List of Appendices

Appendix A – Existing Conditions Memorandum

Stantec

Technical Memo

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File:	Moorhead I-94 & 20th Street Interchange Analysis	Date:	October 18, 2023

Reference: Existing Conditions Memorandum

EXISTING CONDITIONS INVENTORY

PROJECT BACKGROUND

The interchange of Interstate 94 (I-94) with 20th Street/MSAS 126 is a half diamond interchange located in the City of Moorhead, Clay County, Minnesota. I-94 is an Interstate freeway running east and west through Moorhead, connecting Fargo and other cities North Dakota to cities through central Minnesota including the Twin Cities metropolitan area. 20th Street is a minor arterial running north and south through Moorhead and is one of the primary routes connecting I-94 to Moorhead's central business district and residential communities south and north of I-94. Currently, the interchange only serves trips to and from Fargo via a westbound on-ramp and eastbound off-ramp. Trips to and from the east can only be served at adjacent interchanges such as U.S. Highway 75 (US 75)/8th Street and 34th Street.

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) has proposed a study of the interchange to identify feasible alternatives to convert it into a full access interchange to alleviate potential capacity concerns at adjacent interchanges and improve connectivity within Moorhead and the region. Metro COG contracted Stantec to perform the interchange analysis to conceptualize interchange layouts and determine the preferred alternative that fulfills the needs of the interchange while remaining within site constraints. This technical memorandum summarizes the existing conditions inventory for the interchange. Further analysis of the existing conditions and interchange alternatives will be conducted and documented in the final report.

STUDY AREA

The primary study area for this project consists of the I-94 and 20th Street interchange including the existing ramp terminal intersections and freeway weaving segments. Due to its proximity, the Moorhead Travel Information Center/Rest Area located off the eastbound lanes of I-94 is also included in the primary study area. A secondary study area was also included in the project and includes the adjacent interchanges of I-94 with 8th Street/US 75, Main Avenue/I-94 Business, and 34th Street, as well as nearby adjacent intersections and the surrounding collector and arterial roadway network.

The study area and extents are shown in Appendix A.

EXISTING INTERCHANGE GEOMETRICS

The I-94 and 20th Street interchange is a half diamond interchange with a westbound on-ramp in the northwest quadrant and an eastbound off-ramp in the southwest quadrant. From Metro COG's GIS roadway

database, I-94 is classified as an interstate, 20th Street is classified as a minor arterial, and 28th Avenue, the adjacent frontage road on the north side of I-94, is classified as a collector[1].

I-94 is a four-lane divided freeway with 12-foot through lanes, 4-foot inside shoulders, and 10-foot outside shoulders and has a speed limit of 55 mph. South of the interchange, 20th Street is briefly a four-lane undivided roadway then adds a two-way left-turn lane (TWLTL) 400 feet south of the southern ramp terminal intersection. This section has 11- and 12-foot through lanes, a 12-foot TWLTL, and curb and gutter. North of the interchange, 20th Street is a three-lane section with 12-foot through lanes, a 12-foot TWLTL, and curb and gutter. The transition from three lanes to four lanes occurs at the 20th Street overpass, with the southbound outside through lane added as a second receiving lane for the single through lane at the north ramp terminal intersection and the northbound inside through lane converting to a dedicated left turn lane after the south ramp terminal intersection. The speed limit along all of 20th Street is 30 mph. 28th Avenue is a two-lane roadway with 12-foot lanes and a speed limit of 30 mph. 20th Street has a right-of-way width of 80 feet.

The westbound on-ramp has a length of approximately 1,030 feet, a lane width of 15 feet, and a 5-foot inside shoulder. The westbound on-ramp enters I-94 as a weave section connecting through to the adjacent US 75 interchange with a marked length of approximately 2,600 feet and a lane width of 12 feet. The eastbound off-ramp has a length of approximately 1,690 feet, a lane width of 16 feet, and 4-foot shoulders. The eastbound off-ramp originates from I-94 as a weave section connecting from the adjacent US 75 interchange with a marked length of approximately 1,970 feet and a lane width of 12 feet.

The north and south ramp terminal intersections operate under signal control, with the north intersection consisting of the westbound on-ramp and 28th Avenue east of 20th Street and the south intersection consisting of the eastbound off-ramp only. The signals are interconnected along 20th Street with the 12th Avenue and Main Avenue signals. The intersection with 28th Avenue west of 20th Street is approximately 190 feet north of the north ramp terminal intersection, operates under side-street stop control, and is right-in right-out (RIRO) only. Signal timings for the ramp terminal intersections and for the 30th Avenue intersection were provided by the City of Moorhead and will be used in initial project analyses. The intersection with 28th Avenue west of 20th Street is approximately 190 feet north of the north ramp terminal intersection, operates under side-street stop control, and is right-in right-out (RIRO).

There are several accesses in the vicinity of the interchange that may be impacted by the layout or construction activities for this project. South of the interchange on 20th Street, there are two accesses serving Triumph Lutheran Brethren Church and a doctor's office on the west side approximately 280 and 440 feet south of the south ramp terminal intersection, with the northern access being RIRO only. North of the interchange on 20th Street, there is one access serving M-State on the west side approximately 640 feet north of the north ramp terminal intersection. Another access for M-State is located on the north side of 28th Avenue approximately 600 feet west of 20th Street. On 28th Avenue east of 20th Street, Ken's Sanitation and Recycling and Gavilon Fertilizer have three accesses located on the north side approximately 260, 500, and 560 to the east of the intersection.

The Moorhead Travel Information Center/Rest Area is located approximately 1,600 feet east of 20th Street on the eastbound side of I-94 with the off-ramp located approximately 2,220 feet east of the 20th Street interchange eastbound off-ramp. The on-ramp exiting the rest area begins approximately 1,350 feet east of the rest area off-ramp and enters I-94 as a weave section connecting to the Main Avenue and 34th Street interchanges. The off-ramp diverge taper is 240 feet long and the weave section is marked at 5,090 feet long extending fully to the 34th Street off-ramp, with the Main Avenue ramp beginning at approximately 2,230 feet.

[1] Metro COG GIS Roadway Database

The rest area has separate loops for passenger car and combination truck traffic leading to their designated parking areas.

Functional classifications for the roadways in the interchange area are shown in Appendix B. Existing interchange geometrics and traffic signal timings are shown in Appendix C.

EXISTING ACTIVE TRANSPORTATION FACILITIES

Pedestrian and bicycle facilities are present in the interchange area. Sidewalk is present along the west side of 20th Street between 24th Avenue and 30th Avenue. The sidewalk is five feet wide, is separated from the back of curb, and shares the bridge with 20th Street as it passes over I-94. Shared use paths are present along 20th Street between adjacent streets and along the south side of 28th Avenue east of 20th Street. The shared use paths are ten feet wide and separated from the back of curb. The shared use path along 20th Street has a dedicated bridge over I-94. 28th Avenue west of 20th Street has painted on-street bicycle lanes. Marked crosswalks are present at both ramp terminal intersections with one crossing the eastbound off-ramp at the south intersection and three crossing the westbound on-ramp, the south leg of 20th Street, and 28th Avenue at the north intersection. These crossings have Accessible Pedestrian Signal (APS) pushbuttons and pedestrian signal phases. Appendix D shows existing bicycle and walking paths and routes within the corridor's vicinity.

A ‘Parks and Trails Framework’ was developed in the 2045 Fargo-Moorhead Transportation Plan to create a network of parks, pathways, and trails throughout Moorhead. The transportation plan outlines the goal to create complete streets with improved traffic flow and safer pedestrian facilities. I-94 creates a barrier for active transportation users where there are limited crossing opportunities, therefore future improvements to the 20th Street interchange should maintain and enhance pedestrian and bicycle safety and connectivity within the community, especially in the vicinity of Minnesota State Community and Technical College (M-State) which may potentially generate a high number of active transportation trips.

MATBUS is the transit provider in the Fargo-Moorhead metro area and has one fixed route that enters the interchange area. Route 5 serves destinations in southern Moorhead and circles around M-State, crossing I-94 on 20th Street in both directions. The route travels eastbound on 28th Avenue and turns right onto 20th Street, serving a sheltered bus stop across from M-State approximately 560 feet west of 20th Street adjacent to the westbound on-ramp. The route runs on 30-minute headways from about 6:00 AM to 10:00 PM on weekdays and 7:00 AM to 10:00 PM on Saturdays. MATBUS routes and timetables are shown in Appendix E. Local school bus routes also run through the interchange area that utilize 28th Avenue.

EXISTING INTELLIGENT TRANSPORTATION SYSTEMS

There are no existing intelligent transportation systems (ITS) in the vicinity of the interchange or along I-94 through Moorhead.

EXISTING BRIDGES

There are three bridges within the interchange area. Information about each bridge is shown in the following sections:

- **Bridge No. 14811: 20th Street (MSAS 126) over I-94** – This bridge was built in 1973, is 231.5 feet long and 59 feet wide. The bridge carries four lanes of vehicle traffic and includes a raised sidewalk on the west side. The detour route length is four miles. The condition ratings from the current Structure Inventory Report are shown below. The underclearance rating of 5 is a due to the providing less vertical clearance (16.1 feet) than the current minimum standard of 16’-6”.

Reference: Existing Conditions Memorandum

+ NBI CONDITION RATINGS +	
Deck	7
Superstructure	8
Substructure	7
Channel	N
Culvert	N
+ NBI APPRAISAL RATINGS +	
Structure Evaluation	6
Deck Geometry	6
Underclearances	5
Waterway Adequacy	N
Approach Alignment	8

- **Bridge No. 14530: Pedestrian Bridge over I-94 –** This bridge was built in 1995, is 232 feet long and 12.3 feet wide. The bridge carries a 10-foot wide shared-use path over I-94. The condition ratings from the current Structure Inventory Report are shown below. This bridge provides 16.8 feet of vertical clearance over I-94, slightly less than the current standard of 17'-4" for pedestrian bridges.

+ NBI CONDITION RATINGS +	
Deck	8
Superstructure	8
Substructure	8
Channel	N
Culvert	N
+ NBI APPRAISAL RATINGS +	
Structure Evaluation	8
Deck Geometry	N
Underclearances	6
Waterway Adequacy	N
Approach Alignment	N

- **Bridge No. 9477: Burlington Northern Santa Fe (BNSF) Railroad over I-94** – This bridge was built in 1960, is 238 feet long, and 18.5 feet wide. The bridge carries the Burlington Northern Santa Fe (BNSF) East Breckenridge-South Moorhead Line single track over I-94. The condition ratings from the current Structure Inventory Report are shown below. The underclearance rating of 4 is a due to the providing less vertical clearance (16.1 feet) than the current minimum standard of 16'-6".

Reference: Existing Conditions Memorandum

+ NBI CONDITION RATINGS +	
Deck	7
Superstructure	6
Substructure	7
Channel	N
Culvert	N
+ NBI APPRAISAL RATINGS +	
Structure Evaluation	6
Deck Geometry	N
Underclearances	4
Waterway Adequacy	N
Approach Alignment	N

The Structure Inventory Reports for the three bridges are included in Appendix F.

EXISTING UTILITIES AND DRAINAGE

In the vicinity of the interchange, overhead transmission power lines are present along the south side of I-94, on the south side of the eastbound off-ramp, and along the east side of 20th Street. This set of power lines connects to a sub-station adjacent to the eastbound off-ramp approximately 800 feet west of 20th Street. An additional overhead service power line runs parallel to 20th Street east of the railroad. Signal hardware is present in the interchange area to service the ramp terminal intersection signals. Various underground utilities are also present in the interchange area, including power lines, communications lines (fiber optic, telephone, and cable), petroleum pipelines, and water supply lines, particularly around the west ramp terminal intersection in the northwest quadrant.

Lighting is present along 20th Street consisting of luminaires with a spacing ranging from approximately 110 to 210 feet and luminaires at the ramp terminal intersections. No lighting is present immediately near the railroad or shared-use path crossings.

A water tower is located near the interchange in the northeast quadrant of the westbound on-ramp intersection east of Ken's Sanitation and Recycling.

20th Street and the overpass have an urban drainage system with curb and gutter and catch basins that flows into the interchange area and to County Ditch 30 north of I-94 and the ditch south of I-94, or to the urban storm sewer systems north and south of the interchange. Drainage along the I-94 mainline in the interchange area flows into a storm sewer system and to a lift station in the southeast quadrant of the interchange, where it flows into the south ditch. Outside the interchange area, I-94 flows into the ditches through culverts.

EXISTING FREIGHT, EMERGENCY SERVICES, AND RAILROAD

I-94 is a major interstate highway that serves regional, national, and international freight truck traffic, particularly between the Midwest, western U.S., and Canadian Prairies. 20th Street serves as an unofficial harvest truck route in the fall and serves businesses with frequent heavy vehicle activity, including Ken's Sanitation and Recycling, Gavilon Fertilizer, and the Anheuser-Busch Malt Plant.

Some emergency services are present in the vicinity of the interchange. The Moorhead Fire Department Southside Fire Station is located on 20th Street near the intersection with 24th Avenue. Along with other city emergency services, 20th Street is a primary route to access areas of Moorhead south of I-94. With few alternate I-94 crossings, maintenance of traffic during construction will be essential to maintain access to emergency services. Additionally, 20th Street is identified as a primary snow emergency route and thus will be prioritized in maintaining operations during snow events. A map of snow emergency routes is shown in Appendix G.

An active freight railway runs parallel to 20th Street approximately 120 feet east of the centerline. The railway crosses I-94 with a dedicated bridge and crosses 28th Avenue and its adjacent shared use path with an at-grade crossing. This crossing has vehicle and pedestrian warning gates and vehicle channelization. The railway is identified as the East Breckenridge-South Moorhead Line in the Moorhead Subdivision operated by BNSF under their Twin Cities Division. An estimated eight trains use this line in a 24-hour period with a maximum speed of 60 mph at the 28th Avenue crossing. Two crashes were reported at this crossing location in the past 20 years. One crash occurred in 2005 involving a combination truck and the most recent crash occurred in 2008 involving a light pickup truck. Both crashes resulted only in property damage. Railway crossing data and crash data is shown in Appendix H.

TRAFFIC DATA

Historic average annual daily traffic (AADT) volumes within the interchange area were obtained from MnDOT's Traffic Mapping Application and are shown in Table 1.

Table 1 – Historic Average Annual Daily Traffic (AADT) Volumes[2]

Count Location	AADT (Year)
I-94 Mainline West of Interchange Ramps	56,808 (2021)
I-94 Mainline East of Interchange Ramps	38,816 (2021)
20th Street South of Interchange Ramps	22,815 (2021)
20th Street North of Interchange Ramps	14,400 (2017)
Eastbound Off-ramp	4,367 (2021)
Westbound On-ramp	4,901 (2021)
28th Avenue East of 20th Street	8,527 (2021)
28th Avenue West of 20th Street	1,500 (2019), 980 (2020)

Turning movement counts were collected by Stantec using video collected by Metro COG for the two ramp terminal intersections of the interchange. Video was collected for 24 hours on Thursday, May 4, 2023. Counts were collected during the AM (7:00 – 9:00 AM), mid-day (11:00 AM – 1:00 PM), and PM (4:00 – 6:00 PM) in 15-minute intervals to determine the peak hour volumes of the two intersections. Counts included vehicle classes sorted by passenger cars/light duty pickup trucks, single-unit trucks, and combination trucks. Volumes were balanced between the two intersections. Pedestrian and bicycle counts were also collected using the same video data. These counts were taken over 24 hours in 15-minute intervals to determine the number of pedestrians and bicycles on each side of 20th Street (on the sidewalk and shared-use path) and their direction of travel. In 24 hours, 36 pedestrians and 28 bicycles used the sidewalk on the west side of 20th Street and 29

[2] https://www.dot.state.mn.us/traffic/data/tma.html

pedestrians and 54 bicycles used the shared-use path on the east side. Peak hour turning movement counts, pedestrian and bicycle counts, and detailed raw count data is shown in Appendix I.

To estimate the 2023 AADT of the ramp terminal intersection legs listed in Table 1, factors were developed by comparing the 2021 AADT to peak hour turning movement counts that were collected by Metro COG on Tuesday, September 14, 2021. This calculation accounted for variability throughout the year by applying seasonal adjustment factors obtained by MnDOT[3] of 0.93 for September and 0.97 for May. For 20th Street north of the interchange ramps, since the AADT was calculated for 2017, an additional growth factor was applied to estimate 2021 AADT at a growth rate of 0.84% per year. Table 2 shows the estimated 2023 AADT of the ramp terminal intersection legs. Detailed AADT estimation calculations are shown in Appendix I. The significant volume difference between 2021 and 2023 estimated AADT on 20th Street north of I-94 is likely due to the 20th Street rail grade separation project completed in 2022. The slight volume decrease between 2021 and 2023 for the eastbound off-ramp is likely due to variation in travel or commuting patterns resulting from the later stages of the COVID-19 pandemic.

Table 2 – Historic Average Annual Daily Traffic (AADT) Volumes

Count Location	Historic AADT (Year), *Est.*	2023 Estimated AADT
20th Street South of Interchange Ramps	22,815 (2021)	24,810
20th Street North of Interchange Ramps	14,400 (2017), *14,900 (2021)*	19,530
Eastbound Off-ramp	4,367 (2021)	4,190
Westbound On-ramp	4,901 (2021)	5,100
28th Avenue East of 20th Street	8,527 (2021)	8,750

ORIGIN-DESTINATION DATA

Origin-destination data obtained from Metro COG's Streetlight subscription will be used to determine the travel patterns of local traffic, particularly between the adjacent interchanges. Future volume analysis will include examining origin-destination data and determining the traffic volumes to and from the east that adjust their route from an adjacent interchange to the newly opened eastern ramps at 20th Street. More details on this data will be included in subsequent project analyses and reports.

CRASH DATA

A review of the crash data for the interchange area over a five-year period from 2018 through 2022 was completed. Crash data was obtained from the MnDOT crash database using the Minnesota Crash Mapping Analysis Tool (MnCMAT2). Data was obtained for the two ramp terminal intersections and for a section of the I-94 mainline which constitutes the influence area of the interchange and rest area ramps. The mainline was divided into two segments based on AADT volumes. The first segment (west segment) begins at the start of the weave area at the US 75 east ramps 3,900 feet west of 20th Street and ends at the merge point of the 20th Street westbound on-ramp, equaling approximately 0.55 miles. The second segment (east segment) begins at the westbound on-ramp merge point and ends at the end of the weave area at the Main Avenue ramps 4,400 feet east of 20th Street, equaling approximately 1.03 miles. These segments capture weaving behavior between adjacent interchanges. While outside the primary study area, due to its proximity, the RIRO

[3] https://www.dot.state.mn.us/traffic/data/reports/vc/Seasonal_Adjustment_Factors.pdf

intersection of 28th Street west of 20th Street was also examined for crashes, but no crashes were reported there between 2018 and 2022.

Crashes were reviewed for accuracy, which included verifying the crash type, vehicle directions, and relation to intersections and segments. A summary of reported crashes is provided in Table 3 and discussed in more detail below. MnDOT crash data and a map of the segments and crashes are included in Appendix J.

Between 2018 and 2022, there were no reported pedestrian or bicycle related crashes in the vicinity of the interchange. It is important to note that it can be difficult to identify crash trends for transportation modes other than vehicles, such as pedestrians and bicycles. Additionally, many pedestrian/bicycle crashes go unreported. Therefore, the absence of reported pedestrian/bicycle crashes in a five-year period of crash data does not necessarily indicate safe conditions for these users.

Table 3 – Interchange Area Crash Data, 2018 – 2022

	Number of Crashes					
		Personal Injury*				
	Fatal	Type A	Type B	Type C	Property Damage	Total Crashes
Segments						
I-94 Mainline West Segment	0	0	2	5	43	50
I-94 Mainline East Segment	1	1	6	2	37	47
Intersections						
20th St & 28th Ave WB on-ramp	0	0	0	1	10	11
20th St & EB off-ramp	0	0	0	2	6	8

**Personal Injury Crashes include Type A (Serious Injury), Type B (Minor Injury), and Type C (Possible Injury).*

The five-year crash and severity rates for each segment and intersection were compared to the five-year statewide average rates and the five-year critical rates for similar segments and intersections. Locations with crash or severity rates above the critical rates are generally considered in need of safety improvements. The crash rate is expressed in crashes per million vehicle miles traveled (MVMT) and per million entering vehicles (MEV) for segments and intersections, respectively. The severity rate is expressed in fatal and serious injury crashes per 100 million vehicle miles traveled (100 MVMT) and per 100 million entering vehicles (100 MEV) for segments and intersections, respectively. The results are shown in Table 4. Crash calculation sheets are also included in Appendix J.

Reference: Existing Conditions Memorandum

Table 4 – Crash Rates 2018 – 2022						
	Crash Rates (per MVMT/MEV)			Severity Rates (per 100 MVMT/100 MEV)		
Location	Observed Crash Rate	Average Statewide Crash Rate*	Critical Crash Rate**	Observed Severity Rate	Average Statewide Severity Rate*	Critical Severity Rate**
Segments						
I-94 Mainline West Segment	**0.877**	0.944	1.280	**0.000**	0.592	2.780
I-94 Mainline East Segment	**0.641**	0.944	1.240	**2.727**	0.592	2.430
Intersections						
20th St & 28th Ave WB on-ramp	**0.263**	0.592	0.910	**0.000**	0.824	3.820
20th St & EB off-ramp	**0.161**	0.592	0.880	**0.000**	0.824	3.480

**Average crash rates based on crash rates from MnDOT 2016-2020 Intersection and Section Toolkits.*

***Critical crash rates give an indication of the statistical significance of the crash rate. Locations with a crash rate above the critical crash rate are considered to be in need of safety improvements because there is a high probability that conditions at this location are contributing to the higher crash rate.*

The predominant crash patterns, trends, and types of crashes were identified and are summarized below:

- The observed crash rates for the I-94 segments and ramp terminal intersections were all below the critical crash rates for similar segments and intersections. Only the east segment of the I-94 mainline had a severity rate that was above the critical rate due to one fatal and one serious injury crash.

- The fatal crash occurred on the east segment of the mainline and involved two combination trucks and an SUV where one truck lost the ability to brake and rear ended the SUV into the other truck. The SUV occupants were killed in the crash. The serious injury crash involved a single vehicle rollover at high speeds following a police chase while the driver was under the influence of alcohol.

- Out of 97 reported crashes on the mainline, run off road/single vehicle crashes (59) were the most common crash type. Other crash types include rear end crashes (24) and sideswipe crashes (14). Ten mainline crashes were likely related to vehicles entering or exiting the highway within the weave sections, mostly between 20th Street and US 75 and resulting only in possible injury and property damage.

- There was a higher concentration of rear end crashes on the mainline segment west of 20th Street, some of which were related to traffic congestion and backups that are known to frequently occur in the westbound direction in the area of the I-94 bridge over the Red River.

- There were 19 total intersection related crashes at the two ramp terminal intersections. The most common crash type at the intersections were rear end crashes (10). Other crash types include angle crashes (5), sideswipe crashes (3), and one head-on crash. Two rear-end crashes and one angle crash resulted in possible injury.

LAND USE AND ZONING

Existing zoning surrounding the interchange includes parcels in the northeast quadrant zoned as Regional Commercial (RC) and Heavy Industrial (HI), in the northwest quadrant as Institutional (INS), in the southeast quadrant as Residential Low Density 1 and 2 (RLD1 & RLD2), and in the southwest quadrant as Institutional (INS), Community Commercial (CC), and Residential High Density 1 (RHD1).

Existing land use occupying the parcels is generally consistent with zoning, with a Ken's Sanitation and Recycling, Gavilon Fertilizer, and the Anheuser-Busch Malt Plant in the northeast quadrant, M-State in the northwest quadrant, a single-family and duplex home neighborhood in the southeast quadrant, and Triumph Lutheran Brethren Church, commercial properties, and multi-family apartment buildings in the southwest quadrant. Future land use highlighted in the 'City of Moorhead 2022 Comprehensive Plan' is also generally consistent with existing land use and zoning. Existing zoning and future land use is shown in Appendix K.

Additionally, the Moorhead Travel Information Center/Rest Area located off the eastbound lanes of I-94 is approximately 1,600 feet east of 20th Street. The rest area allows travelers entering Minnesota to stop for restrooms, vending, a picnic area, and tourist information, and has parking for passenger cars and combination trucks. Traffic volumes entering and exiting the rest area were collected on Tuesday, September 14, 2021 in 15-minute intervals. The volumes show in the AM peak hour of rest area traffic 15 entering and 25 exiting vehicles with 32-33% heavy vehicles and in the PM peak hour 20 entering and 23 exiting vehicles with 13-15% heavy vehicles. Rest area raw count data is shown in Appendix I.

ENVIRONMENTAL CONSIDERATIONS

Environmental features in the vicinity of the interchange were identified and briefly reviewed to ensure they are considered in the development of alternatives and impacts to them are understood.

Wetlands were identified and classified using the National Wetlands Inventory (NWI) Wetlands Mapper[4]. A Riverine habitat is present to the north of I-94 running east and west starting from the west end of the primary study area, entering a culvert in between the westbound on-ramp and 28th Avenue, and daylighting outside of the study area east on the rest area. A 0.54-acre Freshwater Emergent Wetland habitat is present in the southeast quadrant of the interchange immediately east of the railroad and south of I-94. A 0.35-acre Freshwater Emergent Wetland habitat is present immediately southeast of the off-ramp entering the rest area. Additional Freshwater Pond habitats are present east of the study area along the south side of I-94 and along the south side of 28th Avenue. A map of wetlands is shown in Appendix L.

Floodplains were identified using the FEMA Flood Map Service Center[5]. Most of I-94 in the interchange area and portions of the ramps lie within Flood Zone X 'Other Flood Areas', which describes areas of 0.2% (500 year) annual chance of flood, areas of 1% (100 year) annual chance of flood with average depths of less than one foot or with drainage areas less than one square mile, and areas protected by levees from 1% (100 year) annual chance of flood. A map of floodplain is shown in Appendix L.

[4] https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/
[5] https://msc.fema.gov/portal/home

Reference: Existing Conditions Memorandum

Contaminated sites were identified using the Minnesota Pollution Control Agency (MPCA) What's in My Neighborhood map[6]. Various types of pollutants were identified from active and inactive sites. Construction stormwater pollution was noted for construction activity on I-94, 20th Street, 28th Avenue, and the M-State parking lot expansion/replacement, of which only the M-State site is active. Ken's Sanitation and Recycling was identified for having pollution involving underground tanks, industrial stormwater pollution, and hazardous waste, of which the stormwater is active and the hazardous waste is active, but a minimal quantity generator. MacroSource/Gavilon Fertilizer was identified for having pollution involving aboveground tanks, air quality, industrial stormwater pollution, and toxics reduction, all of which are active. Lastly, several properties on 29th Street adjacent to I-94 and the eastbound off-ramp were identified for having hazardous waste and petroleum remediation as part of a leak site, all of which are inactive.

Apart from the previously identified rest area and shared-use paths along 20th Street and 28th Avenue, there are no parks or recreation areas within the interchange area. Community amenities including schools are limited to M-State in the northwest quadrant of the interchange and the rest area.

Environmental Justice (EJ) categories were examined using the EPA Environmental Justice Screening and Mapping Tool[7] and data provided by Metro COG. The area in the southwest quadrant of the interchange is above the 50th percentile in populations of people of color, low income, and higher unemployment rate. The area in the southwest quadrant has approximately a 30 percent minority population. The area in the northwest quadrant is above the 50th percentile in populations of low income and age over 64. Maps of EJ areas are shown in Appendix L.

PREVIOUS STUDIES

Several related studies within the primary and secondary study areas were performed prior to the I-94 and 20th Street Interchange Analysis, including the following:

- **TH 75 and 20th Street Corridor Study Report (2008)** – This study identified future improvement needs along 20th Street from Main Avenue to 60th Avenue, including the ramp terminal intersections. The study concluded that the preferred 20th Street cross section through the interchange is a four-lane divided section with continuous median and turn lanes, and the preferred 20th Street interchange layout is a conversion to a full access interchange with a new westbound off-ramp in the northeast quadrant with a 'Button Hook Connection' to 28th Avenue and a new eastbound on-ramp loop in the southwest quadrant, which would not meet MnDOT design standards due to a reduced radius to minimize impacts to surrounding parcels.

- **Moorhead East Growth Area AUAR (2018)** – The AUAR examined future land development scenarios of an over 4,000-acre area of eastern Moorhead Township and southern Dilworth east of 34th Street. While outside the study area of the 20th Street interchange, the development scenarios may influence the forecasted traffic expected to travel through the interchange.

- **2045 Metro Grow: Fargo-Moorhead Metropolitan Transportation Plan (2019)** – This latest long-range transportation plan includes transportation planning strategies to shape the Fargo-Moorhead area transportation network for the next 20 years. While no specific recommendations are made to the 20th Street interchange, the plan generally prioritizes collaborating with MnDOT to improve/

[6] https://mpca.maps.arcgis.com/apps/webappviewer/index.html
[7] https://ejscreen.epa.gov/mapper/

preserve uninterrupted traffic flow on I-94 and creating transportation facilities that promote multimodal inclusion.

- **US 10/75 Corridor Study (2020)** – This study developed context sensitive solutions for US 75 north of I-94, the concurrent route section in downtown Moorhead, and US 10 east of downtown. While the study does not cover 20th Street, the recommendations for these two major corridors may influence future traffic patterns on 20th Street and at the interchange.

- **Interstate Operations Analysis Report (pending completion in 2023)** – This report covers a high-level study of interstate operations in the Fargo-Moorhead area to identify prioritized improvements to improve safety, traffic operations, and mobility, including along I-94 through Moorhead. The study identifies that the 20th Street interchange may have local access and connectivity needs that warrant conversion to a full access interchange and selected the interchange to be a mid-term project to occur concurrently with the I-94 reconstruction and expansion to a six-lane freeway facility. Forecast traffic volumes from this study developed using the Advanced Traffic Analysis Center's (ATAC) 2045 Fargo-Moorhead Travel Demand Model (TDM) and accounting for conversion of the 20th Street interchange to full access will be used in the I-94 and 20th Street Interchange Analysis for estimating operational performance of the developed interchange alternatives.

CONCLUSIONS

The following is a summary of conclusions drawn from the Existing Conditions Inventory:

- The purpose of the I-94 & 20th Street Interchange Analysis is to determine the preferred alternative from a list of feasible alternatives to convert the interchange into a full access interchange, alleviating potential capacity concerns at adjacent interchanges and improving connectivity within Moorhead and the region.

- The existing interchange is a half diamond interchange with a westbound on-ramp and eastbound off-ramp that serves traffic to and from Fargo. I-94 is a four-lane freeway and 20th Street is four lanes south of the interchange and three lanes to the north. The ramp terminal intersections are signalized. The existing ramps connect to I-94 via weaving section that continues to the adjacent US 75 interchange. The northern ramp terminal intersection includes 28th Avenue on its eastern leg. A BNSF railroad is adjacent to 20th Street 120 feet to the east. A shared-use path is also adjacent to 20th Street and passes over I-94 on a dedicated bridge and 20th Street has an adjacent sidewalk.

- The Moorhead Travel Information Center/Rest Area is approximately 1,600 feet east of 20th Street. The on-ramp exiting the rest area connects with I-94 via a weaving section that continues to the adjacent Main Avenue and 34th Street interchanges.

- Peak hour vehicle turning movement counts and 24-hour bicycle and pedestrian counts were collected for 2023. They will be used in further operational analysis and will be compared to the 2021 counts collected by Metro COG. Rest area entry and exit volume counts were also collected in 2021. 2045 forecast traffic volumes developed in the pending Interstate Operations Analysis Report using the Fargo-Moorhead TDM will be used to estimate full access interchange volumes. Origin-destination data from Streetlight will also be examined.

- Crash data collected between 2018 and 2022 was reviewed for the mainline and for the ramp terminal intersections of the 20th Street interchange. Observed crash rates were all below the critical

rates for similar segments and intersections except for the mainline segment east of the ramps, which had a severity rate that was above the critical rate due to one fatal and one serious injury crash occurring. These crashes were likely not attributable to interchange traffic. Ten mainline crashes were likely related to ramp traffic entering and exiting the mainline at the weaving sections, mostly between 20th Street and US 75 and resulting in lower severity crashes. The most common crash type at the ramp terminal intersections was rear-end, followed by angle. Although no pedestrian or bicycle crashes were reported, this does not indicate safe conditions for these users.

- Adjacent zoning and land uses to the interchange are a mixture of commercial, industrial, institutional, and residential. Some environmental features were identified that may weigh into the consideration of alternatives and construction, including wetlands, contaminated sites, and adjacent community amenities.

Stantec Consulting Services Inc.

Adam Capets PE, PTOE
Transportation Engineer

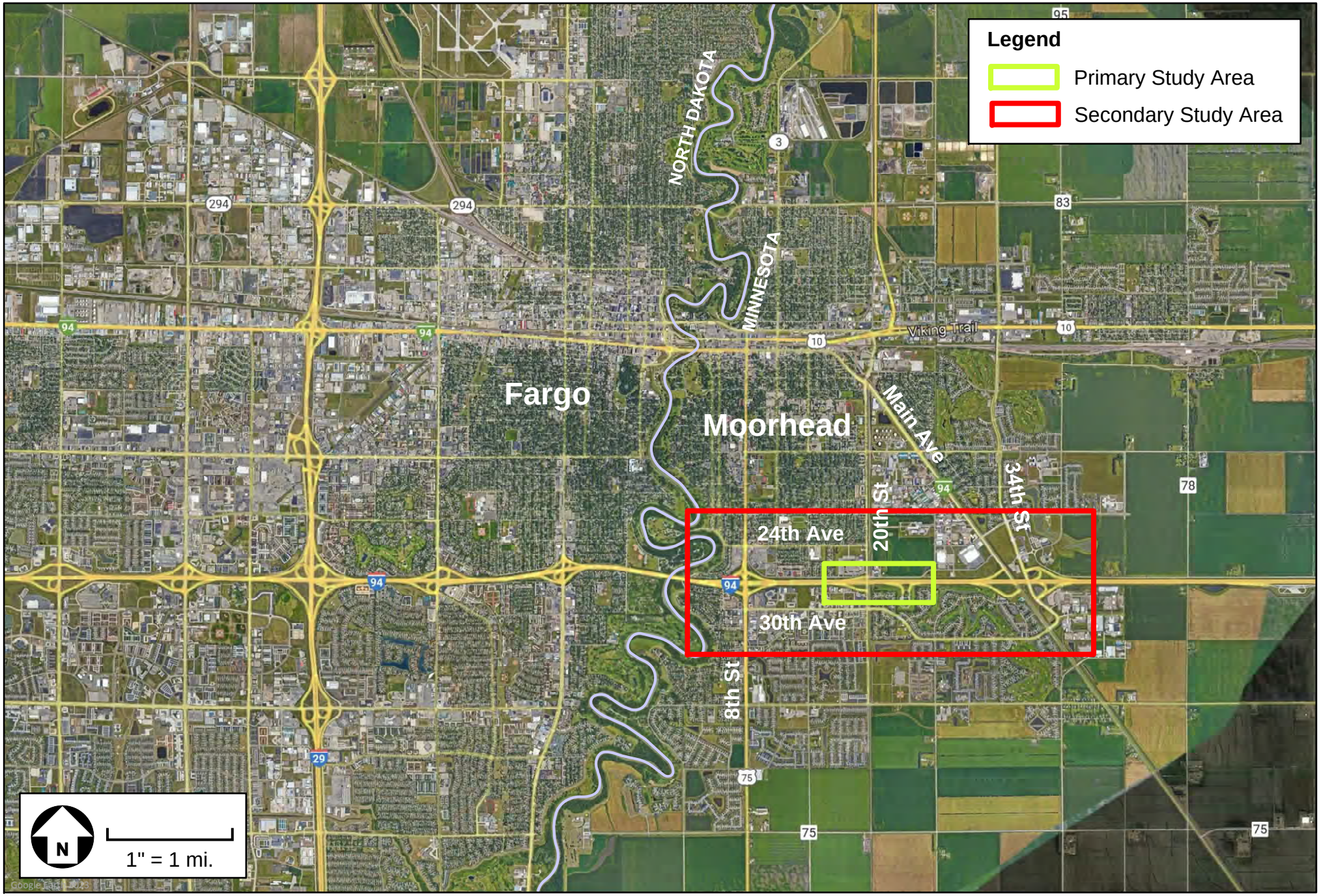
Phone: (312) 262-2238
Adam.Capets@stantec.com

Wade Frank PE
Associate, Sr. Transportation Manager

Phone: (701) 566-6022
Wade.Frank@stantec.com

Attachment: Appendices

APPENDIX A – STUDY AREA



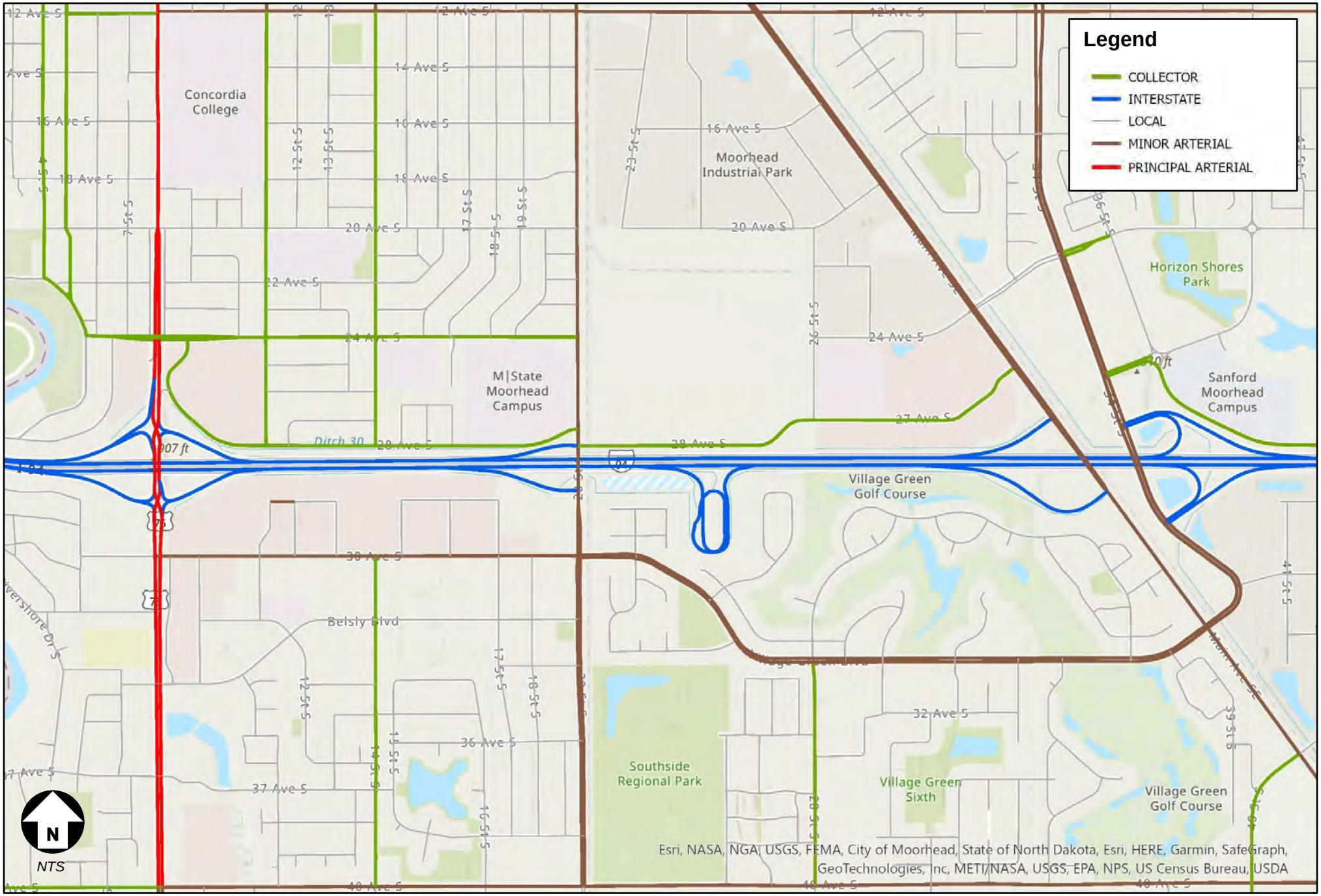
Study Area

Appendix A

I-94 & 20th Street Interchange Analysis
Moorhead, Minnesota

Stantec

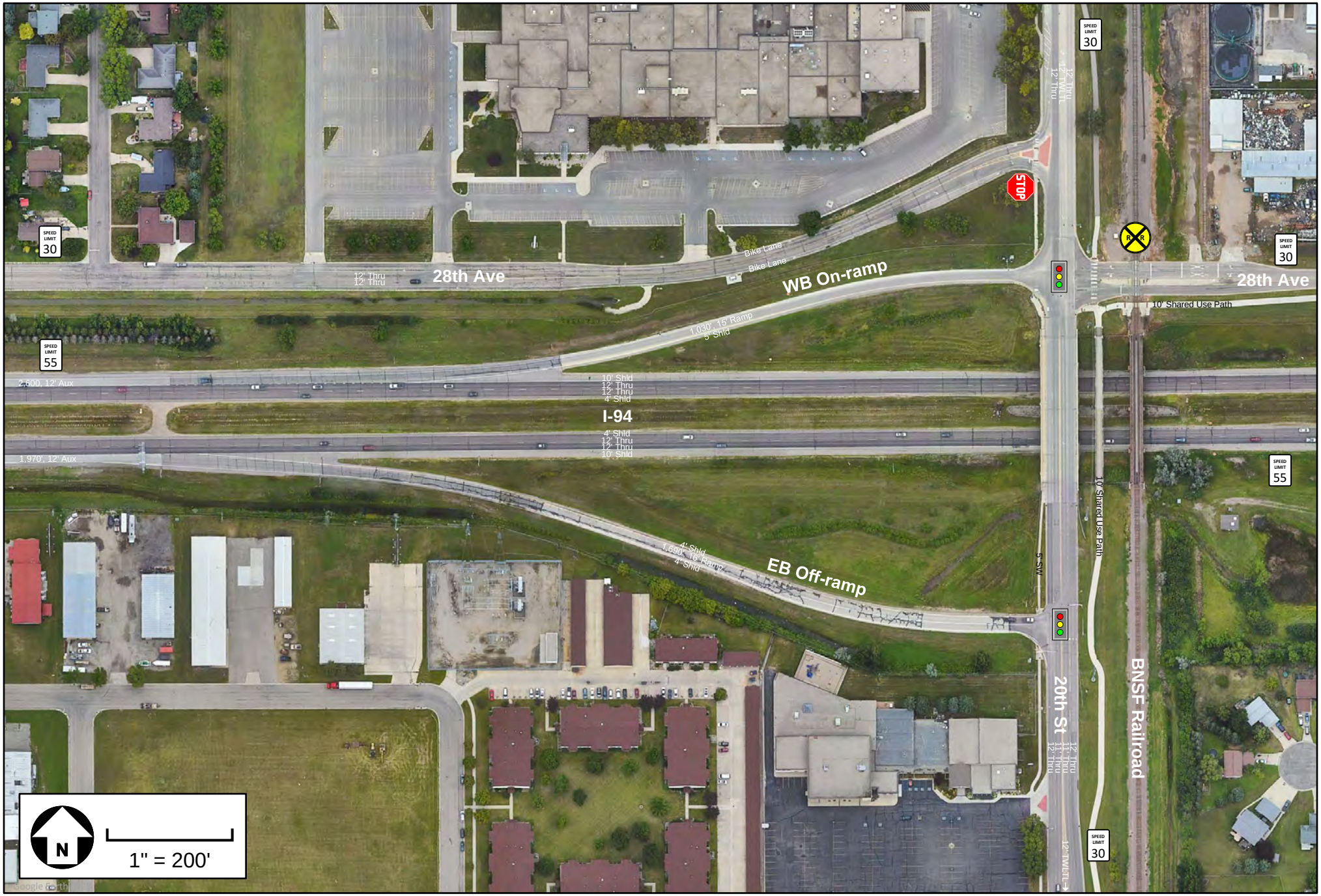
APPENDIX B – ROADWAY FUNCTIONAL CLASSIFICATION



Roadway Functional Classification

Appendix B

APPENDIX C – EXISTING INTERCHANGE GEOMETRICS, RECORD PLANS, AND TRAFFIC SIGNAL TIMINGS

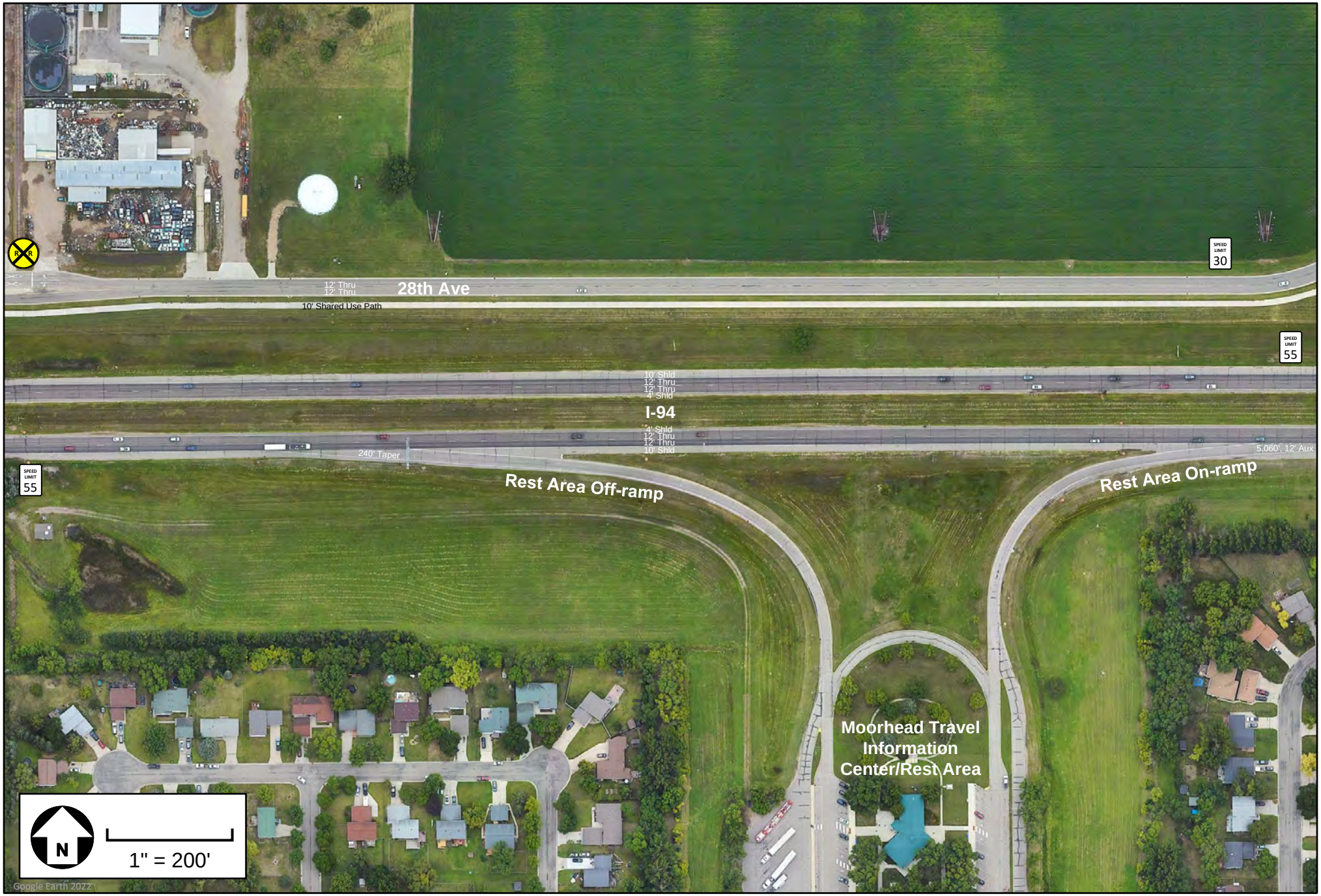


Existing Interchange Geometrics

Appendix C.1

I-94 & 20th Street Interchange Analysis
Moorhead, Minnesota

Stantec

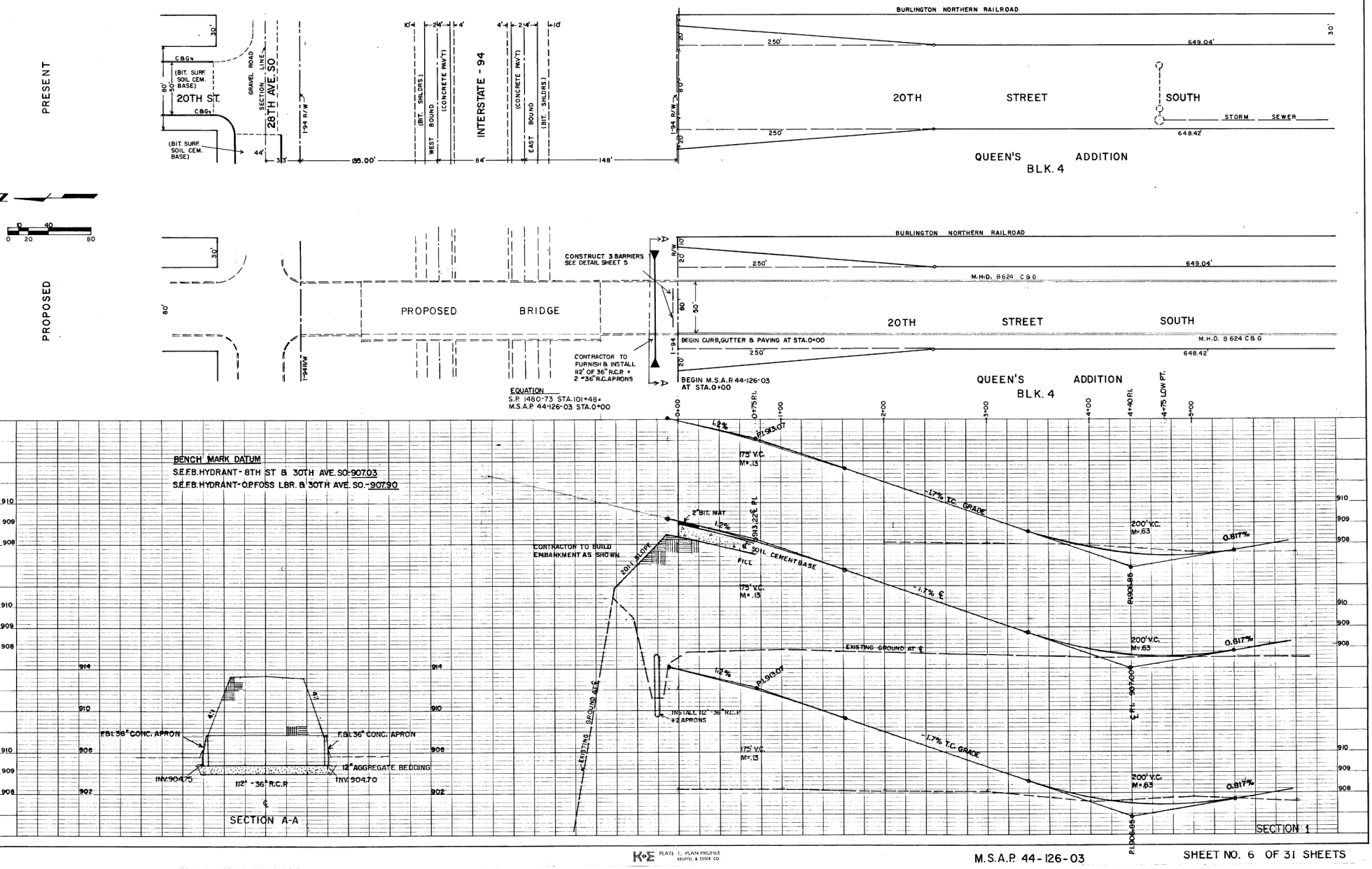


Existing Interchange Geometrics

Appendix C.2

I-94 & 20th Street Interchange Analysis
Moorhead, Minnesota

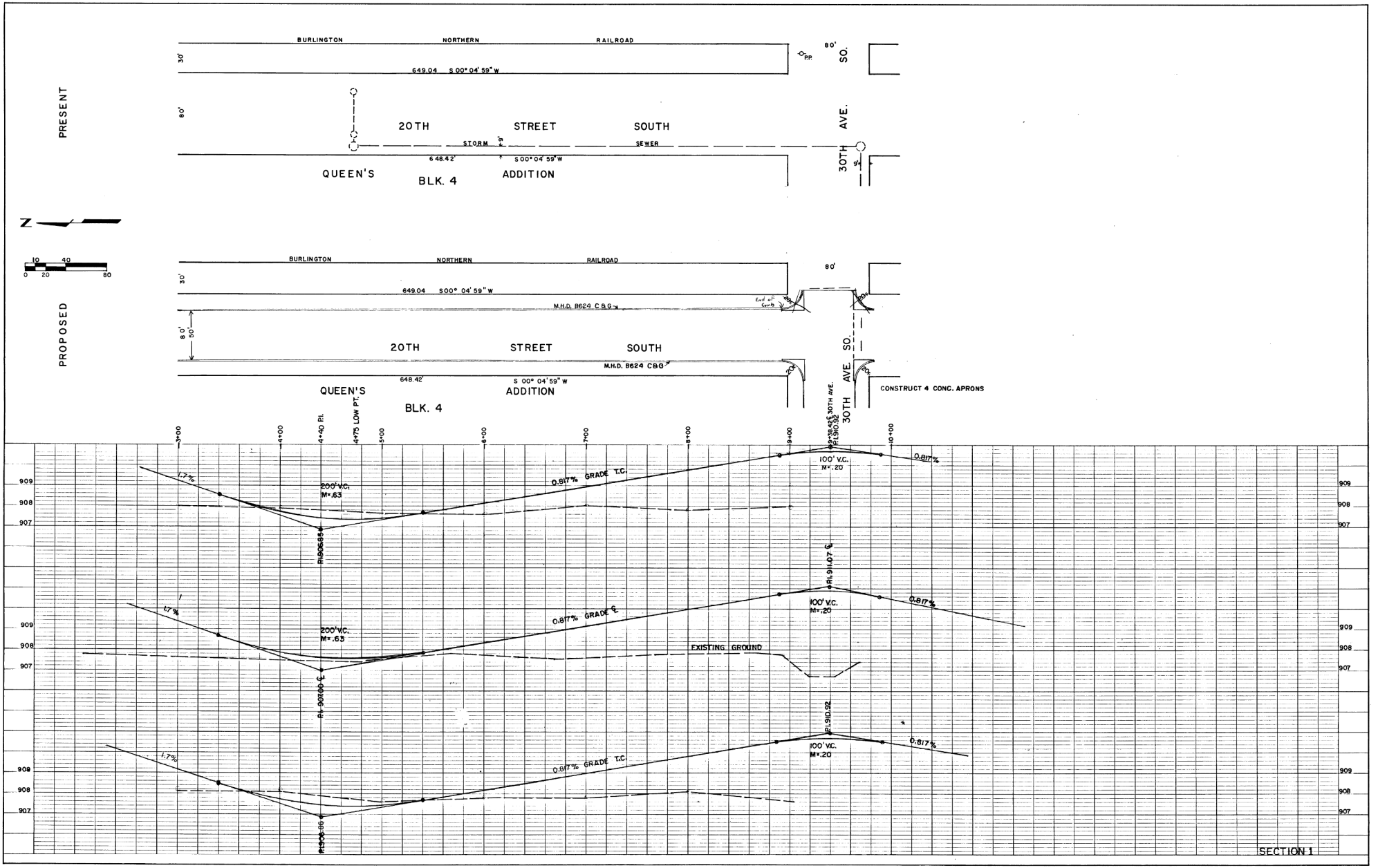
Stantec



K&E PLATE 1, PLAN-PROFILE KEUFFEL & ESSER CO.

M.S.A.P 44-126-03

SHEET NO. 6 OF 31 SHEETS

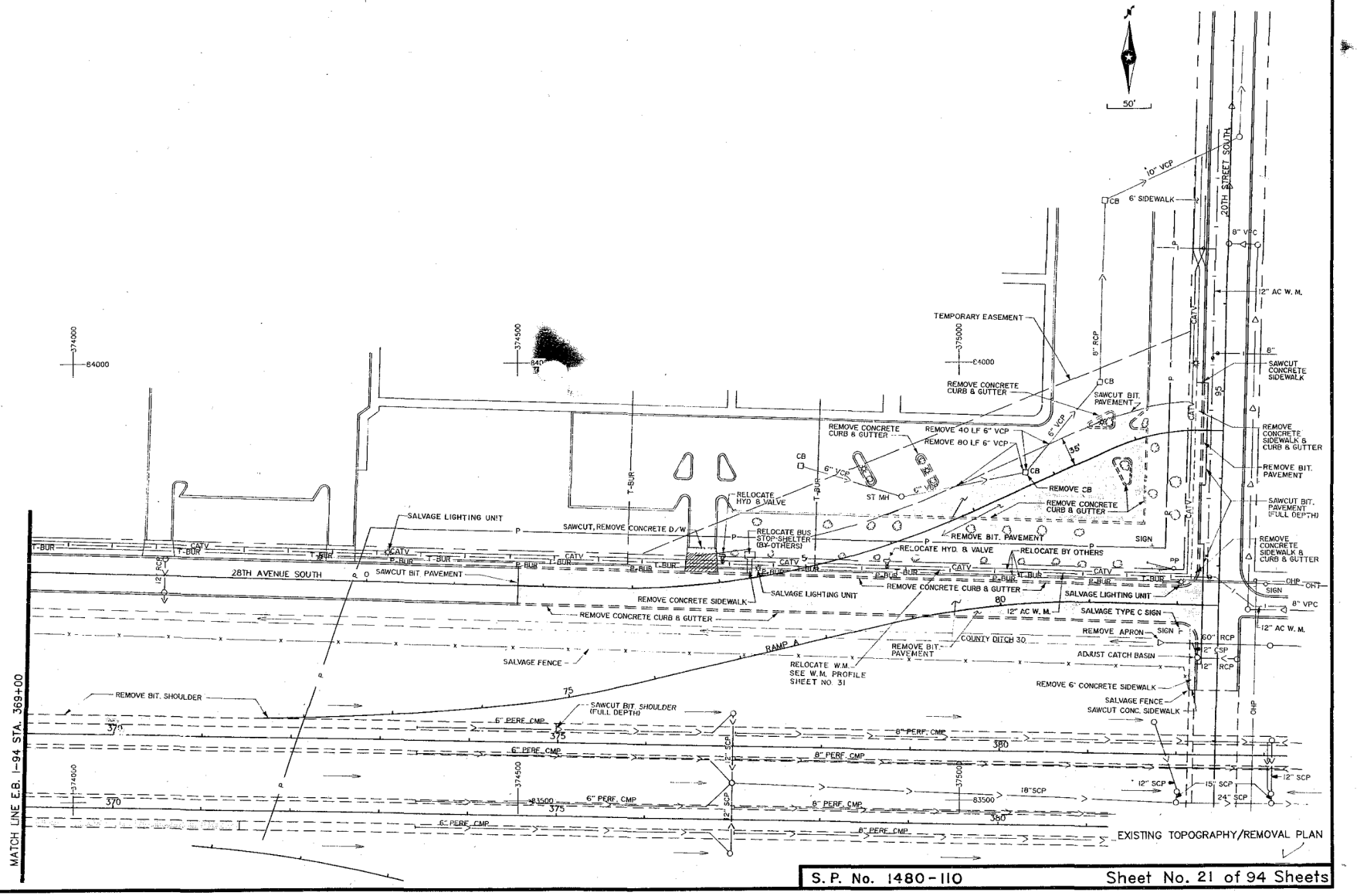


SECTION 1

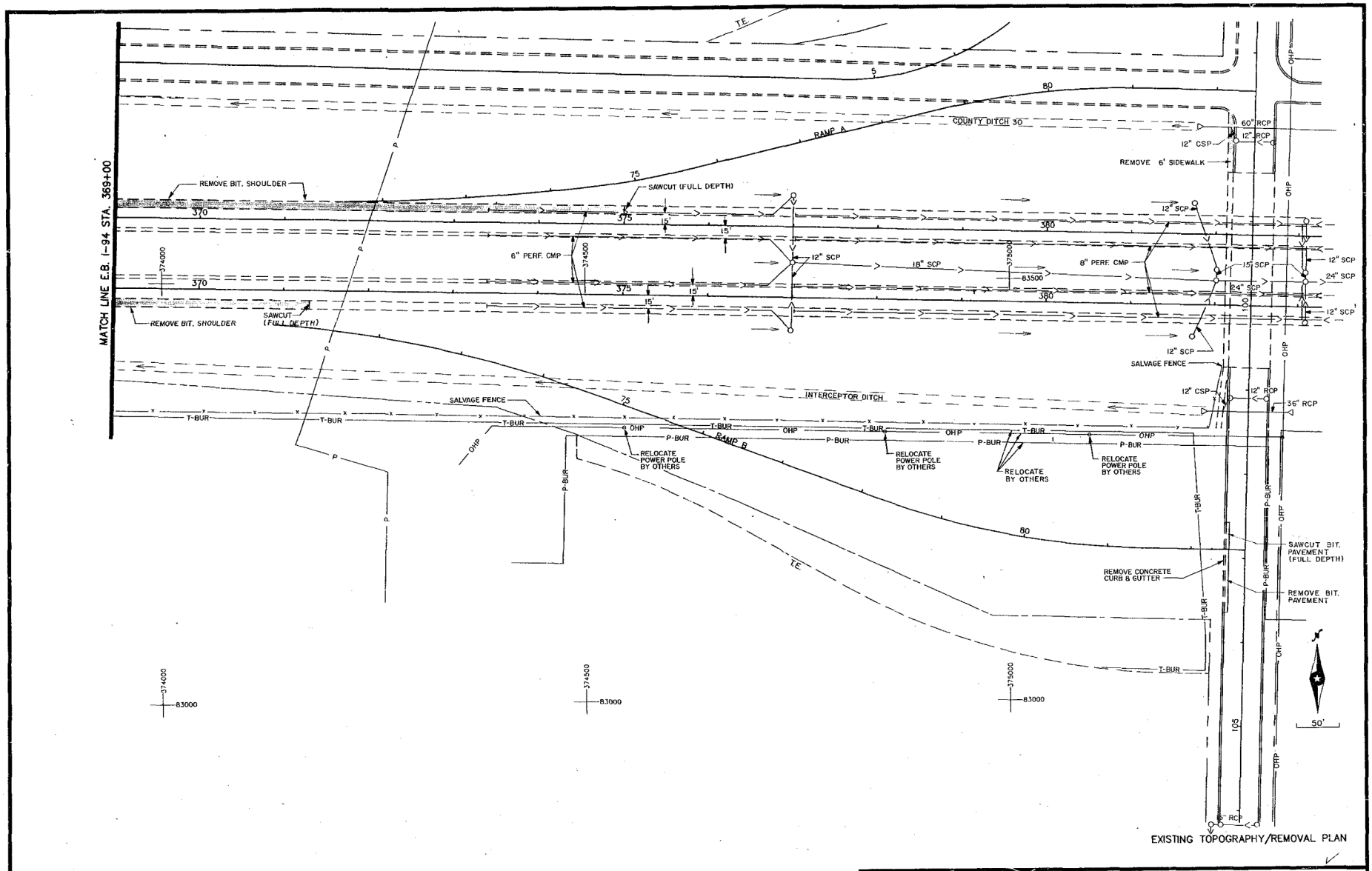
K•E PLATE 1, PLAN-PROFILE KEUFFEL & ESSER CO. 48 7004

M. S. A. P. 44-126-03

SHEET NO. 7 OF 31 SHEETS

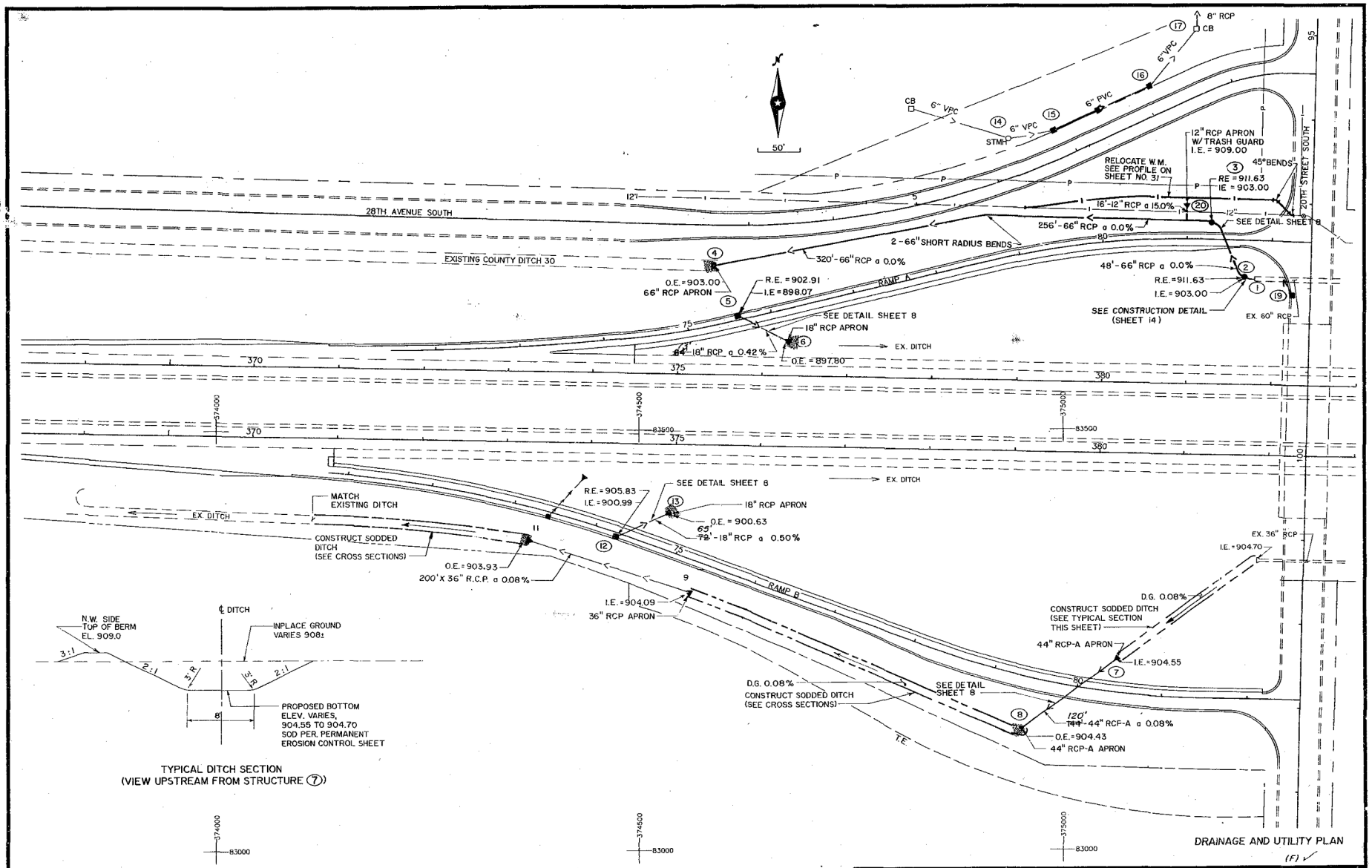


S. P. No. 1480-110 Sheet No. 21 of 94 Sheets



EXISTING TOPOGRAPHY/REMOVAL PLAN

S. P. No. 1480-110 Sheet No. 22 of 94 Sheets



S.P. No. 1480-110 Sheet No. 32 of 94 Sheets

FEED POINT #1

FP-#1 120/240 VOLT

3 CIRCUIT BREAKERS

LIGHTING STANDARDS AND BASES						
#	STATION	LT	RT	LOCATION	TYPE	BASE
1						
2						
3						
4	82 + 10		X	RAMP A	6-40	E
5	82 + 10	X		RAMP A	6-40	E
6	0 + 90	X		28TH AVE S	6-30	E
7	2 + 75	X		28TH AVE S	6-30	E
8	4 + 75	X		28TH AVE S	6-30	E
9	7 + 25	X		28TH AVE S	6-30	E
10	9 + 65	X		28TH AVE S	6-30	E

NOTES FOR THIS DRAWING

1. PROVIDE 2" RIGID GALVANIZED STEEL CONDUIT STUB & CAP. SEE NOTE #3 ON LIGHTING ASSEMBLY BASE DETAIL.
2. PROVIDE ARMORED CABLE, 3 CONDUCTOR NO. 4 PERM/DOT 3804 & 3805 DIRECT BURIED UNDERGROUND BRANCH CIRCUIT WIRING FOR A LIGHTING ASSEMBLY. MINIMUM DEPTH OF BURIAL 24". CIRCUIT IN CONDUIT UNDER ROADWAYS.
3. PROVIDE ARMORED CABLE, 3 CONDUCTORS NO.4 PER MN/DOT 3804 & 3805 DIRECT BURIED UNDERGROUND BRANCH CIRCUIT WIRING FOR A LIGHTING ASSEMBLY. MINIMUM DEPTH OF BURIAL 24". CIRCUIT IN CONDUIT UNDER ROADWAYS.
4. PROVIDE FEED POINT PEDESTAL CABINET "FP" PER PLAN DETAIL. CONNECT BRANCH CIRCUITS AS REQUIRED.

NOTES FOR THIS DRAWING

5. POWER COMPANY 120/240 VOLT PAD MOUNT TRANSFORMER. AT FD PT. FP #1 240/480 AT FD PT. A99R.
6. PROVIDE 3" RIGID GALVANIZED STEEL CONDUIT UNDER ROADWAY MINIMUM 36" BELOW GRADE.
7. PROVIDE 3" RSC 2 HH FOR FUTURE SIGNAL

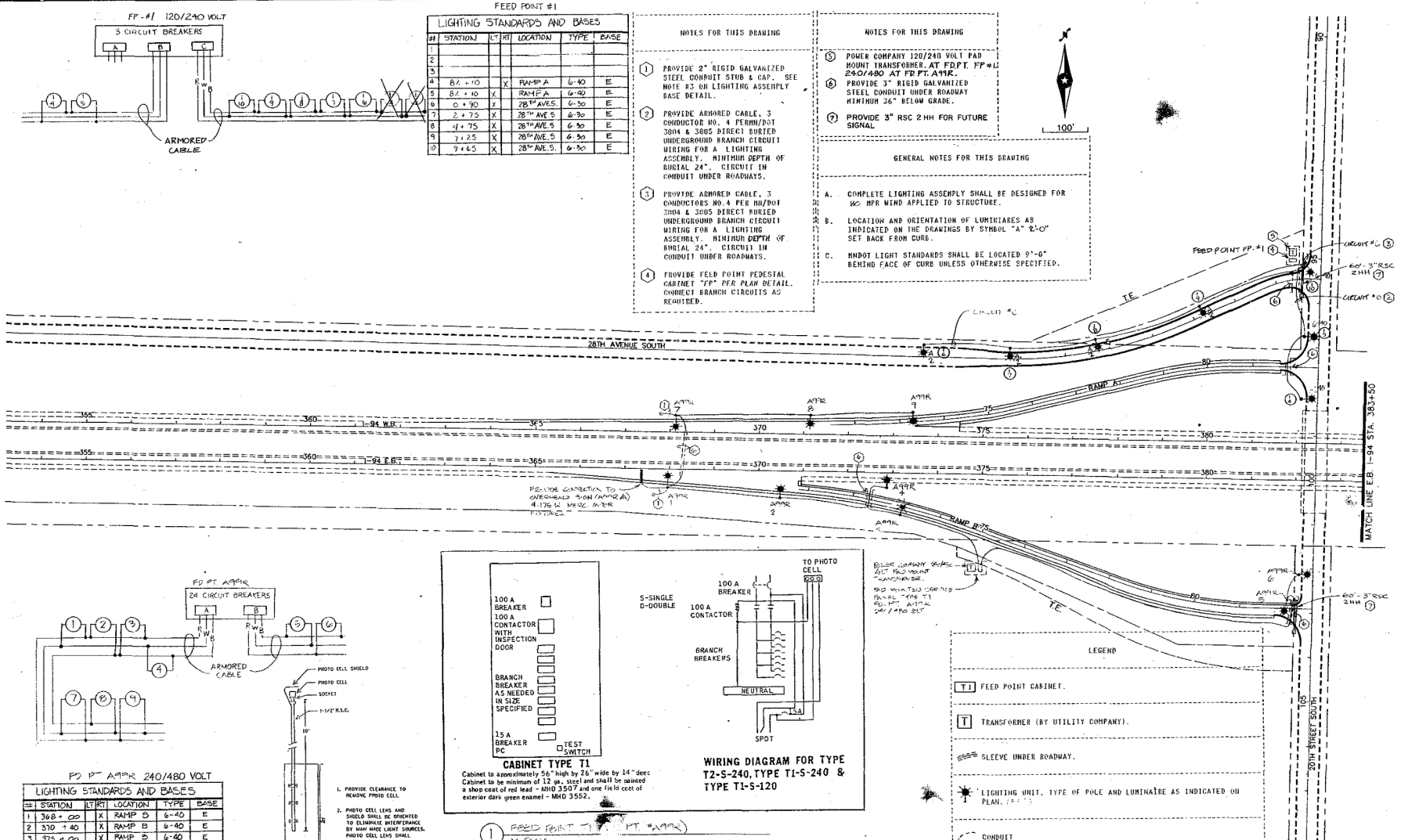
GENERAL NOTES FOR THIS DRAWING

A. COMPLETE LIGHTING ASSEMBLY SHALL BE DESIGNED FOR 90 MPR WIND APPLIED TO STRUCTURE.

B. LOCATION AND ORIENTATION OF LUMINIARES AS INDICATED ON THE DRAWINGS BY SYMBOL "A" 2'-0" SET BACK FROM CURB.

C. MNDOT LIGHT STANDARDS SHALL BE LOCATED 9'-0" BEHIND FACE OF CURB UNLESS OTHERWISE SPECIFIED.

100'



FD PT A99R

24 CIRCUIT BREAKERS

FD PT A99R 240/480 VOLT

LIGHTING STANDARDS AND BASES						
#	STATION	LT	RT	LOCATION	TYPE	BASE
1	368 + 00		X	RAMP B	6-40	E
2	370 + 40		X	RAMP B	6-40	E
3	375 + 00		X	RAMP B	6-40	E
4	372 + 90		X	RAMP B	6-40	E
5	82 + 30		X	RAMP B	6-40	E
6	82 + 00		X	RAMP B	6-40	E
7	383 + 30			[illegible]	6-40	E
8	370 + 90			MP A	6-40	E
9	373 + 30			RAMP A	6-40	E

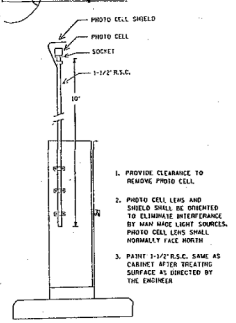


PHOTO CELL DETAIL

CABINET TYPE T1

Cabinet to approximately 56" high by 26" wide by 14" deep. Cabinet to be minimum of 12 ga. steel and shall be painted a shop coat of red lead - MHD 3507 and one field coat of exterior dark green enamel - MHD 3552.

WIRING DIAGRAM FOR TYPE T2-S-240, TYPE T1-S-240 & TYPE T1-S-120

1 FEED POINT T1 AT FD PT #A99R
NO SCALE

LEGEND

- T1 FEED POINT CABINET.
- T TRANSFORMER (BY UTILITY COMPANY).
- SLEEVE UNDER ROADWAY.
- LIGHTING UNIT, TYPE OF POLE AND LUMINAIRE AS INDICATED ON PLAN. (TYP.)
- CONDUIT
- DIRECT BURIED POWER CABLE - 3 WIRE NUMBER 4 A.W.G. ARMORED CABLE, SPECIFICATION NUMBER 3804 & 3805.

LIGHTING PLAN

DUNHAM ASSOCIATES, INC.
CONSULTING ENGINEERS
STRUCTURAL - MECHANICAL - ELECTRICAL
POWER DISTRIBUTION
9141 GRAND AVE. SO. 612-885-1200
MINNEAPOLIS, MINNESOTA 55420

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

REG. NO. 16619 DATE

S.P. No. 1480-110 Sheet No. 33 of 94 Sheets

SIGNAL INDICATIONS

ALL SIGNAL INDICATIONS SHALL BE 12 IN L.E.D.
EACH SIGNAL FACE SHALL HAVE A BACKGROUND SHIELD

SIGNAL FACE	R	Y	G	RLTA	YLTA	GLTA
2-1,2-2	●	●	●			
4-1,4-2,4-3	●	●	●			
6-1,6-2	●	●	●			

NMC LOOP DETECTORS

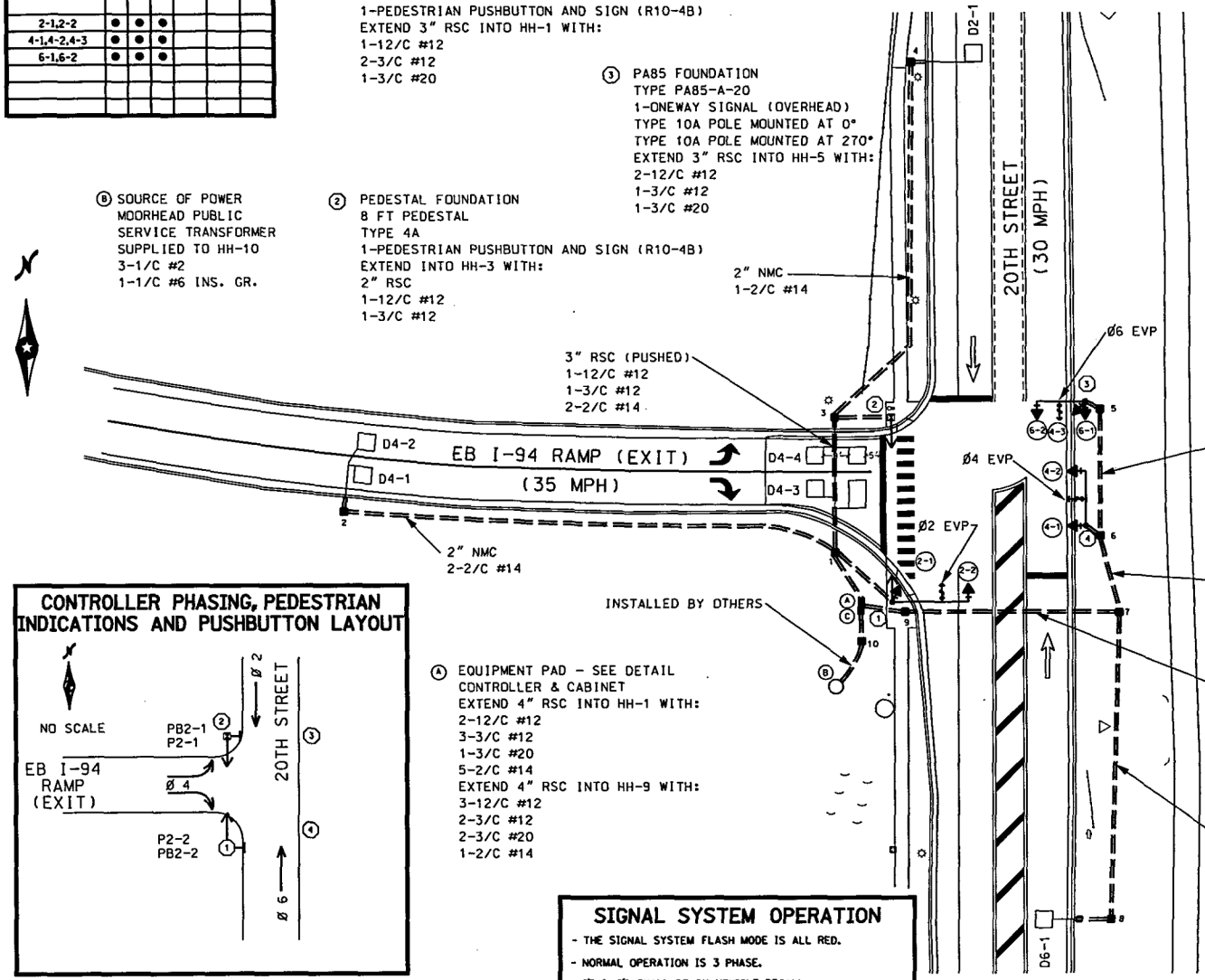
NUMBER	SIZE (FEET)	DIST. TO STOP BAR	SURFACE TYPE
D2-1	1-6x6	120	BITUMINOUS
D4-1	1-6x6	180	CONCRETE
D4-2	1-6x6	180	CONCRETE
D4-3	1-6x10,1-6x6	5,20	BITUMINOUS
D4-4	2-6x6	5,20	BITUMINOUS
D6-1	1-6x6	120	BITUMINOUS

① PA85 FOUNDATION
TYPE PA85-A-25
1-ONEWAY SIGNAL (OVERHEAD)
TYPE 10B POLE MOUNTED AT 270°
1-PEDESTRIAN PUSHBUTTON AND SIGN (R10-4B)
EXTEND 3" RSC INTO HH-1 WITH:
1-12/C #12
2-3/C #12
1-3/C #20

② PEDESTAL FOUNDATION
8 FT PEDESTAL
TYPE 4A
1-PEDESTRIAN PUSHBUTTON AND SIGN (R10-4B)
EXTEND INTO HH-3 WITH:
2" RSC
1-12/C #12
1-3/C #12

③ PA85 FOUNDATION
TYPE PA85-A-20
1-ONEWAY SIGNAL (OVERHEAD)
TYPE 10A POLE MOUNTED AT 0°
TYPE 10A POLE MOUNTED AT 270°
EXTEND 3" RSC INTO HH-5 WITH:
2-12/C #12
1-3/C #12
1-3/C #20

Ⓑ SOURCE OF POWER
MOORHEAD PUBLIC
SERVICE TRANSFORMER
SUPPLIED TO HH-10
3-1/C #2
1-1/C #6 INS. GR.



Ⓐ EQUIPMENT PAD - SEE DETAIL
CONTROLLER & CABINET
EXTEND 4" RSC INTO HH-1 WITH:
2-12/C #12
3-3/C #12
1-3/C #20
5-2/C #14
EXTEND 4" RSC INTO HH-9 WITH:
3-12/C #12
2-3/C #12
2-3/C #20
1-2/C #14

④ PA85 FOUNDATION
TYPE PA85-A-20
1-ONEWAY SIGNAL (OVERHEAD)
TYPE 10A POLE MOUNTED AT 270°
TYPE D SIGN - SEE SIGNING SHEET
EXTEND 3" RSC INTO HH-6 WITH:
1-12/C #12
1-3/C #12
1-3/C #20

Ⓒ SIGNAL SERVICE CABINET
EXTEND 2" RSC INTO CONTROLLER
CABINET WITH:
3-1/C #6
EXTEND 2" RSC INTO HH-10 WITH:
3-1/C #2
1-1/C #6 INS. GR.

NOTES:

1. SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
2. HANDHOLES SHALL BE PVC TYPE WITH METAL FRAMES AND COVERS.
3. EXACT LOCATION OF HANDHOLES, POLES, LOOP DETECTORS AND CABINET SHALL BE DETERMINED BY THE ENGINEER.

CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSHBUTTON LAYOUT

SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 3 PHASE.
- Ø2 & Ø6 SHALL BE ON VEHICLE RECALL

SYSTEM I.D. #22587
T.E. #3042

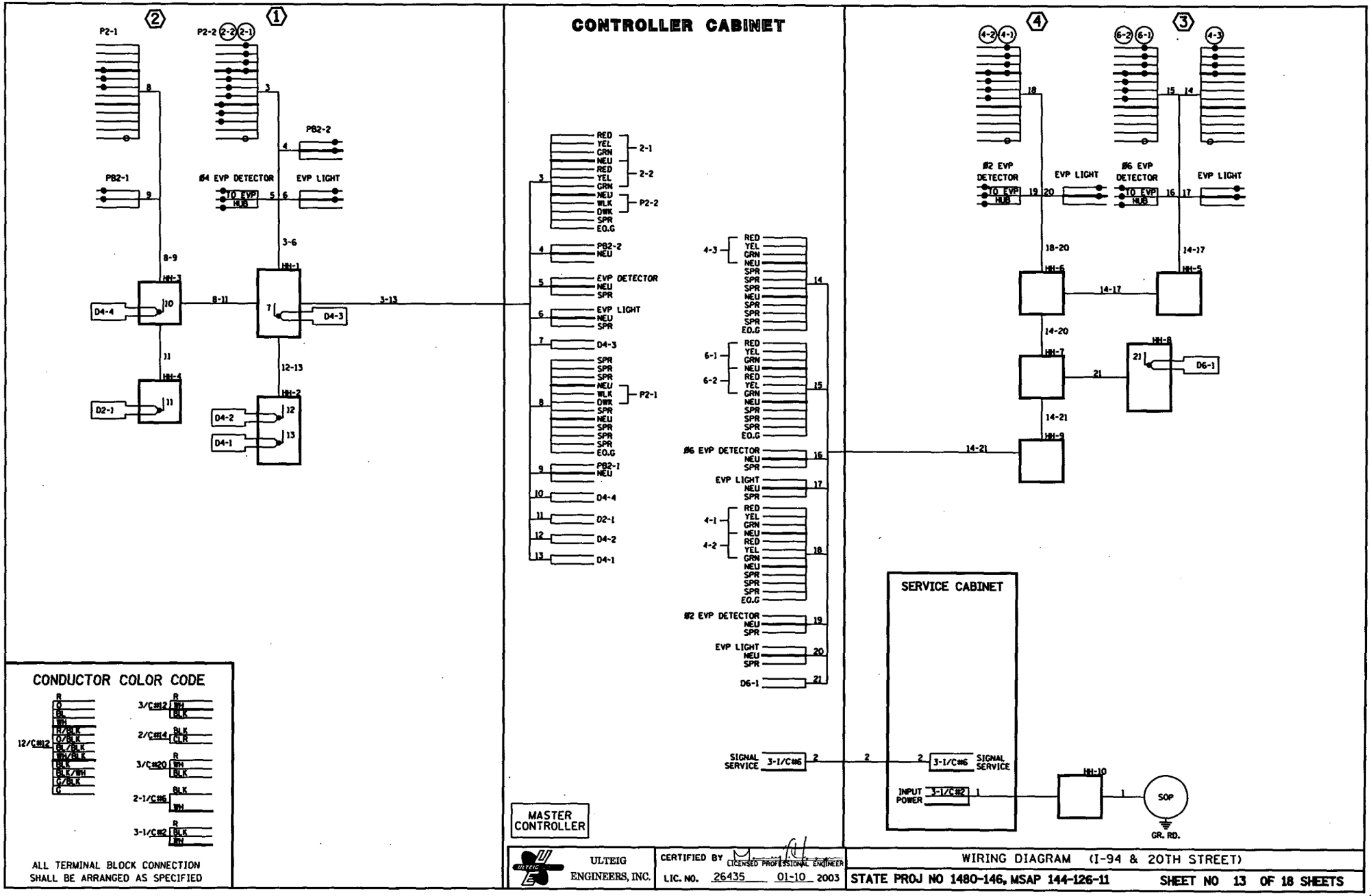
SCALE
0 40' 80' 160' 120' 200'

ULTEIG ENGINEERS, INC.

CERTIFIED BY _____ LICENSED PROFESSIONAL ENGINEER
LIC. NO. 26435 01-10 2003

INTERSECTION LAYOUT (I-94 & 20TH STREET)

STATE PROJ NO 1480-146, MSAP 144-126-11 SHEET NO 12 OF 18 SHEETS


CONTROLLER CABINET
P2-1
P2-2
PB2-2
PB2-1
#4 EVP DETECTOR
EVP LIGHT
TO EVP HUB
8-9
3-6
8-11
3-13
12-13
HH-3
HH-1
HH-4
HH-2
D4-4
D4-3
D2-1
D4-2
D4-1
RED
YEL
GRN
NEU
WHT
BLK
DWK
SPR
EQ.G
2-1
2-2
P2-2
PB2-1
EVP DETECTOR
EVP LIGHT
D4-3
D4-4
D2-1
D4-2
D4-1
4-3
6-1
6-2
4-1
4-2
#6 EVP DETECTOR
#2 EVP DETECTOR
D6-1
SIGNAL SERVICE
3-1/C#6
SERVICE CABINET
INPUT POWER
3-1/C#2
HH-10
SOP
GR. RD.
HH-6
HH-5
HH-7
HH-8
HH-9
18-20
14-17
14-20
14-21
21
CONDUCTOR COLOR CODE
12/C#12
3/C#12
2/C#14
3/C#20
2-1/C#6
3-1/C#2
ALL TERMINAL BLOCK CONNECTION SHALL BE ARRANGED AS SPECIFIED
MASTER CONTROLLER
ULTEIG ENGINEERS, INC.
CERTIFIED BY
LICENSED PROFESSIONAL ENGINEER
LIC. NO. 26435
01-10 2003
WIRING DIAGRAM (I-94 & 20TH STREET)
STATE PROJ NO 1480-146, MSAP 144-126-11
SHEET NO 13 OF 18 SHEETS

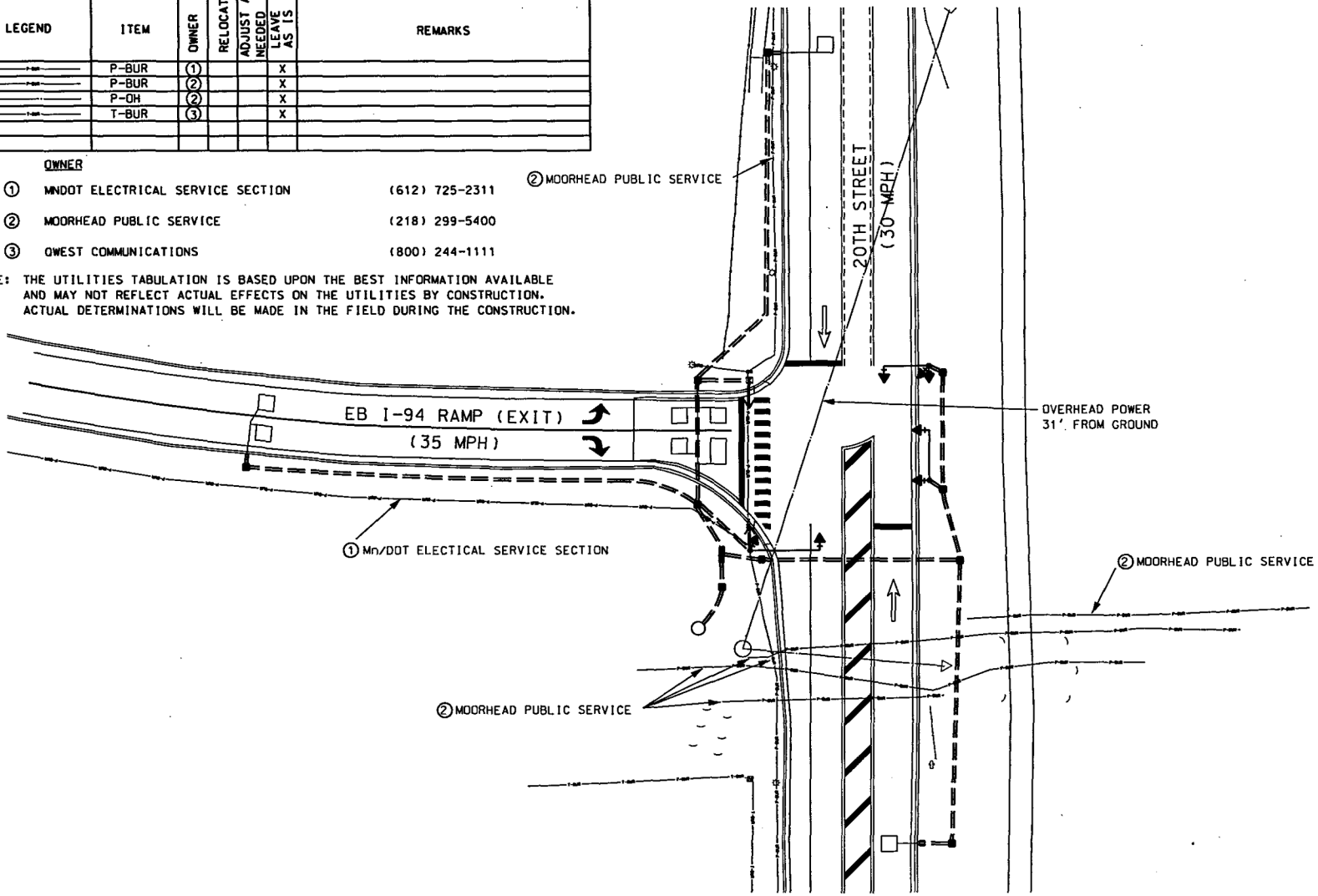
UTILITIES

LEGEND	ITEM	OWNER	RELOCATE	ADJUST AS NEEDED	LEAVE AS IS	REMARKS
	P-BUR	①			X	
	P-BUR	②			X	
	P-OH	②			X	
	T-BUR	③			X	

OWNER

①	MNDOT ELECTRICAL SERVICE SECTION	(612) 725-2311
②	MOORHEAD PUBLIC SERVICE	(218) 299-5400
③	QWEST COMMUNICATIONS	(800) 244-1111

NOTE: THE UTILITIES TABULATION IS BASED UPON THE BEST INFORMATION AVAILABLE AND MAY NOT REFLECT ACTUAL EFFECTS ON THE UTILITIES BY CONSTRUCTION. ACTUAL DETERMINATIONS WILL BE MADE IN THE FIELD DURING THE CONSTRUCTION.



SCALE

0 40' 80' 160' 120' 200'

ULTEIG ENGINEERS, INC.

CERTIFIED BY _____ LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26435 01-10 2003

UTILITIES (I-94 & 20TH STREET)

STATE PROJ NO 1480-146, MSAP 144-126-11 SHEET NO 14 OF 18 SHEETS

PLOTTED/REVISED: 12-MAR-2010

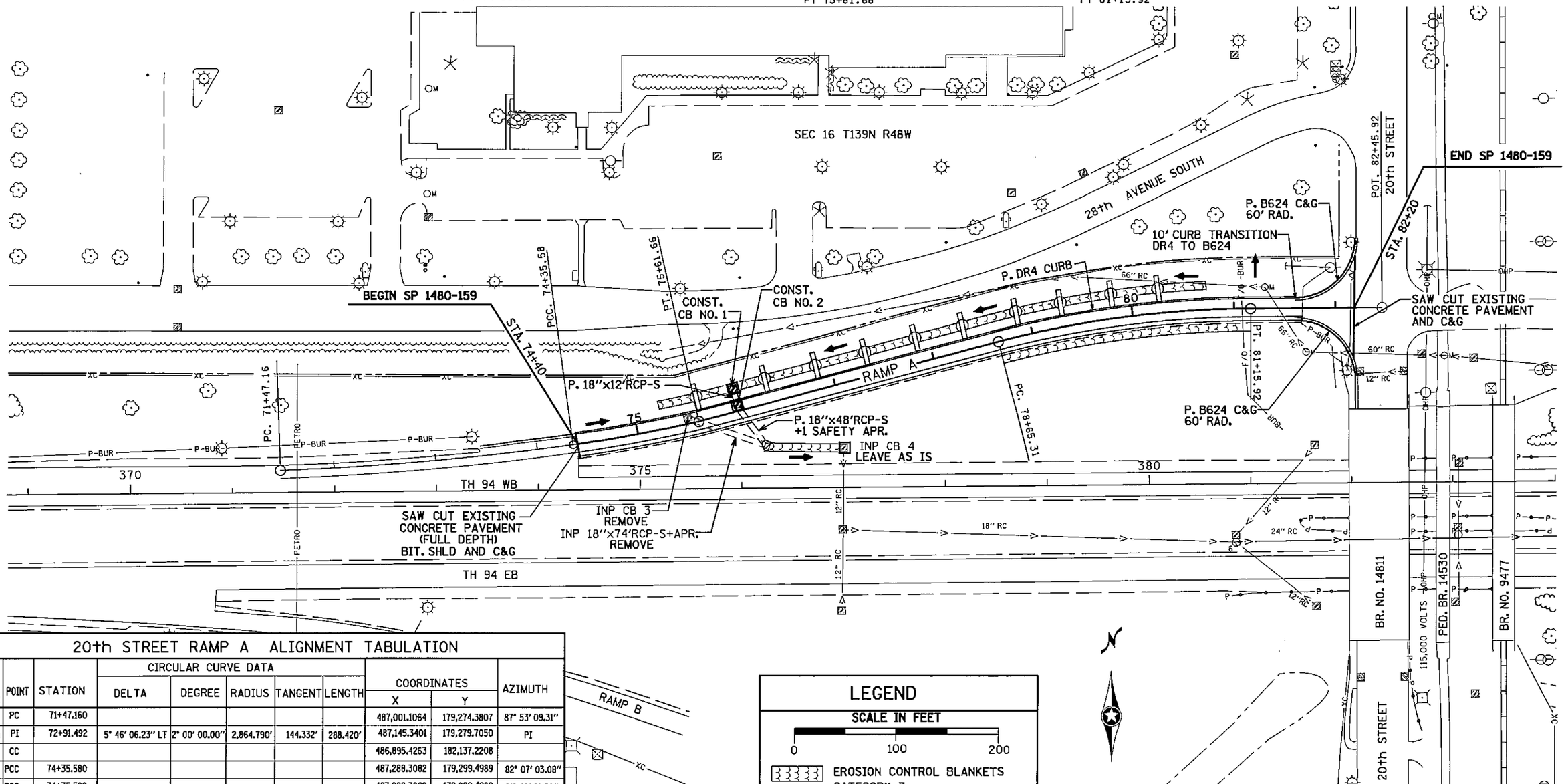
DISTRICT 4
DISTRICT *:
PLOT NAME: plan19
PATH & FILENAME: IP_PWP-dl2155\SV1480159_cpdgn

NOTE:
THE RIGHT OF WAY & EASEMENTS SHOWN ON THE TOPOGRAPHY SHEETS GIVE A GRAPHICAL LOCATION WITH RESPECT TO THE GEOMETRIC DESIGN AND MAP DATA. THE EXACT RIGHT OF WAY, EASEMENTS, AND BOUNDARY CORNERS ARE LOCATED BY REFERENCE TO THE RIGHT OF WAY PLATS AND ARE IDENTIFIED ON THE RIGHT OF WAY MAP, WHICH SHALL BE USED FOR STAKING PURPOSES.

