Central Entrance Vision Plan

Duluth-Superior Metropolitan Interstate Council

November 2021 **- DRAFT**

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Released for public review 11/22/2021

To view this plan online and for information about its development, please visit:
https://dsmic.org/centralentrance/

Prepared for the Duluth-Superior Metropolitan Interstate Council

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Duluth and Superior urban area communities cooperating in planning and development through a joint venture of the Arrowhead Regional Development Commission and the Northwest Regional Planning Commission

The work activities described within are supported by funding from the Federal Highway Administration, the Federal Transit Administration, the Minnesota and Wisconsin Departments of Transportation, the Arrowhead Regional Development Commission and the Northwest Regional Planning Commission. The contents of this document reflect the views of the authors who are responsible for the facts or accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the U.S. Department of Transportation, the Minnesota Department of Transportation or the Wisconsin Department of Transportation. The report does not constitute a standard, specification, or regulation.

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MIC Policy Board, Transportation Advisory Committee, and Staff – Nov. 2021

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Appendices

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Executive Summary

Introduction

The Duluth-Superior Metropolitan Interstate Council (MIC), in cooperation with the Minnesota Department of Transportation (MnDOT), Duluth Transit Authority (DTA), St. Louis County, and the City of Duluth, have completed the Central Entrance Vision Plan to advance a vision for future improvements to Central Entrance (Trunk Highway 194) from Mesaba Avenue to Trinity Road in Duluth. Although the corridor has been studied for decades and recommendations have been identified, few improvements have been implemented. This latest planning process presents an opportunity to develop a plan that can be embraced by the stakeholder agencies, businesses, residents, and corridor users for near term improvements that are anticipated to be constructed in the next five years.

MnDOT has scheduled a full reconstruction of Central Entrance from Mesaba Avenue to Trinity Road in 2026. This Plan sets the overall corridor vision for a walkable, bikeable, transit-oriented urban thoroughfare and provides direction for MnDOT's upcoming preliminary design and public involvement processes. This executive summary provides a brief overview of the planning process and recommendations. More details are available in the full plan document.

Planning Process Goals

The primary goals of the Central Entrance Vision Plan are as follows:

Advance the vision for a walkable, bikeable and transit-oriented thoroughfare which will create an attractive destination that:

1) is safe and comfortable for both motorized and nonmotorized users, and
2) encourages new types of residential and commercial development.

Plan Partners

The Central Entrance Vision Plan was led by the MIC, in cooperation with partner agencies who served on a project Steering Committee. The Steering Committee included representatives from the following agencies:

- MIC
- MnDOT District 1
- DTA
- St. Louis County
- City of Duluth

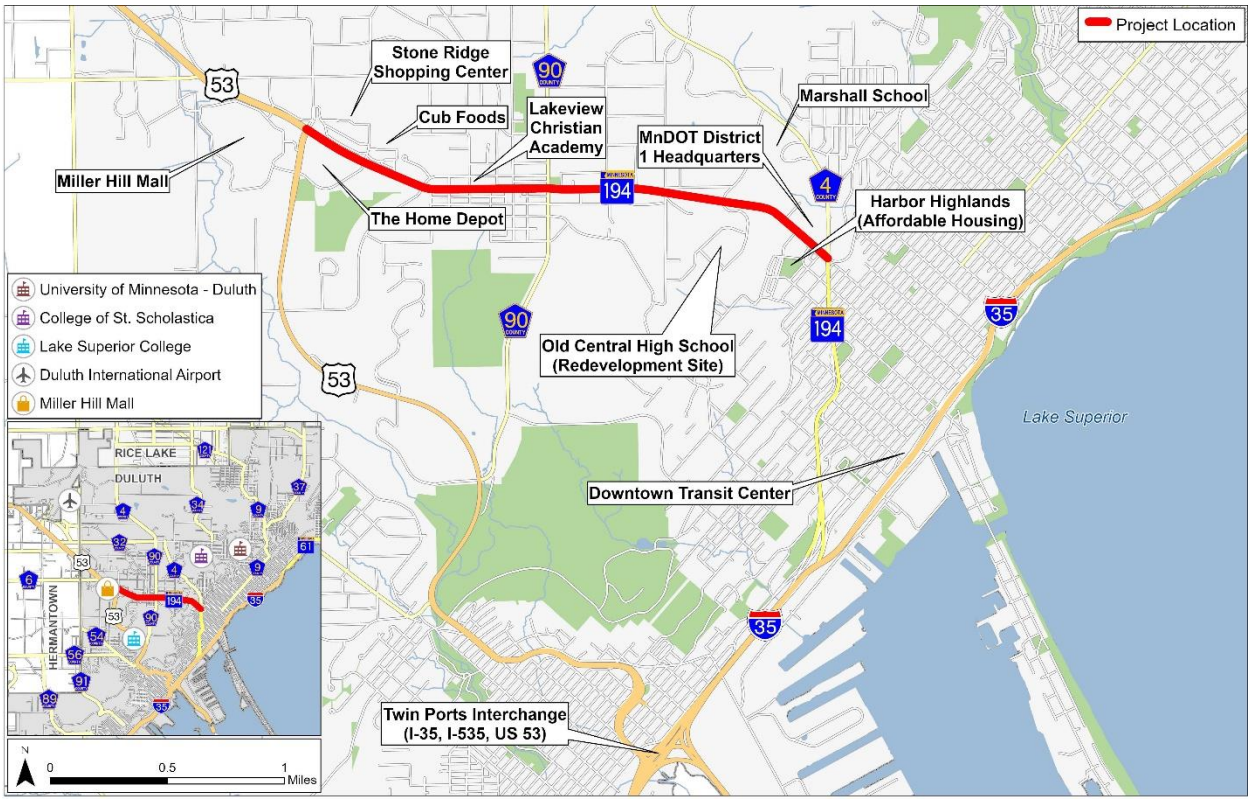
Existing Conditions

Central Entrance is an arterial roadway that has historically served automobile traffic and has encouraged vehicle throughput and drive-by land uses. The corridor has poor pedestrian and bicycle infrastructure, multiple (and large) driveway accesses that create conflicts between vehicles and nonmotorized users, and legacy bus stops that lack adequate accessibility and amenities. Coupling these

challenges with high vehicle speeds makes the corridor an uncomfortable place to walk or bike, and discourages development and redevelopment along the corridor.

At the same time, Central Entrance plays a vital role in Duluth's roadway network due to local topography. Along with US 53 and West Arrowhead Road, it is one of the few direct routes connecting the city's largest commercial area to downtown Duluth and neighborhoods along Lake Superior. Because of its role in the overall roadway network, Central Entrance is an important connecting corridor for all modes of transportation.

Central Entrance Corridor Location

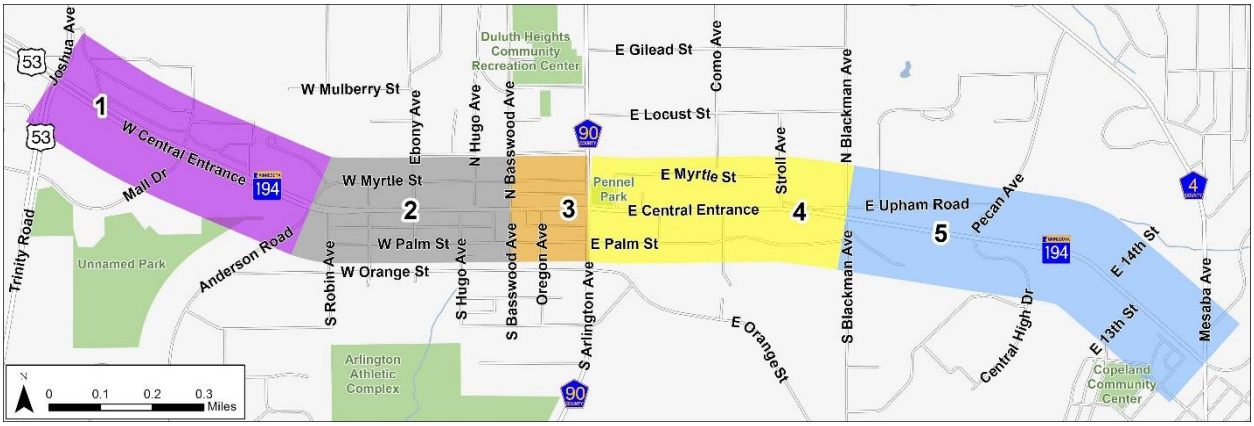


For the purposes of this Plan, Central Entrance was divided into five zones that roughly align with the surrounding land uses and roadway context. The five zones used in this Plan are as follows:

- Zone 1: Trinity Road to Anderson Road
- Zone 2: Anderson Road to Basswood Avenue
- Zone 3: Basswood Avenue to Arlington Avenue (County State Aid Highway [CSAH] 90)
- Zone 4: Arlington Avenue (CSAH 90) to Blackman Avenue
- Zone 5: Blackman Avenue to Mesaba Avenue (CSAH 4)

These zones are shown in the figure below and are referenced throughout this Plan.

Central Entrance Corridor Zones



Public Engagement

Multiple community events were conducted to kick off the engagement process and build a foundation for the Central Entrance community vision. Due to the global pandemic and evolving guidelines, the engagement team provided multiple learning and feedback avenues. Throughout, we learned from the community's lived experiences and identified their wants, needs, and aspirations for the corridor. All events and feedback opportunities were publicized on the MIC website and social media channels, and distributed through the MIC, partner agency, and community database contact lists. Engagement activities included:

- Multiple online surveys and mapping activities
- "Better Central Entrance" in-person engagement event
- Facilitated virtual workshops with participatory mapping activities
- Community Advisory Committee meetings
- Targeted outreach to businesses

Common and focused themes emerged from engagement activities to create and focus the community's vision. These themes centered on **traffic, biking, walking, safety, and corridor aesthetics**. All information and feedback gathered during the engagement process informed the vision developed for the corridor.

Corridor Vision

The future vision for Central Entrance developed through this planning process sets the overall direction for the development of this roadway as a multimodal corridor that supports and encourages new types of development. The vision includes several components: project goals and recommendations based on a set of guiding values, recommended concepts for future engineering analysis, and land use scenarios to explore the potential development that could be prompted by improvements in the corridor. This Plan does not present a single recommended concept for the entire corridor. Instead it provides a set of concepts and design elements that can be combined based on further evaluation to realize the overall vision.

Recommendations

Based on the planning process goals and input provided through public engagement opportunities, a set of guiding values was developed to describe the high-level vision for the future of Central Entrance:

> **Safe & equitable multimodal transportation system:** Central Entrance will be a safe, accessible, and comfortable street for all people, making walking, biking and transit viable and an easy choice while moving people and goods in cars, trucks, and buses safely and efficiently.
>
> **Healthy, walkable community:** Central Entrance will support denser, connected, and transit-oriented land use patterns and multimodal travel year-round.
>
> **Thriving local business community:** Central Entrance will meet the needs of new and existing businesses by providing reasonable access and creating opportunities for new types of development and redevelopment.
>
> **Sustainable and resilient corridor:** Central Entrance improvements will address long-term infrastructure needs and create opportunities for green infrastructure.
>
> **A vibrant gateway to Duluth:** Central Entrance will be an attractive corridor that welcomes visitors and residents alike to the City of Duluth and the Central Entrance business district by establishing a sense of place.

Project goals and recommendations were developed for each guiding value to address the issues and concerns discussed during the Steering Committee and public engagement processes. These are meant to supplement the recommended concepts and provide additional guidance for the project as it progresses towards design and additional public engagement.

Guiding Value	Recommendations
Safe & equitable multimodal transportation system	**Goal A: Implement a design that supports the role of Central Entrance as a key link in the roadway network between downtown Duluth and the Miller Hill commercial area.** A.1) Evaluate 3- and 4-lane section and one-way pair concepts for implementation in Zones 2-4. A.2) Evaluate the need for construction of turn lanes at intersections throughout the corridor. A.3) Apply context-sensitive street design elements, including exploration of opportunities such as narrowing travel lanes (11 feet shown in recommended concepts). A.4) At a minimum, evaluate the construction of roundabouts at the intersections of Central Entrance and the following cross streets (see figure below): • Anderson Road • Arlington Avenue (CSAH 90) • Pecan Avenue

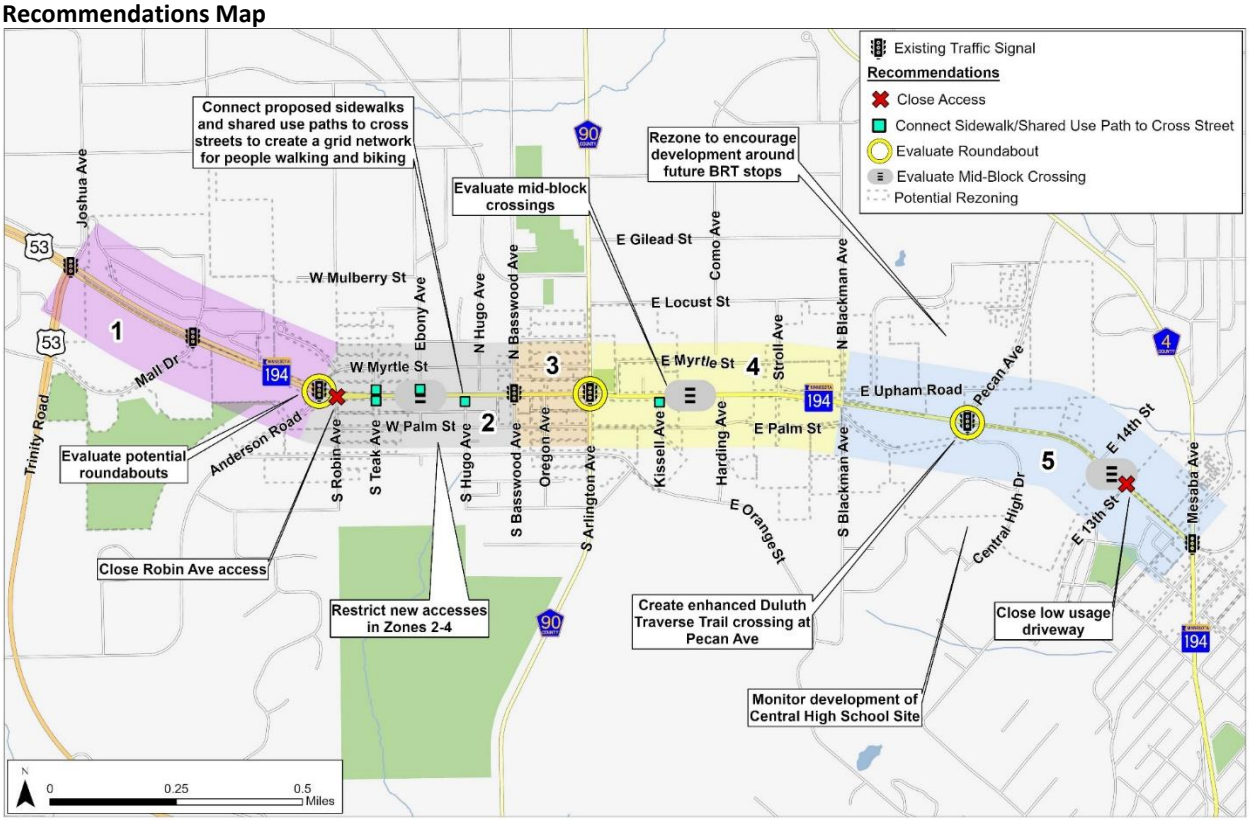
Guiding Value	Recommendations
	Goal B: Create a corridor that supports existing transit service and is ready for potential bus rapid transit (BRT) service. B.1) Avoid using bus pull-out lanes to reduce delays associated with buses re-entering traffic. B.2) Ensure that pedestrian access is provided to all transit stops in the corridor. B.3) Coordinate with the Duluth Transit Authority during design to ensure it supports BRT operations on Central Entrance. B.4) Update the Central Entrance-Miller Hill Small Area Plan to implement this study and the Better Bus Blueprint for Routes 102 and 112. *See also: Goal A recommendations*
	Goal C: Improve the ability to walk and bike along and across Central Entrance. C.1) At a minimum, provide pedestrian facilities along both sides of Central Entrance and a bicycle facility along at least one side, as recommended in MnDOT's Pedestrian and Bicycle Recommendations Report. C.2) Consider mid-block crossings with appropriate markings and warning technology, such as advanced stop bars, high-visibility crosswalk markings, raised tables, Pedestrian Hybrid Beacons (PHBs) or Rectangular Rapid Flashing Beacons (RRFBs) in the vicinity of the following locations (see figure below): • Ebony Avenue • Kissell Avenue or Harding Avenue • East 14th Street or East 13th Street C.3) Provide Americans with Disabilities Act (ADA)-compliant pedestrian infrastructure throughout the corridor with connections to adjacent destinations. C.4) Create an enhanced bicycle crossing for the Duluth Traverse Trail at Pecan Avenue (see figure below). C.5) Connect new nonmotorized facilities along Central Entrance to the following cross streets with pedestrian and/or bicycle facilities as appropriate to enhance the nonmotorized transportation network and improve neighborhood access to transit stops (see figure below): • Teak Avenue • Ebony Avenue • Hugo Avenue • Kissell Avenue
	Goal D: Create a safe and comfortable corridor for all users, with a target of zero traffic injuries or deaths. D.1) Construct boulevards between vehicle travel lanes and nonmotorized facilities to provide physical separation from traffic to support users of all ages and abilities, as supported by MnDOT's Statewide Pedestrian System Plan. *(Note: see Action Item IP-12, "Seek opportunities to provide wide vegetated buffers between people walking and vehicle traffic")*

Guiding Value	Recommendations
	D.2) Include pedestrian safety countermeasures at signalized intersections in the corridor, including, but not limited to, curb bump outs, Leading Pedestrian Intervals (LPIs), advanced stop bars, and raised crosswalks.
Healthy, walkable community	**Goal E: Create a walkable land use pattern; reward the short trip.** E.1) Implement nodal-based zoning along the corridor to allow for mixed-used transit-oriented development patterns for Route 102 BRT. E.2) Consider a creating hybrid MU-C zone that does not allow for the "vehicle related," "building materials sales," "garden material sales," and large retail store uses. E.3) Rezone the nodes within 1/4 mile from the Route 102 BRT stops to MU-C or a hybrid MU-C (see figure below). E.4) Monitor the redevelopment of the former Central High School site and update this plan, the Better Bus Blueprint, and the Central Entrance-Miller Hill Small Area Plan accordingly (see figure below). E.5) As redevelopment occurs, consider encouraging the following design guidelines: • Site designs with reduced setbacks that place buildings closer to the roadway • Site designs that relocate parking to the back of buildings (away from the street) rather than adjacent to the street • Connectivity standards (e.g. street connectivity index or link-to-node ratio, maximum block lengths (400-600 ft)) and bonuses for pedestrian and trail connections between streets or the end of cul-de-sacs to ensure a more walkable development pattern, disperse vehicle travel, and increase emergency response time
	Goal F: Create a year-round multimodal corridor. F.1) Work with City of Duluth and DTA staff to craft a model maintenance agreement that provides for winter snow removal and clearing of leaves, brush, and other debris during the remainder of the year. *(Note: see MnDOT Statewide Pedestrian System Plan Action Items M-1, "Design to support effective maintenance," M-2 "Explore options for how MnDOT can help local agencies take the lead on maintenance work," and M-3, "Clarify MnDOT's policies to reflect the expectation of year-round maintenance of pedestrian facilities")* F.2) Add Central Entrance to the City of Duluth's winter sidewalk and pathway priority network for clearing pedestrian and bicycle facilities to ensure that the best access is provided to all people, regardless of mode choice. F.3) Construct boulevards wherever possible to provide snow storage and keep nonmotorized facilities clear of snow and ice. *See also: Goal C recommendations*

Guiding Value	Recommendations
Thriving local business community	**Goal G: Maintain reasonable access for businesses along the corridor.** G.1) Develop an access management policy, as recommended in the Central Entrance Corridor Study. G.2) As redevelopment occurs, encourage site designs that limit curb cuts on Central Entrance, where possible, through requiring shared driveways and only allow "right-in, right-out" driveways where necessary as recommended in the Central Entrance-Miller Hill Small Area Plan. G.3) Establish driveway guidelines that address driveway width and other design features to slow turning vehicles and limit pedestrian exposure. G.4) As recommended in the Central Entrance Corridor Study, do not allow any new accesses on Central Entrance in Zones 2-4. G.5) Consider removing access to Central Entrance at the following locations (see figure below): • Robin Avenue • MnDOT driveway at East 13th Street
	Goal H: Identify and increase opportunities to enhance the public realm for outdoor dining, sitting, and access to green space to support businesses in the corridor. H.1) Encourage public realm development through plazas, pocket parks, or additions to the sidewalks with café zones through opportunities such as public-private partnerships. *See also: Goal E recommendations*
Sustainable and resilient corridor	**Goal I: Address long-term infrastructure needs in the corridor.** I.1) Replace aging infrastructure through full reconstruction of Central Entrance from Trinity Road to Mesaba Avenue.
	Goal J: Prioritize opportunities to incorporate green infrastructure and street trees into the design to support stormwater management and mitigate climate change. J.1) Evaluate the potential for construction of stormwater best management practices (BMPs) in boulevard and median spaces. J.2) Work with the City of Duluth Forestry Department to identify appropriate tree locations and species for inclusion in the final design. *(Note: see MnDOT Statewide Pedestrian System Plan Action Item IP-13, "Prioritize street trees as critical pedestrian infrastructure for adapting to climate change")* *See also: Recommendation D.1*
A vibrant gateway to Duluth	**Goal K: Create an aesthetically pleasing corridor that supports placemaking and establishes a sense of place.** K.1) Work with the City of Duluth to design and construct gateway features in Zones 1 and 5 that welcome visitors to the Central Entrance business district and the City of Duluth, as discussed in the Central Entrance Corridor Study. K.2) Develop a streetscape plan to create a cohesive feel for the corridor, as recommended in the Central Entrance Corridor Study.

