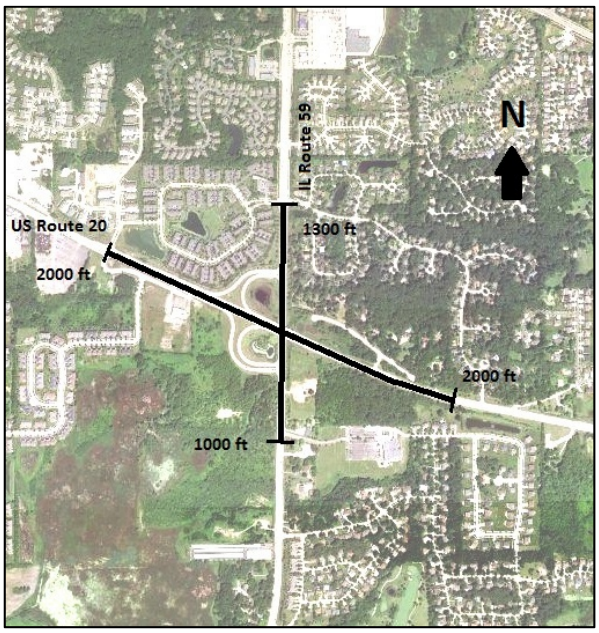
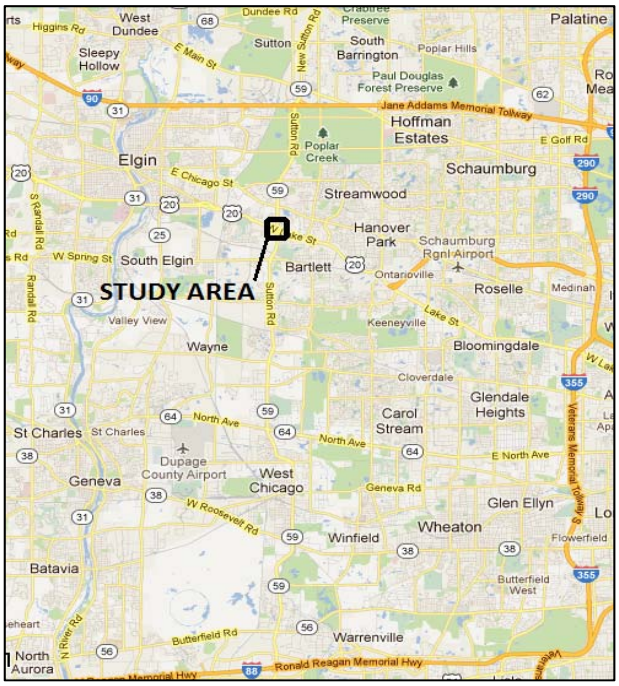
1.1 Introduction

1.1.1 Project Study Area

The project is located in Hanover Township in northwest Cook County and is situated within the Village of Bartlett, the Village of Streamwood and unincorporated areas. The study limits extend along US Route 20 for 2000 feet east and west of IL Route 59 and along IL Route 59 for 1000 feet south and 1300 feet north of US Route 20. The limits are indicated on the adjacent map. The project logical termini extend to Irving Park Road on the north, West Bartlett Road on the south, South Bartlett Road on the east and Naperville Road on the west. Although not within the study area, these intersections will be considered during the study to evaluate the impacts that improvements to the US Route 20 and IL Route 59 Interchange will have on these intersections.





1.1.2 Interchange History

The US Route 20 and IL Route 59 interchange was built in 1989. The interchange is currently a full access partial cloverleaf interchange with ramps on the west quadrants of the interchange. At the time of construction, much of the area around the interchange was undeveloped with the exception of the residential subdivision in the northeast quadrant. Since the construction of the interchange, commercial and residential developments have emerged along US Route 20 and IL Route 59 both within and adjacent to the project area. The Village of Bartlett population has increased from 19,373 residents in 1990 to 41,208 residents in 2010, more than doubling in size in 20 years. The Village of Streamwood has increased from 30,987 in 1990 to 39,858 residents in 2010 and adjacent communities have shown similar growth. The land use adjacent to the project area has become denser residential and commercial in nature during this time period.

The project planning process implements IDOT's Context Sensitive Solutions (CSS) process, a public involvement program which synthesizes the needs of many stakeholders in order to discern the most appropriate course of action for the project.