PI 72+91.49
X 487,145.340
Y 179,279.705
Δ 5° 46' 06.23" (LT)
D 2° 00' 00.00"
T 144.33
L 288.42
R 2,864.79
PC 71+47.16
PT 74+35.58

PI 74+98.65
X 487,350.741
Y 179,308.477
Δ 4° 30' 43.35" (LT)
D 3° 34' 42.87"
T 63.08
L 126.08
R 1,601.08
PC 74+35.58
PT 75+61.66

PI 79+91.27
X 487,827.389
Y 179,432.984
Δ 14° 22' 21.53" (RT)
D 5° 44' 05.97"
T 125.97
L 250.61
R 999.06
PC 78+65.31
PT 81+15.92



20th STREET RAMP A ALIGNMENT TABULATION

POINT NUMBER	POINT	STATION	CIRCULAR CURVE DATA					COORDINATES		AZIMUTH
			DELTA	DEGREE	RADIUS	TANGENT	LENGTH	X	Y	
	PC	71+47.160						487,001.1064	179,274.3807	87° 53' 09.31"
RP2000	PI	72+91.492	5° 46' 06.23" LT	2° 00' 00.00"	2,864.790'	144.332'	288.420'	487,145.3401	179,279.7050	PI
	CC							486,895.4263	182,137.2208	
	PCC	74+35.580						487,288.3082	179,299.4989	82° 07' 03.08"
	PCC	74+35.580						487,288.3082	179,299.4989	81° 49' 01.70"
RP2001	PI	74+98.655	4° 30' 43.35" LT	3° 34' 42.87"	1,601.078'	63.075'	126.085'	487,350.7411	179,308.4766	PI
	CC							487,060.4223	180,884.2759	
	PT	75+61.665						487,412.2742	179,322.3379	77° 18' 18.35"
	PC	78+65.307						487,705.5134	179,401.1368	75° 21' 19.86"
RP2003	PI	79+91.275	14° 22' 21.53" RT	5° 44' 05.97"	999.056'	125.968'	250.613'	487,827.3889	179,432.9840	PI
	CC							487,958.0953	178,434.5371	
	PT	81+15.920						487,953.3553	179,433.5817	89° 43' 41.38"
RP2005	POT	82+45.923						488,083.3544	179,434.6043	

LEGEND

SCALE IN FEET
0 100 200

- EROSION CONTROL BLANKETS CATEGORY 3
- STORM DRAIN INLET PROTECTION
- TEMPORARY DITCH CHECK TYPE 2
- DRAINAGE FLOW ARROW

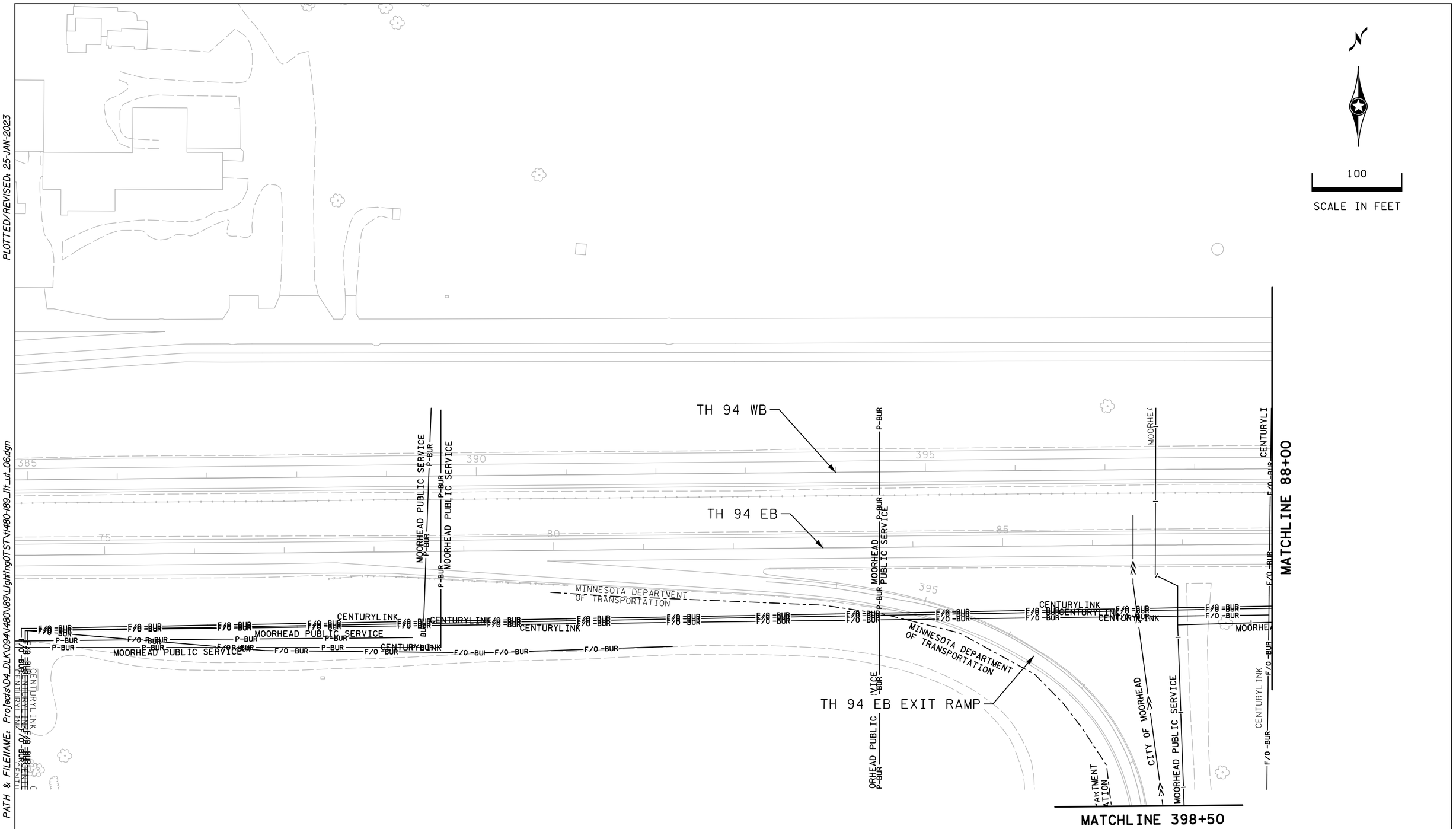
CERTIFIED BY _____ LIC. NO. 44217 FEB. 12, 2010
LICENSED PROFESSIONAL ENGINEER

20th STREET RAMP A CONSTRUCTION PLAN SHEET

STATE PROJ. NO. 1480-159 (TH 94) SHEET NO. 19 OF 25 SHEETS

PLOTTED/REVISED: 25-JAN-2023

PLOT NAME: 11480-189_lft_ut_06
PATH & FILENAME: Projects\D4_DLK\094\480\89\Lgnting0TSTV11480-189_lft_ut_06.dgn



BY	DATE	REVISIONS

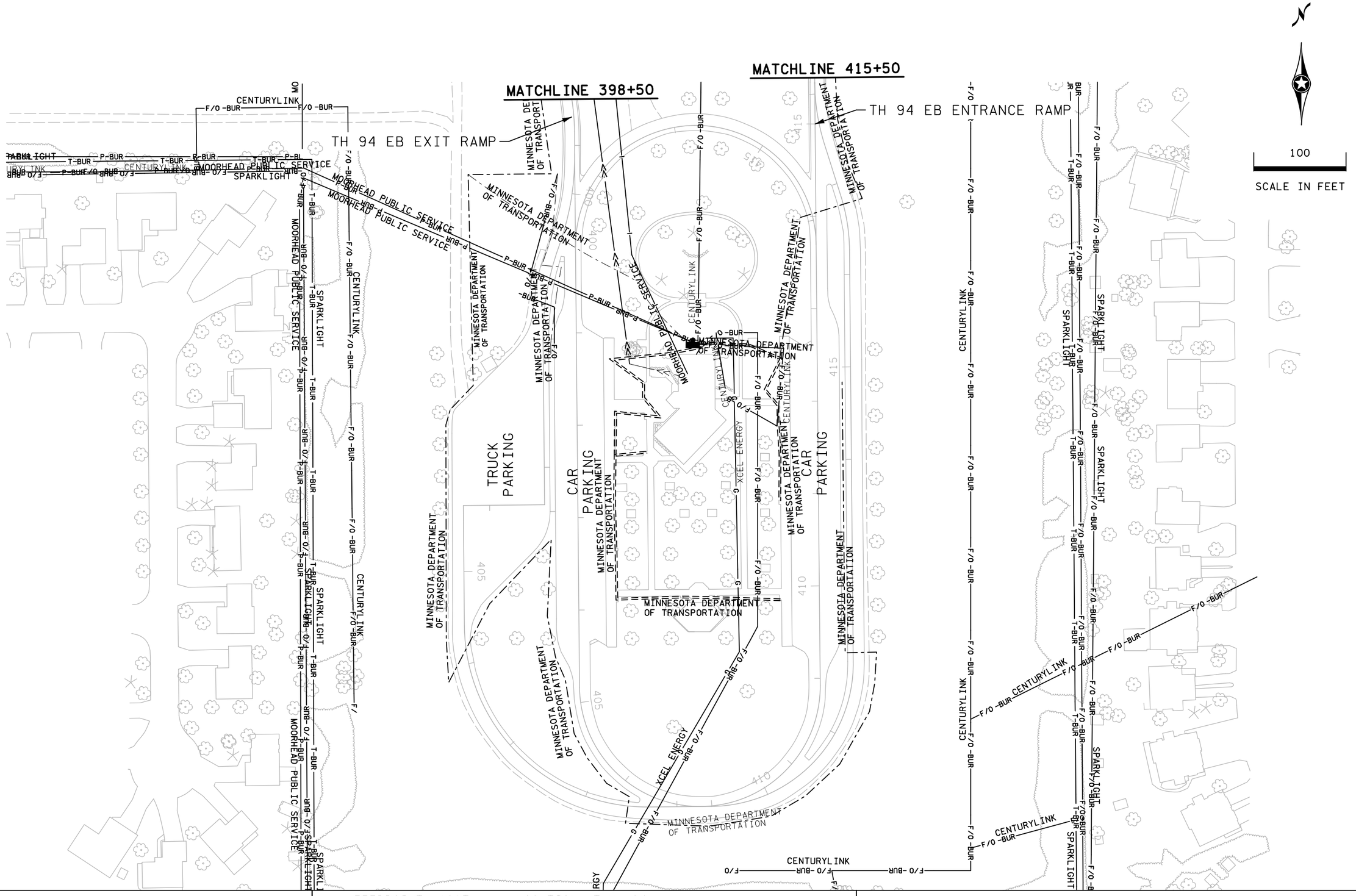
DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

INPLACE UTILITY PLAN (MOORHEAD-SYSTEM B)

STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 21 OF 30 SHEETS



PLOTTED/REVISED: 25-JAN-2023

IPLOT NAME: t1480-189_lft_uf_04

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BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94

METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____

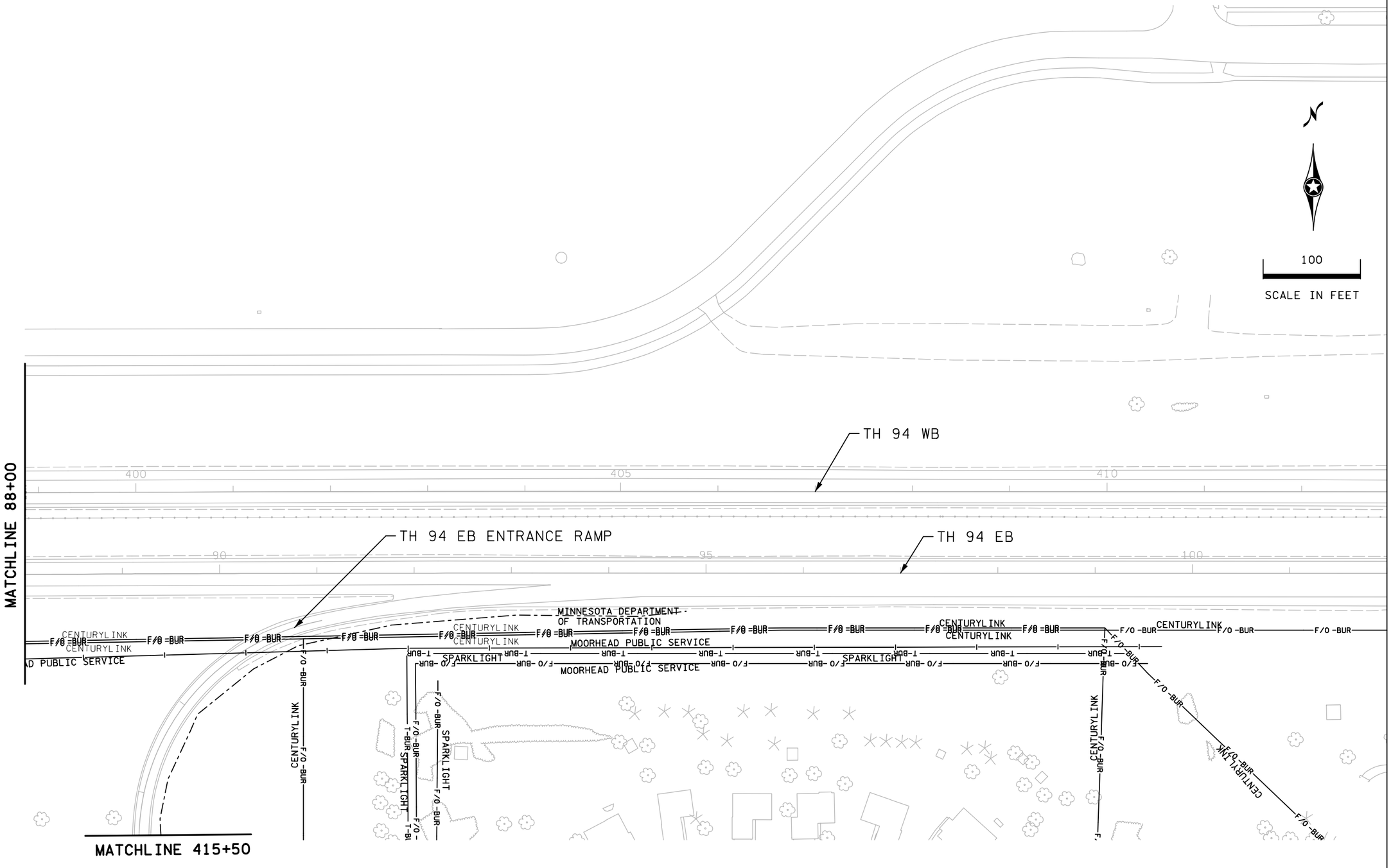
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

INPLACE UTILITY PLAN (MOORHEAD-SYSTEM B)

STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 22 OF 30 SHEETS

PLOTTED/REVISED: 25-JAN-2023

IPLOT NAME: t1480-189_lft_ut_05
PATH & FILENAME: Projects\04_DLK\094\1480V89\Lighting0TSTV1480-189_lft_ut_05.dgn



BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

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CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

INPLACE UTILITY PLAN (MOORHEAD–SYSTEM B)

STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 23 OF 30 SHEETS

REMOVE LIGHTING UNIT
REMOVE LIGHT FOUNDATION

INPLACE DIRECT BURIED CABLE (TO BE REMOVED)

100
SCALE IN FEET

APPROXIMATE RW

TH 94 WB

TH 94 EB

TH 94 EB EXIT RAMP

385 390 395 75 80 85 395

MATCHLINE 88+00

MATCHLINE 398+50

BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

REMOVAL PLAN (MOORHEAD–SYSTEM B)

STATE PROJ.NO.1480-189 (T.H. 94) SHEET NO. 24 OF 30 SHEETS

REMOVE CABINET
REMOVE EQUIPMENT PAD

REMOVE LIGHTING UNIT
REMOVE LIGHT FOUNDATION

REMOVE LIGHTING UNIT
REMOVE LIGHT FOUNDATION

REMOVE LIGHTING UNIT
REMOVE LIGHT FOUNDATION
REMOVE CONCRETE PAD

REMOVE LIGHT FOUNDATION

INPLACE DIRECT BURIED
CABLE (TO BE REMOVED)

INPLACE NON-METALLIC
CONDUIT (TO BE REMOVED)

INPLACE HANDHOLE
(TO BE REMOVED)

INPLACE UTILITY VAULT
(TO BE REMOVED)

INPLACE CAMERA

MATCHLINE 398+50

MATCHLINE 415+50

TH 94 EB EXIT RAMP

TH 94 EB ENTRANCE RAMP

TRUCK PARKING

CAR PARKING

CAR PARKING

APPROXIMATE RW

APPROXIMATE RW

100
SCALE IN FEET

BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

REMOVAL PLAN (MOORHEAD-SYSTEM B)

STATE PROJ.NO.1480-189 (T.H. 94) SHEET NO. 25 OF 30 SHEETS

REMOVE LIGHTING UNIT
REMOVE LIGHT FOUNDATION

INPLACE DIRECT BURIED CABLE (TO BE REMOVED)

N

100

SCALE IN FEET

MATCHLINE 88+00

APPROXIMATE RW

TH 94 WB

400

405

410

TH 94 EB

90

95

100

TH 94 EB ENTRANCE RAMP

APPROXIMATE RW

MATCHLINE 415+50

BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

REMOVAL PLAN (MOORHEAD–SYSTEM B)

STATE PROJ.NO.1480-189 (T.H. 94) SHEET NO. 26 OF 30 SHEETS

PLOTTED/REVISED: 25-JAN-2023

IPLOT NAME: 11480-189_Jft_Jo_J5
PATH & FILENAME: Projects\D4_DLK\094V480\89\Lighting0TSTV1480-189_Jft_Jo_J5.dgn

LEGEND

- LIGHTING UNIT TYPE 9-40 ROADWAY LUMINAIRE
- 2" NON-METALLIC CONDUIT (UNLESS OTHERWISE NOTED)
- DIRECT BURIED LIGHTING CABLE 4/C 4 AWG
- PERMANENT GROUND ROD (25 OHMS OR LESS)
- XX LIGHTING UNIT IDENTIFIER

100
SCALE IN FEET

APPROXIMATE RW

TH 94 WB

TH 94 EB

385 390 395

75 80 85

395

T 1
T 2
T 3
T 4
T 5

3" NON-METALLIC CONDUIT

TH 94 EB EXIT RAMP

MATCHLINE 88+00

MATCHLINE 398+50

BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

LIGHTING PLAN (MOORHEAD–SYSTEM B)

STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 27 OF 30 SHEETS

LEGEND

- PAD MOUNTED CABINET
- LIGHTING UNIT TYPE 9-40 ROADWAY LUMINAIRE
- LIGHTING UNIT TYPE 1X-15
- LIGHTING UNIT TYPE 1X-15 WITH RAB Lighting FLOODLIGHT FFLED M SF W
- LIGHTING UNIT 6D-40 ROADWAY LUMINAIRE
- LIGHTING UNIT TYPE 9-40 PARKING LOT LUMINAIRE
- 2" NON-METALLIC CONDUIT (UNLESS OTHERWISE NOTED)
- DIRECT BURIED LIGHTING CABLE 4/C 4 AWG
- PERMANENT GROUND ROD (25 OHMS OR LESS)
- INPLACE CAMERA
- (XX) LIGHTING UNIT IDENTIFIER

MATCHLINE 398+50

MATCHLINE 415+50

TH 94 EB EXIT RAMP

TH 94 EB ENTRANCE RAMP

3" NON-METALLIC CONDUIT

FD.PT. A98T
PAD MOUNTED SERVICE CABINET
SECONDARY TYPE L2
120/240 VOLT
EQUIPMENT PAD B
F&I 2" R.S.C AND
3-1/C 2 TO INPLACE S.O.P

3" NON-METALLIC CONDUIT

3" NON-METALLIC CONDUIT

3" NON-METALLIC CONDUIT

3" NON-METALLIC CONDUIT

TRUCK PARKING

CAR PARKING

CAR PARKING

APPROXIMATE RW

APPROXIMATE RW

T 6, T 7, T 8, T 9, T 10, T 11, T 12, T 13, T 14, T 15, T 16, T 17, T 18, T 19, T 20, T 21, T 22, T 27, T 28, T 29, T 30, T 31, T 32, T 33, T 34, T 35, T 36, T 37, T 38, T 39, T 40

400, 400, 405, 405, 410, 410, 415, 415, 415

100

SCALE IN FEET

BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

LIGHTING PLAN (MOORHEAD-SYSTEM B)

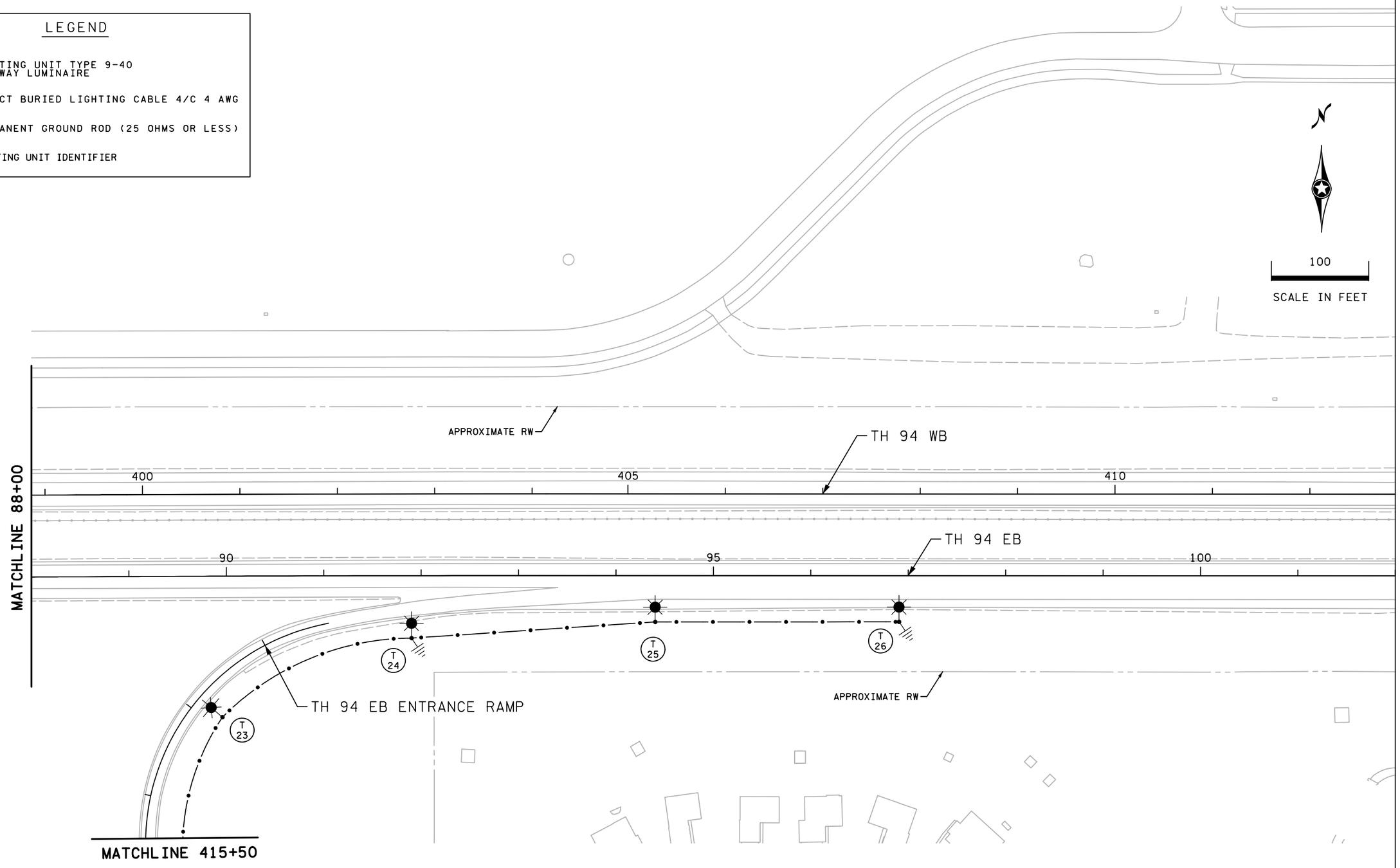
STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 28 OF 30 SHEETS

PLOTTED/REVISED: 25-JAN-2023

IPLOT NAME: t:\480-189_lft_lo_l4
PATH & FILENAME: Projects\D4_DLK\094\480\189\Lighting\OTS\T\480-189_lft_lo_l4.dgn

LEGEND

- LIGHTING UNIT TYPE 9-40 ROADWAY LUMINAIRE
- DIRECT BURIED LIGHTING CABLE 4/C 4 AWG
- PERMANENT GROUND ROD (25 OHMS OR LESS)
- XX LIGHTING UNIT IDENTIFIER



BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

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LICENSED PROFESSIONAL ENGINEER

LIGHTING PLAN (MOORHEAD-SYSTEM B)

STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 29 OF 30 SHEETS

FEEDPOINT A98T
LIGHTING UNITS LOCATION AND TYPE

	NO.	STATION	LT.	RT.	LOCATION	LIGHTING UNIT TYPE	LUMINAIRE TYPE	FOUNDATION TYPE	BASE TYPE
	1	79+56		-	TH 94 EB	9-40	40 FOOT	DESIGN E	BREAKAWAY
	2	82+06		-	TH 94 EB	9-40	40 FOOT	DESIGN E	BREAKAWAY
	3	395+55		-	TH 94 EXIT RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
	4	84+58		-	TH 94 EB	9-40	40 FOOT	DESIGN E	BREAKAWAY
	5	397+88		-	TH 94 EXIT RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
(1)	6	400+08		-	TH 94 EXIT RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
	7	401+28	-		CAR/TRUCK PARKING	6D-40	40 FOOT	HIGH TOP	NON-BREAKAWAY
	8						40 FOOT		
(1)	9	402+29		-	TRUCK PARKING	9-40	PARKING LOT	DESIGN E W/ SURROUND	NON-BREAKAWAY
(1)	10	404+45		-	TRUCK PARKING	9-40	PARKING LOT	DESIGN E W/ SURROUND	NON-BREAKAWAY
	11	403+11	-		CAR PARKING	9-40	40 FOOT	HIGH TOP	NON-BREAKAWAY
(1)	12	406+39		-	TRUCK PARKING EXIT	9-40	40 FOOT	DESIGN E W/ SURROUND	NON-BREAKAWAY
	13	404+94	-		CAR PARKING EXIT	9-40	40 FOOT	DESIGN E W/ SURROUND	NON-BREAKAWAY
(1)	14	408+64		-	TRUCK/CAR PARKING EXIT	9-40	40 FOOT	DESIGN E W/ SURROUND	NON-BREAKAWAY
	15	411+12	-		TRUCK PARKING EXIT	6D-40	40 FOOT	HIGH TOP	NON-BREAKAWAY
	16				CAR PARKING ENTRANCE		40 FOOT		
	17	413+38	-		TRUCK PARKING EXIT	6D-40	40 FOOT	HIGH TOP	NON-BREAKAWAY
	18				CAR PARKING ENTRANCE		40 FOOT		
	19	415+56	-		TRUCK PARKING EXIT	6D-40	40 FOOT	HIGH TOP	NON-BREAKAWAY
	20				CAR PARKING ENTRANCE		40 FOOT		
(1)	21	417+29		-	TH 94 ENTRANCE RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY

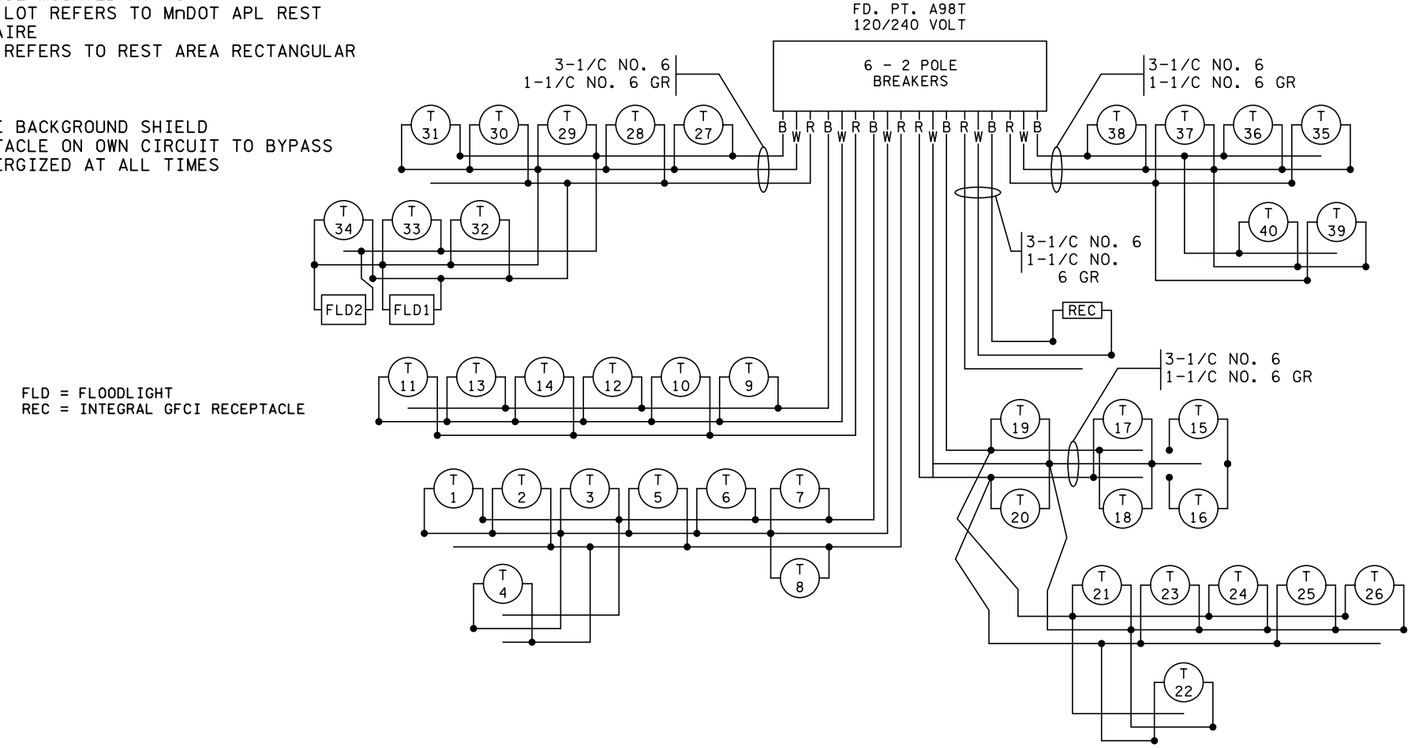
FEEDPOINT A98T
LIGHTING UNITS LOCATION AND TYPE

	NO.	STATION	LT.	RT.	LOCATION	LIGHTING UNIT TYPE	LUMINAIRE TYPE	FOUNDATION TYPE	BASE TYPE
	22	415+69	-		CAR PARKING LOOP	9-40	40 FOOT	DESIGN E W/ SURROUND	NON-BREAKAWAY
	23	417+14		-	TH 94 ENTRANCE RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
	24	91+90		-	TH 94 ENTRANCE RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
	25	94+40		-	TH 94 ENTRANCE RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
	26	96+91		-	TH 94 ENTRANCE RAMP	9-40	40 FOOT	DESIGN E	BREAKAWAY
	27	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	28	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	29	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	30	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	31	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	32	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	33	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
							FLOODLIGHT		
	34	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
							FLOODLIGHT		
	35	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	36	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	37	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
(2)	38	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	39	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY
	40	AS SHOWN			WALKWAY	1X-15	WALKWAY	DESIGN P W/ SURROUND	NON-BREAKAWAY

NOTE:
-LUMINAIRE TYPE 40 FOOT REFERS TO MnDOT APL ROADWAY LUMINAIRE FOR ROADWAY USE MOUNTED AT 40 FT
-LUMINAIRE TYPE PARKING LOT REFERS TO MnDOT APL REST AREA PARKING LOT LUMINAIRE
-LUMINAIRE TYPE WALKWAY REFERS TO REST AREA RECTANGULAR WALKWAY LUMINAIRE

SPECIFIC NOTES:
(1) LUMINAIRE TO INCLUDE BACKGROUND SHIELD
(2) INTEGRAL GFCI RECEPTACLE ON OWN CIRCUIT TO BYPASS PHOTOCELL AND BE ENERGIZED AT ALL TIMES

W DENOTES NEUTRAL CONDUCTOR
B AND R DENOTE CURRENT CARRYING CONDUCTORS



FLD = FLOODLIGHT
REC = INTEGRAL GFCI RECEPTACLE

BY	DATE	REVISIONS

DRAWN BY: AKS CKD BY: SZ

FEEDPOINT: A98T LOCATION: T.H. 94
METER ADDRESS:

CERTIFIED BY _____ LIC. NO. 24682 DATE: _____
SUSAN ZARLING
LICENSED PROFESSIONAL ENGINEER

LIGHTING PLAN (MOORHEAD-SYSTEM B)

STATE PROJ.NO.1480-189 (T.H.94) SHEET NO. 30 OF 30 SHEETS

SEPAC ECOM All Data

5/29/2017
11:44:56

Intersection Name: **28th Ave S & 20th Street** Intersection Alias: **28th&20th**

Access Data

1 :**1200/1312 Baud**
3 :**1200/1312 Baud**

Access Code: **9999** Channel: 1 Address: **0**

Revision: **3.30** IP Address:

Phase Initialization Data

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Initial	1-Inact	4-Grn	0-None	1-Inact	1-Inact	4-Grn	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None

PHASE DATA

Vehical Basic Timings							Misc Timings					Pedestrian Timings						
Phase	Min Green	Passage	Max1	Max2	Yellow	All Red	Green Delay	Yellow Delay	Walk Off	Walk Offset Mode	Bike Green	Walk	Ped Clr	Alt Walk	Alt Ped Clr	Flash Walk	Ext Ped Clr	Actuated Rest in Walk
1	7	2.0	45	55	3.0	2.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
2	13	3.5	90	160	3.5	1.8	0	0	0	0-Advance	0	7	14	0	0	No	0	No
3	0	0.0	0	0	3.0	1.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
4	9	2.5	45	55	3.5	1.8	0	0	0	0-Advance	0	7	11	0	0	No	0	No
5	7	2.0	45	55	3.0	2.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
6	13	3.5	90	160	3.5	1.8	0	0	0	0-Advance	0	7	14	0	0	No	0	No
7	0	0.0	0	0	3.0	1.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
8	0	0.0	0	0	3.0	1.0	0	0	0	0-Advance	0	7	11	0	0	No	0	No
9	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
10	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
11	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
12	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
13	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
14	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
15	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
16	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No

Vehicle Density Timings							General Control				Miscellaneous					Special Sequence		
Ph.	Added Initial	Max Initial	Time B4 Redu	Car B4 Redu	Time To Redu	Min Gap	Non-Act Response	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Pass	Condit Service	No Simu Gap Out	Omit	Minus Yel	Omit Call
1	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
2	0.0	0	0	0	0	0.0	NonActI	Min	None	0	Yes	Yes	No	No	No	0	0	0
3	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
4	0.0	0	0	0	0	0.0	NonActII	None	None	0	Yes	No	No	No	No	0	0	0
5	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
6	0.0	0	0	0	0	0.0	NonActI	Min	None	0	Yes	Yes	No	No	No	0	0	0
7	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
8	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
9	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
10	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
11	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
12	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
13	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
14	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
15	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
16	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0

Vehical Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay
Veh Det:1	1	Veh	6	0.0	0
Veh Det:2	1	Veh	6	0.0	0
Veh Det:3	5	Veh	2	0.0	0
Veh Det:4	5	Veh	2	0.0	3
Veh Det:5	2	Veh	0	0.0	0
Veh Det:6	6	Veh	0	0.0	0
Veh Det:7	4	Veh	0	0.0	222
Veh Det:8	4	Veh	0	0.0	222
Veh Det:9	4	Veh	0	0.0	0
Veh Det:10	4	Veh	0	0.0	0
Veh Det:11	4	Veh	0	0.0	7
Veh Det:12	4	Veh	0	0.0	0

Pedestrian Detector

Default Data

Special Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay

:

Default Data

Unit Data

General Control

Startup Time: 5sec
Startup State: Flash
Red Revert: 40sec
Auto Ped Clr: No
Stop T Reset: No
Alt Sequence: 0
Special Seq: 0-Standard

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

I/O Modes:

ABC Input(Entry) Modes: 7
D Input(Entry) Modes: 2
ABC Output(O/STS) Modes: 0
D Output(O/STS) Modes: 6

Remote Flash

Test A = Flash

Phase	Entry	Exit

Default Data - No Fla

Channel	Flash Color	Flash Alternat

Default Data - No Flash

Overlaps

	Overlaps															
Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

Start Green

	Overlaps															
Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TG Preempt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stop Grn/Yel Phase	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring

Phase	Ring	Next Phase
1	1	2
2	1	3
4	1	1
5	2	6
6	2	7

	Phase(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Concurrent Phases		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
		5	5	7	7	2	2	4	4								
		6	6	8	8	5	6	7	8								

Alternate Sequences

No Alternate Sequences Programmed

Port 1 Data

BIU Addr	Port Status	Basic Det	Message 40
0	Used	No	No
1	Used	No	No
8	Used	No	No
16	Used	No	No
18	Used	No	No

Channel	Control	Hardware Pins
1	1 - Veh Phase 1	1 - Phase 1 RYG
2	2 - Veh Phase 2	2 - Phase 2 RYG
3	3 - Veh Phase 3	3 - Phase 3 RYG
4	4 - Veh Phase 4	4 - Phase 4 RYG
5	5 - Veh Phase 5	5 - Phase 5 RYG
6	6 - Veh Phase 6	6 - Phase 6 RYG
7	7 - Veh Phase 7	7 - Phase 7 RYG
8	8 - Veh Phase 8	8 - Phase 8 RYG
9	18 - Ped Phase 2	10 - Phase 2 DPW
10	20 - Ped Phase 4	12 - Phase 4 DPW
11	22 - Ped Phase 6	14 - Phase 6 DPW
12	24 - Ped Phase 8	16 - Phase 8 DPW
13	33 - Overlap A	17 - Overlap A RYG
14	34 - Overlap B	18 - Overlap B RYG
15	35 - Overlap C	19 - Overlap C RYG
16	36 - Overlap D	20 - Overlap D RYG
17	17 - Ped Phase 1	9 - Phase 1 DPW
18	19 - Ped Phase 3	11 - Phase 3 DPW
19	21 - Ped Phase 5	13 - Phase 5 DPW
20	23 - Ped Phase 7	15 - Phase 7 DPW

Coordination Data

Dial/Split **Cycle**

/

General Coordination Data

Operation Mode: 0=Free
Coordination Mode: 0=Permissive
Maximun Mode: 2=Max 2
Correction Mode: 0=Dwell

Offset Mode: 0=Beg Grn
Force Mode: 0=Plan
Max Dwell Time: 0
Yield Period: 0

Manual Dial: 1
Manual Split: 1
Manual Offset: 1

Split Times and Phase Mod

Dial / **Split**

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode

Traffic Plan Data

Plan: //
Offset Time:
Mode:
Alternat Sequence:
Special Function:
Rg 2 Lag Time:
Correction Mode:
Rg 3 Lag Time:
Rg 4 Lag Time:

Local TBC Data

Start of Daylight Saving Month: 0 Week: 0
End of Daylight Saving Month: 0 Week: 0
Cycle Zero Reference Hours: 0 Min: 0

Source Day / Equate Days 1 2 3 4 5 6 7

Traffic Data

PHASE FUNCTION

Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		:	//		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

Event	Program Day	Hour	Min.	Aux Ouputs 1	2	3	Det. Diag. D1	Det. Rpt. D2	Det. Mult100 D3	Dimming	Special Function Outputs 1	2	3	4	5	6	7	8
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10	SF11	SF12	SF13	SF14	SF15	SF16
Special Function 1	X															
Special Function 2		X														
Special Function 3			X													
Special Function 4				X												
Special Function 5					X											
Special Function 6						X										
Special Function 7							X									
Special Function 8								X								

Phase Function

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Function Phase Recall

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF16

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

Vehicle Function

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF16

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF16

Overlap Function

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

Dimming Data

Channel	Red	Yellow	Green	Alternate

Default Data - No Dimming Programmed

Preemption Data

General Preemption Data

Ring	Min Grn/Walk Time
1	5
2	5
3	10
4	10

Flash > Preepmt 1	Preepmt 2 = Preempt 3	Preepmt 4 = Preempt 5
Preepmt 1 > Preempt 2	Preepmt 3 = Preempt 4	Preepmt 5 = Preempt 6

Preempt Timers

Preempt	Non-Locking	Link to Preempt	Delay	Extend	Duration	Max Call	Lock-Out	Min Green	Min Walk	Select: Ped Clear	Select: Yel	Select: Red	Track: Grn	Track: Ped	Track: Yel	Track: Red	Dwell Green	Return: Ped Clear	Return: Yel	Return: Red
1	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	No	0	1	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0
3	No	0	0	5	5	120	0	0	0	8	40	20	10	8	40	20	10	8	40	20
4	No	0	0	5	5	120	0	0	0	8	40	20	10	8	40	20	10	8	40	20
5	No	0	0	5	5	120	0	0	0	8	40	20	10	8	40	20	10	8	40	20
6	No	0	0	0	0	0	0	0	0	8	40	20	10	8	40	20	10	8	40	20

Preempt 1

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
4	Yes	Yes
5	No	Yes
6	No	Yes
8	No	Yes

Preempt 2

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 3

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 4

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 5

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 6

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1

Phase	Exit Phase	Exit Calls

Priority 2

Phase	Exit Phase	Exit Calls

Priority 3

Phase	Exit Phase	Exit Calls

Priority 4

Phase	Exit Phase	Exit Calls

Priority 5

Phase	Exit Phase	Exit Calls

Priority 6

Phase	Exit Phase	Exit Calls

Preempt 1

Vehical Phases

Ph.	Track	Dwell	Cycle
2	Red	Red	Min Recall
5	Red	Red	Actuated
6	Red	Red	Min Recall

Pedestrian Phases

Ph	Track	Dwell	Cycle
2	Don't Walk	Don't Walk	Actuated
6	Don't Walk	Don't Walk	Actuated

Overlaps

Ovlp	Track	Dwell	Cycle
C	Red	Red	Actuated

Preempt 2

Vehical Phases

Ph.	Track	Dwell	Cycle
4	Green	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 3

Vehical Phases

Ph.	Track	Dwell	Cycle
2	Red	Green	No
5	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle
3	Red	Flash Grn	No

Preempt 4

Vehical Phases

Ph.	Track	Dwell	Cycle
4	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 5

Vehical Phases

Ph.	Track	Dwell	Cycle
1	Red	Green	No
6	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle
1	Red	Flash Grn	No

Preempt 6

Vehical Phases

Ph.	Track	Dwell	Cycle

Default Data

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

System/Detectors Data

Local Critical Alarms

Revert to Backup: 15

1st Phone:

2nd Phone:

Local Free: No Cycle Failure: No Coord Failure: No Conflict Flash: No Remote Flash: No

Local Fash: No Cycle Fault: No Coord Fault: No Premption: No Voltage Monitor: No

Special Status 1: No Special Status 2: No Special Status 3: No Special Status 4: No Special Status 5: No Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Veh/Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Default Data

Sample Interval:

Default Data

Queue: 1

Input Selection: 0=Average

Detector Failed Level : 0

Queue: 2

Input Selection: 0=Average

Detector Failed Level : 0

Default Data

Queue:

Level	Enter	Leave	Dial / Split / Offset
			/ /

Default Data

Vehical Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Vehical Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Special Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - Diag 0 Values

Default Data - No Diag 1 Values

Default Data - No Diag 0 Valu

Pedestrian Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Pedestrian Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Special Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Values

Default Data - No Diag 1 Values

Default Data - No Diag 1 Values

Speed Trap Data

Speed Trap:

Measurement:

Detector 1 Detector_2 Distance :

Dial/Split/Offset

//

Default Data

Speed Trap Low Treshold	Speed Trap High Treshold

Default Data

Volume Detector Data

Report Interval	0

Volume Detector Number	Controller Detector Channel

Default Data

SEPAC ECOM All Data

3/31/2021
1:53:28PM

Intersection Name: **I-94 S Ramp & 20 St** Intersection Alias: **I94Sr&20s**

Access Data

1 :**1200 Baud**
3 :**1200 Baud**

Access Code: **9999** Channel: 1 Address: **0**

Revision: **3.30** IP Address:

Phase Initialization Data

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Initial	0-None	4-Grn	0-None	1-Inact	0-None	4-Grn	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None

PHASE DATA

	Vehical Basic Timings						Misc Timings						Pedestrian Timings						
Phase	Min Green	Passage	Max1	Max2	Yellow	All Red	Green Delay	Yellow Delay	Walk Offset Time	Walk Offset Mode	Bike Green	Bike Psg	Walk	Ped Clr	Alt Walk	Alt Ped Clr	Flash Walk	Ext Ped Clr	Actuated Rest in Walk
1	0	0.0	0	0	99.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
2	20	3.0	90	80	3.5	1.5	0.0	0.0	0	0-Advance	0.0	0.0	4	13	0	0	No	0	No
3	0	0.0	0	0	99.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
4	10	3.5	45	70	4.0	1.5	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
5	0	0.0	0	0	99.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
6	20	3.0	90	80	3.5	1.5	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
7	0	0.0	0	0	99.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
8	0	0.0	0	0	99.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
9	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
10	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
11	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
12	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
13	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
14	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
15	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
16	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No

	Vehicle Density Timings						General Control				Miscellaneous					Special Sequence		
Ph.	Added Initial	Max Initial	Time B4 Redu	Car B4 Redu	Time To Redu	Min Gap	Non-Act Response	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Pass	Condit Service	No Simu Gap Out	Omit	Minus Yel	Omit Call
1	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	2	0	6
2	2.0	30	20	0	20	3.0	NonActI	Min	None	0	Yes	Yes	No	No	No	0	0	0
3	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
4	0.0	0	0	0	0	0.0	NonActII	Min	None	0	No	No	No	No	No	0	0	0
5	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
6	2.0	30	20	0	20	3.0	NonActI	Min	None	0	Yes	Yes	No	No	No	0	0	0
7	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
8	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
9	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
10	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
11	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
12	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
13	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
14	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0

15	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
16	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0

Vehical Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay
Veh Det:2	2	Veh	0	0.0	0
Veh Det:4	4	Veh	0	0.0	0
Veh Det:6	6	Veh	0	0.0	0
Veh Det:9	4	Veh	0	0.0	20
Veh Det:10	4	Veh	0	0.0	20
Veh Det:11	4	Veh	0	0.0	7
Veh Det:12	2	Veh	0	0.0	0
Veh Det:13	2	Veh	0	0.0	0
Veh Det:14	2	Veh	0	0.0	0
Veh Det:15	6	Veh	0	0.0	0
Veh Det:16	6	Veh	0	0.0	0
Veh Det:17	6	Veh	0	0.0	0

Pedestrian Detector

Assign Phase	Mode	Switch Phase	Extend	Delay

Default Data

Special Detector Phase Assignment

Assign Phase	Mode	Switch Phase	Extend	Delay

:

Default Data

Unit Data

General Control

Startup Time: 6 sec
Startup State: All Red
Red Revert: 2.0 sec
Auto Ped Clr: No
Stop T Reset: No
Alt Sequence: 0
Special Seq: 0-Standard

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

I/O Modes:

ABC Input(Entry) Modes: 7
D Input(Entry) Modes: 3
ABC Output(O/STS) Modes: 0
D Output(O/STS) Modes: 6

Remote Flash

Test A = Flash

Phase	Entry	Exit

Default Data
- No Flash

Default Data
- No Flash

Overlaps

Overlaps

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Phase(s)																

Start Green

Overlaps

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Phase(s)																

Ring

Phase	Ring	Next Phase
2	1	3
4	1	1
6	2	7

Phase(s)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Concurrent Phases	1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
	5	5	7	7	2	2	4	4								
	6	6	8	8	5	6	7	8								

Alternate Sequences

No Alternate Sequences Programmed

Port 1 Data

BIU Addr	Port Status	Basic Det	Message 40
17	Used	No	No

Signal Driver Ouput

Channel	Control	Hardware Pins
1	1 - Veh Phase 1	1 - Phase 1 RYG
2	2 - Veh Phase 2	2 - Phase 2 RYG
3	3 - Veh Phase 3	3 - Phase 3 RYG
4	4 - Veh Phase 4	4 - Phase 4 RYG
5	5 - Veh Phase 5	5 - Phase 5 RYG
6	6 - Veh Phase 6	6 - Phase 6 RYG
7	7 - Veh Phase 7	7 - Phase 7 RYG
8	8 - Veh Phase 8	8 - Phase 8 RYG
9	18 - Ped Phase 2	10 - Phase 2 DPW
10	20 - Ped Phase 4	12 - Phase 4 DPW
11	22 - Ped Phase 6	14 - Phase 6 DPW
12	24 - Ped Phase 8	16 - Phase 8 DPW
13	33 - Overlap A	17 - Overlap A RYG
14	34 - Overlap B	18 - Overlap B RYG
15	35 - Overlap C	19 - Overlap C RYG
16	36 - Overlap D	20 - Overlap D RYG
17	17 - Ped Phase 1	9 - Phase 1 DPW
18	19 - Ped Phase 3	11 - Phase 3 DPW
19	21 - Ped Phase 5	13 - Phase 5 DPW
20	23 - Ped Phase 7	15 - Phase 7 DPW

Coordination Data

Dial/Split **Cycle**

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General Coordination Data

Operation Mode: 0=Free
Coordination Mode: 0=Permissive
Maximun Mode: 2=Max 2
Correction Mode: 0=Dwell

Offset Mode: 0=Beg Grn
Force Mode: 0=Plan
Max Dwell Time: 0
Yield Period: 0

Manual Dial: 1
Manual Split: 1
Manual Offset: 1

Split Times and Phase Modes

Dial / **Split**

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode

Traffic Plan Data

Plan: //
Offset Time:
Mode:
Alternat Sequence:
Special Function:
Rg 2 Lag Time:
Correction Mode:
Rg 3 Lag Time:
Rg 4 Lag Time:

Local TBC Data

Start of Daylight Saving Month: 0 Week: 0
End of Daylight Saving Month: 0 Week: 0
Cycle Zero Reference Hours: 0 Min: 0

Source Day / Equate Days 1 2 3 4 5 6 7

Traffic Data

PHASE FUNCTION

Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		:	//		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

Event	Program Day	Hour	Min.	Aux Ouputs 1	2	3	Det. Diag. D1	Det. Rpt. D2	Det. Mult100 D3	Dimming	Special Function Outputs 1	2	3	4	5	6	7	8
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10	SF11	SF12	SF13	SF14	SF15	SF16
Special Function 1	X															
Special Function 2		X														
Special Function 3			X													
Special Function 4				X												
Special Function 5					X											
Special Function 6						X										
Special Function 7							X									
Special Function 8								X								

Phase Function

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								

Phase Omit

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

Ped Omit

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Veh Det Coord ReSvc

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Function Phase Recall

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Phase Min Recall

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Veh Det Ped Recall

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Veh Det Bike Recall

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Vehicle Function

Veh Det Switch Omit

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Veh Det Switch Now

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Veh Det Switch Also

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Overlap Function

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Dimming Data

Default Data - No Dimming Programmed

Lane Defination

Lanes	Name	Green Inbound	Yellow Inbound	Red Inbound	Green Outbound	Yellow Outbound

Default Data - Lane Defination

program_day program_hour program_minute LanePhFun

Preemption Data

General Preemption Data

Preempt > Flash	Preempt 2 > Preempt 3	Preempt 4 > Preempt 5
Preempt 1 > Preempt 2	Preempt 3 > Preempt 4	Preempt 5 > Preempt 6

Preempt Timers

Preempt	NLock	Link to Pmpt	Del	Ext	Dur	Max Call	Lock-Out	De Bounce	Gate Ext	Min G | W	Select Ped Clear	Select Yel	Select Red	Track Grn	Track Ped	Track Yel	Track Red	Dwell Green	Return Ped Clear	Return Yel	Return Red	Sel Ret Mode
1	N	0	0	0	0	0	0	0.0	0	0 | 0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut
2	N	0	0	0	0	0	0	0.0	0	0 | 0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut
3	N	0	0	5	0	120	0	0.0	0	0 | 0	8	3.5	1.5	0	0	0.0	0.0	10	8	3.5	1.5	F Aut
4	N	0	0	5	0	120	0	0.0	0	0 | 0	0	4.0	1.5	0	0	0.0	0.0	10	0	4.0	1.5	F Aut
5	N	0	0	5	0	120	0	0.0	0	0 | 0	0	4.5	1.5	0	0	0.0	0.0	10	0	4.5	1.5	F Aut
6	N	0	0	0	0	0	0	0.0	0	0 | 0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut

Preempt 1

Phase	Exit Phase	Exit Calls

Preempt 2

Phase	Exit Phase	Exit Calls

Preempt 3

Phase	Exit Phase	Exit Calls
2	Yes	Yes
4	No	Yes
6	Yes	Yes

Preempt 4

Phase	Exit Phase	Exit Calls
2	Yes	Yes
4	No	Yes
6	Yes	Yes

Preempt 5

Phase	Exit Phase	Exit Calls

Preempt 6

Phase	Exit Phase	Exit Calls

Priority Timers

Priority	Non-Locking	Del ay	Ext end	Free Dial	Free Split	Min Green	No Lock out	Lock out A	Lock out B	Max Green	Pre-Green	Recall	Excl-co Phase Svc.	Transit Overlap Signal Type	Transit Overlap Blankout
1	No	0	0	4	4	0	0	0	0	1	0.0	0-None	No	0-None,0-No Output	0-None,0-No Output
2	No	0	0	4	4	0	0	0	0	1	0.0	0-None	No	0-None,0-No Output	0-None,0-No Output
3	No	0	0	4	4	0	0	0	0	1	0.0	0-None	No	0-None,0-No Output	0-None,0-No Output
4	No	0	0	4	4	0	0	0	0	1	0.0	0-None	No	0-None,0-No Output	0-None,0-No Output
5	No	0	0	4	4	0	0	0	0	1	0.0	0-None	No	0-None,0-No Output	0-None,0-No Output
6	No	0	0	4	4	0	0	0	0	1	0.0	0-None	No	0-None,0-No Output	0-None,0-No Output

Priority Detector Channels

Priority **1**

Detector	1A	2A	3A	4A	5A	6A	B	C	X
Channel	0	0	0	0	0	0	0	0	0

Priority **2**

Detector	1A	2A	3A	4A	5A	6A	B	C	X
Channel	0	0	0	0	0	0	0	0	0

Priority **3**

Detector	1A	2A	3A	4A	5A	6A	B	C	X
Channel	0	0	0	0	0	0	0	0	0

Priority **4**

Detector	1A	2A	3A	4A	5A	6A	B	C	X
Channel	0	0	0	0	0	0	0	0	0

Priority **5**

Detector	1A	2A	3A	4A	5A	6A	B	C	X
Channel	0	0	0	0	0	0	0	0	0

Priority **6**

Detector	1A	2A	3A	4A	5A	6A	B	C	X
Channel	0	0	0	0	0	0	0	0	0

Priority Fixed Phases

Priority 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Co-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
QJ-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Co-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
QJ-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Co-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
QJ-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Co-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
QJ-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 5

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Co-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
QJ-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 6

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Co-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
QJ-Phase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Legend: 0 1
CO-PHASE FALSE TRUE
QJ-PHASE

Priority Bank

Priority 1

Priority Bank : 1 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 2 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 3 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 4 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 2

Priority Bank : 1 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 2 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 3 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 4 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 3

Priority Bank : 1 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 2 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 3 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 4 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 4

Priority Bank : 1 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 2 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 3 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 4 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 5

Priority Bank : 1 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 2 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 3 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 4 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority 6

Priority Bank : 1 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 2 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : 3 Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Bank : **4** Level 0

Partial Priority		Full Priority		Recovery	
Alt Seq	0	Freq. Override	False	Method	0-Normal
Alt Seq Enabled	False	Ped skip	0	Return	0-Cycle
Min Walk	0	Force full Priority	False	PedWait	0
		Frequency	0	PedOverride	0
		Freq. Level	0-Min		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exit Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phase Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Omit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Codes: 0 FALSE X TRUE

Priority :
Priority Bank :
Queue Phase Detector Time
Default data

Priority :
Priority Bank :
Queue Phase Detector Time
Default data

Priority :
Priority Bank :
Queue Phase Detector Time
Default data

Priority :
Priority Bank :
Queue Phase Detector Time
Default data

Priority :
Priority Bank :
Queue Phase Detector Time
Default data

Priority :
Priority Bank :
Queue Phase Detector Time
Default data

Priority : **1**

Bank	**1**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						
Bank	**2**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						
Bank	**3**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						
Bank	**4**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						

Priority : **2**

Bank	**1**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						
Bank	**2**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						
Bank	**3**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						
Bank	**4**							
Detector	PE	1A	2A	3A	4A	5A	6A	B
		Default Data						

Priority : 3								
Bank 1								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 2								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 3								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 4								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								

Priority : 4								
Bank 1								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 2								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 3								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 4								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								

Priority : 5								
Bank 1								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 2								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 3								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 4								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								

Priority : 6								
Bank 1								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 2								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 3								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								
Bank 4								
Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data								

Preempt 1

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph	Track	Dwell	Cycle	Ovlp	Track	Dwell	Cycle	Trail Grn
Default Data				**Default Data**				**Default Data**				

Preempt 2

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn
Default Data				**Default Data**				**Default Data**				

Preempt 3

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn
2	Red	Green	No									
6	Red	Green	No	**Default Data**				**Default Data**				

Preempt 4

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn
4	Red	Green	No									
				Default Data				**Default Data**				

Preempt 5

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn
1	Red	Green	No									
6	Red	Green	No	**Default Data**				**Default Data**				

Preempt 6

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn

Default Data **Default Data** **Default Data**

System/Detectors Data

Local Critical Alarms

Revert to Backup: 15 1st Phone:

Local Free: No Cycle Failure: No Coord Failure: No Conflict Flash: No Remote Flash: No 2nd Phone:

Local Fash: No Cycle Fault: No Coord Fault: No Premption: No Voltage Monitor: No

Special Status 1: No Special Status 2: No Special Status 3: No Special Status 4: No Special Status 5: No Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Name	Veh/ Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Default Data **Default Data** **Default Data**

Sample Interval: 0

Queue: 1 Input Selection: 0=Average

Detector Failed Level : 0

Queue: 2 Input Selection: 0=Average

Detector Failed Level : 0

Queue:

Level	Enter	Leave	Dial / Split / Offset
			/ /

Default Data

Vehical Detector **Vehical Detector** **Special Detector**

Diagnostic Value 0 Diagnostic Value 1 Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Detector	Max Presence	No Activity	Erratic Count

Detector	Max Presence	No Activity	Erratic Count

Default Data - Diag 0 Values **Default Data - No Diag 1 Values** **Default Data - No Diag 0 Valu**

Pedestrian Detector **Pedestrian Detector** **Special Detector**

Diagnostic Value 0 Diagnostic Value 1 Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Detector	Max Presence	No Activity	Erratic Count

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Values **Default Data - No Diag 1 Values** **Default Data - No Diag 1 Values**

Speed Trap Data

Speed Trap:

Measurement:

Detector 1 Detector_2 Distance :

Dial/Split/Offset

//

Default Data

Speed Trap Low Treshold	Speed Trap High Treshold

Default Data

Volume Detector Data

Report Interval 0

Volume Detector Number	Controller Detector Channel

Default Data

SEPAC ECOM All Data

6/24/2019
2:46:01PM

Intersection Name: **30 Ave S & 20 St**

Intersection Alias: **30AS20S**

Access Data

1 :**1200/1312 Baud**
3 :**1200/1312 Baud**

Access Code: **9999**

Channel: 1

Address: **0**

Revision: **3.34**

IP Address:

Phase Initialization Data

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Initial	1-Inact	4-Grn	1-Inact	1-Inact	1-Inact	4-Grn	1-Inact	1-Inact	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None

PHASE DATA

Vehical Basic Timings							Misc Timings					Pedestrian Timings						
Phase	Min Green	Passage	Max1	Max2	Yellow	All Red	Green Delay	Yellow Delay	Walk Off	Walk Offset Mode	Bike Green	Walk	Ped Clr	Alt Walk	Alt Ped Clr	Flash Walk	Ext Ped Clr	Actuated Rest in Walk
1	1	3.0	7	0	3.0	1.5	0	0	0	0-Advance	0	0	0	0	0	No	0	No
2	15	3.0	40	0	3.0	1.5	0	0	0	0-Advance	0	7	12	0	0	No	0	No
3	7	3.0	7	0	3.0	1.5	0	0	0	0-Advance	0	0	0	0	0	No	0	No
4	10	3.0	40	0	3.0	1.5	0	0	0	0-Advance	0	7	12	0	0	No	0	No
5	7	3.0	7	0	3.0	1.5	0	0	0	0-Advance	0	0	0	0	0	No	0	No
6	15	3.0	40	0	3.0	1.5	0	0	0	0-Advance	0	0	12	0	0	No	0	No
7	7	3.0	20	0	3.0	1.5	0	0	0	0-Advance	0	0	0	0	0	No	0	No
8	10	3.0	30	0	3.0	1.5	0	0	0	0-Advance	0	7	12	0	0	No	0	No
9	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
10	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
11	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
12	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
13	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
14	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
15	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No
16	0	0.0	0	0	3.0	0.0	0	0	0	0-Advance	0	0	0	0	0	No	0	No

Vehicle Density Timings							General Control				Miscellaneous					Special Sequence		
Ph.	Added Initial	Max Initial	Time B4 Redu	Car B4 Redu	Time To Redu	Min Gap	Non-Act Response	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Pass	Condit Service	No Simu Gap Out	Omit	Minus Yel	Omit Call
1	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
2	0.0	0	0	0	0	0.0	NonActI	Min	None	0	No	Yes	No	No	No	0	0	0
3	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
4	0.0	0	0	0	0	0.0	NonActII	None	None	0	No	Yes	No	No	Yes	0	0	0
5	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
6	0.0	0	0	0	0	0.0	NonActI	Min	None	0	No	Yes	No	No	No	0	0	0
7	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
8	0.0	0	0	0	0	0.0	NonActII	None	None	0	No	Yes	No	No	Yes	0	0	0
9	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
10	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
11	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
12	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
13	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
14	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
15	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0
16	0.0	0	0	0	0	0.0	None	None	None	0	No	No	No	No	No	0	0	0

Vehical Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay
Veh Det:1	6	Veh	0	0.0	0
Veh Det:2	6	Veh	0	0.0	0
Veh Det:3	1	Veh	0	0.0	0
Veh Det:4	1	Veh	0	0.0	0
Veh Det:5	2	Veh	0	0.0	0
Veh Det:6	2	Veh	0	0.0	0
Veh Det:7	5	Veh	0	0.0	0
Veh Det:8	5	Veh	0	0.0	0
Veh Det:9	8	Veh	0	0.0	0
Veh Det:10	8	Veh	0	0.0	0
Veh Det:11	3	Veh	0	0.0	0
Veh Det:12	3	Veh	0	0.0	0
Veh Det:17	4	Veh	0	0.0	0
Veh Det:18	4	Veh	0	0.0	0
Veh Det:19	7	Veh	0	0.0	0
Veh Det:20	7	Veh	0	0.0	0
Veh Det:21	3	Veh	0	0.0	0
Veh Det:22	7	Veh	0	0.0	0
Veh Det:23	1	Veh	0	0.0	0
Veh Det:24	5	Veh	0	0.0	0
Veh Det:25	2	Veh	0	0.0	0
Veh Det:26	2	Veh	0	0.0	0
Veh Det:27	6	Veh	0	0.0	0
Veh Det:28	6	Veh	0	0.0	0
Veh Det:29	4	Veh	0	0.0	0
Veh Det:30	4	Veh	0	0.0	0
Veh Det:31	8	Veh	0	0.0	0
Veh Det:32	8	Veh	0	0.0	0

Pedestrian Detector

Default Data

Special Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay
Spc Det:1	4	Veh	0	0.0	5
Spc Det:2	4	Veh	0	2.0	0
Spc Det:3	8	Veh	0	0.0	5
Spc Det:4	8	Veh	0	2.0	0

Unit Data

General Control

Startup Time: 6sec
Startup State: All Red
Red Revert: 60sec
Auto Ped Clr: No
Stop T Reset: No
Alt Sequence: 0
Special Seq: 0-Standard
I/O Modes:
ABC Input(Entry) Modes: 0
ABC Output(O/STS) Modes: 0
D Input(Entry) Modes: 2
D Output(O/STS) Modes: 6

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

Remote Flash

Test A = Flash No

Phase	Entry	Exit
2	Yes	Yes
6	Yes	Yes

Channel	Flash Color	Flash Alternat
1	Red	Yes
2	Red	No
3	Red	Yes
4	Red	No
5	Red	Yes
6	Red	No
7	Red	Yes
8	Red	No
13	Red	No
14	Red	No
15	Red	No
16	Red	No

Overlaps

Overlaps

Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

Start Green

Overlaps

Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TG Preempt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stop Grn/Yel Phase	1	3	5	7	0	0	0	0	0	0	0	0	0	0	0	0

Ring

Phase	Ring	Next Phase
1	1	2
2	1	3
3	1	4
4	1	1
5	2	6
6	2	7
7	2	8
8	2	5

Phase(s)

Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
	5	5	7	7	2	2	4	4								
	6	6	8	8	5	6	7	8								

Alternate Sequences

No Alternate Sequences Programmed

Port 1 Data

BIU Addr	Port Status	Basic Det	Message 40
0	Used	No	No
1	Used	No	No
8	Used	No	No
9	Used	No	No
16	Used	No	No
18	Used	No	No

Channel	Control	Hardware Pins
1	1 - Veh Phase 1	1 - Phase 1 RYG
2	2 - Veh Phase 2	2 - Phase 2 RYG
3	3 - Veh Phase 3	3 - Phase 3 RYG
4	4 - Veh Phase 4	4 - Phase 4 RYG
5	5 - Veh Phase 5	5 - Phase 5 RYG
6	6 - Veh Phase 6	6 - Phase 6 RYG
7	7 - Veh Phase 7	7 - Phase 7 RYG
8	8 - Veh Phase 8	8 - Phase 8 RYG
9	18 - Ped Phase 2	9 - Phase 1 DPW
10	20 - Ped Phase 4	10 - Phase 2 DPW
11	22 - Ped Phase 6	11 - Phase 3 DPW
12	24 - Ped Phase 8	12 - Phase 4 DPW
13	33 - Overlap A	13 - Phase 5 DPW
14	34 - Overlap B	14 - Phase 6 DPW
15	35 - Overlap C	15 - Phase 7 DPW
16	36 - Overlap D	16 - Phase 8 DPW

Coordination Data

Dial/Split **Cycle**

/

General Coordination Data

Operation Mode: 0=Free
Coordination Mode: 0=Permissive
Maximun Mode: 2=Max 2
Correction Mode: 0=Dwell
Offset Mode: 0=Beg Grn
Force Mode: 0=Plan
Max Dwell Time: 0
Yield Period: 0
Manual Dial: 1
Manual Split: 1
Manual Offset: 1

Split Times and Phase Mod

Dial / **Split**

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode

Traffic Plan Data

Plan: //
Offset Time:
Mode:
Alternat Sequence:
Special Function:
Rg 2 Lag Time:
Correction Mode:
Rg 3 Lag Time:
Rg 4 Lag Time:

Local TBC Data

Start of Daylight Saving Month: 0 Week: 0
End of Daylight Saving Month: 0 Week: 0
Cycle Zero Reference Hours: 0 Min: 0

Source Day: Equate Days 1 2 3 4 5 6 7

Traffic Data

PHASE FUNCTION

Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		:	//		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

Event	Program Day	Hour	Min.	Aux Ouputs 1	2	3	Det. Diag. D1	Det. Rpt. D2	Det. Mult100 D3	Dimming	Special Function Outputs 1	2	3	4	5	6	7	8
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10	SF11	SF12	SF13	SF14	SF15	SF16
Special Function 1	X															
Special Function 2		X														
Special Function 3			X													
Special Function 4				X												
Special Function 5					X											
Special Function 6						X										
Special Function 7							X									
Special Function 8								X								

Phase Function

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Function Phase Recall

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF16

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

Vehicle Function

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF16

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF16

Overlap Function

PF1 PF2 PF3 PF4 PF5 PF6 PF7 PF8 PF9 PF10 PF11 PF12 PF13 PF14 PF15 PF1(

Dimming Data

Channel	Red	Yellow	Green	Alternate

Default Data - No Dimming Programmed

Preemption Data

General Preemption Data

Ring	Min Grn/Walk Time
1	5
2	5
3	10
4	10

Flash > Preepmt 1	Preepmt 2 = Preempt 3	Preepmt 4 = Preempt 5
Preepmt 1 > Preempt 2	Preepmt 3 = Preempt 4	Preepmt 5 = Preempt 6

Preempt Timers

Preempt	Non-Locking	Link to Preempt	Delay	Extend	Duration	Max Call	Lock-Out	Min Green	Min Walk	Select: Ped Clear	Select: Yel	Select: Red	Track: Grn	Track: Ped	Track: Yel	Track: Red	Dwell Green	Return: Ped Clear	Return: Yel	Return: Red
1	No	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	No	0	0	5	5	120	0	0	0	8	40	20	10	8	40	20	10	8	40	20
4	No	0	0	5	5	120	0	0	0	8	40	20	10	8	40	20	10	8	40	20
5	No	0	0	5	5	120	0	0	0	8	40	20	10	8	40	20	10	8	40	20
6	No	0	0	0	0	0	0	0	0	8	40	20	10	8	40	20	10	8	40	20

Preempt 1

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 2

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	Yes	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	Yes	Yes

Preempt 3

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 4

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 5

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 6

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1

Phase	Exit Phase	Exit Calls

Priority 2

Phase	Exit Phase	Exit Calls

Priority 3

Phase	Exit Phase	Exit Calls

Priority 4

Phase	Exit Phase	Exit Calls

Priority 5

Phase	Exit Phase	Exit Calls

Priority 6

Phase	Exit Phase	Exit Calls

Preempt 1

Vehical Phases

Ph.	Track	Dwell	Cycle
3	Green	Green	No
8	Green	Green	No

Pedestrian Phases

Ph	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp	Track	Dwell	Cycle
B	Flash Grn	Flash Grn	No
D	Flash Grn	Flash Grn	No

Preempt 2

Vehical Phases

Ph.	Track	Dwell	Cycle
2	Red	Red	Min Recall
5	Red	Red	Actuated
6	Red	Red	Min Recall
7	Red	Red	Actuated

Pedestrian Phases

Ph.	Track	Dwell	Cycle
2	Don't Wk	Don't Wk	Actuated
6	Don't Wk	Don't Wk	Actuated

Overlaps

Ovlp.	Track	Dwell	Cycle
2	Red	Red	Actuated
4	Red	Red	Actuated

Preempt 3

Vehical Phases

Ph.	Track	Dwell	Cycle
2	Red	Green	No
5	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle
1	Red	Flash Grn	No
3	Red	Flash Grn	No

Preempt 4

Vehical Phases

Ph.	Track	Dwell	Cycle
4	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle
2	Red	Flash Grn	No
4	Red	Flash Grn	No

Preempt 5

Vehical Phases

Ph.	Track	Dwell	Cycle
1	Red	Green	No
6	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle
1	Red	Flash Grn	No
3	Red	Flash Grn	No

Preempt 6

Vehical Phases

Ph.	Track	Dwell	Cycle

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle
2	Red	Flash Grn	No
4	Red	Flash Grn	No

System/Detectors Data

Local Critical Alarms

Revert to Backup: 15

1st Phone:

2nd Phone:

Local Free: No Cycle Failure: No Coord Failure: No Conflict Flash: No Remote Flash: No

Local Fash: No Cycle Fault: No Coord Fault: No Premption: No Voltage Monitor: No

Special Status 1: No Special Status 2: No Special Status 3: No Special Status 4: No Special Status 5: No Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Veh/Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Default Data

Sample Interval:

Default Data

Queue: 1

Input Selection: 0=Average

Detector Failed Level : 0

Queue: 2

Input Selection: 0=Average

Detector Failed Level : 0

Default Data

Queue:

Level	Enter	Leave	Dial / Split / Offset
			/ /

Default Data

Vehical Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - Diag 0 Values

Vehical Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Valu

Pedestrian Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Values

Pedestrian Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Speed Trap Data

Speed Trap:

Measurement:

Detector 1 Detector_2 Distance :

Default Data

Dial/Split/Offset

//

Default Data

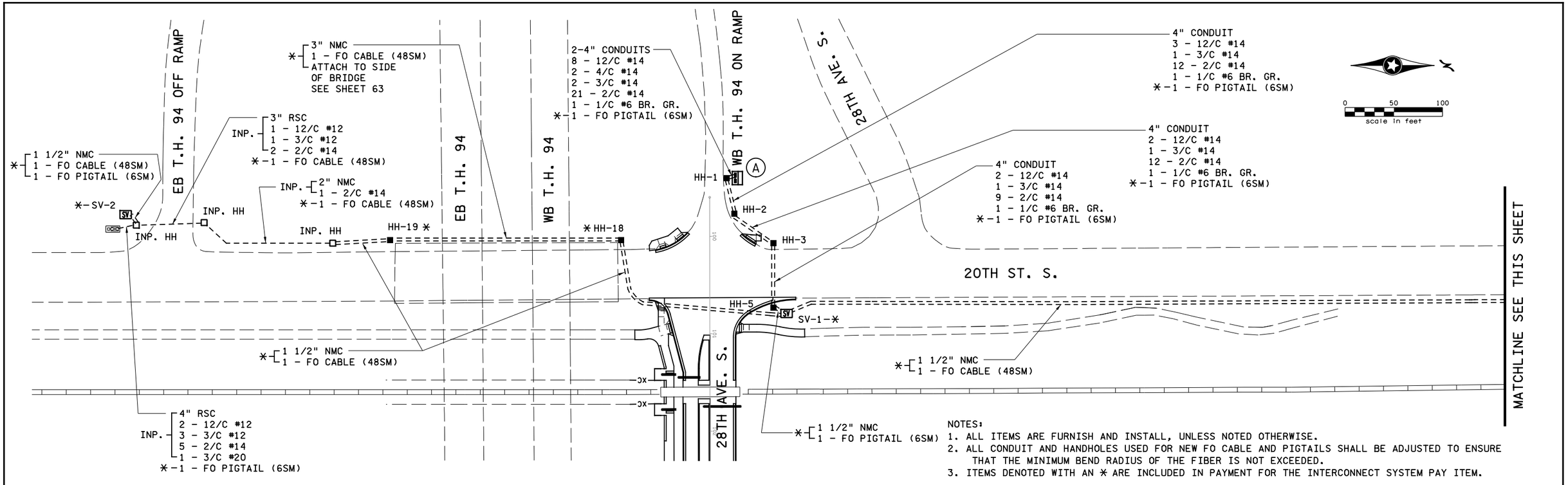
Speed Trap Low Treshold	Speed Trap High Treshold

Volume Detector Data

Report Interval	0

Volume Detector Number	Controller Detector Channel

Default Data



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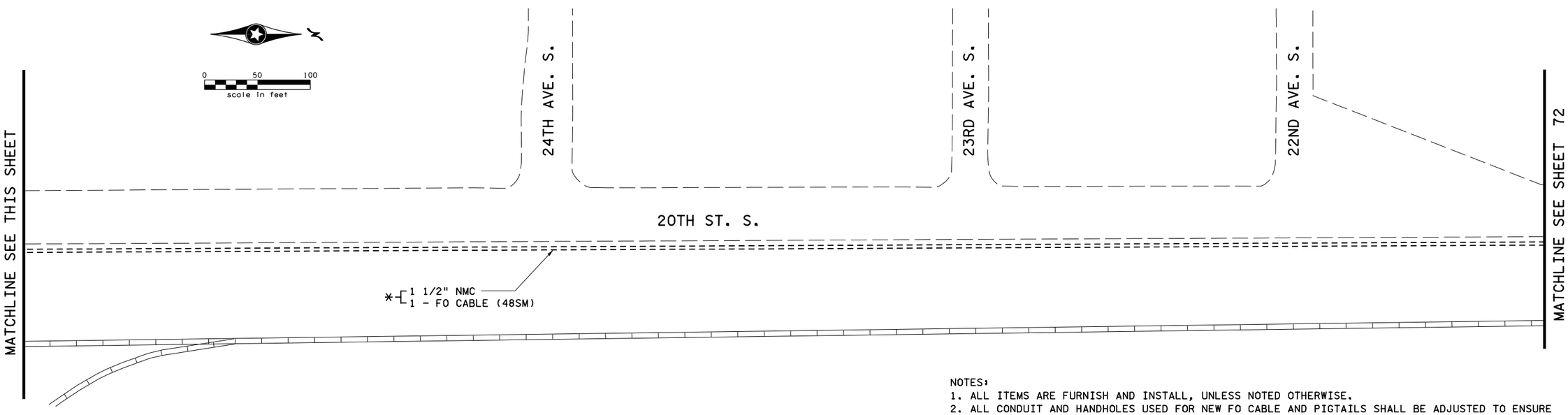
2. ALL CONDUIT AND HANDHOLES USED FOR NEW FO CABLE AND PIGTAILS SHALL BE ADJUSTED TO ENSURE THAT THE MINIMUM BEND RADIUS OF THE FIBER IS NOT EXCEEDED.
3. ITEMS DENOTED WITH AN * ARE INCLUDED IN PAYMENT FOR THE INTERCONNECT SYSTEM PAY ITEM.



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Date 06/07/12 License # 42785

STATE PROJECT NO. 144-143-001
STATE PROJECT NO. 1480-164 (T.H. 94)
CITY PROJECT NO. 12-2-03

DRAWN BY B. BETTS
DESIGNED BY B. BETTS
CHECKED BY A. POTTER
COMM. NO. 0117383

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CITY OF MOORHEAD
INTERCONNECT LAYOUT
28TH AVENUE SOUTH

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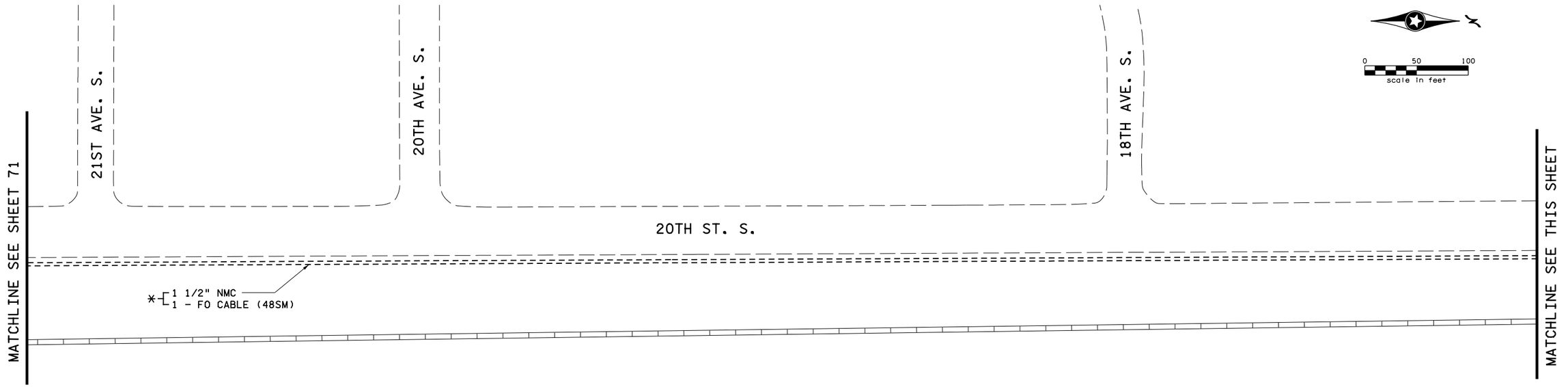

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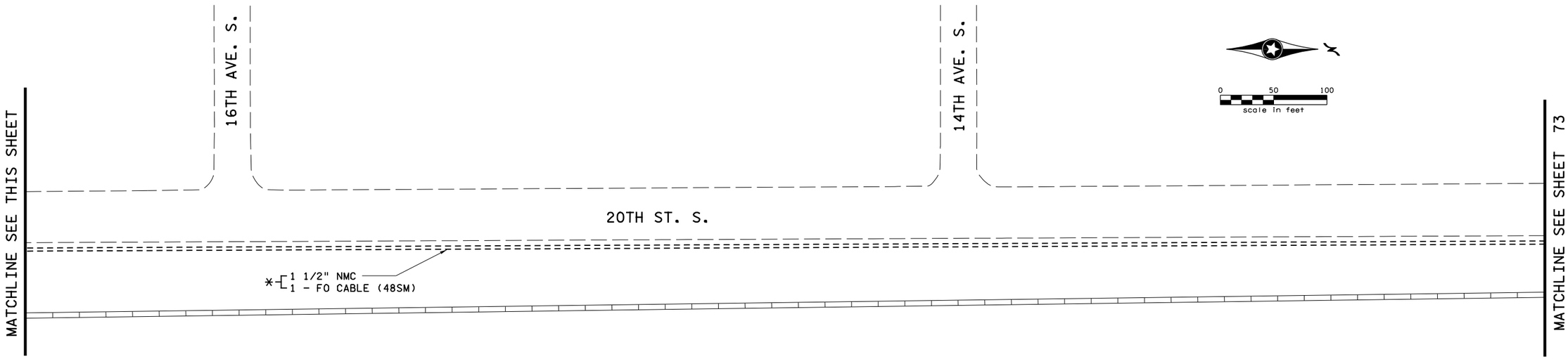

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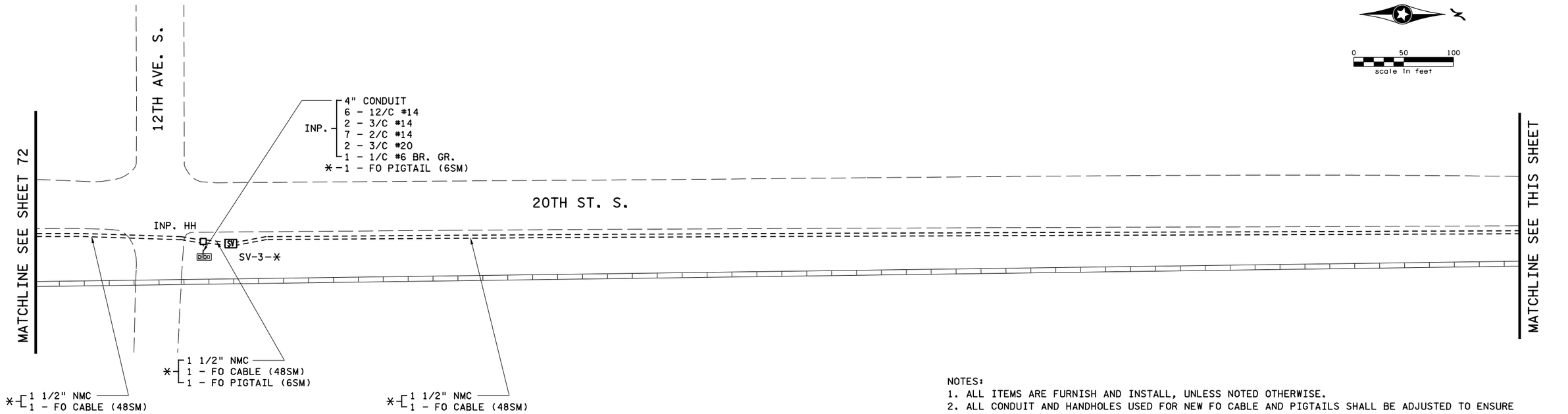

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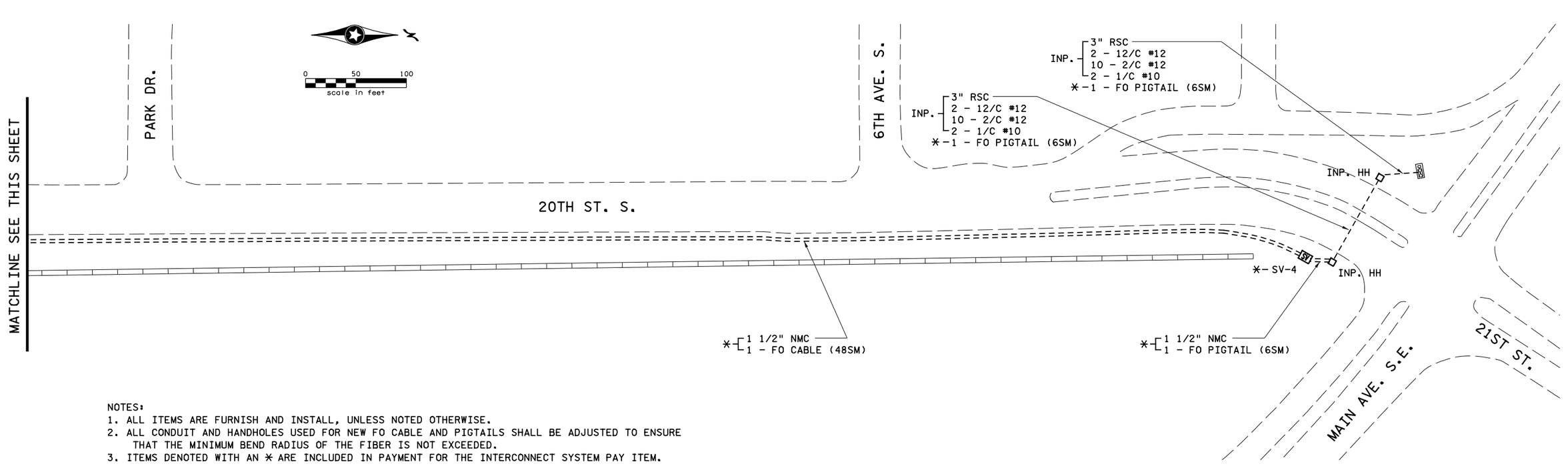

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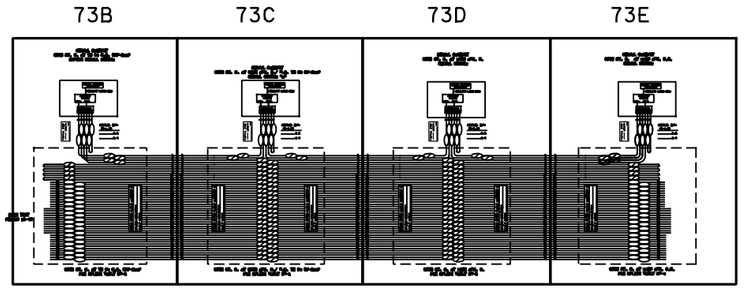

20TH ST. S.