Guiding Value	Recommendations
	K.3) Identify opportunities to enhance sense of place, particularly in Zones 2-3, through the inclusion of streetscape elements such as benches, planter boxes, and native plantings.

Recommendations Map



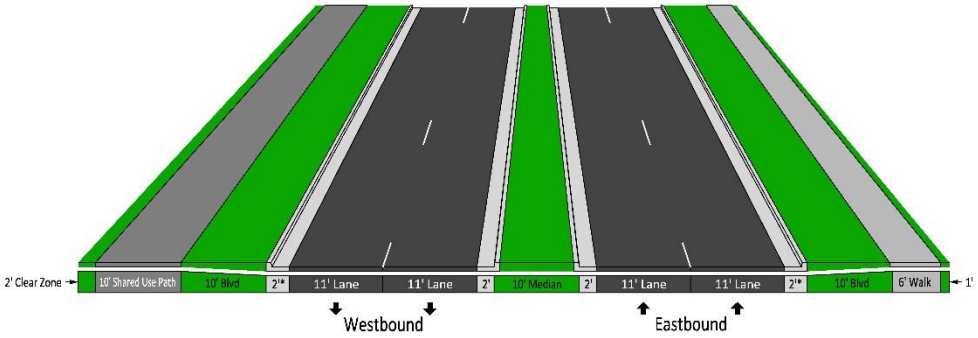
Recommended Concepts for Future Study

The concepts developed as part of this Plan are intended to be at a planning level, and will require further study and engineering analysis before moving forward. Final designs considered for construction may or may not match these initial concepts or could be assembled from a combination of these concepts, depending on the results of more detailed future analyses. The concepts here are intended as a general guide.

Based on land use context, existing right of way, and other characteristics, the study area zones were placed into two groups for the purposes of concept development. Concepts are presented first for Zones 1 and 5, then for Zones 2-4.

<u>Zones 1 and 5</u>

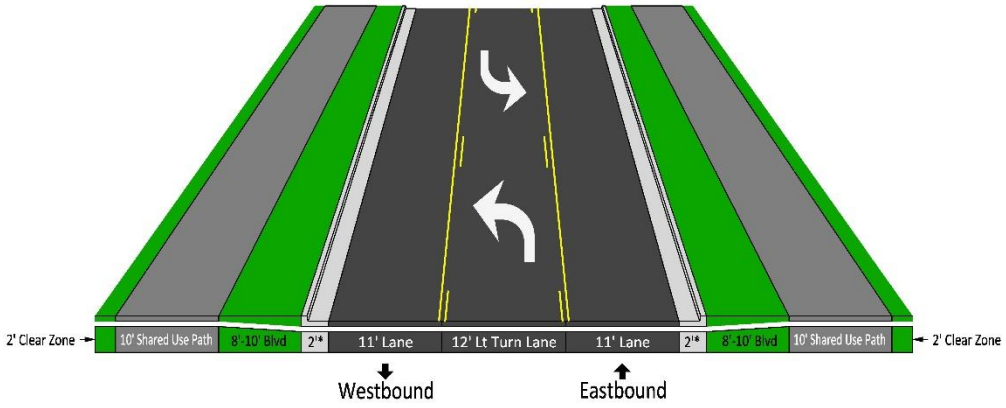
Because of their similarities, a single concept was developed to illustrate the overall vision for Zones 1 and 5. The specific roadway design that is ultimately implemented will vary based on conditions along the corridor.



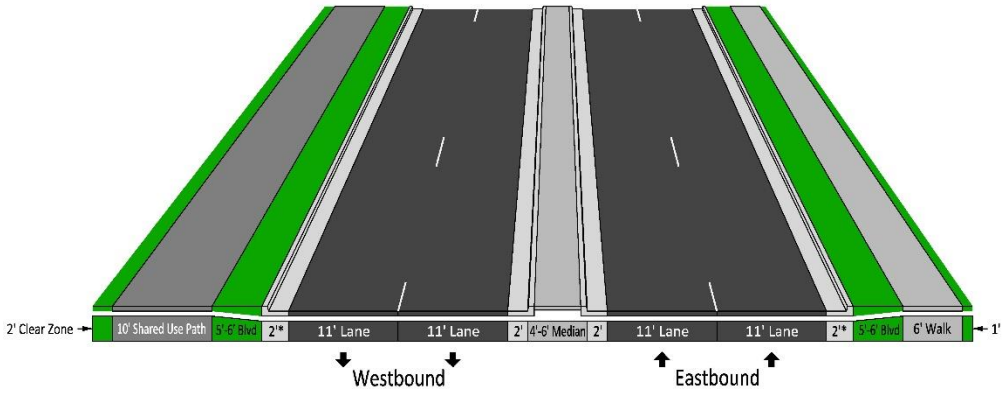
Zones 1 and 5 Recommended Concept

Zones 2-4

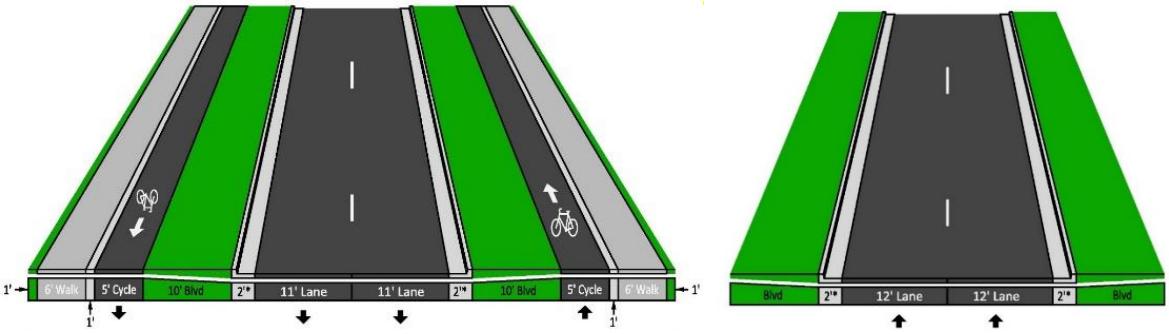
The concepts developed for Zones 2-4 include options for attempting to meet project goals using only the available space and options that would require MnDOT to purchase additional right of way. Three potential concepts for these zones are shown on the following pages.



Zones 2-4: Three-Lane Concept



Zones 2-4: Four-Lane Concept



Zones 2-4: One-way Pair Concept with Central Entrance (left) and Palm Street (right)

In addition to the concepts, a variety of other design elements were discussed with the Steering Committee and the public. These include a wide range of safety, aesthetic, and streetscape features that could apply to multiple concepts and address issues related to all modes of transportation on Central Entrance, including several Federal Highway Administration (FHWA) Proven Safety Countermeasures. These elements should be incorporated into the final design for all zones where effective and viable to advance the overall project goals. They include:

- Boulevards
- Center Median and Pedestrian Refuge Islands
- Shared Use Path
- Sidewalk
- Raised Crosswalk
- Leading Pedestrian Interval
- Pedestrian Hybrid Beacon (PHB)
- Roundabouts
- Turn Lanes
- Street Trees
- Sidewalk/Shared Use Path Lighting
- Green Stormwater Infrastructure

Land Use Scenario

The project team conducted a land use scenario analysis to complement the development of roadway concepts. Based on discussions with the Steering Committee, the land use scenarios focused on the potential for transit-oriented development around anticipated DTA "pre-BRT" stops. With changes to zoning around future stops, there is the potential to create 825 residential units and 292,000 square feet of retail space valued at roughly $161 million over the next 25 years.

Next Steps

The purpose of the Central Entrance Vision Plan was to establish a cohesive vision for the Central Entrance corridor. As MnDOT moves into the pre-design process, additional analysis and public involvement will be necessary to refine the vision established in this Plan. The concepts developed as part of this Plan are high-level, and will require further study and engineering analysis before moving forward. Project design and engineering are anticipated to take place between 2022 and 2025, with construction in 2026. This schedule may change based on funding opportunities, engineering analysis, or other factors.

1 Introduction

The Duluth-Superior Metropolitan Interstate Council (MIC), in cooperation with the Minnesota Department of Transportation (MnDOT), Duluth Transit Authority (DTA), St. Louis County, and the City of Duluth, have completed the Central Entrance Vision Plan to advance a vision for future improvements to Central Entrance (Trunk Highway 194) from Mesaba Avenue to Trinity Road in Duluth.

Central Entrance is an arterial roadway that has historically served automobile traffic and has encouraged vehicle throughput and drive-by land uses. The corridor has poor pedestrian and bicycle infrastructure, multiple (and large) driveway accesses that create conflicts between vehicles and nonmotorized users, and legacy bus stops that lack adequate accessibility and amenities. Coupling these challenges with high vehicle speeds makes the corridor an uncomfortable place to walk or bike, and discourages development and redevelopment along the corridor.

At the same time, Central Entrance plays a vital role in Duluth's roadway network due to local topography. Along with US 53 and West Arrowhead Road, it is one of the few direct routes connecting the city's largest commercial area to downtown Duluth and neighborhoods along Lake Superior. Although the corridor has been studied for decades and recommendations have been identified, few improvements have been implemented. This latest planning process presents an opportunity to develop a plan that can be embraced by the stakeholder agencies, businesses, residents, and corridor users for near term improvements that are anticipated to be constructed in the next five years.

MnDOT has scheduled a full reconstruction of Central Entrance from Mesaba Avenue to Trinity Road in 2026. This Plan sets the overall corridor vision for a walkable, bikeable, transit-oriented urban thoroughfare and provides direction for MnDOT's upcoming preliminary design and public involvement processes.

2 Planning Process Goals

The primary goals of the Central Entrance Vision Plan are as follows:

Advance the vision for a walkable, bikeable and transit-oriented thoroughfare which will create an attractive destination that:

1) is safe and comfortable for both motorized and nonmotorized users, and
2) encourages new types of residential and commercial development.

3 Plan Partners

The Central Entrance Vision Plan was led by the MIC, in cooperation with partner agencies who served on a project Steering Committee. Steering Committee meeting summaries are included in **Appendix A**. The Steering Committee included representatives from the following agencies:

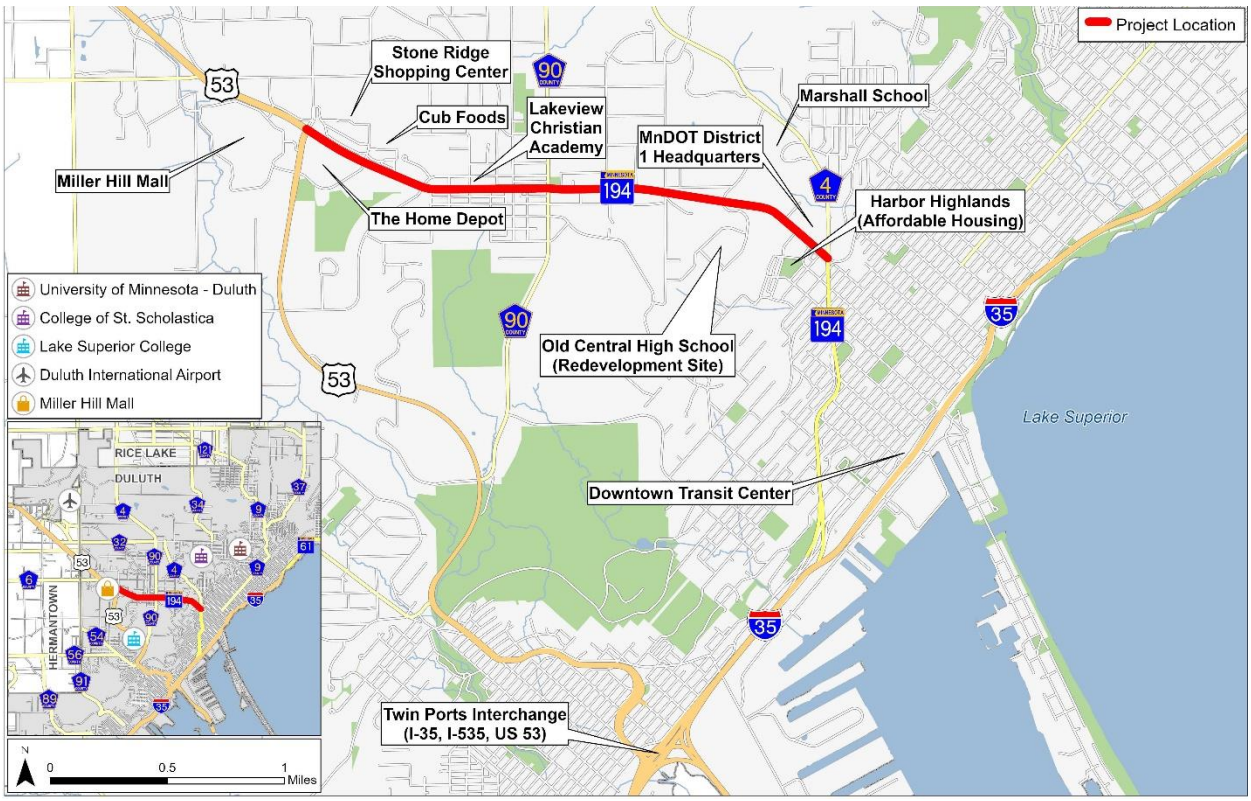
- MIC
- MnDOT District 1
- DTA
- St. Louis County
- City of Duluth

4 Existing Conditions

4.1 Corridor Location

Central Entrance plays a vital role in Duluth's roadway network. Along with US 53 and West Arrowhead Road, it is one of the few direct routes connecting the city's largest commercial area to downtown Duluth and neighborhoods along Lake Superior (**Figure 1**). There are several schools located on or near Central Entrance. The MnDOT District 1 offices are located along the corridor near its southern terminus. There are several residential areas just beyond the corridor as well as affordable housing along and near the corridor. In addition, the former Duluth Central High School site (located south of Central Entrance and east of Blackman Avenue), is anticipated to be redeveloped into a mix of residential and office uses. Because of its role in the overall roadway network, Central Entrance is an important connecting corridor for all modes of transportation. The sections that follow provide additional details on existing conditions.

Figure 1 - Central Entrance Corridor Location



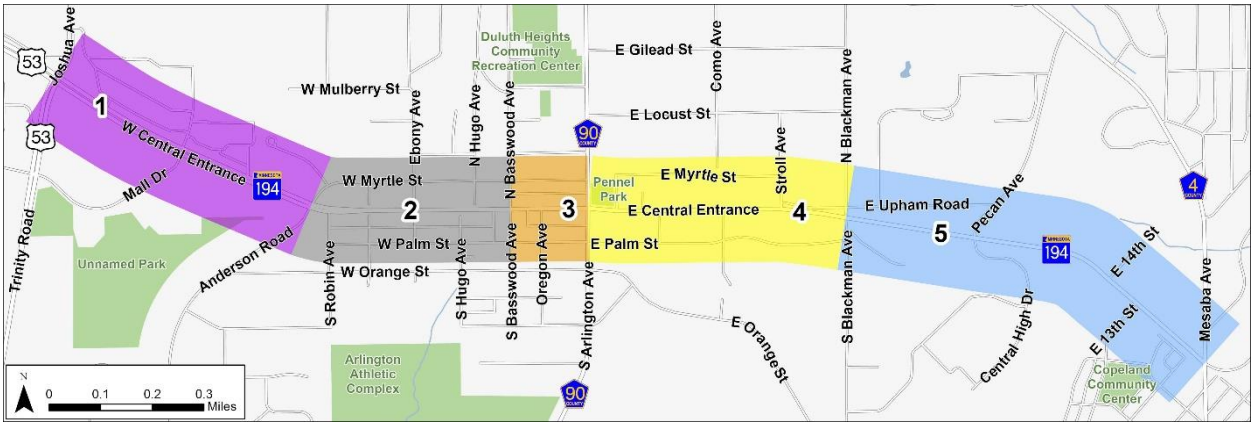
4.2 Identification of Zones

The Central Entrance Corridor Study (2012) divided the roadway into several segments for analysis. For the purposes of this Plan, the zone segments originally proposed were adjusted to align with surrounding land uses and roadway context more closely. The five zones used in this Plan are as follows:

- Zone 1: Trinity Road to Anderson Road
- Zone 2: Anderson Road to Basswood Avenue
- Zone 3: Basswood Avenue to Arlington Avenue (County State Aid Highway [CSAH] 90)
- Zone 4: Arlington Avenue (CSAH 90) to Blackman Avenue
- Zone 5: Blackman Avenue to Mesaba Avenue (CSAH 4)

These zones are shown in **Figure 2** and are referenced throughout this Plan.

Figure 2 - Central Entrance Corridor Zones

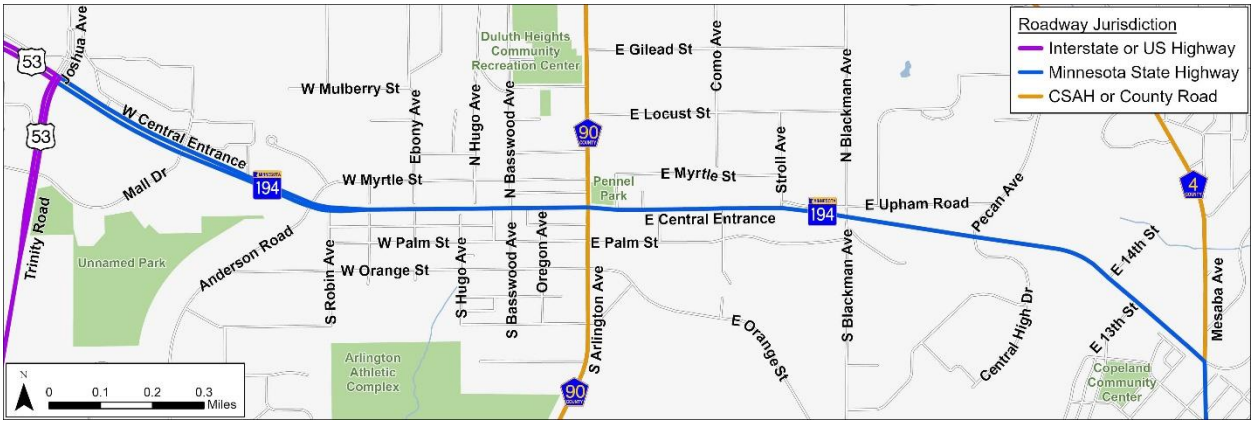


4.3 Roadway Jurisdiction and Functional Classification

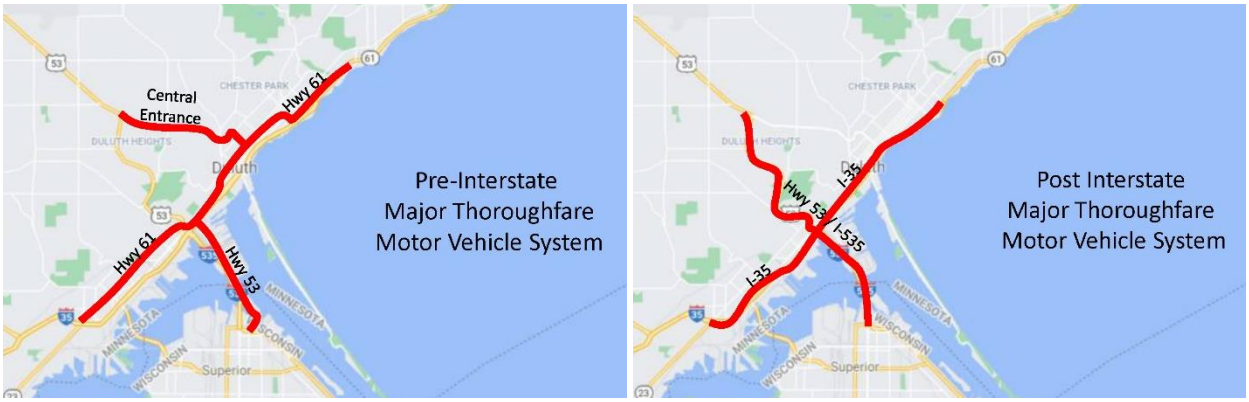
The portion of Central Entrance under consideration is a non-interstate, principal arterial route. As described in the MIC's 2045 Long Range Transportation Plan, principal arterial roadways are intended to primarily serve a mobility function with minimal land access. Arterials generally serve the movement of people and goods for extended distances. Principal arterials are typically high capacity, higher speed roadways with restricted access. However, these attributes can vary in more urbanized areas and rural centers. Central Entrance currently has many more access points than would be expected on a typical arterial roadway. This causes challenges for vehicle mobility and creates numerous conflict points between people walking and biking and cars.