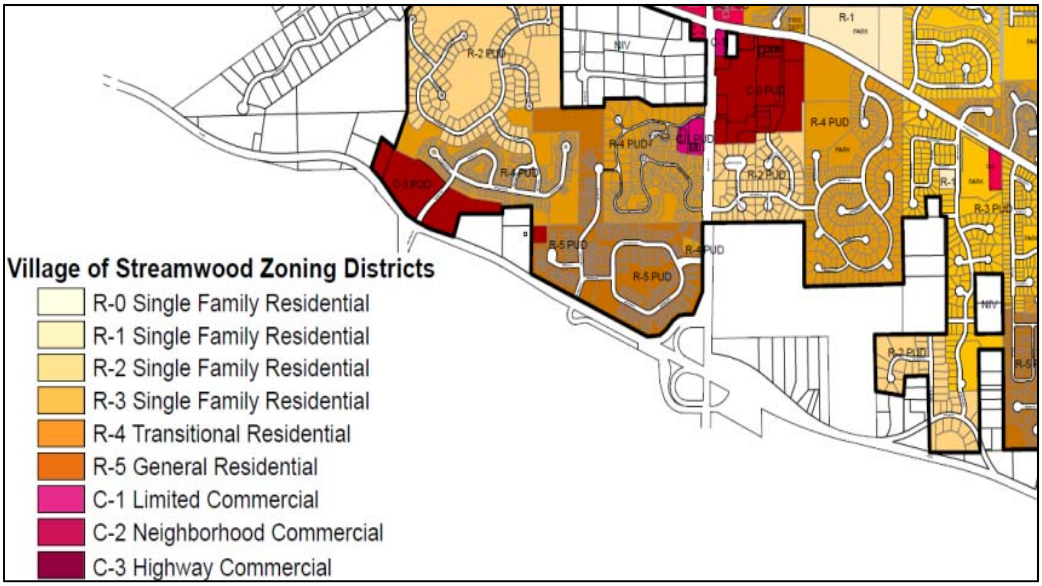
Currently the project is funded in IDOT's Fiscal Year 2012 to 2017 Proposed Highway Improvement Program for construction.

1.1.3 Classification and Regional Context

The "Strategic Regional Arterial (SRA) Design Concept Report," developed in 1994 by the Illinois Department of Transportation (IDOT), outlined the SRA network of over 100 existing road sections in Northeastern Illinois and recommended improvement projects needed on each SRA route to adequately serve the increasing long-distance trip demands as supporting routes to the expressway system. The SRA system forms a network of key routes intended to accommodate long-distance and high-volume automobile and commercial vehicle traffic as an alternate to the existing expressway system and regional transit alternatives. Both US Route 20 and IL Route 59 are identified as SRA routes.

US Route 20 is an SRA Route that serves local and regional traffic. US Route 20 connects the far western suburbs to the western termini of the Elgin-O'Hare Expressway, approximately 4 miles east of the project, moving over 40,000 vehicles per day (vpd) in the project study area. In the mid 1990's a SRA Report was not conducted in the area of US Route 20 due to the Elgin-O'Hare Extension that was being studied at that time.

IL Route 59 is also a Strategic Regional Arterial that serves local and regional traffic. IL Route 59 connects to I-88 approximately 14 miles south of the project and I-90 approximately 4 miles north of the project. IL Route 59 is a north-south route that travels through numerous suburbs throughout the region, moving over 45,000 vehicles per day (vpd) in the project study area. In 1993, as part of an SRA Report for IL Route 59, it was recommended that this section of IL Route 59 include three lanes in each direction with a 30 foot median and 150 feet of right-of-way, interconnected with signals between IL Route 64 (North Avenue) and IL Route 72 (Higgins Road).



In 2011, improvements were made along IL Route 59 to improve the congestion at the interchange. These improvements included extending the left turn lanes and installing right turn lanes at each of the ramp junctions to US Route 20. As part of these improvements, a ledge was constructed along the east side of IL Route 59 in the project area to accommodate a future multi-use path.