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FIBER OPTIC SCHEMATIC
28TH AVENUE SOUTH
INDEX MAP

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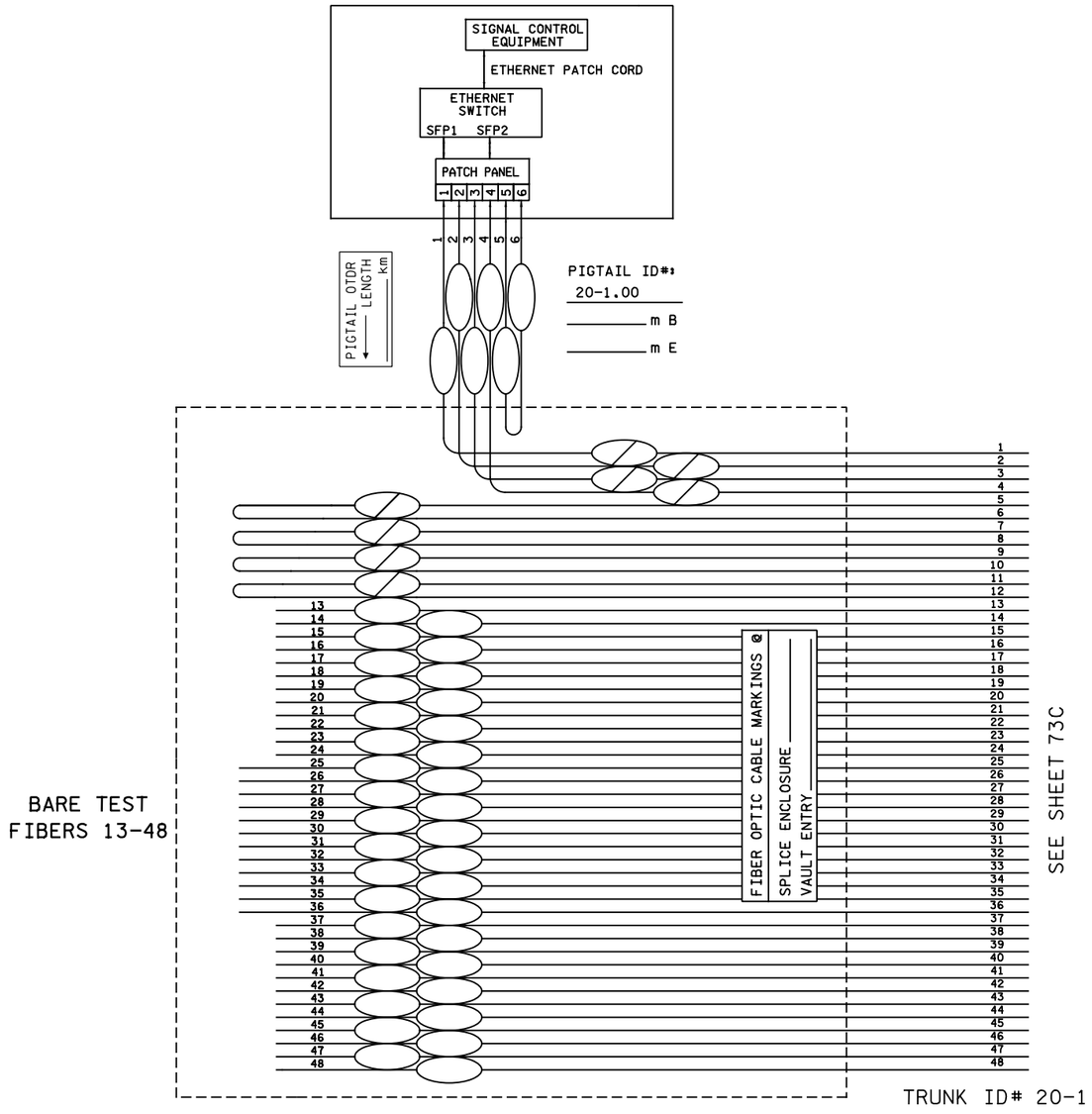
20TH ST. S. AT T.H. 94 E.B. OFF-RAMP
SIGNAL SYSTEM



20TH ST. S. AT TH 94 E.B. OFF-RAMP
F&I SPLICE VAULT SV-2

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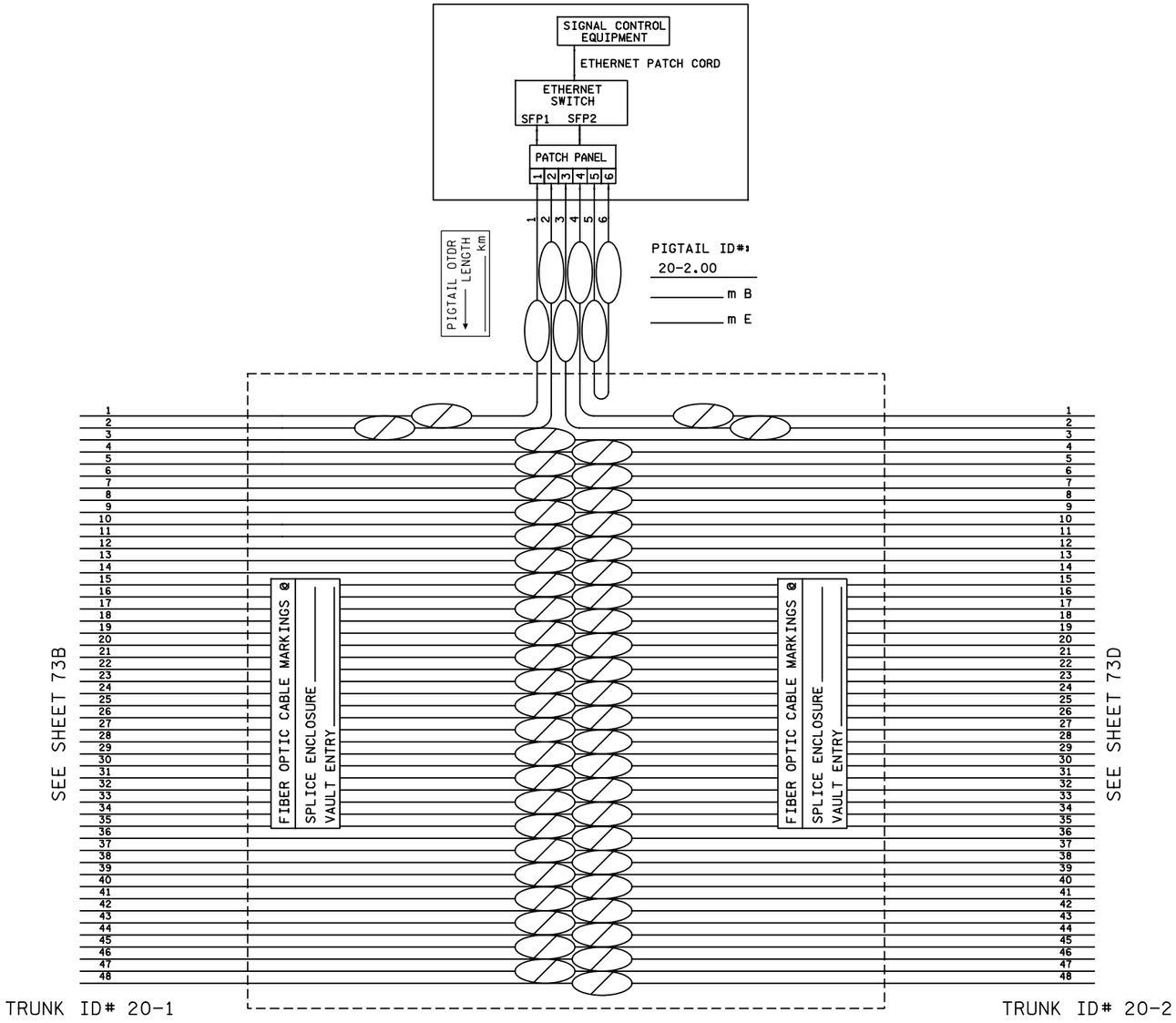

20TH ST. S. AT 28TH AVE. S./ W.B. TH 94 ON-RAMP
F&I SPLICE VAULT SV-1

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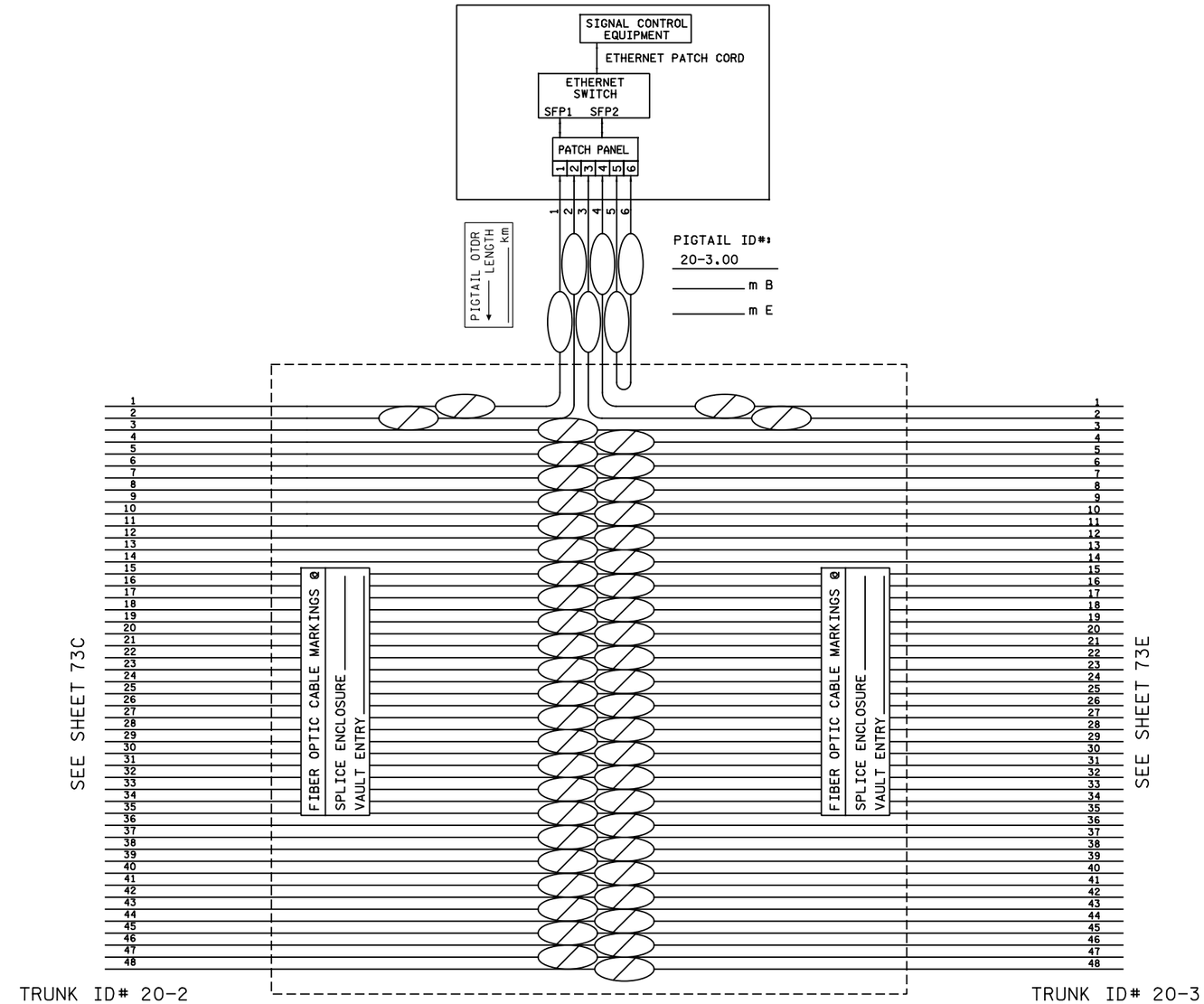

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28TH AVENUE SOUTH

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SIGNAL CABINET
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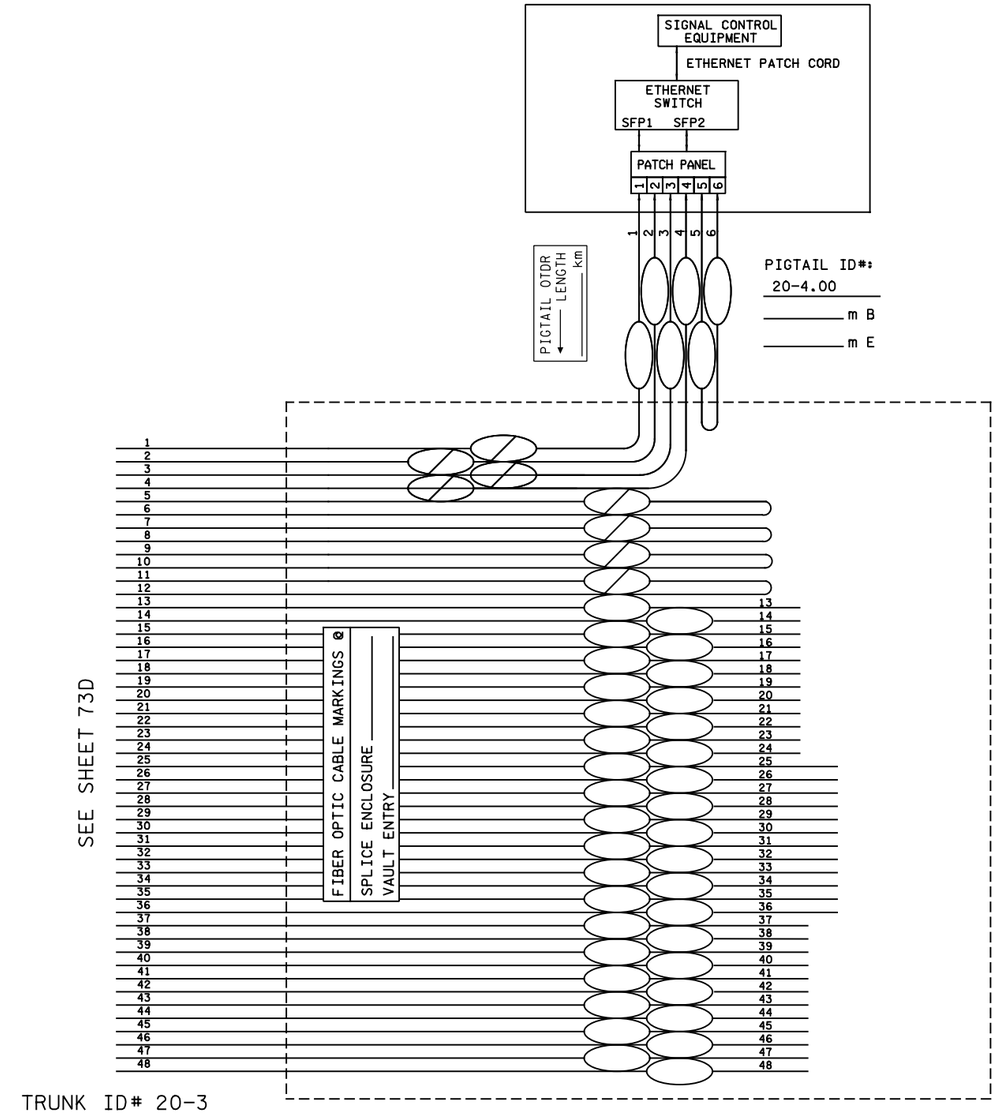
SIGNAL SYSTEM



20TH ST. S. AT MAIN AVE. S.E.
F&I SPLICE VAULT SV-4

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APPENDIX D – EXISTING BICYCLE AND WALKING PATHS

FIGURE 6: EXISTING BICYCLING MAP

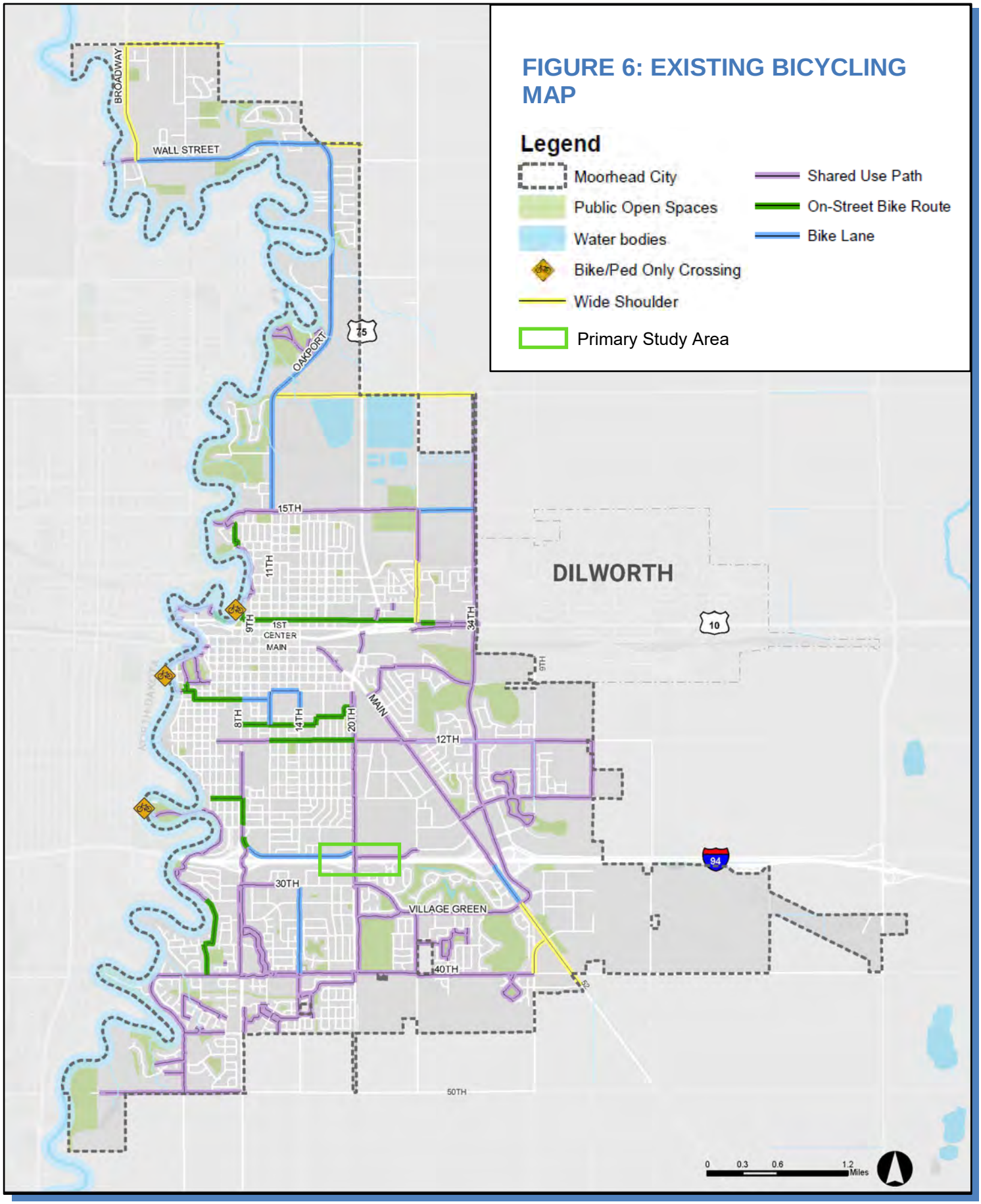
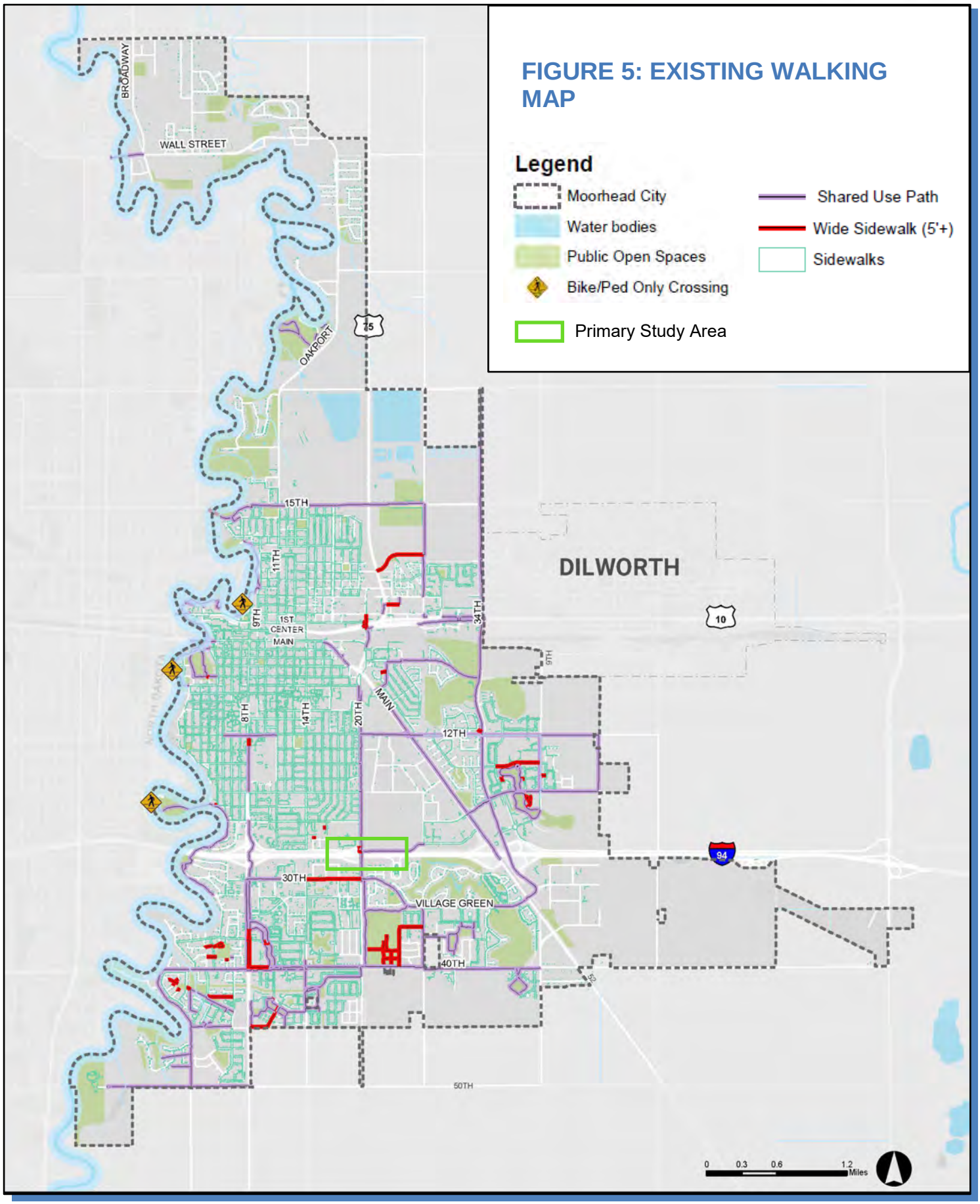
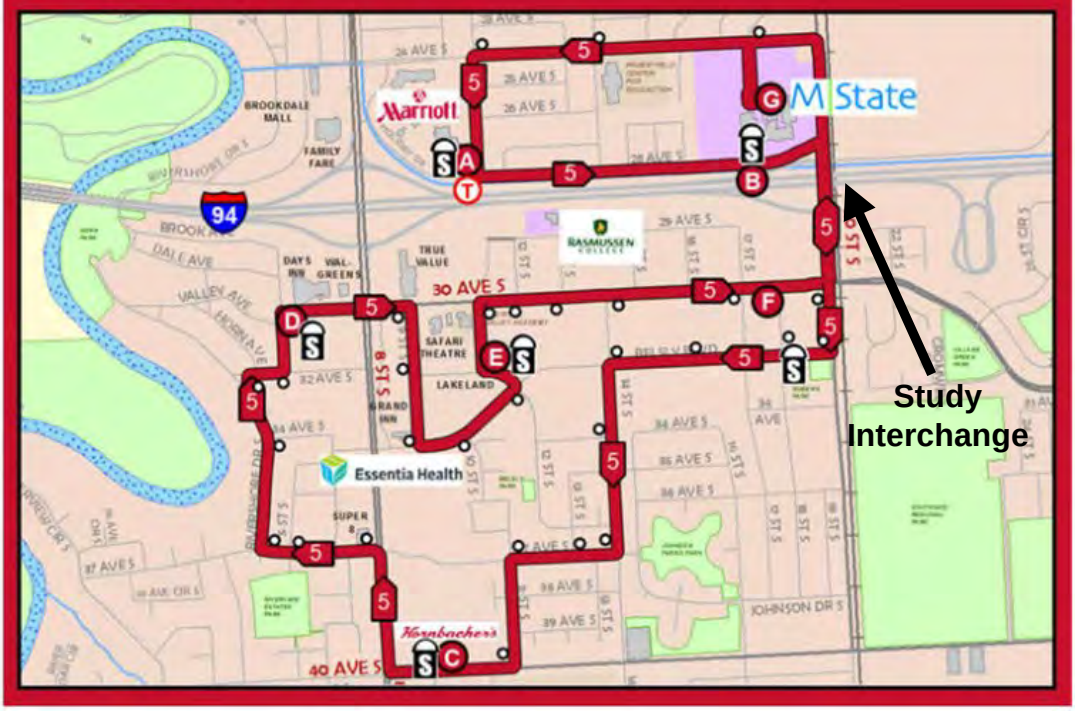


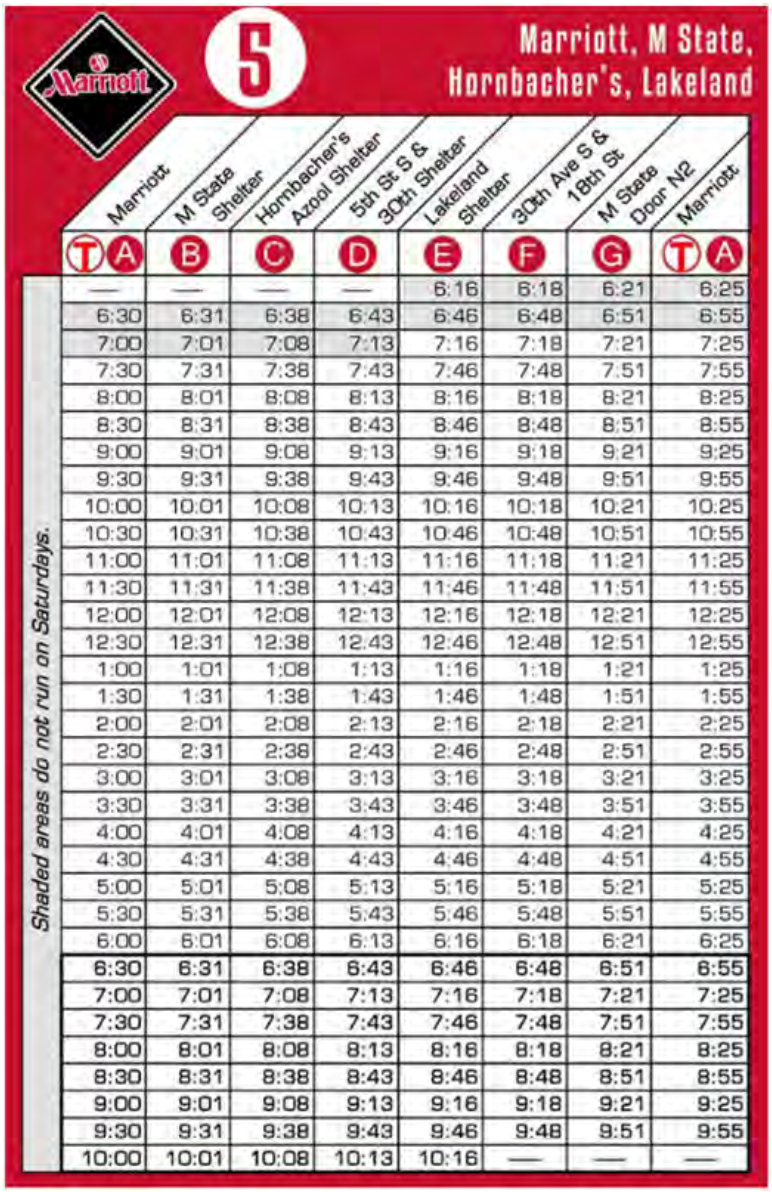
FIGURE 5: EXISTING WALKING MAP



APPENDIX E – MATBUS ROUTES

Route 5





Marriott, M State, Hornbacher's, Lakeland

Marriott (T A)	M State Shelter (B)	Hornbacher's Azool Shelter (C)	5th St S & 30th Shelter (D)	Lakeland Shelter (E)	30th Ave S & 18th St (F)	M State Door N2 (G)	Marriott (T A)
—	—	—	—	6:16	6:18	6:21	6:25
6:30	6:31	6:38	6:43	6:46	6:48	6:51	6:55
7:00	7:01	7:08	7:13	7:16	7:18	7:21	7:25
7:30	7:31	7:38	7:43	7:46	7:48	7:51	7:55
8:00	8:01	8:08	8:13	8:16	8:18	8:21	8:25
8:30	8:31	8:38	8:43	8:46	8:48	8:51	8:55
9:00	9:01	9:08	9:13	9:16	9:18	9:21	9:25
9:30	9:31	9:38	9:43	9:46	9:48	9:51	9:55
10:00	10:01	10:08	10:13	10:16	10:18	10:21	10:25
10:30	10:31	10:38	10:43	10:46	10:48	10:51	10:55
11:00	11:01	11:08	11:13	11:16	11:18	11:21	11:25
11:30	11:31	11:38	11:43	11:46	11:48	11:51	11:55
12:00	12:01	12:08	12:13	12:16	12:18	12:21	12:25
12:30	12:31	12:38	12:43	12:46	12:48	12:51	12:55
1:00	1:01	1:08	1:13	1:16	1:18	1:21	1:25
1:30	1:31	1:38	1:43	1:46	1:48	1:51	1:55
2:00	2:01	2:08	2:13	2:16	2:18	2:21	2:25
2:30	2:31	2:38	2:43	2:46	2:48	2:51	2:55
3:00	3:01	3:08	3:13	3:16	3:18	3:21	3:25
3:30	3:31	3:38	3:43	3:46	3:48	3:51	3:55
4:00	4:01	4:08	4:13	4:16	4:18	4:21	4:25
4:30	4:31	4:38	4:43	4:46	4:48	4:51	4:55
5:00	5:01	5:08	5:13	5:16	5:18	5:21	5:25
5:30	5:31	5:38	5:43	5:46	5:48	5:51	5:55
6:00	6:01	6:08	6:13	6:16	6:18	6:21	6:25
6:30	6:31	6:38	6:43	6:46	6:48	6:51	6:55
7:00	7:01	7:08	7:13	7:16	7:18	7:21	7:25
7:30	7:31	7:38	7:43	7:46	7:48	7:51	7:55
8:00	8:01	8:08	8:13	8:16	8:18	8:21	8:25
8:30	8:31	8:38	8:43	8:46	8:48	8:51	8:55
9:00	9:01	9:08	9:13	9:16	9:18	9:21	9:25
9:30	9:31	9:38	9:43	9:46	9:48	9:51	9:55
10:00	10:01	10:08	10:13	10:16	—	—	—

Shaded areas do not run on Saturdays.

APPENDIX F – STRUCTURE INVENTORY REPORTS

MINNESOTA STRUCTURE INVENTORY REPORT

Bridge ID: 14811 **MSAS 126 over I 94** Date: 06/30/2023

+ GENERAL +

Agency Br. No. **Crew**
District 4 **Maint. Area** 4A
County 14 - CLAY
City MOORHEAD
Township
Desc. Loc. 1.0 MI E OF JCT TH 75
Sect., Twp., Range 21 - 139N - 48W
Latitude 46d 50m 50.16s
Longitude 96d 44m 51.79s
Custodian STATE HWY
Owner STATE HWY
Insp Responsibility DISTRICT 4
Year Built 1973
Date Opened to Traffic 06-01-1974
MN Year Remodeled
FHWA Year Reconstructed
Bridge Plan Location CENTRAL
Potential ABC YES

+ STRUCTURE +

Service On HWY;PED
Service Under HIGHWAY
Main Span Type PRESTR BM SPAN
Main Span Detail
Appr. Span Type
Appr. Span Detail
Skew
Culvert Type
Barrel Length
Number of Spans
MAIN: 4 APPR: 0 TOTAL: 4
Main Span Length 71.4 ft
Structure Length 231.5 ft
Deck Width 59.1 ft
Deck Material C-I-P CONCRETE
Wear Surf Type LOW SLUMP CONC
Wear Surf Install Year 1987
Wear Course/Fill Depth 0.16 ft
Deck Membrane NONE
Deck Rebars NONE
Deck Rebars Install Year
Structure Area 13,682 sq ft
Roadway Area 11,571 sq ft
Sidewalk Width - L/R 6.0 ft
Curb Height - L/R 0.83 ft
Rail Codes - L/R 07 21

+ ROADWAY ON BRIDGE +

Facility MSAS 126
Functional Class URB/MINOR ART
ADT (YEAR) 22,815 (2021)
HCADT
National Highway System N
Route Sys/Nbr (TIS) MSAS 126
Ref. Point (TIS) 001+00.973
Detour Length 4 mi.
Lanes 3 Lanes ON Bridge
Control Section (TH Only)
Function MAINLINE
Type 2 WAY TRAF
Bridge Match ID 2
Roadway Key 1-ON

+ RDWY DIMENSIONS ON BRIDGE +

If Divided	NB-EB	SB-WB
Roadway Width	50.0 ft	
Vertical Clearance		
Max. Vert. Clear.		
Horizontal Clear.	49.9 ft	
Appr. Surface Width	50.0 ft	
Bridge Roadway Width	50.0 ft	
Median Width on Bridge	NA	

+ MISC. BRIDGE DATA +

Structure Flared NO
Parallel Structure NONE
Field Conn. ID
Cantilever ID
Foundations
Abut. CONC - FTG PILE
Pier CONC - FTG PILE
Historic Status NOT ELIGIBLE
On - Off System ON

+ PAINT +

Year Painted
Painted Area
Primer Type
Finish Type

+ BRIDGE SIGNS +

Posted Load NOT REQUIRED
Traffic NOT REQUIRED
Horizontal NOT REQUIRED
Vertical NOT REQUIRED

+ INSPECTION +

Deficient Status ADEQ
Local Planning Index 90
Last Routine Insp Date 09-14-2021
Routine Insp Frequency 24
Inspector Name DISTRICT 4
Status A-OPEN

+ NBI CONDITION RATINGS +

Deck	7
Superstructure	8
Substructure	7
Channel	N
Culvert	N

+ NBI APPRAISAL RATINGS +

Structure Evaluation	6
Deck Geometry	6
Underclearances	5
Waterway Adequacy	N
Approach Alignment	8

+ SAFETY FEATURES +

Bridge Railing 1-MEETS STANDARDS
GR Transition 0-SUBSTANDARD
Appr. Guardrail 1-MEETS STANDARDS
GR Termini 0-SUBSTANDARD

+ SPECIAL INSPECTIONS +

Frac. Critical N
Underwater N
Pinned Asbly. N

+ WATERWAY +

Drainage Area
Waterway Opening
Navigation Control NOT APPL
Pier Protection
Nav. Vert./Horz. Clr.
Nav. Vert. Lift Bridge Clear.
MN Scour Code A-NON WATERWAY
Scour Evaluation Year

+ CAPACITY RATINGS +

Design Load HS 20
Operating Rating HS 38.00
Inventory Rating HS 16.80
Posting
Rating Date 06-26-2003
Overweight Permit Codes
A: 1 B: 1 C: 1

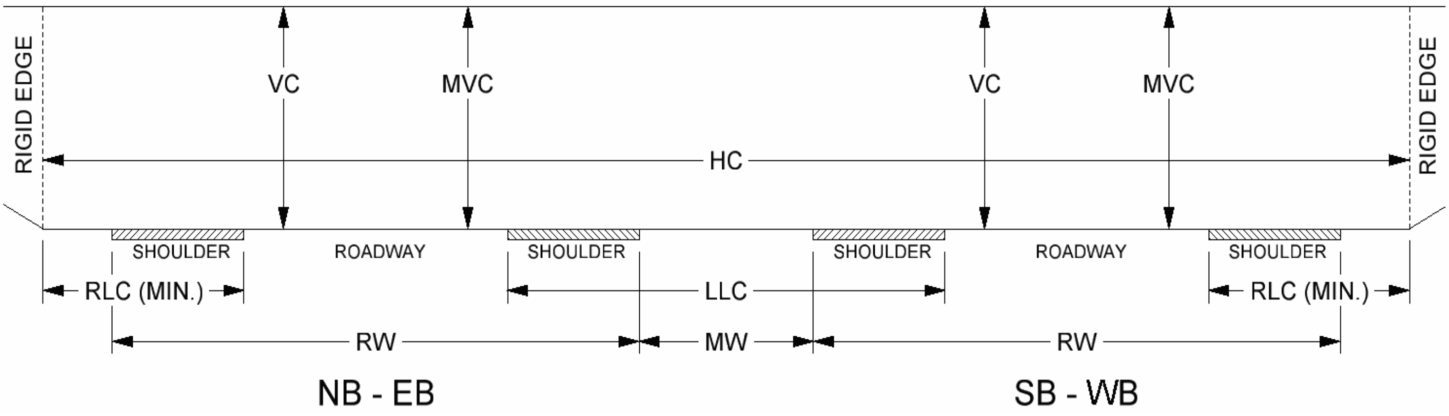
MINNESOTA STRUCTURE INVENTORY REPORT
Roadway Under Bridge

Bridge ID: 14811 — I 94 under MSAS 126 — Date: 06/30/2023

+ FEATURES +			+ DIMENSIONS +			
Item Description	NBI (if appl)	Value	Item Description	Diagram Abbrev.	Values NB-EB	Values SB-WB *
Road Name		I 94	**Roadway Width**	RW	36.7 ft	37.4 ft
Functional Class.	26	URB/PR ART ISTH	**Vertical Clearance**	VC	16.1 ft	16.1 ft
ADT (YEAR)	29 (& 30)	38,500 (2019)	**Max. Vert. Clear**	MVC	16.1 ft	16.1 ft
HCADT	109	4,235	**Horizontal Clear**	HC	66.4 ft	66.4 ft
National Highway System	104	Y	**Lateral Clr. - Lt**	LLC	28.2 ft	
Route Sys/Nbr (TIS)		ISTH 94	**Lateral Clr. - Rt**	RLC	15.9 ft	
Ref. Point (TIS)		001+00.573	**Median Width**	MW	52.0 ft	
Detour Length	19	4 mi.				
Lanes	28B	4 Lanes UNDER Bridge				
Control Section (TH Only)		1480				
Function	5C	MAINLINE				
Type	102	2 WAY TRAF				
Bridge Match ID		1				
Roadway Key	5A	2-UNDER				

* Entered only if this record is for a divided roadway

DIVIDED HIGHWAY WITHOUT MEDIAN OBSTRUCTION



RIGID EDGE IS A TOE OF SLOPE STEEPER THAN 1 TO 3 OR A FIXED OBJECT SUCH AS GUARDRAIL, PIER STRUT OR OTHER BARRIER.

LLC (LEFT LATERAL CLEARANCE) IS THE MEASUREMENT BETWEEN OUTSIDE ROADWAY EDGES.

RLC (RIGHT LATERAL CLEARANCE) IS THE MEASUREMENT FROM THE OUTSIDE EDGE OF THE ROADWAY TO THE RIGID EDGE. RIGHT IS DETERMINED WHEN FACING THE DIRECTION OF TRAVEL. RLC IS THE MINIMUM DIMENSION AFTER MEASURING IN BOTH DIRECTIONS.

MINNESOTA STRUCTURE INVENTORY REPORT

Bridge ID: 14530 **PED (AT 20TH ST) over I 94** Date: 06/30/2023

+ GENERAL +

Agency Br. No. **Crew**
District 4 **Maint. Area** 4A
County 14 - CLAY
City MOORHEAD
Township
Desc. Loc. 1.0 MI E OF JCT TH 75
Sect., Twp., Range 21 - 139N - 48W
Latitude 46d 50m 50.05s
Longitude 96d 44m 50.88s
Custodian STATE HWY
Owner CITY
Insp Responsibility DISTRICT 4
Year Built 1995
Date Opened to Traffic
MN Year Remodeled
FHWA Year Reconstructed 2015
Bridge Plan Location CENTRAL
Potential ABC N.A.

+ STRUCTURE +

Service On PED-BICYCLE
Service Under HIGHWAY
Main Span Type PRESTR BM SPAN
Main Span Detail
Appr. Span Type
Appr. Span Detail
Skew
Culvert Type
Barrel Length
Number of Spans
MAIN: 2 APPR: 0 TOTAL: 2
Main Span Length 113.4 ft
Structure Length 231.8 ft
Deck Width 12.3 ft
Deck Material C-I-P CONCRETE
Wear Surf Type N/A
Wear Surf Install Year
Wear Course/Fill Depth
Deck Membrane NONE
Deck Rebars EPOXY COATED REBAR
Deck Rebars Install Year 2015
Structure Area 2,842 sq ft
Roadway Area
Sidewalk Width - L/R
Curb Height - L/R
Rail Codes - L/R NN NN

+ ROADWAY ON BRIDGE +

Facility PEDESTRIAN
Functional Class
ADT (YEAR)
HCADT
National Highway System N
Route Sys/Nbr (TIS) 0
Ref. Point (TIS)
Detour Length
Lanes
Control Section (TH Only)
Function N/A
Type NOT APPLI
Bridge Match ID
Roadway Key 1-ON

+ RDWY DIMENSIONS ON BRIDGE +

If Divided **NB-EB** **SB-WB**
Roadway Width
Vertical Clearance
Max. Vert. Clear.
Horizontal Clear.
Appr. Surface Width
Bridge Roadway Width
Median Width on Bridge NA

+ MISC. BRIDGE DATA +

Structure Flared NO
Parallel Structure NONE
Field Conn. ID
Cantilever ID
Foundations
Abut. CONC - FTG PILE
Pier CONC - FTG PILE
Historic Status NOT ELIGIBLE
On - Off System OFF

+ PAINT +

Year Painted
Painted Area
Primer Type
Finish Type

+ BRIDGE SIGNS +

Posted Load NOT REQUIRED
Traffic NOT REQUIRED
Horizontal NOT REQUIRED
Vertical NOT REQUIRED

+ INSPECTION +

Deficient Status ADEQ
Sufficiency Rating
Last Routine Insp Date 09-14-2021
Routine Insp Frequency 24
Inspector Name DISTRICT 4
Status A-OPEN

+ NBI CONDITION RATINGS +

Deck 8
Superstructure 8
Substructure 8
Channel N
Culvert N

+ NBI APPRAISAL RATINGS +

Structure Evaluation 8
Deck Geometry N
Underclearances 6
Waterway Adequacy N
Approach Alignment N

+ SAFETY FEATURES +

Bridge Railing N-NOT REQUIRED
GR Transition N-NOT REQUIRED
Appr. Guardrail N-NOT REQUIRED
GR Termini N-NOT REQUIRED

+ SPECIAL INSPECTIONS +

Frac. Critical N
Underwater N
Pinned Asbly. N

+ WATERWAY +

Drainage Area
Waterway Opening
Navigation Control NOT APPL
Pier Protection
Nav. Vert./Horz. Clr.
Nav. Vert. Lift Bridge Clear.
MN Scour Code A-NON WATERWAY
Scour Evaluation Year 1995

+ CAPACITY RATINGS +

Design Load
Operating Rating
Inventory Rating
Posting
Rating Date
Overweight Permit Codes

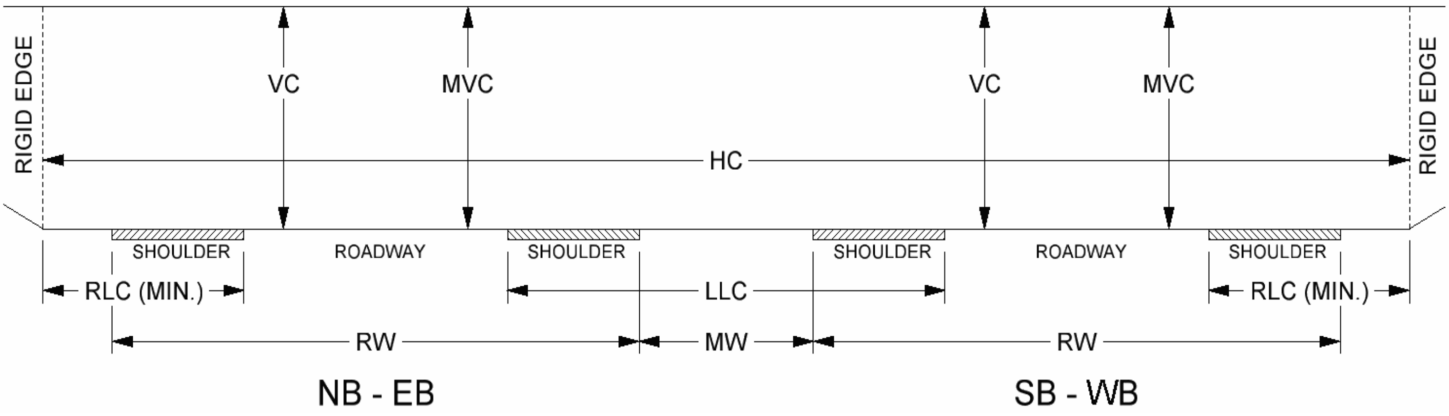
MINNESOTA STRUCTURE INVENTORY REPORT
Roadway Under Bridge

Bridge ID: 14530 — I 94 under PED (AT 20TH ST) — Date: 06/30/2023

+ FEATURES +			+ DIMENSIONS +			
Item Description	NBI (if appl)	Value	Item Description	Diagram Abbrev.	Values NB-EB	Values SB-WB *
Road Name		I 94	**Roadway Width**	RW	36.0 ft	36.0 ft
Functional Class.	26	URB/PR ART ISTH	**Vertical Clearance**	VC	16.9 ft	16.8 ft
ADT (YEAR)	29 (& 30)	38,500 (2019)	**Max. Vert. Clear**	MVC	16.9 ft	16.8 ft
HCADT	109	4,235	**Horizontal Clear**	HC	60.8 ft	60.8 ft
National Highway System	104	Y	**Lateral Clr. - Lt**	LLC	28.9 ft	
Route Sys/Nbr (TIS)		ISTH 94	**Lateral Clr. - Rt**	RLC	15.9 ft	
Ref. Point (TIS)		001+00.585	**Median Width**	MW	52.0 ft	
Detour Length	19	4 mi.				
Lanes	28B	4 Lanes UNDER Bridge				
Control Section (TH Only)		1480				
Function	5C	MAINLINE				
Type	102	2 WAY TRAF				
Bridge Match ID		1				
Roadway Key	5A	2-UNDER				

* Entered only if this record is for a divided roadway

DIVIDED HIGHWAY WITHOUT MEDIAN OBSTRUCTION



RIGID EDGE IS A TOE OF SLOPE STEEPER THAN 1 TO 3 OR A FIXED OBJECT SUCH AS GUARDRAIL, PIER STRUT OR OTHER BARRIER.

LLC (LEFT LATERAL CLEARANCE) IS THE MEASUREMENT BETWEEN OUTSIDE ROADWAY EDGES.

RLC (RIGHT LATERAL CLEARANCE) IS THE MEASUREMENT FROM THE OUTSIDE EDGE OF THE ROADWAY TO THE RIGID EDGE. RIGHT IS DETERMINED WHEN FACING THE DIRECTION OF TRAVEL. RLC IS THE MINIMUM DIMENSION AFTER MEASURING IN BOTH DIRECTIONS.

MINNESOTA STRUCTURE INVENTORY REPORT

Bridge ID: 9477 **BNSF RR over I 94** Date: 06/30/2023

+ GENERAL +

Agency Br. No. **Crew**
District 4 **Maint. Area** 4A
County 14 - CLAY
City MOORHEAD
Township
Desc. Loc. 1.0 MI E OF JCT TH 75
Sect., Twp., Range 21 - 139N - 48W
Latitude 46d 50m 50.01s
Longitude 96d 44m 50.03s
Custodian STATE HWY
Owner STATE HWY
Insp Responsibility DISTRICT 4
Year Built 1960
Date Opened to Traffic
MN Year Remodeled 2007
FHWA Year Reconstructed
Bridge Plan Location DISTRICT
Potential ABC N.A.

+ STRUCTURE +

Service On RAILROAD
Service Under HIGHWAY
Main Span Type STEEL THRU GIRD
Main Span Detail
Appr. Span Type
Appr. Span Detail
Skew
Culvert Type
Barrel Length
Number of Spans
MAIN: 4 APPR: 0 TOTAL: 4
Main Span Length 66.0 ft
Structure Length 238.0 ft
Deck Width 18.5 ft
Deck Material N/A
Wear Surf Type N/A
Wear Surf Install Year
Wear Course/Fill Depth
Deck Membrane NONE
Deck Rebars N/A
Deck Rebars Install Year
Structure Area 4,403 sq ft
Roadway Area
Sidewalk Width - L/R
Curb Height - L/R
Rail Codes - L/R NN NN

+ ROADWAY ON BRIDGE +

Facility RAILROAD
Functional Class
ADT (YEAR)
HCADT
National Highway System N
Route Sys/Nbr (TIS) 0
Ref. Point (TIS)
Detour Length
Lanes
Control Section (TH Only)
Function N/A
Type NOT APPLI
Bridge Match ID
Roadway Key 1-ON

+ RDWY DIMENSIONS ON BRIDGE +

If Divided **NB-EB** **SB-WB**
Roadway Width
Vertical Clearance
Max. Vert. Clear.
Horizontal Clear.
Appr. Surface Width
Bridge Roadway Width
Median Width on Bridge NA

+ MISC. BRIDGE DATA +

Structure Flared NO
Parallel Structure NONE
Field Conn. ID RIVETED
Cantilever ID
Foundations
Abut. CONC - FTG PILE
Pier CONC - FTG PILE
Historic Status NOT ELIGIBLE
On - Off System OFF

+ PAINT +

Year Painted 2007
Painted Area
Primer Type 3309-ORGANIC ZINC
Finish Type URETHANE

+ BRIDGE SIGNS +

Posted Load NOT REQUIRED
Traffic NOT REQUIRED
Horizontal OBJECT MARKERS
Vertical NOT REQUIRED

+ INSPECTION +

Deficient Status ADEQ
Sufficiency Rating
Last Routine Insp Date 08-04-2022
Routine Insp Frequency 12
Inspector Name DISTRICT 4
Status A-OPEN

+ NBI CONDITION RATINGS +

Deck 7
Superstructure 6
Substructure 7
Channel N
Culvert N

+ NBI APPRAISAL RATINGS +

Structure Evaluation 6
Deck Geometry N
Underclearances 4
Waterway Adequacy N
Approach Alignment N

+ SAFETY FEATURES +

Bridge Railing N-NOT REQUIRED
GR Transition 1-MEETS STANDARDS
Appr. Guardrail 1-MEETS STANDARDS
GR Termini 1-MEETS STANDARDS

+ SPECIAL INSPECTIONS +

Frac. Critical N
Underwater N
Pinned Asbly. N

+ WATERWAY +

Drainage Area
Waterway Opening
Navigation Control NOT APPL
Pier Protection
Nav. Vert./Horz. Clr.
Nav. Vert. Lift Bridge Clear.
MN Scour Code A-NON WATERWAY
Scour Evaluation Year

+ CAPACITY RATINGS +

Design Load
Operating Rating
Inventory Rating
Posting
Rating Date
Overweight Permit Codes

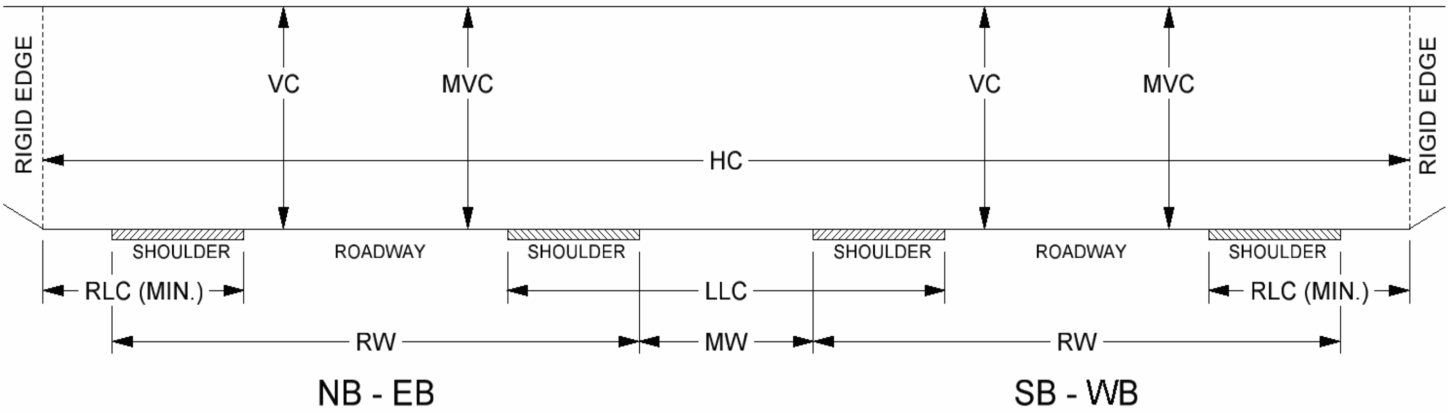
MINNESOTA STRUCTURE INVENTORY REPORT
Roadway Under Bridge

Bridge ID: 9477 — I 94 under BNSF RR — Date: 06/30/2023

+ FEATURES +			+ DIMENSIONS +			
Item Description	NBI (if appl)	Value	Item Description	Diagram Abbrev.	Values NB-EB	Values SB-WB *
Road Name		I 94	**Roadway Width**	RW	38.0 ft	37.8 ft
Functional Class.	26	URB/PR ART ISTH	**Vertical Clearance**	VC	16.2 ft	16.2 ft
ADT (YEAR)	29 (& 30)	38,500 (2019)	**Max. Vert. Clear**	MVC	16.2 ft	16.2 ft
HCADT	109	4,235	**Horizontal Clear**	HC	61.9 ft	61.9 ft
National Highway System	104	Y	**Lateral Clr. - Lt**	LLC	27.7 ft	
Route Sys/Nbr (TIS)		ISTH 94	**Lateral Clr. - Rt**	RLC	9.9 ft	
Ref. Point (TIS)		001+00.596	**Median Width**	MW	52.0 ft	
Detour Length	19	4 mi.				
Lanes	28B	4 Lanes UNDER Bridge				
Control Section (TH Only)		1480				
Function	5C	MAINLINE				
Type	102	2 WAY TRAF				
Bridge Match ID		1				
Roadway Key	5A	2-UNDER				

* Entered only if this record is for a divided roadway

DIVIDED HIGHWAY WITHOUT MEDIAN OBSTRUCTION

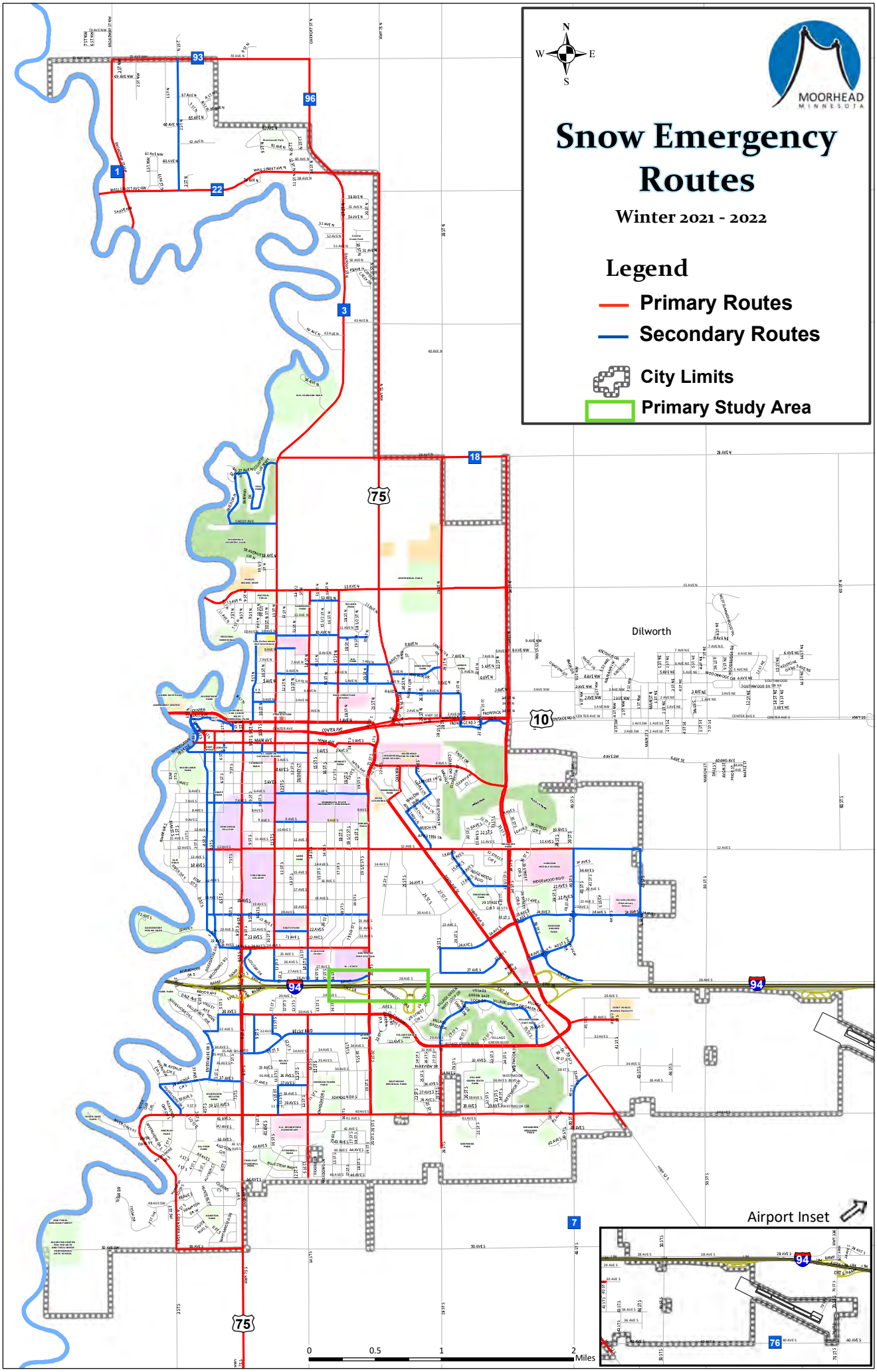


RIGID EDGE IS A TOE OF SLOPE STEEPER THAN 1 TO 3 OR A FIXED OBJECT SUCH AS GUARDRAIL, PIER STRUT OR OTHER BARRIER.

LLC (LEFT LATERAL CLEARANCE) IS THE MEASUREMENT BETWEEN OUTSIDE ROADWAY EDGES.

RLC (RIGHT LATERAL CLEARANCE) IS THE MEASUREMENT FROM THE OUTSIDE EDGE OF THE ROADWAY TO THE RIGID EDGE. RIGHT IS DETERMINED WHEN FACING THE DIRECTION OF TRAVEL. RLC IS THE MINIMUM DIMENSION AFTER MEASURING IN BOTH DIRECTIONS.

APPENDIX G – SNOW EMERGENCY ROUTES


N
W
E
S
MOORHEAD
MINNESOTA
Snow Emergency Routes
Winter 2021 - 2022
Legend
Primary Routes
Secondary Routes
City Limits
Primary Study Area
Dilworth
Airport Inset
0
0.5
1
2
Miles

APPENDIX H – RAILWAY CROSSING AND CRASH DATA

U. S. DOT CROSSING INVENTORY FORM

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk * denotes an optional field.

A. Revision Date (MM/DD/YYYY)	B. Reporting Agency	C. Reason for Update (Select only one)	D. DOT Crossing Inventory Number
02 / 02 / 2022	☐ Railroad ☐ Transit ☒ State ☐ Other	☒ Change in Data ☐ New Crossing ☐ Closed ☐ No Train Traffic ☐ Quiet Zone Update ☐ Re-Open ☐ Date Change Only ☐ Change in Primary Operating RR ☐ Admin. Correction	062577F

Part I: Location and Classification Information

1. Primary Operating Railroad	2. State	3. County
BNSF Railway Company [BNSF]	MINNESOTA	CLAY

4. City / Municipality	5. Street/Road Name & Block Number	6. Highway Type & No.
☒ In ☐ Near MOORHEAD	28th AVE S (Street/Road Name) | * (Block Number)	MSAS143

7. Do Other Railroads Operate a Separate Track at Crossing?	8. Do Other Railroads Operate Over Your Track at Crossing?
☐ Yes ☒ No If Yes, Specify RR	☐ Yes ☒ No If Yes, Specify RR

9. Railroad Division or Region	10. Railroad Subdivision or District	11. Branch or Line Name	12. RR Milepost
☐ None TWIN CITIES	☐ None MOORHEAD	☐ None E BRECK-S MOORH	(prefix) | 0040.018 | (suffix) (nnnn.nnn)

13. Line Segment *	14. Nearest RR Timetable Station *	15. Parent RR (if applicable)	16. Crossing Owner (if applicable)
288	MOORHEAD JCT	☒ N/A	☐ N/A BNSF

17. Crossing Type	18. Crossing Purpose	19. Crossing Position	20. Public Access (if Private Crossing)	21. Type of Train	22. Average Passenger Train Count Per Day
☒ Public ☐ Private	☒ Highway ☐ Pathway, Ped. ☐ Station, Ped.	☒ At Grade ☐ RR Under ☐ RR Over	☐ Yes ☐ No	☒ Freight ☐ Intercity Passenger ☐ Commuter ☐ Transit ☐ Shared Use Transit ☐ Tourist/Other	☐ Less Than One Per Day ☐ Number Per Day 0

23. Type of Land Use
☐ Open Space ☐ Farm ☐ Residential ☒ Commercial ☐ Industrial ☐ Institutional ☐ Recreational ☐ RR Yard

24. Is there an Adjacent Crossing with a Separate Number?	25. Quiet Zone (FRA provided)
☐ Yes ☒ No If Yes, Provide Crossing Number	☒ No ☐ 24 Hr ☐ Partial ☐ Chicago Excused Date Established

26. HSR Corridor ID	27. Latitude in decimal degrees	28. Longitude in decimal degrees	29. Lat/Long Source
☒ N/A	(WGS84 std: nn.nnnnnnn) 46.84779	(WGS84 std: -nnn.nnnnnnn) -96.747285	☒ Actual ☐ Estimated

30.A. Railroad Use *	31.A. State Use *
	MOORHEAD 28TH AVE SO WAS D-6048
30.B. Railroad Use *	**31.B. State Use ***
30.C. Railroad Use *	**31.C. State Use ***
30.D. Railroad Use *	**31.D. State Use ***
32.A. Narrative (Railroad Use) * (I.27 I.28 I.29)Value Provided by Railroad, Not Ye	**32.B. Narrative** (State Use) *

33. Emergency Notification Telephone No. (posted)	34. Railroad Contact (Telephone No.)	35. State Contact (Telephone No.)
800-832-5452	817-352-1549	651-366-3667

Part II: Railroad Information

1. Estimated Number of Daily Train Movements

1.A. Total Day Thru Trains (6 AM to 6 PM)	1.B. Total Night Thru Trains (6 PM to 6 AM)	1.C. Total Switching Trains	1.D. Total Transit Trains	1.E. Check if Less Than One Movement Per Day ☐ How many trains per week?
4	4	0	0	

2. Year of Train Count Data (YYYY)	3. Speed of Train at Crossing
2019	3.A. Maximum Timetable Speed (mph) 60 3.B. Typical Speed Range Over Crossing (mph) From 1 to 60

4. Type and Count of Tracks
Main 1 Siding 0 Yard 0 Transit 0 Industry 0

5. Train Detection (Main Track only)
☒ Constant Warning Time ☐ Motion Detection ☐AFO ☐ PTC ☐ DC ☐ Other ☐ None

6. Is Track Signaled?	7.A. Event Recorder	7.B. Remote Health Monitoring
☒ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

U. S. DOT CROSSING INVENTORY FORM

A. Revision Date *(MM/DD/YYYY)*	PAGE 2	D. Crossing Inventory Number *(7 char.)*
02/02/2022		062577F

Part III: Highway or Pathway Traffic Control Device Information

1. Are there Signs or Signals? ☒ Yes ☐ No

2. Types of Passive Traffic Control Devices associated with the Crossing

2.A. Crossbuck Assemblies *(count)*	2.B. STOP Signs *(R1-1)* *(count)*	2.C. YIELD Signs *(R1-2)* *(count)*	2.D. Advance Warning Signs *(Check all that apply; include count)* ☒ None
0	0	0	☐ W10-1 2 ☐ W10-3 ☐ W10-11 ☐ W10-2 1 ☐ W10-4 ☐ W10-12

2.E. Low Ground Clearance Sign *(W10-5)*	2.F. Pavement Markings	2.G. Channelization Devices/Medians	2.H. EXEMPT Sign *(R15-3)*	2.I. ENS Sign *(I-13)* Displayed
☐ Yes *(count_____)* ☒ No	☒ Stop Lines ☐ Dynamic Envelope ☒ RR Xing Symbols ☐ None	☒ All Approaches ☐ Median ☐ One Approach ☐ None	☐ Yes ☒ No	☒ Yes ☐ No

2.J. Other MUTCD Signs	2.K. Private Crossing Signs *(if private)*	2.L. LED Enhanced Signs *(List types)*
☐ Yes ☒ No Specify Type _____ Count 0 Specify Type _____ Count _____ Specify Type _____ Count _____	☐ Yes ☐ No	0

3. Types of Train Activated Warning Devices at the Grade Crossing *(specify count of each device for all that apply)*

3.A. Gate Arms *(count)*	3.B. Gate Configuration	3.C. Cantilevered *(or Bridged)* Flashing Light Structures *(count)*	3.D. Mast Mounted Flashing Lights *(count of masts)* 5	3.E. Total Count of Flashing Light Pairs
Roadway 3 Pedestrian 2	☒ 2 Quad ☐ Full *(Barrier)* Resistance ☐ 3 Quad ☐ Median Gates ☐ 4 Quad	Over Traffic Lane 0 ☐ Incandescent Not Over Traffic Lane 0 ☐ LED	☐ Incandescent ☒ LED ☐ Back Lights Included ☐ Side Lights Included	6

3.F. Installation Date of Current Active Warning Devices: *(MM/YYYY)*	3.G. Wayside Horn	3.H. Highway Traffic Signals Controlling Crossing	3.I. Bells *(count)*
_____/_____ ☐ Not Required	☐ Yes Installed on *(MM/YYYY)* _____/_____ ☒ No	☐ Yes ☒ No	2

3.J. Non-Train Active Warning	3.K. Other Flashing Lights or Warning Devices
☐ Flagging/Flagman ☐ Manually Operated Signals ☐ Watchman ☐ Floodlighting ☒ None	Count 0 Specify type _____

4.A. Does nearby Hwy Intersection have Traffic Signals?	4.B. Hwy Traffic Signal Interconnection	4.C. Hwy Traffic Signal Preemption	5. Highway Traffic Pre-Signals	6. Highway Monitoring Devices *(Check all that apply)*
☐ Yes ☒ No	☒ Not Interconnected ☐ For Traffic Signals ☐ For Warning Signs	☐ Simultaneous ☐ Advance	☐ Yes ☒ No Storage Distance * _____ Stop Line Distance * _____	☐ Yes - Photo/Video Recording ☐ Yes – Vehicle Presence Detection ☒ None

Part IV: Physical Characteristics

1. Traffic Lanes Crossing Railroad	2. Is Roadway/Pathway Paved?	3. Does Track Run Down a Street?	4. Is Crossing Illuminated? *(Street lights within approx. 50 feet from nearest rail)*
☐ One-way Traffic ☒ Two-way Traffic ☐ Divided Traffic Number of Lanes 3	☒ Yes ☐ No	☐ Yes ☒ No	☐ Yes ☒ No

5. Crossing Surface *(on Main Track, multiple types allowed)* Installation Date * *(MM/YYYY)* _____/_____ Width * _____ Length * 56

☐ 1 Timber ☐ 2 Asphalt ☐ 3 Asphalt and Timber ☒ 4 Concrete ☐ 5 Concrete and Rubber ☐ 6 Rubber ☐ 7 Metal
☐ 8 Unconsolidated ☐ 9 Composite ☐ 10 Other *(specify)* _____

6. Intersecting Roadway within 500 feet?	7. Smallest Crossing Angle	8. Is Commercial Power Available? *
☒ Yes ☐ No If Yes, Approximate Distance *(feet)* 62	☐ 0° – 29° ☐ 30° – 59° ☒ 60° - 90°	☒ Yes ☐ No

Part V: Public Highway Information

1. Highway System	2. Functional Classification of Road at Crossing	3. Is Crossing on State Highway System?	4. Highway Speed Limit
☐ (01) Interstate Highway System ☐ (02) Other Nat Hwy System (NHS) ☒ (03) Federal AID, Not NHS ☐ (08) Non-Federal Aid	☒ (0) Rural ☐ (1) Urban ☐ (1) Interstate ☒ (5) Major Collector ☐ (2) Other Freeways and Expressways ☐ (3) Other Principal Arterial ☐ (6) Minor Collector ☐ (4) Minor Arterial ☐ (7) Local	☐ Yes ☒ No	30 MPH ☒ Posted ☐ Statutory

5. Linear Referencing System *(LRS Route ID)* * 0500023953920143-I

6. LRS Milepost * 0.022

7. Annual Average Daily Traffic *(AADT)*	8. Estimated Percent Trucks	9. Regularly Used by School Buses?	10. Emergency Services Route
Year 2019 AADT 4448	_____ %	☐ Yes ☒ No Average Number per Day 0	☐ Yes ☒ No

Submission Information - *This information is used for administrative purposes and is not available on the public website.*

Submitted by _____ Organization _____ Phone _____ Date _____

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	**BNSF Railway Company [BNSF]**	1a. **BNSF**	1b. **TC0408200**
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	**BNSF Railway Company [BNSF]**	3a. **BNSF**	3b. **TC0408200**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
062577F	**04/15/08**	**06:40 AM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MOORHEAD JUNCT	**TWIN CITIES**	**CLAY**	**27**	**MN**

11. City *(if in a city)*

12. Highway Name or No. **MSAS 143 NR 194** ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other *(specify)* — Code: **D**

14. Vehicle Speed *(est. mph at impact)*: **3**

15. Direction *(geographical)* — 1. North 2. South 3. East 4. West — Code: **3**

16. Position — 1. Stalled on crossing, 2. Stopped on Crossing, 3. Moving over crossing, 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train *(units pulling)*, 2. Train *(units pushing)*, 3. Train *(standing)*, 4. Car(s) *(moving)*, 5. Car(s) *(standing)*, 6. Light loco(s) *(moving)*, 7. Light loco(s) *(standing)*, 8. Other *(specify)*, A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance — 1. Rail equipment struck highway user, 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

20c. State the name and quantity of the hazardous material released, if any

21. Temperature *(specify if minus)*: **45** °F

22. Visibility *(single entry)* — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather *(single entry)* — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist *(single entry)* — 1. Freight train, 2. Passenger train, 3. Commuter train, 4. Work train, 5. Single car, 6. Cut of cars, 7. Yard/Switching, 8. Light loco(s), 9. Main./inspect. car, A. Spec. MoW Equip. — Code: **1**

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class: **2**

28. Number of Locomotive Units: **3**

29. Number of Cars: **106**

30. Consist Speed *(Recorded if available)* — R. Recorded, E. Estimated: **25** mph — Code: **E**

31. Time Table Direction — 1. North 2. South 3. East 4. West — Code: **4**

32. Type of Crossing Warning — 1. Gates, 2. Cantilever FLS, 3. Standard FLS, 4. Wig wags, 5. Hwy. traffic signals, 6. Audible, 7. Crossbucks, 8. Stop signs, 9. Watchman, 10. Flagged by crew, 11. Other *(specify)*, 12. None

Code(s): **07** **11**

33. Signaled Crossing Warning

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code: **2**

35. Location of Warning — 1. Both Sides, 2. Side of Vehicle Approach, 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown — Code: **3**

37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age

39. Driver's Gender — 1. Male, 2. Female — Code: **1**

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver — 1. Drove around or thru the gate, 2. Stopped and then proceeded, 3. Did not stop, 4. Stopped on crossing, 5. Other *(specify)* — Code: **3**

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by *(primary obstruction)* — 1. Permanent Structure, 2. Standing railroad equipment, 3. Passing Train, 4. Topography, 5. Vegetation, 6. Highway Vehicles, 7. Other *(specify)*, 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users		
49. Railroad Employees		
52. Passengers on Train		

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage *(est. dollar damage)*: **$3,000**

48. Total Number of Highway-Rail Crossing Users *(include driver)*: **1**

50. Total Number of People on Train *(include passengers and crew)*: **2**

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description
AGE OF DRIVER UNKNOWN

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	**BNSF Railway Company [BNSF]**	1a. **BNSF**	1b. **TC0905203**
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	**BNSF Railway Company [BNSF]**	3a. **BNSF**	3b. **TC0905203**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
062577F	**09/20/05**	**04:25 PM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MOORHEAD	**TWIN CITIES**	**CLAY**	**27**	**MN**

11. City *(if in a city)*

12. Highway Name or No. **COUNTY RD 77** ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto; B. Truck; C. Truck-trailer; D. Pick-up truck; E. Van; F. Bus; G. School Bus; H. Motorcycle; J. Other Motor Vehicle; K. Pedestrian; M. Other *(specify)* — Code: **C**

14. Vehicle Speed *(est. mph at impact)*: **10**

15. Direction *(geographical)* — 1. North 2. South 3. East 4. West — Code: **3**

16. Position — 1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train *(units pulling)*; 2. Train *(units pushing)*; 3. Train *(standing)*; 4. Car(s) *(moving)*; 5. Car(s) *(standing)*; 6. Light loco(s) *(moving)*; 7. Light loco(s) *(standing)*; 8. Other *(specify)*; A. Train pulling- RCL; B. Train pushing- RCL; C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance — 1. Rail equipment struck highway user 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

20c. State the name and quantity of the hazardous material released, if any

21. Temperature *(specify if minus)*: **82** °F

22. Visibility *(single entry)* — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather *(single entry)* — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist *(single entry)* — 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car A. Spec. MoW Equip. — Code: **1**

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **MAIN**

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed *(Recorded if available)*	Code	31. Time Table Direction	Code
3	**3**	**110**	R. Recorded E. Estimated **25** mph	**R**	1. North 2. South 3. East 4. West	**4**

32. Type of Crossing Warning — 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other *(specify)* 12. None

Code(s): **07** **11**

33. Signaled Crossing Warning

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code: **2**

35. Location of Warning — 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown — Code:

37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown — Code: **1**

38. Driver's Age

39. Driver's Gender — 1. Male 2. Female — Code: **1**

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver — 1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other *(specify)* — Code: **3**

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by *(primary obstruction)* — 1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other *(specify)* 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage *(est. dollar damage)*: **$15,000**

48. Total Number of Highway-Rail Crossing Users *(include driver)*: **1**

50. Total Number of People on Train *(include passengers and crew)*: **2**

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: **1**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description
AGE OF DRIVER UNKNOWN

55. Typed Name and Title

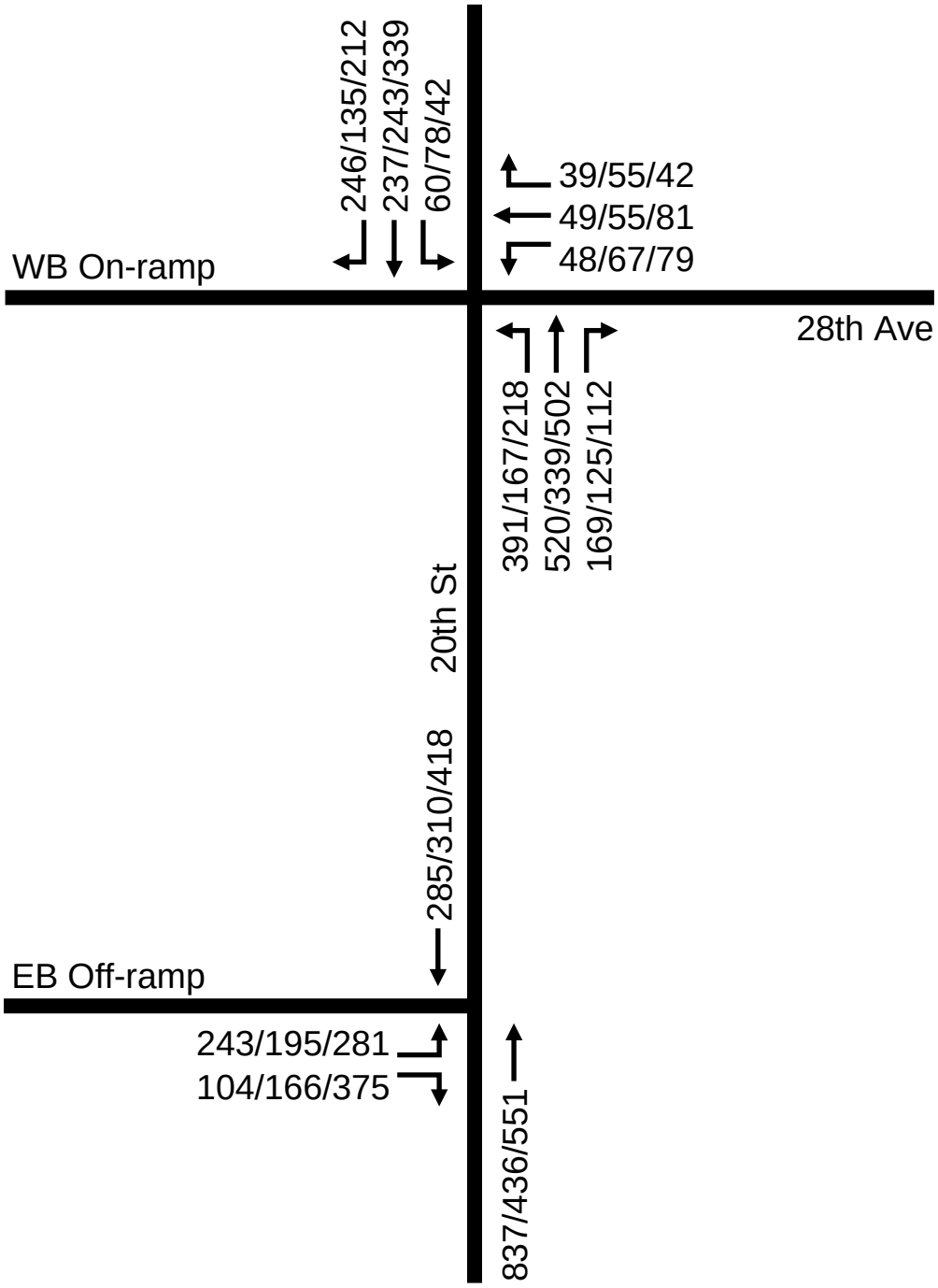
56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

APPENDIX I – PEAK HOUR, PEDESTRIAN & BICYCLE, AND RAW COUNT DATA, AADT ESTIMATION CALCULATION, REST AREA DATA



2023 Peak Hour Vehicle Volumes (Balanced)

Appendix I

I-94 & 20th Street Interchange Analysis
Moorhead, Minnesota

Stantec

Daily Ped-Bike Counts 2023-05-04

	West Sidewalk				East Shared-use Path			
	Northbound ↑		Southbound ↓		Northbound ↑		Southbound ↓	
Time								
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	1	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	1	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	1	0	0	0	0
02:45	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	1	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	1	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	1	0	0	0	0	0	0	0
05:00	0	0	0	0	1	0	0	0
05:15	1	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	1	0	0
07:15	0	0	0	0	0	1	0	0
07:30	0	0	0	0	0	1	0	0
07:45	0	0	0	0	0	1	0	0
08:00	0	0	0	0	0	0	0	0
08:15	1	0	0	0	0	0	0	0
08:30	1	1	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0
09:45	0	1	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	1
10:15	0	0	0	0	1	1	0	0

10:30	2	0	1	1	0	0	0	0
10:45	0	0	0	0	0	1	0	0
11:00	0	1	1	0	0	0	0	0
11:15	0	0	1	0	0	0	0	1
11:30	1	0	0	0	1	5	0	0
11:45	0	0	0	1	2	0	0	0
12:00	0	0	0	0	0	0	0	5
12:15	0	0	0	0	0	0	2	0
12:30	0	0	0	0	0	0	0	1
12:45	0	0	0	0	0	0	1	0
13:00	0	0	0	0	0	0	0	1
13:15	0	0	0	0	0	1	0	0
13:30	0	0	0	0	1	0	0	0
13:45	0	0	0	0	0	0	0	0
14:00	0	0	1	0	0	1	0	0
14:15	0	0	0	0	0	2	0	0
14:30	1	0	0	0	0	0	1	2
14:45	0	0	0	0	1	1	0	0
15:00	0	0	0	0	0	1	0	0
15:15	0	0	0	0	3	1	0	0
15:30	0	0	0	1	0	0	0	0
15:45	0	0	0	0	5	0	0	0
16:00	0	0	0	0	0	0	0	1
16:15	0	0	0	0	0	2	0	0
16:30	0	2	0	0	0	0	0	1
16:45	0	1	0	0	2	0	0	0
17:00	0	0	0	1	0	6	1	4
17:15	0	0	0	0	1	1	0	0
17:30	0	0	0	0	0	0	0	1
17:45	0	0	1	0	2	0	2	2
18:00	0	0	3	0	0	1	0	0
18:15	0	1	0	2	0	0	0	0
18:30	0	0	0	0	0	0	0	0
18:45	0	0	2	1	0	0	0	0
19:00	0	0	1	0	0	0	0	0
19:15	2	0	0	0	0	0	1	1
19:30	1	0	4	0	0	0	0	0
19:45	1	0	1	0	0	1	0	0
20:00	0	0	0	1	0	0	0	0
20:15	1	0	1	1	0	0	0	0
20:30	0	2	0	2	0	1	0	0
20:45	0	0	0	2	0	0	0	1
21:00	0	0	0	0	0	0	0	0
21:15	0	0	0	1	0	1	0	0
21:30	0	0	0	0	0	0	0	0
21:45	0	0	0	1	0	0	0	0
22:00	0	0	0	0	0	0	0	0

22:15	0	0	0	0	1	0	0	0
22:30	0	1	0	1	0	0	0	0
22:45	0	0	2	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0
23:15	1	0	0	0	0	0	0	0
23:30	0	0	0	0	0	1	0	0
23:45	0	0	0	0	0	0	0	0
TOTAL	15	10	21	18	21	32	8	22

Study Name	I-94 & 20th St North Ramp Interchange
Project	Fargo_Moorhead_Freeway
Project Code	
Legs and Movements	All Processed Legs & Movements
Bin Size	15 minutes
Time Zone	America/Chicago
Start Time	2023-05-04 07:00:00
End Time	2023-05-04 18:00:00
Location	I-94 & 20th St North Ramp Interchange
Latitude and Longitude	46.847762,-96.747698

AM Peak	7:00 AM - 9:00 AM
Mid Day	11:00 AM - 1:00 PM
PM Peak	4:00 PM - 6:00 PM

Lights

Leg	20th				28th				20th				Ramp				
Direction	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	**Totals**
2023-05-04 07:00:00	36	32	5	0	5	10	11	0	23	75	61	0	0	0	0	0	258
2023-05-04 07:15:00	62	36	6	0	13	7	6	0	19	104	97	0	0	0	0	0	350
2023-05-04 07:30:00	73	64	15	0	8	10	7	0	42	158	115	0	0	0	0	0	492
2023-05-04 07:45:00	66	70	18	0	5	11	10	0	52	141	121	0	0	0	0	0	494
2023-05-04 08:00:00	40	45	19	0	10	12	18	0	43	100	57	0	0	0	0	0	344
2023-05-04 08:15:00	44	58	29	0	4	16	14	0	41	88	50	0	0	0	0	0	344
2023-05-04 08:30:00	38	55	11	0	16	10	10	0	25	66	54	0	0	0	0	0	285
2023-05-04 08:45:00	36	49	15	0	11	7	9	0	25	82	53	0	0	0	0	0	287
2023-05-04 11:00:00	39	63	18	0	14	18	16	0	24	77	38	0	0	0	0	0	307
2023-05-04 11:15:00	24	45	11	0	8	11	7	0	30	73	46	0	0	0	0	0	255
2023-05-04 11:30:00	24	57	15	0	13	21	16	0	18	93	34	0	0	0	0	0	291
2023-05-04 11:45:00	28	73	11	0	9	14	15	0	36	85	42	0	0	0	0	0	313
2023-05-04 12:00:00	35	58	27	0	15	16	15	0	36	101	30	0	0	0	0	0	333
2023-05-04 12:15:00	18	48	12	0	19	11	16	0	23	78	35	0	0	0	0	0	260
2023-05-04 12:30:00	42	59	20	0	11	9	20	0	23	59	45	0	0	0	0	0	288
2023-05-04 12:45:00	35	65	18	0	8	13	16	0	37	78	56	0	0	0	0	0	326
2023-05-04 16:00:00	47	54	14	0	17	27	23	0	23	101	38	0	0	0	0	0	344
2023-05-04 16:15:00	53	88	13	0	21	23	32	0	35	118	47	0	0	0	0	0	430
2023-05-04 16:30:00	51	79	9	0	7	19	17	0	26	102	57	0	0	0	0	0	367
2023-05-04 16:45:00	45	69	11	0	8	14	15	0	21	118	52	0	0	0	0	0	353
2023-05-04 17:00:00	61	95	9	0	5	23	10	0	23	140	58	0	0	0	0	0	424
2023-05-04 17:15:00	45	91	11	0	7	10	13	0	12	131	54	0	0	0	0	0	374
2023-05-04 17:30:00	49	78	15	0	15	10	12	0	29	120	49	0	0	0	0	0	377
2023-05-04 17:45:00	32	76	4	0	13	9	14	0	18	114	53	0	0	0	0	0	333

Buses & SU

Leg	20th				28th				20th				Ramp				
Direction	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	**Totals**
2023-05-04 07:00:00	4	3	1	0	0	0	0	0	0	1	0	0	0	0	0	0	9
2023-05-04 07:15:00	2	3	0	0	1	0	1	0	0	4	1	0	0	0	0	0	12
2023-05-04 07:30:00	0	2	0	0	0	0	1	0	0	5	0	0	0	0	0	0	8
2023-05-04 07:45:00	0	3	2	0	0	0	0	0	8	4	0	0	0	0	0	0	17
2023-05-04 08:00:00	1	7	0	0	1	2	4	0	2	2	0	0	0	0	0	0	19
2023-05-04 08:15:00	1	0	1	0	2	0	1	0	0	2	0	0	0	0	0	0	7
2023-05-04 08:30:00	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	5
2023-05-04 08:45:00	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	4
2023-05-04 11:00:00	0	5	1	0	1	0	1	0	1	0	0	0	0	0	0	0	9
2023-05-04 11:15:00	1	1	0	0	0	0	0	0	2	2	1	0	0	0	0	0	7
2023-05-04 11:30:00	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
2023-05-04 11:45:00	0	3	1	0	0	0	2	0	0	1	0	0	0	0	0	0	7
2023-05-04 12:00:00	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
2023-05-04 12:15:00	1	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0	5
2023-05-04 12:30:00	2	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	6
2023-05-04 12:45:00	1	0	0	0	1	0	0	0	1	4	0	0	0	0	0	0	7
2023-05-04 16:00:00	0	1	1	0	0	0	0	0	0	3	0	0	0	0	0	0	5
2023-05-04 16:15:00	0	0	0	0	1	0	5	0	1	4	1	0	0	0	0	0	12
2023-05-04 16:30:00	1	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	6
2023-05-04 16:45:00	1	4	0	0	0	0	0	0	0	1	3	0	0	0	0	0	9
2023-05-04 17:00:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2023-05-04 17:15:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2023-05-04 17:30:00	0	1	0	0	0	2	0	0	0	1	1	0	0	0	0	0	5
2023-05-04 17:45:00	0	1	0	0	0	0	0	0	3	1	0	0	0	0	0	0	5

Combination Trucks

Leg	20th				28th				20th				Ramp				
Direction	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	**Totals**
2023-05-04 07:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023-05-04 07:15:00	2	0	0	0	1	2	0	0	1	0	0	0	0	0	0	0	6
2023-05-04 07:30:00	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
2023-05-04 07:45:00	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
2023-05-04 08:00:00	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	4
2023-05-04 08:15:00	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	5
2023-05-04 08:30:00	0	0	0	0	0	2	1	0	1	3	0	0	0	0	0	0	7
2023-05-04 08:45:00	1	0	0	0	0	1	0	0	1	2	0	0	0	0	0	0	5
2023-05-04 11:00:00	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	3
2023-05-04 11:15:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2023-05-04 11:30:00	0	0	0	0	0	1	0	0	1	2	1	0	0	0	0	0	5
2023-05-04 11:45:00	0	0	0	0	0	1	0	0	3	1	0	0	0	0	0	0	5
2023-05-04 12:00:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2023-05-04 12:15:00	0	0	1	0	0	1	0	0	2	1	0	0	0	0	0	0	5
2023-05-04 12:30:00	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	3
2023-05-04 12:45:00	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	4
2023-05-04 16:00:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2023-05-04 16:15:00	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	3
2023-05-04 16:30:00	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	3
2023-05-04 16:45:00	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
2023-05-04 17:00:00	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	4
2023-05-04 17:15:00	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3
2023-05-04 17:30:00	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	3
2023-05-04 17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 07:00:00	40	35	6	0	**81**	5	10	11	0	**26**	23	76	61	0	**160**	0	0	0	0	**0**	**267**
2023-05-04 07:15:00	66	39	6	0	**111**	15	9	7	0	**31**	20	108	98	0	**226**	0	0	0	0	**0**	**368**
2023-05-04 07:30:00	73	66	15	0	**154**	8	12	9	0	**29**	42	163	115	0	**320**	0	0	0	0	**0**	**503**
2023-05-04 07:45:00	66	73	20	0	**159**	5	11	10	0	**26**	61	147	121	0	**329**	0	0	0	0	**0**	**514**
2023-05-04 08:00:00	41	52	19	0	**112**	11	17	22	0	**50**	46	102	57	0	**205**	0	0	0	0	**0**	**367**
2023-05-04 08:15:00	45	58	30	0	**133**	6	20	15	0	**41**	42	90	50	0	**182**	0	0	0	0	**0**	**356**
2023-05-04 08:30:00	39	56	11	0	**106**	17	13	11	0	**41**	26	70	54	0	**150**	0	0	0	0	**0**	**297**
2023-05-04 08:45:00	37	49	15	0	**101**	11	9	10	0	**30**	26	86	53	0	**165**	0	0	0	0	**0**	**296**
2023-05-04 11:00:00	39	68	19	0	**126**	15	20	17	0	**52**	25	78	38	0	**141**	0	0	0	0	**0**	**319**
2023-05-04 11:15:00	25	46	11	0	**82**	8	11	7	0	**26**	33	75	47	0	**155**	0	0	0	0	**0**	**263**
2023-05-04 11:30:00	25	58	15	0	**98**	13	22	16	0	**51**	19	97	35	0	**151**	0	0	0	0	**0**	**300**
2023-05-04 11:45:00	28	76	12	0	**116**	9	15	17	0	**41**	39	87	42	0	**168**	0	0	0	0	**0**	**325**
2023-05-04 12:00:00	36	60	27	0	**123**	15	17	15	0	**47**	36	102	30	0	**168**	0	0	0	0	**0**	**338**
2023-05-04 12:15:00	19	50	13	0	**82**	19	13	16	0	**48**	25	80	35	0	**140**	0	0	0	0	**0**	**270**
2023-05-04 12:30:00	44	60	20	0	**124**	11	11	20	0	**42**	25	60	46	0	**131**	0	0	0	0	**0**	**297**
2023-05-04 12:45:00	36	65	18	0	**119**	10	14	16	0	**40**	39	83	56	0	**178**	0	0	0	0	**0**	**337**
2023-05-04 16:00:00	47	55	15	0	**117**	17	27	23	0	**67**	24	104	38	0	**166**	0	0	0	0	**0**	**350**
2023-05-04 16:15:00	53	88	13	0	**154**	22	24	37	0	**83**	38	122	48	0	**208**	0	0	0	0	**0**	**445**
2023-05-04 16:30:00	52	81	9	0	**142**	7	20	17	0	**44**	28	105	57	0	**190**	0	0	0	0	**0**	**376**
2023-05-04 16:45:00	46	73	11	0	**130**	8	14	15	0	**37**	22	120	55	0	**197**	0	0	0	0	**0**	**364**
2023-05-04 17:00:00	61	97	9	0	**167**	5	23	10	0	**38**	24	142	58	0	**224**	0	0	0	0	**0**	**429**
2023-05-04 17:15:00	46	91	11	0	**148**	7	10	13	0	**30**	13	132	55	0	**200**	0	0	0	0	**0**	**378**
2023-05-04 17:30:00	49	79	15	0	**143**	15	13	12	0	**40**	30	122	50	0	**202**	0	0	0	0	**0**	**385**
2023-05-04 17:45:00	32	77	4	0	**113**	13	9	14	0	**36**	21	115	53	0	**189**	0	0	0	0	**0**	**338**

AM

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 07:15:00	66	39	6	0	**111**	15	9	7	0	**31**	20	108	98	0	**226**	0	0	0	0	**0**	**368**
2023-05-04 07:30:00	73	66	15	0	**154**	8	12	9	0	**29**	42	163	115	0	**320**	0	0	0	0	**0**	**503**
2023-05-04 07:45:00	66	73	20	0	**159**	5	11	10	0	**26**	61	147	121	0	**329**	0	0	0	0	**0**	**514**
2023-05-04 08:00:00	41	52	19	0	**112**	11	17	22	0	**50**	46	102	57	0	**205**	0	0	0	0	**0**	**367**
Grand Total	246	230	60	0	**536**	39	49	48	0	**136**	169	520	391	0	**1080**	0	0	0	0	**0**	**1752**
% HV	2.0%	6.5%	3.3%	0.0%	**4.1%**	7.7%	18.4%	14.6%	0.0%	**14.0%**	7.7%	3.3%	0.3%	0.0%	**2.9%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**4.1%**
% Approach	45.9%	42.9%	11.2%	0.0%		28.7%	36.0%	35.3%	0.0%		15.6%	48.1%	36.2%	0.0%		0.0%	0.0%	0.0%	0.0%		
% Total	14.0%	13.1%	3.4%	0.0%	**30.6%**	2.2%	2.8%	2.7%	0.0%	**7.8%**	9.6%	29.7%	22.3%	0.0%	**61.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	
Lights	241	215	58	0	**514**	36	40	41	0	**117**	156	503	390	0	**1049**	0	0	0	0	**0**	**1680**
% Lights	98.0%	93.5%	96.7%	0.0%	**95.9%**	92.3%	81.6%	85.4%	0.0%	**86.0%**	92.3%	96.7%	99.7%	0.0%	**97.1%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**95.9%**
Articulated Trucks	2	0	0	0	**2**	1	7	1	0	**9**	3	2	0	0	**5**	0	0	0	0	**0**	**16**
% Articulated Trucks	0.8%	0.0%	0.0%	0.0%	**0.4%**	2.6%	14.3%	2.1%	0.0%	**6.6%**	1.8%	0.4%	0.0%	0.0%	**0.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**0.9%**
Buses and Single-Unit Trucks	3	15	2	0	**20**	2	2	6	0	**10**	10	15	1	0	**26**	0	0	0	0	**0**	**56**
% Buses and Single-Unit Trucks	1.2%	6.5%	3.3%	0.0%	**3.7%**	5.1%	4.1%	12.5%	0.0%	**7.4%**	5.9%	2.9%	0.3%	0.0%	**2.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**3.2%**

Mid-day

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 12:00:00	36	60	27	0	**123**	15	17	15	0	**47**	36	102	30	0	**168**	0	0	0	0	**0**	**338**
2023-05-04 12:15:00	19	50	13	0	**82**	19	13	16	0	**48**	25	80	35	0	**140**	0	0	0	0	**0**	**270**
2023-05-04 12:30:00	44	60	20	0	**124**	11	11	20	0	**42**	25	60	46	0	**131**	0	0	0	0	**0**	**297**
2023-05-04 12:45:00	36	65	18	0	**119**	10	14	16	0	**40**	39	83	56	0	**178**	0	0	0	0	**0**	**337**
Grand Total	135	235	78	0	**448**	55	55	67	0	**177**	125	325	167	0	**617**	0	0	0	0	**0**	**1242**
% HV	3.7%	2.1%	1.3%	0.0%	**2.5%**	3.6%	10.9%	0.0%	0.0%	**4.5%**	4.8%	2.8%	0.6%	0.0%	**2.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**2.8%**
% Approach	30.1%	52.5%	17.4%	0.0%		31.1%	31.1%	37.9%	0.0%		20.3%	52.7%	27.1%	0.0%		0.0%	0.0%	0.0%	0.0%		
% Total	10.9%	18.9%	6.3%	0.0%	**36.1%**	4.4%	4.4%	5.4%	0.0%	**14.3%**	10.1%	26.2%	13.4%	0.0%	**49.7%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	
Lights	130	230	77	0	**437**	53	49	67	0	**169**	119	316	166	0	**601**	0	0	0	0	**0**	**1207**
% Lights	96.3%	97.9%	98.7%	0.0%	**97.5%**	96.4%	89.1%	121.8%	0.0%	**95.5%**	95.2%	97.2%	99.4%	0.0%	**97.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**97.2%**
Articulated Trucks	0	0	1	0	**1**	1	5	0	0	**6**	4	2	0	0	**6**	0	0	0	0	**0**	**13**
% Articulated Trucks	0.0%	0.0%	1.3%	0.0%	**0.2%**	1.8%	9.1%	0.0%	0.0%	**3.4%**	3.2%	0.6%	0.0%	0.0%	**1.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**1.0%**
Buses and Single-Unit Trucks	5	5	0	0	**10**	1	1	0	0	**2**	2	7	1	0	**10**	0	0	0	0	**0**	**22**
% Buses and Single-Unit Trucks	3.7%	2.1%	0.0%	0.0%	**2.2%**	1.8%	1.8%	0.0%	0.0%	**1.1%**	1.6%	2.2%	0.6%	0.0%	**1.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**1.8%**

PM

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 16:15:00	53	88	13	0	**154**	22	24	37	0	**83**	38	122	48	0	**208**	0	0	0	0	**0**	**445**
2023-05-04 16:30:00	52	81	9	0	**142**	7	20	17	0	**44**	28	105	57	0	**190**	0	0	0	0	**0**	**376**
2023-05-04 16:45:00	46	73	11	0	**130**	8	14	15	0	**37**	22	120	55	0	**197**	0	0	0	0	**0**	**364**
2023-05-04 17:00:00	61	97	9	0	**167**	5	23	10	0	**38**	24	142	58	0	**224**	0	0	0	0	**0**	**429**
Grand Total	212	339	42	0	**593**	42	81	79	0	**202**	112	489	218	0	**819**	0	0	0	0	**0**	**1614**
% HV	0.9%	2.4%	0.0%	0.0%	**1.7%**	2.4%	2.5%	6.3%	0.0%	**4.0%**	6.3%	2.2%	1.8%	0.0%	**2.7%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**2.5%**
% Approach	35.8%	57.2%	7.1%	0.0%		20.8%	40.1%	39.1%	0.0%		13.7%	59.7%	26.6%	0.0%		0.0%	0.0%	0.0%	0.0%		
% Total	13.1%	21.0%	2.6%	0.0%	**36.7%**	2.6%	5.0%	4.9%	0.0%	**12.5%**	6.9%	30.3%	13.5%	0.0%	**50.7%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	
Lights	210	331	42	0	**583**	41	79	74	0	**194**	105	478	214	0	**797**	0	0	0	0	**0**	**1574**
% Lights	99.1%	97.6%	100.0%	0.0%	**98.3%**	97.6%	97.5%	93.7%	0.0%	**96.0%**	93.8%	97.8%	98.2%	0.0%	**97.3%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**97.5%**
Articulated Trucks	0	1	0	0	**1**	0	2	0	0	**2**	6	3	0	0	**9**	0	0	0	0	**0**	**12**
% Articulated Trucks	0.0%	0.3%	0.0%	0.0%	0.2%	0.0%	2.5%	0.0%	0.0%	**1.0%**	5.4%	0.6%	0.0%	0.0%	**1.1%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**0.7%**
Buses and Single-Unit Trucks	2	7	0	0	**9**	1	0	5	0	**6**	1	8	4	0	**13**	0	0	0	0	**0**	**28**
% Buses and Single-Unit Trucks	0.9%	2.1%	0.0%	0.0%	**1.5%**	2.4%	0.0%	6.3%	0.0%	**3.0%**	0.9%	1.6%	1.8%	0.0%	**1.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	**1.7%**

Study Name	I-94 & 20th St South Ramp Interchange
Project	Fargo_Moorhead_Freeway
Project Code	
Legs and Movements	All Processed Legs & Movements
Bin Size	15 minutes
Time Zone	America/Chicago
Start Time	2023-05-04 07:00:00
End Time	2023-05-04 18:00:00
Location	I-94 & 20th St South Ramp Interchange
Latitude and Longitude	46.847762,-96.747698

AM Peak	7:00 AM - 9:00 AM
Mid Day	11:00 AM - 1:00 PM
PM Peak	4:00 PM - 6:00 PM

Lights

Leg	20th								20th				Ramp				
Direction	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	**Totals**
2023-05-04 07:00:00	0	45	0	0	0	0	0	0	0	136	0	0	16	0	43	0	240
2023-05-04 07:15:00	0	44	0	0	0	0	0	0	0	180	0	0	18	0	35	0	277
2023-05-04 07:30:00	0	73	0	0	0	0	0	0	0	237	0	0	24	0	78	0	412
2023-05-04 07:45:00	0	82	0	0	0	0	0	0	0	239	0	0	30	0	67	0	418
2023-05-04 08:00:00	0	62	0	0	0	0	0	0	0	148	0	0	29	0	53	0	292
2023-05-04 08:15:00	0	70	0	0	0	0	0	0	0	134	0	0	19	0	42	0	265
2023-05-04 08:30:00	0	64	0	0	0	0	0	0	0	121	0	0	29	0	26	0	240
2023-05-04 08:45:00	0	61	0	0	0	0	0	0	0	105	0	0	24	0	46	0	236
2023-05-04 11:00:00	0	76	0	0	0	0	0	0	0	94	0	0	23	0	40	0	233
2023-05-04 11:15:00	0	55	0	0	0	0	0	0	0	106	0	0	47	0	45	0	253
2023-05-04 11:30:00	0	68	0	0	0	0	0	0	0	103	0	0	31	0	39	0	241
2023-05-04 11:45:00	0	93	0	0	0	0	0	0	0	114	0	0	29	0	48	0	284
2023-05-04 12:00:00	0	75	0	0	0	0	0	0	0	120	0	0	48	0	64	0	307
2023-05-04 12:15:00	0	65	0	0	0	0	0	0	0	88	0	0	37	0	47	0	237
2023-05-04 12:30:00	0	78	0	0	0	0	0	0	0	107	0	0	40	0	22	0	247
2023-05-04 12:45:00	0	85	0	0	0	0	0	0	0	111	0	0	40	0	53	0	289
2023-05-04 16:00:00	0	82	0	0	0	0	0	0	0	108	0	0	59	0	58	0	307
2023-05-04 16:15:00	0	113	0	0	0	0	0	0	0	118	0	0	72	0	72	0	375
2023-05-04 16:30:00	0	100	0	0	0	0	0	0	0	132	0	0	82	0	69	0	383
2023-05-04 16:45:00	0	81	0	0	0	0	0	0	0	132	0	0	96	0	59	0	368
2023-05-04 17:00:00	0	105	0	0	0	0	0	0	0	157	0	0	121	0	67	0	450
2023-05-04 17:15:00	0	102	0	0	0	0	0	0	0	121	0	0	120	0	81	0	424
2023-05-04 17:30:00	0	82	0	0	0	0	0	0	0	126	0	0	76	0	71	0	355
2023-05-04 17:45:00	0	91	0	0	0	0	0	0	0	120	0	0	61	0	66	0	338

Buses & SU

Leg	20th				28th				20th				Ramp				
Direction	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	**Totals**
2023-05-04 07:00:00	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5
2023-05-04 07:15:00	0	5	0	0	0	0	0	0	0	4	0	0	0	0	1	0	10
2023-05-04 07:30:00	0	5	0	0	0	0	0	0	0	4	0	0	0	0	4	0	13
2023-05-04 07:45:00	0	3	0	0	0	0	0	0	0	12	0	0	1	0	0	0	16
2023-05-04 08:00:00	0	11	0	0	0	0	0	0	0	5	0	0	2	0	1	0	19
2023-05-04 08:15:00	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	5
2023-05-04 08:30:00	0	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	5
2023-05-04 08:45:00	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
2023-05-04 11:00:00	0	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8
2023-05-04 11:15:00	0	1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	7
2023-05-04 11:30:00	0	1	0	0	0	0	0	0	0	3	0	0	0	0	1	0	5
2023-05-04 11:45:00	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5
2023-05-04 12:00:00	0	3	0	0	0	0	0	0	0	1	0	0	0	0	1	0	5
2023-05-04 12:15:00	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
2023-05-04 12:30:00	0	2	0	0	0	0	0	0	0	4	0	0	0	0	1	0	7
2023-05-04 12:45:00	0	0	0	0	0	0	0	0	0	4	0	0	1	0	2	0	7
2023-05-04 16:00:00	0	1	0	0	0	0	0	0	0	2	0	0	0	0	3	0	6
2023-05-04 16:15:00	0	5	0	0	0	0	0	0	0	4	0	0	3	0	3	0	15
2023-05-04 16:30:00	0	2	0	0	0	0	0	0	0	2	0	0	1	0	3	0	8
2023-05-04 16:45:00	0	4	0	0	0	0	0	0	0	6	0	0	0	0	0	0	10
2023-05-04 17:00:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	5
2023-05-04 17:15:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2023-05-04 17:30:00	0	1	0	0	0	0	0	0	0	3	0	0	0	0	1	0	5
2023-05-04 17:45:00	0	1	0	0	0	0	0	0	0	1	0	0	2	0	1	0	5

Combination Trucks

Leg	20th				28th				20th				Ramp				
Direction	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	**Totals**
2023-05-04 07:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023-05-04 07:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2023-05-04 07:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023-05-04 07:45:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
2023-05-04 08:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 08:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 08:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
2023-05-04 08:45:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2023-05-04 11:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 11:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 11:30:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	4
2023-05-04 11:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
2023-05-04 12:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023-05-04 12:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
2023-05-04 12:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 12:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2023-05-04 16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2023-05-04 17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 17:15:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
2023-05-04 17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2023-05-04 17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 07:00:00	0	49	0	0	**49**	0	0	0	0	**0**	0	136	0	0	**136**	16	0	44	0	**60**	**245**
2023-05-04 07:15:00	0	49	0	0	**49**	0	0	0	0	**0**	0	184	0	0	**184**	18	0	38	0	**56**	**289**
2023-05-04 07:30:00	0	78	0	0	**78**	0	0	0	0	**0**	0	241	0	0	**241**	24	0	82	0	**106**	**425**
2023-05-04 07:45:00	0	85	0	0	**85**	0	0	0	0	**0**	0	252	0	0	**252**	31	0	68	0	**99**	**436**
2023-05-04 08:00:00	0	73	0	0	**73**	0	0	0	0	**0**	0	153	0	0	**153**	31	0	55	0	**86**	**312**
2023-05-04 08:15:00	0	72	0	0	**72**	0	0	0	0	**0**	0	137	0	0	**137**	19	0	43	0	**62**	**271**
2023-05-04 08:30:00	0	66	0	0	**66**	0	0	0	0	**0**	0	122	0	0	**122**	30	0	32	0	**62**	**250**
2023-05-04 08:45:00	0	61	0	0	**61**	0	0	0	0	**0**	0	111	0	0	**111**	24	0	46	0	**70**	**242**
2023-05-04 11:00:00	0	83	0	0	**83**	0	0	0	0	**0**	0	94	0	0	**94**	23	0	42	0	**65**	**242**
2023-05-04 11:15:00	0	56	0	0	**56**	0	0	0	0	**0**	0	112	0	0	**112**	47	0	46	0	**93**	**261**
2023-05-04 11:30:00	0	69	0	0	**69**	0	0	0	0	**0**	0	107	0	0	**107**	31	0	43	0	**74**	**250**
2023-05-04 11:45:00	0	97	0	0	**97**	0	0	0	0	**0**	0	115	0	0	**115**	29	0	52	0	**81**	**293**
2023-05-04 12:00:00	0	78	0	0	**78**	0	0	0	0	**0**	0	121	0	0	**121**	48	0	65	0	**113**	**312**
2023-05-04 12:15:00	0	67	0	0	**67**	0	0	0	0	**0**	0	89	0	0	**89**	37	0	50	0	**87**	**243**
2023-05-04 12:30:00	0	80	0	0	**80**	0	0	0	0	**0**	0	111	0	0	**111**	40	0	24	0	**64**	**255**
2023-05-04 12:45:00	0	85	0	0	**85**	0	0	0	0	**0**	0	115	0	0	**115**	41	0	56	0	**97**	**297**
2023-05-04 16:00:00	0	83	0	0	**83**	0	0	0	0	**0**	0	110	0	0	**110**	59	0	62	0	**121**	**314**
2023-05-04 16:15:00	0	118	0	0	**118**	0	0	0	0	**0**	0	122	0	0	**122**	75	0	77	0	**152**	**392**
2023-05-04 16:30:00	0	102	0	0	**102**	0	0	0	0	**0**	0	134	0	0	**134**	83	0	73	0	**156**	**392**
2023-05-04 16:45:00	0	85	0	0	**85**	0	0	0	0	**0**	0	138	0	0	**138**	96	0	61	0	**157**	**380**
2023-05-04 17:00:00	0	108	0	0	**108**	0	0	0	0	**0**	0	157	0	0	**157**	121	0	70	0	**191**	**456**
2023-05-04 17:15:00	0	102	0	0	**102**	0	0	0	0	**0**	0	123	0	0	**123**	120	0	82	0	**202**	**427**
2023-05-04 17:30:00	0	83	0	0	**83**	0	0	0	0	**0**	0	129	0	0	**129**	76	0	73	0	**149**	**361**
2023-05-04 17:45:00	0	92	0	0	**92**	0	0	0	0	**0**	0	121	0	0	**121**	63	0	67	0	**130**	**343**

AM

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 07:15:00	0	49	0	0	**49**	0	0	0	0	**0**	0	184	0	0	**184**	18	0	38	0	**56**	**289**
2023-05-04 07:30:00	0	78	0	0	**78**	0	0	0	0	**0**	0	241	0	0	**241**	24	0	82	0	**106**	**425**
2023-05-04 07:45:00	0	85	0	0	**85**	0	0	0	0	**0**	0	252	0	0	**252**	31	0	68	0	**99**	**436**
2023-05-04 08:00:00	0	73	0	0	**73**	0	0	0	0	**0**	0	153	0	0	**153**	31	0	55	0	**86**	**312**
Grand Total	0	285	0	0	**285**	0	0	0	0	**0**	0	830	0	0	**830**	104	0	243	0	**347**	**1462**
% HV	0.0%	8.4%	0.0%	0.0%	**8.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	3.1%	0.0%	0.0%	**3.1%**	2.9%	0.0%	4.1%	0.0%	**3.7%**	**4.3%**
% Approach	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		12.5%	0.0%	29.3%	0.0%		
% Total	0.0%	19.5%	0.0%	0.0%	**19.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	56.8%	0.0%	0.0%	**56.8%**	7.1%	0.0%	16.6%	0.0%	**23.7%**	
Lights	0	261	0	0	**261**	0	0	0	0	**0**	0	804	0	0	**804**	101	0	233	0	**334**	**1399**
% Lights	0.0%	91.6%	0.0%	0.0%	**91.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	96.9%	0.0%	0.0%	**96.9%**	97.1%	0.0%	95.9%	0.0%	**96.3%**	**95.7%**
Articulated Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	4	0	**4**	**5**
% Articulated Trucks	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%		**0.0%**	0.0%	0.1%	0.0%	0.0%	**0.1%**	0.0%	0.0%	1.6%	0.0%	**1.2%**	**0.3%**
Buses and Single-Unit Trucks	0	24	0	0	**24**	0	0	0	0	**0**	0	25	0	0	**25**	3	0	6	0	**9**	**58**
% Buses and Single-Unit Trucks	0.0%	8.4%	0.0%	0.0%	**8.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	3.0%	0.0%	0.0%	**3.0%**	2.9%	0.0%	2.5%	0.0%	**2.6%**	**4.0%**

