Introduction

Study Area Overview

The University Drive and 10th Street corridors are significant north-south roadways in Fargo and provide access to key areas of the city like downtown, North Dakota State University (NDSU), the Fargodome, Sanford Health Athletic Complex, multiple core neighborhoods, several schools, and the north Fargo Sanford Health campus.

The two corridors form a one-way pair between 13th Avenue South and 19th Avenue North, with University Drive carrying southbound traffic and 10th Street carrying northbound traffic. The one-way pair segment is designated as US Highway 81.

Purpose of Study

The *University Drive and 10th Street Corridor Study* (the study) is to evaluate the existing one-way pair between 13th Avenue South and 19th Avenue North to identify roadway improvements that can mitigate safety, multimodal, and traffic flow issues that either exist today or are anticipated to be exacerbated by changes in travel patterns.

A major component of the corridor study will be assessing the value of converting the one-way pair to two-way operations, and the impacts that such a change would have for roadway users, study area residents, and businesses. While the one-way to two-way conversion assessment is a vital component of this study, other improvement types (including some that maintain the existing one-way pair) will also be considered.

Related Studies

The University and 10th Street Study is a continuation of the family of plans that includes the Core Neighborhoods Master Plan and Downtown InFocus Master Plan. These studies are summarized below. Other regional plans that will serve as foundation to this study include, but are not limited to, the Fargo Transportation Plan, Metropolitan Transportation Plan, Metropolitan Bicycle and Pedestrian Plan, Transit Development Plan, Fargo Safe Routes to School Plan, Fargo/West Fargo Parking and Access Requirements Study, and the Metropolitan Freight Study. Key takeaways from these plans are woven into the fabric of this study and referenced as necessary. Each plan is available at the Metro COG website.

Core Neighborhoods Master Plan

The Fargo Core Neighborhoods Master Plan is intended to provide a holistic approach for meeting the challenges in Fargo's most historic neighborhoods. These neighborhoods generally cover the area between the Red River, 25th Street, Interstate 94, and 19th Avenue North. The University Drive and 10th Street corridors are the primary north-south arterials through these neighborhoods and ensuring these corridors support neighborhood needs is critical in achieving the goals of the plan.

Related to transportation, one of the priority issues identified in the Core Neighborhoods Plan is the safety, quality of life, and land use impacts of traffic and major roadways. The most significant transportation issues that were identified are:

- Walking, biking, and transit have historically been secondary considerations, with emphasis being on efficiency of automobile traffic
- Pedestrian safety issues, especially along school walking routes
- Homes fronting arterial roadways in Core Neighborhoods have absentee ownership rates nearly twice the Core Neighborhoods average

Downtown InFocus Master Plan

The downtown master plan was developed to establish a blueprint for the future of downtown revitalization and development. Major goals of the downtown plan are to foster inclusive growth and develop downtown into both a neighborhood for people to live in as well as a destination for business and entertainment.

To meet downtown revitalization goals, the master plan recognizes that transportation is a key component. The University Drive and 10th Street corridors serve as major arterials in and out of downtown, even if they are on the far west edge of the downtown area. General transportation goals for downtown include:

- Establish the role and design of all downtown streets so future reconstruction results in an interconnected downtown network that serves all transportation modes
- Reduce automobile reliance by creating a downtown bicycle network and enhancing transit stops

Multimodal Emphasis

University Drive and 10th Street are two of the most diversly used corridors in the region, with heavy amounts of vehicle, truck, and bus traffic along the corridor, and heavy amounts of pedestrian and bicycle traffic along and across each corridor. To provide sustainable and equitable transportation recommendations, analysis will document existing facility types and identify levels of service (LOS) for vehicles, bicyclists, pedestrians, and transit users to best recommend roadway improvements that serve all roadway users. LOS is a metric designed to gauge efficiency, comfort, and frustration.

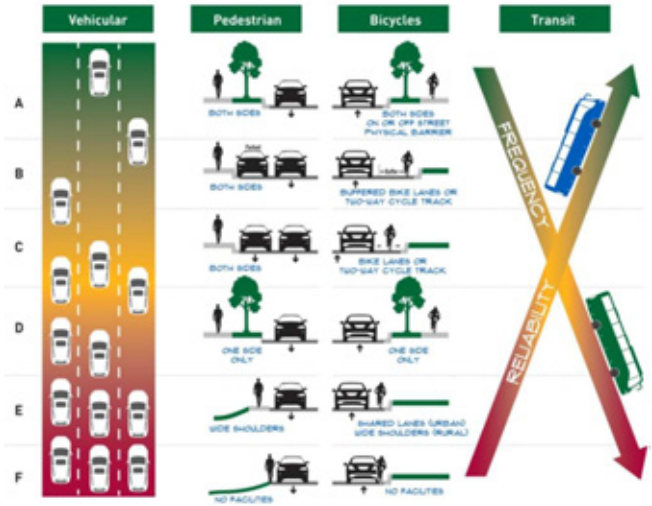
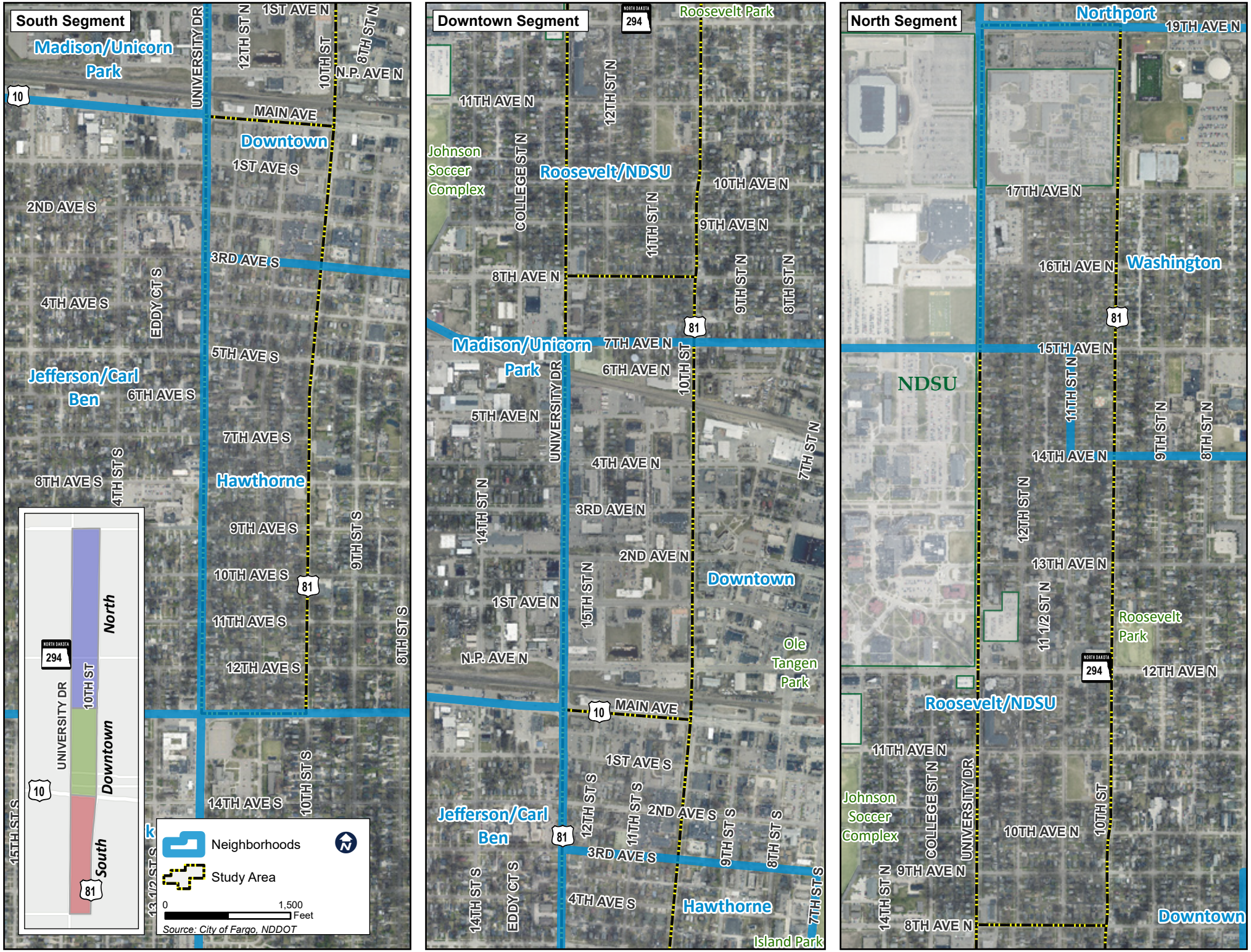


Figure 1: Study Area

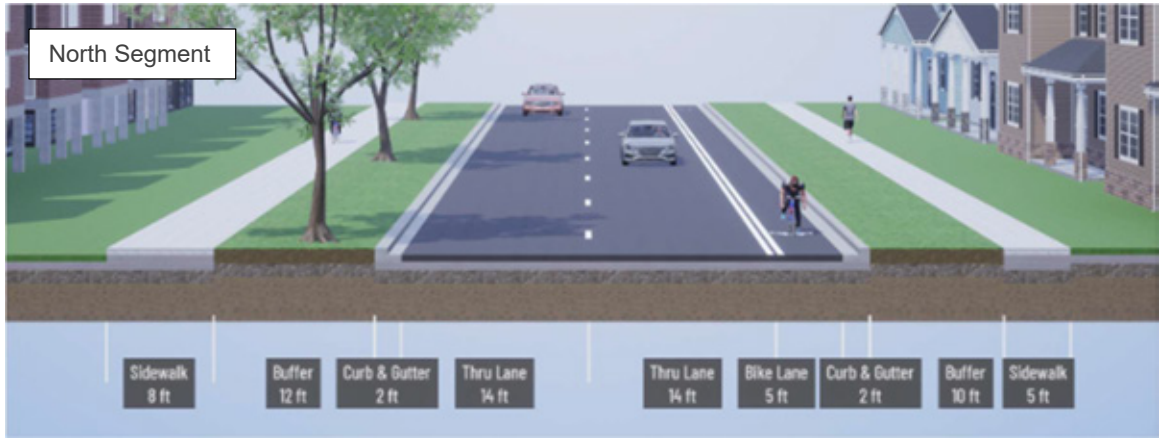


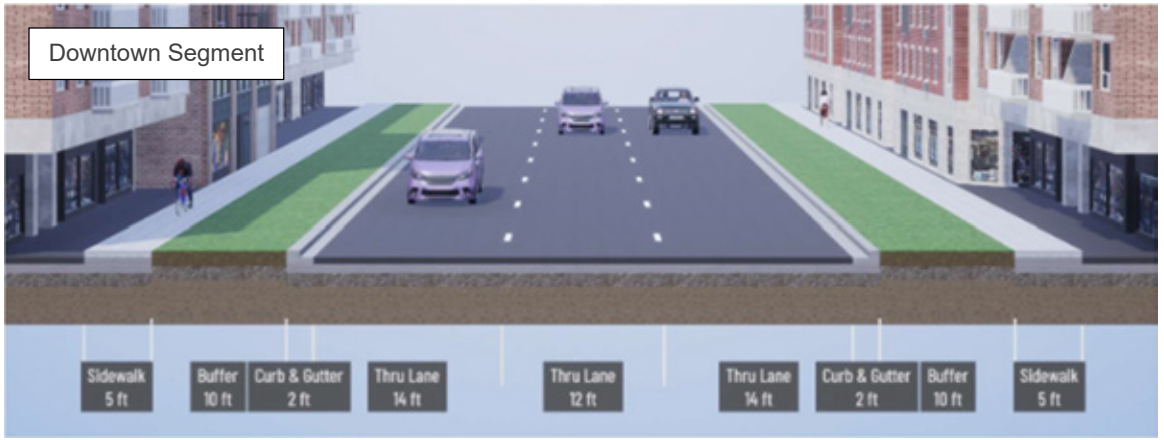
Existing Roadway Infrastructure

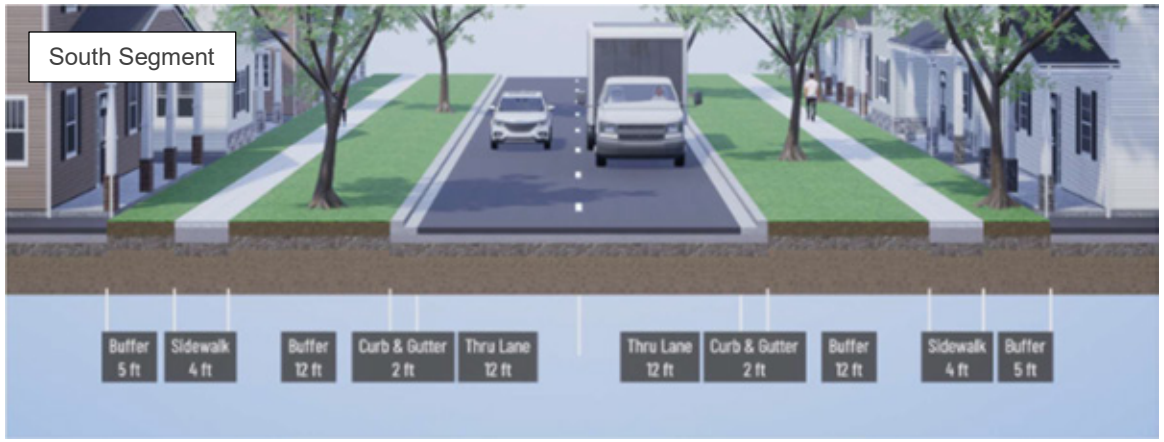
University Drive

- One-way southbound traffic between 19th Avenue North and 13th Avenue South
- 30 mph speed limit
- University Drive is functionally classified as a Principal Arterial, meaning the route is intended to be a major traffic-carrying route. However, the corridor provides a significant amount of direct property access, a feature not typical of most arterial roadways. Recognizing dual purpose of the corridor, the *Fargo-West Fargo Parking & Access Study* has categorized University Drive as a Mixed Use Collector.
- Traffic signals are present at higher-volume intersections, with lower volume intersections under side street stop control. In general, there are around 5 to 6 signals per mile, which is higher-than-average signal density.
- Two lanes for traffic throughout most of the area, with a small stretch of three lane traffic between 3rd Ave North and 2nd Ave South, roughly corresponding with the study's downtown sub-area.
- Sidewalks are present along the entire corridor, with most segments having a grass boulevard to provide some separation between pedestrians and moving traffic. Boulevard widths vary along the corridor, but are generally between 8 and 12 feet wide, but narrower under bridges and adjacent to some turn lanes.
- Bike lanes are present on the northern end of the corridor near NDSU, however no such facilities are present south of 4th Avenue North.
- Pavement conditions along the corridor are generally good

