edition* (AASHTO 2018) provides general guidance on customary levels of service for roadways. Per a 2016 memo regarding levels of service on the National Highway System, FHWA does not have regulations or policies that require specific minimum level of service values for freeway projects, and what is recommended by AASHTO is regarded by FHWA as guidance only (FHWA 2016). The AASHTO guidance states that an urban freeway, such as I-94 in Milwaukee, should operate at a level of service C or D. The guidance also notes that the appropriate level of service for a roadway should also consider a variety of factors, including the desires of motorists, community goals, adjacent land use type and development intensity, environmental factors, and aesthetic and historic values. In addition,

WisDOT's Facilities Development Manual (FDM) states that the desirable level of service for a roadway like I-94 in Milwaukee County (Corridors 2030 Backbone and Connector routes in an urbanized area with population greater than 50,000) is level of service D (WisDOT FDM 11-5).

FHWA concurred that level of service D is appropriate for this project. The level of service guidance for this project is documented in the *I-94 East-West Traffic Analysis – Existing (2019) Conditions* technical memorandum from March 2022 (Appendix B-2).

Level of service for existing and future traffic was determined using the 2016 Highway Capacity Software (HCS 2016) tool. HCS 2016 is a relatively simple software model that uses estimated traffic volumes (as obtained from SEWRPC) and basic freeway design inputs to estimate level of service.

1.4.5.1 Existing Traffic Volumes

As discussed in Section 1.4.2 and as shown in **Exhibit 1-2**, the I-94 East-West Corridor is adjacent to or provides a connection to many local destinations. Many of the destinations create constant traffic demand daily. Other destinations, such as American Family Field or State Fair Park, host large events that place increased demand on the freeway system at varying times.

In the study area, I-94 currently carries between 158,000 and 178,000 vpd on an average weekday (Year 2019 volumes; **Exhibit 1-12**). Year 2019 average weekday volumes between Hawley Road and General Mitchell Boulevard were approximately 165,500 vpd. Volumes between the Stadium Interchange and 35th Street were approximately 178,000 vpd and 158,000 vpd at 26th Street. Year 2019 average weekday volumes on all Stadium Interchange ramps combined were 81,700 vpd, as shown in **Exhibit 1-13**. The weekday volumes represent an annual average over a year of weekdays. This includes typical weekday commuter traffic, as well as special events (Milwaukee Brewers baseball games, Wisconsin State Fair, Summerfest, and so on).

Between 2009 and 2019, there was an increase in traffic volumes on I-94 east of the Stadium Interchange. Average weekday traffic volumes increased by over 10 percent between the Stadium Interchange and 35th Street and at 26th Street. Traffic volumes west of the Stadium Interchange increased nearly 4 percent based on WisDOT traffic counts (WisDOT 2020). This 10-year period included reconstruction of the Zoo Interchange (2014 to 2018).

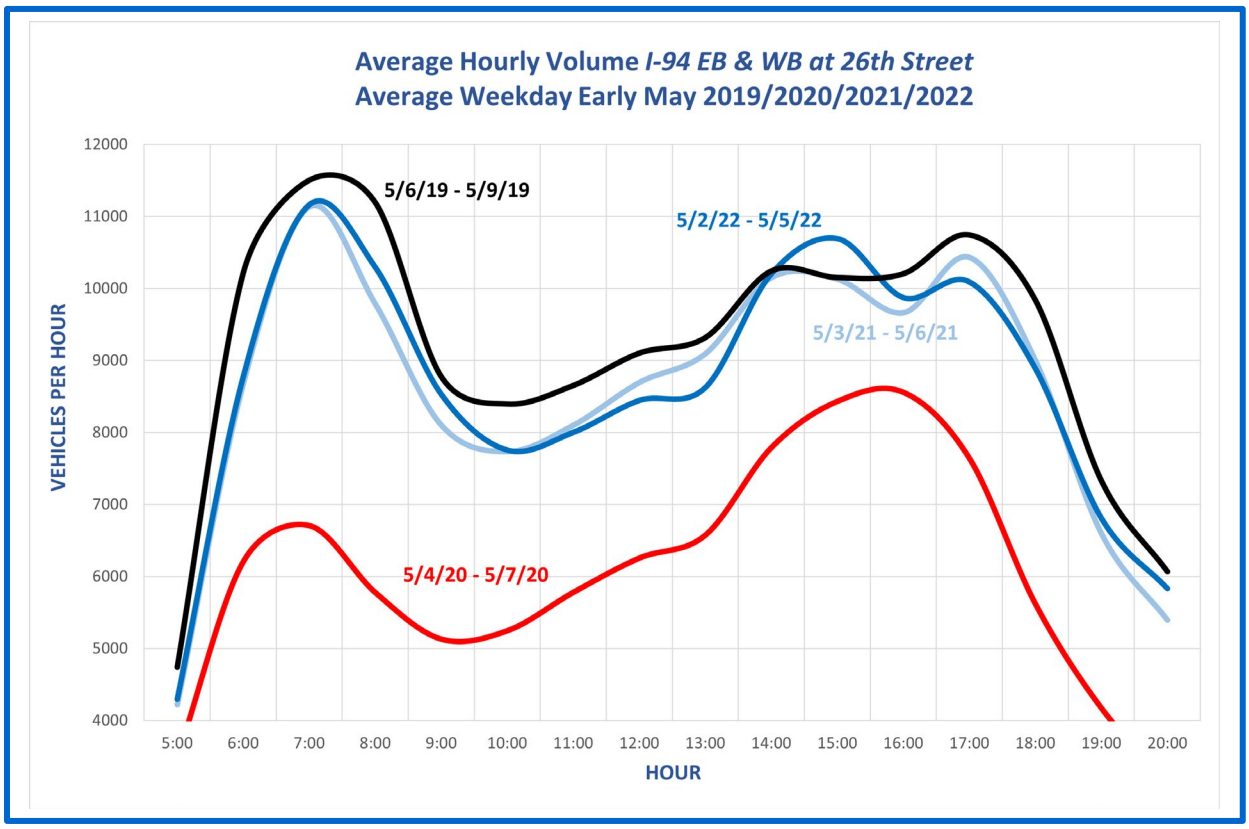
In general, two peak periods exist daily, in the morning and in the afternoon, corresponding to weekday commuter peaks. The I-94 East-West Corridor is in a highly urbanized area (population greater than 200,000) and experiences high traffic volumes during these peaks spanning over multiple hours. As traffic impacts vary throughout the corridor at different times, multiple hours are analyzed. To accurately model the corridor for traffic, the analysis must include the highest-volume hours as well as the adjacent hours with growing volume and declining volume. The corridor peaks were identified to capture the highest volume at all sites as well as 30 to 60 minutes of growing and declining volume during each period. Annual (2019) average weekday (Monday to Thursday) hourly volumes from the automatic traffic recorder sites were used to identify the peak periods. In 2019, the corridor peak periods were 5:30 to 9:30 a.m. and 1:30 to 6:30 p.m. In 2009, the year used in the previous corridor analysis for the 2016 Final EIS, the peak periods were 6:00 to 9:30 a.m. and 1:30 to 7:00 p.m. The 2019 data indicated a small shift to earlier in the day for commuter traffic. The morning peak period was expanded, and the afternoon period condensed.

Based on 2019 data, during the heaviest traffic periods, the level of service on I-94 ranges between level of service D and level of service F. The following segments of I-94, which includes most of the study area, operate at level of service E (severe congestion) or level of service F (extreme congestion) during the peak periods (**Exhibit 1-14** and **Exhibit 1-15**):

- Eastbound I-94 from 70th Street to 25th Street during the morning peak period
- Eastbound I-94 from 68th Street to 25th Street during the afternoon peak period
- Westbound I-94 from 16th Street to 68th Street during the morning peak period
- Westbound I-94 from 16th Street to 68th Street during the afternoon peak period

From a regional perspective, the I-94 East-West Corridor in both directions is one of the freeway and arterial corridors that experiences extreme congestion (defined by SEWRPC as level of service F) daily (SEWRPC 2014).

It should be noted that WisDOT used all possible, reliable means to consider the pandemic-related impacts on I-94 traffic. The following chart displays 1-week snapshots of traffic counts taken near I-94 and 26th Street in May 2019, 2020, 2021, and 2022. Although this chart may not completely represent all traffic changes in this corridor, it illustrates that traffic in the I-94 East-West Corridor has returned close to pre-pandemic levels.



1.4.5.2 Future Traffic Volumes

The SEWRPC 2050 travel forecasts take into account recent and planned development in or near the study area. See the technical memorandum titled *IH-94 E/W Corridor Peak Hour Traffic Volume Development Methodologies* for more information on how WisDOT used SEWRPC's 2050 traffic forecast to assess future traffic conditions for this study (Appendix B-1).

An increase in traffic volume on I-94 is expected. Between 2019 and 2050, average weekday traffic volumes between the Stadium Interchange and 35th Street are expected to increase 5 percent (about 0.2 percent per year) to 187,500 vpd, while traffic volumes at 26th Street are expected to increase 6 percent (about 0.2 percent per year) to 167,000 vpd (**Exhibit 1-12**). Between Hawley Road and General

Mitchell Boulevard, traffic volumes are expected to increase 6 percent (about 0.2 percent per year) to 175,000 vpd. Between 2019 and 2050, average weekday traffic volumes on all Stadium Interchange ramps combined are expected to increase approximately 2.0 percent to 83,000 vpd, as shown in **Exhibit 1-13**. The projected increase in movements is due to the fact that in a fully developed corridor such as the I-94 East-West Corridor, there is not anticipated to be a large change in system interchange ramp movements. The existing Stadium Interchange was designed with the expectation that I-94 would intersect with other freeways at this location. Those plans did not happen. Thus, the low growth in turning movements allowed WisDOT to explore downgrading the Stadium Interchange from a system interchange to a service interchange (See Section 2.2.1.3).