Mid-day

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 12:00:00	0	78	0	0	**78**	0	0	0	0	**0**	0	121	0	0	**121**	48	0	65	0	**113**	**312**
2023-05-04 12:15:00	0	67	0	0	**67**	0	0	0	0	**0**	0	89	0	0	**89**	37	0	50	0	**87**	**243**
2023-05-04 12:30:00	0	80	0	0	**80**	0	0	0	0	**0**	0	111	0	0	**111**	40	0	24	0	**64**	**255**
2023-05-04 12:45:00	0	85	0	0	**85**	0	0	0	0	**0**	0	115	0	0	**115**	41	0	56	0	**97**	**297**
Grand Total	0	310	0	0	**310**	0	0	0	0	**0**	0	436	0	0	**436**	166	0	195	0	**361**	**1107**
% HV	0.0%	2.3%	0.0%	0.0%	**2.3%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	2.3%	0.0%	0.0%	**2.3%**	0.6%	0.0%	4.6%	0.0%	**2.8%**	**2.4%**
% Approach	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		38.1%	0.0%	44.7%	0.0%		
% Total	0.0%	28.0%	0.0%	0.0%	**28.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	39.4%	0.0%	0.0%	**39.4%**	15.0%	0.0%	17.6%	0.0%	**32.6%**	
Lights	0	303	0	0	**303**	0	0	0	0	**0**	0	426	0	0	**426**	165	0	186	0	**351**	**1080**
% Lights	0.0%	97.7%	0.0%	0.0%	**97.7%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	97.7%	0.0%	0.0%	**97.7%**	99.4%	0.0%	95.4%	0.0%	**97.2%**	**97.6%**
Articulated Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	5	0	**5**	**5**
% Articulated Trucks	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	2.6%	0.0%	**1.4%**	**0.5%**
Buses and Single-Unit Trucks	0	7	0	0	**7**	0	0	0	0	**0**	0	10	0	0	**10**	1	0	4	0	**5**	**22**
% Buses and Single-Unit Trucks	0.0%	2.3%	0.0%	0.0%	**2.3%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	2.3%	0.0%	0.0%	**2.3%**	0.6%	0.0%	2.1%	0.0%	**1.4%**	**2.0%**

PM

Leg	20th					28th					20th					Ramp					
Direction	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	Right	Thru	Left	U-Turn	**App Total**	**Int Total**
2023-05-04 16:15:00	0	118	0	0	**118**	0	0	0	0	**0**	0	122	0	0	**122**	75	0	77	0	**152**	**392**
2023-05-04 16:30:00	0	102	0	0	**102**	0	0	0	0	**0**	0	134	0	0	**134**	83	0	73	0	**156**	**392**
2023-05-04 16:45:00	0	85	0	0	**85**	0	0	0	0	**0**	0	138	0	0	**138**	96	0	61	0	**157**	**380**
2023-05-04 17:00:00	0	108	0	0	**108**	0	0	0	0	**0**	0	157	0	0	**157**	121	0	70	0	**191**	**456**
Grand Total	0	413	0	0	**413**	0	0	0	0	**0**	0	551	0	0	**551**	375	0	281	0	**656**	**1620**
% HV	0.0%	3.4%	0.0%	0.0%	**3.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	2.2%	0.0%	0.0%	**2.2%**	1.1%	0.0%	5.0%	0.0%	**2.7%**	**2.7%**
% Approach	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		68.1%	0.0%	51.0%	0.0%		
% Total	0.0%	25.5%	0.0%	0.0%	**25.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	34.0%	0.0%	0.0%	**34.0%**	23.1%	0.0%	17.3%	0.0%	**40.5%**	
Lights	0	399	0	0	**399**	0	0	0	0	**0**	0	539	0	0	**539**	371	0	267	0	**638**	**1576**
% Lights	0.0%	96.6%	0.0%	0.0%	**96.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	97.8%	0.0%	0.0%	**97.8%**	98.9%	0.0%	95.0%	0.0%	**97.3%**	**97.3%**
Articulated Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	6	0	**6**	**6**
% Articulated Trucks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	2.1%	0.0%	**0.9%**	**0.4%**
Buses and Single-Unit Trucks	0	14	0	0	**14**	0	0	0	0	**0**	0	12	0	0	**12**	4	0	8	0	**12**	**38**
% Buses and Single-Unit Trucks	0.0%	3.4%	0.0%	0.0%	**3.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	2.2%	0.0%	0.0%	**2.2%**	1.1%	0.0%	2.8%	0.0%	**1.8%**	**2.3%**

		North Ramp	South Ramp	Total	Hourly	Max	PHF
AM	2023-05-04 07:00:00	267	245	512	3047		
	2023-05-04 07:15:00	368	289	657	3214		
	2023-05-04 07:30:00	503	425	928	3184		
	2023-05-04 07:45:00	514	436	950	2803		
	2023-05-04 08:00:00	367	312	679	2391		
	2023-05-04 08:15:00	356	271	627			
	2023-05-04 08:30:00	297	250	547			
	2023-05-04 08:45:00	296	242	538		3214	0.85
MD	2023-05-04 11:00:00	319	242	561	2253		
	2023-05-04 11:15:00	263	261	524	2342		
	2023-05-04 11:30:00	300	250	550	2331		
	2023-05-04 11:45:00	325	293	618	2333		
	2023-05-04 12:00:00	338	312	650	2349		
	2023-05-04 12:15:00	270	243	513			
	2023-05-04 12:30:00	297	255	552			
	2023-05-04 12:45:00	337	297	634		2349	0.90
PM	2023-05-04 16:00:00	350	314	664	3013		
	2023-05-04 16:15:00	445	392	837	3234		
	2023-05-04 16:30:00	376	392	768	3202		
	2023-05-04 16:45:00	364	380	744	3180		
	2023-05-04 17:00:00	429	456	885	3117		
	2023-05-04 17:15:00	378	427	805			
	2023-05-04 17:30:00	385	361	746			
	2023-05-04 17:45:00	338	343	681		3234	0.91

AADT Estimation

		September			May		
	2021 AADT	2021 AM Peak	2021 PM Peak	Peaks as proportion of AADT	2023 AM Peak	2023 PM Peak	Estimate 2023 AADT
20th St (S of EB Ramp)	22815	1159	1294	0.1000	1219	1339	24810
WB On Ramp	4901	631	568	0.2275	686	511	5100
EB Off Ramp	4367	436	655	0.2323	347	656	4190
28th Ave (E of 20th St)	8527	365	368	0.0799	365	356	8750
	2017 AADT						
20th St (N of WB Ramp)	14400	898	868	0.1102	1095	1124	19530
	2021 Est						
	14900						

Study Name	EB Entrance Rest Area
Project	Fargo_Moorhead_Freeway
Project Code	
Channel Granularity	By Direction
Bin Size	15 minutes
Time Zone	America/Chicago
Start Time	2021-09-14 06:45:00
End Time	2021-09-14 18:15:00
Location	EB Entrance Rest Area
Latitude and Longitude	46.846658,-96.741917
AM Peak	7:30 AM - 8:30 AM (0.667)
PM Peak (Overall Peak Hour)	5 PM - 6 PM (0.714)

Leg	**Lights**	**Buses/SU**	**Combo**	**Total**
Direction				
Start Time	Thru	Thru	Thru	Thru
2021-09-14 06:45:00	2	0	0	2
2021-09-14 07:00:00	3	0	1	4
2021-09-14 07:15:00	1	1	1	3
2021-09-14 07:30:00	1	1	0	2
2021-09-14 07:45:00	5	1	0	6
2021-09-14 08:00:00	1	0	1	2
2021-09-14 08:15:00	6	0	0	6
2021-09-14 16:00:00	5	1	2	8
2021-09-14 16:15:00	3	0	0	3
2021-09-14 16:30:00	2	0	0	2
2021-09-14 16:45:00	3	1	0	4
2021-09-14 17:00:00	4	0	0	4
2021-09-14 17:15:00	7	0	0	7
2021-09-14 17:30:00	3	1	0	4
2021-09-14 17:45:00	5	0	0	5
2021-09-14 18:00:00	2	0	2	4
Grand Total				66
% Approach				100.0%
% Total				100.0%
Lights				53
% Lights				80.3%
Articulated Trucks				7
% Articulated Trucks				10.6%
Buses and Single-Unit Trucks				6
% Buses and Single-Unit Trucks				9.1%

Study Name	EB Exit Rest Area
Project	Fargo_Moorhead_Freeway
Project Code	
Channel Granularity	By Direction
Bin Size	15 minutes
Time Zone	America/Chicago
Start Time	2021-09-14 06:45:00
End Time	2021-09-14 18:15:00
Location	EB Exit Rest Area
Latitude and Longitude	46.846599,-96.740543
AM Peak (Overall Peak Hour)	7 AM - 8 AM (0.781)
PM Peak	5:15 PM - 6:15 PM (0.639)

Leg		**Lights**	**Buses/SU**	**Combo**	**Total**
Direction					
Start Time		Thru	Thru	Thru	Thru
	2021-09-14 06:45:00	2	1	1	4
	2021-09-14 07:00:00	4	0	2	6
	2021-09-14 07:15:00	6	0	1	7
	2021-09-14 07:30:00	2	1	1	4
	2021-09-14 07:45:00	5	2	1	8
	2021-09-14 08:00:00	1	0	0	1
	2021-09-14 08:15:00	3	0	0	3
	2021-09-14 16:00:00	5	0	2	7
	2021-09-14 16:15:00	5	1	0	6
	2021-09-14 16:30:00	3	1	0	4
	2021-09-14 16:45:00	2	0	0	2
	2021-09-14 17:00:00	1	1	0	2
	2021-09-14 17:15:00	5	0	0	5
	2021-09-14 17:30:00	7	2	0	9
	2021-09-14 17:45:00	5	0	0	5
	2021-09-14 18:00:00	3	0	1	4
Grand Total					77
% Approach					100.0%
% Total					100.0%
Lights					59
% Lights					76.6%
Articulated Trucks					9
% Articulated Trucks					11.7%
Buses and Single-Unit Trucks					9
% Buses and Single-Unit Trucks					11.7%

	Ent	Exit	Sum	Roll Peak
2021-09-14 06:45:00	2	4	6	32
2021-09-14 07:00:00	4	6	10	40
2021-09-14 07:15:00	3	7	10	33
2021-09-14 07:30:00	2	4	6	32
2021-09-14 07:45:00	6	8	14	
2021-09-14 08:00:00	2	1	3	
2021-09-14 08:15:00	6	3	9	
2021-09-14 16:00:00	8	7	15	36
2021-09-14 16:15:00	3	6	9	27
2021-09-14 16:30:00	2	4	6	30
2021-09-14 16:45:00	4	2	6	37
2021-09-14 17:00:00	4	2	6	41
2021-09-14 17:15:00	7	5	12	43
2021-09-14 17:30:00	4	9	13	
2021-09-14 17:45:00	5	5	10	
2021-09-14 18:00:00	4	4	8	

APPENDIX J – MNDOT CRASH DATA AND CRASH CALCULATIONS

Crash Summary

20th St & 28th Ave S

Report Version 1.0
February 2020

Crash Severity/Crash Year

Crash Severity	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
K - Fatal	0	0	0	0	0	0	0	0	0	0	0	0
A - Serious Injury	0	0	0	0	0	0	0	0	0	0	0	0
B - Minor Injury	0	0	0	0	0	0	0	0	0	0	0	0
C - Possible Injury	1	0	0	0	0	0	0	1	0	0	0	0
N - Prop Dmg Only	10	0	0	0	0	0	1	0	1	4	4	0
U - Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Total	11	0	0	0	0	0	1	1	1	4	4	0

Crash Severity/Number of Vehicles

Crash Severity	Total	0	1	2	3+
K - Fatal	0	0	0	0	0
A - Serious Injury	0	0	0	0	0
B - Minor Injury	0	0	0	0	0
C - Possible Injury	1	0	0	1	0
N - Prop Dmg Only	10	0	0	10	0
U - Unknown	0	0	0	0	0
Total	11	0	0	11	0

Basic Type Summary

	Total	%
Pedestrian	0	0.0
Bike	0	0.0
Single Vehicle Run Off Road	0	0.0
Single Vehicle Other	0	0.0
Sideswipe Same Direction	1	9.1
Sideswipe Opposing	1	9.1
Rear End	5	45.5
Head On	1	9.1
Left Turn	0	0.0
Angle	3	27.3
Other	0	0.0
Total	11	100.0

First Harmful Event Summary

	Total	%
Pedestrian	0	0.0
Bicyclist	0	0.0
Motor Vehicle In Transport	11	100.0
Parked Motor Vehicle	0	0.0
Train	0	0.0
Deer/Animal	0	0.0
Other - Non Fixed Object	0	0.0
Collision Fixed Object	0	0.0
Non-Collision Harmful Events	0	0.0
Other/Unknown	0	0.0
Total	11	100.0

Relationship to Intersection Summary

	Total	%
Not at Intersection/Interchange	2	18.2
Four-Way Intersection	4	36.4
T or Y Intersection	0	0.0
Five-Way Intersection or More	0	0.0
Roundabout	0	0.0
Intersection Related	2	18.2
Driveway Access Related	0	0.0
At School Crossing	0	0.0
Railway Grade Crossing	0	0.0
Shared Use Path or Trail	0	0.0
Interchange or Ramp	2	18.2
Crossover Related	0	0.0
Acceleration/Deceleration Lane	0	0.0
Other/Unknown	1	9.1
Total	11	100.0

Weather 1 Summary

	Total	%
Clear	6	54.5
Cloudy	4	36.4
Rain	0	0.0
Snow	0	0.0
Sleet, Hail (Freezing Rain/Drizzle)	0	0.0
Fog/Smog/Smoke	0	0.0
Blowing Sand/Soil/Dirt/Snow	1	9.1
Severe Crosswinds	0	0.0
Other/Unknown	0	0.0
Total	11	100.0

Light Condition Summary

	Total	%
Daylight	8	72.7
Sunrise	2	18.2
Sunset	0	0.0
Dark (Str Lights On)	1	9.1
Dark (Str Lights Off)	0	0.0
Dark (No Str Lights)	0	0.0
Dark (Unknown Light)	0	0.0
Other/Unknown	0	0.0
Total	11	100.0

Crash Summary

20th St & 28th Ave S

Report Version 1.0
February 2020

Time of Day/Day of Week

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	Total	%
SUN	0	0	0	0	0	1	0	0	0	0	0	0	1	9.1
MON	0	0	0	1	0	0	0	0	0	0	0	0	1	9.1
TUE	0	0	0	1	0	1	0	0	0	0	0	0	2	18.2
WED	0	0	0	0	0	0	1	0	0	0	0	0	1	9.1
THU	0	0	0	0	1	0	1	0	0	1	0	0	3	27.3
FRI	0	0	0	1	1	0	1	0	0	0	0	0	3	27.3
SAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Total	0	0	0	3	2	2	3	0	0	1	0	0	11	100.0
%	0.0	0.0	0.0	27.3	18.2	18.2	27.3	0.0	0.0	9.1	0.0	0.0	100.0	100.0

Driver & Non-Motorist Age/Gender Summary

Age	M	F	NR	No Value	Total	%
<14	0	0	0	0	0	0.0
14	0	0	0	0	0	0.0
15	0	0	0	0	0	0.0
16	0	0	0	0	0	0.0
17	0	0	0	0	0	0.0
18	0	0	0	0	0	0.0
19	0	0	0	0	0	0.0
20	1	0	0	0	1	4.5
21-24	0	1	0	0	1	4.5
25-29	1	0	0	0	1	4.5
30-34	3	1	0	0	4	18.2
35-39	1	4	0	0	5	22.7
40-44	2	1	0	0	3	13.6
45-49	0	0	0	0	0	0.0
50-54	2	1	0	0	3	13.6
55-59	1	1	0	0	2	9.1
60-64	0	1	0	0	1	4.5
65-69	0	0	0	0	0	0.0
70-74	0	0	0	0	0	0.0
75-79	1	0	0	0	1	4.5
80-84	0	0	0	0	0	0.0
85-89	0	0	0	0	0	0.0
90-94	0	0	0	0	0	0.0
95+	0	0	0	0	0	0.0
No Value	0	0	0	0	0	0.0
Total	12	10	0	0	22	100.0
%	54.5	45.5	0.0	0.0	100.0	100.0

Month Summary

Month Summary	Total	%
January	3	27.3
February	0	0.0
March	0	0.0
April	2	18.2
May	1	9.1
June	0	0.0
July	0	0.0
August	2	18.2
September	1	9.1
October	0	0.0
November	0	0.0
December	2	18.2
Total	11	100.0

Physical Condition Summary

Physical Condition Summary	Total	%
Apparently Normal (Including No Drugs/Alcohol)	22	100.0
Physical Disability (Short Term or Long Term)	0	0.0
Medical Issue (Ill, Sick or Fainted)	0	0.0
Emotional (Depression, Angry, Disturbed, etc.)	0	0.0
Asleep or Fatigued	0	0.0
Has Been Drinking Alcohol	0	0.0
Has Been Taking Illicit Drugs	0	0.0
Has Been Taking Medications	0	0.0
Other/Unknown	0	0.0
Not Applicable	0	0.0
Total	22	100.0

Selection Filter:

WORK AREA: State - FILTER: Year('2018','2019','2020','2021','2022') - SPATIAL FILTER APPLIED

Analyst:

Adam Capets

Notes:

Intersection Safety Screening

Intersection: 20th St & 28th Ave S

Statewide Averages based on 2016-2020 crashes

Crashes by Crash Severity	
Fatal (K)	0
Serious Injury (A)	0
Minor Injury (B)	0
Possible Injury (C)	1
Property Damage (PDO)	10
Total Crashes	11

Intersection Characteristics	
Entering Volume	22,871
Environment	Urban
Lighting	Lit
Traffic Control	Signal

Annual crash cost = $50,000

Statewide comparison = Signal, High Volume (>20K)

Total Crash Rate	
Observed	0.263
Statewide Average	0.592
Critical Rate	0.910
Critical Index	**0.29**

Fatal & Serious Injury Crash Rate	
Observed	0.000
Statewide Average	0.824
Critical Rate	3.820
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference (i.e. observed crash rate ÷ critical crash rate).

The observed total crash rate for this period is 0.26 per MEV; this is 71% below the critical rate. Based on similar statewide intersections, an additional 28 crashes over the five years would indicate this intersection operates outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Crash Summary

20th St & EB Off Ramp

Report Version 1.0
February 2020

Crash Severity/Crash Year

Crash Severity	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
K - Fatal	0	0	0	0	0	0	0	0	0	0	0	0
A - Serious Injury	0	0	0	0	0	0	0	0	0	0	0	0
B - Minor Injury	0	0	0	0	0	0	0	0	0	0	0	0
C - Possible Injury	2	0	0	0	0	0	0	1	0	1	0	0
N - Prop Dmg Only	6	0	0	0	0	0	1	0	1	3	1	0
U - Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	0	0	0	0	0	1	1	1	4	1	0

Crash Severity/Number of Vehicles

Crash Severity	Total	0	1	2	3+
K - Fatal	0	0	0	0	0
A - Serious Injury	0	0	0	0	0
B - Minor Injury	0	0	0	0	0
C - Possible Injury	2	0	0	2	0
N - Prop Dmg Only	6	0	0	6	0
U - Unknown	0	0	0	0	0
Total	8	0	0	8	0

Basic Type Summary

	Total	%
Pedestrian	0	0.0
Bike	0	0.0
Single Vehicle Run Off Road	0	0.0
Single Vehicle Other	0	0.0
Sideswipe Same Direction	1	12.5
Sideswipe Opposing	0	0.0
Rear End	5	62.5
Head On	0	0.0
Left Turn	0	0.0
Angle	2	25.0
Other	0	0.0
Total	8	100.0

First Harmful Event Summary

	Total	%
Pedestrian	0	0.0
Bicyclist	0	0.0
Motor Vehicle In Transport	8	100.0
Parked Motor Vehicle	0	0.0
Train	0	0.0
Deer/Animal	0	0.0
Other - Non Fixed Object	0	0.0
Collision Fixed Object	0	0.0
Non-Collision Harmful Events	0	0.0
Other/Unknown	0	0.0
Total	8	100.0

Relationship to Intersection Summary

	Total	%
Not at Intersection/Interchange	0	0.0
Four-Way Intersection	0	0.0
T or Y Intersection	5	62.5
Five-Way Intersection or More	0	0.0
Roundabout	0	0.0
Intersection Related	0	0.0
Driveway Access Related	0	0.0
At School Crossing	0	0.0
Railway Grade Crossing	0	0.0
Shared Use Path or Trail	0	0.0
Interchange or Ramp	3	37.5
Crossover Related	0	0.0
Acceleration/Deceleration Lane	0	0.0
Other/Unknown	0	0.0
Total	8	100.0

Weather 1 Summary

	Total	%
Clear	7	87.5
Cloudy	0	0.0
Rain	0	0.0
Snow	1	12.5
Sleet, Hail (Freezing Rain/Drizzle)	0	0.0
Fog/Smog/Smoke	0	0.0
Blowing Sand/Soil/Dirt/Snow	0	0.0
Severe Crosswinds	0	0.0
Other/Unknown	0	0.0
Total	8	100.0

Light Condition Summary

	Total	%
Daylight	5	62.5
Sunrise	1	12.5
Sunset	0	0.0
Dark (Str Lights On)	2	25.0
Dark (Str Lights Off)	0	0.0
Dark (No Str Lights)	0	0.0
Dark (Unknown Light)	0	0.0
Other/Unknown	0	0.0
Total	8	100.0

Crash Summary

20th St & EB Off Ramp

Time of Day/Day of Week

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	Total	%
SUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
MON	0	0	0	1	0	0	0	0	0	0	0	0	1	12.5
TUE	0	0	1	0	0	1	0	0	0	0	0	0	2	25.0
WED	0	0	0	0	0	0	0	1	1	0	0	0	2	25.0
THU	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
FRI	0	0	0	0	0	0	0	0	1	1	0	0	2	25.0
SAT	1	0	0	0	0	0	0	0	0	0	0	0	1	12.5
Total	1	0	1	1	0	1	0	1	2	1	0	0	8	100.0
%	12.5	0.0	12.5	12.5	0.0	12.5	0.0	12.5	25.0	12.5	0.0	0.0	100.0	100.0

Driver & Non-Motorist Age/Gender Summary

Age	M	F	NR	No Value	Total	%
<14	0	0	0	0	0	0.0
14	0	0	0	0	0	0.0
15	0	0	0	0	0	0.0
16	0	0	0	0	0	0.0
17	0	0	0	0	0	0.0
18	0	1	0	0	1	6.2
19	0	0	0	0	0	0.0
20	0	1	0	0	1	6.2
21-24	4	1	0	0	5	31.2
25-29	2	0	0	0	2	12.5
30-34	1	1	0	0	2	12.5
35-39	1	0	0	0	1	6.2
40-44	0	1	0	0	1	6.2
45-49	0	0	0	0	0	0.0
50-54	0	0	0	0	0	0.0
55-59	0	1	0	0	1	6.2
60-64	1	0	0	0	1	6.2
65-69	0	1	0	0	1	6.2
70-74	0	0	0	0	0	0.0
75-79	0	0	0	0	0	0.0
80-84	0	0	0	0	0	0.0
85-89	0	0	0	0	0	0.0
90-94	0	0	0	0	0	0.0
95+	0	0	0	0	0	0.0
No Value	0	0	0	0	0	0.0
Total	9	7	0	0	16	100.0
%	56.2	43.8	0.0	0.0	100.0	100.0

Month Summary

Month Summary	Total	%
January	0	0.0
February	0	0.0
March	0	0.0
April	0	0.0
May	1	12.5
June	0	0.0
July	1	12.5
August	0	0.0
September	0	0.0
October	2	25.0
November	1	12.5
December	3	37.5
Total	8	100.0

Physical Condition Summary

Physical Condition Summary	Total	%
Apparently Normal (Including No Drugs/Alcohol)	13	81.2
Physical Disability (Short Term or Long Term)	0	0.0
Medical Issue (Ill, Sick or Fainted)	0	0.0
Emotional (Depression, Angry, Disturbed, etc.)	1	6.2
Asleep or Fatigued	0	0.0
Has Been Drinking Alcohol	2	12.5
Has Been Taking Illicit Drugs	0	0.0
Has Been Taking Medications	0	0.0
Other/Unknown	0	0.0
Not Applicable	0	0.0
Total	16	100.0

Selection Filter:

WORK AREA: State - FILTER: Status Note('Under $1000','30 Day Rule','Reportable'), Year('2018','2019','2020','2021','2022') - SPATIAL FILTER APPLIED

Analyst: Adam Capets

Notes:

Intersection Safety Screening

Intersection: 20th St & EB off Ramp

Statewide Averages based on 2016-2020 crashes

Crashes by Crash Severity	
Fatal (K)	0
Serious Injury (A)	0
Minor Injury (B)	0
Possible Injury (C)	2
Property Damage (PDO)	6
Total Crashes	8

Intersection Characteristics	
Entering Volume	27,182
Environment	Urban
Lighting	Lit
Traffic Control	Signal

Annual crash cost = $63,600

Statewide comparison = Signal, High Volume (>20K)

Total Crash Rate	
Observed	0.161
Statewide Average	0.592
Critical Rate	0.880
Critical Index	**0.18**

Fatal & Serious Injury Crash Rate	
Observed	0.000
Statewide Average	0.824
Critical Rate	3.480
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference (i.e. observed crash rate ÷ critical crash rate).

The observed total crash rate for this period is 0.16 per MEV; this is 82% below the critical rate. Based on similar statewide intersections, an additional 36 crashes over the five years would indicate this intersection operates outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Crash Summary

East I-94

Crash Severity/Crash Year

Crash Severity	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
K - Fatal	1	0	0	0	0	0	0	0	0	0	1	0
A - Serious Injury	1	0	0	0	0	0	0	0	1	0	0	0
B - Minor Injury	6	0	0	0	0	0	1	2	2	1	0	0
C - Possible Injury	2	0	0	0	0	0	2	0	0	0	0	0
N - Prop Dmg Only	37	0	0	0	0	0	11	7	2	9	8	0
U - Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Total	47	0	0	0	0	0	14	9	5	10	9	0

Crash Severity/Number of Vehicles

Crash Severity	Total	0	1	2	3+
K - Fatal	1	0	0	0	1
A - Serious Injury	1	0	1	0	0
B - Minor Injury	6	0	4	1	1
C - Possible Injury	2	0	1	0	1
N - Prop Dmg Only	37	0	24	11	2
U - Unknown	0	0	0	0	0
Total	47	0	30	12	5

Basic Type Summary

	Total	%
Pedestrian	0	0.0
Bike	0	0.0
Single Vehicle Run Off Road	30	63.8
Single Vehicle Other	0	0.0
Sideswipe Same Direction	8	17.0
Sideswipe Opposing	0	0.0
Rear End	9	19.1
Head On	0	0.0
Left Turn	0	0.0
Angle	0	0.0
Other	0	0.0
Total	47	100.0

First Harmful Event Summary

	Total	%
Pedestrian	0	0.0
Bicyclist	0	0.0
Motor Vehicle In Transport	17	36.2
Parked Motor Vehicle	0	0.0
Train	0	0.0
Deer/Animal	0	0.0
Other - Non Fixed Object	0	0.0
Collision Fixed Object	24	51.1
Non-Collision Harmful Events	6	12.8
Other/Unknown	0	0.0
Total	47	100.0

Relationship to Intersection Summary

	Total	%
Not at Intersection/Interchange	43	91.5
Four-Way Intersection	0	0.0
T or Y Intersection	0	0.0
Five-Way Intersection or More	0	0.0
Roundabout	0	0.0
Intersection Related	0	0.0
Driveway Access Related	0	0.0
At School Crossing	0	0.0
Railway Grade Crossing	0	0.0
Shared Use Path or Trail	0	0.0
Interchange or Ramp	4	8.5
Crossover Related	0	0.0
Acceleration/Deceleration Lane	0	0.0
Other/Unknown	0	0.0
Total	47	100.0

Weather 1 Summary

	Total	%
Clear	23	48.9
Cloudy	4	8.5
Rain	0	0.0
Snow	12	25.5
Sleet, Hail (Freezing Rain/Drizzle)	0	0.0
Fog/Smog/Smoke	0	0.0
Blowing Sand/Soil/Dirt/Snow	8	17.0
Severe Crosswinds	0	0.0
Other/Unknown	0	0.0
Total	47	100.0

Light Condition Summary

	Total	%
Daylight	31	66.0
Sunrise	0	0.0
Sunset	0	0.0
Dark (Str Lights On)	11	23.4
Dark (Str Lights Off)	1	2.1
Dark (No Str Lights)	4	8.5
Dark (Unknown Light)	0	0.0
Other/Unknown	0	0.0
Total	47	100.0

Crash Summary

East I-94

Time of Day/Day of Week

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	Total	%
SUN	0	0	1	0	0	1	1	2	1	2	0	0	8	17.0
MON	0	0	1	0	3	1	0	0	1	1	0	0	7	14.9
TUE	0	0	0	1	0	0	1	2	1	0	1	0	6	12.8
WED	0	1	0	0	1	0	0	1	0	0	0	0	3	6.4
THU	1	0	0	1	1	1	1	0	1	0	0	0	6	12.8
FRI	0	0	1	0	0	2	2	2	1	0	0	0	8	17.0
SAT	0	0	1	1	0	3	0	1	0	1	1	1	9	19.1
Total	1	1	4	3	5	8	5	8	5	4	2	1	47	100.0
%	2.1	2.1	8.5	6.4	10.6	17.0	10.6	17.0	10.6	8.5	4.3	2.1	100.0	100.0

Driver & Non-Motorist Age/Gender Summary

Age	M	F	NR	No Value	Total	%
<14	0	0	0	0	0	0.0
14	0	0	0	0	0	0.0
15	0	0	0	0	0	0.0
16	1	2	0	0	3	4.3
17	1	0	0	0	1	1.4
18	1	1	0	0	2	2.9
19	0	2	0	0	2	2.9
20	0	0	0	0	0	0.0
21-24	2	6	0	0	8	11.6
25-29	7	3	0	0	10	14.5
30-34	4	0	0	0	4	5.8
35-39	4	3	0	0	7	10.1
40-44	2	3	0	0	5	7.2
45-49	5	2	0	0	7	10.1
50-54	5	0	0	0	5	7.2
55-59	2	1	0	0	3	4.3
60-64	5	1	0	0	6	8.7
65-69	2	0	0	0	2	2.9
70-74	0	1	0	0	1	1.4
75-79	0	1	0	0	1	1.4
80-84	0	0	0	0	0	0.0
85-89	0	0	0	0	0	0.0
90-94	0	0	0	0	0	0.0
95+	0	0	0	0	0	0.0
No Value	0	0	0	2	2	2.9
Total	41	26	0	2	69	100.0
%	59.4	37.7	0.0	2.9	100.0	100.0

Month Summary

Month Summary	Total	%
January	9	19.1
February	2	4.3
March	3	6.4
April	3	6.4
May	1	2.1
June	3	6.4
July	2	4.3
August	3	6.4
September	3	6.4
October	1	2.1
November	4	8.5
December	13	27.7
Total	47	100.0

Physical Condition Summary

Physical Condition Summary	Total	%
Apparently Normal (Including No Drugs/Alcohol)	61	91.0
Physical Disability (Short Term or Long Term)	0	0.0
Medical Issue (Ill, Sick or Fainted)	0	0.0
Emotional (Depression, Angry, Disturbed, etc.)	1	1.5
Asleep or Fatigued	1	1.5
Has Been Drinking Alcohol	4	6.0
Has Been Taking Illicit Drugs	0	0.0
Has Been Taking Medications	0	0.0
Other/Unknown	0	0.0
Not Applicable	0	0.0
Total	67	100.0

Selection Filter:

WORK AREA: State - FILTER: Year('2018','2019','2020','2021','2022'), Status Note('Under $1000','30 Day Rule','Reportable') - SPATIAL FILTER APPLIED

Analyst: Adam Capets

Notes:

Segment Safety Screening

Segment: Mainline I-94 EAST

Statewide Averages based on 2016-2020 crashes

Crashes by Crash Severity	
Fatal (K)	1
Incapacitating Injury (A)	1
Minor Injury (B)	6
Possible Injury (C)	2
Property Damage (PDO)	37
Total Crashes	47

Analysis Description	
Length	1.034 miles
VMT	73,334,451
Non-junction AND Junction Crashes	

Annual crash cost per mile = *$812,501*

Statewide comparison = *Urban Freeway*

Total Crash Rate (CR)	
Observed	0.641
Statewide Average	0.944
Critical Rate	1.240
Critical Index	**0.52**

Fatal & Serious Injury Crash Rate (FAR)	
Observed	2.727
Statewide Average	0.592
Critical Rate	2.430
Critical Index	**1.12**

The observed crash rate is the number of crashes per million vehicle miles traveled (MVMT). The critical rate is a statistical comparison based on similar trunk highways statewide. An observed crash rate greater than the critical rate indicates that the section operates outside the expected, normal range. The critical index reports the magnitude of this difference (i.e. observed crash rate ÷ critical crash rate).

The observed total crash rate for this period is 0.64 per MVMT; this is 48% below the critical rate. Based on similar statewide segments, an additional 44 crashes over the five years would indicate this section operates outside the normal range.

The observed fatal and serious injury crash rate for this period is 2.73 per 100 MVMT; this is 1.1 times the critical rate. This section may be a sustained severe crash location.

Crash Summary

West I-94

Crash Severity/Crash Year

Crash Severity	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
K - Fatal	0	0	0	0	0	0	0	0	0	0	0	0
A - Serious Injury	0	0	0	0	0	0	0	0	0	0	0	0
B - Minor Injury	2	0	0	0	0	0	1	0	0	0	1	0
C - Possible Injury	5	0	0	0	0	0	0	0	2	1	2	0
N - Prop Dmg Only	43	0	0	0	0	0	8	13	3	5	14	0
U - Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Total	50	0	0	0	0	0	9	13	5	6	17	0

Crash Severity/Number of Vehicles

Crash Severity	Total	0	1	2	3+
K - Fatal	0	0	0	0	0
A - Serious Injury	0	0	0	0	0
B - Minor Injury	2	0	1	1	0
C - Possible Injury	5	0	1	3	1
N - Prop Dmg Only	43	0	27	13	3
U - Unknown	0	0	0	0	0
Total	50	0	29	17	4

Basic Type Summary

	Total	%
Pedestrian	0	0.0
Bike	0	0.0
Single Vehicle Run Off Road	27	54.0
Single Vehicle Other	2	4.0
Sideswipe Same Direction	5	10.0
Sideswipe Opposing	1	2.0
Rear End	15	30.0
Head On	0	0.0
Left Turn	0	0.0
Angle	0	0.0
Other	0	0.0
Total	50	100.0

First Harmful Event Summary

	Total	%
Pedestrian	0	0.0
Bicyclist	0	0.0
Motor Vehicle In Transport	21	42.0
Parked Motor Vehicle	0	0.0
Train	0	0.0
Deer/Animal	0	0.0
Other - Non Fixed Object	0	0.0
Collision Fixed Object	25	50.0
Non-Collision Harmful Events	4	8.0
Other/Unknown	0	0.0
Total	50	100.0

Relationship to Intersection Summary

	Total	%
Not at Intersection/Interchange	44	88.0
Four-Way Intersection	0	0.0
T or Y Intersection	0	0.0
Five-Way Intersection or More	0	0.0
Roundabout	0	0.0
Intersection Related	0	0.0
Driveway Access Related	0	0.0
At School Crossing	0	0.0
Railway Grade Crossing	0	0.0
Shared Use Path or Trail	0	0.0
Interchange or Ramp	6	12.0
Crossover Related	0	0.0
Acceleration/Deceleration Lane	0	0.0
Other/Unknown	0	0.0
Total	50	100.0

Weather 1 Summary

	Total	%
Clear	23	46.0
Cloudy	9	18.0
Rain	3	6.0
Snow	10	20.0
Sleet, Hail (Freezing Rain/Drizzle)	0	0.0
Fog/Smog/Smoke	0	0.0
Blowing Sand/Soil/Dirt/Snow	5	10.0
Severe Crosswinds	0	0.0
Other/Unknown	0	0.0
Total	50	100.0

Light Condition Summary

	Total	%
Daylight	33	66.0
Sunrise	2	4.0
Sunset	0	0.0
Dark (Str Lights On)	13	26.0
Dark (Str Lights Off)	0	0.0
Dark (No Str Lights)	2	4.0
Dark (Unknown Light)	0	0.0
Other/Unknown	0	0.0
Total	50	100.0

Crash Summary

West I-94

Time of Day/Day of Week

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	Total	%
SUN	1	0	0	0	0	1	1	1	1	0	1	1	7	14.0
MON	0	0	0	0	1	1	0	0	3	1	1	0	7	14.0
TUE	0	0	0	2	1	2	0	0	0	1	0	0	6	12.0
WED	0	0	0	1	3	0	0	1	0	0	1	0	6	12.0
THU	0	0	0	2	1	1	1	1	0	0	1	1	8	16.0
FRI	0	1	0	0	3	2	1	1	1	0	0	0	9	18.0
SAT	0	0	0	0	2	0	2	0	1	1	1	0	7	14.0
Total	1	1	0	5	11	7	5	4	6	3	5	2	50	100.0
%	2.0	2.0	0.0	10.0	22.0	14.0	10.0	8.0	12.0	6.0	10.0	4.0	100.0	100.0

Driver & Non-Motorist Age/Gender Summary

Age	M	F	NR	No Value	Total	%
<14	0	0	0	0	0	0.0
14	0	0	0	0	0	0.0
15	0	0	0	0	0	0.0
16	1	2	0	0	3	4.0
17	1	0	0	0	1	1.3
18	4	1	0	0	5	6.7
19	2	1	0	0	3	4.0
20	4	1	0	0	5	6.7
21-24	4	3	0	0	7	9.3
25-29	8	6	0	0	14	18.7
30-34	3	6	0	0	9	12.0
35-39	4	3	0	1	8	10.7
40-44	1	2	0	0	3	4.0
45-49	2	1	0	0	3	4.0
50-54	1	2	0	0	3	4.0
55-59	2	1	0	0	3	4.0
60-64	2	0	0	0	2	2.7
65-69	1	0	0	0	1	1.3
70-74	0	1	0	0	1	1.3
75-79	0	1	0	0	1	1.3
80-84	0	0	0	0	0	0.0
85-89	1	0	0	0	1	1.3
90-94	0	0	0	0	0	0.0
95+	0	0	0	0	0	0.0
No Value	0	0	0	2	2	2.7
Total	41	31	0	3	75	100.0
%	54.7	41.3	0.0	4.0	100.0	100.0

Month Summary

Month Summary	Total	%
January	8	16.0
February	8	16.0
March	5	10.0
April	1	2.0
May	3	6.0
June	3	6.0
July	4	8.0
August	0	0.0
September	3	6.0
October	3	6.0
November	1	2.0
December	11	22.0
Total	50	100.0

Physical Condition Summary

Physical Condition Summary	Total	%
Apparently Normal (Including No Drugs/Alcohol)	71	97.3
Physical Disability (Short Term or Long Term)	0	0.0
Medical Issue (Ill, Sick or Fainted)	0	0.0
Emotional (Depression, Angry, Disturbed, etc.)	0	0.0
Asleep or Fatigued	0	0.0
Has Been Drinking Alcohol	0	0.0
Has Been Taking Illicit Drugs	0	0.0
Has Been Taking Medications	0	0.0
Other/Unknown	2	2.7
Not Applicable	0	0.0
Total	73	100.0

Selection Filter:

WORK AREA: State - FILTER: Year('2018','2019','2020','2021','2022'), Status Note('Under $1000','30 Day Rule','Reportable') - SPATIAL FILTER APPLIED

Analyst: Adam Capets

Notes:

Segment Safety Screening

Segment: Mainline I-94 WEST

Statewide Averages based on 2016-2020 crashes

Crashes by Crash Severity	
Fatal (K)	0
Incapacitating Injury (A)	0
Minor Injury (B)	2
Possible Injury (C)	5
Property Damage (PDO)	43
Total Crashes	50

Analysis Description	
Length	0.549 miles
VMT	57,004,891
Non-junction AND Junction Crashes	

Annual crash cost per mile = $582,257

Statewide comparison = Urban Freeway

Total Crash Rate (CR)	
Observed	0.877
Statewide Average	0.944
Critical Rate	1.280
Critical Index	**0.69**

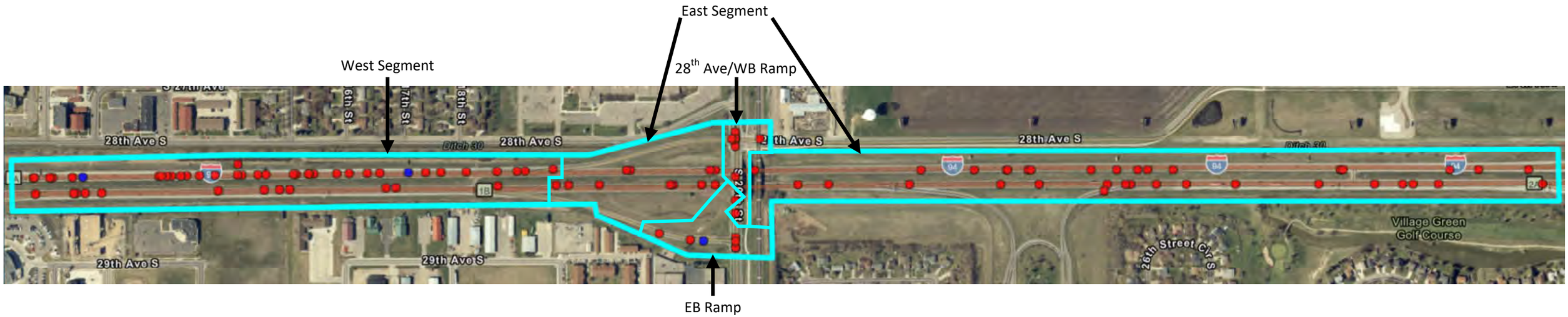
Fatal & Serious Injury Crash Rate (FAR)	
Observed	0.000
Statewide Average	0.592
Critical Rate	2.780
Critical Index	**0.00**

The observed crash rate is the number of crashes per million vehicle miles traveled (MVMT). The critical rate is a statistical comparison based on similar trunk highways statewide. An observed crash rate greater than the critical rate indicates that the section operates outside the expected, normal range. The critical index reports the magnitude of this difference (i.e. observed crash rate ÷ critical crash rate).

The observed total crash rate for this period is 0.88 per MVMT; this is 31% below the critical rate. Based on similar statewide segments, an additional 23 crashes over the five years would indicate this section operates outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MVMT; this is 100% below the critical rate. The section operates within the normal range.

Crash Map


West Segment
East Segment
28th Ave/WB Ramp
EB Ramp
28th Ave S
6th St
7th St
8th St
Ditch 30
29th Ave S
94
Village Green
Golf Course
26th Street Cir S

APPENDIX K – EXISTING ZONING AND FUTURE LAND USE

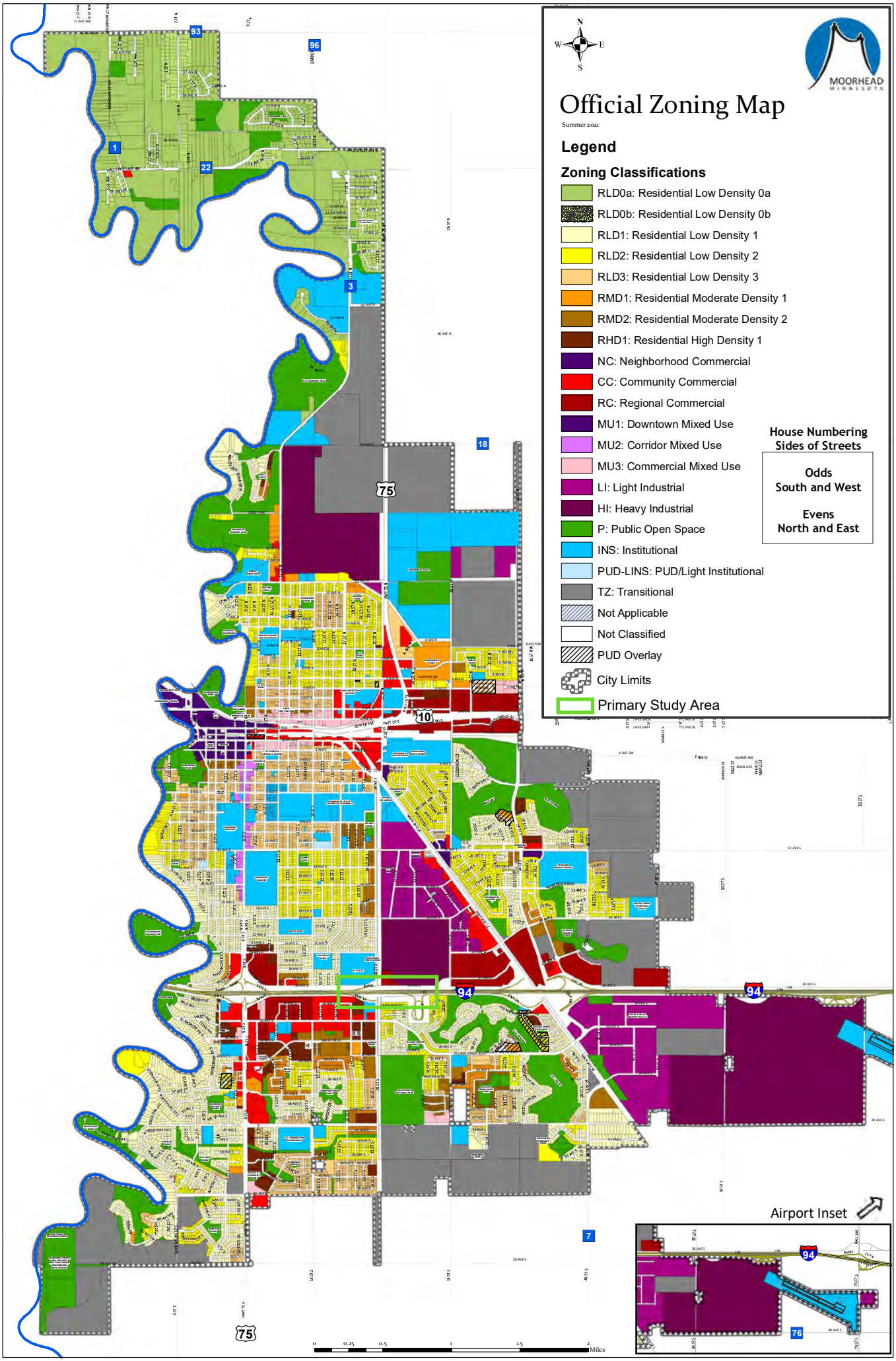
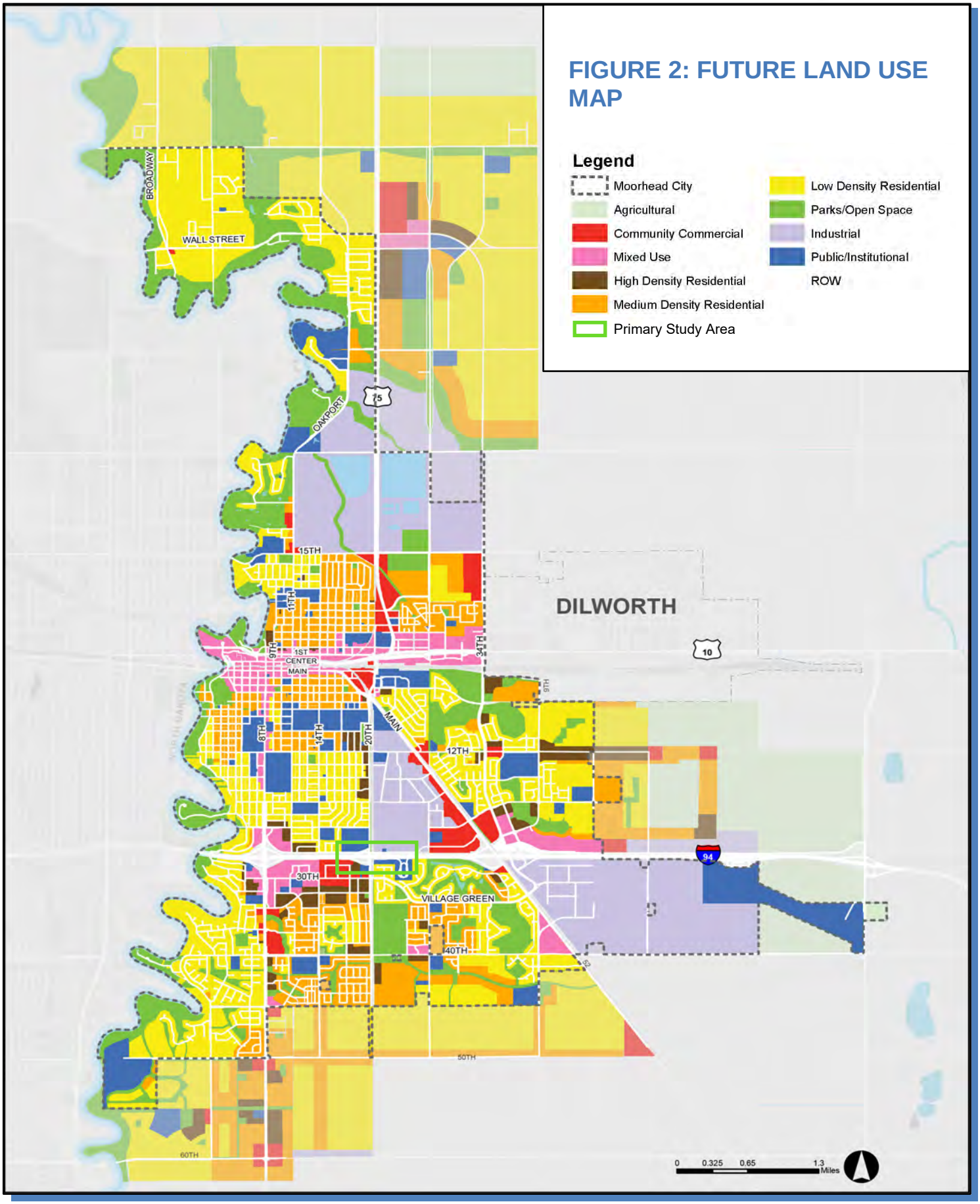

Official Zoning Map
Summer 2021
Legend
Zoning Classifications
RLD0a: Residential Low Density 0a
RLD0b: Residential Low Density 0b
RLD1: Residential Low Density 1
RLD2: Residential Low Density 2
RLD3: Residential Low Density 3
RMD1: Residential Moderate Density 1
RMD2: Residential Moderate Density 2
RHD1: Residential High Density 1
NC: Neighborhood Commercial
CC: Community Commercial
RC: Regional Commercial
MU1: Downtown Mixed Use
MU2: Corridor Mixed Use
MU3: Commercial Mixed Use
LI: Light Industrial
HI: Heavy Industrial
P: Public Open Space
INS: Institutional
PUD-LINS: PUD/Light Institutional
TZ: Transitional
Not Applicable
Not Classified
PUD Overlay
City Limits
Primary Study Area
House Numbering
Sides of Streets
Odds
South and West
Evens
North and East
MOORHEAD
MINNESOTA
Airport Inset
0 0.25 0.5 1 1.5 2 Miles

FIGURE 2: FUTURE LAND USE MAP



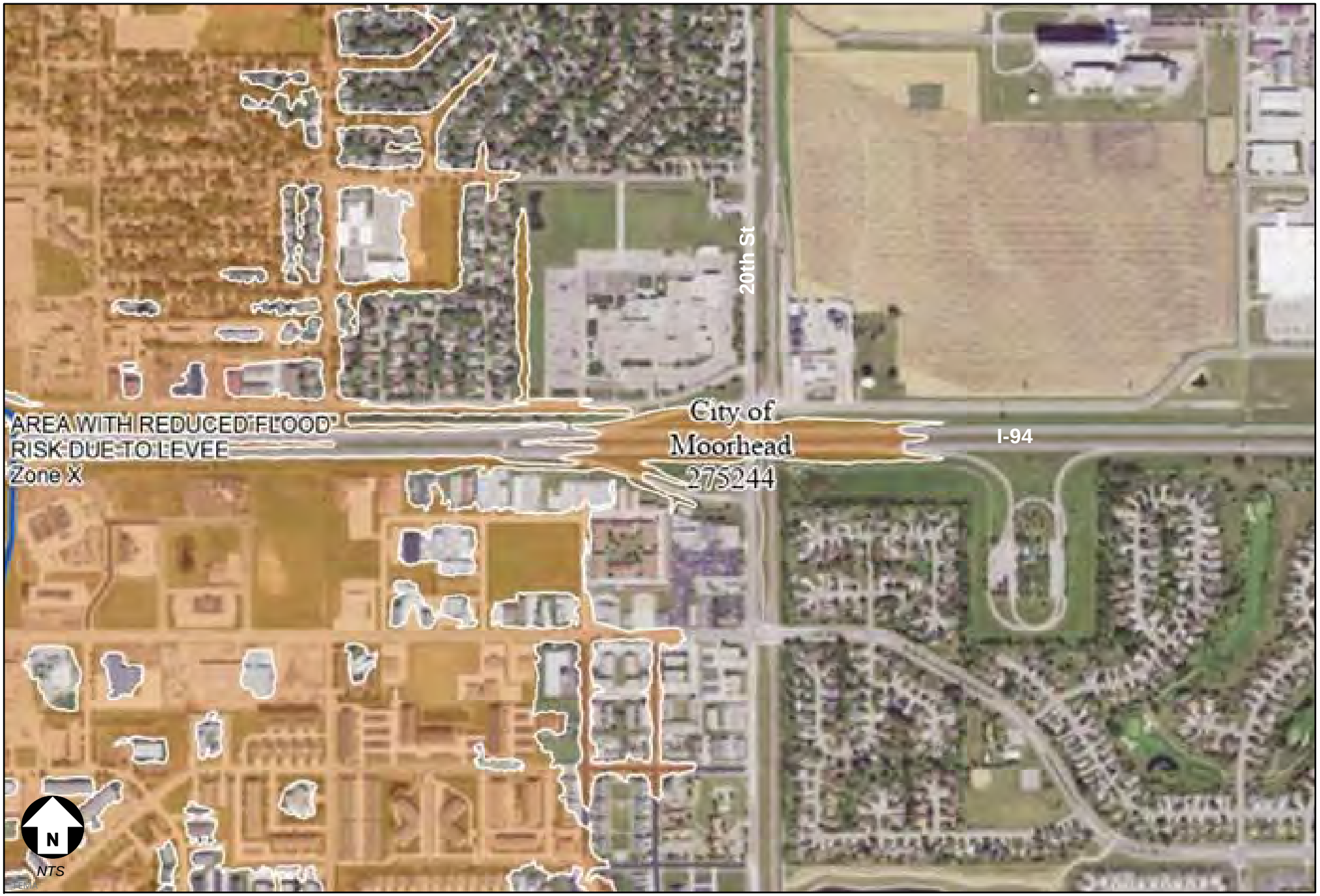
APPENDIX L – ENVIRONMENTAL MAPS AND DATA

Wetlands

Appendix L.1

I-94 & 20th Street Interchange Analysis
Moorhead, Minnesota

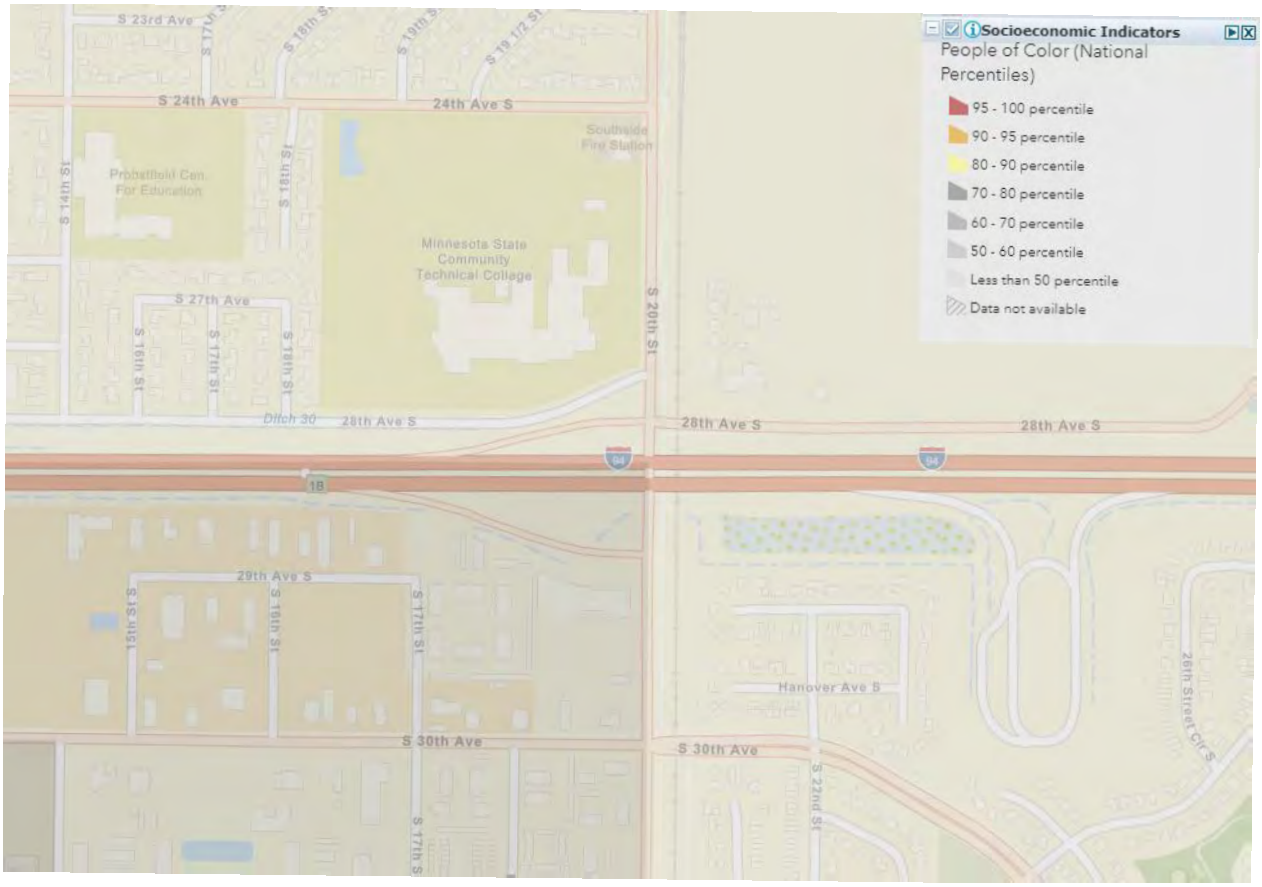
Stantec

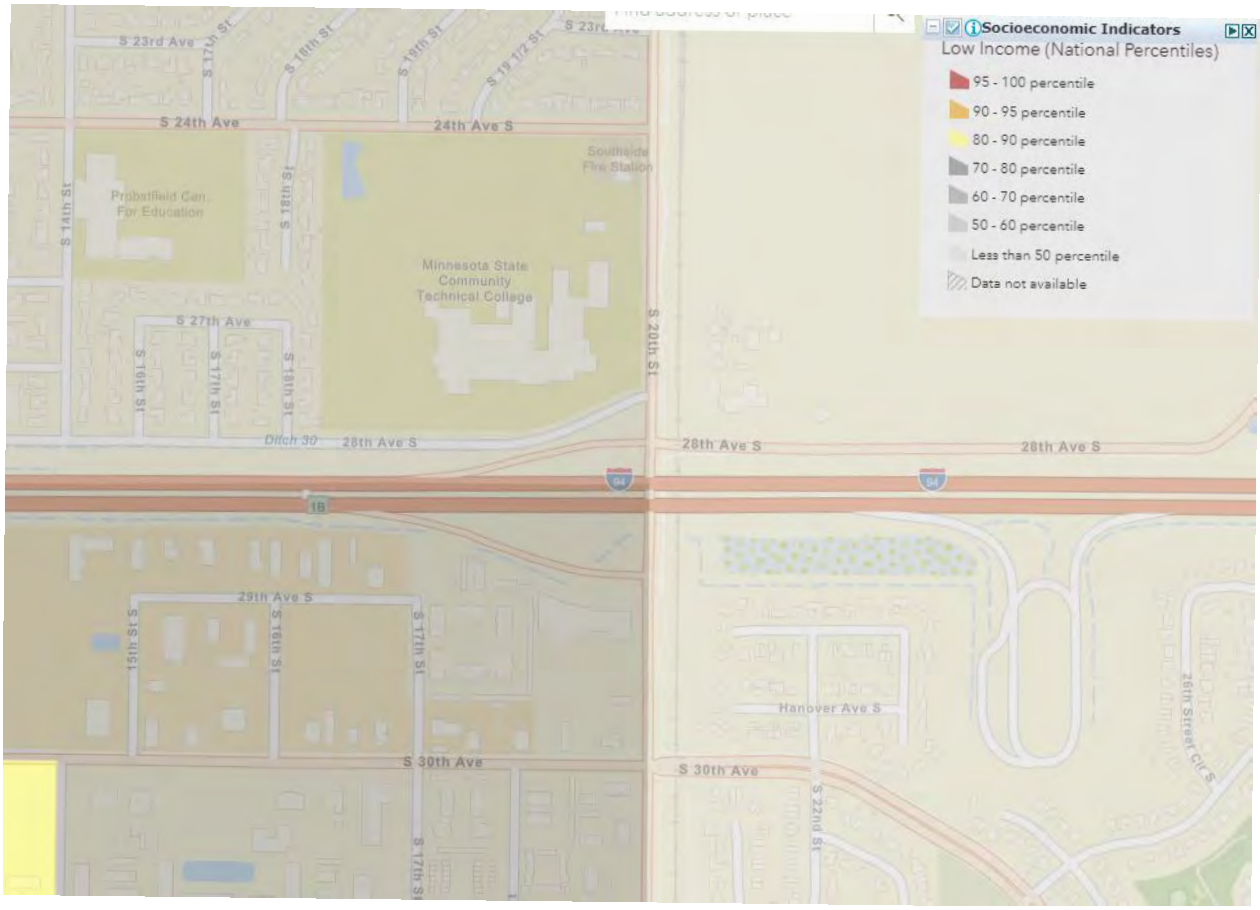


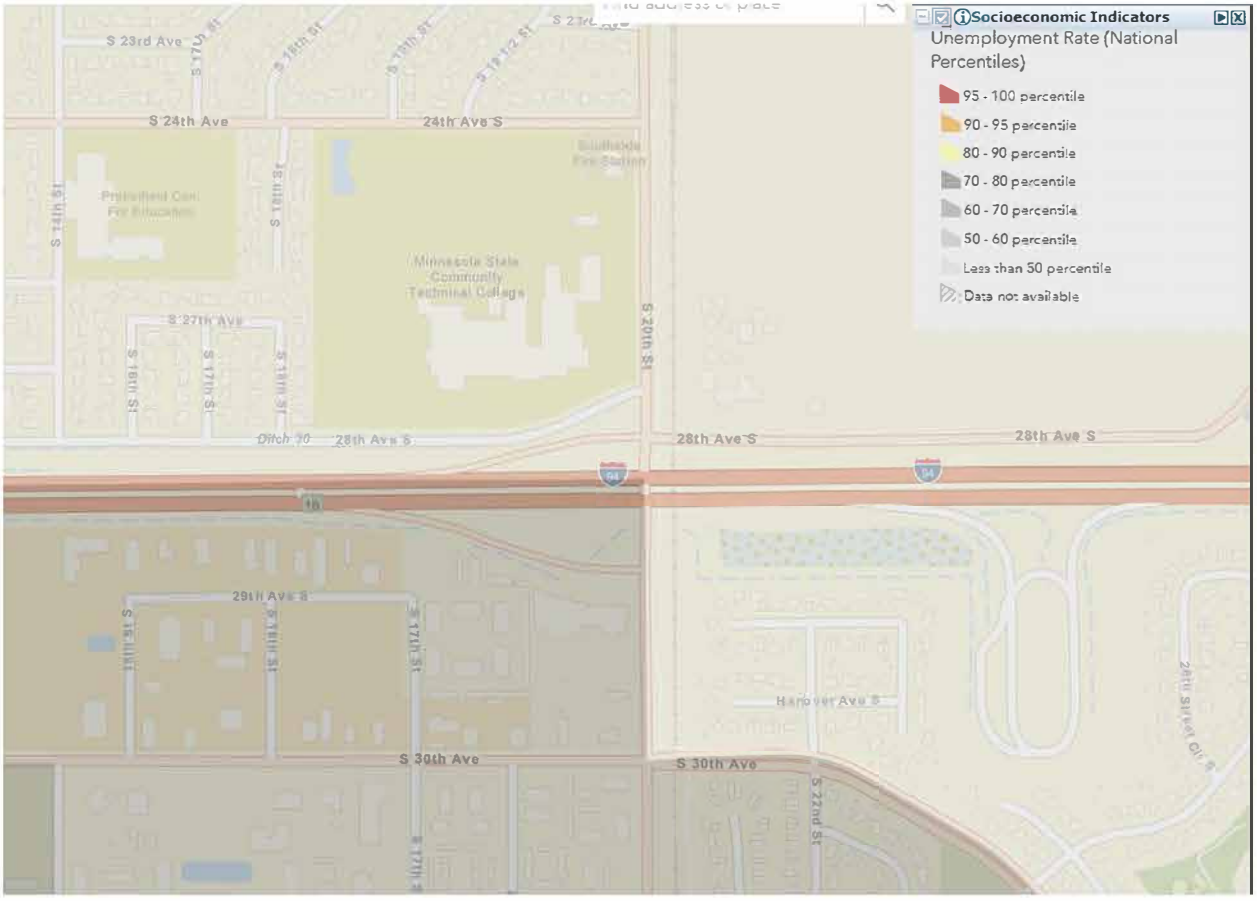
Floodplain

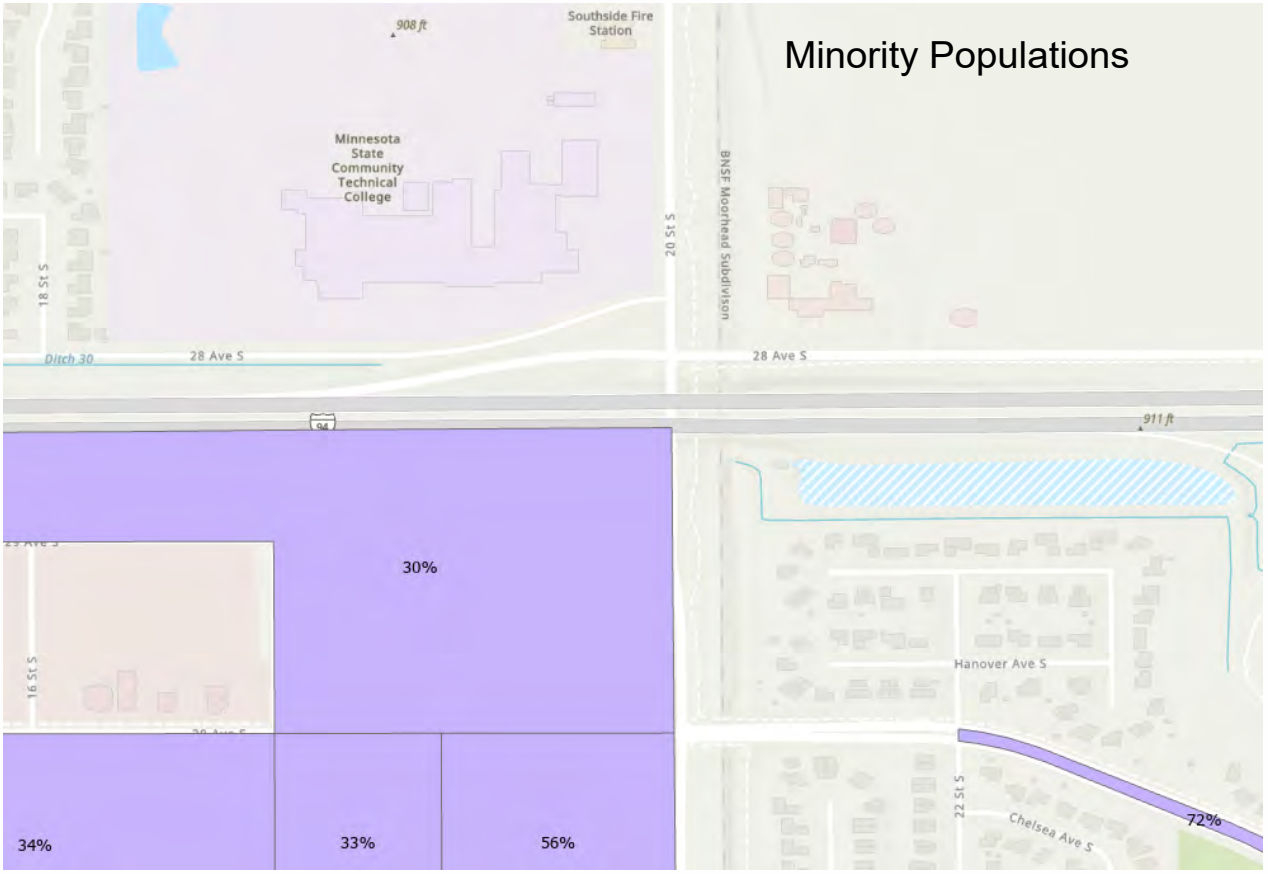
Appendix L.2

Environmental Justice Areas






Socioeconomic Indicators
Unemployment Rate (National Percentiles)
95 - 100 percentile
90 - 95 percentile
80 - 90 percentile
70 - 80 percentile
60 - 70 percentile
50 - 60 percentile
Less than 50 percentile
Data not available
S 23rd Ave
S 24th Ave
24th Ave S
Minnesota State Community Technical College
S 27th Ave
Ditch 30
28th Ave S
S 20th St
29th Ave S
S 30th Ave
Hanover Ave S


Minority Populations
908 ft
Southside Fire Station
Minnesota State Community Technical College
BNSF Moorhead Subdivison
Ditch 30
28 Ave S
911 ft
30%
34%
33%
56%
Hanover Ave S
Chelsea Ave S
72%

Appendix B – SRC Meeting Agendas and Minutes

Stantec

Agenda

Moorhead I-94 & 20th Street Interchange Analysis - SRC Meeting #1

Location: **FM Metro COG Conference Room**
Date: **July 10, 2023**

---

1. Introductions
    a. Stantec Team
    b. Study Review Committee Members
2. Project Schedule Overview
    a. Key Milestones
    b. Implementation presentations
3. Data collection/existing conditions memo
4. Community Engagement Approach
    a. Community Meetings
    b. Stakeholder Outreach – Three Meetings
        i. Educational/Institutional (M State, MSUM, Triumph Lutheran Brotherhood Church, Moorhead Area Public Schools)
        ii. Industrial/Business (BNSF, Busch Agricultural Resources, Ken's Sanitation, Gavilon Fertilzer, Fargo-Moorhead-West Fargo Chamber of Commerce, Moorhead Business Association)
        iii. Municipal/City (MATBUS, Moorhead Fire Department, Moorhead Public Service)
5. SRC #2 – Purpose and Need/Fatal Flaw Analysis
    a. Date and Time
    b. Identify additional attendees outside of SRC
        i. FHWA – Minnesota Division
        ii. MnDOT Geometric Design Support Unit
        iii. City of Moorhead – Community Development
        iv. Other?
6. Next steps

a. Draft Purpose and Need development.
b. Traffic Model setup.

7. Non-agenda items

Meeting Summary

SRC #1 - Moorhead I-94/20th Street Interchange Analysis

SRC #1 - Moorhead I-94/20th Street Interchange Analysis / 193806354

Date/Time:	July 10, 2023 / 1:00 PM
Place:	Metro COG Conference Room / Zoom
Next Meeting:	January 18, 2023
Attendees:	Dan Farnsworth (Metro COG), Ayden Schaffler (Metro COG), Ben Griffith (Metro COG), Jon Atkins (City of Moorhead), Forrest Steinhoff (City of Moorhead), Mary Safgren (MnDOT), Jerilyn Swenson (MnDOT), Amanda Ellingson (MnDOT), Makala Girodat (MnDOT), Wade Frank (Stantec), Angie Bolstad (Stantec), Keith Strickland (Stantec), Adam Capets (Stantec)
Absentees:	Wayne Zacher (NDDOT)
Distribution:	Attendees/Absentees

Item: **Action:**

Introductions

Everyone in the Metro COG conference room introduced themselves followed by those calling in virtually.

Project Schedule Overview

Wade went over the proposed project schedule.

Wade used Wednesdays as a place holder for SRC and community input meetings. The group decided to keep SRC meetings on Wednesday's at 1pm and send meeting invites ahead of time. Meetings can be adjusted as needed. Community input meetings will be targeted for Tuesdays as the primary day or Thursdays if necessary.

Stantec – Send appointments for all SRC meetings.

Presentations to local jurisdictions will be completed prior to finalizing the report. These presentations will focus on plan implementation. The current schedule for implementation presentations are as follows (in order of presentation occurrence):

- Moorhead P&Z Presentation
- Moorhead City Council Presentation
- Metro COG TTC Presentation
- Metro COG Policy Board Presentation

The group discussed adding in an implementation presentation to MnDOT District 4 staff. A MnDOT meeting is not in the scope, but it was suggested to replace one of the Moorhead meetings with a MnDOT meeting. Jon is going to follow-up with Kristie Leshovsky regarding which meeting she feels could be replaced. Mary is going to follow-up with their MPO liaison regarding who from MnDOT should be invited to the MnDOT implementation presentation.

Jon – Follow-up with Kristie regarding removing a Moorhead implementation presentation meeting and replacing it with a presentation to MnDOT.

Mary – Follow-up with MnDOT's MPO liaison to determine who should be invited to the MnDOT implementation presentation.

Item:	Action:
It was decided MnDOT's implementation presentation would occur before the City of Moorhead. Jon offered to drive to Detroit Lakes for this presentation to meet with MnDOT staff and answer questions from the city's perspective.	
Data Collection/Existing Conditions Memo	
Wade sent a draft existing conditions memo prior to the meeting. The group discussed information Stantec needs to complete the memo and questions on the data already received. A summary of this discussion is below.	
The City of Moorhead will send as-built plans for north of the bridge and look for what they have south of the bridge. Jon didn't think they would have much south of the bridge. Jon will also send signal timing plans and plans from the 2015 fiber project.	Jon – Send as-built plans, signal timings, and fiber plans.
MnDOT will have as-built plans for the bridges and will send these. MnDOT will also send signal timings for their signals. Amanda mentioned that MnDOT completed an interstate widening project that went through the rest area location. MnDOT should have planimetrics for this area but will not have detailed traffic data from that project. She will look into it and get back to Stantec.	MnDOT – Send as built plans, signal timings, and planimetrics for I-94 by the rest area.
Jerilyn asked if Stantec might have as-built plans for I-94 or 20th Street from the TH75 Diverging Diamond project. Stantec will check into what existing information on I-94/20th Street they have.	Stantec – Review TH75 data archives for I-94/20th Street information.
Dan is going to check into the future ramp traffic info from the Interstate Operations Study.	Dan – Review what traffic data for future ramps is available from the Interstate Operations Study.
20th Street is not designated as a truck route; however, it acts as a truck route, especially during harvest (beet trucks). A lot of the trucks from the industrial area use SE Main, so outside of harvest time, it is not used as heavily.	
The group discussed preliminary traffic volume findings; specifically, at 20th Street North of the Interchange Ramps and the Eastbound Off-ramp. The 20th Street North of Interchange Ramps showed a large increase of traffic volumes from 14,900 vehicles in 2021 to 19,530 vehicles in 2023. It was theorized that this could be due to the opening of the Main Ave/21st Street underpass in 2022. The Eastbound Off-ramp shows a slight decrease in traffic volumes from 4,367 vehicles in 2021 to 4,190 vehicles in 2023. This decrease could also be a result of the underpass opening.	
Exiting data to check traffic volumes and potentially develop an area factor was discussed. MnDOT is going to provide ATR data from their traffic counter east of the Red River, Jon is going to look into 2022 counts conducted by ATAC he believes he has (turning movement counts only), Jon is also going to provide traffic system footage from 20th Street and 30th Ave S.	MnDOT – Provide ATR data from counter east if the Red River. Jon – Look for 2022 turning movement counts and provide traffic system footage.

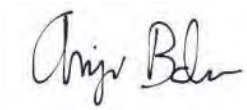
Item:	Action:
Putting out tubes to check traffic counts was mentioned. However, this would need to wait until September when school is back in session. It was decided to review the existing data mentioned above and decide later if this is needed.	
Stantec will need access to Metro COG's Streetlight subscription. Wade will email Dan requesting access and providing a list of specific users.	Wade – Email Dan requesting access to Metro COG's Streetlight subscription and provide a list of specific users from Stantec.
Stantec would like to request the cube model data showing the current interstate configuration and access to and from the east.	Dan – Provide Stantec the most current cube model of the interchange.
Existing crash data did not show a major safety concern. However, MnDOT noted that they do have some concerns with the ramp spacing and merge actions between 20th and 34th. The EB exit ramp from the rest area is very close to the deceleration lane for the EB I-94/Main Ave exit.	
Wade noted that in past discussions with Tom Lundberg regarding the upcoming I-94 study from the Red River to TH 336 (PEL Light Study), that MnDOT may want to look at relocating the rest area to a location outside of town. Jerilyn will check with Tom but feels it is likely we should assume it will be staying in its current location.	Jerilyn – Check with Tom Lundberg regarding the likelihood of moving the existing MnDOT rest area.
MnDOT is currently putting together the scope for the I-94 PEL light study with the goal of getting the study underway sometime this winter. Jon asked if Stantec could review the scope before it is released to ensure these studies have no conflicts. Mary said she will send it once complete.	Mary – Send draft I-94 PEL light study scope once completed.
Wade asked everyone to review the draft existing conditions memo and provide comments by 7/24 (in two weeks).	All – Review the existing conditions memo and provide comments by 7/24.
Community Engagement Approach	
Angie noted that there will be a total of five SRC meetings. There will be two in-person community meetings with a virtual component and a virtual comment opportunity on the draft report. All materials will be posted to Metro COG's project website.	
M State was determined to be the preferred meeting location for in-person community meetings. Triumph Lutheran Church will be the backup location M State's schedule doesn't work. Stantec will check into available options at M State for the first community meeting in September.	Stantec – Coordinate with M State regarding a potential meeting location in September on a Tuesday or Thursday.
The in-person community meetings will be open house style. A presentation most likely will not be needed for the first open house. This can be discussed further closer to the meeting date.	
Stantec will post legal ads advertising the community meetings in both the Fargo Forum and the FM Extra. The FM Extra is free to publish in.	
Stakeholder meetings were grouped by entities with common priorities and interests. The preliminary list of entities is below: o Educational/Institutional	

Item:	Action:
• M State • MSUM • Triumph Lutheran Brotherhood Church • Moorhead Area Public Schools o Industrial/Business • BNSF • Busch Agricultural Resources • Ken's Sanitation and Recycling • Gavilon Fertilizer • Fargo Moorhead West Fargo Chamber of Commerce • Moorhead Business Association o Municipal/City • MATBUS • Moorhead Fire Department • Moorhead Public Service	All – Review preliminary stakeholder list.
SRC members were asked to review this list following the meeting and let Stantec know if they have additional suggestions. Meetings will be held at the Metro COG conference with a virtual option available.	
SRC #2 - Purpose and Need/Fatal Flaw Analysis	
The date and time is currently proposed for 8/16 at 1pm. An email appointment will be sent for this time and moved if necessary.	Jerilyn – Check on a FHWA contact to sit in on the SRC #2 meeting.
Additional meeting participants for this purpose and need/fatal flaw meeting were discussed. Jerilyn is going to check on finding a contact from FHWA (Minnesota Division) and Amanda is going to reach out to the MnDOT Geometric Design Support Unit to see who would have capacity to sit in on this meeting.	Amanda - Check on a MnDOT Geometric Design Support Unit to sit in on the SRC #2 meeting.
Next Steps	
Next steps include writing the draft purpose and need and setting up the traffic model.	

The meeting adjourned at 2:30 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Angie Bolstad PE (MN, ND)
Transportation Engineer

Angela.Bolstad@stantec.com

Stantec

Agenda

Moorhead I-94 & 20th Street Interchange Analysis - SRC Meeting #2

Location: **FM Metro COG Conference Room**
Date: **August 30, 2023**

---

1. Introductions
2. Project Overview
3. Data collection/existing conditions memo
    a. Follow-up on Action Items from SRC Meeting #1
4. Community Engagement Update
    a. Public Input Meeting #1
        i. September 19th, 5:00pm to 7:00pm at M State
        ii. Open House Format
5. Draft Purpose and Need
    a. Overview
        i. Comments
6. Fatal Flaw Discussion
    a. Review Alternatives from the 2008 20th Street and TH 75 (8th Street) Corridor Study
    b. Discuss interchange types/features and design approaches that represent fatal flaws
7. Next steps
    a. Public Input Meeting #1
    b. Finalize Existing Conditions Memo
    c. Metro COG Regional Travel Demand Model runs.
8. Non-agenda items

Meeting Summary

SRC #2 - Moorhead I-94/20th Street Interchange Analysis

SRC #2 - Moorhead I-94/20th Street Interchange Analysis / 193806354

Date/Time:	August 30, 2023 / 2:30 PM
Place:	Metro COG Conference Room / Zoom
Next Meeting:	October 18, 2023
Attendees:	Dan Farnsworth (Metro COG), Ayden Schaffler (Metro COG), Ben Griffith (Metro COG), Jon Atkins (City of Moorhead), Forrest Steinhoff (City of Moorhead), Clay Lexen (City of Moorhead), Mary Safgren (MnDOT), Amanda Ellingson (MnDOT), Makala Girodat (MnDOT), Jamal Love (MnDOT), Abbi Ginsberg (FHWA), Wade Frank (Stantec), Angie Bolstad (Stantec), Keith Strickland (Stantec), Adam Capets (Stantec)
Absentees:	Jerilyn Swenson (MnDOT)
Distribution:	Attendees/Absentees

Item:	Action:
Introductions With new attendees from MnDOT and FHWA, introductions in the room and online were conducted.	
Project Overview For the benefit of Jamal and Abbi as new attendees, Wade provided an overview of the project. The goal of the study is to identify two feasible alternatives to expand the interchange to a full access interchange. The City of Moorhead would like to follow this study by carrying the identified alternatives forward into preliminary engineering and environmental documentation. The project is not currently funded, and the goal is to have a viable design ready for construction in 2030-2031. Key issues driving the need for a full access interchange include congestion and reduced effectiveness of the adjacent interchanges at 8th and 34th Streets (currently and as the City develops and grows to the south), and providing an additional way for eastbound I-94 traffic to leave the interstate in the event of a crash on I-94 to avoid traffic queuing, safety concerns and poor driver behavior. Mary Safgren noted that MnDOT will be conducting a study of the I-94 corridor from the Red River to the TH 336 Interchange. This will be a PEL light study and will focus on capacity improvements in the study area. The 20th Street Interchange study will help inform the I-94 study and vice versa.	
Data Collection/Existing Conditions Memo Wade reminded the group to provide comments on the memo if they have any and to complete any remaining actions items related to data requests.	SRC to provide comments and remaining data.

Item: **Action:**

Community Engagement Update

Angie provided a brief overview of the Public Input Meeting #1. It will be held on September 19th from 5:00pm to 7:00pm at M State, which is located near the northwest quadrant of the 20th Street Interchange. The meeting will be an open house style format and we will have boards describing the project, the existing conditions, the project schedule, and key issues and will also have plots of the study area for people to view and write comments on if they choose to. Angie and Wade will represent Stantec at the meeting and several SRC members indicated they will also attend.

Draft Purpose and Need

All: provide comments on P&N by 9/13/23

Wade gave a quick presentation via PowerPoint on what a Purpose and Need Statement is why it is needed. The presentation included definitions and typical components included in the Purpose and Need. Wade also described a presentation he recently attended in which the speaker evaluated key word trends in successful funding applications which may be helpful in strengthening the Purpose and Need Statement. The group then discussed the Draft Purpose and Need Statement which states the Purpose is to decrease vehicle miles traveled and travel time for users, and to improve mobility while extending the congestion-free lifespan of I-94 and the functionally classified network between 8th and 34th Streets. The Need statements include system linkage and traffic operations. Secondary goals include supporting Active Transportation and minimizing impacts to facilities and properties in the vicinity of the interchange.

Discussion of the draft statement included whether safety is part of the Purpose of the project. Adam responded that there is not a significant crash history at the interchange. Abbi noted that the Purpose and Need needs to be clear that this project has independent utility from the larger I-94 study and that an Interstate Access request will be required.

Wade asked the group to send any additional comments on the draft document via email.

Fatal Flaw Discussion

Wade described a previous study that was completed in 2008 that evaluated several new interchange options. He showed the layouts of the five alternatives that were evaluated and summarized the advantages and disadvantages documented in the study. One of the disadvantages noted for one of the alternatives (partial cloverleaf) was that the ramp radii did not meet MnDOT design standards. Jamal noted that this statement was not accurate – the ramp radii shown would meet current standards.

After reviewing the prior study alternatives, Wade went through a “Fatal Flaw Checklist” which included approximately 20 issues related to 6 categories. The group discussed each of the issues and determined which might be considered fatal flaws by one or more of the stakeholder agencies. The results are

Item:	Action:
documented in the "Fatal Flaw Checklist_meeting notes" spreadsheet included with these meeting minutes. Key takeaways from the discussion were: • Physically impacting the buildings on the M State campus would be viewed as a fatal flaw from the City's perspective. Impacts to building access, parking and circulation could potentially be acceptable. • Ramp speeds not meeting MnDOT criteria would be fatal flaw. • Ramps crossing railroad tracks at-grade would be a fatal flaw. Jamal noted that group should look at the I-494 and East Bush Lake Road as an example of what MnDOT has done to avoid at grade ramp/railroad crossings. • Alternatives that make access to the Welcome Center east of the interchange more difficult would be viewed negatively by MnDOT. Potential impacts to the Welcome Center should be coordinated with Jenny Krantz, MnDOT Rest Area Program Manager At the conclusion of the discussion, Wade asked the group to fill out the checklist on their own and email it to him if anyone had additional comments.	All: provide additional fatal flaw comments by 9/13/23.
Next Steps Wade summarized the next steps the team will be working on which includes conducting Public Input Meeting #1, finalizing the Existing Conditions Memo, and beginning model runs with the Travel Demand Model. Dan noted that Stantec and Metro COG are processing a contract amendment related to some additional traffic analysis work needed to determine the potential traffic volumes at the 20th Street Interchange under the build (full interchange) scenario. The next SRC meeting is currently schedule for October 18th.	

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact Wade Frank via email.

Stantec

Agenda

Moorhead I-94 & 20th Street Interchange Analysis - SRC Meeting #3

Location: **Stantec Conference Room**
Date: **November 4, 2024**

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1. Introductions
2. Status Update
3. Travel Demand Model/Traffic Forecast Overview
4. Alternatives Development Overview
5. Identify Two Preferred Alternatives for detailed study
    a. Elevated Diverging Diamond
    b. Elevated Tight Diamond
    c. Elevated Three-level Diamond
    d. Single Quadrant
    e. Partial Cloverleaf
6. Next steps
    a. Evaluation of Preferred Alternatives
    b. Stakeholder Engagement
    c. Community Meeting #2
    d. SRC #4?
7. Non-agenda items

Stantec

Agenda

Moorhead I-94 & 20th Street Interchange Analysis - SRC Meeting #3

Location: **Stantec Conference Room**
Date: **November 4, 2024**

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1. Attendees:

    a. In person: Jonathan Atkins and Forrest Steinhoff (City of Moorhead), Dan Farnsworth (Metro COG), Wade Frank (Stantec).
    b. Virtual: Amanda Ellingson, Mary Safgren, Trudy Kordosky, and Kevin Lachowitzer (MnDOT D4), Tom Trowbridge and Clay Lexen (City of Moorhead), Keith Strickland and Adam Capets (Stantec)

2. Status Update: Dan provided an update to the group on the fact that the project was on hold for several months due to some modifications to the funding procedures for MPO's in North Dakota. The study is now back up and running and will be completed in the spring of 2025.

3. Travel Demand Model/Traffic Forecast Overview: Keith presented an overview of the travel demand model and traffic forecast work that was completed. There were no issues or concerns voiced by the attendees regarding the methodology and results.

4. Alternatives Development Overview – Wade gave an overview of the alternatives development process, which including identification of 15 initial potential interchange types, which were screened down to the five interchange alternatives below for evaluation:

    a. Elevated Diverging Diamond
    b. Elevated Tight Diamond
    c. Elevated Three-level Diamond
    d. Single Quadrant
    e. Partial Cloverleaf

    The alternatives reflect two different approaches to achieving a full interchange: 1.) to elevating 20th Street and the ramps to provide vertical grade separation over the railroad tracks to avoid replacing the railroad bridge, 2.) Building an interchange with all ramps on the west side of the interchange on existing grade and replacing all three bridges (20th Street, the pedestrian bridge, and the railroad bridge) to accommodate the additional ramp lanes required for these concepts. A preliminary layout of each alternative was presented and pros and cons of each were discussed in relation to safety, mobility, impacts to adjacent properties and infrastructure, and cost. The goal of this phase of the study is to review the five alternatives above to identify two to carry forward for the remainder of the study and the next steps of project development. The following items were discussed in relation to the alternatives presented.

    - Anheuser Busch's property has to remain agriculture fields because of emissions purposes. (The week after the meeting, it was announced that the Anheuser facility will be closed and sold).

- Jonathan noted that if an elevated alternative is selected to move forward, he would recommend the DDI interchange based on the performance of the 8th Street DDI and driver familiarity.
- Tom asked if there had been consideration to shift the alignment of 20th Street west and the railroad east to reduce the amount of fill required. Wade responded that altering the railroad alignment was not considered as the railroads generally do not like to introduce lateral alignment adjustments over short distances.
- Tom noted it would be beneficial if the WB off-ramp continue west to 28th Ave on the west side of 20th Street.
- In general, the group was not in favor of the elevated alternatives due to the overall project cost and the extent of retaining walls that would be required. Wade noted that it may be prudent to have one alternative available that does not require replacement of the railroad bridge due to the unpredictable nature of railroad bridge replacement projects.
- MnDOT asked the study team to be aware of the pumphouse and associated infrastructure located in the SE quadrant of the interchange.
- Tom proposed an alternative which would shift 20th St further west which would allow for traffic use during construction and could allow for ramps to fit under the existing pedestrian and rail bridges.
- After reviewing the scores of the alternatives, the SRC agreed that the Parclo option should be carried forward. After discussion, the SRC determined that the alternative Tom proposed should be evaluated for feasibility as the second option. Tom will provide an illustration of his alternative ideas to the SRC and Stantec after the meeting.
- Wade asked if the SRC felt a fourth & final SRC meeting was necessary, or if the SRC wished to correspond via email during the final draft of the report. Jon felt it would be good to have an SRC meeting after the two final interchange alternatives are developed, but before the public input meeting.

Stantec

Agenda

Moorhead I-94 & 20th Street Interchange Analysis - SRC Meeting #4

Location: **Metro COG Conference Room**
Date: **February 25th 2025**

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1. Introductions
2. Stakeholder Meeting Recap
3. Alternatives Update
    a. Traffic Analysis
    b. Revised Alternatives
4. Community Meeting #2
5. Next steps
    a. Draft Report
    b. SRC and Public Review of Draft Report
    c. Final Report
    d. Implementation Presentations
6. Non-agenda items

Meeting Summary

Study Review Committee Meeting #4 – Moorhead I-94 & 20th St Interchange Analysis

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Date / Time: February 25th, 2025 / 2:30 pm
Location: Metro COG Conference Room / Zoom
Attendees: Dan Farnsworth (Metro COG), Wade Frank (Stantec), Jeremy Freihammer, (Stantec) Adam Capets (Stantec), Tom Trowbridge (City of Moorhead), Jonathan Atkins (City of Moorhead), Clay Lexen (City of Moorhead), Mary Safgren (MnDOT), Trudy Kordosky (MnDOT), Kevin Lachowitzer (MnDOT), Amanda Ellingson (MnDOT), Rosemary Bruce-White (MnDOT); Will Hutchings (NDDOT)

Introductions

The meeting began with introductions of those attending both in-person and online.

Stakeholder Meeting Recap

Wade provided a recap of the two stakeholder meetings which were held on February 3rd. The meetings included hearing the stakeholders' current use of the 20th St interchange, future plans, and alternative interchange layouts were shown and discussed with the stakeholders.

The stakeholders present at the meetings included: Triumph Church, Moorhead Fire Dept, Moorhead Public Schools, Moorhead Public Service, M-State, MSUM, MATBUS, MacroSource, Ken's Sanitation, FMWF Chamber, and BNSF.

A follow-up stakeholder meeting was held on February 24th with Anheuser-Busch.

Alternatives Update

Wade discussed the latest interchange layout alternatives that have been developed as part of this study.

- The Parclo alternative has remained similar to the one shown at SRC Meeting #3 with the only modification being the location of the 28th Ave connection to 20th St.
- The Single Quadrant alternative, which was shown at the last SRC meeting but did not move forward at that time, was resurrected with some modifications. This latest variation of the Single Quadrant alternative provides 20th St connections to 28th Ave both to the east and the west, with the rail crossing of 28th Ave remaining at its current locations.

These two interchange alternatives were shown to Moorhead staff on Feb 21st and the alternatives met Moorhead's needs. Tom noted that Moorhead feels good about these as the top two alternatives.

Wade noted that the roundabout alternative with the offset 20th St bridge was analyzed after the SRC Meeting #3, however after running the traffic analysis, it was found that the roundabouts would require multiple lanes, which would impact geometric design and adjacent properties. Wade noted that a roundabout alternative could still be considered as a variation of the current Parclo alternative.

There was then discussion about the recent announcement of the closure of the Anheuser-Busch facility. This closure was announced in late 2024 when the 20th St Study was roughly 70% complete and assumptions were that no future development would occur on that large property. Recent discussions point to the Anheuser-Busch property being sold with the potential for development on the property. The SRC discussed how best to proceed with this study given the study needs to be completed by April 30th.

When discussing the alternatives, Wade asked for comments from the SRC members. One comment was to show the potential for a road on the west side of M-State's property connecting 28th Ave with 24th Ave for the Parclo Alternative (the Single Quadrant Alternative would not require it). It was suggested that public input be solicited about this connection as part of the upcoming public input opportunity. Another comment was from Tom, noting that there can be sight distance issues on the north side of the current pedestrian bridge. Trudy also noted for the 28th Avenue connection to 20th Street, we should show a driveway to MacroSource's property off of 28th to confirm they would still have access to their property. No other comments were provided by MnDOT at the meeting however the alternatives will be sent to SRC members for additional comments, and Wade encouraged MnDOT SRC members to forward alternatives to their geometric section for review.

Rosemary suggested that MnDOT could analyze future growth of the Anheuser-Busch property as part of the ongoing MnDOT I-94 Red River to Hwy 336 Study. Tom also noted that if the additional growth and traffic analysis wasn't too expensive, the City of Moorhead might be able to fund this additional work, either as part of this study or as a follow-up to this study. The preference seemed to be that MnDOT could further analyze growth and traffic of the Anheuser-Busch property as part of their study. Rosemary will coordinate with the study team.

Community Meeting #2

Wade & Dan discussed the planned upcoming public input. A public open house is scheduled for March 11th from 5 pm – 7 pm at Triumph Church. Metro COG will send an email to the SRC members reminding them of the meeting closer to the meeting date. In addition to the open house, online engagement will also be available. The online engagement will feature the same materials and information as the public open house.

Next Steps

- MnDOT (Rosemary) will connect the I-94 Red River to Hwy 336 Study team with the 20th St Study team with the intention of incorporating Anheuser-Busch property growth analysis into the I-94 Red River to Hwy 336 Study.

- Wade will send the SRC the most recent alternatives for comments. Comments should be received prior to the March 11th public input meeting.
- Dan/Wade will send the most recent alternatives to the Stakeholders prior to the March 11th public input meeting. Meeting with the Stakeholders could be offered if they have questions or concerns.
- The draft report will be put together after the public input opportunity closes in mid-March. The draft report will be sent to the public and SRC members for a review period of at least 15 calendar days.
- Once comments on the draft report have been received and incorporated, the final report will be developed.
- Presentations will then follow with four presentations planned per the scope of work. Potential presentation may include: Moorhead Planning Commission, Moorhead City Council, Metro COG's TTC, and Metro COG's Policy Board. Rosemary noted that MnDOT's ATP 4 meeting could be a venue in which to present this study.

Appendix C – Stakeholder Meeting Minutes

Meeting Summary

Stakeholder Meeting #1 – Moorhead I-94 & 20th St Interchange Analysis

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Date / Time: February 3rd, 2025 / 2:00 pm
Location: Metro COG Conference Room / Zoom
Attendees: Dan Farnsworth - Metro COG; Wade Frank - Stantec; Travis Reimche, Doug Rogness, Ben Bigaoutte - Triumph Lutheran Brethren Church; Jeff Wallin – Moorhead Fire Dept; Steve Moore – Moorhead Public Schools; Travis Schmidt – Moorhead Public Service; Tom Capistran, Pat Nordick – MState; Georges Tippens – MSUM; Luke Grittner - MATBUS

Introductions / Study Overview

- The meeting began with introductions and Wade provided an overview of the Moorhead I-94 & 20th St Study.