Figure 2: University Drive Typical Roadway Sections



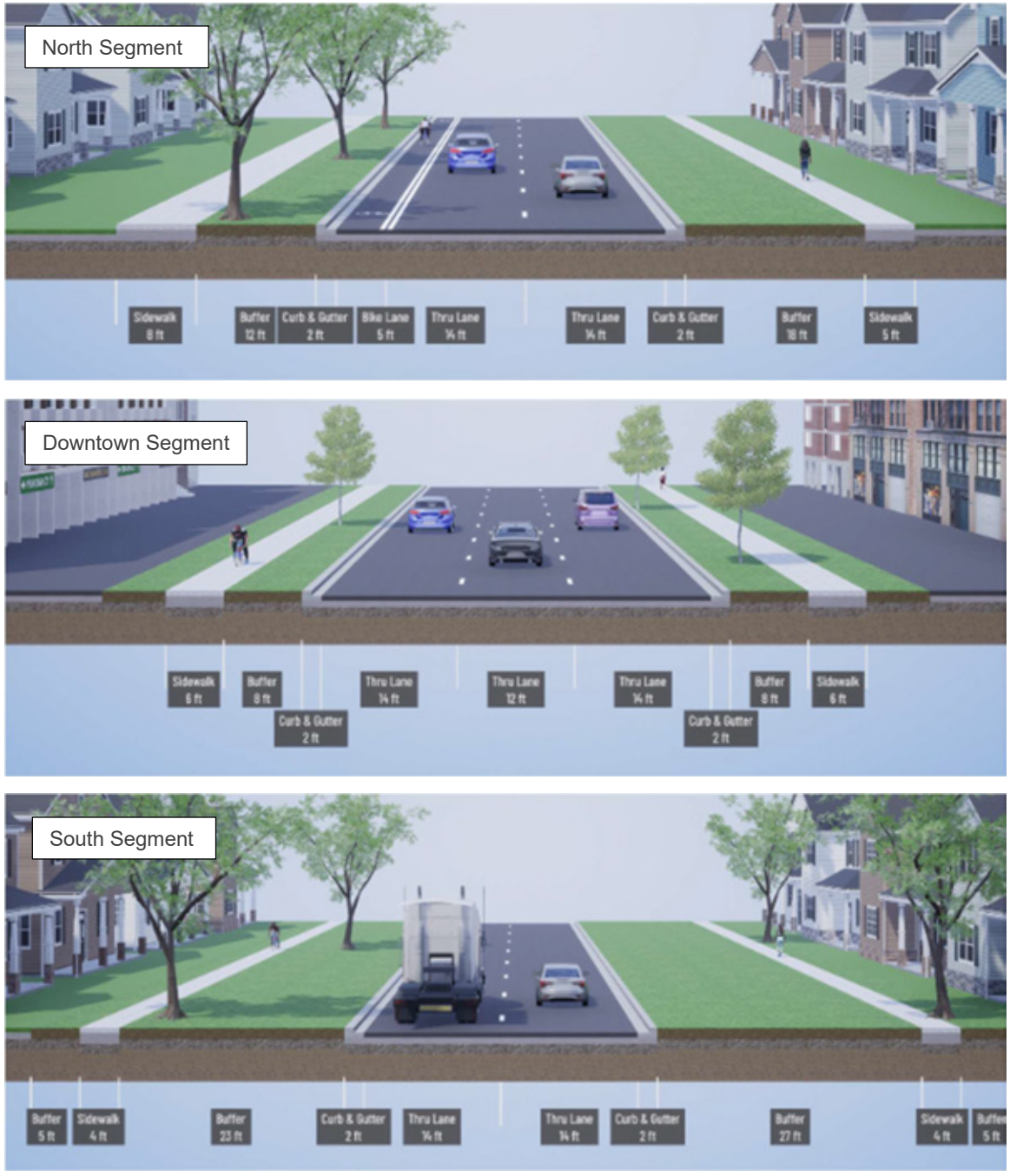




10th Street

- One-way northbound traffic between 13th Avenue South and 19th Avenue North
- 30 mph speed limit
- Functionally classified as a Principal Arterial, but like University Drive, significant amounts of direct property access are also provided. The *Fargo-West Fargo Parking & Access Study* has categorized 10th Street as a Mixed Use Collector (like University Drive).
- Traffic signals present at higher-volume intersections. Signal density is highest in the downtown sub-area with 7 signals in one mile between Main Avenue and 12th Avenue North. Signal density is lower south of Main Avenue (5 signals per mile) and north of 12th Avenue North (3 signals per mile).
- Two lanes for traffic throughout most of the area, with a small stretch of three lane traffic between 2nd Ave South and 4th Ave North, roughly corresponding with the study's downtown sub-area.
- Sidewalks are present along the entire corridor, with most segments having a grass boulevard to provide some separation between pedestrians and moving traffic. Boulevards are wider north and south of downtown, with widths typically at least 12 feet north of 12th Avenue north and widths over 20 feet south of downtown. Narrower boulevards are present downtown, but widths are still typically around 8 feet. Like University Drive, boulevard widths tend to be narrower under bridges and adjacent to turn lanes.
- Bike lanes are present north of 4th Avenue North, however no such facilities are present to the south
- Pavement conditions are generally good

Figure 3: 10th Street Typical Roadway Sections



Land Use

University Drive and 10th Street traverse some of Fargo's most historic neighborhoods. The combination of community age and network functional classification, land use along the corridors is some of the most diverse in the city.

North Study Area (12th Avenue North to 19th Avenue North)

Surrounding land uses include NDSU to the west and mostly residential areas to the east. Commercial uses along the 19th Avenue at the north end of the corridor influence traffic patterns on the one-way pair, but most business accesses are located on 19th Avenue North.

Notable uses on the north end of the study area include the Fargodome and Sanford Health Athletic Complex along University Drive and Fargo North High School, H.A. Thompson and Sons Arena, and Roosevelt Elementary along 10th Street.

Downtown Area

Between 12th Avenue North and 7th Avenue North, land uses are a mix of residential (primarily single family) and light commercial

Between 7th Avenue North and Main Avenue, University Drive and 10th Street are on the west edge of downtown Fargo. Land uses are generally light commercial and multifamily residential.

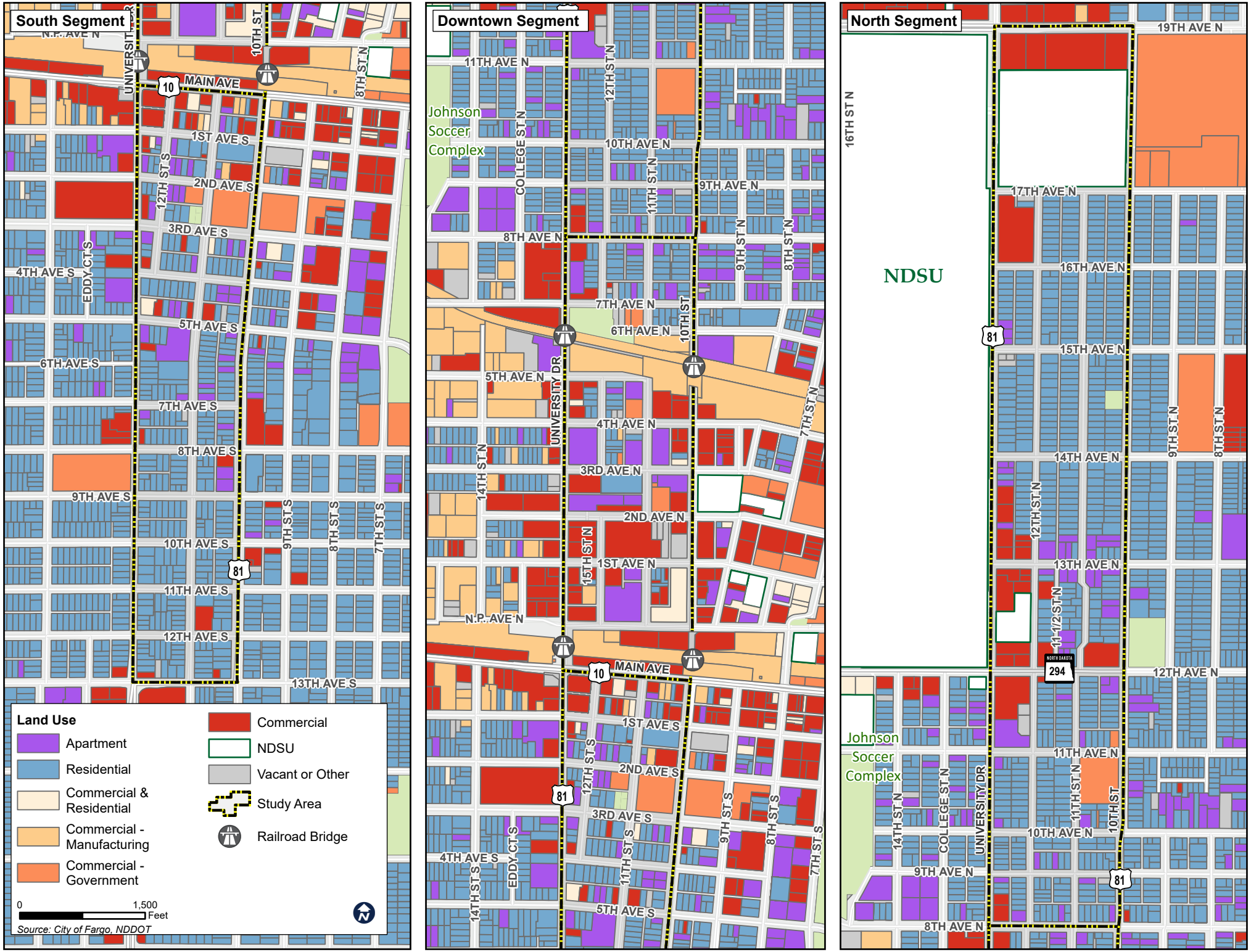
Notable uses on the downtown segment include NDSU's Barry Hall on 10th Street and Family Fare Supermarket, Pan-O-Gold Baking, and the Manchester Office Building on University Drive.

South Study Area

Running between Main Avenue and 13th Avenue South, adjacent land uses along 10th Street are primarily single family residential, with University Drive's land use south of 13th Avenue South being primarily commercial.

While this sub-area is mainly residential, some notable non-residential uses include Bethany Retirement Living and the Agassiz School on University Drive and the Cass County Courthouse on 10th Street.

Figure 4: Study Area Land Use



Vehicle Traffic

The University Drive and 10th Street corridors are important north-south corridors in Fargo, especially given their proximity and access to downtown and NDSU.

-Daily traffic volumes on University Drive range from a low of around 7,500 per day on north end near 19th Avenue North to a high of around 17,000 vehicles per day just north of Main Avenue.

-Daily traffic on 10th Street is lower with a range from a low of around 6,000 vehicles per day near 19th Avenue North to a high of around 11,000 vehicles per day just south of Main Avenue. Interestingly, the maximum capacity of the corridor is currently inverse of the traffic volumes, with the most capacity on the north and the least on the south.

-Fridays are the highest traffic day of the week (around 13 percent higher than average) and Sundays are the lowest traffic day (around 28 percent lower than average). Fridays experience the convergence of events at the various event centers along the corridor and commuter traffic.

-Monthly traffic variations are generally minor. December sees the largest deviation from average, with around 11 percent less traffic than the average month. December is commonly a less active time period for NDSU and many major event centers.

Traffic Peaking Characteristics

Traffic peaking is characteristic of the Fargo-Moorhead region, with the AM peak hour beginning around 7 am and the PM peak hour beginning at 5 pm.

-Outside of the AM peak period, traffic volumes are higher on University Drive throughout the day, with this especially evident in the PM peak period.

-A common trend is traffic commuting into the downtown business district during the AM peak hour. The PM peak hour sees both an exodus of daily workers from the area, but also an influx of visitors to the area as well to frequent restaurants, shopping, and alike.

-Around 7.2 percent of daily traffic occurs in the AM peak and around 9.2 percent of daily traffic occurs in the PM peak hour

Level of Service

Level of service (LOS) is a letter grade between “A” and “F” that is assigned to transportation infrastructure to describe its performance related to the safe, comfortable, and efficient movement of people. For vehicle traffic, level of service is typically a function of the amount of delay experienced as a result of traffic control. Levels of service for vehicle traffic are generally good on both corridors, with acceptable levels of service present throughout the day (LOS C). While not serious, some minor delays do occur during peak hours:

-Peak hour delays on some side street during peak hours, but this is common for local streets intersecting with arterial roadways. Given the well-connected grid network, signals are in close proximity and can be used for corridor access during peak hour traffic.

-Generally speaking, one-way corridors are far simpler to maintain effective operations. Signal timing has reduced signal phases, and progression is a simple distance and speed calculation.

-Travel speeds remain relatively constant throughout the day along University Avenue, and throughout the corridor. While the cross-section does deviate from north to south, for the most part, it adjusts to the amount of turning traffic at key intersections.

-Traffic speeds deviate along 10th Street. Speeds are typically 5 MPH faster north of 12th Avenue North than the area north of 13th Avenue South. As noted earlier, the northern most segment has low volumes and high capacity.

Figure 5: Hourly Traffic Profile

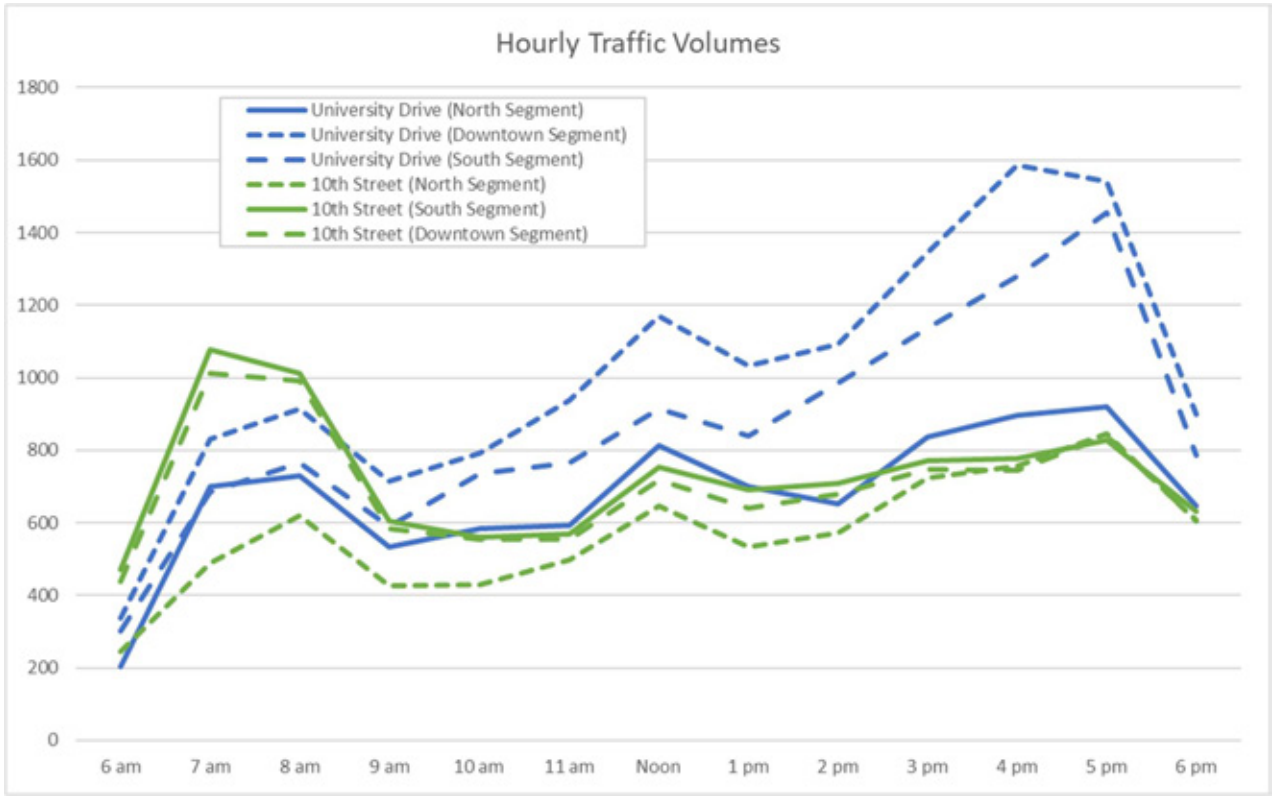
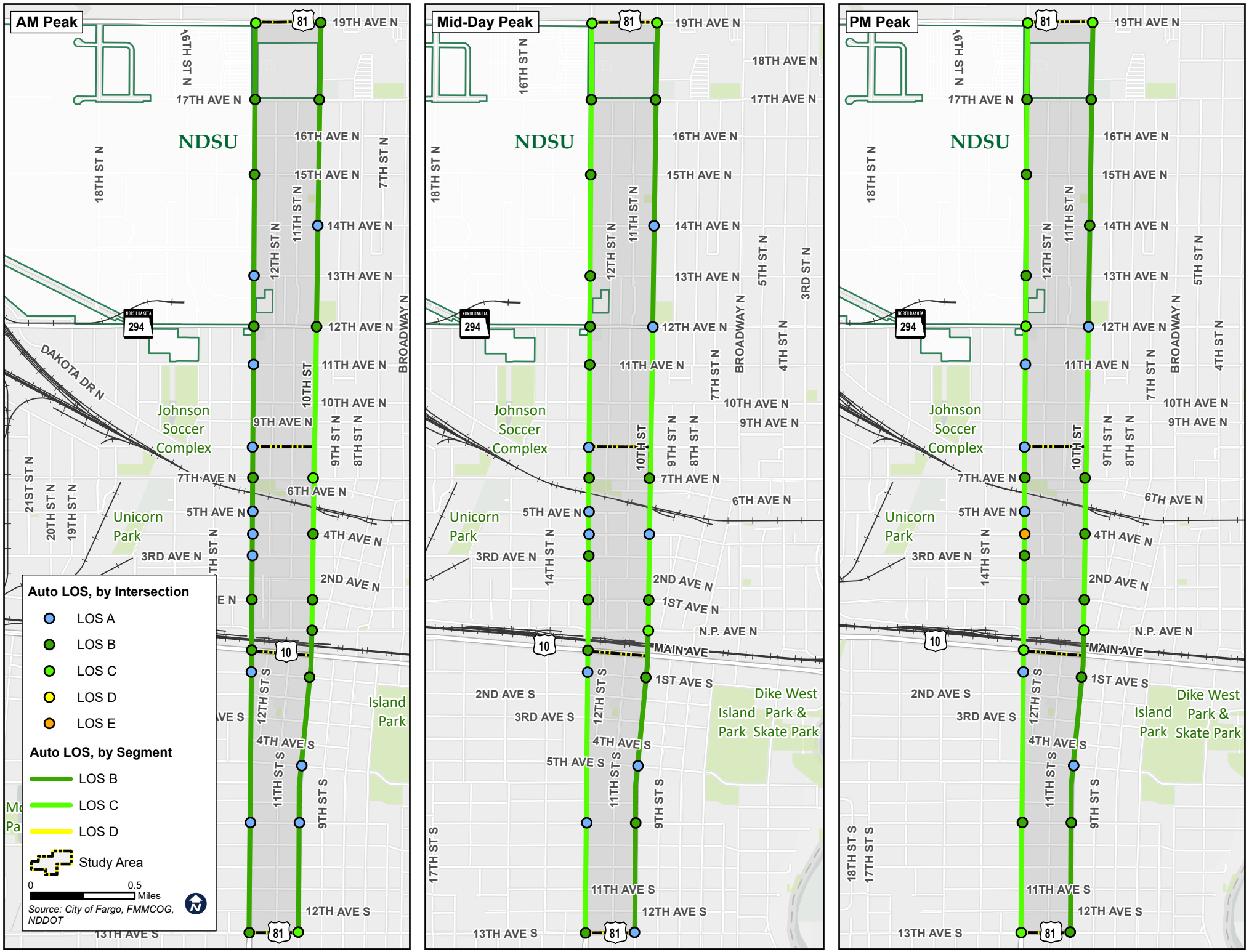


