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WORLD RESOURCES INSTITUTE

Road Safety Inspection

Olson Memorial Highway (MN HWY55)

July 2024

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1 INTRODUCTION

This report presents findings and recommendations from a road safety inspection carried out on Olson Memorial Highway in Minneapolis, Minnesota, on July 10–11, 2024.

1.1 Background

Olson Memorial Highway, or State Highway 55, is owned by the Minnesota Department of Transportation (MnDOT). The corridor includes major intersections, with Lyndale Avenue connecting to entrance and exit ramps to Interstate 94, Van White Memorial Blvd, Morgan Avenue and Penn Avenue.

The highway was constructed between 1938–1940 replacing 6th Avenue North, a thriving commercial street with numerous businesses, synagogues, churches, and cultural centers. The construction of the highway and subsequent highway expansion projects destroyed most of these establishments and divided or displaced a vibrant community in an area labeled as "blighted" by city officials[1]. Historically, redlining, and racial covenants in Minneapolis meant that this community was comprised of predominantly Black and Jewish residents. In 1968, the construction of Interstate 94 further divided the area from downtown Minneapolis.

Figure 1 Olson Hwy at Penn Avenue.

Today, road safety is a major concern on the corridor and efforts are ongoing to address the historic and current harms of these major highway projects.[2] The City of Minneapolis has identified this section of the Olson Memorial Highway as part of a “high-injury” street network and a pedestrian high-injury street. The intersection with Lyndale Avenue is categorized as a high-injury intersection by the City of Minneapolis.[3]

In June 2023, the Minneapolis City Council passed a resolution[4] supporting the removal of Olson Memorial Highway (hereafter “the corridor”) and restoring Sixth Avenue North- “prioritizing public health, racial equity, safety, affordability, accessibility and sustainability.” MnDOT has received a federal Reconnecting Communities planning grant as part of broader plans to overhaul the design of the corridor.[5] Construction is expected to start in 3–4 years, though studies exploring different options are underway. Our Streets MN is also a recipient of a separate Reconnecting Communities planning grant and is leading community efforts to reimagine the Olson Highway corridor.

[1] https://www.ourstreetsmn.org/initiative/bring-back-6th/
[2] https://talk.dot.state.mn.us/rethinking-i94
[3] https://www.minneapolismn.gov/government/programs-initiatives/visionzero/vz-data-stats/
[4] https://lims.minneapolismn.gov/Download/RCAV2/31183/Olson%20Memorial%20Highway%20-%20Highway%2055%20Resolution%20-%20V2.pdf
[5] https://www.dot.state.mn.us/metro/projects/olsonmemorialhwystudy/index.html

In 2022, MnDOT made road safety improvements to the corridor, including removing one lane in both directions of travel using plastic bollards and markings and adding painted curb extensions. Design alternatives are being considered as part of the long-term overhaul project, including the incorporation of bike and pedestrian infrastructure and transit priority routes.[6]

This road safety inspection was carried out through the Community Connectors Program. With support from the Robert Wood Johnson Foundation, Smart Growth America in collaboration with Equitable Cities, the New Urban Mobility Alliance (NUMO), and America Walks have created the Community Connectors program to help advance locally driven projects that will reconnect communities separated or harmed by transportation infrastructure and tap available federal and state funds to support them. Read more about the program here https://smartgrowthamerica.org/program/community-connectors-grants/.

1.2 Scope of the Inspection

The Road Safety Inspection was carried out at the request of Our Streets Minnesota and covered a 1.4-mile section of the Olson Memorial Highway in Minneapolis between Oak Lake Avenue (44°59'03.7"N 93°17'07.5"W), and the bridge over Bassett Creek, just west of Thomas Avenue (44°59'03"N 93°18'52.4"W). The inspection examined current conditions on the corridor and included adjacent service roads such as Olson Highway Service Road and Frontage Road on both the north and south sides of the corridor.

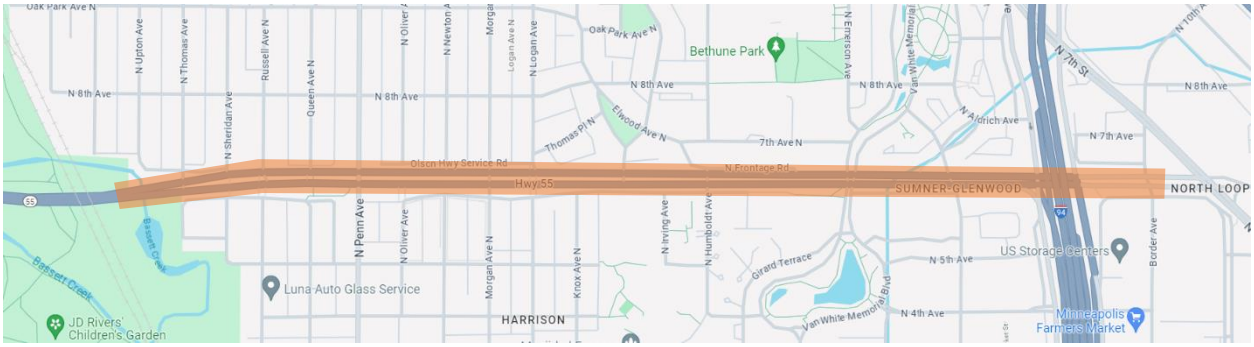

Figure 2 Olson Hwy (Hwy 55) with extent of inspection marked in orange.

The Road Safety Inspection team was comprised of:

- Ben Welle, Director of Integrated Transport & Innovation, World Resources Institute
- Siba El-Samra, Urban Mobility Manager, World Resources Institute
- Vineet John, Urban Mobility Manager, World Resources Institute
- Leah Lazer, Research Associate and Project Manager, New Urban Mobility Alliance

Crash data analysis was supported by Juan Camilo Pérez, Valentina Perdomo, and David Pérez of World Resources Institute.

Site visits were carried out on July 10–11, 2024, under mixed weather conditions including rain, hail, and sun between the hours of 9 a.m. –6 p.m. The inspection team traveled the corridor on foot, by car and by bus.

[6] https://www.dot.state.mn.us/metro/projects/olsonmemorialhwystudy/alternatives.html

The team was joined on site by staff from Our Streets, MnDOT Metro division, and members of local stakeholder organizations based on the Olson Highway corridor (Green Garden Bakery, Summit Academy and Heritage Park Neighborhood Association) for a portion of the site visit between Bryant Avenue and Humboldt Avenue.

1.3 Road Safety Inspections

Road safety inspections, or audits, are carried out as part of a Safe System Approach to road safety by proactively identifying and addressing road design and infrastructure deficits before road deaths or injuries can occur.

A road safety inspection does not do the following:

- It does not check on compliance with local or national road design standards, but it may reference these standards. It aims to go beyond standards to assess how the road's design, infrastructure and usage perform in the given context, which includes local traffic conditions, road user behavior, adjacent land use, etc.
- It does not evaluate the appropriateness, merits, or demerits of a road or road projects on the whole. These are generally considered through other means such as feasibility studies.
- It does not necessarily highlight positive aspects of the design, even if there are design elements that contribute to road safety. The inspection focuses primarily on addressing potential road safety issues.
- It does not provide detailed design solutions but suggests interventions that can rectify safety issues.

A road safety inspection considers the safety of all users, including pedestrians, cyclists, motorcyclists, car passengers and others, as well as road users of varying ages and physical abilities. The inspection process does not focus on how road users are supposed to behave, rather it focuses on how road users actually behave. Accordingly, the recommendations from an inspection will typically encapsulate measures to direct user behavior through design interventions.

Typically, the participants in a road safety inspection are (i) the road owner (the relevant city authority), (ii) a road-operating agency, (iii) the road safety inspector (the individual or team conducting the inspection) and/or (iv) local stakeholders.

1.4 Report Structure

Chapter 2 of the report provides an overview of crash data and analysis carried out prior to the inspection.

Chapter 3 summarizes the main findings from the inspection.

Chapters 4 and 5 provide details on the findings from the inspection.

If the inspection team identified an issue considered detrimental to road safety, the issue is referred to in this report as a 'problem.'

Each problem's impact on safety is provided in detail and followed by a 'recommendation' on how the problem can be overcome. In some locations, a 'comment' is provided to point out issues that may not directly impact road safety but are worth noting. Problems are classified as general or specific.

Each problem identified in this report is a current road safety issue on the corridor as observed at the time of the inspection. The recommendations provided are intended to mitigate the problem and reduce the risk of death or injury through road traffic crashes. In the case of this report, the problems and recommendations are reflective of current conditions on Olson Highway and does not consider any planned, future improvements to the corridor.

Chapter 4 describes general observations. The General Observations section contains those findings and recommendations that pertain to the whole, or a large section, of the corridor. For the sake of compactness, these observations are combined without listing every instance in which the issue is prevalent. To mitigate these risks, the associated recommendation must be implemented along the whole corridor at every instance where the issue is prevalent.

Chapter 5 of the report presents site-specific observations of the inspection. These issues are specific to a particular location on the corridor. In some cases, multiple issues may be shown at one location and labeled accordingly. The recommended treatment is listed immediately after each issue.

2 DATA AND ANALYSIS

Data on all reported crashes on the Corridor from 2014 to 2023 was obtained from MnDOT. This data is based on crash reports completed by law enforcement officers after every reported crash.

The dataset also classifies crashes by severity of injury, defined by the Minnesota Department of Public Safety as follows:

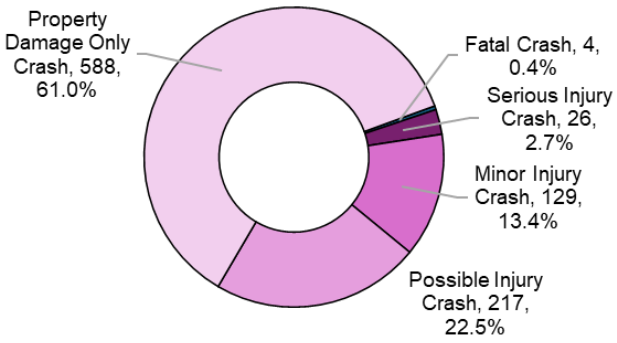

Figure 3 Breakdown of crashes by type and severity of injury (2014-2023)

Suspected Serious Injury (A): *Non-fatal injury with 1 or more of the following: Severe laceration exposing underlying tissues/muscle/organs or significant loss of blood; Broken or distorted arm or leg; Crush injuries; Suspected moderate or major skull, chest, or abdominal injury; Significant burns (2nd or 3rd degree burns on 10% or more of the body); Unconsciousness leaving crash scene; Paralysis.*

Suspected Minor Injury (B): *Any injury that is evident at the scene of the crash, other than fatal or serious injuries. Ex. lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).*

Possible Injury (C): *Any injury reported or claimed which is not a fatal, suspected serious or suspected minor injury. Ex. momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Injuries reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.*

No Apparent Injury (O): *Situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury, and the person does not report any change in normal function.*

The dataset records 4 fatal crashes, 26 serious injury crashes, 129 minor injury crashes, 217 possible injury crashes and 588 property damage crashes for a total of 964 reported crashes between 2014 and 2023.

