

# East Grand Avenue

## Bike, Pedestrian, and Motor Vehicle Traffic Study

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**Prepared for: Greater Egypt Regional Planning & Development Commission**

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**Project information:**

East Grand Avenue  
Carbondale, IL  
Oates Project Number: 222106

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**Prepared by:**



**In conjunction with:**



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## Executive Summary

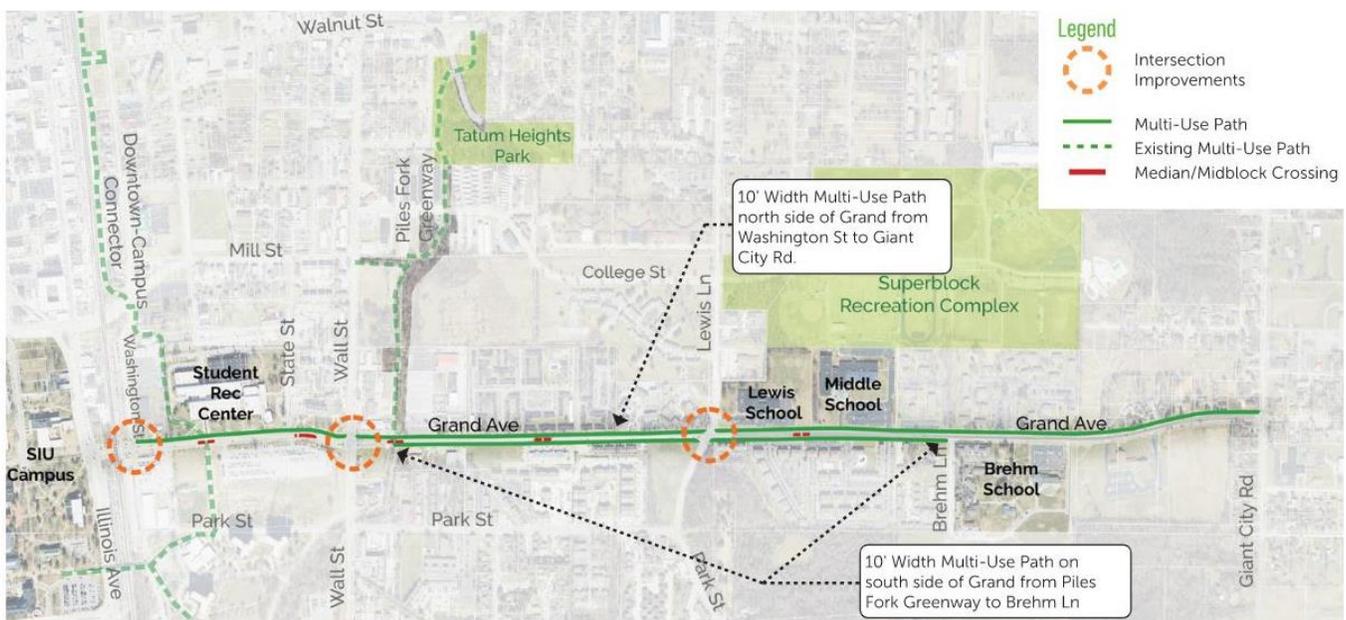
East Grand Avenue was evaluated for opportunities to create a corridor that is safe for both motorized and non-motorized users. The existing corridor lacks sufficient bicycle facilities and poses several safety concerns for both pedestrians and vehicles including speeding, nonstandard intersection layouts, and insufficient pedestrian crossings.

Existing roadway layouts and available right of way were analyzed along the corridor. Crash incident reports were evaluated to determine the areas of greatest safety concern. Following the Federal Highway Administration’s Safe System Approach, several feasible roadway configurations were developed which considered the need for speed reduction and included both pedestrian and bicycle facilities. All design configurations considered the corridor’s most vulnerable users.

The configurations were compared against each other and presented to the study oversight committee for comment. The final recommendations were determined by utilizing the study oversight committee’s insight and preferences while combining feasible configurations for each segment of the corridor into one cohesive corridor layout.

Recommendations from this study include:

- Road diet from Washington Street to Wall Street
- Removal of bike lanes from Lewis Lane to Giant City Road
- Extension of the turn lane from Carbondale Middle School to Giant City Road
- North side multiuse path from Washington Street to Giant City Road
- South side multiuse path from Wall Street to Brehm Preparatory School
- Intersection modifications to the intersection of Washington Street and East Grand Avenue
- Intersection geometric redesign versus roundabout study and right of way impact analysis for the intersection of East Grand Avenue and Lewis Lane
- Protected refuge island midblock crossings at State Street, Piles Fork Greenway, University Village Apartments, and Lewis Elementary School



Map Overview: New Multi-Use Path

## 1. Introduction

East Grand Avenue represents an important connection between residential, commercial, and educational opportunities within the City of Carbondale, IL. Not only does it provide a vital link between Southern Illinois University campus and multiple student residential housing options, but it also runs in front of three primary education facilities for the City of Carbondale providing a link between the student's homes and their educational buildings. Combined with a growing commercial network, these qualities make East Grand Avenue a great candidate for a transformation from a corridor governed by the motor-vehicle to one that is pedestrian friendly, inviting, and safe for all modes of transportation including bicyclists and those requiring mobility assistance devices.



Map: Project Location

Greater Egypt Regional Planning and Development Commission, in pursuit of the Federal Highway Administration's Safe System Approach, commissioned this study to determine the feasibility of roadway modifications to meet their objective of protecting vulnerable users such as pedestrians, bicyclists, and those with disabilities. The population of the university is on the rise and with the recent introduction of electric scooters to the city, the development of more multimodal transportation facilities along East Grand Avenue is of increasing importance. The City of Carbondale adopted a Great Streets policy in 2015 and a copy is included in the Appendix of this report. The combination of these factors makes East Grand Avenue an exciting opportunity to expand facilities for non-motorized users within the City of Carbondale.

Resources that encapsulate the vision and goals set forth for this corridor study include:

- Moving to a Complete Streets Design Model: A Report to Congress on Opportunities and Challenges, 2022
- The U.S. Department of Transportation, Federal Highway Administration's Complete Streets webpage: <https://highways.dot.gov/complete-streets>
- FHWA-HEP-17-024: Small Town and Rural Multimodal Networks
- FHWA Safe System Approach
- Illinois Strategic Highway Safety Plan (2022-2026)

This study provides information on the existing conditions of the corridor, summarizes current developments along the corridor, and provides a feasibility analysis for several roadway configuration alternatives. Recommendations for the corridor's development, phasing plans, and concept level cost estimates are provided in order to ensure the continuation of this exciting transformation.

## 2. Study Process

### 2.1 Methodology

The process for completion of this study began with a review of existing conditions and current development along the corridor. Information was gathered and compiled into an existing conditions map. The various roadway segments and intersections along the corridor were then analyzed for configuration possibilities. A community wide survey was conducted to determine the public’s concerns and ideas and local stakeholders were contacted to incorporate their interests into determining the final recommendations for the corridor.

### 2.2 Nomenclature

For ease of understanding, the following nomenclature will be used throughout this report.

**Washington Street to Wall Street (WW)** - The segment of East Grand Avenue between Washington Street on the west and Wall Street on the east will be referred to as “WW.”

**Wall Street to Lewis Lane (WL)** - The segment of East Grand Avenue between Wall Street on the west and Lewis Lane on the east will be referred to as “WL.”

**Lewis Lane to Giant City Road (LG)** – The segment of East Grand Avenue between Lewis Lane on the west and Giant City Road on the east will be referred to as “LG.” Due to the differences in existing conditions for portions of this segment, it will be split into two sections. “LG1” represents the segment in front of both Lewis Elementary and Carbondale Middle Schools and “LG2” represents the segment to the east of the middle school.

**Intersections – (I1 I2 I3)** – The intersections within the study area will be referred to accordingly:

- I1** – Intersection of East Grand Avenue and Washington Street
- I2** – Intersection of East Grand Avenue and Wall Street
- I3** – Intersection of East Grand Avenue and Lewis Lane



Map: Project Limits

### 3. Study Vision

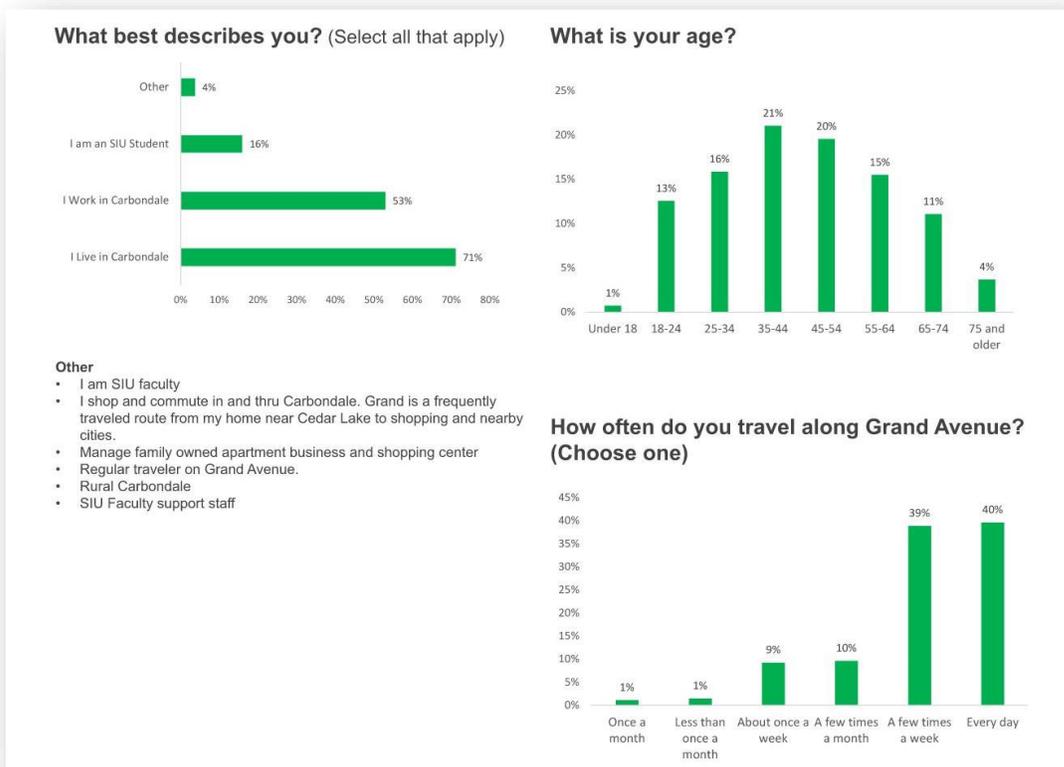
The study began with determining a vision that would best describe the goal of this corridor’s transformation and help guide the study towards that goal.

*To create a safer, more welcoming, and pedestrian friendly corridor that serves the diverse multimodal needs of its users and serves as a model of complete streets in our Carbondale community.*

### 4. Community Engagement

Gathering public input is an important tool for any development study. It allows the team to listen to the experiences of the community members that utilize the corridor daily and compare those experiences to the data collected. This not only gives validity to the study but also helps to determine improvements that will produce the desired results for multi-modal users and be supported by the community.

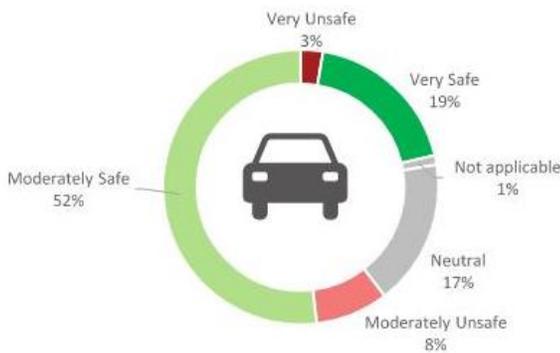
During this study there were three forms of community engagement. The first was an online survey in which over 275 community members responded. The results of this survey are compiled in the Appendix of this report. Feedback from this survey will be mentioned throughout this report as it pertains to each section. The second form of community engagement happened in communications with each of the three schools located along the corridor: Lewis Elementary School, Carbondale Middle School, and Brehm Preparatory School. The Chancellor’s office at Southern Illinois University was also contacted as an introduction to the study and to request partnership in spreading the word of the online survey to the student body. The students, staff, and their families at all four of these facilities are significant users of the East Grand Avenue corridor. Copies of communications with them are provided in the Appendix of this report.



An important overall takeaway from the survey results is the community’s safety rating for the corridor in terms of each mode of transportation. A vast majority of vehicle and transit users were of the opinion that those modes of transportation were safe on East Grand Avenue. This was in stark contrast to safety concerns for using bicycles, electric scooters, and mobility devices on East Grand Avenue. Between 70%-75% of respondents said that the use of bicycles, electric scooters, and mobility devices were unsafe on East Grand Avenue. According to the community, the city’s desire to create a multimodal corridor should start with safer amenities for their most vulnerable users.

**How would rate the safety of the following modes of travel along Grand Avenue.**

**Vehicle**



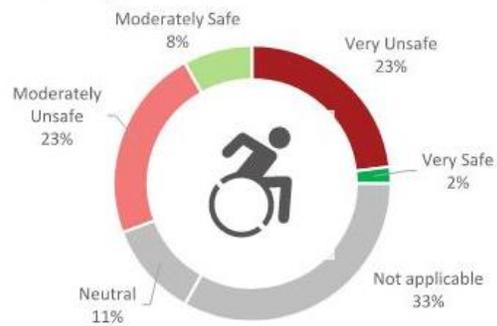
**Bicycle**



**Transit**



**Wheelchair or Personal Mobility Device**

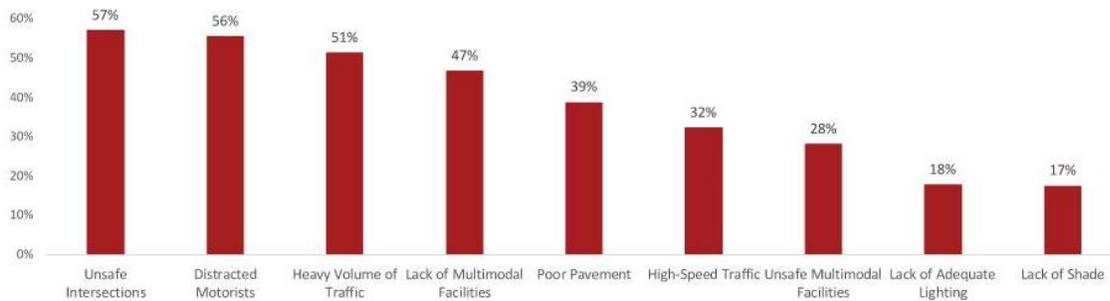


**Electric Scooter**



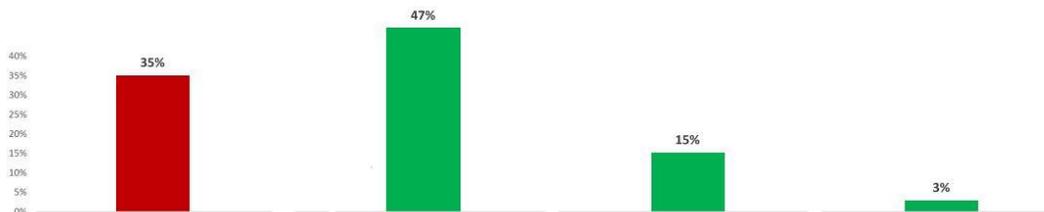
Another important overall takeaway is the number of respondents from the survey that label themselves as “interested but concerned” bicyclists was 47%. This percentage matches exactly the 47% of respondents that believed a lack of multimodal facilities is one of the challenges along East Grand Avenue. This makes it appear that a significant amount of respondents may begin to travel the corridor by bicycle if safe facilities were provided for users of this category.

**What are existing challenges along Grand Avenue for your current or desired mode of travel? (Select all that apply)**



**What best describes you as a bicyclist? (Choose one)**

			
<b>No Way, No How</b>	<b>Interested but Concerned</b>	<b>Enthusied and Confident</b>	<b>Strong and Fearless</b>
			
No desire to bicycle at all!	You enjoy bicycling, but are nervous about riding in traffic. You prefer bike trails and bike facilities separated from traffic.	You are comfortable riding in traffic, but prefer facilities like bike lanes.	You ride in all types of traffic, regardless of whether there are bike facilities.



## 5. Existing Conditions

Included in this section is a description of the existing conditions of each roadway segment and intersection that was analyzed during this study as well as a summary of the results and projects planned from previous studies performed along the corridor.

### 5.1 Roadway Segments

#### 5.1.1 WW – Washington Street to Wall Street – 2022 AADT = 9,600

Description:

The segment of the corridor from Washington Street to Wall Street is bordered on both the north and south side by SIU property and is therefore an important corridor that leads to the campus and is bustling with student activity including pedestrians, electric scooters, and bicycles.

Roadway:

The existing roadway typically consists of four 12' drive lanes. The speed limit along this segment is posted at 30 mph. Vehicle speeds measured over a one-week period show that the daily 85<sup>th</sup> percentile speed for this segment averages approximately 40 mph which is 10 mph over the posted speed limit. The online survey shows that the community agrees with the posted speed limits, but comments show that they also believe a significant number of users exceed the posted limits. Therefore, the data collected for this study confirms the community's observations. Charts showing the daily 85<sup>th</sup> percentile speed are provided in the Appendix.



WW – Looking East



WW – Looking West

**Pedestrian and Bicycle:**

5' sidewalks line both the north and south sides of this segment. There are no designated bicycle facilities along this segment, however, in Carbondale, bicycles are allowed to travel on the sidewalks. With university parking facilities on the south side of this segment and important university amenities on the north side, many pedestrians cross the roadway along this segment. Most of the crossings occur at the Student Recreation Center where there is a protected crossing with recent enhancements which added a center refuge island and push button activated advance warning lights. However, pedestrians are also known to cross at the intersection of State Street which is not currently a marked pedestrian crossing. The intersection of State Street is an uncontrolled intersection.

**Crashes:**

The total number of incidents along this segment from 2016-2022 is 66 with three type A injury classifications, no fatalities, and three pedestrian/bicycle incidents all with type B injury classification.

Pedestrian and bicycle incidents have dropped significantly since the installation of the enhanced pedestrian crossing at the Student Recreation Center. The crossing went from a ladder style crosswalk to a protected refuge island with push button activated advanced warning lights and pedestrian scale lighting. This shows that this type of improvement has a significant impact on safety and is an effective and proven tool for this corridor. The pedestrian incidents that have occurred after the installation of this protected crossing have all occurred at the intersection of East Grand Avenue and State Street.



WW – Improved Pedestrian Crossing at SIU Student Rec Center with Refuge Islands and Advanced Warning Lights



WW – Pedestrian Crossing Prior to Improvements (2013)

**5.1.2 WL – Wall Street to Lewis Lane – 2022 AADT = 8,600**

**Description:**

The segment of the corridor from Wall Street to Lewis Lane is mixed with both commercial and multifamily residential properties. Most of the commercial businesses reside on the south side of the roadway and apartments are located on the north side of the roadway. Most of the housing along this segment of the corridor is considered SIU student housing.



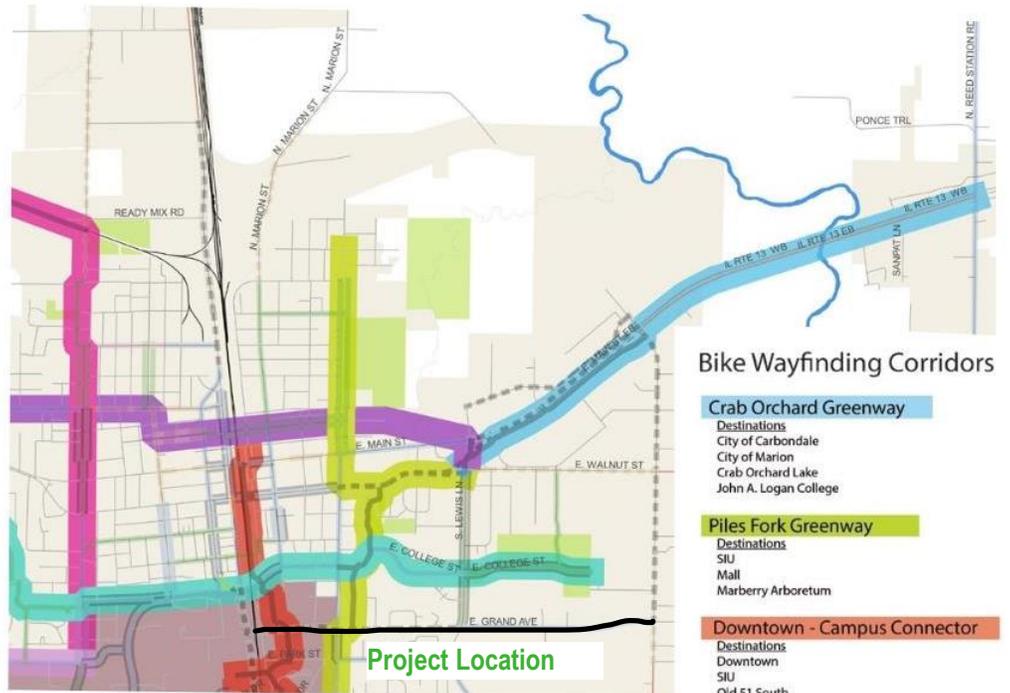
WL – Looking East

**Roadway:**

The existing roadway consists of two 10’ drive lanes and a 10’ turn lane. The speed limit along this segment is posted at 30 mph. Vehicle speeds measured over a one-week period show that the daily 85<sup>th</sup> percentile speed for this segment averages approximately 40 mph which is 10 mph over the posted speed limit. Charts showing the daily 85<sup>th</sup> percentile speed are provided in the Appendix.

**Pedestrian and Bicycle:**

5’ sidewalks line both the north and south sides of this segment. There are no designated bicycle facilities along this segment, however, as stated previously, bicycles are allowed to travel on the sidewalks. The Piles Fork Greenway currently ends at its intersection with East Grand Avenue on the north side. This greenway extends to the north and provides a bicycle and pedestrian connection to the regional Crab Orchard Greenway.



**Crashes:**

The total number of incidents along this segment from 2016-2022 is 39 with no fatalities and one A injury classification. Of the incidents, two were pedestrian/bicycle incidents one of which was the A injury incident the other a B injury classification.

**5.1.3 LG – Lewis Lane to Giant City Road – 2022 AADT = 5,700**

**Description:**

The segment of the corridor from Lewis Lane to Giant City Road is again lined with multi-family residential properties, however it also consists of three schools, a large church, and a small cluster of single-family homes.

**Roadway:**

The existing roadway consists of two 12' drive lanes and a 12' turn lane for the segment between Lewis Lane and the middle school. Beyond the middle school the center turn lane is removed leaving just the two 12' drive lanes.



LG – Looking West

The speed limit along this segment is posted at 40 mph. Vehicle speeds measured over a one-week period show that the daily 85<sup>th</sup> percentile speed for this segment averages approximately 47 mph which is 7 mph over the posted speed limit. Many comments to the online survey regarding speed limits along the corridor recommended that the speed limit along this segment of East Grand Avenue be lowered to 30 mph. Their concerns were the recent developments with more multi-family housing as well as the three schools and their students.

With both an elementary and middle school located within a very close proximity of each other, vehicle backups are common along the roadway during school drop-off and pickup times.



LG – Looking East

**Pedestrian and Bicycle:**

5' sidewalks line both the north and south sides of this segment. Students are known to cross the road between the multi-family complexes on the south side of the road and the schools on the north side of the road. 4' wide shoulders, which are designated as bicycle facilities in the city's master plan, are on each side of the road. However, these facilities are not marked on the pavement nor signed as bike lanes. These are therefore typically known as urban shoulders and are only conducive to bicyclists in the "strong and fearless" category. This category typically represents about 4%-7% of the typical bicyclist and does not include school age children.

**Crashes:**

The total number of incidents along this segment from 2016-2022 is 43 with no fatalities and one A injury classification. Of those incidents none were pedestrian/bicycle related.



**5.2 Intersections**

**5.2.1 I1 – East Grand Avenue and Washington Street**

**Description:**

The intersection of Washington Street and East Grand Avenue is not a typical intersection. West bound traffic on East Grand Avenue must stop at the stop signs, however east bound traffic on East Grand Avenue does not have a stop sign. South bound traffic on Washington Street has a stop sign. South of East Grand Avenue, Washington Street changes to a one-way street (south bound only) so there is no traffic arriving and traveling north bound at this intersection.



**I1 – Looking East on East Grand Avenue**

**Crashes:**

Between the years 2017 and 2021 IDOT crash data documents 12 crashes at this intersection, two designated with an A injury classification and one with a B injury classification. Another 10 incidents were reported by the City of Carbondale.

The ratio of serious injury to incident at this intersection is worse than any other intersection along the study corridor. Even though the number of incidents is lower at this intersection, the likelihood of an incident causing a serious injury is much higher thus making this intersection one of concern.

**5.2.2 I2 – East Grand Avenue and Wall Street**

**Description:**

The intersection of East Grand Avenue and Wall is a signaled intersection. Eastbound traffic on East Grand Avenue must go from two through lanes to one left turn only, one through, and one right turn only lane. Combined with the curve in the roadway before the intersection, this causes confusion to an unfamiliar driver. It was also a well-documented concern within the comments of the online survey.



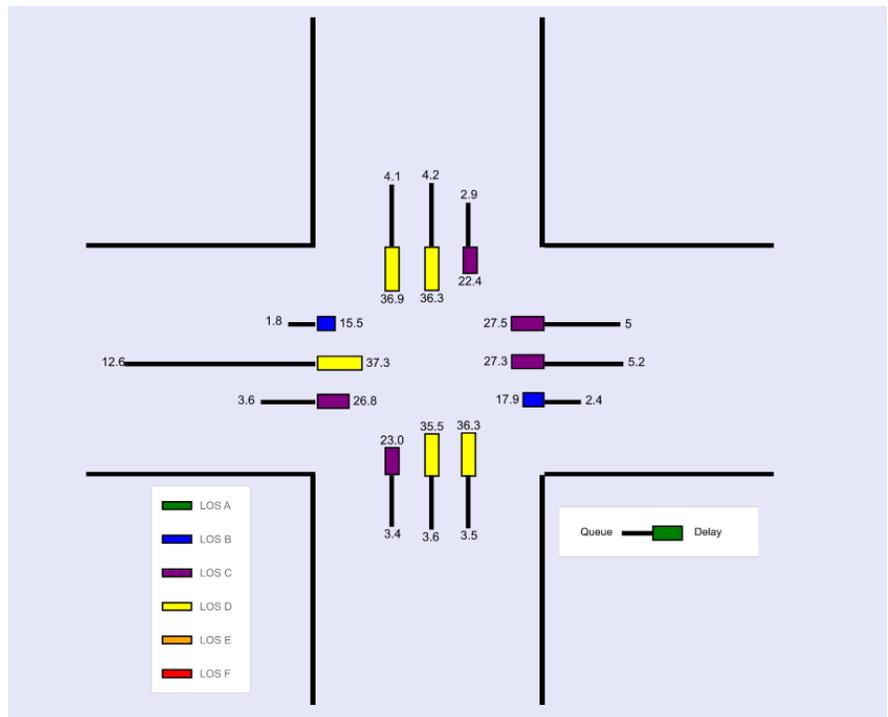
I2 – Aerial View

**Crashes:**

Between the years 2017 and 2021 IDOT crash data documents 38 crashes at this intersection with one designated with an A injury classification and five with a B injury classification. Another 28 incidents were reported by the City of Carbondale.

**Turning Movements:**

Existing turning movements were counted and analyzed to give an idea of the level of service of the existing conditions. The online survey shows that 38% of respondents believe the wait time at this light is too long and our data collaborates that opinion. The full report is available in the Appendix.



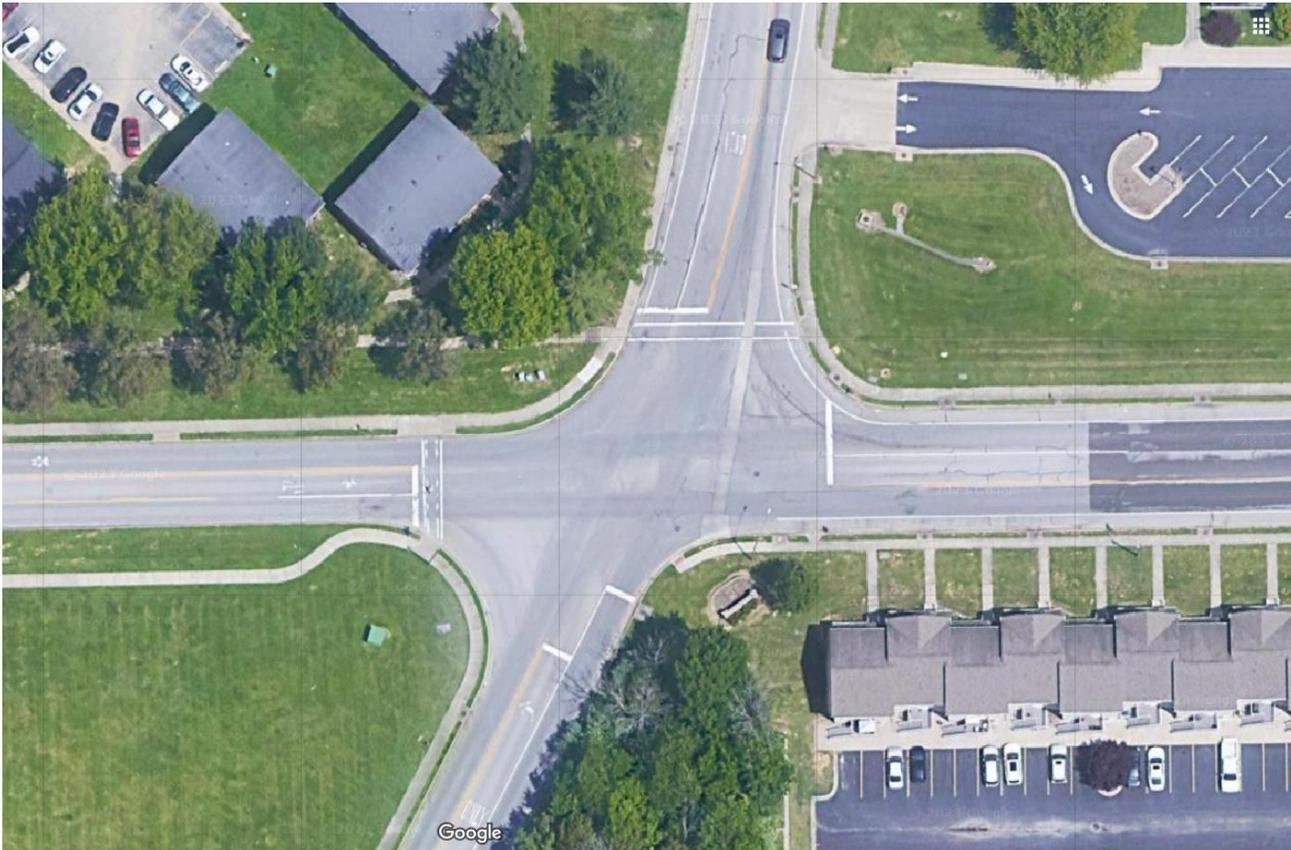
I2 – Existing Level of Service

### 5.2.3 I3 – East Grand Avenue and Lewis Lane

#### Description:

The intersection of East Grand Avenue and Lewis Lane has several challenges. It is a four way stop controlled intersection with steep grade transitions on Lewis Lane both north and south of the intersection. Lewis Lane also comes in skewed and not directly perpendicular to East Grand Avenue. This scenario causes the stop bars for both Lewis Lane and East Grand Avenue to be located at a larger distance away from the intersection to accommodate turning movements for a tractor trailer, WB-55. Lastly, Lewis Elementary School is in the northeast quadrant of this intersection. School drop-off and pickup times cause backups at the intersection.

The online survey asked the community about the challenges of this intersection. 45% of respondents marked "other" in our survey and left comments to explain. The comments overwhelmingly explain that the size of this intersection makes for confused motorists and movements. They do not feel comfortable with the steep slopes of Lewis Lane and the breadth of space between the stop signs. They would support the idea of a traffic light or a roundabout at this location. The comments for this intersection greatly outnumbered the comments for any other question on the survey which shows the level of frustration community members feel with this intersection.



I3 – Aerial View

#### Crashes:

Between the years 2017 and 2021 IDOT crash data documents 15 crashes at this intersection with three designated with a B injury classification. Another 16 incidents were reported by the City of Carbondale. This is the safest intersection along the corridor with the least amount of incidents and the least serious injury results.

### **5.3 Previous Studies, Grant Funding, and Related Documentation**

The study began by compiling the multiple pieces of information involved in numerous other studies of components of the East Grand Avenue corridor. They have been summarized here and applicable components are included in the Appendix of this report.

#### **5.3.1 2016 Carbondale Bicycle Master Plan**

In 2016, the City of Carbondale undertook a city-wide bicycle master plan. This plan included an evaluation of current bicycle facilities as well as recommendations for improvements. For the East Grand Avenue corridor, this plan suggested widening the existing sidewalks to multi-use paths on both the north and south side of East Grand Avenue from Illinois Avenue to Wall Street. It also suggests doing the same for the segment between Wall Street and Lewis Lane. From Lewis Lane to Giant City Road, the plan recommended maintaining the existing on street striped bike lanes and provide better signage and pavement markings. Relevant components of this study are included in the Appendix.

#### **5.3.2 2022 Carbondale Bike Corridors Study and Piles Fork Greenway ITEP**

In the summer of 2022, the City of Carbondale completed a bike corridor study. This project included an evaluation and progress report of the 2016 Bicycle Master Plan, a city-wide bike wayfinding plan, and proposed an ITEP application project which included the rehabilitation of the Piles Fork Greenway. For the East Grand Avenue corridor, the updated 2022 study agreed with the recommendation of the 2016 plan and reported on the projects that had been completed along the corridor. ITEP funding was successfully obtained in 2023 for the proposed Piles Fork Greenway rehabilitation. The planned project includes a pedestrian crossing of East Grand Avenue at its intersection with the Piles Fork Greenway. Relevant aspects of the 2022 study, ITEP application, and conceptual designs are included in the Appendix of this report.

#### **5.3.3 Wall Street Road Diet**

In the summer of 2022, the City of Carbondale applied for and was awarded HSIP funding to complete a road diet on Wall Street. This application included adding bike lanes to Wall Street and reconfiguring the signals at the intersection of East Grand Avenue and Wall Street **(I2)**. Wall Street will be converted to a three-lane road with 11' travel lanes and a 10' turn lane. Relevant aspects of the application and the 2019 Wall Street Bike Lane Study are included in the Appendix of this report.

#### **5.3.4 Roundabout Study of Lewis Lane and East Grand Avenue**

In 2018 the City of Carbondale performed a study and proposed a roundabout at the intersection of Lewis Lane and East Grand Avenue. To avoid the purchase of new right-of-way, the city proposed a smaller diameter than the IDOT recommended 105' minimum diameter roundabout for this location. The proposed roundabout could serve an IDOT BUS-40 vehicle but did not meet the requirements for a WB-55. The city was unsuccessful in obtaining this design variance and the project was put on hold. Relevant portions of the city's Intersection Design Study as submitted to IDOT are included in the Appendix of this report.

## 6. Analysis and Results

The corridor was evaluated per roadway segment for feasible solutions to the different challenges for each individual segment. Those feasible solutions for each segment were then considered for overall corridor consistency and economic impact. The goal of the study was to provide feasible options for the city that would be economically responsible as well as provide a cohesive feel to the corridor. Overall corridor plan sheets and location maps are included as Attachments to this report and each individual segment is described separately in this section of the report.

### 6.1 WW – Washington Street to Wall Street

This segment of the corridor is the widest with four lanes and no turn lane. It is also the segment that leads into Southern Illinois University campus and is a connection from multiple student housing complexes to the university. With an AADT below 10,000, a speed limit of 30 mph which is being exceeded, and multiple crashes, this segment is a good candidate for a road diet.

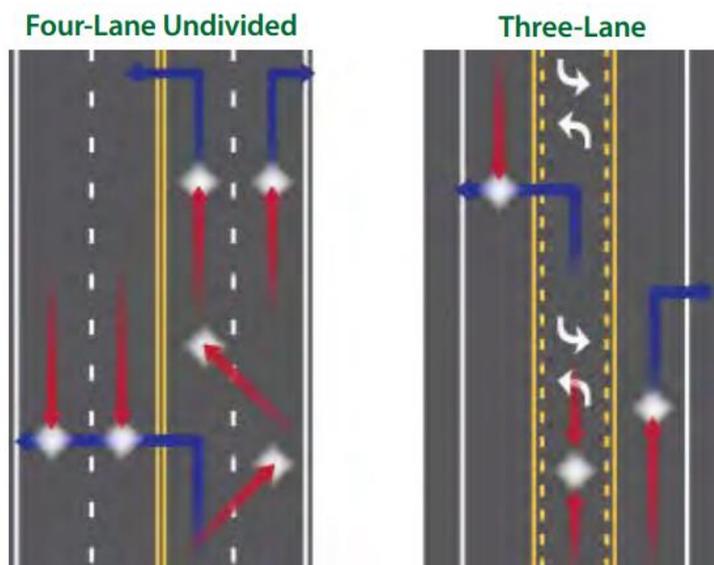
#### 6.1.1 Reasons for a Road Diet

A road diet offers many positive outcomes:

- Improving safety
- Reducing speed
- Mitigating queues associated with left-turning traffic
- Improving the pedestrian environment
- Improving bicyclist accessibility

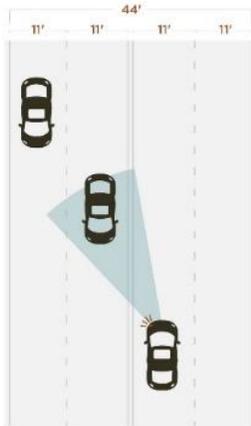
Safety:

Improved safety results in the reduction of conflict points between vehicles. As the figure illustrates, in a 4-lane undivided roadway, there are 6 conflict points, but in the reduced 3 lane configuration, there are only three. Also, the following figure shows the reduction of line-of-sight issues associated with a car on the inside lane blocking a car in the outside lane. Both of these scenarios will help reduce the number of incidents along the roadway. The reduced speed (mentioned next) will also help reduce the severity of crashes as well.



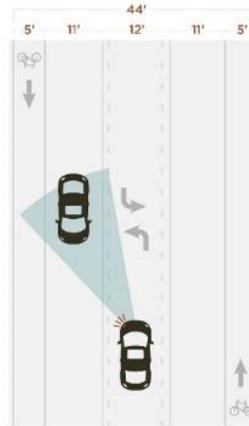
## RESULTS OF A 4-TO-3 LANE ROAD DIET

A comparison of sight distance and roadway space allocation.



**BEFORE**

On a four-lane, undivided road, left-turning drivers experience incomplete sight distance. Oncoming traffic in the outside lane is hidden by the vehicle in the inside lane.



**AFTER**

A three-lane road improves sight distance, and oncoming traffic is completely visible to left-turning drivers. Additional space on both sides of the road can be used for complete street improvements such as bike lanes.

### Reduced speeds:

According to the FHWA "Road Diet Informational Guide" a roadway undergoing a road diet will see an average 5 mph speed reduction in the 85<sup>th</sup> percentile speed after the conversion. This is a function of the perceived narrower lanes. The current observed 85<sup>th</sup> percentile is 10 mph over the speed limit. This will reduce speeds to better match the posted and desired speed limit. The guide also reports a 7% reduction in the number of vehicles traveling over the posted speed limit.

### Left turn queue mitigation:

With the replacement of a two-way left turn Lane through vehicles will not be forced to queue behind the stopped turning vehicle.

### Improving the bicycle and pedestrian environment:

With the road diet, it frees up pavement space for the addition of a dedicated bike lane in the pavement, or right-of-way to construct a multi-use path. Pedestrians also benefit from the reduced distance they must travel to cross the roadway. Previously it was 4 lanes of traffic, with the road diet it's only three lanes. In addition, mid-block crossing can now utilize the center median as a refuge island for pedestrians to safely wait for the traffic to clear.

### 6.1.2 Road Diet Analysis

The roadway conceptual plan includes a road diet of East Grand Avenue from Washington Street to Wall Street. The current lane configuration is a four-lane undivided highway. There are numerous commercial entries located along this section which means it is acting as a de facto three lane cross section. As cars waiting to turn left sit in the inside lane, they hold up cars behind them. The current ADT on this segment of road is 9,600. The FHWA suggests that road diets are feasible for roadways with less than 15,000 ADT. By the guidelines shown here, this segment is an "ideal" candidate for a road diet.

## ROAD DIET TRAFFIC VOLUME GUIDELINES

The average daily traffic volume (ADT) of a corridor helps determine road diet feasibility.

IDEAL	GOOD		UNFAVORABLE
<b>LESS THAN 10,000 ADT</b> Capacity shouldn't be affected.	<b>10,000 - 15,000 ADT</b> An intersection analysis and signal retiming may be needed.	<b>15,000 - 20,000 ADT</b> A corridor analysis is necessary to consider key intersections and other turn lane needs.	<b>OVER 20,000 ADT</b> A feasibility study should be conducted to determine applicability.

To analyze the effects of a road diet on this section of East Grand Avenue, we used Highway Capacity Software and looked at the major intersection at State Street to compare existing and proposed roadway lane configurations to see the effects on traffic delays. The proposed road diet has nearly zero effect on eastbound and westbound delays. The northbound delay increases by about 3 seconds and the southbound delay increases by 6 seconds. Showing that the increased delay for the exiting vehicles is minimal. The results of this capacity analysis are located in the Appendix.

	Eastbound	Westbound	Northbound	Southbound
<b>Existing</b>	1.2 sec/LOS A	0.3 sec/LOS A	14.2 sec/LOS B	18.2 sec/LOS C
<b>Proposed</b>	1.4 sec/LOS A	0.3 sec/LOS A	16.9 sec/LOS C	24.4 sec/LOS C

The intersection at Wall Street was also analyzed and determined that it will not be affected by a road diet because the proposed plan will leave the lane configurations and signal timing unchanged at this intersection.

### 6.1.3 Roadway Layout

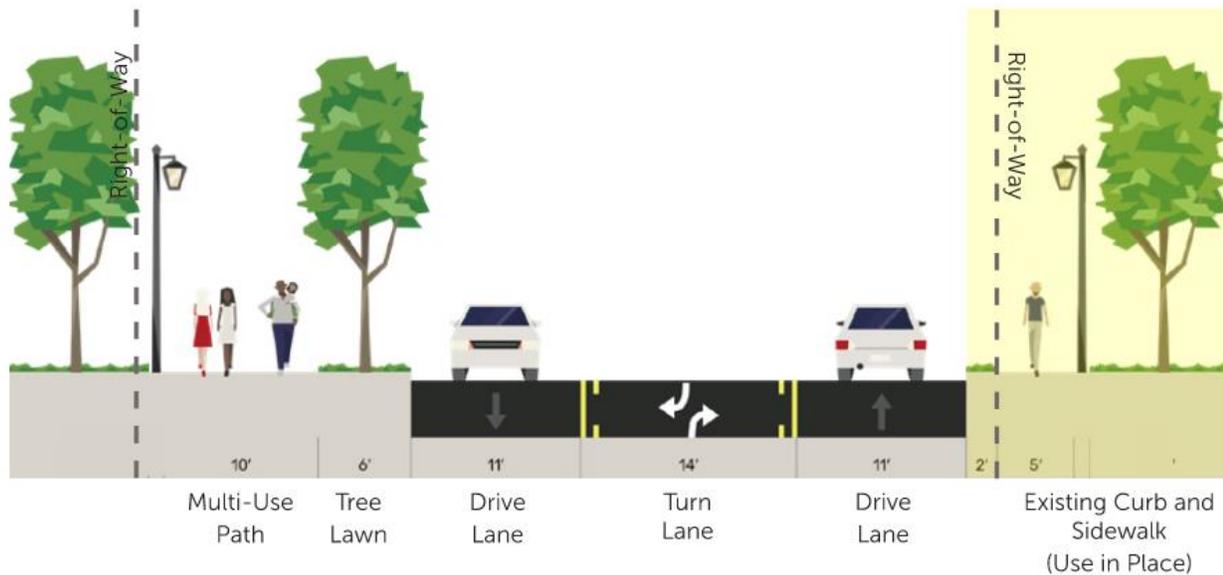
With this segment being an ideal candidate for a road diet, analysis began on how best to optimize the existing roadway and minimize the expense of a reconstruction. Exact location of the right-of-way was not verified during this study; however, record documents and county GIS parcel information indicates that the available right-of-way along East Grand Avenue for this segment ranges between 62' and over 80' in width. Below is a graphic of the current roadway layout on East Grand Avenue.



### Existing Conditions: Grand Ave (Washington to Wall) - Looking East

On the south side of East Grand Avenue is university property and the current sidewalk appears to reside off right-of-way and on university property. After researching the city's stormwater infrastructure (included in the Appendix), it was determined that the stormwater main is located on the south side of the roadway as well. Both of these qualities make it more economically efficient to move the north curb line of the roadway and leave the south curb line and corresponding stormwater infrastructure as is. With the north curb line removed, pavement reduction will vary between 10' – 18' depending on the final lane width determination. A new curb and gutter and stormwater later extensions will be needed on the north side.