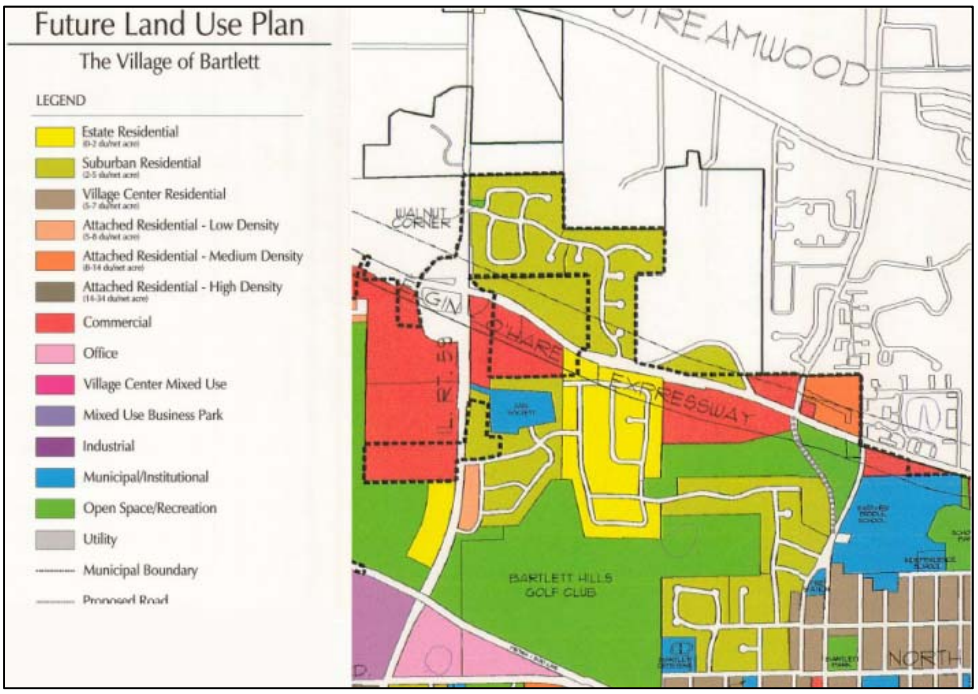
The land use within the project area generally consists of residential, commercial and undeveloped areas. The southeast and southwest quadrants adjacent to the interchange are currently undeveloped. The Village of Bartlett Future Land Use Plan indicates that these parcels are zoned for commercial development.

1.1.4 Existing Conditions

Within the study area, US Route 20 is a four lane median-divided SRA that runs in a northwest-southeast orientation. The pavement material is portland cement concrete (PCC). The lanes are twelve feet wide with a sixteen foot wide median. The median has combination concrete curb and gutter type B6.12 on both sides. In the area of the ramp terminals, US Route 20 has combination concrete curb and gutter type B6.12 on the inside and the outside lanes are bordered by an eight foot PCC shoulder.

IL Route 59 is also a four lane median-divided SRA that runs in a north-south direction and is constructed with portland cement concrete pavement. The lanes are twelve feet wide with a sixteen foot wide median. The median has combination concrete curb and gutter type B6.12 on both sides in the channelized area of the interchange and M3.12 curb and gutter north and south of the interchange area. The outside lanes are bordered with combination concrete curb and gutter type B6.12.

US Route 20 is grade separated over IL Route 59 with a vertical clearance of 16'-3". The south ramp junction along IL Route 59 provides access to and from eastbound US Route 20 and the north ramp junction provides access to and from westbound US Route 20. Both ramp junctions/intersections are controlled with traffic signals. The existing geometry of the ramp junctions with IL Route 59 includes left and right turns along IL Route 59.



The IL Route 59 and US Route 20 interchange area is surrounded by undeveloped and residential land. The northwest quadrant of the interchange includes a townhouse community with buildings and detention basins adjacent to the public right-of-way. The northeast quadrant includes single family homes adjacent to the public right-of-way. The southwest and southeast quadrants are undeveloped directly adjacent to the public right-of-way and including existing with wetlands, floodplains and wooded areas. A single commercial/light industrial parcel is located adjacent to the southwest quadrant just west of the interchange. Each of the infield areas for the cloverleaf ramps are utilized for detention and include wetland areas.

No sidewalk is present within the study limits and no parking is allowed along either IL Route 59 or US Route 20. Existing drainage is provided predominantly by an open drainage system along US Route 20 and via a closed drainage systems along IL Route 59.