As a trunk highway route, Central Entrance falls under the jurisdiction of MnDOT, as does US 53 at the west end of the project area (**Figure 3**). St. Louis County is responsible for Arlington Ave (CSAH 90) and Mesaba Ave (CSAH 4) north of Central Entrance. The remaining roadways that intersect with Central Entrance are local streets.

Figure 3 - Existing Roadway Jurisdiction



Central Entrance's role has changed since the development of the Interstate system in Duluth. However, it is important to note that Central Entrance does continue to serve as a direct connection between two urban places within the Duluth area, the primary commercial area around the Miller Hill Mall and the central urban core, which includes the Downtown and medical campuses. With that said, the need and role for Central Entrance to serve as a primary high-capacity, urban thoroughfare has been reduced. Central Entrance no longer has as direct a connection between the major thoroughfares as it once did. Prior to the development of I-35, Central Entrance with a linkage to 6th Avenue E provided a direct connection to 2nd and 3rd Streets in Duluth. These one-way pairs served as the high capacity and efficient traffic movement routes running east-west across the densely populated neighborhoods of Duluth with connections on both ends to US 61, which was the primary route connecting Duluth to the Twin Cities and up the North Shore.



Pre- and post-Interstate major thoroughfare motor vehicle systems in Duluth

Once I-35 was built, Central Entrance was no longer the primary connection to this east-west thoroughfare, and in turn has a reduced role of carrying motor vehicle traffic flows longer distances between urban centers. The primary high-capacity thoroughfare system has shifted to I-35 and US 53. Major regional transportation investments have and continue to be made to improve the function and level of service of this high capacity, limited access, regional throughway system. The backbone of the motor vehicle transportation system in the Duluth-Superior area includes I-35, the Blatnik Bridge

(currently planned for major reconstruction), I-535, Piedmont/Trinity Avenues/US 53 (which had major reconstruction and expansion in the early 2000s), and the heart of this major thoroughfare high-capacity system, the Twin Ports Interchange (currently undergoing full reconstruction). This primary thoroughfare system, especially I-35, US 53 and I-535, continues to be improved to better serve longer distance traffic flows between important centers of activity, and is designed to provide the highest level of service. Central Entrance, while still providing key direct connections within the Duluth urban area, no longer serves a backbone role as a high speed, thoroughfare connection between urban centers.

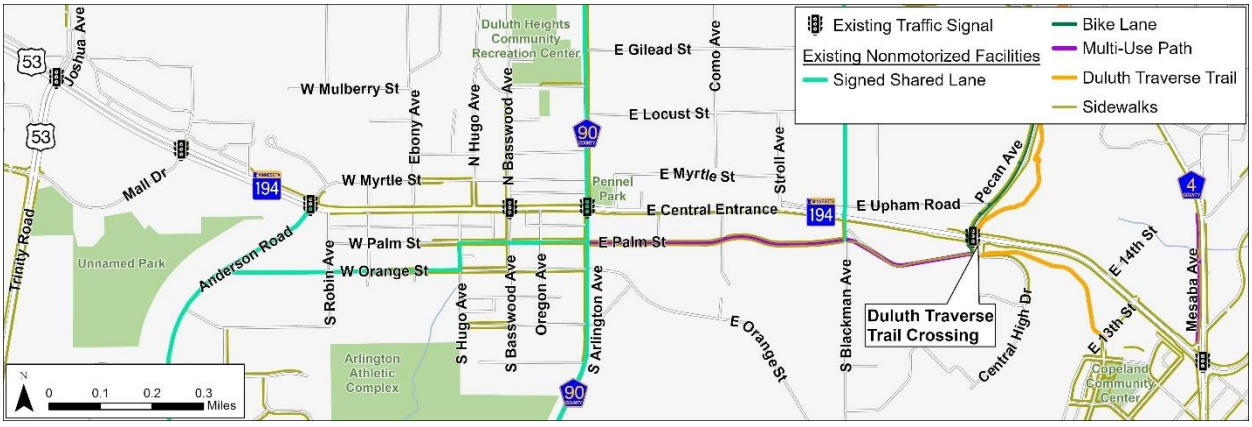
4.4 Nonmotorized Transportation Facilities

In general, places to walk and bike along Central Entrance are limited. There are currently no dedicated bicycle-only facilities within the corridor. There are sidewalks in some areas, but many are narrow or in poor condition. Steering Committee members and other participants noted that there are issues with maintenance and snow removal during the winter that make the existing sidewalks unsafe and difficult to navigate. **Figure 4** shows the existing sidewalks and bikeways in the project area. There are signed shared lanes for biking in the following locations:

- Along Anderson Road, south of Central Entrance
- Along Arlington Avenue (CSAH 90), north and south of Central Entrance
- Along Blackman Avenue, north and south of Central Entrance

There is an on-street bike lane along Pecan Avenue extending north from Central Entrance and a multiuse trail along Mesaba Avenue extending north from Central Entrance. There is also a parallel bike route south of Central Entrance for a portion of the study area that begins as a signed shared lane and ends as a multiuse path. A signed shared lane extends along W Orange Street from Anderson Road to S Hugo Avenue, then travels one block north to W Palm Street and runs east to Arlington Avenue. It then transitions to a multiuse path along E Palm Street from Arlington Avenue to Blackman Avenue. Past Blackman Avenue, it follows Clearwood Drive for a short distance before transitioning to an off-street multiuse trail that ends at E 13th Street.

Figure 4 - Existing Nonmotorized Transportation Facilities



Poor sidewalk condition along Central Entrance

There are also long distances between signalized intersections with no designated locations for people walking or biking to cross the road (**Figure 4**). Steering Committee members noted that it is common to see people walking across the road between intersections to reach destinations such as transit stops.

The Duluth Traverse Trail, a multiuse natural surface trail that extends along the entire ridgeline of the City of Duluth, crosses Central Entrance at Pecan Avenue (**Figure 4**). Trail users of all ages and abilities can be expected to cross at this location, increasing the need to consider nonmotorized users at this intersection.

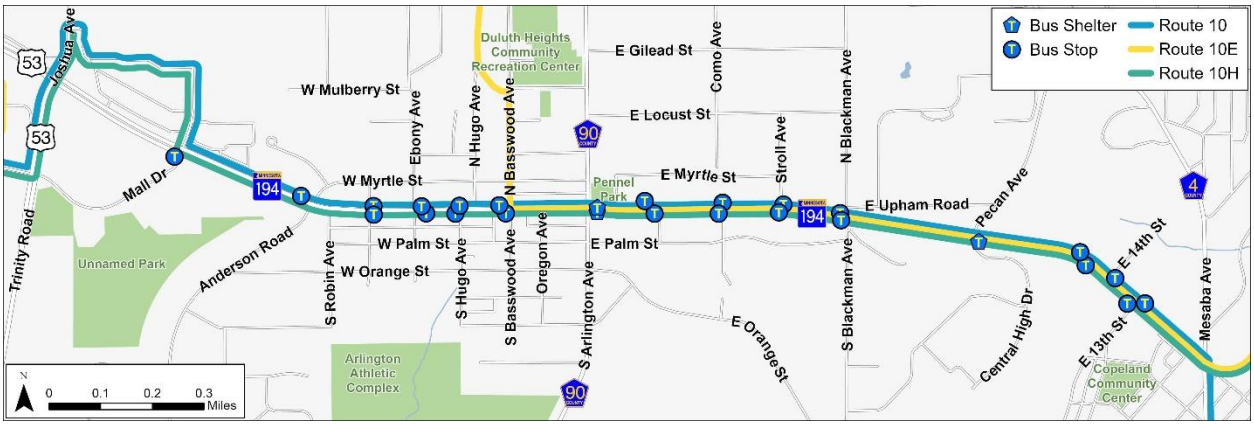
Snow-covered sidewalk near a transit stop

4.5 Transit Service

DTA Routes 10, 10E, and 10H currently provide fixed-route transit service along Central Entrance. **Figure 5** shows existing transit routes and stops. Route 10 is one of the highest ridership routes in the DTA system and serves as a vital transit link between downtown Duluth, the Miller Hill Mall area, and the Duluth International Airport. Average daily ridership is approximately 1,000; however, this number does not account for interlining, where riders are already on buses from other routes that transition into a route to the mall after reaching downtown. There are populations in the corridor that rely on transit services, and the various commercial destinations in the corridor provide job opportunities for individuals who may rely on transit.

The condition of the sidewalk network is an issue that impacts access to transit services in the corridor. Sidewalks connecting to transit stops in some areas are in poor condition, and some stops do not have any connecting sidewalks. As noted earlier, there is a lack of opportunities to safely cross the road, especially to reach transit stops. Stops in the corridor generally lack amenities such as benches and shelters, however these are provided in some locations. There are also bus pull-offs in the corridor that are less efficient and safe than an in-lane stop. The DTA has expressed interest in removing bus pull-offs in future designs for Central Entrance unless they are required for traffic operations purposes.

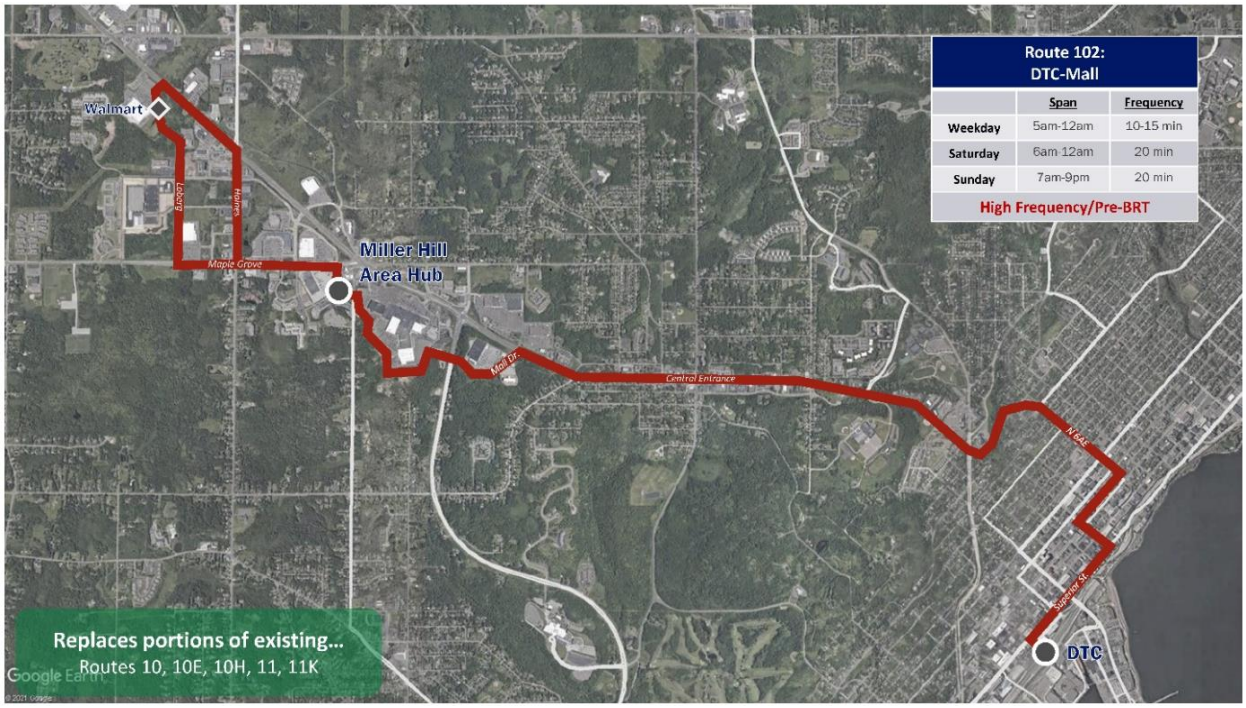
Figure 5 - Existing Transit Routes and Stops along Central Entrance



As part of the DTA's Better Bus Blueprint transit planning process, Central Entrance is one of two "pre-BRT" routes proposed in the Recommended Draft Network. The new "pre-BRT" route will be identified as Route 102 (DTC-Mall), and will consolidate portions of existing routes 10, 10E, 10H, 11, and 11K as shown in **Figure 6**. Accommodations for this type of service is an important consideration for this Plan and for the preliminary/final design of the corridor when it is reconstructed.

Central Entrance bus stop

Figure 6 - Proposed DTA Route 102



Source: DTA Better Bus Blueprint Comprehensive Operations Analysis

4.6 Traffic Volumes and Roadway Characteristics

Traffic volumes on Central Entrance range from 20,000–23,200 daily based on 2019 MnDOT data (**Figure 7**). The posted speed limit is 40 miles per hour (MPH) starting at Trinity Road in Zone 1, then drops to 30 MPH just west of Anderson Road and remains 30 MPH through the remainder of the zones. Central Entrance currently maintains two eastbound and two westbound travel lanes throughout the study area. The roadway is a mix of divided and undivided sections, with center left-turn lanes and medians in some locations (**Table 1**).

Roadways are designed as rural, suburban and urban sections. Segments of roadway designated as rural generally do not have curb and gutter and use ditches to convey stormwater runoff. Segments designated as suburban may have curb and gutter on one side of the roadway and ditches on the other. Urban roadways have curb and gutter on both sides of the roadway and use stormwater pipes and catch basins to collect and control stormwater runoff. Urban and suburban designs are used when right of way is more constrained, adjacent development is more intense, or there is an adjacent resource that must be avoided. **Table 1** describes the roadway design of Central Entrance as it exists today.

Figure 7 - Traffic Volumes

Table 1 - Existing Roadway Design by Zone

Location	Section Type	Divided/Undivided	Median/Turn Lanes
Zone 1	Rural	4-lane Divided	Mix of grass ditch and raised concrete median
Zone 2	Urban	4-lane Undivided	Painted median and center left-turn lanes approaching intersections
Zone 3	Urban	5-lane Undivided	Center left-turn lane
Zone 4	Urban	5-lane Undivided	Center left-turn lane
Zone 5 (Blackman Ave to just west of E 14th St)	Urban	Primarily 4-lane Divided	Mix of painted and raised concrete median
Zone 5 (Just west of E 14th St to Mesaba Ave)	Urban	5-lane Undivided	Center left-turn lane

4.7 Right of Way

Right of way is property owned by the agency that is responsible for the roadway. It is the area in which the roadway, drainage, traffic control, signage, etc. must be located in. If an agency needs to make improvements that extend beyond the existing right of way, it must be purchased from the property owner.

In general, Zones 1 and 5 have more available right of way than Zones 2-4. From a roadway design perspective, this means that a proposed design that can be accommodated in Zones 1 and 5 may not "fit" in Zones 2-4 unless additional land can be purchased. **Figure 8** shows the approximate existing MnDOT right of way limits and width along Central Entrance. The approximate range of available right of way along Central Entrance in each of the five zones is as follows:

- Zone 1: ~155-215 ft.
- Zone 2: ~80 ft.
- Zone 3: ~80 ft.
- Zone 4: ~83-108 ft.
- Zone 5: ~91-209 ft.

Figure 8 - Existing Right of Way (Approximate)

4.8 Crash Analysis

A high-level crash analysis was completed to identify potential safety concerns along Central Entrance. Crash rates were calculated for each of the zones using Minnesota Crash Mapping Analysis Tool (MnCMAT) data from 2017-2019. Intersection crashes were reviewed separately. Segment crash rates (not including junction crashes) are shown in **Table 2**. Zones 3, 4, and 5 have crash rates that exceed statewide averages. In addition, the intersections at Trinity Road, Mall Drive, Arlington Avenue, and Mesaba Avenue have crash rates above the statewide average. Crash rates for intersections in the study area are shown in **Table 3**. Involvement of pedestrian and bicycle users in crashes was also reviewed. During the three-year period, there were pedestrian crashes at the Anderson Road, Arlington Avenue, and Pecan Avenue intersections, and a bicycle crash at Basswood Avenue (**Figure 9**).

Table 2 - Segment Crash Rates (2017-2019, not including junction crashes)

Zone	No. Crashes	AADT	Segment length (miles)	Calculated Crash Rate**	Calculated Severity Rate
1	4	20,000	0.56	0.33	0.41
2	5	23,200	0.34	0.58	0.69
3	13	23,200	0.19	**2.69**	3.31
4	12	22,500	0.50	**0.97**	1.22
5	18	22,500	0.80	**0.91**	1.37

*Most recent AADTs taken from MnDOT maps.
**Intersection crash rates are expressed in crashes per million entering vehicles per mile.
2015 MnDOT green sheet average crash rates: Urban 4-Lane Undivided: 0.87; Urban 4-Lane Divided: 0.61; 5-Lane Undivided: 0.67

Table 3 - Intersection Crash Rates (2017-2019)

Intersection	No. Crashes	Daily Entering Vehicles*	Calculated Crash Rate**	Calculated Severity Rate
TH 194 & TH 53	48	31,636	**1.39**	1.76
TH 194 & Mall Dr	46	27,300	**1.54**	1.87
TH 194 & Anderson Rd	14	24,400	0.52	0.71
TH 194 & Basswood Ave	18	25,600	0.64	0.86
TH 194 & Arlington Ave	56	30,450	**1.68**	1.98
TH 194 & Pecan Ave	9	24,450	0.34	0.60
TH 194 & CSAH 4	47	31,750	**1.35**	1.81

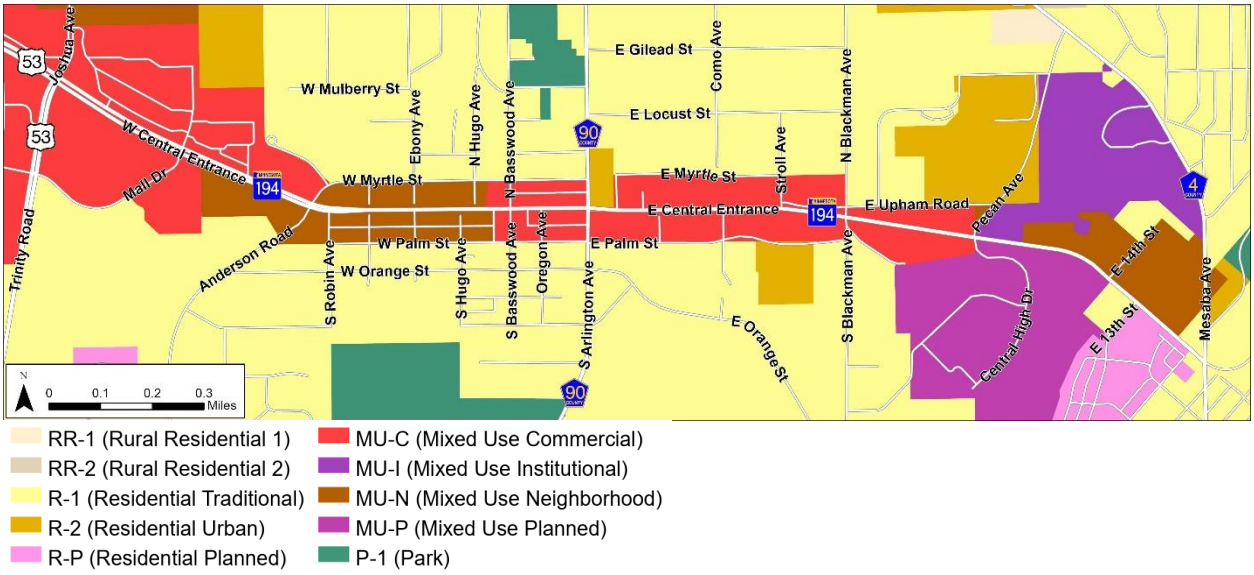
*Most recent AADTs taken from MnDOT maps. Assumptions were made for AADTs on: north leg of Mall Dr, north leg of Anderson Rd, south leg of Basswood Ave, south leg of Pecan Dr.
**Intersection crash rates are expressed in crashes per million entering vehicles. The average crash rate for a high volume, low speed signalized intersection is 0.72 (2015 MnDOT Green Sheets).