The data shows a decline in annual crashes from a higher average of 159 crashes a year from 2014–2015 to an average of 70 crashes a year in the last four years (2020-23). Injury crashes (crashes with evident minor or major injuries or fatalities) show a slower decline from an average of 20 injury crashes a year from 2014–15 to an average of 14 injury crashes a year in the last four years (2020–23).

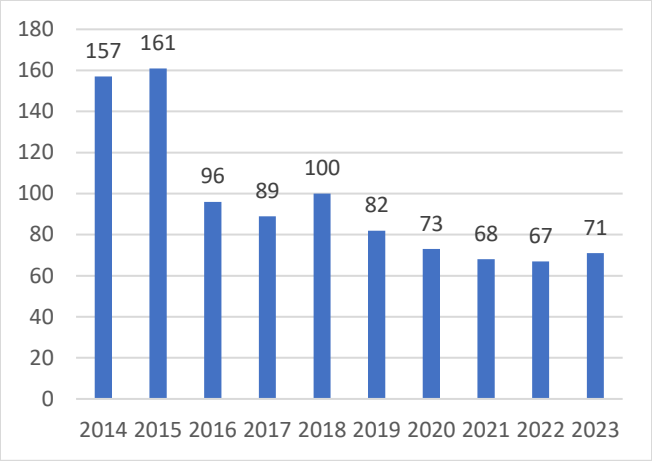

Figure 4 All Crashes by year (2014-2023)

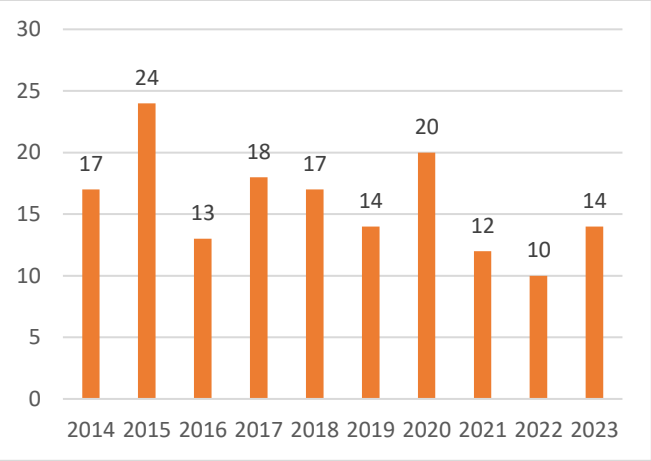

Figure 4 Injury and Fatal crashes by year (2014-2023)

For recent years this translates to an average of 5.83 crashes a month on the 1.4-mile corridor, of which an average of 1.16 crashes a month are expected to result in an evident injury.

Severe crashes are dispersed along the corridor, but significant hotspots for severe crashes resulting in serious injury or fatalities were noted at Thomas Avenue, Penn Avenue, Morgan Avenue, Humboldt Avenue, Bryant Avenue, Lyndale Avenue and Oak Lake Avenue.

Crash locations:

Crashes in the dataset have geographic coordinates identified by responding law enforcement officers in the crash report. These have been mapped onto the corridor in the figure below. A heat map of crashes shows that hotspots tend to cluster around major intersections, with at least two intersections (with Lyndale Avenue and Penn Avenue) being statistically significant hotspots for crashes.

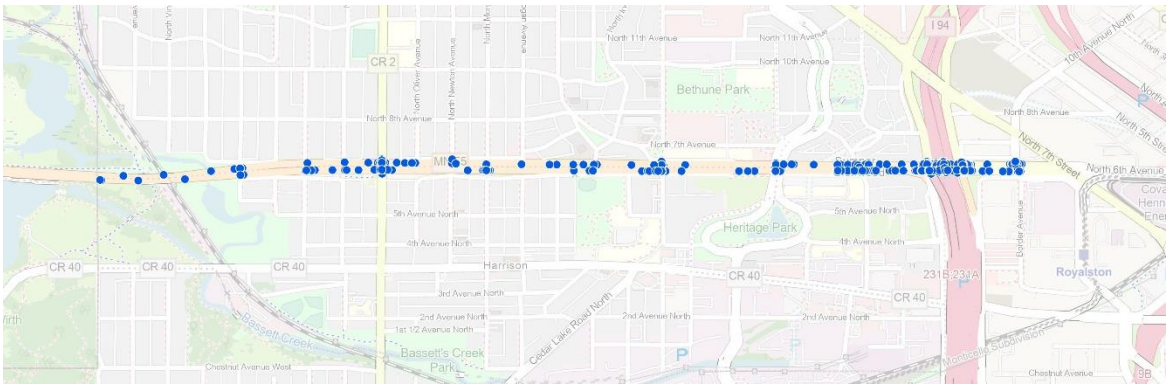

Figure 5 Map of all crash locations on the corridor (2014-2022)

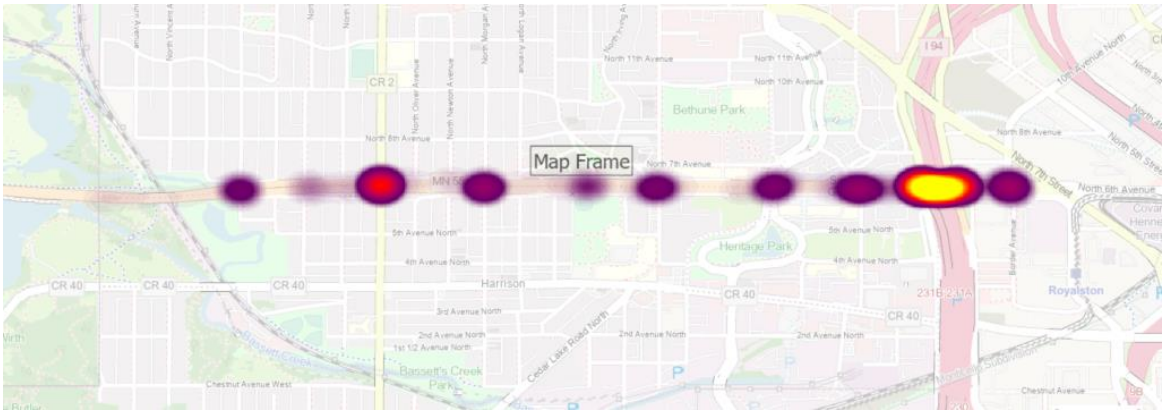

Figure 6 Heat map of crashes with brighter colors indicating a higher density of crashes (2014-2023)

Crashes with vulnerable road users:

Crashes with vulnerable road users, such as pedestrians and bicyclists, are also concentrated at intersections primarily in the eastern half of the corridor, where density and land use are likely generating more pedestrian and bicycle activity. Intersections with hotspots for pedestrian and bike crashes include Oak Lake Avenue, Morgan Avenue and Penn Avenue.

Crash severity by time of day:

Crashes occur primarily in the daytime, particularly around "rush hour" times, such as 8 a.m., 2 p.m. and 5 p.m.

However, crashes tend to be more severe at nighttime hours, likely due to higher speeds and less congestion on the corridor. The period between 11pm and 2am saw the largest share of severe crashes resulting in serious injury or fatalities.

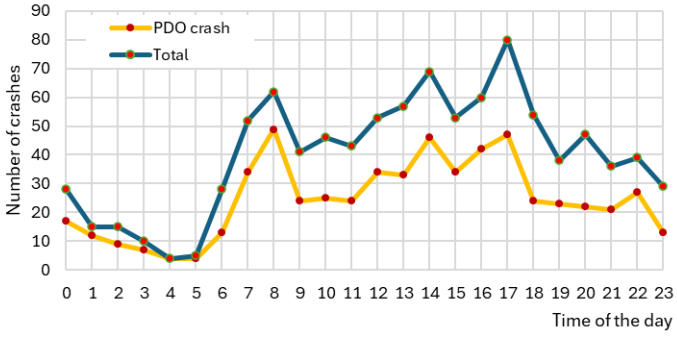

Figure 7 Crashes by time of day (2014-2023)

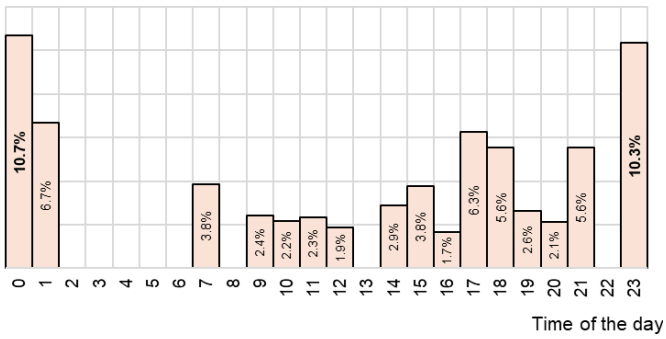

Figure 8 Share of severe crashes by hour of day (2014- 2023) showing larger share of severe crashes at between 11pm and 2am

Observations from the data:

- Crashes are dispersed along the entire corridor, but crash hotspots appear to be located at intersections. This indicates that problems causing crashes are likely found throughout the whole corridor, such as high vehicle speeds or corridor-wide infrastructure deficits, rather than at a particular location.

- The higher severity of crashes in nighttime hours also supports the idea that speed is a major contributor since speeds tend to increase at night when congestion is minimal. Speed is already identified as the cause of most traffic fatalities in Minneapolis.[7]

- Intersections on the corridor are large and complex, with more conflict points due to the presence of service roads also meeting at the intersections. Higher traffic volumes and resulting higher exposure may explain why significant hotspots exist at major intersections such as Penn Avenue and Lyndale Avenue.

- The most common type of collision is angle (or side-impact) crashes and turns, which together account for more than half of all crashes on the corridor where a "manner of collision" was noted in the crash data. This indicates a high risk of conflict while making turns or merging on the corridor, most likely at intersections or other merging areas. Collisions at turns can also be exacerbated by higher speeds at the time of impact.

- The intersection of Olson Highway with I-94 at Lyndale Avenue is of particular interest, both because of the high number of crashes at this location and because the intersection seems to split the corridor into two distinct sections with possible impacts on walking and biking.