By 2050, increased traffic volumes will generally cause I-94 eastbound to operate at level of service E or F during the morning and afternoon peak periods, while westbound I-94 will generally operate at level of service F during the morning and afternoon peak periods (**Exhibit 1-16** and **Exhibit 1-17**). The areas noted in Section 1.4.5.1 as being at level of service E or F in 2019 will continue to have congestion problems in the future.

Future Traffic under Various Scenarios

As part of the project's traffic analysis, WisDOT worked with SEWRPC to determine future traffic volumes in the I-94 East-West Corridor based on potential unanticipated major shifts in travel behaviors and patterns. Transportation innovations, economic upheavals, and/or pandemics are difficult to anticipate and therefore increase the level of uncertainty in traffic forecasts. For detailed information on this analysis, see the *IH 94 East-West Reconstruction Project – Forecast Variability Analysis* (Appendix B-3).

Several year 2050 traffic scenarios were considered based on a range of assumptions for variables including the following:

- Transit
- Vehicle occupancy
- Travel cost
- Average trip length
- Working from home
- Online shopping
- Freeway capacity

Scenarios were analyzed based on reliance on passenger vehicles (including a reduced reliance scenario and an increased reliance scenario) and potential and extreme options. A potential scenario simulates a set of circumstances that might occur in the future (lower impact input values reflective of recent societal impacts), whereas an extreme scenario simulates a scenario that has least likelihood of occurrence (higher impact input values to assess conditions that may significantly affect the project traffic forecast). SEWRPC and WisDOT analyzed four scenarios:

1. Reduced passenger vehicle reliance potential scenario
2. Increased passenger vehicle reliance potential scenario
3. Reduced passenger vehicle reliance extreme scenario
4. Increased passenger vehicle reliance extreme scenario

To model future traffic volumes, these scenarios assume a combination of values for different variables. The combination of variable values considered under potential and extreme reduced and increased reliance scenarios are shown in **Table 1-11**. The *IH 94 East-West Reconstruction Project – Forecast Variability Analysis* provides detail as to how the values in Table 1-11 were arrived at. These values were

input into SEWRPC's current trip-based fifth-generation travel simulation models to generate year 2050 traffic volumes. These traffic volumes were compared with year 2050 baseline[12] average weekday traffic volumes for the I-94 East-West Corridor to account for how future uncertainties might affect traffic volumes.

Table 1-11. Combination of Variable Values Considered under Potential and Extreme Reduced and Increased Reliance Scenarios

Variable	Reduced Reliance Scenario		Increased Reliance Scenario	
	Potential	Extreme	Potential	Extreme
Transit	VISION 2050 transit with VISION 2050 fares	VISION 2050 transit with no fares	No change (same as baseline scenario)[a]	No change (same as baseline scenario)[a]
Vehicle Occupancy (all purposes)	10% increase compared with baseline scenario	20% increase compared with baseline scenario	20% decrease compared with baseline scenario	20% decrease compared with baseline scenario
Travel Cost	10% increase compared with baseline scenario	50% increase compared with baseline scenario	10% decrease compared with baseline scenario	20% decrease compared with baseline scenario
Work from Home	20% of eligible workers work from home	60% of eligible workers work from home	20% of eligible workers work from home	No change (same as baseline scenario)
Online Shop	10% of home-based shop online	20% of home-based shop online	10% of home-based shop online	No change (same as baseline scenario)
Home-based Work Average Trip Length (miles)	10% increase compared with baseline scenario	No change (same as baseline scenario)	10% increase compared with baseline scenario	25% increase compared with baseline scenario
Freeway Capacity	No change (same as baseline scenario)	No change (same as baseline scenario)	10% increase compared with baseline scenario	10% increase compared with baseline scenario

[a] A continuation of the current trend in declining transit service.

% = percent

Transit represents one area of uncertainty in traffic forecasts. Better transit accessibility through expanded service areas, shorter headways, or reduced fares may result in increased transit use and decreased passenger vehicle trips. However, transit use in the southeastern Wisconsin region has declined in recent years. Between 2011 and 2017, the average weekday transit ridership in the region declined by 22.6 percent based on estimates obtained from the National Transit Database.

Future uncertainty associated with transit use was quantified by incorporating three different transit scenarios into the analysis: (1) continued trends in transit service and ridership (VISION 2050 Fiscally Constrained Transportation System [FCTS]); (2) planned transit service and coverage under VISION 2050 (VISION 2050 Plan); and (3) an optimistic transit scenario in which passengers ride for free with the same transit service and coverage as under VISION 2050.

[12] Model outcomes of various scenarios compared with a baseline scenario. In this analysis, the baseline scenario is the year 2050 I-94 East-West Corridor No-build scenario. The baseline scenario assumes existing plus committed regional highway network and the year 2050 socioeconomic variables under a fiscally constrained transportation system.

The VISION 2050 transit with no fares scenario had the largest impact in lowering freeway forecast volumes (a decrease in traffic volumes of 7.7 to 11.5 percent). The VISION 2050 transit with VISION 2050 fares scenario had a modest impact on lowering freeway forecast volumes (1.1 to 2.8 percent).

Other variables resulting in a noticeable decrease in traffic volumes were a 10 or 20 percent increase in vehicle occupancy and 50 percent increase in travel cost compared with the baseline scenario. On the other hand, assuming a 20 percent decrease in vehicle occupancy compared with the baseline scenario increased forecast volumes by 6.3 to 10.7 percent. Also, assuming a 10 percent increase in freeway capacity and 25 percent increase in average trip length compared with the baseline scenario resulted in noticeable increases in traffic forecast volumes.

As with freeway volumes, the VISION 2050 transit with no fares scenario had the largest impact (a 5.9 to 10.5 percent decrease) in lowering forecast volumes on arterial roadways. Other variables resulting in noticeable reductions on arterial street traffic volumes were a 10 or 20 percent increase in vehicle occupancy, a 50 percent increase in travel cost, and 60 percent of eligible workers working from home, compared with the baseline scenario. A 10 percent increase in freeway capacity also lowered forecast traffic volumes on arterial roadways because an increase in freeway capacity tends to divert traffic away from arterial roads to freeways. The VISION 2050 transit with VISION 2050 fares scenario had mixed impacts on forecast arterial traffic volumes.

In the I-94 East-West Corridor, the baseline No-build 2050 traffic scenario results in a level of service E throughout the corridor.[13]

> *The reduced reliance potential scenario, increased reliance potential scenario, and increased reliance extreme scenario all resulted in traffic operations at level of service E or F throughout the corridor. The reduced reliance extreme scenario would operate at a level of service D at the eastern end of the study area but drop to level of service E or F elsewhere in the corridor.*

Thus, even under a scenario in which all of the VISION 2050 transit strategies are enacted and no fares are charged for transit, along with an increase in vehicle occupancy, increase in travel cost, and more people working from home and shopping online, I-94 would continue to show congestion and operate at level of service E or F.

1.5 Local Government, Public, and Agency Input

WisDOT presented the key elements of the need for the project at public involvement meetings (PIMs) held on August 21 and 23, 2012. At the meetings, the public had the opportunity to review exhibits, see a presentation that illustrated the need for the project, and provide WisDOT with comments. On November 2, 2012, the draft purpose and need statement was posted on the project website for public review. Public comments focused on improving safety and traffic flow and maintaining existing access in the corridor.

On November 2, 2012, WisDOT sent the purpose and need section of this document to Cooperating and Participating Agencies. WisDOT received responses from the National Park Service, USEPA, U.S. Army Corps of Engineers (Corps of Engineers), VA National Cemetery Administration, WDNR, SEWRPC, and the City of Milwaukee (Appendix C of the 2016 Final EIS). The update of the purpose and need section considered input from the agencies and the public.

[13] WisDOT, in coordination with FHWA, determined that level of service D or better is appropriate for this project. This determination is consistent with FDM 11-5-3.

During the Draft EIS availability period, some interest groups questioned the validity of WisDOT's traffic projections. These groups claimed that AADT on I-94 in the study area is declining. Several sections of the 2016 Final EIS provide additional information to address the concerns, and Section 6.4 of the 2016 Final EIS provides a detailed response to the concerns.

WisDOT presented the key elements of the need for the project at a virtual PIM in March 2021 as part of the Supplemental EIS process. WisDOT staff was also available at the December 2021 and June 2022 PIMs to discuss purpose and need. This Supplemental Draft EIS will also document coordination with Cooperating and Participating Agencies and address any agency and public concerns related to this updated purpose and need. Section 5 of this Supplemental Draft EIS provides further detail on public involvement and agency coordination.

1.6 Purpose and Need Performance Measures

The following are purpose and need factors that demonstrate the need for transportation improvements in the I-94 East-West Corridor:

- System linkage and route importance
- High crash rates
- Existing freeway conditions and deficiencies
- Existing and future traffic volumes

The project purpose and need sets the stage for developing and evaluating possible improvement alternatives. Additional factors considered in evaluating potential alternatives include resource agency input, local government input, public input, cost, and impacts to the human/natural environment.