Stakeholder Input (Existing Conditions) + Review of Interchange Alternatives

- Triumph Church
  - A lot of traffic comes from I-94 via the west and turns into the church from 20th St. It would be hard to lose either of the 20th St entrances. The access on 30th Ave would be hard if the main access and would need to be widened.
  - Some traffic comes from the east but not much.
  - Their worse congestion is around 3:30 in the afternoon on weekdays when preschool gets out and there is heavier traffic in the area. It is difficult to turn NB on 20th St from the parking lot.
  - Triumph is on hold on any expansion plans to their West Fargo campus as they're waiting on the outcome of the I-94 / 20th St interchange to determine their Moorhead campus plans.
  - When presented the interchange alternatives, Triumph had concerns about how the EB offramp shifting further to the south would affect the atmosphere and safety of their only green space, where their playground is located.
- Moorhead Fire Dept
  - They sometimes use the 20th St interchange to go westbound.
  - Their current south Moorhead station might be replaced in the next 5-10 years in the same location.
  - From their south Moorhead station, it is difficult to head east. Ramps to/from the east would help.
  - Two lanes in each direction on 20th Street through the interchange is preferred in order to get through the interchange quickly during an emergency.
  - A third fire station is being considered in Moorhead. This station may be located along Hwy 75 in south Moorhead. A fourth station may eventually be considered too, which might be located near 34th St near the Sanford Clinic. New development must surpass 50% to justify building a new station

    - If the interchange were closed (including the 20th St bridge) for construction, they were not concerned and would be able to work around it by establishing a temporary facility south of I-94.
- MState
    - They have some students who travel to/from the east (Fergus Falls), who would likely use interchange ramps to/from the east. Most of their students come from the west.
    - MState would be concerned about a full interchange here in that it would increase traffic on 20th St.
    - MState currently has a number of vehicles that cut through their parking lot after the northbound left turn on 20th St onto 28th Ave was eliminated.
    - When presented the interchange alternatives, MState has some concerns about the loss of parking and would expect lost parking spaced to be replaced (by the City) on other parts of the property.
    - They would be willing to work with the City of Moorhead to establish a north-south connection between 24th and 28th Avenue on the west side of their property.
- Moorhead Public Service
    - MPS owns the water tower on the NE quadrant of the 20th St interchange. The water tower is fairly new and they would not want to see it impacted. They also own the substation located on the SW quadrant. They have plans to modify the substation, but modifications would all be within the existing substation property.
    - MPS also has a 115 kV transmission line on the east side of 20th St at this interchange. They also have electrical utilities between the eastbound offramp and Triumph Church.
    - When asked if it was possible to re-route power to deactivate the transmission line during construction, they responded that it could be done for a short time, but redundancy would be a concern.
    - If the 20th St bridge was closed for construction, it could affect their response times.
    - When presented the interchange alternatives, they didn't see many concerns on the south side of the interstate, but some concerns in the vicinity of the water tower due to a 12-inch water line located about 7-8 feet below the surface.
- MSUM
    - Most of their students and staff use 8th Street.
    - MSUM noted that in the long term, a full interchange at 20th St would be beneficial. However, construction of the interchange could be problematic with additional traffic on and other corridors in the vicinity.
- Moorhead Public Schools
    - A lot of busses (they have 50 total) use 20th St, however they're not sure if they would gain any efficiencies if ramps were added to/from the east.
    - If the 20th St bridge were to be closed for construction, they could work around that.
    - They use 28th Ave east of 20th St a lot but not 28th Ave west
- MATBUS
    - MATBUS noted that they have one route that uses 20th St – Route 5. Route 5 also uses 28th Ave west of 20th St.

Next Steps

- Dan will send the stakeholders a notification about the upcoming public input opportunity.

Meeting Summary

Stakeholder Meeting #2 – Moorhead I-94 & 20th St Interchange Analysis

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Date / Time: February 3rd, 2025 / 3:30 pm
Location: Metro COG Conference Room / Zoom
Attendees: Dan Farnsworth - Metro COG; Wade Frank - Stantec; Chad Hahn – MacroSource; Ken Gillette, Julie Gillette – Ken's Sanitation; Katherine Grindberg – FMWF Chamber; Sean Schnider – Moorhead Public Schools; Alex Fiorini - BNSF

Introductions / Study Overview

- The meeting began with introductions and Wade provided an overview of the Moorhead I-94 & 20th St Study.

Stakeholder Input (Existing Conditions) + Review of Interchange Alternatives

- MacroSource
  - They don't believe they'd see a big benefit of a full interchange at 20th St since a lot of their traffic comes from the west on I-94 and from County 52 on the east.
  - MacroSource noted that they have a spur rail line, parallel to 20th St and the existing tracks which they use regularly (5 times per week). When used, the rail cars will park from just N of 28th Ave to 24th Ave. They (and BNSF) noted that If 28th Avenue we re-routed to the north to connect with 24th Ave as shown on the exhibits, the road would cross a track switch. An at-grade crossing of a switch is not possible from an infrastructure standpoint and rail cars can be in the vicinity of the switch for up to an hour, therefore a roadway crossing at that location is not possible.
  - During their peak operating time (April through June), they have approximately 50 trucks per day hauling fertilizer out of their facility
  - MacroSource mentioned that since the last 20th St interchange study, they were under the assumption that it was not possible/feasible to reconfigure the interchange so they invested $10 Million into their existing facility.
  - With the recent announcement of Anheuser-Busch's facility closing, MacroSource would be interested in expanding their facility approximately 300 feet to the north.
  - He proposed an idea for the realignment of 28th Ave which might work for them:
    - 28th Ave could be routed east of their facility, east of Ken's, and east of the water tower and tie into the intersection of 24th Ave & 20th St.
    - The rail switch and their spur line could be relocated further north and run on the northeast side of the realigned 28th Ave.
    - MacroSource could still expand, and railcars unloaded on the NE side of 28th Ave could pipe their products under 28th Ave to their facility.
    - This could also allow Ken's to expand
- Ken's Sanitation
  - Similar to MacroSource, they don't believe they'd see a big benefit of a full interchange at 20th St since a lot of their traffic comes from the ND direction

    - Ken's Sanitation estimates they have 10-15 trucks that come to their facility per week
    - With the recent announcement of Anheuser-Busch's facility closing, Ken's Sanitation would be interested in expanding their facility. They have been considering some land immediately north of the water tower.
    - Their scale is on the south side of the facility and they would need access to it off 28th Avenue in any post-project scenario.
- BNSF
    - BNSF doesn't find this interchange to be a positive to them.
    - BNSF currently has 6 trains per day on average with an allowable speed of 60 mph (however most trains go slower than this). When asked if they expect train traffic to increase or decrease along this line, they mentioned that they are always interested in expanding their business. It is the only north-south line on their network.
    - .
    - When asked about the rail bridge over I-94, he noted that if reconstructed, it would need to meet their current design standards and would require construction of a temporary shoo-fly crossing of I-94
- Moorhead Public Schools
    - A lot of their busses go on 20th St to get to the high school and career center.
    - They believe a full interchange would be beneficial to them because they could use the interstate to avoid the rail tracks along 20th St.

Next Steps

- Dan will send the stakeholders a notification about the upcoming public input opportunity.
- Dan will send the stakeholders information about the ongoing MnDOT study of I-94 between Red River and Hwy 336
- Metro COG and Stantec will arrange a meeting with Anheuser-Busch to discuss the interchange alternatives since they were not present at the stakeholder meeting.

Appendix D – Public Input Meeting Summaries

Public Engagement Summary

Public Input Meeting #1 – Summary

Moorhead I-94 & 20th Street Interchange Analysis

Stantec PN: 193806354

Date/Time:	September 19, 2023 / 5:00PM to 7:00PM
Place:	Minnesota State Community and Technical College – 1900 28th Ave S, Moorhead, MN 56560
Attendees:	See Sign-In Sheet

Overview

Metro COG and Stantec hosted the first public input meeting to discuss the Moorhead I-94 and 20th Street Interchange Analysis on September 19, 2023. The meeting was held from 5 p.m. to 7 p.m. at the Minnesota State Community and Technical College in the Bergos Rooms. Approximately 20-25 people attended to learn about the study background and purpose, and to provide input regarding the future improvements made to the I-94 and 20th Street Interchange.

All meeting materials were posted to Metro COG's project website ahead of the meeting.

Meeting materials included:

- Informative boards displaying the following: welcome, project background, project logistics (including next steps and tentative project schedule), existing conditions, and key features.
- Handout describing the project, study purpose, primary and secondary study area, tentative project schedule, contact information, and how to stay involved.
- Large roll plot of the primary and secondary study area.
- Comment cards for individuals to express comments and/or ideas. Comment cards could be left at the meeting, scanned and emailed, or tri-folded and mailed.
- Sign-in sheet for attendees to fill out upon arrival.

Advertising

The meeting was advertised through the following channels:

- Fargo Forum Legal Display Advertisement on September 13
- Metro COG Media Release on September 13
- FM Extra Legal Display Advertisement on September 14
- Radio Interviews on September 15 and 19
- Social Media Advertisements

Summary of Comments Received

At the meeting, people were able to leave a general comment on the provided comment cards and post-it notes on the project layout roll plot. They were also given the option to send their comments to Dan Farnsworth via email, mail, or online through the project website. The comment period closed on Friday, September 29.

A summary of the comments received and the responses provided is included in the supporting documentation.

PIM #1 Supporting Documentation

The following documents have been included as supporting documentation for this public input meeting:

- Informative Boards Displayed at Meeting
- Meeting Handout
- Project Layout
- Legal Display Ads and Media Release
- Written and Emailed Comments
- Meeting Photos
- Public Input Meeting #1 Sign-in Sheet

Stantec Consulting Services Inc.

Angie Bolstad, PE
Transportation Engineer

Phone: (612) 712-2019

Angela.Bolstad@stantec.com

Attachment: PIM#1 Supporting Documentation

cc. Dan Farnsworth, Metro COG Project Manager
Wade Frank, Stantec Project Manager

INFORUM
Powered by The Forum and WDAY

Public Meeting Notice: Moorhead I-94 and

Published September 13, 2023 at 1:46 AM

Public Meeting Notice: Moorhead I-94 and 20th Street Interchange Analysis Notice is hereby given that the Fargo-Moorhead Metropolitan Council of Governments (Metro COG) and their project partners (Stantec Consulting Services, Inc.) will hold a public input meeting on Tuesday, September 19, 2023, from 5:00 p.m. to 7:00 p.m. CDT at Minnesota State Community and Technical College (1900 28th Avenue S, Moorhead, MN 56560) to provide project background information and collect feedback related to the Moorhead I-94 and 20th Street Interchange Analysis. This study will analyze the need and feasibility for a full interchange at I-94 and 20th Street. This includes reviewing traffic and travel time impacts of a full interchange, completing an environmental screening, and identifying potential alternatives which would look at impacts to the surrounding area and estimated construction costs. Parking Instructions: Park in the West Lot and enter Minnesota State Community and Technical College through the W1 doors. The meeting will be held in the Bergos rooms using an open house format. Meeting materials are also available on the project website for those who cannot attend in-person. Online public engagement can be accessed by visiting the project website with input being solicited until September 29, 2023. Public comments can also be submitted via email or mail to the project manager listed below. Dan Farnsworth, Metro COG Project Manager; Phone: (701) 532-5106; Email: farnsworth@fmmetrocog.org; Address: 1 - 2nd Street North, Case Plaza, Suite 232, Fargo, North Dakota 58102 For meeting materials and additional project information, visit the project website at: fmmetrocog.org/20thInterchange. Metro COG is committed to ensuring

all individuals regardless of race, color, gender, age, national origin, disability/handicap, sexual orientation, or income status have access to Metro COG's programs and services. Metro COG will make a good faith effort to accommodate requests for translation services or physical copies of meeting proceedings and related materials. Please contact Savanna Leach, Metro COG Executive Assistant at (701) 532-5101 at least five days in advance of the meeting if any special accommodations are required for any member of the public to be able to participate. (Sept. 13, 2023) 257657

MOORHEAD BUILDING PERMITS

PB23-0349 2238 35TH STREET CIR S 434 - Add or Alter Dwellings DUNCAN KATHRYN 09/06/2023 03/04/2024 2,200.00

PB23-0430 321 8TH ST S 437- Add or Alter All Other Buildings & Structures Border Foods 09/07/2023 03/05/2024 350,000.00

PB23-0512 4218 17TH ST S 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/06/2023 03/04/2024 13,251.00

PB23-0554 4881 HAMPTON CIR S 434 - Add or Alter Dwellings KOWITZ KRISTOPHER DAVID 09/07/2023 03/05/2024 19,000.00

PB23-0556 1807 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0557 1813 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0558 1801 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0559 1749 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0560 1819 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0561 1825 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0562 1831 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0563 1837 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0564 1843 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0565 1849 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0566 1901 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0567 1907 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0568 1913 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0569 4024 2 1/2 ST S 434 - Add or Alter Dwellings Your Home Improvement Company 09/06/2023 03/04/2024 3,500.00

PB23-0570 1919 JOHNSON DR S 102 - One-Family Houses Attached Jordahl Custom Homes 09/07/2023 03/05/2024 225,000.00

PB23-0580 211 12TH ST N 434 - Add or Alter Dwellings M & J Construction 09/05/2023 03/04/2024 3,000.00

PB23-0581 606 29TH ST N 434 - Add or Alter Dwellings M & J Construction 09/05/2023 03/03/2024 13,000.00

PB23-0582 1565 46TH AVE S 434 - Add or Alter Dwellings Ness Construction of the Lakes LLC 09/05/2023 03/03/2024 10,500.00

PB23-0583 1549 46TH AVE S 434 - Add or Alter Dwellings NESS RYEN N & AMY J 09/05/2023 03/03/2024 7,000.00

PB23-0584 604 HAMPTON DR E 434 - Add or Alter Dwellings Allstar Construction Res Op Co LLC09/05/2023 03/03/2024 10,214.00

PB23-0585 1533 46TH AVE S 434 - Add or Alter Dwellings Allstar Construction Res Op Co LLC09/05/2023 03/03/2024 10,355.00

PB23-0586 503 42ND AVE S 434 - Add or Alter Dwellings Allstar Construction Res Op Co LLC09/05/2023 03/03/2024 14,725.00

PB23-0587 600 HAMPTON DR E 434 - Add or Alter Dwellings Allstar Construction Res Op Co LLC09/06/2023 03/04/2024 13,347.00

PB23-0588 1703 46TH AVE S 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/05/2023 03/03/2024 19,383.00

PB23-0589 1550 44TH AVE S 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/05/2023 03/03/2024 15,959.00

PB23-0590 2316 7TH ST S 434 - Add or Alter Dwellings Bradsteen Construction Inc 09/05/2023 03/03/2024 27,000.00

PB23-0592 1914 15TH ST S 434 - Add or Alter Dwellings Pella Northland 09/07/2023 03/05/2024 16,157.00

PB23-0593 1402 45TH AVE S 434 - Add or Alter Dwellings Thorsteinson & Sons Constructi 09/06/2023 03/04/2024 14,000.00

PB23-0594 3361 39TH ST S 434 - Add or Alter Dwellings Summit Installations, LLC 09/06/2023 03/04/2024 2,291.00

PB23-0597 3616 VILLAGE GREEN LN 434 - Add or Alter Dwellings RAUGUTT JON 09/06/2023 03/04/2024 12,000.00

PB23-0598 3819 10TH ST S 434 - Add or Alter Dwellings KROSHUS MERLIN 09/06/2023 03/04/2024 15,365.00

PB23-0599 1908 29TH STREET CIR S 434 - Add or Alter Dwellings TINQUIST DANIEL N & DANIELLE L 09/06/2023 03/04/2024 117,351.00

PB23-0601 2721 26TH STREET CIR S 434 - Add or Alter Dwellings Your Home Improvement Company 09/06/2023 03/04/2024 2,250.00

PB23-0602 217 15TH ST N 434 - Add or Alter Dwellings Bradsteen Construction Inc 09/08/2023 03/06/2024 10,000.00

PB23-0603 1702 41ST AVE S 434 - Add or Alter Dwellings Cornerstone Remodeling LLC 09/07/2023 03/06/2024 11,297.00

PB23-0605 4465 19TH ST S 101 - One-Family Houses Detached HOUGH JV INC 09/08/2023 03/06/2024 210,000.00

PB23-0606 4473 19TH ST S 101 - One-Family Houses Detached HOUGH JV INC 09/08/2023 03/06/2024 205,000.00

PB23-0607 1910 5TH AVE N 437- Add or Alter All Other Buildings & Structures LIFEPOINT SANCTUARY INC 09/07/2023 03/05/2024 32,600.00

PB23-0608 3600 WESTMOOR DR 434 - Add or Alter Dwellings Olson-Legatt Roofing Inc. 09/08/2023 03/06/2024 21,825.00

PB23-0609 3813 RIVERSHORE DR S 434 - Add or Alter Dwellings Olson-Legatt Roofing Inc. 09/08/2023 03/06/2024 17,500.00

PB23-0610 3817 RIVERSHORE DR S 434- Add or Alter Dwellings Olson-Legatt Roofing Inc. 09/08/2023 03/06/2024 15,900.00

PB23-0612 3411 25TH ST S 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/08/2023 03/06/2024 17,316.00

PB23-0613 1901 41ST AVE S 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/08/2023 03/06/2024 9,377.00

PB23-0614 1901 41ST AVE S 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/08/2023 03/06/2024 9,400.00

PB23-0615 412 ALLYSON CIR 434 - Add or Alter Dwellings Fargo Roofing & Siding LLC 09/08/2023 03/06/2024 30,342.00

PUBLIC NOTICES

MOORHEAD SCHOOL BOARD

The following are abbreviated minutes of the Moorhead School Board, Independent School District 152, School Board Meeting held on August 28, 2023. The minutes, in their entirety, can be viewed in the Office of the Superintendent, MAPS Operations Center, 1313 36th Avenue South, Moorhead, or online at www.moorheadschools.org.

28 August 2023

CALL TO ORDER: On August 28, 2023, at 6:00 p.m., the School Board of Moorhead Area Public Schools #152 held its regular meeting at the MAPS Operations Center. Board Room 600. Chair Burgard called the meeting to order, with Laniee Bergin, Cassidy Bjorklund, Dave Marquardt, Keith Vogt, and Matt Valan in attendance. Several administrators were also present, including: Dr. Brandon Lunak, Dr. Jeremy Lamon, Kristin Dehmer, Duane Bogacker, Brenda Richman, and Dan Markert. Steve Moore entered remotely.

Presence of Agenda: Dr. Lunak recommended approval of the agenda as presented.

Approval of Agenda - ACTION: Bjorklund moved, seconded by Marquardt, to approve the agenda as presented. Motion Carried, 6-0-0, Roll Call Vote: Bergin - yes, Burgard - yes, Bjorklund - yes, Marquardt - yes, Vogt - yes and Valan - yes.

Public Forum: There were no requests to address the School Board.

CONSENT AGENDA: The following items were enacted under one resolution on August 14, 2023: August 14, 2023, School Board Meeting Minutes; August Claims; Family Medical Leave; Leave of Absence; Change in Contract; Resignations; and New Employees:

ACTION: Vogt moved, seconded by Bjorklund, to approve the Consent Agenda as presented. Motion Carried, 6-0-0, Roll Call Vote: Bergin - yes, Burgard - yes, Bjorklund - yes, Marquardt - yes, Vogt - yes and Valan - yes.

Revised 2023-2024 MHS Family and Student Handbook Language: Josh Haag, principal at Moorhead High School, reviewed the revised Student Parking of Motor Vehicles in School District Locations, language with the School Board. Administration recommended approval of the revised language.

ACTION: Valan moved, seconded by Bjorklund, to approve the revised Student Parking of Motor Vehicles in School District Locations language for the 2023-2024 MHS Family and Student Handbook as presented. Motion Carried, 6-0-0, Roll Call Vote: Bergin - yes, Burgard - yes, Bjorklund - yes, Marquardt - yes, Vogt - yes, and Valan - yes.

Health Services Update 2023-2024 Moorhead Area Public Schools: Erika Poney, supervisor of Health Services, gave an update on the 2023-2024 MAPS Health Services and the 2023-2024 school year goals. Board discussion followed.

Moorhead High School Hall of Honor Class Lawrence, Hall of Honor Committee member, presented to the School Board the six inductees for 2023. They are as follows: Douglas Echerle, Doug Hamilton, Russ Heinzer, Scott Hombacher, Greg Siekaniec, and Arlan Stangeland. The six inductees will be honored at the Hall of Honor induction ceremony brunch scheduled for Saturday, September 30. Board discussion followed.

Opening Day Enrollment: Kristin Dehmer, assistant superintendent of business and administrative services, briefed the School Board on the district's 2023-2024 Opening Day Enrollment. MAPS opened the school year with 7348 students K-12, a decrease of 79 students from 2022-2023 Opening Day.

Energy Efficiency Project: Approval to Award Ameresco: Steve Moore, executive director of operations and emergency management, recommended Ameresco as the qualified provider after requesting RFP for the project. The district will enter into an energy services agreement with Ameresco and sign an agreement with a financial institution funding the implementation work under the energy services agreement.

ACTION: Vogt moved, seconded by Marquardt, to approve the following resolutions: Select Ameresco as the district's energy services provider under Minnesota statutes section 123B.65; authorize and direct staff to execute Ameresco's energy services agreement; authorize and direct staff to sign finance documents with Bank of America, for $2,933,000 which will fund the implementation of the energy services agreement; authorize and direct staff to sign the "Notice to Proceed" document for the implementation and presented. Motion Carried, 6-0-0, Roll Call Vote, Bergin - yes, Burgard - yes, Bjorklund - yes, Marquardt - yes, Vogt - yes, and Valan - yes.

Minnesota Legislative Changes to MAPS Policies: Reading Dr. Lunak and the School Board completed a reading of selected Moorhead policies affected by Minnesota legislative changes. The Superintendent and School Board exercised the omission providing adoption in a single meeting under MAPS policy 321. The following policies were reviewed: 102 Equal Educational Opportunity, 412 License Status, 446 Staff Development, 509 Enrollment of Nonresident Students, 513 Student Promotion, Retention, and Program Design, 514 Bullying Prohibition, 515 Protection and Privacy of Pupil Records, 518 School Meals Policy, 522 Drug-free Workplace/Drug-free School, 573 Tobacco-free Environment, 577 Student Dress and Appearance, 613 Graduation Requirements, 616 School District Accountability, 621 Literacy and READ, 624 Online Learning Options, 630 Organization of School Calendar and School Day, and 653 Credit for Learning. Board discussion followed.

ACTION: Valan moved, seconded by Bjorklund, to approve the following policies to reflect the 2023 legislative changes in a single meeting pursuant to MAPS policy 321: 102 Equal Educational Opportunity, 412 License Status, 446 Staff Development, 509 Enrollment of Nonresident Students, 513 Student Promotion, Retention, and Program Design, 514 Bullying Prohibition, 515 Protection and Privacy of Pupil Records, 518 School Meals Policy, 522 Drug-free Workplace/Drug-free School, 573 Tobacco-free Environment, 577 Student Dress and Appearance, 613 Graduation Requirements, 616 School District Accountability, 621 Literacy and READ, 624 Online Learning Options, 630 Organization of School Calendar and School Day, and 653 Credit for Learning as presented. Motion Carried, 6-0-0, Roll Call Vote, Bergin - yes, Burgard - yes, Bjorklund - yes, Marquardt - yes, Vogt - yes and Valan - yes.

Superintendent Updates: None.

Adjournment: ACTION: Bjorklund moved, seconded by Vogt, to approve the adjournment of the August 28, 2023, School Board meeting at 7:27 p.m. Motion Carried, 6-0-0, Roll Call Vote, Bergin - yes, Burgard - yes, Bjorklund - yes, Marquardt - yes, Vogt - yes and Valan - yes.

/s/ Matt Valan, Clerk

Deb Becker,
Recording Secretary

(1t-ms)

Public Meeting Notice: Moorhead I-94 and 20th Street Interchange Analysis

Notice is hereby given that the Fargo-Moorhead Metropolitan Council of Governments (Metro COG) and their project partners (Stantec Consulting Services, Inc.) will hold a public input meeting on Tuesday, September 19, 2023, from 5:00 p.m. to 7:00 p.m. CDT at Minnesota State Community and Technical College (1900 28th Avenue S, Moorhead, MN 56560) to provide project background information and collect feedback related to the Moorhead I-94 and 20th Street Interchange Analysis.

This study will analyze the need and feasibility for a full interchange at I-94 and 20th Street. This includes reviewing traffic and travel time impacts of a full interchange, completing an environmental screening, and identifying potential alternatives which would look at impacts to the surrounding area and estimated construction costs.

Parking Instructions: Park in the West Lot and enter Minnesota State Community and Technical College through the W1 doors. The meeting will be held in the Bergos rooms using an open house format.

Meeting materials are also available on the project website for those who cannot attend in-person. Online public engagement can be accessed by visiting the project website with input being solicited until September 29, 2023. Public comments can also be submitted via email or mail to the project manager listed below.

Dan Farnsworth, Metro COG Project Manager; Phone: (701) 532-5106; Email: farnsworth@fmmetrocog.org; Address: 1 - 2nd Street North, Case Plaza, Suite 232, Fargo, North Dakota 58102

For meeting materials and additional project information, visit the project website at: fmmetrocog.org/20thInterchange.

Metro COG is committed to ensuring all individuals regardless of race, color, gender, age, national origin, disability/handicap, sexual orientation, or income status have access to Metro COG's programs and services. Metro COG will make a good faith effort to accommodate requests for translation services or physical copies of meeting proceedings and related materials. Please contact Savanna Leach, Metro COG Executive Assistant at (701) 532-5101 at least five days in advance of the meeting if any special accommodations are required for any member of the public to be able to participate.

(1t-ms)

METROCOG Fargo-Moorhead Metropolitan Council of Governments

Case Plaza Suite 232 | One 2nd Street North
Fargo, North Dakota 58102-4807
p: 701.532.5100| f: 701.232.5043
e: metrocog@fmmetrocog.org
www.fmmetrocog.org

FOR IMMEDIATE RELEASE

Contact: Dan Farnsworth, Metro COG Transportation Planner
FM Metropolitan Council of Governments
(701) 532-5106 | farnsworth@fmmetrocog.org

MOORHEAD I-94 AND 20TH STREET INTERCHANGE ANALYSIS – PUBLIC INPUT OPPORTUNITY

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) will be holding a public input meeting on Tuesday, September 19 at the Minnesota State Community and Technical College (1900 28th Avenue S, Moorhead, MN 56560) to provide project background information and collect feedback related to the I-94 and 20th Street Interchange Analysis. The meeting will be held from 5:00 p.m. to 7:00 p.m. CDT in the Bergos rooms with an open house format. Those interested in attending the public input meeting can park in the West Lot and enter the through the W1 doors.

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> Dan Farnsworth, Metro COG Project Manager
> farnsworth@fmmetrocog.org
> 1 - 2nd Street N.
> Case Plaza, Suite 232
> Fargo, ND 58102

The purpose of this study is to analyze the need and feasibility for a full interchange at I-94 and 20th Street. This includes reviewing traffic and travel time impacts of a full interchange, completing an environmental screening, and identifying potential alternatives which would look at impacts to the surrounding area and estimated construction costs.

For questions regarding the study, please contact Dan Farnsworth, Metro COG Transportation Planner, at farnsworth@fmmetrocog.org / (701) 532-5106. Alternative participation options will be accommodated upon request.

###

WELCOME TO PUBLIC INPUT MEETING #1

Moorhead I-94 & 20th Street Interchange Analysis

Tuesday, Sept. 19 | 5PM - 7PM

Attend a Future Public Meeting

Plan to join us at future public meetings. We will advertise upcoming meetings online and throughout the community.

You can be notified of future public meetings by providing your email address to: **farnsworth@fmmetrocog.org**.

Visit the Project Website

Stay up-to-date on meetings, next steps, and opportunities through the project website: **www.fmmetrocog.org/20thInterchange**

Leave a Comment

Share feedback via comment card or by emailing **farnsworth@fmmetrocog.org**. Comments will be collected until Sept. 29.

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PROJECT BACKGROUND

About the Project

Interstate 94 (I-94) is a heavily traveled corridor and a key link for a variety of traffic users, including local and through freight traffic, workforce and education commuters, local and regional shopping, and recreational travel. While there are four interchanges in less than 2.5 miles in Moorhead, the efficient operations of both I-94 and the local road network are limited by the fact that only two of these are full interchanges.

The current 20th Street Interchange has ramps on the west side only, meaning all westbound traffic on I-94 and traffic wanting to go east on I-94 need to use either the 34th Street (1.25 miles east of 20th Street) or 8th Street/US Hwy 75 (1 mile west of 20th Street) interchanges. The lack of Interstate connectivity to/from the east on 20th Street is presumed to increase the use of nearby interchanges and increase travel time for some users.

Study Purpose

The purpose of this study is to analyze the need and feasibility for a full interchange at I-94 and 20th Street. This includes reviewing traffic and travel time impacts of a full interchange, completing an environmental screening, and identifying potential alternatives which would look at impacts to the surrounding area and estimated construction costs.

Primary Study Area

The primary study area being analyzed focuses on the I-94 interchange at 20th Street. This area encompasses the footprint of the potential interchange alternatives. Screening for environmental impacts, technical performance, project costs, etc. for each of the interchange alternatives will take place in this area.

Secondary Study Area

The purpose of the secondary study area is to understand how different interchange alternatives at I-94 and 20th Street might effect the surrounding local and interstate network. This will not identify or evaluate potential alternatives within this area.

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PROJECT LOGISTICS

Next Steps

Collect comments from the public regarding existing conditions and future opportunities.

Finalize the environmental Purpose & Need Statement.

Develop an initial set of feasible alternatives based on technical analysis and community feedback.

Hold meetings with impacted stakeholders along the corridor.

Hold a second public input meeting in January 2024 to gain feedback on proposed alternatives.

Create a draft report with study findings and an implementation strategy.

Tentative Project Schedule*

2023 → 2024

June	July	August	September	October	November	December	January	February	March	April	May	June
Data Collection												
	Purpose & Need Development											
			Alternatives Development & Analysis									
			★ Public Input Meeting #1 Sept. 19, 2023		★ Stakeholder Meetings Nov. 2023		★ Public Input Meeting #2 Jan. 2024					
								Alternatives Cost & Funding Analysis				
									Draft Report			
									★ Report Comment Period Mar. 2024			
										Final Report		
											Implementation Presentations to Local Jurisdictions	

*The project schedule is subject to change as the project progresses.

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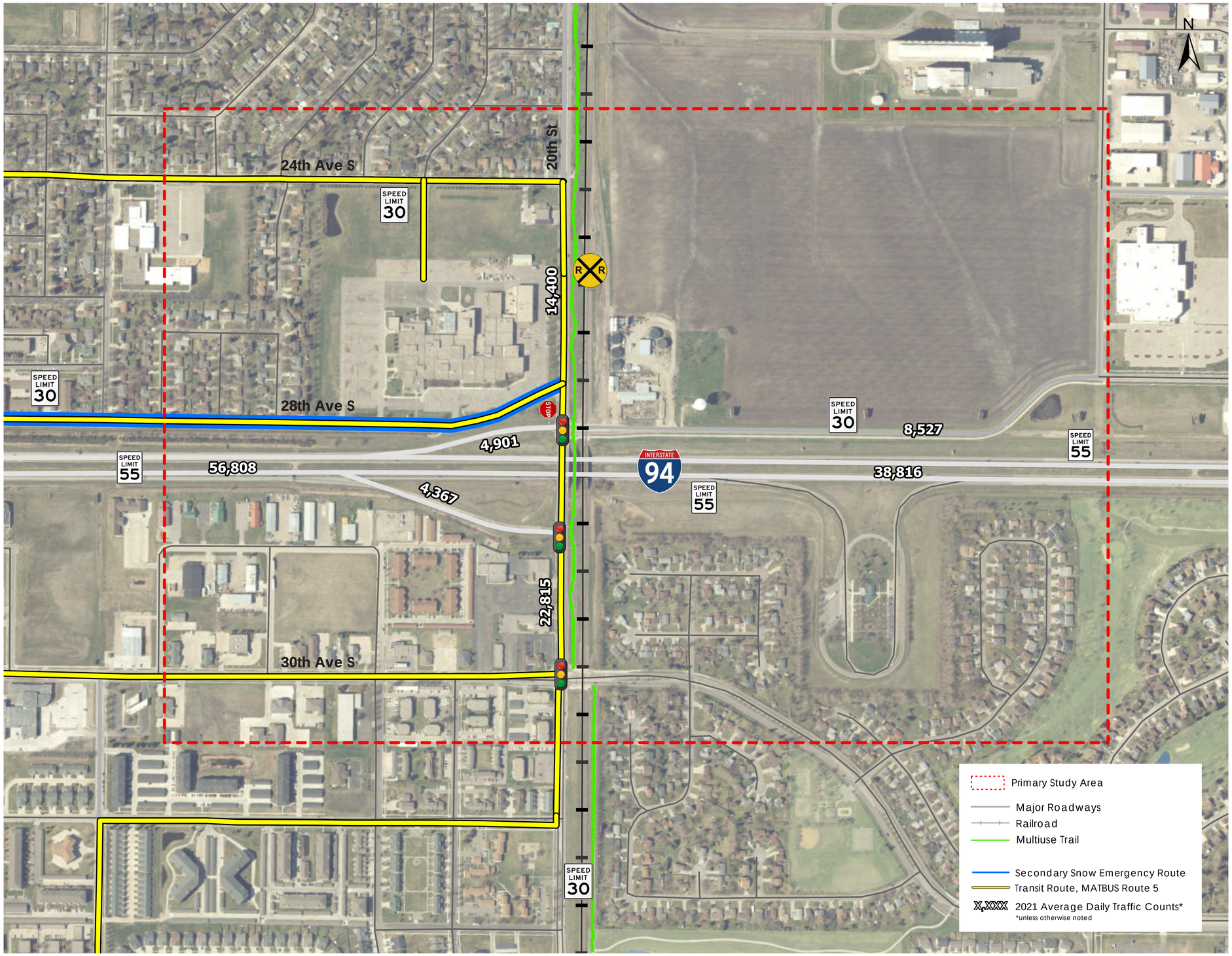
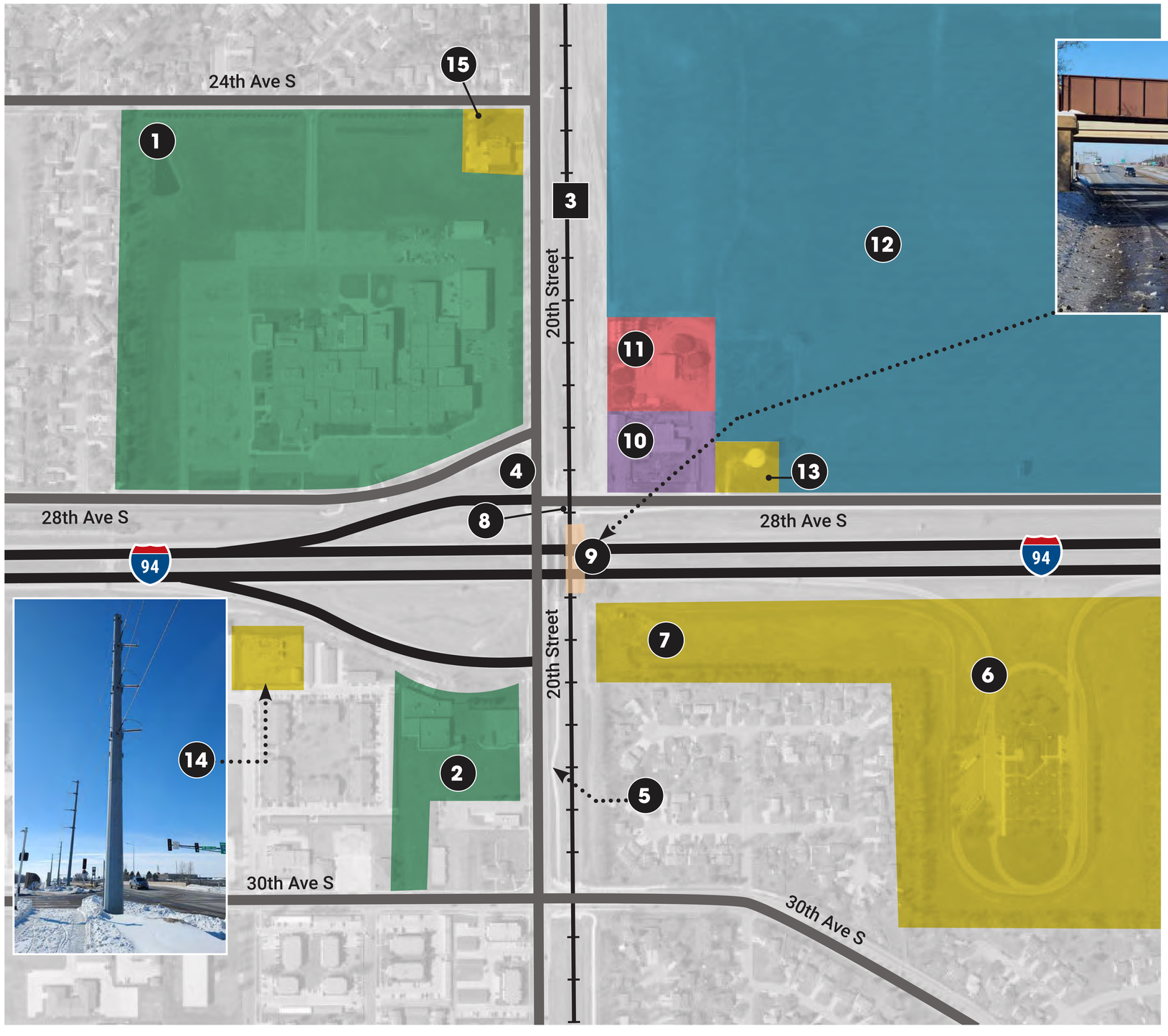
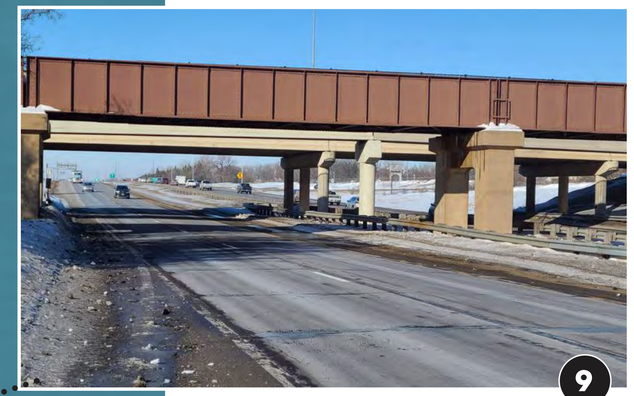
EXISTING CONDITIONS



KEY FEATURES





FEATURES

1	M State
2	Triumph Lutheran Brotherhood Church
3	BNSF Moorhead Subdivsion Track
4	28th Avenue Intersections
5	Multi-Use Trail
6	MnDOT Wayside Rest Area
7	MnDOT Lift Station
8	At-grade RR Crossing Contributes to Congestion and Driver Confusion
9	Existing Bridge Piers Limit I-94 Modifications
10	Ken's Sanitation and Recycling
11	Gavilon Fertilizer
12	Busch Agricultural Resources Property
13	City of Moorhead Water Tower
14	Moorhead Public Service Substation
15	Moorhead Fire Station No. 2

About the Project

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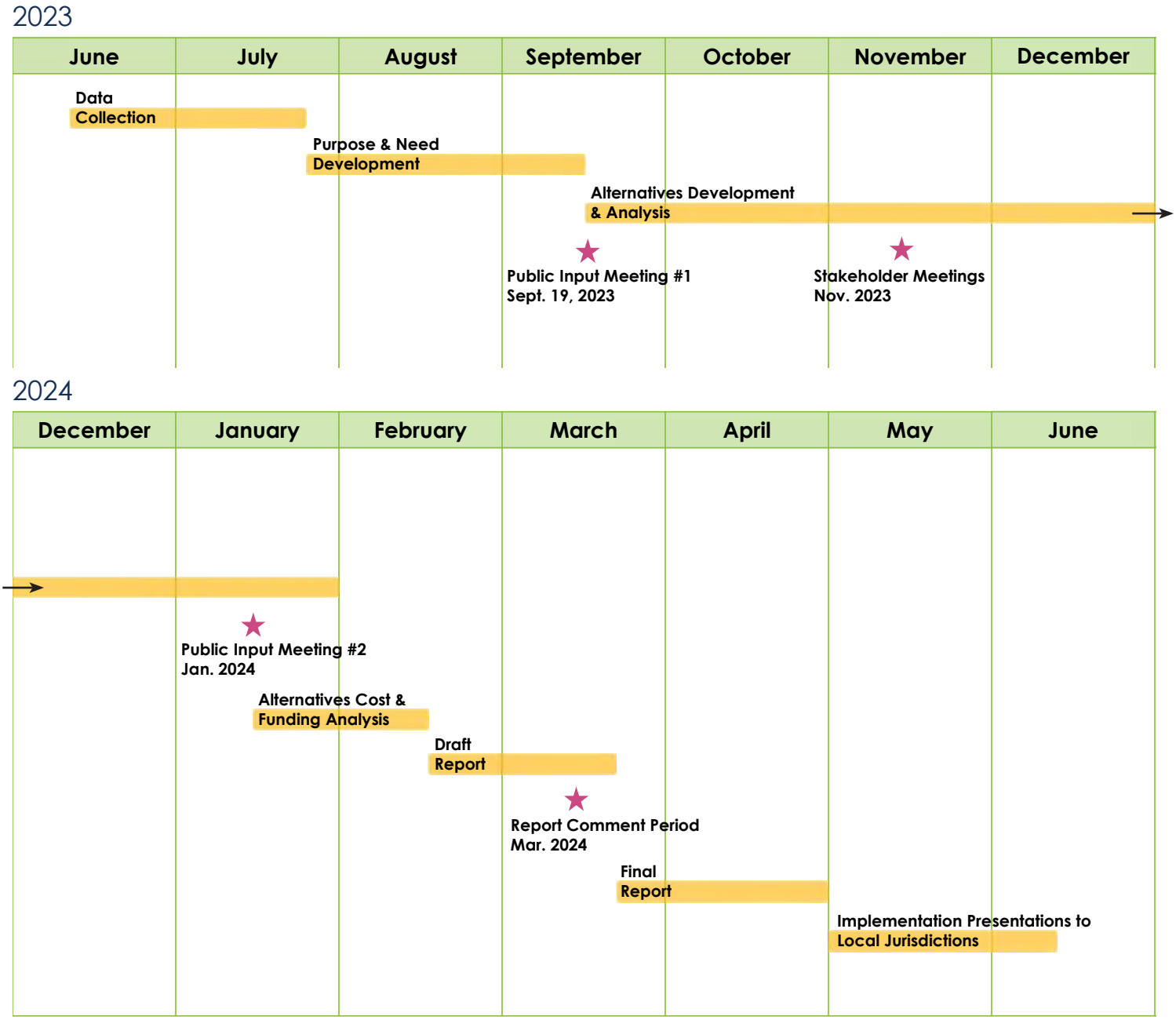
PUBLIC INPUT MEETING #1 | Sept. 19, 2023

Tentative Project Schedule*



*The project schedule is subject to change as the project progresses.

Stay Involved

Visit the Project Website
Stay up-to-date on future meetings, next steps, and opportunities through the project website:

SCAN ME!

www.fmmetrocog.org/20thInterchange

Contact Us

Dan Farnsworth, Metro COG Transportation Planner
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PUBLIC INPUT MEETING #1 PHOTOS | Sept. 19, 2023

Meeting Room Set-up

Minnesota State Community and Technical College (Bergos Rooms)

PUBLIC INPUT MEETING #1 PHOTOS | Sept. 19, 2023

Interacting with the public

Open house format with boards and layouts

Public Input Meeting #1 – Sept. 19, 2023

Name	Representing	Email
Sharon Williams		[redacted]
Would you like to be on this study's email notification list?		YES NO
DAN MAHLI		[redacted]
Would you like to be on this study's email notification list?		YES NO
Willard Hetrevi		[redacted]
Would you like to be on this study's email notification list?		YES NO
Ben Griffith	MeTro COG	[redacted]
Would you like to be on this study's email notification list?		YES NO
Barb Bustamante	ClayCo A.M.H.LAC	
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO
Would you like to be on this study's email notification list?		YES NO

Public Input Meeting #1 – Sept. 19, 2023

Name	Representing	Email
Kristin Ohren	neighbor	[redacted]
Would you like to be on this study's email notification list?	YES	NO
Marty Ohren	neighbor	[redacted]
Would you like to be on this study's email notification list?	YES	NO
DAN FISCHER		[redacted]
Would you like to be on this study's email notification list?	YES	NO
Kristie Leshovsky	City of Moorhead	
Would you like to be on this study's email notification list?	YES	NO
Pam Trowbridge	Citizen	[redacted]
Would you like to be on this study's email notification list?	YES	NO
Chris Dahl	Resident	[redacted]
Would you like to be on this study's email notification list?	YES	NO
John Lesch	Resident	[redacted]
Would you like to be on this study's email notification list?	YES	NO
Carson Ouellette	U.S. Senator Tina Smith Resident	[redacted]
Would you like to be on this study's email notification list?	YES	NO
Would you like to be on this study's email notification list?	YES	NO
Would you like to be on this study's email notification list?	YES	NO
Would you like to be on this study's email notification list?	YES	NO

Public Input Meeting #1 – Sept. 19, 2023

Name	Representing	Email
Mary Horacek	—	
Would you like to be on this study's email notification list? YES NO		
John Williams		[redacted]
Would you like to be on this study's email notification list? (YES) NO		
CHRIS WELLE	—	[redacted]
Would you like to be on this study's email notification list? (YES) NO		
Roger Kopperud		[redacted]
Would you like to be on this study's email notification list? (YES) NO		
Steve Trowbridge	Citizen	
Would you like to be on this study's email notification list? YES (NO)		
Darren Dressen		[redacted]
Would you like to be on this study's email notification list? (YES) NO		
Kjersti Madey	KVLY	[redacted]
Would you like to be on this study's email notification list? (YES) NO		
STEPHEN OLSON	SELF - RESIDENT	[redacted]
Would you like to be on this study's email notification list? YES (NO)		
Michael Rasmussen	Self	[redacted]
Would you like to be on this study's email notification list? (YES) NO		
Would you like to be on this study's email notification list? YES NO		
Would you like to be on this study's email notification list? YES NO		

Moorhead I-94 & 20th Street Interchange Analysis - Public Input Meeting #1				
	Name	**Received Via**	**Comment 1**	**Response 1 (if applicable)**
1	Sharon Williams	Comment card at PIM	Would like to see a roundabout at 20th & 28th Ave S, plus eliminate the traffic light. Would allow frontage road traffic to turn left on 20th & 20th St traffic going north to turn left on the frontage road. And move Ken's sanitation.	n/a (comment card)
2	Rita Rueckert	Email	As a lifelong resident of Moorhead, I strongly encourage proceeding with this project. From a resident's perspective, it gives greater flexibility and convenience for entering or exiting Interstate. However as a matter of public safety, ANYTHING that can be done to reduce the traffic congestion at the 8th Street interchange is greatly needed. The lines of eastbound cars at 8th street yesterday was backed up over the RR bridge. I have seen these lines in the AM and the PM. It is a dangerous situation for Interstate traffic, especially the ones who are unaware of the area traffic patterns. Thank you for the opportunity to share my opinion.	Thank you for your input regarding the I-94 & 20th St Interchange Analysis. We'll make note of your support for a full interchange at 20th Street. We'll also note your concerns about traffic exiting I-94 at 8th St. Recently we completed the Interstate Operations Analysis which looked at traffic and safety issues on both I-94 and I-29. We identified the eastbound I-94 exit ramp at 8th St as a location with excessive traffic backups and have recommended a project to reduce the traffic queues on the ramp and I-94 mainline. Thanks again for your interest in this study and your feedback.
3	Jessica	Online Form	As someone that uses the interchange daily I am wondering what the full plan will be. Add on raps for east bound, add off rap to 20th west bound, widen the overall bridge or adjust lanes?	Thanks for interest in the I-94 & 20th St Interchange Analysis and thanks for providing your question via the online survey/comment form. The goal of this study will be to develop interchange alternatives and determine the feasibility of adding ramps to & from the east. Ramps to/from the west will remain, however alignments of those ramps may change. As for the 20th Street bridge, there's a chance the bridge may be widened, depending on the alternatives, and the lane configuration of 20th St may change as well. We are currently developing interchange alternatives which we plan to show to the public this winter. We will have a much better idea of the layout of the ramps, bridge, lanes, etc. at that point.
4	Nancy Oster	Email	I live in south Moorhead, Meadows Golfcourse. I support adding the interchange. We never should have closed it, being we needed easier access to Menards, College, and Antique, etc.	Thank you for your interest in this study and your input. We'll make note of your comment as you we move forward with this study.
5	Thomas Overmiller	Email	As a resident near Hwy 94 btwn 8th and 20th, I have a few questions regarding the interchange project proposal. •The project analysis page says there is a "presumed" need or inconvenience due to the lack of full interchange for east-bound traffic. Is this presumed need based upon hard data you've gathered or just a general inclination? *- At the beginning of this study it has been our general inclination that the lack of Interstate connectivity to/from the east on 20th St is presumed to increase the use of nearby interchanges and increase travel time for some users. However, we'll be conducting traffic analysis and origin-destination analysis in the upcoming months to obtain hard data about the number of vehicles that are using nearby interchanges to travel to & from the east.* •How will a full interchange affect/impact Minnesota State Community College, Triumph Lutheran, the recycling station, and the SE corner residences? *- We are in the process of developing full interchange alternatives which we plan to present to the public this winter for comments. Our goal is to minimize impacts to nearby residences, businesses, and institutions as best we can. That said, any impacts will vary based on the alternatives developed. Since the alternatives are still in development I can't speak too much about these at the moment, but we'll have a much clearer idea of the affect of the alternatives on nearby properties this winter. We encourage you to stay engaged and join us this winter for our second round of public engagement. If you haven't already signed-up for this project's email list, we encourage you to do so here: http://fmmetrocog.org/20thInterchange/get-involved (see "Subscribe" in lower right area of webpage)* •I would guess that the N/W train tracks/railway is a significant reason why there is no eastbound interchange. How will such an interchange affect the tracks? *- The adjacent railroad tracks just east of 20th St will be a challenge as we develop alternatives, and crossing the tracks will have implications to traffic flow during train movements. While some alternatives may involve crossing the tracks, other alternatives will be developed which will avoid the need to cross train tracks such as loop ramps to/from the east.* •Will such a project increase property taxes or specials for nearby residents or would this project be funded by MN state? *- I would envision this project would be primarily funded by the state of Minnesota since it involves a MnDOT corridor and interchange. However some aspects of the funding may fall on the city such as some improvements to 20th Street. It's hard to say what source of funding Moorhead may use. That might be a question the city could better answer.*	Thank you for interested in this study and thanks for your questions. Please see below for answers to your questions. I hope this helps. Feel free to reach out if you have any additional questions. *NOTE: Dan's comments are under each bullet (-) seen to the left.*

Moorhead I-94 & 20th Street Interchange Analysis - Public Input Meeting #1				
	Name	**Received Via**	**Comment 1**	**Response 1 (if applicable)**
6	Lori Van Beek	Email	You asked that I put our comments in writing, so here you go. The bus drivers supervisor may have more comments after meeting with the drivers (Josh is copied on this email). MATBUS Route 5 travels both north and south on 20th Street South between 24th Avenue and Belsly Blvd. This is an important route for us to reach M|State and multi-family housing south of I-94. Northbound comments: •Route 5 travels east on 30th Avenue and then makes a left-hand turn onto 20th Street. The 20th Street lane is very narrow and has yellow candle sticks separating it from cars merging on to 20th Street from westbound 30th Avenue. •After turning onto 20th Street, the bus has to move into the right-hand lane to go straight. The left-hand lane becomes a left-hand turn only lane for entering onto the I-94. Many vehicles don't understand this and quickly cut-in because they want to go straight rather than turn onto I-94. Southbound comments: •The right-hand lane leading to the I-94 exit is a right turn-only lane with an arrow painted on the road. However, the arrow isn't always visible and cars often go straight. Since the Route 5 bus is going straight and then needs to make a right-hand turn at 30th Avenue, it can be difficult to move to the right lane between I-94 and 30th Avenue due to cars not adhering to the right turn only.	Thanks for providing those comments from MATBUS's perspective. Those are helpful. I'll forward onto the study team.
7	Doug Rogness	Email	My name is Doug Rogness. I serve as Lead Pastor at Triumph Lutheran Brethren Church, on the corner of I-94 & 20th Street. I am excited to see what comes of this conversation, as I believe it will relieve pressure on 8th and even on 30th through the residential neighborhoods. I am concerned about two things: 1) the impact on our driveways leading to 20th Street. Many of our vehicles exit to 20th, and if we have a full interchange, I believe traffic will increase and make that more difficult. And, 2) any changes to this interchange will probably impact our property. I'd love to be in the loop on that. Several years ago, a drawing was released of a possible change on this interchange, and the drawing showed the exit ramp going right through our building. We were unaware of that conversation until the drawing was released. I'd like to be a part of conversations as they move forward. Thanks for your consideration, and thanks for all you do for the FM area! - Pastor Doug Rogness	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. Those are both good and valid concerns you have about the church's property and driveway access. As we begin to develop interchange design alternatives, we'll do our best to accommodate the church's driveway access, while considering safety of those using both 20th St and the driveways. Sometimes these studies recommend consolidating driveways for safety and mobility reasons. If this study recommends any such driveway revisions, this would be a cooperative discussion involving the property owners. Regarding the impact of the interchange to the church or church property, we would like to see as minimal of an impact as possible. Ideally there would be no impact. If there is the possibility that an alternative would impact the church or church property, we would like to meet with you early on. We plan to hold a series of stakeholder meetings in November to have discussions with businesses and institutions, including you/church representative(s), to hear what questions and concerns everyone might have about potential modifications to this interchange. You can plan to hear more from us about setting up at meeting in a couple months. In the meantime, please don't hesitate to reach out if you have any additional questions or concerns.
8	Andrew Nielsen	Email	I think the current interchange is adequate and traffic flows well both on 20th Street and coming off/on I-94. The only time we would need to travel east at that interchange is to avoid a train along 20th Street. I feel that money would be better spent elsewhere.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study.
9	Maria Kellam	Email	Please add exits for East ramps into and out of 20th St.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
10	Amber Dew	Email	: I live on 42nd Ave and 19th street. Last year I traveled east every day for work. I have family I visit frequently going east as well as standard travel to Minneapolis. I will be working at the Sanford moorhead clinic as a theerapist which requires me to travel east starting November. I do NOT want an interchange at 20th street. Of all the people who should want one, I do NOT see a significant benefit for the price. 8th street is very close and 34th is not terribly far away. If a solution is needed to use 34th interchange more, build 45-50mph road between 20th street and 34th street either on the Ken's sanitation -menards frontage road which might also increase business development in that area. Business and convenience may have the added benefit to keep Moorhead citizens inside the city. Making it easier to just bypass the city is not really the answer here. An interchange does not quite have the benefit I think some citizens think it will especially for the expense. Spend the money on other streets intersections around the interstate to improve efficiency rather than waste money on this project. Thank you for your public service.	Thanks for interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the interchange and other suggestions & needs in south Moorhead. This study will be looking into the feasibility of a full interchange at 20th St. If it is found to be unfeasible, the interchange may remain as-is. Once again, we appreciate your comment and will make note of it as we proceed with this study.
11	Ariana Krecklau	Email	This should have on and off ramps for I94 east and west bound. Traffic gets too backed up when exiting I94 east turning left onto 20th. To enter I 94 west there should be a lane dedicatedfor this as well as removing the weird frontage road turn right next to it	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
12	Stanley J Kwiencien	Email	east bound on i94 and 20th st would probably be good. personally, probably not going to be used by myself very much but I see it as an accessibility to the interstate that is much needed.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study.
13	Alex Upton	Email	I live in the Johnson Farms neighborhood and the expansion of this interchange would be extremely beneficial to me. Whenever I need to travel East to the Twin Cities or along the Highway 10 corridor, I must either backtrack along 30th Ave to the 8th St interchange, or take the slow route through Village Green to the 34th St interchange. The story is the same but reversed when returning from the East. Having a full interchange at 20th St would speed up travel time and make getting to and from my house easier.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.

Moorhead I-94 & 20th Street Interchange Analysis - Public Input Meeting #1				
	Name	**Received Via**	**Comment 1**	**Response 1 (if applicable)**
14	David Jacobs	Email	When students are leaving M state they seldom stop and it is sometimes hard to enter eastbound 94 from 20th. I would like 94 access from both sides.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
15	William Weightman	Email	The mixed used bridge (that would likely be demolished to make way for this project) is one of the best we have across i-94. It involves minimal change in grade (critical for bicycles and pedestrians) and is the eastern-most best bridge for these users (highway 52 is too dangerous due to automobile speeds and no separated infrastructure, and 34th street has significant grade change and effectively connects no walkable places). The loss of this bridge to make the necessary room would be a great disappointment. The induced vehicle demand this would bring to a largely residential area is also undesirable. Only saving 2 minutes in an automobile trip, by encouraging more utilization of automobiles to the area, is problematic. The area is already too dangerous for peds and bicycles at the surrounding intersections, and encouraging more vehicles to use the space will disincentivize human based transportation. Additionally, highway interchanges are expensive use of city land and a long term maintenance liability. There should be a real financial return for the city in higher property values (and therefore taxes) that would generate more income than the long term expense of maintaining the expanded interchange.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. Your point makes a lot of sense that the existing bicycle/pedestrian bridge over I-94 is a safe, useful, and comfortable experience for users. For these reasons we'll do our best to preserve this bicycle/pedestrian bridge as we look at the interchange alternatives. The fact that this bridge is separated from 20th St and the fact that the bridge piers are located where they are put this bridge in a favorable location to remain in-place. In the event that this bicycle/pedestrian bridge would need to be removed, bicycle and pedestrians will be accommodated at this interchange. I'll also note that we are looking at ways to improve pedestrian crossings of 20th St.
16	Rand Carlson	Email	I would much prefer the creation of a more convenient frontage road between the interchange and 34th St. An extension of 27th from Main to 34th would make a lot more sense. The existing geometry from layman's point of view isn't very conducive to a cloverleaf ramp at the location and the railroad doesn't allow for a diamond interchange to be created there. The rest area at the location means that with proper acceleration lane length going eastbound, weaving between drivers going into the rest area and those going onto the mainline would be introduced and I don't foresee that being safe. I think the best option by far along with the lowest cost would just be to extend 27th ave to 34th St.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study.
17	David	Email	Driving south bound is a bit of a mess due to the shifting lane where 28th ave merges, but in light of how changes to 8th street have made 8th more dangerous, I would rather this intersection not be be touched. I'm worried that it will just add more options for people to merge into incorrect lanes.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study.
18	James Paulsen	Email	much needed.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
19	Jarad Mahlen	Email	For everyone living in between 8th st and 20th street in Moorhead and travelling east this would substantially save on their commute.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
20	John Olson	Email	It's fine how it is. I've never had any issues	Thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study.
21	Brian J	Email	This is absolutely a necessity for the citizens and City odd Moorhead... It's way overdue fire implementation.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
22	Mike Jorud	Email	this would be great for me on and off 20th many times a day,thanks	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
23	Michelle Werner	Email	The mornings around 8 am the interchange is very busy as there is traffic coming from the Village Green area getting on the interstate, and people exiting the interstate trying to go North. Sometimes, the light going North/Douth 8 am is very busy with people coming from the South getting on the interstate, and people exiting the interstate trying to go North. The N/S light changes and the exit light turns green, but sometimes very few vehicles can go through because there is no room to turn North. This exit gets backed up often in the morning. I have also seen this same thing happen during around elementary dismissal (2:30 pm) and 5 pm-6 pm. It also causes traffic/vehicles to back up onto the interstate unsafely, occasionally. This also happens, occasionally, on the 8th St Exit. Thank you for your time.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study.
24	Tobey K	Email	I am absolutely happy with the way it is. Please leave it alone. I never see backed up traffic at this location. There is no need for it. If you wish to do anything, please put a left turning lane on 34th Street (going north) at the Boulder Taphouse and Target frontage road. Leave the raised curbed area and make the turn so it is obvious to the people leaving Boulder and Target that they can only turn right. Thanks!	Thanks for your comment pertaining to the I-94 & 20th Street Interchange Analysis. We'll make note of your comment as we continue proceeding with this study.
25	Jim McKinstra	Email	This is a no-brainer. Of course there should be a full interchange allowing both eastbound and westbound traffic at 20th St S and I-94. Why wasn't this done earlier? Why didn't the full interchange exist years and years ago? To me this has never made any sense to have only east bound traffic, coming from Fargo, being able to exit on 20th Street S and not allowing westbound traffic to do the same.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. To answer your question below, I'm guessing the reason for the ramps only going to/from the west currently is because of the adjacent railroad tracks and the traffic backups that could occur on the ramp due to a train. Also, since most traffic is traveling to/from the west (Fargo), ramps to/from the east might not have been as high of a priority at that time. However, this study will be looking at alternatives which would provide ramps to/from the east while designing ramps that would have minimal/no impact by the adjacent railroad.

Moorhead I-94 & 20th Street Interchange Analysis - Public Input Meeting #1				
	Name	**Received Via**	**Comment 1**	**Response 1 (if applicable)**
26	Gregory J Anderson	Email	I think it is a critical spot and should be a full interchange!	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
27	Sean Brandenburg	Email	Given the growth of the F-M Area in the last 10-15 years, it seems to certainly be time for a full interchange at this location. Having to meander around through the city to go to 34th street to access the interstate eastbound is ridiculous and unnecessary for a city of our size. Likewise for folks traveling westbound on 94 trying to access M-State, Moorhead High, and other frequently traveled to destinations.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
28	Chad Markuson	Email	Adding the west bound exit will be huge for people traveling to both MSUM and Moorhead HS	Thanks for interest in the I-94 & 20th St Interchange Analysis and thanks for comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
29	Brenda Norris	Email	A full interchange at this intersection would be wonderful to access the downtown Moorhead. 8th Street South traffic is congested and getting to the 34th Street interchange is confusing when you are heading east out of town.	Thanks for interest in the I-94 & 20th St Interchange Analysis and thanks for comment pertaining to the study. We'll make note of your support for a full interchange at 20th Street as we continue proceeding with this study.
30		Email	We are concerned about additional noise level, increased traffic on 20th street, cost to home owners(assessments) ,safety considerations for pedestrians walking or riding bike, length of construction project inconvenience, and overall real need as presented.	Thanks for your interest in the I-94 & 20th St Interchange Analysis and thanks for your comment pertaining to the study. We'll make note of your comment as we continue proceeding with this study. I'll note that, as part of this study, we'll be running a computer model to determine how ramps to/from the east could affect traffic on city corridors such as 20th St. We plan to have this data available at our next public involvement opportunity, which is scheduled for this winter. Would you like your email address to be included for future notifications regarding this study?

March 2025

Public Engagement Summary

Moorhead I-94 & 20th St Interchange Study
Public Engagement – Second Round (March 2025)

Overview

The second round of public engagement for the Moorhead I-94 & 20th St Interchange Study was held in March of 2025. This round of public engagement presented to the public the two interchange alternatives developed since the first round of engagement held in September of 2023. The purpose of the second round of public engagement was to keep the public informed of the study progress and solicit feedback on the two interchange alternatives. The second round of public engagement involved both online and in-person engagement.

Public Notifications

Notifications for the online and in-person engagement were in accordance with Metro COG's Public Participation Plan (PPP). The following methodologies were used to notify the public.

Notification Method	Date of Notification
Newspaper ad in FM Extra*	March 6th
Press release	March 4th
Website materials (Metro COG homepage banner, Metro COG website calendar, and materials on project page)	March 4th
Social media announcements	Metro COG 1st post: March 7th City of Moorhead post: March 7th Metro COG 2nd post: March 11th
Email to interested persons list, SRC members, and Stakeholders	March 4th
Postcards (80 postcards sent to nearby residential & business properties)	Mailed on March 5th
*Metro COG's PPP requires newspaper ads to be published at least 7 days prior to a public meeting. However, since the FM Extra publishes only weekly, it was deemed most effective to publish the ad on March 6th rather than February 27th.	

The public comment period was open until March 24th, 2025.

Public Open House

A public open house was held from 5:00 pm to 7:00 pm on March 11th, 2025 at the Triumph Lutheran Brethren Church located at 2901 20th St S in Moorhead. Approximately 30-35 people attended the public open house.

Meeting materials included:

- Sign-in sheet. 32 people signed in.
- NDDOT Title VI Public Participation Survey. 10 people filled out the Title VI survey.
- Four display boards
    - Project Background
    - Key Features
    - Partial Cloverleaf interchange layout
    - Single Quadrant interchange layout
- Printed table displays of the two interchange alternatives (Partial Cloverleaf and Single Quadrant)
- A Frequently Asked Questions handout
- A seven-question survey, which included space for open-ended comments. 16 surveys were completed.

Online Engagement

Online engagement consisted of project information and materials, a public survey, an email sign-up option and contact information. Online engagement was held on the project webpage which was hosted as part of Metro COG's website. This round of online engagement went live on March 4th and remained live through March 24th.

The same materials presented at the March 11th public open house were shown online. Similarly, the same survey provided at the public open house was provided online. In total, 22 people took the online survey.

Summary of Feedback

The vast majority of feedback was received via the online and paper surveys. The surveys were comprised of nine questions with one question being an open-ended comment opportunity. Key results from the surveys and comments are summarized below. For the full survey results, please refer to the attachment.

Improvements to interchange

- 14% - Would like no improvements to interchange
- 11% - Would like improvements to interchange but no ramps to/from east
- 75% - Would like improvements to interchange, including ramps to/from east

Parclo (Partial Cloverleaf) interchange

- 69% - Like this interchange configuration
- 3% - Are neutral about this interchange configuration
- 18% - Dislike this interchange configuration

Single Quadrant interchange

- 57% - Like this interchange configuration
- 5% - Are neutral about this interchange configuration
- 38% - Dislike this interchange configuration

A new north-south road from 28th Ave to 24th Ave on west side of M-State (applies to Parclo alternative)

- 56% - Would like to see this roadway
- 26% - Would not like to see this roadway
- 18% - Unsure

Upon reviewing the open-ended comments, the following themes were shared by the public:

- **7 comments** expressing interest in ramps to/from the east
- **5 comments** expressed confusion in lane assignments and/or missing pavement markings on 20th St at interchange
- **3 comments** would like improved bicycle/pedestrian accommodations at 20th St interchange
- **3 comments** would like more vehicle capacity on the 20th St interchange bridge
- **3 comments** expressed concerns about adding additional traffic onto 20th St

All open-ended comments can be viewed in the full survey results provided in the attachment.

Attachment 1

Survey Results

Q1 What is your name? (Optional)

Answered: 7 Skipped: 31

#	RESPONSES	DATE
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

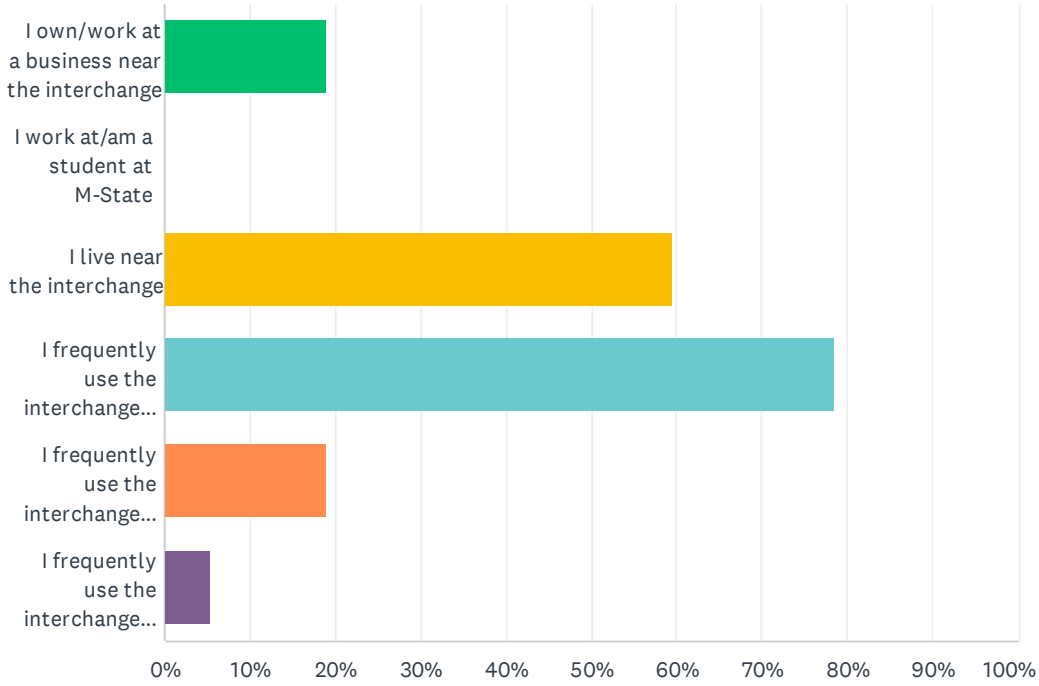
Q2 If you'd like to receive a response, please provide your e-mail address. (Optional)

Answered: 6 Skipped: 32

#	RESPONSES	DATE
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Q3 What is your relationship with the interchange? (Select all that apply)

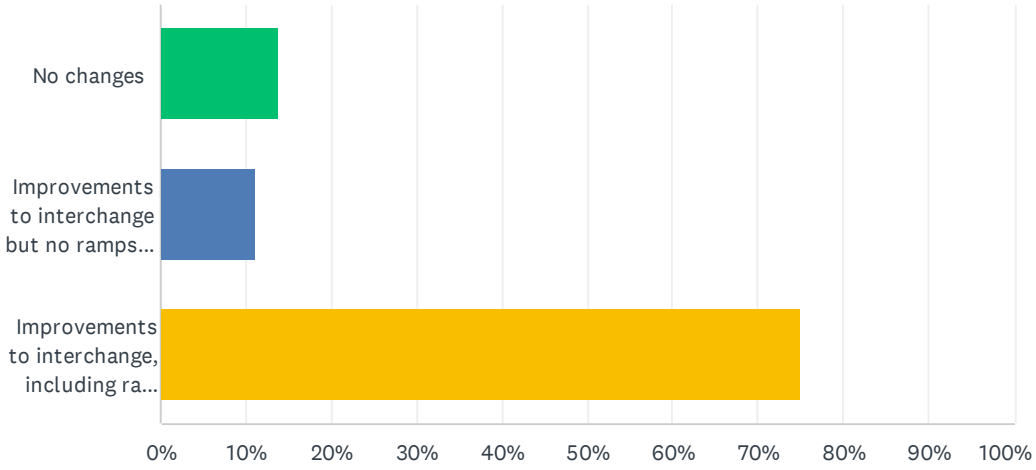
Answered: 37 Skipped: 1



ANSWER CHOICES	RESPONSES	
I own/work at a business near the interchange	18.92%	7
I work at/am a student at M-State	0.00%	0
I live near the interchange	59.46%	22
I frequently use the interchange (driving)	78.38%	29
I frequently use the interchange (walking/bicycling)	18.92%	7
I frequently use the interchange (public transportation)	5.41%	2
Total Respondents: 37		

Q4 In future years (7+ years), would you like to see changes/improvements to the I-94 & 20th St interchange?

Answered: 36 Skipped: 2



ANSWER CHOICES	RESPONSES	
No changes	13.89%	5
Improvements to interchange but no ramps to/from the east.	11.11%	4
Improvements to interchange, including ramps to/from the east.	75.00%	27
TOTAL		36

Q5 Feel free to share which improvements you'd like to see to the I-94 & 20th St interchange. (optional)

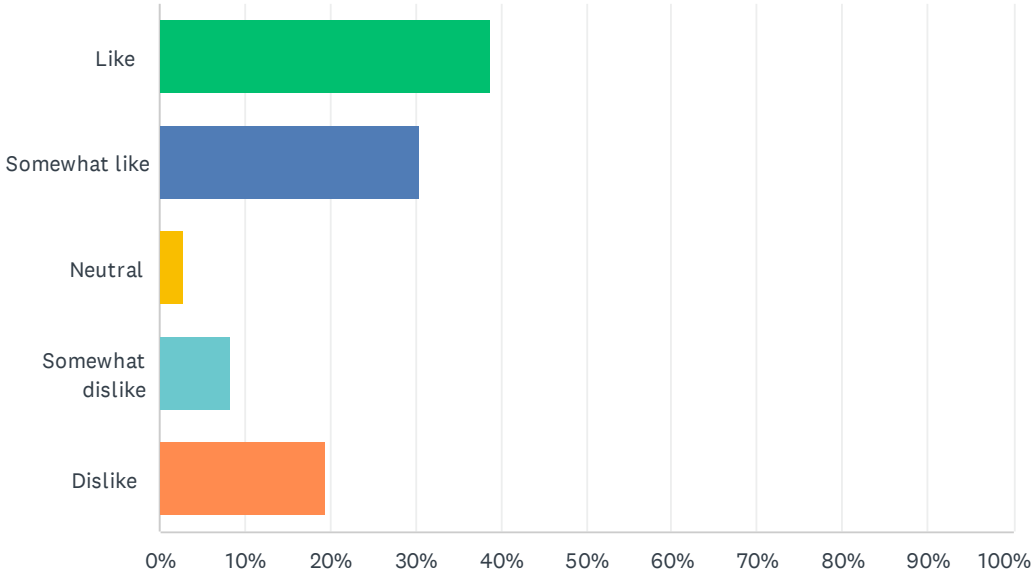
Answered: 19 Skipped: 19

#	RESPONSES	DATE
1	None	3/22/2025 2:13 PM
2	In addition to wanting an exit onto 20th St when we are coming home from the Cities, I have also long thought we need a traffic light at the T intersection of 24th Ave and 20th street by the fire station. It is very difficult to turn left or right from 24th Ave onto 20th St.	3/17/2025 12:35 PM
3	Eliminate the interchange. Adding the street connection is good in all contexts	3/16/2025 4:08 AM
4	[redacted] I have a strong connection to the I-94 and 20th Street interchange and the surrounding area. While I could use this interchange regularly, I intentionally avoid it—especially during the morning commute—because it's unpredictable and feels unsafe. Delays can be caused by train crossings, interstate backups, and local congestion, making it difficult to gauge how long it will take to get through. The current road layout is narrow, poorly marked, and confusing—particularly for new drivers, older residents, or those unfamiliar with the area. It's unclear which lanes turn left or go straight, and the timing of entering the intersection or proceeding on a green light can be difficult to interpret. These factors make the interchange especially challenging to navigate and prone to close calls or accidents. Improving this interchange would significantly enhance safety and connectivity from a commuter and community perspective. It would make accessing key institutions like M State, MSUM, and the new Moorhead High School more straightforward and reliable—especially for visitors who may already be unsure of the layout. Compared to the 8th Street exit, this could become a much safer, more efficient route into south Moorhead. I strongly support the partial cloverleaf option, which appears to be the safest and most efficient design. Moving the traffic light further north and eliminating the complicated connection to 28th Street would streamline traffic flow and reduce confusion. Beyond traffic safety, this project also offers economic potential. Improving access along the frontage road on the north side of I-94 between 20th Street and Main Avenue SE could help catalyze development in an area with vacant lots, farmland, and underutilized space—especially near the Moorhead High School Career Academy and south of Menards. Finally, I would never consider using this interchange on a bike—it feels entirely unsafe for pedestrians or cyclists. A redesigned interchange could incorporate better multimodal access and promote safer travel options for all residents.	3/15/2025 10:09 AM
5	Entrance to East 94 and Exit from west 94	3/13/2025 10:26 AM
6	Add East West I94 entrance/exit near 20th st. Moorhead. Add alternating tamps for 8th st. on ramps to I94	3/13/2025 10:25 AM
7	Railroad crossing to the east from 20th st so. to 28th	3/13/2025 10:23 AM
8	It would be great to be able to get to 20th street either from east or west.	3/13/2025 10:20 AM
9	I will just recommend have fresh pain of the line that are on the lanes so they be more noticeable at night or inclement weather.	3/13/2025 10:19 AM
10	Silent zone for railroad. Easier to read/placement of speed limit signs on 20th street or each side of the 20th street bridge.	3/13/2025 10:17 AM
11	not worth the money to redo the interchange. Change the interchange by Menard's.	3/13/2025 10:12 AM
12	Ramps are great, left turn lane , straight, and right on northbound 20th St is needed sadly.	3/13/2025 10:10 AM
13	Any opportunity for safer pedestrian crossing from path to MState? Cascade improvement to 30th Ave/ 20th St intersection.	3/13/2025 10:07 AM
14	There needs to be a wider bridge with more lanes for traffic north and south, as well as an on/off ramp on 20th st going east and west.	3/13/2025 10:05 AM

15	Definity access to both East & West directions onto & off I-94. Lane Clarity/ more lane options - divers are often confused which lane to be in to access 94 going west. 29th Ave access to 20th St no lost, also access to 28th Ave from 20th St is narow, truck and plows have trouble going in.	3/13/2025 10:02 AM
16	Obviously it needs some changes. I like the simplicity of the partial cloverleaf and that the 28th Ave S, intersection moves north. Anything that makes traffic flow smoother would be good.	3/13/2025 9:57 AM
17	Single quadrant	3/11/2025 6:20 PM
18	Reconfigure north- and south-bound lanes on 20th St @ I94, including the village green blvd intersection. There is excessive weaving required, especially north-bound on 20th street.	3/11/2025 2:13 PM
19	It should be a diamond interchange. The off ramp from I94 onto 20th St heading North backs up so much during high AND low traffic areas. Also the left turn should have guiding lines as the turn leads you directly into a turning lane and not the straight lane.	3/10/2025 7:54 AM

Q6 Please share your preference on the Parclo interchange alternative.

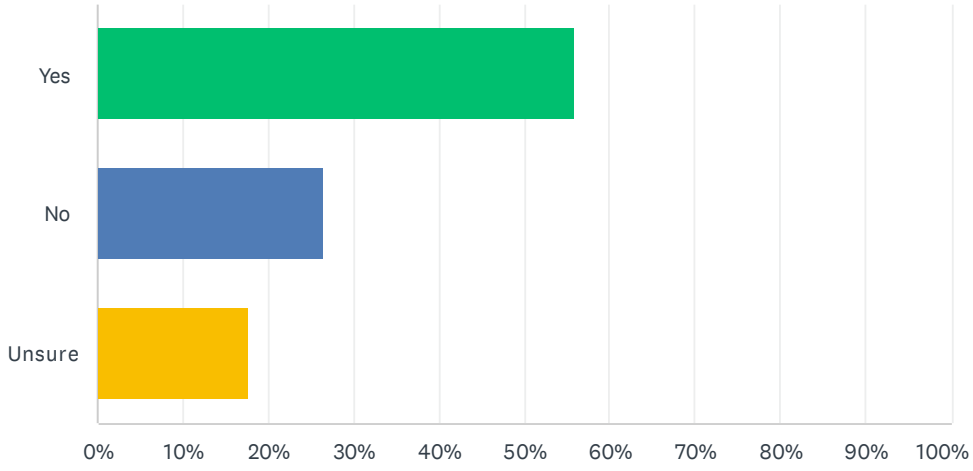
Answered: 36 Skipped: 2



ANSWER CHOICES	RESPONSES	
Like	38.89%	14
Somewhat like	30.56%	11
Neutral	2.78%	1
Somewhat dislike	8.33%	3
Dislike	19.44%	7
TOTAL		36

Q7 For the Parclo interchange alternative, would you like to see a north-south connector road from 28th Ave to 24th Ave on the west side of the M State campus? (see Parclo figure above for possible north-south connector road)

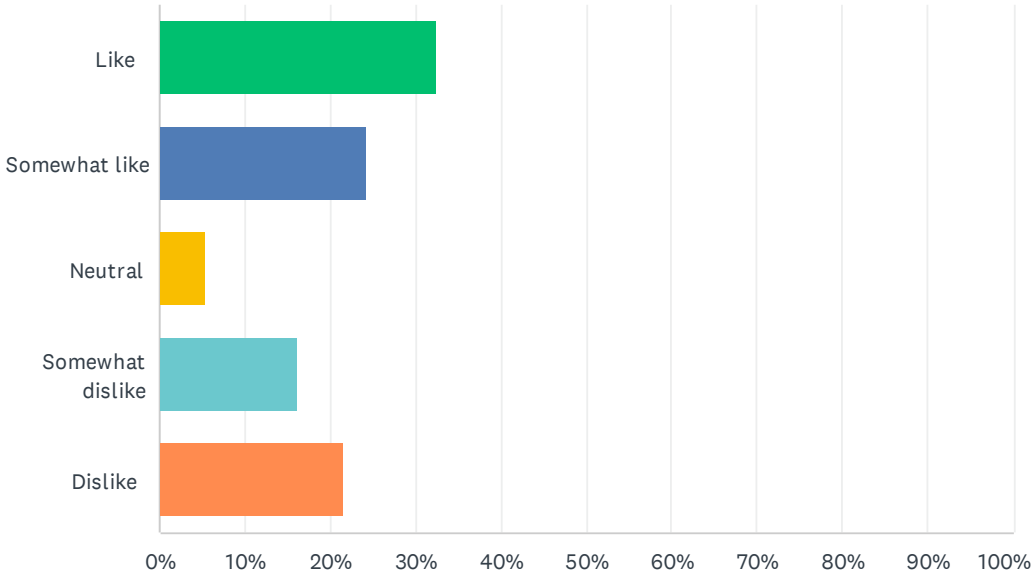
Answered: 34 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	55.88%	19
No	26.47%	9
Unsure	17.65%	6
TOTAL		34

Q8 Please share your preference on the Single Quadrant interchange alternative.

Answered: 37 Skipped: 1



ANSWER CHOICES	RESPONSES	
Like	32.43%	12
Somewhat like	24.32%	9
Neutral	5.41%	2
Somewhat dislike	16.22%	6
Dislike	21.62%	8
TOTAL		37

Q9 Please share any comments you have regarding the I-94 & 20th St interchange. (optional)

Answered: 19 Skipped: 19

#	RESPONSES	DATE
1	I do not understand the need to add additional traffic on 20th street which is a two lane road. We have 8th street, old 52 and 34th street that are all 4 lane roads. The selling point years ago on 34th street is that was supposed to be the “new” 8th street and take all of this traffic. I have seen traffic backed up from 12th avenue back to 6th Ave at certain times of the day. Now you want to add more traffic to 20th street? Again , another engineering dream that does not need to be done…..	3/22/2025 2:13 PM
2	We live [redacted] so often take 28th Ave from our place to/from Menards. God forbid we lose our direct Menards route ;) We use that a lot.	3/17/2025 12:35 PM
3	There is no good option here, the best option is to eliminate the connection entirely.	3/16/2025 4:08 AM
4	i'm glad to see this needed improvement is moving forward and it definitely favor partial cloverleaf.	3/13/2025 10:24 AM
5	Like the single quadrant interchange with the extra lane from 20th st. so to 28th ave S. Do not like the extra bridge and merging traffic.	3/13/2025 10:23 AM
6	It may not be worth the cost to have East access given the RR.	3/13/2025 10:21 AM
7	I would like to keep it simple and I feel the partial is the simpler option.	3/13/2025 10:20 AM
8	I answered to have no changes on the back, but if it is going to happen, I like the single quadrant interchange because easier access to 28th Ave going west and no change going east like what we have already.	3/13/2025 10:19 AM
9	Northbound turning East (right-hand turn) could use a right turn lane due to trains and often time traffic gets backed up with the current situation combined forward/ turn lane combo. Why does the partial cloverleaf EB off ramp have 2 left turn lanes only for once crossing the bridge (NB) then have a left turn lane to get back on the interstate going WB?	3/13/2025 10:17 AM
10	i like the single quadrant if I had to choose	3/13/2025 10:12 AM
11	33-40 million is NOT worth it for the tax payer of Moorhead or Minnesota, the people of Moorhead will get nothing more for spending this kind of money.	3/13/2025 10:11 AM
12	the flow for single quadrant is super neat. Would there be additional unexpected costs with the parclo interchange with the sanitization and recycling site? Environmental hazards or the like?	3/13/2025 10:10 AM
13	Traffic issues spike at RP crossing - would creating a bridge overpass across 29th Ave help mitigate? marginal cost might prohibit. I have no issue paying specials for this improvement!	3/13/2025 10:07 AM
14	I dislike how the patrol cloverleaf impacts businesses as well as residential & school traffic. I'm concerned with the proposed single quadrant and the traffic that will occur on the 28th Ave intersection that redirects people to 28th Ave or the interstate. Would there be a three-way stop? A traffic light?	3/13/2025 10:05 AM
15	Keep bike & foot traffic in mind, possibly making it easier to get from the bike path parell to 2th St, to the east of 20th st, towards Mstate	3/13/2025 9:57 AM
16	I’m no traffic guy, but I fail to see how these will help with traffic flow. I work at a business nearby and I use this exit everyday. These two options will not help with traffic flow. Yes they provide exit ramps to and from the east, but appears that these options would make traffic flow even worse	3/13/2025 8:31 AM
17	I don't think East-bound ramps are needed. I live north of 24th avenue and west of 20th street and sometimes need to go east on I94, but simply going to 8th street and using the diverging diamond is a great option that requires exactly zero lane changes once you are west bound on	3/11/2025 2:13 PM

	I94 towards 8th street. My main concern is if 20th street access from I94 becomes more convenient, 20th street will become very busy. Even more so than it already has become since the 20th/main underpass was completed. Next will be making 20th st 4+ lanes and then signals will be needed at 24th and 20th avenues. None of this is needed, currently, in my opinion. Most of the existing traffic issues at this interchange could be solved with a wider bridge, medians, actual turn lanes, and reworking the 28th avenue access south of Mstate.	
18	Something needs to be done regarding the lack of EB access here. Either option is better than nothing. This will likely reduce traffic at 8th st and 34th St and make access to the neighborhood around the area easier.	3/7/2025 7:20 PM
19	Traffic is already pretty hectic in that area, so a vast improvement to the traffic flow would be adding additional lanes to 20th St S, especially before considering adding interstate connections.	3/4/2025 4:41 PM

Attachment 2

Public Open House Sign-in Sheet

METROCOG Fargo-Moorhead Metropolitan Council of Governments

Case Plaza Suite 232 | One 2nd Street North
Fargo, North Dakota 58102-4807
p: 701.232.3242 | f: 701.232.5043
e: metrocog@fmmetrocog.org
www.fmmetrocog.org

MOORHEAD I-94 & 20TH ST INTERCHANGE STUDY

PUBLIC OPEN HOUSE

TUESDAY MARCH 11TH, 5:00 PM – 7:00 PM
TRIUMPH LUTHERAN BRETHREN CHURCH

NAME	EMAIL (If interested in future updates)	REPRESENTING (Citizen, business, etc.)
Betsy Dressen	[redacted]	Citizen
Darren Dressen		Citizen
Rick Mjones		Citizen
Tom Trowbridge		City
Kevin Luchowitzer		MnDot
RUSSELL PFAFF		CITIZEN
Stanley J Kwiecien		Citizen
STANLEY D. KWIECIEN		CITIZEN
Valerie Jones		citizen
Roger Romans		Citizen
Gary & Beverly Jerger		citizen
Vicki Bowe		citizen
David Bowe		
CAYLEKEN		CITY
Denise Larson		Citizen
DANN Blomquist		Citizen
JIM HALEY		CITIZEN / BUSINESS
Kevin Mohs		Citizen
Ingrid Harbo		

METROCOG Fargo-Moorhead Metropolitan Council of Governments

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PUBLIC OPEN HOUSE

TUESDAY MARCH 11TH, 5:00 PM – 7:00 PM
TRIUMPH LUTHERAN BRETHREN CHURCH

NAME	EMAIL (If interested in future updates)	REPRESENTING (Citizen, business, etc.)
Sebastian McDougall	[redacted]	Moorhead City Council
Ryan Dahlin		Moorhead Plumbing & Heating
Rose Funk		Citizen
David Somdahl		self
Heather Nesemeier		Moorhead City Council
Rob Zimman		City
Lisa Romaine		citizen
Alec Janson		Citizen
Chad Hahn		MicroSales LLC
Jason Gross/Angela Gross		Citizen
ANDREW NIELSEN		CITIZEN

Attachment 3

Public Open House Poster Boards

PROJECT BACKGROUND

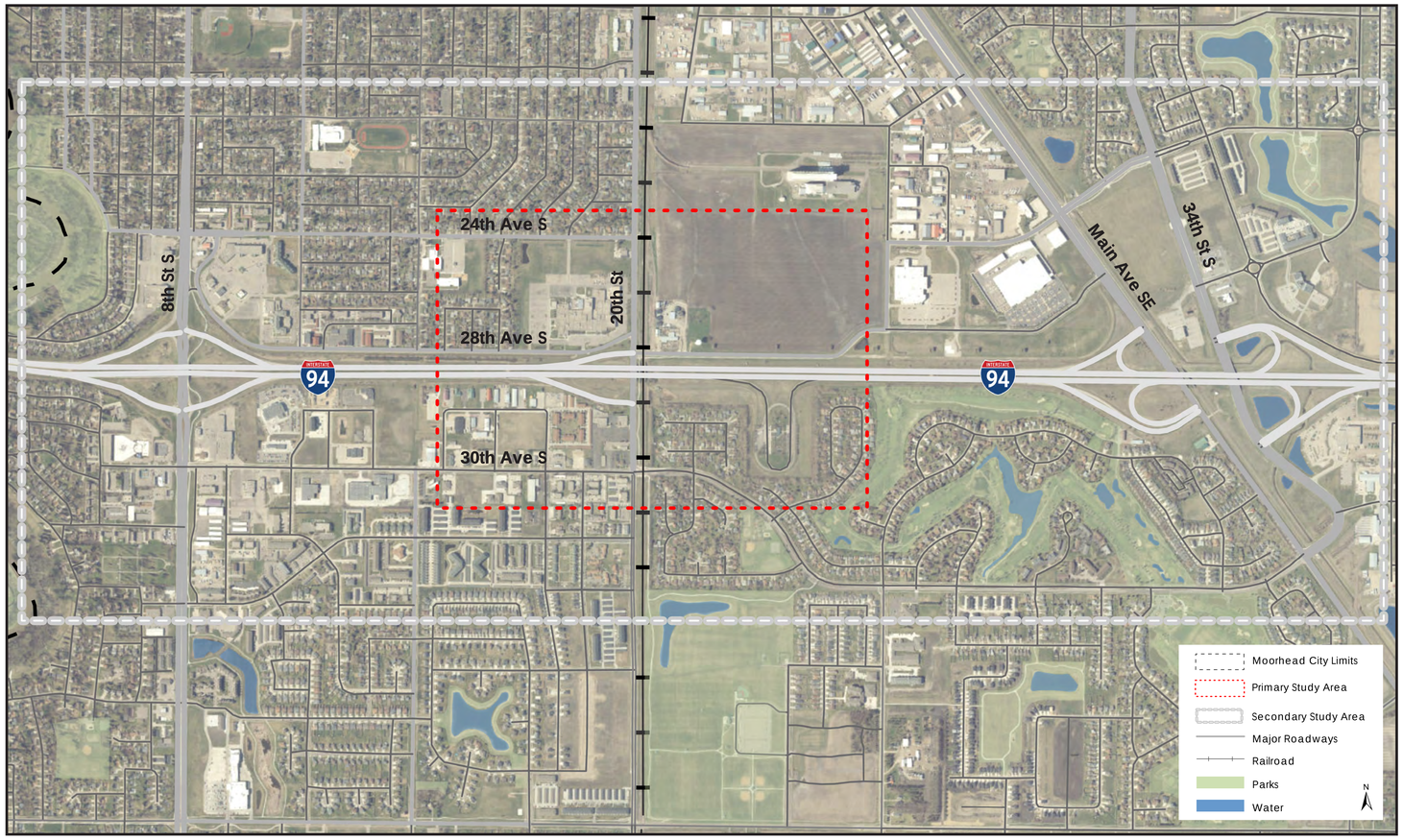
About the Project

Interstate 94 (I-94) is a heavily traveled corridor and a key link for a variety of traffic users, including local and through freight traffic, workforce and education commuters, local and regional shopping, and recreational travel. While there are four interchanges in less than 2.5 miles in Moorhead, the efficient operations of both I-94 and the local road network are limited by the fact that only two of these are full interchanges.

The current 20th Street Interchange has ramps on the west side only, meaning all westbound traffic on I-94 and traffic wanting to go east on I-94 need to use either the 34th Street (1.25 miles east of 20th Street) or 8th Street/US Hwy 75 (1 mile west of 20th Street) interchanges. The lack of Interstate connectivity to/from the east on 20th Street is presumed to increase the use of nearby interchanges and increase travel time for some users.

Study Purpose

The purpose of this study is to analyze the need and feasibility for a full interchange at I-94 and 20th Street. This includes reviewing traffic and travel time impacts of a full interchange, completing an environmental screening, and identifying potential alternatives which would look at impacts to the surrounding area and estimated construction costs.



Primary Study Area

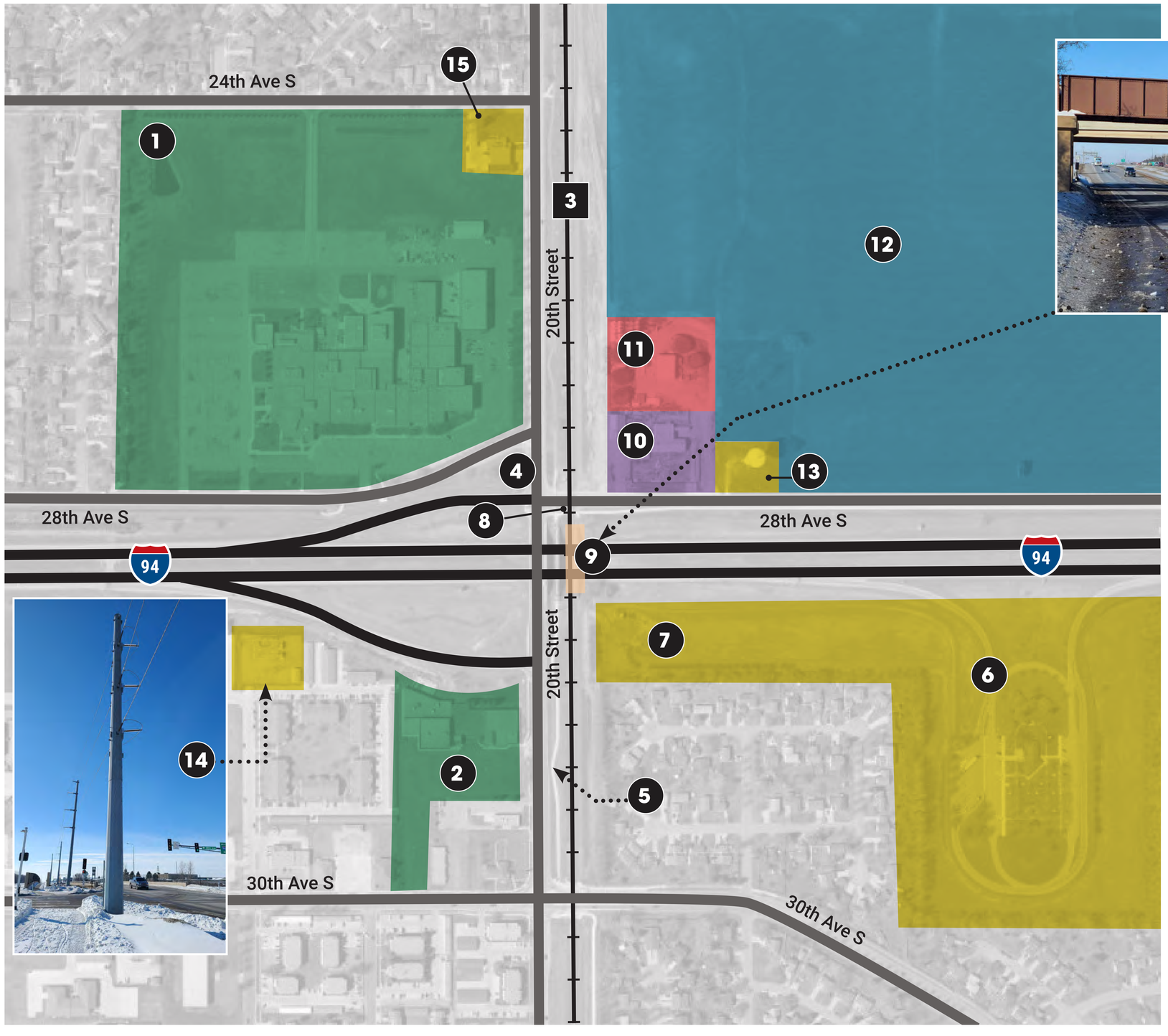
The primary study area being analyzed focuses on the I-94 interchange at 20th Street. This area encompasses the footprint of the potential interchange alternatives. Screening for environmental impacts, technical performance, project costs, etc. for each of the interchange alternatives will take place in this area.

Secondary Study Area

The purpose of the secondary study area is to understand how different interchange alternatives at I-94 and 20th Street might effect the surrounding local and interstate network. This will not identify or evaluate potential alternatives within this area.