Figure 6: Existing Average Daily Traffic Volumes

Figure 7: Existing Vehicle Levels of Service



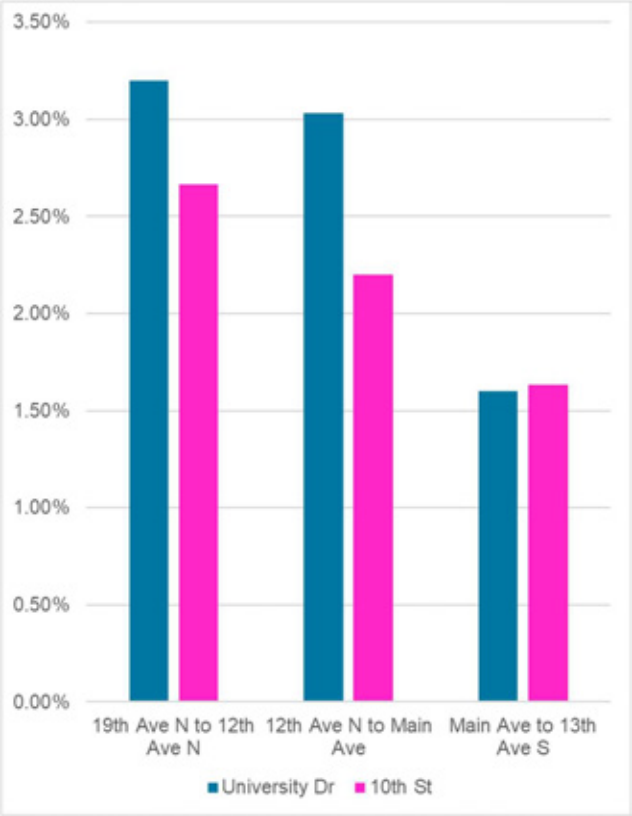
Freight/Truck Traffic

Truck traffic is generally low along the corridor, making up 2 to 3 percent of traffic. Truck traffic is slightly higher on the north side of the corridor compared to the south side.

While truck traffic is generally low, University Drive and 10th Street are the US 81 Business Route and part of the National Highway System, therefore maintaining acceptable operations for freight flows is important.

Freight level of service (LOS) is a function of freight travel time reliability. Freight LOS in the study area is generally good, with freight LOS C or better, with freight travel times during peak hour conditions being around 25 percent higher than they are in uncongested conditions.

Figure 8: Truck Traffic by Segment



Regional Traffic

Analysis of trip length data shows that much of the vehicle traffic on the University Drive and 10th Street corridors has trip lengths around 10 miles in length, meaning that traffic from all over the Fargo-Moorhead area is using study area roadways to travel to major destinations like NDSU and downtown, among other locations.

Origin-destination analysis revealed the following:

-For traffic that starts or finishes its trip in the study area, the NDSU area and downtown are the highest activity areas.

-75 to 85 percent of traffic traveling to NDSU or downtown Fargo uses I-29 as the primary north-south roadway rather than University Drive/10th Street if their trip origin is south of 13th Avenue South.

-For traffic at the north and south ends of the University Drive and 10th Street corridors, less than 10 percent of traffic uses either corridor end-to-end. Similar patterns were observed with truck traffic.

Figure 9: Trip Lengths by Segment

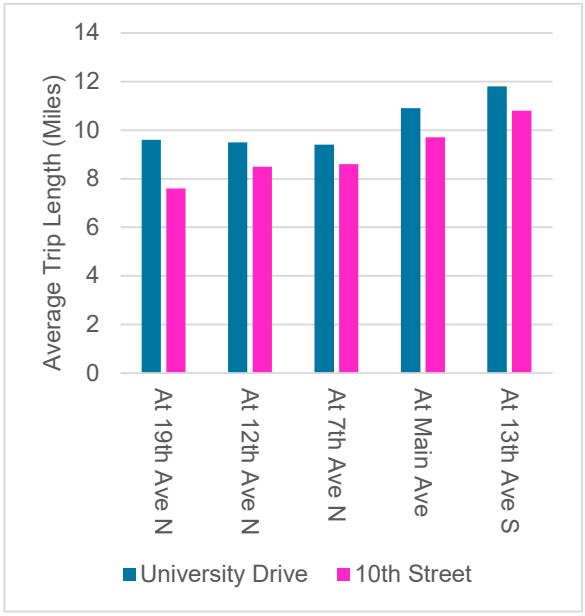
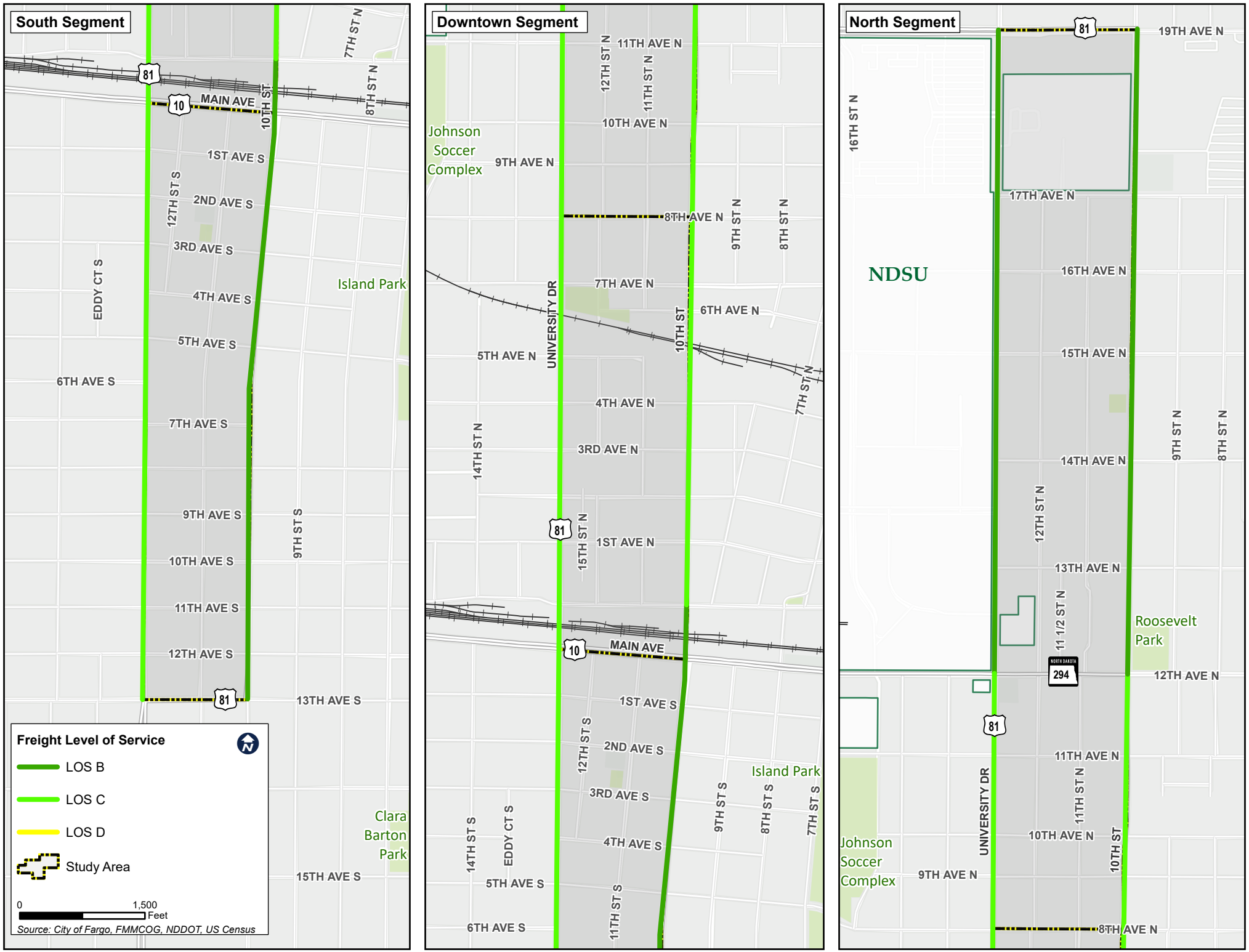


Figure 10: Starting/Ending Locations of Study Area Trips

Figure 11: Freight Levels of Service



Pedestrians

The University Drive and 10th Street corridors are in one of the highest pedestrian activity areas of the region. Major generators like NDSU and downtown draw in pedestrian activity, as does the presence of multiple schools like Fargo North and Roosevelt Elementary.

Level of Service

Level of service for the pedestrian mode is a function of pedestrian safety and comfort. Pedestrian activity is supported by the sidewalks on both sides of University Drive and 10th Street. Sidewalks are buffered from street traffic by grassy boulevards throughout the study area, improving pedestrian comfort and providing pedestrian Level of Service B.

Pedestrian Activity by Location

Pedestrian activity is considerably higher near NDSU compared to the rest of the study area, especially along University Drive. In the downtown area, pedestrian activity is notably higher on 10th Street than on University Drive given its proximity to downtown.

Mode Share

Around 8 percent of study area residents walk to and from work, which is double the Fargo average of 4 percent.

Latent Pedestrian Demand

Origin-destination data shows that a relatively high percentage of trips (29 to 48 percent, with higher rates near NDSU) starting in the study area are 2 miles or less in length, indicating there may be some latent demand for non-automobile traffic in the study area.

Pedestrian Crash History

While pedestrian facilities are generally good, there is a history of pedestrian crashes, with 8 pedestrian crashes (no fatalities) reported between 2017 and 2021. These crashes were evenly distributed across University Drive and 10th Street. All pedestrian crashes occurred north of Main Avenue, where pedestrian activity is the highest. All pedestrian crashes occurred at intersections, with 6 of 8 occurring at traffic signals.

Pedestrian Crash Survivability

Safety data shows that pedestrians have a 90 percent chance of surviving a crash involving a vehicle at speeds under 20 mph, but this probability is reduced to 60 percent at 30 mph and further reduced to 20 percent at 40 mph.

Using speed data from StreetLight Insight, between 5 and 7 percent of traffic is traveling at speeds greater than 30 mph and around 3 percent of traffic is traveling at speeds higher than 40 mph. Based on this data, it appears that most traffic is traveling around the 30 mph speed limit.

Americans With Disabilities Act (ADA) Deficiencies

Detectable warning panels are not present at most intersections on University Drive south of 12th Avenue North and for most intersections on 10th Street south of 4th Avenue North.

Schools

Beyond NDSU, multiple schools are located in the study area, with Fargo North High School and Roosevelt Elementary located on 10th Street and Agassiz School located on University Drive. Ben Franklin Middle School is also in the study area (located on 8th Street North).

Traffic signals or pedestrian beacons are located adjacent to Fargo North, Roosevelt, and Agassiz. Controlled pedestrian crossings on 10th Street are more spaced out near Ben Franklin Middle School, with the nearest signals 2 blocks north and south of the school.

Controlled Pedestrian Crossings

Pedestrians are provided many controlled crossing locations via traffic signals, with signals spaced an average of two to three blocks from one another. The longest gap between traffic signals on University Drive is five blocks between 8th and 13th Avenues South. There are two segments of 10th Street where signals are spaced five blocks from each other, these being between 8th and 13th Avenues South and between 12th and 17th Avenues North.