The next variable in determining the new roadway configuration is the conversation on the widths of the drive lanes and turn lanes. Drive lanes can vary in size from a minimum of 10' wide. The final determination on drive lane widths is often determined by the governing entity. It is important to note that reduced lane widths slow drivers down and, according to the data collected and public engagement, speeds are an issue along this corridor. The road diet should reduce speeds by 5 mph and narrower lanes would help to reduce these speeds even more. Along the entirety of the East Grand Avenue corridor, the existing lane widths vary between 10' wide in some locations and 12' in others. See the figure below for the proposed road diet layout determined through initial conversations with the city. The 14' turn lane could be reduced to match the 10' turn lane that exists in the next segment of the roadway and what is currently being proposed for the road diet on Wall Street as well. Once exact right-of-way locations are determined, a final decision on lane widths can be made.

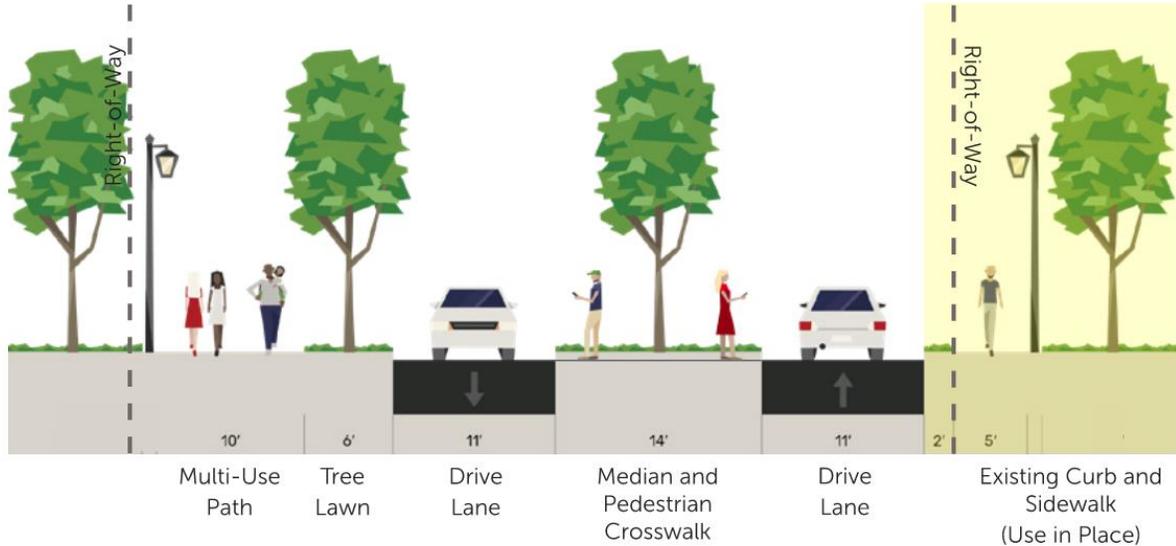


## Proposed Grand Ave (Washington to Wall): Typical

### 6.1.4 Additional Items

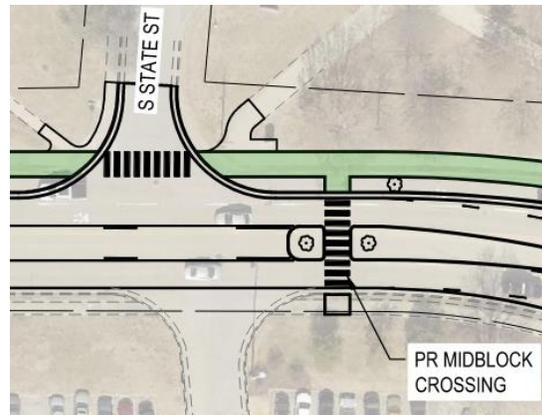
With the roadway width reduced, there is room for a multi-use path along the north side of East Grand Avenue. The path should be 10' wide or greater with a buffer between the roadway and the path of more than 5'. Street trees can provide a greater pedestrian feel to the corridor and provide much needed shade and stormwater runoff control. It is the recommendation of this study to maximize the buffer between the path and roadway to allow adequate room for street trees. An added benefit of these trees is that they provide another means of reducing speeds along the corridor. By giving drivers an object close to the roadway that they can base their speeds on, they inherently slow down. When drivers travel on a roadway that has vast open space on each side, they tend to drive faster.

Another option for the city would be to provide ornamental pedestrian scale lighting along the new multi-use path. The lighting could help increase safety as well as the pedestrian emphasis of the corridor. The existing lighting appears sufficient for travel along the roadway and lighting was not a large concern according to our community survey. However, the presence of ornamental lights would create a visual awareness for a pedestrian corridor and help create an SIU gateway by providing a location for SIU banners on the ornamental lights.



## Proposed Grand Ave (Washington to Wall): At Pedestrian Crossing

With the reduced roadway width and added two way turn lane, pedestrian crossings can now have protected refuge islands. As shown here, these islands help reduce the crossing distance for pedestrians as well as allowing a one directional cross before protection. Pedestrians will no longer need to look both ways to cross prior to the island. This is especially important at the intersection of State Street where several pedestrian incidents continue to occur. Pedestrian refuge islands are also known to provide a traffic calming impact on vehicle speeds. Proposed plan sheets are provided in the Attachments to this report.



WW – Proposed Midblock Crossing at S State St

A detailed cost estimate for the road diet, pedestrian crossings, street trees, and north side multi-use path from the railroad crossing to the Piles Fork Greenway will be submitted for HSIP funding and is included in the Attachments to this report. The City of Carbondale expressed the desire to mill and overlay the street as a function of the road diet construction and this was added to the cost estimate.

### 6.1.5 Alternative or Additional Recommendations

Additional recommendations to consider through the development of the corridor for this segment are listed below:

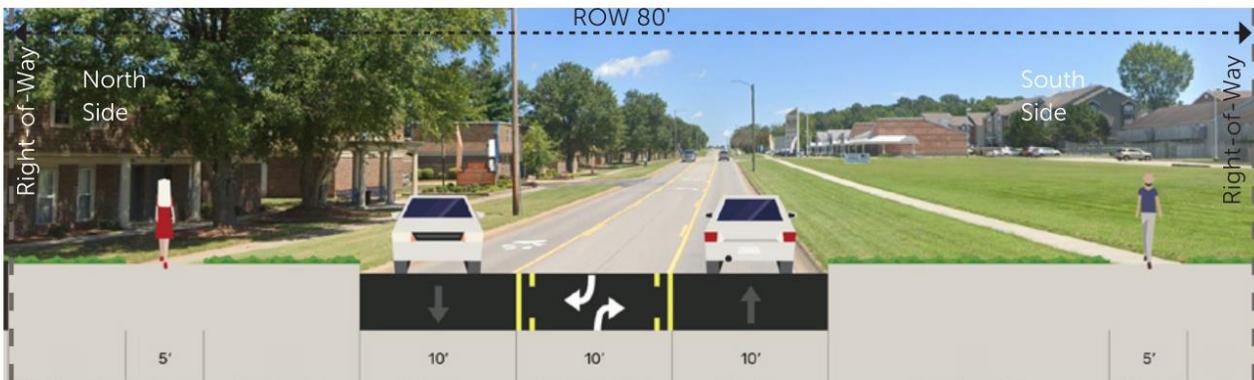
- A multi-use path could be added to the south side of the roadway through working with the university.

## 6.2 WL– Wall Street to Lewis Lane

From Wall Street to Lewis Lane is the next segment along the East Grand Avenue corridor. From the existing conditions analysis, it was determined that speeding and pedestrian safety are the most important challenges for this segment of the corridor. The residents are on the north side and commercial opportunities are on the south side making safe pedestrian crossings one of the most important aspects for multimodal users of this segment. The only serious injury along this corridor was a pedestrian injury, therefore the analysis and recommendations of this segment focuses on pedestrian and bicycle facilities.

### 6.2.1 Available Right-of-Way

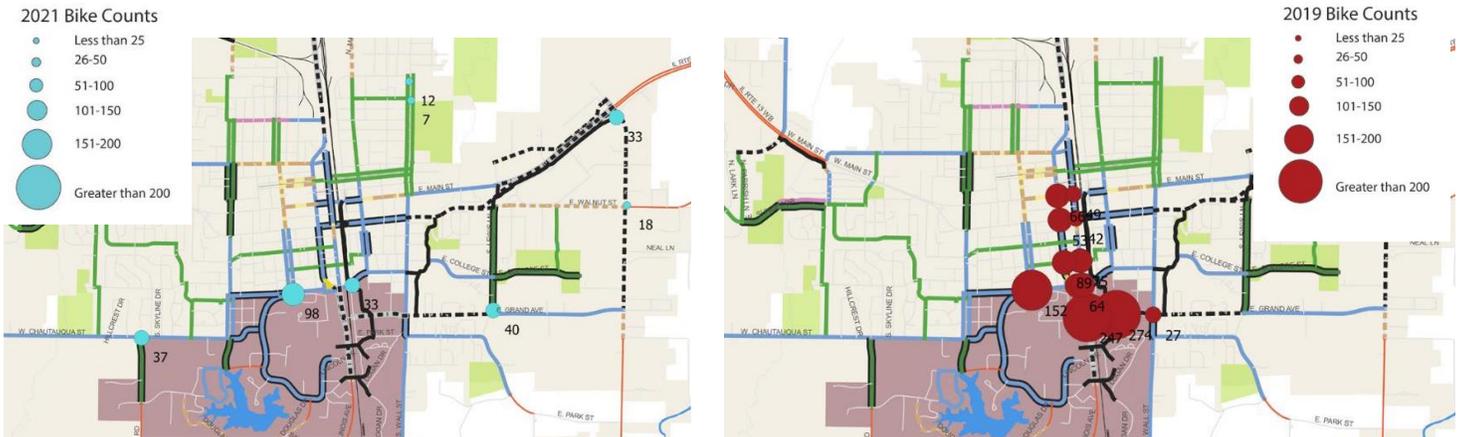
This segment of the East Grand Avenue corridor is consistent in width and layout. The available right-of-way is approximately 80' wide and the existing roadway footprint is approximately 34' wide. The existing roadway layout consists of two 10' drive lanes and a 10' turn lane. This layout is already ideal for traffic calming and safety and will be left as is. This allows almost 46' of available right-of-way to create pedestrian and bicycle facilities within. Street trees can also easily be added in order to reduce the open space along the roadway and reduce speeding.



Existing Conditions: Grand Ave (Wall to Lewis) - Looking East

### 6.2.2 Pedestrian and Bicycle

Currently, 5' wide sidewalks exist on both the north and south side of East Grand Avenue for this segment with no dedicated bicycle facilities. According to both 2019 and 2021 bicycle counts provided in the 2022 Carbondale Bike Corridor Study (provided in the Appendix), bicycle traffic in this area exceeds 40 users per day.



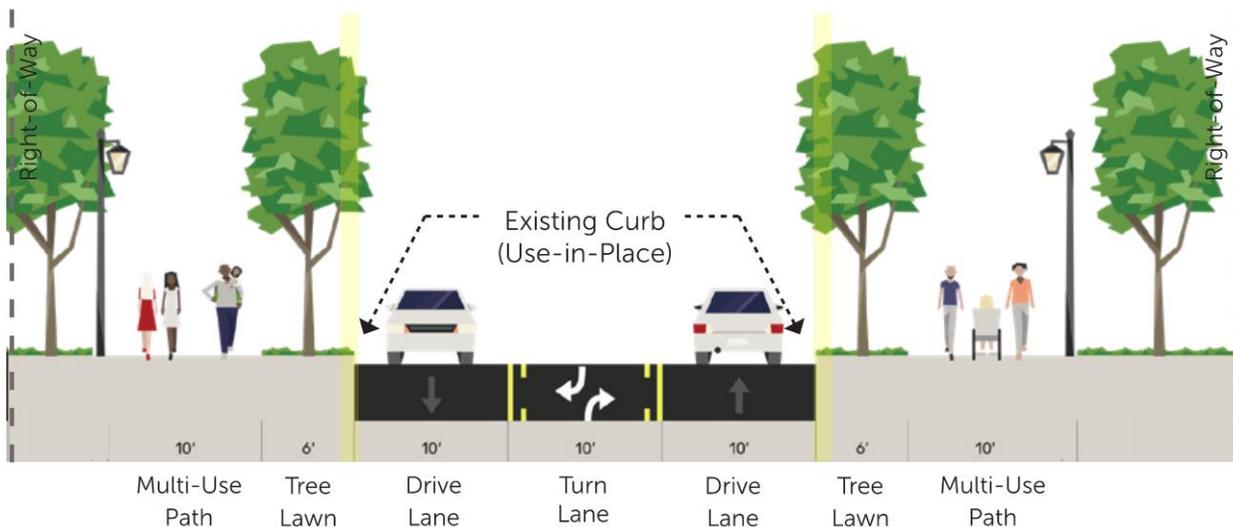
Electric scooter activity in this area also boasts one of the highest usage rates for all of Carbondale. The data gathered from July of 2022 until December 2022 is included in the Appendix of this report. The number of trips generated along this segment of the corridor is over 13,000 over a 5-month period which comes to almost 100 trips per day. Electric scooters were new to the campus in 2022 and have more than doubled the total number of bicycle users.



### Electronic Scooter Counts

Since crash data for this year was not yet available at the time of this report, the influx of these scooters could be causing safety concerns that are not yet quantifiable but are sure to increase with the use of the scooters on campus. This data points to the need for dedicated bicycle facilities along this segment of the corridor.

With the available right-of-way, a multi-use path could be provided on both sides of the street. However, to accomplish this the existing sidewalks will need to be removed. With the **WW** segment having a proposed multi-use path on the north side of the street, it is the recommendation that this segment also begin with the path on the north side. This will bring a direct connection to the Piles Fork Greenway located on the north side of East Grand Avenue. The south side multi-use path can come in subsequent phases of the corridor development.

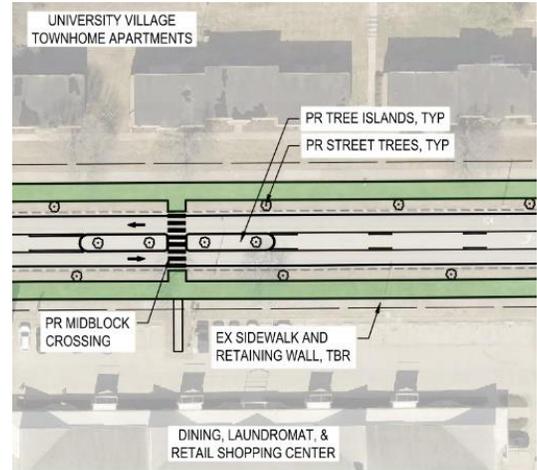


### Proposed Grand Ave (Wall to Lewis): Typical

**6.2.3 Additional Items**

Additional items recommended for this segment of the corridor which could help reduce speeding by creating a pedestrian atmosphere include pedestrian scale ornamental lighting and street trees. Not only will they help reduce the speed of traffic but will also provide shade and bring continuity between this segment of the corridor and the **WW** segment.

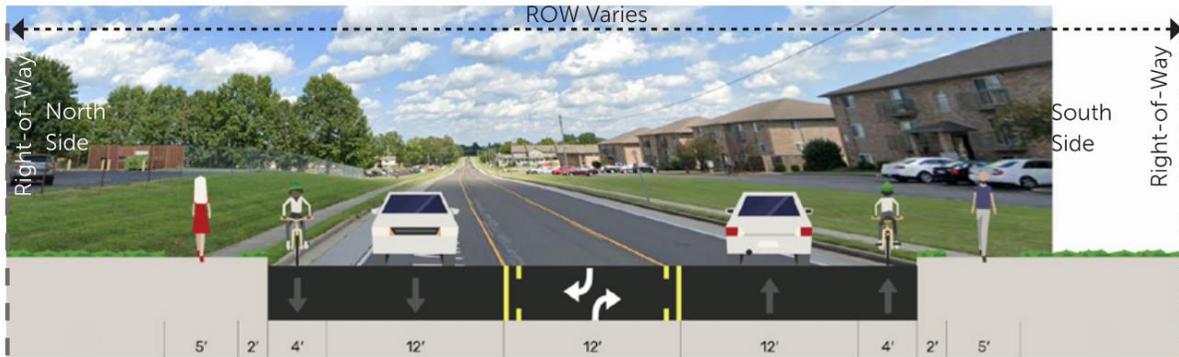
Protected pedestrian crossings with refuge islands are proposed at the Piles Fork Greenway (as applied for in the previous ITEP grant application) as well as a new proposed crossing at University Village connecting it to the commercial amenities of the Grand Street Mall. This will provide safe passage from the apartments and bus stop located on the north side of the road to the commercial opportunities and more apartments on the south side of the road. It will also help to alert drivers of pedestrians present in the corridor which is shown to help reduce speeding.



**WL – Proposed Midblock Crossing**

**6.3 LG1 - Lewis Lane to Carbondale Middle School**

From Lewis Lane to the middle school is the next segment of the corridor. This segment begins the posted 40 mph speed limit, has a dedicated turn lane, and both an elementary school and middle school on the north side. The greatest concerns for this segment are student safety and speeding.

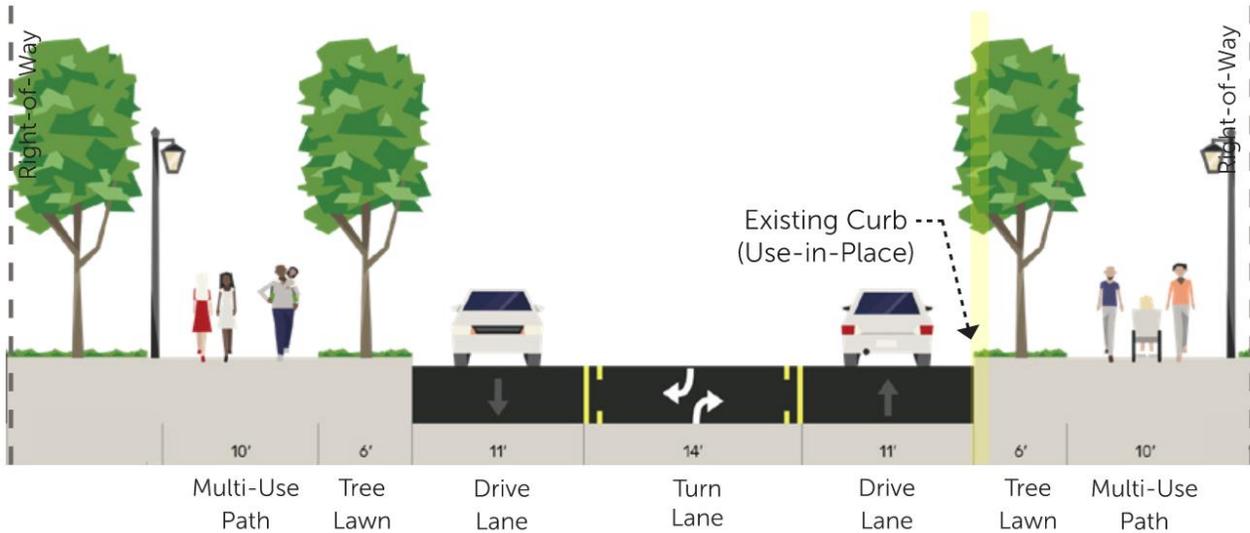


**Existing Conditions: Grand Ave (Lewis to Middle School) - Looking East**

**6.3.1 Roadway Layouts**

With speed and student crossing safety being the greatest concern for this segment, a reduction in the roadway width is necessary to slow traffic. Current conditions with wide shoulders as bike lanes and vast open space on each side of the road, allow for the driver to feel safe driving faster. To reduce speeds, conflicts or narrowing roadways are necessary. Holding one side of the roadway and utilizing the existing curb and stormwater facilities is the most economical option for reducing roadway width. The stormwater main resides on the south side of the street in this area so the south side curb should remain in place with the north side moving in to remove the wide shoulders.

With the reduction in the roadway width, the conversation regarding lane width is again a part of the design. The decision on lane widths should be a balance between pedestrian safety, speed reduction, and city standards. Shown below is the proposed roadway layout for this segment of the corridor. This could be modified to match the proposed road diet on Wall Street which calls for 11' drive lanes and 10' turning lanes. The exact location of the right-of-way and terrain will have the final determination on lane widths.



## Proposed Grand Ave (Lewis to Middle School): Typical

### 6.3.2 Pedestrian and Bicycle

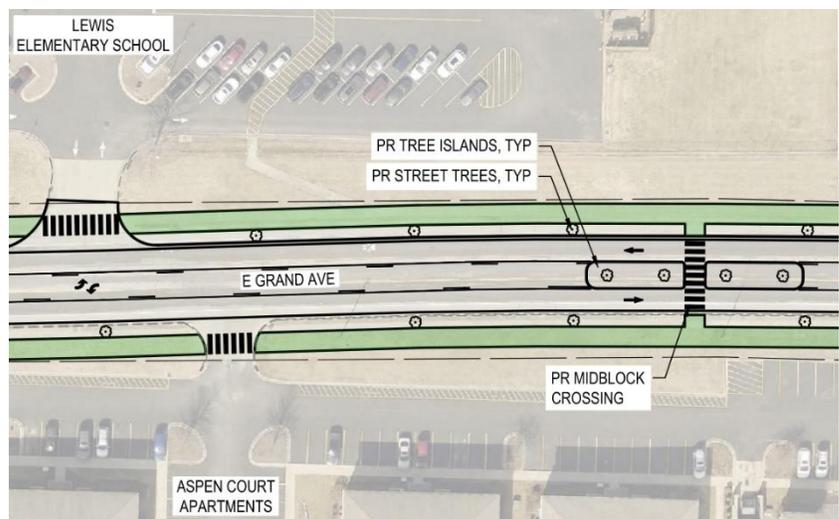
With over 80’ of right-of-way, there is ample space for a multi-use path on both the north and south sides of the roadway for this segment as well. This would replace the underutilized bike lanes. With the schools located on the north and the remainder of the corridor multi-use path beginning on the north side of the roadway, it is the recommendation of this report that the sidewalk be removed and replaced with a 10’ wide multi-use trail on the north side of this segment first. This trail will provide a connection to the schools and can run east to connect directly with Giant City Road or can be terminated at any time east of the middle school. The multi-use trail on the south side of the roadway can be built in subsequent phases of the corridor’s development.

### 6.3.3 Additional Items

Additional items recommended for this segment of the corridor include street trees to help reduce the speed of traffic, provide shade, and bring continuity between all segments of the corridor.

Protected pedestrian crossing with refuge island is proposed between the elementary and middle schools. This will provide safe passage from the apartments to the schools for students and will help slow speeds on the road by providing a visual pedestrian presence for the motorists to be aware of. The

conflict in the turn lane will also help prevent motorists from using this lane to pass other drivers as they wait in the pickup and drop-off lines for the schools. This was a concern expressed by the schools in the area as dangerous behavior they would like to see stopped.



LG – Proposed Midblock Crossing

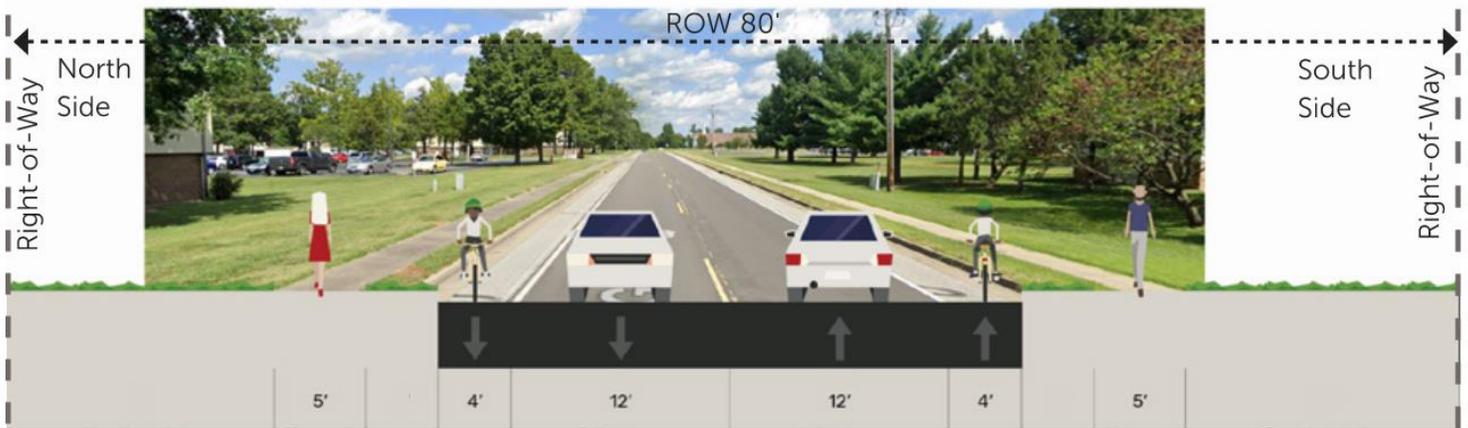
**6.3.4 Alternative or Additional Recommendations**

Additional recommendations to consider through the development of the corridor for this segment are listed below:

- Work with the schools in the area to develop modifications to the existing pick-up and drop-off times or traffic patterns. One possibility is utilizing Lewis Lane for the elementary school.
- Reduce the speed limit of this portion of the corridor to 30 mph to match the speeds through the remainder of the corridor.

**6.4 LG2 – Carbondale Middle School to Giant City Road**

The final segment of the corridor is from the middle school to Giant City Road. This segment closely resembles **LG1** except for the dedicated turn lane which ends prior to this segment. With the urban shoulders and 12’ drive lanes, speeding is a concern for this segment which houses another school and several single-family homes. The dedicated bike lanes which act like urban shoulders are not comfortable for most riders and are therefore underutilized.



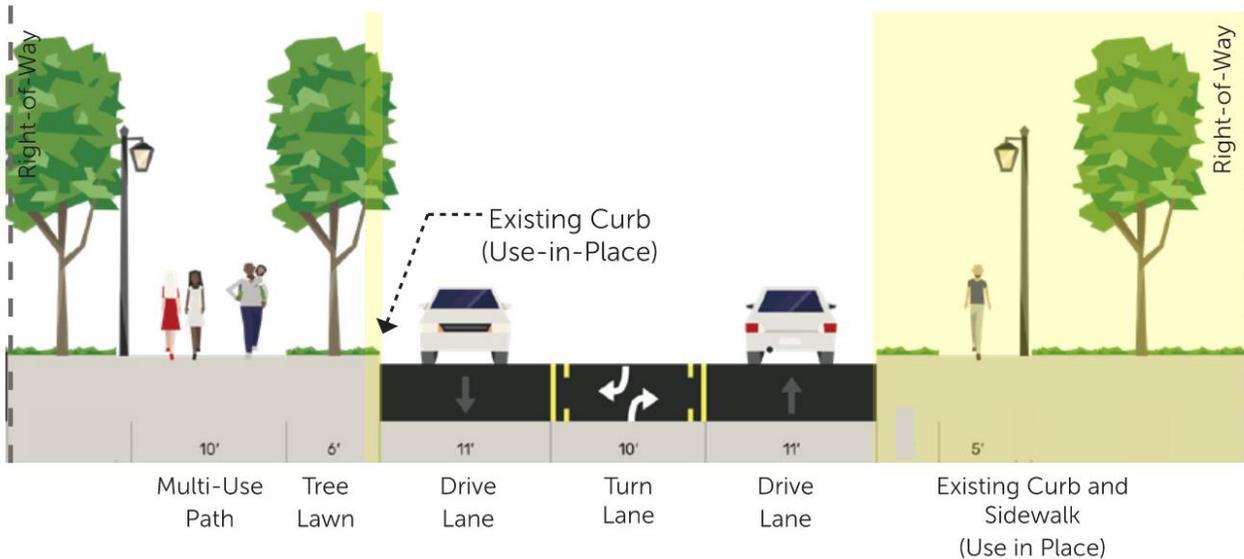
**Existing Conditions: Grand Ave (Middle School to Giant City) - Looking East**

**6.4.1 Roadway Layouts**

In order to reduce speeds, lane widths and roadway footprint should be reduced. The most economical way to accomplish this for this segment of roadway is to remove the underutilized bike lanes and provide a new two way left turn lane. This will fit within the existing roadway footprint, slow traffic, and provide safe turn lanes for the businesses, schools, and homes along this segment. The proposed layout closely resembles the existing layout for segment **WW** and matches the proposed Wall Street road diet for consistency in the area. This recommendation could be modified for 10’ drive lanes and a 12’ turn lane as well.

**6.4.2 Pedestrian and Bicycle**

If the bicycle lanes are removed to help slow the speed of traffic, a multi-use path should be added to one side of the roadway to accommodate bicycle and scooter traffic along the corridor. With plenty of right-of-way available, this can be done to either or both sides of the road. It is the recommendation of this study to provide one on the north side for consistency with the remainder of the corridor and if the south side multi-use path is developed in future phases that it extends to Brehm Preparatory School.



**Proposed Grand Ave (Middle School to Giant City): Typical**

**6.4.3 Alternative or Additional Recommendations**

Additional recommendations to consider through the development of the corridor for this segment are listed below:

- A multi-use path could be added to the south side of the roadway for the full length of the segment.
- Reduce the speed limit of this portion of the corridor to 30 mph to match the speeds through the remainder of the corridor.

## 6.5 I1 – East Grand Avenue and Washington Street

The intersection of Washington Street and East Grand Avenue is an awkward two-way stop on non-opposing legs of the intersection. This unusual stop layout causes confusion for motorists unfamiliar with the area. This configuration combined with the likelihood of a serious injury during a crash are the biggest challenges of this intersection.

### 6.5.1 Right in and Right out Only

It is therefore the recommendation of this study to remove the stop sign on East Grand Avenue at this intersection and make the north leg of Washington Street a right in/right out only intersection as shown here.

This modification will remove the ability for people traveling east bound on East Grand Avenue to turn left and proceed north on Washington Street. These users who wish to access Washington Street can access it from the north at its intersection with Mill Street. The only amenities on Washington Street between Mill Street and East Grand Avenue are several parking lots and the Newman Catholic Student Center.

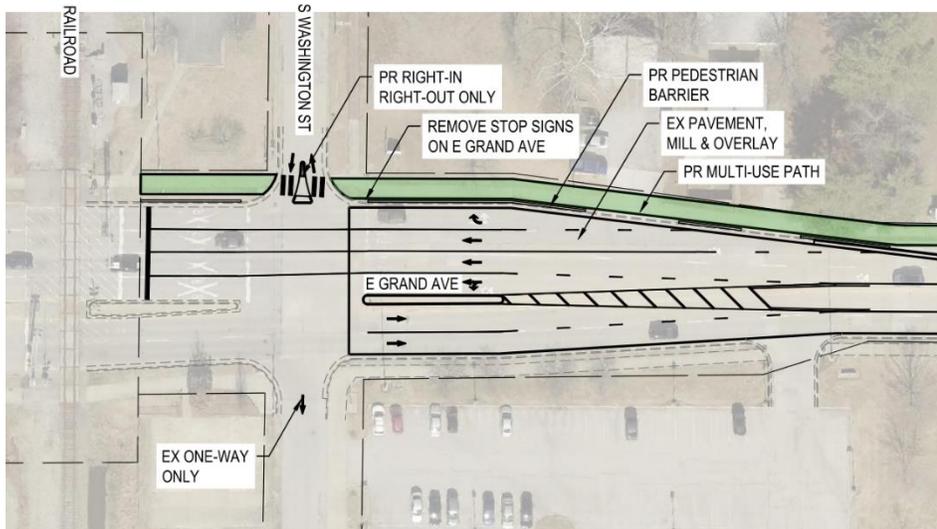


I1 – Aerial View

The only amenities on Washington Street between Mill Street and East Grand Avenue are several parking lots and the Newman Catholic Student Center.

The right in/right out only modification will also remove the ability for users traveling south bound on Washington Street to turn left onto East Grand Avenue. Again, the users of Washington Street can proceed north on Washington Street and reach East Grand Avenue through utilizing Mill Street.

With the small number of anticipated users of Washington Street these inconveniences are minimal in comparison with the seriousness of the crash incidents at this intersection.



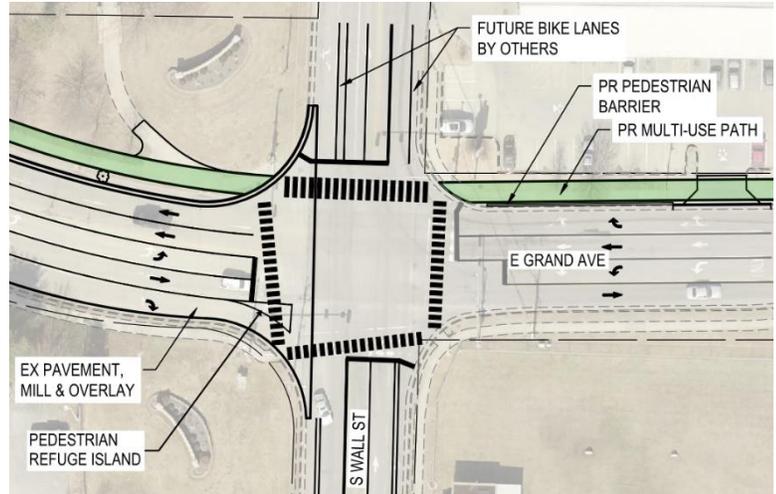
I1 – Proposed Conceptual Layout

## 6.6 I2 - East Grand Avenue and Wall Street

Since the existing turning movement analysis indicates that there is a delay concern at the intersection of East Grand Avenue and Wall Street, a signal optimization study should be performed to help address this challenge and decrease delays. However, the study should only be performed after the construction of the road diet on Wall Street has been completed.

Once the updated turning movements and traffic impacts from the Wall Street road diet can be captured, the new study can be used to evaluate signal timing, optimization, and lane use or necessity. A possible outcome from the study is that the northern most westbound through lane could be removed on the west leg of the intersection.

This would help reduce the crossing distance for pedestrians moving from the northwest quadrant to the northeast quadrant. It would also reduce the right turn continuous movement lane from Wall Street to East Grand Avenue. These types of lanes can be dangerous to pedestrians and should be removed if the updated movements do not create an undesirable impact on the level of service of the intersection.



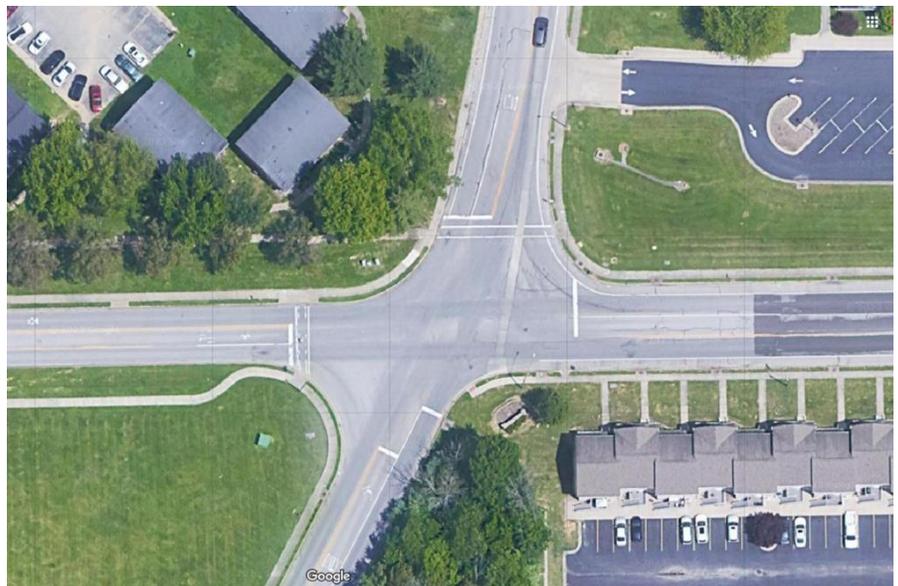
I2 – Proposed Conceptual Layout

## 6.7 I3 - East Grand Avenue and Lewis Lane

The intersection of East Grand Avenue and Lewis Lane was one of the most commented on during our community engagement. Some of the complaints were focused on school drop off and pick up times for the elementary school. These conditions are limited to short durations during the weekdays and only while school is in session. To design to these conditions would place a disproportionate amount of emphasis on these short moments of time and create an intersection too large to be conducive to multi-modal movements.

### 6.7.1 Geometric Layout

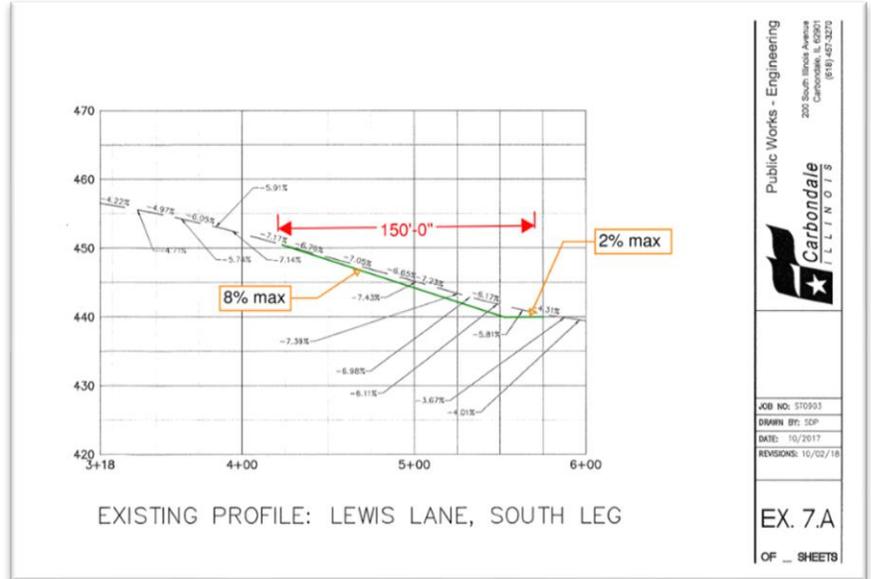
This leaves the greatest challenge for this intersection to be the geometric layout of the intersection. The overall size of the intersection and distance between stop bars creates a greater space between stopped vehicles making it hard to accurately determine who arrived first at the intersection. The stop bars are located more than 50' away from the intersecting road edge of pavement. This greatly exceeds the IDOT recommended standard of 30'. The skew angle that Lewis Lane meets East Grand Avenue with is approximately 25 degrees. This exceeds the recommended IDOT standard of 15 degrees and comes close to exceeding the max allowed skew angle of 30 degrees.



I3 – Aerial View

**6.7.2 ADA Compliant Crossing**

Another concern for this intersection is the steep cross slopes on the south Lewis Lane leg. The cross slopes are not currently ADA compliant and therefore a pedestrian crossing cannot be provided at this location under the current geometric layout of this intersection. For a compliant crossing to be provided here, the existing hillside would need to be flattened near the intersection and regraded up the hill. This would take approximately 150' of roadway removal up the hill of the south leg of Lewis Lane to regrade the roadway and meet current design standards for the ADA crosswalk and intersection approach.



I2 – Street View of ADA Deficient Crossing facing south (above) – facing east (below)

**6.7.3 Existing Analysis**

As stated previously this intersection has been analyzed in the past for a roundabout and that data was available for review. Therefore, for this study, the intersection was reanalyzed for the level of service for the 4-way stop existing condition, a roundabout, and a signalized intersection. Below is a chart of the levels of service results for each leg of the intersection under each of these three conditions. The data behind this table is included in the Appendix of this report.

Condition	Eastbound	Westbound	Northbound	Southbound
Existing	<b>B</b>	<b>D</b>	<b>B</b>	<b>B</b>
Signalized	<b>C</b>	<b>D</b>	<b>C</b>	<b>C</b>
Roundabout	<b>A</b>	<b>B</b>	<b>A</b>	<b>B</b>

**6.7.4 Recommendation**

To address the community’s concerns and issues with this intersection, it is recommended that the city perform a geometric design study which would include a survey of the surrounding terrain. This study would provide the city with a layout and estimate of probable cost to realign Lewis Lane, remove the steep approaches to the intersection, reduce its’ skew angle and the distance between the legs and stop bars, and bring all of the pedestrian crossings into ADA compliance. This new study could be compared to the previous roundabout analysis and the most economically efficient solution can be chosen. With this intersection currently being relatively safe and without great delays, the expense of a realignment or a roundabout may not be a justifiable project for the city. To address the existing ADA crossing compliance issue, the study recommends placing signs to redirect pedestrians to the compliant crossing route through the intersection.

## 7. Next Steps

Several steps can be taken to fully implement the findings of this study. In this section is an implementation plan with estimated project costs associated with each phase. It is important to reiterate here that this study used approximate right-of-way information gathered from archive drawings and the county parcel website. Any right-of-way impacts, including analysis of both temporary and permanent easements should be done with caution. Pedestrian scale ornamental lighting can be a significant cost increase for the project. Construction costs for segments **WW** and **WL** are given as two options, one with and one without lighting.

“Approximate Construction Cost”, as used below was determined using 2023 unit cost estimates and does not include inflation, utility relocations, right-of-way acquisitions, permitting, design fees, or construction inspection fees.

“Detailed Estimate of Total Project Cost”, as used below was determined using 2023 unit cost and includes inflation, approximate utility relocation costs, design and construction fees, as well as a contingency for unforeseen circumstances. It does not include right-of-way acquisitions.

### 7.1 Phase I – Development of WW and I1 and I2

#### 7.1.1 HSIP Grant Application

This segment is the logical first step to the transformation of the East Grand Avenue corridor. It is the segment of the corridor directly connecting the SIU campus and contains the vital connection of the Piles Fork Greenway to the Downtown-Campus Connector Greenway. This segment was therefore chosen to be submitted for an HSIP grant in 2023. The application includes the road diet, mill and overlay of the remaining roadway, northside multi-use path from the railroad crossing on the west to the Piles Fork Greenway connection on the east, associated street trees, pedestrian crossings, and intersection improvements to intersection **I1**. The associated plan sheets, typical sections, and a detailed estimate of total project cost are included in an Attachment to this report. The project cost estimate for this segment is a detailed estimate for design and construction of the project and is provided in 2023 unit costs. This cost estimate did not include ornamental pedestrian lighting. For this segment of the corridor, pedestrian lighting can be expected to add \$400K to the total construction cost.

#### 7.1.2 Southside Multi-Use Path and I2

The southside multi-use path is not included in the HSIP application and would need to be accomplished in conjunction with SIU. The estimate below includes removal of the existing concrete sidewalk and replacement with a 10' concrete path.

Approximate construction cost with pedestrian lights: \$700K - \$800K

Approximate construction cost without pedestrian lights: \$300K - \$400K

**I2-** Intersection signal reconfiguration can be performed if intersection delays are still a concern after both Wall Street and East Grand Avenue road diets have been completed.

Approximate design cost: \$20K - \$30K

### 7.2 Phase II – Development of WL

#### 7.2.1 Northside Multi-Use Path

This segment would include northside sidewalk removal, northside multi-use path construction, stormwater removal and replacement, short retaining wall from **I2** to the commercial driveway prior to the Piles Fork Greenway, short retaining wall in front of the Georgetown Apartments, street trees, and pedestrian crossings.

Approximate construction cost with pedestrian lights: \$1.1M - \$1.5M

Approximate construction cost without pedestrian lights: \$700K - \$900K

### **7.2.2 Southside Multi-Use Path**

This segment would include the southside multi-use path, sidewalk removal, and driveway crossing enhancements.

Approximate construction cost with pedestrian lights: \$850K - \$1.2M

Approximate construction cost without pedestrian lights: \$450K - \$650K

## **7.3 Phase III - Development of LG1 and I3**

### **7.3.1 Northside Multi-Use Path and Curb Relocation**

This segment would include the relocation of the north curb line as well as the associated stormwater infrastructure from **I3** to the Brookside Apartment entrance. Also included is mill and overlay, restriping, street trees, northside sidewalk removal, and northside multi-use path construction from **I3** to the Brookside Apartment entrance.

Approximate construction cost: \$950K - \$2.0M

### **7.3.2 Southside Multi-Use Path**

Southside multi-use path, sidewalk removal, street trees, and driveway crossing enhancements could be performed separately and would extend from **I3** to the entrance of Brehm Preparatory School.

Approximate construction cost: \$450K - \$550K

### **7.3.3 Intersection I3**

**I3** - Intersection geometric design study: \$25K - \$50K

## **7.4 Phase IV - Development of LG2**

### **7.4.1 Turn Lane Addition**

This segment consists of mill and overlay of the existing roadway from the Brookside Apartments entrance to Giant City Road.

Approximate construction cost: \$300K - \$450K

### **7.4.2 Northside Multi-Use Path**

Northside multi-use path construction and associated street trees and sidewalk removal from the Brookside Apartments entrance to Giant City Road could be performed in the future as Carbondale's bicycle network continues to grow toward the east.