1.7 Relationship to Other Projects

In the absence of any reconstruction, ongoing maintenance of I-94 has continued to address deteriorating pavement conditions. WisDOT resurfaced I-94 in the study area in 2011 and 2012, which was the third repaving of this stretch since its construction and is a short-term solution to address deteriorating pavement conditions (see Section 1.4.4.1, Pavement Condition). In 2018, WisDOT added high-friction surface treatment to the I-94 bridge pavement in the Stadium Interchange. Most recently, in 2020 WisDOT rehabilitated 22 bridges along I-94 in the study area by repairing concrete and columns and rehabilitating or replacing bearings on select bridges (Project ID 1060-11-73).

WisDOT is nearing the completion of the reconstruction of the Zoo Interchange (Interstate 41 [I-41], I-94, Interstate 894 [I-894], and US 45) to address obsolete design of roadway and bridges, increase traffic capacity, and improve safety. The portions of the Zoo Interchange project adjacent to I-94 were completed in 2018; the freeway and bridges were reconstructed, interchange access was modified to improve safety and traffic flow, and local streets affected by the freeway reconstruction were reconstructed. The north leg of the project is currently under construction and is anticipated to be completed in 2023.[14] Along with the Zoo Interchange reconstruction, WisDOT has successfully completed studies and construction of other major interchanges and interstates in the Milwaukee metropolitan area since 2000:

[14] The recent traffic volume data cited in this document were obtained before construction of the Zoo Interchange north leg started in 2021.

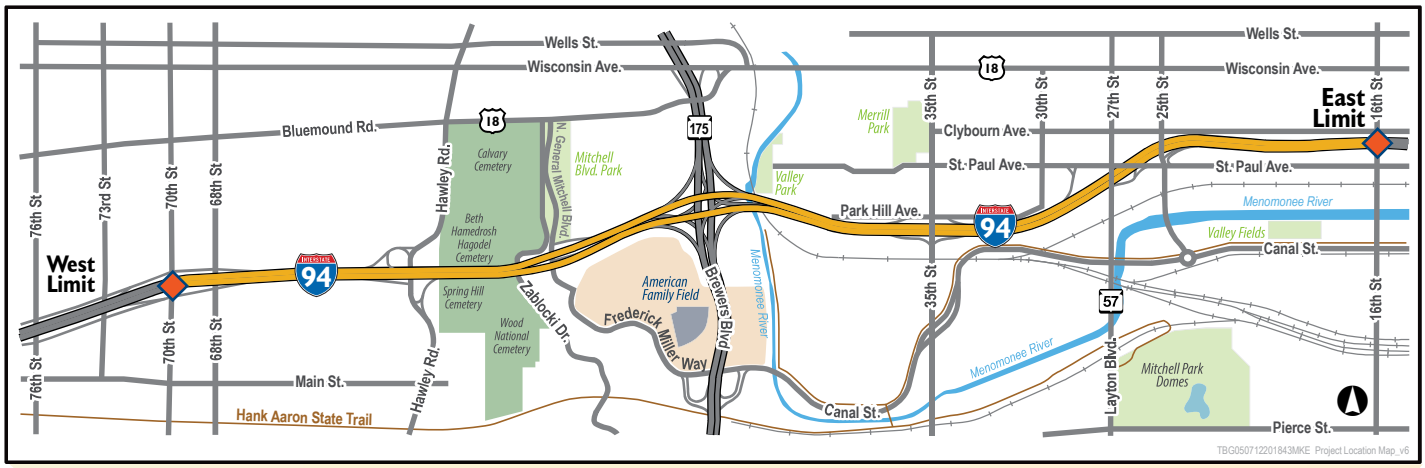
- Marquette Interchange
- Mitchell Interchange and I-94 North-South (I-94 from the Mitchell Interchange in Milwaukee County to the Wisconsin-Illinois state line)

The following recently completed or ongoing studies and projects are near the I-94 East-West Corridor; refer to the 2016 Final EIS for projects completed prior to 2016 that may influence traffic patterns on I-94:

- An auxiliary lane was added on both eastbound and westbound I-94 between Moorland Road and the WIS 100 ramps, and two bridges were replaced in this corridor. Construction was completed in 2017.
- A bus rapid transit (BRT) transit study was completed by Milwaukee County to explore the development of BRT along a corridor paralleling I-94 between downtown Milwaukee and the Milwaukee Regional Medical Center. A Finding of No Significant Impact was issued in 2018, construction began in 2021, and BRT service is expected to start in early 2023. The route is north of I-94, following Wisconsin Avenue from downtown Milwaukee to Hawley Road and then Bluemound Road west of Hawley Road to 95th Street where it turns north toward the Milwaukee Regional Medical Center. WisDOT committed $300,000 to the Milwaukee County BRT transit study.
- Resurfacing pavement on I-94 and I-43 near the Marquette Interchange was completed in 2020.
- Bridge rehabilitation along I-43 between Wisconsin Avenue and Walnut Street was completed in 2021.
- Bridge rehabilitation on Dana Court Bridge over land (WE Energies easement along I-94) was completed in 2021 (City of Milwaukee project).
- Rehabilitation of three bridges on WIS 175 north of the Stadium Interchange was completed in 2021.
- In May 2022, the City of Milwaukee, Milwaukee County, and WisDOT announced a feasibility study to examine the future of WIS 175 from Wisconsin Avenue to Lisbon Avenue (north of I-94). The study, funded by WisDOT, is estimated to cost $2 million to $3 million, and will take roughly a year and a half. The study will evaluate converting this portion of WIS 175 from a freeway to a boulevard.
- Resurfacing and bridge rehabilitation on I-43 from the Mitchell Interchange to the Marquette Interchange (mainline) in 2022.
- Reconstruction/expansion of I-41/US 45 from Swan Boulevard to Burleigh Street (Zoo Interchange North Leg) is under construction and is expected to be complete in 2023. Related projects include polymer overlays of the Zoo Interchange mainline bridges and overpass bridges.
- Reconstruction of West National Avenue from 62nd Street to 65th Street. Construction is anticipated in 2023 (City of West Allis project).
- Replacement of the 70th Street bridge over the Canadian Pacific Railroad/Hank Aaron State Trail is anticipated in 2023 (City of Milwaukee project).
- Reconditioning of Greenfield Avenue from 56th Street to Brewers Boulevard is anticipated in 2024 (Village of West Milwaukee project).
- Resurfacing and bridge rehabilitation on I-43 from the Mitchell Interchange to the Marquette Interchange (ramps) is anticipated in 2024.

- Pavement replacement of WIS 59 (National Avenue) from 39th Street to 1st Street is anticipated in 2025 (City of Milwaukee project).

Bridge rehabilitation (deck overlays) on I-794 between the Marquette Interchange to Lake Interchange is anticipated in 2025.



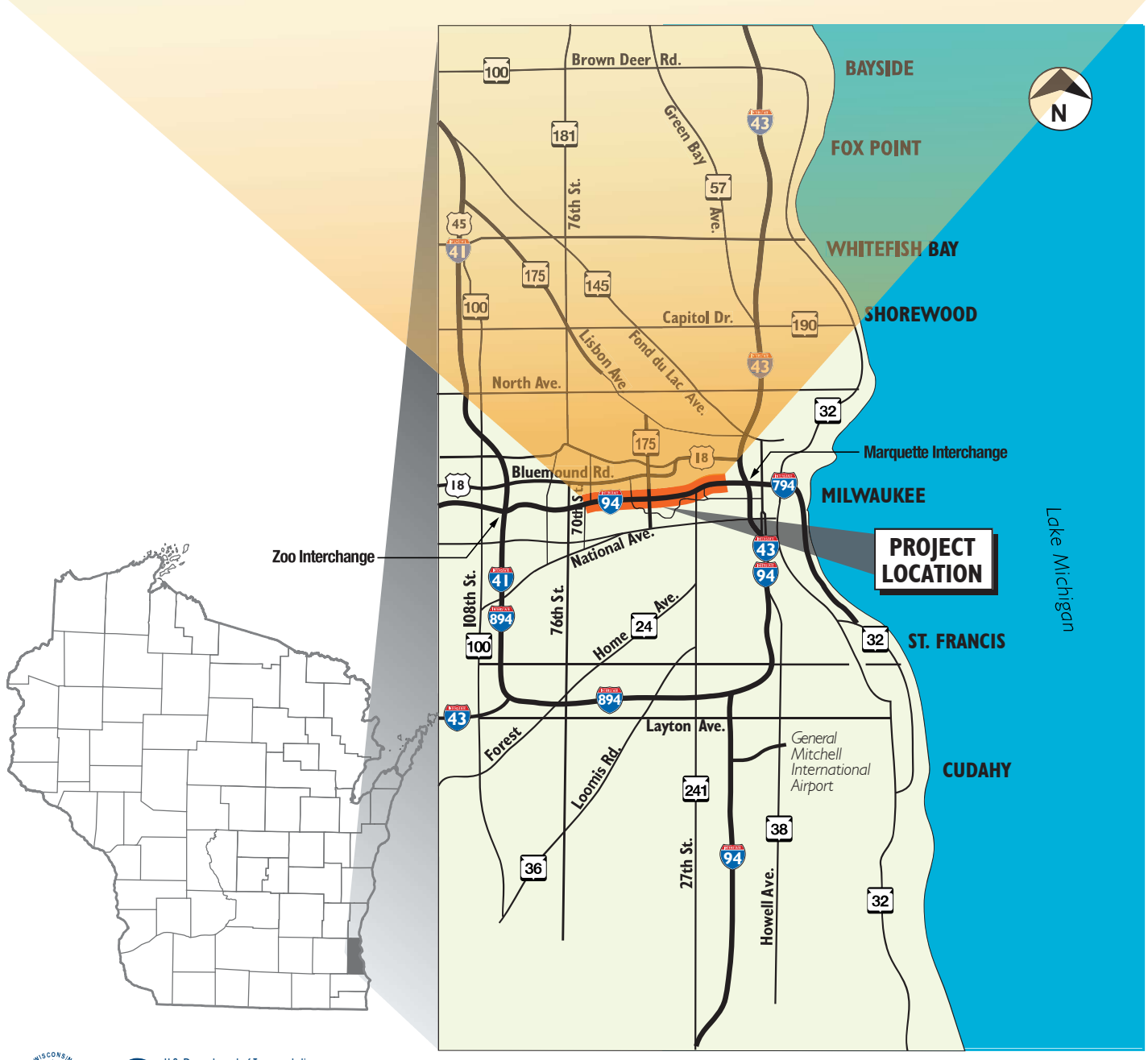


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Exhibit 1-1
Project Location Map