- Pedestrian and bike safety is also of concern, particularly at intersections and in the eastern half of the corridor. The physical inspection of the corridor looks at whether current road infrastructure and vehicle speeds are barriers to walking and biking. Crash counts alone are not a good indicator of risk to vulnerable road users, since unsafe road conditions may reduce or prevent walking and biking trips on the corridor, thus resulting in low overall injury counts. Data on modal splits for the corridor were not available to estimate an injury rate by road user. The City of Minneapolis has classified the road as part of a high-injury network and a high-pedestrian-injury network[8] of streets.

[7] https://www.minneapolismn.gov/government/programs-initiatives/visionzero/vz-data-stats/
[8] https://cityoflakes.maps.arcgis.com/apps/instant/basic/index.html?appid=5cb76e74c91f425c9860a9d3f07859d1

3 SUMMARY OF THE FINDINGS AND KEY RECOMMENDATIONS

Here we summarize the top five major issues identified during the inspection that are likely contributing to crashes and crash risk on the corridor. Details of our findings and recommendations are provided in chapters 4 and 5.

- **High vehicle speeds increase risk across the corridor**: Land use on the corridor, especially between Morgan Avenue and Lyndale Avenue, is not consistent with current speed limits of 30–40mph. Schools, libraries, parks, and medium/high-density residential development are generating pedestrian and bike activity, but current road conditions do not safely support these activities.

  High speeds are also believed to be a contributor to severe crashes between vehicles at intersections and turns. Service lanes are wide with no posted speed guidance, which allows vehicles to speed. We recommend reviewing speed limits and working to reduce speeds to 25mph on the eastern half of the corridor (matching speed limits on Olson/6th Avenue in the North Loop), 25mph on all approaches to Olson + Lyndale Avenue and increasing up to 30mph on the rest of the corridor if pedestrian infrastructure is adequately provided (see points below). Service roads should be signed at 20mph with traffic calming devices to ensure vehicles comply.

- **Unmarked mid-block crossings put pedestrians at risk**: Pedestrian mid-block crossings are unmarked, unprotected and sometimes unlit. This poses high risk to pedestrians or other vulnerable road users attempting to use these crossings with current speed limits of 40mph. We recommend marking all pedestrian crossings with adequate signage and warning to drivers to yield to pedestrians. We also recommend protecting them with signals or raised crossings. Signals such as HAWK (High-Intensity Activated cross WalK) or RRFB (Rectangular Rapid Flashing Beacon) can be used. There are long stretches of road from Thomas Avenue to Penn Avenue, as well as Morgan Avenue to Humboldt Avenue, with no signalized crossings for pedestrians. We recommend providing protected crossings in these stretches.

- **Left turns are likely a cause of severe collisions**: The large size of intersections and high corridor speeds increase risk of severe collisions during left turns. We recommend using dedicated left turn signal phases at locations where demand for turns exist. Traffic surveys can also be used to close certain left turns, especially at unsignalized intersections, and to direct turning traffic to the nearest signalized intersections. At some intersections left turn signals were provided but inoperative at the time of inspection.

  The lack of left turn signal phases makes it difficult for pedestrians, as the pedestrian green phase often conflicts with left turn vehicles at intersections.

- **Large intersection sizes**: Large intersection sizes are also contributing to the issues of speed and turns mentioned above as drivers try to clear the junction quickly turning across multiple lanes. Drivers waiting inside the intersection can block visibility for other road users. The presence of

service roads joining the corridor at intersections further increases complexity. We recommend tightening intersections and shortening crossing distances further with additional curb extensions and lane reductions. Providing clear directions and lane and turn guidance, especially at the I-94 interchange, can also help drivers navigate the intersection safely. Re-evaluate the use of service roads, which, in some cases, do not serve any necessary purpose. Service roads entrances can be moved away from major intersections to reduce intersection complexity.

- **Poorly maintained pedestrian and bike infrastructure are preventing safe travel on the corridor**. The corridor requires regular maintenance of facilities to provide high quality infrastructure for vulnerable road users. There are multiple issues of pavement quality, missing or faded road markings, inoperative pedestrian signal buttons, poor drainage and broken or poorly located curb ramps. These are more evident on the corridor west of I-94. All of these are safety and universal accessibility issues, as they compel road users to walk on the roadway, cross at locations other than safe crosswalks or otherwise reduce or avoid trips on the corridor. Sidewalks should provide continuity on the corridor for all road users, regardless of ability.

  The recently implemented temporary curb extensions and lane closures on the corridor are opportunities to upgrade and utilize the space for new, higher-quality infrastructure for bicycle and pedestrian use.

4 GENERAL OBSERVATIONS AND RECOMMENDATIONS

This section details the general road safety observations and recommendations that pertain to the entire corridor or a large section of it. The recommendations for each problem identified below are intended to be applied throughout the corridor or at every instance where the problem exists on the corridor.

4.1 Problem: Unsafe speed limits on the corridor

The current marked speed limit on most of Olson Highway is 40mph. A limited sample of speed measurements with a handheld speed gun during the inspection found few cases of speeding over the limit. We observed the highest speeds going eastbound at Thomas Avenue. Speeds reached up to 55mph in a few cases but were mostly between 40–45mph. Even though these speeds mostly align with the speed limit on the corridor, they are still a major concern.

Olson Memorial Highway was designed and built to be a highway with heavy traffic flowing in and out of the city with speed limits set accordingly. However, this does not align with the current function and land use context of the corridor. The corridor, especially in the section between Morgan Avenue and I-94, has a mix of uses and high density of housing, businesses, schools, senior housing, and other institutions in addition to transit stops and the presence of vulnerable road users such as pedestrians, cyclists, young students, and senior citizens.

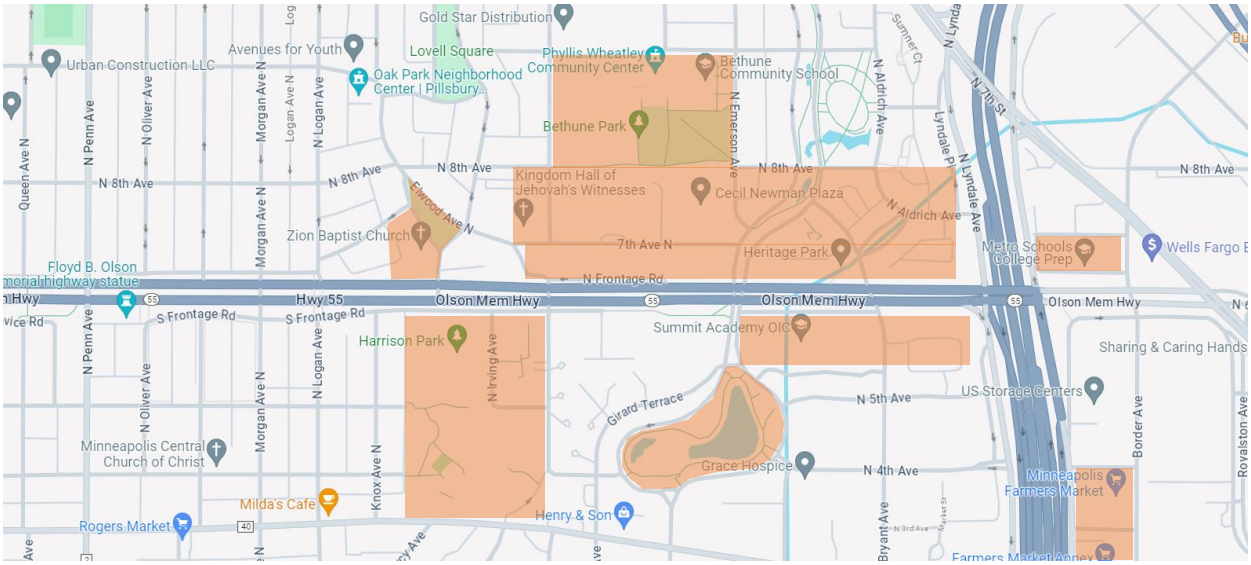

Figure 9 Map of Olson Hwy between Penn Ave and Oak Lake Ave. Parks, schools, medium and high-density residential buildings, libraries, and religious buildings are marked in orange. All of these generate demand for pedestrian activity but speeds on Olson Hwy currently do not support safe access to these for vulnerable road users

The discrepancy between the actual, current function of the road and the assigned, historical function of the road means that the current speed limit is higher than safe, recommended speeds for existing conditions; therefore, it puts road users at risk.

Recommendations: Lowering the speed limit is recommended to reduce injury and road deaths along the corridor. This is the case in the section between Lyndale Avenue and Morgan Avenue, where the presence of schools, libraries and businesses means that more vulnerable road users are likely to be present.

Figure 10 Pedestrians and children on the corridor.

- We recommend lowering the speed limit on the corridor to no more than 30mph. Speed limits should be set based on safety to maximize survivability in the event of a crash and based on the types of crashes expected on the corridor. A 30mph (50kph) speed limit is the maximum recommended speed limit on urban arterials and major roads where side collisions are possible (see table below for Safe System survivable impact speeds as defined by Guide for Safe Speeds).[9] This is the case for most of the Olson Highway corridor.
- For the section between Morgan Avenue and Lyndale Avenue, we recommend further reducing the speed limit to 25mph, accounting for land use and higher volumes of pedestrian use. This reduction will match limits on 6th Avenue leading to Olson Highway and similar streets in Minneapolis and create a clear, consistent driving environment for drivers. Signage and other visual cues should be used to provide clarity to drivers and denote the speed transition from a highway environment to an urban road environment.

Type of road/road section	Safe System survivable impact speed	
Roads/road sections with possible crashes between cars and vulnerable road users including 2- and 3-wheelers	Max. 30 kph	(≈20 mph)
Roads/road sections with intersections with possible side-on crashes between cars	Max. 50 kph	(≈30 mph)
Roads/road sections with possible frontal (head-on) crashes between cars	Max. 70 kph	(≈45 mph)
Roads/road sections with no likelihood of side-on or frontal crashes between cars and limited access (usually motorways)	Max. 100 kph*	(≈65 mph)

* In many countries, motorways still have higher speed limits of up to 120 kph or even 130 kph. But setting speed limits on motorways should be about balancing three core priorities: safety, mobility, and the environment. Introducing lower speed limits on motorways cuts both fuel consumption and pollutant emissions. Thus, speed limits over 100 kph should generally be avoided.

Figure 11 Survivable impact speeds based on the type of collision expected on a roadway.