The existing right-of-way width along IL Route 59 varies from 130 feet at the northern project limit, becomes wider at the interchange to accommodate the US Route 20 ramps, to 160 feet at the southern project limit.

The existing right-of-way width along US Route 20 varies from 100 feet at the western project limit, becomes wider at the interchange to accommodate the IL Route 59 ramps and local roads such as Horizon Drive, and narrows at the eastern project limit to 130 feet.

1.2 Purpose of the Proposed Action

The purpose of the proposed action is to enhance safety, reduce congestion, improve capacity and mobility and potentially accommodate and/or improve vehicular, pedestrian and bicycle access through the interchange. In addition to serving the motoring public, the proposed action will also address the need for multimodal access and safety while minimizing social, economic and environmental impacts.

1.3 Need for the Proposed Action

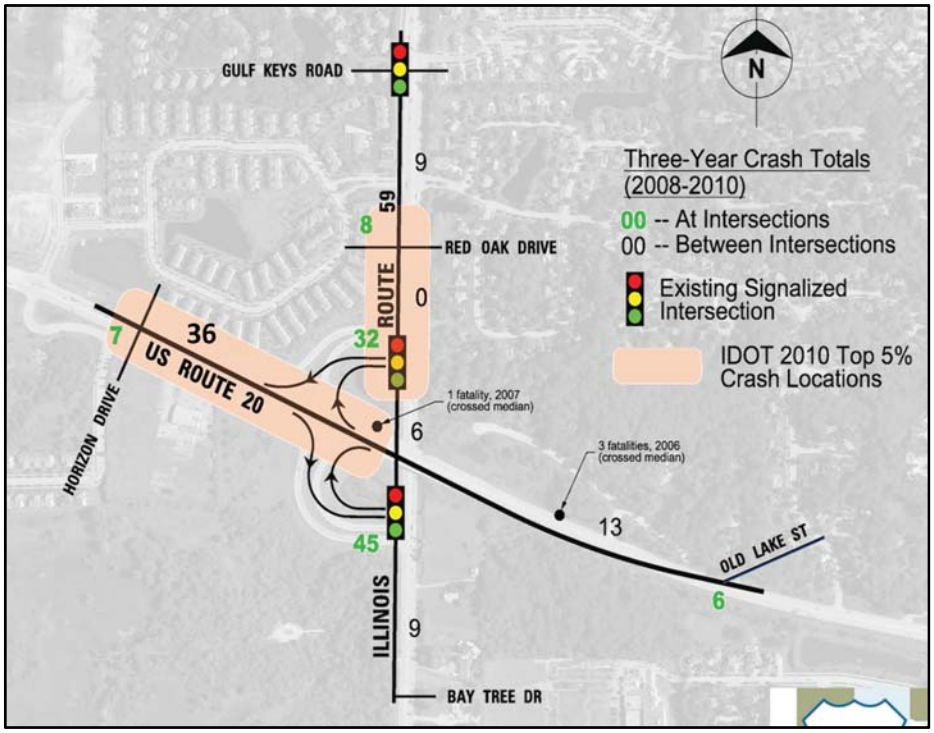
1.3.1 Enhance Vehicular Safety

An analysis of IDOT crash data from 2008-2010 has indicated the need for improved safety in the project study area. As part of the Federal Highway Administration Highway Safety Improvement Program, states are required to describe at least five percent (5%) of highway locations exhibiting the most pressing safety needs each year. Specifically, the safety issues that should be addressed include the 5% locations identified in the study area and the high number of crashes on both US Route 20 and IL Route 59 near the interchange. The crash totals and 5% locations are identified on the map to the right.

5% Locations within Study Area

IDOT has identified a 5% location along US Route 20 from the structure over IL Route 59 to just west of the Horizon Drive intersection. Geometry of the entrance ramp and acceleration lane along with a weave LOS of E, during the PM peak hour, for the ramp merge onto US Route 20 are concerns in this section of US Route 20.

Along IL Route 59, IDOT has identified a 5% location from the structure carrying US Route 20 over IL Route 59 north to the Red Oak Drive/Southwicke Drive intersection. The crash data in this area was compiled prior to the installation of the southbound right turn lane and the extension of northbound left turn lane storage length at the north ramp junction of the interchange.