METROCOG
FM REGIONAL TRANSPORTATION PLANNING ORGANIZATION

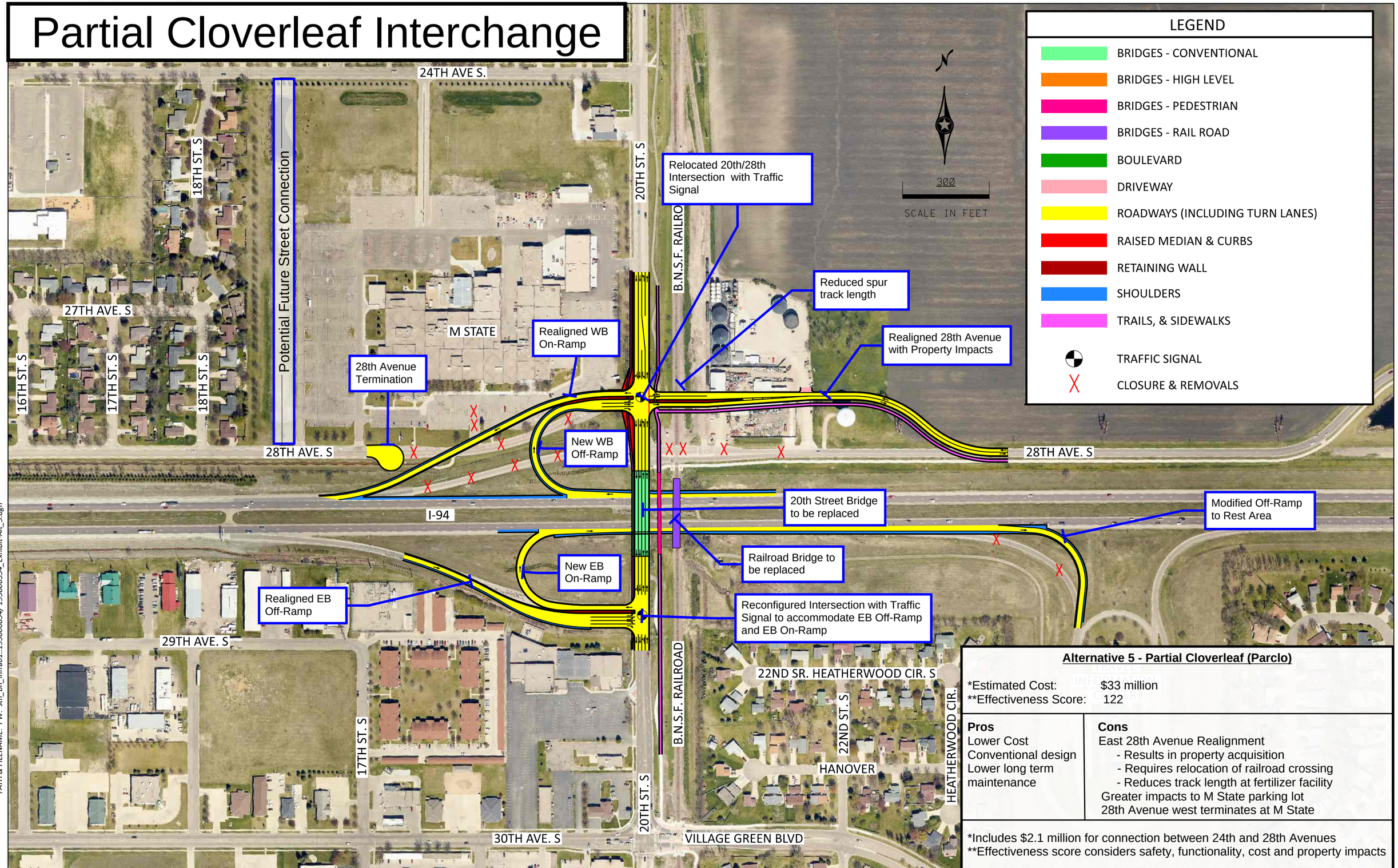
KEY FEATURES



FEATURES

1	M State
2	Triumph Lutheran Brotherhood Church
3	BNSF Moorhead Subdivsion Track
4	28th Avenue Intersections
5	Multi-Use Trail
6	MnDOT Wayside Rest Area
7	MnDOT Lift Station
8	At-grade RR Crossing Contributes to Congestion and Driver Confusion
9	Existing Bridge Piers Limit I-94 Modifications
10	Ken's Sanitation and Recycling
11	Gavilon Fertilizer
12	Busch Agricultural Resources Property
13	City of Moorhead Water Tower
14	Moorhead Public Service Substation
15	Moorhead Fire Station No. 2

Partial Cloverleaf Interchange



Alternative 5 - Partial Cloverleaf (Parclo)

*Estimated Cost: $33 million
**Effectiveness Score: 122

Pros	Cons
Lower Cost Conventional design Lower long term maintenance	East 28th Avenue Realignment - Results in property acquisition - Requires relocation of railroad crossing - Reduces track length at fertilizer facility Greater impacts to M State parking lot 28th Avenue west terminates at M State

*Includes $2.1 million for connection between 24th and 28th Avenues
**Effectiveness score considers safety, functionality, cost and property impacts

NO	DATE	APPR	REVISION	SURVEY
				DRAWN
				DESIGNED
				APPROVED

DEPARTMENT OF TRANSPORTATION

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

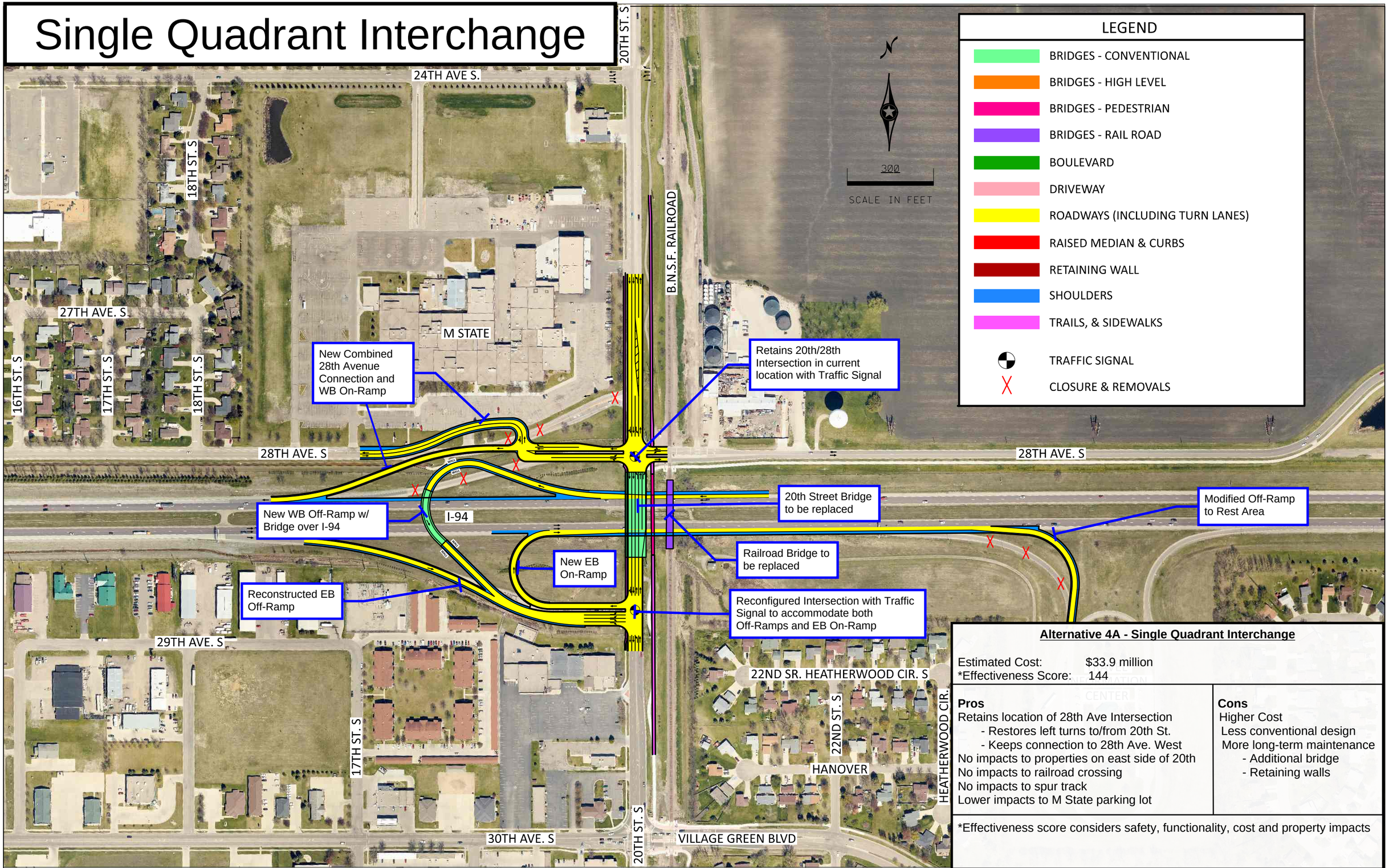
ALTERNATIVE 5
PARTIAL CLOVERLEAF

STATE PROJ. NO.	-	SHEET NO.	6
TRUNK HWY.	I94	TOTAL SHEETS	6

PLOTTED/REVISED:

MODEL NAME: Default
PATH & FILENAME: PW: stn_bh_infra01..193806854/ 193806354_Exhibit-Alt_5.dgn

Single Quadrant Interchange



Alternative 4A - Single Quadrant Interchange

Estimated Cost: $33.9 million
*Effectiveness Score: 144

Pros
Retains location of 28th Ave Intersection
- Restores left turns to/from 20th St.
- Keeps connection to 28th Ave. West

No impacts to properties on east side of 20th
No impacts to railroad crossing
No impacts to spur track
Lower impacts to M State parking lot

Cons
Higher Cost
Less conventional design
More long-term maintenance
- Additional bridge
- Retaining walls

*Effectiveness score considers safety, functionality, cost and property impacts

NO	DATE	APPR	REVISION	
				SURVEY -
				DRAWN -
				DESIGNED -
				APPROVED -

DEPARTMENT OF TRANSPORTATION | Stantec

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 4A
SINGLE QUANDRANT
WITH 28TH AVE. CONNECTION

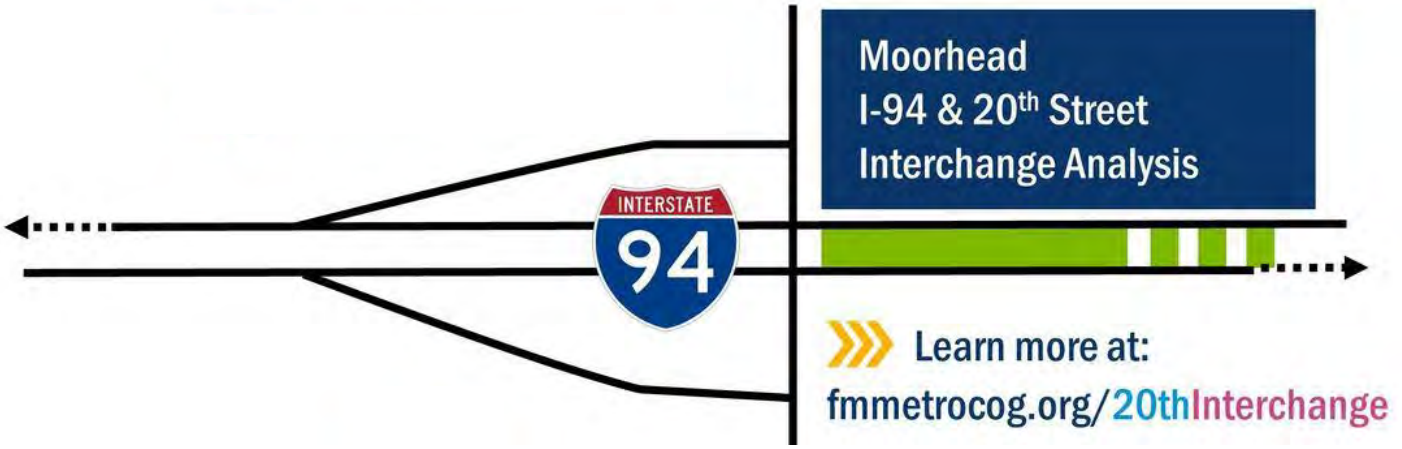
STATE PROJ. NO.	-	SHEET NO.	4A
TRUNK HWY.	I94	TOTAL SHEETS	6

PLOTTED/REVISED: $DATE$

MODEL NAME: Default
PATH & FILENAME: PW: str_bh_infra01..193806854/ 193806354_Exhibit-Alt_4A.dgn

Attachment 4

Frequently Asked Questions



Frequently Asked Questions

When will a new I-94 & 20th St Interchange be built?

There are currently no plans to reconstruct the I-94 & 20th St Interchange. This study is a feasibility study to determine whether it's viable to reconstruct the interchange from a half interchange to a full interchange. If deemed necessary to reconstruct the interchange, a process of securing funding, environmental review, design, federal review, various approvals, and other steps will be necessary before construction could occur. This process would take at least 5-7 years.

How would a new interchange be paid? Will I be assessed, or will property taxes increase?

Since interchanges are part of the Interstate highway system, they are paid primarily with federal and state funds. However, some city of Moorhead funds would likely be needed for improvements on city roadways such as 20th Street. Improvements to city roadways can be paid using various funding mechanisms. Since this is a feasibility study, it's too early to know what the funding breakdowns might be.

How many interchange alternatives were analyzed?

The study team began with high-level analysis of 15 interchange types and scored them based on three criteria: operational efficiency, safety, and cost. The 15 interchanges were then narrowed to five interchange alternatives. Further analysis, along with input from the study review committee helped refine the five alternatives to the final two for consideration.

Why were the Partial Cloverleaf (Parclo) and Single Quadrant interchange the top two alternatives?

The main reasons the Parclo and Single Quadrant interchanges became the top two were:

- Railroad crossings - The railroad track located immediately east of 20th Street prevents interchange ramps from being added on the east side of 20th Street. By policy, interchange ramps are not allowed to cross railroad tracks.
- Cost – Some initial alternatives proposed elevating 20th Street and the interchange to allow for ramps to be built over the railroad tracks. However, such alternatives became cost prohibitive due to the number of bridges, retaining walls, and earthwork. The Parclo and Single Quadrant Interchange alternatives were identified as the most cost-effective concepts to achieve the goals of the project.

How will the closure of Anheuser-Busch affect a future interchange at this location?

The short answer is that it's hard to know at this time if the closure of Anheuser-Busch will affect the future of the 20th Street Interchange. While there is some speculation that the Anheuser-Busch property could be sold and future development could eventually occur, area Planners will keep abreast of any changes to this area in order to properly plan for potential growth. MnDOT's ongoing I-94 study from the Red River to Hwy 336 (Exit 6) will look into the potential impacts of growth in this area as well as other recent development announcements along I-94 in Moorhead.

Attachment 5

Public Open House Photos

Attachment 6

Press Release

METROCOG Fargo-Moorhead Metropolitan Council of Governments

Case Plaza Suite 232 | One 2nd Street North
Fargo, North Dakota 58102-4807
p: 701.532.5100 | f: 701.232.5043
e: metrocog@fmmetrocog.org
www.fmmetrocog.org

FOR IMMEDIATE RELEASE

Contact: Dan Farnsworth, Metro COG Transportation Planner
FM Metropolitan Council of Governments
(701) 532-5106 | farnsworth@fmmetrocog.org

MOORHEAD I-94 AND 20TH STREET INTERCHANGE STUDY – PUBLIC INPUT OPPORTUNITY

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) will be holding a public open house on Tuesday, March 11th from 5:00 pm to 7:00 pm at Triumph Lutheran Brethren Church (2901 20th St S, Moorhead). The open house will feature informational boards, public input exercises, and project staff will be available to answer questions.

Meeting materials will also be available on the project website for those who cannot attend in-person. Online public engagement can be accessed by visiting the project website at www.fmmetrocog.org/20thInterchange with input being solicited until March 24th, 2025. Public comments can also be submitted via email or mail to the project manager listed below:

Dan Farnsworth, Metro COG Project Manager
farnsworth@fmmetrocog.org
One 2nd Street N.
Case Plaza, Suite 232
Fargo, ND 58102

The purpose of this study is to analyze the need and feasibility of a full interchange at I-94 and 20th Street. This includes reviewing traffic and travel time effects of a full interchange, identifying feasible interchange configurations, estimated costs, and more. Results from this study can help decision makers in deciding whether a full interchange should be pursued in the future.

For questions regarding the study, please contact Dan Farnsworth, Metro COG Transportation Planner, at farnsworth@fmmetrocog.org / (701) 532-5106. Alternative participation options will be accommodated upon request.

###

Attachment 7

Newspaper Ad

PUBLIC OPEN HOUSE
MOORHEAD I-94 & 20TH ST INTERCHANGE STUDY

About the Project

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG), in conjunction with the city of Moorhead, MnDOT and study team, has been conducting a study of the I-94 & 20th St Interchange in Moorhead.

The purpose of the study is to analyze the need and feasibility of a full interchange at I-94 & 20th St. This includes reviewing traffic and travel time effects of a full interchange, identifying feasible interchange configurations, estimated costs, and more.

Public Open House

A public open house will be held on Tuesday March 11th from 5:00 pm – 7:00 pm at the Triumph Lutheran Brethren Church located at: 2901 20th St S, Moorhead, MN. The open house will feature informational and public engagement boards, and project staff will be available to answer questions.

If unable to attend the open house, the public can provide input and learn about the study by visiting the study website at: www.fmmetrocog.org/20thInterchange or scanning the QR code below. Also, written comments can be mailed/emailed by March 24th, to Dan Farnsworth; Metro COG Project Manager; One 2nd St N, Case Plaza Suite 232, Fargo, ND 58102.
Email: farnsworth@fmmetrocog.org.

Metro COG is committed to ensuring all individuals regardless of race, color, sex, age, national origin, disability/handicap, sexual orientation, or income status have access to Metro COG's programs and services. Meeting facilities will be accessible to mobility impaired individuals. Metro COG will make a good faith effort to accommodate requests for translation services for meeting proceedings and related materials. To request accommodations, contact Angela Brumbaugh, Metro COG Office Manager, at (701) 532-5100 or brumbaugh@fmmetrocog.org. TTY users may use Relay North Dakota at 711 or 1-800-366-6888.

361140

Attachment 8

Newspaper Article

INFORUM
Powered by The Forum and WDAY

NEWS MOORHEAD

Does Moorhead need another full I-94 interchange? Feasibility study explores options for 20th Street junction

While there are currently no plans to reconstruct the partial interchange at I-94 and 20th Street, Metro COG is conducting a study on the feasibility of a full interchange in the location.

The partial interchange at Interstate 94 and 20th Street in Moorhead is pictured on Monday, March 10, 2025. Alyssa Goelzer / The Forum

By **Ingrid Harbo**
March 15, 2025 at 7:20 AM

Comments Share News Reporting

MOORHEAD — Congestion, clogged and crashes are words that come up when residents and commuters talk about the partial interchange between Interstate 94 and 20th Street in Moorhead.

Valerie Jones lives near the area. She attended an open house for a Fargo-Moorhead Metropolitan Council of Governments feasibility study on the interchange on Tuesday, March 11.

“I feel right now it’s congested, especially during peak hours in the morning, after work,” Jones said. “I’ve seen numerous crashes, especially north of this over the last few years.”

While there are currently no plans to reconstruct the partial interchange at I-94 and 20th Street, the feasibility study explores the costs and effects of potential full interchange designs in the location.

At present, there are only ramps coming to and from the interstate on the west side of the interchange. There are no ramps to and from the east.

A railroad track runs parallel to 20th Street to the east. Minnesota State Community and Technical College is located northwest of the interchange, and the now-shuttered Anheuser-Busch plant(https://www.inforum.com/news/moorhead/controversial-start-for-moorhead-landmark-that-will-soon-close) is to the northeast of it. To the south, there are businesses, residential neighborhoods and an interstate rest area.

Metro COG Transportation Planner Dan Farnsworth said the study looks at whether it is feasible and economical to reconstruct the interchange from a partial interchange to a full interchange.

“As Moorhead grows, and grows to the east, then there’ll likely be a little more demand over the years and decades,” Farnsworth said. “It would be convenient for those accessing M State from the east, MSUM and could also relieve some traffic on the other interchanges in Moorhead.”

Metro COG has narrowed down ideas for a potential interchange from 15 options to just two. Those options are called a partial

cloverleaf and single quadrant interchange. Both would introduce exits and on-ramps west of 20th Street, avoiding crossing or bridging the existing railroad bridge.

The simpler partial cloverleaf alternative has an estimated cost of $33 million. That design would cut off 28th Avenue South near M State and require a property directly northeast of the interchange to be acquired to allow for a realignment of 28th Avenue South.

I94 20th Street Interchange - Partial Clover - Metro COG(https://www.scribd.com/document/838857452/I94-20th-Street-Interchange-Partial-Clover-Metro-COG#from_embed) by The Forum of Fargo-Moorhead(https://www.scribd.com/user/747840639/The-Forum-of-Fargo-Moorhead#from_embed) on Scribd

The single quadrant alternative is estimated to cost $33.9 million, and includes building a bridge over I-94 for the westbound interstate exit. It has less effects on surrounding properties, but is a less conventional design.

I94 20th Street Interchange - Single Quadrant - Metro COG(https://www.scribd.com/document/838857453/I94-20th-Street-Interchange-Single-Quadrant-Metro-COG#from_embed) by The Forum of Fargo-Moorhead(https://www.scribd.com/user/747840639/The-Forum-of-Fargo-Moorhead#from_embed) on Scribd

If a full interchange at 20th Street were constructed someday, it would be less busy than the existing full interchanges at 34th Street and Eighth Street in Moorhead, Farnsworth said.

No funding is currently available for reconstructing the interchange, Farnsworth said.

“This will help decision makers with whether they find it worthwhile and feasible to actually fund it or not,” Farnsworth said.

Decision makers for the project include the Moorhead City Council and Minnesota Department of Transportation, he said. The city would likely pursue funding from the Legislature if it decided to pursue the project.

Alec Janson and Lisa Romano said they live in the area and use the interchange when driving to and from work. Romano said the 20th Street bridge over the interstate tends to get clogged in the morning, especially when there is a train on the tracks.

Janson said building a full interchange is a good idea.

“Progress is good,” Janson said. “Some change is necessary.”

Metro COG is taking public input on the study online through March 24. Project information and a survey are at fmmetrocog.org/20thInterchange/get-involved.(http://fmmetrocog.org/20thInterchange/get-involved)

The partial interchange at Interstate 94 and 20th Street in Moorhead is pictured on Monday, March 10, 2025. Alyssa Goelzer / The Forum

Comments Share News Reporting Tags
(#conversations)

By Ingrid Harbo(https://www.inforum.com/ingrid-harbo)

Ingrid Harbo joined The Forum in March 2024.
(https://www.inforum.com/ingrid-harbo)
Harbo reports on Moorhead and Clay County news.
Readers can reach Harbo at 701-241-5526 or iharbo@forumcomm.com. Follow her on Twitter @ingridaharbo.
Twitter (https://twitter.com/ingridaharbo)
()

CONVERSATION

Appendix E – Travel Demand Model Memorandum

Stantec

Memo

To: Wade Frank

From: Kiarash Fariborzi, PE

Project: Moorhead I-94 & 20th St Interchange Study

Date: August 27, 2024

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

The purpose of this memo is to discuss the methodology, assumptions and model results regarding:

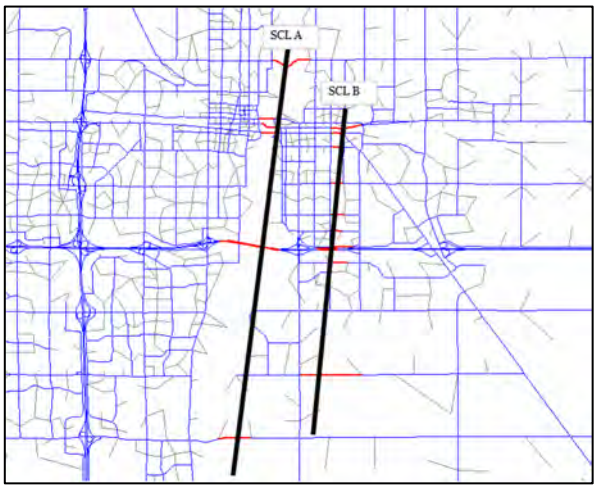
1. Base year model calibration
2. Future year trip estimation
3. Future year traffic forecasts for no-build scenario
4. Future year traffic forecasts for build scenario

1. Base year Model Calibration

The Fargo-Moorhead regional travel demand model was used as the basis for this analysis. However, necessary adjustments were made to address the issues observed in the model. One of these issues is over-estimation of the traffic congestion in the AM and PM peak hours.

Figure 1 shows two screenlines used to assess the overall magnitude of the demand in the regional model base year. Screenline A captures the roadways crossing the Red River. The roadways captured by each screenline is depicted in red color and the ADTs for these roadways were extracted from MNDOT online traffic database. To convert the ADT to AM and PM peak hour traffic, K factors were obtained from the permanent count station data on I-94 Red River Bridge and were applied to ADTs.

Figure 1: Screenline Map



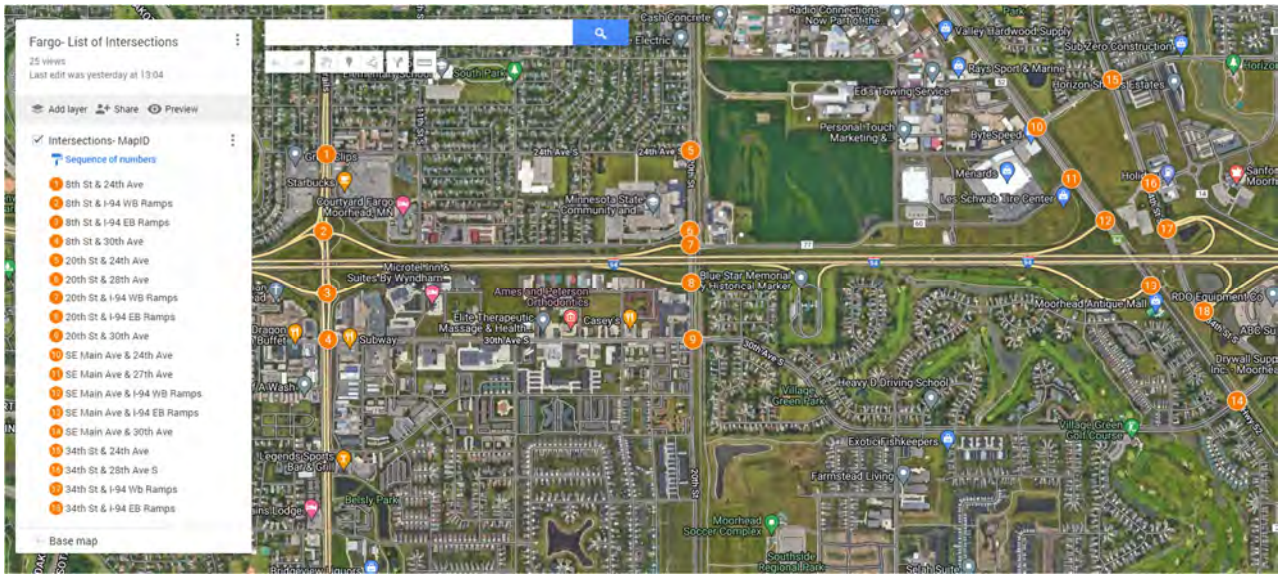
The screenline analysis indicated that the total screenline crossing volume was higher than the observed traffic by about 80% in the AM peak hour and by about 50% in the PM peak hour. Therefore, the regional model demand was globally scaled down by a factor of 0.55 for the AM peak hour and 0.65 for the PM peak hour. Table 1 shows the roadway volumes crossing Screenline A after applying the aforementioned adjustment. The purpose of this adjustment was to get the total screenline crossing volume closer to the observed traffic.

Table 1: Screenline Crossing Volume Summary for Screenline A

		AM				PM			
Dir	Description	Obs	Est	Diff	% Diff	Obs	Est	Diff	% Diff
EB	15th Ave N	233	238	6	2%	409	335	-74	-18%
WB		403	323	-81	-20%	313	285	-28	-9%
EB	1st Ave N	263	324	62	24%	461	516	55	12%
WB		455	532	77	17%	353	426	73	21%
EB	Center Ave	133	6	-127	-96%	233	203	-30	-13%
WB		230	173	-57	-25%	178	7	-171	-96%
EB	I-94 Business (Main Ave)	490	744	253	52%	862	957	95	11%
WB		850	848	-2	0%	660	767	107	16%
EB	I-94	2,262	3,067	805	36%	3,894	3,555	-339	-9%
WB		3,903	3,371	-533	-14%	3,018	3,589	571	19%
EB	60th Ave	217	278	61	28%	381	318	-63	-16%
WB		376	326	-50	-13%	292	328	36	12%
	All	**9,814**	**10,229**	**415**	**4%**	**11,054**	**11,286**	**232**	**2%**

Next, an Origin-Destination Matrix Estimation (ODME) process was developed and used for base year model calibration. The ODME process adjusts the OD trips and assign them to the network in an iterative fashion to narrow the gap between the observed and estimated volumes. The model was calibrated to the observed AM and PM peak hour turning movement volumes for the 18 intersections depicted in **Figure 2**. In addition, the permanent count station on I-94 Red River Bridge was utilized in the calibration as well.

Figure 2: Study Intersections



The traffic data were provided by FM Metro COG. It was noted that in several locations the observed data were out of balance between two adjacent intersections. Therefore, the raw observed data were balanced first, and the revised balanced traffic volumes were used as the calibration targets.

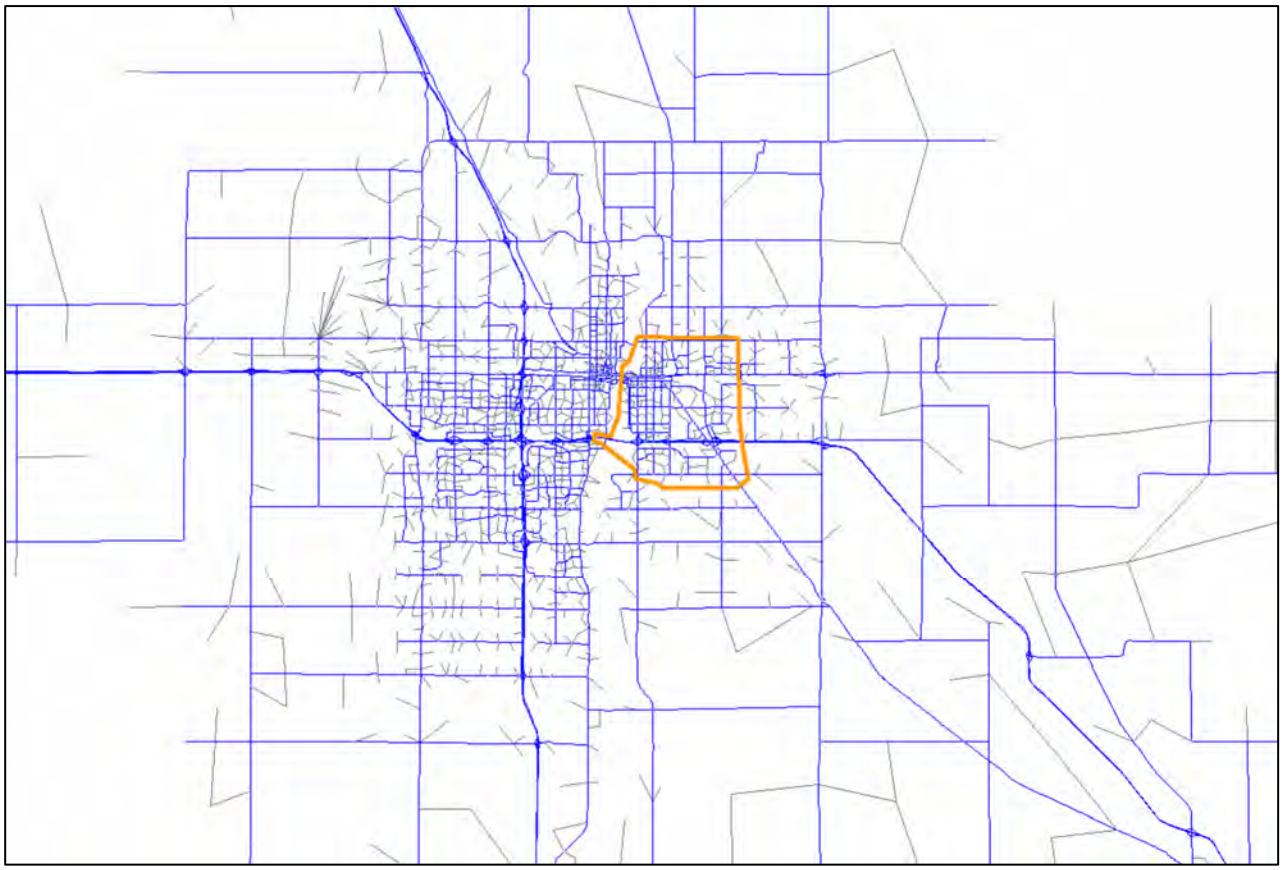
The ODME process was performed at the subarea level. **Figure 3** shows the boundaries of the subarea. The subarea trip tables were extracted from the regional model and the necessary refinements were made to the subarea network including:

1- reviewing the speeds and capacities and correcting them where needed

2- Splitting TAZs as needed to ensure a realistic loading of traffic to the network

3- Applying turn penalties as needed to obtain a logical routing of traffic

Figure 3: Subarea Boundaries



Tables 2 shows a comparison of the observed and estimated traffic volumes on I-94 and **Table 3** shows the same comparison for every movement of the 18 study intersections. With the GEH statistic below 5 in all the freeway segments and ramps as well as all the turning movements in both time periods, it can be argued that the model acceptably replicates the observed traffic volumes.

Reference: **Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study**

Table 2: Model Estimates vs Observed Volume on I-94

			AM Peak Hour					PM Peak Hour				
Dir.	**Seg.**	**Description**	**Obs**	**Est**	**Diff**	**% Diff**	**GEH**	**Obs**	**Est**	**Diff**	**% Diff**	**GEH**
EB	**ML**	**I-94 at Red River**	**2,262**	**2,307**	**45**	**2%**	**1**	**3,894**	**3,932**	**38**	**1%**	**1**
	ramp	Off-ramp to 8th St	1,010	1,050	40	4%	1	1,736	1,726	-10	-1%	0
	ramp	On-ramp from 8th St	263	254	-9	-3%	1	485	479	-6	-1%	0
	ML	**I-94 between 20th St & 8th St**	**1,515**	**1,512**	**-3**	**0%**	**0**	**2,643**	**2,685**	**42**	**2%**	**1**
	ramp	Off-ramp to 20th St	436	374	-62	-14%	3	655	659	4	1%	0
	ML	**I-94 east of 20th St**	**1,079**	**1,138**	**59**	**5%**	**2**	**1,988**	**2,026**	**38**	**2%**	**1**
	ramp	Off-ramp to Main Ave	282	279	-3	-1%	0	459	468	9	2%	0
	ramp	Off- ramp to 34th St	483	496	13	3%	1	665	689	24	4%	1
	ramp	On-ramp from 34th St	82	81	-1	-2%	0	184	167	-17	-9%	1
	ML	**I-94 east of 34th St**	**396**	**443**	**47**	**12%**	**2**	**1,048**	**1,036**	**-12**	**-1%**	**0**
WB	**ML**	**I-94 at Red River**	**3,903**	**3,904**	**1**	**0%**	**0**	**3,018**	**3,053**	**35**	**1%**	**1**
	ramp	On-ramp from 8th St	1,378	1,397	19	1%	1	1,364	1,336	-28	-2%	1
	ramp	Off-ramp to 8th St	351	353	2	1%	0	326	320	-6	-2%	0
	ML	**I-94 between 20th St & 8th St**	**2,876**	**2,860**	**-16**	**-1%**	**0**	**1,980**	**2,037**	**57**	**3%**	**1**
	ramp	On-ramp from 20th St	631	565	-66	-11%	3	568	558	-10	-2%	0
	ML	**I-94 east of 20th St**	**2,245**	**2,296**	**51**	**2%**	**1**	**1,412**	**1,479**	**67**	**5%**	**2**
	ramp	On-ramp from Main Ave	539	511	-28	-5%	1	354	371	17	5%	1
	ramp	On- ramp from 34th St	478	485	7	2%	0	509	482	-27	-5%	1
	ramp	Off-ramp to 34th St	157	162	5	3%	0	98	97	-1	-1%	0
	ML	**I-94 east of 34th St**	**1,385**	**1,461**	**76**	**5%**	**2**	**647**	**723**	**76**	**12%**	**3**

Table 3: Model Estimates vs Observed Turning Movement Volumes at 18 Study Intersections

		AM Peak Hour					PM Peak Hour				
INT. ID	**MOVEMENT**	**Obs**	**Est**	**% Diff**	**Diff**	**GEH**	**Obs**	**Est**	**% Diff**	**Diff**	**GEH**
1	EBL	10	10	1%	0	0	35	35	0%	0	0
1	EBT	55	56	1%	1	0	80	80	0%	0	0
1	EBR	141	144	2%	3	0	270	270	0%	0	0
1	WBL	277	283	2%	6	0	285	288	1%	3	0
1	WBT	35	35	0%	0	0	45	45	-1%	0	0
1	WBR	95	95	0%	0	0	80	82	3%	2	0
1	NBL	159	159	0%	0	0	279	241	-14%	-38	2
1	NBT	1000	959	-4%	-41	1	874	888	2%	14	0
1	NBR	192	192	0%	0	0	175	171	-2%	-4	0
1	SBL	85	85	0%	0	0	85	85	0%	0	0
1	SBT	558	570	2%	12	1	985	998	1%	13	0
1	SBR	20	20	0%	0	0	40	40	-1%	0	0
2	SBR	677	663	-2%	-14	1	814	804	-1%	-10	0
2	SBT	349	342	-2%	-7	0	740	738	0%	-2	0
2	WBR	217	218	0%	1	0	137	142	3%	5	0
2	WBL	134	136	1%	2	0	182	178	-2%	-4	0
2	NBT	1235	1249	1%	14	0	1291	1308	1%	17	0
2	NBL	708	733	4%	25	1	547	532	-3%	-15	1
3	SBT	403	397	-1%	-6	0	747	744	0%	-3	0
3	SBL	80	81	1%	1	0	175	173	-1%	-2	0
3	NBR	183	174	-5%	-9	1	310	306	-1%	-4	0
3	NBT	1254	1255	0%	1	0	1002	1014	1%	12	0
3	EBR	321	322	0%	1	0	900	900	0%	0	0
3	EBL	689	728	6%	39	1	836	826	-1%	-10	0
4	EBL	191	185	-3%	-6	0	141	142	1%	1	0
4	EBT	50	50	-1%	0	0	70	70	0%	0	0

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

4	EBR	43	43	0%	0	0	60	60	0%	0	0
4	WBL	57	56	-1%	-1	0	110	110	0%	0	0
4	WBT	42	41	-2%	-1	0	65	64	-2%	-1	0
4	WBR	601	535	-11%	-66	3	442	441	0%	-1	0
4	NBL	17	18	5%	1	0	40	41	2%	1	0
4	NBT	645	708	10%	63	2	729	737	1%	8	0
4	NBR	57	57	0%	0	0	70	70	0%	0	0
4	SBL	294	290	-1%	-4	0	377	377	0%	0	0
4	SBT	327	328	0%	1	0	1064	1061	0%	-3	0
4	SBR	103	101	-2%	-2	0	206	206	0%	0	0
5	EBR	76	64	-16%	-12	1	54	49	-10%	-5	1
5	EBL	35	35	-1%	-1	0	62	62	0%	0	0
5	NBT	398	389	-2%	-9	0	365	357	-2%	-8	0
5	NBL	124	112	-10%	-12	1	42	47	13%	5	1
5	SBR	86	86	0%	0	0	54	54	-1%	0	0
5	SBT	269	277	3%	8	0	367	364	-1%	-3	0
6	EBR	36	39	7%	3	0	51	59	15%	8	1
6	NBT	522	500	-4%	-22	1	407	404	-1%	-3	0
6	SBR	5	5	-10%	0	0	11	11	4%	0	0
6	SBT	340	337	-1%	-3	0	410	401	-2%	-9	0
7	SBR	171	166	-3%	-5	0	153	140	-9%	-13	1
7	SBT	162	163	0%	1	0	264	277	5%	13	1
7	SBL	43	46	8%	3	0	44	44	0%	0	0
7	WBR	46	31	-33%	-15	2	34	28	-18%	-6	1
7	WBT	63	64	2%	1	0	117	115	-2%	-2	0
7	WBL	45	45	1%	0	0	75	66	-12%	-9	1
7	NBR	168	196	17%	28	2	98	94	-4%	-4	0
7	NBT	476	470	-1%	-6	0	373	376	1%	3	0
7	NBL	397	334	-16%	-63	3	298	303	2%	5	0
8	SBT	207	208	1%	1	0	339	343	1%	4	0
8	NBT	768	783	2%	15	1	518	515	0%	-3	0
8	EBR	157	158	1%	1	0	402	400	0%	-2	0
8	EBL	273	216	-21%	-57	4	251	258	3%	7	0
9	NBR	23	23	1%	0	0	29	29	0%	0	0
9	NBT	440	424	-4%	-16	1	184	183	-1%	-1	0
9	NBL	14	14	-2%	0	0	13	13	1%	0	0
9	EBR	6	0	-98%	-6	3	17	17	1%	0	0
9	EBT	58	58	0%	0	0	137	137	0%	0	0
9	EBL	177	187	6%	10	1	206	208	1%	2	0
9	SBR	188	189	1%	1	0	235	237	1%	2	0
9	SBT	98	97	-1%	-1	0	285	286	0%	1	0
9	SBL	79	80	2%	1	0	221	221	0%	0	0
9	WBR	151	172	14%	21	2	128	125	-3%	-3	0
9	WBT	85	85	0%	0	0	94	94	0%	0	0
9	WBL	20	20	-1%	0	0	27	27	1%	0	0
10	EBL	35	35	0%	0	0	18	18	-2%	0	0
10	EBT	25	27	8%	2	0	32	40	24%	8	1
10	EBR	9	14	55%	5	1	41	40	-2%	-1	0
10	SBL	35	35	-1%	0	0	45	45	0%	0	0
10	SBT	248	292	18%	44	3	306	306	0%	0	0
10	SBR	45	50	12%	5	1	10	22	116%	12	3
10	NBL	23	21	-10%	-2	1	10	12	19%	2	1
10	NBT	357	372	4%	15	1	273	272	0%	-1	0
10	NBR	97	80	-17%	-17	2	172	176	2%	4	0
10	WBL	206	167	-19%	-39	3	199	208	4%	9	1
10	WBT	60	66	10%	6	1	32	36	12%	4	1
10	WBR	70	78	12%	8	1	43	47	9%	4	1
11	SBT	343	319	-7%	-24	1	440	450	2%	10	0

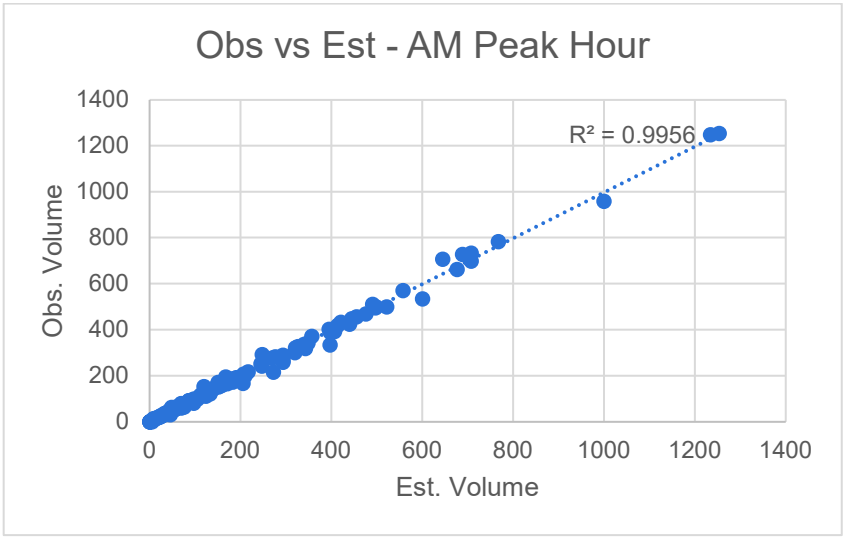
Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

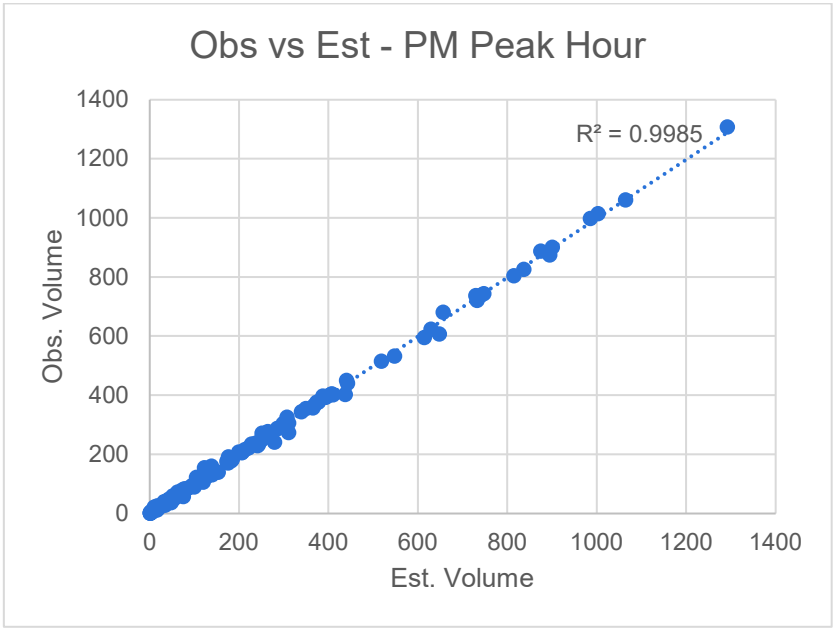
11	SBR	120	154	28%	34	3	105	104	-1%	-1	0
11	NBL	49	63	29%	14	2	44	38	-14%	-6	1
11	NBT	407	393	-3%	-14	1	349	355	2%	6	0
11	EBL	70	80	14%	10	1	105	105	0%	0	0
11	EBR	38	32	-16%	-6	1	62	72	16%	10	1
12	SBR	294	259	-12%	-35	2	251	271	8%	20	1
12	SBT	87	92	6%	5	1	251	250	0%	-1	0
12	NBT	456	457	0%	1	0	393	393	0%	0	0
12	NBL	245	253	3%	8	0	103	100	-3%	-3	0
13	SBT	87	92	6%	5	1	251	250	0%	-1	0
13	NBT	491	510	4%	19	1	253	259	2%	6	0
13	EBR	77	80	4%	3	0	227	235	3%	8	1
13	EBL	210	199	-5%	-11	1	243	234	-4%	-9	1
14	NBR	112	115	3%	3	0	17	26	50%	9	2
14	NBT	294	267	-9%	-27	2	129	129	0%	0	0
14	NBL	12	15	23%	3	1	13	13	2%	0	0
14	EBR	14	14	0%	0	0	13	13	3%	0	0
14	EBT	168	175	4%	7	1	138	159	15%	21	2
14	EBL	145	150	4%	5	0	73	72	-2%	-1	0
14	SBR	46	42	-8%	-4	1	139	131	-6%	-8	1
14	SBT	70	66	-5%	-4	0	241	229	-5%	-12	1
14	SBL	30	28	-7%	-2	0	48	36	-24%	-12	2
14	WBR	1	0	-66%	-1	1	1	3	225%	2	2
14	WBT	97	100	3%	3	0	213	216	1%	3	0
14	WBL	55	58	6%	3	0	112	117	5%	5	0
15	EBR	54	52	-4%	-2	0	75	56	-25%	-19	2
15	EBT	52	49	-6%	-3	0	70	60	-15%	-10	1
15	EBL	52	57	9%	5	1	104	121	17%	17	2
15	WBR	45	45	0%	0	0	28	28	0%	0	0
15	WBT	133	122	-8%	-11	1	99	89	-10%	-10	1
15	WBL	106	99	-7%	-7	1	39	42	8%	3	0
15	NBR	44	49	12%	5	1	57	57	0%	0	0
15	NBT	395	402	2%	7	0	629	623	-1%	-6	0
15	NBL	70	61	-13%	-9	1	53	48	-10%	-5	1
15	SBR	133	129	-3%	-4	0	122	154	26%	32	3
15	SBT	414	419	1%	5	0	614	595	-3%	-19	1
15	SBL	26	26	0%	0	0	23	23	-2%	0	0
16	NBR	247	242	-2%	-5	0	206	205	-1%	-1	0
16	NBT	499	500	0%	1	0	732	721	-1%	-11	0
16	NBL	89	86	-4%	-3	0	16	11	-30%	-5	1
16	EBR	1	1	-43%	0	0	1	2	50%	1	0
16	EBT	1	0	-99%	-1	1	1	0	-95%	-1	1
16	EBL	1	1	-48%	0	1	1	1	-15%	0	0
16	SBR	6	7	22%	1	1	4	4	2%	0	0
16	SBT	497	495	0%	-2	0	647	607	-6%	-40	2
16	SBL	71	67	-6%	-4	1	77	83	7%	6	1
16	WBR	10	12	19%	2	1	6	6	5%	0	0
16	WBT	1	0	-94%	-1	1	1	0	-98%	-1	1
16	WBL	152	152	0%	0	0	176	191	8%	15	1
17	SBT	205	199	-3%	-6	0	387	396	2%	9	0
17	SBL	445	449	1%	4	0	437	403	-8%	-34	2
17	WBR	126	130	3%	4	0	59	62	6%	3	0
17	WBL	31	32	4%	1	0	39	35	-11%	-4	1
17	NBR	33	36	10%	3	1	72	79	10%	7	1
17	NBT	708	698	-1%	-10	0	894	875	-2%	-19	1
18	SBT	195	190	-2%	-5	0	307	325	6%	18	1
18	SBL	41	41	1%	0	0	119	106	-11%	-13	1
18	WBR	421	434	3%	13	1	656	681	4%	25	1

18	WBL	63	63	0%	0	0	5	8	62%	3	1
18	NBR	40	39	-2%	-1	0	65	61	-6%	-4	0
18	NBT	320	301	-6%	-19	1	310	273	-12%	-37	2

The results in **Table 3** are plotted in **Figure 4** where the horizontal axis is the estimated volume and the vertical axis is the observed volume. The above 0.99 R-squared statistic in each period suggest a very good fit.

Figure 4: Observed vs Estimated Turning Movement Volume Plots





2. Future Year Trip Estimation

The 2050 future trip tables were obtained from the regional model. The subarea trip tables were extracted from the regional model and were scaled down by a factor of 0.55 and 0.65 for the AM and PM peak hours respectively. As discussed in the last section, these factors are to correct for the model overestimation of demand as indicated by the screenline analysis. A delta layer of trip adjustment was applied to the future year subarea trip tables prior to being assigned to the network to reflect the ODME correction in the base year calibration. This delta trip table is obtained by subtracting the pre-ODME trip table from the post-ODME trip table.

Prior to running the future year model, the 2050 model Socio-Economic Data (SED) were reviewed and revised. The revisions are discussed below.

1- The model cross-classifies the households by income and size to 20 classes. It was found that the allocation of households to these 20 classes is not consistent between the base and future years. It was observed that this inconsistency results in fewer trips in the future year in many zones despite having the same number of households as the base year. Therefore, the future year data was revised to follow the base year household allocation shares to the 20 household classes.

2- A minimum growth of 10% (equivalent to a 0.35% CAGR) in households, school enrolments and employment was set for every TAZ. It was observed that the original data assumed no or negative SED growth for many zones in the region. This assumption for some TAZs resulted in trip reduction in the future year compared to the base year which seems unrealistic. Therefore, to minimize the zones with negative trip growth, a minimum SED growth as mentioned earlier was assumed at the zonal level.

3- The original SED assumes a much steeper growth in employment in the region compared to the household growth and the adjustment described above increases the regional total employment even further. To offset this increase, the employment at the zones whose future employment was double the base year or more, were reduced by 20%. This adjustment would bring the regional total future employment back to the same level assumed in the original SED.

A summary of the revised SED and the resulting trip ends is provided in **Table 4**. It is seen that at the regional level the household CAGR is at 1.2% while the employment shows a larger growth with a 1.5% CAGR. The trip growth is similar to the household growth as expected. At the subarea level, while the household growth is similar to the regional household growth, the employment grows more rapidly than it does in the region. This is due to the assumed large developments on the east side of the study area.

The SED growth at the zonal level is depicted in **Figures 5 and 6.** The difference between the base and future year households is shown in **Figure 5.** It is seen that the number of households increases substantially in two zones in the study area where more than 1,000 households are assumed to be added in the future year. Given the existing conditions of the zones and land availability, this level of growth seems unrealistic. However, it was decided not to make any adjustments to the households in these two zones since the resulting traffic growth, which will be discussed later, in the vicinity of these two zones is reasonable. **Figure 6** shows the difference in the number of jobs between the base and the future year. As seen, there are several zones on the east of the subarea where the number of jobs is assumed to increase by more than 1,000. This level of growth does not seem physically impossible due to the land availability in that area. This level of growth, however, can significantly change the future year trip pattern.

Table 4: SED and Trip End Summary

		Base	Future	% Diff	% CAGR
Region	HH	112,220	155,824	39%	1.2%
	EMP	153,955	233,036	51%	1.5%
	AM OD Trip Ends	138,580	181,628	31%	1.0%
	PM OD Trip Ends	137,169	186,501	36%	1.1%
Study Area	HH	12,949	17,400	34%	1.1%
	EMP	13,431	24,258	81%	2.2%
	AM OD Trip Ends	17,818	22,602	27%	0.9%
	PM OD Trip Ends	16,978	22,464	32%	1.0%

Figure 5: Household Growth

Figure 6: Employment Growth

3. Future Year Traffic Forecast for No-Build Scenario

Figures 7 and 8 show the CAGR in traffic volume between the base and the future year. It is seen that the eastbound traffic in the AM peak hour grows more than the westbound traffic does while this is reverse in the PM peak hour. This is due to the substantial employment growth on the east side of the subarea. The traffic is flowing towards that area in the AM and away from it in the PM, hence the substantial increase in the eastbound direction in the AM and WB direction in the PM. The largest roadway growth in the study area occurs on Main Ave SE followed by 34th St. The growth on 20th St is not as high as these two arterials due to lower capacity and free-flow speed on 20th St. **Table 5** compares the estimated traffic on the I-94 mainline and ramp segments within the study area between the base year and future year no-build. The interchanges at 34th St and Main Ave have the largest growth due to serving the traffic to and from the large developments on the east side of the study area. **Table 6** compares the base and future year model estimated turning movement volumes for the 18 study area intersections depicted in **Figure 2**.

Figure 7: Volume CAGR (AM Peak Hour)

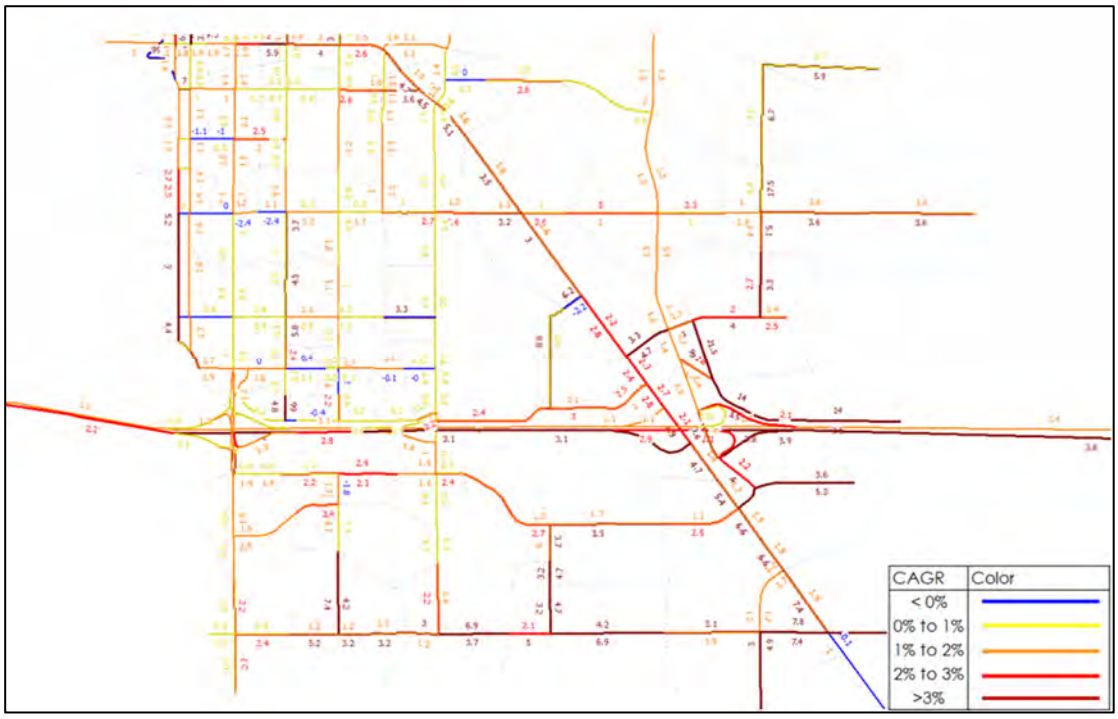
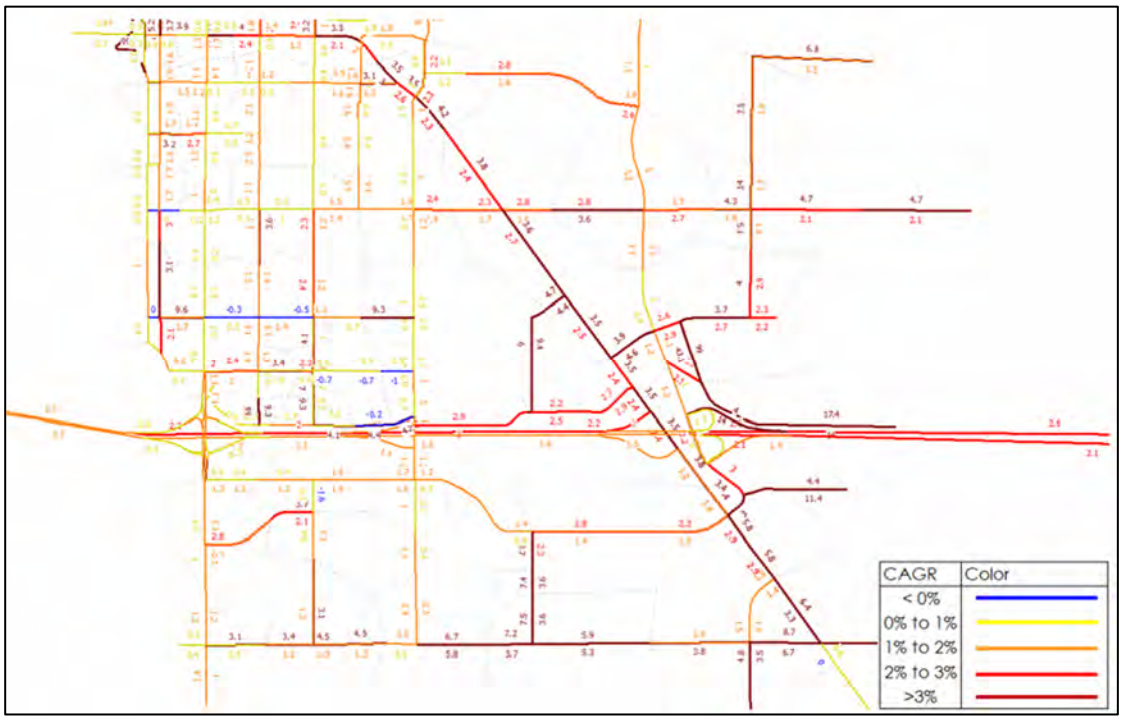


Figure 8: Volume CAGR (PM Peak Hour)



Reference: **Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study**

Table 5: Base Year vs Future Year Traffic Volume on I-94

Dir.	Seg.	Description	AM Peak Hour					PM Peak Hour				
			Base Year	Future No-Build	Diff	% Diff	CAGR	Base Year	Future No-Build	Diff	% Diff	CAGR
EB	**ML**	**I-94 at river**	**2,307**	**4,139**	**1,832**	**79%**	**2.2%**	**3,932**	**5,488**	**1,556**	**40%**	**1.2%**
	ramp	Off-ramp to 8th St	1,050	1,326	276	26%	0.9%	1,726	2,017	291	17%	0.6%
	ramp	On-ramp from 8th St	254	364	110	43%	1.3%	479	501	23	5%	0.2%
	ML	**I-94 b/w 20th St & 8th St**	**1,512**	**3,178**	**1,666**	**110%**	**2.8%**	**2,685**	**3,972**	**1,288**	**48%**	**1.5%**
	ramp	Off-ramp to 20th St	374	581	207	55%	1.6%	659	886	228	35%	1.1%
	ML	**I-94 east of 20th St**	**1,138**	**2,597**	**1,459**	**128%**	**3.1%**	**2,026**	**3,086**	**1,060**	**52%**	**1.6%**
	ramp	Off-ramp to Main Ave	279	753	474	170%	3.7%	468	738	270	58%	1.7%
	ramp	Off- ramp to 34th St	496	861	365	73%	2.1%	689	831	142	21%	0.7%
	ramp	On-ramp from 34th St	81	228	148	183%	3.9%	167	279	112	67%	1.9%
	ML	**I-94 east of 34th St**	**443**	**1,211**	**768**	**173%**	**3.8%**	**1,036**	**1,796**	**760**	**73%**	**2.1%**
	All		7,934	15,239	7,306	92%	2.4%	13,865	19,595	5,730	41%	1.3%
WB	**ML**	**I-94 at river**	**3,904**	**5,253**	**1,349**	**35%**	**1.1%**	**3,053**	**4,808**	**1,755**	**58%**	**1.7%**
	ramp	On-ramp from 8th St	1,397	1,794	397	28%	0.9%	1,336	1,704	368	28%	0.9%
	ramp	Off-ramp to 8th St	353	395	42	12%	0.4%	320	408	89	28%	0.9%
	ML	**I-94 b/w 20th St & 8th St**	**2,860**	**3,854**	**994**	**35%**	**1.1%**	**2,037**	**3,513**	**1,476**	**72%**	**2.0%**
	ramp	On-ramp from 20th St	565	734	169	30%	1.0%	558	861	304	54%	1.6%
	ML	**I-94 east of 20th St**	**2,296**	**3,121**	**825**	**36%**	**1.1%**	**1,479**	**2,651**	**1,172**	**79%**	**2.2%**
	ramp	On-ramp from Main Ave	511	695	184	36%	1.1%	371	779	407	110%	2.8%
	ramp	On- ramp from 34th St	485	561	75	16%	0.5%	482	629	148	31%	1.0%
	ramp	Off-ramp to 34th St	162	282	120	74%	2.1%	97	277	180	186%	4.0%
	ML	**I-94 east of 34th St**	**1,461**	**2,147**	**686**	**47%**	**1.4%**	**723**	**1,521**	**798**	**110%**	**2.8%**
	All		13,994	18,835	4,841	35%	1.1%	10,454	17,151	6,697	64%	1.9%

Table 6: Base Year vs Future Year Turning Movement Volume at 18 Study Area Intersections

INT ID	MOVEMENT	AM Peak Hour					PM Peak Hour				
		Base Year	Future No-Build	% Diff	Diff	CAGR	Base Year	Future No-Build	% Diff	Diff	CAGR
1	EBL	10	4	-64%	-6	-3.7%	35	29	-18%	-6	-0.7%
1	EBT	56	83	50%	28	1.5%	80	84	4%	4	0.2%
1	EBR	144	260	80%	116	2.2%	270	352	30%	82	1.0%
1	WBL	283	310	9%	26	0.3%	288	578	101%	291	2.6%
1	WBT	35	34	-1%	0	0.0%	45	66	48%	21	1.5%
1	WBR	95	83	-13%	-12	-0.5%	82	64	-22%	-18	-0.9%
1	NBL	159	280	76%	121	2.1%	241	354	47%	113	1.4%
1	NBT	959	1,175	22%	216	0.8%	888	1,110	25%	222	0.8%
1	NBR	192	368	92%	176	2.4%	171	267	56%	96	1.7%
1	SBL	85	73	-14%	-12	-0.5%	85	88	3%	3	0.1%
1	SBT	570	787	38%	217	1.2%	998	1,205	21%	207	0.7%
1	SBR	20	20	-3%	-1	-0.1%	40	31	-23%	-9	-1.0%
2	SBR	663	817	23%	154	0.8%	804	987	23%	184	0.8%
2	SBT	342	549	60%	207	1.8%	738	1,135	54%	397	1.6%
2	WBR	218	235	8%	17	0.3%	142	194	37%	52	1.2%
2	WBL	136	160	18%	25	0.6%	178	215	21%	37	0.7%
2	NBT	1,249	1,790	43%	541	1.3%	1,308	1,724	32%	416	1.0%
2	NBL	733	977	33%	243	1.1%	532	716	35%	184	1.1%

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

3	SBT	397	572	44%	174	1.4%	744	1,166	57%	423	1.7%
3	SBL	81	138	71%	57	2.0%	173	184	7%	11	0.2%
3	NBR	174	227	31%	53	1.0%	306	317	4%	11	0.1%
3	NBT	1,255	1,866	49%	612	1.5%	1,014	1,437	42%	423	1.3%
3	EBR	322	425	32%	103	1.0%	900	1,014	13%	114	0.4%
3	EBL	728	900	24%	172	0.8%	826	1,003	21%	177	0.7%
4	EBL	185	191	3%	6	0.1%	142	148	4%	6	0.2%
4	EBT	50	49	-2%	-1	-0.1%	70	64	-8%	-6	-0.3%
4	EBR	43	46	7%	3	0.3%	60	68	13%	8	0.4%
4	WBL	56	68	20%	11	0.7%	110	124	13%	14	0.4%
4	WBT	41	36	-14%	-6	-0.5%	64	49	-24%	-15	-1.0%
4	WBR	535	706	32%	171	1.0%	441	556	26%	115	0.9%
4	NBL	18	24	36%	6	1.2%	41	59	44%	18	1.4%
4	NBT	708	1,196	69%	488	2.0%	737	1,050	42%	313	1.3%
4	NBR	57	71	25%	14	0.8%	70	85	21%	14	0.7%
4	SBL	290	456	57%	165	1.7%	377	585	55%	209	1.6%
4	SBT	328	437	33%	109	1.1%	1,061	1,382	30%	321	1.0%
4	SBR	101	104	3%	3	0.1%	206	213	3%	7	0.1%
5	EBR	64	67	5%	3	0.2%	49	23	-52%	-25	-2.7%
5	EBL	35	26	-25%	-9	-1.1%	62	57	-7%	-4	-0.3%
5	NBT	389	476	23%	88	0.8%	357	449	26%	92	0.9%
5	NBL	112	143	28%	31	0.9%	47	80	69%	33	2.0%
5	SBR	86	90	5%	4	0.2%	54	49	-8%	-4	-0.3%
5	SBT	277	337	22%	60	0.7%	364	476	31%	112	1.0%
6	EBR	39	69	78%	30	2.2%	59	179	205%	121	4.2%
6	NBT	500	619	24%	119	0.8%	404	529	31%	125	1.0%
6	SBR	5	5	4%	0	0.1%	11	10	-10%	-1	-0.4%
6	SBT	337	399	19%	63	0.6%	401	489	22%	88	0.7%
7	SBR	166	200	20%	34	0.7%	140	240	72%	101	2.0%
7	SBT	163	203	25%	40	0.8%	277	349	26%	72	0.9%
7	SBL	46	65	41%	19	1.3%	44	80	82%	36	2.2%
7	WBR	31	28	-10%	-3	-0.4%	28	32	14%	4	0.5%
7	WBT	64	142	121%	78	3.0%	115	268	133%	153	3.2%
7	WBL	45	98	117%	53	2.9%	66	150	127%	84	3.1%
7	NBR	196	254	30%	58	1.0%	94	223	138%	129	3.3%
7	NBT	470	591	26%	122	0.9%	376	497	32%	121	1.0%
7	NBL	334	391	17%	57	0.6%	303	353	16%	50	0.6%
8	SBT	208	301	45%	93	1.4%	343	499	45%	156	1.4%
8	NBT	783	918	17%	135	0.6%	515	720	40%	205	1.2%
8	EBR	158	263	66%	105	1.9%	400	532	33%	132	1.1%
8	EBL	216	318	47%	102	1.4%	258	354	37%	95	1.2%
9	NBR	23	44	92%	21	2.4%	29	33	15%	4	0.5%
9	NBT	424	479	13%	54	0.4%	183	193	5%	10	0.2%
9	NBL	14	14	2%	0	0.1%	13	15	11%	2	0.4%
9	EBR	0	1	373%	1	5.9%	17	14	-17%	-3	-0.7%
9	EBT	58	119	106%	61	2.7%	137	175	28%	38	0.9%
9	EBL	187	253	35%	66	1.1%	208	366	76%	158	2.1%
9	SBR	189	310	64%	121	1.8%	237	391	65%	154	1.9%
9	SBT	97	109	12%	12	0.4%	286	384	34%	98	1.1%
9	SBL	80	146	81%	65	2.2%	221	257	16%	36	0.6%
9	WBR	172	186	8%	14	0.3%	125	162	30%	37	1.0%
9	WBT	85	150	77%	65	2.1%	94	141	51%	48	1.5%
9	WBL	20	21	6%	1	0.2%	27	35	27%	8	0.9%
10	EBL	35	43	23%	8	0.8%	18	39	122%	22	3.0%
10	EBT	27	35	30%	8	1.0%	40	61	53%	21	1.6%
10	EBR	14	35	153%	21	3.5%	40	98	146%	58	3.4%
10	SBL	35	53	54%	19	1.6%	45	64	42%	19	1.3%
10	SBT	292	507	74%	215	2.1%	306	485	58%	179	1.7%

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

10	SBR	50	243	383%	192	6.0%	22	177	722%	156	8.1%
10	NBL	21	73	253%	52	4.8%	12	54	354%	42	5.8%
10	NBT	372	527	42%	155	1.3%	272	527	94%	255	2.5%
10	NBR	80	263	227%	183	4.5%	176	569	223%	392	4.4%
10	WBL	167	359	115%	191	2.9%	208	470	126%	262	3.1%
10	WBT	66	85	28%	19	0.9%	36	54	51%	18	1.5%
10	WBR	78	297	279%	218	5.1%	47	287	510%	240	6.9%
11	SBT	319	683	114%	363	2.9%	450	845	88%	395	2.4%
11	SBR	154	218	42%	64	1.3%	104	208	99%	103	2.6%
11	NBL	63	207	227%	144	4.5%	38	81	114%	43	2.9%
11	NBT	393	735	87%	342	2.3%	355	902	154%	547	3.5%
11	EBL	80	128	60%	48	1.8%	105	248	136%	143	3.2%
11	EBR	32	61	92%	29	2.4%	72	135	88%	63	2.4%
12	SBR	259	411	59%	152	1.7%	271	501	85%	230	2.3%
12	SBT	92	333	261%	241	4.9%	250	479	91%	229	2.4%
12	NBT	457	943	106%	486	2.7%	393	982	150%	590	3.5%
12	NBL	253	285	13%	32	0.4%	100	278	177%	177	3.8%
13	SBT	92	333	261%	241	4.9%	250	479	91%	229	2.4%
13	NBT	510	744	46%	233	1.4%	259	713	175%	454	3.8%
13	EBR	80	270	236%	190	4.6%	235	191	-19%	-44	-0.8%
13	EBL	199	484	143%	285	3.3%	234	548	134%	314	3.2%
14	NBR	115	246	113%	131	2.8%	26	216	745%	190	8.2%
14	NBT	267	376	41%	109	1.3%	129	491	281%	362	5.1%
14	NBL	15	30	102%	15	2.6%	13	55	313%	41	5.4%
14	EBR	14	49	253%	35	4.8%	13	52	283%	38	5.1%
14	EBT	175	338	93%	163	2.5%	159	229	44%	70	1.4%
14	EBL	150	265	76%	115	2.1%	72	118	65%	47	1.9%
14	SBR	42	32	-24%	-10	-1.0%	131	161	23%	30	0.8%
14	SBT	66	507	665%	441	7.8%	229	365	59%	136	1.7%
14	SBL	28	33	18%	5	0.6%	36	50	38%	14	1.2%
14	WBR	0	13	3732%	13	14.5%	3	41	1162%	38	9.8%
14	WBT	100	148	48%	48	1.5%	216	432	100%	216	2.6%
14	WBL	58	214	266%	155	4.9%	117	364	211%	247	4.3%
15	EBR	52	222	327%	170	5.5%	56	247	338%	191	5.6%
15	EBT	49	114	133%	65	3.2%	60	168	181%	108	3.9%
15	EBL	57	205	261%	148	4.9%	121	392	223%	270	4.4%
15	WBR	45	44	-2%	-1	-0.1%	28	30	7%	2	0.3%
15	WBT	122	217	78%	95	2.1%	89	184	106%	95	2.7%
15	WBL	99	163	65%	64	1.9%	42	101	140%	59	3.3%
15	NBR	49	109	121%	59	3.0%	57	101	78%	44	2.2%
15	NBT	402	466	16%	64	0.5%	623	585	-6%	-38	-0.2%
15	NBL	61	223	268%	163	4.9%	48	293	512%	245	6.9%
15	SBR	129	300	133%	171	3.2%	154	334	117%	180	2.9%
15	SBT	419	442	6%	24	0.2%	595	615	3%	20	0.1%
15	SBL	26	54	109%	28	2.8%	23	35	53%	12	1.6%
16	NBR	242	387	60%	145	1.8%	205	299	46%	95	1.4%
16	NBT	500	703	41%	203	1.3%	721	893	24%	172	0.8%
16	NBL	86	125	45%	39	1.4%	11	23	102%	11	2.6%
16	EBR	1	7	1118%	6	9.7%	2	29	1836%	28	11.6%
16	EBT	0	0	1300%	0	10.3%	0	1	2440%	1	12.7%
16	EBL	1	4	685%	4	7.9%	1	17	1936%	16	11.8%
16	SBR	7	26	260%	19	4.9%	4	14	246%	10	4.7%
16	SBT	495	716	44%	220	1.4%	607	742	22%	135	0.7%
16	SBL	67	86	28%	19	0.9%	83	207	150%	124	3.5%
16	WBR	12	92	668%	80	7.8%	6	69	990%	63	9.3%
16	WBT	0	1	1683%	1	11.3%	0	0	2000%	0	11.9%
16	WBL	152	254	67%	102	1.9%	191	334	75%	143	2.1%
17	SBT	199	515	158%	316	3.6%	396	671	69%	275	2.0%

17	SBL	449	461	3%	13	0.1%	403	434	8%	31	0.3%
17	WBR	130	197	52%	67	1.6%	62	174	179%	112	3.9%
17	WBL	32	85	164%	53	3.7%	35	103	198%	68	4.1%
17	NBR	36	99	173%	63	3.8%	79	195	147%	116	3.4%
17	NBT	698	1,018	46%	320	1.4%	875	1,042	19%	167	0.6%
18	SBT	190	489	157%	299	3.6%	325	615	89%	290	2.4%
18	SBL	41	111	168%	69	3.7%	106	159	50%	53	1.5%
18	WBR	434	619	43%	186	1.3%	681	618	-9%	-63	-0.4%
18	WBL	63	242	285%	179	5.1%	8	213	2530%	205	12.9%
18	NBR	39	118	199%	78	4.1%	61	120	96%	59	2.5%
18	NBT	301	498	65%	197	1.9%	273	619	127%	346	3.1%

4. Future Year Traffic Forecast for Build Scenario

Figure 9 shows the differences between the build and no-build networks. These differences are as follows:

1- Adding the ramps to and from the east at 20th St

2- Relocating the connection point of 28th Ave S to 20th St further north to connect to 24th Ave S.

Figure 9: Build Network

The highway assignment was performed on the build network using the same O-D trip tables as the no-build scenario. **Figures 10 through 13** demonstrate the results of the select link analysis on the new ramps for AM and PM peak hours. **Figure 10** shows that of the total WB off-ramp AM peak hour volume (284 vehicles) about half are long-distance trips coming from I-94 on the east end of the study area while the other half are local trips entering I-94 from 34th St or Main Ave. Majority of these trips are destined to the future development just south of I-94 between 20th St and 8th St, and the rest are destined to the zones north of I-94. Similar patterns are observed in other select link analyses depicted in **Figures 11, 12 and 13**.

Table 7 compares the build and no-build scenario volumes on I-94. It is seen that the new EB on-ramp volumes are 225 and 318 in the AM and PM peak hours respectively and the new WB off-ramp volumes are 284 and 227 for the AM and PM peak hours respectively. These volumes are in the same order of magnitude as the volumes on their competing ramps. The turning movement volumes for the 18 study area intersections are summarized in **Table 8**.

Reference: **Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study**

Figure 10: Select Link Volumes on WB Off-Ramp AM Peak Hour

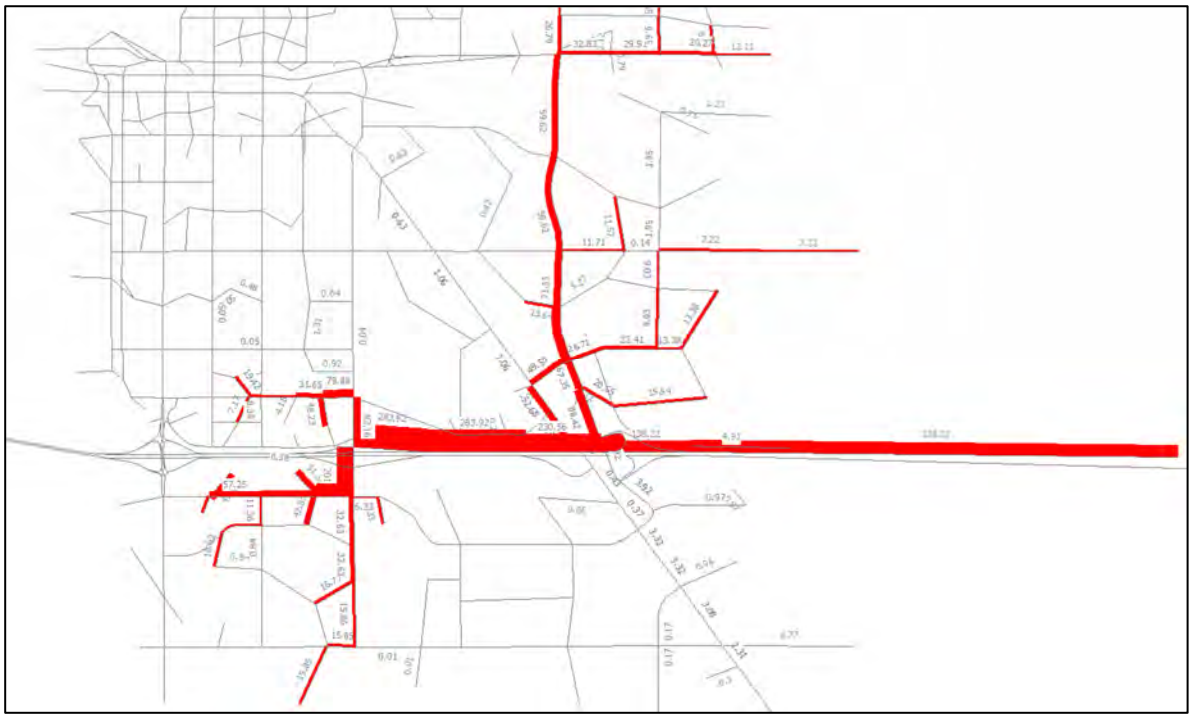


Figure 11: Select Link Volumes on EB On-Ramp AM Peak Hour

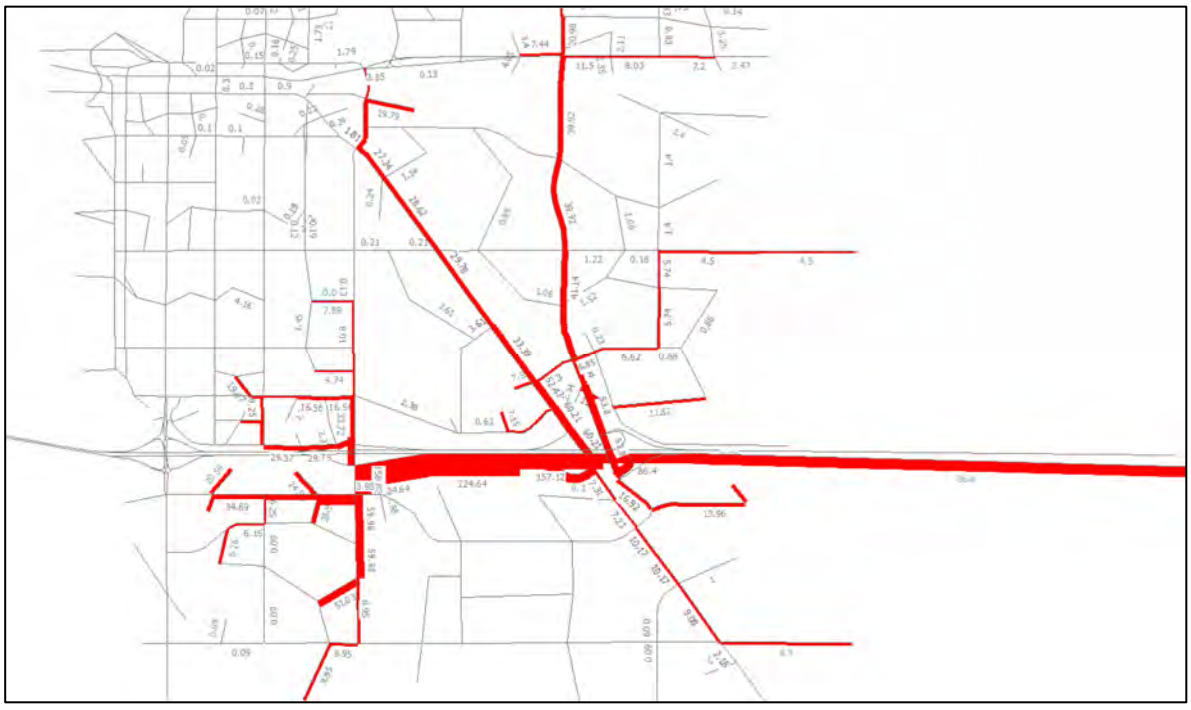


Figure 12: Select Link Volumes on WB Off-Ramp PM Peak Hour

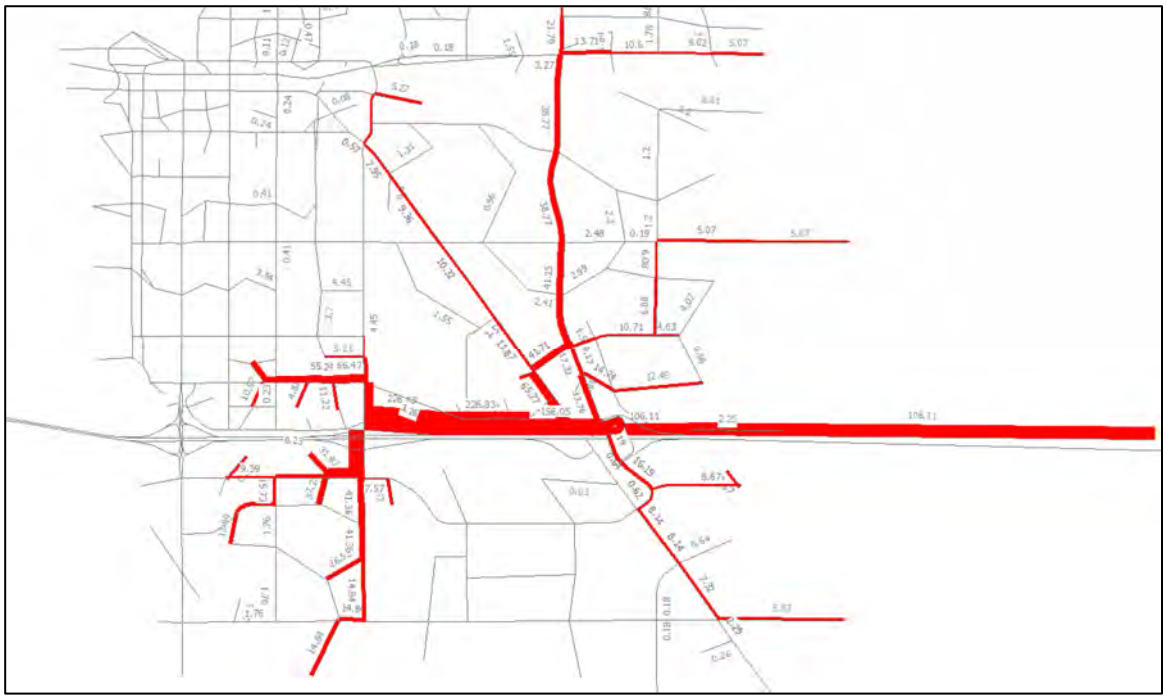
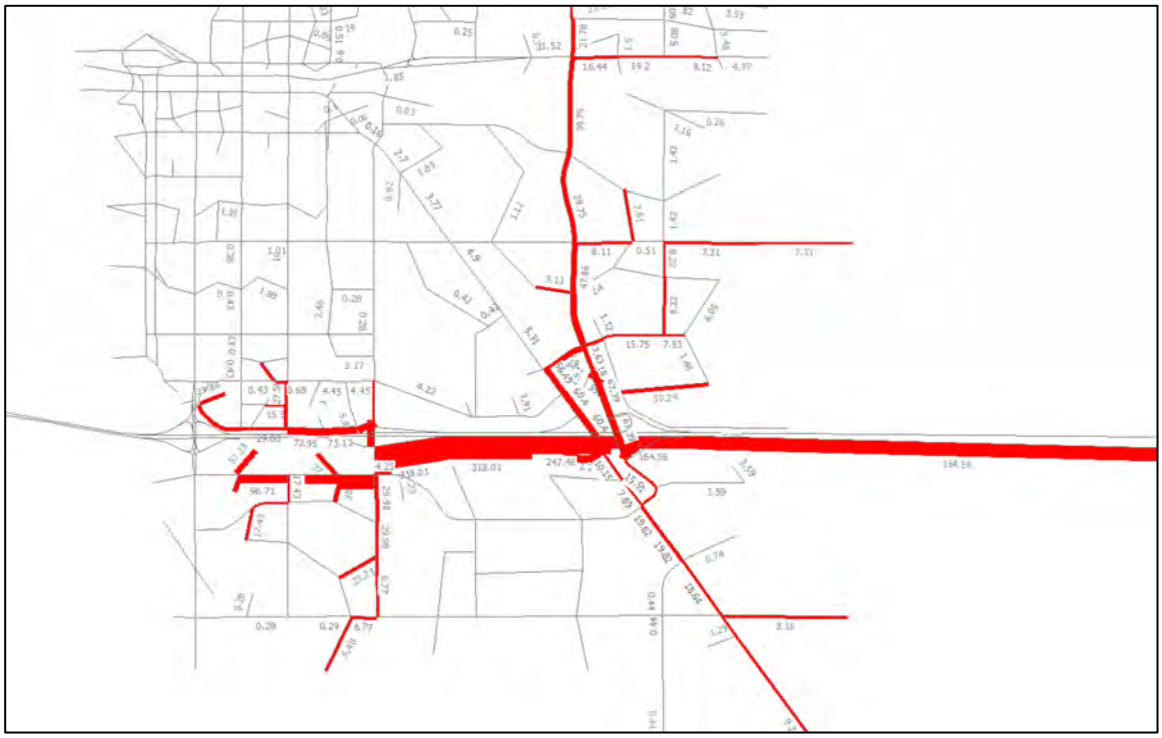


Figure 13: Select Link Volumes on EB On-Ramp PM Peak Hour



Reference: **Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study**

Table 7: Future Year Build vs No-Build Traffic Volume on I-94

			AM Peak Hour				PM Peak Hour			
Dir.	Seg.	Description	Future No-Build	Future Build	Diff	% Diff	Future No-Build	Future Build	Diff	% Diff
	ML	**I-94 at river**	**4,139**	**4,139**	**0**	**0%**	**5,488**	**5,488**	**0**	**0%**
	ramp	Off-ramp to 8th St	1,326	1,323	-2	0%	2,017	2,000	-17	-1%
	ramp	On-ramp from 8th St	364	275	-89	-24%	501	357	-145	-29%
	ML	**I-94 b/w 20th St & 8th St**	**3,178**	**3,091**	**-87**	**-3%**	**3,972**	**3,844**	**-128**	**-3%**
	ramp	Off-ramp to 20th St	581	548	-33	-6%	886	873	-13	-1%
EB	ramp	On-ramp from 20th St (New)		225				318		
	ML	**I-94 east of 20th St**	**2,597**	**2,544**	**-53**	**-2%**	**3,086**	**2,971**	**-115**	**-4%**
	ramp	Off-ramp to Main Ave	753	795	42	6%	738	827	89	12%
	ramp	Off- ramp to 34th St	861	952	91	11%	831	903	72	9%
	ramp	On-ramp from 34th St	228	190	-39	-17%	279	236	-43	-15%
	ML	**I-94 east of 34th St**	**1,211**	**1,211**	**0**	**0%**	**1,796**	**1,796**	**0**	**0%**
All			15,239	15,293	54	0%	19,595	19,613	18	0%
	ML	**I-94 at river**	**5,253**	**5,253**	**0**	**0%**	**4,808**	**4,808**	**0**	**0%**
	ramp	On-ramp from 8th St	1,794	1,784	-10	-1%	1,704	1,706	2	0%
	ramp	Off-ramp to 8th St	395	262	-133	-34%	408	316	-93	-23%
	ML	**I-94 b/w 20th St & 8th St**	**3,854**	**3,731**	**-123**	**-3%**	**3,513**	**3,418**	**-95**	**-3%**
	ramp	On-ramp from 20th St	734	677	-57	-8%	861	690	-171	-20%
WB	ramp	Off-ramp to 20th St (New)		284				227		
	ML	**I-94 east of 20th St**	**3,121**	**3,055**	**-66**	**-2%**	**2,651**	**2,728**	**76**	**3%**
	ramp	On-ramp from Main Ave	695	806	111	16%	779	962	184	24%
	ramp	On- ramp from 34th St	561	629	69	12%	629	704	75	12%
	ramp	Off-ramp to 34th St	282	244	-38	-14%	277	232	-45	-16%
	ML	**I-94 east of 34th St**	**2,147**	**2,147**	**0**	**0%**	**1,521**	**1,521**	**0**	**0%**
All			18,835	18,872	37	0%	17,151	17,311	160	1%

Table 8: Future Year Build vs No-Build Turning Movement Volume at 18 Study Area Intersections

		AM Peak Hour				PM Peak Hour			
INT ID	MOVEMENT	Future No-Build	Future Build	% Diff	Diff	Future No-Build	Future Build	% Diff	Diff
1	EBL	4	5	30%	1	29	28	-2%	-1
1	EBT	83	86	4%	3	84	85	1%	1
1	EBR	260	266	2%	6	352	341	-3%	-11
1	WBL	310	275	-11%	-34	578	545	-6%	-33
1	WBT	34	35	2%	1	66	69	4%	3
1	WBR	83	81	-2%	-2	64	67	4%	3
1	NBL	280	282	1%	2	354	346	-2%	-8
1	NBT	1,175	1176	0%	2	1110	1102	-1%	-8
1	NBR	368	381	3%	13	267	242	-9%	-25
1	SBL	73	74	0%	0	88	90	2%	1
1	SBT	787	792	1%	5	1205	1224	2%	18
1	SBR	20	19	0%	0	31	29	-6%	-2
2	SBR	817	818	0%	1	987	991	0%	4
2	SBT	549	526	-4%	-24	1135	1106	-3%	-30
2	WBR	235	161	-32%	-75	194	123	-36%	-71
2	WBL	160	102	-36%	-58	215	193	-10%	-22
2	NBT	1,790	1819	2%	29	1724	1721	0%	-2
2	NBL	977	966	-1%	-11	716	715	0%	-1
3	SBT	572	529	-7%	-42	1166	1181	1%	15
3	SBL	138	98	-29%	-39	184	117	-36%	-67

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

3	NBR	227	177	-22%	-50	317	239	-25%	-78
3	NBT	1,866	1890	1%	23	1437	1446	1%	9
3	EBR	425	428	1%	3	1014	1010	0%	-4
3	EBL	900	895	-1%	-6	1003	990	-1%	-13
4	EBL	191	191	0%	0	148	148	0%	0
4	EBT	49	50	3%	2	64	62	-4%	-3
4	EBR	46	45	-3%	-1	68	71	5%	3
4	WBL	68	68	0%	0	124	124	0%	0
4	WBT	36	36	1%	0	49	52	6%	3
4	WBR	706	686	-3%	-20	556	533	-4%	-23
4	NBL	24	24	0%	0	59	56	-5%	-3
4	NBT	1,196	1189	-1%	-6	1050	1005	-4%	-46
4	NBR	71	71	0%	0	85	85	0%	0
4	SBL	456	421	-8%	-35	585	589	1%	4
4	SBT	437	433	-1%	-4	1382	1389	1%	7
4	SBR	104	104	0%	0	213	213	0%	0
5	EBR	67	36	-47%	-32	23	9	-61%	-14
5	EBL	26	29	14%	4	57	57	0%	0
5	EBT	N/A	64			N/A	59		
5	WBL	N/A	33			N/A	122		
5	WBT	N/A	48			N/A	46		
5	WBR	N/A	6			N/A	27		
5	NBT	476	449	-6%	-27	449	437	-3%	-12
5	NBL	143	169	19%	27	80	112	40%	32
5	SBR	90	77	-14%	-12	49	47	-5%	-2
5	SBT	337	361	7%	24	476	471	-1%	-5
6	EBR	69	75	10%	7	179	193	7%	13
6	NBT	619	811	31%	192	529	662	25%	133
6	SBR	5	5	4%	0	10	11	7%	1
6	SBT	399	425	6%	25	489	591	21%	102
7	SBR	200	264	32%	64	240	316	32%	76
7	SBT	203	236	16%	33	349	467	34%	118
7	SBL	65	N/A			80	N/A		
7	WBR	28	82	198%	55	32	84	163%	52
7	WBT	142	N/A			268	N/A		
7	WBL	98	202	105%	103	150	143	-5%	-7
7	NBR	254	N/A			223	N/A		
7	NBT	591	729	23%	138	497	578	16%	81
7	NBL	391	413	6%	22	353	374	6%	21
8	SBT	301	372	24%	71	499	517	4%	18
8	NBT	918	857	-7%	-61	720	618	-14%	-103
8	EBR	263	264	0%	0	532	538	1%	6
8	EBL	318	284	-11%	-34	354	335	-5%	-19
9	NBR	44	14	-69%	-31	33	21	-36%	-12
9	NBT	479	514	7%	35	193	218	13%	25
9	NBL	14	11	-19%	-3	15	15	0%	0
9	EBR	1	1	-11%	0	14	12	-16%	-2
9	EBT	119	78	-34%	-41	175	130	-26%	-45
9	EBL	253	321	27%	67	366	464	27%	98
9	SBR	310	385	24%	75	391	407	4%	16
9	SBT	109	121	11%	12	384	396	3%	12
9	SBL	146	130	-11%	-15	257	252	-2%	-5
9	WBR	186	182	-2%	-4	162	160	-1%	-1
9	WBT	150	118	-21%	-32	141	114	-19%	-27
9	WBL	21	18	-12%	-2	35	26	-26%	-9
10	EBL	43	43	-1%	0	39	39	-1%	0
10	EBT	35	35	0%	0	61	61	0%	0
10	EBR	35	35	1%	0	98	99	1%	1

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

10	SBL	53	53	0%	0	64	64	1%	1
10	SBT	507	489	-4%	-18	485	504	4%	20
10	SBR	243	230	-5%	-13	177	160	-10%	-18
10	NBL	73	73	0%	0	54	46	-14%	-8
10	NBT	527	535	1%	8	527	513	-3%	-14
10	NBR	263	260	-1%	-3	569	572	1%	4
10	WBL	359	396	10%	37	470	469	0%	0
10	WBT	85	85	0%	0	54	62	13%	7
10	WBR	297	231	-22%	-66	287	260	-9%	-27
11	SBT	683	707	4%	24	845	873	3%	28
11	SBR	218	214	-2%	-4	208	200	-4%	-8
11	NBL	207	255	23%	48	81	191	137%	111
11	NBT	735	747	2%	11	902	898	0%	-4
11	EBL	128	122	-5%	-6	248	234	-6%	-14
11	EBR	61	167	172%	106	135	302	123%	167
12	SBR	411	529	29%	118	501	702	40%	201
12	SBT	333	345	3%	12	479	472	-1%	-6
12	NBT	943	1002	6%	59	982	1089	11%	107
12	NBL	285	277	-2%	-7	278	260	-6%	-18
13	SBT	333	345	3%	12	479	472	-1%	-6
13	NBT	744	726	-2%	-18	713	698	-2%	-15
13	EBR	270	242	-10%	-28	191	175	-8%	-15
13	EBL	484	554	15%	70	548	652	19%	104
14	NBR	246	248	1%	3	216	229	6%	13
14	NBT	376	374	0%	-2	491	489	0%	-2
14	NBL	30	24	-19%	-6	55	44	-20%	-11
14	EBR	49	37	-25%	-12	52	47	-9%	-5
14	EBT	338	275	-18%	-62	229	180	-21%	-49
14	EBL	265	251	-5%	-14	118	102	-13%	-16
14	SBR	32	30	-7%	-2	161	161	1%	1
14	SBT	507	489	-4%	-18	365	349	-4%	-16
14	SBL	33	31	-6%	-2	50	50	-1%	0
14	WBR	13	13	2%	0	41	46	13%	5
14	WBT	148	92	-38%	-56	432	394	-9%	-38
14	WBL	214	246	15%	32	364	386	6%	22
15	EBR	222	205	-7%	-17	247	239	-3%	-8
15	EBT	114	117	2%	3	168	168	0%	0
15	EBL	205	203	-1%	-2	392	386	-1%	-6
15	WBR	44	44	0%	0	30	27	-11%	-3
15	WBT	217	215	-1%	-1	184	166	-10%	-18
15	WBL	163	172	6%	9	101	112	11%	11
15	NBR	109	111	2%	3	101	110	8%	9
15	NBT	466	483	4%	17	585	602	3%	16
15	NBL	223	213	-5%	-10	293	294	0%	0
15	SBR	300	283	-6%	-17	334	332	-1%	-2
15	SBT	442	467	5%	24	615	651	6%	36
15	SBL	54	58	7%	4	35	37	8%	3
16	NBR	387	388	0%	1	299	300	0%	1
16	NBT	703	720	3%	18	893	910	2%	17
16	NBL	125	125	0%	0	23	23	0%	0
16	EBR	7	7	4%	0	29	29	0%	0
16	EBT	0	0	0%	0	1	1	0%	0
16	EBL	4	4	-7%	0	17	17	-1%	0
16	SBR	26	26	-1%	0	14	14	0%	0
16	SBT	716	742	4%	26	742	788	6%	46
16	SBL	86	76	-11%	-9	207	200	-3%	-7
16	WBR	92	83	-9%	-8	69	78	12%	9
16	WBT	1	1	0%	0	0	0	0%	0

Reference: Travel Demand Modeling Memorandum for I-94 & 20th St Interchange Study

16	WBL	254	262	3%	8	334	336	0%	2
17	SBT	515	484	-6%	-31	671	655	-2%	-16
17	SBL	461	527	14%	66	434	497	15%	63
17	WBR	197	195	-1%	-2	174	166	-5%	-8
17	WBL	85	49	-43%	-37	103	66	-36%	-37
17	NBR	99	102	3%	3	195	207	6%	11
17	NBT	1,018	1038	2%	20	1042	1067	2%	26
18	SBT	489	428	-12%	-61	615	568	-8%	-47
18	SBL	111	104	-6%	-6	159	154	-3%	-5
18	WBR	619	667	8%	48	618	655	6%	37
18	WBL	242	285	18%	43	213	247	16%	34
18	NBR	118	86	-27%	-32	120	83	-31%	-38
18	NBT	498	473	-5%	-25	619	619	0%	0

Appendix F – Highway Interchange Tool Memorandum

Stantec

Memo

To:	Wade Frank, PE Stantec Project Manager	From:	Adam Capets, PE, PTOE Transportation Engineer
Project/File:	193806354 - Moorhead I-94/20th Street Interchange Analysis	Date:	September 11, 2024

Reference: Highway Interchange Tool (HIT) Results

Highway Interchange Tool (HIT)

The Highway Interchange Tool (HIT) is a proprietary tool developed by Stantec to investigate feasible interchange layouts based on a series of volume, geometric, and area characteristics inputs. The HIT examines several dozen unique interchange layouts with many variations for each layout. The HIT delivers a final score for each layout based on three categories: operational efficiency, safety, and cost.

Inputs and Outputs

The volume inputs used in the HIT for this analysis were the 2050 peak hour volumes for the freeway and ramp terminal intersections developed under the Travel Demand Modeling task, with separate HIT analyses being conducted for the AM and PM peak hours. The HIT analysis assumed a full access interchange would be constructed, and thus movements for an eastbound on-ramp and westbound off-ramp were included in the 2050 volumes. Pedestrian and bicycle volumes were also included, assuming conservative volumes of 20 each per hour per direction to ensure the HIT accounted for active transportation.

The geometric and area characteristics inputs included many aspects of the interchange including lane, ramp, and taper geometry, speeds, terrain, area population, adjacent interchange spacing, signal timing parameters, right-of-way, and construction costs. While the HIT is most suitable for interchanges that can utilize all quadrants, to best account for the railroad on the east side of 20th Street as a geometric constraint, the tool was set to assume right-of-way is cost-prohibitive in the northeast and southeast quadrants. The HIT inputs are provided as an attachment to this memo.

Results and Conclusions

The HIT was conducted independently for AM and PM peak hour volumes, however most of the interchange layouts that resulted from the analyses were the same between both peak hours. The roughly top 20 scoring layouts for each peak hour were selected and their AM and PM scores were summed and ordered from highest to lowest into an aggregate list of top alternatives. The results included some duplicate interchange layouts, thus they were excluded from the final list. This list of top alternatives and their respective aggregate scores are shown in the table below. The HIT outputs of the top alternatives and schematic diagrams of each layout are provided as an attachment to this memo.