Figure 9 - Crash Analysis (2017-2019)

4.9 Land Use and Development

Existing land uses vary along Central Entrance. In Zone 1, there are several big box retailers that are part of the larger Miller Hill Mall commercial area. There is also a hotel, several single-family homes, and wooded areas. Zone 2 is primarily single-family homes, with several commercial destinations and Lakeview Christian School on the north side of the roadway. Zones 3 and 4 are primarily auto-oriented commercial development. Zone 5 contains a hotel, several commercial destinations, wooded areas, and multifamily housing between E 13th Street and Mesaba Avenue. The existing land uses are largely consistent with existing zoning for the corridor, shown in **Figure 10**.

Figure 10 - Existing Project Area Zoning



The former site of Duluth Central High School is located south of Central Entrance in Zone 5, just east of Blackman Avenue (see **Figure 1**). In 2021, the Duluth School Board approved the sale of a large portion of the site to a developer, while retaining a portion of the site for school board purposes. At this time, the mix of potential land uses that could be developed on the site is not known. The City of Duluth intends to work with a developer on a master planning process. As the future of this site could have a large impact on travel to and from this portion of the corridor, MnDOT should continue to monitor plans for the site as design for Central Entrance moves forward. In particular, the intersection of Central Entrance and Blackman Avenue could be impacted by changing traffic patterns.

5 Past Studies and Recommendations

Many plans and studies have been prepared for Central Entrance overall the past several decades. To help develop a vision for Central Entrance going forward, the project team reviewed these past efforts to identify key recommendations that are still relevant to the context of Central Entrance today. This information was discussed with members of the Steering Committee. Several of these plans were instrumental in shaping the vision presented in this Plan, including the following:

- Central Entrance-Miller Hill Small Area Plan (City of Duluth, 2009): This plan created a new vision for the corridor by identifying new preferred types of development, land use recommendations and placemaking objectives. It also recommended that any project along the corridor provide safe and convenient nonmotorized transportation options.
- Central Entrance Corridor Study (MIC, 2012): This study provided multimodal transportation recommendations to complement the City of Duluth's new vision for the corridor as described in the Central Entrance-Miller Hill Small Area Plan.
- MnDOT Pedestrian and Bicycle Recommendation Report (MnDOT, 2020): This report provided nonmotorized transportation recommendations to be scoped and included with the Central Entrance project. These recommendations are based on observations made by MnDOT's Bicycle & Pedestrian Safety Engineer and other staff during a project field walk.
- MnDOT ADA Group – Central Entrance Report (MnDOT, 2021): This report, also produced by MnDOT, includes recommendations for the Central Entrance project targeted at bringing the corridor into compliance with the Americans with Disabilities Act (ADA).

Other plans and studies that were reviewed include:

- Long Range Transportation Plan, Sustainable Choices 2045 (MIC, 2019)
- Imagine Duluth 2035 Comprehensive Plan: Forward Together (City of Duluth, 2016)
- Metropolitan Bikeways Plan (MIC, 2019)
- DTA Transit Development Plan (Duluth Transit Authority, 2017)
- City of Duluth Retail Analysis (Cushman Wakefield Northmarq, 2015)
- Comprehensive Operations Analysis (Duluth Transit Authority, 2021)
- Miller Hill Corridor Plan (City of Duluth, 1979)

Several major themes emerged during the review of past plans and studies. **Table 4** shows plans and studies that noted issues related to access management, bicycle and pedestrian facilities, transit service, and issues related to the overall streetscape of Central Entrance. An inventory of transportation recommendations from past plans and studies, including maps, is included in **Appendix B**.

Specific transportation recommendations were mapped to produce an overall picture of previously recommended improvements and to identify areas of similarity or conflict between past plans and studies (see **Appendix B**). Conflicts identified and discussed with the Steering Committee included:

- The appropriate number of travel lanes for Central Entrance
- The number and type of intersection improvements needed, including signalized intersection versus roundabout options and their spacing
- The need to construct continuous bicycle facilities along Central Entrance, on a parallel street, or both
- The level of interest from the stakeholders involved in pursuing a one-way pair concept
- The extent of streetscape and aesthetic elements feasible given maintenance resource constraints

Discussions of these issues with the Steering Committee and members of the public have informed the concept development and overall plan recommendations.

Table 4 - Overview of Plans and Studies Reviewed

			Themes			
Title	**Year**	**Lead Agency/ Organization**	**Access mgmt.**	**Bike/Ped**	**Transit**	**Streetscape**
MIC Long Range Transportation Plan - Sustainable Choices 2045	2019	MIC		x	x	
Metropolitan Bikeways Plan	2019	MIC		x	x	x
Central Entrance Corridor Study	2012	MIC	x	x		x
City of Duluth Comprehensive Plan - Imagine Duluth 2035: Forward Together	2016	City of Duluth	x	x	x	x
Central Entrance-Miller Hill Small Area Plan	2009	City of Duluth	x	x	x	x
Miller Hill Corridor Plan	1979	City of Duluth	x	x	x	x
Comprehensive Operations Analysis	2021	DTA			x	
Transit Development Plan	2017	DTA			x	
MnDOT ADA Group - Central Entrance Report	2021	MnDOT	x	x	x	x
Pedestrian and Bicycle Recommendations Report	2020	MnDOT	x	x		x
City of Duluth Retail Analysis	2015	Cushman Wakefield Northmarq	x	x	x	x

6 Public Engagement

6.1 Engagement Goals and Strategy

Effective and inclusive public engagement was a priority for this Plan to obtain consent from businesses, residents, and partner agencies regarding the overall vision for Central Entrance and to inform the refinement of design features. The engagement team's strategy was rooted in two-way learning through intentional and inclusive engagement. To counteract fatigue from past studies, the engagement team continuously focused on the study's outcome to guide the programmed reconstruction in 2026.The following goals were established and guided the engagement work for this Plan.

Central Entrance engagement goals:

Build trust

Set and manage expectations

Consistently educate

Reduce barriers to participation

Create early buy-in

Provide opportunities for input on real decisions

This section provides an overview of the engagement activities conducted and key takeaways from each effort. Additional information and data are included in **Appendix C**.

6.2 Developing the Community Vision

Multiple community events were conducted to kick off the engagement process and build a foundation for the Central Entrance community vision. Due to the global pandemic and evolving guidelines, the engagement team provided multiple learning and feedback avenues. Throughout, we learned from the community's lived experiences and identified their wants, needs, and aspirations for the corridor. All events and feedback opportunities were publicized on the MIC website and social media channels, and distributed through the MIC, partner agency, and community database contact lists.

6.2.1 Website – Online Engagement

An online survey with multiple choice and open-ended questions was distributed via the project website. The survey asked how people use Central Entrance, what are the challenges traveling along Central Entrance, and other questions focused on gathering vison preferences for the corridor. There were two components to the overall survey effort:

- Survey (same questions as in-person "Better Central Entrance" event, see below)
- Comment Map - 40 online map comments (locations shown in **Figure 11**)

Over 80 surveys were completed online and in-person between June 3-7, 2021. Walkability, bikeability, and safety were at the forefront of participant responses related to transportation issues. Sense of place and interest in advancing more local businesses rose to the top.

Figure 11 - Comments Received Via Online Mapping Activity

6.2.2 In-Person "Better Central Entrance" Event

The project team participated in the "Better Central Entrance" event held June 4-5th and hosted by Zeitgeist, a local nonprofit arts and community development organization.

- Event hosted in vacant lot at intersection of Arlington Avenue (CSAH 90) and Central Entrance
- Featured two-way learning and an in-person survey (same questions as online survey)
- 80+ surveys completed online and in-person between June 3-7, 2021
- 15+ comments received from discussions with Zeitgeist and study staff

Better Central Entrance Event (June 4-5th, 2021)

6.2.3 Summary of Findings from Online and In-Person Engagement

Because the online and Better Central Entrance surveys were the same, the results were analyzed together. Most respondents indicated that they drive a vehicle for their current travel but would like to walk and bike significantly more for future travel. Respondents noted the top strength of Central Entrance was its access to the mall, downtown Duluth, hospitals, and Lake Superior. **Table 5** presents the results of other questions on the survey.

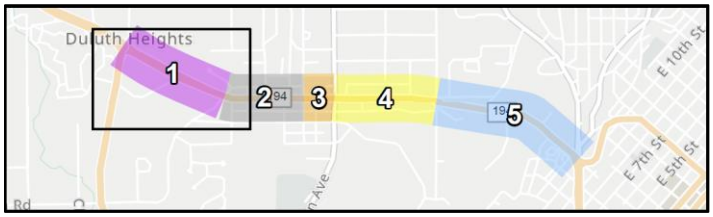
Table 5 - Findings from Online and In-Person Survey

Top 5 challenges using Central Entrance	Future vision for Central Entrance
1. Traffic 2. Safety 3. Turning (turn lanes, in and out of businesses) 4. Speed 5. Bad sidewalks	1. Walkability 2. Businesses 3. Placemaking 4. Safety 5. Bikeability
Top 5 Needs	**What would you do?**
1. Walkability 2. Safety 3. Getting across the street 4. Vehicle flow 5. Bikeability	1. Add greenspace 2. Add/fix sidewalks 3. Reduce traffic 4. Add/fix bike path 5. More pedestrian safety

6.2.4 Facilitated Virtual Workshops

A series of two virtual workshops were held on June 24th and 29th, 2021 to facilitate more in-depth discussion on the issues people experience in the Central Entrance corridor. The workshops featured a presentation component, which provided background information on previous plans and studies and results from the initial online and in-person surveys. Following the presentation, workshop participants were divided into breakout groups and participated in virtual corridor walks using recent video footage taken in each of the five zones. Facilitators and attendees then recorded findings and discussion items using a participatory mapping activity. Key items discussed for each zone are presented on the following pages.

Zone 1 – Trinity to Anderson Road

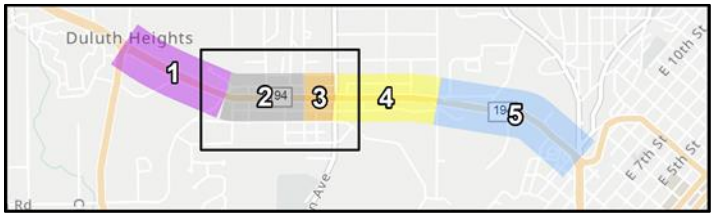


Items discussed:

- Potential bike connection to Arrowhead Road

- Importance of connections to existing and future land uses
- Addition of center median/turn lane or tree right of way
- Raised crosswalks, especially at roundabouts - potential emergency vehicle concern
- Roundabouts at Trinity Road and Anderson Road
- Opportunity for a 4 to 2-lane conversion?
- Vehicle and pedestrian access issues near Cub Foods
- Pedestrian connections missing at Mall Drive
- Gateway at Anderson Road
- Direct connection needed from transit stop to sidewalk
- Importance of ramps for wheelchair access

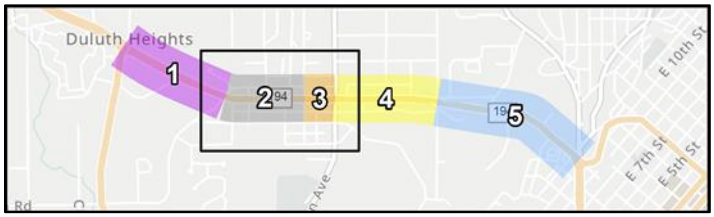
Zone 2 – Anderson Road to Basswood Avenue



Items discussed:

- Transit stop consolidation along with BRT?
- Evaluate a one-way pair
- Need mid-block crossing with median and possible raised crosswalk
- 4 to 3-lane conversion possible?
- Center boulevard/median
- Safe bicycle facility on Central Entrance to access destinations
- Potential for above grade pedestrian crossings?
- Multiple bike routes? (on and parallel to Central Entrance)
- Reduce number of accesses/driveways

Zone 3 – Basswood Avenue to Arlington Avenue/CSAH 90

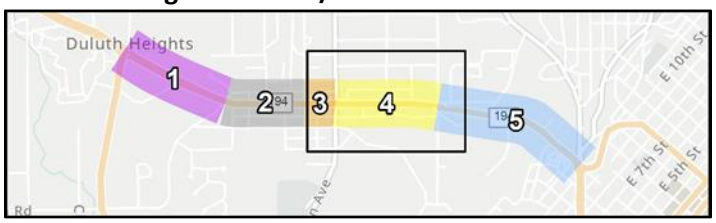


Items discussed:

- Bike/walk access for businesses on one or both sides
- Traffic movements for businesses - enter on Central Entrance and exit on backage road?

- Roundabout at Arlington Avenue – major crosstown route and connection to airport
- Limited right of way – reallocate from car-focused to people-focused
- Opportunity for placemaking in empty lot next to Arlington Avenue

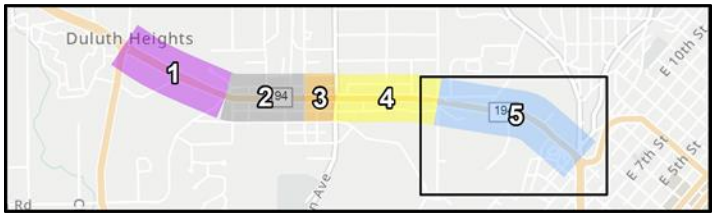
Zone 4 - Arlington Avenue/CSAH 90 to Blackman Avenue



Items discussed:

- Auto-oriented businesses, lots of driveways, parallel bike route may be more comfortable
- Upgrade Palm Street for walking and biking
- Connection to campus connector trail (Blackman Avenue)
- Do Intersection Control Evaluation (ICE) studies
- Create gateway at Central Entrance and Blackman Avenue

Zone 5 – Blackman Avenue to Mesaba Avenue



Items discussed:

- Roundabout at Mesaba Avenue
- Potential overpass at Pecan Avenue
- Create gateways at Pecan and Mesaba Avenues
- Need for sidewalk lighting
- Controlled intersection at Central Entrance and 13th Street
- Mesaba Avenue - dramatic spot within transportation network that provides a view of the lake, also a more complex intersection
- Potential for unique transit to help people get up the hill - public streetcar/funicular (a type of cable railway used to travel up and down steep slopes)

Common and focused themes emerged from engagement activities to create and focus the community's vision. These themes centered on **traffic, biking, walking, safety, and corridor aesthetics**. All information and feedback gathered during this phase of engagement informed the values, concepts, and potential features of the corridor.

6.3 Refining the Community Vision

6.3.1 Community Advisory Committee

The Central Entrance Community Advisory Committee (CAC) was established to provide advice to the Steering Committee during development of the vision and concepts. The purpose of the CAC was to serve as a voice for the community and provide lived experiences and expertise, as individuals who frequently travel along Central Entrance. Through two separate virtual meetings, CAC members representing residents, businesses, and community organizations (We Walk in Duluth, Bridging Hearts, and the MIC Bike Pedestrian Advisory Committee) provided feedback and input on the following:

- Past study recommendations to carry forward or to set aside
- Needs and issues for all travel modes
- Vision confirmation and refinement
- Review and comment on design concepts

The main themes permeating the CAC feedback, and the takeaways to inform and refine the vision of Central Entrance were:

- Agree with planning process goals advancing a vision for a walkable, bikeable and transit-oriented thoroughfare which creates an attractive destination that: 1) is safe and comfortable to use for those of all ages and abilities, and 2) encourages new types of residential and commercial development
- Provide an equitable transportation system
- Create a transit-ready corridor: improve access to existing services and prepare for pre-BRT route
- Safety should be the overarching factor driving the vision
- Corridor should be a supportive place for businesses by becoming an attractive place/destination
- Traffic calming
- All-season multi-modal corridor
- Green space and gateway to Duluth that focuses on people

6.3.2 Features Survey

Draft concepts for Zones 1-5 along with information on various roadway design features were presented in an online survey for the public and local businesses. There were general and specific questions related to feature preferences and priorities such as wider boulevards or a wider median. Multiple choice and open-ended questions were included. Public surveys were distributed to and through project stakeholders, the Steering and Community Advisory Committees, local partners, and the MIC's social media accounts. The survey was open for four weeks, and received over 150 responses.

For the business survey, the questions were the same except for additional questions asking for the name and location of the responding business. In addition to the survey distribution tactics used for the public survey, a local business advocacy group (APEX) distributed the survey link to local businesses, and postcard mailers were also mailed to businesses along Central Entrance. The survey was open for three

weeks. Five businesses responded. Results from the public and the businesses that responded to the survey mirrored each other with similar themes and findings.

Key findings:

- In all zones, the most important feature was **shared use path, cycle track, or similar place to bike** (**sidewalk** a close second)
- **Wider boulevards** overwhelmingly preferred to wider center medians given space constraints
- Slightly more than half of respondents prefer a **two-way shared use path on one side** of the road versus a one-way cycle track on both sides.
- **One-way pairs**: The majority of the respondents **did not like** the one-way pair concept. Comments included: Poses concern for neighborhoods, businesses, and will cause more congestion and traffic.
- **Mid-block crossings**: 60 percent of respondents **would like** mid-block crossings. Arlington Avenue was most frequently mentioned as well as high pedestrian generators, including near transit stops and fast-food restaurants.
- **Roundabouts**: Over two-thirds of respondents **are supportive** of roundabouts on Central Entrance, and most selected Arlington Avenue as a prime location to evaluate.

All engagement activities during this phase further refined the community's vison for Central Entrance and kickstarted the community's excitement at future possibilities. Moving forward, as study partners transition into design activities, it will be imperative to leverage the trust established, build upon and strengthen community stakeholder relationships, and apply lessons learned to the design process. **Appendix D** outlines a framework for continuing and enhancing relationships with stakeholder groups, residents, businesses, and transit users during the design phase.

Central Entrance Zones | Existing Conditions

1 Trinity Rd to Anderson Rd

- Limited to no sidewalks
- High crash rate intersections (Trinity Rd & Mall Dr) *(above state average)*
- Pedestrian crash at Anderson Rd
- Long block lengths between signalized intersections
- Big box retail
- Surface parking lots

2 Anderson Rd to Basswood Ave

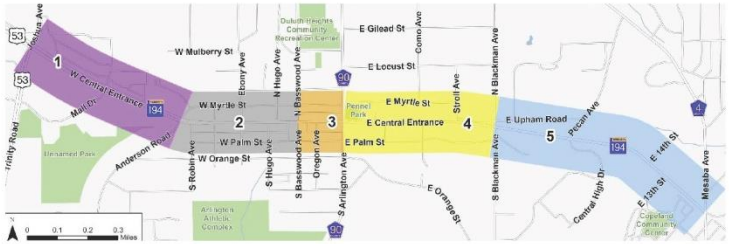
- Sidewalks both sides, width varies, poor condition, poorly maintained
- Bicycle crash at Basswood Ave
- Long distance between signalized intersections
- Short block lengths between side streets *(many dead end onto Central Entrance)*
- Residential
- School

3 Basswood Ave to Arlington Ave (CSAH 90)

- Attached sidewalk both sides
- Bicycle crash at Basswood Ave
- High crash rate intersection (Arlington Ave) *(above state average)*
- Pedestrian crash at Arlington Ave
- High crash rate along segment *(above state average)*
- Small scale commercial
- Mix of urban and suburban setbacks

4 Arlington Ave (CSAH 90) to Blackman Ave

- Sidewalk south-side, width varies
- Bus shelter at two of ten transit stops
- High crash rate intersection (Arlington Ave) *(above state average)*
- Pedestrian crash at Arlington Ave
- High crash rate along segment *(above state average)*
- Long block lengths between signalized intersections
- Park
- Auto-oriented/ suburban commercial



5 Blackman Ave to Mesaba Ave

- Attached, sidewalks both sides except from Blackman & Pecan Ave, width varies
- Bus shelter at two of seven transit stops
- Pedestrian crash at Pecan Ave
- High crash rate intersection (Mesaba Ave) *(above state average)*
- High crash rate along segment *(above state average)*
- Long block lengths between signalized intersections
- Mix of developed and undeveloped/wooded
- Affordable housing & regional trails nearby

Central Entrance Vision Recommendations

Maximize the Safety & Comfort for Active Transportation Users

7 Corridor Vision

The role and function of streets has changed beyond solely serving motor vehicle travel. Central Entrance, like other major streets in North American cities, was designed primarily to move vehicle traffic and minimize vehicle travel delay, neglecting the needs of other users. In combination with more auto-oriented land use policies and patterns, a built form emerged that limited mobility choice, grew vehicle traffic, and disconnected communities.