IL Route 59 Vehicular Safety

A total of 109 crashes were reported on the 0.94-mile study segment of IL Route 59 from north of Baytree Drive to south of Gulf Keys Road. Of these crashes, 77 occurred at intersections (71% of the total) while 32 were determined to be mid-block crashes. Ninety-one (91) crashes, or 84% of the total, occurred on the portion of IL Route 59 between the eastbound US Route 20 ramps and Red Oak Drive (inclusive), a distance of 0.32 miles. This segment was flagged by IDOT as a Five-Percent Report section in 2010.

No fatalities were reported during the 2008-2010 study period, or in 2006-2007. Injury crashes constituted 34% of the total crashes in both segments and intersections. In intersection crashes, however, the count and severity of injuries per crash was higher.

COLLISION TYPE	YEAR			TOTAL	% OF TOTAL CRASHES
	2008	2009	2010		
Rear-End	23	12	24	59	54%
Turning	6	5	8	19	17%
Sideswipe-Same Direction	6	2	5	13	12%
Fixed Object	6	--	--	6	6%
Angle	5	--	--	5	5%
Other Collisions	3	2	2	7	6%
Total	**49**	**21**	**39**	**109**	**100%**

CRASH SEVERITY AND NUMBER OF INJURIES	YEAR			TOTAL	% OF TOTAL CRASHES
	2008	2009	2010		
"A" Injury (Incapacitating)	2	2	1	5	5%
"B" Injury (Non-incapacitating)	6	2	6	14	13%
"C" Injury (Reported, not apparent)	7	3	8	18	17%
"K" (Fatality)	--	--	--	--	--
Total	**15**	**7**	**15**	**37**	**34%**

Rear-end crashes were the most common type of incident recorded, accounting for 54% of all crashes. Nearly 50% of the total crashes occurred in the four hours between 3pm and 7pm when traffic was heaviest. These types and times of incidents had different causes depending on their location, but had the issue of high traffic volumes and the resulting close vehicle spacing in common.

US Route 20 Vehicular Safety

A total of 62 crashes were reported on the 0.84-mile study segment of US Route 20 between Tuscany Drive and Old Lake Street, not including those intersections. Of these crashes, 60 (82% of the total) occurred on the mainline of US Route 20 between Tuscany Drive and the east limit of the interchange. This segment was identified by IDOT in 2010 as a Five-Percent Report location.

COLLISION TYPE	YEAR			TOTAL	% OF TOTAL CRASHES
	2008	2009	2010		
Rear-End	8	6	7	21	34%
Fixed Object	7	4	--	11	18%
Sideswipe-Same Direction	5	2	4	11	18%
Other Collisions	14	5	--	19	31%*
Total	**34**	**17**	**11**	**62**	**100%**

**The 19 "Other Collisions" were scattered among eight types, none of which exceeded three crashes in the 2008-2010 study period.*

CRASH SEVERITY	YEAR			TOTAL	% OF TOTAL CRASHES
	2008	2009	2010		
"A" Injury (Incapacitating)	3	0	2	5	8%
"B" Injury (Non-incapacitating)	5	0	1	6	10%
"C" Injury (Reported, not apparent)	3	2	0	5	8%
"K" (Fatality)	0	0	0	0	--
Total	**11**	**2**	**3**	**16**	**26%**