[9] https://www.globalroadsafetyfacility.org/sites/default/files/2024-05/Guide%20for%20Safe%20Speeds%20-%20Managing%20Traffic%20Speeds%20to%20Save%20Lives.pdf

- For service roads, we recommend speeds of no more than 20mph, given that residences, schools, and other facilities are located on these roads.

To ensure the new speed limit is effective and enforced, several tools are needed:

- Installing clear speed limit and advanced warning signage to allow for a smooth transition.
- Implementing infrastructure changes to align with the new speed limit, such as road diets (in the case of Olson Highway making lane reduction more permanent and visible), introducing traffic calming measures and ensuring lane widths align with the speed limit. These measures can alert drivers to the change in speed environment and ensure they slow down. This is important since narrower streets and lanes can slow traffic by changing a driver's perception of safety and risk. Drivers tend to drive faster on wide straight roads with wide lanes that they perceive as "safe" to speed up on, and slower on narrower roads with narrower lanes.[10]
- Using enforcement tools, especially in the beginning stages of implementing the speed limit change
- Communicating the changes with the community and potential road users through signage and engagement events

Given that there are unprotected pedestrian crossings midblock on the corridor, further infrastructure interventions are needed to enable safe crossings on a 30mph corridor. Traffic calming tools should be used to ensure drivers stop and yield to pedestrians. Implementing high visibility, marked and signalized mid-block crossings with warning signage, to alert drivers and prioritize pedestrians is essential. If these are not implemented, speeds should be lowered to 25mph for the length of the corridor.

Service roads along Olson Memorial Highway do not currently provide clear speed limit guidance to drivers. Drivers may assume that speed limits on the main corridor also apply to the service roads. There are residential buildings, schools, and senior centers directly in front of these roads. Given that the default speed limit is 20mph on these roads, we recommend signage and traffic calming infrastructure such as raised crossings, speed humps and curb extensions, in addition to the tools mentioned above.

[10] https://www.wri.org/research/cities-safer-design

4.2 Problem: Stop lines are missing at all intersections

The lack of stop lines coupled with faded or missing marked crossings are causing vehicles to stop on crossing areas or further into the intersection. This issue was noted at several locations on the corridor. When a vehicle blocks a crossing, it compels pedestrians to walk further into the roadway, blocks other drivers' view of pedestrians in the crossing and blocks pedestrians' view of other oncoming vehicles. This issue is possibly exacerbated by the temporary curb extensions that did not also adjust the position of stop lines and crossing points to accommodate the change in intersection geometry. This encourages drivers to inch forward into the now tighter intersection over the existing pedestrian crossings.

Figure 12 Vehicles stopped on the crosswalk during the red phase.

Recommendation: *Stop lines should be used to indicate the point behind which vehicles are required to stop in compliance with a traffic control signal… or stop sign* (MUTCD 3B.16). Stop lines are already present on all city-owned streets that intersect Olson Highway and saw a higher level of compliance by drivers. Adding stop lines on Olson Highway would make it consistent with other streets on the corridor and reduce the likelihood of vehicles blocking crossings or stopping in the intersection.

Stop lines and pedestrian crossing locations should account for the change in intersection geometry due to curb extensions, lane reductions or other "daylighting" or road diet measures. Stop lines and crossings should be relocated and restriped to minimize crossing distances and maximize visibility of pedestrians, bicyclists and traffic control signals or signs.

4.3 Problem: Unmarked, unprotected pedestrian mid-block crossings

At multiple locations, pedestrian paths lead to unmarked, unprotected and, in some cases, unlit crossings across Olson Highway, especially at mid-block locations. Such crossings exist all along the corridor, such as near Thomas, Sheridan, Queen, Oliver, Newton, Logan, Knox, and James avenues. These may be remnants from historic blocks or represent junctions that existed prior to the construction of Olson Highway.

There are no warnings or indications of any sort provided to drivers traveling over 40mph that pedestrians may be present and using these crossings. These crossing locations are a high-risk conflict point for pedestrians or bicyclists that choose to cross there.

This is both a safety risk and a walkability and accessibility problem. While ADA-compliant curb ramps have been provided at some of these crossings, the high speeds on the corridor, the lack of visible signs or markings and the unlikelihood of drivers yielding to pedestrians on the corridor render these crossings extremely high risk for use by everyone, but especially for road users with disabilities, despite the ADA-compliant ramps. The high perceived risk of using these crossings likely dissuades most pedestrian and bicyclist use along the corridor. However, during the inspection, we observed pedestrians using these mid-block crossings at several locations.

At present these unmarked crossing locations provide no cues to any road user regarding right of way or priority, however the presence of curb ramps and paths leading to the crossing can indicate to pedestrians that these are legal crosswalks or intersections where they do have right of way.

Figure 13 Examples of unmarked, mid-block crossings on Olson Hwy, including those with newer ADA-compliant ramps as well as older crossings

Recommendations: Addressing unprotected crossings can improve safety issues as well as quality of life and accessibility issues on the corridor. Whether marked or unmarked, from a safety perspective, these crossing locations should be treated as intersection points where pedestrians have right of way and severe conflicts are highly likely.

- All crossings, regardless of location, should be marked.
- For a multi-lane road like Olson Highway with speeds of 40mph or more and high-traffic volumes, marked, high-visibility crosswalks should be implemented in conjunction with other safety measures (MUTCD 3B.18). These measures include speed reductions, enhanced driver awareness of pedestrians and active warnings of pedestrian presence. Our primary recommendation is to reduce speeds on the corridor (see item 4.1 above)
- Drivers should be required to yield to pedestrians at these locations, and there should be signage and warnings indicating so.

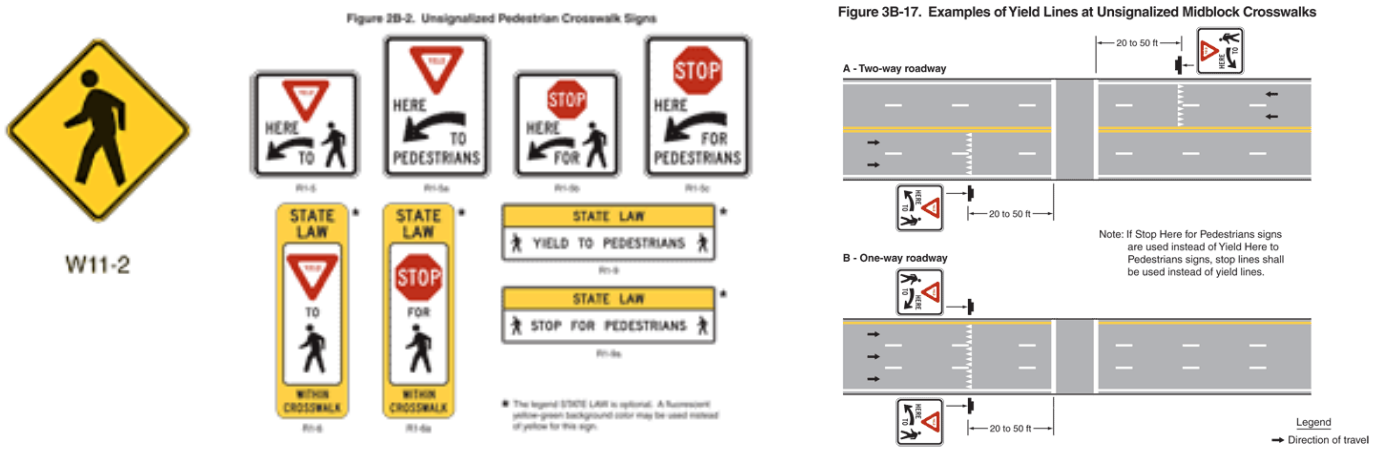

Figure 14 Examples of signs and markings used for unsignalized mid-block crossings (MUTCD 2B/3B).

- Pedestrian activated signals such as Rectangular Rapid Flashing Beacons (RRFB)s or Hawk signals can improve driver yield compliance and significantly reduce the risk of a crash at these crossings. RRFBs are recommended by the FHWA[11] for use on multi-lane roads like Olson Memorial

Figure 15 Example of a Rectangular Rapid Flashing Beacon (RRFB) and pedestrian crossing signage installed at 8th Ave and 2nd St. in Minneapolis

  Highway with speed limits of 40mph or less at locations where pedestrian safety issues exist. They are already in use on other roads in Minneapolis (see image).
- Where vehicular compliance is an issue and additional protection is needed, installing speed humps, or raised crossings can ensure vehicular traffic yields to pedestrians.
- Ensure all pedestrian crossing locations and transit stops are well lit at night.

[11] https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/techSheet_RRFB_2018.pdf; https://highways.dot.gov/sites/fhwa.dot.gov/files/RRFB_508_0.pdf

- At some locations, engineering studies can help determine whether to close crossings or redirect pedestrians to nearby protected crossings, if such crossings are located within reasonably close walking distance (e.g.: Queen Avenue or Oliver Avenue crossings) that does not increase pedestrian travel times. Pedestrians are sensitive to time cost of travel, so protected mid-block crossings are recommended if the distance between signalized crossings is too large and inconvenient.
- At present, the sections between Thomas Avenue and Penn Avenue, as well as between Morgan Avenue and Humboldt Avenue, are stretches of the corridor with around 500 meters (1600ft) between signalized crossings. We recommend providing protected mid-block pedestrian crossings in these sections to shorten walk times to the nearest signalized crossing to less than 200m (650 ft).

4.4 Problem: Unclear purpose of closed right lanes on the corridor

Road safety improvements previously made on Olson Memorial Highway include lane and road width reductions. The right lane is closed to traffic in both directions using pavement markings and temporary delineator posts. These measures are proven interventions that can reduce road death and injury.

The use of temporary measures, while useful to test interventions, should not be considered permanent or long-term solutions because:

- The use of temporary materials alone does not provide a visual cue to drivers to reduce speeds, since roadway width appears to be the same.
- Temporary plastic delineators or bollards do not provide physical protection for pedestrians or bicyclists attempting to cross the road.
- The closed lane does not currently provide any indication as to whether it is intended to be used by pedestrians and bicyclists. Currently, cyclists occasionally use the lane to travel along the highway. However, the temporary nature of the improvements means that intersections and crossings are not designed to accommodate safe bicycle use on this closed lane. This may give a false sense of safety to cyclists, but also reflects the need for proper, separated cycling infrastructure.

Figure 16 Cyclists using the closed right lane on Olson Hwy

Recommendation:

The additional space from the closed right lanes and curb extensions presents an opportunity to provide safe and comfortable pedestrian and bicyclist facilities on the corridor or to improve other services such as transit or stormwater drainage.

Ensure that crossings align with the new road geometry resulting from lane closures and curb extensions.