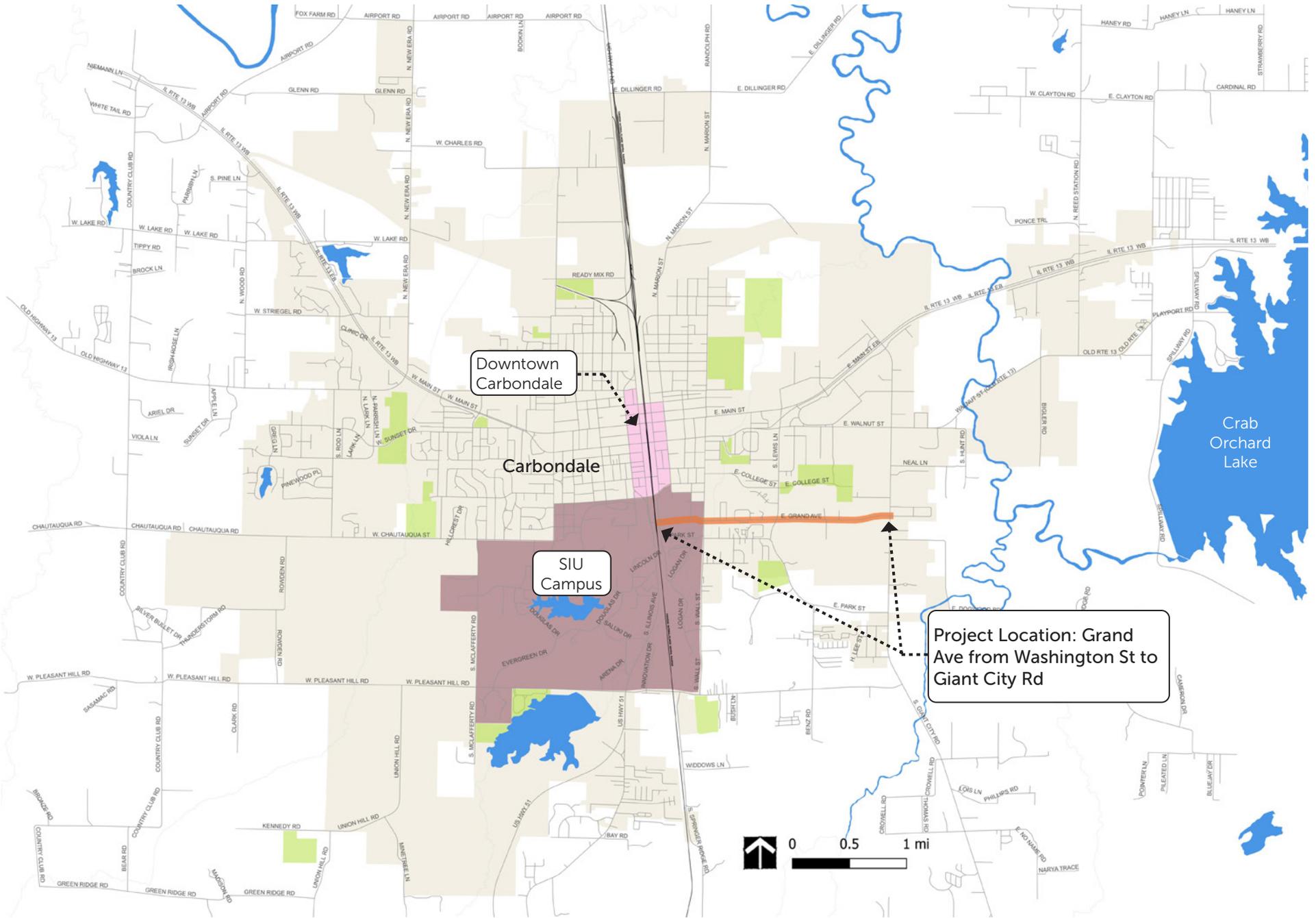
Approximate construction cost: \$400K - \$600K

## **ATTACHMENTS**

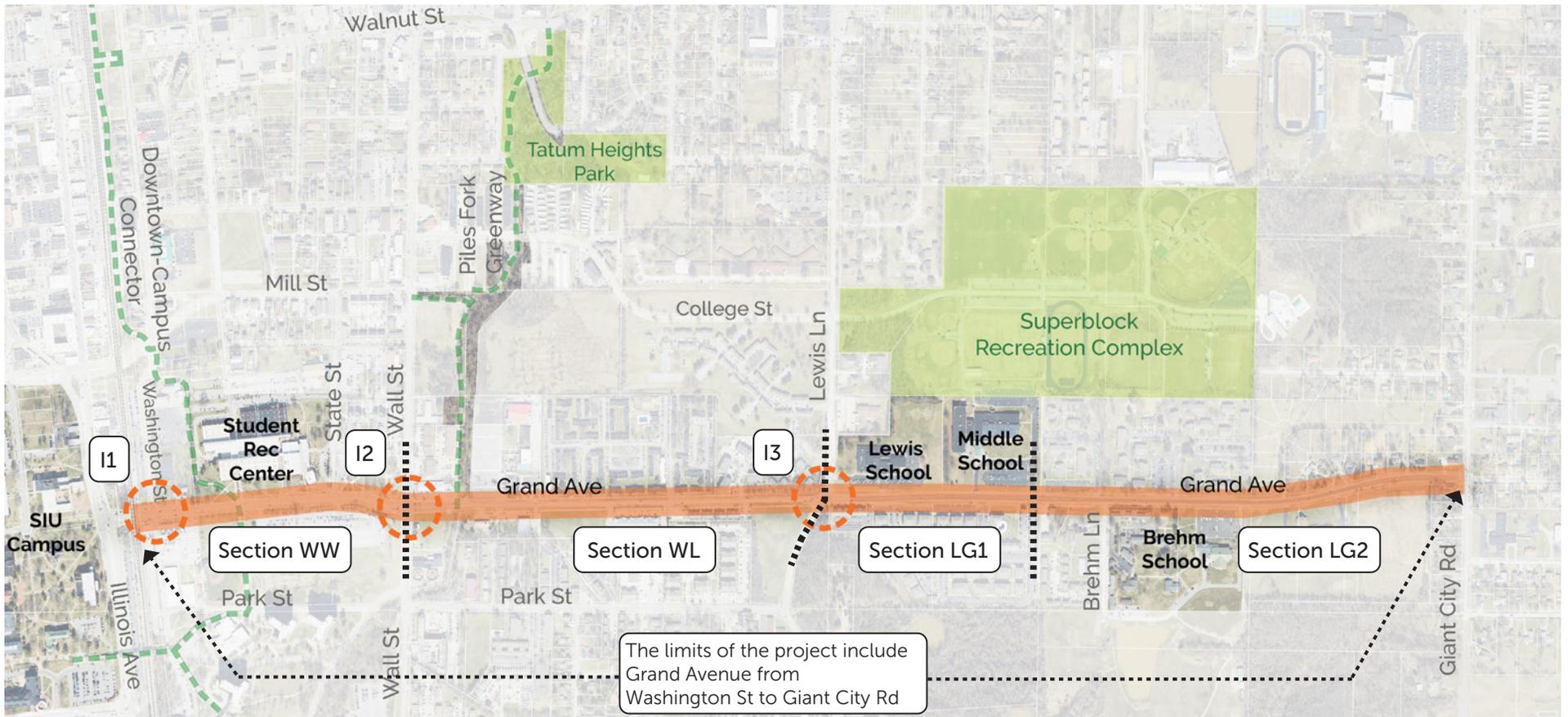
- A Project Map Overviews**
- B Plan Sheets**
- C Typical Sections**
- D HSIP Grant Application**
  - Plans**
  - Sections**
  - Cost Estimate**

# **ATTACHMENT A**

## **Project Map Overviews**



Map: Project Location

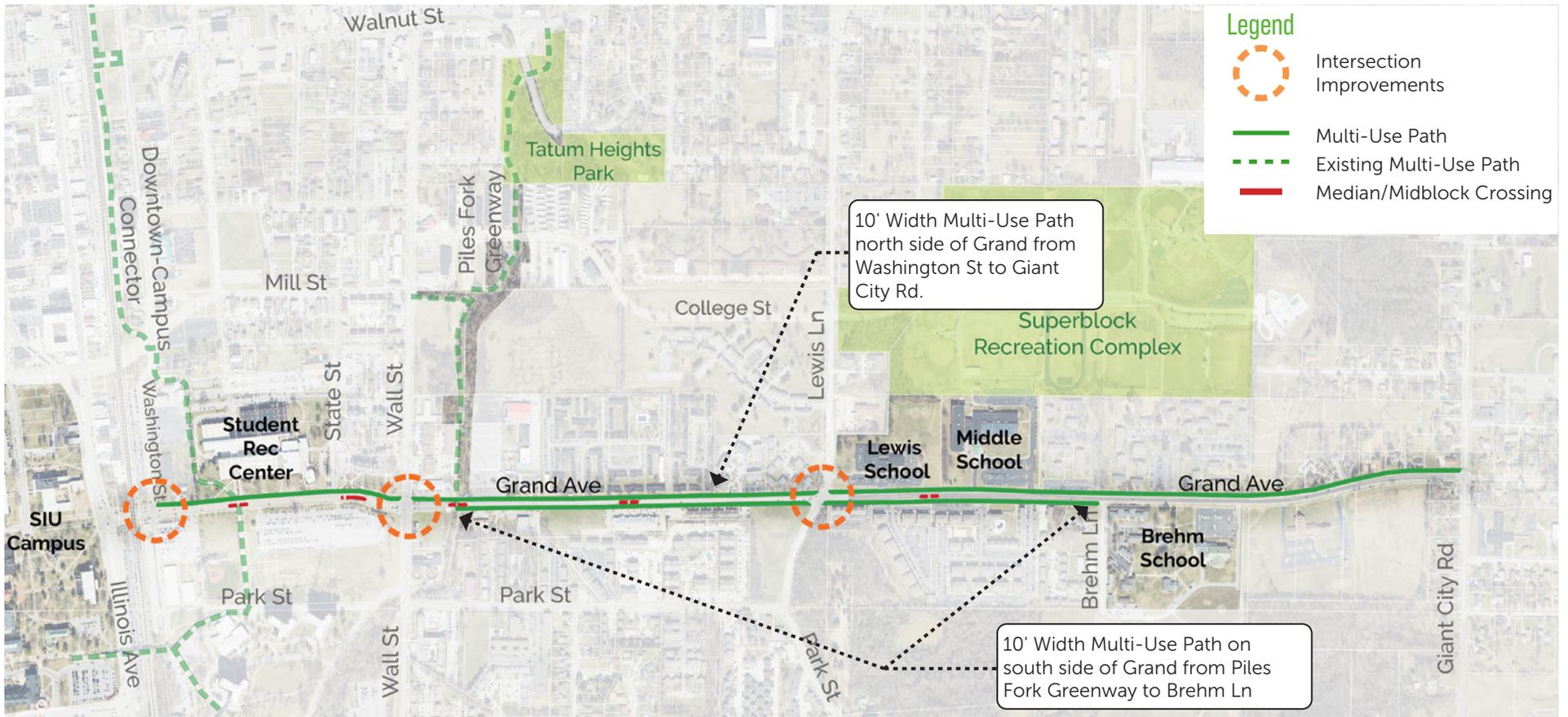


Map: Project Limits

## Project Abbreviations

The report uses the following abbreviations to refer to different sections and interchanges along Grand Avenue.

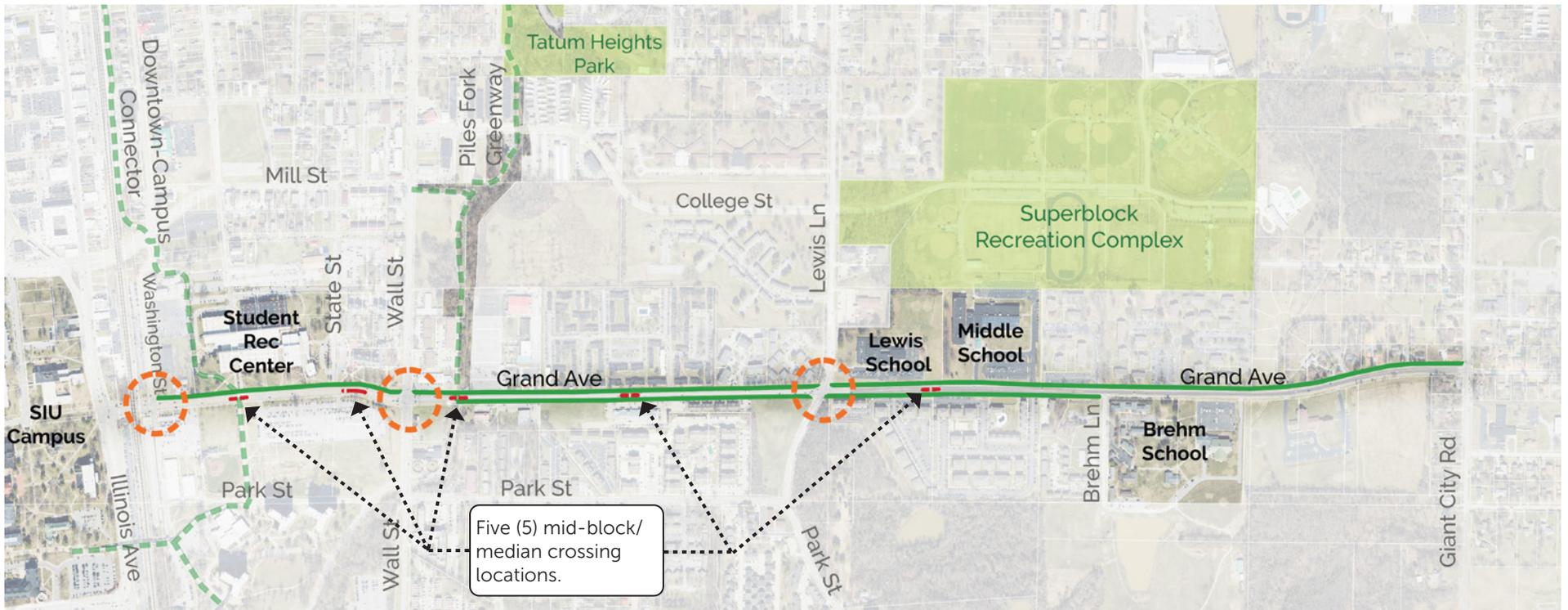
- WW:** The section of Grand Avenue from Washington Street to Wall Street.
- WL:** The section of Grand Avenue from Wall Street to Lewis Lane.
- LG1:** The section of Grand Avenue from Lewis Lane to the Middle School.
- LG2:** The section of Grand Avenue from the Middle School to Giant City Road.
  
- I1:** Intersection of Washington Street and Grand Avenue.
- I2:** Intersection of Wall Street and Grand Avenue.
- I3:** Intersection of Lewis Lane and Grand Avenue.



## Map Overview: New Multi-Use Path

Right: Examples of a multi-use path adjacent to a street.

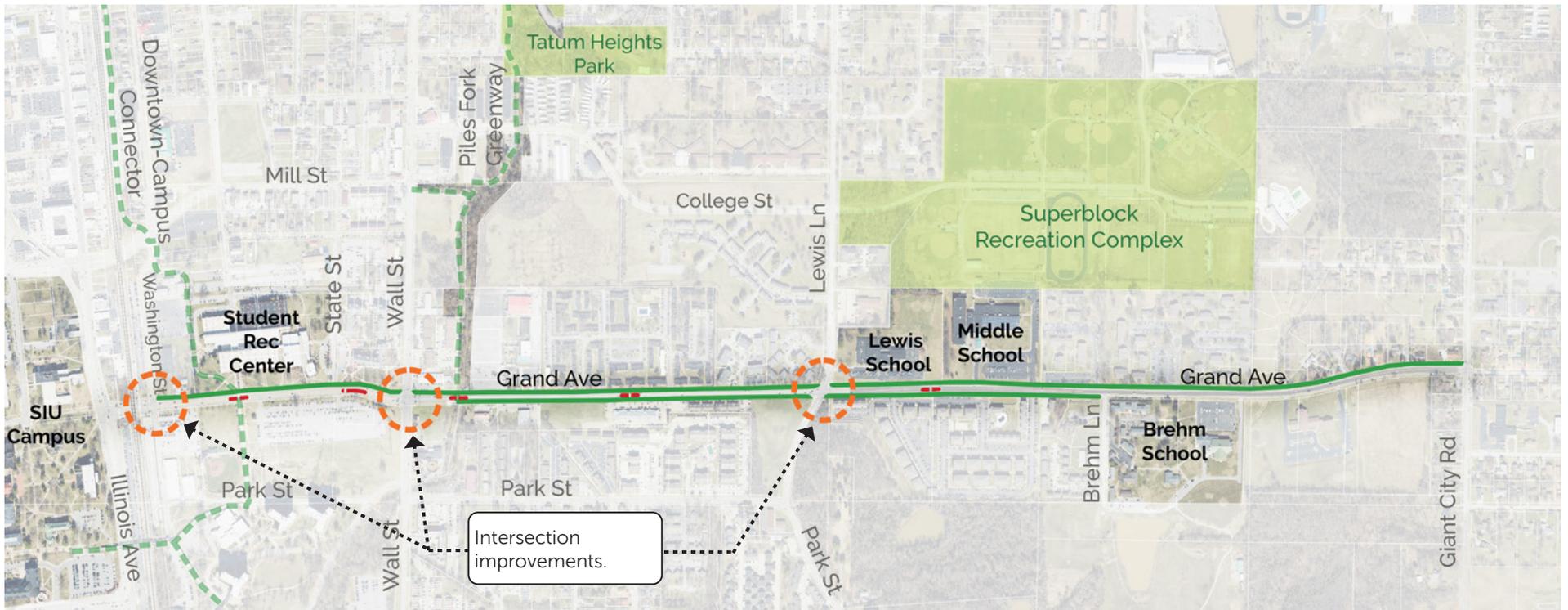




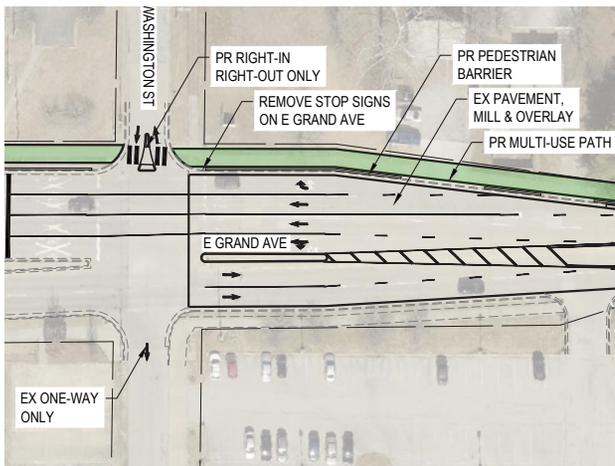
## Map Overview: Medians/Mid-Block Crossings

Right: Example of a mid-block crossing with a landscaped median. Medians can also be an opportunity for signage or other aesthetics.

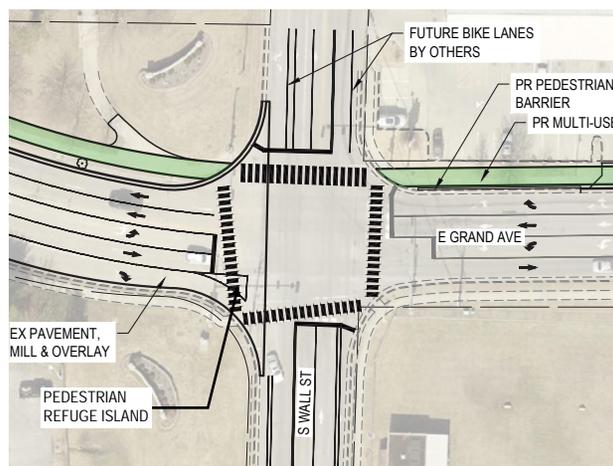




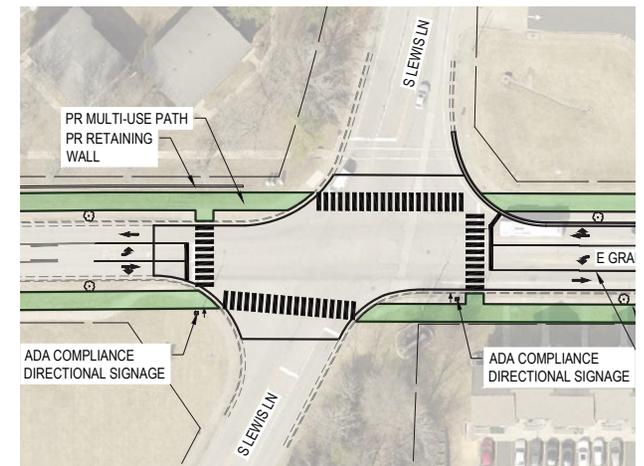
## Map Overview: Intersection Improvements



Intersection: Washington and Grand



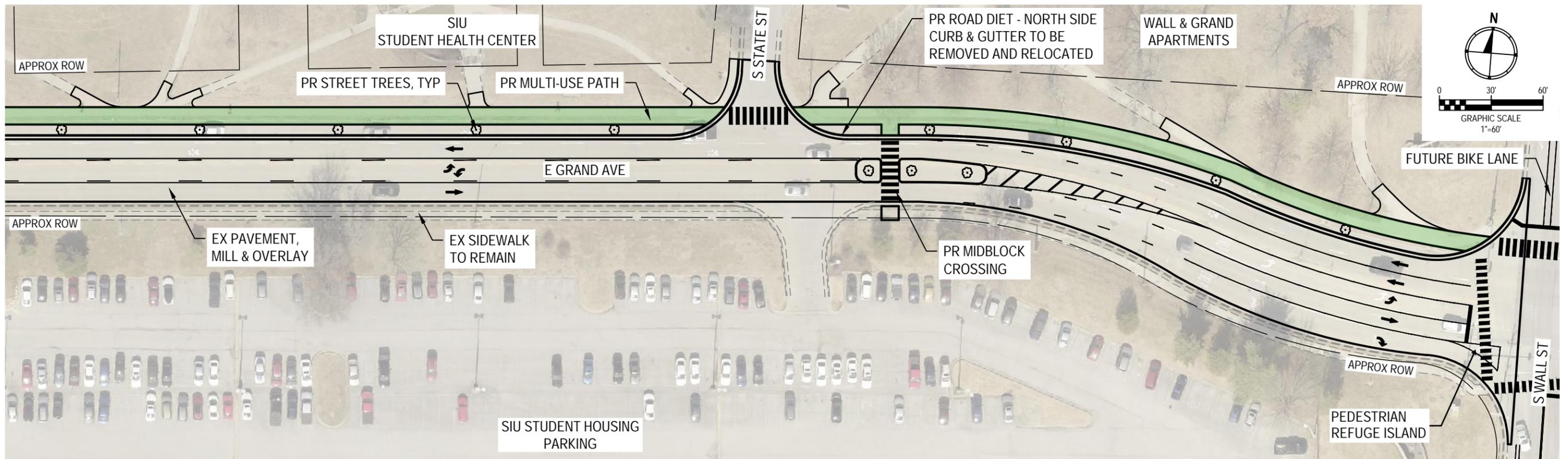
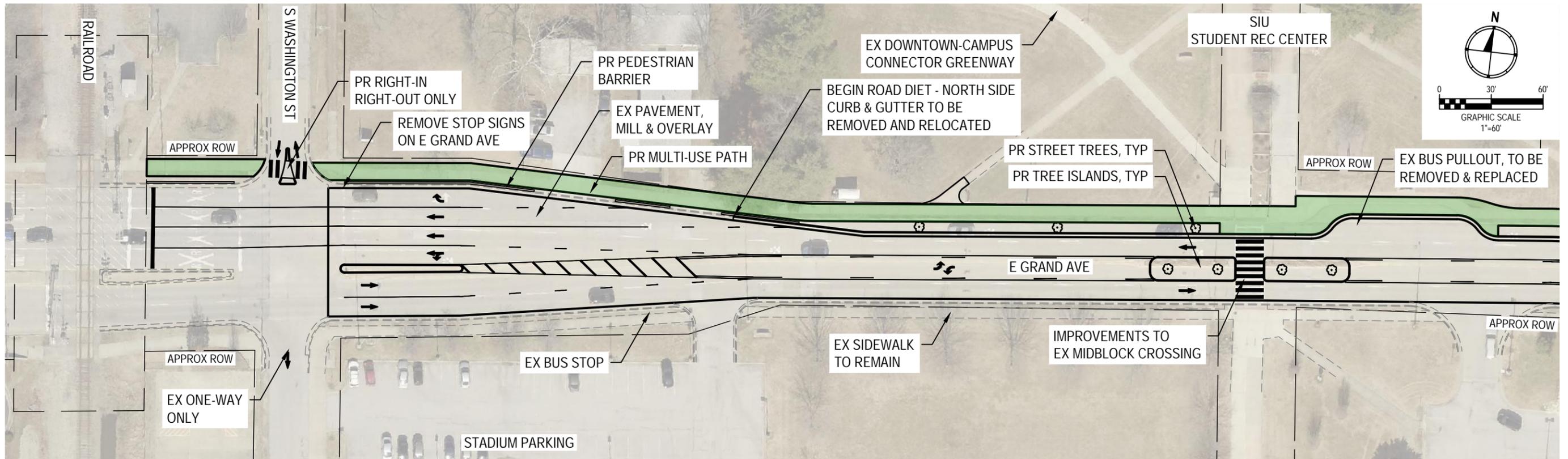
Intersection: Wall and Grand

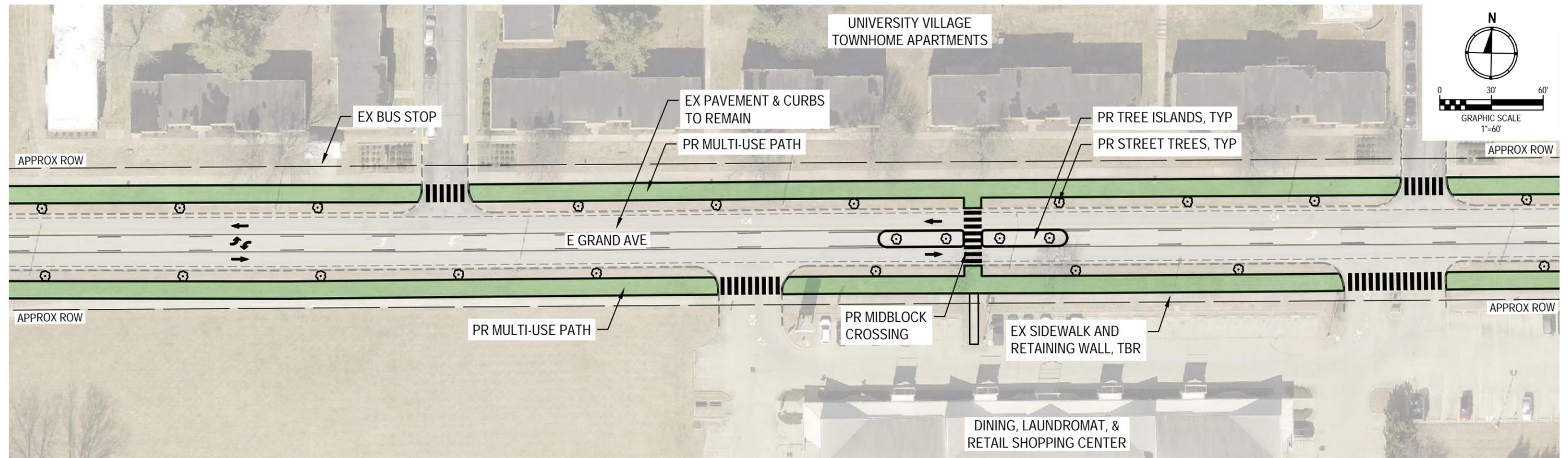
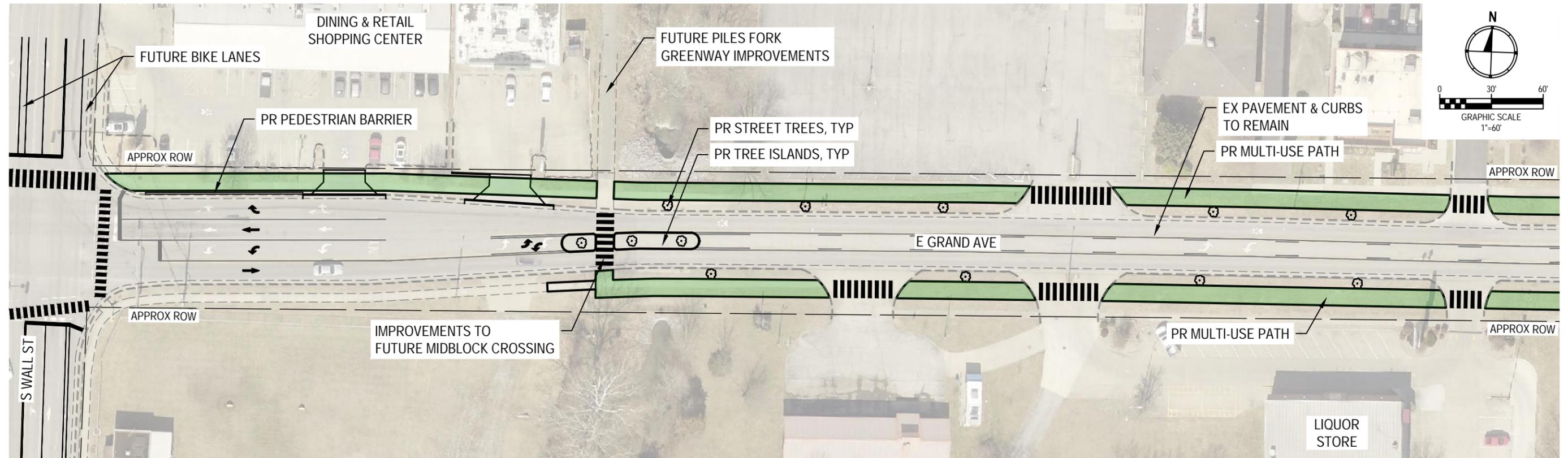


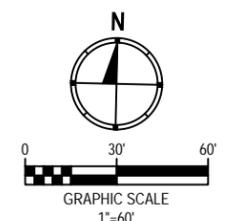
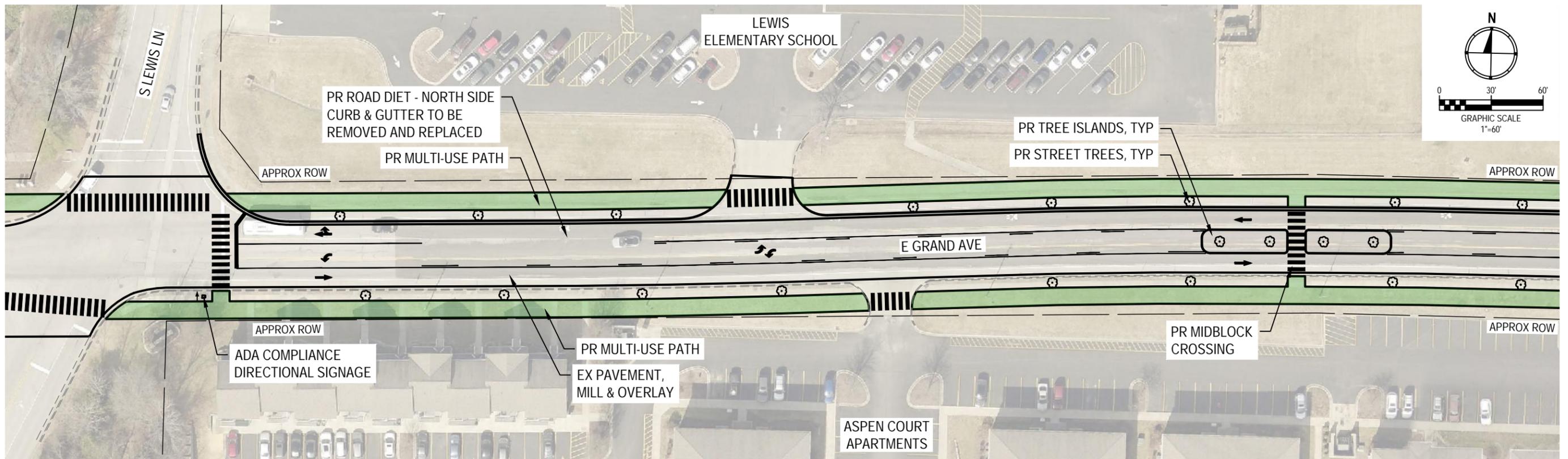
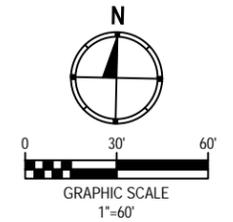
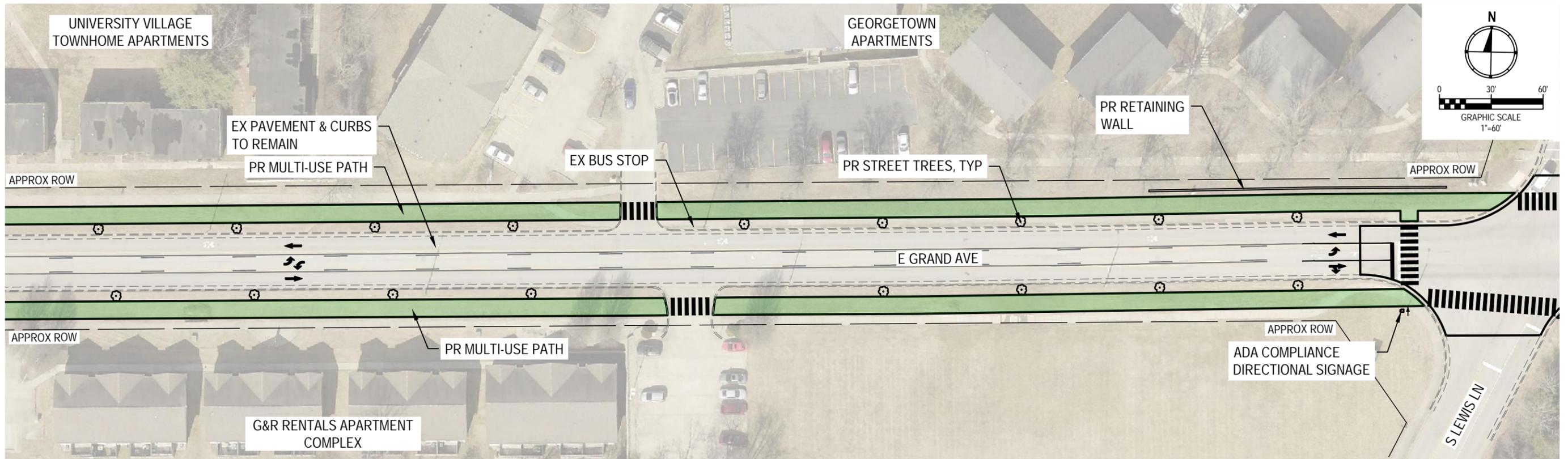
Intersection: Lewis and Grand

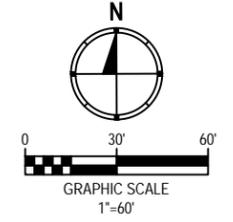
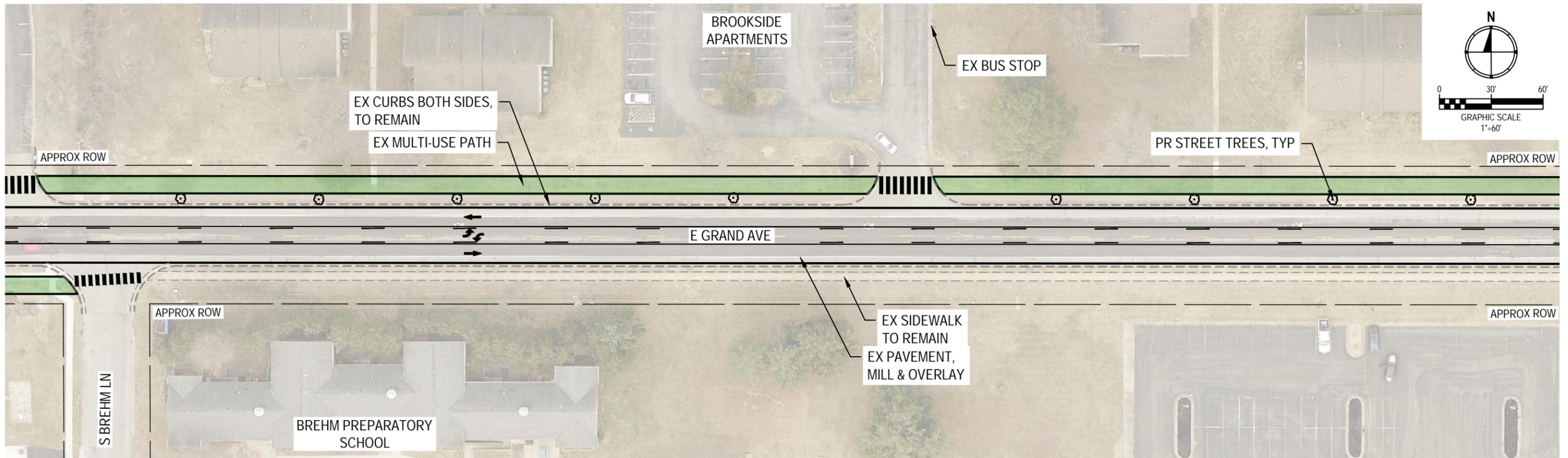
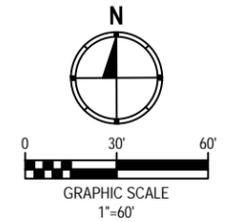
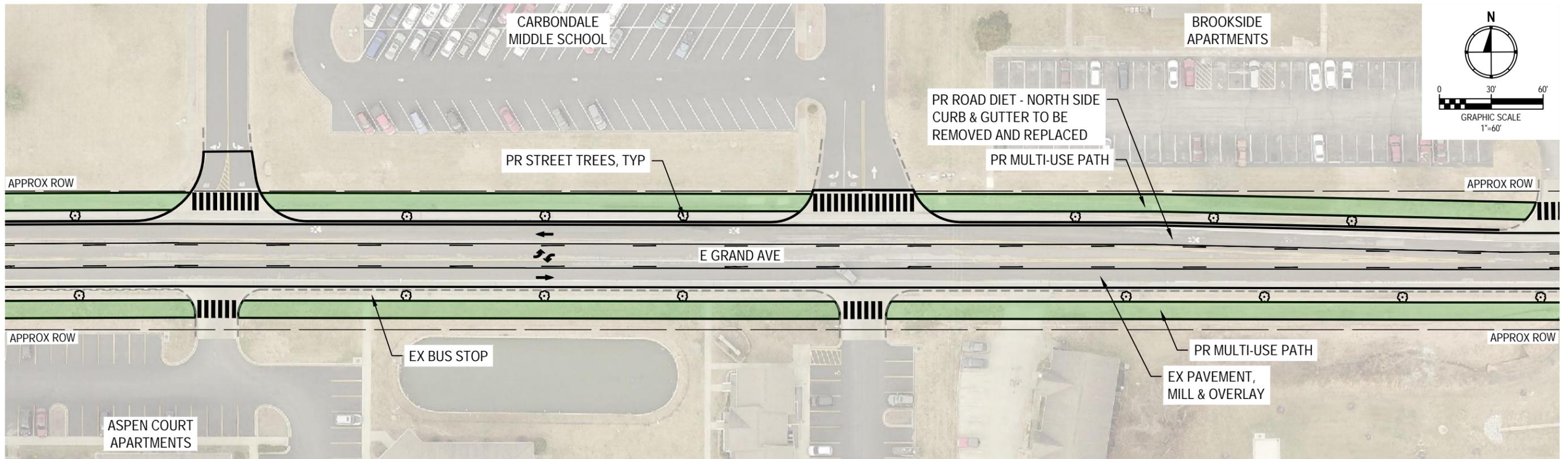
# **ATTACHMENT B**

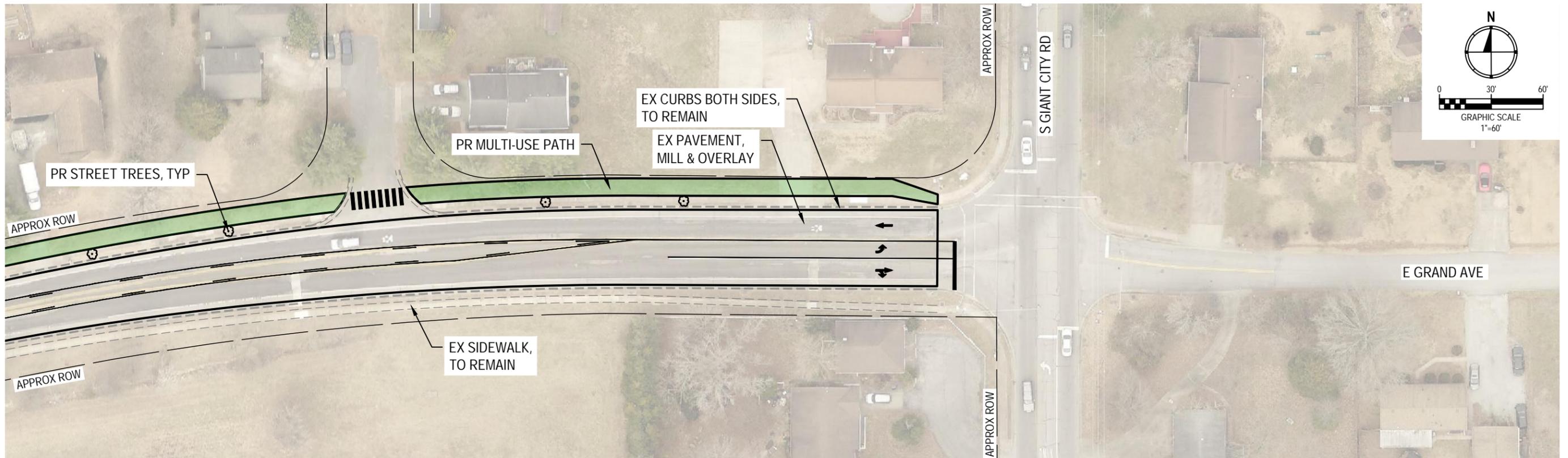
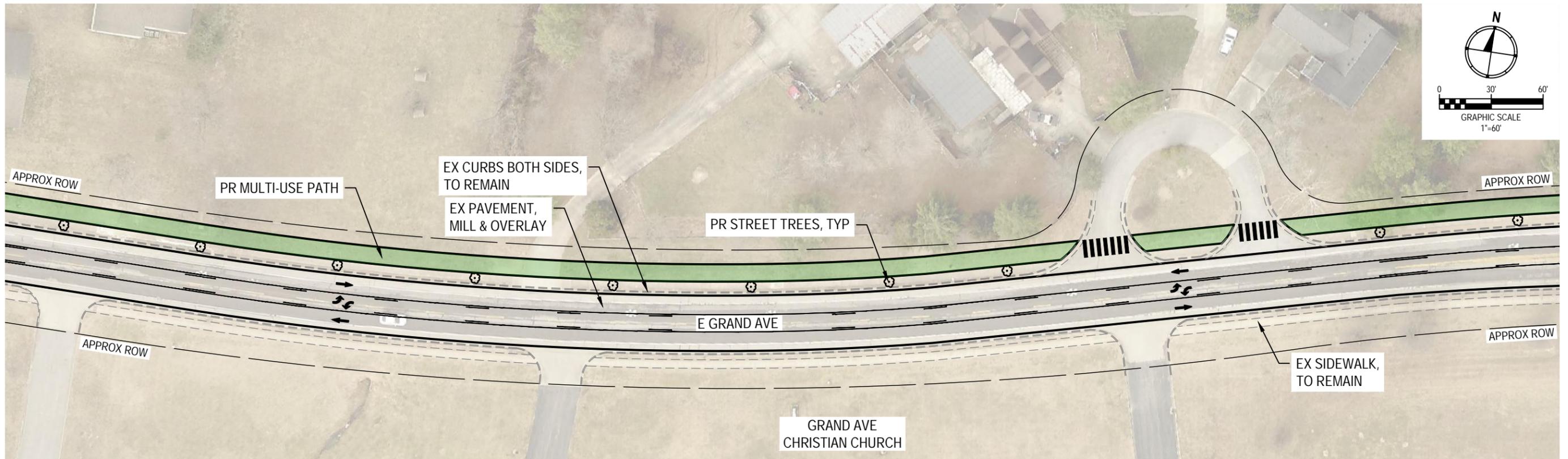
## **Project Plan Sheets**