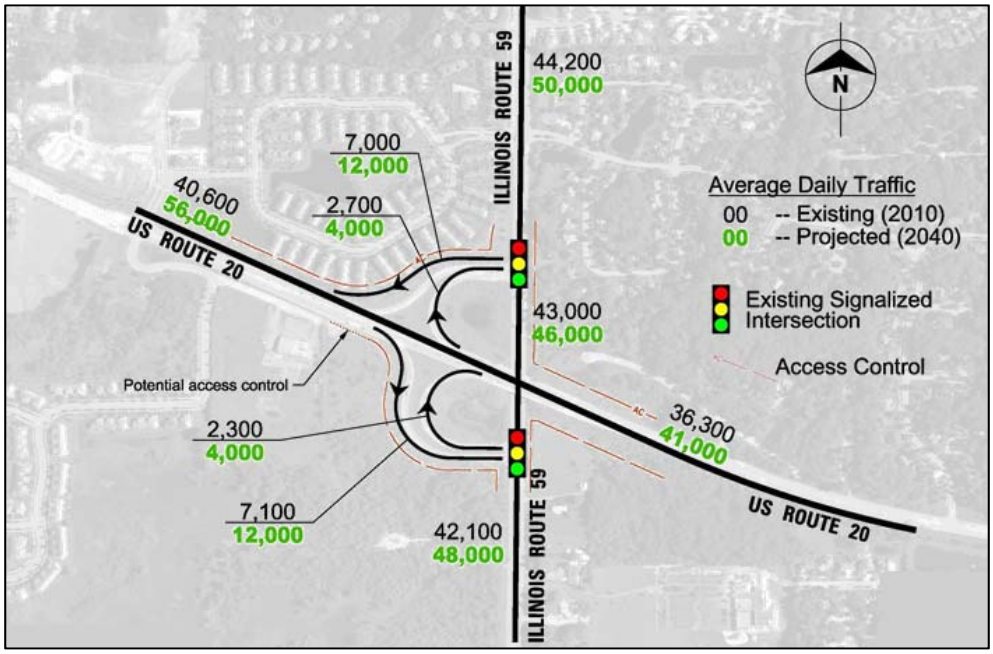
During the 2008-2010 study period, no fatalities were reported, along with 5 "A", 6 "B", and 5 "C" injuries. There was one fatality reported in 2007. Rear-end (21 incidents) and sideswipe-same direction (11 incidents) accounted for 52% of crashes. Fixed-object (11) collisions accounted for another 18%. A close review of the crash reports reveals that seven crashes of various types occurred after vehicles crossed the center median. One of these crashes resulted in the 2007 fatality, and another five resulted in injuries.

Over 30% of crashes took place during nighttime hours. Fourteen (14) of 43 crashes (33%) occurred between the hours of 8:00 pm and 5:00 am, despite the relatively low traffic volumes at that time and the presence of roadway lighting throughout the segment. Relatively few of these incidents included citations for impaired driving, so other factors may be responsible. Ten crashes of various types involved vehicles using the westbound US 20 entrance ramp, including seven which began on the ramp itself. This strongly suggests that constrictive ramp geometry is at least a contributing factor to the crash issue at this location. These statistics suggest that vehicles are passing through the interchange faster than roadway geometrics will allow.

1.3.2 Reduce Traffic Congestion

The demand from regional growth and residential and commercial development has resulted in increased traffic delays along IL Route 59, thereby creating longer travel times through the US Route 20 interchange. The figure to the right shows the 2010 two-way average daily traffic (ADT) volumes along US Route 20 are 40,600 vehicles per day (vpd) west of the IL Route 59 interchange and 36,300 vpd east of the interchange. The Chicago Metropolitan Agency for Planning (CMAP) forecasts that traffic volumes will increase along US Route 20 by 40% to 56,000 vpd west of the IL Route 59 interchange and by 14% to 41,000 vpd east of the interchange by year 2040. Additionally, the 2010 two-way average daily traffic (ADT) volumes along IL Route 59 are 42,100 vehicles per day (vpd) south of the US Route 20 interchange, 43,000 vpd at the interchange and 44,200 vpd north of the interchange. The CMAP, also forecasts that traffic volumes will increase along IL Route 59 by 14% to 48,000 vpd south of the 59 interchange, by 7% to 46,000 vpd at the interchange and by 14% to 50,000 vpd north of the interchange by year 2040. Without improvements to interchange (no build), CMAP forecasts that traffic will also increase along each of the interchange ramps.

Level of Service (LOS) is the measure by which the quality of flow of a highway, roadway, or intersection operates under specific traffic conditions. LOS accounts for the operating speed, traffic density (vehicles per mile per lane), and traffic flow rate (vehicles per hour per lane). As travel speeds decrease and traffic density increases, traffic flow becomes increasingly unstable. LOS is graded from A to F; the AASHTO Highway Capacity Manual describes the LOS levels as A-Optimum free flow (delay less than 5.0 seconds per vehicle), B-Reasonable free flow (delay between 5.1 and 15.0 seconds per vehicle), C-Stable flow (delay between 15.1 and 25.0 seconds per vehicle), D-Approaching unstable flow (delay between 25.1 and 40.0 seconds per vehicle), E-Unstable flow (delay between 40.1 and 60.0 seconds per vehicle), F-Forced or breakdown flow (delay greater than 60.1 seconds per vehicle). IDOT design standards require a Level of Service of C for suburban SRA routes, while LOS D is acceptable for some interchange elements.