If the closed right lanes are intended for pedestrian and cyclist use, it is important to provide the right infrastructure that reflects this function and ensure safety and comfort. Raised barriers and signage are some ways to achieve this goal. Intersections and crossings should be marked to warn drivers that this is a bicycle route.

Transitioning from temporary to permanent materials can further emphasize and amplify the safety benefit of road narrowing and protect vulnerable road users.

4.5 Problem: Large intersections and wide curb radii

Intersections along Olson Memorial Highway are large due to multiple lanes on the approaches and wide medians. Large intersections are difficult for road users, especially pedestrians and cyclists, to navigate. They allow vehicular traffic to travel at higher speeds and cause an increase in confusion and conflict among road users. Vehicles turning left pose an especially high risk, which is reflected in a large number of crashes at intersections.

Additionally, curb radii at intersections and medians are wide enough to allow turning at high speeds. This not only increases the risks due to the high speeds, but also increases crossing distances for pedestrians and cyclists. As part of the lane narrowing project, some curb radii along intersection corners and medians were painted red and lined with delineators; however, the new curb radii are still wide and do not provide needed traffic calming and protection for vulnerable road users.

Figure 17 Wide turning radii on turns.

Recommendation:

Use curb extensions to tighten the turning radii for traffic turning on and off Olson Memorial Highway to lower speeds and ensure road users in the crosswalk have right of way. Tighten the curb radii for a turning speed that matches the recommended safe speed limit.

Extend medians to better manage turning traffic and allow space for refuge islands for those crossing.

Install turn path markings where needed to avoid turning traffic conflict.

Carry out traffic surveys to evaluate whether dedicated left and right turns are necessary at all intersections. Intersections with low demand for turns can have these lanes removed to further reduce intersection size.

4.6 Problem: Poor maintenance of infrastructure between Thomas Avenue and Lyndale Avenue

There is a significant disparity in corridor maintenance and infrastructure quality on Olson Memorial Highway between the west and east sections of I-94. In general, sidewalks, curb ramps, lights, and utilities, as well as bus stops, are in better condition east of I-94.

Between Lyndale and Thomas Avenues, pedestrian facilities need maintenance and more regular upkeep. Weeds growing through cracks in the sidewalk were large enough to block pedestrians' paths in some cases. Curb ramps were deteriorated with breaks in the pavement, and multiple pedestrian signal buttons were damaged or missing signage.

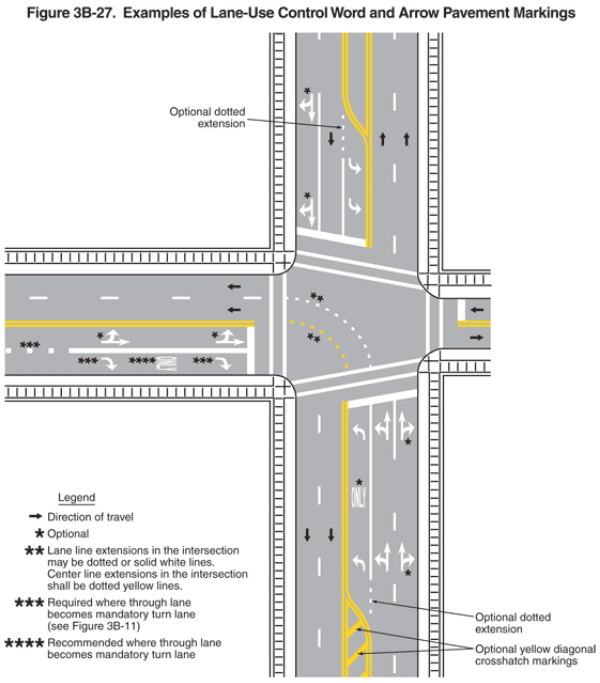

Figure 18 Example of lane extensions to manage turns.

Figure 19 Poor roadway and sidewalk conditions on the corridor.

Additionally, infrastructure such as light poles, traffic lights and signposts had rust and peeling paint, which makes for a less visually pleasant environment for walking and biking.

These issues in maintenance may compel pedestrians, bicyclists, or disabled road users to use the roadway instead of sidewalks and crossings, exposing them to higher risk of injury or death.

It may also cause road users to reduce the number of trips taken by non-motorized means or avoid trips on the corridor altogether.

Recommendation:

Regular routine roadway maintenance can directly impact road safety by providing safe, accessible, and convenient routes of travel, and indirectly encourage safer modes of travel like walking, biking, or public transport.

Ensure sidewalks are clear and free of obstructions, with engineered curb ramps that are accessible for all road users.

Provide pedestrian signal buttons within reach at all intersections and ensure they are working.

4.7 Problem: Left turns at intersections

Crash data indicates that one of the most common types of crashes on the corridor are angle crashes between motor vehicles at intersections. These are likely to be turning vehicles. Due to the large size of intersections on the corridor, vehicles often wait in the intersection or make turns at higher speeds. With oncoming traffic having speed limits of 40mph or more, collisions with turning vehicles can be severe.

We also noted that while dedicated left turn lanes and signals are provided, the left turn signals at some intersections were inoperative at the time of inspection.

Since there is no dedicated left turn phase at most intersections, there is also no protected pedestrian crossing phase at those locations since left turning vehicles will be in conflict with crossing pedestrians.

Figure 20 Pictures show vehicles waiting inside of large intersections to make turns, cars queueing to make turns at James Ave., and vehicles attempting to cross both carriageways from the side roads.

Recommendation: Lowering speeds on the corridor is the best way to reduce the likelihood and severity of angle crashes at intersections and turns. Global safe system guidance for roads where side collisions are possible calls for speeds of no more than 30mph to minimize the risk of injury or death. Olson Highway has multiple intersections and median openings for turns including uncontrolled intersections with regular demand for left turns, which makes it even more important to consider lowering speeds to 30mph or less on the corridor.

Reducing the size of intersections with curb and median extensions is also recommended along with lane extensions to guide drivers through the intersection.

Consider eliminating “yield on green” left turns or provide dedicated turn signals. Dedicated left turn signals which are inoperative can be used to control left turns at intersections which have turn lanes.

Consider engineering studies and traffic analysis to close uncontrolled turns across the median and redirecting turning traffic to the nearest signalized intersection.

4.8 Problem: Pedestrian signal buttons provided only across Olson Memorial Highway at intersections

Most signalized intersections along the corridor provide pedestrian signals call buttons to cross Olson Highway, however at several intersections, there are no pedestrian signal buttons for the crossings across the intersecting avenues. This can cause accessibility issues for disabled road users who rely on audible crossing cues.

Figure 21 Pedestrian signal button on Olson Highway

Recommendation:

Provide pedestrian signal call buttons on all legs of signalized intersections where missing to ensure universal accessibility for all road users. If actuated signals are used, ensure that pedestrian signal buttons are working (see 5.6.2 below), and sufficient crossing times are provided.

Provide audible crossing alerts and truncated domes to indicate crossings for all road users.

Consider implementing “No turn on red” at all intersections in the eastern half of the corridor where pedestrian activity is expected.

5 SPECIFIC OBSERVATIONS AND RECOMMENDATIONS

In this chapter, we highlight road safety problems that were identified at a particular location on the corridor. Problems are sorted into sections by the closest major intersection to the problem identified.

5.1 Olson + Thomas Avenue

5.1.1 Problem: High vehicular speeds

In addition to the problem of high speeds on the corridor as explained in the general recommendations chapter above, high vehicle speeds are particularly an issue at this location. Eastbound vehicles were noted travelling at highway speeds of over 40mph coming over the bridge. Speed limits before the bridge are 50mph. At this location the road transitions from a highway-type environment to an urban environment with a lower posted limit of 40mph but vehicles continue to travel at higher than posted speed. High speeds at this location are likely responsible for crashes with turning vehicles at Thomas Avenue.

Recommendation: In addition to signage indicating speed limits, and the general recommendation to lower speeds corridor-wide, we recommend adding more visual cues for drivers to indicate that they are entering a lower speed urban zone with multiple intersections and other road users. These can include:

- Reduced speed zone ahead signs. *A Reduced Speed Limit Ahead (W3-5 or W3-5a) sign should be used to inform road users of a reduced speed zone where the speed limit is being reduced by more than 10 mph*. (MUTCD 2C.38)
- Other visual cues such as neighborhood markers, landscaping, or entranceways can be used.
- Road markings or transverse rumble strips near the bridge in conjunction with signage indicating intersections, pedestrian activity, or turning vehicles ahead.

  Road features such as roundabouts can also enforce a transition from suburban to urban zones.

Figure 22 Example of Reduced Speed Zone ahead signs

5.1.2 Problem: Multiple Speed Limit signs in close proximity may be confusing to drivers.

Two speed limit signs are located in quick succession on Eastbound Olson Highway at Thomas Avenue - one indicating a citywide limit and one indicating the new limit for Olson Highway.

Recommendation: Evaluate whether this is the right location for the citywide limit signage or increase spacing between signs.

Figure 23 Multiple Speed Limit signs in close proximity.

5.1.3 Problem: Sidewalk connectivity at N. Sheridan Avenue and Olson Highway.

Due to the presence of the frontage road, the sidewalk on Olson Highway ends at a curb cut ramp leading into the junction rather than toward the crossing or adjacent corner curb cut ramp. There are no marked crossings and vehicles turning here can turn at high speeds due to the wide turn radius provided by the curb which can place crossing pedestrians at risk. Misaligned curb ramps and discontinuous sidewalks are especially dangerous for mobility impaired pedestrians or those with other mobility needs.