The vision for Central Entrance, developed through this planning process, represents a return to streets that **put people and place first**. The future of Central Entrance is **multimodal**. Central Entrance should become a corridor that is designed, managed, and operated to **enable safe access for all** people, all users, regardless of age, ability, or mode of transportation. Central Entrance can become a place, a **gateway** to Duluth, celebrating the unique qualities of the community through a boulevard-like feel. Transportation investments should prioritize people walking, biking, and using transit, while still accommodating vehicle traffic, and encourage land use practices that are healthier, more sustainable, and more human-centered and walkable by design.

Creating safe places for people to walk [and bike] is essential to improving equity and mobility, addressing climate change, and ultimately providing a better quality of life for everyone.

-MnDOT Statewide Pedestrian System Plan

The term walkable is more than providing sidewalks and crossings. It represents an approach that puts people back at the center of street and community design. Walkable places are also bike- and transit-oriented; provide a mix of uses (e.g. housing, shops, places of work, parks, schools) within close proximity (easily reached by foot or bike, rewarding the short trip); promote human-scale design where buildings are built to the street and surface parking is minimized or placed to the back of buildings; and foster the social- and business-life of quality public spaces, from the street itself to parks and plazas. Ultimately, streets are ecosystems unto themselves and when they are equitable by design, they help communities realize their full economic, social, and environmental potential. This shift in how we understand street design aligns with the Guiding Values of this Plan, described in more detail on the following pages.

The concepts in this Plan focus on corridor design that is not only multimodal, encouraging transportation choice for people of all ages and abilities, but also makes safety a top priority. Central Entrance has crash rates well above the state average (see **Section 4.8**). MnDOT is part of the Minnesota Toward Zero Deaths statewide partnership working to reduce crashes, injuries, and traffic-related deaths on Minnesota roads. This Plan takes a context sensitive approach. Recognizing that there are different contexts and conditions along the corridor, it does not present a single recommended concept for the entire corridor. Instead, it provides a set of concepts and design elements that can be combined based on further evaluation to realize the overall vision. The following components are included in this section:

- Project goals and recommendations based on the Guiding Values
- Recommended concepts for future engineering analysis and refinement

- Elements to consider when developing evaluation and decision-making criteria
- Land use scenarios that explore the development potential which could be realized with corridor improvements

Paired with policy frameworks like Complete Streets, Vision Zero and Climate Action plans, cities and states that make changes to better support all users start to see mode shifts, resulting in less CO_2 emissions, less single occupancy vehicle growth, and improved safety, among many other physical and social benefits. These changes are occurring even in winter cities. According to the City of Minneapolis 2017 Pedestrian and Bicycle Count Report, Minneapolis' commuting population increased **nine percent** from 2005-2017. During this time motor vehicle commute mode dropped **four percent**, **walk commute mode increased seven percent**, and bike commute mode increased 18%. The number of people bicycling is growing by an average of **eight percent** per year, which in large part is due to the City's continued investment in walking, biking, and transit.

7.1 Guiding Values

Based on the planning process goals and input provided through public engagement opportunities, a set of guiding values was developed to shape final plan recommendations. These values are intended to describe the high-level vision for the future of Central Entrance , and should set the overall direction for improvements moving forward:

Safe & equitable multimodal transportation system: Central Entrance will be a safe, accessible, and comfortable street for all people, making walking, biking and transit viable and an easy choice while moving people and goods in cars, trucks, and buses safely and efficiently.

Healthy, walkable community: Central Entrance will support denser, connected, and transit-oriented land use patterns and multimodal travel year-round.

Thriving local business community: Central Entrance will meet the needs of new and existing businesses by providing reasonable access and creating opportunities for new types of development and redevelopment.

Sustainable and resilient corridor: Central Entrance improvements will address long-term infrastructure needs and create opportunities for green infrastructure.

A vibrant gateway to Duluth: Central Entrance will be an attractive corridor that welcomes visitors and residents alike to the City of Duluth and the Central Entrance business district by establishing a sense of place.

7.2 Goals and Recommendations

Based on the guiding values discussed above, project goals and recommendations were developed to address the issues and concerns discussed during the Steering Committee and public engagement processes (**Table 6**). These are meant to supplement the recommended concepts and provide additional guidance for the project as it progresses towards design and additional public engagement. Where appropriate, the locations noted in the recommendations are shown in **Figure 12**.

Table 6 - Values, Goals, and Recommendations

Guiding Value	Goals	Recommendations	Lead Agencies
Safe & equitable multimodal transportation system	A) Implement a design that supports the role of Central Entrance as a key link in the roadway network between downtown Duluth and the Miller Hill commercial area.	A.1) Evaluate 3- and 4-lane section and one-way pair concepts for implementation in Zones 2-4. A.2) Evaluate the need for construction of turn lanes at intersections throughout the corridor. A.3) Apply context-sensitive street design elements, including exploration of opportunities such as narrowing travel lanes (11 feet shown in recommended concepts). A.4) At a minimum, evaluate the construction of roundabouts at the intersections of Central Entrance and the following cross streets (see **Figure 12**): • Anderson Road • Arlington Avenue (CSAH 90) • Pecan Avenue	MnDOT
	B) Create a corridor that supports existing transit service and is ready for potential BRT service.	B.1) Avoid using bus pull-out lanes to reduce delays associated with buses re-entering traffic. B.2) Ensure that pedestrian access is provided to all transit stops in the corridor. B.3) Coordinate with the Duluth Transit Authority during design to ensure it supports BRT operations on Central Entrance. B.4) Update the Central Entrance-Miller Hill Small Area Plan to implement this study and the Better Bus Blueprint for Routes 102 and 112. *See also: Goal A recommendations*	MnDOT, DTA
	C) Improve the ability to walk and bike along and across Central Entrance.	C.1) At a minimum, provide pedestrian facilities along both sides of Central Entrance and a bicycle facility along at least one side, as recommended in MnDOT's Pedestrian and Bicycle Recommendations Report.	MnDOT

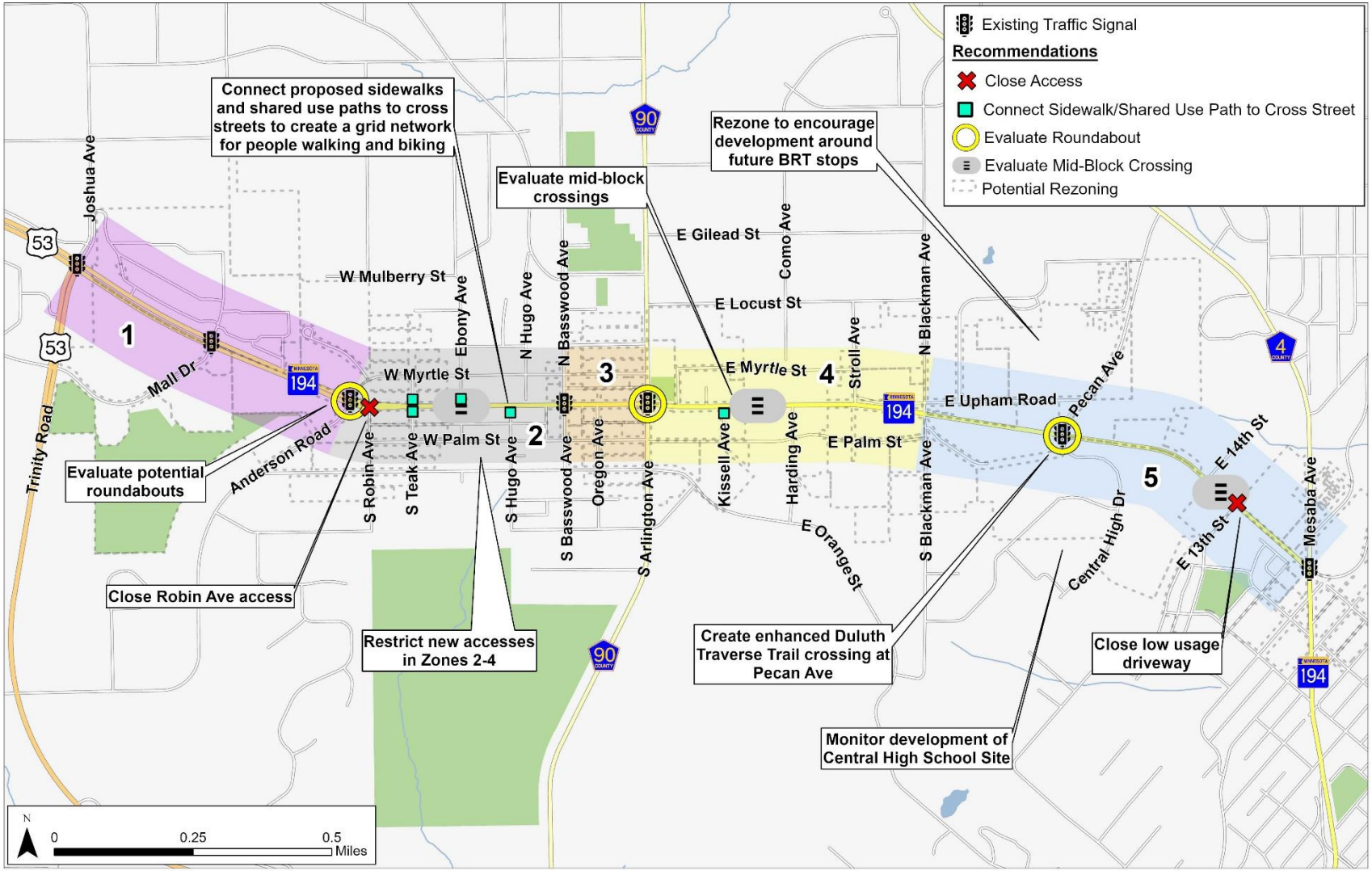
Guiding Value	Goals	Recommendations	Lead Agencies
		C.2) Consider mid-block crossings with appropriate markings and warning technology, such as advanced stop bars, high-visibility crosswalk markings, raised tables, Pedestrian Hybrid Beacons (PHBs) or Rectangular Rapid Flashing Beacons (RRFBs) in the vicinity of the following locations (see **Figure 12**): • Ebony Avenue • Kissell Avenue or Harding Avenue • East 14th Street or East 13th Street C.3) Provide ADA-compliant pedestrian infrastructure throughout the corridor with connections to adjacent destinations. C.4) Create an enhanced bicycle crossing for the Duluth Traverse Trail at Pecan Avenue (see **Figure 12**). C.5) Connect new nonmotorized facilities along Central Entrance to the following cross streets with pedestrian and/or bicycle facilities as appropriate to enhance the nonmotorized transportation network and improve neighborhood access to transit stops (see **Figure 12**): • Teak Avenue • Ebony Avenue • Hugo Avenue • Kissell Avenue	
	D) Create a safe and comfortable corridor for all users, with a target of zero traffic injuries or deaths.	D.1) Construct boulevards between vehicle travel lanes and nonmotorized facilities to provide physical separation from traffic to support users of all ages and abilities, as supported by MnDOT's Statewide Pedestrian System Plan. *(Note: see Action Item IP-12, "Seek opportunities to provide wide vegetated buffers between people walking and vehicle traffic")* D.2) Include pedestrian safety countermeasures at signalized intersections in the corridor, including, but not limited to, curb bump outs, Leading Pedestrian Intervals (LPIs), advanced stop bars, and raised crosswalks.	MnDOT

Guiding Value	Goals	Recommendations	Lead Agencies
Healthy, walkable community	E) Create a walkable land use pattern; reward the short trip.	E.1) Implement nodal-based zoning along the corridor to allow for mixed-used transit-oriented development patterns for Route 102 BRT. E.2) Consider a creating hybrid MU-C zone that does not allow for the "vehicle related," "building materials sales," "garden material sales," and large retail store uses. E.3) Rezone the nodes within 1/4 mile from the Route 102 BRT stops to MU-C or a hybrid MU-C (see **Figure 12**). E.4) Monitor the redevelopment of the former Central High School site and update this plan, the Better Bus Blueprint, and the Central Entrance-Miller Hill Small Area Plan accordingly (see **Figure 12**). E.5) As redevelopment occurs, consider encouraging the following design guidelines: • Site designs with reduced setbacks that place buildings closer to the roadway • Site designs that relocate parking to the back of buildings (away from the street) rather than adjacent to the street • Connectivity standards (e.g. street connectivity index or link-to-node ratio, maximum block lengths (400-600 ft)) and bonuses for pedestrian and trail connections between streets or the end of cul-de-sacs to ensure a more walkable development pattern, disperse vehicle travel, and increase emergency response time	MnDOT, City of Duluth
	F) Create a year-round multimodal corridor.	F.1) Work with City of Duluth and DTA staff to craft a model maintenance agreement that provides for winter snow removal and clearing of leaves, brush, and other debris during the remainder of the year. *(Note: see MnDOT Statewide Pedestrian System Plan Action Items M-1, "Design to support effective maintenance," M-2 "Explore options for how MnDOT can help local agencies take the lead on maintenance work," and M-3,*	MnDOT, City of Duluth, DTA

Guiding Value	Goals	Recommendations	Lead Agencies
		"Clarify MnDOT's policies to reflect the expectation of year-round maintenance of pedestrian facilities") F.2) Add Central Entrance to the City of Duluth's winter sidewalk and pathway priority network for clearing pedestrian and bicycle facilities to ensure that the best access is provided to all people, regardless of mode choice. F.3) Construct boulevards wherever possible to provide snow storage and keep nonmotorized facilities clear of snow and ice. *See also: Goal C recommendations*	
Thriving local business community	G) Maintain reasonable access for businesses along the corridor.	G.1) Develop an access management policy, as recommended in the Central Entrance Corridor Study. G.2) As redevelopment occurs, encourage site designs that limit curb cuts on Central Entrance, where possible, through requiring shared driveways and only allow "right-in, right-out" driveways where necessary as recommended in the Central Entrance-Miller Hill Small Area Plan. G.3) Establish driveway guidelines that address driveway width and other design features to slow turning vehicles and limit pedestrian exposure. G.4) As recommended in the Central Entrance Corridor Study, do not allow any new accesses on Central Entrance in Zones 2-4. G.5) Consider removing access to Central Entrance at the following locations (see **Figure 12**): • Robin Avenue • MnDOT driveway at East 13th Street	MnDOT, City of Duluth
	H) Identify and increase opportunities to enhance the public realm for outdoor dining, sitting, and	H.1) Encourage public realm development through plazas, pocket parks, or additions to the sidewalks with café zones through opportunities such as public-private partnerships.	MnDOT, City of Duluth

Guiding Value	Goals	Recommendations	Lead Agencies
	access to green space to support businesses in the corridor.	*See also: Goal E recommendations*	
Sustainable and resilient corridor	I) Address long-term infrastructure needs in the corridor.	I.1) Replace aging infrastructure through full reconstruction of Central Entrance from Trinity Road to Mesaba Avenue.	MnDOT
	J) Prioritize opportunities to incorporate green infrastructure and street trees into the design to support stormwater management and mitigate climate change.	J.1) Evaluate the potential for construction of stormwater best management practices (BMPs) in boulevard and median spaces. J.2) Work with the City of Duluth Forestry Department to identify appropriate tree locations and species for inclusion in the final design. *(Note: see MnDOT Statewide Pedestrian System Plan Action Item IP-13, "Prioritize street trees as critical pedestrian infrastructure for adapting to climate change")* *See also: Recommendation D.1*	MnDOT, City of Duluth
A vibrant gateway to Duluth	K) Create an aesthetically pleasing corridor that supports placemaking and establishes a sense of place.	K.1) Work with the City of Duluth to design and construct gateway features in Zones 1 and 5 that welcome visitors to the Central Entrance business district and the City of Duluth, as discussed in the Central Entrance Corridor Study. K.2) Develop a streetscape plan to create a cohesive feel for the corridor, as recommended in the Central Entrance Corridor Study. K.3) Identify opportunities to enhance sense of place, particularly in Zones 2-3, through the inclusion of streetscape elements such as benches, planter boxes, and native plantings.	MnDOT, City of Duluth

Figure 12 - Recommendations Map



7.3 Recommended Concepts for Future Study

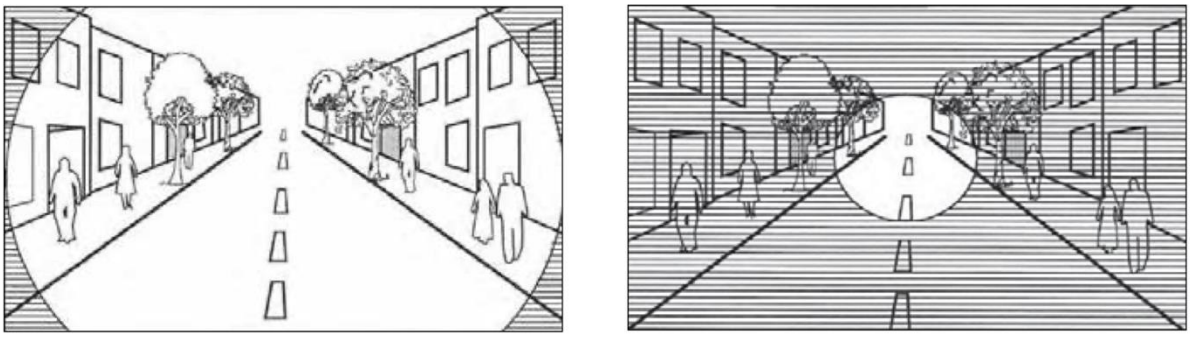
A key component of the Central Entrance Vision Plan is to develop viable roadway concepts for each of the zones in the study area for consideration during design. The concepts developed as part of this Plan are intended to be at a planning level, and will require further study and engineering analysis before moving forward. While the concepts shown include specific widths or a range of widths for certain features, final designs considered for construction may or may not match these initial concepts or could be assembled from a combination of these concepts, depending on the results of more detailed future analyses. The concepts here are intended as a general guide.

Based on land use context, existing right of way, and other characteristics, the study area zones were placed into two groups for the purposes of developing concepts. Concepts are presented first for Zones 1 and 5, then for Zones 2-4.

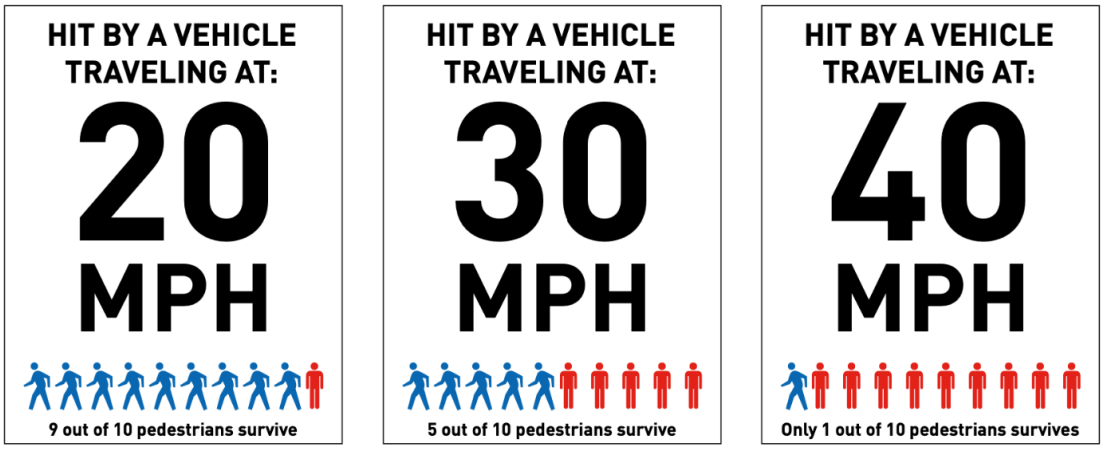
In addition to the basic concepts, the project team developed a set of corridor visualizations to better represent the overall scale and feel that could be achieved for Central Entrance. These visualizations are intended to be a general guide for the overall feel of the corridor and are included in the descriptions of each zone on the following pages. As noted previously, any specific improvements are subject to further design and engineering analysis.