Figure 12: Pedestrian Activity by Intersection

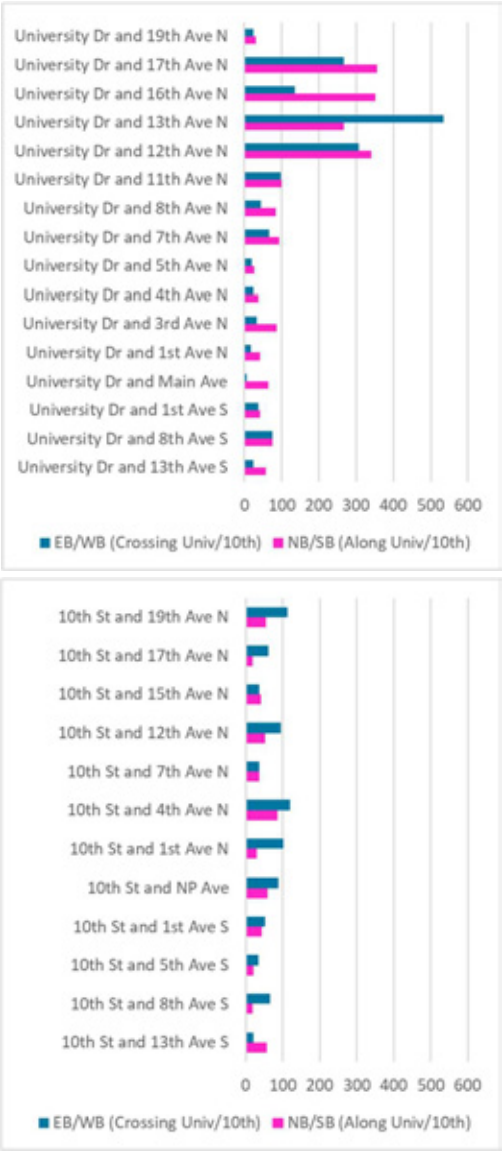
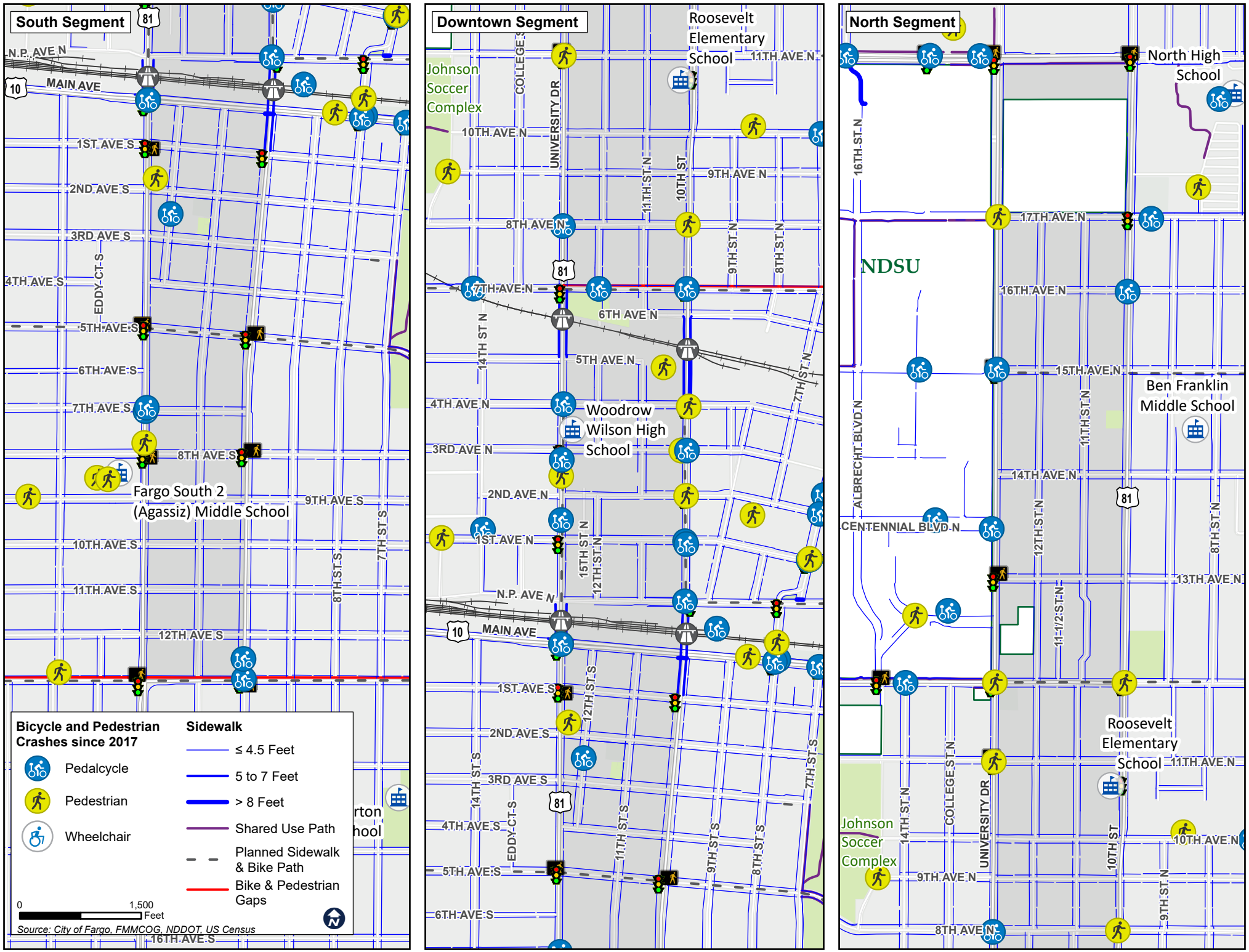


Figure 13: Pedestrian Facilities, Generators, and Ped/Bike Crash History



Bicyclists

Bicycle facilities are inconsistent in the study area. Bike lanes are present on the northern segments of the University Drive and 10th Street corridors, but neither street has facilities on their respective southern segments.

Study Area Bicycle Level of Service

Bicycle level of service is a function of the level of comfort and safety experienced by cyclists. It is affected by the type of facility provided, adjacent traffic volumes and speeds, the degree of separation between cyclists and traffic, and whether on-street parking is provided or not.

North of 4th Avenue North

Other than a small segment of 10th Street between 17th Avenue North and 19th Avenue North, buffered bike lanes are present along both University Drive and 10th Street north of 4th Avenue North. Where these on-street bike facilities are present, bicycle level of service B is provided, indicating generally comfortable conditions for cyclists on this northern part of the study area.

South of 4th Avenue North

There are no bicycle facilities south of 4th Avenue North, with no on-street facilities and no off-street facilities since sidewalks are not wide enough to accommodate bicycle traffic. Therefore, bicycle level of service is markedly lower on this segment, in the range of level of service D or level of service E. This is the result of no dedicated bike facilities combined with high traffic volumes.

Mode Share

Cycling makes up a higher percentage of trips in the study area compared to the Fargo average, however it is still fairly low. Data indicates that around 4 percent of study area residents commute to work by bicycle compared to 1 percent across the entire city of Fargo.

Latent Cycling Demand

Origin-destination data shows that a relatively high percentage of trips (29 to 48 percent, with higher raters near NDSU) starting in the study area are 2 miles of less in length, indicating there may be some latent demand for non-automobile traffic in the study area.

This analysis suggests that there are opportunities to increase non-motorized mode shares through improvements that enhance comfort and convenience for cyclists.

Bicycle Crashes

There is a history of crashes involving cyclists, with 16 such crashes occurring between 2017 and 2021. Bicycle crashes have been split across University Drive (8 crashes – all north of Main Avenue) and 10th Street (9 crashes – 7 occurring north of Main Avenue). All bicycle crashes occurred at intersections, with half occurring at signals and half occurring at stop-controlled intersections.

Surrounding Bicycle Network

Between downtown and 12th Avenue North, bicycle facilities on University Drive and 10th Street connect with several east-west facilities, with these facilities generally being spaced a few blocks from one another. East-west bike facilities are currently lacking north of 12th Avenue and south of downtown, however there are planned facilities on the north and south ends of the study (especially north of 12th Avenue North) that will enhance the multimodal network.

Figure 14: Short Distance Trips

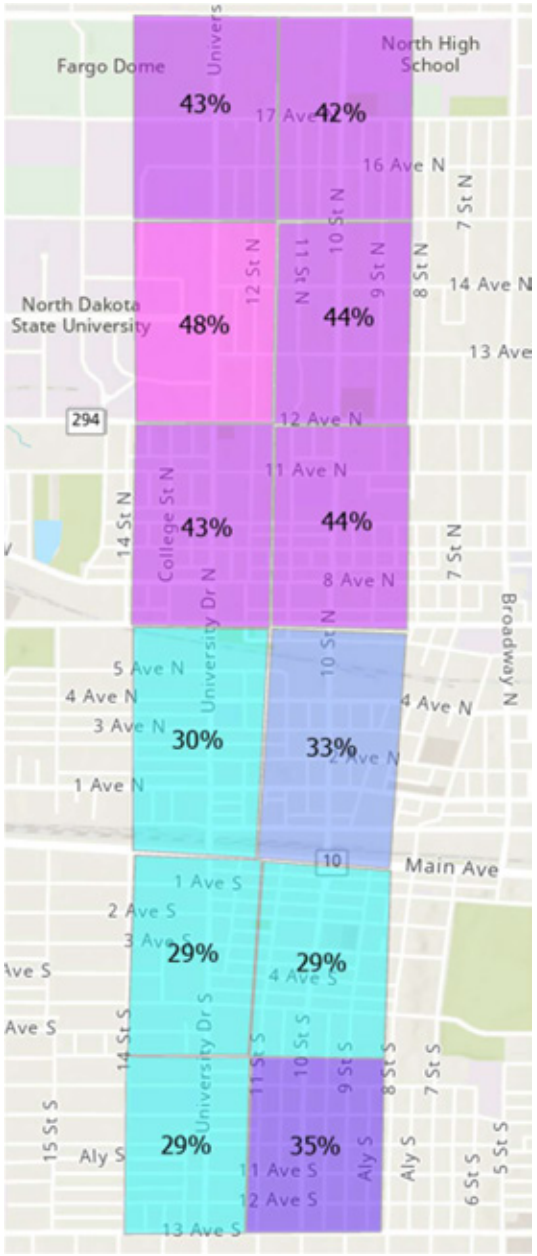
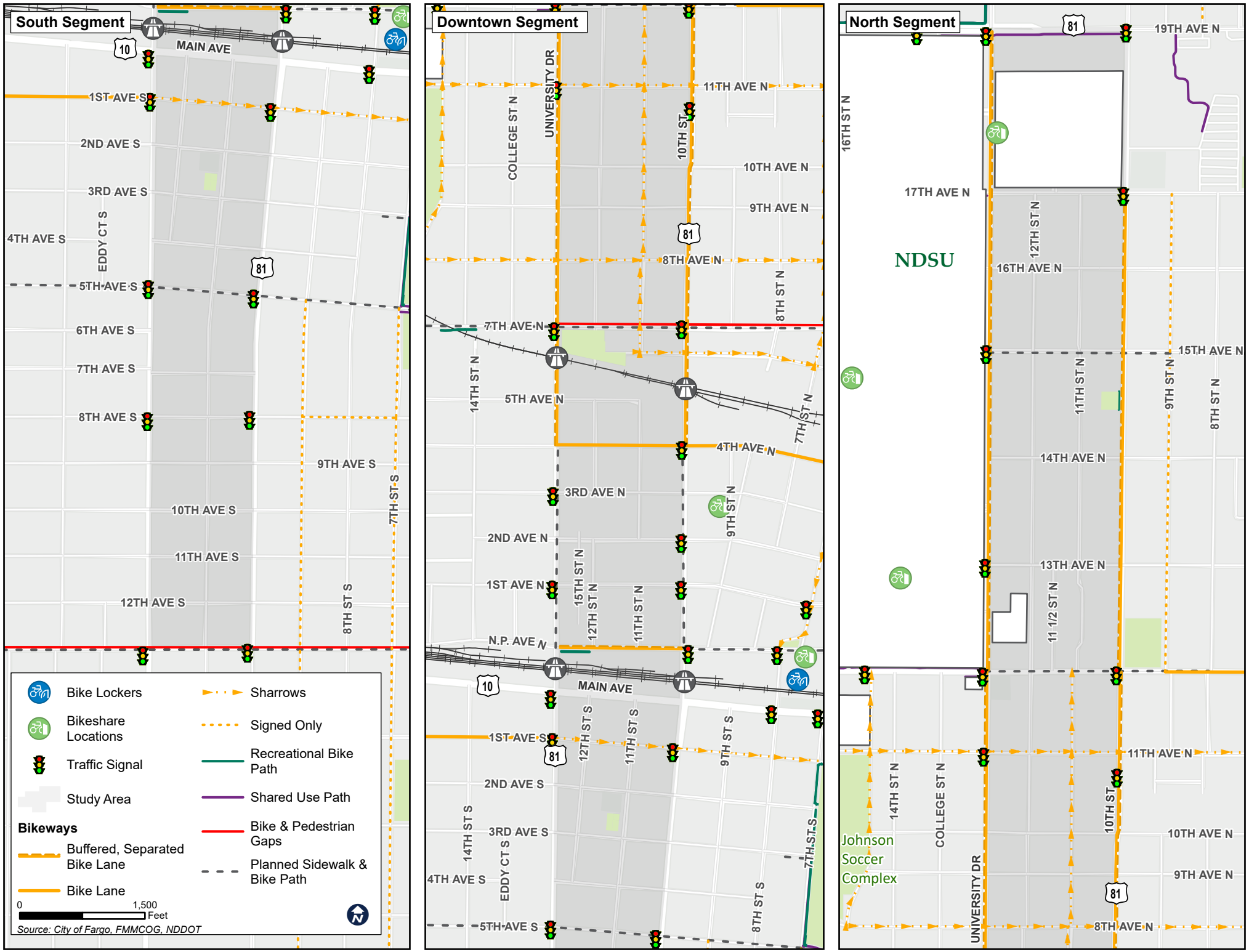


Figure 15: Bicycle Facilities



Transit

The University Drive and 10th Street corridors are some of the best supported transit corridors in the region.

Transit riders in the study area have access to several bus routes that provide service to key locations like NDSU, downtown, West Acres, Osgood, and other activity centers along corridors like 13th Avenue South, 25th Street, and 32nd Avenue South. Major bus routes that serve the study area are listed in Table 1.

Transit Level of Service

Transit level of service describes the performance of a transit system and is a function of the number hours per day where service is provided and the percentage of time where service is on time.

The University Drive and 10th Street corridors are some of the most served transit corridors in the metropolitan area, so transit LOS A is provided throughout the study area.

Mode Share

Around 4 percent of study area residents use transit to commute to work, compared to the Fargo average of 1 percent.

Ridership

Based on information in the current MATBUS Transit Development Plan, the routes with the highest ridership are Route 15 and Route 33, which each have daily ridership numbers above 1,000 riders per day. These routes are the most used bus routes in the Fargo-Moorhead area, with Route 15 carrying around around a third of all Fargo/West Fargo transit riders and Route 33 carrying around 42 percent of all NDSU riders.

Other bus routes in the study area carry significantly lower numbers of passengers, with routes 13, 13U, 14, 17, and 18 carrying between 150 and 500 passengers per day.