IL Route 59 Level of Service

The AM and PM Level of Service was calculated at the ramp junctions along IL Route 59 based on existing traffic. The south junction has an overall LOS D (AM) and C (PM), although the south approach operates at an LOS E during the AM peak hour with a 95th percent queue length of 2,725 feet for through traffic. This queue prevents left turning vehicles from entering the left turn lane at the intersection. The north junction has an overall LOS A (AM) and B (PM) although the east approach operates at a LOS E during the PM peak hour. These results are based on the turn lane improvements that were completed in year 2011.

The AM and PM Level of Service based on Year 2040 traffic volumes was also calculated at the ramp junctions along IL Route 59. The south junction has an overall LOS F (AM) and B (PM), although the south and west approaches operate at an LOS F during the AM peak hour. The 95th percent queue length for the west approach, backing up on the ramp to US Route 20, is over 1,500 feet and the through traffic on the south approach extends for 4,425 feet. This queue prevents left turning vehicles from entering the left turn lane at the intersection.

The north junction has an overall LOS C (AM) and E (PM) although the west approach operates at a LOS F during the AM and PM peak hour and the south approach through movement operates at a LOS E during the PM peak hour.

US Route 20 Level of Service

The US Route 20 westbound entrance ramp merge from IL Route 59 to US Route 20 operates at a level of service E during the existing PM peak hour.

1.3.3 Improve Residential, Commercial and Institutional Access

Safe Vehicular Access along IL Route 59 and US Route 20

There are a number of local street/driveway minor access points along both US Route 20 and IL Route 59 in the project study area. Along US Route 20 intersections within the project study area include Horizon Drive and Old Lake Street. However, the intersection of US Route 20 and Red Oak Drive is outside of the project study area. Along IL Route 59 the Southwicke Drive/Red Oak Drive intersection and the entrance to the Jain Society of Metropolitan Chicago are within the project study area. Crossing and turning maneuvers that occur at these intersections create opportunities for conflicts. These intersections represent potential hazards because of the priority of movement on the main road, limited gaps in traffic along both US Route 20 and IL Route 59, and high travel speeds along both routes. Vehicles stopping or slowing to turn create speed differentials between vehicles traveling in the same direction. This is particularly problematic on along both US Route 20 and IL Route 59 and is likely a contributing factor to poor safety/crashes at these interesctions.

Improve Pedestrian and Bicyclist Safety and Access

Pedestrian, ADA and bicycle access does not exist in the interchange area. There are no bicycle or pedestrian facilities along IL Route 59 between West Bartlett Road and Red Oak Drive/Southwicke Drive. There is an existing bike path on the south side of West Bartlett Road that crosses IL Route 59. Currently, there is an existing sidewalk on the north side of Red Oak Drive and on the south side of Southwicke Drive as the streets approach IL Route 59. Additionally, there is existing sidewalk on the west side of IL Route 59 north of the Red Oak Drive/Southwicke Drive intersection and on both sides of IL Route 59 north of the Laurel Oaks Drive/High Point Lane intersection.

There are no bicycle or pedestrian facilities along US Route 20 between Naperville Road and South Bartlett Road. Currently, there is an existing bike path along the east side of Naperville Road that crosses US Route 20 and sidewalk on the north side of US Route 20 approximately 200 feet west of South Bartlett Road. Sidewalk is located at the following cross roads along US Route 20:

- Red Oak Drive – Along the west side of the road
- Horizon Drive – Along both sides of the road
- Monarch Drive - Along both sides of the road

Additionally, a ledge was constructed along the east side of IL Route 59 in 2011 for a future multi-use path.

1.4 Conclusion

Future forecasts show an increase in population and development surrounding the project area. Additionally, the study area includes multiple 5% crash locations. Without improvement, the US Route 20 and IL Route 59 interchange will likely experience an increase in vehicle crashes and elevated traffic congestion. An unimproved interchange will continue to inadequately serve other modes of transportation, such as bicycles and pedestrians. The purpose of this study is to discover solutions that will lead to a reduction in the likelihood of crashes, provide greater traffic capacity, mobility and serve all roadway users.