TR0315151044MKE 1-1_Project_Location_Map_v7 05.26.22 kr gr

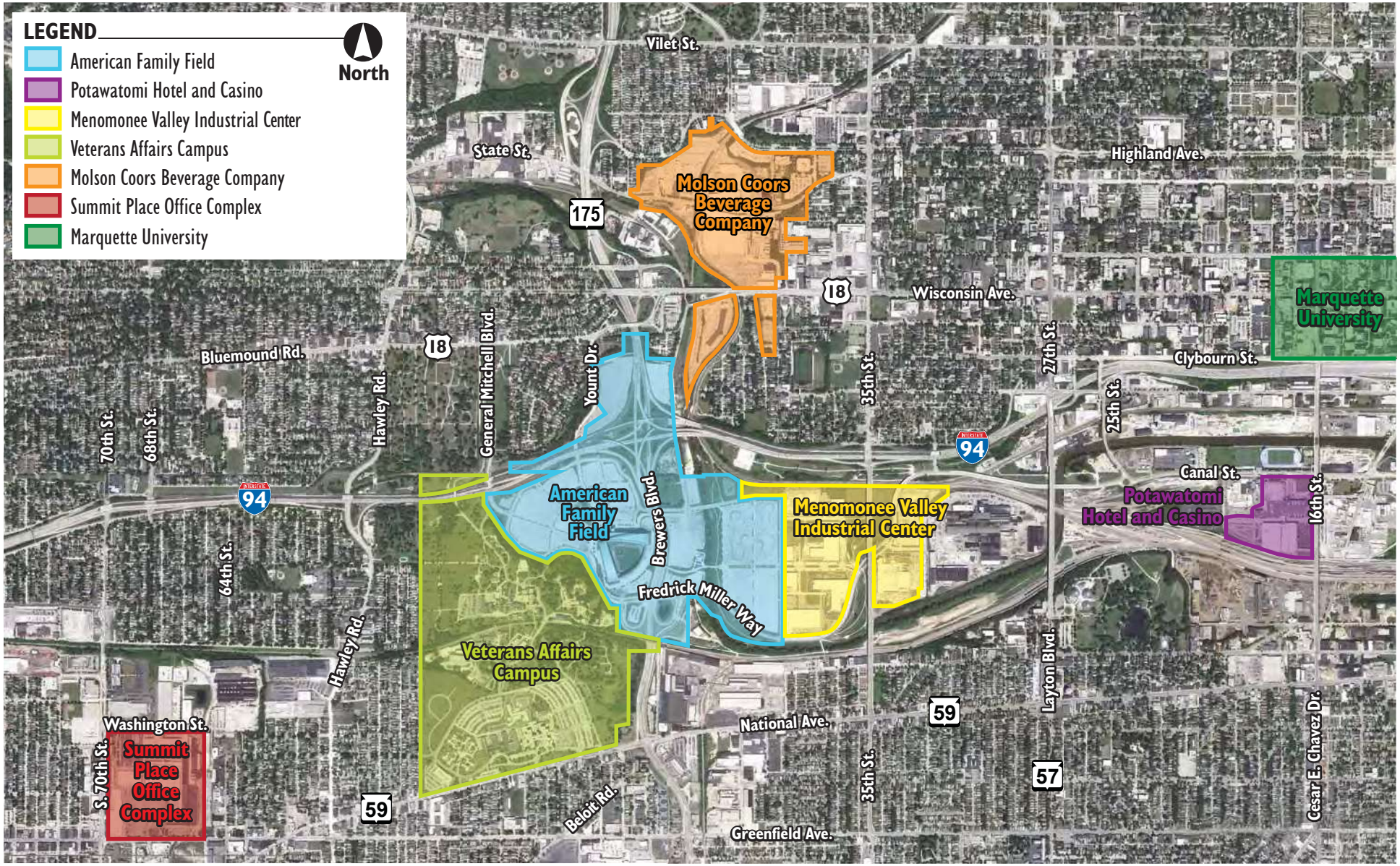

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Exhibit 1-2
Major Traffic Generators

TR0315151044MKE 1-2_MajorTrafficGenerations_v6 05.26.2022 kr gr

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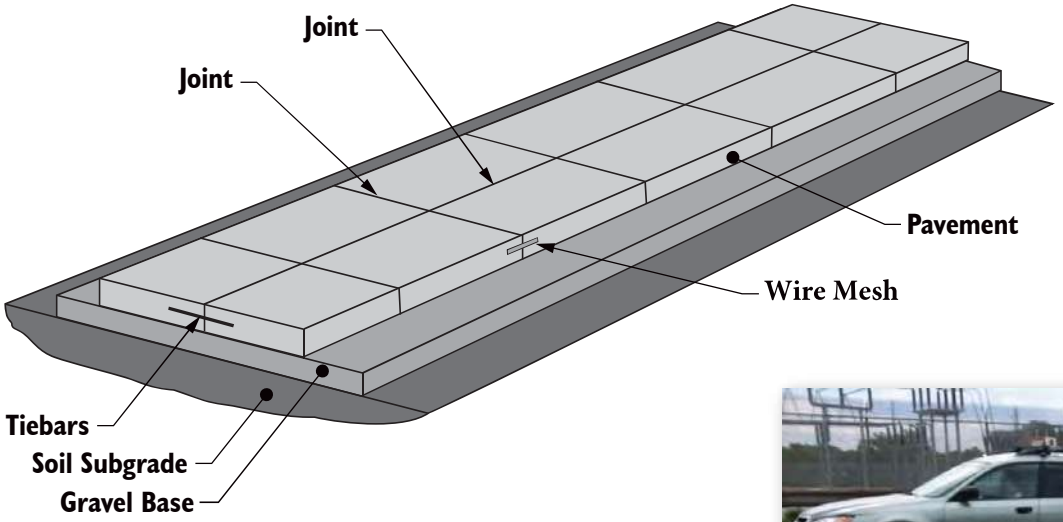
Exhibit 1-3
Total Crash Rates (2015 - 2019)
Compared to Statewide Average

TR0315151044MKE 1-3_TotalCrashRates2015-2019_v7 08.09.22 sls gr



NOTE: This photo was taken during the 2012 resurfacing of the eastbound lanes of I-94. The photo illustrates the pavement components depicted in the graphic at left.

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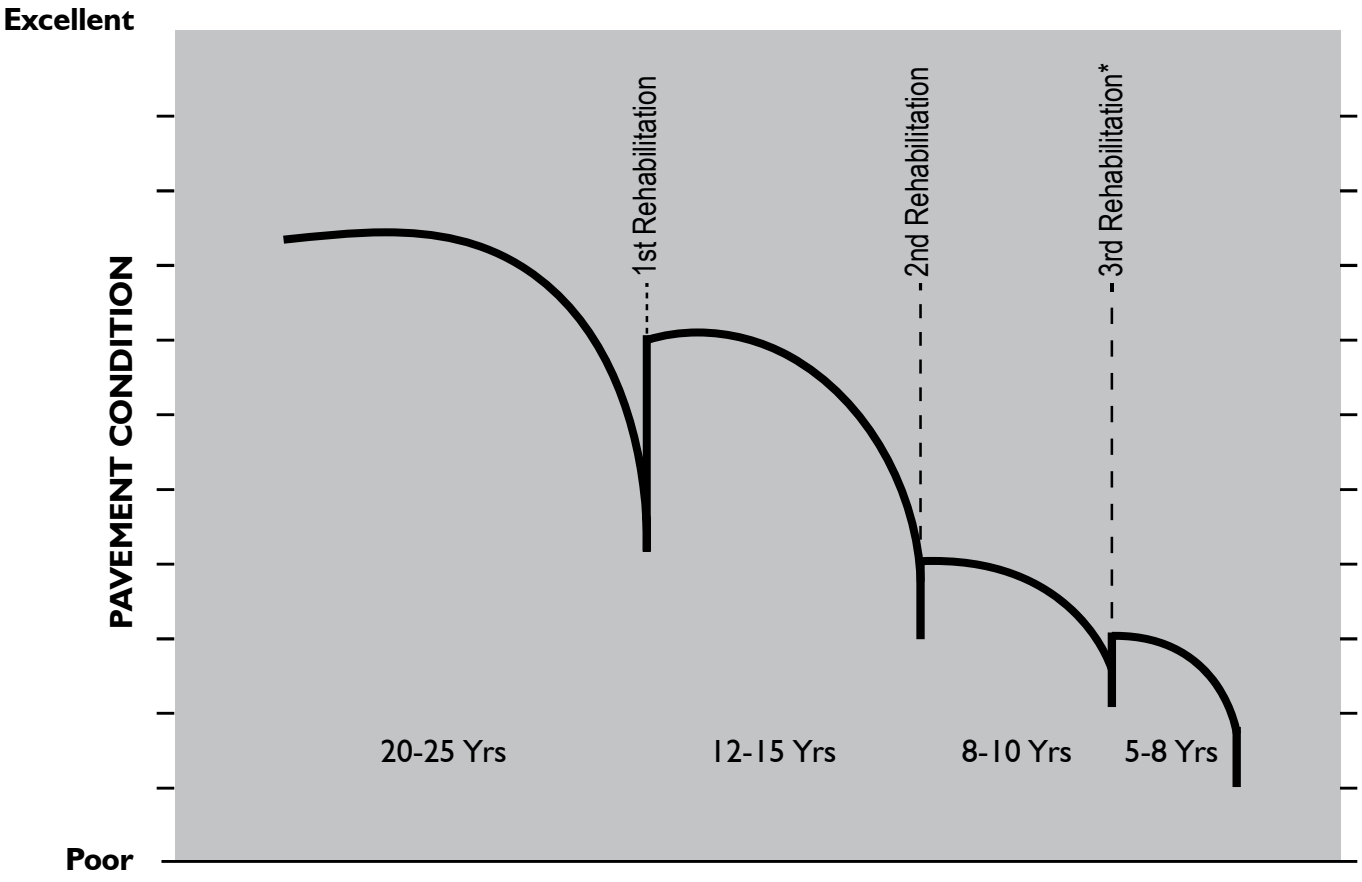
Exhibit 1-4
Basic Pavement Components