NDSU Transit Activity

Students commuting between the NDSU main campus and downtown campus is a major driver of transit demand in the study area. Three of the fifteen most used bus stops in the metro area are located on north University Drive:

- University Drive N and NDSU Transit Hub: 680 boardings per day
- University Drive and 17th Avenue N: 150 boardings per day
- University Drive N and Niskanen Apartments: 150 boardings per day

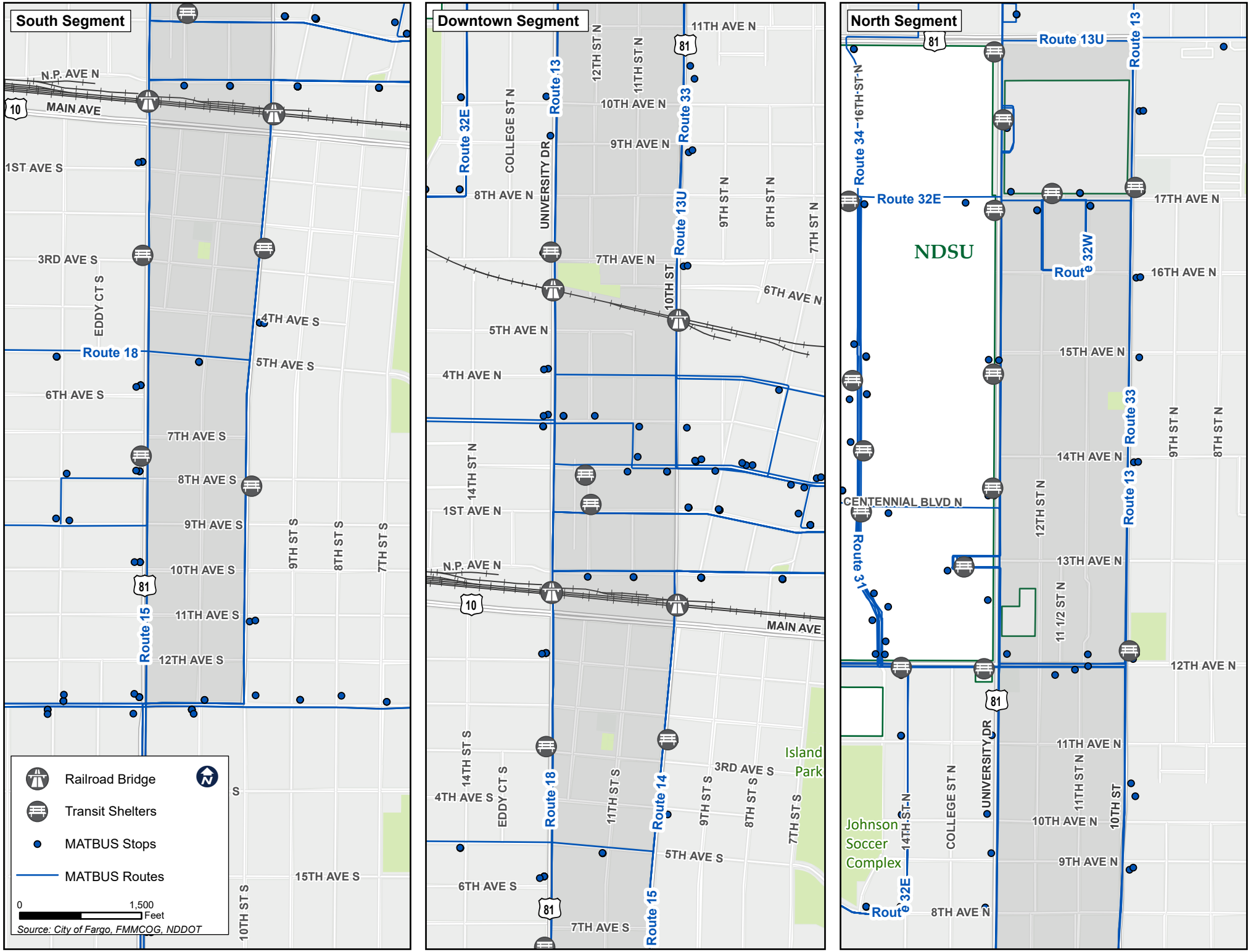
Traffic Impacts from Buses

Under existing roadway conditions, traffic is generally unimpeded by bus stops on University Drive or 10th Street since multiple through lanes are present. Analysis in later phases of this report will however study how interactions between transit and vehicle traffic could impact traffic flow in revised roadway scenarios.

Table 1: Transit Routes

Route	Key Destinations	Bus Frequency			Average Daily Ridership
		Weekday Day	Weekday Evening	Saturday	
13	NDSU, downtown, Northport	30 Minutes	60 Minutes	Same as Weekday	400
13U	NDSU, downtown	30 Minutes	60 Minutes	Same as Weekday	250
14	Downtown, south University Drive, 32nd Avenue S, 42nd Street, West Acres	30 Minutes	60 Minutes	Same as Weekday	500
15	Downtown, 13th Avenue South, West Acres	15 Minutes	30 Minutes	30 Minutes During the Day; 60 Minutes in the Evening	1,050
33	NDSU main campus and downtown campus	7 to 10 Minutes	-	-	1,200
17	Downtown, 7th Avenue North, 25th Street North, 12th Avenue North	60 Minutes	60 Minutes	60 Minutes	150
18	Downtown, 25th Street South, 32nd Avenue South, Osgood, 52nd Avenue South	60 Minutes	60 Minutes	60 Minutes	180

Figure 16: Transit Facilities



Crash History – Overall Trends

The past five years of crash data (2017-2021) was analyzed to assess study area crash patterns and identify potential safety issues that can be mitigated with roadway improvements.

General Trends

- Angle crashes are the most common crash type (52% of crashes). A notable trend is that 16% of angle crashes were a result of red light running compared to the Fargo average of 9%.
- Around 35% of crashes occurred away from intersections. Crash potential between intersections is increased by existing access densities being well above what is typically recommended on arterial roadways.
- History of bicycle and pedestrian crashes north of Main Avenue (8 pedestrian crashes, 15 bicycle crashes). These crashes are generally split across University Drive and 10th Street, with the majority of such crashes occurring at intersections.

Access Density and Related Crash Potential

The significant amount of residential land uses along both University Drive and 10th Street requires a much greater degree of property access compared to typical arterial roadways.

Existing access densities and comparisons to desirable access densities are detailed in the table below.

Impacts from High Access Density

High access densities (especially on arterial roadways with high traffic volumes) increase crash potential and disrupt traffic flow. Research shows that each additional access point along a one mile stretch of roadway increases crash rates by around 4 percent and reduce traffic speeds by around 0.25 miles per hour.

Figure 17: Crash Types Summary (Manner of Collision)

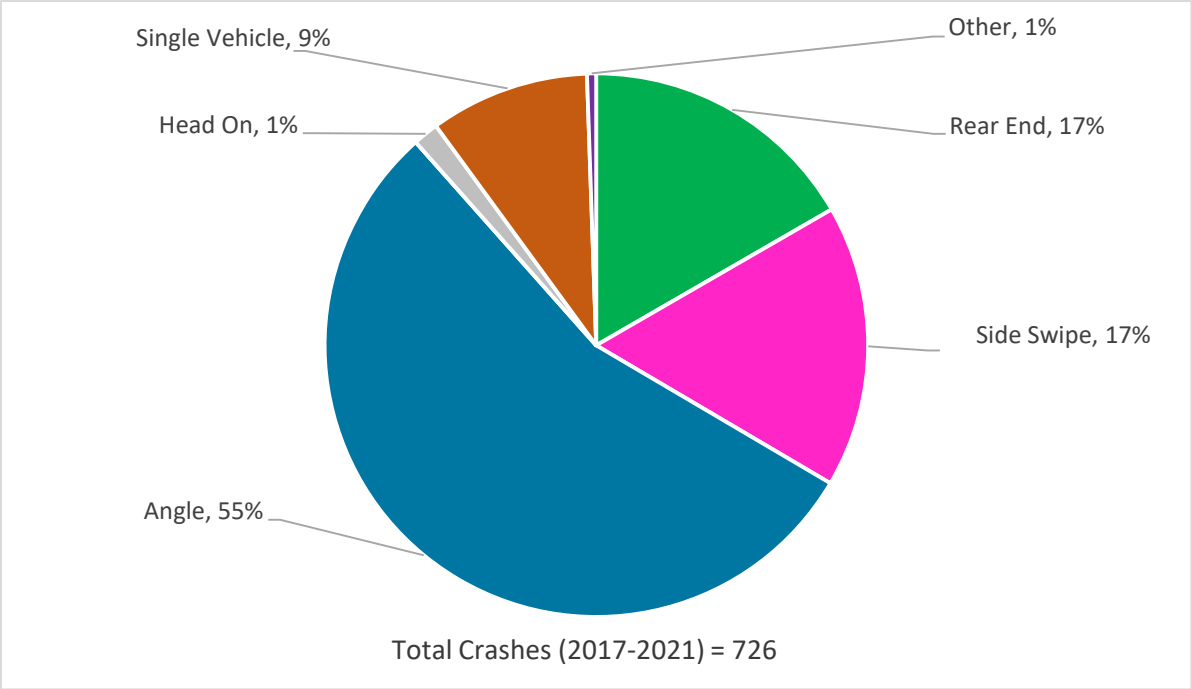
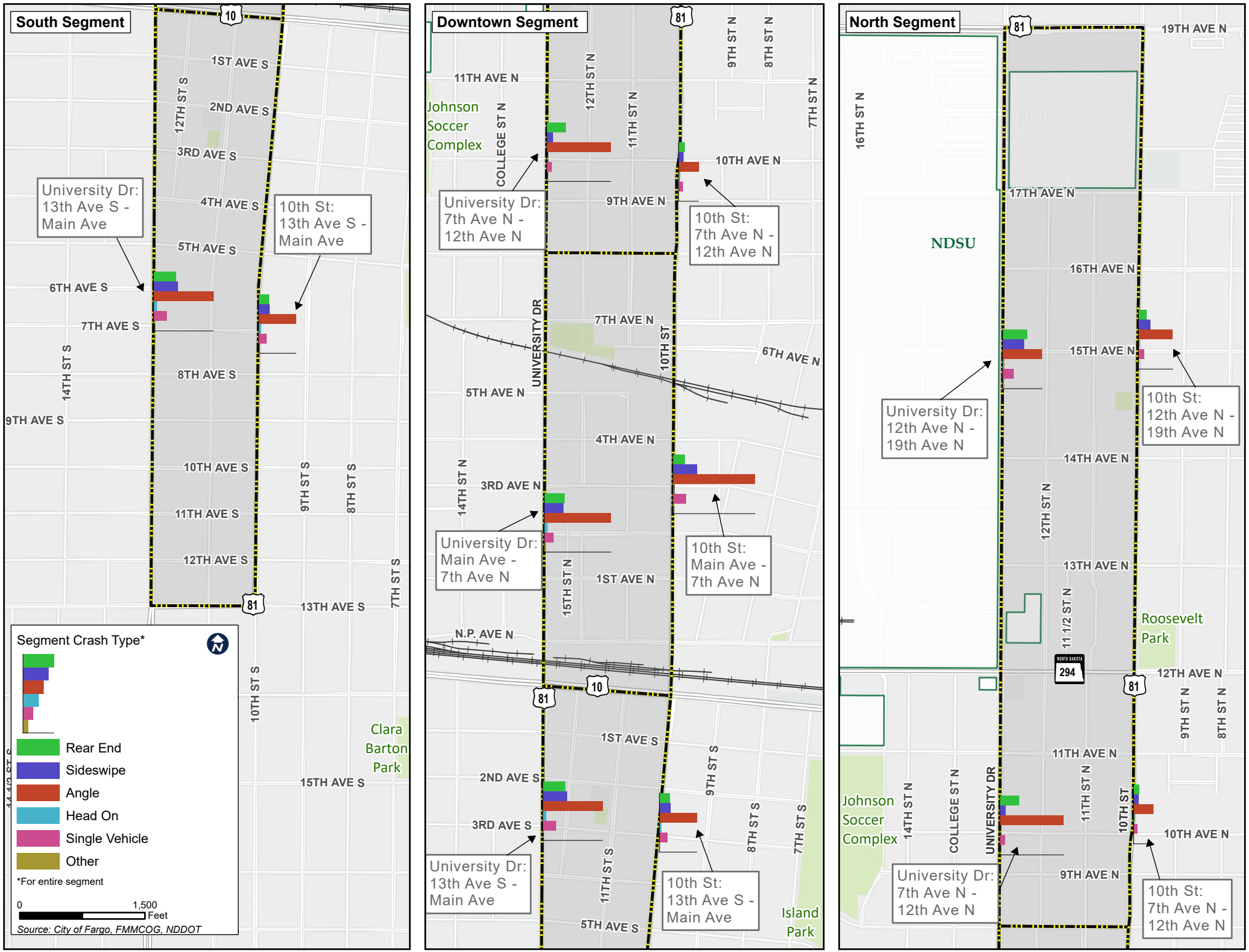


Table 2: Access Densities

Roadway	Segment	Access Density (Per Mile)	NDDOT Guidelines (Accesses Per Mile)	Local Guidelines (Accesses per Mile)
University Drive	19th Avenue N to 12th Avenue N	32	12	26
	12th Avenue N to Main Avenue	43		
	Main Avenue to 13th Avenue S	57		
10th Street	12th Avenue N to 19th Avenue N	72		
	Main Avenue to 12th Avenue N	53		
	13th Avenue S to Main Avenue	31		

Figure 18: Intersection Crashes by Manner of Collision

Figure 19: Segment Crashes by Manner of Collision



Crash Severity

A review of crash severity indicates that injury crashes occur at a higher rate in the study area compared to the Fargo city average.

- 30% of study area crashes resulted in injuries, compared to 23% across the entire city of Fargo
- Over half (55%) of injury crashes were angle crashes
- No fatal crashes were reported from 2017 to 2021

Intersections Above the Critical Severity Rate

Only one intersection has a crash rate that exceeds the critical severity rate, a calculated statistical metric used to identify locations with disproportionately high numbers of injury crashes.

University Drive and Main Avenue – 38 percent of crashes were injury crashes, with half of injury crashes being angle crashes. Based on available data, this intersection is in the top 10 percent of high severity crash rate intersections in Fargo.

A review of details for each injury crash at this location did not reveal any trends related to red-light running or excess speeding.

A noteworthy feature of this intersection is the northbound lane between Main Avenue and NP Avenue. All other intersections along University drive in this area have no northbound traffic, so this could interfere with driver expectancy. A review of crash data does not suggest crash trends related to this northbound lane, however this condition should be monitored given its uniqueness.

Intersections Above the Fargo Average Severity Rate

Injury crash rates at the following intersections exceed the Fargo average, but do not exceed the critical severity rate:

- University Drive and 3rd Avenue North (15/19)
- University Drive and 5th Avenue South (11/14)
- University Drive and 1st Avenue North (13/26)
- 10th Street and 13th Avenue South (8/22)
- 10th Street and 1st Avenue North (39/53)
- 10th Street and 4th Avenue North (12/22)
- 10th Street and 19th Avenue North (10/15)

Angle crashes were the most represented crash type at all the intersections listed above. Across these 7 intersections, an average of 63 percent of crashes are angle crashes compared to the Fargo average of 31 percent. A noteworthy feature of the study area is the historic neighborhood context that has buildings closer to the roadway and many more large trees compared to much of Fargo. Buildings and trees can restrict sight lines, increasing angle crash potential.

Segments Above the Fargo Average Severity Rate

No roadway segments had injury crash rates that exceed the critical severity rate; however, the majority of the University Drive Corridor and one segment of the 10th Street corridor have severity crash rates that exceed the Fargo average. These segments include:

- University Drive – 5th Avenue South to 13th Avenue South (rear end crashes are the most common)
- 10th Street – 13th Avenue South to 5th Avenue South (angle crashes are the most common)
- 10th Street – 7th Avenue North to 12th Avenue North (angle crashes are the most common)

Access densities are high on each of these segments (mostly from private or commercial driveways), which combined with sight line issues from trees and buildings could be contributing to elevated crash rates.