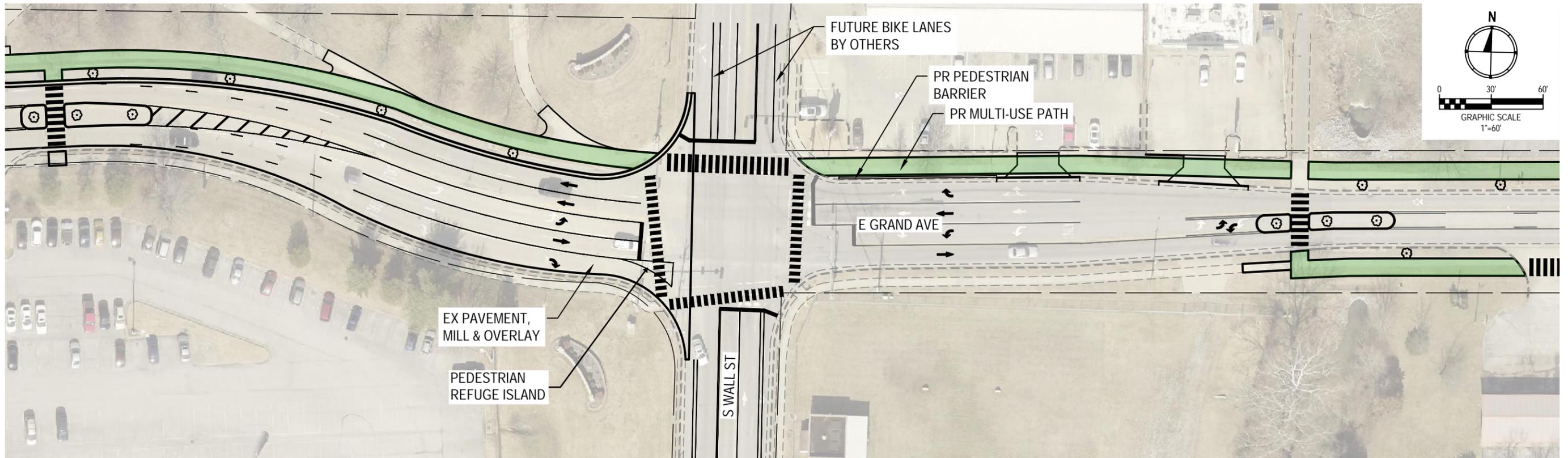
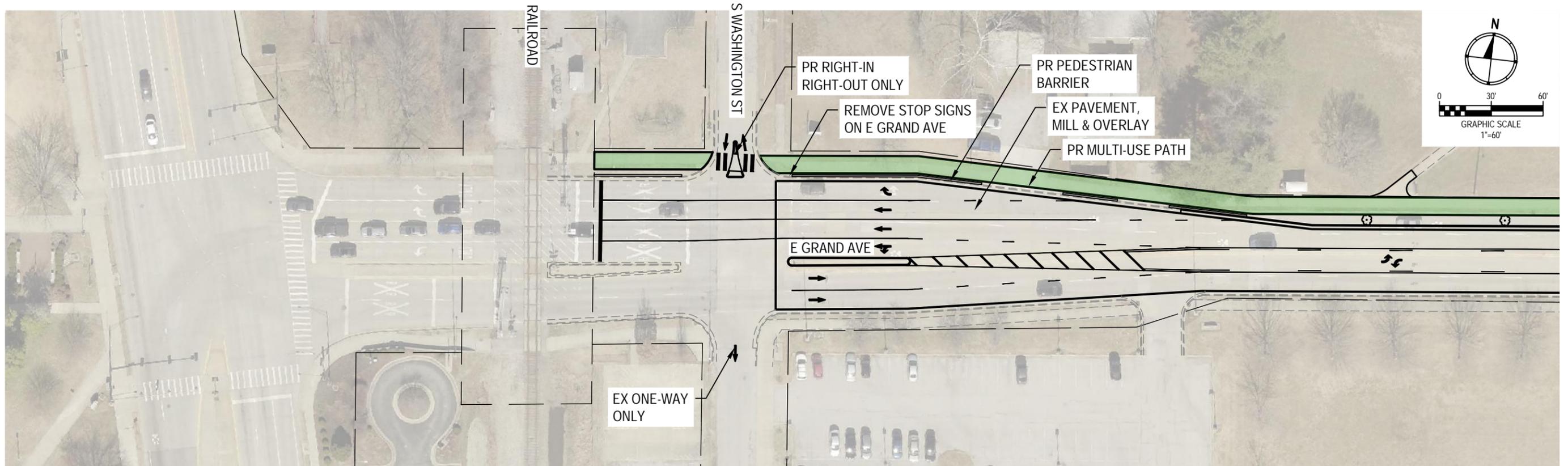






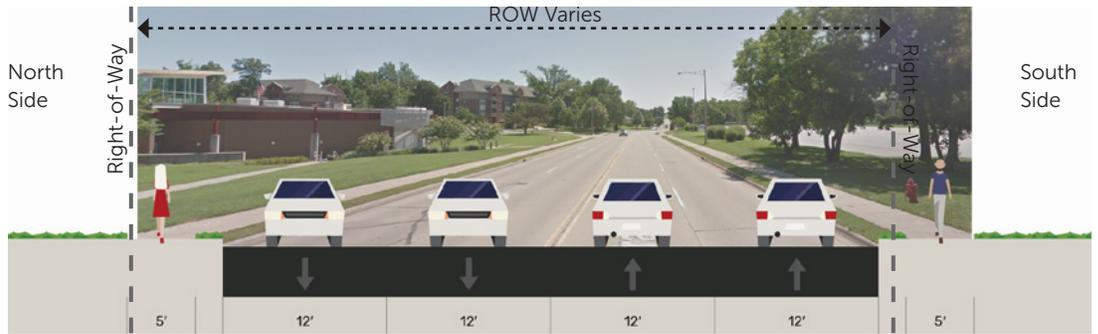






# **ATTACHMENT C**

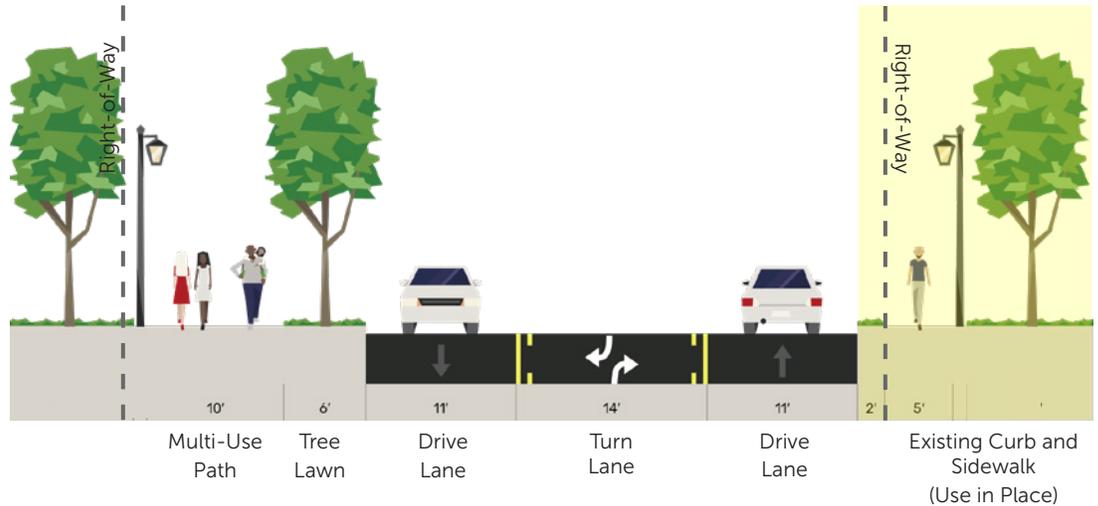
## **Typical Sections**



## Existing Conditions: Grand Ave (Washington to Wall) - Looking East

### Highlights

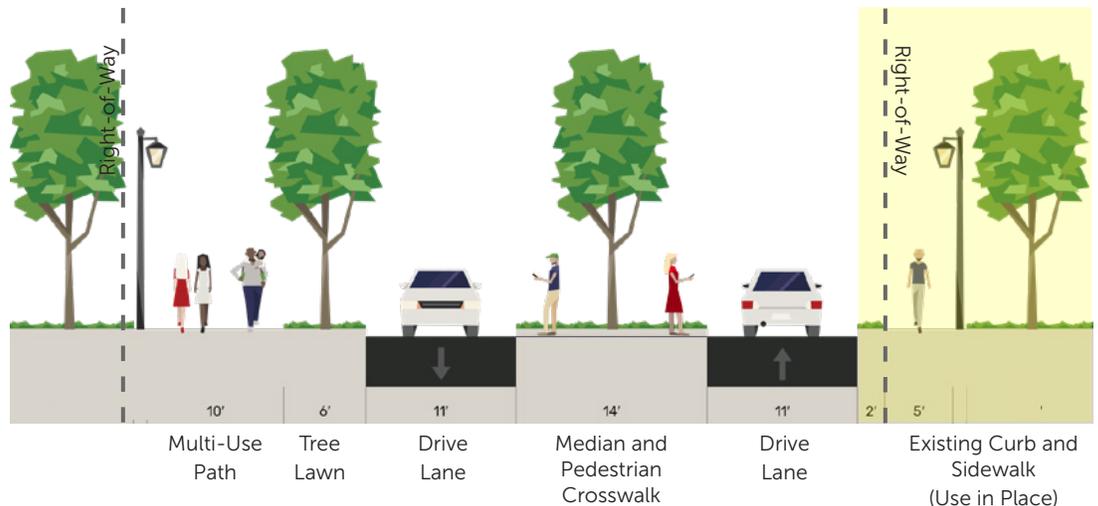
- » New 10' Multi-Use Path on north side of Grand.
- » New street trees and optional pedestrian lighting enhances the street.
- » Reduced width of new lanes will help calm traffic.
- » Mill and new overlay of Grand.
- » South curb line and south sidewalk to remain in place.



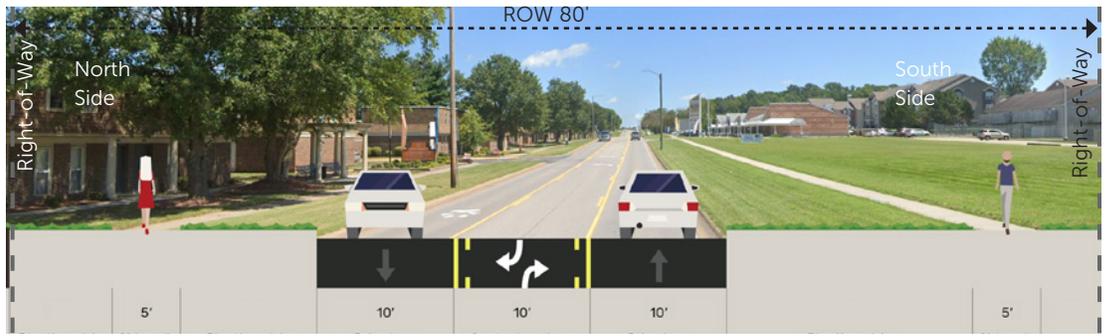
## Proposed Grand Ave (Washington to Wall): Typical

### Highlights

- » Median with landscaping will act as a refuge for pedestrians as they cross Grand.
- » Medians are an opportunity for enhancements (landscaping, signage, etc.) to create a gateway into SIU.



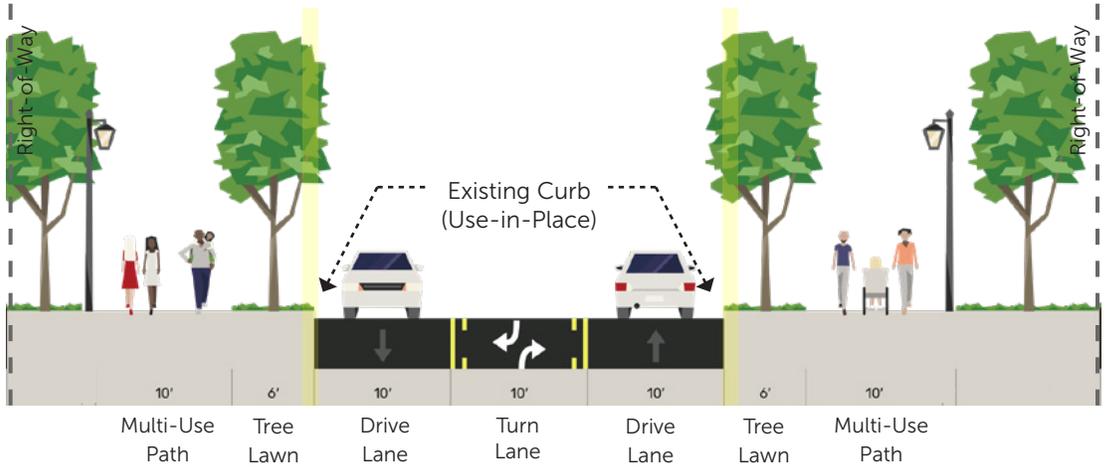
## Proposed Grand Ave (Washington to Wall): At Pedestrian Crossing



## Existing Conditions: Grand Ave (Wall to Lewis) - Looking East

### Highlights

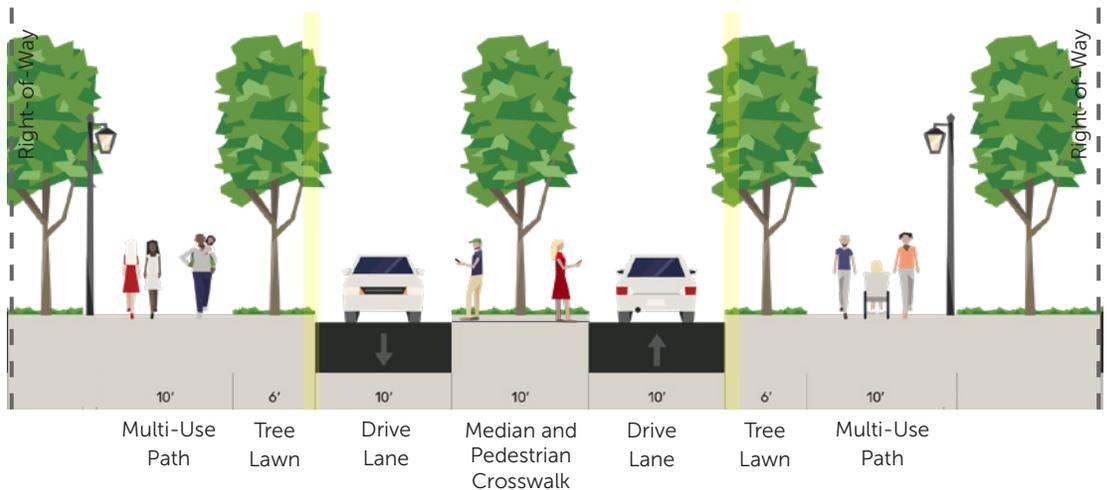
- » New 10' Multi-Use Path on **both sides** of Grand.
- » New street trees and optional pedestrian lighting enhances the street.
- » Existing curb line on both sides of street to remain in place.



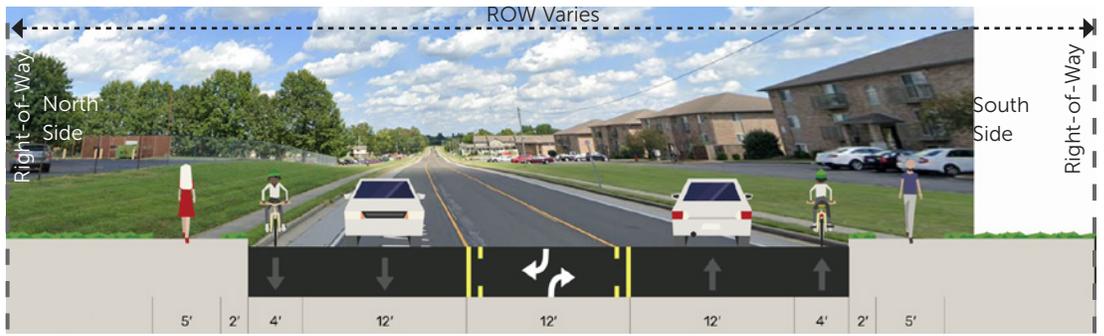
## Proposed Grand Ave (Wall to Lewis): Typical

### Highlights

- » Median with landscaping will act as a refuge for pedestrians as they cross Grand.



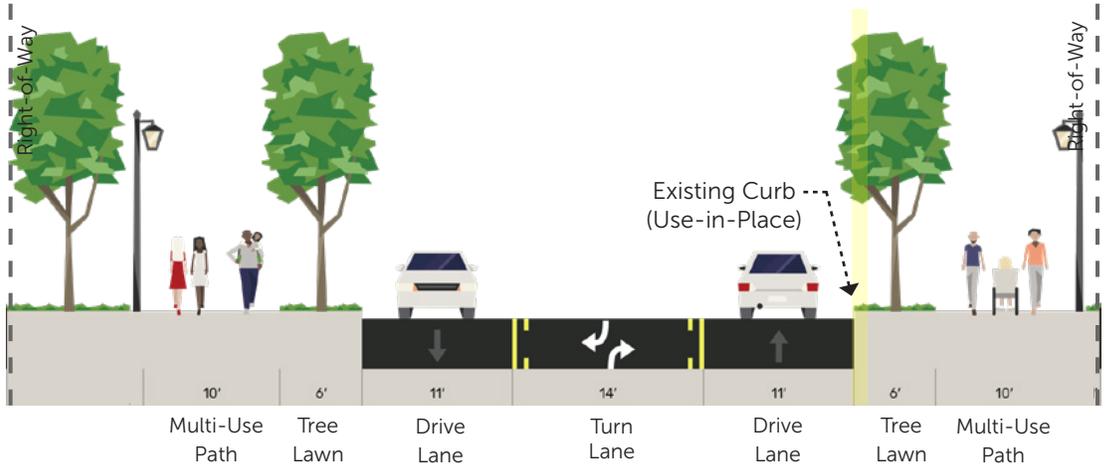
## Proposed Grand Ave (Wall to Lewis): At Pedestrian Crossing



Existing Conditions: Grand Ave (Lewis to Middle School) - Looking East

Highlights

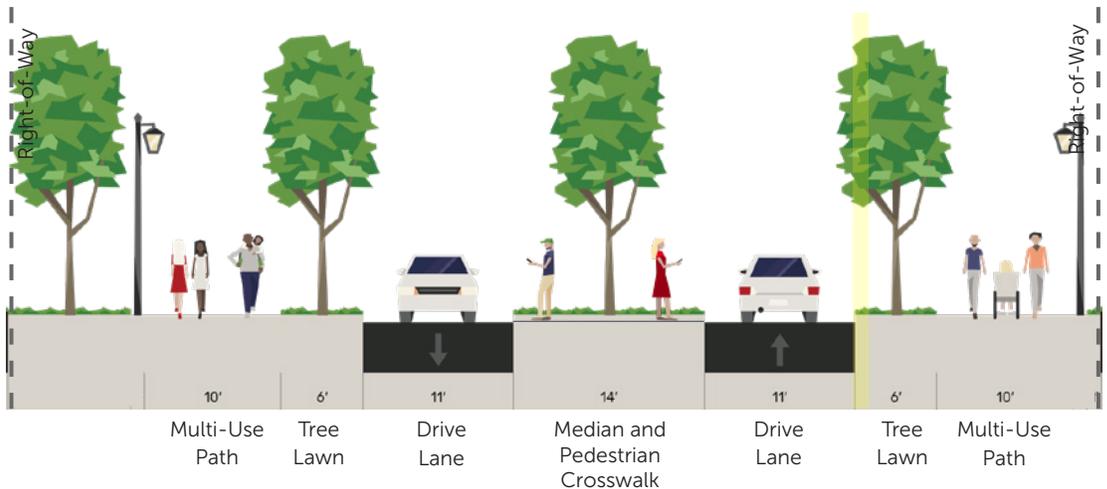
- » New 10' Multi-Use Path on **both sides** of Grand.
- » New street trees and optional pedestrian lighting enhances the street.
- » Reduced width of new lanes will help calm traffic.
- » Mill and new overlay of Grand.
- » Existing curb line on south side of street to remain in place.



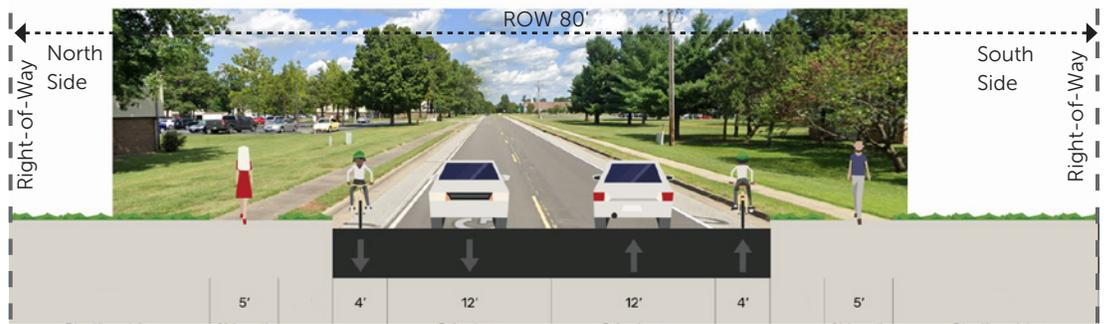
Proposed Grand Ave (Lewis to Middle School): Typical

Highlights

- » Median with landscaping will act as a refuge for pedestrians as they cross Grand.



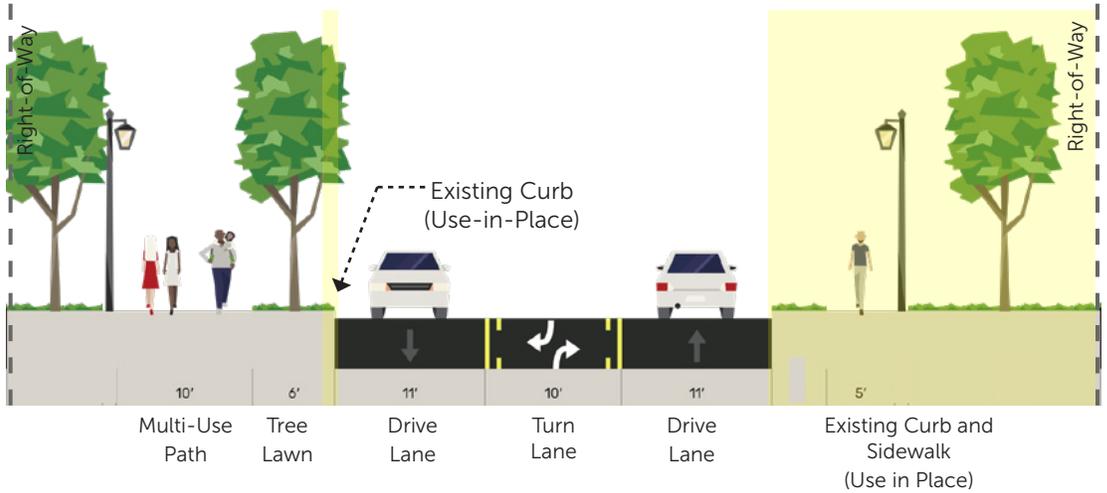
Proposed Grand Ave (Lewis to Middle School): At Pedestrian Crossing



Existing Conditions: Grand Ave (Middle School to Giant City) - Looking East

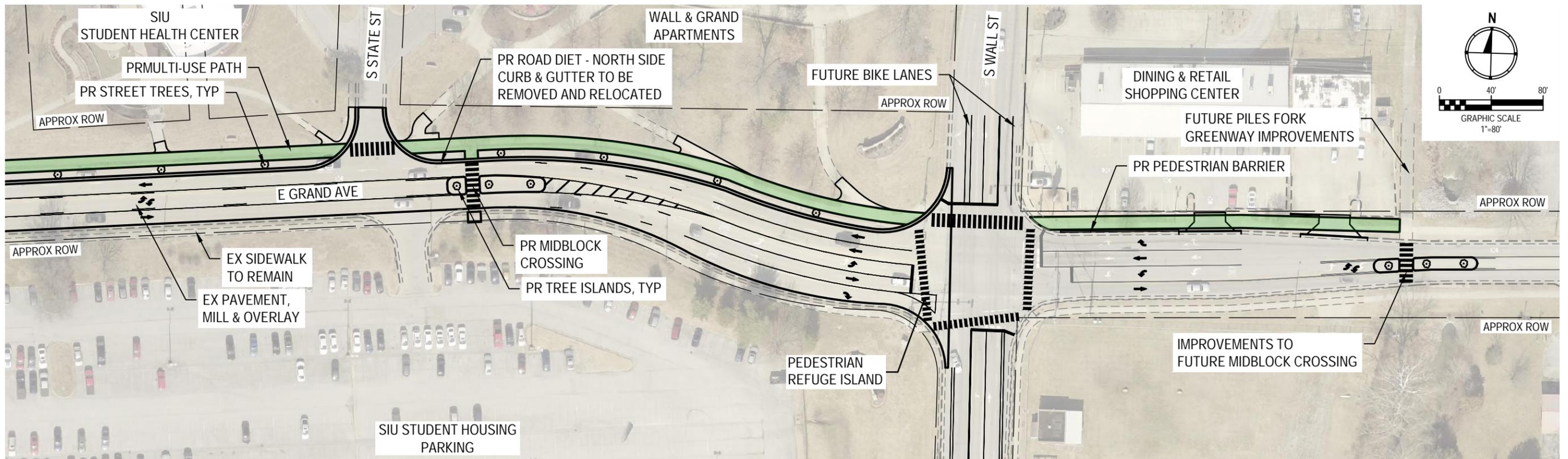
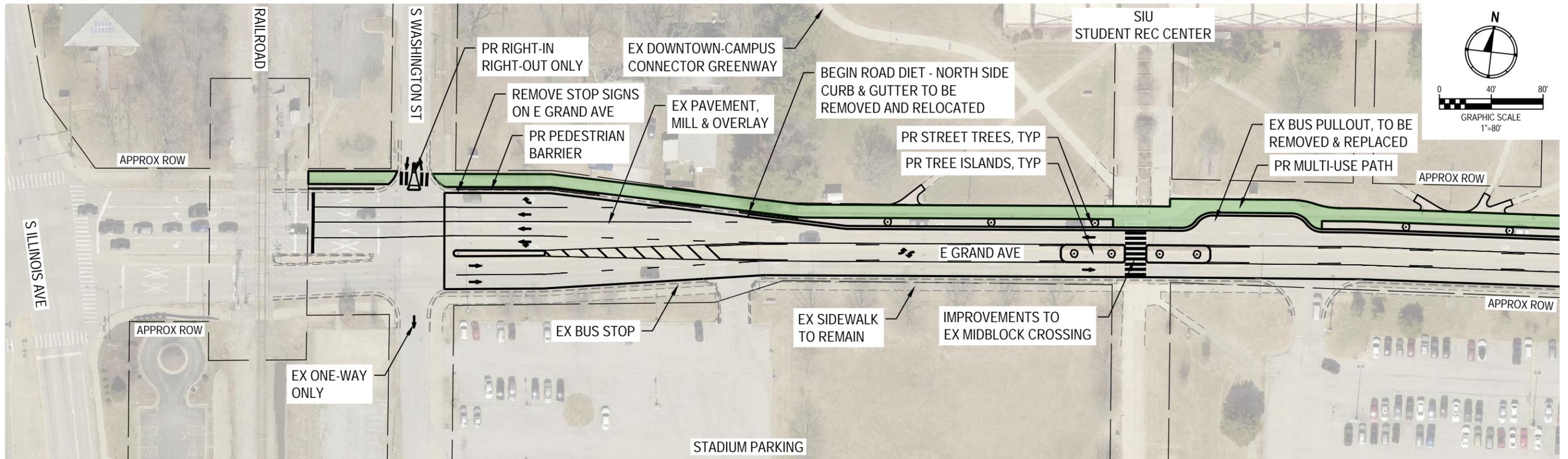
Highlights

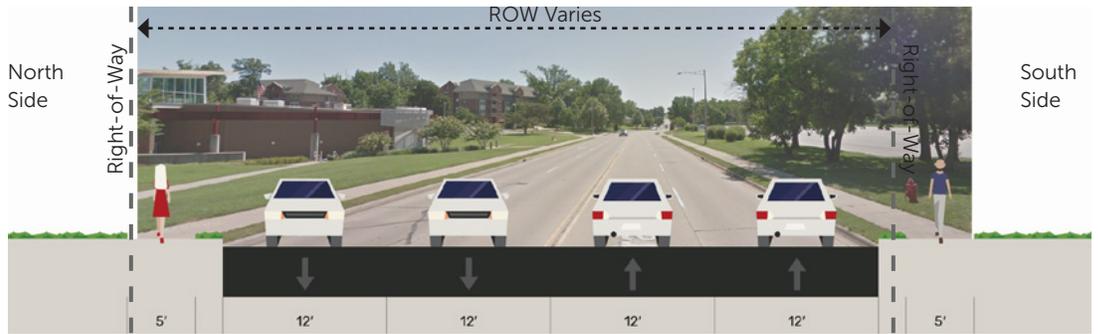
- » New 10' Multi-Use Path on **north side** of Grand.
- » New street trees and optional pedestrian lighting enhances the street.
- » Reduced width of new lanes will help calm traffic.
- » Mill and new overlay of Grand.
- » Existing curb line on both sides of street to remain in place.



Proposed Grand Ave (Middle School to Giant City): Typical

**ATTACHMENT D**  
**HSIP Grant Application**  
**Plans**  
**Sections**  
**Cost Estimate**

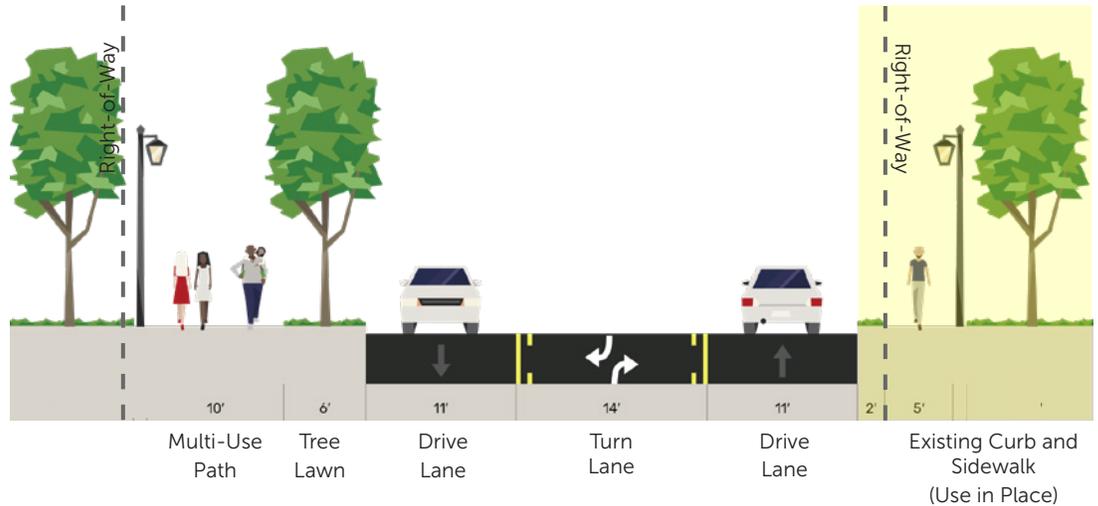




## Existing Conditions: Grand Ave (Washington to Wall) - Looking East

### Highlights

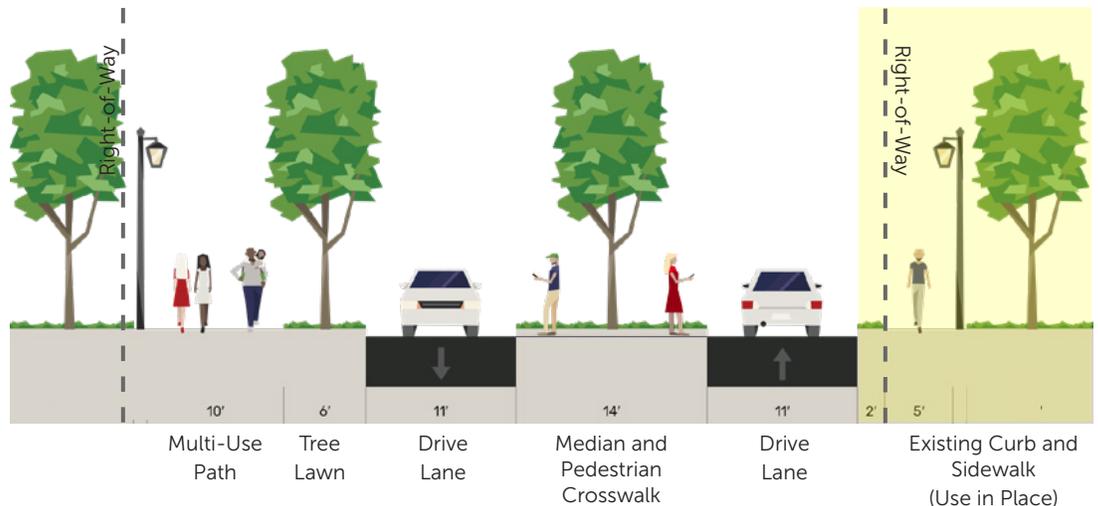
- » New 10' Multi-Use Path on north side of Grand.
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- » Reduced width of new lanes will help calm traffic.
- » Mill and new overlay of Grand.
- » South curb line and south sidewalk to remain in place.



## Proposed Grand Ave (Washington to Wall): Typical

### Highlights

- » Median with landscaping will act as a refuge for pedestrians as they cross Grand.
- » Medians are an opportunity for enhancements (landscaping, signage, etc.) to create a gateway into SIU.



## Proposed Grand Ave (Washington to Wall): At Pedestrian Crossing



## **APPENDIX**

- 1 Community Engagement**
- 2 Daily 85th Percentile Speed Measurement**
- 3 Existing Turning Movements at E. Grand and Wall St.**
- 4 Previous Studies, Grant Funding, and Related Documentation**
- 5 Road Diet Analysis on the Intersection of E. Grand and State St.**
- 6 Existing Stormwater System Exhibit**
- 7 Electronic Scooter Data**
- 8 Level of Service Analysis for the Intersection of E. Grand and State St.**
- 9 U.S. Department of Transportation, Federal Highway Administration, FHWA-SA-20-015, The Safe System Approach**
- 10 City of Carbondale, Resolution No. 2015 – R – 12, a Resolution Adopting A Complete Streets Policy**

# **APPENDIX 1**

## **Community Engagement**

**1.1 Online Survey**

**1.2 Correspondence with SIU Chancellor's Office**

**1.3 Correspondence with Brehm Preparatory and Carbondale School District #95**

# **APPENDIX 1**

## **Community Engagement**

### **1.1 Online Survey**

# East Grand Avenue Multimodal Study



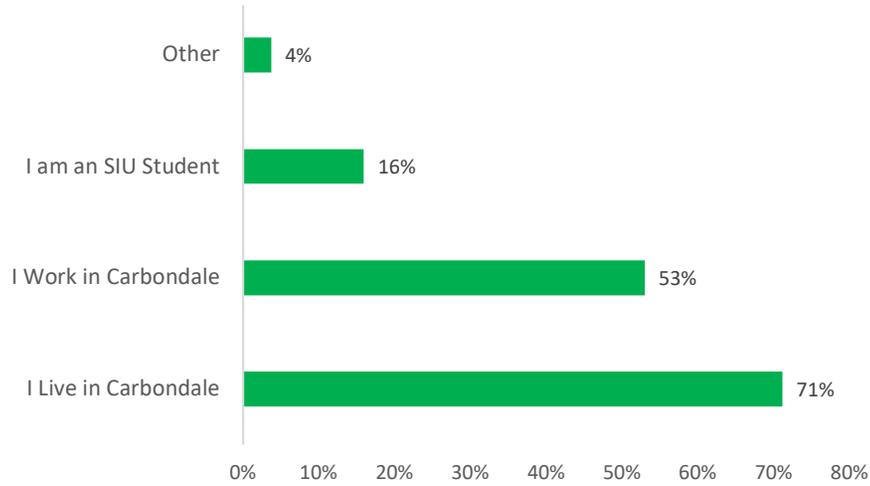
The Southern Illinois Metropolitan Planning Organization (SIMPO), in collaboration with the City of Carbondale and Oates Associates, Inc. are conducting a study to evaluate the East Grand Avenue corridor from Washington Street to Giant City Road.

The goal of the study is to provide direction and assistance for the design of multimodal improvements for people walking, riding bicycles, using wheelchairs and mobility-assistive devices, and for people taking public transit.

**If you regularly travel along the East Grand Ave corridor, please provide your input on current conditions and give us suggestions for future improvements! Scan the code below to view project details and take the public survey.**



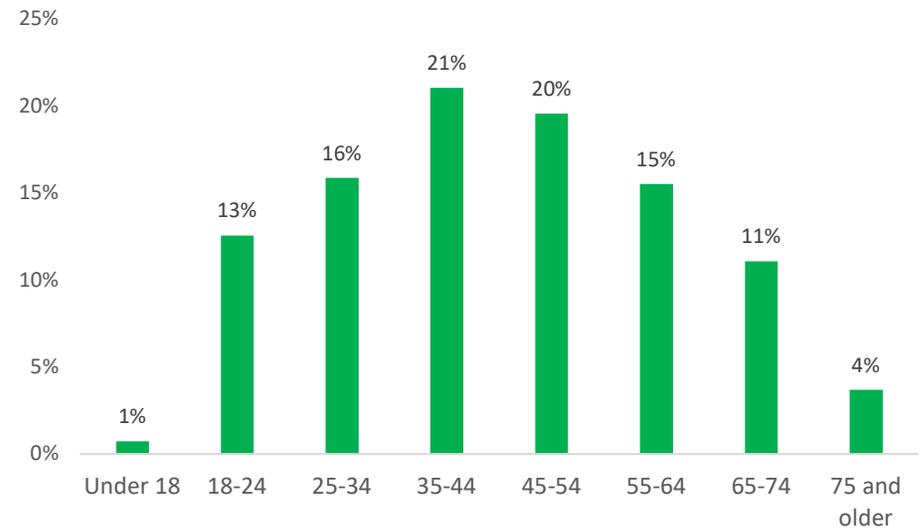
## What best describes you? (Select all that apply)



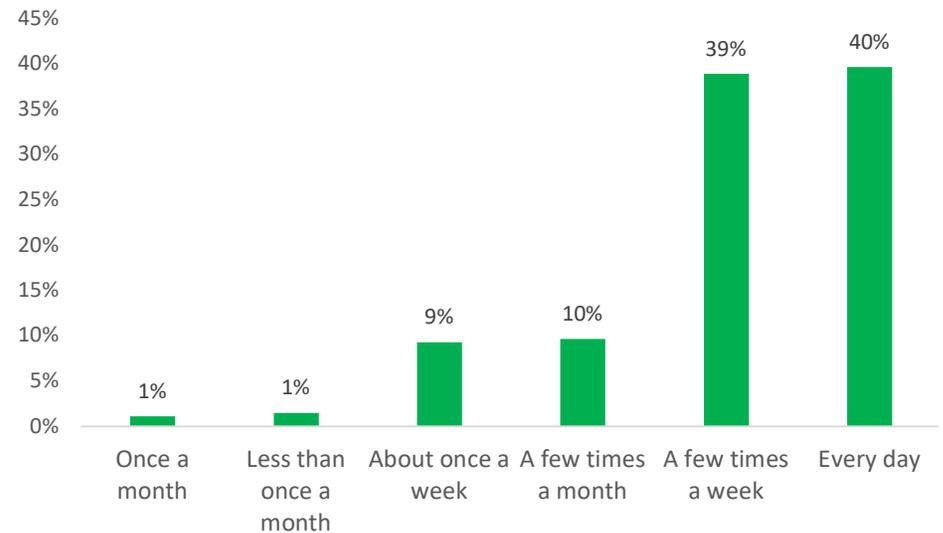
### Other

- I am SIU faculty
- I shop and commute in and thru Carbondale. Grand is a frequently traveled route from my home near Cedar Lake to shopping and nearby cities.
- Manage family owned apartment business and shopping center
- Regular traveler on Grand Avenue.
- Rural Carbondale
- SIU Faculty support staff

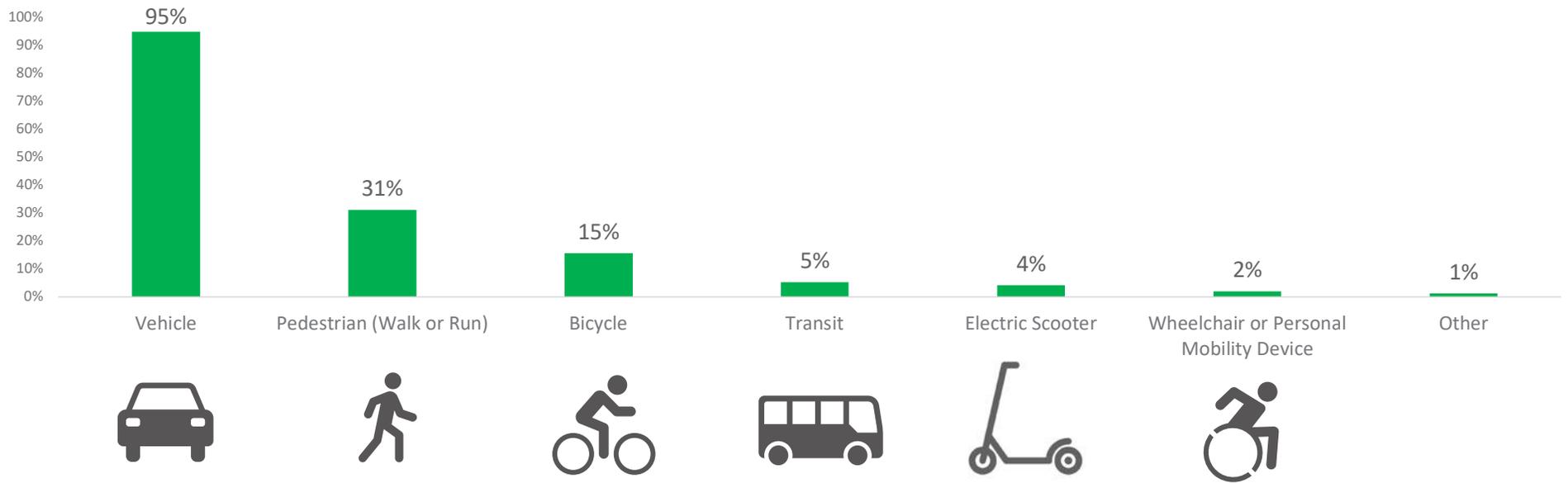
## What is your age?



## How often do you travel along Grand Avenue? (Choose one)



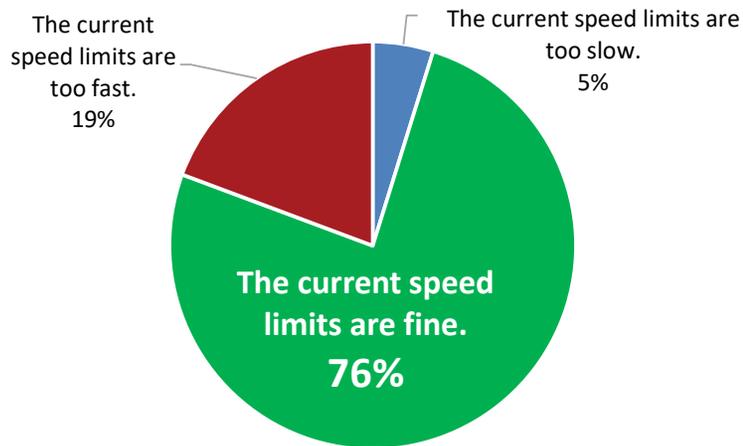
## How do you currently travel along Grand Avenue? (Select all that apply)



### Other

- push stroller, children ride bicycles
- Rides from my son

**The speed limit on Grand Avenue is currently 40 m.p.h. east of Lewis Lane and 30 m.p.h. west of Lewis Lane, what is your opinion regarding the current speed limits. (Choose one)**



**45% of respondents also agreed with the statement, "Most of the traffic generally moves at appropriate speeds, but there are a few vehicles that greatly speed."**

**Please explain:**

- 30 MPH all around are good.
- 40 east of Lewis is fine, it should be 40 west of Lewis as well though
- "40 mph feels unsafe to me east of Lewis lane due to the poor visibility at the Lewis Lane/Grand Ave intersection and due to the turning traffic onto Grand Ave from the apartments and from the middle and elementary school on Lewis.
- 30 mph feels unsafe to me west of Lewis lane because pedestrians need to cross Grand Ave, and there's not enough crosswalks"
- "All inner-city roads with high pedestrian traffic should be 25mph, like every other city. If they are not, every intersection should be a fully controlled intersection with well-marked and sooth quality crosswalks to allow disabled people to walk across them."
- But nobody seems to observe the school zone. They think it ends after the first school traveling east bc there is a normal speed limit sign before the school zone ends. Clearly marking the school zone from start to end may help. I hate being pressured to speed by drivers who I guess don't realize
- Considering the high residential rate and the young children in the area, I do believe that the speed limits need to be better enforced. The current speed limits are appropriate but not followed.
- Distracted driving & speeding are issues.
- Don't see the speed limit as being a problem.
- Due to the elementary and junior high schools, the speed limit of 40mph is too fast.
- East of Lewis lane should also be 30 or less and west of Lewis could be lowered to 25 for the safety of all, especially students.
- Except that the 40mph sign and the school zone sign are really close together and the school zone sign gets ignored.
- I believe all of E Grand should be 30-35mph.
- I do think the difference may confuse people - if they even pay attention. There are many drivers who are easily over 40mph along the whole road and some who pass in the median west of Lewis Lane.
- I have observed the speed limits and have actually been passed on E Grand.
- "I think 30 mph west of Lewis Lane is okay, but I could see it moving to the limits set for the outskirts of campus, which is 25mph. East of Lewis Lane is fine as it is."
- I think 40 mph east of Lewis school is too fast. There's also another school farther east, the middle school and Brehm.
- I think that they should stay in the lower sector of speed also considering the middle school near that area.
- I think the speed limit east of Lewis is too fast - I live on Grand east of Lewis and people FLY down that segment of the road. I think 30 mph west of Lewis is reasonable
- I think there needs to be better signage about the curve on Grand next to Wall Street.