TR0315151044MKE 1-4_Basic_Pavement_Components_v1 07.15.21 sls



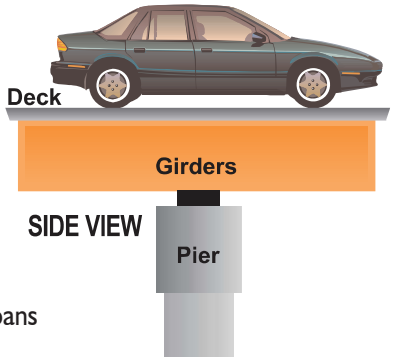
* Many states decide to reconstruct in place of further rehabilitations

Bridge Terminology

There are several types of construction designs for bridges.

Most Wisconsin bridges have:

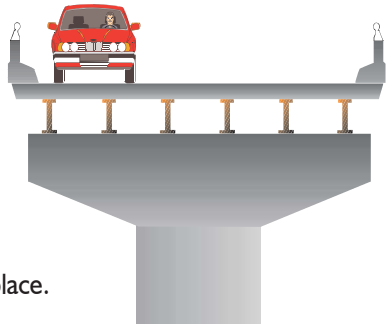
- Decks, the top surface of the bridge on which you drive
- Girders, the horizontal spans that rest on the piers
- Piers, the vertical columns that support the girders



Construction used in the I-94 East-West Corridor

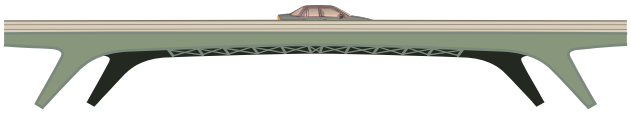
Steel or concrete girder

A beam that supports the deck in traditional bridge design. Steel-girder bridges are simple and economical. When the deck wears out, it can be removed and replaced. The steel girders remain in place.



Steel "K" Frame

A steel frame resembling the letter "K" that supports the deck. The piers and girders are combined into two main load carrying members

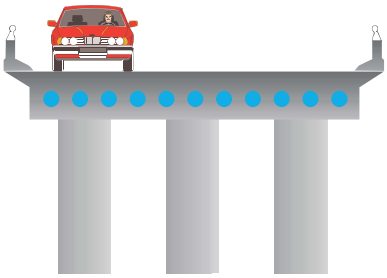


Concrete Rigid Frame Bridge

A bridge type in which the superstructure and substructure components are constructed in place as a single unit

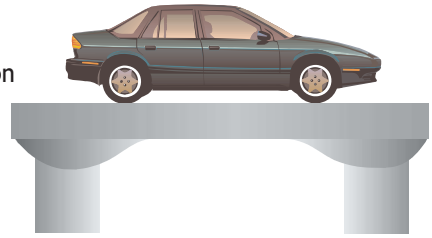
Concrete voided slab

A concrete slab divided into a series of hollow circular cells that run parallel to the roadway inside of the slab. The slab serves the same purpose as a deck and girders in other bridge types.



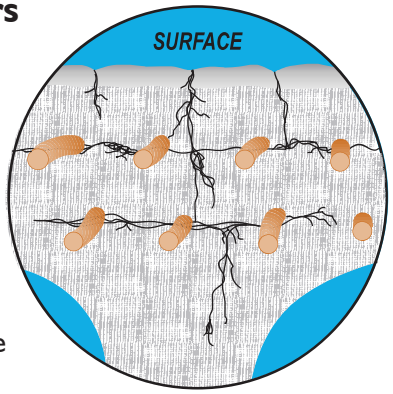
Concrete haunched slab

A continuous concrete slab that is tapered so that the thickest portion is over the piers and thinnest portion is the area between the piers.



Reinforcing Bars

Concrete is typically poured over a lattice of steel reinforcing bars called "rebar." Rebar gives concrete its strength and is used in concrete piers, girders, and decks. When cracks form in the deck allowing water to come in contact with the rebar, the rebar rusts and the concrete comes apart. New bridges have coated rebar to reduce rusting.



Deteriorating Pier at I-94 Bridges over 70th Street

Deteriorating Pier at I-94 Bridges over 70th Street

Underside of Deck Spalls at I-94 Bridges over Mitchell Blvd.

Underside of Deck Spalls at I-94 Bridges over Yount Drive

Spalls and Exposed Rebar at I-94 Bridge over 32nd Street

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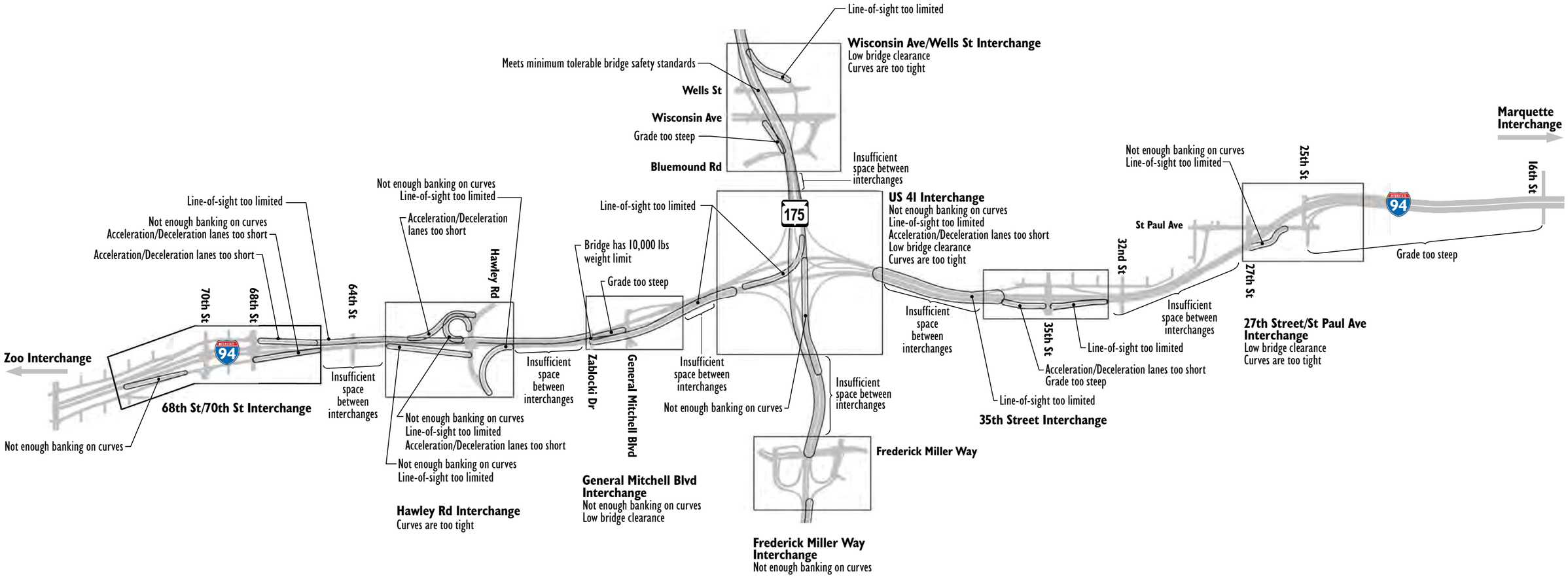
Exhibit 1-7
Bridge Deterioration