Making Safety a Top Priority: Why Speed Matters

Speed kills places and people and plays a major role in serious injuries and fatal collisions. The most vulnerable users—people walking and bicycling, and children, elders, low-income persons, and people of color—are disproportionately affected. A person walking who is hit by a person driving at 20 mph has a 90 percent chance of surviving the crash. **The chances of survival are reduced by nearly 50 percent when the person driving is traveling 10 mph faster** (30 mph). At lower speeds, drivers can see more of their surroundings and have more time to see, react, yield, and stop for others.



A driver's field of vision increases as speed decrease. Driver's field of vision at 15 MPH (left) compared to driver's field of vision at 30-40 MPH (right)



The risk of injury and fatality increases as speed increases, especially for vulnerable users like people walking (Graphics: City of Seattle Vision Zero Plan)

People's driving behavior and thus vehicle speeds match the "design speed" of the road. Streets should be designed to achieve the "target" speed—the speed the community want motorists to drive—by applying engineering treatments that give greater visual cues and have proven traffic calming effects like lane width, street trees, and medians and edge treatments, including building form and its relationship to the street. Today, Central Entrance is primarily posted at 30 MPH, but the visual cues (or lack thereof) create an environment where traveling at speeds above the posted speed is common. The future corridor design should support limiting speeds to 30 MPH and consider a target speed of 25 MPH. The concepts and recommendations for the corridor present tools to encourage motorists to drive at the desired target speed including, but not limited to:

- Medians*
- Pedestrian Refuge Islands and crosswalk visibility enhancements*
- Roundabouts*
- Signal Improvements (e.g. signal progression, Leading Pedestrian Interval*)
- "Road diets" or lane reconfiguration*
- Street trees
- Bikeways and walkways*

*FHWA Proven Safety Countermeasures effective in reducing roadway fatalities and serious injuries.

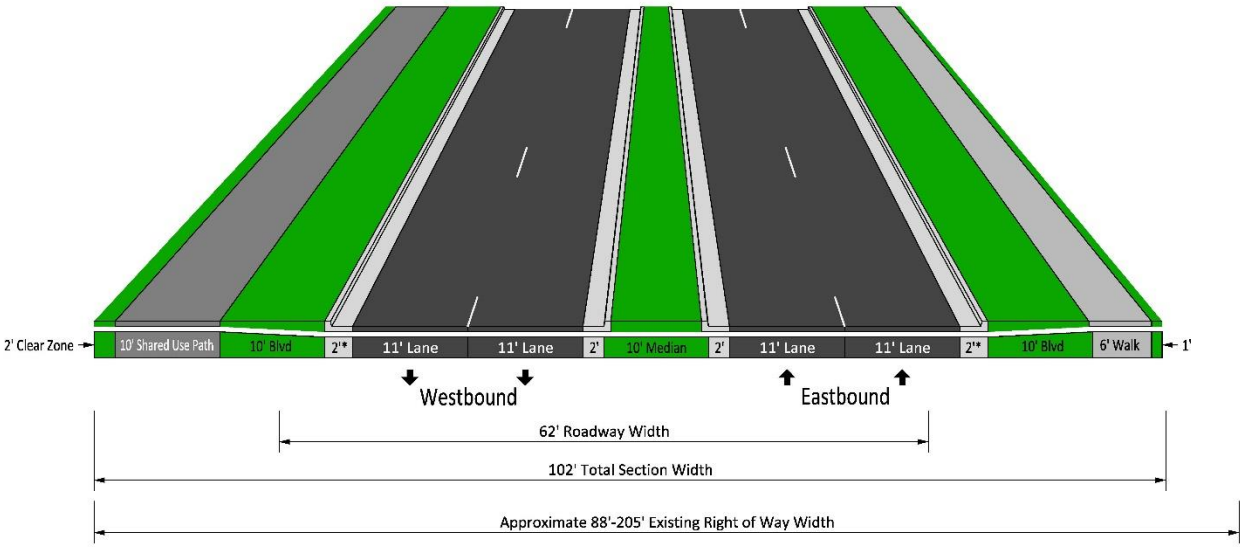
7.3.1 Zones 1 and 5

There are many similarities between Zones 1 and 5. Both are generally less developed and have more available right of way than Zones 2-4. They also have fewer access locations and include locations with grass ditches and/or concrete medians. They form the endpoints of the study area, act as gateways, and link to the broader roadway network. Because of these similarities, a single concept was developed to illustrate the overall vision for these zones. The specific roadway design that is ultimately implemented will vary based on conditions along the corridor.

Figure 13 shows the recommended concept for Zones 1 and 5. This concept maintains two eastbound and two westbound vehicle travel lanes, similar to what exists today. However, they have been narrowed to 11 feet. The key features of this concept include:

- Two 11-foot travel lanes in each direction
- A 6-foot sidewalk on the south side of the road
- A 10-foot shared use path on the north side of the road
- A 10-foot center median
- 10-foot boulevards on both sides of the road between the travel lanes and the sidewalk or shared use path

Figure 13 - Zones 1 and 5: Recommended Concept



There are a number of anticipated benefits from the recommended concept:

- Sidewalk and shared use path provide safe, separated areas to walk and bike
- Center median provides a refuge for people crossing the street at intersections or mid-block crossings and helps manage access for turning vehicles
- Boulevard areas provide winter snow storage area, keeping sidewalk/shared use path clear
- Wide boulevard and median areas create the opportunity to create a gateway feel with street trees—a triple canopy also provides a traffic calming effect—and provides space for other landscaping and stormwater treatments. Maintains similar vehicle capacity to the existing roadway by keeping four travel lanes
- Maintains an outside lane for use by transit vehicles, and provides an option for future conversion to a bus-only lane

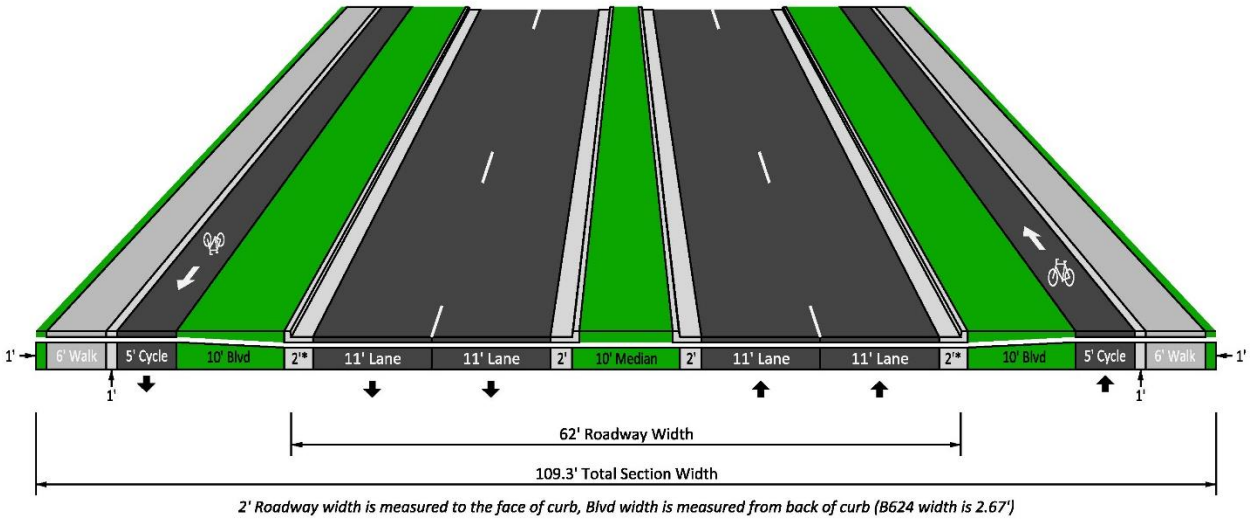
Several potential challenges of implementing this concept include:

- Careful design will be needed to transition to any concept that is selected for Zones 2-4.
- While travel along Central Entrance for people walking and biking will be greatly improved, special attention will need to be paid to mid-block and intersection crossings, as users will still need to cross two lanes of vehicle traffic at a time.
- People might bike on the sidewalk

While the shared use path could be provided on either side of the roadway, it is shown on the north side of the road in this concept to maintain consistency with the shared use path shown in the four-lane concept for Zones 2-4. There are several compelling reasons for a shared use path on the north side in these zones as described in **Section 7.3.2**. **Figure 15** shows an enhanced visualization of the recommended concept for Zones 1 and 5.

Figure 14 shows an alternate concept for Zones 1 and 5. This concept features a pair of one-way cycle tracks that would allow for separated bicycle travel along both sides of the roadway. This alternate concept is not recommended at this time due to the potential for wrong-way riding on cycle tracks that is likely to occur given the distance that must be crossed to reach the opposite direction facility.

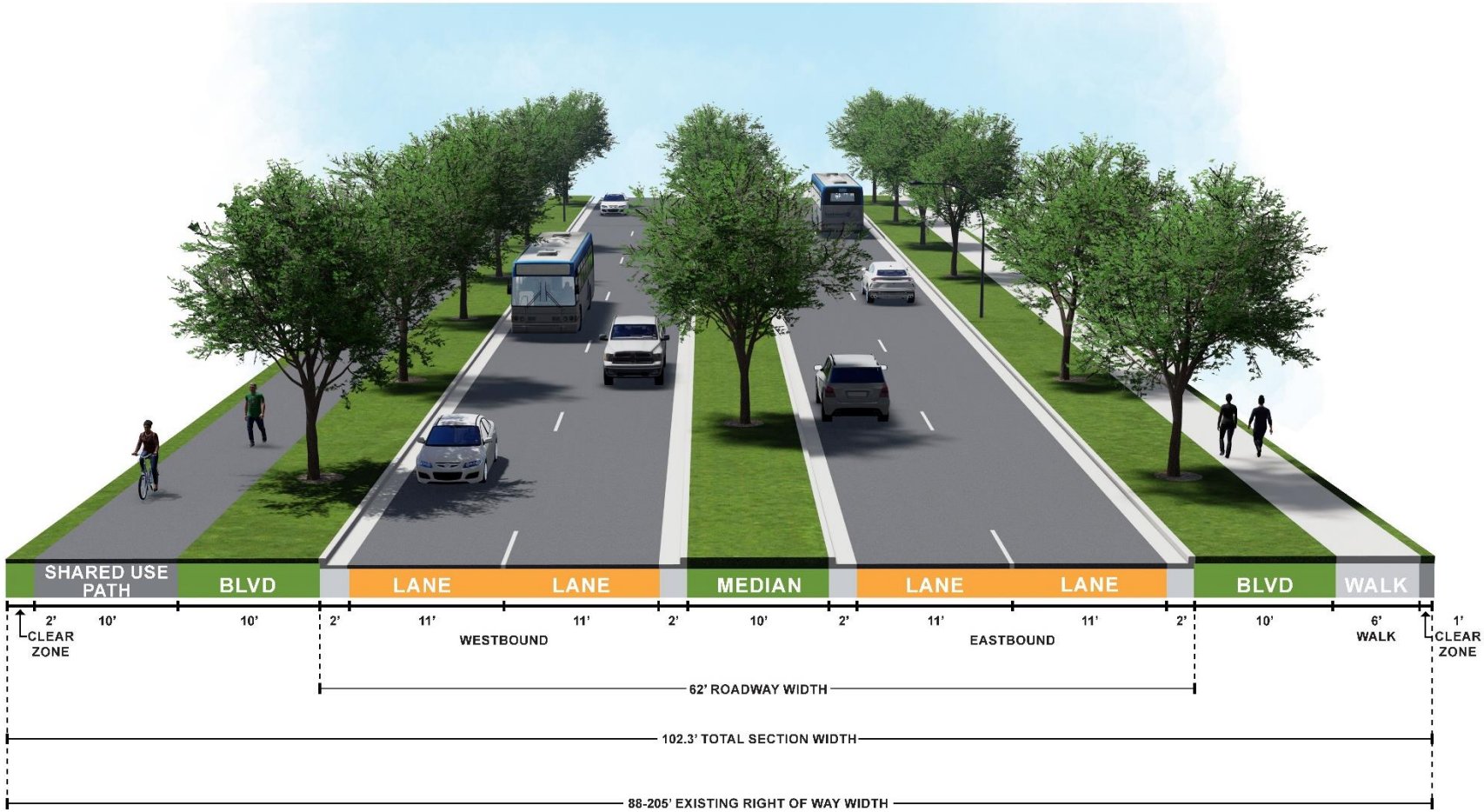
Figure 14 - Zones 1 and 5: Alternate Concept



As described in **Section 6**, there is interest in exploring opportunities to use gateway features in Zones 1 and 5 to better establish a sense of place along Central Entrance, welcoming visitors to Duluth. One example of a gateway feature that could be added to the center median is shown on the following page.

CSAH 20 (Blake Road), Hopkins, MN

Figure 15 - Zones 1 and 5: Recommended Concept Visualization



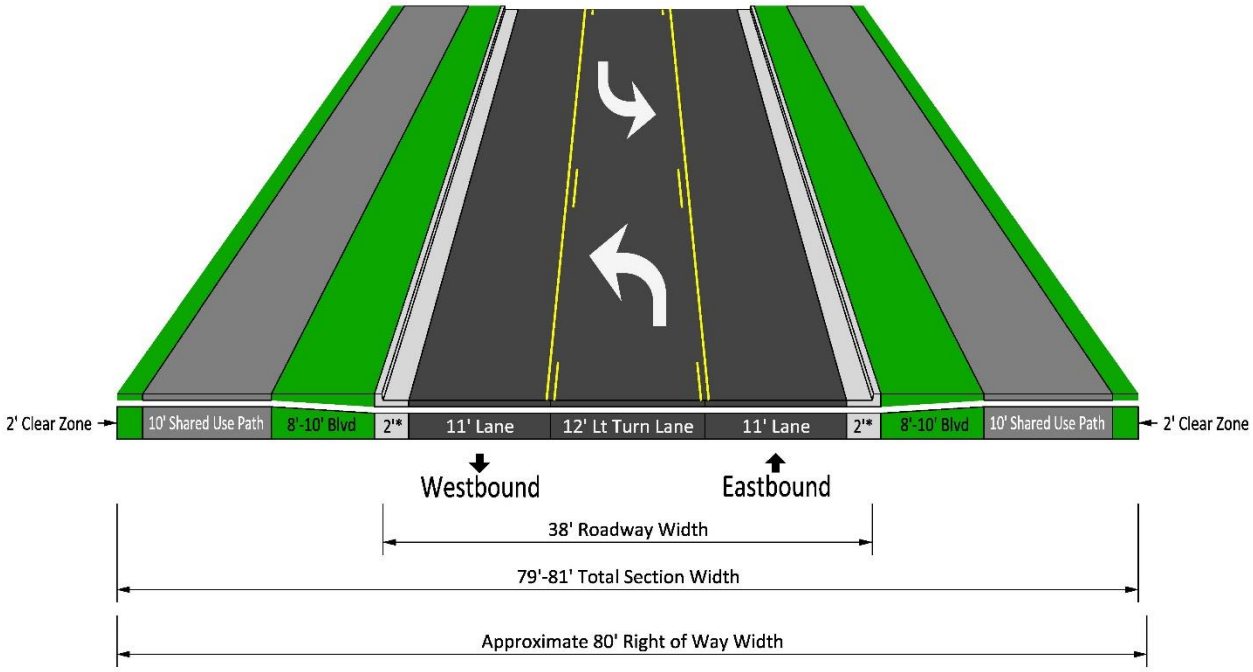
7.3.2 Zones 2-4

Although existing land uses and roadway sections vary across Zones 2-4, there are several similarities in terms of available right of way and transportation needs. The existing right of way in Zones 2-3 is approximately 80 feet, expanding slightly to approximately 86 feet in Zone 4. This means that available space is much more constrained than in Zones 1 and 5. As a result, the concepts developed include options for attempting to meet project goals using only the available space and options that would require MnDOT to purchase additional right of way. To the extent possible, a consistent design should be maintained through Zones 2-4 to provide a predictable environment for all users. Three potential concepts for these zones are described on the following pages.

Three-Lane Section Concept (two travel lanes)
This concept is centered around a design with a total of two travel lanes, one eastbound and one westbound, as shown in **Figure 16.** The key features of this concept include:

- One 11-foot travel lane in each direction
- A 10-foot shared use path on both sides of the road
- A 12-foot center left-turn lane
- 8-10-foot boulevards on both sides of the road between the travel lane and the shared use path

Figure 16 - Zones 2-4: Three-Lane Concept



There are a number of anticipated benefits from the three-lane concept:

- Shared use paths provide safe, separated areas to walk and bike

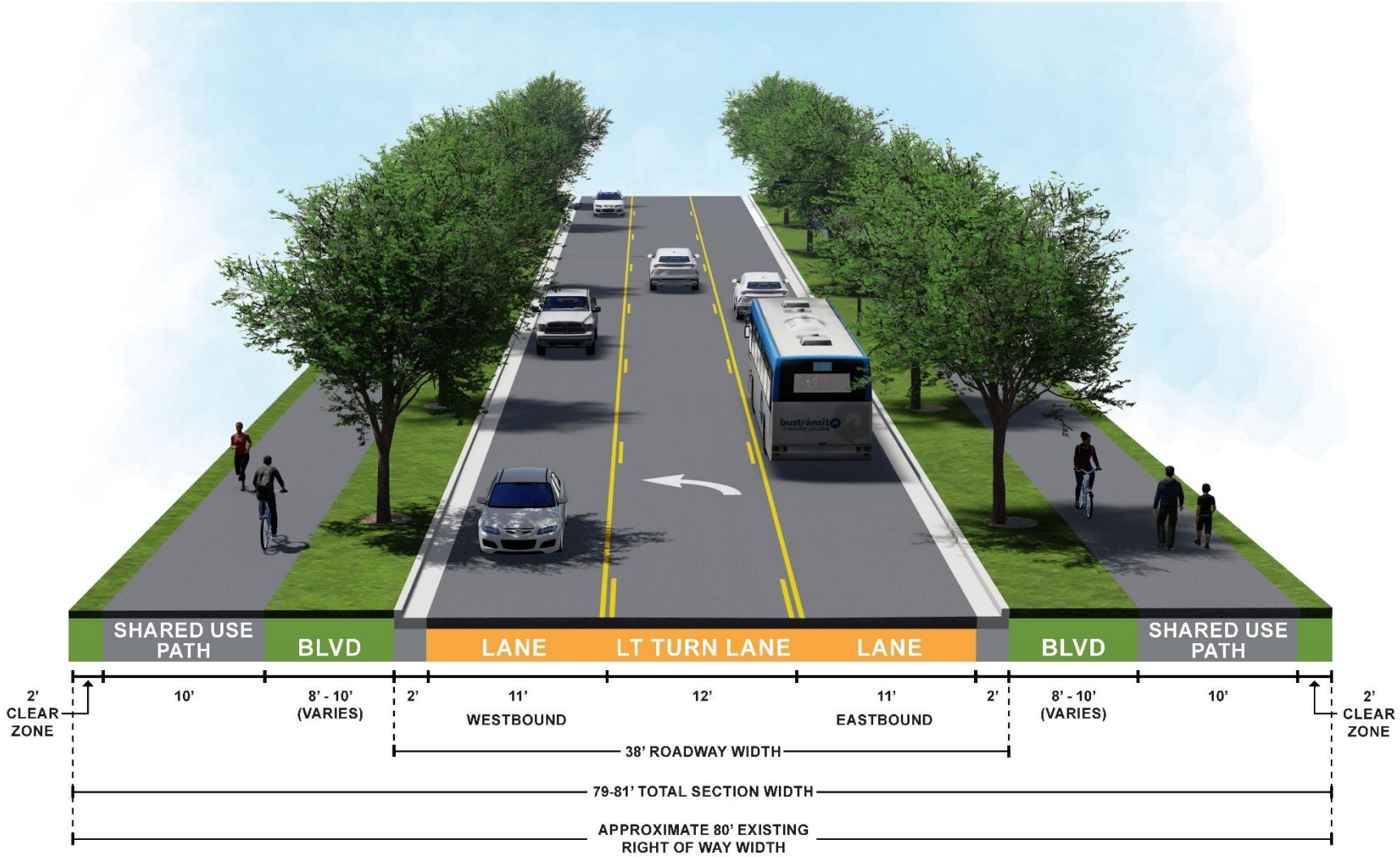
- Potential mid-block crossing locations are improved by allowing for a crossing island in the median, shortening the crossing distance for people walking and biking (people have to cross only one lane of traffic at a time)
- Crossing distances at intersections may be reduced, depending on the intersection design
- Road diets can reduce the risk of crashes and serious injuries
- Boulevard areas provide winter snow storage area, keeping shared use path clear
- Wide boulevards create opportunity to add trees, stormwater treatment, or other landscaping

Several potential challenges of implementing this concept include:

- Careful design will be needed to transition to the Zones 1 and 5 concept
- Reduces the lane capacity of the roadway, potentially impacting traffic operations
- Restricts transit vehicle operations and limits future options for bus-only lanes

Figure 17 shows an enhanced visualization of the three-lane concept for Zones 2-4.