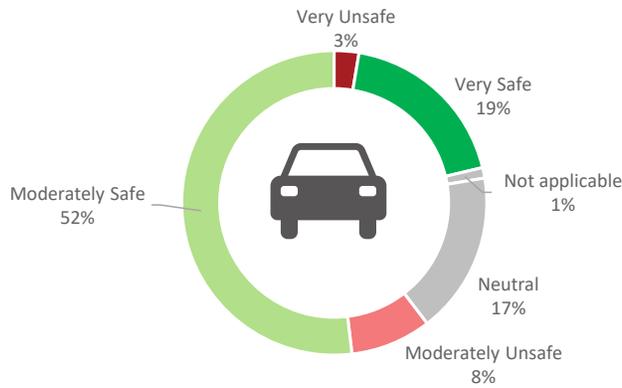
## The speed limit on Grand Avenue is currently 40 m.p.h. east of Lewis Lane and 30 m.p.h. west of Lewis Lane, what is your opinion regarding the current speed limits.

### CONTINUED Please explain

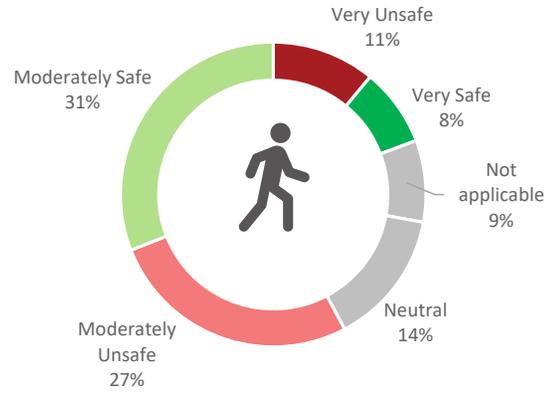
- I would like to see the road widened to support better traffic flow coming in and out of SIU. More lanes could also make it safer for those in the bike lane. The bike lane needs to continue down E. Grand Ave. into campus.
- if it is slower then we have a greater chance to notice that the other person may be speeding or drunk so we have a better chance to avoid accidents
- If obeyed, I think the speed limit is reasonable.
- It doesn't make any sense to me that the speed limits increase at Lewis Lane, when there are three schools on that stretch of road.
- It doesn't matter what the speed limits are. Drivers will disobey them. I rarely see patrol along East Grand. As a pedestrian in the area from Wall to Washington, I notice traffic really speeds up traveling West from the Grand/Wall intersection. I think there is a lot more foot traffic from Wall to Washington than further east, especially people trying to cross the street. As a driver, I've witnessed numerous times vehicles running red lights at that intersection.
- It feels slow when you are driving, but we need to have a 30mph speed limit for the sake of others who are not in a vehicle.
- It should all be 40mph
- It should be lowered east of Lewis lane. Significant development has occurred along this stretch since the 40mph was enacted.
- Most drivers do not reduce speed when they get to the 30 MPH. Myself included! It's easy to forget because the road doesn't narrow.
- Nobody pays attention to traffic laws, the speed limit is irrelevant.
- Overall fine but the signage about the school zone by Lewis and CMS is generally not observed or in the wrong place.
- "People fly in front of Lewis and CMS. VERY DANGEROUS.
- Should be 30 mph for both
- Speed limits posted are fine as long as car traffic observes the slower limits while school is in session.
- Speed restrictions have no value if not actively and aggressively enforced.
- Stop light at Lewis would greatly help as many motorists do not come to a complete stop and yield to drivers who have the right of way.
- The current limits are too if people will follow them
- The posted speed limits are fine -- the adherence to the limits in the 30 MPH zone is a big challenge given it is two lanes each direction and people have much trouble following the 30 MPH limit.
- The posted speeds are adequate but seldomly observed and never enforced.
- The question is not limits, it's enforcement. I have seen drag racing at 4 in the afternoon between Illinois and Wall.
- The speed limit from Lewis Lane to Brookside needs to be lowered. Perhaps even from Lewis Lane to Giant City Road the speed limit could probably be lowered.
- The speed limit on all roads in town should be a maximum of 20 mph. If a pedestrian is hit at 20 mph the pedestrian has only a 5% chance of serious injury or death. Also current speed limits should be enforced.
- The speed limits are fine, but there's no enforcing of these limits.
- The speed limits are fine, the issue is people are treating them like suggested minimums.
- The speed west of Lewis Lane can also be 40mph
- There are many pedestrians and cars turning in and out of the road. The posted speed on the east side of grand is too high. 30 should be the max. Lowering the posted speed limit is a start.
- They should be 30 the whole way.
- Traffic snarls slows everyone down to a crawl, but once the traffic dies down, the speed limits are ok. It seems like the locals are less patient with traffic and I observe tailgating, passing in the double yellow line zones. I'm used to it, but new drivers must really be challenged.
- West of Lewis lane can be 40 or 45 MPH. However East of Lewis Lane should stay the same.
- With the schools on grand it should be 30 th whole way

# How would rate the safety of the following modes of travel along Grand Avenue.

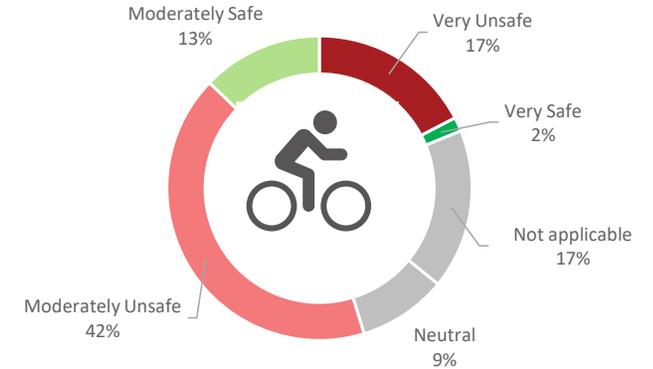
## Vehicle



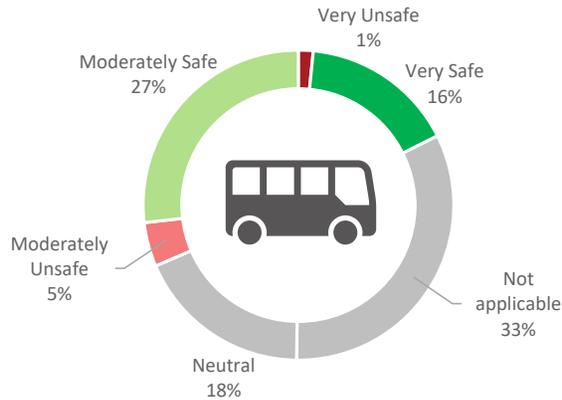
## Pedestrian



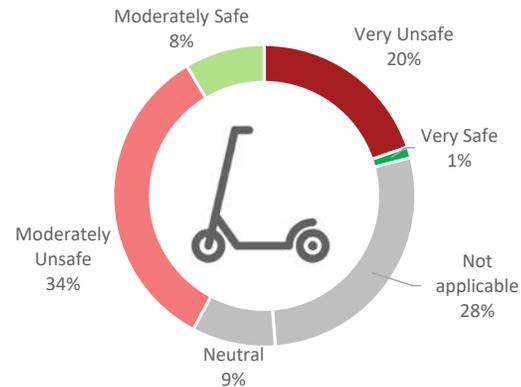
## Bicycle



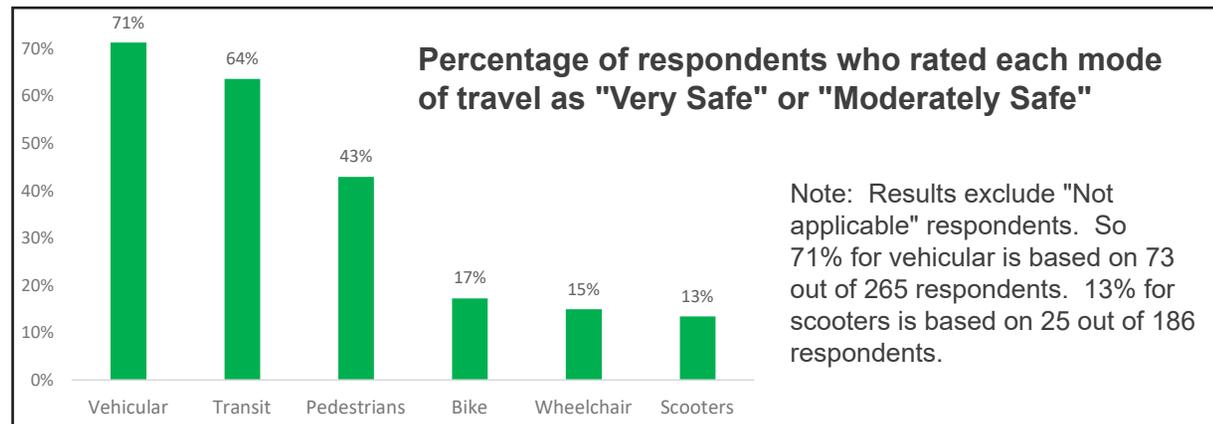
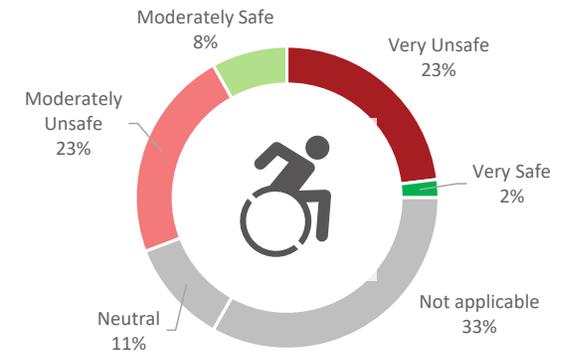
## Transit



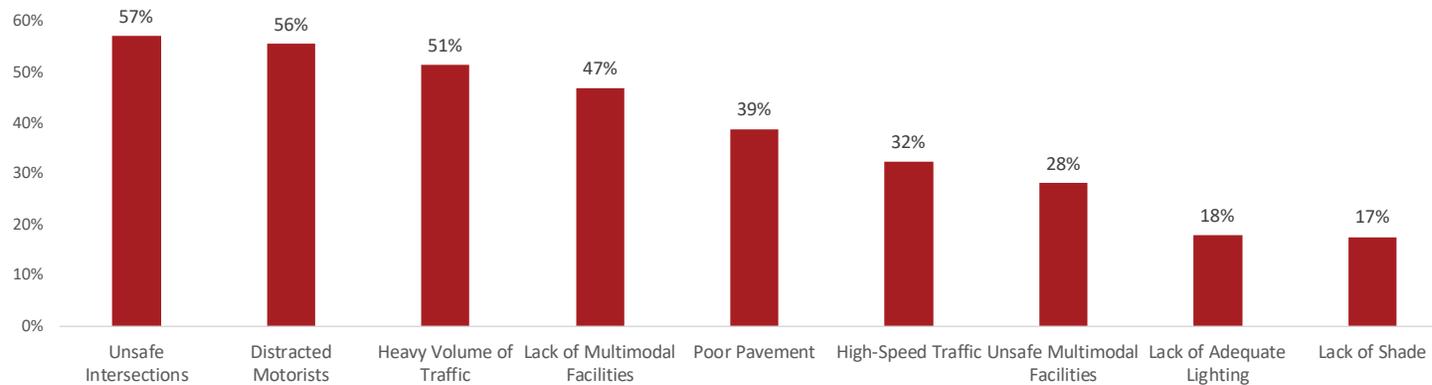
## Electric Scooter



## Wheelchair or Personal Mobility Device



## What are existing challenges along Grand Avenue for your current or desired mode of travel? (Select all that apply)

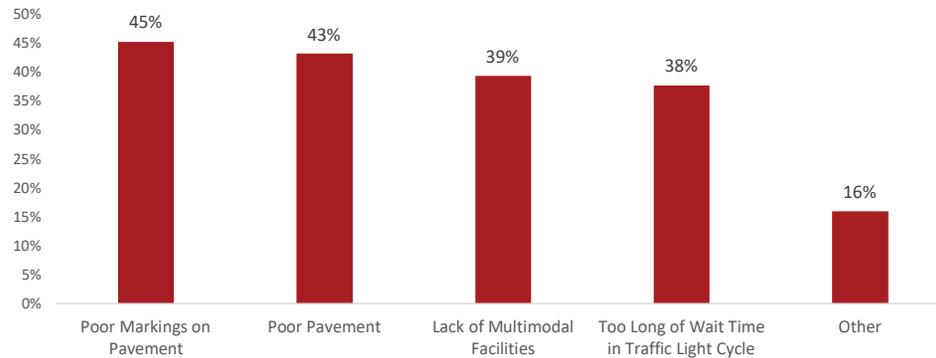


### Please explain

- As a bus operator, I find that the main challenge is that the utility poles and some signs are close enough to the lane of travel that my bus has to be on the line of the center turn lane.
- As more apartments got added, traffic has definitely increased.
- Continued: They can head down Washington Street to the underpass or to Route 13 to continue heading west instead of waiting. A turn lane would allow traffic to continue to flow and better utilize the underpass.
- Crosswalks
- Distracted pedestrians
- Dropping off a child at Lewis school can be very difficult with the amount of traffic at that intersection.
- Inadequate number of crosswalks
- Intersection at Lewis Lane and Grand can be unsafe
- lack of cross walks
- Lines and crosswalks need repainted
- No turn lane for rec - traffic backs up or cars cut in between traffic (sometimes unsafely/unexpectedly); turn lanes on to wall st can be confusing for those unfamiliar
- People parking their vehicles in the parking land and going to apartments in University Village. They use it as a short term parking space. I really do not think shade cover would be beneficial as it will encourage loitering and that is a problem already
- People travel too fast in general in Carbondale
- Safety issues for Lewis and CMS students crossing Grand/Lewis.
- The dismissal and arrival traffic from the schools along with the high volume of people coming and going to and from multiple large apartment bldgs combined with a large number student pedestrians headed to SIU creates a very unsafe situation.
- The electric scooters are a big problem. They zip by you on the sidewalk going too fast, and they are left all over the sidewalk even overnight.
- The lane shift with no sign is dangerous
- This is a highly traveled road and needs overhauled.
- Vehicle drivers do not seem to understand how to take turns at the 4-way stop at Grand and Lewis Lane. It's dangerous in almost all circumstances.

## At the Grand Avenue and Wall Street intersection, what challenges do you see?

(Select all that apply)



### Please explain

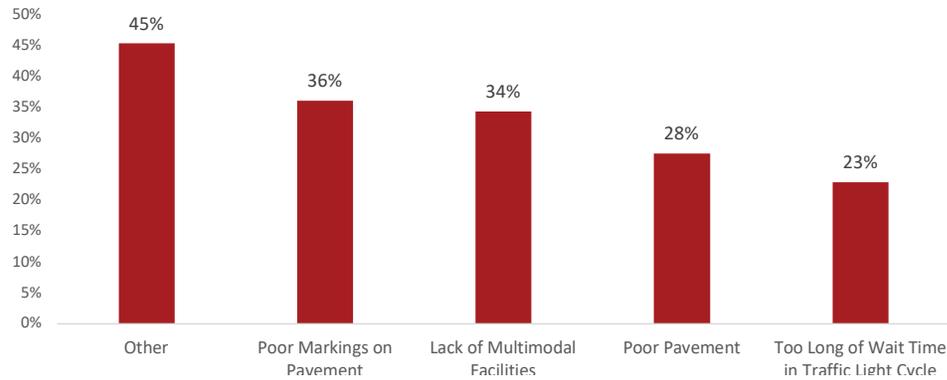
- Confusing for cyclists
- Customers from shopping strip have trouble entering or exiting the parking area due to traffic.
- Don't have any issues with it.
- Floods when it rains. Markings on the pavement are difficult to interpret -- when to merge when eastbound on Grand? Need to delineate and give motorist more time to merge eastbound before intersection. Grading creates speed going into turn lane.
- Flow of lanes
- I usually have no problem at this intersection.
- It is just a weird intersection
- No problem
- Poor signage and lane use
- Potential backup on reconfigured Wall St just beyond hill crest
- Students need to walk to campus and the walking accommodations are not there and I do not feel safe walking across that intersection
- The curve of the road entering the intersection from the road is manageable but a bit harsh.
- The lanes aren't wide enough.
- There needs to be a sign with the traffic directions further in advance for left turn and thru.
- Distracted walkers on their cell phones
- East bound traffic turn lanes are confusing
- Floods. Markings on the pavement are difficult to interpret -- when to merge when eastbound on Grand? Need to delineate and give motorist more time to merge eastbound before intersection. Pavement grade creates acceleration going into turn lane.
- Heavily-trafficked intersection which is also at the corner of a university campus with many students on foot, etc. This should not be a main thoroughfare with so much foot traffic.
- High number of pedestrians and cars.
- I usually have no problem at this intersection.
- It is difficult to choose the proper lane on Grand Avenue heading east on Grand ahead of this intersection. I still make a mistake. South on Wall is hard: the right lane abruptly ends
- It seems okay to me.

## At the Grand Avenue and Wall Street intersection, what challenges do you see?

### CONTINUED: Please explain

- Lack of a roundabout
- Might improve area by straightening curve on East Grand for better view of what's ahead at that intersection when traveling east. Often pedestrians also waiting to cross street North/South to and from parking lot to Wall/Grand Apts.
- Need a designated walk/bike path- need to separate cars from pedestrians and bicyclists. The drivers aren't paying attention.
- Overall, it's an OK intersection. A little congested due to people turning into the business areas near the intersection, but it usually flows reasonably well.
- People coming west to east often don't realize they need to be in the right lane to go straight through the intersection so it's a hazardous rush when they do realize.
- People speed through that light as it turns yellow/red. Especially coming south on Wall.
- People who run a red light so late it's green again by the time they drive through it.
- poor pavement around Wall & Mill intersection too
- Sidewalks start to get rough, also it's difficult to turn into the area where common grounds is because there's no turning lane if you're coming from campus
- Some people drive by the red light
- Southbound on Wall turning East onto Grand - many cut the turn short causing concern for anyone sitting in the turn lane of West bound Grand.
- Speeding
- The lanes aren't wide enough.
- The right lane could have cars turning right, but if the cyclist wants to go straight, it's not clear where they should be. But, frankly, I don't have a problem at this intersection on a bicycle. I think it's weird for peds
- The strange split into three lane going south on Wall St cause people to cut each other off in confusion all the time
- The traffic light's noise is beyond irritating. Wall and East Grand.
- This is not a safe cross walk for pedestrians or wheelchairs. Cars traveling south on wall will blow through to make the light.
- Traffic congestion with people entering and exiting the little strip mall at corner on Grand and Wall. People tend to try to beat the lights, as well.
- Traffic going west to east - people don't realize they need to get to the right lane to go straight through the intersection.
- With Wall St going to one lane of thru travel (which is a great idea), it may be worth studying and considering light timing to prevent traffic backing up on Wall St thus increasing probabilities of rear end collisions from speeding cars coming over hill.
- You can't see the car at the north stop sign easily.
- You have to be in the correct lane to move ahead. Once I knew about it, I could change lanes early, but it was unusual at first.

## At the Grand Avenue and Lewis Lane intersection, what challenges do you see? (Select all that apply)



### Please explain

- 4 way stop
- A 4-way stop for 8 lanes of traffic is difficult during busy times.
- Confusing intersection with poor visibility
- Drivers don't always take their turn; too much in a hurry.
- Four-way stop
- I think a light would benefit this intersection.
- Intersection is so wide and spread out, it's not always easy to identify who's turn it is and what lane they are going to
- Intersection is so wide that people drive through it out of turn bc it's difficult to tell who arrived first
- Intersection is too wide and difficult to see other other directions
- Issues only occur during commute hours.
- It's a four-way stop, but the intersection is HUGE.
- Needs a roundabout or something else to direct traffic through this large size intersection.
- Needs a traffic light
- no safe space for pedestrian crossing
- People are unaware of how to use a stop sign correctly
- People don't know how to stop at a 4 way stop sign
- Poor layout
- Should have a roundabout there.
- Stopping on incline can be hard
- Terrible drivers.
- the intersection is so large at at such varying angles that it can be difficult to see other vehicles approaching until being very close to the intersection.
- The lanes are so far spread out that people get confused at the 4 way stop for whose turn it is.
- The lanes aren't wide enough.
- the sheer size of this intersection leads to confusion of process/turn taking; can be hard to tell if oncoming traffic is turning or coming straight if not using signals.
- the sidewalk at northwest corner is weird.
- The stop signs are so far apart that it is difficult to determine who has the right of way.

## At the Grand Avenue and Lewis Lane intersection, what challenges do you see?

### CONTINUED: Please explain

- There is not a traffic light. Children crossing, distracted drivers,
- This intersection is horrible. Needs to be a light or a roundabout. I go through it everyday to drop my son at the middle school.
- Too many lanes and directions, confused motorists. Good place for a roundabout.
- Too wide. Can't see others. Bad visibility.
- Traffic light needed at this intersection.
- Visibility is poor. Lots of people don't seem to understand the rules of the road in terms of who gets to go next at the stop sign. There should be a turnaround or light there. Also, people coming down Grand go way too fast coming up to the stop sign.
- Well there's no traffic light here, but wait times through the 4-way intersection can be too long when the intersection is busy and people also never know when to take their turn. A light or roundabout is needed here! Plus, why is the intersection so big?
- 4 way stop with additional turn lanes. People rush their turns or just go. Intersection is way too spreadout.
- 1. There is no traffic light at this intersection so answer 2 above makes no sense.2. People don't seem to remember the rules of the road and how to "go" at a 4-way stop sign intersection.
- 4 way stop is a nightmare in am on school days
- A 4-way stop for 8 lanes of traffic is difficult during busy times.
- Build roundabout.
- Cars do not come to full stop
- Congestion and high traffic volume due to schools in an already densely populated area.
- DEADLY INTERSECTION THAT NEEDS A LIGHT
- Desperately needs anything but stop signs due to the school on the corner. Drivers ignore right of way with current stop signs.
- Drivers not coming to a full stop.
- Elevation
- Fix the sidewalks. Make the cut for wheelchairs more shallow.
- Hard to see people coming north on Lewis
- I don't think motorists are attuned to the length of time it takes a pedestrian to cross here. I've seen motorists get impatient and turn when pedestrians have the right of way.
- I think a traffic light needs to be there, not a 4way stop sign
- I thought this was supposed to be a roundabout. The grading is weird. The signs are poor.
- Intersection too broad, traffic unsure how to time each other. Also no traffic light at this intersection, so survey is off.
- intersection too large !
- issues of stop sign?
- It is a strange intersection - it takes a long time to get through and with multiple lanes turning and going straight - it is confusing whose turn it is to drive. Also, when there are pedestrians, it really is difficult to navigate.
- It needs traffic lights. To big of an intersection to have only stop signs
- It's hard to tell who's truth it is to travel through the intersection due to the large size of the intersection. This would be a great place for a round-about.
- Lack of a roundabout and pedestrian activated crosswalk
- Lack of visibility in intersection
- Large intersection with people generally not using the 4-way correctly.
- Long distance across intersection.
- Mostly speeders/impatient stops.
- need traffic light

## At the Grand Avenue and Lewis Lane intersection, what challenges do you see?

### CONTINUED: Please explain

- Needs a stoplight! Nobody knows when it's their turn to go and it's dangerous, particularly being on a hill.
- Needs more protection for school-age pedestrians.
- No one knows how to use a stop sign
- No one stops
- Nobody knows how a 4 way stop works!!!
- Other vehicles often disobey the stop signs and other rules of the road at this intersection. Part of the problem may be the distance from one side of the intersection to the other, and the slope coming from the south side of the intersection.
- People don't know how this intersection works
- People don't know how to navigate a 4 way stop
- People don't understand the concept of taking turns. Hazardous for children crossing to and from school.
- People often fail to completely stop and fail to yield to those turning or at the intersection first.
- PLEASE do not make this a roundabout. That might work well for cars but kids/pedestrians would be endangered. And the school district has never been able to hire crossing guards and keep them successfully.
- Poor traffic flow when coming into the intersection from any direction.
- same as above
- See my comments above. Drivers disregard the stop signs, or don't wait for their turns.
- Slow responses at intersection
- so spread out, 4-way stop=takes time and not always easy to tell who's turn it should be.
- Some people are just bad at four way stops with turn lanes. It gets a little scary sometimes
- Stop signs are too far apart. Too much traffic from all directions. Impossible for pedestrians to cross or kids going to school
- Stop signs are too far apart. People don't know whose turn it is to go. This is a perfect place for a roundabout.
- Student crossing is unsafe.
- Terrible drivers
- That intersection backs up every weekday morning. I have observed many near accidents between vehicles trying to get in and out of the Elementary and the apartments.
- That stop sign is problematic in that the intersection logistics are odd. The traffic when the 2 nearby schools get out can be intense.
- The 4-way stop makes drivers aggressive and dangerous.
- The hill itself presents many problems and challenges to all modes of transportation to include walking.
- The hill on the northbound side of the intersection can make it really hard to see drivers there and having 8 cars stopping at the same time makes it really confusing whose turn it is and people are regularly pulling out in front of others.
- The intersection at East Grand and Lewis could be improved. It's too wide and the angles are awkward, so there is often confusion and hesitancy among drivers about who has the right of way.
- The intersection is far too large
- The intersection is large and awkward, far from ideal for a 4-way stop. This particular spot is where the majority of study, budget, and reconfiguration need to go in my opinion.
- The intersection is too broad. It is difficult to make eye contact with the other drivers.
- The intersection is very wide so people try to "sneak" through as others are moving through the intersection.
- The lanes aren't wide enough.
- The Lewis Lane intersection is too big. A lot of close calls there for sure. Not sure accident stats but probably high. Needs improved.

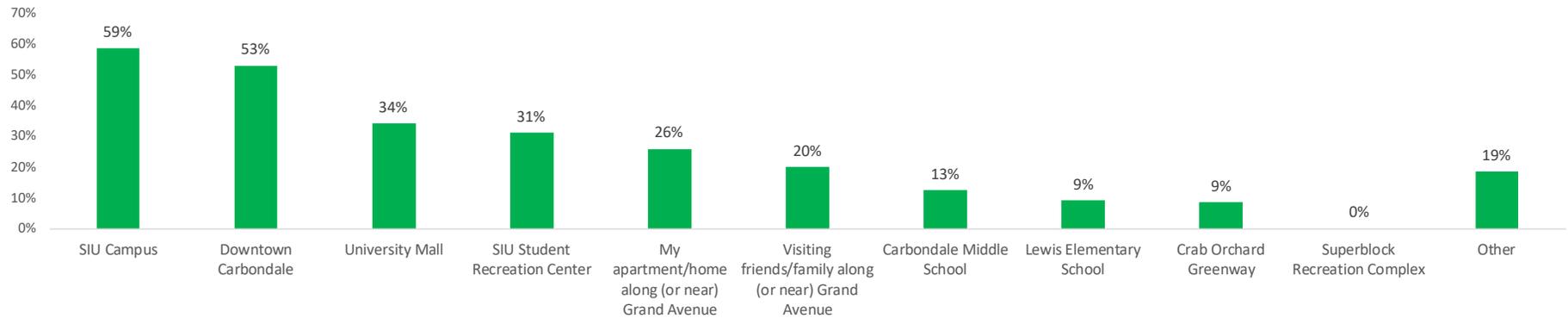
## At the Grand Avenue and Lewis Lane intersection, what challenges do you see?

### CONTINUED: Please explain

- the sheer size of this intersection leads to confusion of process/turn taking; can be hard to tell if oncoming traffic is turning or coming straight if not using signals.
- The sight lines/stop signs are so far away from each other it creates a lot of confusion for driver. Either a light needs to added or a round-about, which I believe was determined to be unfeasible within the exiting right-of-way
- There is no traffic light.
- There is not a traffic light. Children crossing, distracted drivers,
- There isn't a traffic light. The four way can get confusing with the hill.
- There needs to be a better way to drop kids off at school. Sometimes you have to wait awhile to turn left into Lewis school unless someone is nice and lets you in.
- There needs to either be a traffic light or a roundabout here. It's terrible.
- They don't know when to take their turn
- This intersection is a mess. People seem to really struggle with the four-way stop. I think it would be a good place for a round-about, except that would present challenges for children needing to cross the street to and from school.
- This intersection is a nightmare. A light or rotary or change in design should be implemented. There is too much open space, and it is somewhat dangerous for all peds, bikes, and vehicles.
- This intersection needs a traffic light or round about. This intersection is very unsafe.
- This is (inexplicably) a four-way stop intersection. It is HUGE. It makes it difficult to maintain as a 4way stop because it's hard to tell who stopped first, and everyone is such an aggressive driver.
- This is a horrible intersection. The offset leads people to forget about one of the directions. Hard to keep track of everyone. There's NO light at this intersection, but something needs to be done. Add in school kids and buses and it's a mess.
- Too big of intersection. Confuses people.
- Too many lanes and directions, confused motorists. Good place for a roundabout.
- Too much congestion at certain times of day and drivers lose track of when it is his turn to go.
- too much traffic at the opening and closing of the school.
- Too wide.
- traffic build up from school bus pick up times
- very busy intersection and cars do not always wait their turn when stopping. Also seems dangerous for pedestrians trying to cross.
- Very large intersection with different lanes for different directions. This usually causes confusion and multiple vehicles will begin moving from their stop at the same time, then hesitate in the middle of the intersection while the other vehicle passes.

# What destinations do you access via Grand Avenue (for all or part of your trip)?

(Select all that apply)



## Other

- Access to Giant City Road (shopping/restaurants/recreation)
- Add CCHS. And add shopping on Giant City Road (north of the HS). Add to get to Route 13 east from Grand to GC Road.
- Anywhere west.
- Brehm Preparatory School
- Carbondale Park District facility at the former Lakeland School which is at the intersection of Grand and Giant City Rd.
- doctor's office
- friends on Giant City Road
- Giant City Road
- Giant city state park/ giant city rd.
- My work place
- Redeemer Church on Lewis
- SIU student health services
- Traveling through
- Access to Giant City Road
- Access to Giant City Road (shopping/restaurants/recreation)
- Accessing hwy13
- All. Uber Driver
- As a thru-way to shopping, restaurants and access to Giant City road & Route 13; travel to other towns in the area.
- Brehm Preparatory School
- Century Assisted Living
- Doctor's appointments
- doctor's office
- Doctor's offices on Lewis Lane and Wall Street.
- Dominos and CCHS
- Drove daughter to/from Brehm
- Getting from Malls to south of town.
- Getting to Chautauqua and Pleasant Hill Roads.
- Giant City Blacktop
- Grand Ave. Christian Church
- Grand Avenue Mall
- I live on Dogwood Road. I pretty much have to use Grand to go anywhere unless I go all the way to Main.
- I live on Giant City Rd and use Grand Ave to avoid Pleasant Hill Rd due to its condition
- I'm on it frequently As part of daily living.
- It's generally one of the less-congested routes to access Giant City Road from town. It feels faster than taking Main Street.
- Lowes
- Most often I use this road as a corridor from Giant City Rd. into town.
- My church on West Mill Street from my home on Giant City Road.
- My kids used to attend Lewis and CMS. I worked at CMS for about 7 years. Parents are in a rush to drop off/pick up kids. Students are in a rush (from apartments) to get to class. Many hazards for the walkers (kids who live within a mile of the schools).
- My work place
- North Carbondale by bicycle
- People from south of town use it to access Lowes and that entire shopping dining area, getting to Kroger and that area as well
- Shopping areas on E Main and the north end of Giant City Rd.
- SIH
- SIU Student Health Center
- Superblock and east side of Carbondale
- The superblock
- Thru driving to the blacktop. Also Lakeland Center.
- Traveling to CCHS
- WalMart, Planet Fitness, Shawnee Health Center on Lewis Lane
- Why did you not include The Newman Center, much used

## What improvements along Grand Avenue would improve your current or desired mode of travel?

- 4 lanes, raise unsupervised driving age to 18. Step up traffic enforcement.
- A bike lane and security recording to catch hit and run drivers or any criminals.
- A bike lane from Lewis to Route 51 and a round-about at the intersection of Lewis and Grand.
- A crosswalk connecting East Campus Lot and the entrance to Wall and Grand Apartments would be fantastic.
- A defined bike lane so bicycles are off the sidewalk.
- A roundabout
- A roundabout at Lewis lane, bike lanes (or a multiuse path) west of Wall Street, and something to stop people speeding along the turn lane toward the stop sign at Lewis Lane when traffic is backed up.
- A TRAFFIC LIGHT AT LEWIS/GRAND
- "additional North/South crosswalk; or widen East Grand and allow an area in the middle of the road to stop on foot, if needed wider sidewalks"
- An easy fix would be to more frequently clean the glass out of the bike lane and intersections. The Grand Avenue and Lewis Lane intersection backs up and causes too many traffic problems. Adding a round about at that intersection might fix the congestion. A bike lane needs to be added going from the intersection at Lewis to Park Ave.
- An off-street bike path between Lewis and Grand. Reliable and consistent crossing guards for school children at Lewis and Grand.
- Any that would improve travel by means other than car or bus.
- Better bike lanes
- Better crosswalk markings/lighting; installing a bike lane
- Better lane markings, better visibility at intersections, slower speeds, more signage, more visible signage.
- Better lighting, better areas for bikers and pedestrians, properly marked roads, stoplights, more prominent school zones, improved roads with no potholes
- Better road quality, fixing of potholes
- Better sidewalks
- Better sidewalks, lighting, actual bike lanes, traffic control at the Lewis and Grand intersection.
- Better signage for directions - larger, in more places. Easy to get lost or turn down a one-way road on accident due to small or hidden signs.
- Better traffic flow for all modes involved
- Bicycle lane the entire distance of East Grand Ave, larger/wider bicycle lane, better marked bicycle lane (with reflectors/poles/etc)
- Bike lanes
- Bike lanes and a roundabout.
- Bike lanes and cleaner lanes.
- Bike lanes and sidewalks
- Bike lanes between Wall Street and Lewis Lane. (There are bike lanes east of Lewis Lane, and there is a multimodal path on the south side of Grand Ave. between Wall Street and Washington St. )
- bike lanes from Lewis to Illinois
- bus shelters, from wind and rain
- Clearly marked lanes, smoother roads, lighting to see pedestrians at night
- Creative ways to slow traffic
- Cross walks at grand and Lewis, maybe a stop light.
- Dedicated bike lanes, more lighting past Lewis.
- Easier access to Grand from side streets both residential and retail.
- Enforcement of speed laws! I'd also like to see bike lanes w/some kind of guardrail to keep cars out of the lane. And come up w/a better layout of the Lewis and Grand intersection; I hate driving through it.

# What improvements along Grand Avenue would improve your current or desired mode of travel?

## CONTINUED:

- Fix 3-way stop at Newman Center to make it more clear and evident who should stop and who should go. Fix crossing for pedestrians at this same Newman Center intersection. Make sure sidewalks are all interconnected and bike paths as well.
- Fix drainage issues and potholes on road
- Fix potholes
- Fix the potholes and terrible road conditions first then switch the stoplights to roundabouts.
- "Fix the road. Add clear bike paths.
- Don't install a roundabout at Lewis and Grand. How would that even work with two schools there where kids have to cross the street. Vehicles would have to stop in the roundabout to let pedestrians walk and kids would just cross in front of cars.
- Put in a second crosswalk at Student Health/Grand Ave Apartments east of the current crosswalk at the Rec Center. Students and staff have to park in the west of Grand parking lot and then play frogger with the traffic to go to and from the Health Student and the Grand Ave apartments."
- Fixing the poor pavement.
- Fixing the potholes
- Generally speaking, I don't think Grand Avenue between Wall Street and Giant City Road is overwhelmingly unsafe for any type of user. They've got nice wide sidewalks and the road is in excellent condition. The problems are between Illinois/51 and Wall Street. The RR crossing needs work. It's difficult to bike or drive across. People also straddle the RR tracks when stopped by the light. Also, potholes make driving difficult in this stretch of road. For EB vehicles on Grand moving from Illinois 51 toward Wall Street, there seems to be GREAT confusion as to what lane motorists should be in when they want to go straight through the Wall/Grand intersection. Finally, there needs to be better pedestrian access between the parking lot south of the Rec Center and the easternmost part of the Rec Center/Student Health building. I've seen workers/students/residents trying to dodge traffic to get across the road there.
- Grand Avenue is fine; Giant City Road is in dire need of repairs & resurfacing!
- I already prefer it to other routes
- I believe Grand Avenue needs safer lanes for bikes and pedestrians.
- I don't really have a desired improvement to list.
- I feels bump in some places.
- I think there needs to be improved roadways in general. For instance, the lanes are too narrow and the pavement has many potholes.
- I think traffic lights would be very beneficial at Grand and Lewis. I understand that that could cause too much congestion with morning and afternoon school traffic, though
- I travel it because it is easier to navigate the other roads in town
- I wish Lewis and Grand had a roundabout.
- I would like to see a better relationship in solving the unsafe crosswalk in front of the rec center between Carbondale and the University.
- I've been here a long time. The sidewalks and bike paths on both sides have definitely been an improvement! Traffic control of some form just during start and end of school could be helpful as parents are generally in a rush. The increase in traffic with the newer apartments has added to the craziness of dropping off and picking kids up from school.
- "If utility poles adjacent to the WB lane from Lewis Lane to Don Taco could be set back, that would make for safer transit operation. With the volume of pedestrians and cyclists, emphasis should definitely be placed on making Grand Avenue more accommodating to multimodal transportation. I think the highest priority should be placed on intersections. Wall & Grand could use improved pedestrian crossings (signal timer, enhanced pavement marking, etc.) Grand & Lewis is where the most improvement is needed. I don't know if a signal or a roundabout would be more appropriate but change is needed for traffic flow and ped/cyclist safety. Another hazard for all Grand Avenue users is cars quickly and aggressively pulling out into traffic. I am sure some of this is the result of traffic moving too fast on Grand Avenue. Perhaps some traffic calming along Grand Avenue?
- I am glad to see this study taking place. I am looking forward to good things for the people of Carbondale."
- "Improved paving and road markings.  
Bike path

# What improvements along Grand Avenue would improve your current or desired mode of travel?

## CONTINUED:

- Pedestrian sidewalks that connect to other main sidewalks
- Widened road (if we're not going to restrict traffic completely)"
- Intersection at Lewis Lane and crosswalk at Student Rec Center and adding one for the Student Health Center would be top of my list.
- Less business and residential development along this area.
- Maybe instead of a traffic light someone to help guide traffic would also work during busy times like when school gets let out or before school starts.
- More bike lane access and a roundabout at Lewis.
- "More crosswalks, bike lanes, buss turnout spots at bus stops, general road and sidewalk upkeep"
- More lanes
- More safety around the four-way stop.
- Needs repaved, better markings, and the intersections need better travel.
- Needs to be improved access to the businesses at wall and grand.
- Patched potholes and a light at lewis and east grand.
- Patrol for speeding
- Pavement improvements, bike lanes
- Police enforcement of existing laws and traffic speeds in the area. Wider bike lanes and a bus off road loading and unloading area half way between the intersections between Giant City Rd and S Wall St.
- Reduce speed to 30 the whole way. Put in round about at lewis.
- Reducing/enforcing speed limits, sidewalks that are level, Pedestrian activated crosswalks, protected bike lanes.
- Repave it.
- Repaved roads, repaint lines, flashing stop signs, flashing speed limit indication in school zone.
- Roundabout
- Roundabout at Grand and Lewis,
- Round-about at Grand Ave and Lewis Lane intersection.
- Roundabout at Lewis
- Roundabout at Lewis Ln.
- Roundabout on Grand and Lewis. Widen Grand west of Lewis Lane all the way to Wall.
- Roundabout would be very effective for the grand/Lewis intersection and a crossing guard or crossing light
- Roundabout!!!! Please!
- Roundabouts
- Roundabouts at both 4-way intersections.
- round-a-bouts would assist with the flow of traffic and help reduce the wait at intersections. Including better pavement markings would assist with this flow.
- See above comments
- See above questions
- Slower speed limits, traffic lights at Grand Avenue and Lewis Lane intersection
- Slowing traffic (not a slower speed limit necessarily, but either better enforcement, or traffic calming measures.)
- "Smooth roads with no holes or ridges  
(Intersection of 13 and Wall and Giant City Rd needs help as well with road conditions.)"
- stop lights
- The aforementioned roundabout
- The intersection of Lewis and Grand Ave. really needs attention.
- The intersection of Lewis Ln and Grand Ave is poorly designed.

# What improvements along Grand Avenue would improve your current or desired mode of travel?

## CONTINUED:

- The issues are not any different than any other busy street. I am thankful that we have that much traffic in town. I agree that some safety measure should be taken to avoid any serious accidents
- The lanes aren't wide enough. The traffic doesn't flow as easily.
- The Lewis lane intersection improvement would improve safety for all individuals on Grand Avenue. Walking through that intersection is a nightmare.
- The Lewis lane intersection would be better controlled by a roundabout, should the space allow for one. I feel a traffic light here could cause more issues than the current stop sign does, as the traffic volume doesn't seem to be too high and vehicles will still disregard the light just as they do with the stop signs. A roundabout would force vehicles into a safer traffic pattern to navigate the intersection. The natural slowing down of traffic through a roundabout would also create a safer experience for pedestrians and people using other personal modes of transportation in a way not possible with either a stop sign or stop light.
- The light at Wall and Grand is absolutely out of whack, as are most of the traffic lights in this town! And the intersection with Lewis Lane is the worst in town, mostly because people don't know how to drive!
- The street needs a new asphalt.
- There needs to be a traffic circle at the Lewis/Grand intersection, or a traffic light.
- Total redesign.
- Traffic circles, please
- Traffic light at grand and lewis
- "Traffic light at Lewis and Grand  
Improve lane flow at Wall and Grand  
Possibly widen Grand from Wall to Lewis to 4 lanes with center turn lane"
- Traffic light by Lewis school. People constantly go out of turn and the intersection is very dangerous.
- Traffic oval at Lewis intersection.
- Tunnels and maybe a roundabout
- Unsure. I wonder if additional pedestrian crosswalks (with timed lights, similar to the one across from the rec center). A roundabout at Lewis and Grand may help the turning traffic problem.
- Widen the road and install traffic signals at Lewis and Grand.
- Widening the road at the intersection of Grand and Wall to allow space for proper turn lanes, beginning earlier.
- Wider sidewalks, ideally wide enough for "lanes" and more high-viz crossing.

# What best describes you as a bicyclist? (Choose one)



No Way, No How

Interested but Concerned

Enthusied and Confident

Strong and Fearless

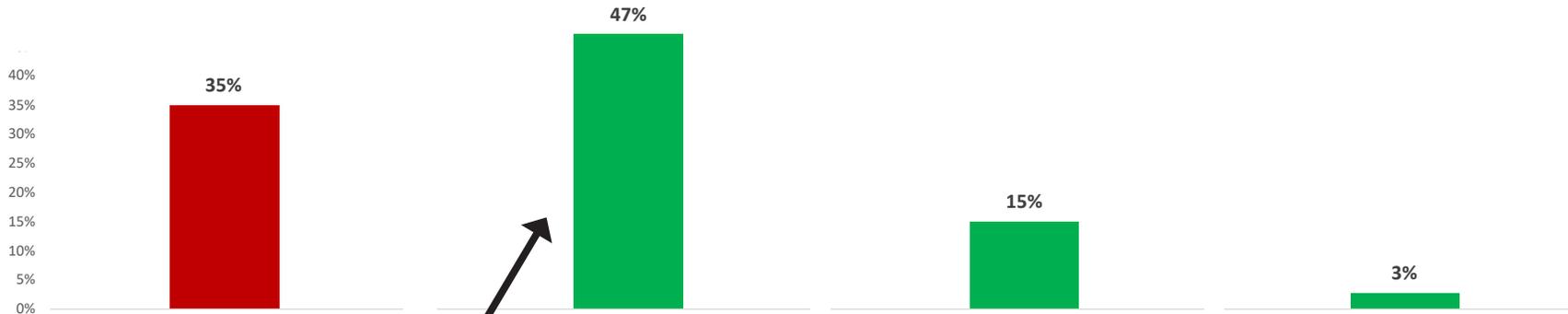


No desire to bicycle at all!