North
Not to Scale



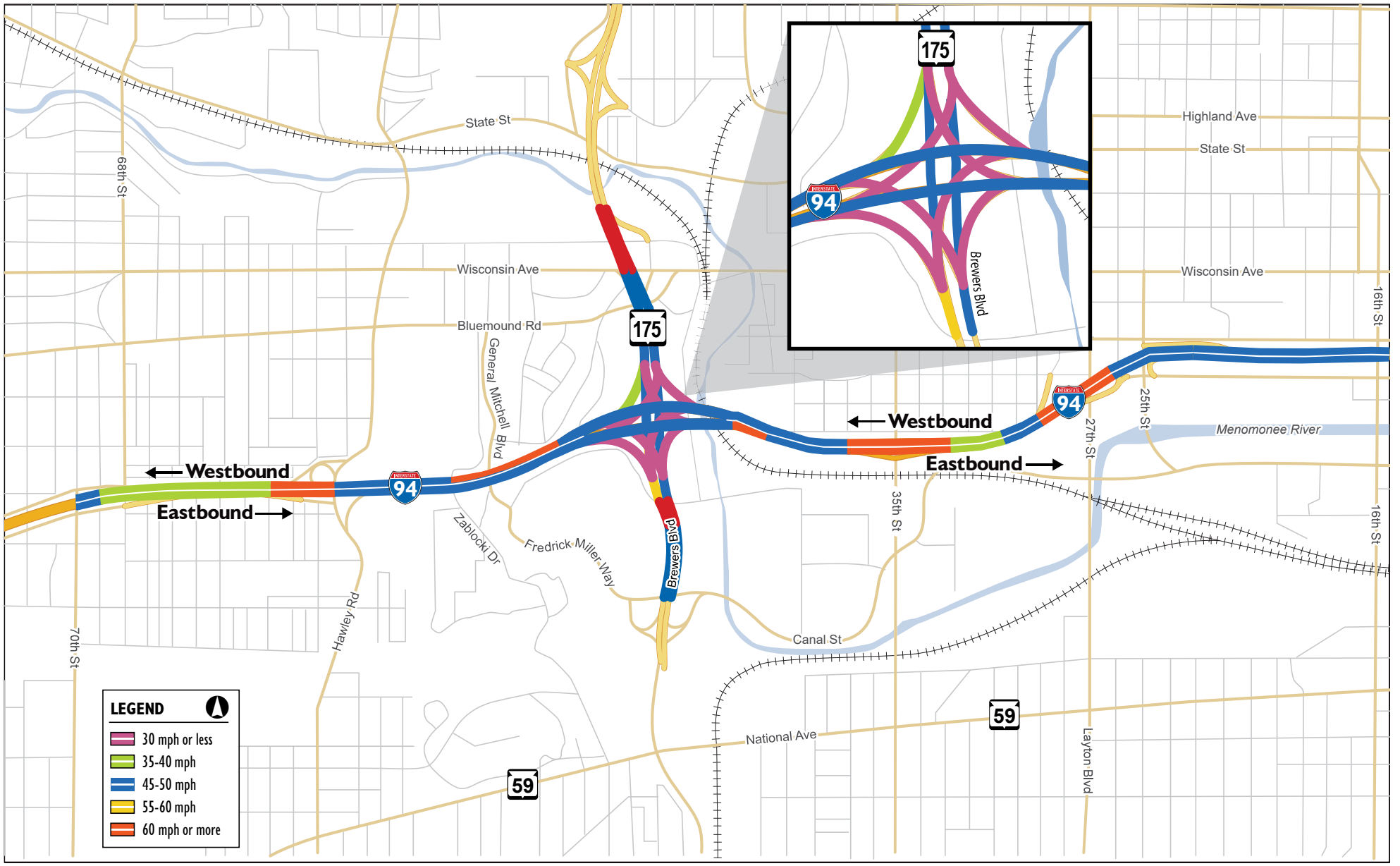


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Exhibit 1-9
Existing Design Speed of Curves

TR0315151044MKE 1-9_ExistingDesignSpeedofCurves_v3 02.26.22 kr sls gr

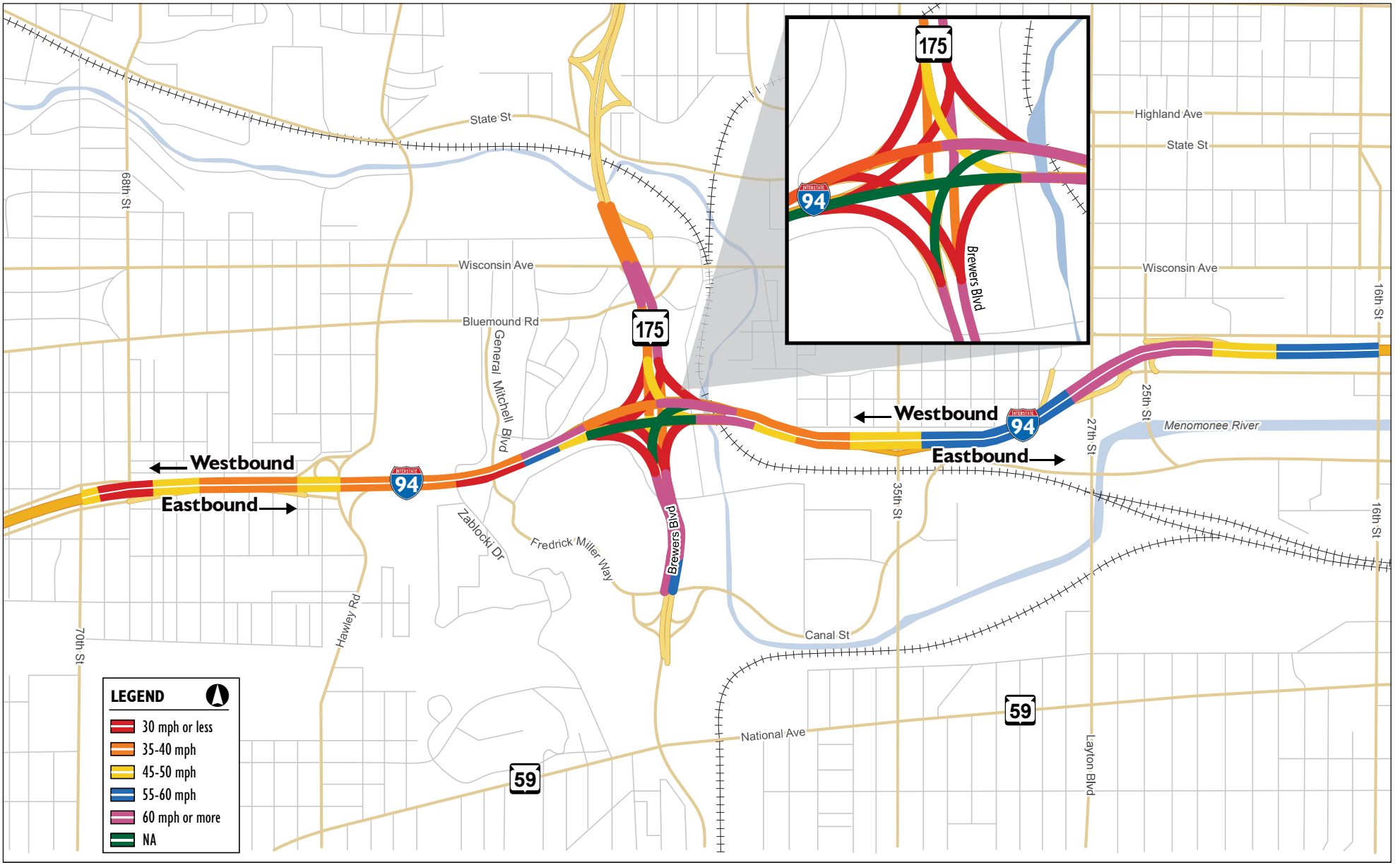

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Exhibit 1-10
Existing Design Speed Based on Stopping Sight Distance

TR0315151044MKE 1-10_ExistDSBStoppingSightDistance_v3 05.26.22 kr sls gr

Level of Service A

Level of Service D

Level of Service B

Level of Service E

Level of Service C

Level of Service F

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Exhibit 1-12
Existing and Future No-Build Traffic Volumes