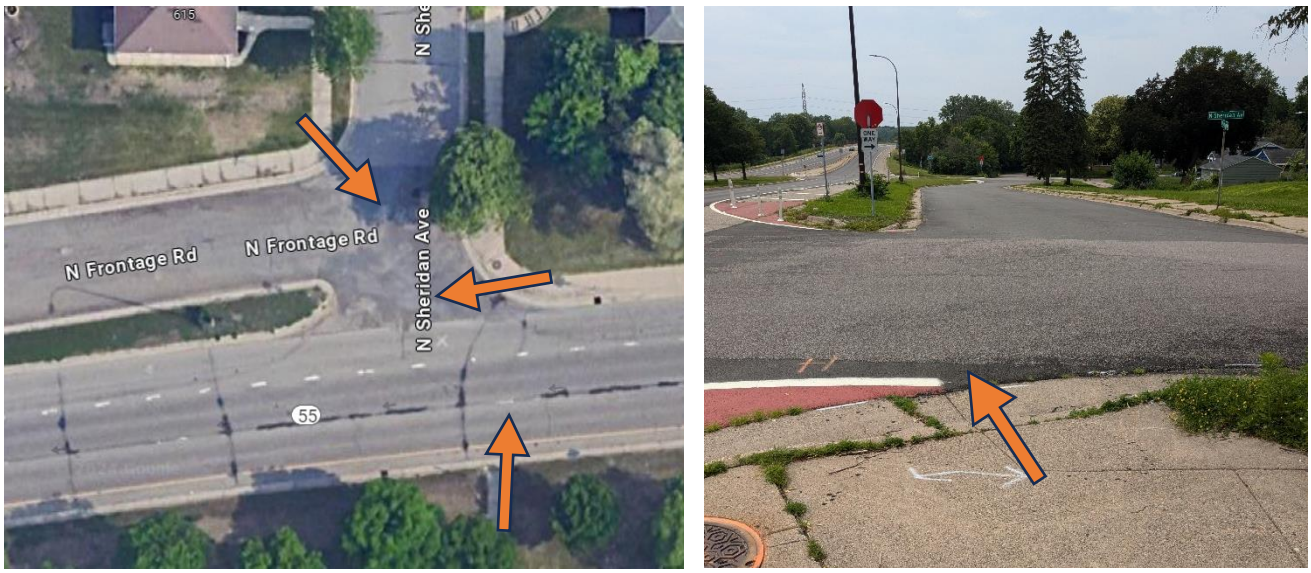

Figure 24: Arrows indicate location and direction of current curb ramps at Olson Hwy.+ N. Sheridan Ave.

Recommendation: Provide continuous sidewalks. Road space on the very wide frontage road or on the unused side lane of Olson Highway. can be used to provide continuous sidewalks. Align curb ramps with expected pedestrian crossing lines.

5.1.4 Comment: Frontage Road between Thomas Avenue and Sheridan Avenue.

The frontage road here does not seem to serve the purpose of property access and may be present solely to aid connectivity due to the presence of one-way residential streets. While this is not a current road safety issue, the frontage road may be unnecessary at this location and the space may be better utilized to provide safer pedestrian/bike paths or other public amenities. Narrower, two-way residential streets may also help slow traffic on side streets.

5.2 Olson + Russell Avenue

5.2.1 Problem: (i) Median opening here allows for higher speed merging

(ii) Two unmarked, unprotected pedestrian crossings are located at a high-speed turn.

The opening in the median on Olson Highway at Russell Avenue is currently designed to allow vehicles to enter Eastbound Olson Highway from North Russell Avenue. The angle of the road and Yield signage allows vehicle to merge onto Eastbound Olson without slowing down or stopping.

A pre-existing unmarked, unprotected pedestrian crossing is located at this junction. The crossing appears to have been recently split into two paths to allow pedestrian movement on both sides of the median turn. In addition to the general risk of unmarked, unprotected crossings on a 40mph road (as described in the general recommendations) the crossing on the east side (marked in orange below) has an added component of risk for crossing pedestrians, as drivers of turning vehicles are likely looking westward at oncoming traffic as they attempt to merge and may not see crossing pedestrians. Drivers are also likely not to stop or attempt to merge as quickly as possible at speed during breaks in traffic.

Figure 25 Unmarked, unprotected crossing at Russell Ave. Crossing marked in orange may not be visible to drivers merging at speed (For e.g. The school bus merging in the photo at right)

Recommendation: In addition to general recommendations provided in the previous chapter, we recommend the following:

- Implement measures to prevent uncontrolled merging at high speeds. This can include replacing the yield sign with a stop sign to compel drivers to stop, look and then merge, or altering the angle at which Russell Avenue. joins Olson Highway closer to 90 degrees to encourage lower speeds on merging.
- Closing uncontrolled openings and redirecting turning traffic to the nearest signalized intersection. If traffic surveys indicate a need for turns at these uncontrolled locations, convert them into signalized intersections which will make it safer for all road users and reconnect the previously existing city grid.
- Reconsider or evaluate the need for two separate pedestrian crossing paths in such proximity at this location. A single, high visibility marked crossing before the merge may be sufficient.

5.3 Olson + Queen Avenue

5.3.1 Problem: Sidewalk continuity at Queen Avenue.

Curb Ramps on the north side of Olson do not connect at Queen Avenue. This can push pedestrians or mobility impaired road users onto the roadway. Moreover, the newly installed plastic bollards used to extend the curb at this location also push pedestrians to walk on frontage road rather than crossing the shortest distance across Queen Avenue.

Figure 26: Curb cuts do not align for crossing Queen Avenue. Bollards also placed in the path of travel when crossing Queen Avenue. (photo on right)

Recommendation:
Provide continuous walkway on Olson Highway with curb ramps in all expected directions of pedestrian travel. Curb ramps or bollards should not obstruct pedestrian or wheelchair use and provide for the shortest and safest path of travel.

5.3.2 Problem: Road signs in close proximity obstructs view of lane control sign

A "No parking" sign has been placed in front of a lane control sign which may obstruct view for some drivers approaching Penn Avenue.

Recommendation: Remove or relocate No parking sign. Lane control signs can also be provided overhead at the junction or on approach.

Figure 27 Road signs in close proximity obstructs view of lane control sign.

5.3.3 Problem: Mid-block crossing on Queen Avenue. has no safe crossing infrastructure.

In addition to the general risk of unmarked, unprotected crossings on a 40mph road (as described in the general recommendations), the mid-block crossing at Queen Avenue. is a slightly unique case since it has a bicycle path that leads to it. The crossing is also part of a proposed "low-stress bikeway" on Queen

Avenue. by the city of Minneapolis, as well as erroneously marked as a dedicated bicycle right-of way on Google Maps. This may lead bicyclists to cross 6 road lanes +1 turn lane of Olson Highway at a location where no signage, markings, or signals exist to slow down or warn drivers of bicyclists crossing. Crash data does not show conflicts with bicycles at this location; however, this may be because bicyclists choose to cross at a relatively safer location like the signalized intersection on Penn Avenue rather than at Queen. Avenue. Bicyclists or pedestrians choosing to cross at Queen Avenue however are at higher risk of a collision.

Figure 28 Current marked bike route on northern section of Queen Avenue

Recommendation: If the intention is to retain Queen Avenue as a direct bike route, additional measures are needed to protect bicyclists. This can include warning signs, yield to pedestrian signs, marked crossings, pedestrian or bicyclist activated signals.

The design of the curb on the north side of Olson should also include curb ramps for the crossing.

However, due to the proximity of a signalized intersection at Penn Avenue, a more desirable and safer (though less direct) option may be to direct bicycle and pedestrian traffic to the intersection with Penn Avenue. In this case, we recommend closing the crossing at Queen Avenue. and removing the paths on the south-side of Olson leading to Queen Avenue. In addition, safe crossing facilities should be provided at Penn Avenue. such as wider refuge areas, bike boxes, and road markings for bike lanes.

The sidewalk on the northside between Queen Avenue and Penn Avenue should be widened to accommodate bicycles.

Figure 29 Current bike path and crossings at Queen Avenue. and Penn. Avenue

5.4 Olson + Penn Avenue

5.4.1 Problem: "No Turn on Red" sign may be outside of the line of sight of drivers.

Existing "No Turn on Red" sign on Eastbound Olson is located far from both the traffic signal and the current right-most driving lane. This may be partly because of the closure of the right-most lane on the carriageway. The sign may be too far for drivers to notice.

Recommendation: The No Turn Sign should ideally be located with the signal or adjacent to the lane from which turns are made. Additional signage can be added to the overhead traffic light.

Figure 30 No turn on red sign.

5.4.2 Problem: Bike path leads to the intersection but no safe bike crossing infrastructure is provided.

A bi-directional bike path leads from Queen Avenue. to the south-west corner of the intersection of Penn Avenue. and Olson Highway. The short bike path brings bicyclists to the intersection but ends at the intersection. No other bike crossing infrastructure, such as bike boxes or bike lanes were noted in or beyond the intersection either on Olson Highway or Penn Avenue.

Recommendation: Safe crossing facilities should be provided at Penn Avenue. such as wider refuge areas, bike boxes, and/or road markings for bike lanes. Connectivity to other bike lanes or bike networks from this intersection should be provided.

5.4.3 Problem: Missing fare machines at bus stop on southside of Olson Highway.

The bus stop on the south-east corner of Olson and Penn Avenue does not have a fare payment machine at the stop. Since transit service on this corridor requires off-board fare payment, transit users have to cross the road to the bus stop on the opposite side to pay their fares before crossing back to take the bus toward downtown. This is unnecessary exposure to traffic risk.

Recommendation: Provide fare payment and collection machines at all bus stops if off-board fare payment is a requirement to ride on transit buses.

5.5 Olson + Humboldt Avenue

5.5.1 Problem: Sidewalk connectivity, accessibility, and continuity issues.

There are multiple issues with sidewalk connectivity and accessibility at this location. This intersection has a higher volume of pedestrian use due to surrounding land uses, and crash data indicated severe crashes with pedestrians at this location. Safety issues are marked on the map below and existing pedestrian routes and ramps are marked in orange.

i. The sidewalk along the North Frontage Road ends at the intersection and the curb ramp leads into the center of the intersection, rather than to an adjacent sidewalk.

   The median between North Frontage Road and Olson Highway is blocked by lamp posts and street signs and is not wide enough for an accessible pedestrian route, so the only accessible route to the transit stop is this curb ramp.