Figure 20: Crash Severity

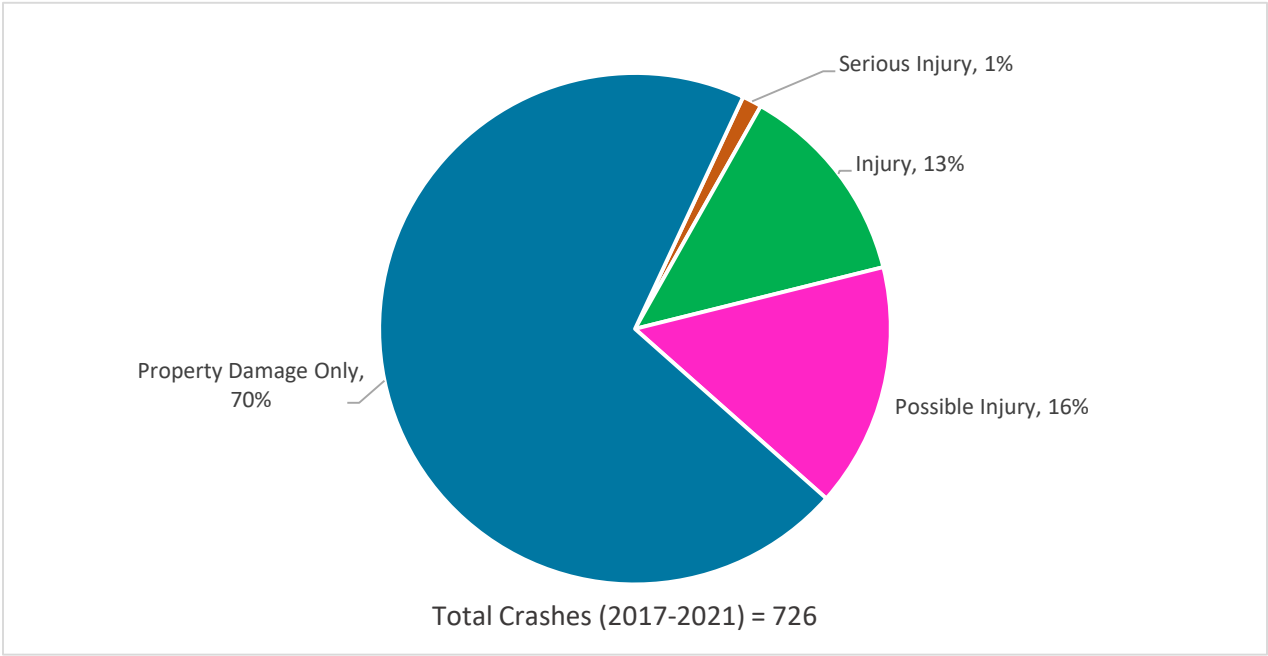


Figure 21: Intersection Crashes by Severity

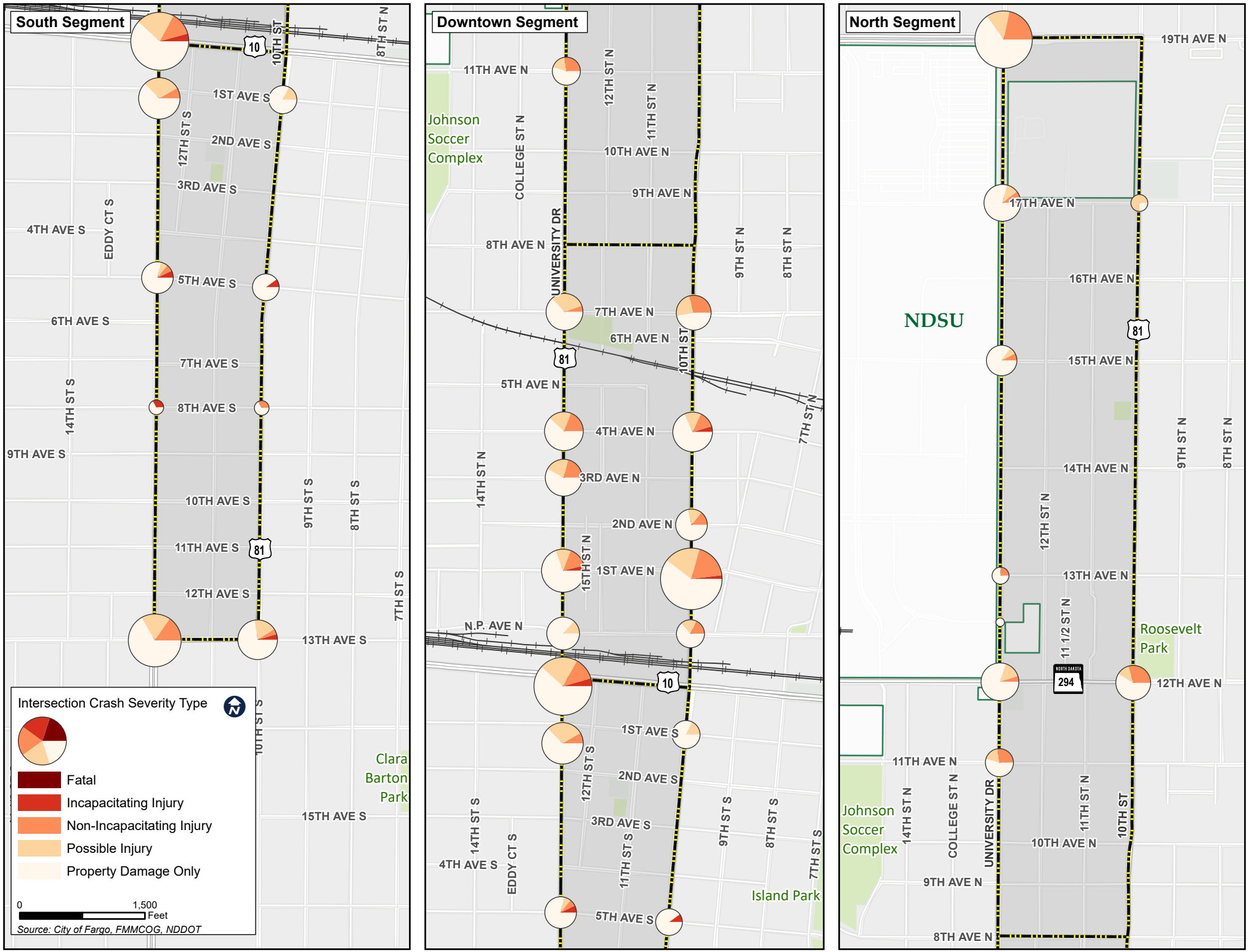


Figure 22: Segment Crashes by Severity

Crash Rates

Intersection and segment crash rates were calculated to identify locations with disproportionately high crash rates. This analysis used the critical crash analysis methodology, which applies statistical methods to identify high crash locations. If a location has a crash rate that exceeds the calculated critical crash rate, it is likely that existing roadway design is contributing to elevated crash rates.

Note that high crash rate locations were identified based on crash rates documented in the recent *Fargo Transportation Plan* (2016-2020 crash data). Rates from this plan were used to ensure methodological consistency when comparing study area crash rates to city-wide crash rates.

Intersection Crash Rates

Intersections Above the Critical Crash Rate

12 intersections have crash rates that exceed the critical crash rate, with angle crashes being the most represented crash type at each intersection. These intersections are listed in Table 3, with this table also including notable roadway features and other crash-related information at these high-crash intersections.

Trends that were observed at multiple intersections include red light running and excess vehicle speeds.

Intersections Above the Fargo Average Crash Rate

Six intersections have crash rates that are above the Fargo average, but below the critical crash rate. Intersections in this category do not necessarily have crash issues that should be mitigated, however crash trends should be monitored to see if crash rates increase. These intersections are:

- University Drive and 3rd Avenue North
- University Drive and 2nd Avenue North
- University Drive and 13th Avenue South
- 10th Street and 4th Avenue South
- 10th Street and 7th Avenue North

Like most of the study area, angle crashes were the most represented crash type at each intersection except University Drive and 2nd Avenue North, where rear end crashes were most represented.

Table 3: Intersections Above the Critical Crash Rate

Roadway	Intersection	Most Common Crash Types	Notable Roadway Features	Other Comments
University Drive	19th Avenue N	Angle (56%) Head On (20%)	Negative EB/WB left turn lane offset; Unique configuration with one-way traffic only on north approach; Driveways within intersection functional area	All head on collisions were between EB/WB vehicles
	15th Avenue N	Angle (69%) Rear End (23%)	No dedicated left turn phases; High pedestrian activity area may cause distractions	
	12th Ave N	Angle (55%) Rear End (20%)	High volume driveways within intersection functional area	
	8th Avenue N	Angle (73%) Rear End (19%)	Two-way stop controlled intersection; Sight distance issues; Driveways within intersection functional area	
	7th Avenue N	Angle (42%) Rear End (32%)	Sight-distance issues; Driveways within intersection functional area	37% of crashes caused by excess vehicle speeds
	4th Avenue N	Angle (76%) Rear End (11%)	Two-way stop controlled intersection; Driveways within intersection functional area	36% of crashes caused by excess vehicle speeds
	1st Avenue N	Angle (50%) Sideswipe (23%)	Double WB left turn lane operates in flashing yellow arrow during off-peak periods; Drivers may still be acclimating to recent striping changes; Lane skews on east and west approaches	23% of crashes caused by red light running
	NP Avenue	Angle (39%) Sideswipe (26%)	Two-way stop controlled intersection; Skewed east-west approaches; Northbound turn lane is atypical of the rest of the corridor; Sight distance issues	
	Main Avenue	Angle (45%) Rear End (21%)	Northbound receiving lane toward NP Avenue is a recent change	
10th Street	1st Avenue N	Angle (74%) Rear End (15%)	Sight distance issues	19% of crashes caused by red light running
	3rd Avenue N	Angle (33%) Single Vehicle (28%)	Two-way stop controlled intersection; Sight distance issues; High activity driveways within intersection functional area	
	15th Avenue N	Angle (71%) Sideswipe (13%)	Two-way stop controlled intersection; Sight distance issues; Driveways within intersection functional area; Parked vehicles	

Segment Crash Rates

This analysis was a broader analysis that evaluated crash patterns along longer segments of roadway rather than focusing on isolated intersections.

Segments Above the Critical Crash Rate

Three segments of study area roadways have crash rates above the critical crash rate. These segments, as well as notable information for these segments can be seen in the table to the right.

Trends common to all high-crash roadways segments are dense signal spacing and dense access spacing (especially due to residential/commercial accesses), with dense access spacing also appearing to contribute to many crashes away from intersections.

Segments Above the Fargo Average Crash Rate

Two roadway segments have crash rates above the Fargo average, but below the critical crash rate. As such, crash rates should be monitored. These segments are:

- University Drive: 5th Avenue South to 13th Avenue South
- 10th Street: 7th Avenue North to 12th Avenue North

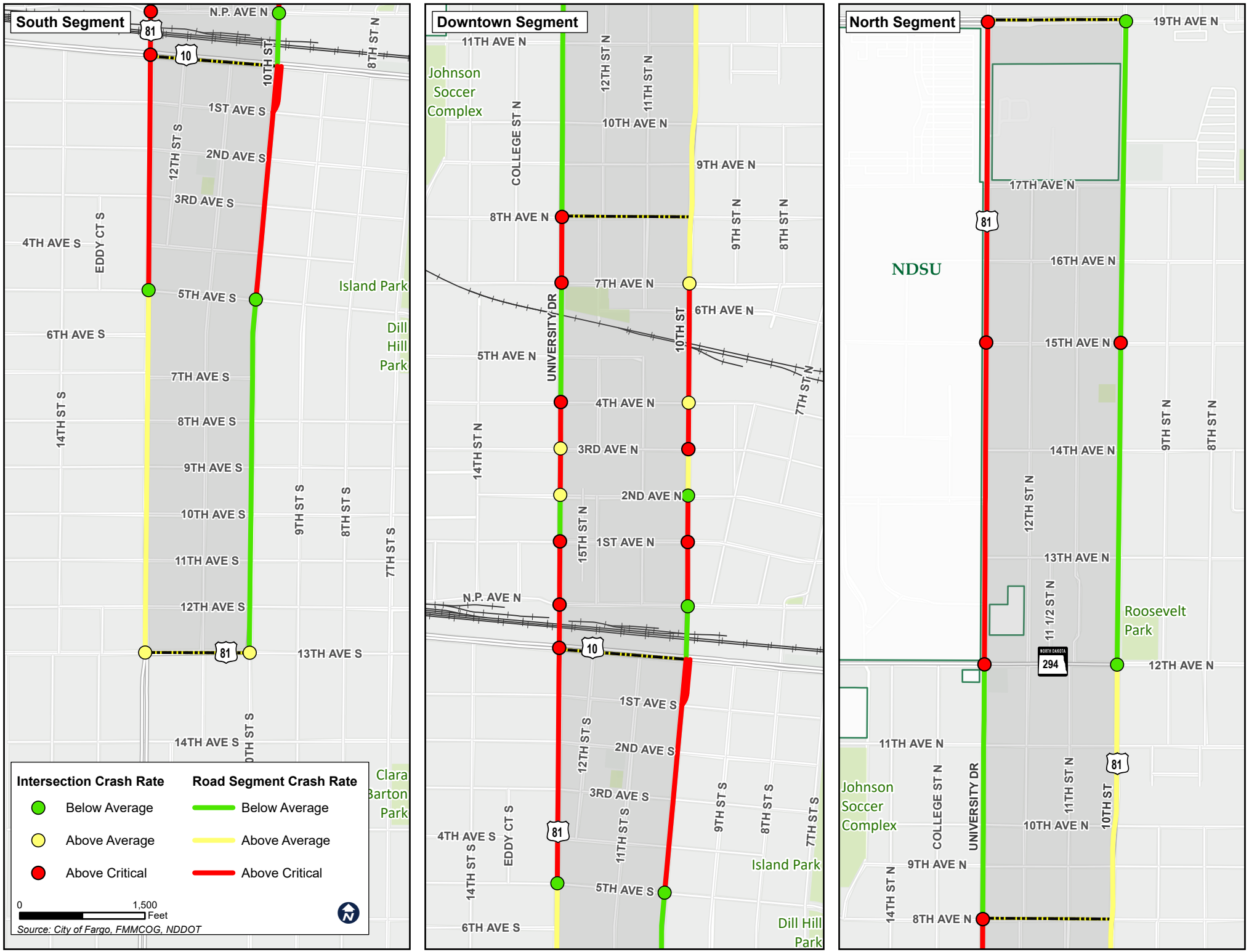
Angle crashes are the most represented crash type on both segments. Access densities are high on both segments, mainly from residential driveways onto each corridor.

Table 4: Roadway Segments Above the Critical Crash Rate

Roadway	Segment	Most Common Crash Types	Notable Roadway Features	Other Comments
University Drive	19th Avenue N to 12th Avenue N	Angle (40%) Rear End (25%)	5 signals in one mile; Dense access spacing (32 per mile)	59% of crashes occurred away from intersections
	4th Avenue N to 5th Avenue S	Angle (45%) Sideswipe (26%)	Southbound lane drop at 3rd Avenue South; 5 signals in ¾ mile; Dense access spacing (52 per mile)	40% of crashes occurred away from intersections
10th Street	5th Avenue S to 7th Avenue N	Angle (53%) Rear End (18%)	7 signals in one mile; Dense access spacing (30 per mile)	34% of crashes occurred away from intersections

Dense Access Spacing on 10th Street (Between 2nd Avenue N and 4th Avenue N)

Figure 23: Intersection and Segment Crash Rates



Transportation Equity

Demographics often influence the characteristics of travel in an area, and an understanding of study area demographics can help identify specific infrastructure needs in the area.

To support potential recommendations coming from this study, special attention was paid to the following demographic groups:

-Children aged 14 and under
-Adults aged 65 and older
-Low income
-BIPOC populations
-Households with no vehicle

These groups often benefit most from quality non-motorized facilities as they tend to be less reliant on single occupancy automobile travel compared to other demographic groups.

Analysis below is based on American Community Survey data.

Adults Aged 65 and Older

Older adults tend to walk at slower paces and can sometimes have difficulties navigating poor walking surface conditions. As a result, they are over-represented in pedestrian fatalities compared to the general population.

Around the study area, older adults are most represented on the south end of the study area and least represented on the north end of the study area near NDSU.

Children Aged 14 and Under

School-aged children who walk or bike to school should have safe and comfortable sidewalks and bike facilities to get to and from school.

The study area has fewer school-aged children compared to other areas of the Fargo-Moorhead area; however, concentrations are higher on the north and south ends of the study area.

Low Income Populations

Low income populations tend to use pedestrian and bicycle infrastructure at a higher rate than the general population. As such, quality non-motorized infrastructure should be provided to ensure equitable transportation opportunities.

A threshold of 1.5 times the poverty level is typically used when identifying low-income populations. Using this definition for low income, such populations are most represented in the downtown area and in the northern part of the study area near NDSU.

Based on American Community Survey data, low income populations are over two times the Fargo average in the north and downtown portions of the study area.

BIPOC Populations

Black, indigenous, and people of color also tend to use pedestrian and bicycle facilities at higher rates than the general population.