TR0315151044MKE 1-12_ExistingFutureTrafficVolumes_v3 05.26.22 kr sls gr

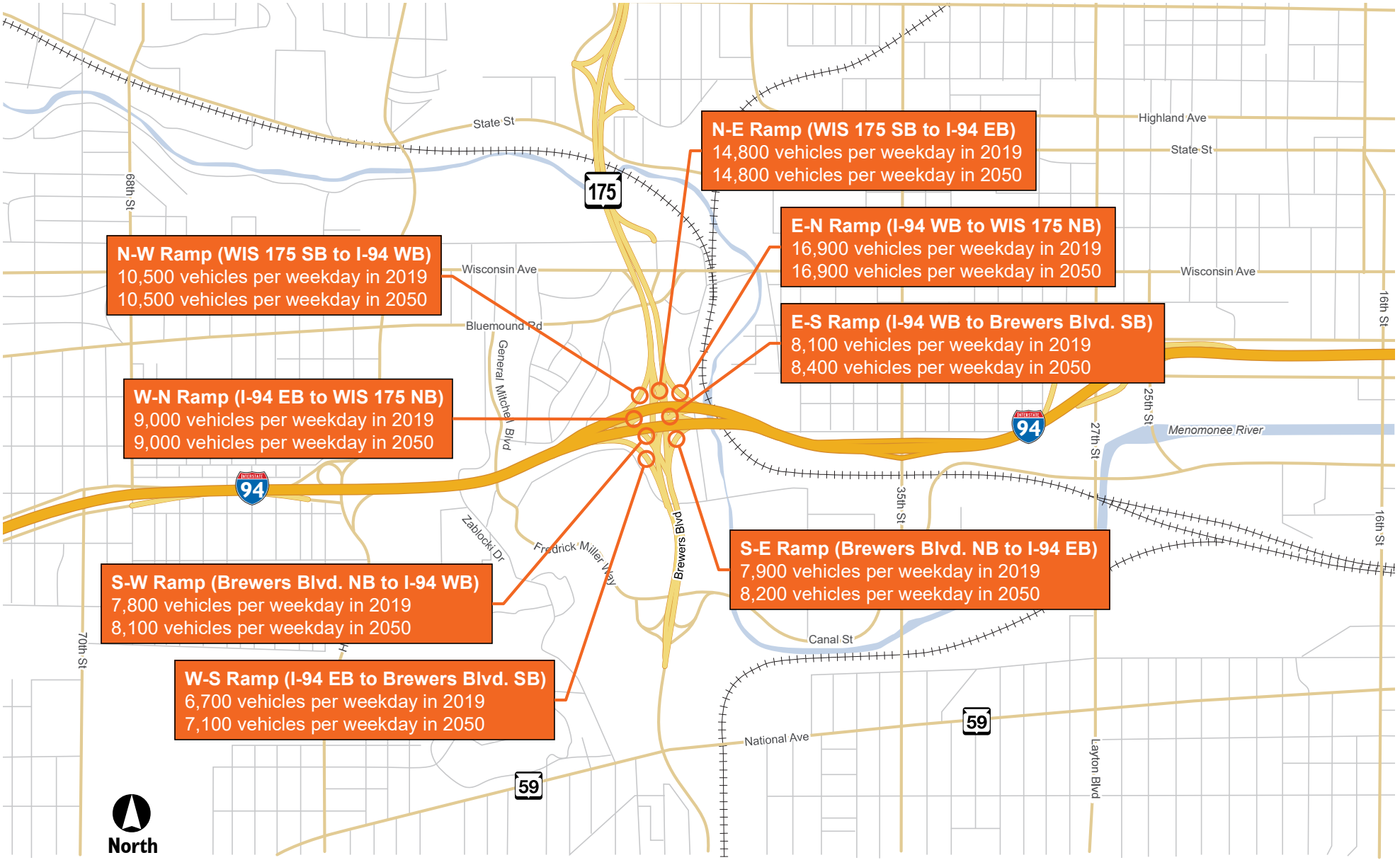

Exhibit 1-13
Existing and Future No-Build Traffic Volumes
Stadium Interchange Ramps

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TR0315151044MKE 1-13_Exist_Future_NoBuild_Traffic_Vols_Stadium_Ramps_v5 05.26.22 kr sls gr

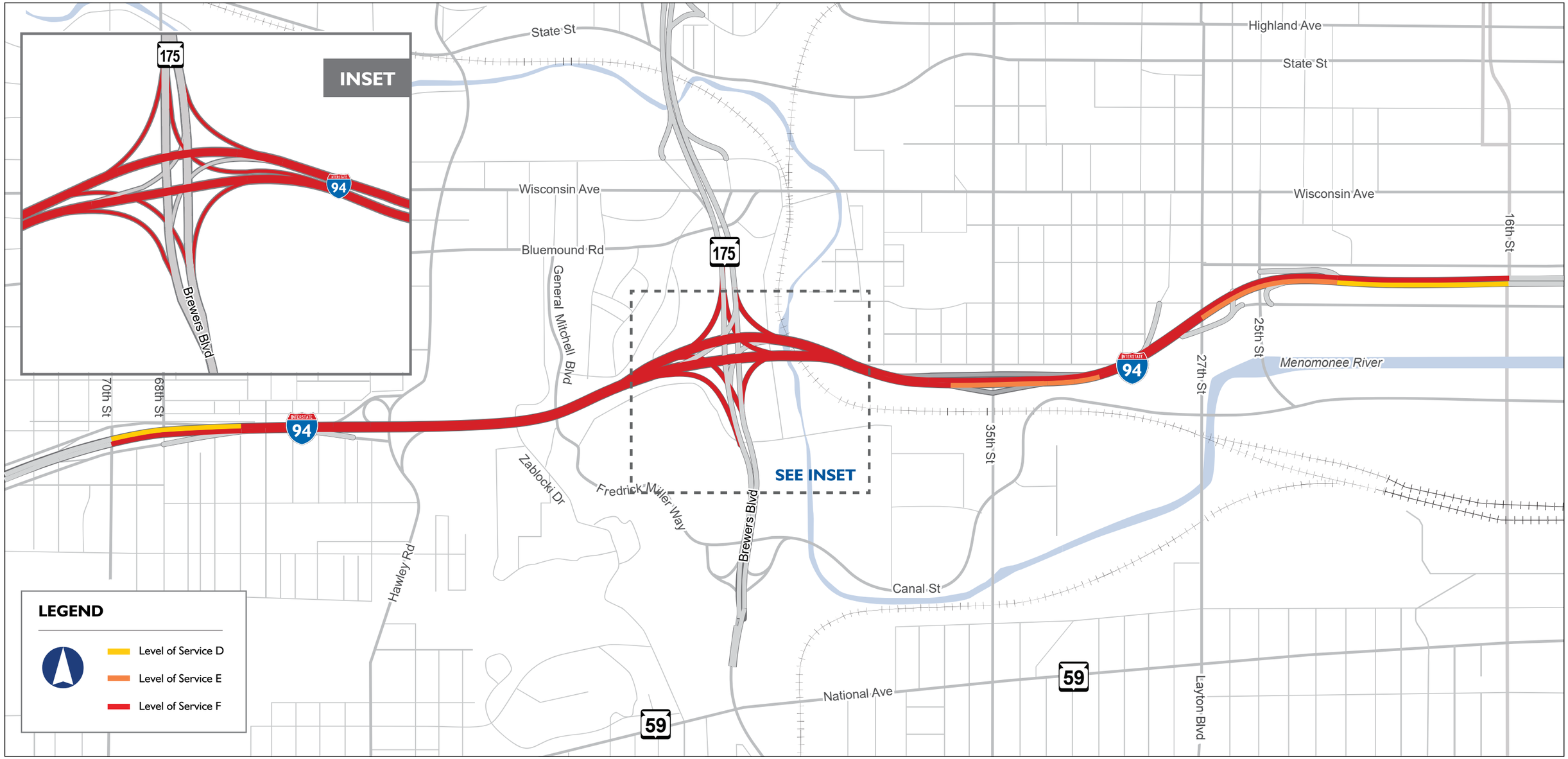

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Exhibit 1-14
Existing (2019) Traffic Operations - Morning Peak Period

TR0315151044MKE 1-14_Existing_TrafficOperations_MorningPeak_v6 02.17.22 sls gr

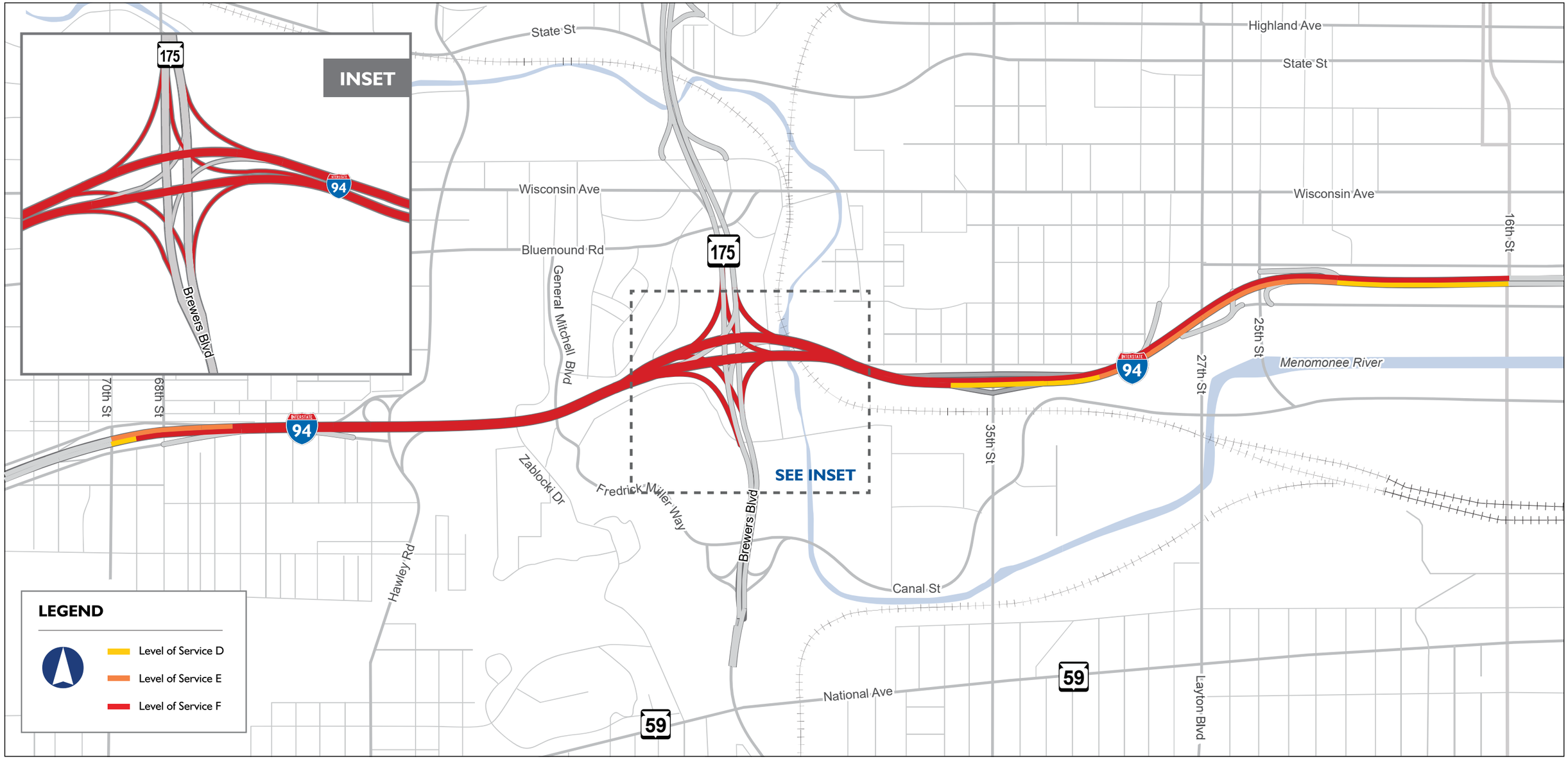

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Exhibit 1-15
Existing (2019) Traffic Operations – Evening Peak Period