Reference: Interchange Evaluation Tool Results

Top Alternatives for Interchange Layouts	
Interchange Layout Name	**AM & PM Total Score**
1. Diverging Diamond Interchange (DDI)	13.1
2. Diamond with U-turn for Arterial Lefts	12.6
3. Diamond with U-turn over Freeway and Slip Lanes for Arterial Lefts	12.5
4. Single Quadrant	12.0
5. Diamond Single Point with Displaced Ramp Lefts	11.9
6. Diamond Single Point/Single Point Urban Interchange (SPUI)	11.8
7. Diamond with U-turn for Arterial and Ramp Lefts	11.8
8. Diamond with Contraflow Arterial Lefts and U-turn for Ramp Lefts	11.6
9. Elevated Double U-turn	11.6
10. Standard Diamond	11.6
11. Diamond Single Point with Displaced Arterial Lefts	11.3
12. Half Clover/Parclo	11.3
13. Diamond Single Point with U-turn for Arterial Lefts	10.8
14. Diamond with Displaced Arterial Lefts and U-turn for Ramp Lefts	10.8
15. Diamond with Displaced Arterial Lefts	10.7

Due to the existing constraints involving the railroad to the east of 20th Street, some of the alternatives resulting from the HIT analysis are less feasible than others. Many of the alternatives require utilizing all quadrants, which would require additional grade separation from the railroad and thus increased structure costs for 20th Street. Roadway and structure width on 20th Street should be minimized to keep structure costs as low as possible. Interchange layouts involving single point intersections, displaced lefts, or contraflow lefts require additional width on 20th Street to accommodate the geometry, and thus should be avoided. This includes Alternatives 5, 6, 8, 11, 13, 14, and 15. While the DDI also may require additional roadway and structural width, since it results in the highest score, it was not excluded.

The following interchange layout alternatives resulting from the HIT should be advanced for further consideration and compared alongside previously identified interchange alternatives:

1. Diverging Diamond Interchange (DDI)
2. Diamond with U-turn for Arterial Lefts
3. Diamond with U-turn over Freeway and Slip Lanes for Arterial Lefts
4. Single Quadrant
7. Diamond with U-turn for Arterial and Ramp Lefts
9. Elevated Double U-turn
10. Standard Diamond
12. Half Clover/Parclo

Reference: Interchange Evaluation Tool Results

Regards,

STANTEC CONSULTING SERVICES INC.

Adam Capets PE, PTOE (MN, WY, ND, MI, KS)
Transportation Engineer
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Attachment: HIT Inputs, HIT Output and Top Alternatives

AM

Freeway Direction
East/West

Southbound Through

	Bikes	Pedestrians
Volume	20	20
PHF	0.85	0.85

Southbound Arterial

	Right	Through	Left
Truck %	2%	2%	2%
PHF	0.85	0.85	0.85
Volume	264	170	66

Eastbound Freeway

Truck %	PHF	Volume	
2%	0.85	284	Left
16%	0.85	2,544	Through
2%	0.85	264	Right

Westbound Freeway

	Volume	PHF	Truck %
Right	82	0.85	2%
Through	3,055	0.85	16%
Left	202	0.85	2%

Northbound Arterial

	Left	Through	Right
Volume	413	445	159
PHF	0.85	0.85	0.85
Truck %	2%	2%	2%

Northbound Through

	Bikes	Pedestrians
PHF	0.85	0.85
Volume	20	20

PM

Freeway Direction
East/West

Southbound Through

	Bikes	Pedestrians
Volume	20	20
PHF	0.91	0.91

Southbound Arterial

	Right	Through	Left
Truck %	2%	2%	2%
PHF	0.91	0.91	0.91
Volume	316	374	94

Eastbound Freeway

Truck %	PHF	Volume	
2%	0.91	335	Left
16%	0.91	2,971	Through
2%	0.91	538	Right

Westbound Freeway

	Volume	PHF	Truck %
Right	84	0.91	2%
Through	2,728	0.91	16%
Left	143	0.91	2%

Northbound Arterial

	Left	Through	Right
Volume	374	244	224
PHF	0.91	0.91	0.91
Truck %	2%	2%	2%

Northbound Through

	Bikes	Pedestrians
PHF	0.91	0.91
Volume	20	20

Required Inputs

Roadway Geometry

Freeway # of Lanes (EB):	2
Freeway # of Lanes (WB):	2
Freeway Lane Width (ft):	12
Freeway Inside Paved Shoulder Width (ft):	4
Freeway Outside Paved Shoulder Width (ft):	10
Acceleration Lane Length (ft):	800
Second Acc. Lane Additional Length (ft):	800
Deceleration Lane Length (ft):	400
Ramp Left Paved Shoulder Width (ft):	4
Ramp Right Paved Shoulder Width (ft):	4
C-D Left Paved Shoulder Width (ft):	4
C-D Right Paved Shoulder Width (ft):	4
Arterial # of Lanes (NB):	2
Arterial # of Lanes (SB):	2
Arterial Lane Width (ft):	12
Arterial Median Type:	Undivided
Arterial Inside Paved Shoulder Width (ft):	0
Arterial Outside Paved Shoulder Width (ft):	0

Facility Free Flow Speeds

Freeway Speed (mph):	55
Arterial Speed (mph):	30
Left Over Speed (mph):	30
Ramp Speed (mph):	35
Loop Speed (mph):	25
Flyover Speed (mph):	45
Freeway Flyover U-Turn Speed (mph):	30
C-D Speed (mph):	45

Driver Population Adjustments

Freeway Capacity Adjustment Factor:	1.00
Freeway Speed Adjustment Factor:	1.00
Average Vehicle Occupancy:	1.64

Area Characteristics

Terrain:	Level
Metropolitan Area with Population ≥ 250k:	TRUE
Location in Central Business District:	FALSE
Interchange Density (interchange/mile):	1.053

Signal Timing Settings

Critical Intersection Volume-to-Capacity Ratio:	0.85
Platoon Ratio:	1.00
Minimum Cycle Length - 2 phase (s):	45
Minimum Cycle Length - 3 phase (s):	60
Minimum Cycle Length - 4+ phase (s):	75
Maximum Cycle Length (s):	180
Minimum Green Time - Major Movement (s):	15
Minimum Green Time - Minor Movement (s):	5
Yellow Time (s):	3.5
Red Time (s):	2.0
Start-Up Lost Time (s):	1.0
Extension of Effective Green (s):	1.0
Volume Requiring Dual Left Turn Lanes (vph):	300
Maximum Delay Override (s):	300

Measure of Effectiveness Weights

Efficiency Weight:	1.00
Cost Weight:	1.00
Safety Weight:	1.00

Measure of Effectiveness Range

Minimum MOE Score:	0
Maximum MOE Score:	10

Right-of-Way Availability

Available NE Quadrant ROW (sqft):	Tight
Available NW Quadrant ROW (sqft):	Tight
Available SW Quadrant ROW (sqft):	Standard
Available SE Quadrant ROW (sqft):	Standard
Cost of NE Quadrant ROW ($/sqft):	Prohibitive
Cost of NW Quadrant ROW ($/sqft):	$ 0.65
Cost of SW Quadrant ROW ($/sqft):	$ 0.65
Cost of SE Quadrant ROW ($/sqft):	Prohibitive

Infrastructure Costs

Cost for Sq. Yard of Pavement ($):	$ 42
Cost for Sq. Yard of Bridge ($):	$ 1,500
Cost for Signalization ($):	$ 230,000

Weights for Safety Conflict Opportunities

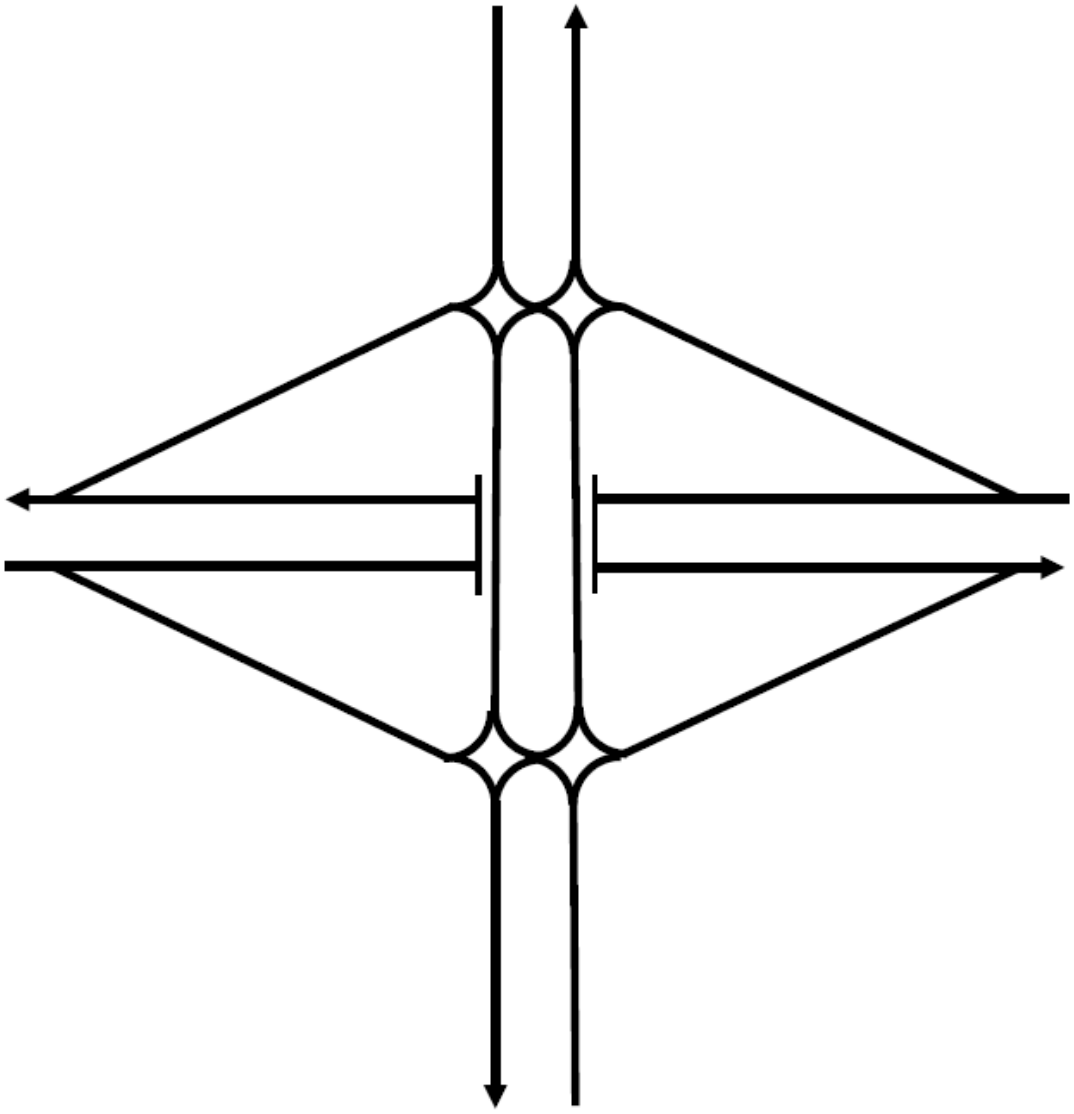
Vehicle Merge:	1.00
Vehicle Diverge:	1.00
Vehicle Crossing:	2.00
Bike Merge:	0.00
Bike Diverge:	0.00
Bike Crossing:	1.00
Pedestrian Signal Crossing:	1.00
Pedestrian Stop Crossing:	0.00
Pedestrian Uncontrolled Crossing:	3.00

Sheet	Left from Arterial	Left from Freeway	Name	Avoid ROW?	Base Efficiency	Base Cost	Base Safety	Weighted Efficiency	Weighted Cost	Weighted Safety	Overall Score
AM											
8E.1	**8**	**E**	DDI (Tight)	YES	7.6	9.8	2.4	2.5	3.3	0.8	**6.6**
10B.1	**10**	**B**	U Turn on Arterial Tight Diamond (Tight Standard)		5.3	9.3	4.2	1.8	3.1	1.4	**6.3**
12B	**12**	**B**	U Turn over Freeway with Slips Tight Diamond (Tight)	YES	8.0	2.7	8.0	2.7	0.9	2.7	**6.3**
12B.1	**12**	**B**	U Turn over Freeway with Slips Tight Diamond (Standard)		8.1	2.4	8.0	2.7	0.8	2.7	**6.2**
10B	**10**	**B**	U Turn on Arterial Tight Diamond (Tight)	YES	4.5	9.5	4.2	1.5	3.2	1.4	**6.1**
1E.5	**1**	**E**	Displaced Single Point (Tight Standard)		8.8	2.4	7.1	2.9	0.8	2.4	**6.1**
10G.2	**10**	**G**	Ramp Arterial U-Turn (Tight Standard)		1.3	9.4	7.5	0.4	3.1	2.5	**6.1**
10G.1	**10**	**G**	Ramp Arterial U-Turn (Tight)	YES	0.9	9.6	7.5	0.3	3.2	2.5	**6.0**
2A	**2**	**A**	Tight Diamond Single Point (Tight)	YES	8.0	5.0	5.0	2.7	1.7	1.7	**6.0**
99DF	**9**		Single Quadrant SE		1.3	6.5	10.0	0.4	2.2	3.3	**5.9**
11H.3	**11**	**H**	Elevated Double U from Dunlop South of Arterial (Standard)		4.5	4.8	8.5	1.5	1.6	2.8	**5.9**
8A.1	**8**	**A**	Displaced Single Point (Tight)	YES	10.0	3.4	4.1	3.3	1.1	1.4	**5.8**
94DF			Southern Half Clover		2.3	10.0	5.2	0.8	3.3	1.7	**5.8**
5G	**5**	**G**	Tight Contraflow U on Arterial (Tight)	YES	5.3	5.1	6.9	1.8	1.7	2.3	**5.8**
2B	**2**	**B**	Tight Diamond	YES	6.0	7.6	3.6	2.0	2.5	1.2	**5.7**
94FF		**F**	Single Quadrant SW		0.7	6.5	10.0	0.2	2.2	3.3	**5.7**
11H.4	**11**	**H**	Elevated Double U from Dunlop South of Arterial (Spread)		3.2	5.1	8.5	1.1	1.7	2.8	**5.6**
6G.1	**6**	**G**	Standard Contraflow U Turn on Arterial (Tight Standard)		5.0	4.7	6.9	1.7	1.6	2.3	**5.5**
12B.2	**12**	**B**	U Turn over Freeway with Slips Tight Diamond (Spread)		8.3	0.0	8.0	2.8	0.0	2.7	**5.4**
8B.1	**8**	**B**	Displaced Tight Diamond (Tight)	YES	6.4	5.0	4.8	2.1	1.7	1.6	**5.4**
10A.4	**10**	**A**	U Turn on Arterial Single Point (Tight Standard)		4.9	6.3	4.9	1.6	2.1	1.6	**5.4**
PM											
8E.1	**8**	**E**	DDI (Tight)	YES	7.4	9.7	2.3	2.5	3.2	0.8	**6.5**
10B.1	**10**	**B**	U Turn on Arterial Tight Diamond (Tight Standard)		5.5	9.3	4.2	1.8	3.1	1.4	**6.4**
12B	**12**	**B**	U Turn over Freeway with Slips Tight Diamond (Tight)	YES	8.0	2.6	8.2	2.7	0.9	2.7	**6.3**
10B	**10**	**B**	U Turn on Arterial Tight Diamond (Tight)	YES	4.9	9.5	4.2	1.6	3.2	1.4	**6.2**
12B.1	**12**	**B**	U Turn over Freeway with Slips Tight Diamond (Standard)		8.1	2.3	8.2	2.7	0.8	2.7	**6.2**
99DF	**9**		Single Quadrant SE		1.8	6.5	10.0	0.6	2.2	3.3	**6.1**
5G	**5**	**G**	Tight Contraflow U on Arterial (Tight)	YES	5.6	5.0	6.9	1.9	1.7	2.3	**5.9**
2B	**2**	**B**	Tight Diamond	YES	6.1	7.6	3.8	2.0	2.5	1.3	**5.9**
2A	**2**	**A**	Tight Diamond Single Point (Tight)	YES	7.5	4.9	5.2	2.5	1.6	1.7	**5.8**
1E.5	**1**	**E**	Displaced Single Point (Tight Standard)		8.0	2.3	7.1	2.7	0.8	2.4	**5.8**
10G.1	**10**	**G**	Ramp Arterial U-Turn (Tight)	YES	0.0	9.6	7.7	0.0	3.2	2.6	**5.8**
11H.3	**11**	**H**	Elevated Double U from Dunlop South of Arterial (Standard)		3.5	5.8	7.8	1.2	1.9	2.6	**5.7**
10G.2	**10**	**G**	Ramp Arterial U-Turn (Tight Standard)		0.0	9.4	7.7	0.0	3.1	2.6	**5.7**
6G.1	**6**	**G**	Standard Contraflow U Turn on Arterial (Tight Standard)		5.5	4.6	6.9	1.8	1.5	2.3	**5.7**
8A.1	**8**	**A**	Displaced Single Point (Tight)	YES	9.2	3.3	4.0	3.1	1.1	1.3	**5.5**
94FF		**F**	Single Quadrant SW		0.0	6.5	10.0	0.0	2.2	3.3	**5.5**
8G.1	**8**	**G**	Displaced U Turn on Arterial (Tight)	YES	7.0	5.0	4.4	2.3	1.7	1.5	**5.5**
12B.2	**12**	**B**	U Turn over Freeway with Slips Tight Diamond (Spread)		8.3	0.0	8.2	2.8	0.0	2.7	**5.5**
94DF			Southern Half Clover		2.3	10.0	4.1	0.8	3.3	1.4	**5.5**
10A.4	**10**	**A**	U Turn on Arterial Single Point (Tight Standard)		5.2	6.2	4.9	1.7	2.1	1.6	**5.5**

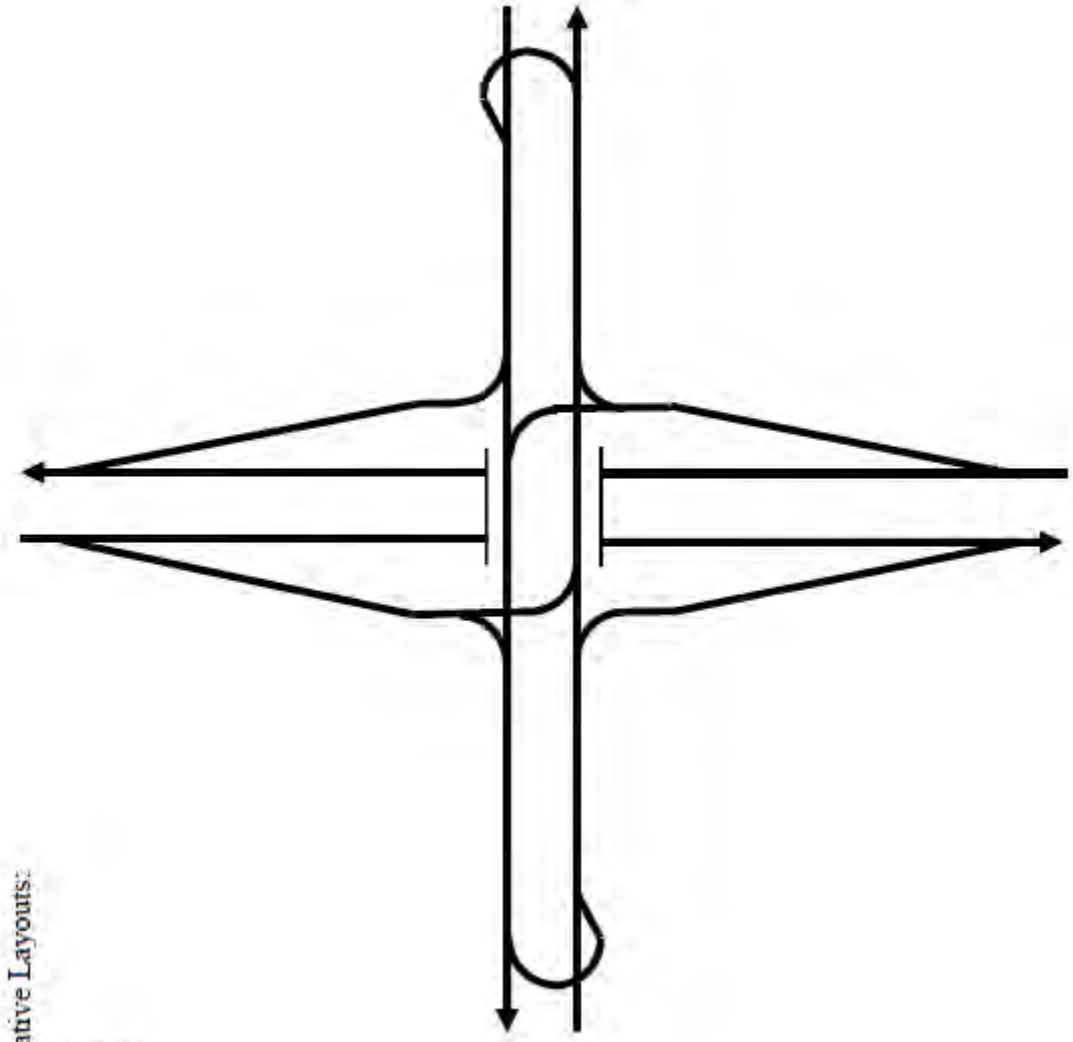
Sheet	Left from Arterial	Left from Freeway	Name	Avoid ROW?	AM & PM Total Score
8E.1	8	E	DDI (Tight)	YES	13.1
10B.1	10	B	U Turn on Arterial Tight Diamond (Tight Standard)		12.6
12B	12	B	U Turn over Freeway with Slips Tight Diamond (Tight)	YES	12.5
12B.1	12	B	U Turn over Freeway with Slips Tight Diamond (Standard)		12.4
10B	10	B	U Turn on Arterial Tight Diamond (Tight)	YES	12.3
99DF	9		Single Quadrant SE		12.0
1E.5	1	E	Displaced Single Point (Tight Standard)		11.9
2A	2	A	Tight Diamond Single Point (Tight)	YES	11.8
10G.1	10	G	Ramp Arterial U-Turn (Tight)	YES	11.8
10G.2	10	G	Ramp Arterial U-Turn (Tight Standard)		11.7
5G	5	G	Tight Contraflow U on Arterial (Tight)	YES	11.6
11H.3	11	H	Elevated Double U from Dunlop South of Arterial (Standard)		11.6
2B	2	B	Tight Diamond	YES	11.6
8A.1	8	A	Displaced Single Point (Tight)	YES	11.3
94DF			Southern Half Clover		11.3
94FF		F	Single Quadrant SW		11.2
6G.1	6	G	Standard Contraflow U Turn on Arterial (Tight Standard)		11.2
12B.2	12	B	U Turn over Freeway with Slips Tight Diamond (Spread)		10.9
10A.4	10	A	U Turn on Arterial Single Point (Tight Standard)		10.8
8G.1	8	G	Displaced U Turn on Arterial (Tight)	YES	10.8
11H.4	11	H	Elevated Double U from Dunlop South of Arterial (Spread)		10.7
8B.1	8	B	Displaced Tight Diamond (Tight)	YES	10.7

*This list contains some duplicates with slight variations

1. Diverging Diamond Interchange (DDI)

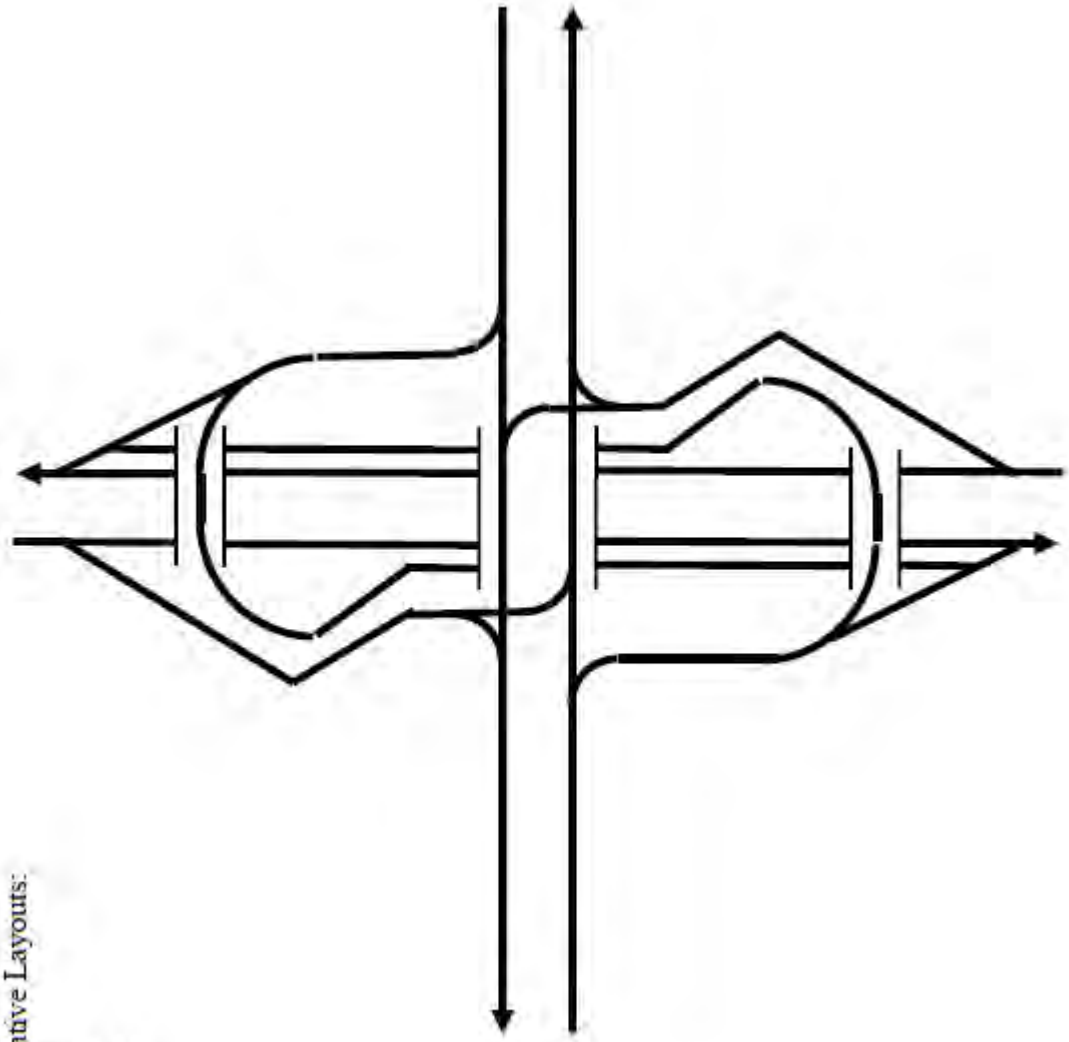


2. Diamond with U-turn for Arterial Lefts



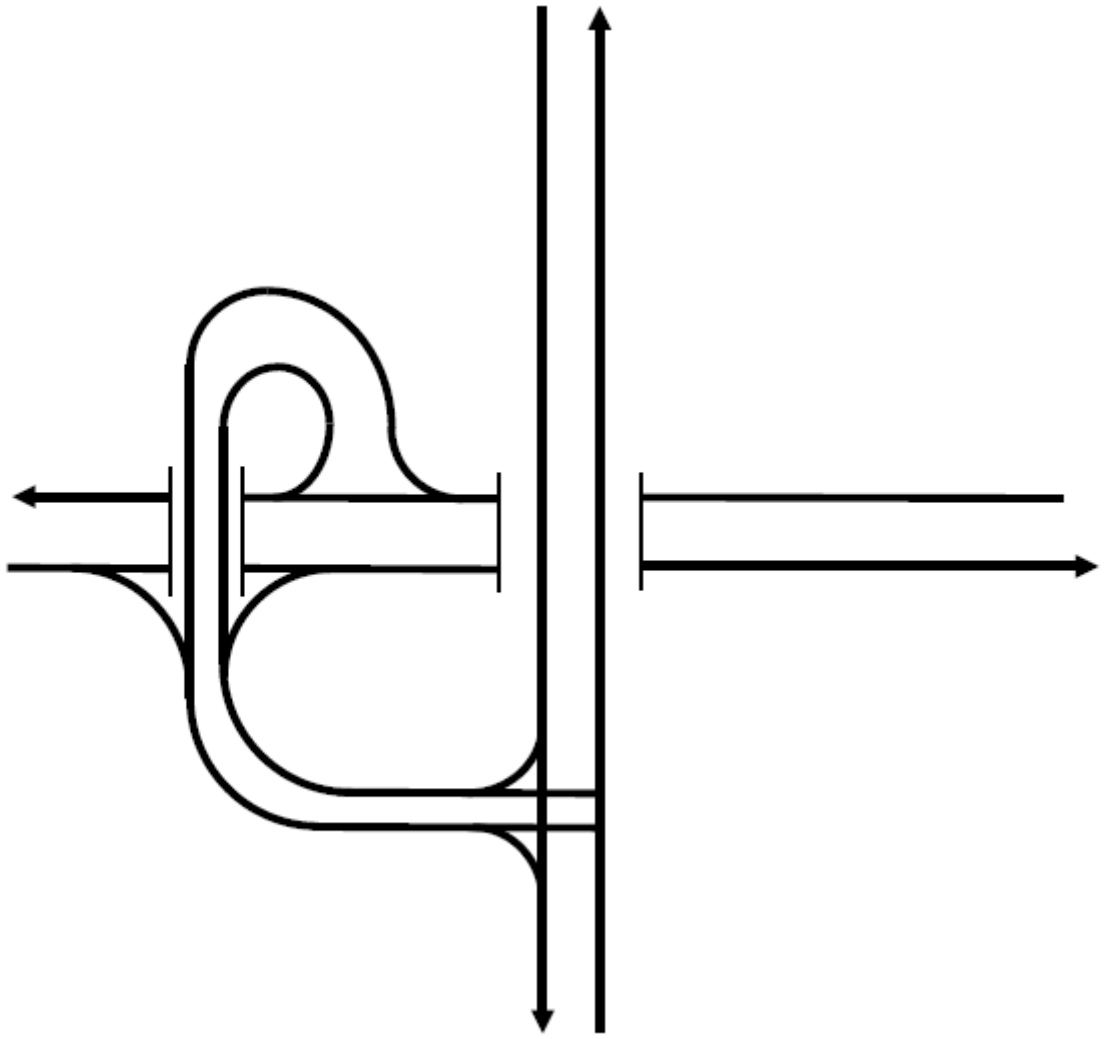
lternative Layouts:
0B
0B.1
0B.2

3. Diamond with U-turn over Freeway and Slip Lanes for Arterial Lefts

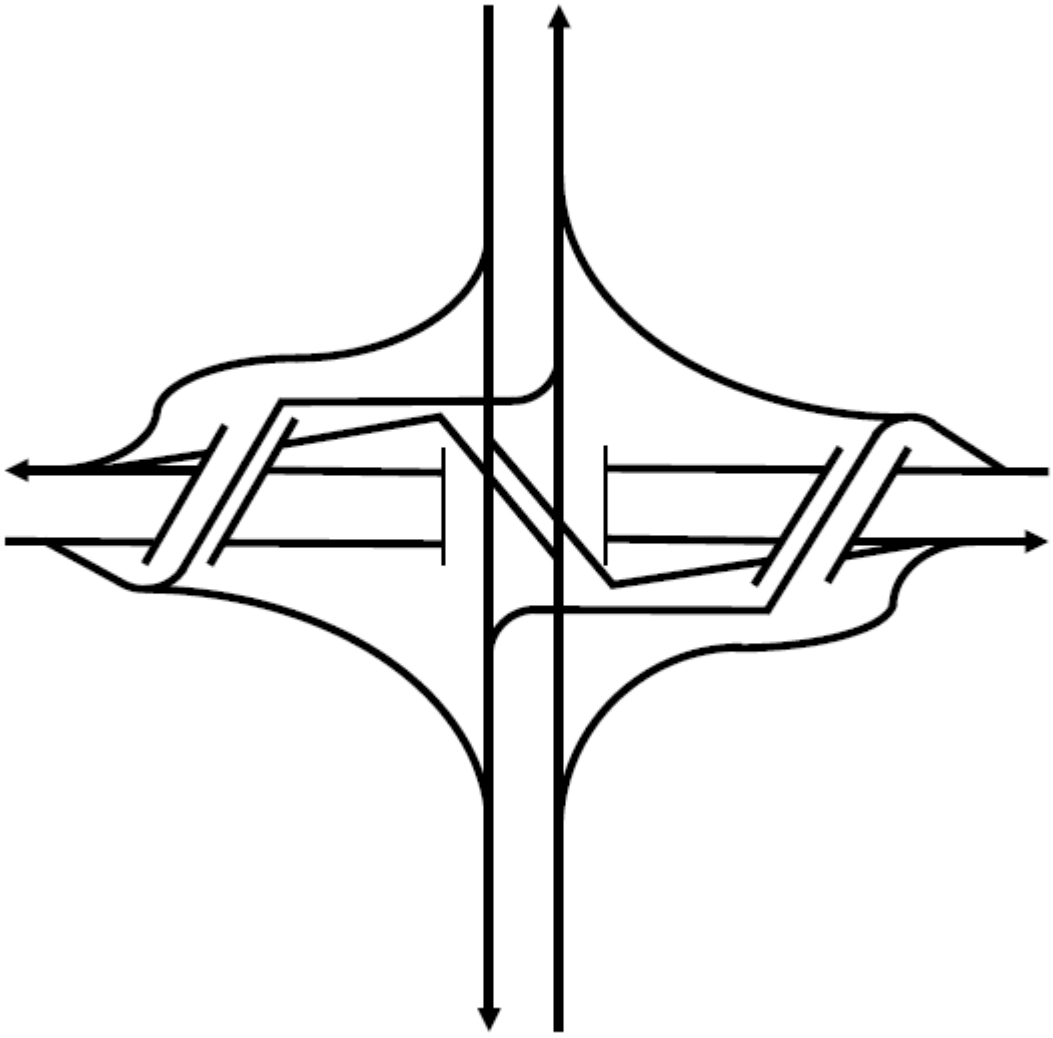


Alternative Layouts:
2B
2B.1
2B.2

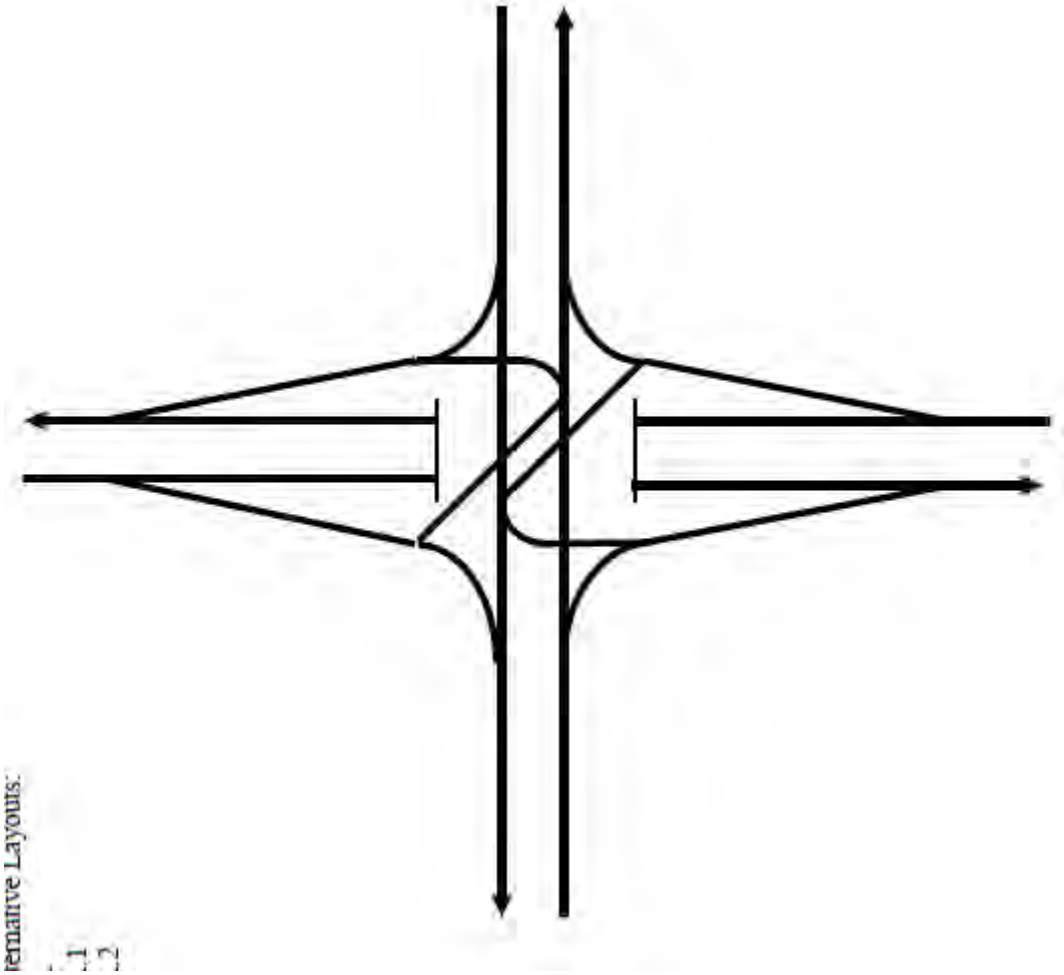
4. Single Quadrant



5. Diamond Single Point with Displaced Ramp Lefts

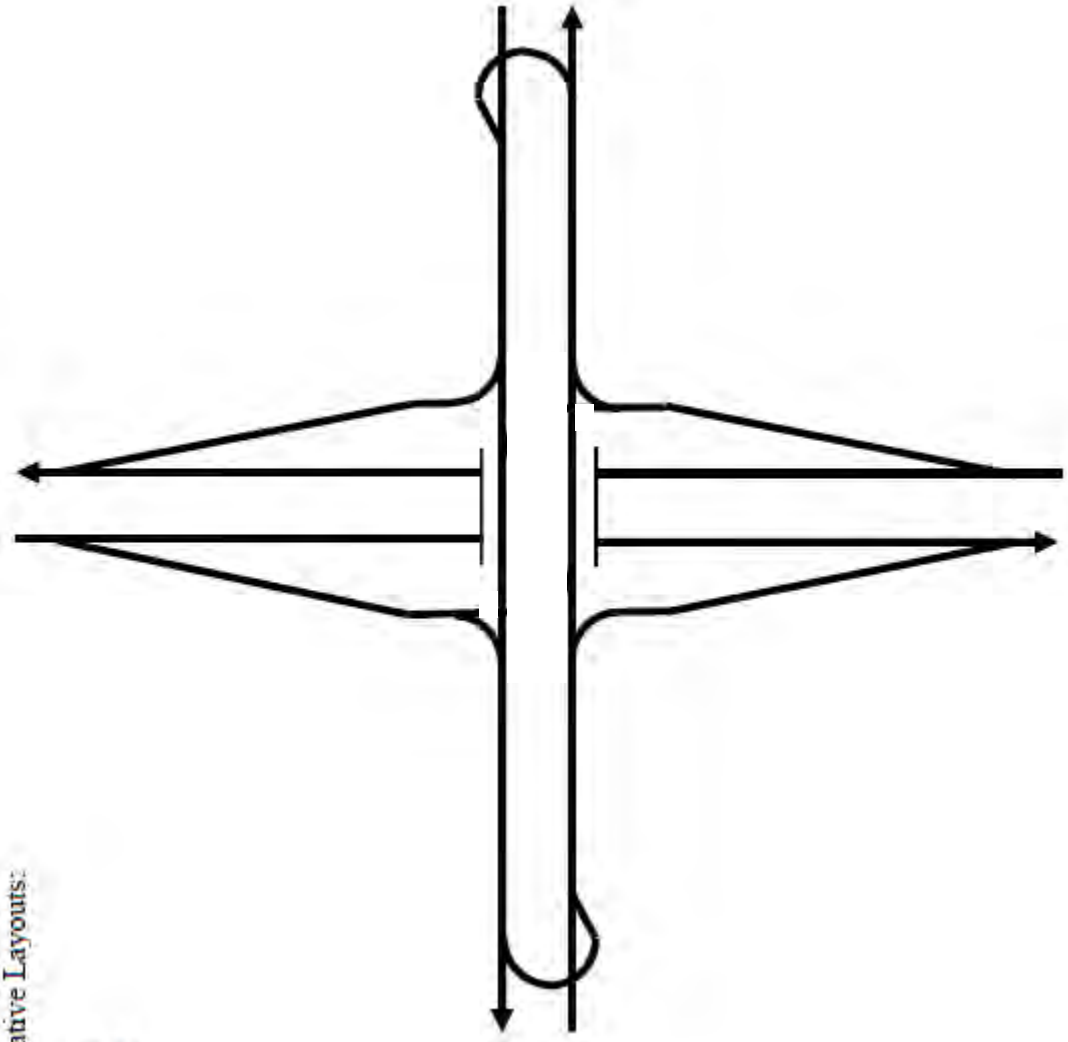


6. Diamond Single Point/Single Point Urban Interchange (SPUI)



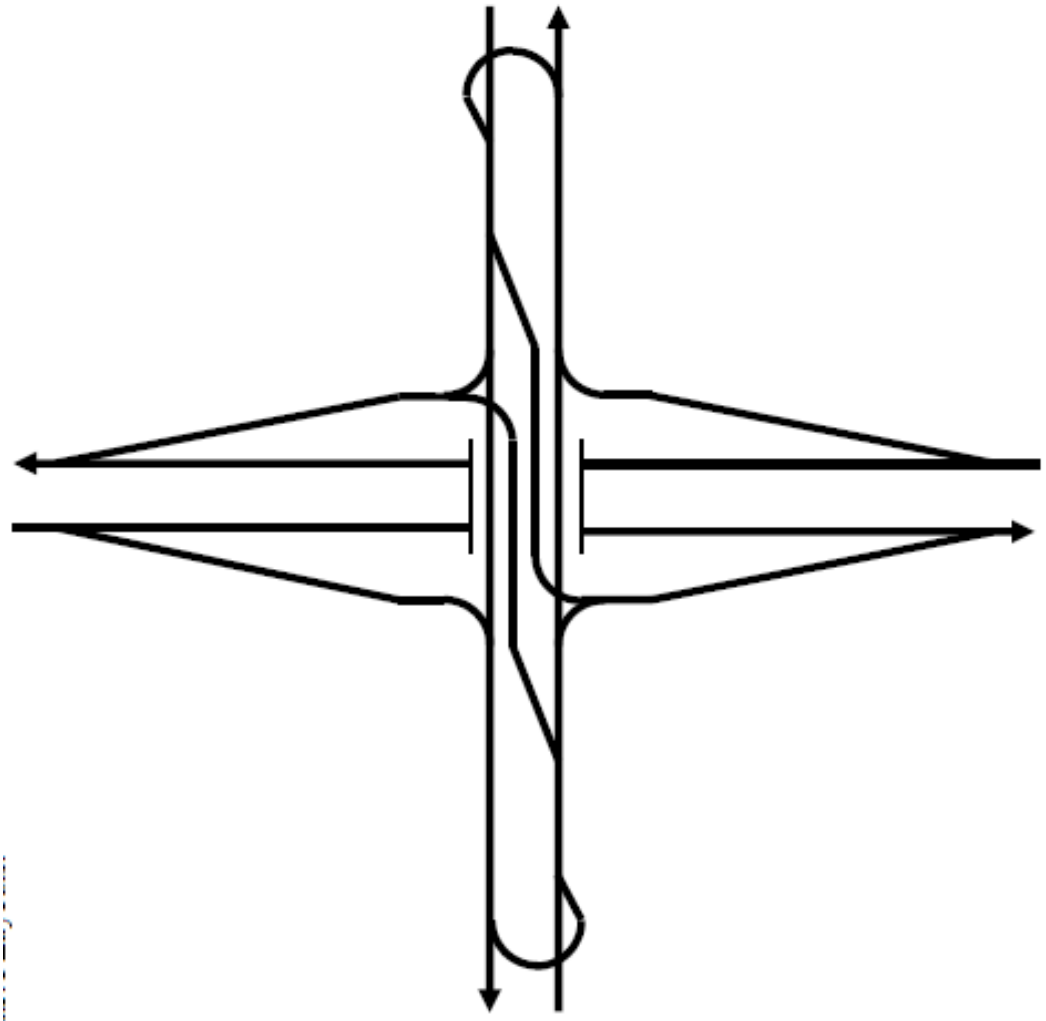
ernative Layouts:

7. Diamond with U-turn for Arterial and Ramp Lefts

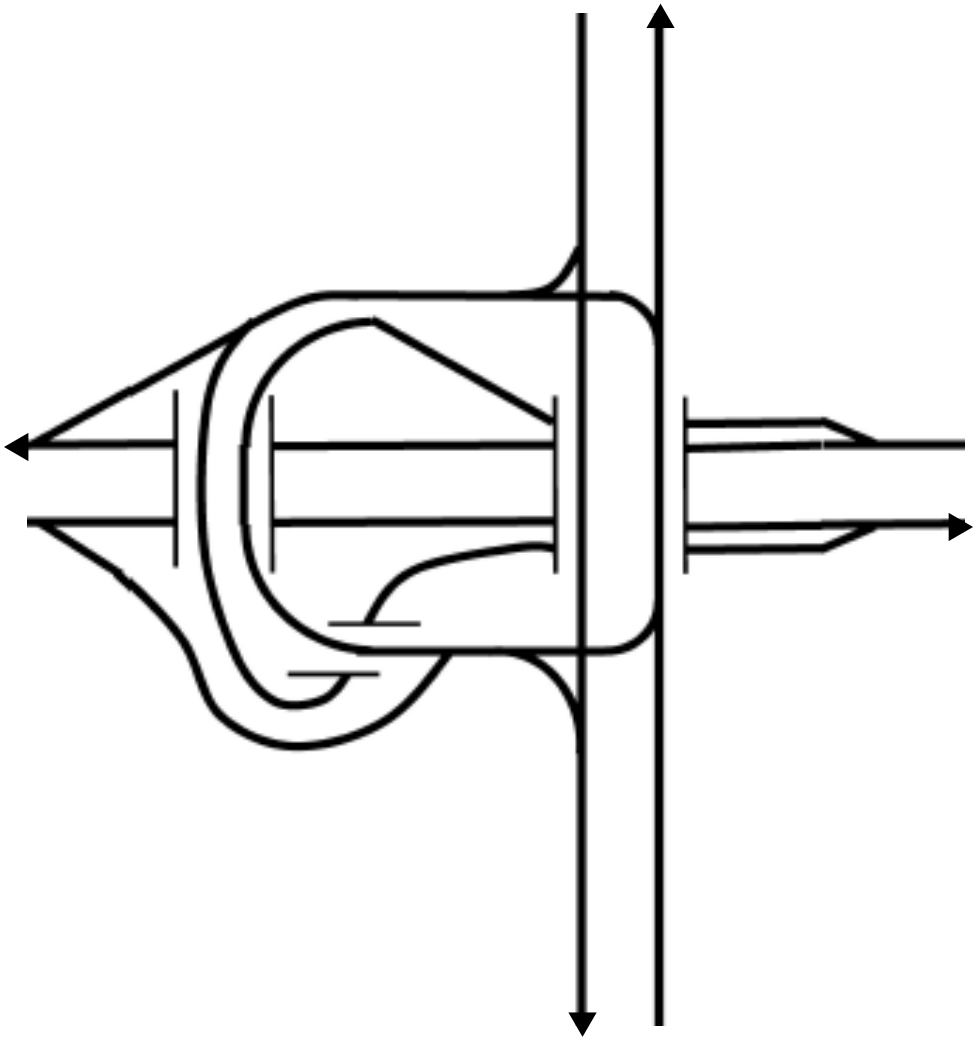


lternative Layouts:
0B
0B.1
0B.2

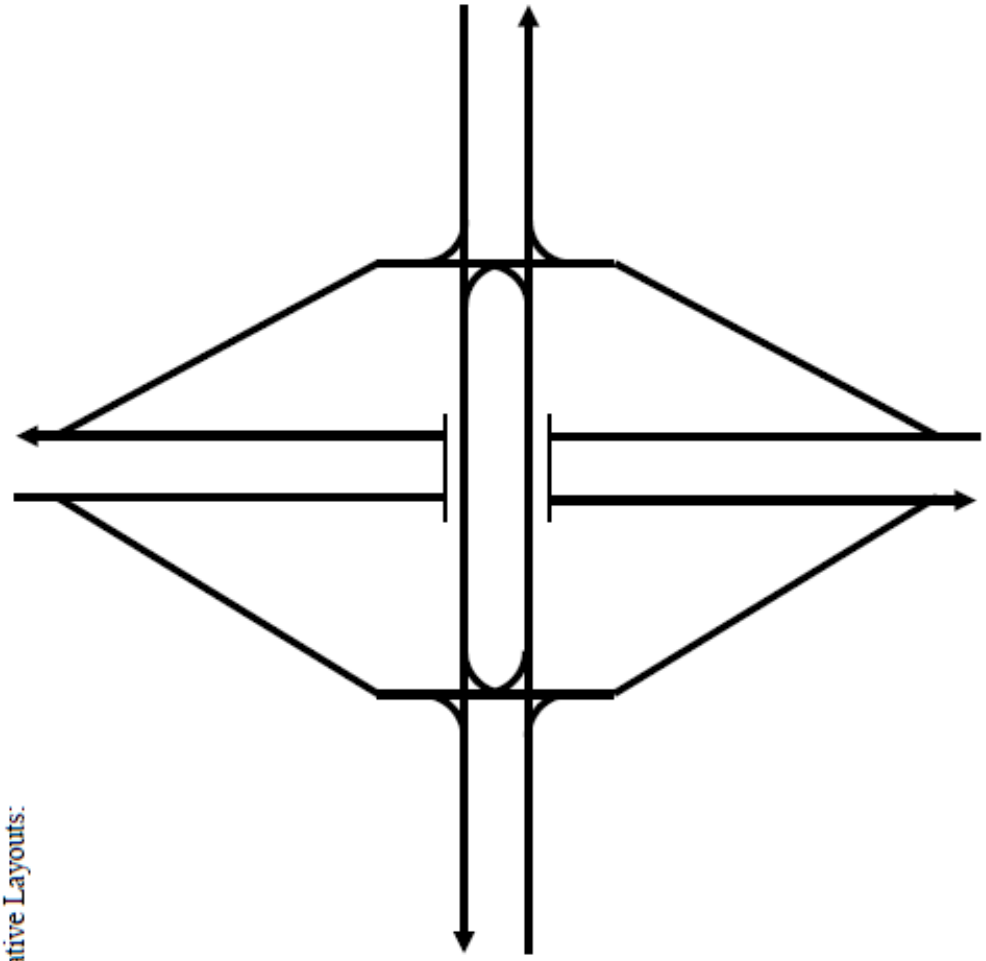
8. Diamond with Contraflow Arterial Lefts and U-turn for Ramp Lefts



9. Elevated Double U-turn

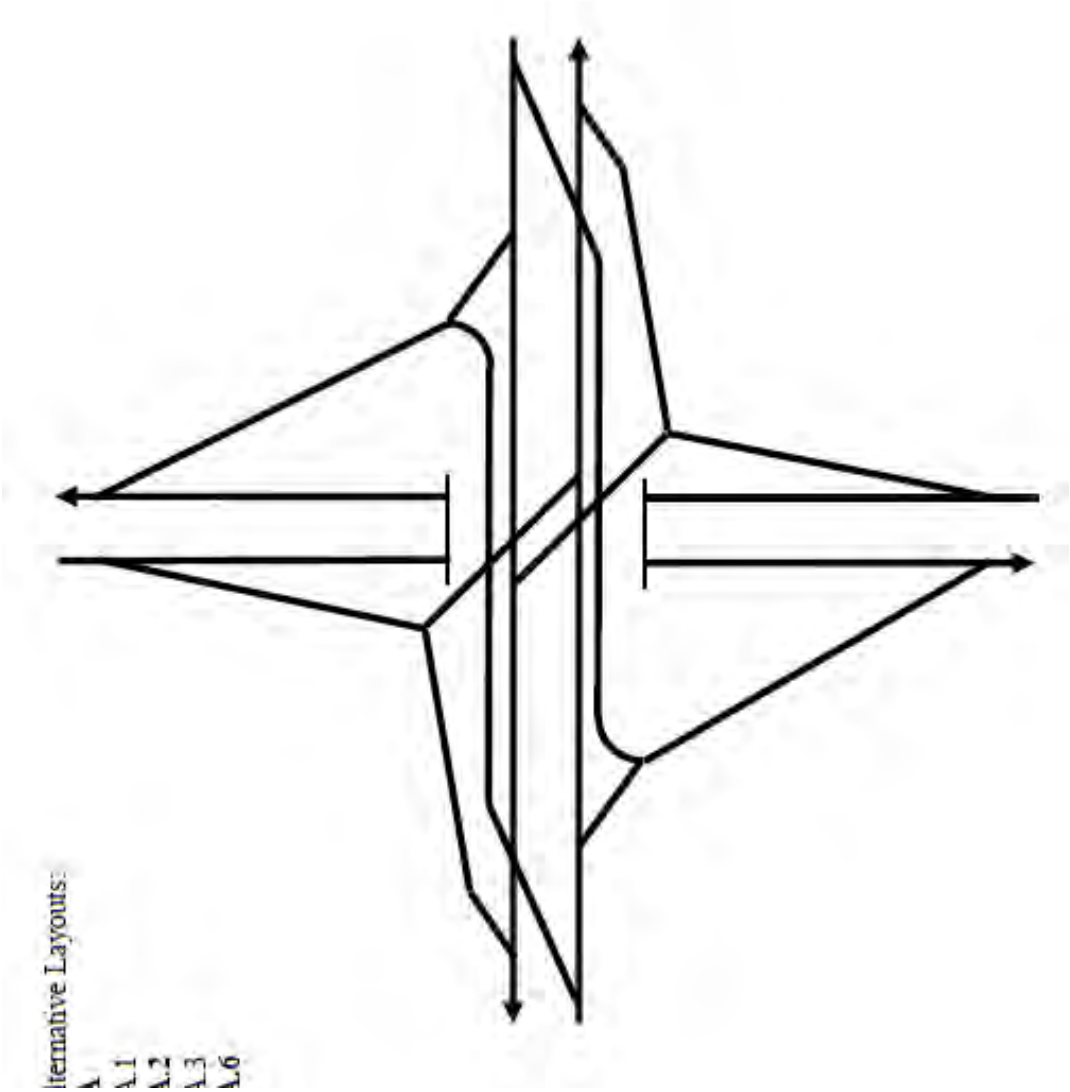


10. Standard Diamond

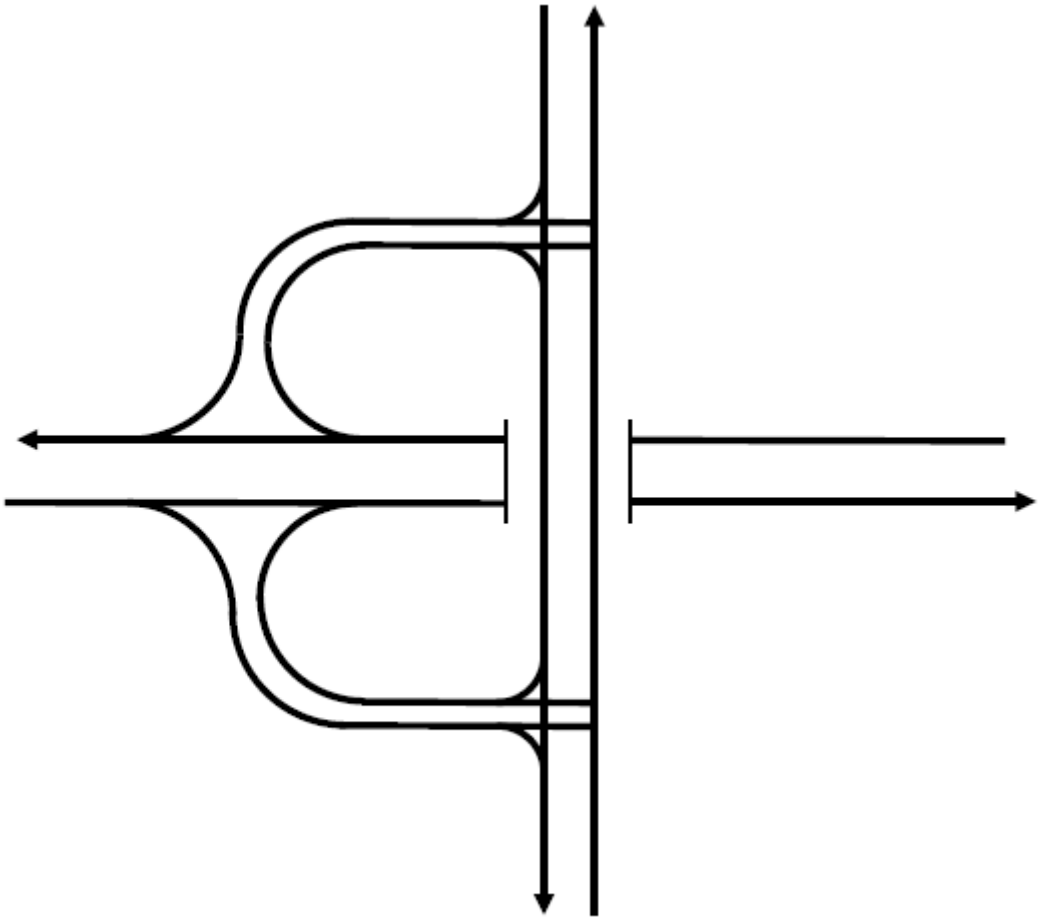


mative Layouts:

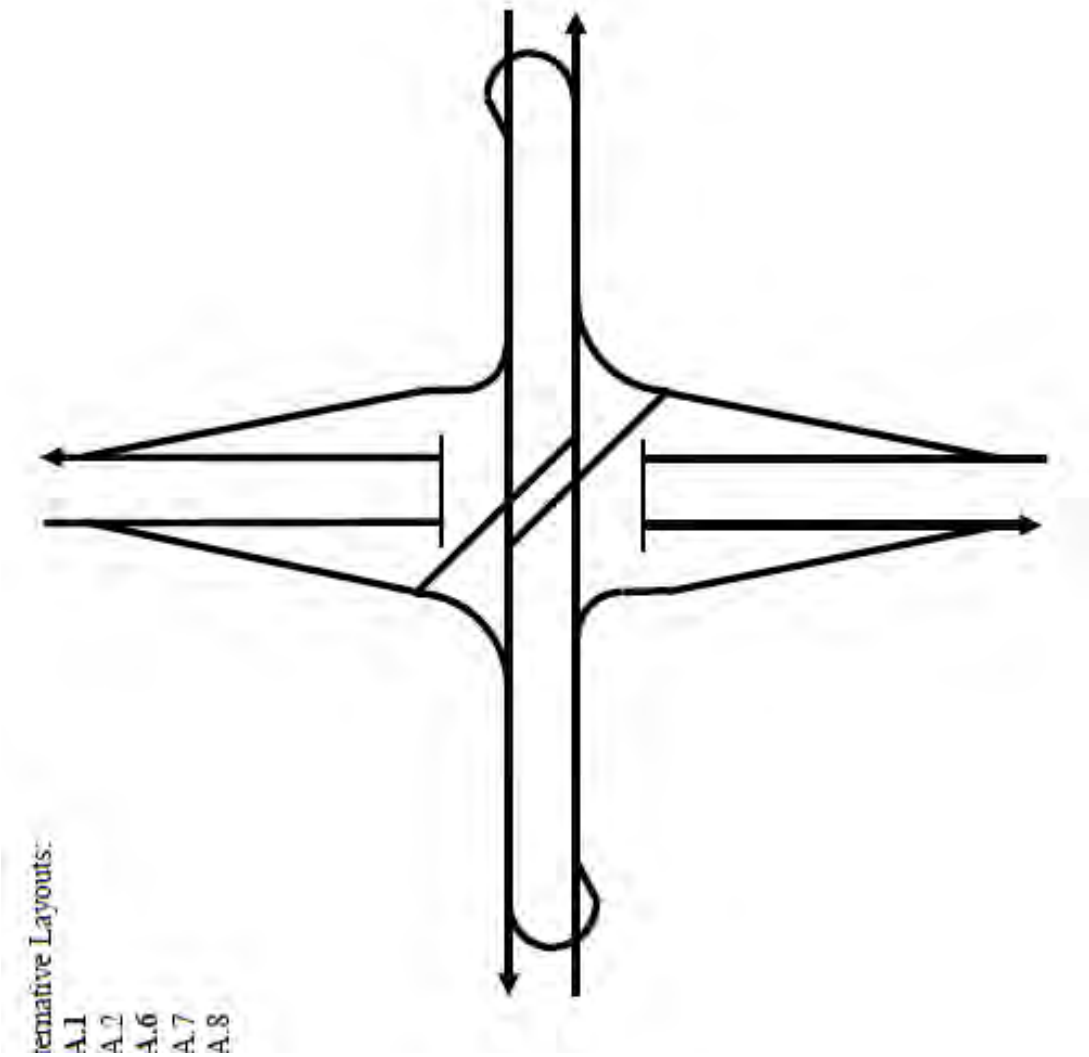
11. Diamond Single Point with Displaced Arterial Lefts



12. Half Clover/Parclo

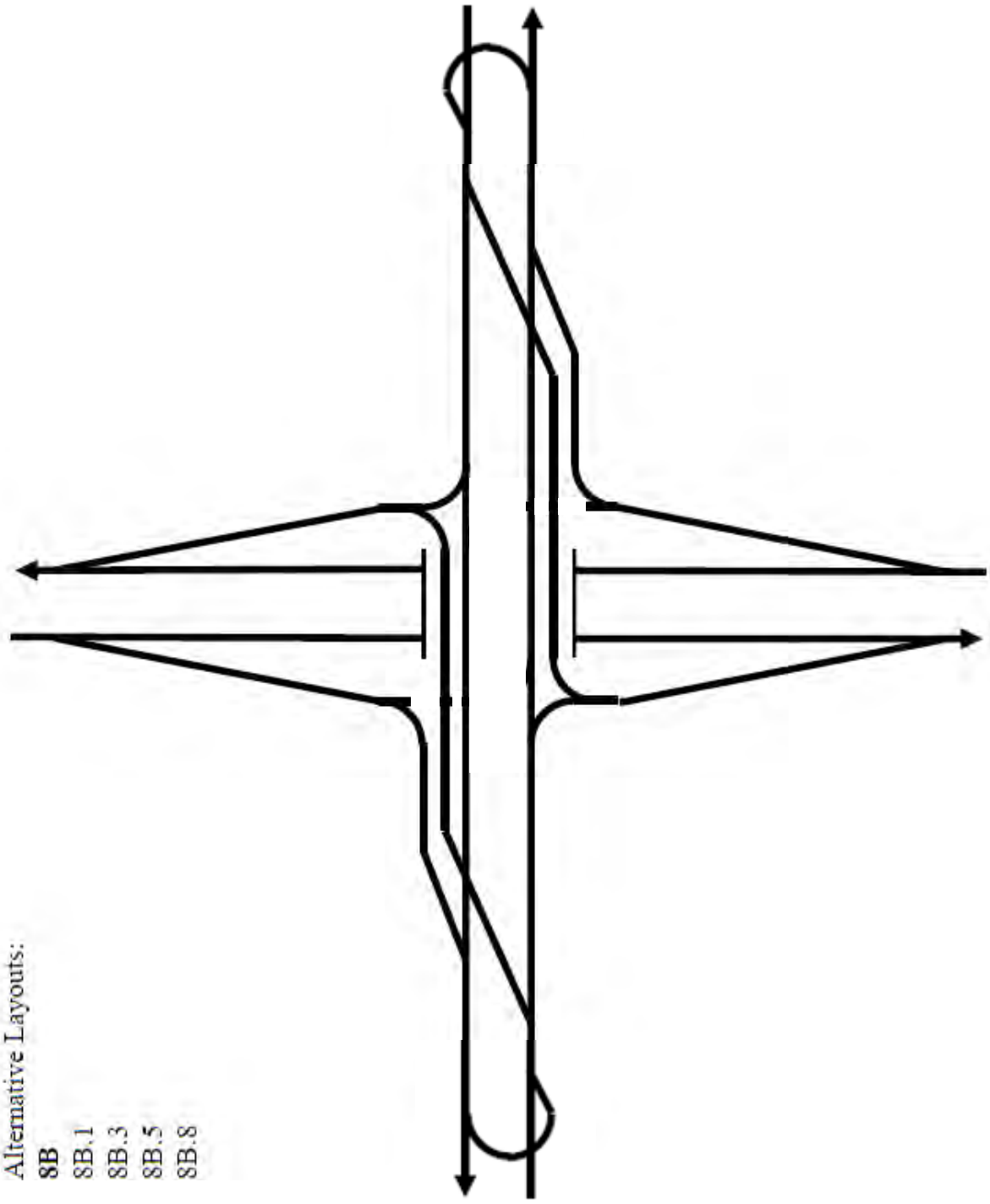


13. Diamond Single Point with U-turn for Arterial Lefts

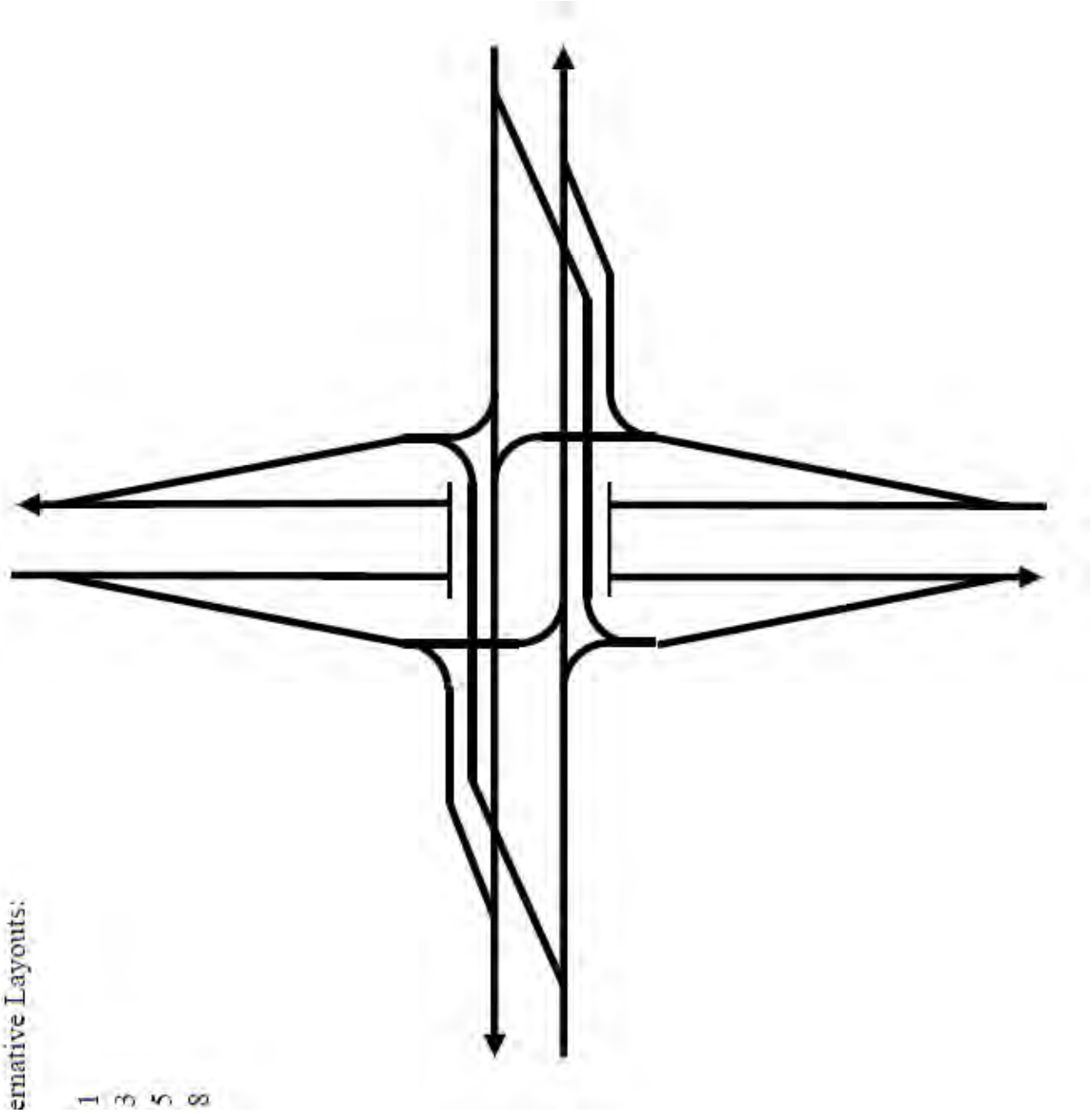


ternative Layouts:
A.1
A.2
A.6
A.7
A.8

14. Diamond with Displaced Arterial Lefts and U-turn for Ramp Lefts



15. Diamond with Displaced Arterial Lefts

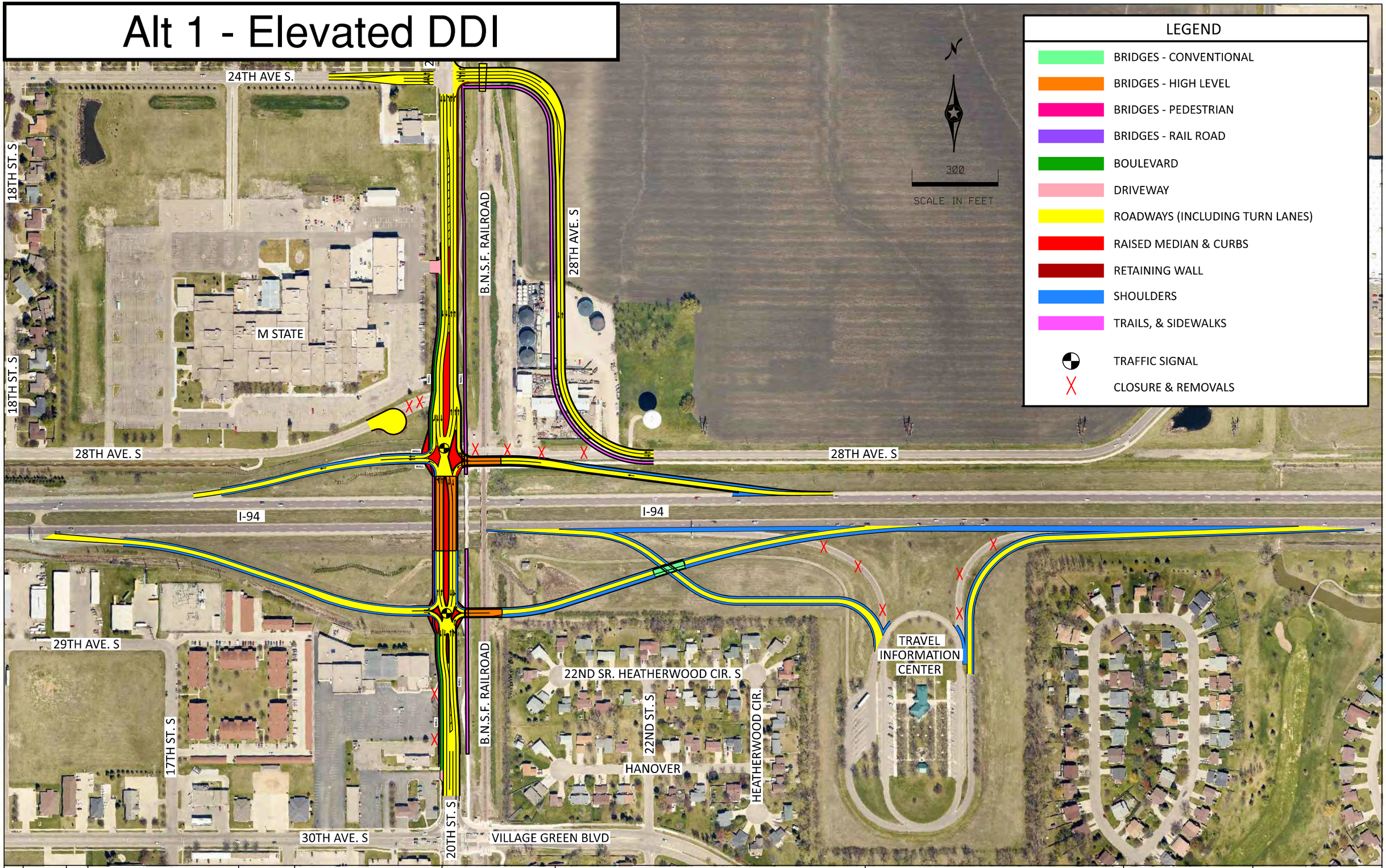


ernative Layouts:

1
3
5
8

Appendix G – Alternatives Exhibits

Alt 1 - Elevated DDI



LEGEND

- BRIDGES - CONVENTIONAL
- BRIDGES - HIGH LEVEL
- BRIDGES - PEDESTRIAN
- BRIDGES - RAIL ROAD
- BOULEVARD
- DRIVEWAY
- ROADWAYS (INCLUDING TURN LANES)
- RAISED MEDIAN & CURBS
- RETAINING WALL
- SHOULDERS
- TRAILS, & SIDEWALKS
- TRAFFIC SIGNAL
- CLOSURE & REMOVALS

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NO	DATE	APPR	REVISION	
				SURVEY -
				DRAWN -
				DESIGNED -
				APPROVED -

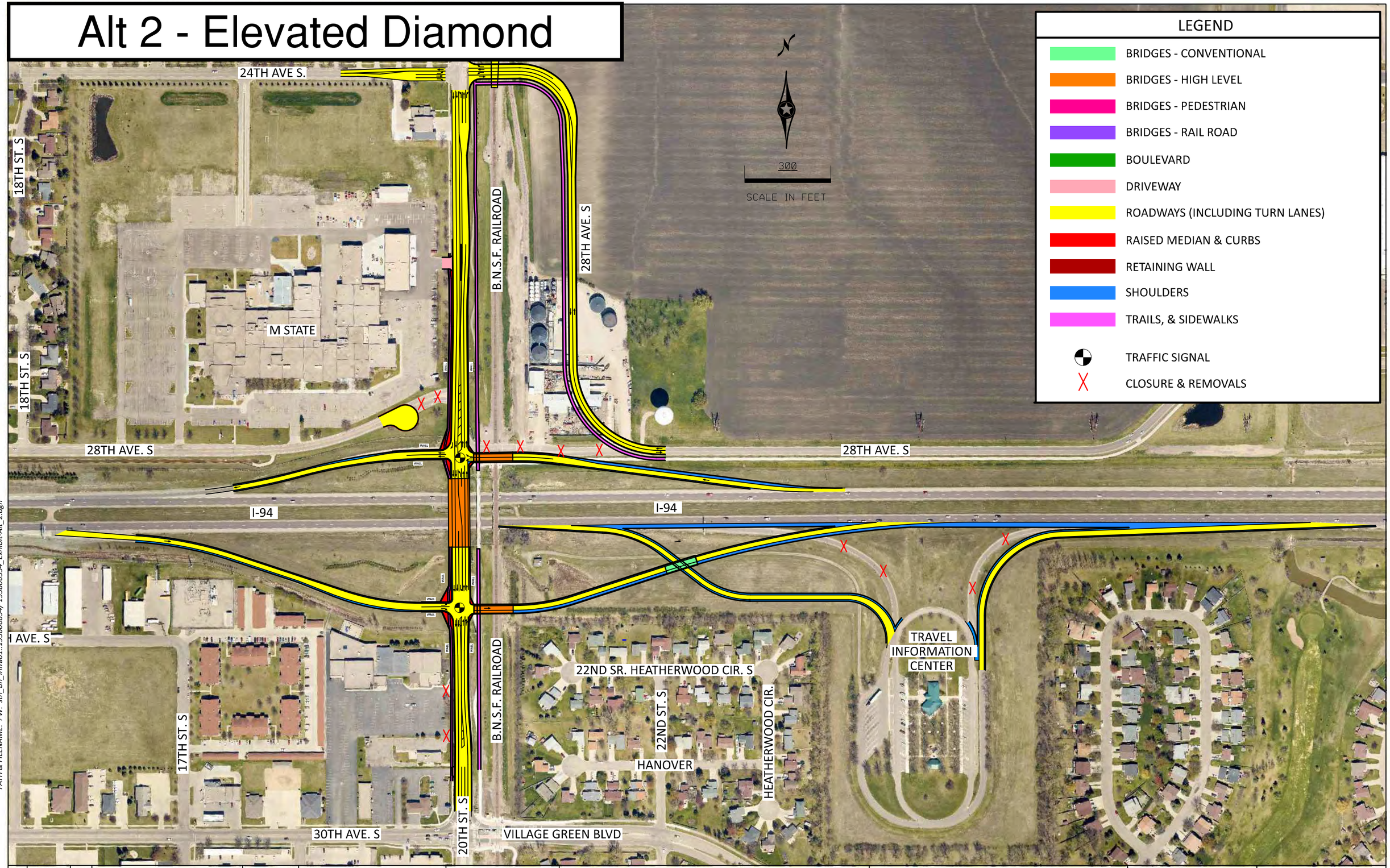
DEPARTMENT OF TRANSPORTATION

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 1
ELEVATED DDI

STATE PROJ. NO.	-	SHEET NO.	1
TRUNK HWY.	I94	TOTAL SHEETS	5

Alt 2 - Elevated Diamond



LEGEND

- BRIDGES - CONVENTIONAL
- BRIDGES - HIGH LEVEL
- BRIDGES - PEDESTRIAN
- BRIDGES - RAIL ROAD
- BOULEVARD
- DRIVEWAY
- ROADWAYS (INCLUDING TURN LANES)
- RAISED MEDIAN & CURBS
- RETAINING WALL
- SHOULDERS
- TRAILS, & SIDEWALKS
- TRAFFIC SIGNAL
- CLOSURE & REMOVALS

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				DRAWN	-
				DESIGNED	-
				APPROVED	-

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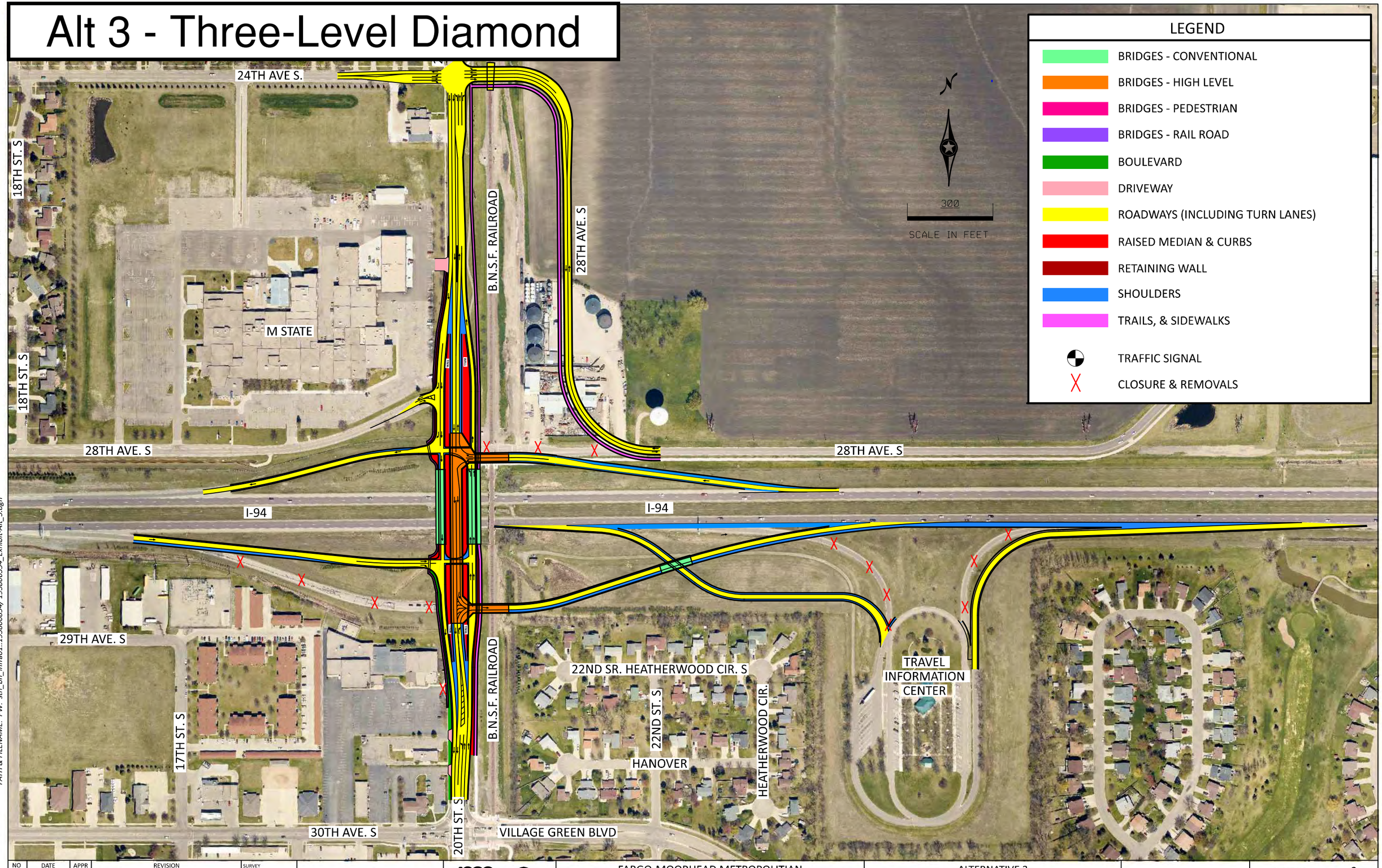
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 2
ELEVATED TIGHT DIAMOND

STATE PROJ. NO.	-	SHEET NO.	2
TRUNK HWY.	I94	TOTAL SHEETS	5

Alt 3 - Three-Level Diamond



LEGEND

- BRIDGES - CONVENTIONAL
- BRIDGES - HIGH LEVEL
- BRIDGES - PEDESTRIAN
- BRIDGES - RAIL ROAD
- BOULEVARD
- DRIVEWAY
- ROADWAYS (INCLUDING TURN LANES)
- RAISED MEDIAN & CURBS
- RETAINING WALL
- SHOULDERS
- TRAILS, & SIDEWALKS
- TRAFFIC SIGNAL
- CLOSURE & REMOVALS

PLOTTED/REVISED: $DATE$

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			-	DRAWN
			-	DESIGNED
			-	APPROVED

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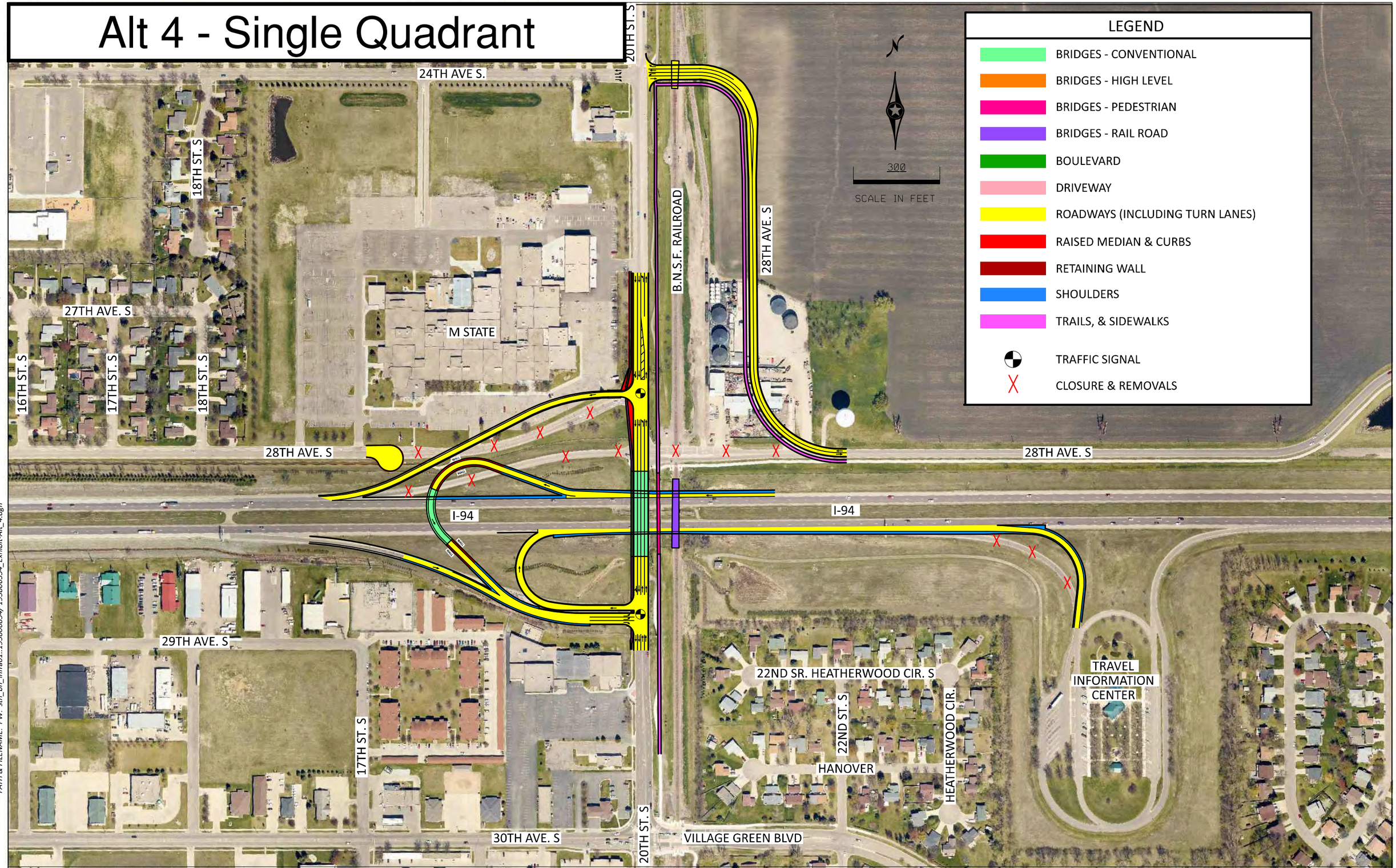
FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 3
LEVEL DIAMOND

STATE PROJ. NO.	-	SHEET NO.	3
TRUNK HWY.	I94	TOTAL SHEETS	5

Alt 4 - Single Quadrant



LEGEND

- BRIDGES - CONVENTIONAL
- BRIDGES - HIGH LEVEL
- BRIDGES - PEDESTRIAN
- BRIDGES - RAIL ROAD
- BOULEVARD
- DRIVEWAY
- ROADWAYS (INCLUDING TURN LANES)
- RAISED MEDIAN & CURBS
- RETAINING WALL
- SHOULDERS
- TRAILS, & SIDEWALKS
- TRAFFIC SIGNAL
- CLOSURE & REMOVALS

PLOTTED/REVISED: $DATE$

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NO	DATE	APPR	REVISION	
				SURVEY -
				DRAWN -
				DESIGNED -
				APPROVED -

DEPARTMENT OF TRANSPORTATION

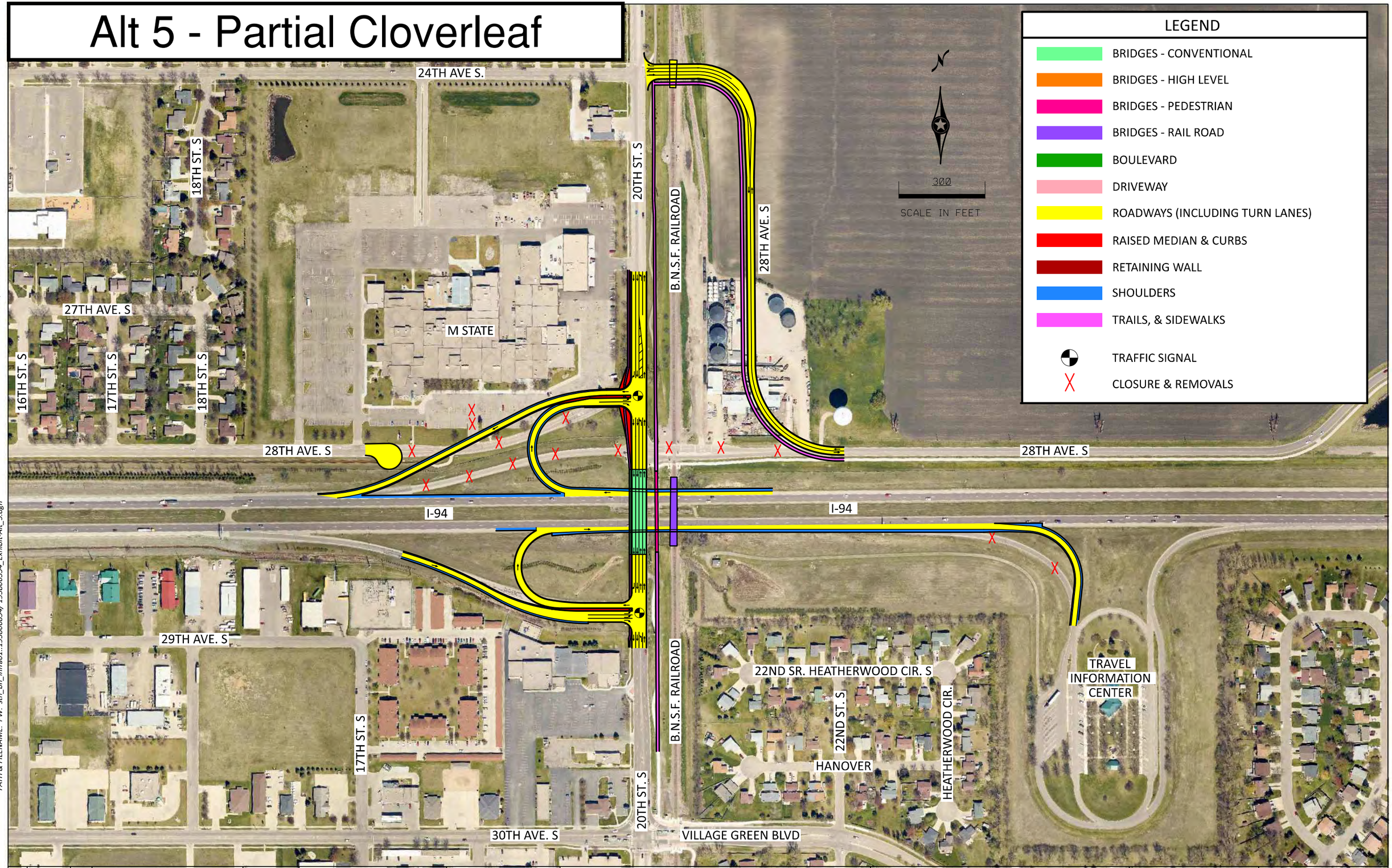
Stantec

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 4
SINGLE QUADRANT

STATE PROJ. NO.	-	SHEET NO.	4
TRUNK HWY.	I94	TOTAL SHEETS	5

Alt 5 - Partial Cloverleaf



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NO	DATE	APPR	REVISION	SURVEY
				DRAWN
				DESIGNED
				APPROVED

DEPARTMENT OF TRANSPORTATION

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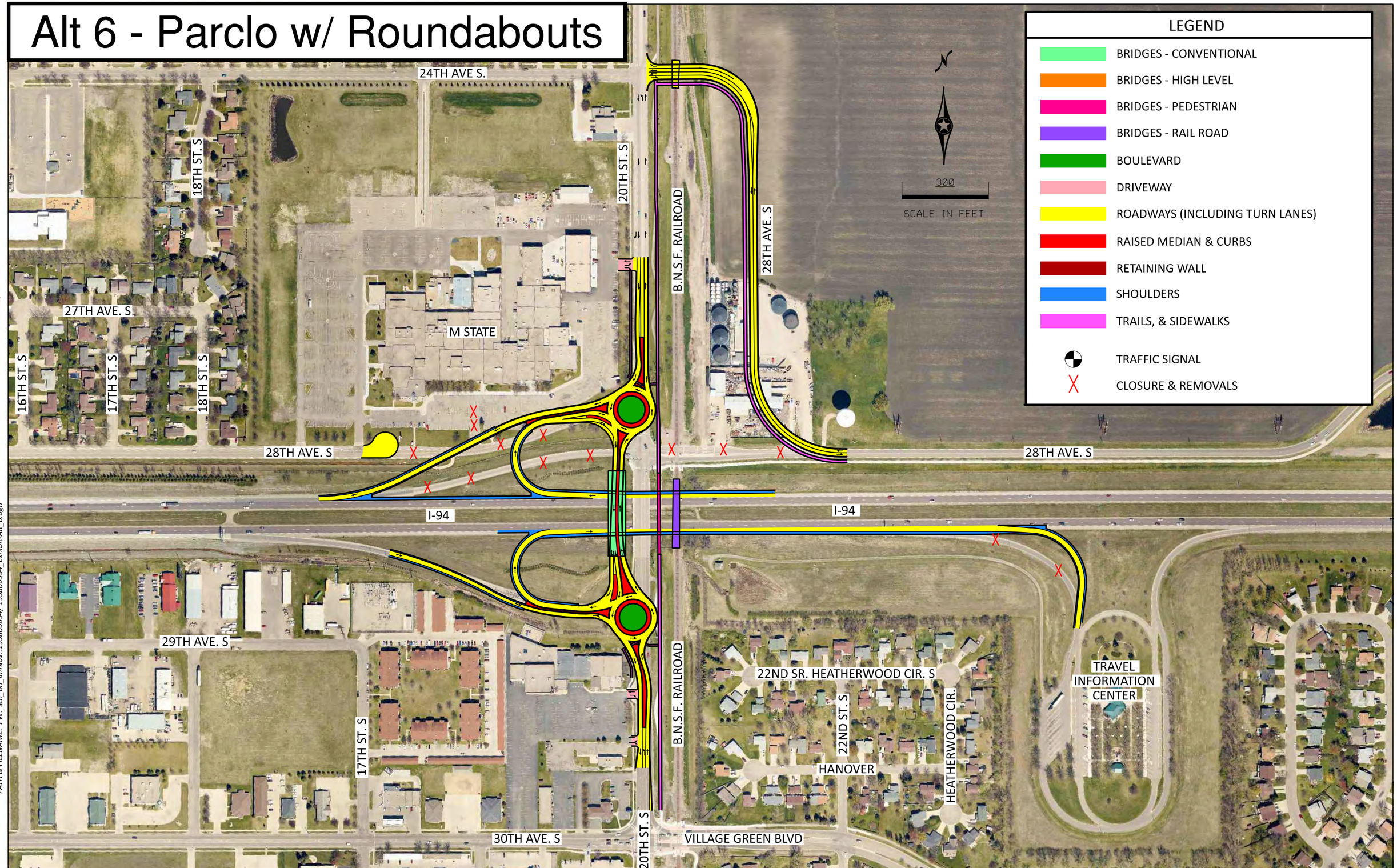
FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 5
PARTIAL CLOVERLEAF

STATE PROJ. NO.	-	SHEET NO.	5
TRUNK HWY.	I94	TOTAL SHEETS	5

Alt 6 - Parclo w/ Roundabouts



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NO	DATE	APPR	REVISION	SURVEY
				DRAWN
				DESIGNED
				APPROVED

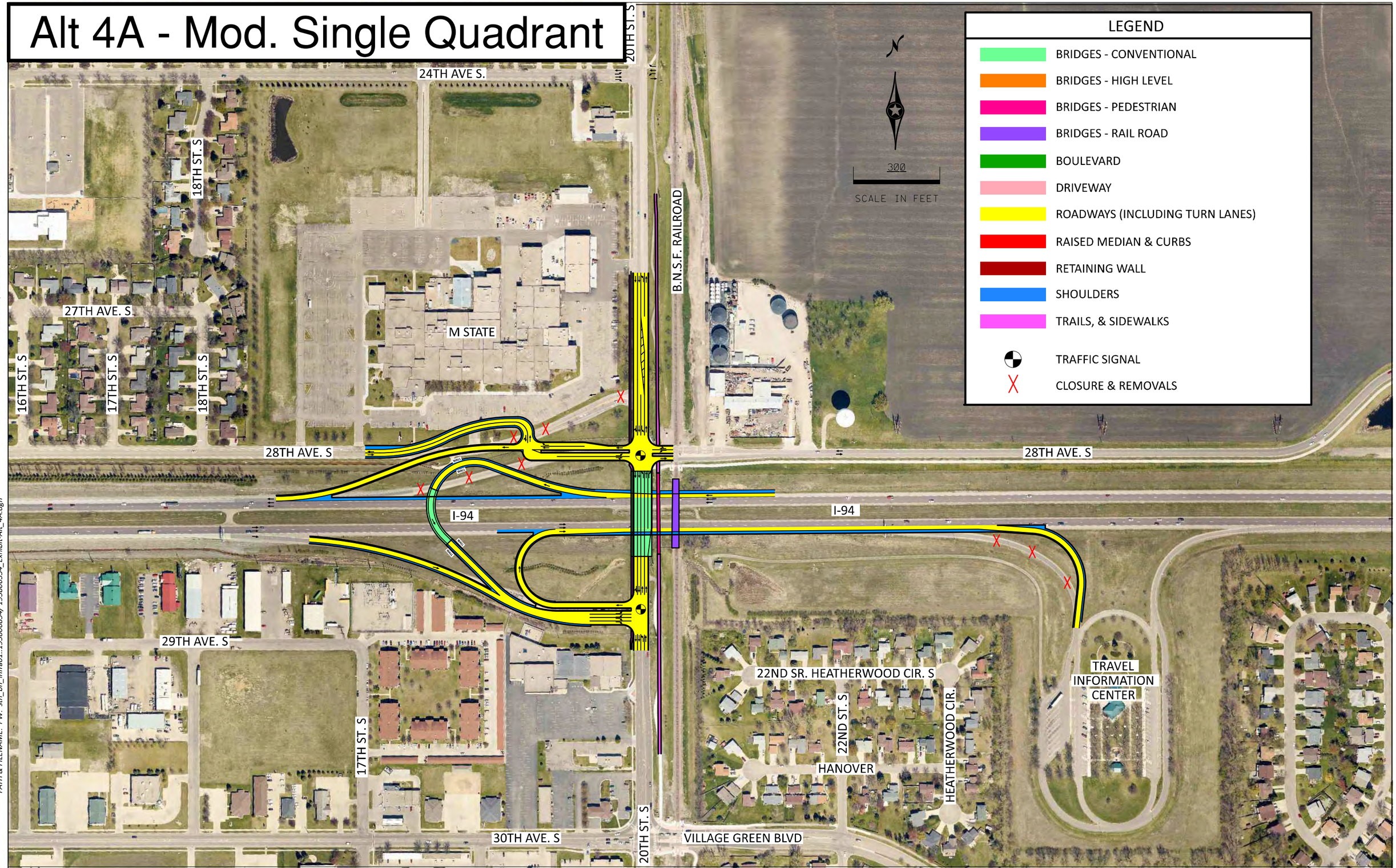
DEPARTMENT OF TRANSPORTATION

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 6
OFFSET ALIGNMENT WITH ROUNDABOUTS