You enjoy bicycling, but are nervous about riding in traffic. You prefer bike trails and bike facilities separated from traffic.

You are comfortable riding in traffic, but prefer facilities like bike lanes.

You ride in all types of traffic, regardless of whether there are bike facilities.



An earlier question identified that only 15% of survey respondents currently travel by bike on Grand Avenue. With 47% responding "Interested by Concerned," it suggests that there is a large number of respondents who would bike on Grand with safe bicycle facilities.

## Is there anything else you would like to share with the planning team about Grand Avenue?

- Safety for children coming to and from school should be top priority.
- School zone speed limits need better enforcement
- Students that live across from the rec center have to cross grand to get to the rec center and back home to the towers every day. I think the crosswalk should not be a crosswalk, but instead be a bridge, so students feel safe crossing grand.
- thank you
- Thank you for working to make improvements
- Thanks for addressing these issues. Roundabout please!!
- thanks for your interest and implementing the ideas that come from the survey
- Thanks you for doing this work and considering everyone's safety.
- The intersection at Lewis Lane and Grand should be a round about.
- The lanes could be wider, especially the turn lane at the Lewis Lane intersection. The markings on the roads aren't intuitive at the intersection with Wall St. The apartments on Grand are not safe. This survey is about the built environment, but it is worth noting that the area feels unsafe. I once had someone cut me off to pull into those apartments to start a brawl in the parking lot. More police presence could have a desirable effect.
- The proximity to Carbondale elementary and middle schools as well as high density housing should also make any planners for this intersection consider a roundabout. Traffic lights and stop signs are much more dangerous than roundabouts, and this intersection has a proportionally higher number of children utilizing it. That reason alone should sway the thought towards a roundabout as the most desirable traffic pattern for this intersection.
- The safety of this pedestrian way of travel is a major concern. There are many young adults and middle age adults who forgo traveling by foot due to the perceived lack of safety of the area. Implementing a system to promote a feeling of safety to encourage all modes of transportation would greatly benefit the community from a health and wellness perspective as well.
- The traffic has increased over the years especially since the High School was relocated and the Giant City Extension was added but the same two lanes are dealing with a whole lot more traffic. Really needs 4 lanes to handle the load. Don't know how you can achieve that. Thank you for your concern.
- There are many other streets throughout Carbondale which are overall much worse, and some of them get almost as much pedestrian traffic. The overall condition of transportation corridors in Carbondale is hostile toward pedestrian use, which means most people use cars even for short trips, which in turn drives crime up because it removes potential witnesses, especially at night. Smooth level sidewalks and good lighting which is easy on the eyes are essential to increasing pedestrian traffic. A non-walkable city is unhealthy on many levels.
- There needs to be better enforcement of school speed zones. And bus stop pull over lanes.
- They need to fill the potholes in not just this road, but all of Carbondale's roads soon
- This is meaningless without addressing getting selfish entitled drivers off the road.
- Use part of the money earmarked for E Grand for more traffic enforcement and the rest for other more important city needs such as fixing that horrible intersection at Mill St where it intersects with S II and S University. Hell, the city/state do not even mark it to know how to use it.
- We need more bicycle paths to make this a city bike friendly in its 100%
- When I try to view the maps it resets all my inputs, frustrating.....
- Why don't you consider eliminating vehicular traffic altogether on this road? You've got apartments and residential housing at one end and the University at the other. You've got ample parking with the SIU parking lot. You could turn this into a pedestrian only boulevard and then enhance shopping along this route. I could see this being a real destination for residents.
- With the opening of Levels, there's lots of foot traffic crossing all of the Wall and Grand intersection in the dark at night. Increased safety for those traveling at night in an already unsafe intersection would prevent many accidents.

# **APPENDIX 1**

## **Community Engagement**

### **1.2 Correspondence with SIU Chancellor's Office**

## Jody Shaw

---

**From:** Jody Shaw  
**Sent:** Friday, February 10, 2023 3:55 PM  
**To:** chancellor@siu.edu  
**Cc:** Michael Ziarnek; Molly Maxwell  
**Subject:** East Grand Avenue Roadway User Survey  
**Attachments:** E Grand Survey Flyer.pdf

Chancellor Lane,

I am inviting you and the University to become an active stakeholder in the future of the East Grand Avenue roadway corridor. I am currently working with the City of Carbondale to complete an analysis of this roadway from Washington Street to Giant City Road. Our vision statement for this study is:

**To create a safer, more welcoming, and pedestrian friendly corridor that serves the diverse multimodal needs of its users and serves as a model of complete streets in our Carbondale community**

We are hoping to create an environment along this roadway that will help promote greater pedestrian and bicycle usage while also supporting an inviting entrance to the University Campus. Since many students, faculty and staff of the University both travel and live along this corridor, and with the Student Recreation Center, Student Health Center, East Campus Housing, and Wall and Grand Apartments all located within our study area, we are inviting you to the table to give your valuable input in our process.

There are several ways that the University can support our efforts and be involved in the decisions.

1. The simplest way is with a phone call with me to begin a conversation or to help guide me as to who else on campus would be a good fit as a liaison for the University during our process. (my contact information is below)
2. We can come to you with a quick presentation on what the study is about and what our goals are. We will gather your input and concerns and answer any questions you may have at this meeting.
3. We are hosting an online survey to gain public opinion and experiences along the corridor. The University could help promote that survey through its student body, faculty and staff. Attached to this email is a promotional flyer advertising the survey and below are links to the survey.

Online Survey Link : [East Grand Avenue Multimodal Study](#)

Facebook Share - [Link to Facebook share for Online Survey](#)

The City of Carbondale greatly appreciates your partnership in this study and values the University's role in the growth of our City. Please feel free to reach out to me and let me know if you would like to participate in this study or have any guidance in how best to engage with the University on this subject.

I appreciate your time,

**Jody Shaw, PE**

PROJECT MANAGER - Civil Engineering - Planning - Asset Management

o 618.345.2200  
d 618.769.3451  
c 618.691.9406



## Jody Shaw

---

**From:** Baughman, Matthew C <baughman@siu.edu>  
**Sent:** Thursday, March 16, 2023 10:19 AM  
**To:** Jody Shaw  
**Cc:** Lane, Austin A; Boese, Jodi K; Potter, Jim B; Burgin, Jeffery T  
**Subject:** RE: East Grand Avenue Roadway User Survey

**Importance:** High

**Categories:** Carbondale

Jody:

I apologize for the oversight in our not responding to your February email. We definitely want to give our students and employees the opportunity to participate in the survey on the redevelopment of Grand Avenue, given it is a main corridor of many of our campus buildings and includes a high density of student off-campus student housing. I am sure we can boost the number of survey responses to make your work on the design for the Grand Avenue corridor with the City of Carbondale as beneficial as possible to the city and university community at large.

By way of this email, I'm connecting you with Jim Potter, our Chief Marketing Officer, and Jeff Burgin, our Vice Chancellor for Student Affairs. What I hope we can do so we don't further delay your survey timeline is have something included in the SIU Today campus email newsletter on Monday and have something similar included in the next version of the student email newsletter. Jim and Jeff will be the primary points of contact for making that happen. I think we could likely do something with some social media push on this as well. Jim can work on that too. Perhaps we get let the survey remain open until the end of March to allow us time to do some internal announcements and follow up messages to our constituency groups.

The information below may be sufficient for their needs, but Jim and Jeff and their teams can reach out to you or you to them as needed.

Thanks again for reaching out about this and for your patience.

*And for the SIU team – please also know that Jody has a freshman daughter living in Thompson Point who is absolutely loving her experience as an Industrial Design major at SIU Carbondale!*

Matt

MATT BAUGHMAN  
Chief of Staff

OFFICE OF THE CHANCELLOR  
116 ANTHONY HALL  
MAIL CODE 4304  
SOUTHERN ILLINOIS UNIVERSITY  
CARBONDALE, ILLINOIS 62901

baughman@siu.edu  
Office: (618) 453-2341  
Desk: (618) 453-1378  
Cell: (618) 201-0082

SIU.EDU

## Jody Shaw

---

**From:** Baughman, Matthew C <baughman@siu.edu>  
**Sent:** Friday, March 24, 2023 1:33 PM  
**To:** Jody Shaw  
**Subject:** Fwd: Salukis invited to participate in East Grand Avenue survey

**Categories:** Carbondale

FYI

Below is the campus e-newsletter from Monday and what I sent to the constituency group leaders asking for their help in spreading the word. Hope it helped. Matt

Sent from my mobile phone

Begin forwarded message:

**From:** "Baughman, Matthew C" <baughman@siu.edu>  
**Date:** March 20, 2023 at 3:29:00 PM EDT  
**To:** "Bryson, Todd" <tbryson@housing.siu.edu>, "Travelstead, Anthony" <tonyt@pso.siu.edu>, "Lee, Yueh-Ting" <leey@siu.edu>, "Gingrich-Philbrook, Craig S" <craiggp@siu.edu>, "Greer, Renada D" <renadag@siu.edu>, "Smoot, Pamela A" <olivia@siu.edu>, "Reed, Jean-Pierre" <reedjp@siu.edu>, "Overton, Isaiah I" <rashawn.overton@siu.edu>, "McKinley-Portee, Caleb R" <crportee@siu.edu>  
**Subject:** Salukis invited to participate in East Grand Avenue survey

Constituency leaders:

Please note the item highlighted below regarding a survey on the redesign/redevelopment of the East Grand Avenue corridor from Washington Street all the way down to Giant City Road. This is a major artery the city is studying that can have a positive impact on the campus community. The time for student and employee input is now so the city and its partner firm making the plans can consider our ideas and concerns. Please encourage your constituents to take the survey this week!

Thanks,

Matt

**MATT BAUGHMAN**  
Chief of Staff  
SIU Carbondale

---

**From:** University Communications and Marketing <siucnews@siu.edu>  
**Sent:** Monday, March 20, 2023 2:22 PM  
**To:** Baughman, Matthew C <baughman@siu.edu>  
**Subject:** SIU Today: Odenkirk to visit SIU



March 20, 2023

## Odenkirk to visit SIU

One of SIU's most well-known alumni, Bob Odenkirk, is returning to campus. The 1984 SIU graduate will receive two degrees during a ceremony at 7 p.m. April 3 at Shryock Auditorium. After the presentation of his degrees, there will be a discussion and audience Q&A session. This event is free and open to the public. Seating is limited and will be first come, first served.



## Salukis invited to participate in East Grand Avenue survey

Faculty, staff and students are encouraged to participate in a study by the Southern Illinois Metropolitan Planning Organization in collaboration with the city of Carbondale to evaluate the East Grand Avenue corridor from Washington Street to Giant City Road. The goal of the study is to provide direction and assistance for the design of multimodal improvements to create a safer, more welcoming and pedestrian friendly corridor that serves the diverse multimodal needs. [Learn more and take the survey.](#)

### SIU in the News

[SIUC's chancellor sees lots of opportunity in new trends](#)

Chancellor Austin A. Lane discusses opportunities that are available for students and how the university works to create seamless pathways from orientation to commencement.

WSIU InFocus — March 14, 2023

[Is personal internet use at work actually good for us?](#)

Professor explains 'cyberloafing' effects  
Steve Karau, professor, School of Management and Marketing, discusses cyberloafing and how March Madness can take time away at work.

# **APPENDIX 1**

## **Community Engagement**

### **1.3 Correspondence with Brehm Preparatory and Carbondale School District #95**

## Jody Shaw

---

**From:** Jody Shaw  
**Sent:** Friday, February 10, 2023 3:42 PM  
**To:** jadkinson@cec95.org  
**Cc:** jpavalonis@ces95.org  
**Subject:** East Grand Avenue Roadway User Survey  
**Attachments:** E Grand Survey Flyer.pdf

Jerry,

It was a pleasure talking with you last week regarding the E. Grand Ave. roadway user study we are undertaking for Grand Avenue in front of both Lewis Elementary and Carbondale Middle Schools. As a brief reminder, we are currently analyzing East Grand Avenue from Washington Street to Giant City Road. We are hoping to determine a way to revitalize the roadway and create a more multimodal friendly corridor. Our Vision statement for the study is “to create a safer, more welcoming, and pedestrian friendly corridor that serves the diverse multimodal needs of its users and serves as a model of complete streets in our Carbondale community.” We are hoping to find ways to make it safer and more inviting to bike riders and pedestrians.

Through our conversation, I understand that the district would be happy to help promote the online survey we are hosting to help gather public opinions and experiences of this vital corridor in Carbondale – AFTER your 5 Essentials Survey period is completed. At this time, we are not sure if our survey will need to be open long enough to extend past the deadline of yours, but I will be in touch in early March to let you know what we have decided.

IN THE MEANTIME - We still would very much appreciate some vital input from your schools. Attached is a flyer with information about the online survey that we are hosting. Would you think it ok to pass this information along to your faculty and staff of both Lewis Elementary and Carbondale Middle School? I thought maybe if they had a teacher lounge, we could ask they place this flyer in there or attach it to a staff email if you thought it appropriate. If your faculty or staff would also like to share a link on their personal social media accounts to promote the survey, that information is below as well.

Online Survey Link : [East Grand Avenue Multimodal Study](#)

Facebook Share - [Link to Facebook share for Online Survey](#)

I look forward to hearing your thoughts on the matter and thank you so much for your time and consideration!

**Jody Shaw, PE**

PROJECT MANAGER - Civil Engineering - Planning - Asset Management

o 618.345.2200  
d 618.769.3451  
c 618.691.9406



## Jody Shaw

---

**From:** Jody Shaw  
**Sent:** Friday, February 10, 2023 3:45 PM  
**To:** laneal.nance@brehm.org  
**Subject:** East Grand Avenue Roadway User Survey  
**Attachments:** E Grand Survey Flyer.pdf

Laneal,

It was a pleasure talking with you last week regarding the E. Grand Ave. roadway user study we are undertaking for Grand Avenue in front of Brehm Preparatory school. This study will help the city of Carbondale create a more multimodal friendly corridor. Our Vision statement for the study is “to create a safer, more welcoming, and pedestrian friendly corridor that serves the diverse multimodal needs of its users and serves as a model of complete streets in our Carbondale community.” The information you shared with us is summarized below and will be included in our evaluations and recommendations going forward. If you have come up with any other ideas, suggestions or concerns about what might help make East Grand a safer corridor for everyone that uses it, please feel free to send them to me. I also would be very appreciative if you would also take the quick survey linked to below to help us further document your responses!

Summary of response:

1. 1 of 5 local Brehm students walk to school out of an enrollment of 52
2. 40 mph appears to be too fast for the roadway in front of the school
3. A lack of designated turn lanes causes safety concerns while turning into the school for being reentered
4. The 4 way stop at Lewis causes delays and confusion due to the terrain at the intersection
5. Recalls an incident where a bicyclist was injured by a motorist at Lewis intersection. Incident appears to be unreported and not included in state or city police reports

We have one last favor to ask you, and I mentioned this on the phone. Attached is a flyer with information about the online survey that we are hosting to gather public opinion. Would you please pass this information along to your faculty and staff? If you have a social media account or newsletter that you think would help promote the survey, we would appreciate your help in getting the word out about this great opportunity to provide input on this important roadway in Carbondale! If your faculty or staff would like to share a link on their social media accounts to promote the survey, that information is below as well.

Thanks again for all your help with this exciting opportunity!

Online Survey Link : [East Grand Avenue Multimodal Study](#)

Facebook Share - [Link to Facebook share for Online Survey](#)

### Jody Shaw, PE

PROJECT MANAGER - Civil Engineering - Planning - Asset Management

o 618.345.2200  
d 618.769.3451  
c 618.691.9406



## **APPENDIX 2**

### **Daily 85th Percentile Speed Measurement**

# Road Segment - Washington to Wall (east bound)

## Sequential 85th Percentile Graph

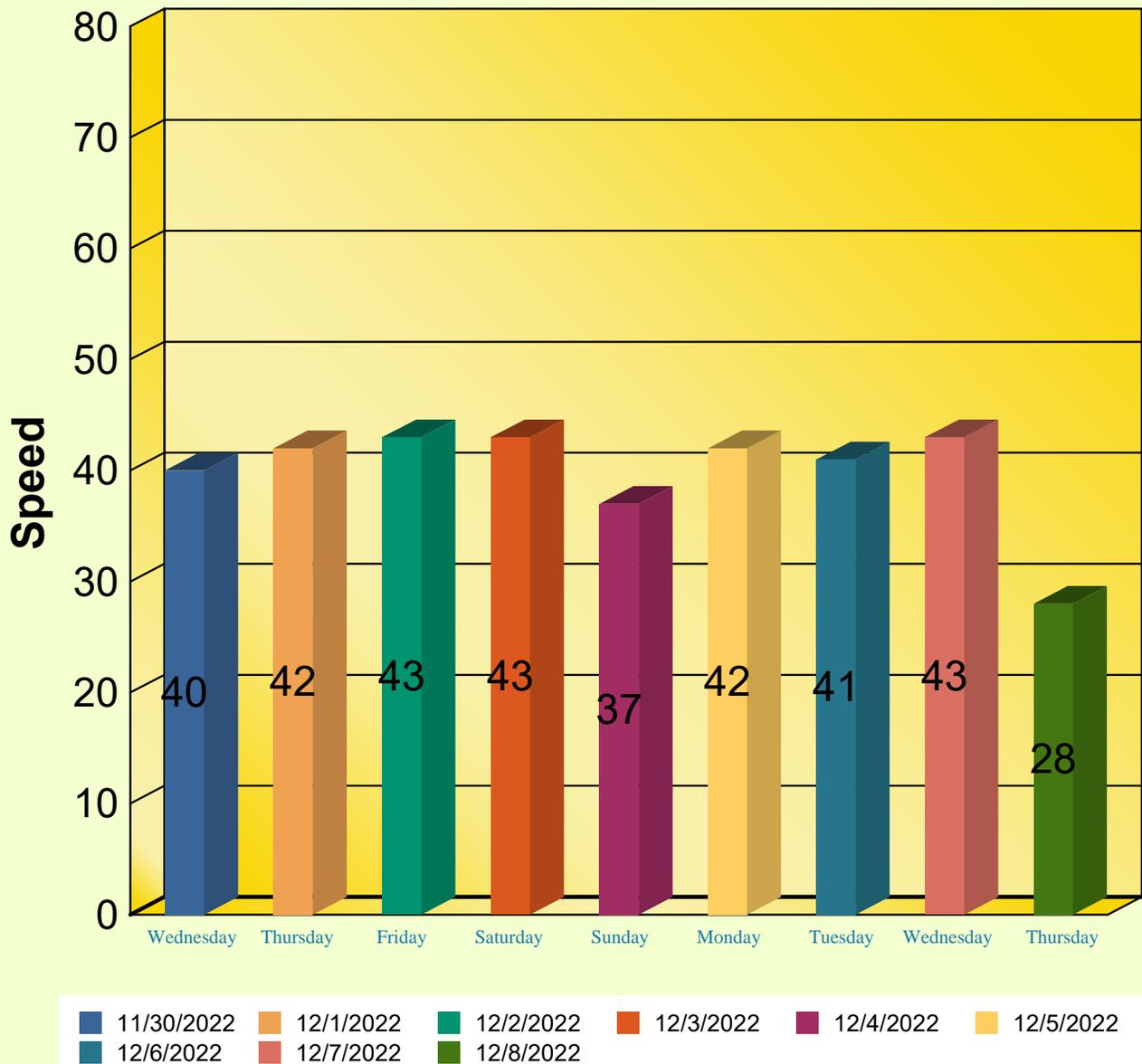
Device ID: 406702  
Street: E Grand Avenue  
State: IL  
City: Carbondale  
County: Jackson

Begin: 11/29/2022 04:00 PM  
Lane: EB  
Operator: OA  
Speed Limit: 40  
AADT Factor: 1

End: 12/07/2022 08:00 AM  
Hours: 184.00  
Period (min): 15  
Raw Count: 9,539  
AADT Count: 1,244

### All Vehicles in Study

### Daily 85th Percentile Speed

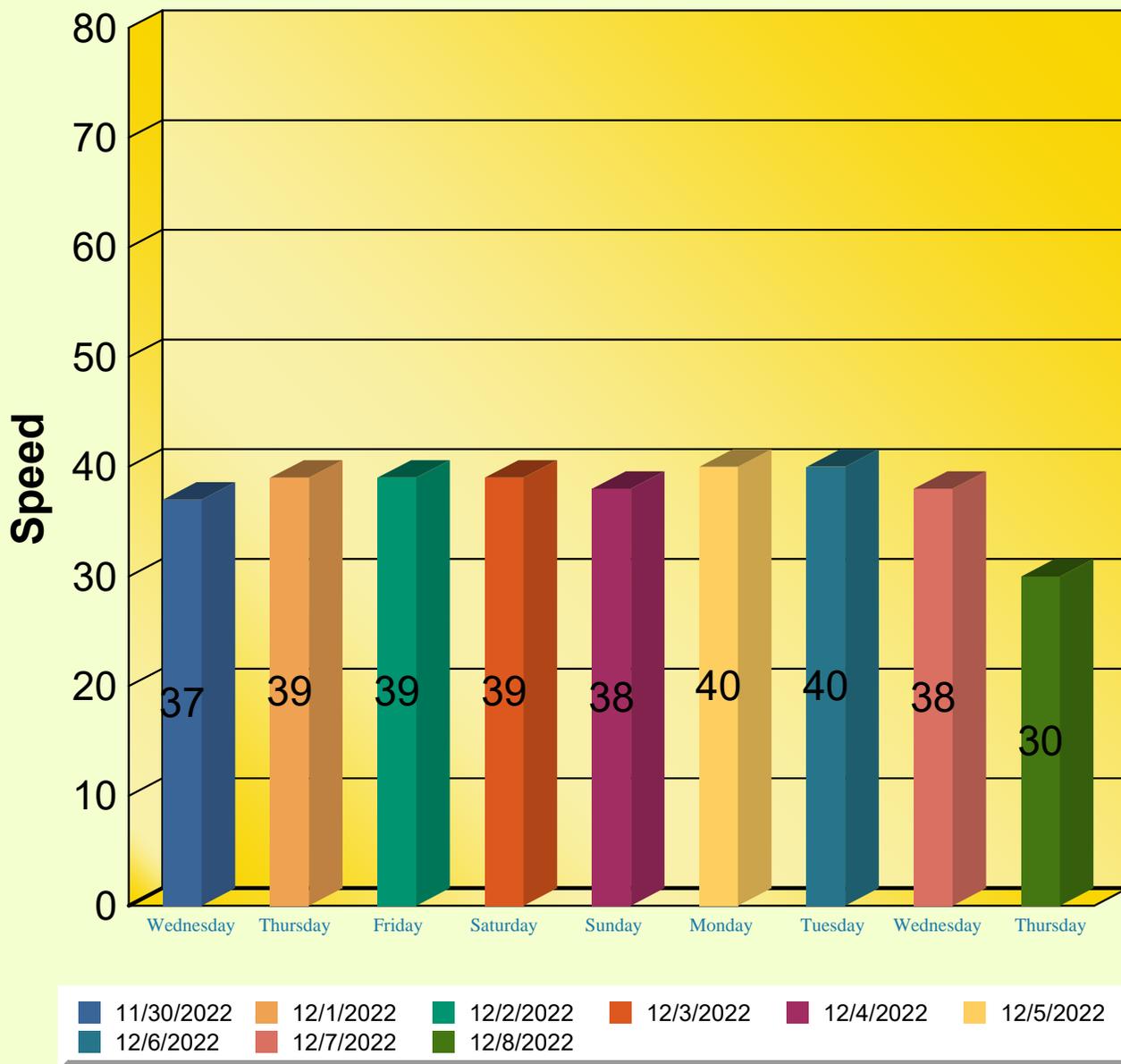


# Road Segment - Washington to Wall (west bound #1)

## Sequential 85th Percentile Graph

Device ID: 407066	Begin: 11/29/2022 04:00 PM	End: 12/07/2022 08:00 AM
Street: E Grand Avenue	Lane: WB	Hours: 184.00
State: IL	Operator: OA	Period (min): 15
City: Carbondale	Speed Limit: 40	Raw Count: 17,847
County: Jackson	AAAT Factor: 1	AAAT Count: 2,328

### All Vehicles in Study Daily 85th Percentile Speed



# Road Segment - Washington to Wall (west bound #2)

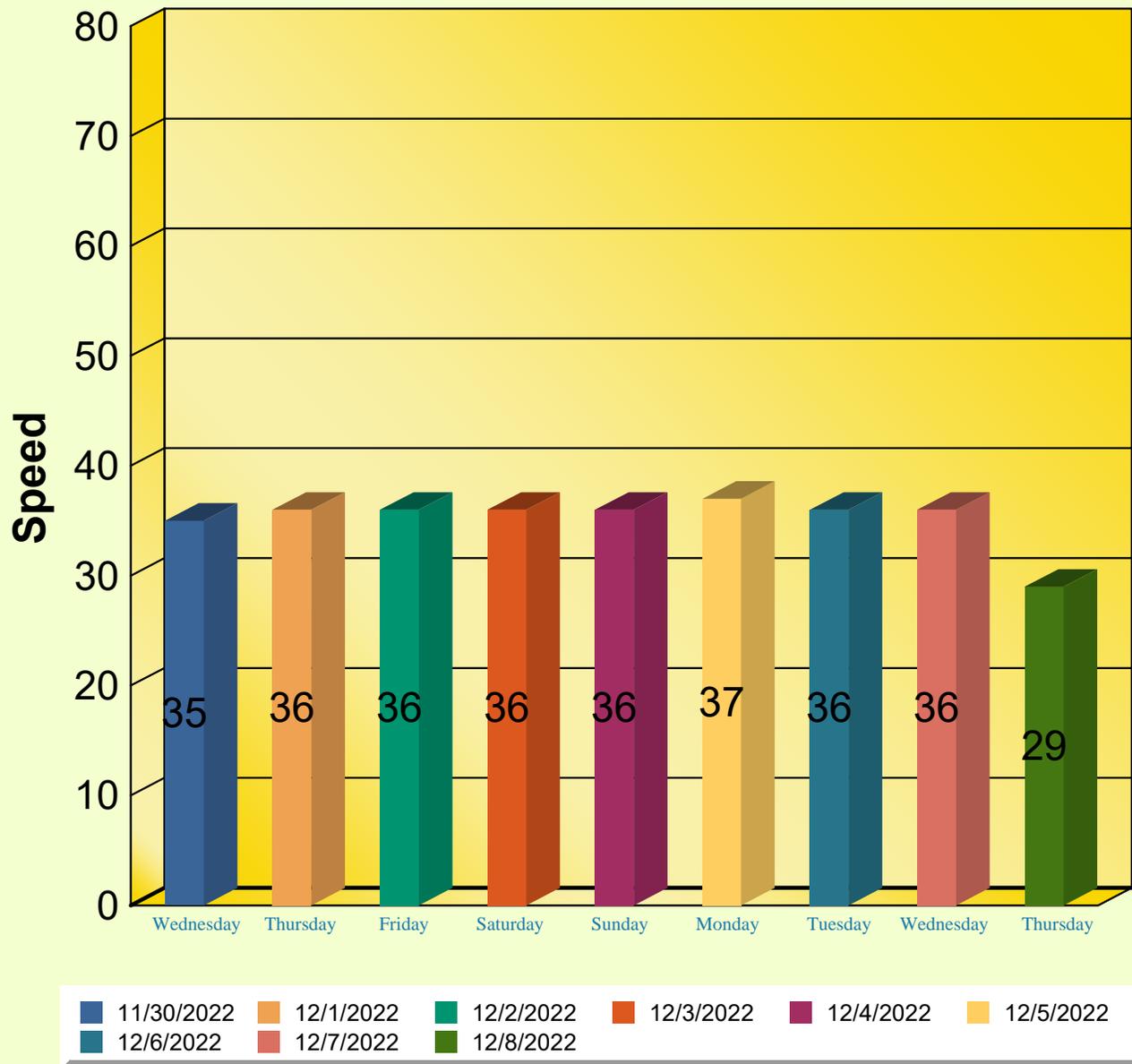
## Sequential 85th Percentile Graph

Device ID: 407065  
Street: E Grand Avenue  
State: IL  
City: Carbondale  
County: Jackson

Begin: 11/29/2022 04:00 PM  
Lane: WB  
Operator: OA  
Speed Limit: 40  
AADT Factor: 1

End: 12/07/2022 08:00 AM  
Hours: 184.00  
Period (min): 15  
Raw Count: 17,970  
AADT Count: 2,344

### All Vehicles in Study Daily 85th Percentile Speed



# Road Segment - Wall to Lewis (east bound)

## Sequential 85th Percentile Graph

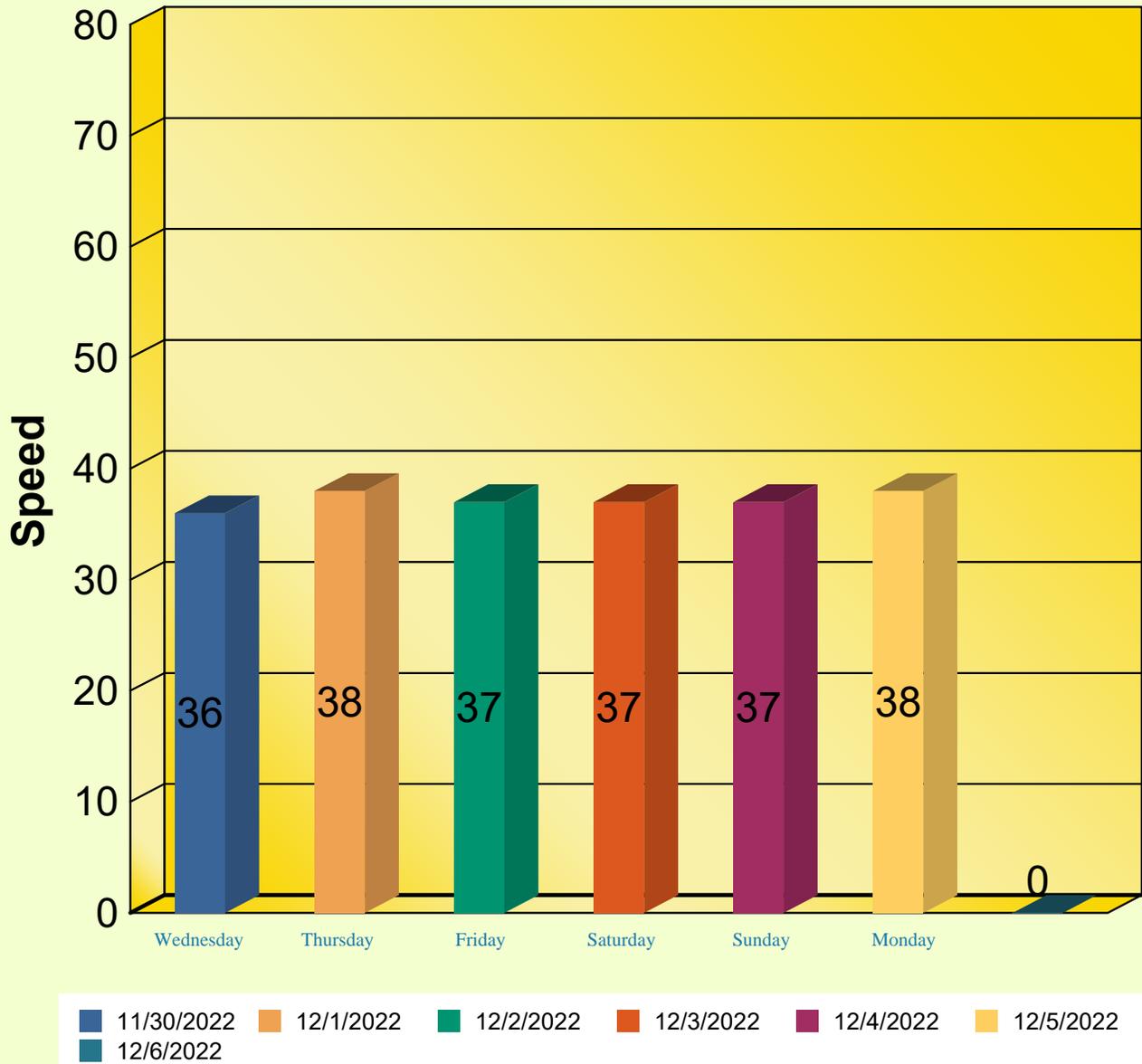
Device ID: 136691  
Street: E Grand Avenue  
State: IL  
City: Carbondale  
County: Jackson

Begin: 11/29/2022 04:00 PM  
Lane: EB  
Operator: OA  
Speed Limit: 40  
AADT Factor: 1

End: 12/07/2022 08:00 AM  
Hours: 184.00  
Period (min): 15  
Raw Count: 26,165  
AADT Count: 3,413

### All Vehicles in Study

### Daily 85th Percentile Speed



# Road Segment - Wall to Lewis (west bound)

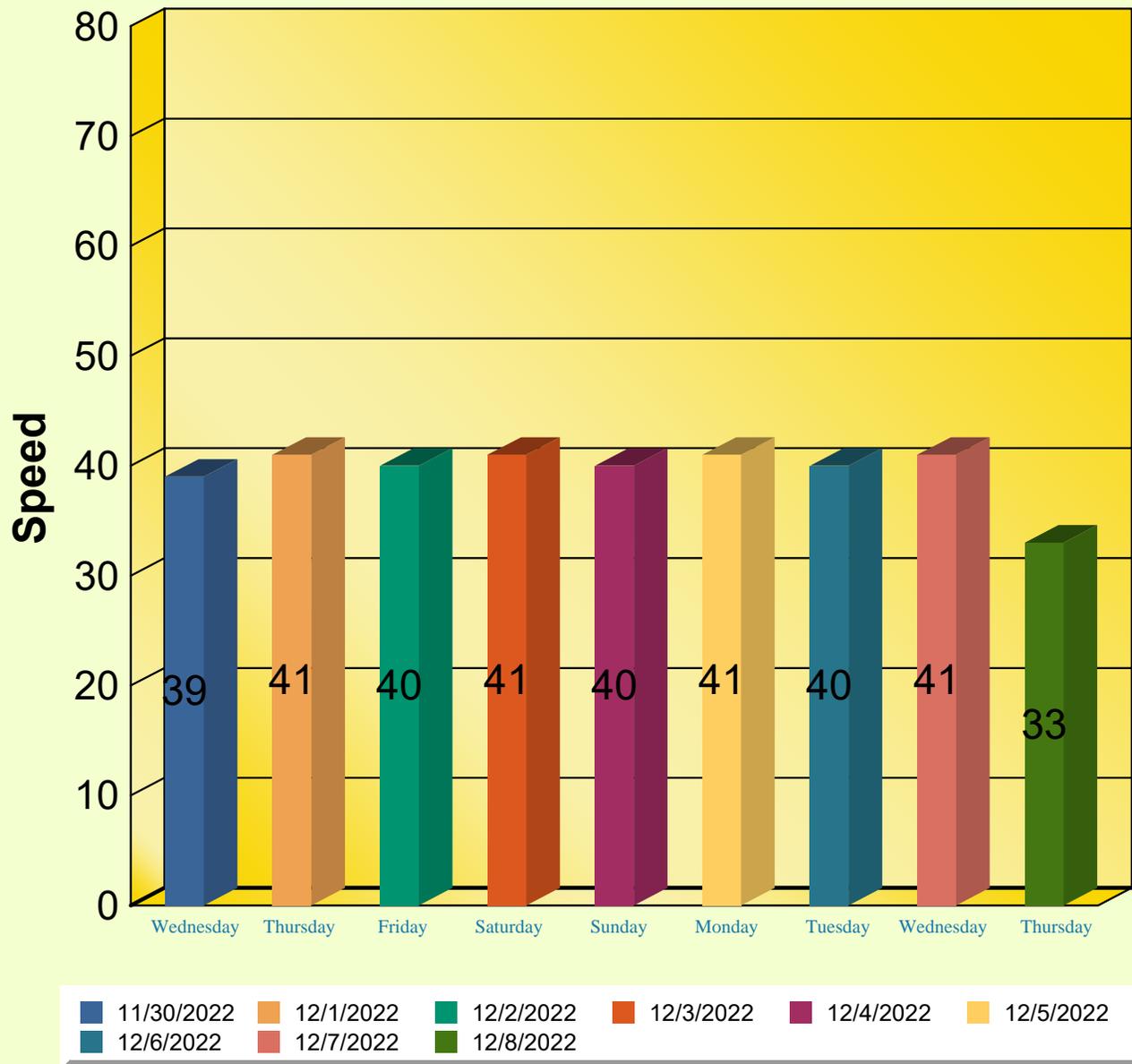
## Sequential 85th Percentile Graph

Device ID: 136678  
Street: E Grand Avenue  
State: IL  
City: Carbondale  
County: Jackson

Begin: 11/29/2022 04:00 PM  
Lane: WB  
Operator: OA  
Speed Limit: 40  
AADT Factor: 1

End: 12/07/2022 08:00 AM  
Hours: 184.00  
Period (min): 15  
Raw Count: 16,568  
AADT Count: 2,161

### All Vehicles in Study Daily 85th Percentile Speed

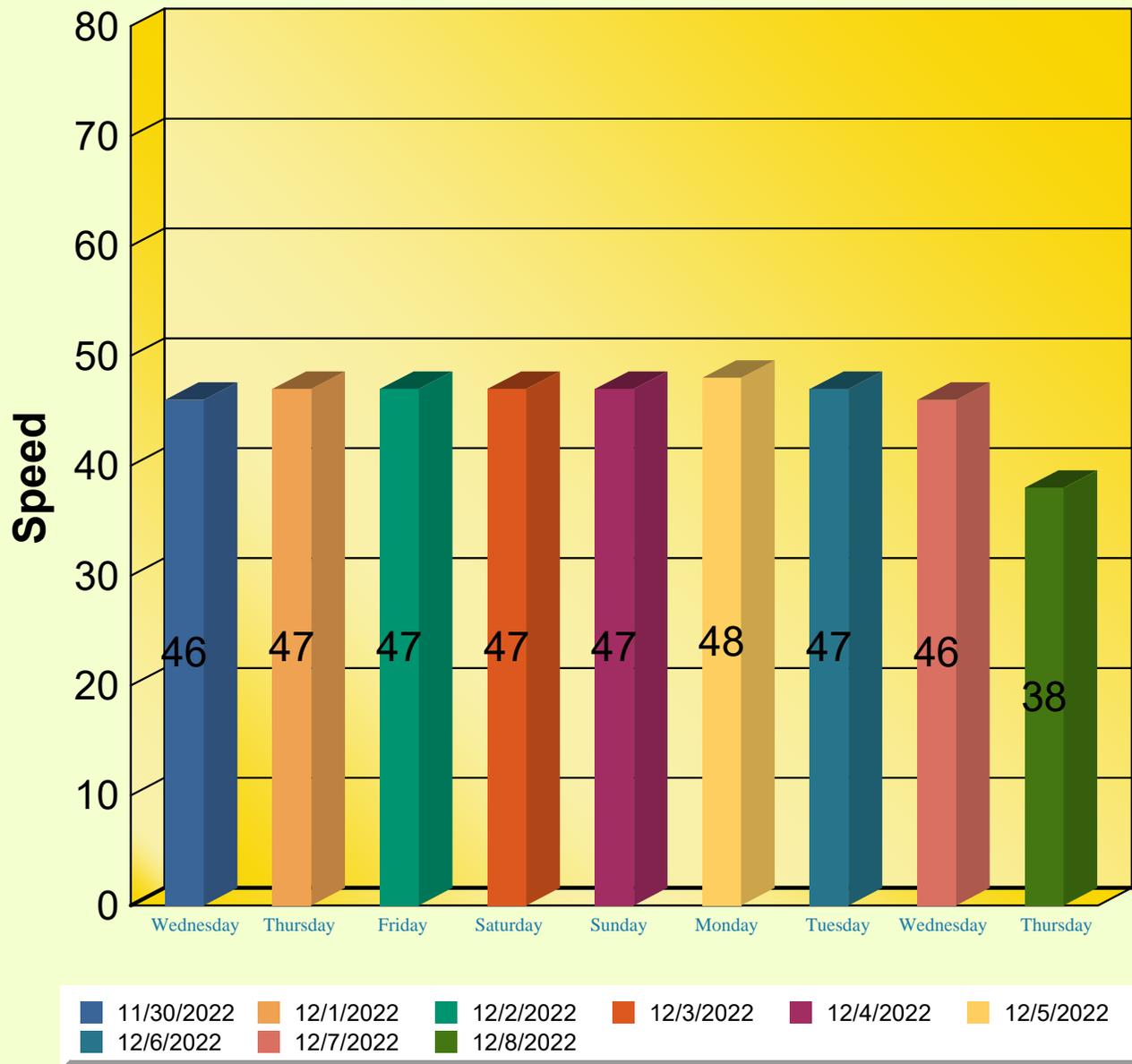


# Road Segment - Lewis to Giant City (east bound)

## Sequential 85th Percentile Graph

Device ID: 406701	Begin: 11/29/2022 04:00 PM	End: 12/07/2022 08:00 AM
Street: E Grand Avenue	Lane: EB	Hours: 184.00
State: IL	Operator: OA	Period (min): 15
City: Carbondale	Speed Limit: 40	Raw Count: 18,141
County: Jackson	AACT Factor: 1	AACT Count: 2,366

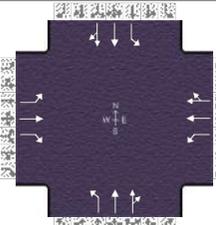
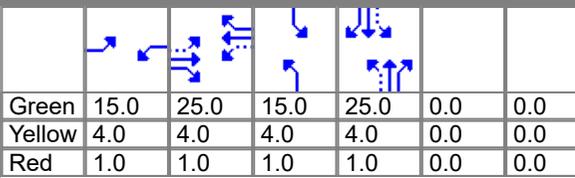
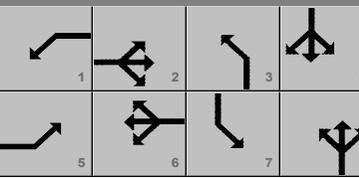
### All Vehicles in Study Daily 85th Percentile Speed



## **APPENDIX 3**

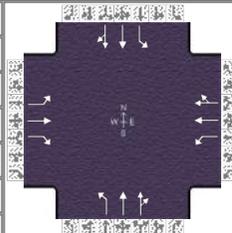
### **Existing Turning Movements at E. Grand and Wall St.**

## HCS7 Signalized Intersection Input Data

General Information						Intersection Information										
Agency	Oates Associates					Duration, h	0.25									
Analyst	MI	Analysis Date	1/16/2023			Area Type	CBD									
Jurisdiction	IDOT	Time Period	AM Peak			PHF	0.85									
Urban Street	Grand Avenue	Analysis Year	2022			Analysis Period	1 > 7:00									
Intersection	Wall St	File Name	Signal_Grand and Wall St_AM Peak (2022).xus													
Project Description	AM Peak (2022)															
Demand Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h				48	250	128	54	255	41	122	113	59	51	114	51	
Signal Information																
Cycle, s	100.0	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	Yes	Simult. Gap E/W	On													
Force Mode	Fixed	Simult. Gap N/S	On													
Green				15.0	25.0	15.0	25.0	0.0	0.0							
Yellow				4.0	4.0	4.0	4.0	0.0	0.0							
Red				1.0	1.0	1.0	1.0	0.0	0.0							
Traffic Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h				48	250	128	54	255	41	122	113	59	51	114	51	
Initial Queue (Q <sub>b</sub> ), veh/h				0	0	0	0	0	0	0	0	0	0	0	0	
Base Saturation Flow Rate (s <sub>0</sub> ), veh/h				1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Parking (N <sub>m</sub> ), man/h				None			None			None			None			
Heavy Vehicles (P <sub>HV</sub> ), %				3	3	3	3	3		3	3		3	3		
Ped / Bike / RTOR, /h				0	0	13	0	0	4	0	0	6	0	0	5	
Buses (N <sub>b</sub> ), buses/h				0	0	0	0	0	0	0	0	0	0	0	0	
Arrival Type (AT)				3	3	3	3	3	3	3	3	3	3	3	3	
Upstream Filtering (I)				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lane Width (W), ft				12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0		
Turn Bay Length, ft				0	0	160	125	0		250	0		100	0		
Grade (P <sub>g</sub> ), %				2			2			2			2			
Speed Limit, mi/h				30	30	30	30	30	30	30	30	30	30	30	30	
Phase Information				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Maximum Green (G <sub>max</sub> ) or Phase Split, s				15.0	25.0	15.0	25.0	15.0	25.0	15.0	25.0	15.0	25.0			
Yellow Change Interval (Y), s				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Red Clearance Interval (R <sub>c</sub> ), s				1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
Minimum Green (G <sub>min</sub> ), s				6	6	6	6	6	6	6	6	6	6			
Start-Up Lost Time (lt), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Extension of Effective Green (e), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Passage (PT), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Recall Mode				Max	Max	Max	Max	Max	Max	Max	Max	Max				
Dual Entry				No	Yes	No	Yes	No	Yes	No	Yes	No	Yes			
Walk (Walk), s				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Pedestrian Clearance Time (PC), s				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Multimodal Information				EB			WB			NB			SB			
85th % Speed / Rest in Walk / Corner Radius				0	No	25	0	No	25	0	No	25	0	No	25	
Walkway / Crosswalk Width / Length, ft				9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0	
Street Width / Island / Curb				0	0	No	0	0	No	0	0	No	0	0	No	
Width Outside / Bike Lane / Shoulder, ft				12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	
Pedestrian Signal / Occupied Parking				No	0.50		No	0.50		No	0.50		No	0.50		