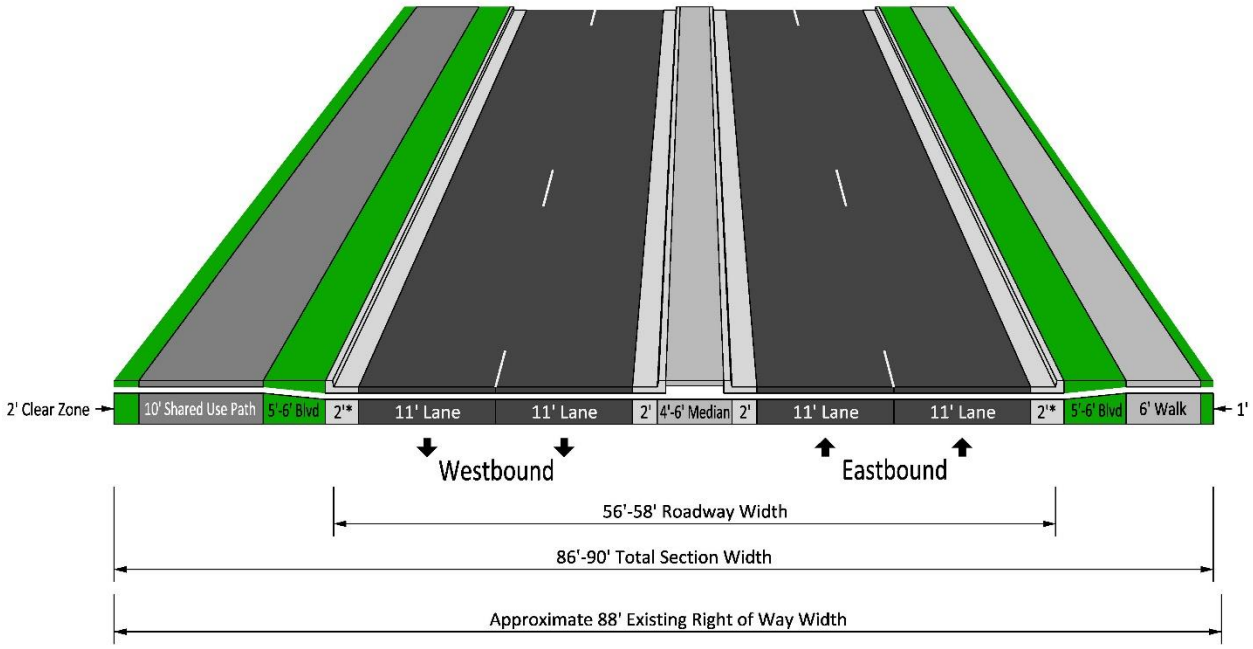
Figure 17 - Zones 2-4: Three-Lane Concept Visualization



Four-Lane Section Concept (four travel lanes)
This concept is centered around a design with a total of four travel lanes as shown in **Figure 18**. The key features of this concept include:

- Two 11-foot travel lanes in each direction
- A 6-foot sidewalk on the south side of the road
- A 10-foot shared use path on the north side of the road
- A 4-foot center median, widening to 6 feet at pedestrian crossing locations
- 5-6-foot boulevards on both sides of the road between the travel lanes and the sidewalk or shared use path

Figure 18 - Zones 2-4: Four-Lane Concept



There are a number of anticipated benefits from the four-lane concept:

- Sidewalk and shared use path provide safe, separated areas to walk and bike
- Center median provides a refuge for people crossing the street at intersections or mid-block crossings and helps manage access for turning vehicles
- Boulevard areas provide winter snow storage area, keeping sidewalk/shared use path clear
- Maintains similar vehicle capacity to the existing roadway by keeping four travel lanes
- Maintains an outside lane for use by transit vehicles, and provides an option for future conversion to a bus-only lane

Several potential challenges of implementing this concept include:

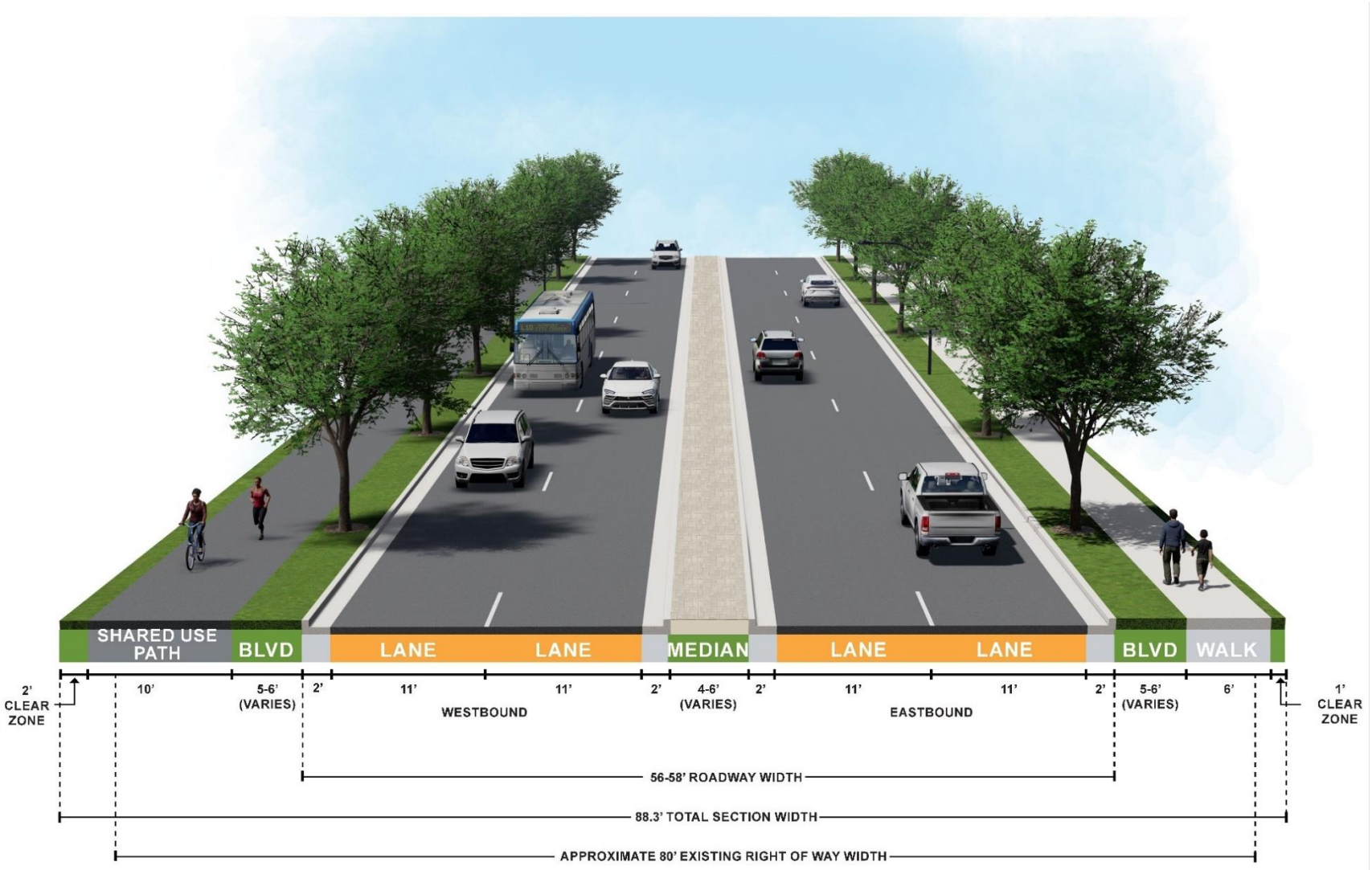
- Exceeds the available right of way width, and requires MnDOT to purchase additional right of way to implement (with dimensions shown)
- Careful design will be needed to transition to the Zones 1 and 5 concept
- While travel along Central Entrance for people walking and biking will be greatly improved, special attention will need to be paid to mid-block and intersection crossings, as users will still need to cross two lanes of vehicle traffic at a time.
- While boulevard and median areas are present, the narrower width limits options for street trees, stormwater treatment, or other landscaping compared to Zones 1 and 5.
- People might bike on the sidewalk

While the shared use path could be provided on either side of the roadway, it is shown on the north side of the road in this concept for several reasons:

- There is an existing bike route south of Central Entrance that is a combination of a signed shared lane on Palm Street and an existing multiuse trail. A shared use path along the north side of Central Entrance creates a parallel route for bicycle travel that does not require crossing the roadway.
- There are portions of Zones 2-4 with no or fewer driveways that would hinder shared use path construction and operations.
- There are schools on and just beyond the north side of the corridor (see **Figure 1**).

Figure 19 shows an enhanced visualization of the four-lane concept for Zones 2-4.

Figure 19 - Zones 2-4: Four-Lane Concept Visualization



One-Way Pair Concept

This concept is centered around a design that expands the project area to include both Central Entrance and Palm Street. Two westbound travel lanes would be provided on Central Entrance, and two eastbound travel lanes would be provided on Palm Street, as shown in **Figure 20**. The key features of this concept include:

- On Central Entrance:
  - Two 11-foot westbound travel lanes
  - 6-foot sidewalk on both sides of the road
  - 5-foot cycle track on both sides of the road (providing both eastbound and westbound travel on the corridor)
  - 10-foot boulevards between travel lanes and cycle track

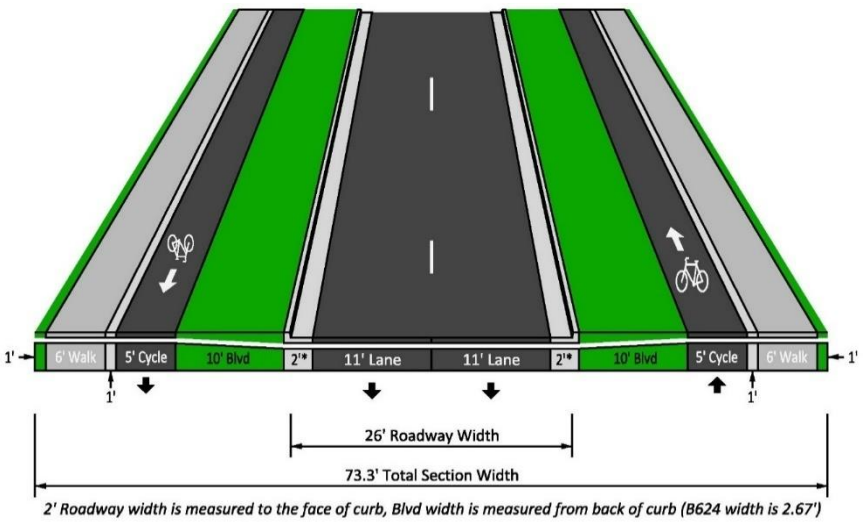
- On Palm Street:
  - Two 12-foot eastbound travel lanes (may vary, would match existing street width)
  - Boulevard and pedestrian and bicycle facilities to be determined based on existing street widths

There are a number of anticipated benefits from the one-way pair concept:

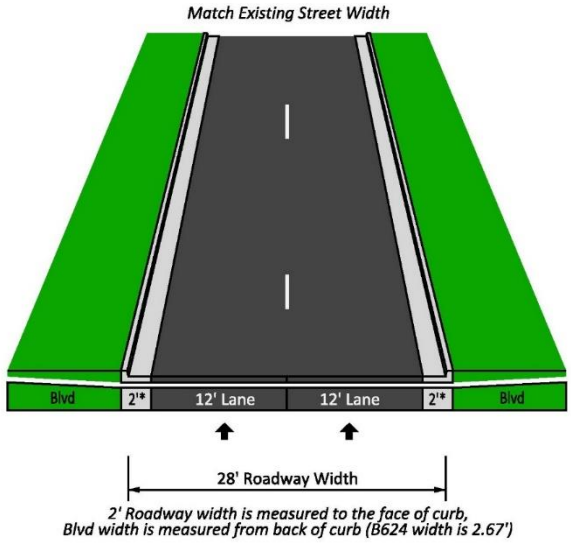
- Sidewalks and cycle tracks provide safe, separated areas to walk and bike (in both directions)
- Shortens the crossing distance for people walking and biking by removing two travel lanes on Central Entrance
- Provides high level of vehicle capacity by maintaining two travel lanes in each direction
- Boulevard areas provide winter snow storage area, keeping sidewalks and cycle tracks clear
- Wide boulevard areas create opportunity to add trees, stormwater treatment, or other landscaping

Figure 20 - Zones 2-4: One-Way Pair Concept

Central Entrance (Westbound)



Palm Street (Eastbound)



The potential challenges of implementing the one-way pair concept include:

- The City of Duluth and the Duluth Transit Authority are currently not in favor of this concept.
- Careful design would be needed to transition to the Zones 1 and 5 concept and determine where the one-way pair would start and end.
- Potential for significant right of way acquisition, relocation, and/or purchase of entire properties at connection points between Central Entrance and Palm Street (near Zones 1 and 5)
- One-way streets encourage higher motor vehicle speeds and limit how walk-, bike- and transit-friendly the street is

- Creates a "pass-through" feel and may limit how people reach their destinations—people may need to travel further (more vehicle circling)
- Many cities are converting their one-way streets back to two-way streets, including in downtown Duluth
- Multi-lane one-ways still create multiple threat conditions for pedestrians
- Two-way bicycle travel along a one-way road may result in confusing movements
- Increases traffic on Palm Street, which currently operates as a low-volume neighborhood street and backage road
- Restricts access for property owners and residents along both corridors to one direction of travel (right-in/right-out or left-in/left-out)
- Potential negative impact on property values along Palm Street due to increased noise and other impacts associated with higher traffic volumes
- Potential to negatively impact existing transit operations by introducing additional route deviation
- Complicates existing transit service and future BRT implementation by increasing the distance transit users must walk between stops in opposite directions
- Requires construction of additional sidewalks or other pedestrian infrastructure to maintain connections between transit stops and other destinations

Note that while a separate visualization is not shown for the one-way pair concept, many of the treatments shown in the other Zone 2-4 concepts could be applied to this concept.

High-level Concept Evaluation
To help support MnDOT's decision making process as the project moves into the design phase, the project team conducted a high-level evaluation of the primary base options that could be implemented in Zones 2-4 based on the overall planning process goals outlined in **Section 2**. This information draws on the potential benefits and challenges described above and is provided in **Table 7**. Each cell includes a "Yes," "Mixed/Unclear," or "No" response indicating whether or not the concept is likely to advance each component of the planning process goals. A brief explanatory statement is also provided. This evaluation is not meant to address all components that should be evaluated, but instead provides a starting point for the alternatives evaluation and public engagement to be conducted during the design phase.

The one-way pair concept was discussed extensively among the Steering Committee and project team members. As noted above, it has the potential for impacts to the surrounding neighborhood and land uses during both construction and operations. There are concerns from the City of Duluth about the overall economic impact of the concept and from the DTA about the impact on transit operations and future BRT plans. Under a full alternatives analysis completed as part of a future environmental documentation process, it is anticipated that a one-way pair concept would not score favorably when compared with the three- or four-lane concepts. These other concepts are more likely to be advanced.

Although not shown in **Table 7**, reconstruction of Central Entrance exactly as it exists today should not be advanced as a viable alternative. The issues noted in the existing conditions section above would not be addressed, and the planning process goals would not be advanced.

Table 7 - Zones 2-4 Primary Base Concept Evaluation

Goal	Three-Lane Section	Four-Lane Section	One-Way Pair
Walkability	**Yes -** Additional space for sidewalks and shared use paths. Crossing distances are also reduced where median refuges are provided.	**Mixed/Unclear -** Additional space for sidewalks and shared use paths. Median provides pedestrian refuge. People walking must still cross two vehicle travel lanes at once.	**Mixed/Unclear -** Additional space for sidewalks and shared use paths. Crossing distances are reduced. Walking distances and vehicle speeds likely to increase.
Bikeability	**Yes -** Additional space for shared use paths. Crossing distances are also reduced where median refuges are provided.	**Mixed/Unclear -** Additional space for shared use paths. Median provides pedestrian refuge. People biking must still cross two vehicle travel lanes at once.	**Mixed/Unclear -** Additional space for shared use paths. Crossing distances are also reduced. Two-way bicycle travel along a one-way road may result in confusing movements. Biking distances and vehicle speeds likely to increase.
Transit	**Mixed/Unclear -** Improves access to transit stops. Limits future options for transit-only lanes. Impact on transit operations unclear.	**Yes -** Improves access to transit stops. Maintains future option for transit-only lanes.	**No -** Potential to negatively impact transit operations. Increases distance between transit stops.
Motorized Vehicles	**Mixed/Unclear -** Reduces number of travel lanes. Potentially increases travel times. Impact on crashes and safety unclear.	**Yes -** Maintains current number of travel lanes.	**Mixed/Unclear -** Maintains current number of travel lanes. One-ways may require backtracking to reach destinations.
Encourages Development	**Yes -** Improves access to adjacent land uses for people walking and biking. Provides opportunities for aesthetic improvements and placemaking.	**Yes -** Improves access to adjacent land uses for people walking and biking. Provides opportunities for aesthetic improvements and placemaking.	**No -** Potential to discourage development and reduce property values.

7.3.3 Project Elements

In addition to the primary base option concepts, a variety of other design elements were discussed with the Steering Committee and the public. These include a wide range of safety, aesthetic, and streetscape features that could apply to multiple concepts and address issues related to all modes of transportation on Central Entrance. These elements should be incorporated into the final design for all zones where effective and viable to advance the guiding values and project goals. They are meant to be a starting point rather than a limited set of options. **Table 8** outlines the benefits and potential challenges of implementing these elements. Elements that have been designated as Proven Safety countermeasures by the Federal Highway Administration (FHWA) have been noted.