STATE PROJ. NO.	-	SHEET NO.	6
TRUNK HWY.	I94	TOTAL SHEETS	6

Alt 4A - Mod. Single Quadrant



PLOTTED/REVISED: $DATE$

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NO	DATE	APPR	REVISION	
				SURVEY -
				DRAWN -
				DESIGNED -
				APPROVED -

DEPARTMENT OF TRANSPORTATION

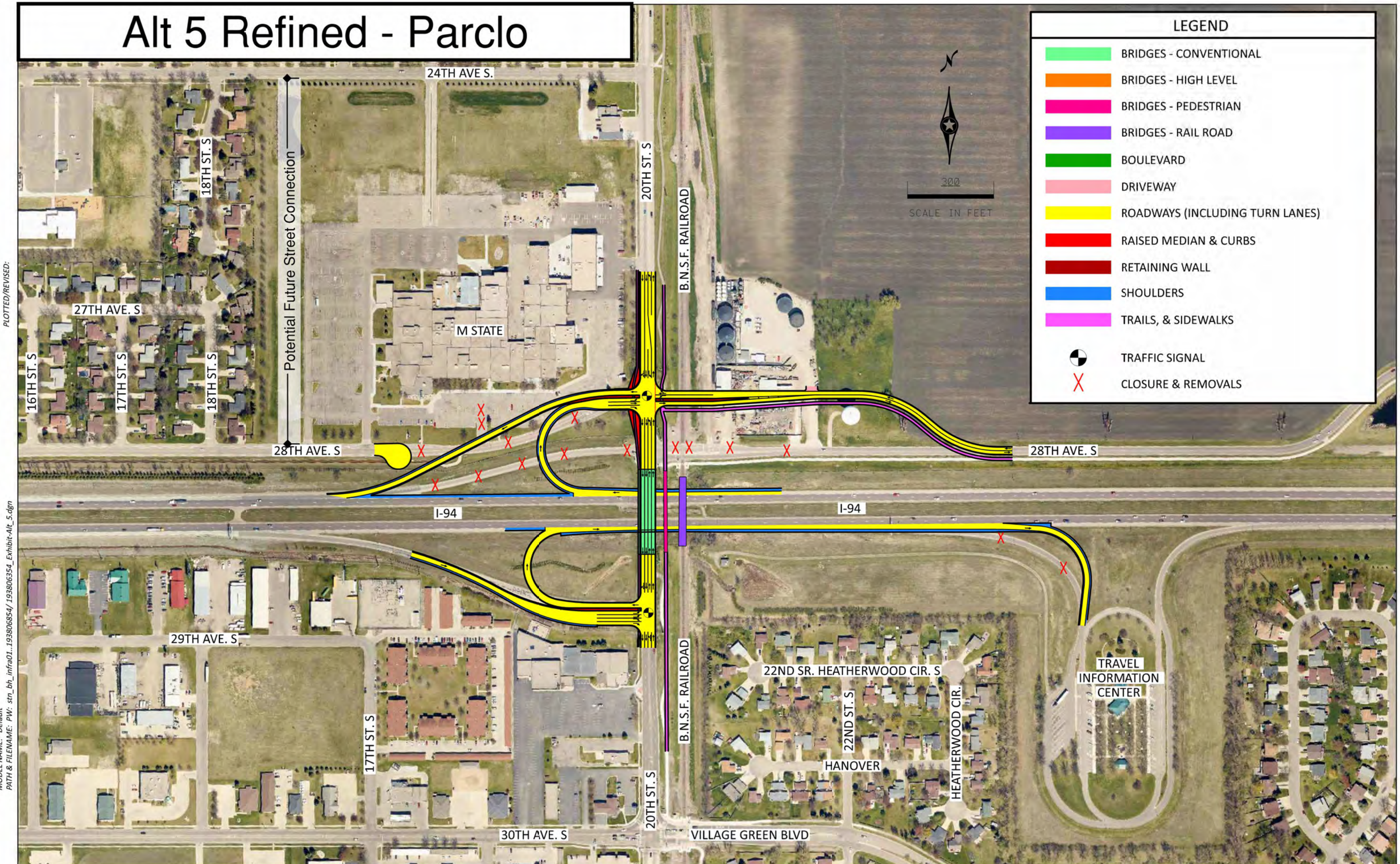
Stantec

FARGO-MOORHEAD METROPOLITIAN
COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 4A
SINGLE QUANDRANT
WITH 28TH AVE. CONNECTION

STATE PROJ. NO.	-	SHEET NO.	4A
TRUNK HWY.	I94	TOTAL SHEETS	6

Alt 5 Refined - Parclo



LEGEND

- BRIDGES - CONVENTIONAL
- BRIDGES - HIGH LEVEL
- BRIDGES - PEDESTRIAN
- BRIDGES - RAIL ROAD
- BOULEVARD
- DRIVEWAY
- ROADWAYS (INCLUDING TURN LANES)
- RAISED MEDIAN & CURBS
- RETAINING WALL
- SHOULDERS
- TRAILS, & SIDEWALKS
- TRAFFIC SIGNAL
- CLOSURE & REMOVALS

PLOTTED/REVISED:

MODEL NAME: Default
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NO	DATE	APPR	REVISION	
				SURVEY
				DRAWN
				DESIGNED
				APPROVED

DEPARTMENT OF TRANSPORTATION | Stantec

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 5
PARTIAL CLOVERLEAF

STATE PROJ. NO.	-	SHEET NO.	6
TRUNK HWY.	I94	TOTAL SHEETS	6

Appendix H – Project Funding Matrix

FUNDING SOURCES FOR TRANSPORTATION PROJECTS

Program	Agency	Purpose / Goals	Applicant Eligibility	Eligible Use of Funds	Loan or Grant Maximums & Terms	Additional Requirements / Notes	Funding Cycle	Contact
Better Utilizing Investments to Leverage Development (BUILD) (Formerly RAISE)	US Department of Transportation	To fund eligible surface transportation projects that will have a significant local or regional impact that advance the Departmental priorities of safety, equity, climate and sustainability, and workforce development, job quality, and wealth creation.	State, local and tribal governments, including U.S. territories, transit agencies, port authorities, metropolitan planning organizations (MPOs), and other political subdivisions of State or local governments.	1. **Capital Projects:** surface transportation capital projects that including: a.highway, bridge, or other road projects eligible under title 23, United States Code; b.public transportation projects eligible under chapter 53 of title 49, United States Code; c.11 passenger and freight rail transportation projects; d.port infrastructure investments (including inland port infrastructure and land ports of entry); e.intermodal projects; f.projects investing in surface transportation facilities that are located on Tribal land and for which title or maintenance responsibility is vested in the Federal Government. 5 g.Research, demonstration, or pilot projects are eligible only if they will result in long-term, permanent surface transportation infrastructure that has independent utility 2. **Planning Projects** a.Planning, preparation, or design— for example environmental analysis, feasibility studies, and other pre-construction activities—of eligible surface transportation capital projects. b.In addition, eligible activities related to multidisciplinary projects or regional planning may include: i.Development of master plans, comprehensive plans, or corridor plans; ii.Planning activities related to the development of a multimodal freight corridor, including those that seek to reduce conflicts with residential areas and with passenger and non-motorized traffic; iii.Development of port and regional port planning grants, including State-wide or multi-port planning within a single jurisdiction or region; iv.Risk assessments and planning to identify vulnerabilities and address the transportation system's ability to withstand probable occurrence or recurrence of an emergency or major disaster.	Grants not less than $5 million and not greater than $25 million, except that for projects located in rural areas (as defined in Section C.4.(a)) the minimum award size is $1 million. Must provide 20% non-federal match. There is no minimum award size, regardless of location, for RAISE planning grants. Total available is $1 Billion.	The primary selection criteria are Safety, Environmental Sustainability, Quality of Life, Mobility and Community Connectivity, Economic Competitiveness and Opportunity, and State of Good Repair. Partnership & Collaboration and Innovation are additional criteria.	Annually, typically in January.	BUILDgrants@dot.gov
Congressionally Directed Spending	US Congress	Provides federal lawmakers the ability to demonstrate priorities for their constituents.	States, local governments and eligible non-profit entities.	Broad latitude in projects; however, some federal lawmakers narrow what kinds of projects they will endorse.	Senate: 1% cap on discretionary spending for congressionally directed spending items. House: Each Representative may request funding for up to 15 projects in their community for fiscal year 2023 – although only a handful may actually be funded.	Typically in March / April.	Annual program, typically in March / April.	Work through congressional delegation.
Corridors of Commerce	Minnesota Department of Transportation	To focus additional transportation investments in state highway projects that directly and indirectly foster economic growth for the State through the provisioning of construction jobs, enabling of goods to be transported through a commerce friendly network of corridors, and providing additional mobility to its citizens.	City, county, township, tribal government, formal corridor coalition, not-for-profit organization, metropolitan planning organization or regional development organization.	Capacity Improvement Projects or Freight Improvement Projects: Capacity Improvement Projects must meet one of the following bullets: • Currently is not a divided highway, and that highway is an expressway or freeway beyond the project limits. • Contains a highway terminus that lacks an intersection or interchange with another trunk highway. • Contains fewer lanes of travel compared to that highway beyond the project limits. • Contain a location that is proposed as a new interchange or to be reconstructed from an intersection to an interchange. Freight Improvement Projects must meet one of the following bullets. • Remove or reduce an existing barrier to commerce. • Preserve existing freight movement. • Support an emerging industry. • Provide connections between the trunk highway system and other transportation modes for the movement of freight.	No maximum or match requirement listed and is dependent on amount of funding appropriated by the Legislature.	Projects must be consistent with MnDOT's Statewide Multimodal Transportation Plan and must be on the Interregional Corridor Network of state highways, including the supplemental freight routes, in Greater Minnesota or any state highway in the eight-county MnDOT Metropolitan District.	This solicitation is not on a regular schedule and is only opened when funds have been authorized by the Legislature. The most recent Capital Construction solicitation was Corridors of Commerce IV, held in 2023.	Noah Hansen noah.hansen@state.mn.us
Greater Minnesota Business Development Public Infrastructure (BDPI)	Minnesota Department of Employment and Economic Development	Eligible projects include publicly owned infrastructure that supports economic development projects, including wastewater collection and treatment, drinking water, storm sewers, utility extensions, and streets.	Counties or statutory or home rule cities outside of the seven-county metropolitan area.	Eligible projects include publicly owned infrastructure that supports economic development projects, including wastewater collection and treatment, drinking water, storm sewers, utility extensions, and streets. Economic development projects include manufacturing, technology, warehousing and distribution, research and development, agricultural processing, and industrial park development.	Applicants will be awarded 50% of eligible, capital costs for eligible projects, up to $2,000,000.	Retail developments and office space development other than incidental office space are NOT eligible for this grant.	Applications are accepted on an open basis; however, currently has no funding. Anticipate an appropriation in the 2023 legislative session.	Jeremy LaCroix 651-259-7457 jeremy.lacroix@state.mn.us
Minnesota Capital Bonding Bill	Minnesota Legislature	State Appropriations can be accessed for a variety of municipal projects that can argue regional significance.	Public bodies (city, township, county or special district), Indian tribes	State Appropriations can be accessed for a variety of municipal projects that can argue regional significance; needs to be publicly owned; state wages rates apply.	Grant; up to 50% of capital project costs.		June in odd numbered years for the even numbered year bonding cycle.	Work through state senator and/or representative.
Public Works & Economic Adjustment Assistance (EAA) Programs	US Economic Development Administration	Provides grants to economically distressed areas for public works projects that: promote economic development; create long-term jobs; and/or benefit low-income persons or the long-term unemployed.	States, cities, counties; Indian tribes; the Federated States of Micronesia; the Republic of the Marshall Islands; commonwealths and territories of the United States; and private or public nonprofits representing a redevelopment area or a designated economic development center.	Public Works: Construction and/or infrastructure projects that meet the needs of communities to enable them to become more economically competitive. Examples include projects supporting water and sewer system improvements, industrial parks, high-tech shipping and logistics facilities, workforce training facilities, business incubators and accelerators, brownfield redevelopment, technology-based facilities, wet labs, multi-tenant manufacturing facilities, science and research parks, and telecommunications infrastructure and development facilities. EAA: supports a wide range of construction and non-construction activities including infrastructure, design and engineering, technical assistance, economic recovery strategies, and capitalization or re-capitalization of Revolving Loan Funds (RLF).	50% of total project costs, up to $3,000,000	Must align with North Western Regional Development Commission's (NWRDC) Comprehensive Economic Development Strategy (CEDS) document and **must be directly tied to job creation or retention**.	Year-round, work through the NWRDC.	Sean Ranum sean@nwrdc.org 218-745-9115
Rural Surface Transportation Grant	US Department of Transportation	To improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of people and freight, and generate regional economic growth and improve quality of life.	States, Regional transportation planning organizations, Local governments, Tribal governments.	Highway, bridge, or tunnel projects eligible under the National Highway Performance Program, Surface Transportation Block Grant Program, or the Tribal Transportation Program; highway freight project eligible under the National Highway Performance Program; highway safety improvement projects; projects on a publicly-owned highway or bridge improving access to certain facilities that support the economy of a rural area; integrated mobility management system, transportation demand management system, or on-demand mobility services.	Grants for up to 80 percent of future eligible project costs.	Will also fund development phase activities, including planning, feasibility analysis, revenue forecasting, environmental review, preliminary engineering and design work, and other preconstruction activities.	Annual program, typically in March.	Paul Baumer 202-366-1092 MPDGrants@dot.gov

FUNDING SOURCES FOR TRANSPORTATION PROJECTS								
Program	**Agency**	**Purpose / Goals**	**Applicant Eligibility**	**Eligible Use of Funds**	**Loan or Grant Maximums & Terms**	**Additional Requirements / Notes**	**Funding Cycle**	**Contact**
Safe Streets and Roads for All (SS4A)	US Department of Transportation	To support planning, infrastructure, behavioral, and operational initiatives to prevent death and serious injury on roads and streets involving all roadway users, including pedestrians; bicyclists; public transportation, personal conveyance, and micromobility users; motorists; and commercial vehicle operators.	Metropolitan planning organizations; Political subdivisions of a State or territory (e.g., cities, towns, counties); Federally recognized Tribal governments; and A multijurisdictional group of entities of the aforementioned three types of entities.	Develop a comprehensive safety action plan (Action Plan). Conduct supplemental safety planning to enhance an Action Plan. Carry out demonstration activities to inform the development of, or an update to, an Action Plan. Perform planning, design, and development activities for projects and strategies identified in an Action Plan. Implement **projects and strategies identified in a Comprehensive Safety Action Plan** that address roadway safety problems.	Up to 80% of project costs with the following minimums and maximums: Planning and Demonstration Grants: minimum of $100,000 and maximum of $10,000,000. Implementation Grants: minimum of $2,500,000 and maximum of $25,000,000.	If applying for an implementation grant, the applicant needs to have a qualified comprehensive safety action plan	**June 26, 2025.**	Paul Teicher SS4A@dot.gov 202-366-4114.
Transportation Economic Development Program	Minnesota Department of Transportation	To help generate economic benefits through investment in transportation infrastructure.	Cities, counties, tribes and other government entities.	Transportation infrastructure projects on state highways that support economic development. Proposed project must have a trunk highway purpose. It must improve, enhance or modify a state trunk highway or highway right of way. Your project may do more than improve the trunk highway, but this program can fund work only on the trunk highway and trunk highway right of way.	Up to 70% of the total transportation infrastructure cost of the project or the state's maximum allowable share as determined by our MnDOT's participation policy.	If you want to submit an application for new or modified interchanges on interstates, you should consult with the Federal Highway Administration (FHWA) Minnesota division before you submit a TED application.	Anticipate opening the next round of funding **June 2025.**	Noah Hansen noah.hansen@state.mn.us
Transportation Infrastructure Finance & Innovation Act (TIFIA)	Federal Highway Administration	Provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance.	State departments of transportation; local government; transit agencies; special authorities; special districts; railroad companies; and private firms or consortia that may include companies specializing in engineering, construction, materials, and/or the operation of transportation facilities.	Many surface transportation projects: Bridges; Intelligent Transportation Systems; Intermodal Connectors; Transit Vehicles and Facilities; Intercity Buses and Facilities; Freight Transfer Facilities; Pedestrian Bicycle Infrastructure Networks; Transit-Oriented Development; Rural Infrastructure Projects; Passenger Rail Vehicles and Facilities; Surface Transportation Elements of Port Projects Project must be included in the applicable State Transportation Improvement Program.	Low-interest loans with flexible terms. Minimum Anticipated Project Costs: $10 million for Transit-Oriented Development, Local, and Rural Projects $15 million for Intelligent Transportation System Projects $50 million for all other eligible Surface Transportation Projects TIFIA Credit Assistance Limit – Credit assistance limited to 33% of reasonably anticipated eligible project costs (unless sponsor provides a compelling justification for up to 49%).	Investment Grade Rating – Senior debt and TIFIA loan must receive investment grade ratings from at least two nationally recognized credit rating agencies (only one rating required if less than $75 million). Dedicated Repayment Source – The project must have a dedicated revenue source pledged to secure both the TIFIA and senior debt financing.	Ongoing application cycle, starting with a Letter of Interest.	BuildAmerica@dot.gov 202-366-2300

Appendix I – Traffic Analysis Memorandum

Stantec

Technical Memo

To:	Wade Frank, PE Stantec Consulting Services Inc.	From:	Ed Terhaar, PE Stantec Consulting Services Inc.
File:	Moorhead I-94 & 20th Street Interchange Analysis	Date:	May 1, 2025

Reference: Traffic Operations Summary

TRAFFIC OPERATIONS SUMMARY

The purpose of the I-94 & 20th Street Interchange Analysis is to determine the preferred alternative from a list of feasible alternatives to convert the interchange into a full access interchange, alleviating potential capacity concerns at adjacent interchanges and improving connectivity within Moorhead and the region.

The following alternatives were analyzed:

- No-Build
- Alternative 4A – Single Quadrant Interchange with 28th Avenue Connection
- Alternative 5 – Partial Cloverleaf Interchange

Layouts for Alternatives 4A and 5 are attached to this memo.

ANALYSIS RESULTS

Year 2050 traffic volumes forecasts were developed for each intersection included in the study using the Fargo-Moorhead regional travel demand model. The model accounted for future growth in the area and the impact of a full access interchange at 20th Street. The resultant forecasts indicated that some volume shift is expected to the new full interchange from the interchanges to the east and west. A summary of the volume differences is shown in the attached figure.

Each alternative was tested and analyzed under 2050 forecast volumes which resulted in identifying the Level of Service (LOS) of movements. A summary of the LOS thresholds from the Highway Capacity Manual (HCM) is shown in Table 1.

Table 1 – Highway Capacity Manual Levels of Service and Control Delay[1]

Signalized Intersection		Unsignalized Intersection	
Level of Service	**Delay per Vehicle (sec)**	**Level of Service**	**Delay per Vehicle (sec)**
A	≤ 10	A	≤ 10
B	> 10 and ≤ 20	B	> 10 and ≤ 15
C	> 20 and ≤ 35	C	> 15 and ≤ 25
D	> 35 and ≤ 55	D	> 25 and ≤ 35
E	> 55 and ≤ 80	E	> 35 and ≤ 50
F	> 80	F	> 50

[1] *Highway Capacity Manual, 7th Edition*, Transportation Research Board, 2022

Reference: Traffic Operations Summary

Capacity analysis for the interchange alternatives and study are intersections was performed using Synchro software and HCM 7th Edition methodology as the basis of the LOS analysis.

A summary of the 2050 peak hour capacity results for each alternative is shown in Table 2.

Table 2 – Level of Service Results

Intersection	No Build				Alt 4A				Alt 5			
	AM		PM		AM		PM		AM		PM	
	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
8th St Intersections												
8th St at 24th Ave	29.9	C	188.4	F	30.4	C	161.9	F	30.4	C	161.9	F
8th St at WBR Ramp	28.0	C	64.4	E	27.2	C	56.6	E	27.2	C	56.6	E
8th St North Crossover	44.3	D	93.2	F	43.9	D	86.5	F	43.9	D	86.5	F
8th St at WBL Ramp	16.9	B	64.2	E	17.6	B	62.2	E	17.6	B	62.2	E
8th St at EBL Ramp	84.6	F	49.3	D	89.0	F	47.5	D	89.0	F	47.5	D
8th St South Crossover	115.7	F	54.9	D	115.7	F	59.8	E	115.7	F	59.8	E
8th St at EBR Ramp	13.6	B	41.4	D	12.9	B	39.7	D	12.9	B	39.7	D
8th St at 30th Ave	162.9	F	791.5	F	169.0	F	689.5	F	169.0	F	689.5	F
20th St Intersections												
20th St at 24th Ave[1]	34.8	C	33.5	C	6.5	A	5.4	A	16.4	B	13.1	B
I-94 WB Ramp at 28th Ave*					20.2	C	29.9	D				
20th St at 28th Ave*	12.1	B	15.4	C								
20th St at I-94 WB/28th Ave	23.0	C	33.4	C	24.4	C	19.7	B	14.8	B	33.4	C
20th St at I-94 EB Ramp	20.5	C	16.5	B	22.9	C	20.5	C	15.8	B	23.0	C
20th St at 30th Ave/Village Green Blvd	43.0	D	30.7	C	48.4	D	39.7	D	48.3	D	39.7	D
34th St Intersections												
Main Ave at 24th Ave	21.6	C	79.5	E	26.1	C	81.8	F	26.1	C	81.8	F
Main Ave at 27th Ave	9.3	A	11.8	B	13.4	B	18.1	B	13.4	B	18.1	B
Main Ave at I-94 WB On Ramp*	13.3	B	15.5	C	15.3	C	19.3	C	15.3	C	19.3	C
Main Ave at I-94 EB Off Ramp*	977.8	F	1,148.1	F	1,159.5	F	1,377.4	F	1,159.5	F	1,377.4	F
Main Ave at 34th St/Village Green	27.4	C	32.0	C	25.9	C	27.7	C	25.9	C	27.7	C
34th St at 24th Ave	26.9	C	34.2	C	25.2	C	38.0	D	25.2	C	38.0	D
34th St at 26th Ave	25.0	C	24.8	C	25.4	C	26.6	C	25.4	C	26.6	C
34th St at I-94 WB On Ramp	27.5	C	11.0	B	26.3	C	11.2	B	26.3	C	11.2	B
34th St at I-94 EB Off Ramp	26.1	C	23.3	C	26.1	C	23.9	C	26.1	C	23.9	C

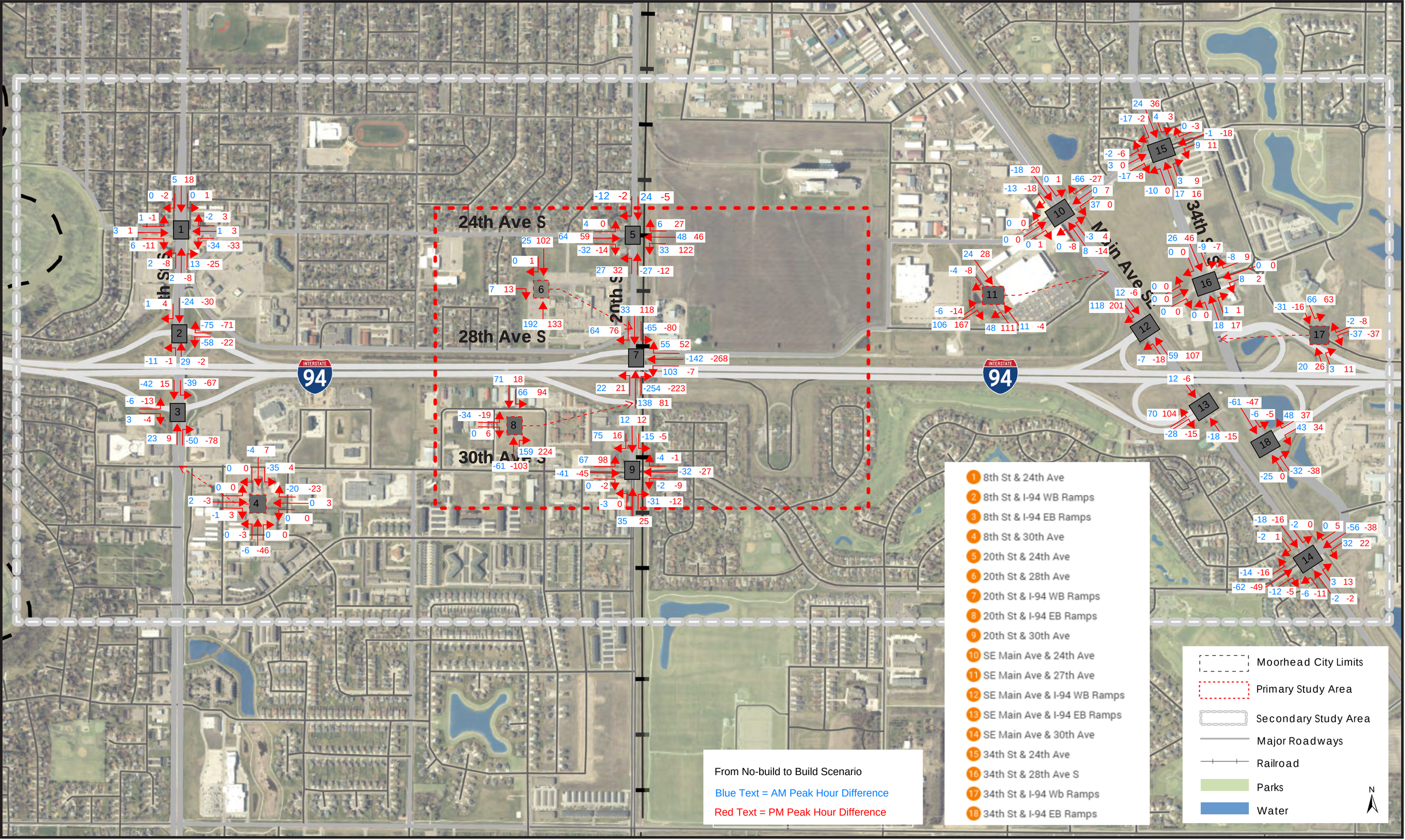
As shown in the table, the LOS results are similar under all alternatives with some variation in overall delay for some locations. Lane configurations at the new interchange were chosen to optimize intersection operations and minimize delays. Based on the traffic forecasts and operational results, the proposed conversion to a full interchange alleviates potential capacity concerns at adjacent interchanges and improves connectivity within Moorhead and the region.

Stantec Consulting Services Inc.

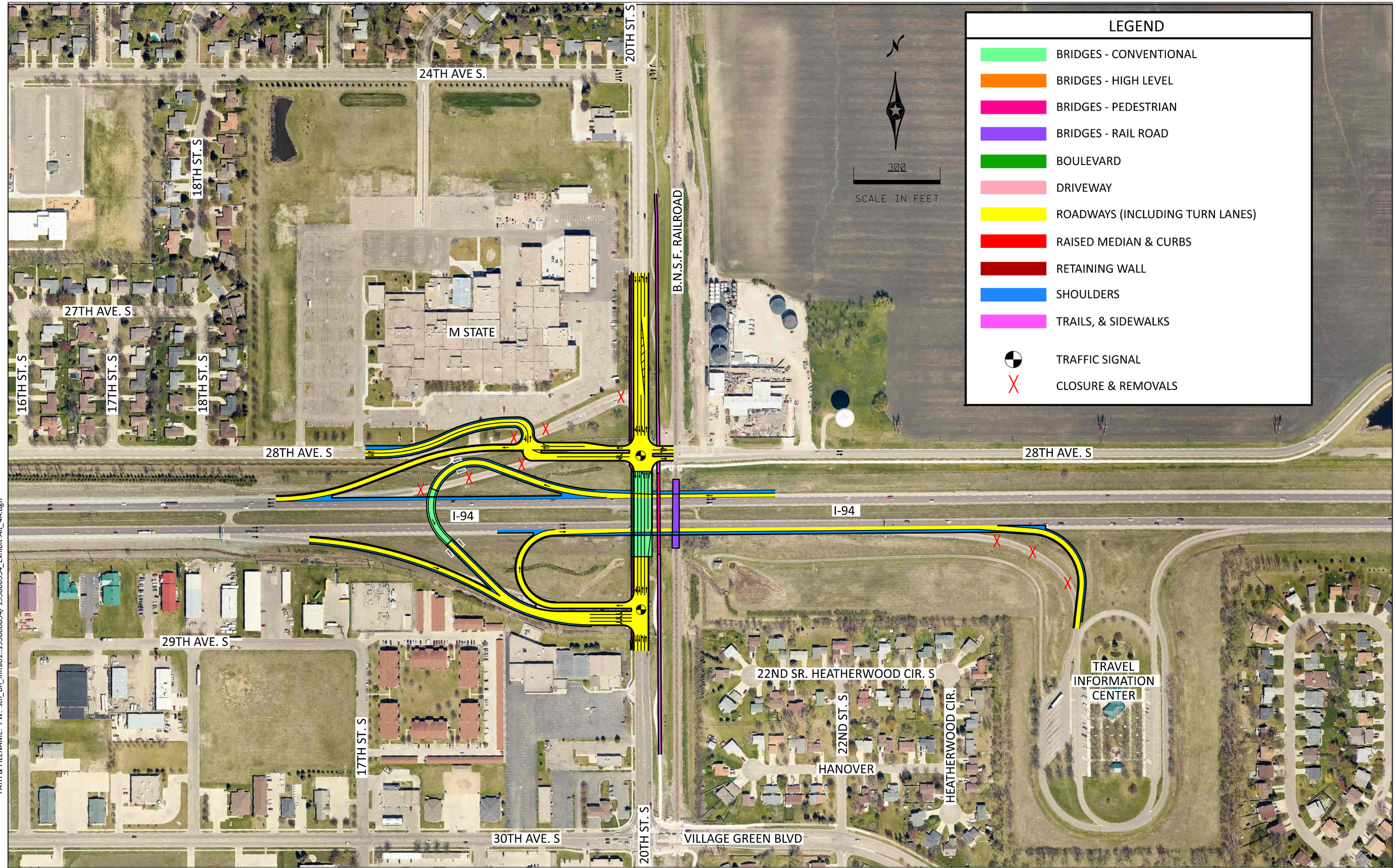
Edward Terhaar PE, (MN, ND, SD, WI)
Traffic Engineer

Attachments: Appendix A – Peak Hour Volume Differences, Appendix B – Alternative Layouts, Appendix C – Detailed Synchro Results

APPENDIX A – PEAK HOUR VOLUME DIFFERENCES


24th Ave S
28th Ave S
30th Ave S
8th St S
20th St S
34th St S
Main Ave SE
INTERSTATE 94
INTERSTATE 94
1 8th St & 24th Ave
2 8th St & I-94 WB Ramps
3 8th St & I-94 EB Ramps
4 8th St & 30th Ave
5 20th St & 24th Ave
6 20th St & 28th Ave
7 20th St & I-94 WB Ramps
8 20th St & I-94 EB Ramps
9 20th St & 30th Ave
10 SE Main Ave & 24th Ave
11 SE Main Ave & 27th Ave
12 SE Main Ave & I-94 WB Ramps
13 SE Main Ave & I-94 EB Ramps
14 SE Main Ave & 30th Ave
15 34th St & 24th Ave
16 34th St & 28th Ave S
17 34th St & I-94 Wb Ramps
18 34th St & I-94 EB Ramps
From No-build to Build Scenario
Blue Text = AM Peak Hour Difference
Red Text = PM Peak Hour Difference
Moorhead City Limits
Primary Study Area
Secondary Study Area
Major Roadways
Railroad
Parks
Water
N

APPENDIX B – ALTERNATIVE LAYOUTS



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				SURVEY	-
				DRAWN	-
				DESIGNED	-
				APPROVED	-

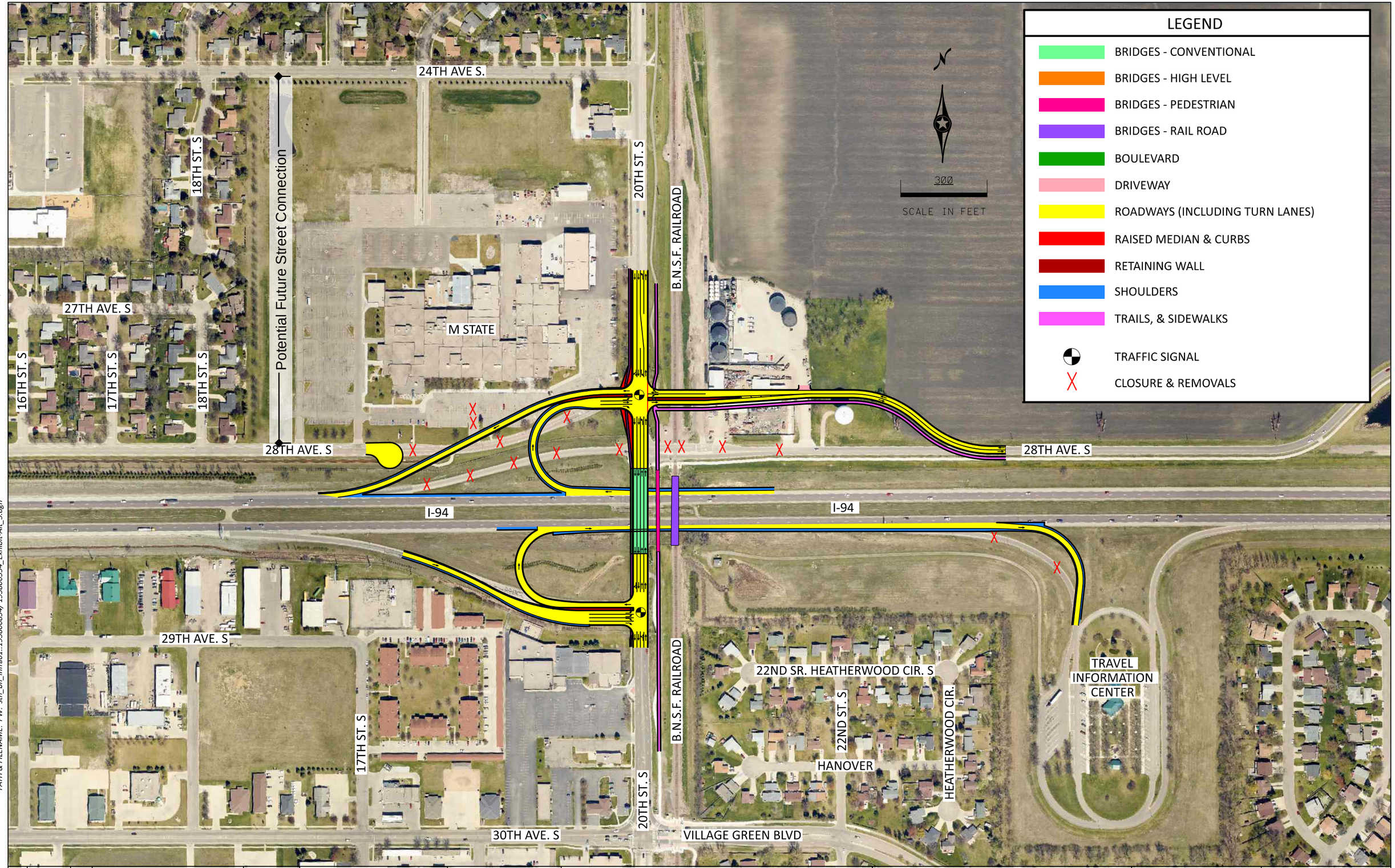
DEPARTMENT OF TRANSPORTATION

Stantec

FARGO-MOORHEAD METROPOLITIAN
COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 4A
SINGLE QUANDRANT
WITH 28TH AVE. CONNECTION

STATE PROJ. NO.	-	SHEET NO.	4A
TRUNK HWY.	I94	TOTAL SHEETS	6



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NO	DATE	APPR	REVISION	SURVEY
				DRAWN
				DESIGNED
				APPROVED

DEPARTMENT OF TRANSPORTATION | Stantec

FARGO-MOORHEAD METROPOLITIAN COUNCIL OF GOVERNMENTS
I-94 & 20TH STREET INTERCHANGE

ALTERNATIVE 5
PARTIAL CLOVERLEAF

STATE PROJ. NO.	-	SHEET NO.	6
TRUNK HWY.	I94	TOTAL SHEETS	6

APPENDIX C – DETAILED SYNCHRO RESULTS

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	26	67	143	476	338	90
Future Vol, veh/h	26	67	143	476	338	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	65	150	-	-	80
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	4	3	3	4	2
Mvmt Flow	31	79	168	560	398	106

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1294	398	504	0	-	0
Stage 1	398	-	-	-	-	-
Stage 2	896	-	-	-	-	-
Critical Hdwy	6.42	6.24	4.13	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.336	2.227	-	-	-
Pot Cap-1 Maneuver	179	648	1056	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	151	648	1056	-	-	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	398	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	17.9	2.09	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1056	-	151	648	-	-
HCM Lane V/C Ratio	0.159	-	0.203	0.122	-	-
HCM Ctrl Dly (s/v)	9.1	-	34.8	11.3	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.6	-	0.7	0.4	-	-

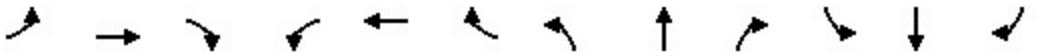
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	69	0	619	400	5
Future Vol, veh/h	0	69	0	619	400	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	70
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	4	2	3	4	2
Mvmt Flow	0	81	0	728	471	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	471	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.24	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.336	-	-	-	-
Pot Cap-1 Maneuver	0	589	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	589	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.09	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	589	-	-
HCM Lane V/C Ratio	-	0.138	-	-
HCM Ctrl Dly (s/v)	-	12.1	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.5	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	98	142	28	391	591	254	65	204	200
Future Volume (veh/h)	0	0	0	98	142	28	391	591	254	65	204	200
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1678	1633	1781	1870	1930	1781	1856	1796	1870
Adj Flow Rate, veh/h				115	167	33	460	695	299	76	240	235
Peak Hour Factor				0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %				15	18	8	2	3	8	3	7	2
Cap, veh/h				133	193	307	724	741	319	254	866	764
Arrive On Green				0.20	0.20	0.20	0.21	0.77	0.77	0.06	0.48	0.48
Sat Flow, veh/h				653	948	1510	1781	1280	551	1767	1796	1585
Grp Volume(v), veh/h				282	0	33	460	0	994	76	240	235
Grp Sat Flow(s),veh/h/ln				1601	0	1510	1781	0	1831	1767	1796	1585
Q Serve(g_s), s				17.0	0.0	1.8	13.3	0.0	44.9	1.6	8.0	9.0
Cycle Q Clear(g_c), s				17.0	0.0	1.8	13.3	0.0	44.9	1.6	8.0	9.0
Prop In Lane				0.41		1.00	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h				326	0	307	724	0	1060	254	866	764
V/C Ratio(X)				0.87	0.00	0.11	0.64	0.00	0.94	0.30	0.28	0.31
Avail Cap(c_a), veh/h				395	0	373	816	0	1060	269	866	764
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.80	0.00	0.80	1.00	1.00	1.00
Uniform Delay (d), s/veh				38.5	0.0	32.4	8.9	0.0	10.0	18.4	15.5	15.7
Incr Delay (d2), s/veh				14.9	0.0	0.1	0.7	0.0	13.7	0.2	0.8	1.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.9	0.0	1.7	4.2	0.0	13.1	0.9	3.4	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				53.4	0.0	32.6	9.5	0.0	23.7	18.7	16.3	16.8
LnGrp LOS				D		C	A		C	B	B	B
Approach Vol, veh/h					315			1454			551	
Approach Delay, s/veh					51.2			19.2			16.8	
Approach LOS					D			B			B	

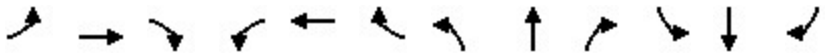
Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	20.8	53.5		25.6	11.2	63.2						
Change Period (Y+Rc), s	5.0	5.3		5.3	5.0	5.3						
Max Green Setting (Gmax), s	21.0	38.7		24.7	7.0	52.7						
Max Q Clear Time (g_c+I1), s	15.3	10.0		19.0	3.6	0.0						
Green Ext Time (p_c), s	0.6	0.6		1.3	0.0	0.0						

Intersection Summary		
HCM 7th Control Delay, s/veh	23.0	
HCM 7th LOS	C	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	318	263	0	918	302	0
Future Volume (veh/h)	318	263	0	918	302	0
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1856	0	1856	1781	0
Adj Flow Rate, veh/h	374	309	0	1080	355	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	4	3	0	3	8	0
Cap, veh/h	504	452	0	2141	2056	0
Arrive On Green	0.29	0.29	0.00	0.61	0.20	0.00
Sat Flow, veh/h	1753	1572	0	3711	3563	0
Grp Volume(v), veh/h	374	309	0	1080	355	0
Grp Sat Flow(s),veh/h/ln	1753	1572	0	1763	1692	0
Q Serve(g_s), s	19.3	17.4	0.0	17.3	8.7	0.0
Cycle Q Clear(g_c), s	19.3	17.4	0.0	17.3	8.7	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	504	452	0	2141	2056	0
V/C Ratio(X)	0.74	0.68	0.00	0.50	0.17	0.00
Avail Cap(c_a), veh/h	692	621	0	2141	2056	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.97	0.00
Uniform Delay (d), s/veh	32.3	31.6	0.0	11.1	19.2	0.0
Incr Delay (d2), s/veh	3.2	2.2	0.0	0.9	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	6.7	0.0	6.5	3.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	35.5	33.8	0.0	12.0	19.3	0.0
LnGrp LOS	D	C		B	B	
Approach Vol, veh/h	683			1080	355	
Approach Delay, s/veh	34.7			12.0	19.3	
Approach LOS	C			B	B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	65.7	34.3	65.7
Change Period (Y+Rc), s	5.0	5.5	5.0
Max Green Setting (Gmax), s	50.0	39.5	50.0
Max Q Clear Time (g_c+I1), s	10.7	21.3	19.3
Green Ext Time (p_c), s	3.2	7.4	11.1

Intersection Summary	
HCM 7th Control Delay, s/veh	20.5
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	119	1	21	150	186	14	479	44	146	109	310
Future Volume (veh/h)	253	119	1	21	150	186	14	479	44	146	109	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1796	1752	1811	1841	1870	1870	1870	1767	1826	1811	1811
Adj Flow Rate, veh/h	298	140	1	25	176	0	16	564	52	172	128	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	6	7	10	6	4	2	2	2	9	5	6	6
Cap, veh/h	330	388	358	314	221		759	636	509	513	984	
Arrive On Green	0.13	0.22	0.22	0.04	0.12	0.00	0.03	0.34	0.34	0.23	0.54	0.00
Sat Flow, veh/h	1725	1796	1485	1725	1841	1585	1781	1870	1497	1739	1811	1535
Grp Volume(v), veh/h	298	140	1	25	176	0	16	564	52	172	128	0
Grp Sat Flow(s),veh/h/ln	1725	1796	1485	1725	1841	1585	1781	1870	1497	1739	1811	1535
Q Serve(g_s), s	10.9	6.6	0.1	1.1	9.3	0.0	0.4	28.5	1.9	1.1	3.5	0.0
Cycle Q Clear(g_c), s	10.9	6.6	0.1	1.1	9.3	0.0	0.4	28.5	1.9	1.1	3.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	388	358	314	221		759	636	509	513	984	
V/C Ratio(X)	0.90	0.36	0.00	0.08	0.80		0.02	0.89	0.10	0.34	0.13	
Avail Cap(c_a), veh/h	371	494	446	374	350		839	744	596	513	984	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.4	33.3	28.8	28.7	42.8	0.0	9.4	31.2	14.8	29.1	11.2	0.0
Incr Delay (d2), s/veh	23.0	0.6	0.0	0.1	6.6	0.0	0.0	16.7	0.4	0.4	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	2.9	0.0	0.5	4.6	0.0	0.1	15.4	0.9	3.2	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.4	33.9	28.8	28.8	49.4	0.0	9.5	47.9	15.2	29.5	11.5	0.0
LnGrp LOS	E	C	C	C	D		A	D	B	C	B	
Approach Vol, veh/h		439			201			632			300	
Approach Delay, s/veh		53.9			46.9			44.3			21.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	58.9	8.0	26.1	27.4	38.5	17.6	16.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.0	40.5	7.0	27.5	7.7	39.8	15.5	19.0
Max Q Clear Time (g_c+I1), s	2.4	5.5	3.1	8.6	3.1	30.5	12.9	11.3
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9	0.2	3.5	0.2	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	43.0
HCM 7th LOS	D

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	57	23	80	450	477	49
Future Vol, veh/h	57	23	80	450	477	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	65	150	-	-	80
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	25	88	495	524	54

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1195	524	578	0	-	0
Stage 1	524	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	206	553	996	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	508	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	188	553	996	-	-	-
Mov Cap-2 Maneuver	188	-	-	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	27.24	1.35	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	996	-	188	553	-	-
HCM Lane V/C Ratio	0.088	-	0.333	0.046	-	-
HCM Ctrl Dly (s/v)	9	-	33.5	11.8	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.4	0.1	-	-

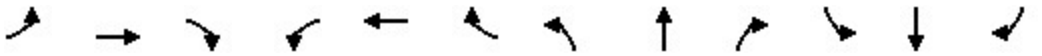
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	180	0	530	490	10
Future Vol, veh/h	0	180	0	530	490	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	70
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	198	0	582	538	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	538	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	543	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	543	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.38	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	543	-	-
HCM Lane V/C Ratio	-	0.364	-	-
HCM Ctrl Dly (s/v)	-	15.4	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	1.7	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	150	268	32	354	498	223	80	350	240
Future Volume (veh/h)	0	0	0	150	268	32	354	498	223	80	350	240
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1811	1870	1870	1870	1945	1811	1870	1870	1870
Adj Flow Rate, veh/h				165	295	35	389	547	245	88	385	264
Peak Hour Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %				6	2	2	2	2	6	2	2	2
Cap, veh/h				178	318	428	644	585	262	297	446	378
Arrive On Green				0.27	0.27	0.27	0.49	0.77	0.77	0.08	0.24	0.24
Sat Flow, veh/h				659	1178	1585	1781	1273	570	1781	1870	1585
Grp Volume(v), veh/h				460	0	35	389	0	792	88	385	264
Grp Sat Flow(s),veh/h/ln				1837	0	1585	1781	0	1843	1781	1870	1585
Q Serve(g_s), s				19.5	0.0	1.3	5.4	0.0	28.3	1.9	15.8	12.2
Cycle Q Clear(g_c), s				19.5	0.0	1.3	5.4	0.0	28.3	1.9	15.8	12.2
Prop In Lane				0.36		1.00	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h				496	0	428	644	0	847	297	446	378
V/C Ratio(X)				0.93	0.00	0.08	0.60	0.00	0.93	0.30	0.86	0.70
Avail Cap(c_a), veh/h				498	0	430	644	0	847	319	718	608
HCM Platoon Ratio				1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.84	0.00	0.84	1.00	1.00	1.00
Uniform Delay (d), s/veh				28.4	0.0	21.8	14.8	0.0	8.3	14.8	29.2	27.9
Incr Delay (d2), s/veh				23.5	0.0	0.1	1.0	0.0	16.4	0.2	19.5	10.3
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.4	0.0	1.4	3.9	0.0	7.7	0.7	9.2	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				51.9	0.0	21.9	15.8	0.0	24.7	15.0	48.7	38.1
LnGrp LOS				D		C	B		C	B	D	D
Approach Vol, veh/h					495			1181			737	
Approach Delay, s/veh					49.8			21.7			40.9	
Approach LOS					D			C			D	

Timer - Assigned Phs	1	2		4	5	6						
Phs Duration (G+Y+Rc), s	28.7	24.4		26.9	11.0	42.1						
Change Period (Y+Rc), s	5.3	* 5.3		5.3	5.0	5.3						
Max Green Setting (Gmax), s	12.0	* 31		21.7	7.0	35.7						
Max Q Clear Time (g_c+I1), s	7.4	17.8		21.5	3.9	0.0						
Green Ext Time (p_c), s	0.4	1.3		0.1	0.0	0.0						

Intersection Summary		
HCM 7th Control Delay, s/veh	33.4	
HCM 7th LOS	C	

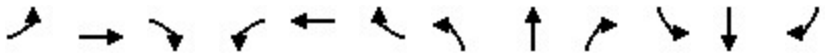
Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	354	532	0	721	500	0
Future Volume (veh/h)	354	532	0	721	500	0
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1826	1870	0	1870	1856	0
Adj Flow Rate, veh/h	389	585	0	792	549	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	5	2	0	2	3	0
Cap, veh/h	799	729	0	1454	1442	0
Arrive On Green	0.46	0.46	0.00	0.41	0.82	0.00
Sat Flow, veh/h	1739	1585	0	3741	3711	0
Grp Volume(v), veh/h	389	585	0	792	549	0
Grp Sat Flow(s),veh/h/ln	1739	1585	0	1777	1763	0
Q Serve(g_s), s	12.5	25.3	0.0	13.6	3.3	0.0
Cycle Q Clear(g_c), s	12.5	25.3	0.0	13.6	3.3	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	799	729	0	1454	1442	0
V/C Ratio(X)	0.49	0.80	0.00	0.54	0.38	0.00
Avail Cap(c_a), veh/h	924	842	0	1454	1442	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.66	0.00
Uniform Delay (d), s/veh	15.0	18.5	0.0	18.0	4.6	0.0
Incr Delay (d2), s/veh	0.6	5.2	0.0	1.5	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	9.3	0.0	5.5	1.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.6	23.7	0.0	19.4	5.1	0.0
LnGrp LOS	B	C		B	A	
Approach Vol, veh/h	974			792	549	
Approach Delay, s/veh	20.5			19.4	5.1	
Approach LOS	C			B	A	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	37.7		42.3		37.7
Change Period (Y+Rc), s	5.0		5.5		5.0
Max Green Setting (Gmax), s	27.0		42.5		27.0
Max Q Clear Time (g_c+I1), s	5.3		27.3		15.6
Green Ext Time (p_c), s	4.5		9.5		4.7

Intersection Summary		
HCM 7th Control Delay, s/veh	16.5	
HCM 7th LOS	B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	366	175	14	35	141	162	15	193	33	257	384	391
Future Volume (veh/h)	366	175	14	35	141	162	15	193	33	257	384	391
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1841	1870	1826	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	402	192	15	38	155	0	16	212	36	282	422	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	4	2	5	2	2	2	2	3
Cap, veh/h	437	447	420	357	230		421	351	297	717	861	
Arrive On Green	0.16	0.24	0.24	0.05	0.12	0.00	0.03	0.19	0.19	0.30	0.46	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1841	1585	1739	1870	1585	1781	1870	1572
Grp Volume(v), veh/h	402	192	15	38	155	0	16	212	36	282	422	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1841	1585	1739	1870	1585	1781	1870	1572
Q Serve(g_s), s	13.1	7.0	0.6	1.2	6.4	0.0	0.4	8.3	1.2	0.7	12.6	0.0
Cycle Q Clear(g_c), s	13.1	7.0	0.6	1.2	6.4	0.0	0.4	8.3	1.2	0.7	12.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	437	447	420	357	230		421	351	297	717	861	
V/C Ratio(X)	0.92	0.43	0.04	0.11	0.67		0.04	0.60	0.12	0.39	0.49	
Avail Cap(c_a), veh/h	437	587	539	424	437		527	496	420	717	861	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.7	25.8	21.8	21.0	33.4	0.0	11.7	29.8	17.3	18.6	15.1	0.0
Incr Delay (d2), s/veh	24.8	0.7	0.0	0.1	3.4	0.0	0.0	7.5	0.8	0.4	2.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	3.1	0.2	0.5	3.0	0.0	0.1	4.4	0.6	3.6	5.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	52.5	26.5	21.8	21.1	36.9	0.0	11.7	37.3	18.1	18.9	17.1	0.0
LnGrp LOS	D	C	C	C	D		B	D	B	B	B	
Approach Vol, veh/h		609			193			264			704	
Approach Delay, s/veh		43.6			33.8			33.1			17.8	
Approach LOS		D			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	41.3	8.5	23.6	28.4	19.5	17.6	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.0	22.9	7.0	25.1	8.7	21.2	13.1	19.0
Max Q Clear Time (g_c+I1), s	2.4	14.6	3.2	9.0	2.7	10.3	15.1	8.4
Green Ext Time (p_c), s	0.0	2.2	0.0	1.3	0.4	1.2	0.0	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	30.7
HCM 7th LOS	C

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations			↑	↱	⅄	
Traffic Vol, veh/h	0	0	677	37	85	20
Future Vol, veh/h	0	0	677	37	85	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	175	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	0	0	796	44	100	24

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	796	796
Stage 1	-	-	796	-
Stage 2	-	-	0	-
Critical Hdwy	-	-	6.44	6.22
Critical Hdwy Stg 1	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	3.536	3.318
Pot Cap-1 Maneuver	-	-	353	387
Stage 1	-	-	441	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	353	387
Mov Cap-2 Maneuver	-	-	353	-
Stage 1	-	-	441	-
Stage 2	-	-	-	-

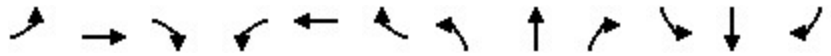
Approach	WB	SB
HCM Ctrl Dly, s/v	0	20.2
HCM LOS		C

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	359
HCM Lane V/C Ratio	-	-	0.344
HCM Ctrl Dly (s/v)	-	-	20.2
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	100	190	460	426	77
Future Volume (veh/h)	24	100	190	460	426	77
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1796	1811	1856	1841	1870
Adj Flow Rate, veh/h	28	118	224	541	501	91
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	7	6	3	4	2
Cap, veh/h	172	147	648	1480	1468	1264
Arrive On Green	0.10	0.10	1.00	1.00	0.80	0.80
Sat Flow, veh/h	1781	1522	799	1856	1841	1585
Grp Volume(v), veh/h	28	118	224	541	501	91
Grp Sat Flow(s),veh/h/ln	1781	1522	799	1856	1841	1585
Q Serve(g_s), s	1.4	7.6	4.1	0.0	7.6	1.2
Cycle Q Clear(g_c), s	1.4	7.6	11.7	0.0	7.6	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	172	147	648	1480	1468	1264
V/C Ratio(X)	0.16	0.80	0.35	0.37	0.34	0.07
Avail Cap(c_a), veh/h	404	346	648	1480	1468	1264
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.63	0.63	1.00	1.00
Uniform Delay (d), s/veh	41.5	44.2	0.6	0.0	2.8	2.2
Incr Delay (d2), s/veh	0.3	7.3	0.9	0.4	0.6	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.1	0.2	0.2	2.2	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	41.8	51.6	1.5	0.4	3.5	2.3
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	146			765	592	
Approach Delay, s/veh	49.7			0.7	3.3	
Approach LOS	D			A	A	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	85.0			85.0	15.0
Change Period (Y+Rc), s	5.3			5.3	5.3
Max Green Setting (Gmax), s	66.7			66.7	22.7
Max Q Clear Time (g_c+I1), s	9.6			13.7	9.6
Green Ext Time (p_c), s	5.1			7.7	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	6.5
HCM 7th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	75	28	5	54	440	591	193	129	128	269
Future Volume (veh/h)	5	5	75	28	5	54	440	591	193	129	128	269
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1633	1633	1633	1870	1945	1737	1796	1826	1870
Adj Flow Rate, veh/h	6	6	88	33	6	64	518	695	227	152	151	316
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	4	18	18	18	2	2	11	7	5	2
Cap, veh/h	144	10	152	124	12	130	800	946	309	314	1136	986
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.04	0.22	0.22	0.02	0.21	0.21
Sat Flow, veh/h	1331	102	1498	1137	120	1282	1781	1404	459	1711	1826	1585
Grp Volume(v), veh/h	6	0	94	33	0	70	518	0	922	152	151	316
Grp Sat Flow(s),veh/h/ln	1331	0	1601	1137	0	1402	1781	0	1863	1711	1826	1585
Q Serve(g_s), s	0.4	0.0	5.6	2.9	0.0	4.7	9.0	0.0	46.0	2.5	6.8	17.0
Cycle Q Clear(g_c), s	5.1	0.0	5.6	8.5	0.0	4.7	9.0	0.0	46.0	2.5	6.8	17.0
Prop In Lane	1.00		0.94	1.00		0.91	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	144	0	162	124	0	142	800	0	1255	314	1136	986
V/C Ratio(X)	0.04	0.00	0.58	0.27	0.00	0.49	0.65	0.00	0.73	0.48	0.13	0.32
Avail Cap(c_a), veh/h	250	0	290	214	0	254	1013	0	1255	350	1136	986
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.58	0.00	0.58	0.94	0.94	0.94
Uniform Delay (d), s/veh	44.9	0.0	42.9	46.9	0.0	42.5	5.5	0.0	30.6	19.1	17.7	21.7
Incr Delay (d2), s/veh	0.1	0.0	2.4	0.8	0.0	1.9	0.2	0.0	2.3	0.4	0.2	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.3	0.8	0.0	1.7	3.5	0.0	23.6	2.2	3.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.0	0.0	45.3	47.8	0.0	44.4	5.8	0.0	32.9	19.5	17.9	22.5
LnGrp LOS	D		D	D		D	A		C	B	B	C
Approach Vol, veh/h		100			103			1440			619	
Approach Delay, s/veh		45.3			45.5			23.1			20.7	
Approach LOS		D			D			C			C	

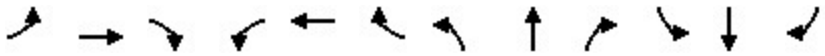
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0	67.5		15.4	11.9	72.7		15.4				
Change Period (Y+Rc), s	5.0	5.3		5.3	5.0	5.3		5.3				
Max Green Setting (Gmax), s	24.0	42.3		18.1	9.0	57.3		18.1				
Max Q Clear Time (g_c+I1), s	11.0	8.8		10.5	4.5	0.0		7.6				
Green Ext Time (p_c), s	1.0	0.2		0.3	0.1	0.0		0.3				

Intersection Summary	
HCM 7th Control Delay, s/veh	24.4
HCM 7th LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	366	466	159	858	165	66
Future Volume (veh/h)	366	466	159	858	165	66
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1856	1856	1856	1693	1841
Adj Flow Rate, veh/h	431	548	187	1009	194	78
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	4	3	3	3	14	4
Cap, veh/h	629	705	812	1317	999	921
Arrive On Green	0.19	0.19	0.07	0.71	0.79	0.79
Sat Flow, veh/h	3401	2768	1767	1856	1693	1560
Grp Volume(v), veh/h	431	548	187	1009	194	78
Grp Sat Flow(s),veh/h/ln	1700	1384	1767	1856	1693	1560
Q Serve(g_s), s	11.8	18.4	4.0	34.6	2.9	1.2
Cycle Q Clear(g_c), s	11.8	18.4	4.0	34.6	2.9	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	629	705	812	1317	999	921
V/C Ratio(X)	0.69	0.78	0.23	0.77	0.19	0.08
Avail Cap(c_a), veh/h	629	705	848	1317	999	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	38.0	34.6	6.5	9.2	4.7	4.5
Incr Delay (d2), s/veh	3.3	5.7	0.1	4.3	0.4	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	13.8	1.4	13.0	1.0	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	41.3	40.3	6.6	13.5	5.1	4.7
LnGrp LOS	D	D	A	B	A	A
Approach Vol, veh/h	979			1196	272	
Approach Delay, s/veh	40.7			12.4	5.0	
Approach LOS	D			B	A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	64.0		24.0		76.0
Change Period (Y+Rc), s	5.0	5.0		5.5		5.0
Max Green Setting (Gmax), s	7.0	57.0		18.5		71.0
Max Q Clear Time (g_c+I1), s	6.0	4.9		20.4		36.6
Green Ext Time (p_c), s	0.1	1.8		0.0		12.7

Intersection Summary		
HCM 7th Control Delay, s/veh	22.9	
HCM 7th LOS	C	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	78	1	18	118	182	11	514	14	130	116	385
Future Volume (veh/h)	321	78	1	18	118	182	11	514	14	130	116	385
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1796	1752	1811	1841	1870	1870	1856	1767	1826	1811	1811
Adj Flow Rate, veh/h	378	92	1	21	139	0	13	605	16	153	136	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	6	7	10	6	4	2	2	3	9	5	6	6
Cap, veh/h	389	420	379	368	184		731	665	537	452	967	
Arrive On Green	0.17	0.23	0.23	0.03	0.10	0.00	0.02	0.36	0.36	0.20	0.53	0.00
Sat Flow, veh/h	1725	1796	1485	1725	1841	1585	1781	1856	1497	1739	1811	1535
Grp Volume(v), veh/h	378	92	1	21	139	0	13	605	16	153	136	0
Grp Sat Flow(s),veh/h/ln	1725	1796	1485	1725	1841	1585	1781	1856	1497	1739	1811	1535
Q Serve(g_s), s	16.5	4.1	0.1	0.9	7.4	0.0	0.3	31.0	0.6	0.8	3.8	0.0
Cycle Q Clear(g_c), s	16.5	4.1	0.1	0.9	7.4	0.0	0.3	31.0	0.6	0.8	3.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	389	420	379	368	184		731	665	537	452	967	
V/C Ratio(X)	0.97	0.22	0.00	0.06	0.76		0.02	0.91	0.03	0.34	0.14	
Avail Cap(c_a), veh/h	389	512	455	436	350		818	733	591	452	967	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.2	30.9	27.8	27.4	43.8	0.0	10.0	30.5	13.7	31.7	11.7	0.0
Incr Delay (d2), s/veh	38.4	0.3	0.0	0.1	6.2	0.0	0.0	18.7	0.1	0.4	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	1.8	0.0	0.4	3.6	0.0	0.1	16.9	0.3	3.0	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.5	31.2	27.8	27.5	50.0	0.0	10.1	49.2	13.8	32.2	12.1	0.0
LnGrp LOS	E	C	C	C	D		B	D	B	C	B	
Approach Vol, veh/h		471			160			634			289	
Approach Delay, s/veh		66.0			47.1			47.5			22.7	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	57.9	7.6	27.9	24.2	40.3	21.0	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.0	39.5	7.0	28.5	7.0	39.5	16.5	19.0
Max Q Clear Time (g_c+I1), s	2.3	5.8	2.9	6.1	2.8	33.0	18.5	9.4
Green Ext Time (p_c), s	0.0	1.1	0.0	0.6	0.1	2.8	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	48.4
HCM 7th LOS	D

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations			↑	↱	⅄	
Traffic Vol, veh/h	0	0	690	58	208	10
Future Vol, veh/h	0	0	690	58	208	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	175	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	758	64	229	11

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	758	758
Stage 1	-	-	758	-
Stage 2	-	-	0	-
Critical Hdwy	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	375	407
Stage 1	-	-	463	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	375	407
Mov Cap-2 Maneuver	-	-	375	-
Stage 1	-	-	463	-
Stage 2	-	-	-	-

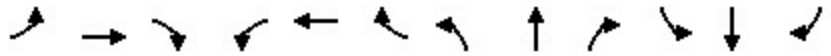
Approach	WB	SB
HCM Ctrl Dly, s/v	0	29.92
HCM LOS		D

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	376
HCM Lane V/C Ratio	-	-	0.637
HCM Ctrl Dly (s/v)	-	-	29.9
HCM Lane LOS	-	-	D
HCM 95th %tile Q(veh)	-	-	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	68	131	475	551	47
Future Volume (veh/h)	47	68	131	475	551	47
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	52	75	144	522	605	52
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	3	2	2	2
Cap, veh/h	179	159	599	1449	1449	1228
Arrive On Green	0.10	0.10	1.00	1.00	0.77	0.77
Sat Flow, veh/h	1781	1585	770	1870	1870	1585
Grp Volume(v), veh/h	52	75	144	522	605	52
Grp Sat Flow(s),veh/h/ln	1781	1585	770	1870	1870	1585
Q Serve(g_s), s	2.3	3.8	2.9	0.0	9.2	0.6
Cycle Q Clear(g_c), s	2.3	3.8	12.1	0.0	9.2	0.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	179	159	599	1449	1449	1228
V/C Ratio(X)	0.29	0.47	0.24	0.36	0.42	0.04
Avail Cap(c_a), veh/h	434	386	599	1449	1449	1228
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.70	0.70	1.00	1.00
Uniform Delay (d), s/veh	35.4	36.1	0.8	0.0	3.2	2.2
Incr Delay (d2), s/veh	0.7	1.6	0.7	0.5	0.9	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.5	0.1	0.2	2.5	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	36.1	37.7	1.5	0.5	4.1	2.3
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	127			666	657	
Approach Delay, s/veh	37.0			0.7	3.9	
Approach LOS	D			A	A	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	71.1				71.1	13.9
Change Period (Y+Rc), s	5.3				5.3	5.3
Max Green Setting (Gmax), s	53.7				53.7	20.7
Max Q Clear Time (g_c+I1), s	11.2				14.1	5.8
Green Ext Time (p_c), s	6.1				6.3	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	5.4
HCM 7th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	5	193	102	20	73	401	523	113	139	153	327
Future Volume (veh/h)	10	5	193	102	20	73	401	523	113	139	153	327
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1811	1811	1870	1945	1722	1870	1870	1870
Adj Flow Rate, veh/h	11	5	212	112	22	80	441	575	124	153	168	359
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	6	6	6	2	2	12	2	2	2
Cap, veh/h	300	8	342	194	75	274	717	797	172	515	909	770
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.68	0.68	0.04	0.16	0.16
Sat Flow, veh/h	1293	37	1554	1127	342	1245	1781	1551	334	1781	1870	1585
Grp Volume(v), veh/h	11	0	217	112	0	102	441	0	699	153	168	359
Grp Sat Flow(s),veh/h/ln	1293	0	1591	1127	0	1587	1781	0	1885	1781	1870	1585
Q Serve(g_s), s	0.6	0.0	10.5	8.2	0.0	4.6	10.6	0.0	19.7	0.0	6.6	17.5
Cycle Q Clear(g_c), s	5.2	0.0	10.5	18.7	0.0	4.6	10.6	0.0	19.7	0.0	6.6	17.5
Prop In Lane	1.00		0.98	1.00		0.78	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	300	0	350	194	0	349	717	0	969	515	909	770
V/C Ratio(X)	0.04	0.00	0.62	0.58	0.00	0.29	0.62	0.00	0.72	0.30	0.18	0.47
Avail Cap(c_a), veh/h	300	0	350	194	0	349	818	0	969	515	909	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.78	0.00	0.78	0.93	0.93	0.93
Uniform Delay (d), s/veh	29.8	0.0	29.9	38.5	0.0	27.6	7.4	0.0	9.6	21.1	21.1	25.7
Incr Delay (d2), s/veh	0.0	0.0	3.0	3.6	0.0	0.3	0.5	0.0	3.6	0.1	0.4	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	4.2	2.5	0.0	1.7	3.1	0.0	6.1	2.4	3.1	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.8	0.0	32.9	42.1	0.0	28.0	7.9	0.0	13.3	21.3	21.5	27.6
LnGrp LOS	C		C	D		C	A		B	C	C	C
Approach Vol, veh/h		228			214			1140			680	
Approach Delay, s/veh		32.8			35.4			11.2			24.7	
Approach LOS		C			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.1	46.7		24.0	15.9	49.0		24.0
Change Period (Y+Rc), s	5.0	5.3		5.3	5.3	* 5.3		5.3
Max Green Setting (Gmax), s	13.0	32.7		18.7	7.0	* 44		18.7
Max Q Clear Time (g_c+I1), s	12.6	8.6		20.7	2.0	0.0		12.5
Green Ext Time (p_c), s	0.5	0.2		0.0	0.1	0.0		0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	19.7
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	419	681	224	618	354	94
Future Volume (veh/h)	419	681	224	618	354	94
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1826	1870	1870	1870	1856	1826
Adj Flow Rate, veh/h	460	748	246	679	389	103
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	5	2	2	2	3	5
Cap, veh/h	814	933	564	1188	896	747
Arrive On Green	0.24	0.24	0.09	0.64	0.48	0.48
Sat Flow, veh/h	3374	2790	1781	1870	1856	1547
Grp Volume(v), veh/h	460	748	246	679	389	103
Grp Sat Flow(s),veh/h/ln	1687	1395	1781	1870	1856	1547
Q Serve(g_s), s	10.2	20.5	5.8	17.7	11.7	3.1
Cycle Q Clear(g_c), s	10.2	20.5	5.8	17.7	11.7	3.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	814	933	564	1188	896	747
V/C Ratio(X)	0.57	0.80	0.44	0.57	0.43	0.14
Avail Cap(c_a), veh/h	814	933	691	1188	896	747
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.90	0.90
Uniform Delay (d), s/veh	28.3	25.7	9.9	8.9	14.4	12.2
Incr Delay (d2), s/veh	1.0	5.2	0.2	2.0	1.4	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	15.4	2.0	6.8	4.9	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	29.4	30.9	10.1	10.9	15.8	12.5
LnGrp LOS	C	C	B	B	B	B
Approach Vol, veh/h	1208			925	492	
Approach Delay, s/veh	30.3			10.7	15.1	
Approach LOS	C			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.9	46.1		26.0		59.0
Change Period (Y+Rc), s	5.0	5.0		5.5		5.0
Max Green Setting (Gmax), s	14.0	35.0		20.5		54.0
Max Q Clear Time (g_c+I1), s	7.8	13.7		22.5		19.7
Green Ext Time (p_c), s	0.2	3.3		0.0		6.5

Intersection Summary		
HCM 7th Control Delay, s/veh		20.5
HCM 7th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	464	130	12	26	114	160	15	218	21	252	376	407
Future Volume (veh/h)	464	130	12	26	114	160	15	218	21	252	376	407
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1826	1870	1826	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	510	143	13	29	125	0	16	240	23	277	413	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	5	2	5	2	2	2	2	3
Cap, veh/h	529	540	792	440	215		485	654	554	563	463	
Arrive On Green	0.21	0.29	0.29	0.04	0.12	0.00	0.21	0.35	0.35	0.11	0.25	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1826	1585	1739	1870	1585	1781	1870	1572
Grp Volume(v), veh/h	510	143	13	29	125	0	16	240	23	277	413	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1826	1585	1739	1870	1585	1781	1870	1572
Q Serve(g_s), s	18.0	5.0	0.1	0.9	5.5	0.0	0.0	8.1	0.8	8.5	18.1	0.0
Cycle Q Clear(g_c), s	18.0	5.0	0.1	0.9	5.5	0.0	0.0	8.1	0.8	8.5	18.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	529	540	792	440	215		485	654	554	563	463	
V/C Ratio(X)	0.96	0.27	0.02	0.07	0.58		0.03	0.37	0.04	0.49	0.89	
Avail Cap(c_a), veh/h	529	627	867	545	408		485	654	554	563	506	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.2	23.3	4.2	19.6	35.5	0.0	24.6	20.6	18.2	15.3	30.9	0.0
Incr Delay (d2), s/veh	30.3	0.3	0.0	0.1	2.5	0.0	0.0	1.6	0.1	0.7	22.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	2.2	0.1	0.4	2.6	0.0	0.2	3.7	0.3	3.3	10.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.4	23.6	4.3	19.6	38.0	0.0	24.6	22.2	18.4	15.9	53.0	0.0
LnGrp LOS	E	C	A	B	D		C	C	B	B	D	
Approach Vol, veh/h		666			154			279			690	
Approach Delay, s/veh		49.9			34.6			22.0			38.1	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.5	25.5	8.0	29.0	13.8	34.2	22.5	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	23.0	8.5	28.5	9.3	20.7	18.0	19.0
Max Q Clear Time (g_c+I1), s	12.0	20.1	2.9	7.0	10.5	10.1	20.0	7.5
Green Ext Time (p_c), s	0.0	0.9	0.0	1.1	0.0	1.4	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	39.7
HCM 7th LOS	D

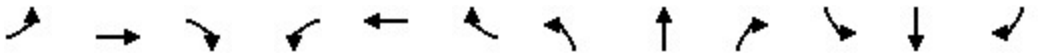
Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	175	217	455	421	82
Future Volume (veh/h)	29	175	217	455	421	82
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1826	1811	1856	1841	1870
Adj Flow Rate, veh/h	34	206	255	535	495	96
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	5	6	3	4	2
Cap, veh/h	273	237	588	1374	1363	1174
Arrive On Green	0.15	0.15	0.50	0.50	0.74	0.74
Sat Flow, veh/h	1781	1547	799	1856	1841	1585
Grp Volume(v), veh/h	34	206	255	535	495	96
Grp Sat Flow(s),veh/h/ln	1781	1547	799	1856	1841	1585
Q Serve(g_s), s	1.6	13.0	23.0	18.0	9.5	1.7
Cycle Q Clear(g_c), s	1.6	13.0	32.6	18.0	9.5	1.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	273	237	588	1374	1363	1174
V/C Ratio(X)	0.12	0.87	0.43	0.39	0.36	0.08
Avail Cap(c_a), veh/h	404	351	588	1374	1363	1174
HCM Platoon Ratio	1.00	1.00	0.67	0.67	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.69	0.69	1.00	1.00
Uniform Delay (d), s/veh	36.5	41.3	18.2	11.1	4.6	3.6
Incr Delay (d2), s/veh	0.2	12.6	1.6	0.6	0.8	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	5.7	4.8	8.2	3.2	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	36.7	53.9	19.8	11.6	5.4	3.7
LnGrp LOS	D	D	B	B	A	A
Approach Vol, veh/h	240			790	591	
Approach Delay, s/veh	51.5			14.3	5.1	
Approach LOS	D			B	A	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	79.4			79.4	20.6
Change Period (Y+Rc), s	5.3			5.3	5.3
Max Green Setting (Gmax), s	66.7			66.7	22.7
Max Q Clear Time (g_c+I1), s	11.5			34.6	15.0
Green Ext Time (p_c), s	5.0			7.5	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	16.4
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	10	202	33	5	54	413	536	193	129	203	264
Future Volume (veh/h)	82	10	202	33	5	54	413	536	193	129	203	264
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1870	1856	1633	1633	1633	1870	1945	1737	1826	1826	1870
Adj Flow Rate, veh/h	96	12	238	39	6	64	486	631	227	152	239	311
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	4	2	3	18	18	18	2	2	11	5	5	2
Cap, veh/h	209	279	487	214	18	191	720	855	308	585	975	847
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.27	1.00	1.00	0.02	0.18	0.18
Sat Flow, veh/h	1310	1870	1572	986	120	1282	1781	1366	491	1739	1826	1585
Grp Volume(v), veh/h	96	12	238	39	0	70	486	0	858	152	239	311
Grp Sat Flow(s),veh/h/ln	1310	1870	1572	986	0	1402	1781	0	1857	1739	1826	1585
Q Serve(g_s), s	7.1	0.5	12.3	3.5	0.0	4.5	13.3	0.0	0.0	2.9	11.3	17.3
Cycle Q Clear(g_c), s	11.6	0.5	12.3	4.1	0.0	4.5	13.3	0.0	0.0	2.9	11.3	17.3
Prop In Lane	1.00		1.00	1.00		0.91	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	209	279	487	214	0	209	720	0	1162	585	975	847
V/C Ratio(X)	0.46	0.04	0.49	0.18	0.00	0.34	0.67	0.00	0.74	0.26	0.25	0.37
Avail Cap(c_a), veh/h	253	342	541	247	0	257	861	0	1162	605	975	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.63	0.00	0.63	0.91	0.91	0.91
Uniform Delay (d), s/veh	43.3	36.4	28.1	38.2	0.0	38.1	6.9	0.0	0.0	5.3	23.8	26.3
Incr Delay (d2), s/veh	1.2	0.0	0.6	0.3	0.0	0.7	0.6	0.0	2.7	0.1	0.5	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.3	4.6	0.9	0.0	1.6	3.2	0.0	0.9	1.0	5.6	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.5	36.5	28.6	38.5	0.0	38.8	7.6	0.0	2.7	5.4	24.4	27.4
LnGrp LOS	D	D	C	D		D	A		A	A	C	C
Approach Vol, veh/h		346			109			1344			702	
Approach Delay, s/veh		33.3			38.7			4.5			21.6	
Approach LOS		C			D			A			C	

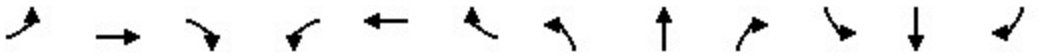
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.1	58.7		20.2	11.9	67.9		20.2				
Change Period (Y+Rc), s	5.0	5.3		5.3	5.0	5.3		5.3				
Max Green Setting (Gmax), s	24.0	42.1		18.3	8.0	58.1		18.3				
Max Q Clear Time (g_c+I1), s	15.3	13.3		6.5	4.9	0.0		14.3				
Green Ext Time (p_c), s	0.8	0.5		0.5	0.1	0.0		0.6				

Intersection Summary												
HCM 7th Control Delay, s/veh			14.8									
HCM 7th LOS			B									

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	284	264	159	858	372	66
Future Volume (veh/h)	284	264	159	858	372	66
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1856	1856	1856	1781	1841
Adj Flow Rate, veh/h	334	311	187	1009	438	78
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	4	3	3	3	8	4
Cap, veh/h	486	588	750	1396	1127	987
Arrive On Green	0.14	0.14	0.07	0.75	1.00	1.00
Sat Flow, veh/h	3401	2768	1767	1856	1781	1560
Grp Volume(v), veh/h	334	311	187	1009	438	78
Grp Sat Flow(s),veh/h/ln	1700	1384	1767	1856	1781	1560
Q Serve(g_s), s	9.3	10.0	3.5	29.5	0.0	0.0
Cycle Q Clear(g_c), s	9.3	10.0	3.5	29.5	0.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	486	588	750	1396	1127	987
V/C Ratio(X)	0.69	0.53	0.25	0.72	0.39	0.08
Avail Cap(c_a), veh/h	548	638	751	1396	1127	987
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.97	0.97
Uniform Delay (d), s/veh	40.7	34.9	5.0	6.7	0.0	0.0
Incr Delay (d2), s/veh	3.4	0.9	0.1	3.3	1.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	7.8	1.1	10.1	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	44.1	35.8	5.0	10.0	1.0	0.2
LnGrp LOS	D	D	A	B	A	A
Approach Vol, veh/h	645			1196	516	
Approach Delay, s/veh	40.1			9.2	0.9	
Approach LOS	D			A	A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	68.3		19.8		80.2
Change Period (Y+Rc), s	5.0	5.0		5.5		5.0
Max Green Setting (Gmax), s	7.0	61.4		16.1		73.4
Max Q Clear Time (g_c+I1), s	5.5	2.0		12.0		31.5
Green Ext Time (p_c), s	0.0	4.2		2.3		13.6

Intersection Summary		
HCM 7th Control Delay, s/veh		15.8
HCM 7th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	78	1	18	118	182	11	514	14	130	121	385
Future Volume (veh/h)	321	78	1	18	118	182	11	514	14	130	121	385
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1796	1752	1811	1841	1870	1870	1856	1767	1826	1811	1811
Adj Flow Rate, veh/h	378	92	1	21	139	0	13	605	16	153	142	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	6	7	10	6	4	2	2	3	9	5	6	6
Cap, veh/h	389	420	379	368	184		726	665	537	452	967	
Arrive On Green	0.17	0.23	0.23	0.03	0.10	0.00	0.02	0.36	0.36	0.20	0.53	0.00
Sat Flow, veh/h	1725	1796	1485	1725	1841	1585	1781	1856	1497	1739	1811	1535
Grp Volume(v), veh/h	378	92	1	21	139	0	13	605	16	153	142	0
Grp Sat Flow(s),veh/h/ln	1725	1796	1485	1725	1841	1585	1781	1856	1497	1739	1811	1535
Q Serve(g_s), s	16.5	4.1	0.1	0.9	7.4	0.0	0.3	31.0	0.6	0.8	4.0	0.0
Cycle Q Clear(g_c), s	16.5	4.1	0.1	0.9	7.4	0.0	0.3	31.0	0.6	0.8	4.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	389	420	379	368	184		726	665	537	452	967	
V/C Ratio(X)	0.97	0.22	0.00	0.06	0.76		0.02	0.91	0.03	0.34	0.15	
Avail Cap(c_a), veh/h	389	512	455	436	350		813	733	591	452	967	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.2	30.9	27.8	27.4	43.8	0.0	10.0	30.5	13.7	31.7	11.8	0.0
Incr Delay (d2), s/veh	38.4	0.3	0.0	0.1	6.2	0.0	0.0	18.7	0.1	0.4	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	1.8	0.0	0.4	3.6	0.0	0.1	16.9	0.3	3.0	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.5	31.2	27.8	27.5	50.0	0.0	10.1	49.2	13.8	32.2	12.1	0.0
LnGrp LOS	E	C	C	C	D		B	D	B	C	B	
Approach Vol, veh/h		471			160			634			295	
Approach Delay, s/veh		66.0			47.1			47.5			22.5	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	57.9	7.6	27.9	24.2	40.3	21.0	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.0	39.5	7.0	28.5	7.0	39.5	16.5	19.0
Max Q Clear Time (g_c+I1), s	2.3	6.0	2.9	6.1	2.8	33.0	18.5	9.4
Green Ext Time (p_c), s	0.0	1.2	0.0	0.6	0.1	2.8	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	48.3
HCM 7th LOS	D

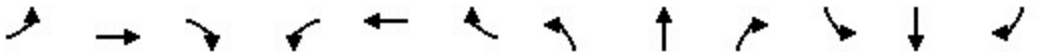
Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	261	158	465	540	58
Future Volume (veh/h)	57	261	158	465	540	58
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	63	287	174	511	593	64
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	3	2	2	2
Cap, veh/h	364	324	484	1255	1255	1064
Arrive On Green	0.20	0.20	1.00	1.00	0.67	0.67
Sat Flow, veh/h	1781	1585	770	1870	1870	1585
Grp Volume(v), veh/h	63	287	174	511	593	64
Grp Sat Flow(s),veh/h/ln	1781	1585	770	1870	1870	1585
Q Serve(g_s), s	2.5	15.0	6.6	0.0	13.0	1.2
Cycle Q Clear(g_c), s	2.5	15.0	19.6	0.0	13.0	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	364	324	484	1255	1255	1064
V/C Ratio(X)	0.17	0.89	0.36	0.41	0.47	0.06
Avail Cap(c_a), veh/h	455	405	484	1255	1255	1064
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.80	0.80	1.00	1.00
Uniform Delay (d), s/veh	27.9	32.9	2.2	0.0	6.7	4.8
Incr Delay (d2), s/veh	0.2	16.7	1.7	0.8	1.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	7.1	0.5	0.3	4.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	28.1	49.6	3.9	0.8	8.0	4.9
LnGrp LOS	C	D	A	A	A	A
Approach Vol, veh/h	350			685	657	
Approach Delay, s/veh	45.7			1.6	7.7	
Approach LOS	D			A	A	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	62.3			62.3	22.7
Change Period (Y+Rc), s	5.3			5.3	5.3
Max Green Setting (Gmax), s	52.7			52.7	21.7
Max Q Clear Time (g_c+I1), s	15.0			21.6	17.0
Green Ext Time (p_c), s	5.9			6.3	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	13.1
HCM 7th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	10	143	122	10	73	374	466	113	139	346	316
Future Volume (veh/h)	84	10	143	122	10	73	374	466	113	139	346	316
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1870	1870	1811	1811	1811	1870	1945	1722	1870	1870	1870
Adj Flow Rate, veh/h	92	11	157	134	11	80	411	512	124	153	380	347
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	5	2	2	6	6	6	2	2	12	2	2	2
Cap, veh/h	212	284	929	258	29	209	884	884	214	447	425	360
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.19	0.19	0.13	0.38	0.38
Sat Flow, veh/h	1274	1870	1585	1179	189	1375	1781	1513	366	1781	1870	1585
Grp Volume(v), veh/h	92	11	157	134	0	91	411	0	636	153	380	347
Grp Sat Flow(s),veh/h/ln	1274	1870	1585	1179	0	1564	1781	0	1879	1781	1870	1585
Q Serve(g_s), s	6.0	0.4	0.0	9.3	0.0	4.5	12.5	0.0	26.1	2.7	16.2	18.2
Cycle Q Clear(g_c), s	10.4	0.4	0.0	9.7	0.0	4.5	12.5	0.0	26.1	2.7	16.2	18.2
Prop In Lane	1.00		1.00	1.00		0.88	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	212	284	929	258	0	238	884	0	1098	447	425	360
V/C Ratio(X)	0.43	0.04	0.17	0.52	0.00	0.38	0.47	0.00	0.58	0.34	0.89	0.96
Avail Cap(c_a), veh/h	289	398	1025	330	0	333	884	0	1098	492	711	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.81	0.00	0.81	0.86	0.86	0.86
Uniform Delay (d), s/veh	37.1	30.7	8.1	34.9	0.0	32.4	24.2	0.0	24.8	9.6	25.4	26.0
Incr Delay (d2), s/veh	1.0	0.0	0.1	1.2	0.0	0.8	0.1	0.0	1.8	0.1	21.4	35.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.2	1.2	2.7	0.0	1.7	8.4	0.0	13.5	0.8	8.2	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.2	30.8	8.2	36.1	0.0	33.2	24.3	0.0	26.6	9.7	46.8	62.0
LnGrp LOS	D	C	A	D		C	C		C	A	D	E
Approach Vol, veh/h		260			225			1047			880	
Approach Delay, s/veh		19.7			34.9			25.7			46.3	
Approach LOS		B			C			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	42.2	24.6		18.2	11.8	55.0		18.2				
Change Period (Y+Rc), s	5.3	* 5.3		5.3	5.0	5.3		5.3				
Max Green Setting (Gmax), s	19.0	* 32		18.1	9.0	42.3		18.1				
Max Q Clear Time (g_c+I1), s	14.5	18.2		11.7	4.7	0.0		12.4				
Green Ext Time (p_c), s	0.4	1.1		0.6	0.1	0.0		0.5				

Intersection Summary		
HCM 7th Control Delay, s/veh	33.4	
HCM 7th LOS	C	

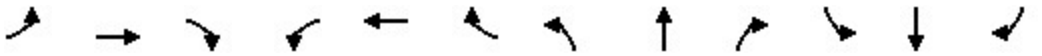
Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	335	538	224	618	517	94
Future Volume (veh/h)	335	538	224	618	517	94
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1826	1870	1870	1870	1856	1826
Adj Flow Rate, veh/h	368	591	246	679	568	103
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	5	2	2	2	3	5
Cap, veh/h	615	742	443	1298	1023	853
Arrive On Green	0.18	0.18	0.08	0.69	0.18	0.18
Sat Flow, veh/h	3374	2790	1781	1870	1856	1547
Grp Volume(v), veh/h	368	591	246	679	568	103
Grp Sat Flow(s),veh/h/ln	1687	1395	1781	1870	1856	1547
Q Serve(g_s), s	8.5	15.5	5.0	14.8	23.7	4.7
Cycle Q Clear(g_c), s	8.5	15.5	5.0	14.8	23.7	4.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	615	742	443	1298	1023	853
V/C Ratio(X)	0.60	0.80	0.56	0.52	0.55	0.12
Avail Cap(c_a), veh/h	615	742	545	1298	1023	853
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.91	0.91
Uniform Delay (d), s/veh	31.9	29.0	11.4	6.2	25.3	17.5
Incr Delay (d2), s/veh	1.8	6.2	0.4	1.5	2.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	12.7	1.7	5.1	12.2	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	33.6	35.2	11.8	7.8	27.2	17.8
LnGrp LOS	C	D	B	A	C	B
Approach Vol, veh/h	959			925	671	
Approach Delay, s/veh	34.6			8.8	25.8	
Approach LOS	C			A	C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.1	51.9		21.0		64.0
Change Period (Y+Rc), s	5.0	5.0		5.5		5.0
Max Green Setting (Gmax), s	12.0	42.0		15.5		59.0
Max Q Clear Time (g_c+I1), s	7.0	25.7		17.5		16.8
Green Ext Time (p_c), s	0.2	4.5		0.0		6.8

Intersection Summary	
HCM 7th Control Delay, s/veh	23.0
HCM 7th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	464	130	12	26	114	160	15	218	21	252	396	407
Future Volume (veh/h)	464	130	12	26	114	160	15	218	21	252	396	407
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1826	1870	1826	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	510	143	13	29	125	0	16	240	23	277	435	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	5	2	5	2	2	2	2	3
Cap, veh/h	533	544	779	443	215		462	649	550	560	478	
Arrive On Green	0.21	0.29	0.29	0.04	0.12	0.00	0.20	0.35	0.35	0.11	0.26	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1826	1585	1739	1870	1585	1781	1870	1572
Grp Volume(v), veh/h	510	143	13	29	125	0	16	240	23	277	435	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1826	1585	1739	1870	1585	1781	1870	1572
Q Serve(g_s), s	18.2	5.0	0.1	0.9	5.5	0.0	0.0	8.2	0.8	8.5	19.2	0.0
Cycle Q Clear(g_c), s	18.2	5.0	0.1	0.9	5.5	0.0	0.0	8.2	0.8	8.5	19.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	533	544	779	443	215		462	649	550	560	478	
V/C Ratio(X)	0.96	0.26	0.02	0.07	0.58		0.03	0.37	0.04	0.49	0.91	
Avail Cap(c_a), veh/h	533	627	850	553	408		462	649	550	560	502	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.9	23.1	4.5	19.4	35.5	0.0	25.6	20.8	18.4	15.4	30.7	0.0
Incr Delay (d2), s/veh	28.4	0.3	0.0	0.1	2.5	0.0	0.0	1.6	0.1	0.7	23.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	2.2	0.1	0.4	2.6	0.0	0.3	3.7	0.3	3.3	11.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.4	23.4	4.5	19.5	38.0	0.0	25.6	22.4	18.5	16.1	54.5	0.0
LnGrp LOS	E	C	A	B	D		C	C	B	B	D	
Approach Vol, veh/h		666			154			279			712	
Approach Delay, s/veh		48.3			34.5			22.3			39.5	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.6	26.2	8.0	29.2	13.8	34.0	22.7	14.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.0	22.8	8.7	28.5	9.3	20.5	18.2	19.0
Max Q Clear Time (g_c+I1), s	2.0	21.2	2.9	7.0	10.5	10.2	20.2	7.5
Green Ext Time (p_c), s	0.0	0.6	0.0	1.1	0.0	1.3	0.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	39.7
HCM 7th LOS	D

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix J – MnDOT Comments and Response Memorandum

DEPARTMENT OF TRANSPORTATION

Office of Project Management & Technical Support
Geometric Design Support Unit – MS 686
395 John Ireland Blvd
St. Paul, MN 55155

Date: March 28th, 2025

To: Kevin Lachowitzer

From: MnDOT Geometric Design Support Unit (GDSU)

Thank you for the opportunity to provide this Over-the-Shoulder (OTS) review for the I-94 and 20th Street interchange project in Moorhead. The following comments on behalf of GDSU are being shared for further consideration by the project team. We look forward to work with you more in the future.

Responses from the Study team are provided in blue italics below.

General Comments:

1. Has an IAR been initiated for this project? *Not at this stage. This is a feasibility study commissioned by the City of Moorhead through FM Metro COG. It is anticipated that at some point in the future, the City will continue to the next phase of project development (Level 1 layout and environmental document) during which things like this will be addressed.*

2. The MnDOT traffic mapping application shows the heaviest volumes are West of 34th St. with a significant drop-off east of there. Does traffic modelling show the need for increased capacity for traffic accessing 20th St. from the east? Please provide additional information if available. *This study included traffic forecasting using Metro COG's 2050 Travel Demand Model which addresses future household and job growth in the area. It is anticipated there will be a notable increase in jobs and households in the vicinity of I-94 between 20th Street and MN Hwy 336 between now and 2050. Figures 26 & 27 in the Fargo-Moorhead Metropolitan Transportation Plan show the forecasted locations of jobs & households: https://www.fmmetrocog.org/application/files/7717/4352/1782/Metro2050_no_Appendix_r_1.pdf. In addition to growth, the lack of westbound I-94 exit ramps in Moorhead (2 of the 4 interchanges in Moorhead don't have ramps to/from the east) possess a problem when an incident causes traffic to backup/stop on westbound I-94. When this occurs, westbound traffic between the 8th St and 34th St interchanges (2.4 miles) is unable to exit.*

Concept No. 5

3. We are in favor of this concept with the following comments:
    a. We have concerns with the sharp, EB exit curve to the Minnesota Travel Information Center. We recommend maintaining the existing exit geometry and extending the auxiliary lane through to the entrance ramp. Modeling may be necessary to determine the best solution but reducing the radius of the first curve on the ramp will likely cause issues. *This comment will be included in the report with a recommendation to evaluate this in the next phase of project development.*
    b. We recommend combining the 20th St. bridge and the pedestrian bridge into one structure if it reduces overall project costs and impacts. *This comment will be included in the report with a recommendation to evaluate this in the next phase of project development.*

c. Consult with the MnDOT Preliminary Bridge Unit to determine appropriate shoulder widths on the 20th St. Bridge. *This comment will be included in the report with a recommendation to evaluate this in the next phase of project development.*

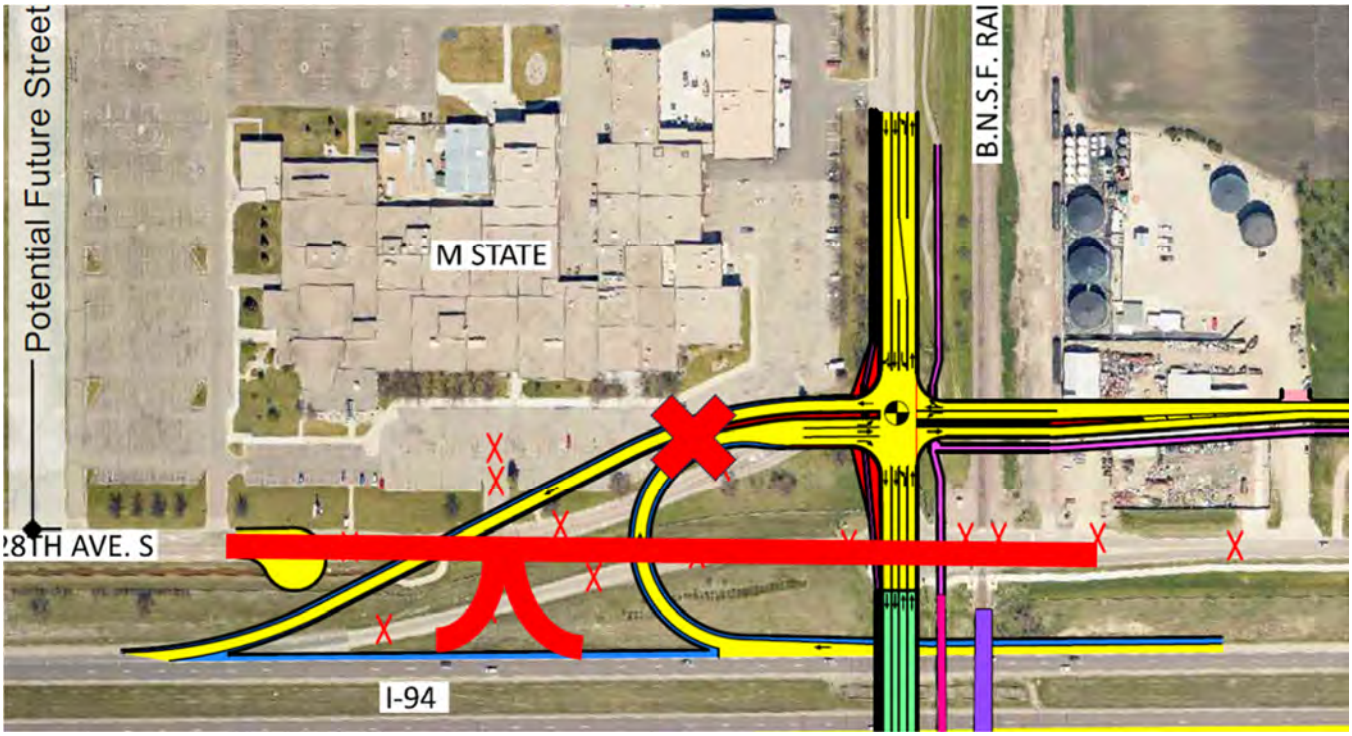
d. Is it necessary to connect 28th Ave. to 20th St? Ending 28th with a cul-de-sac at Ken's Sanitation & Recycling will reduce right of way costs and avoid a property taking that is likely contaminated. *Earlier iterations of this alternative showed a cul-de-sac as you describe. The City of Moorhead feels the connection of 28th Avenue to 20th is very necessary. It is a common route used by residents to access Menard's and other business located near Main Avenue. In addition, the current agricultural field in the northeast quadrant has recently become available for development. The City is seeing significant interest from developers and expect there to be a mix of multifamily housing and commercial development in the area, making the 20th Street connection even more important in the future.*

Concept No. 4A

4. We are not in favor of this concept with the following comments:
    a. The additional bridge costs and complexity of the 20th St WB entrance ramp "scissor" geometry are not warranted based on the traffic volumes shown on the MnDOT traffic mapping application. Concept 5 achieves the same goals with a more standard intersection design. *As noted in the responses above, the alternatives under evaluation are addressing higher traffic volumes than shown on the mapping application. The cost of the additional bridge is offset by the reduced right of way costs associated with Alternative 5 (less impacts to M State's parking lot and no impacts to Ken's Sanitation.)*
    b. We recommend removing the 28th Ave S "scissor" geometry by either ending 28th Ave S with a cul-de-sac or allowing 28th Ave S to tee into 20th St S at approximately where it exists today. *The "scissor" geometry was developed specifically so that full access could be provided to 28th Avenue at 20th St while accommodating the westbound offramp within the existing right of way. This design also allows the 28th Avenue and 20th Street Intersection to be full access as opposed to the current right in/right out configuration. This change will improve transit and school bus operations and also improve safety by eliminating the risk-taking behavior observed in the area (traffic turning left from 28th to 20th even though it is prohibited, and traffic cutting through M State's parking lot to go northbound on 20th Street.) Drivers in the area are familiar with this type of design as it is very similar to I-29 and 13th Avenue South in Fargo.*
    c. While this design is similar to E. Bush Lake Rd. and I-494 in Bloomington, this design includes an undesirable merge where the exit ramps meet. *We agree this is a concern and will recommend that it be evaluated further in the next phase. Initial traffic analysis shows the ramp configuration to function well.*
    d. Have profiles been generated for the fly-over ramp? We have concerns about the grade needed to go from under 20th St to over TH 94 in such a short distance. *Yes, grades were considered in the development of all of the alternatives. The fly-over ramp profile has a maximum grade of 7.9% to go from under 20th street bridge to over I-94.*
    e. Comments 3b and 3c also apply to this concept. *Comment noted.*

Alternatives:

5. If the 28th Ave connection is indeed required, we suggest the following alternative which extends 28th through the existing intersection and replaces the ramp/loop with a buttonhook design:



We have concerns about the feasibility and safety of this concept. There is limited room to make the offramp connection (approximately 115 feet between edge of pavement on I-94 to edge of pavement on 28th Avenue) resulting in what would likely be a design speed of 20 mph or less for the ramp. This could result in traffic backing up onto I-94 during peak times and would not be consistent with driver expectations when exiting the Interstate. It would also make it difficult to provide adequate acceleration lane distance for westbound traffic using the onramp. However, these comments are based on initial reactions only, therefore, we plan to include a recommendation in the report to evaluate this concept further in the next phase of project development.

Again, thank you for the opportunity to provide this OTS review and let us know if you have any questions.

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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