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	Oates Associates			Duration, h	0.25		
Analyst	MI	Analysis Date	1/16/2023	Area Type	CBD		
Jurisdiction	IDOT	Time Period	AM Peak	PHF	0.85		
Urban Street	Grand Avenue	Analysis Year	2022	Analysis Period	1 > 7:00		
Intersection	Wall St	File Name	Signal_Grand and Wall St_AM Peak (2022).xus				
Project Description	AM Peak (2022)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	48	250	128	54	255	41	122	113	59	51	114	51

Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	15.0	25.0	15.0	25.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0			
				Red	1.0	1.0	1.0	1.0	0.0	0.0			

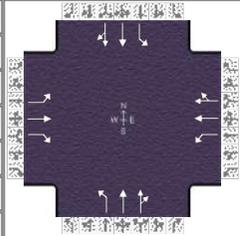
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	20.0	30.0	20.0	30.0	20.0	30.0	20.0	30.0
Change Period, ( Y+R <sub>c</sub> ), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway ( MAH ), s	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Queue Clearance Time ( g <sub>s</sub> ), s	4.2	18.3	4.5	11.0	8.0	7.2	4.4	7.0
Green Extension Time ( g <sub>e</sub> ), s	0.0	1.1	0.1	1.4	0.1	0.7	0.0	0.7
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.22	0.00	0.01	0.01	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( v ), veh/h	56	294	135	64	174	169	144	100	96	60	96	92
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1570	1649	1397	1570	1649	1576	1570	1649	1476	1570	1649	1492
Queue Service Time ( g <sub>s</sub> ), s	2.2	16.3	8.0	2.5	8.9	9.0	6.0	4.8	5.2	2.4	4.6	5.0
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	2.2	16.3	8.0	2.5	8.9	9.0	6.0	4.8	5.2	2.4	4.6	5.0
Green Ratio ( g/C )	0.40	0.25	0.25	0.40	0.25	0.25	0.40	0.25	0.25	0.40	0.25	0.25
Capacity ( c ), veh/h	435	412	349	372	412	394	498	412	369	494	412	373
Volume-to-Capacity Ratio ( X )	0.130	0.714	0.387	0.171	0.422	0.430	0.288	0.242	0.259	0.121	0.232	0.248
Back of Queue ( Q ), ft/ln ( 95 th percentile)	40.5	309.5	138.2	46.6	177.5	169.9	109.2	95	90.3	42.7	91	86.9
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.6	12.1	5.4	1.8	6.9	6.8	4.3	3.7	3.6	1.7	3.6	3.5
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.00	0.00	0.86	0.37	0.00	0.00	0.44	0.00	0.00	0.43	0.00	0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	19.3	34.2	31.1	20.5	31.4	31.5	20.1	29.9	30.1	19.0	29.9	30.0
Incremental Delay ( d <sub>2</sub> ), s/veh	0.6	10.1	3.2	1.0	3.2	3.4	1.5	1.4	1.7	0.5	1.3	1.6
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( d ), s/veh	19.9	44.3	34.4	21.5	34.6	34.9	21.5	31.3	31.8	19.5	31.2	31.6
Level of Service ( LOS )	B	D	C	C	C	C	C	C	C	B	C	C
Approach Delay, s/veh / LOS	38.7		D	32.7		C	27.3		C	28.5		C
Intersection Delay, s/veh / LOS	32.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	2.13	B	2.31	B
Bicycle LOS Score / LOS	1.29	A	0.82	A	0.77	A	0.69	A

## HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Oates Associates			Duration, h	0.25
Analyst	MI	Analysis Date	1/16/2023	Area Type	CBD
Jurisdiction	IDOT	Time Period	AM Peak	PHF	0.85
Urban Street	Grand Avenue	Analysis Year	2022	Analysis Period	1 > 7:00
Intersection	Wall St	File Name	Signal_Grand and Wall St_AM Peak (2022).xus		
Project Description	AM Peak (2022)				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	48	250	128	54	255	41	122	113	59	51	114	51

Signal Information														
Cycle, s	100.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On	Green	15.0	25.0	15.0	25.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0				
				Red	1.0	1.0	1.0	1.0	0.0	0.0				

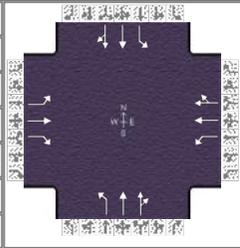
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor ( $f_w$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor ( $f_{HVg}$ )	0.964	0.964	0.964	0.964	0.964	0.988	0.964	0.964	0.988	0.964	0.964	0.988
Parking Activity Adjustment Factor ( $f_p$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor ( $f_{bb}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor ( $f_a$ )	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
Lane Utilization Adjustment Factor ( $f_{LU}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor ( $f_{LT}$ )	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor ( $f_{RT}$ )		0.000	0.847		0.956	0.956		0.895	0.895		0.905	0.905
Left-Turn Pedestrian Adjustment Factor ( $f_{LPB}$ )	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor ( $f_{RPB}$ )			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor ( $f_{wz}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor ( $f_{DDI}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	1570	1649	1397	1570	2820	405	1570	2162	962	1570	2267	873
Proportion of Vehicles Arriving on Green (P)	0.15	0.25	0.25	0.15	0.25	0.25	0.15	0.25	0.25	0.15	0.25	0.25
Incremental Delay Factor (k)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time ( $t_L$ )	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Green Ratio ( $g/C$ )	0.40	0.25	0.40	0.25	0.40	0.25	0.40	0.25
Permitted Saturation Flow Rate ( $s_p$ ), veh/h/ln	914	0	957	0	1054	0	1047	0
Shared Saturation Flow Rate ( $s_{sh}$ ), veh/h/ln								
Permitted Effective Green Time ( $g_p$ ), s	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Permitted Service Time ( $g_u$ ), s	14.0	0.0	6.7	0.0	18.0	0.0	17.8	0.0
Permitted Queue Service Time ( $g_{ps}$ ), s	0.7		1.3		1.1		0.4	
Time to First Blockage ( $g_t$ ), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage ( $g_{ts}$ ), s								
Protected Right Saturation Flow ( $s_R$ ), veh/h/ln		0						
Protected Right Effective Green Time ( $g_R$ ), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian $F_w / F_v$	1.557	0.009	1.557	0.007	1.389	0.006	1.557	0.018
Pedestrian $F_s / F_{delay}$	0.000	0.134	0.000	0.134	0.000	0.134	0.000	0.134
Pedestrian $M_{corner} / M_{cw}$								
Bicycle $c_b / d_b$	500.00	28.13	500.00	28.13	500.00	28.13	500.00	28.13
Bicycle $F_w / F_v$	-3.64	0.80	-3.64	0.34	-3.64	0.28	-3.64	0.20

# HCS7 Signalized Intersection Results Graphical Summary

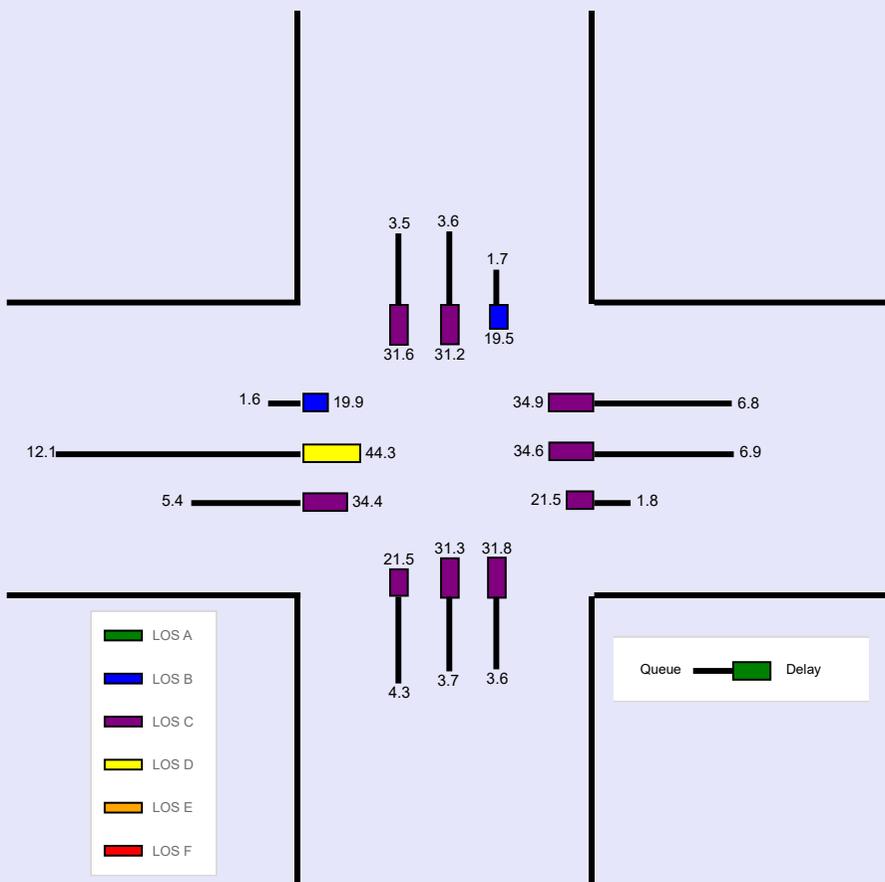
General Information				Intersection Information			
Agency	Oates Associates			Duration, h	0.25		
Analyst	MI	Analysis Date	1/16/2023	Area Type	CBD		
Jurisdiction	IDOT	Time Period	AM Peak	PHF	0.85		
Urban Street	Grand Avenue	Analysis Year	2022	Analysis Period	1 > 7:00		
Intersection	Wall St	File Name	Signal_Grand and Wall St_AM Peak (2022).xus				
Project Description	AM Peak (2022)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	48	250	128	54	255	41	122	113	59	51	114	51

Signal Information											
Cycle, s	100.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	15.0	25.0	15.0	25.0	0.0	0.0	
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	1.0	0.0	0.0	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Back of Queue ( Q ), ft/ln ( 95 th percentile)	40.5	309.5	138.2	46.6	177.5	169.9	109.2	95	90.3	42.7	91	86.9
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.6	12.1	5.4	1.8	6.9	6.8	4.3	3.7	3.6	1.7	3.6	3.5
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.00	0.00	0.86	0.37	0.00	0.00	0.44	0.00	0.00	0.43	0.00	0.00
Control Delay ( d ), s/veh	19.9	44.3	34.4	21.5	34.6	34.9	21.5	31.3	31.8	19.5	31.2	31.6
Level of Service ( LOS)	B	D	C	C	C	C	C	C	C	B	C	C
Approach Delay, s/veh / LOS	38.7		D	32.7		C	27.3		C	28.5		C
Intersection Delay, s/veh / LOS	32.7						C					

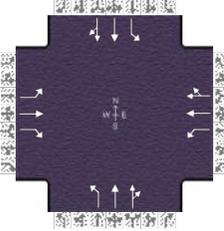
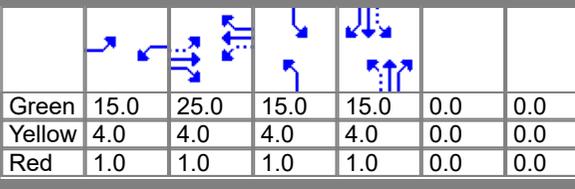
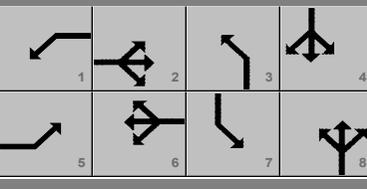


**--- Messages ---**

No errors or warnings exist.

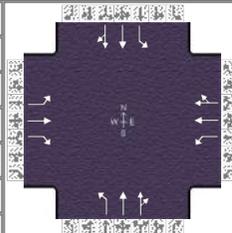
**--- Comments ---**

## HCS7 Signalized Intersection Input Data

General Information						Intersection Information											
Agency		Oates Associates				Duration, h		0.25									
Analyst		MI		Analysis Date		1/16/2023		Area Type		Other							
Jurisdiction		IDOT		Time Period		PM Peak		PHF		0.91							
Urban Street		Grand Avenue		Analysis Year		2022		Analysis Period		1 > 7:00							
Intersection		Wall St		File Name		Signal_Grand and Wall St_PM Peak (2022).xus											
Project Description		PM Peak (2022)															
Demand Information				EB			WB			NB			SB				
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R		
Demand (v), veh/h				73	328	116	92	238	51	107	109	64	91	150	47		
Signal Information																	
Cycle, s		90.0												Reference Phase		2	
Offset, s		0												Reference Point		End	
Uncoordinated		Yes												Simult. Gap E/W		On	
Force Mode		Fixed												Simult. Gap N/S		On	
Green				15.0	25.0	15.0	15.0	0.0	0.0								
Yellow				4.0	4.0	4.0	4.0	0.0	0.0								
Red				1.0	1.0	1.0	1.0	0.0	0.0								
Traffic Information				EB			WB			NB			SB				
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R		
Demand (v), veh/h				73	328	116	92	238	51	107	109	64	91	150	47		
Initial Queue (Q <sub>b</sub> ), veh/h				0	0	0	0	0	0	0	0	0	0	0	0		
Base Saturation Flow Rate (s <sub>0</sub> ), veh/h				1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Parking (N <sub>m</sub> ), man/h				None			None			None			None				
Heavy Vehicles (P <sub>HV</sub> ), %				3	3	3	3	3		3	3		3	3			
Ped / Bike / RTOR, /h				0	0	13	0	0	4	0	0	6	0	0	5		
Buses (N <sub>b</sub> ), buses/h				0	0	0	0	0	0	0	0	0	0	0	0		
Arrival Type (AT)				3	3	3	3	3	3	3	3	3	3	3	3		
Upstream Filtering (I)				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Lane Width (W), ft				12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0			
Turn Bay Length, ft				0	0	160	125	0		250	0		100	0			
Grade (P <sub>g</sub> ), %				2			2			2			2				
Speed Limit, mi/h				30	30	30	30	30	30	30	30	30	30	30	30		
Phase Information				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT						
Maximum Green (G <sub>max</sub> ) or Phase Split, s				15.0	25.0	15.0	25.0	15.0	15.0	15.0	15.0	15.0					
Yellow Change Interval (Y), s				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0					
Red Clearance Interval (R <sub>c</sub> ), s				1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0					
Minimum Green (G <sub>min</sub> ), s				6	6	6	6	6	6	6	6	6					
Start-Up Lost Time (lt), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Extension of Effective Green (e), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Passage (PT), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Recall Mode				Max	Max	Max	Max	Max	Max	Max	Max	Max					
Dual Entry				No	Yes	No	Yes	No	Yes	No	Yes	No	Yes				
Walk (Walk), s				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Pedestrian Clearance Time (PC), s				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Multimodal Information				EB			WB			NB			SB				
85th % Speed / Rest in Walk / Corner Radius				0	No	25	0	No	25	0	No	25	0	No	25		
Walkway / Crosswalk Width / Length, ft				9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0		
Street Width / Island / Curb				0	0	No	0	0	No	0	0	No	0	0	No		
Width Outside / Bike Lane / Shoulder, ft				12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0		
Pedestrian Signal / Occupied Parking				No	0.50		No	0.50		No	0.50		No	0.50			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	Oates Associates			Duration, h	0.25		
Analyst	MI	Analysis Date	1/16/2023	Area Type	Other		
Jurisdiction	IDOT	Time Period	PM Peak	PHF	0.91		
Urban Street	Grand Avenue	Analysis Year	2022	Analysis Period	1 > 7:00		
Intersection	Wall St	File Name	Signal_Grand and Wall St_PM Peak (2022).xus				
Project Description	PM Peak (2022)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	73	328	116	92	238	51	107	109	64	91	150	47

Signal Information				Signal Phases									
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		15.0	25.0	15.0	15.0	0.0	0.0				
		Yellow		4.0	4.0	4.0	4.0	0.0	0.0				
		Red		1.0	1.0	1.0	1.0	0.0	0.0				

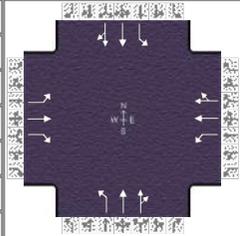
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	20.0	30.0	20.0	30.0	20.0	20.0	20.0	20.0
Change Period, ( $Y+R_c$ ), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway ( $MAH$ ), s	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Queue Clearance Time ( $g_s$ ), s	4.4	17.9	5.1	8.4	6.3	6.4	5.6	6.9
Green Extension Time ( $g_e$ ), s	0.1	1.1	0.1	1.5	0.1	0.6	0.1	0.5
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.19	0.00	0.00	0.00	0.02	0.00	0.03

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	80	360	113	101	159	154	118	94	90	100	107	104
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1745	1832	1553	1745	1832	1728	1745	1832	1624	1745	1832	1696
Queue Service Time ( $g_s$ ), s	2.4	15.9	5.1	3.1	6.2	6.4	4.3	4.0	4.4	3.6	4.7	4.9
Cycle Queue Clearance Time ( $g_c$ ), s	2.4	15.9	5.1	3.1	6.2	6.4	4.3	4.0	4.4	3.6	4.7	4.9
Green Ratio ( $g/C$ )	0.44	0.28	0.28	0.44	0.28	0.28	0.33	0.17	0.17	0.33	0.17	0.17
Capacity ( $c$ ), veh/h	564	509	431	449	509	480	474	305	271	483	305	283
Volume-to-Capacity Ratio ( $X$ )	0.142	0.708	0.262	0.225	0.313	0.321	0.248	0.307	0.332	0.207	0.351	0.367
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	46.3	321.6	93.4	60.9	132	125.9	87.3	91.7	87.7	73.2	106.4	102.2
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	1.8	12.6	3.6	2.4	5.2	5.0	3.4	3.6	3.5	2.9	4.2	4.1
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.00	0.00	0.58	0.49	0.00	0.00	0.35	0.00	0.00	0.73	0.00	0.00
Uniform Delay ( $d_1$ ), s/veh	15.0	29.2	25.3	16.7	25.7	25.8	21.7	32.9	33.1	21.5	33.2	33.3
Incremental Delay ( $d_2$ ), s/veh	0.5	8.1	1.5	1.2	1.6	1.8	1.2	2.6	3.3	1.0	3.2	3.7
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( $d$ ), s/veh	15.5	37.3	26.8	17.9	27.3	27.5	23.0	35.5	36.3	22.4	36.3	36.9
Level of Service (LOS)	B	D	C	B	C	C	C	D	D	C	D	D
Approach Delay, s/veh / LOS	32.0	C		25.1	C		30.9	C		32.1	C	
Intersection Delay, s/veh / LOS	30.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	2.13	B	2.31	B
Bicycle LOS Score / LOS	1.40	A	0.83	A	0.74	A	0.74	A

## HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information			
Agency	Oates Associates			Duration, h	0.25		
Analyst	MI	Analysis Date	1/16/2023	Area Type	Other		
Jurisdiction	IDOT	Time Period	PM Peak	PHF	0.91		
Urban Street	Grand Avenue	Analysis Year	2022	Analysis Period	1 > 7:00		
Intersection	Wall St	File Name	Signal_Grand and Wall St_PM Peak (2022).xus				
Project Description	PM Peak (2022)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	73	328	116	92	238	51	107	109	64	91	150	47

Signal Information														
Cycle, s	90.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On	Green	15.0	25.0	15.0	15.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0				
				Red	1.0	1.0	1.0	1.0	0.0	0.0				

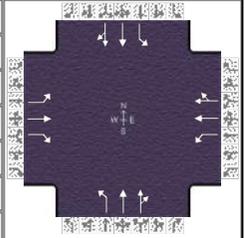
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor ( $f_w$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor ( $f_{HVg}$ )	0.964	0.964	0.964	0.964	0.964	0.988	0.964	0.964	0.988	0.964	0.964	0.988
Parking Activity Adjustment Factor ( $f_p$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor ( $f_{bb}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor ( $f_a$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor ( $f_{LU}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor ( $f_{LT}$ )	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor ( $f_{RT}$ )		0.000	0.847		0.943	0.943		0.887	0.887		0.926	0.926
Left-Turn Pedestrian Adjustment Factor ( $f_{LPB}$ )	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor ( $f_{RPB}$ )			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor ( $f_{wz}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor ( $f_{DDI}$ )	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	1745	1832	1553	1745	2981	579	1745	2303	1153	1745	2775	754
Proportion of Vehicles Arriving on Green (P)	0.17	0.28	0.28	0.17	0.28	0.28	0.17	0.17	0.17	0.17	0.17	0.17
Incremental Delay Factor (k)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time ( $t_L$ )	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Green Ratio ( $g/C$ )	0.44	0.28	0.44	0.28	0.33	0.17	0.33	0.17
Permitted Saturation Flow Rate ( $s_p$ ), veh/h/ln	1044	0	1000	0	1147	0	1176	0
Shared Saturation Flow Rate ( $s_{sh}$ ), veh/h/ln								
Permitted Effective Green Time ( $g_p$ ), s	25.0	0.0	25.0	0.0	15.0	0.0	15.0	0.0
Permitted Service Time ( $g_u$ ), s	16.6	0.0	7.1	0.0	8.1	0.0	8.6	0.0
Permitted Queue Service Time ( $g_{ps}$ ), s	0.7		2.0		0.8		0.6	
Time to First Blockage ( $g_t$ ), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage ( $g_{ts}$ ), s								
Protected Right Saturation Flow ( $s_R$ ), veh/h/ln		0						
Protected Right Effective Green Time ( $g_R$ ), s		0.0						

Multimodal	EB			WB			NB			SB		
Pedestrian $F_w / F_v$	1.557	0.009		1.557	0.007		1.389	0.006		1.557	0.018	
Pedestrian $F_s / F_{delay}$	0.000	0.127		0.000	0.127		0.000	0.138		0.000	0.138	
Pedestrian $M_{corner} / M_{cw}$												
Bicycle $c_b / d_b$	555.56	23.47		555.56	23.47		333.33	31.25		333.33	31.25	
Bicycle $F_w / F_v$	-3.64	0.91		-3.64	0.34		-3.64	0.25		-3.64	0.26	

# HCS7 Signalized Intersection Results Graphical Summary

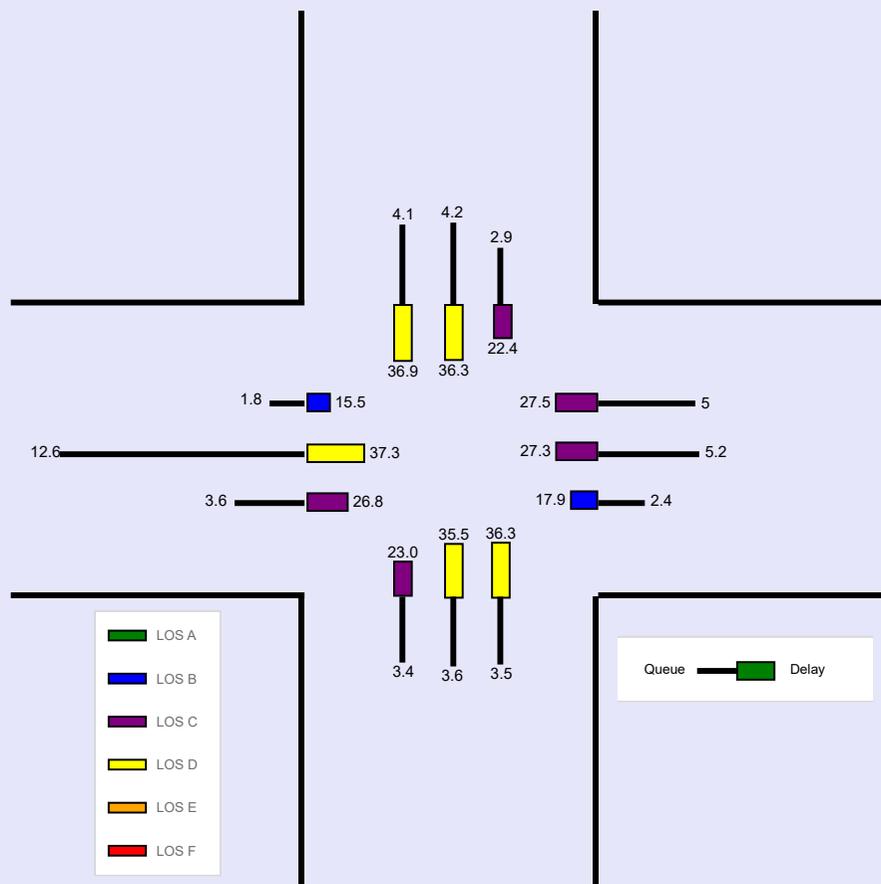
General Information				Intersection Information			
Agency	Oates Associates			Duration, h	0.25		
Analyst	MI	Analysis Date	1/16/2023	Area Type	Other		
Jurisdiction	IDOT	Time Period	PM Peak	PHF	0.91		
Urban Street	Grand Avenue	Analysis Year	2022	Analysis Period	1 > 7:00		
Intersection	Wall St	File Name	Signal_Grand and Wall St_PM Peak (2022).xus				
Project Description	PM Peak (2022)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	73	328	116	92	238	51	107	109	64	91	150	47

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	15.0	25.0	15.0	15.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0		
				Red	1.0	1.0	1.0	1.0	0.0	0.0		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Back of Queue ( Q ), ft/ln ( 95 th percentile)	46.3	321.6	93.4	60.9	132	125.9	87.3	91.7	87.7	73.2	106.4	102.2
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.8	12.6	3.6	2.4	5.2	5.0	3.4	3.6	3.5	2.9	4.2	4.1
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.00	0.00	0.58	0.49	0.00	0.00	0.35	0.00	0.00	0.73	0.00	0.00
Control Delay ( d ), s/veh	15.5	37.3	26.8	17.9	27.3	27.5	23.0	35.5	36.3	22.4	36.3	36.9
Level of Service ( LOS)	B	D	C	B	C	C	C	D	D	C	D	D
Approach Delay, s/veh / LOS	32.0 C			25.1 C			30.9 C			32.1 C		
Intersection Delay, s/veh / LOS	30.0						C					



**--- Messages ---**

No errors or warnings exist.

**--- Comments ---**

## **APPENDIX 4**

### **Previous Studies**

- 4.1 2016 Carbondale Bicycle Master Plan**
- 4.2 2020 Carbondale Bike Corridors Study**
- 4.3 2019 Wall Street Bike Lane Study and 2022 HSIP Funding Application**
- 4.4 Roundabout - East Grand Avenue and Lewis Lane**

# **APPENDIX 4**

## **Previous Studies**

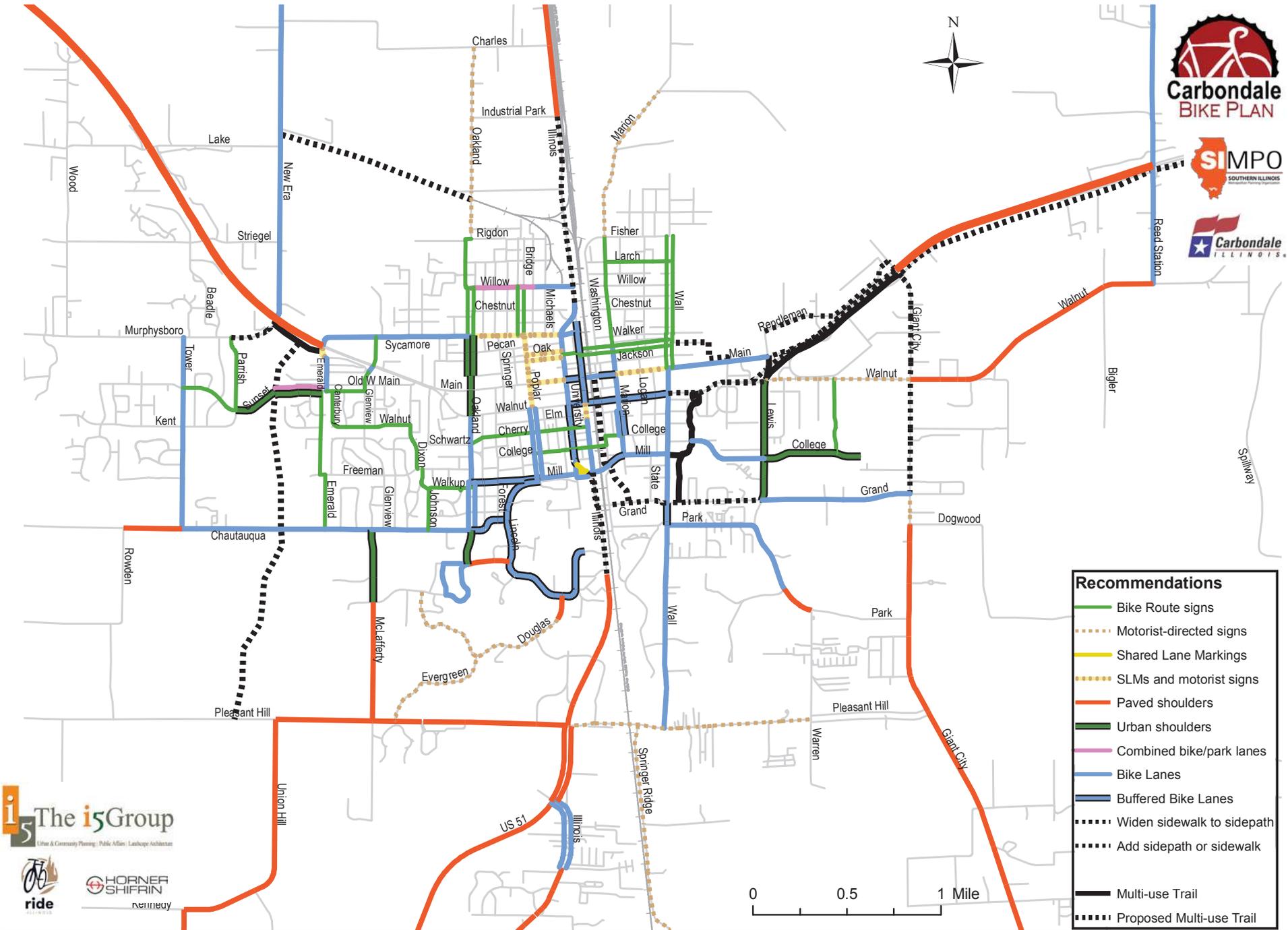
### **4.1 2016 Carbondale Bicycle Master Plan**



# Carbondale BICYCLE MASTER PLAN

May 2016





**FIGURE 4.1: Recommended Bicycle Network**

**i5 The i5 Group**  
 Urban & Community Planning • Public Affairs • Landscape Architecture

**ride**  
 HORNER SHIFRIN  
 newberry

**Carbondale**  
 BIKE PLAN

**SIMPO**  
 SOUTHERN ILLINOIS

**Carbondale**  
 ILLINOIS

- Recommendations**
- Bike Route signs
  - ⋯ Motorist-directed signs
  - Shared Lane Markings
  - ⋯ SLMs and motorist signs
  - Paved shoulders
  - Urban shoulders
  - Combined bike/park lanes
  - Bike Lanes
  - Buffered Bike Lanes
  - ⋯ Widen sidewalk to sidepath
  - ⋯ Add sidepath or sidewalk
  - Multi-use Trail
  - ⋯ Proposed Multi-use Trail

0 0.5 1 Mile

## Recommendation #4

### Improve connections to SIU campus, especially at Grand Avenue, Poplar Street, Mill Street, and Pleasant Hill Road / Hwy 51.

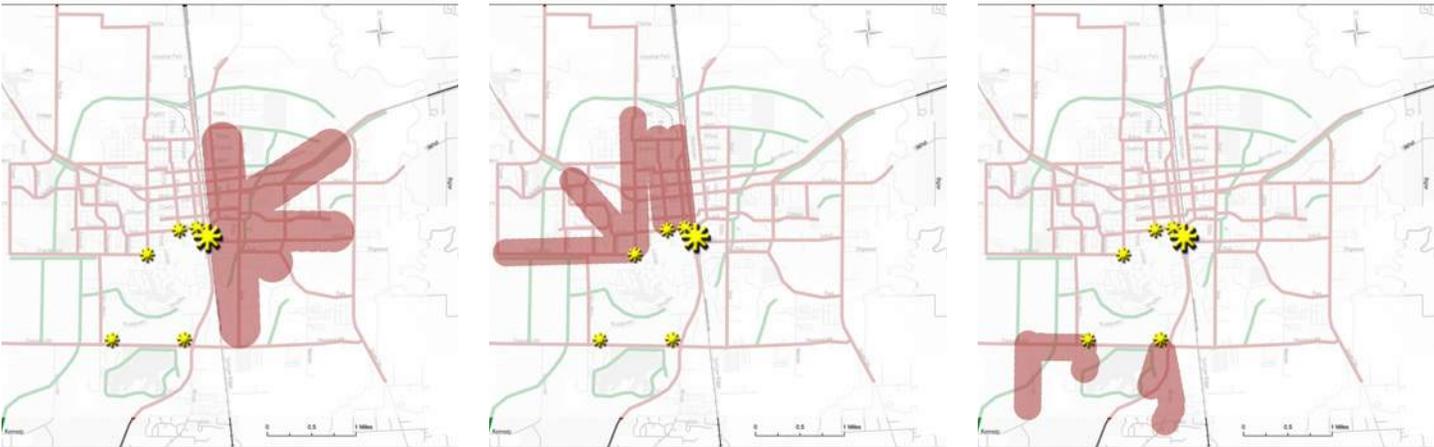
#### OVERVIEW

By far, SIU is the leading bicycle destination within the City. In addition, students have a high desire to bicycle within the City including destinations such as the Mall, Murdale Shopping Center, and downtown. However, many students expressed concern about biking away from campus because they did not feel safe with current bicycle facilities. Connecting the campus to the greater citywide bicycle network should be a high priority.

Connections should be improved to SIUC campus. See Chapter 6 for a detailed discussion of routes including intersection treatments.

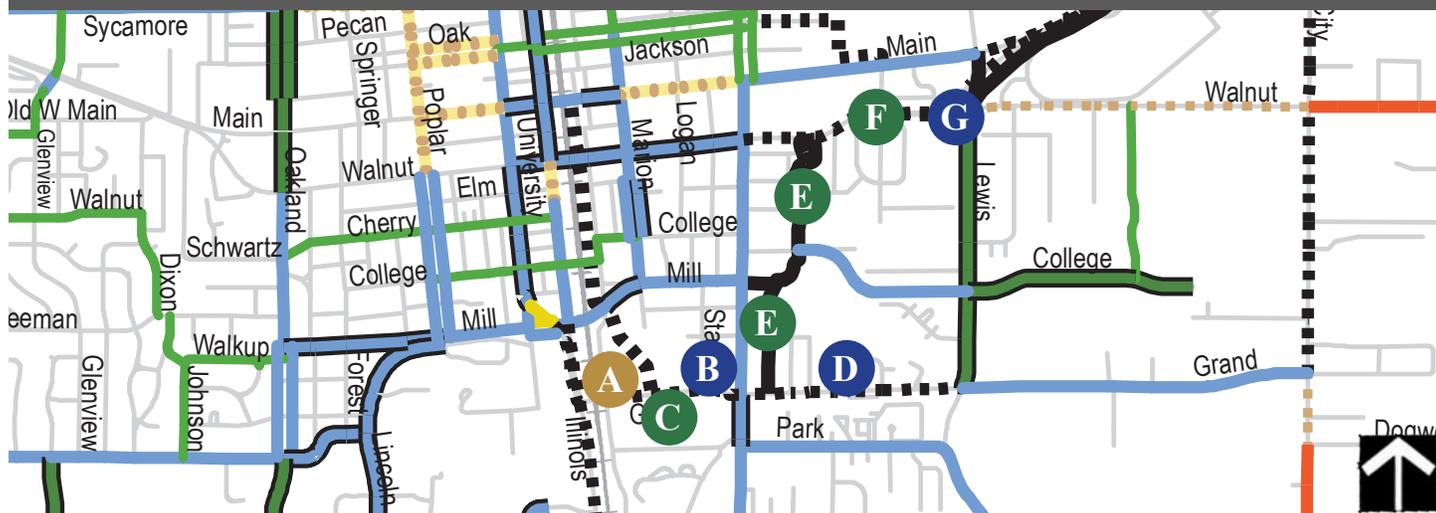


Grand Avenue is a key connection to the SIU campus for bicyclists.



**FIGURE 4.6: Connections to SIU campus for bicyclists.**

## SIU to Route 13/Mall Corridor



### A Grand Ave and Illinois Ave Intersection

- Consider Illinois Ave and Grand Ave intersection for lead pedestrian interval or actuated ped-only phase.
- Add continental crosswalks.
- Priority: **High**



The intersection at Grand Avenue and Illinois Avenue is a key gateway for bicyclists and pedestrians to campus.

### B Grand Ave: Illinois Ave to Wall St

- Widen existing sidewalk on north and south sides to 10' width sidepath.
- Add continental crosswalks at Washington St, State St and south parking lots.
- Add transverse crosswalks at minor entrances.
- Add Sign R1-5c at State St and Grand Ave.
- Replace trail crossing's continuous flashing beacon with actuated Rectangular Rapid Flash Beacon (RRFB) for better effectiveness.
- Priority: **High**



Replace existing continuous flash beacon with RRFB. Widen existing sidewalk to 10' sidepath.

### C Pedestrian Bridge to Grand Ave

- Add wayfinding signs at bridge landing.
- Add multi-use trail striping to existing 10' sidewalk.
- Consider additional 5' wide sidewalk adjacent to 10' multi-use trail from Park St to Grand Ave.
- Priority: **Medium**



**D** Grand Ave: Wall St to Lewis Ln

- Widen at least one side to 10' sidepath, preferably widen both sides to 10' sidepath.
- Add crosswalks at entrances, using continental at busier crossings.
- If road reconstructed, add bike lanes.
- Priority: **Highest**



**E** Greenway Bikeway

- Enhance trailhead locations at Grand Ave, College St, Mill St and Walnut St with wayfinding signs, enhanced paving, and lighting.
- Remove existing dated site furnishings.
- Upgrade bridge railings.
- Upgrade trail to 10' width.
- Add solar power lighting.
- Add crosswalk at College St.
- Priority: Medium



Greenway Bikeway: Existing trailhead at College Street is not visible or inviting. The trailhead should be enhanced.



Greenway Bikeway: Existing bridge railings do not meet current standards and should be upgraded.

**F** Walnut St: Piles Fork Creek to Lewis Ln

- Widen existing sidewalk to 8' sidepath along south side of Walnut St.
- Priority: **High**



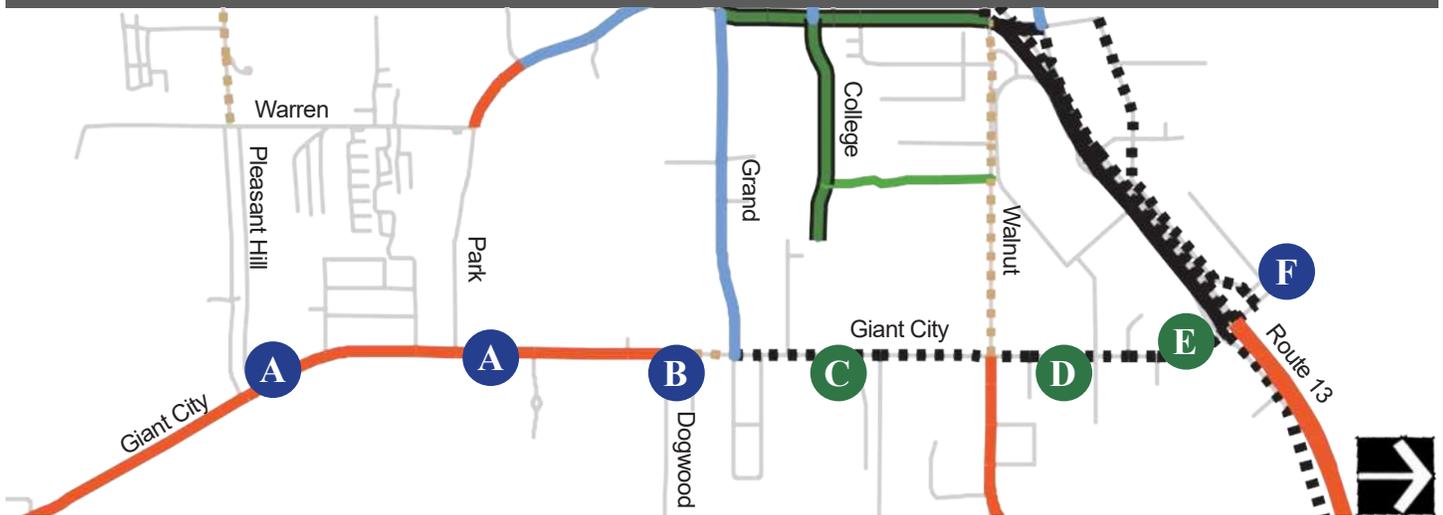
Existing Lewis Lane intersection: There is a lack of a crosswalk. A crosswalk should be added to connect to the multi-use trail constructed in 2015 on the west side of Lewis Lane.

**G** Walnut St and Lewis Ln Intersection

- Provide continental crosswalk across Lewis Ln.
- Priority: **High**



## Giant City Road Corridor



### A Giant City Rd: Pleasant Hill Rd to Dogwood Rd

- Widen paved shoulders to 4', using IDOT's bike-friendlier rumble strip standard (4" from fogline, 8" wide, 3' clear zone, longitudinal gaps).
- Priority: **High**



### B Giant City Rd: Dogwood Rd to Grand Ave

- Add one "State Law - 3 Ft Min to Pass Bicycles" sign each direction for this segment. (Medium Priority)
- Lower priority: widen west side to 8' sidepath width.
- Lower priority: add east side 8' sidepath.