BIPOC populations are most represented in the downtown portion of the study area, where BIPOC representation is around 50 percent higher than the Fargo average. The north and south portions of the study area more closely reflect the Fargo average.

Households With No Vehicle

Households with no vehicle are the most reliant on non-motorized travel and are most represented in the downtown area where around 30 percent of households do not have a car. This is more than double the Fargo average. Households with no vehicle are also more represented than the Fargo average in the southern part of the study area, however are less represented than the Fargo average in the the northern part of the study area near NDSU.

Figure 24: Study Area Demographics

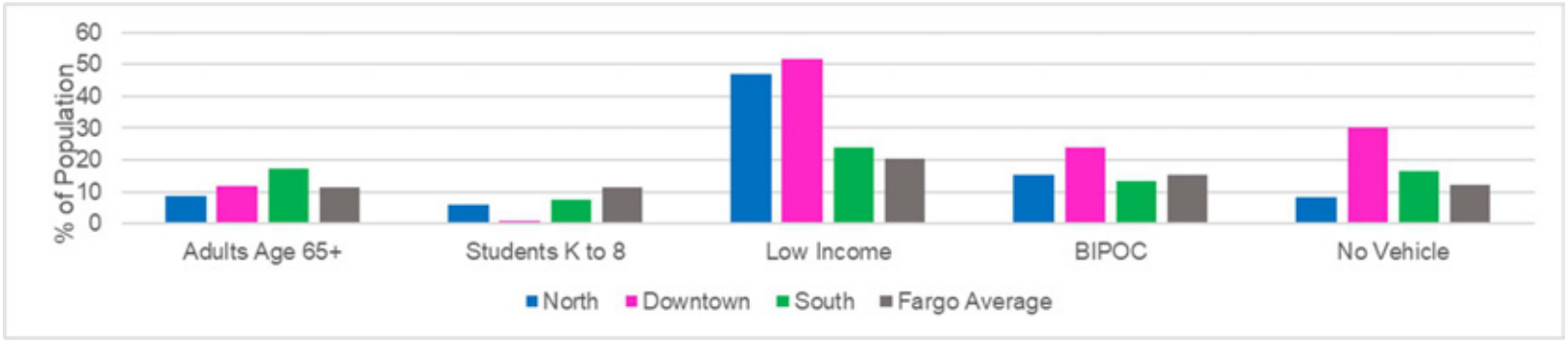


Figure 25: Adults Aged 65 and Older

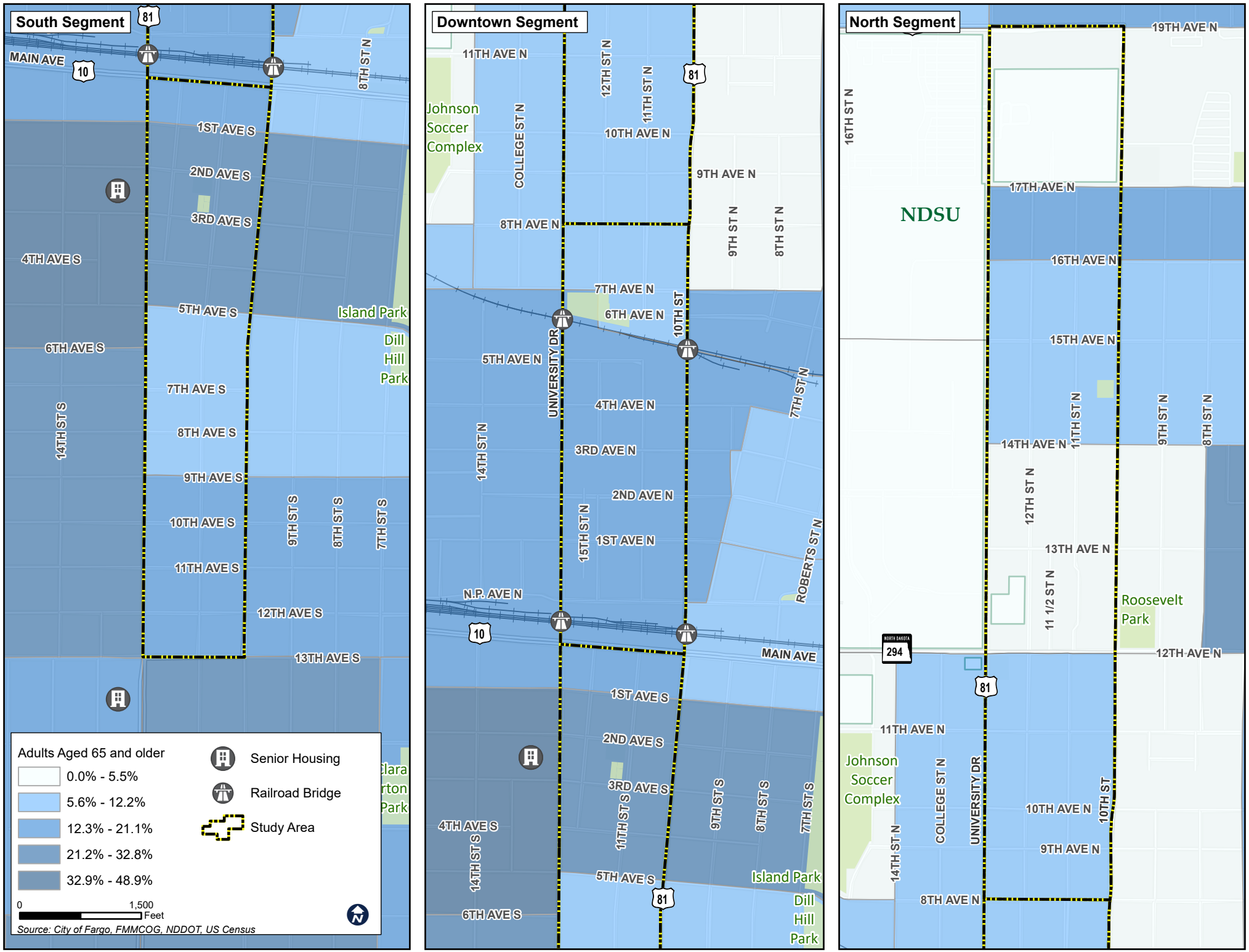


Figure 26: Students Kindergarten through 8th Grade

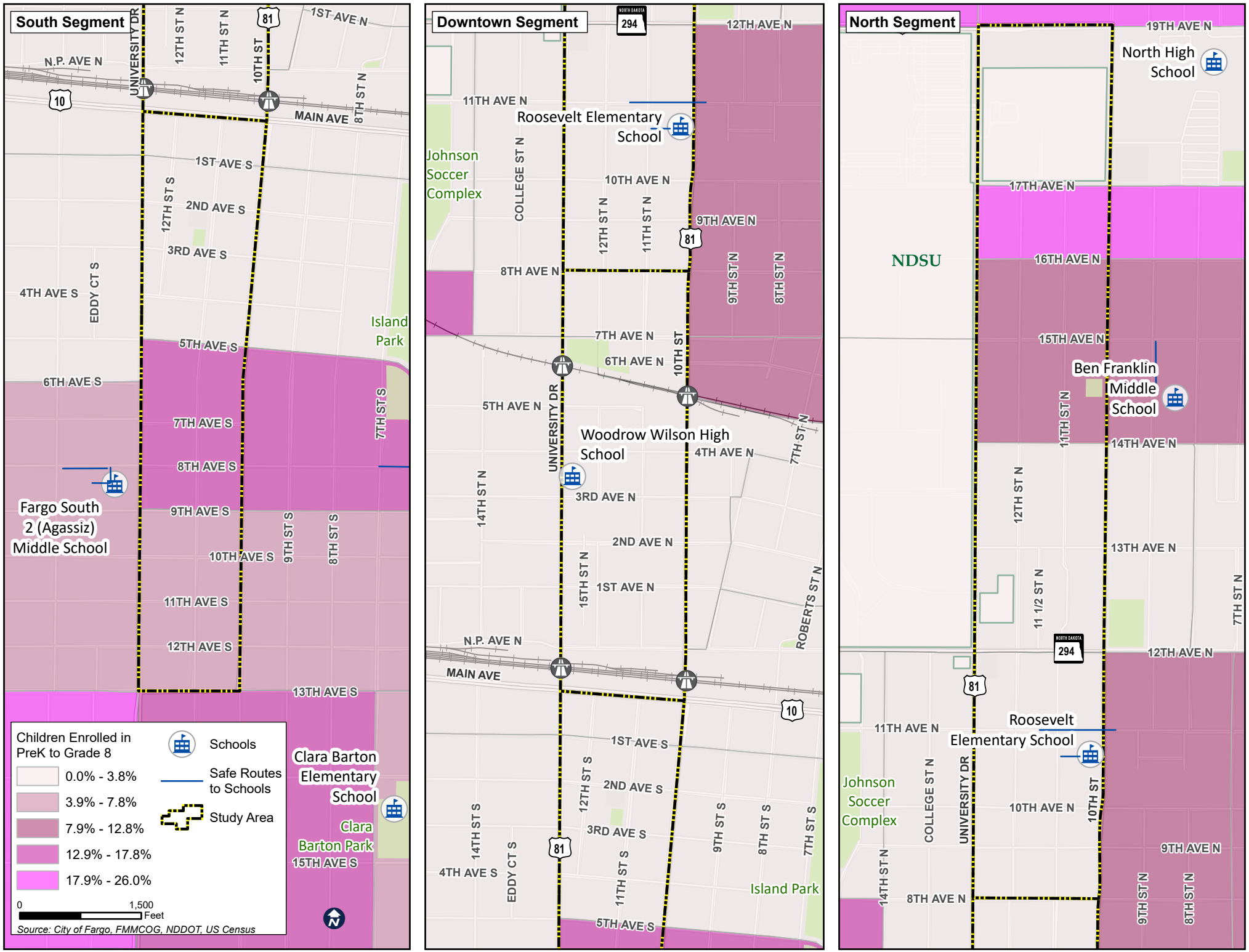


Figure 27: Low Income Populations

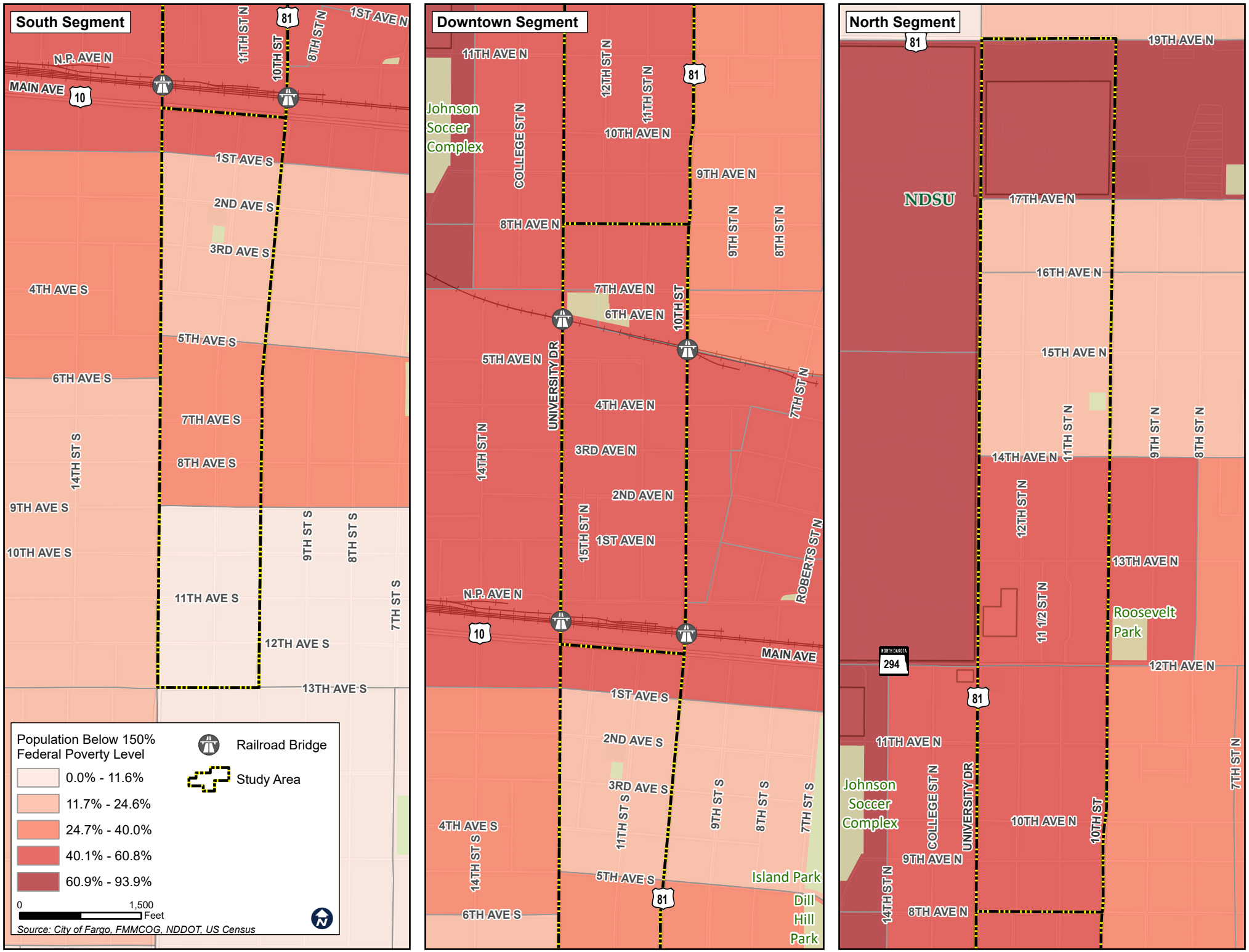
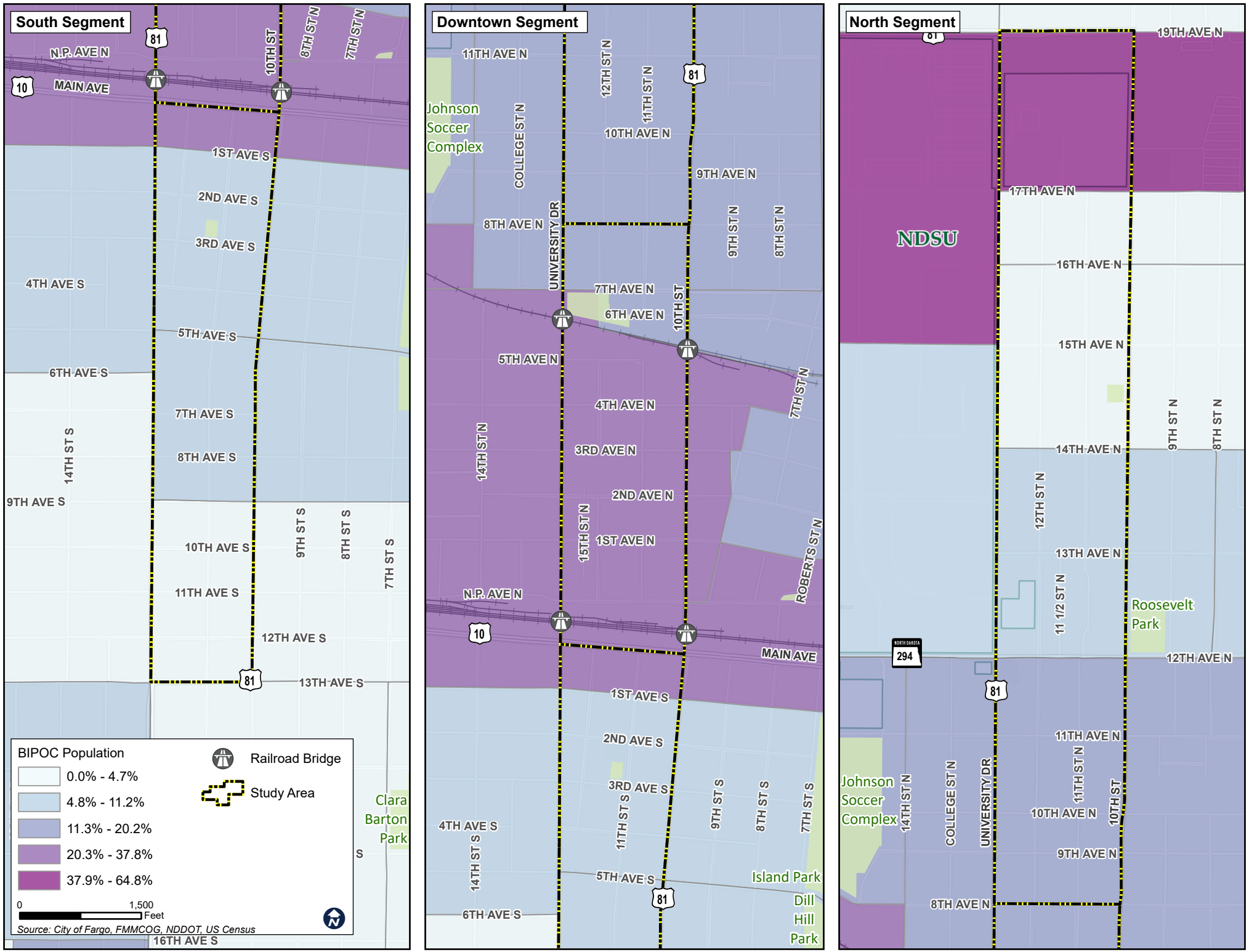


Figure 28: BIPOC Populations



Redevelopment Potential

A high-level assessment was conducted to understand potential redevelopment that could occur in the future. It should be noted that this analysis is not intended to recommend locations for redevelopment, rather it is intended to identify where redevelopment could be expected in the mid to long term.