TR0315151044MKE 1-15_2040_NoBuildTrafficOperations_EveningPeak_v7 02.17.22 sls gr

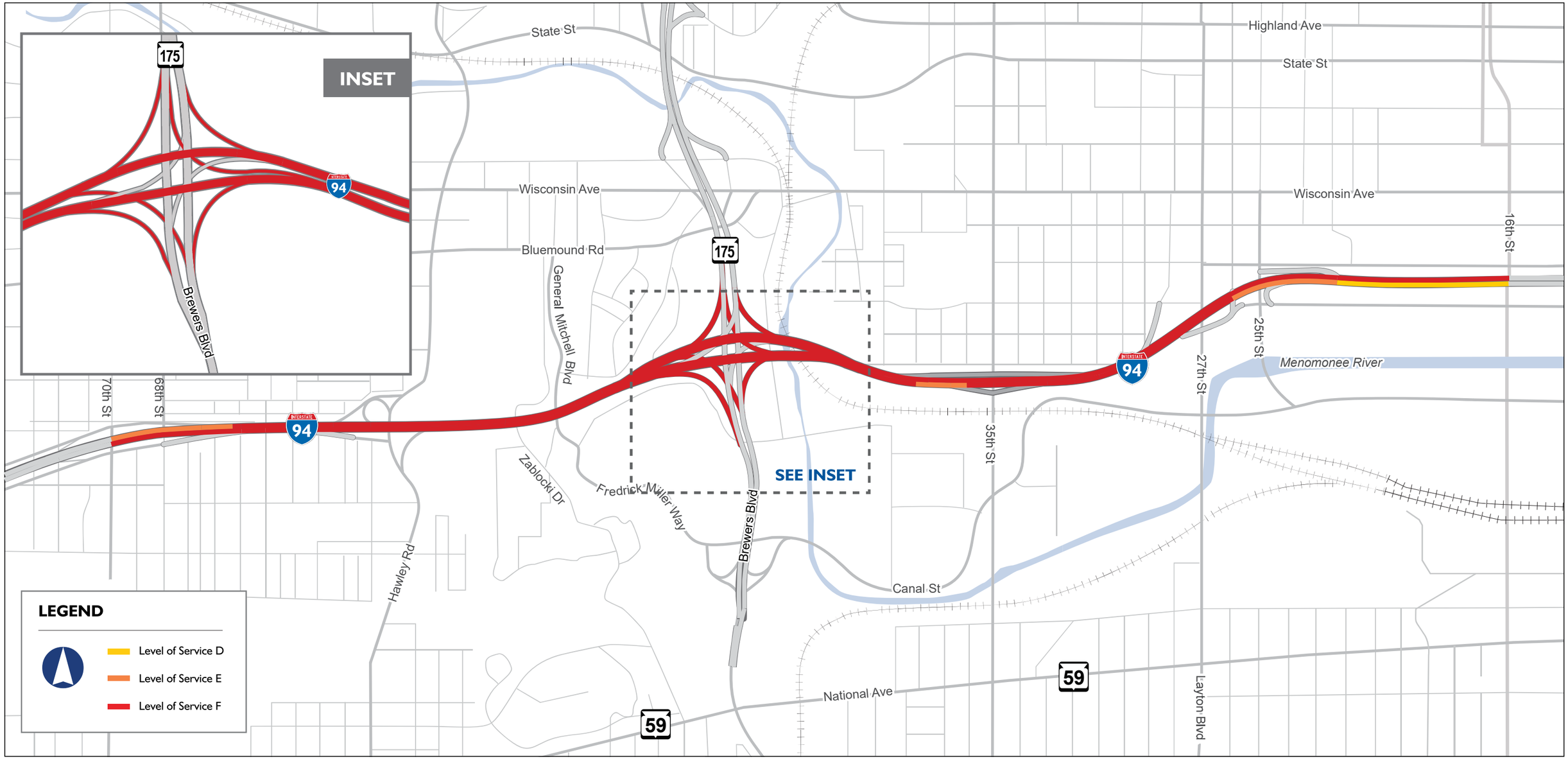

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Exhibit 1-16
2050 No-Build Traffic Operations - Morning Peak Period

TR0315151044MKE 1-16_2050_NoBuildTrafficOperations_MorningPeak_v5 02.17.22 sls gr

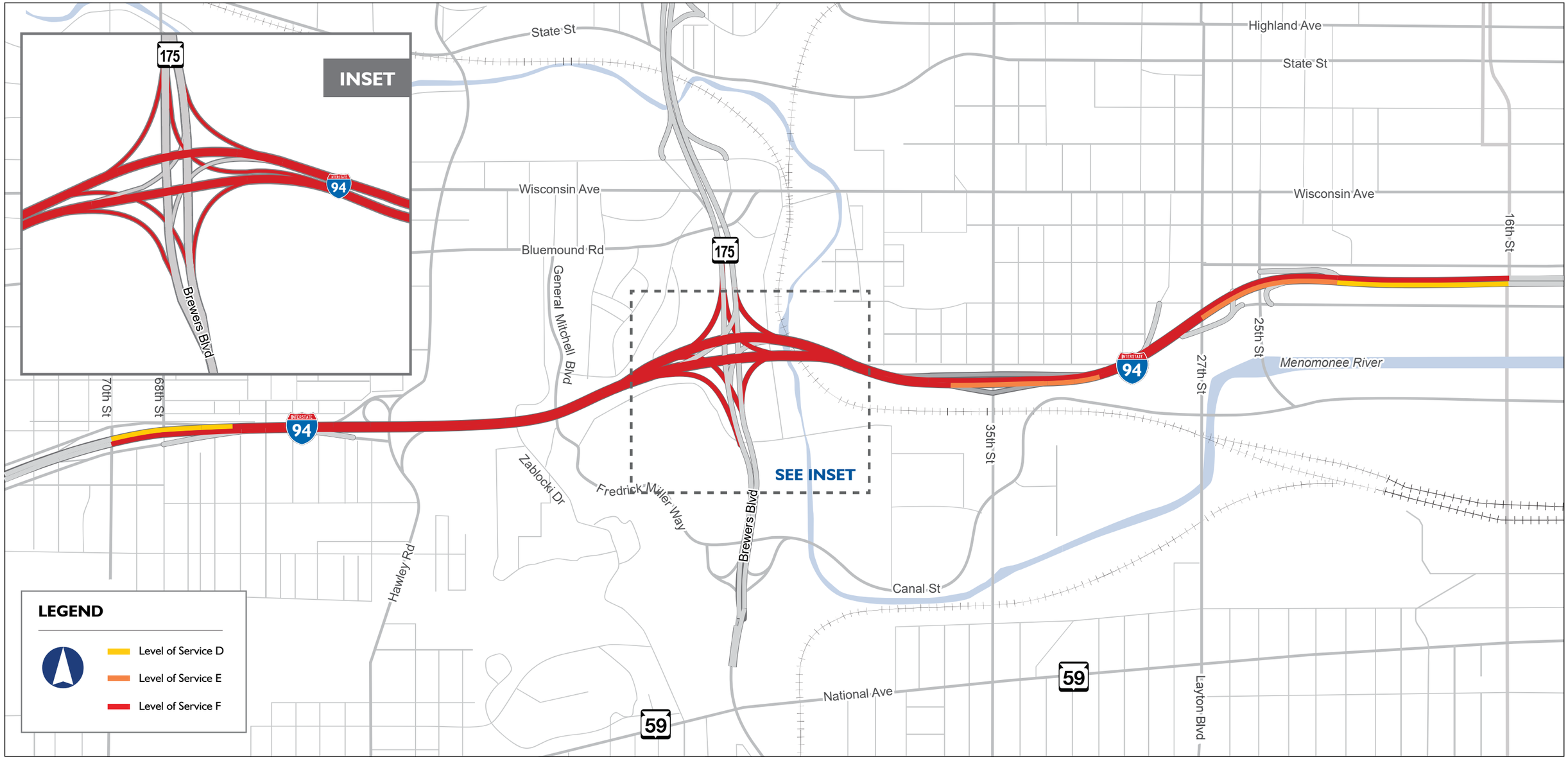

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Exhibit 1-17
2050 No-Build Traffic Operations - Evening Peak Period

TR0315151044MKE 1-15_2050_NoBuildTrafficOperations_MorningPeak_v5 03.14.22 sls gr