   No crossing on the Frontage Road or Elwood Avenue is provided to provide a safe, continuous walking path along Olson Highway

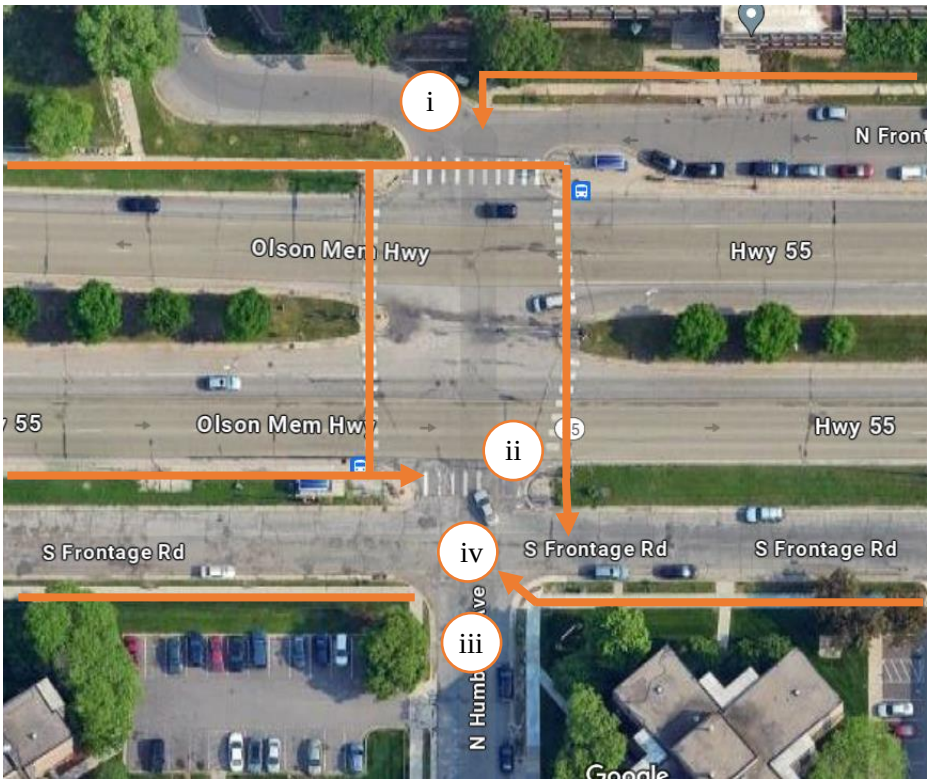

Figure 31 (Above) Map showing issues with sidewalks at Humboldt Ave.

(Right) Curb ramp and sidewalk that leads to the middle of the intersection of N Frontage Rd and Olson Hwy as in Item (i)

ii. Rainwater collects at the pedestrian refuge area on the median of Olson Highway which would compel pedestrians to walk on the road in the intersection.

iii. Sidewalks along the South Frontage Road have missing curb ramps. Curb ramps that are provided do not align with other curb ramps on the median with Olson Highway.

iv. Existing curb ramps are in a state of disrepair and are not easily used.



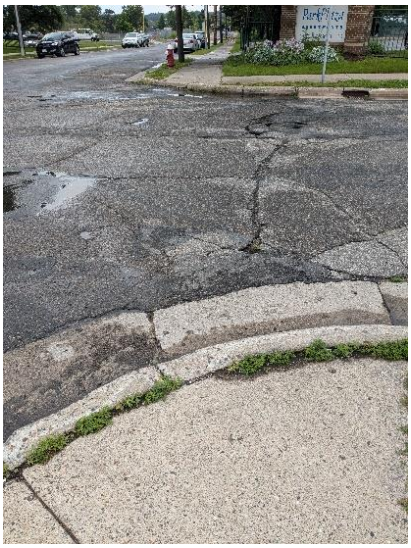

Figure 33 Pictures showing water pooling on the pedestrian crossing (left), broken pavement at curb ramp preventing access (middle), missing curb ramps (right)

Recommendation:

Repair curb ramps where needed with sufficient widths and ADA-compliant infrastructure.

Engineering evaluation is needed to ensure proper drainage on pedestrian walking areas and refuge islands.

Ensure continuous walking path along Olson Highway.

Since there are transit stops at this location, raised pedestrian crossings can be provided on the frontage roads to provide safe access to the stops and reduce vehicle speeds. This will also help provide continuous safe walking route along Olson Highway. If not, speed humps can be provided to ensure vehicles yield to pedestrians crossing the frontage roads.

5.5.2 Problem: Sidewalk blocked by vegetation

Pedestrians and disabled road users may have to walk on the roadway to get around. This is a safety and accessibility issue west of James Avenue.

Recommendation: Trim or maintain vegetation, or work with property owners to keep sidewalks clear if this is on private property.

Figure 34 Blocked sidewalk.

5.6 Olson + Van White Blvd to Olson + Bryant Avenue

5.6.1 Problem: Curb extension results in right most lane of insufficient width

The extension of the curb on the south-east corner of Olson+ Bryant Avenue. did not extend sufficiently to cover the lane completely resulting in a very narrow lane with unclear purpose.

Recommendation: Extend the curb to fully cover the lane if it serves no other purpose. This will shorten crossing distance further.

Figure 35 Very narrow lane due to curb extension that does not cover the whole lane.

5.6.2 Problem: Pedestrian signal button on the south-west side of the intersection of Olson+ Bryant Avenue does not work.

At this location, the green phase for Bryant Avenue is only 15 seconds unless the pedestrian button is activated. Once activated, the green phase is extended to 30 seconds and the pedestrian signal becomes green. If it is not activated the pedestrian signal remains red in all phases, and 15 seconds does not allow sufficient time to cross Olson Highway safely. Unlike other intersections, pedestrian signals do not automatically become green at this location.

Because the button on the south-west corner of the intersection does not work, the pedestrian signal remains red in all phases. If a person chooses to cross even on red, it allows just 15 seconds of time to cross. There is no other way to activate the pedestrian crossing phase unless activated from the other side of the highway. This is a pedestrian and accessibility safety risk.

Recommendation: Repair the pedestrian signal button so that pedestrian crossing phases are available.

This section of the corridor sees higher pedestrian volumes due to denser development and proximity to schools, libraries, churches, and parks. There is no reason to have a permanent pedestrian red signal at this location. Presumably this was done to keep the Bryant Avenue vehicle green phase short at just 15 seconds and maximize green time for Olson Highway, due to low motor vehicle demand on Bryant. However, this comes at the expense of pedestrian safety and accessibility to cross Olson Highway. We recommend a pedestrian green phase with sufficient time to cross Olson Highway that does not require button activation.

5.6.3 No speed limit signs between I-94 and Van White Blvd. Higher vehicle speeds in this section.

After crossing over I-94 at Lyndale Avenue and heading west, no speed limits signs were noted until the intersection with Van White Blvd where a 40mph sign is posted. As per the city of Minneapolis, the speed limit on this section is intended to be 30mph, but no signage was noted in this section that indicated

this speed limit. Drivers coming off the highway do not have any speed guidance for two large blocks with dense development and schools and may assume that highway speeds apply there.

Recommendation: Speed limit signage must be posted earlier on the corridor, closer to the interchange with I-94.

The speed limit should also be reassessed at this location. This is a medium density urban corridor with schools, apartments and other public amenities that sees pedestrian use as well.

We recommend speeds of 25mph in this section of the corridor, which is consistent with Van White Blvd and with Olson Highway/6th Avenue east of I-94. (see general recommendations)

5.6.4 Problem: Crosswalk at Southeast corner of Olson+ Bryant Avenue. is offset from intersection.

After the curb extension was implemented, the crossing was not adjusted to match the new road configuration.

Pedestrians at the crossing may not be visible to vehicles turning right from Bryant Avenue.

Pedestrians may also choose to cross closer to the intersection outside of the marked crossing.

The signal post in the median may reduce accessibility.

Figure 36 Crossing offset from junction.

Recommendation: Align crossings with new curb extension to minimize crossing distance, increase visibility of pedestrians and improve safety and accessibility.

5.6.5 Comment: Service Road between Van White Blvd. and Bryant Avenue.

The Service Road here does not seem to serve any significant purpose besides facilitating access to a parking lot close to Bryant Avenue. While this is not necessarily a road safety issue by itself, the service road creates additional road intersections and unnecessary conflict points very close to both major avenue intersections. Evaluate whether the service road is necessary to meet access needs, or whether alternate safer entry points to the parking lot can be provided along Bryant or Van White Avenues. This will reduce conflict points near the intersection and the space may be better utilized to provide safer pedestrian/bike paths or other public amenities.

5.7 Olson + West Lyndale Avenue

5.7.1 Problem: Unsigned pedestrian crossing signal button at West Lyndale Avenue and Olson Highway

The pedestrian signal button is hard to locate as it is set back from the intersection and does not have signage or markings to indicate its presence. Button may also not be serving any function since it does not have audible alerts, nor affect signal times. This is a pedestrian safety and accessibility issue.

Recommendation: Provide a consistent pedestrian walking environment with functioning and ADA-compliant pedestrian signals and buttons and crossing areas. Signal buttons must be clearly marked and signed.

Figure 37 Pedestrian signal button setback from crossing with missing signage.

5.7.2 Problem: Sidewalk heading north from West Lyndale and Olson ends abruptly near Aldrich Avenue.

Roadway here is 3-4 lanes wide with high vehicle speeds and no safe pedestrian crossing is provided here.

Recommendation: If pedestrian use is expected here, provide a marked and safe crossing across the road with traffic calming and appropriate signage.

If pedestrian use is not expected here, block access to this sidewalk and redirect pedestrians to cross the road at Olson Highway. Ensure that crossing at Olson Highway is safe with adequate pedestrian infrastructure (see above).

Figure 38 Sidewalk ends with no safe crossing facility.

5.7.3 Problem: Faded or missing road markings at multiple locations

Lane markings are faded at this intersection or were not repainted following road maintenance. Pedestrian crosswalk markings are faded and completely missing on the southside crossing across West Lyndale Avenue at Olson Highway.

Recommendation: Refresh road markings and provide marked pedestrian crossings with durable road paint.

Due to the size of the intersection, we recommend extending lane guidance markings into the intersection, especially for turns. Adding highway shield markings on the road is also recommended.

Figure 40 Missing Lane markings and pedestrian crossing.

Figure 39 Obscured visibility of speed limit sign.

5.7.4 Problem: Speed limit sign is obscured by tree branches on Westbound Olson Highway at West Lyndale Avenue.

The sign is not visible to drivers. (Picture above)

Recommendation: Maintain roadside vegetation and ensure signage is visible to all drivers.

Due to width of road at this location, add a second speed limit sign on the median, or overhead.

5.7.5 Problem: curb-ramp leads onto the roadway. High vehicle speeds on road into residential area.

The curb ramp on W Lyndale south of Olson Highway at Lyndale Pl does not lead anywhere except the road. There is no sidewalk on the opposite side, and this is a dangerous location to cross since vehicles turn at speed here.

Recommendation: Do not provide a curb ramp or crossing here. Relocate to a safer location.

Figure 41 Curb ramp onto roadway and high-speed turn into residential area.

Provide traffic calming or rumble strips to warn and slow drivers entering a residential area from the highway interchange.

5.7.6 Problem: Vehicles parked in the right turn slip lane from Olson to W. Lyndale.

Vehicles parked close to the intersection and in the slip lane may lead to rear-end collisions or sudden merging by turning vehicles whose drivers are most likely looking behind them as they merge.

Recommendation: Remove parking here or provide clear road markings to demarcate the travel lane from the parking area. Reinforce travel lane with curb extension.

Figure 42 Vehicles parked in the slip lane.

5.7.7 Traffic light needs update or maintenance on Westbound Olson Highway at W Lyndale Avenue.

Overhead traffic light has faint visibility to drivers in all lanes. See comparison of lights in picture. This is a maintenance issue that can cause road safety problems.