Methodology

This analysis considers redevelopment potential to be the highest when the following conditions are met:

- **Most likely**: Building values are less than the land value
- **Somewhat likely**: Building values are less than two times the land value AND adjacent to properties meeting the "most likely" criteria above.

Potential Redevelopment Areas

Based on these criteria, the highest redevelopment potential is generally between Main Avenue and 7th Avenue North. This is consistent with redevelopment trends that have been seen in the downtown area for the past decade.

Redevelopment has the potential to impact traffic patterns in the future, and this will be considered in more detail as part of future conditions and alternatives analyses that will be completed in subsequent phases of this corridor study.

Figure 29: Potentially Redevelopable Acres by Segment

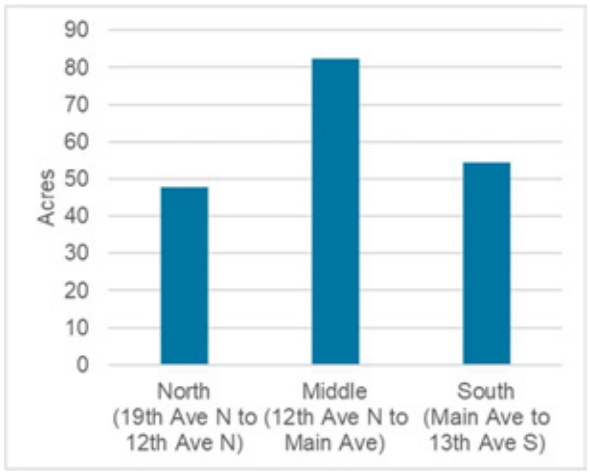
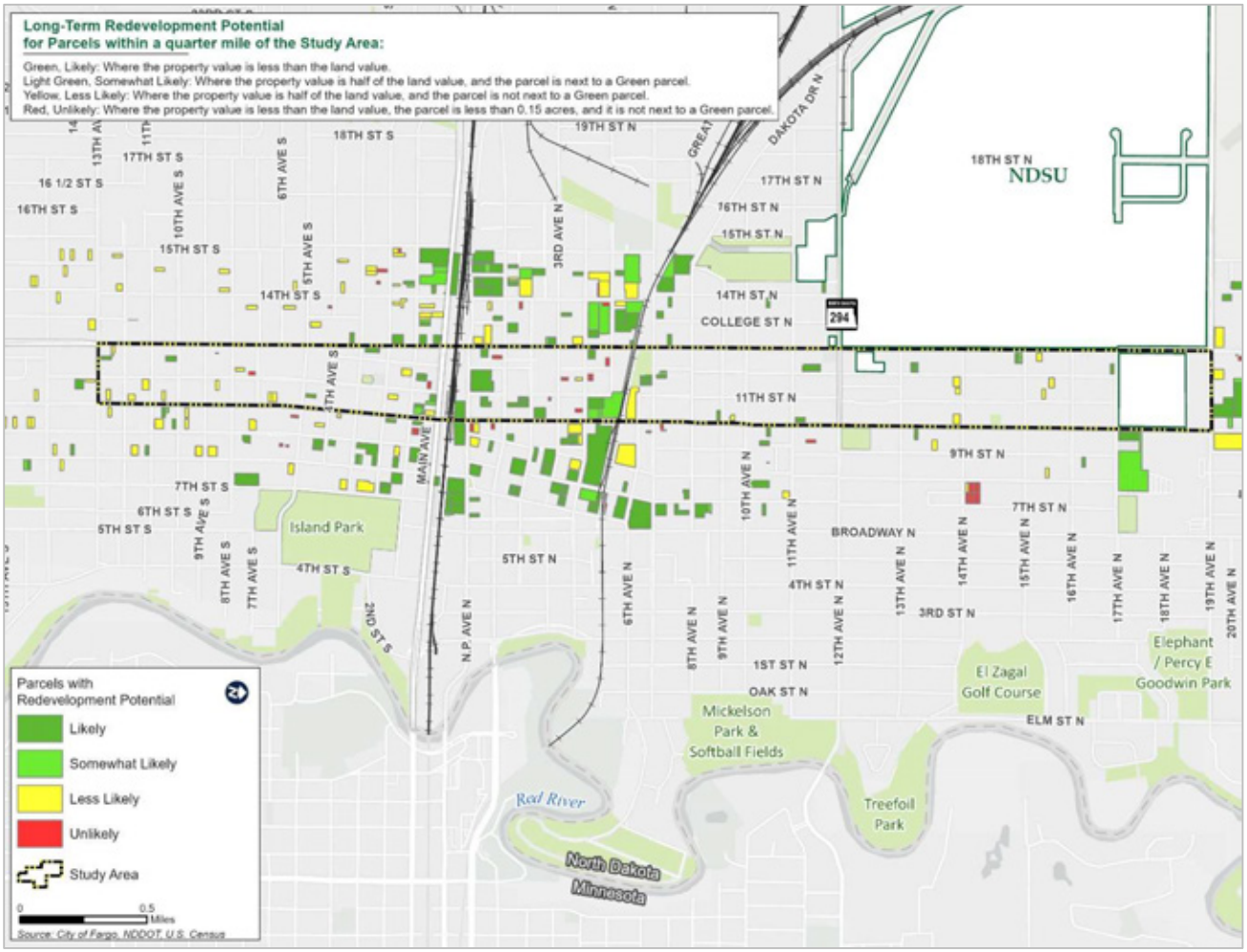


Figure 30: Potential Redevelopment Areas



Event Traffic

Events at the Fargodome and the Sanford Health Athletic Complex result in days with considerably more traffic compared to a typical day. The FargoDome alone hosts more than 100 events in a typical year, and expansion plans would likely see that number increase considerably.

To best quantify traffic increases on especially high-volume days, data from StreetLight Insight was obtained for the following conditions:

- 2021 Average Day
- 2021 NDSU Football Home Games
- 2021 NDSU Men's Basketball Home Games

Data was obtained for locations on University Drive, 19th Avenue North, 17th Avenue North, 15th Avenue North, and Albrecht Boulevard.

Traffic Increases During Events

- Across all data collection locations, NDSU football games bring around **90 percent more traffic** to the Fargodome/Sanford Health Athletic Complex area compared to an average day.
- NDSU men's basketball games draw only slightly above average daily traffic volumes to the area (around 7 percent more than an average day)
- On a percent difference basis, traffic impacts on event days are most significant on the NDSU campus (i.e. on Albrecht Avenue, 15th Avenue, and 17th Avenue) rather than the on the roadway system around campus.
- Traffic increases on University Drive are however still notable, with 2,000 to 3,000 more vehicles per day observed on football game days compared to a typical day.

Traffic Operations During Events

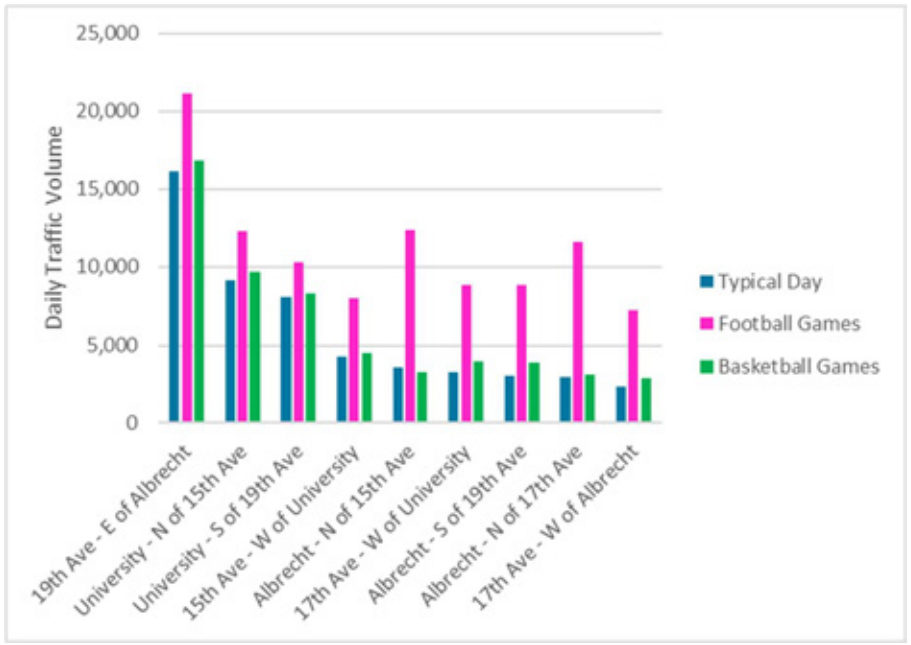
To understand how atypically high traffic volumes during events may impact study area traffic operations, turning movement data was collected at the following intersections before and after a sold-out concert at the Fargodome on 3/19/2022.

-University Drive and 17th Avenue N
-10th Street and 19th Avenue N
-10th Street and 17th Avenue N
-18th Street and 19th Avenue N
-18th Street and 12th Avenue N

Traffic operations analysis was performed at the above intersections during both the arrival and departure periods of the event, and analysis found acceptable traffic operations at all intersections under the existing one-way pair configuration.

Figure 31: Focus Area For Event Day StreetLight Data Analysis

Figure 32: Event Traffic Compared to Typical Traffic by Location



Origins and Destinations of Event Traffic

To help understand event traffic patterns, origin-destination data was obtained for three scenarios:

-Typical day during the NDSU school year
-Day of sold-out concert event at the Fargodome (Elton John; March 2022)
-2021 NDSU Homecoming

Key takeaways from this analysis are provided below.

Typical Day

-On a typical day, the most common starting point for trips toward the NDSU campus/Fargodome are north Fargo and the area around West Acres.

-The most common trip length to the campus area is between 5 and 10 miles (31% of trips).

-34% of trips to the campus area are under 2 miles in length.

Concert at the Fargodome

-On the concert day that was evaluated (Elton John in March 2022), around 40% more traffic was observed traveling to the NDSU/Fargodome area compared to a typical day.

-The most significant increase was seen in trips between 5 and 10 miles in length, with origin-destination data showing a higher concentration of trips originating in the vicinity of West Acres.

-In contrast to a typical day, only 11% of trips are under 2 miles in length.

NDSU Homecoming

-Data from NDSU's 2021 Homecoming shows around 140% more traffic to the NDSU/Fargodome area compared to a typical day.

-The distribution (percentage-wise) of trip lengths generally follows a typical day during the NDSU school year, however with greatly elevated traffic volumes

Figure 33: Origins of Campus Area Traffic on a Typical Day During the NDSU School Year

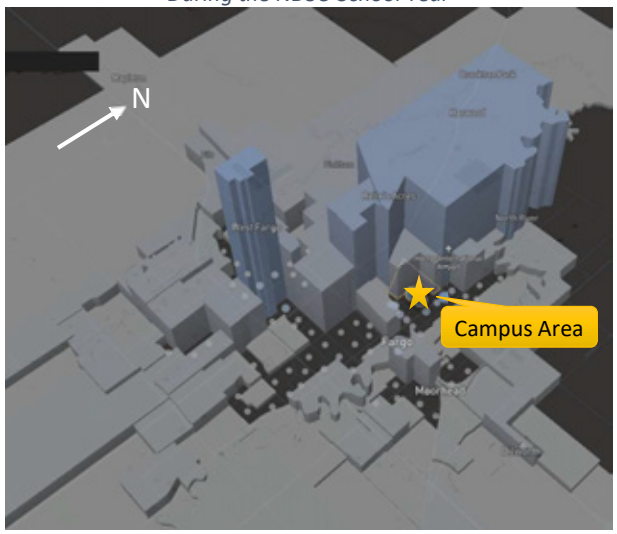


Figure 34: Origins of Campus Area Traffic on a Concert Day at the Fargodome

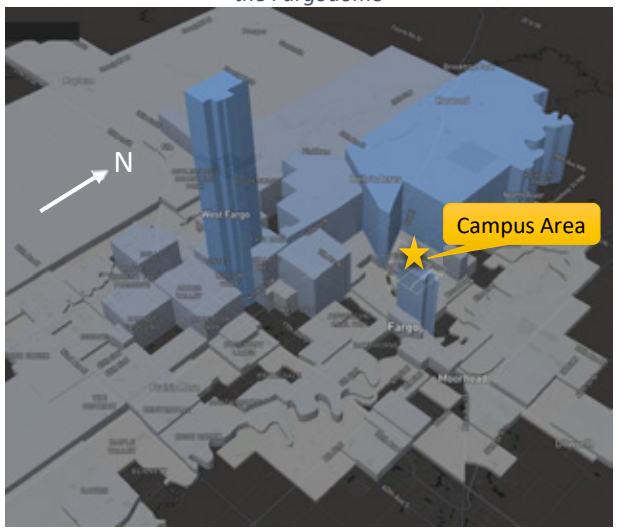


Figure 35: Origins of Campus Area Traffic on NDSU Homecoming

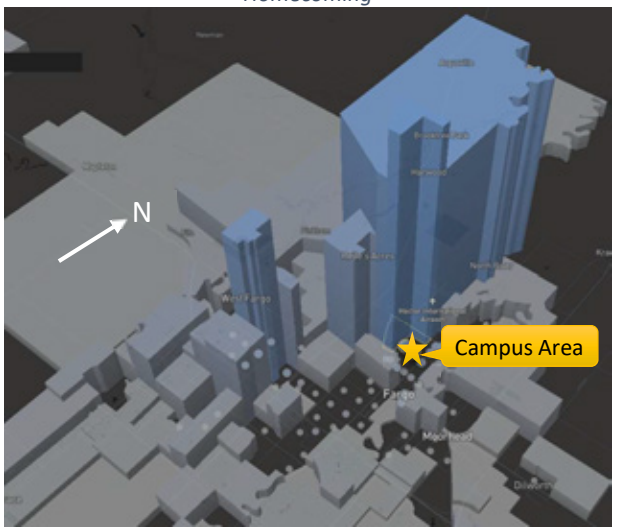


Figure 36: Trip Lengths by Scenario