Table 8 - Benefits and Potential Challenges of Preferred Multimodal, Safety, and Placemaking Elements

Preferred Elements	Benefits	Potential Challenges
Boulevards[4] 	• Provides separation between vehicles and nonmotorized users, which increases the comfort and quality of the walking/biking environment • Creates a winter snow storage area to keep sidewalks or shared use paths clear • Provides space for stormwater treatment, street trees, or landscaping	• Can require additional right of way • Requires additional maintenance if stormwater treatment or aesthetic features are added
Center Median and Pedestrian Refuge Islands[1] 	• ***FHWA Proven Safety Countermeasure*** • Separates opposing vehicle travel lanes and allows pedestrians/bicyclists to cross the roadway in two stages rather than all at once • Reduces certain types of motor vehicle crashes • Can slow vehicle speeds by providing visual narrowing/traffic calming of the roadway • May provide space for stormwater treatment or landscaping	• Restricts driveway access • May require more significant design features and construction costs if stormwater management is impacted • Can require additional right of way • Can require winter maintenance

Preferred Elements	Benefits	Potential Challenges
Shared Use Path[5] 	• ***FHWA Proven Safety Countermeasure*** • Creates a safe and comfortable facility for people walking and biking that is separated from motor vehicles • Can reduce travel times for nonmotorized users if it creates a more direct route to destinations. • Encourages multimodal activity and active living	• May require additional right of way or utility relocations • Requires winter maintenance • May require additional lighting for personal safety • Requires careful intersection and driveway design
Sidewalk[4] 	• ***FHWA Proven Safety Countermeasure*** • Improves the safety and mobility of people walking • Encourages multimodal activity and active living	• May require additional right of way or utility relocations • Requires winter maintenance • May require additional lighting for personal safety
Raised Crosswalk[1] 	• ***FHWA Proven Safety Countermeasure*** • Improves driver ability to perceive and react to bicyclists and pedestrians in the intersection • Reduces vehicle speeds at intersections • Reduces bicycle and pedestrian crash severity • Has been shown to reduce pedestrian crashes by 45 percent	• Feasibility depends on roadway speed • Requires careful design to avoid creating an obstacle for low-clearance commercial and emergency vehicles. • Winter maintenance considerations

Preferred Elements	Benefits	Potential Challenges
Leading Pedestrian Interval[1] 	• ***FHWA Proven Safety Countermeasure*** • Can be added to many existing traffic signals at low cost • Increases visibility of crossing pedestrians, especially slower pedestrians • Improves comfort for pedestrians at high volume intersections • Increases likelihood of motorists yielding to pedestrians. • Has been shown to reduce pedestrian-vehicle crashes by 60 percent at intersections	• Can increase delay for drivers • May not work with older traffic signals
Pedestrian Hybrid Beacon (PHB)[3] 	• ***FHWA Proven Safety Countermeasure*** • Improves visibility of pedestrians at mid-block crossings • Assigns right of way for vehicles and pedestrians • Effective option for crossing locations with higher speeds and vehicle volumes but no traffic signal warranted • Has been shown to lead to a 55 percent reduction in pedestrian crashes, 29 percent reduction in total crashes, 15 percent reduction in serious injury and fatal crashes, and over 90 percent compliance rate	• Education key to effectiveness • Appropriate only for locations with moderate to high pedestrian crossing needs • Challenging on roadways with high driveway density • Can increase vehicle delay

Preferred Elements	Benefits	Potential Challenges
Roundabouts[2] 	• ***FHWA Proven Safety Countermeasure*** • Potential to increase intersection capacity compared to signalized intersection (depending on signal and roundabout configuration) • Reduces vehicle speeds • Medians at intersection legs decrease crossing distance for pedestrians • Reduces the severity of crashes • Typically cost less to maintain than a signalized intersection	• Multi-lane roundabout crosswalks have more conflict points than single lane, and may require additional enhancements such as raised crosswalks, Rectangular Rapid Flashing Beacons (RRFBs), Pedestrian Hybrid Beacons (PHBs), etc. • May require additional right of way • May lead to an increase in the number of crashes at the intersection
Turn Lanes[2] 	• Improves vehicle operations by creating separation between turning vehicles and through traffic • Reduces the potential for crashes involving turning vehicles	• Can require additional right of way • Increases the number of lanes that people biking and walking must cross
Street Trees[4] 	• Slows traffic by constricting the view space of drivers • Provides shade for sidewalk and shared use path users, and people waiting for transit. Improves attractiveness of using these modes • Improves sense of place	• Additional up-front cost to plant • Requires additional ongoing maintenance (both for trees and sidewalk/shared use path facilities below)

Preferred Elements	Benefits	Potential Challenges
Sidewalk/Shared Use Path Lighting[2] 	• Increases visibility and sense of safety • Can improve ability of drivers to see people walking and biking	• Additional installation costs if constructed in addition to street lighting • Can require additional right of way
Green Stormwater Infrastructure[2] 	• Can improve water quality • Can help reduce overall stormwater volume by treating water in place • Can help reduce stormwater flows during heavy rain events	• Requires regular upkeep and maintenance to function properly • Effective locations determined by treatment type, physical constraints, soil conditions, slopes, and other factors

Sources: Minnesota's Best Practices for Pedestrian and Bicycle Safety (January 2021), FHWA Proven Safety Countermeasures, NACTO Urban Street Design Guide
Photo Credits: (1) Minnesota's Best Practices for Pedestrian and Bicycle Safety; (2) WSB; (3) FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations; (4) Google Street View; (5) MnDOT Bicycle Facility Design Manual

Table 9 identifies the objectives from the MIC's Long-Range Transportation Plan (LRTP) that may be advanced by the implementation of each project element.

Table 9 - LRTP Applicability of Preferred Multimodal, Safety, and Placemaking Elements

Preferred Elements	Likely or Potential LRTP Objectives to be Met
Boulevards	To be added
Center Median and Pedestrian Refuge Islands	
Shared Use Path	
Sidewalk	
Raised Crosswalk	
Leading Pedestrian Interval	
Pedestrian Hybrid Beacon (PHB)	
Roundabouts	
Turn Lanes	
Street Trees	
Sidewalk/Shared Use Path Lighting	
Green Stormwater Infrastructure	

Sources: Long Range Transportation Plan - Sustainable Choices 2045 (MIC, 2019)

7.3.4 Design and Evaluation Guidance

There is ample evidence and design guidance to support the vision for Central Entrance, including:

- FHWA *Bikeway Selection Guide*
- FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*
- MnDOT *Statewide Pedestrian System Plan*
- MnDOT *Bicycle Facility Design Manual*
- MnDOT *Minnesota's Best Practices for Pedestrian and Bicycle Safety*
- ITE *Implementing Context Sensitive Design on Multimodal Corridors*
- National Association of Transportation Officials (NACTO) Street Design Guides

Communities embracing the change in street design focused on integrating transportation and land use policies and practices that advance multimodal, compact, walkable form are seeing an increase in walking, biking, and transit and spurring greater community support. It is a self-perpetuating cycle that ultimately shows that transportation projects of the future help **build and connect community**, while also moving people and goods through a community.

To achieve a more balanced, safe, complete, and welcoming multimodal corridor the practice of how streets are designed, evaluated, and maintained requires a multimodal approach to evaluation. Traditional planning and engineering measures, such as vehicle Level of Service (LOS), vehicle throughput, and long-range traffic projections, cannot be the sole measure of performance or decision making. The Institute of Transportation Engineers (ITE) *Implementing Context Sensitive Design on Multimodal Corridors: A Practitioner's Handbook*, outlines methods to remain future minded without limiting a project from investing in quality infrastructure to support walking, biking and transit,

especially when traditional traffic projections predict a growth of vehicle travel; there is limited data on the number of people walking, biking, or using transit; or maintenance practices are not yet aligned. For example, the handbook states that capacity should be focused on the movement of people and goods versus capacity in terms of vehicle volumes. This starts to favor many user groups from bicyclists, transit to freight over single occupancy vehicles.

As MnDOT and project partners move the vision for Central Entrance forward, an equal level of rigor should be applied to improving mobility outcomes for people walking, biking, using other mobility devices (e.g. wheelchairs, scooters) or transit.

Key Questions for Further Analysis
The project team developed a list of key questions related to safety and operations for all transportation modes that further evaluation of the concepts should answer. These questions will add further detail to the high-level evaluation provided in this Plan:

- How does the concept respond or not respond to community needs?
- What are the potential impacts to people and resources along Central Entrance?
- What additional treatments are needed to reduce conflicts between people biking and walking, and between these users and motor vehicles (if any)?
- How does two-way bicycling impact driveway, crossings, and intersection design to ensure conflict is minimized? What additional measures are needed for crossings/crossing locations to connect people biking to the shared use path?
- Is sidewalk bicycling allowed/okay? If not, is bicycling a high priority mode on Central Entrance? If so, how can the roadway space be reconfigured to better support people biking and connections to destinations on both streets? If not, what parallel routes and connections need to be improved to support people biking and help them link to key destinations, including transit?
- How does the lane configuration maintain or improve transit efficiency and impact transit travel times?
- How does this roadway configuration preserve flexibility so future BRT efficiency can be improved (e.g. dedicated lane) to make it more reliable and viable choice for people?
- How does boulevard space support transit/BRT needs (e.g. stop design)?
- How could improvements at intersections such as transit signal priority or bus- and right turn-only lanes keep transit moving effectively through the corridor, while managing turning movements at intersections?
- How is overall safety improved? What type of vehicle crashes are reduced (or not)? Are intersections and mid-block crossings safer?
- How do intersection changes help achieve the desired target speed and improve safety at the intersections?
- Are there opportunities to make new street network connections that reduce the pressure of all cars needing to use Central Entrance?
- How much time will be added to a person's trip by car compared to the time it takes to travel in a car along Central Entrance today? How should travel time increases for vehicles (may or may not include transit) be weighed against other benefits?

- How does the intersection help to better manage vehicle flow (e.g. support with access management, turning movements, and traditional planning measures like LOS)?
- How can signal timing changes help manage traffic flow?
- How does boulevard and/or median space support landscaping, stormwater and/or maintenance? What are additional considerations?

7.3.5 Preliminary Concept Testing

Preliminary traffic modeling was conducted to provide information on the potential impacts of implementing the three-lane section and one-way pair concepts. Additional traffic operations analysis and further analysis of other issues will be necessary to select a final concept.

The traffic operations analysis results suggest that a three-lane concept between Anderson Road and Pecan Avenue may be feasible, depending on how many trips are diverted to other roadways. Modest growth of 3-4 percent to the year 2045 is expected along Central Entrance. Between 24 and 28 percent of existing traffic could divert from Central Entrance under a three-lane concept due to the reduced roadway capacity. A three-lane facility is likely to lead to increased travel times through the corridor, however additional benefits could be provided for transit, bicyclists, and pedestrians.

An analysis of potential roundabouts at Anderson Road, Arlington Avenue (CSAH 90), and Pecan Avenue was also conducted for the three-lane concept, as well as the current roadway configuration. Roundabouts at Anderson Road and Pecan Avenue may be feasible with a three-lane concept if traffic diverts to other routes as the model suggests. If no traffic diverts, there will be a noticeable increase in travel times and delay compared to signalized intersections, however roundabouts may still provide important safety benefits.

The initial analysis suggests that the Arlington Avenue intersection is not an ideal candidate for a roundabout. Under a three-lane scenario, it is expected that travelers would experience poor operations. A four-lane corridor roundabout may be feasible. Implementation of any roundabouts will require an analysis of roadway impacts and available right of way to determine if construction is feasible.

The traffic operations analysis for the one-way pair concept indicated no expected operational or LOS issues. A roundabout analysis was not completed for this scenario. It is expected that acceptable operations would be maintained under roundabout control. Additional details on the preliminary traffic modeling can be found in **Appendix E** and **Appendix F**.

7.4 Land Use Scenarios

7.4.1 Introduction

The project team conducted a land use scenario analysis to complement the development of roadway concepts. The purpose of this analysis is to illustrate the potential for development along Central Entrance and make the visioning process more comprehensive by incorporating land use. Based on discussions with the Steering Committee, the land use scenarios focused on the potential for transit-

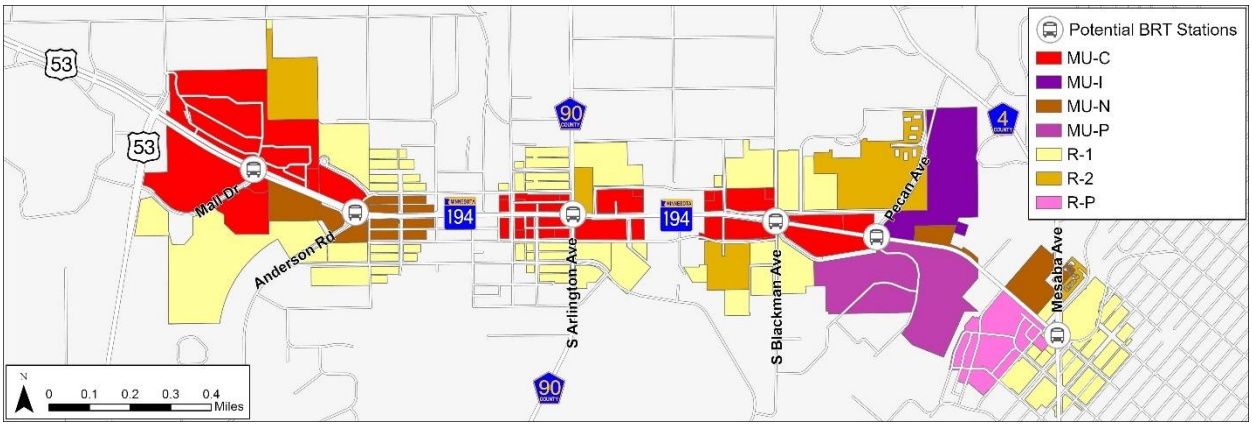
oriented development around anticipated DTA "pre-BRT" stops. With assistance from the DTA, the team identified six nodes where potential bus rapid transit stations could be located along Central Entrance:

- Mall Drive
- Anderson Road
- Arlington Avenue (CSAH 90)
- Blackman Avenue
- Pecan Avenue
- Mesaba Avenue

7.4.2 Identify Target Zoning

The team created 1/4-mile buffers around each of the six nodes and identified all parcels within this buffer. These parcels became the land use study areas. The total area of these parcels is 2,069 acres. The current zoning of each of these parcels was also identified (**Figure 21**).

Figure 21 - Study Nodes: Existing Zoning



After reviewing Duluth's zoning code, the team looked at rezoning all parcels to a singular zone that would give the highest redevelopment density potential around the transit stops. Three zoning districts were analyzed: Mixed Use Commercial (MU-C), Mixed Use Neighborhood (MU-N), and Residential Urban (R-2). The target zoning district was based on the highest density and most uses allowed. Density and allowable uses for each district are shown below.

<u>Density</u>

- MU-C – allows 87 units/acre
- MU-N – allows 87 units/acre, but stricter setbacks than MU-C
- R-2 – allows 58 units/acre

<u>Uses</u>

- MU-C: Allows the most permitted retail/commercial opportunities as well as the largest square footage allowed. No single-family homes are permitted.
- MU-N: Allows some permitted retail/commercial uses but less than MU-C and at a smaller scale. Allows single-family homes (undesirable).

- R-2: Virtually no permitted retail/commercial uses. Intended for residential homes.

Based on this information, the team concluded that rezoning the project area to MU-C would allow for the highest density redevelopment opportunities to serve future transit stops.

7.4.3 Identify Existing Value

After identifying the target zoning district, the team examined redevelopment values for the project area. Using 2021 St. Louis County Assessment Data for each parcel, the current value per unit (residential) or per square foot (commercial) was calculated. The number of dwelling units for residential properties and building square footage for non-residential properties was included in the data. The assessed value of these properties was divided by the number of units or by the total building square footage.

There is a total of 3,586 total existing dwelling units in the identified nodes with a combined value of $271,890,227. The combined value divided by the number of dwelling units equals $75,820 per unit. There is a total of 5,655,443 square feet of non-residential space with a combined value of $274,325,564. The combined value divided by the square footage equals $48.50 per square foot. The combined total existing total is approximately $546 million.

7.4.4 Identify Potential Value

Based on conversations with City of Duluth staff, the team referenced Kenwood Village, a newer MU-C redevelopment project, to have a comparable project to understand how the Central Entrance study area nodes could develop in the future.

Kenwood Village development

Using 2021 assessment data for Kenwood Village, the team calculated its residential value at $157,000 per unit and its retail space at $108 per square foot. These values were applied to the project area. As noted earlier, the project area is 2,069 acres and MU-C allows a maximum density of 87 units/acre. At the maximum density, the project area could allow 180,003 residential units. The total maximum potential residential value equals the maximum number of units multiplied by the value per unit of Kenwood Village for a total of roughly $28 billion. Converting 2,069 acres to square feet results in 90,125,640 square feet of potential retail space. The total maximum retail value equals total square footage multiplied by the value per square foot of Kenwood Village retail for a total of roughly $9.7 billion. Total combined maximum potential value for residential and non-residential is $37.7 billion.

7.4.5 Realistic Potential Value

Realistically, creating 180,000 residential units and 90 million square feet of retail along Central Entrance is not a reasonable expectation, especially within a reasonable timeline. To formulate a realistic approach, the team determined the yearly average of new housing permits for units of five or more family dwellings the City of Duluth granted over the past 10 years, which is 166 (**Table 10**), and assumed 20 percent of new yearly permits are near Central Entrance (33 units per year). Over a period of 25 years, Central Entrance could create 825 residential units. At $157,000 per unit, $129.5 million of realistic potential residential value could be created.

Table 10 - City of Duluth Residential Housing Permits by Year

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
New permits (residential)	146	151	132	105	87	45	31	55	25	35	41	58	32	43	49	59	72	37
Units of 1 family dwellings	138	121	113	87	70	36	31	36	21	33	39	44	29	42	46	40	57	31
Units of 2 family dwellings	10	30	17	2	26	8	0	34	4	4	4	4	0	0	0	16	15	4
Units of 3 or 4 family dwellings	8	28	16	19	0	0	0	6	0	0	0	16	0	0	0	4	1	
Units of 5 or more family dwellings	6	206	103	494	18	104	0	0	16	106	60	126	381	54	153	154	454	160
Number of Units Created	**162**	**385**	**249**	**602**	**114**	**148**	**31**	**76**	**41**	**143**	**103**	**190**	**410**	**96**	**199**	**214**	**527**	**195**

Source: City of Duluth Housing Indicator Report 2020, *Table 20: Residential Housing Permits*

To calculate potential retail development, the square footage of Kenwood Village (14,733 square feet) was divided by the number of residential units at Kenwood Village (83) to determine retail space per unit (177 square feet/unit). A total of 825 potential units in the project area multiplied by 177 square feet/unit equals roughly 146,000 square feet of potential retail space. This retail space multiplied by the value per square foot ($108) equals approximately $15.8 million of realistic potential retail value that could be created. An assumption is made that there will be an equal portion of strictly retail space built for every MU-C retail space. Using this assumption, the strictly retail space would also be valued at $15.8 million for a total realistic potential retail value of roughly $31.5 million. Total combined realistic potential value for the project area, both residential and retail, is roughly $161 million.

Table 11 summarizes the findings of the land use scenario analysis. Key characteristics are provided for each of the following scenarios outlined in great detail above:

Existing: Current residential and retail development in the study area nodes.

Maximum Density Scenario: Maximum development potential city code allows for the MU-C zoning district within the study nodes. Does not consider time or market trends.

Realistic Development Scenario: Feasible development scenario based on housing permit history and retail market assumptions for Central Entrance over time. Some of the project area will develop, but the remainder would stay the same.

Table 11 - Land Use Scenario Summary

	Existing	Max. Density Development Scenario (unrealistic)	Realistic Development Scenario (realistic)
Dwelling Units	3,586 units (includes single-family homes)	180,003 units (only 5 or more dwelling units)	825 units over 25 years (only 5 or more dwelling units)
Residential Value per unit ($)	$~75,820/unit	$~157,000 per unit*	$~157,000 per unit*
Total Residential Value ($)	$~272 million	$~28 billion	$~129.5 million
Standalone Retail Space (sf)	5,655,443 sf	0 sf	146,000 sf
Mixed Use Retail Space (sf)	0 sf	90,125,640 sf	146,000 sf
Total Retail Space (sf)	5,655,443 sf	90,125,640 sf	292,000 sf
Retail Value per square foot	$~48.50/sf	$~108/sf*	$~108/sf*
Total Retail Value	$~274 million	$~9.7 billion	$~31.5 million
Total Project Area Value	$546 million	$~37.7 billion	$~161 million

*Based on Kenwood Village development

7.4.6 Trip Generation

Based on the realistic development scenario, an estimate of the approximate number of additional trips that would be generated by developments in the study area nodes over a 25-year period was calculated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual. This estimate was based on high level assumptions of the types of retail and commercial destinations that could be developed in addition to new multifamily development. Over a 25-year growth period, the additional development described in the scenario could generate roughly 17,000 additional weekday trips, or an increase of 4.6 percent over the current number of weekday trips estimated through a high-level review of existing land uses.

With the potential implementation of BRT as well as improved nonmotorized transportation facilities, it can be assumed that some portion of these additional trips would be taken via transit, biking, or walking. This analysis is purely preliminary and is based on high-level assumptions. More detailed traffic studies will be required as specific developments are proposed to determine the impacts of these land

use changes in greater detail. Additional data from the trip generation analysis is provided in **Appendix G**.

8 Next Steps

The purpose of the Central Entrance Vision Plan was to establish a cohesive vision for the Central Entrance corridor. As MnDOT moves into the pre-design process, additional analysis and public involvement will be necessary to refine the vision established in this Plan. The concepts developed as part of this Plan are high-level, and will require further study and engineering analysis before moving forward. Project design and engineering are anticipated to take place between 2022 and 2025, with construction in 2026. This schedule may change based on funding opportunities, engineering analysis, or other factors.