Figure 43 Overhead traffic light not visible compared to post-mounted light.

Recommendation: Replace or repair traffic light with high visibility lights and back plates. Since only one light is provided for all lanes, ensure signal is bright and visible on approach to the intersection from all lanes. If it is an optically programed signal light, ensure that it is visible from all lanes. Providing one traffic light for each through lane has a better safety benefit than a single light for all lanes.

5.8 Olson + East Lyndale Avenue

5.8.1 Problem: Sidewalk on Lyndale Avenue N ends abruptly at exit to Lakeside Avenue.

No safe crossing options are available at this location on the southside of the intersection where East Lyndale transitions to Lakeside Avenue. The road is designed as a highway exit rather than an urban street and this encourages higher vehicle speeds despite a posted speed limit of 30mph.

A similar issue exists on the left side of East Lyndale heading north from the intersection.

Recommendation: Provide transverse rumble strips or other visual cues for drivers to slow down on East Lyndale entering Lakeside Avenue.

Signage indicating pedestrian activity can be provided.

Provide a marked crossing and yield to pedestrian signage at this location if pedestrian use is expected.

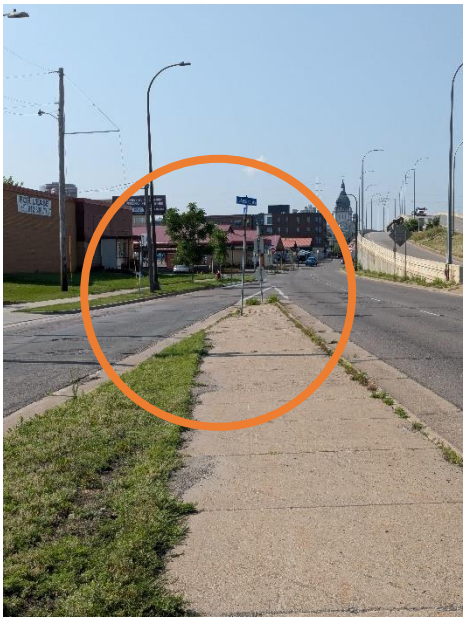

Figure 44 High speed exit design and abrupt end to sidewalk at E Lyndale N and Lakeside Ave.

If pedestrians are not expected to walk along Lyndale on the medians, close off the walkways on both the north and south side and redirect pedestrians to safer sidewalks.

5.8.2 Problem: Pedestrian crossing signal on the south-east corner has activation buttons that are missing.

Signs for this are also in poor condition and in a state of disrepair. This is a pedestrian safety and accessibility issue.

Recommendation: Repair the signal activation buttons and install new signage. Ensure that the position of the post is accessible to all pedestrians and disabled users.

Figure 45 Missing buttons and poor maintenance of pedestrian facility.

5.8.3 Problem: Direction signs do not cover all lanes or provide lane control instructions.

This problem is noted at both approaches to this intersection. This can cause driver confusion resulting in rapid, high-speed merging.

(i) On the south approach from **E Lyndale** Avenue. There are 4 lanes at this location- one left turn only lane, one left and through lane, one through lane, and one right and through turn lane.
The signs however only indicate 3 lanes and do not indicate that the left most lane is a turn only lane, nor do they indicate that the right most lane is a turn or through lane.

(ii) On the east approach from **6th Avenue/Olson Highway**. The left-most lane is used to turn both onto Lyndale Ave. heading south as well as to the on-ramp for I-94. Both these roads diverge at the intersection. However, the sign does not make it clear that these are both left turns leading in different directions.

(iii) Similar issues are noted on **W. Lyndale** Ave headed East on Olson Highway. Drivers heading to I-94 East are expected to make a turn at the intersection after the slip lane, but no such guidance is provided. Right lane is not marked as a turn only lane. No signage is given for through traffic lanes. No indication provided that I-94 West is a left turn ahead.

Recommendation: Provide appropriate signage indicating appropriate use for each lane. This will prevent driver confusion and rapid merging or lane changes that lead to collisions. Having signage indicating use for each lane on the approach has a better safety benefit.

Figure 46 Map indicating locations of issues labelled i, ii and iii

Figure 47 Above: (i) Approach from E Lyndale N Ave
Below: (ii) Approach from Olson Hwy/6th Ave
Bottom: (iii) Approach from Olson Hwy from the west

i. On the approach from Lyndale Avenue. provide signage indicating that left-most lane is a turn-only lane.

ii. On the approach from Olson Highway/6th Avenue. provide signage indicating left-most lane is a left turn-only lane.

Figure 48 (right):

Example of type of directional signage used on W Lyndale that may be suited for use on Olson. Sign can be used to indicate two left turns - one to I-94 and one to Southbound Lyndale Avenue, instead of the current sign which uses only one arrow.

Provide additional signage and missing road arrow markings after the intersection with E Lyndale and Olson Highway to indicate the correct lane and left turn to the I-94 entrance ramp. Direction signs such as in Fig. 47 may be more appropriate.

iii. On the eastward approach from Olson Highway to W Lyndale, indicate right turn lane is a turn only lane. Indicate highway entrance is a right turn after the slip lane.

Signs should indicate through traffic lanes.

Signs for left most lane should indicate left turn ahead for entrance to I94 West.

5.8.4 Problem: No speed limit guidance on approaches to the intersection

The speed limit on Eastbound Olson Highway is 25pmh and on Northbound E Lyndale Avenue is 30mph. However, there is no signage indicating this on the approaches to the intersection. The intersection is currently designed for a higher speed environment.

Recommendation: Reiterate speed limits with additional signage on the approaches. Since speed and turn conflicts are the cause of crashes at this location, consider implementing the lower speed limit on all approaches. (see general recommendations)

5.8.5 Problem: Crosswalk markings are faded and not visible

Pedestrian crossing markings are essential to demarcate safe crossing locations for all road users.

Recommendation: Re-paint Road markings with high-quality, durable paint.

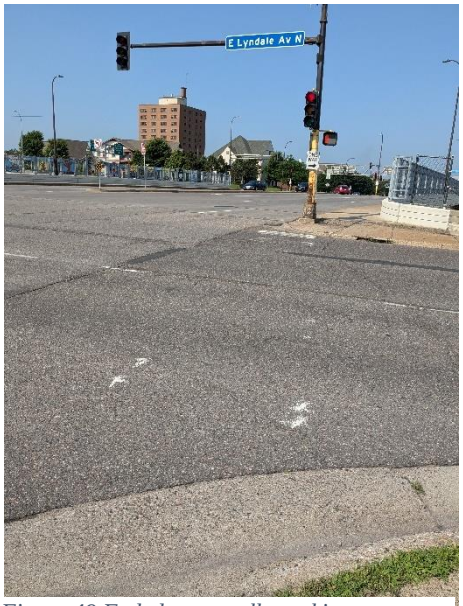

Figure 49 Faded crosswalk marking.

5.9 Olson + Oak Lake Avenue

5.9.1 Problem: Traffic lights may not be visible and clear to drivers approaching the intersection of Oak Lake Avenue and Olson Highway from the north.

There are multiple issues contributing to this problem:

(i) There is no overhead traffic light in this direction.
(ii) The signal on the far side of the junction is low and over 160 ft away.
(iii) A median signal is obstructed by the position of the turn-only lane signage on approach.

Figure 50 Driver view on approach to the intersection showing view of signals. Signal on the right has obstructed visibility.

Recommendation: An overhead traffic signal is recommended on this arm of the intersection, as has been provided for the other arms of the intersection.

The median signal should not be obstructed by other signage.

A near-side signal is suggested.

5.9.2 Problem: Missing markings and signage for bike lane at intersection with Oak Lake Avenue.

Previously implemented green bike lane markings have faded away and no signage is provided to warn motorists or cyclists that right turning vehicles are merging with the bike lane at this location.

Figure 51 Missing marking and signage for through bike lane.

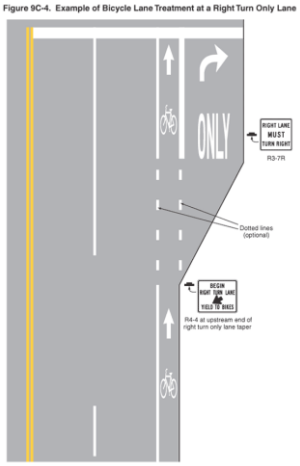

Figure 52 Example of road markings and signs required when right turn lanes and provided adjacent to through bike lanes.

Recommendation: Bicycle symbol and word markings on the roadway should be used to define the bike lane and designate that portion of the road for bicycle use. Additional signage may be used if necessary.

Road signs should indicate the start of the transition zone and right turn lane. These can include “Begin right turn lane”, or “Yield to bikes” or “Right Lane must turn right” signage.

Green pavement paint should be re-done where faded.

Add physical protection for bike lanes where possible, particularly on major bicycle corridors.

5.9.3 Problem: Bike lane ends at the intersection

The bike lane entering Olson Highway at Oak Lake Avenue. ends there and no further connection to bike infrastructure was noted. Road markings are not present on the opposite side of the intersection, and it is not clear where bicyclists are expected to go after they enter the intersection. Bicyclists entering Olson Highway at this location will be unprotected and riding in traffic.

Recommendation: Extend bike lane markings through the intersection to demarcate space for bicyclists to traverse the intersection safely.

Bike lanes should connect to a network of bike infrastructure. Evaluate options to connect this bike lane to current or planned bike infrastructure.

5.9.4 Problem: Yellow line extension marking into the intersection is incorrect and leads into construction zone.

Due to ongoing construction at this site, the intersection geometry has changed. Previously existing intersection guide markings are incorrect. The yellow line extension leads into the construction zone and can provide false direction to motorists coming from the north.

Recommendation: Remove existing yellow line extension and repaint correctly for duration of construction activity.

Ensure correct turn guidance is provided after construction is complete.

Add line extension for bike lane.

Figure 53 Incorrect yellow line extension marking.

5.9.5 Problem: Unclear road use on Border Avenue and Lakeside Avenue.

No lane markings are provided, nor yellow dividers indicating where drivers should go. Signage on Border Avenue and Lakeside Avenue indicate that these are intended to be one-way roads, however in reality motorists use the road in both directions including heavy vehicles. Faded lines indicate that parking is allowed on Border Avenue, but this is used as a travel lane since no vehicles were parked there at the time of inspection.

Recommendation: Renew faded road markings. Provide clear guidance on detours or changes to one-way configuration if any for duration of construction activity. Mark parking areas clearly.

Figure 54 Faded parking and road markings.

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