### C Giant City Rd: Grand Ave to Walnut St

- Add crosswalks across sidestreets, entrances.
- Widen west side to 8' sidepath width.
- Add east side 8' sidepath.
- Priority: **Low** (*Not part of recommended network.*)



## Other High Priority Projects

### G Wall St: Grand Ave to Park St

- Repave for a 4-to-3 road diet, striping and marking 5.3' bike lanes (including gutters) and 1.8' buffers, leaving 11.5' travel lanes and a 12' continuous left-turn lane.
- Include wayfinding-based bike route signs.
- Add another continental crosswalk and roadway warning signage at the north face of the Park St intersection.
- Priority: **High**



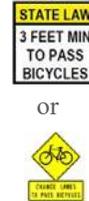
### H Lewis Ln: Walnut St to Grand Ave

- During the next reconstruction, mill the gutter pan from 2' to 1', allowing for 3' striped areas outside of the gutter. This would still be an “urban shoulder” and not a full “bike lane”.
- Add wayfinding-based bike route signs.
- Ideally, expand pavement to allow for 5' bike lanes (including 1' gutter).
- Priority: **High**



### I Walnut St: Lake Heights Ave to Giant City Rd

- Eastbound past Lake Heights Ave and westbound past Giant City Rd, add either “State Law – 3 Feet Min to Pass Bicycles” signs or MUTCD W11-1 Bicycle Warning signs with “Change Lanes to Pass Bicycles” plaques, in fluorescent yellow green color.
- If the road is reconstructed without widening, reduce gutter pan width to 1', stripe 3.5' shoulders, and narrow travel lanes to 11'.
- Priority: **High**



### J Walnut St / Old Hwy 13: Giant City Rd to Reed Station Rd

- If major reconstruction or a safety improvement is done, add 4' paved shoulders. If not, consider adding signs (“State Law – 3 Feet Min to Pass Bicycles” signs or MUTCD W11-1 Bicycle Warning signs with “Change Lanes to Pass Bicycles” plaques, in fluorescent yellow green color) eastbound past Giant City Rd and westbound past Reed Station Rd.
- Priority: **High**



# **APPENDIX 4**

## **Previous Studies**

### **4.2 2020 Carbondale Bike Corridors Study**

# Carbondale Bike Corridors

JUNE 2022



- ↑ Green Earth Nature Preserve
- Downtown → Carbondale
- SUPERBLOCK Recreational Complex
- CENTRAL → Connector
- ↑ Oakland Connector

## PLANNING TEAM



# Bike Wayfinding Corridors

## Bike Master Plan Recommendations

-  Bike Route Signs
-  Motorist Directed Signage
-  Shared Lane Markings (SLM)
-  SLM's and Motorist Signage
-  Bike Lanes
-  Buffered/Separated Bike Lanes
-  Paved Shoulder
-  Urban Shoulder
-  Combined Bike / Parking Lane
-  Widen Sidewalk to Sidepath
-  Add Sidepath or Sidewalk
-  Bikeway / Trail

## Bike Wayfinding Corridors

### Crab Orchard Greenway

- Destinations**  
 City of Carbondale  
 City of Marion  
 Crab Orchard Lake  
 John A. Logan College

### Piles Fork Greenway

- Destinations**  
 SIU  
 Mall  
 Marberry Arboretum

### Downtown - Campus Connector

- Destinations**  
 Downtown  
 SIU  
 Old 51 South

### Central Connector

- Destinations**  
 Parrish Park  
 SIU  
 Downtown  
 Super Block

### Sycamore - Oak Connector

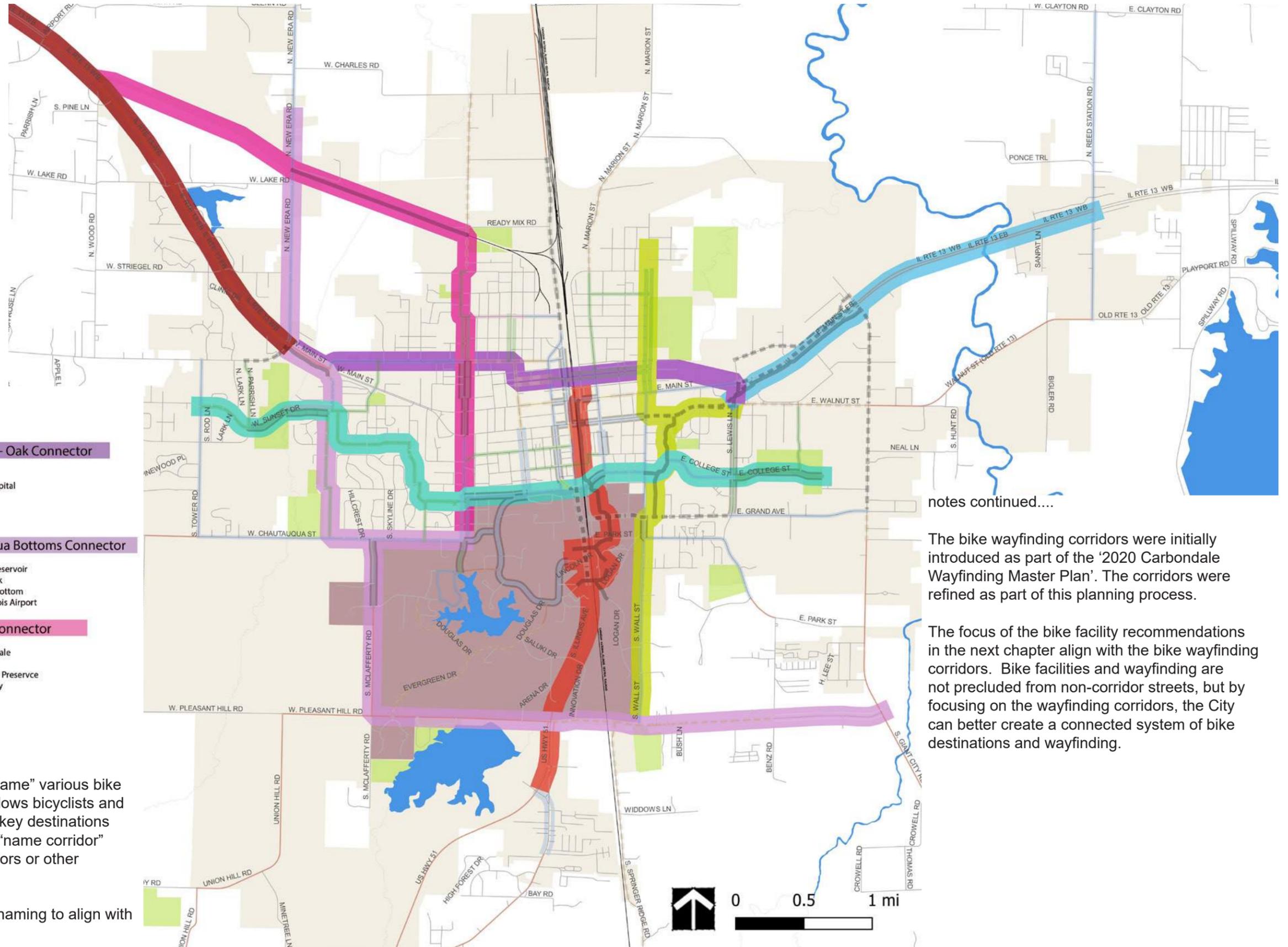
- Destinations**  
 Parrish Park  
 Memorial Hospital  
 Downtown  
 Attucks Park  
 Mall

### Chautauqua Bottoms Connector

- Destinations**  
 Carbondale Reservoir  
 Evergreen Park  
 Chautauqua Bottom  
 Southern Illinois Airport

### Oakland Connector

- Destinations**  
 City of Carbondale  
 Downtown  
 Oakland Nature Preserve  
 Saluki Greenway



notes continued....

The bike wayfinding corridors were initially introduced as part of the '2020 Carbondale Wayfinding Master Plan'. The corridors were refined as part of this planning process.

The focus of the bike facility recommendations in the next chapter align with the bike wayfinding corridors. Bike facilities and wayfinding are not precluded from non-corridor streets, but by focusing on the wayfinding corridors, the City can better create a connected system of bike destinations and wayfinding.

## Notes:

The framework for bicycle wayfinding is to "name" various bike / pedestrian corridors within the City. This allows bicyclists and pedestrians to better understand routes and key destinations along those routes. Streets or trails not in a "name corridor" could have wayfinding to lead to those corridors or other destinations.

This example strives to use "nature" related naming to align with Carbondale's connection to the outdoors.

# Chapter 1 - Bike and Pedestrian Counts

T2 Traffic & Transportation was tasked with obtaining bike and pedestrian traffic counts at ten locations selected by the project team. The data collection was performed utilizing video collection units (VCU) with data processed by miovision. This system enabled the team to collect continuous volume data over several days with video available for manual review as well as processed into count data with more than 95% accuracy. The VCU were deployed trailside or roadside, with no interruptions or safety impacts to traffic flows.

Five VCU were deployed over two time periods September-October 2021: 9/11 – 9/19 and 9/25-10/3. Each deployment captured at least 12 hours of video per day for nine days including two full weekends. All video data was mailed (on usb drives) to the City of Carbondale and the Greater Egypt Regional Planning & Development Commission in October 2021.

As presented in Table 1, bicycle and pedestrian data was collected at various locations throughout Carbondale including intersections, trail crossings, sidewalks, and unmarked mid-block crossings. At locations near SIU, care was taken to include multiple weekdays and weekends with a scheduled Salukis football home game.

Summary data sheets for each location are attached to this memorandum in the order listed in Table 1. Please note these sheets are formatted to present a wealth of data, several rows are highlighted to help discern the pedestrian- and bicycle-specific information and it may be helpful to refer to the Table to confirm the processed movements at each location. Due to the variety of location type vs. desired information, the counts were processed in one of two ways: “TMC” or “Ped & Bike Pathway”, which is printed after the location name at the top of each summary sheet. For the “Ped & Bike Pathway” locations, the data reported will be pedestrians and bicycles combined for a pathway (a sidewalk or midblock crossing). For the “TMC” locations, bikes in the street are reported separately from those in the crosswalk or trail crossing.

Below: Installing a video collection unit (VCU) on September 9, 2021 at the intersection of Wall Street and Larch Street.



**Table 1: Data Collection Summary, Bicycle and Pedestrian Volumes**

Location	“Pedestrian & Bike Pathway” Movements	Days	Hours	Total Bikes
<b>Wall at Fisher</b>	Wall St. both E and W sidewalks + bikes at curb in street	Wednesday 9/15	7 am – 7 pm	0
		Saturday 9/11	7 am – 7 pm	12
		Sunday 9/12	7 am – 7 pm	2
<b>Wall at Larch</b>	Wall St. both E and W sidewalks + bikes at curb in street	Wednesday 9/15	7 am – 7 pm	7
		Saturday 9/11	7 am – 7 pm	7
		Sunday 9/12	7 am – 7 pm	2
<b>Murdale at Emerald</b>	Pedestrian crossings of roadway between parking lots to east and west of Emerald Ln.	Wednesday 9/29		1
		Friday 10/1	7 am – 7 pm	1
		Saturdays 9/25 & 10/2	7 am – 7 pm	2, 0
		Sunday 9/26	7 am – 7 pm	1
<b>Murdale at Glenview</b>	Pedestrian crossings of Glenview Dr. including and south of trail crossing	Wednesday 9/29	7 am – 7 pm	29
		Saturday 9/25	7 am – 7 pm	21
		Sunday 9/26	7 am – 7 pm	25
<b>Chautauqua at McLafferty</b>	Chautauqua St. west of roundabout, both E and W sidewalks + bikes at curb in street	Wednesday 9/29	7 am – 7 pm	37
		Saturday 9/25	7 am – 7 pm	20
		Sunday 9/26	7 am – 7 pm	28
Location	“TMC” Movements	Days	Hours	
<b>Grand at Lewis</b>	All 4 crosswalks + bikes in street	Tuesday 9/14		34
		Wednesday 9/15	7 am – 7 pm	34
		Saturdays 9/11 & 9/18*	7 am – 7 pm	40, 30
		Sunday 9/12	7 am – 7 pm	27
<b>Giant City at Walnut</b>	All 4 crosswalks + bikes in street	Wednesday 9/15	7 am – 7 pm	3
		Saturday 9/11	7 am – 7 pm	10
		Sunday 9/12	7 am – 7 pm	18
<b>Giant City at Frontage Road</b>	All 4 crosswalks + bikes in street	Wednesday 9/15	7 am – 7:30pm	17
		Saturday 9/11	7 am – 7:30pm	33
		Sunday 9/12	7 am – 7:30pm	30
<b>Mill at Washington</b>	Crosswalk on S & W (trail crossing) legs. Bikes in roadway (3-legs).	Tuesday 9/28		30
		Wednesday 9/29	7 am – 7:30pm	33
		Saturday 9/25**	7 am – 7:30pm	15
		Sunday 9/26	7 am – 7:30pm	17
<b>Mill at Poplar</b>	All 3 crosswalks + trail crossing on S side + bikes in street. (NOTE: vehicle counts were also processed for 9/25, 26, 29)	Tuesday 9/28		77
		Wednesday 9/29	7 am – 7 pm	98
		Saturdays 9/25** & 10/2	7 am – 7 pm	36, 13
		Sunday 9/26	7 am – 7 pm	37

\* SIU Football Game Saturday 9/18 6:00 – 9:08 pm

\*\* SIU Football Game Saturday 9/25 2:00 – 5:09 pm

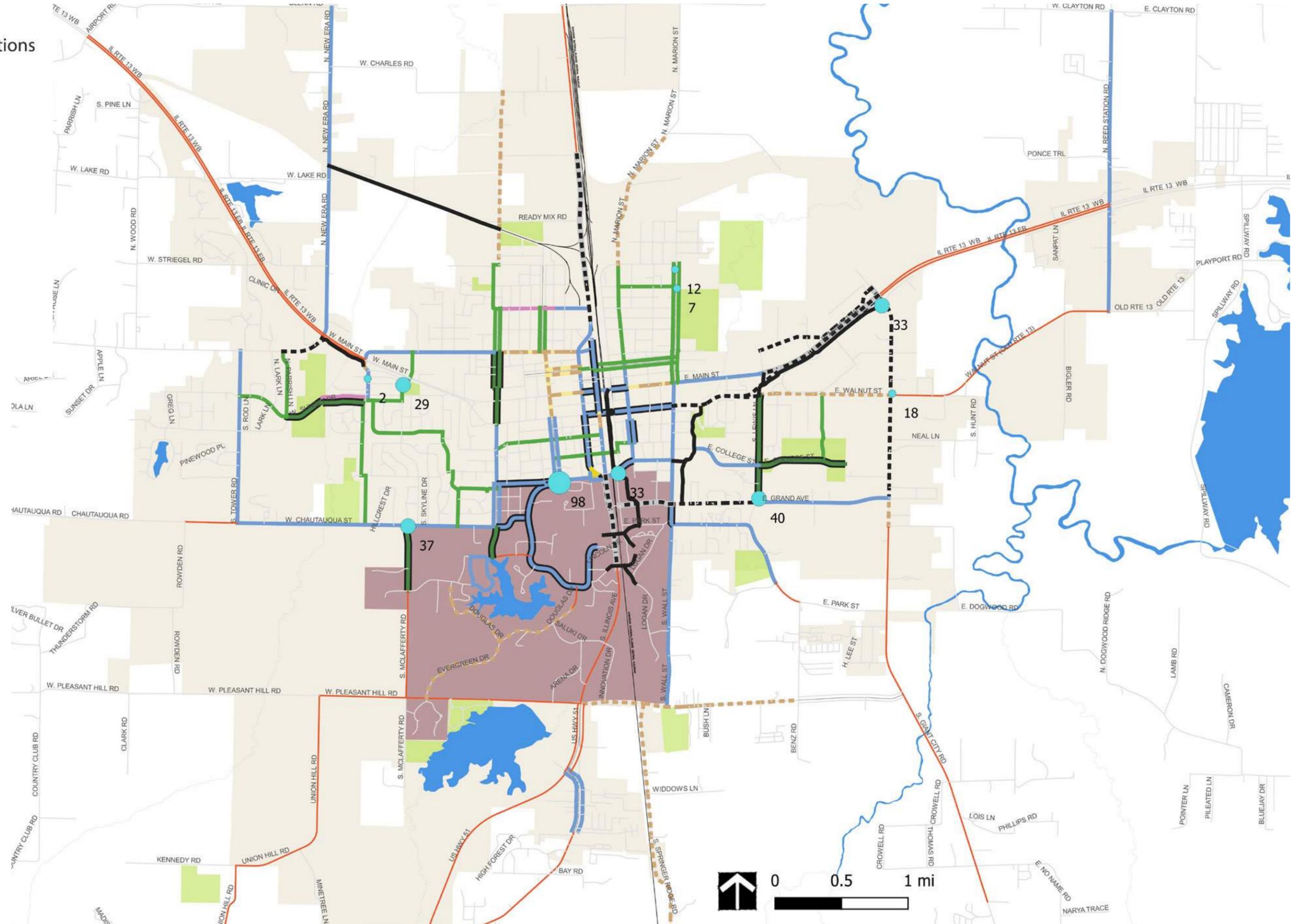
# 2021 Bike Counts

## Bike Master Plan Recommendations

-  Bike Route Signs
-  Motorist Directed Signage
-  Shared Lane Markings (SLM)
-  SLM's and Motorist Signage
-  Bike Lanes
-  Buffered/Separated Bike Lanes
-  Paved Shoulder
-  Urban Shoulder
-  Combined Bike / Parking Lane
-  Widen Sidewalk to Sidepath
-  Add Sidepath or Sidewalk
-  Bikeway / Trail

## 2021 Bike Counts

-  Less than 25
-  26-50
-  51-100
-  101-150
-  151-200
-  Greater than 200



# 2019 Bike Counts

## Bike Master Plan Recommendations

-  Bike Route Signs
-  Motorist Directed Signage
-  Shared Lane Markings (SLM)
-  SLM's and Motorist Signage
-  Bike Lanes
-  Buffered/Separated Bike Lanes
-  Paved Shoulder
-  Urban Shoulder
-  Combined Bike / Parking Lane
-  Widen Sidewalk to Sidepath
-  Add Sidepath or Sidewalk
-  Bikeway / Trail

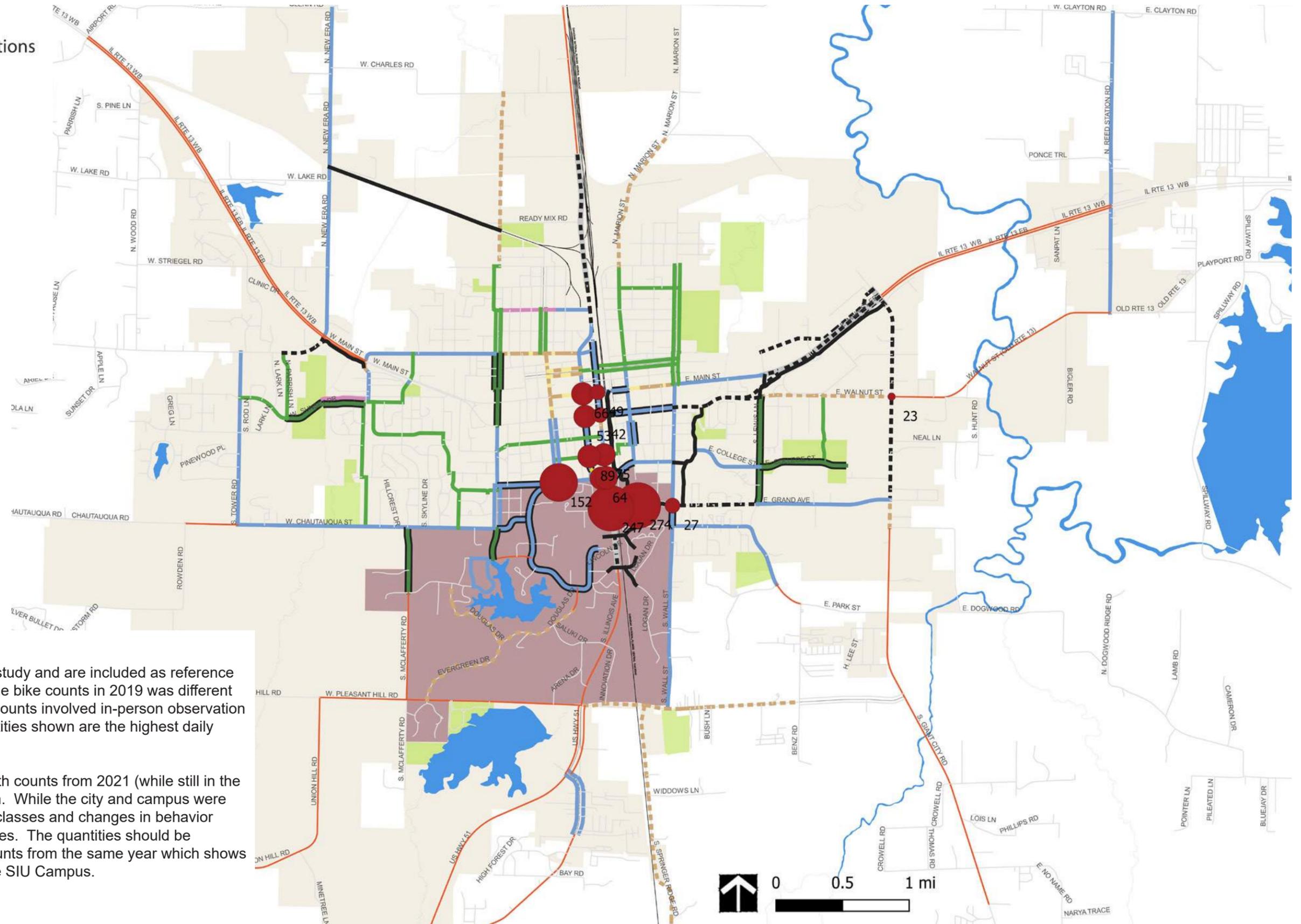
## 2019 Bike Counts

-  Less than 25
-  26-50
-  51-100
-  101-150
-  151-200
-  Greater than 200

## Notes:

2019 bike counts were not part of this study and are included as reference only. The methodology for collecting the bike counts in 2019 was different than the 2021 counts. The 2019 bike counts involved in-person observation over the course of two days. The quantities shown are the highest daily count based on the days observed.

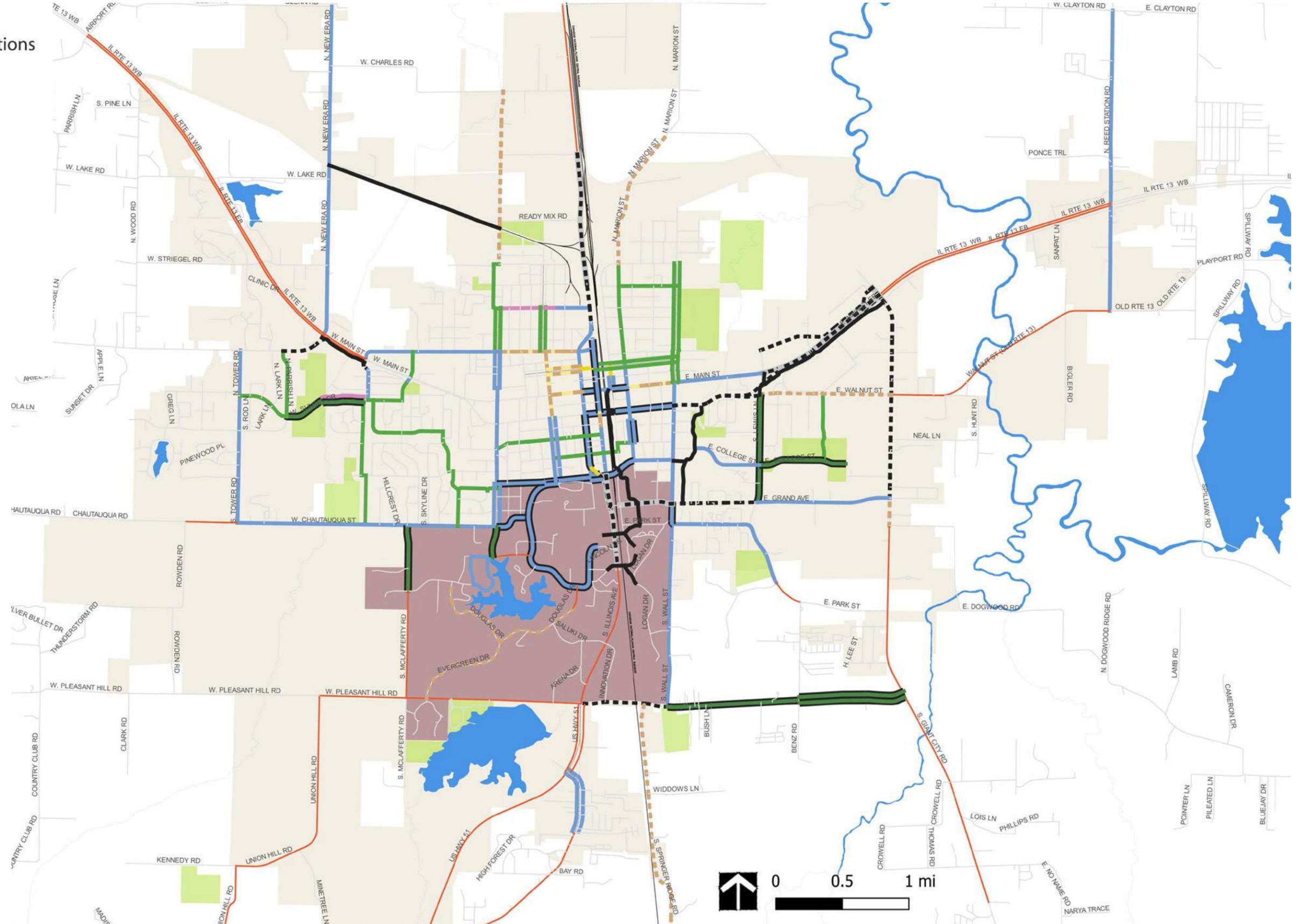
Comparing pre-pandemic quantities with counts from 2021 (while still in the pandemic) should be done with caution. While the city and campus were active during the 2021 counts, on-line classes and changes in behavior likely account for differences in quantities. The quantities should be analyzed in the context of the other counts from the same year which shows that bike counts increased closer to the SIU Campus.



# 2021 Updated Bike Master Plan Recommendations

## Bike Master Plan Recommendations

-  Bike Route Signs
-  Motorist Directed Signage
-  Shared Lane Markings (SLM)
-  SLM's and Motorist Signage
-  Bike Lanes
-  Buffered/Separated Bike Lanes
-  Paved Shoulder
-  Urban Shoulder
-  Combined Bike / Parking Lane
-  Widen Sidewalk to Sidepath
-  Add Sidepath or Sidewalk
-  Bikeway / Trail



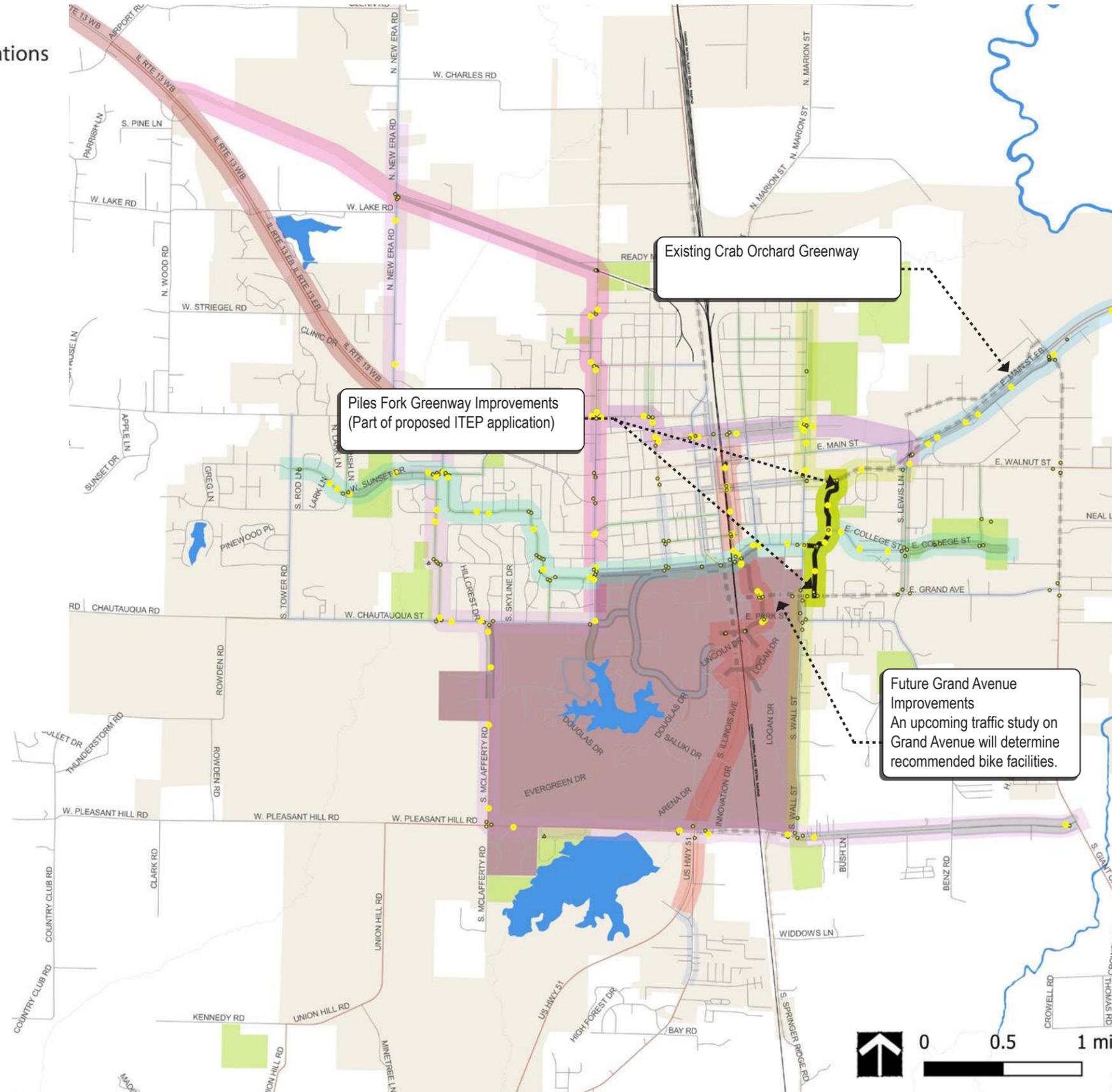
# ITEP APPLICATION

## Bike Master Plan Recommendations

- Bike Route Signs
- Motorist Directed Signage
- Shared Lane Markings (SLM)
- SLM's and Motorist Signage
- Bike Lanes
- Buffered/Separated Bike Lanes
- Paved Shoulder
- Urban Shoulder
- Combined Bike / Parking Lane
- Widen Sidewalk to Sidepath
- Add Sidepath or Sidewalk
- Bikeway / Trail

## Bike Wayfinding Corridors

- Crab Orchard Greenway
- Piles Fork Greenway
- Downtown - Campus Connector
- Central Connector
- Sycamore - Oak Connector
- Chautauqua Bottoms Connector
- Oakland Connector
- Saluki Greenway



## ITEP Application Highlights

Made possible by federal and state funds administered by the Illinois Department of Transportation (IDOT), Illinois Transportation Enhancement Program (ITEP) grant funds are focused on improving bike and pedestrian travel, as well as making other surface transportation improvements that promote alternative options for getting around a community

The proposed ITEP Application study area will:

- Will be an important step in creating a separated bike facility (sidepath/trail) for the majority of the distance from campus to the new Crab Orchard Greenway.
- Include city-wide bike wayfinding elements.

Other corridors (and master plan implementation segments) require mostly re-stripping (or milling of gutter). This work would best performed as part of future street re-paving or re-construction and not part of an ITEP application.

Bike facility improvements on Grand, Mill, and Pleasant Hill will require further traffic study. Grand will be studied in the near future and would then become the next logical segment for improvement.

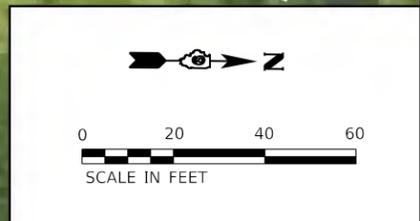
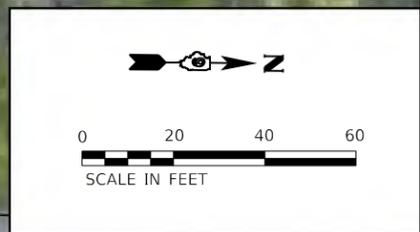
## ITEP Project Area

### Piles Fork Greenway

- Reconstruction and widening of the multi-use trail.
- Reconstruction of creek crossings.

### City-wide Bike Wayfinding

- Implementation of city-wide bike wayfinding as outlined in this plan.



MODEL: D:\d64\it  
 FILE NAME: P:\2022\2208474\_CADD - DWG\4.7\_Tran\CADD\_Sheets\2208474.dwg\plan01.dwg



USER NAME =	bbillhartz
PLOT SCALE =	40,0000 ' / in.
PLOT DATE =	9/6/2022

DESIGNED -	
DRAWN -	
CHECKED -	
DATE -	

REVISED -	



CITY OF CARBONDALE

PLAN OVER PLAN

SCALE: 1"=20' SHEET 1 OF 6 SHEETS STA. 100+19.32 TO STA. 112+00.00

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	21-00151-00-BT	JACKSON		
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

# **APPENDIX 4**

## **Previous Studies**

### **4.3 2019 Wall Street Bike Lane Study and 2022 HSIP Funding Application**



**CARBONDALE**  
All Ways Open

**Planning and Community Development**

200 South Illinois Avenue  
Carbondale, Illinois 62901  
Telephone 618-457-3248  
Fax 618-457-3289  
[www.explorecarbndale.com](http://www.explorecarbndale.com)

June 16, 2022

Jay Kranz  
Local Roads Engineer, District 9  
2801 W. Murphysboro Rd.  
Carbondale, IL  
62901

Re: City of Carbondale HSIP Application 2022

Mr. Kranz,

The City of Carbondale would like to apply for 2022 HSIP funding to improve the safety of drivers, pedestrians, cyclists, and those with disabilities on a minor arterial road, in the center of the southeast part of town.

South Wall Street connects several medium-residential districts with a childcare, retail, and a pharmacy to the north, and Southern Illinois University campus and public schools to the south. The road's straight thoroughfare of four traffic lanes with no bike lane or shoulder, encourages drivers to speed, and with seven connector streets entering this segment with no traffic signals, drivers commonly change lanes to avoid those waiting to make a left turn.

A 2019 traffic study found that conducting a Road Diet on South Wall Street would be the best way to minimize the amount of crashes happening between vehicles, pedestrians, and cyclists. Replacing two traffic lanes with one center turn lane and including bi-directional bike lanes aligns with the City's Complete Streets commitment to calm traffic, improve safety, and recognize all transit modes as integral elements of the transportation system.

The City of Carbondale appreciates this opportunity to improve its transportation network. Please contact our Community Development Department if any further information is needed.

Sincerely,

Molly Maxwell  
Senior Planner and Bike Planning Coordinator  
Community Development Department  
[mmaxwell@explorecarbndale.com](mailto:mmaxwell@explorecarbndale.com)

APRIL 5, 2019

# Wall Street Bike Lane Study

**Carbondale, Illinois**

Prepared for:

Southern Illinois Metropolitan Planning Organization

3000 West DeYoung Street, Suite 800 B-3

Marion, IL 62959

Prepared by:

Lochmueller Group

1928 SrA Bradley R. Smith Drive

Troy, IL 62294



**Table 2: Existing AM Peak Hour Levels of Service at the Study Intersections**

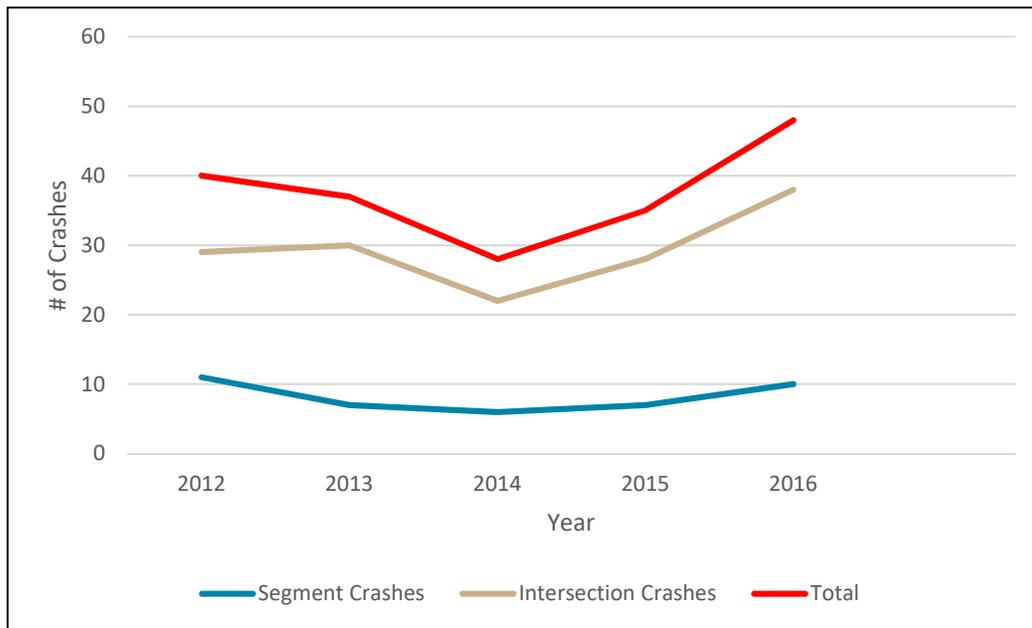
Intersection	Control Type	Approach	Vehicle Delay (Seconds)	LOS
<b>Wall Street/Main Street</b>	Signalized	Northbound	28.3	C
		Southbound	17.8	B
		Westbound	8.4	A
		<b>Overall</b>	<b>11.8</b>	<b>B</b>
<b>Wall Street/Walnut Street</b>	Signalized	Northbound	26.0	C
		Southbound	29.4	C
		Eastbound	10.2	B
		<b>Overall</b>	<b>14.4</b>	<b>B</b>
<b>Wall Street/College Street</b>	1-Way Stop Control (WB)	Westbound	8.1	A
<b>Wall Street/Mill Street</b>	Signalized	Northbound	2.8	A
		Southbound	1.8	A
		Eastbound	18.7	B
		<b>Overall</b>	<b>5.4</b>	<b>A</b>
<b>Wall Street/Grand Avenue</b>	Signalized	Northbound	11.6	B
		Southbound	13.5	B
		Eastbound	11.8	B
		Westbound	11.1	B
<b>Overall</b>	<b>12.7</b>	<b>B</b>		
<b>Wall Street/Park Street</b>	1-Way Stop Control (WB)	Westbound	10.0	B

**Table 3: Existing PM Levels of Service (LOS) at the Study Intersections**

Intersection	Control Type	Approach	Vehicle Delay (Seconds)	LOS
<b>Wall Street/Main Street</b>	Signalized	Northbound	29.8	C
		Southbound	17.0	B
		Westbound	9.2	A
		<b>Overall</b>	<b>12.4</b>	<b>B</b>
<b>Wall Street/Walnut Street</b>	Signalized	Northbound	35.2	D
		Southbound	27.8	C
		Eastbound	10.6	B
		<b>Overall</b>	<b>15.5</b>	<b>B</b>
<b>Wall Street/College Street</b>	1-Way Stop Control (WB)	Westbound	8.4	A
<b>Wall Street/Mill Street</b>	Signalized	Northbound	4.0	A
		Southbound	1.5	A
		Eastbound	18.1	B
		<b>Overall</b>	<b>7.4</b>	<b>A</b>
<b>Wall Street/Grand Avenue</b>	Signalized	Northbound	15.3	B
		Southbound	14.8	B
		Eastbound	13.8	B
		Westbound	12.2	B
<b>Overall</b>	<b>15.6</b>	<b>B</b>		
<b>Wall Street/Park Street</b>	1-Way Stop Control (WB)	Westbound	9.9	A

### Traffic Crash Analysis

Traffic crash data from 2012 to 2016 was analyzed for the study corridor. Crash data was obtained from SIMPO staff. The analysis included both intersection and mid-block crashes. **Figure 5** shows the total number of crashes per year within the study corridor from 2012 to 2016. As shown, the total number of crashes along the study corridor ranged from 28 (2014) to 48 (2016).



**Figure 5: Crash Trends along the Study Corridor (2012-2016)**

As can be seen in Figure 5, traffic crashes along the study corridor showed an increasing trend since 2014. Approximately 78% of the crashes along the study corridor occurred at intersections. **Table 4** shows crash frequencies from 2012 to 2016 at major intersections in the study corridor.

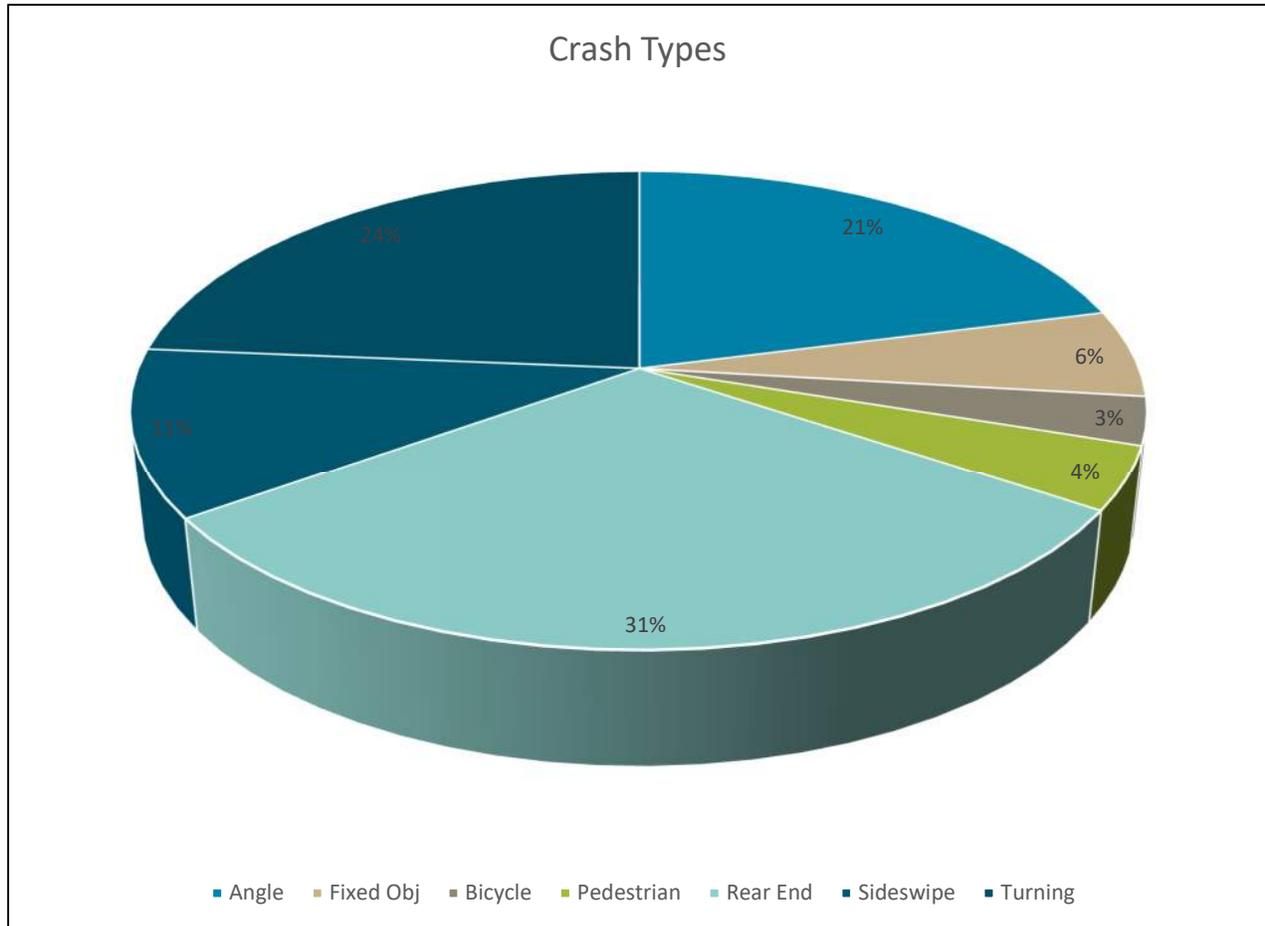
**Table 4: Crashes at Major Intersections (2012-2016)**

Intersection	Year					Total
	2012	2013	2014	2015	2016	
<b>Wall Street/Main Street</b>	9	7	7	7	3	<b>33</b>
<b>Wall Street/Walnut Street</b>	10	9	5	7	10	<b>41</b>
<b>Wall Street/College Street</b>	1	4	0	3	3	<b>11</b>
<b>Wall Street/Mill Street</b>	1	3	1	2	3	<b>10</b>
<b>Wall Street/Grand Avenue</b>	6	3	5	5	15	<b>34</b>
<b>Wall Street/Park Street</b>	1	1	3	2	2	<b>9</b>

As can be seen in Table 4, the highest number of crashes occurred at the Wall Street/Walnut Street intersection followed by the Wall Street/Grand Avenue intersection.

### Crash Types

**Figure 8** shows crash types along the study corridor. As can be seen in Figure 8, 31% of crashes were rear-end crashes followed by turning crashes (24%), and angle crashes (21%) crashes. Pedestrian and bicycle crashes were 4% and 3% of the total crashes, respectively.



**Figure 8: Crash Types**

### Pedestrian and Bicycle Crashes

Pedestrians and bicyclists are the most vulnerable road users. There were 8 reported pedestrian crashes and 6 reported bicycle crashes along the study corridor from 2012 to 2016. **Table 5** shows details of pedestrian crashes along the study corridor. As can be seen in Table 5, all the pedestrian crashes resulted in injuries. There were two pedestrian crashes at the Wall Street/Grand Avenue intersection. **Table 6** shows details of bicycle crashes along the study corridor. As shown in Table 6, all the bicycle crashes resulted in injuries. The Wall Street/Grand Avenue and the Wall Street/Walnut Street intersections had two bicycle crashes each. **Figure 9** shows the locations of pedestrian and bicycle crashes along the study corridor.

**Table 5: Pedestrian Crashes**

Date	Location	Light Condition	Severity Level
<b>1/28/2012</b>	Mid-Block	Dark, Lighted Road	A-Injury
<b>9/10/2012</b>	Mid-Block	Daylight	A-Injury
<b>9/16/2012</b>	Wall St/Mill St	Dark, Lighted Road	B-Injury
<b>8/13/2013</b>	Wall St/Main St	Daylight	B-Injury
<b>11/10/2015</b>	Wall St/Grand Ave	Daylight	C-Injury
<b>3/9/2016</b>	Wall St/Grand Ave	Dark, Lighted Road	C-Injury
<b>10/15/2016</b>	Mid-Block	Dark	C-Injury
<b>11/18/2016</b>	Wall St/Walnut St	Dark, Lighted Road	C-Injury

**Table 6: Bicycle Crashes**

Date	Location	Light Condition	Severity Level
<b>5/19/2012</b>	Wall St/Walnut St	Dusk	B-Injury
<b>10/4/2012</b>	Mid-Block	Daylight	B-Injury
<b>10/4/2013</b>	Wall St/Mill St	Daylight	C-Injury
<b>11/2/2015</b>	Wall St/Grand Ave	Dark, Lighted Road	A-Injury
<b>5/2/2016</b>	Wall St/Walnut St	Daylight	C-Injury
<b>11/28/2016</b>	Wall St/Grand Ave	Daylight	B-Injury

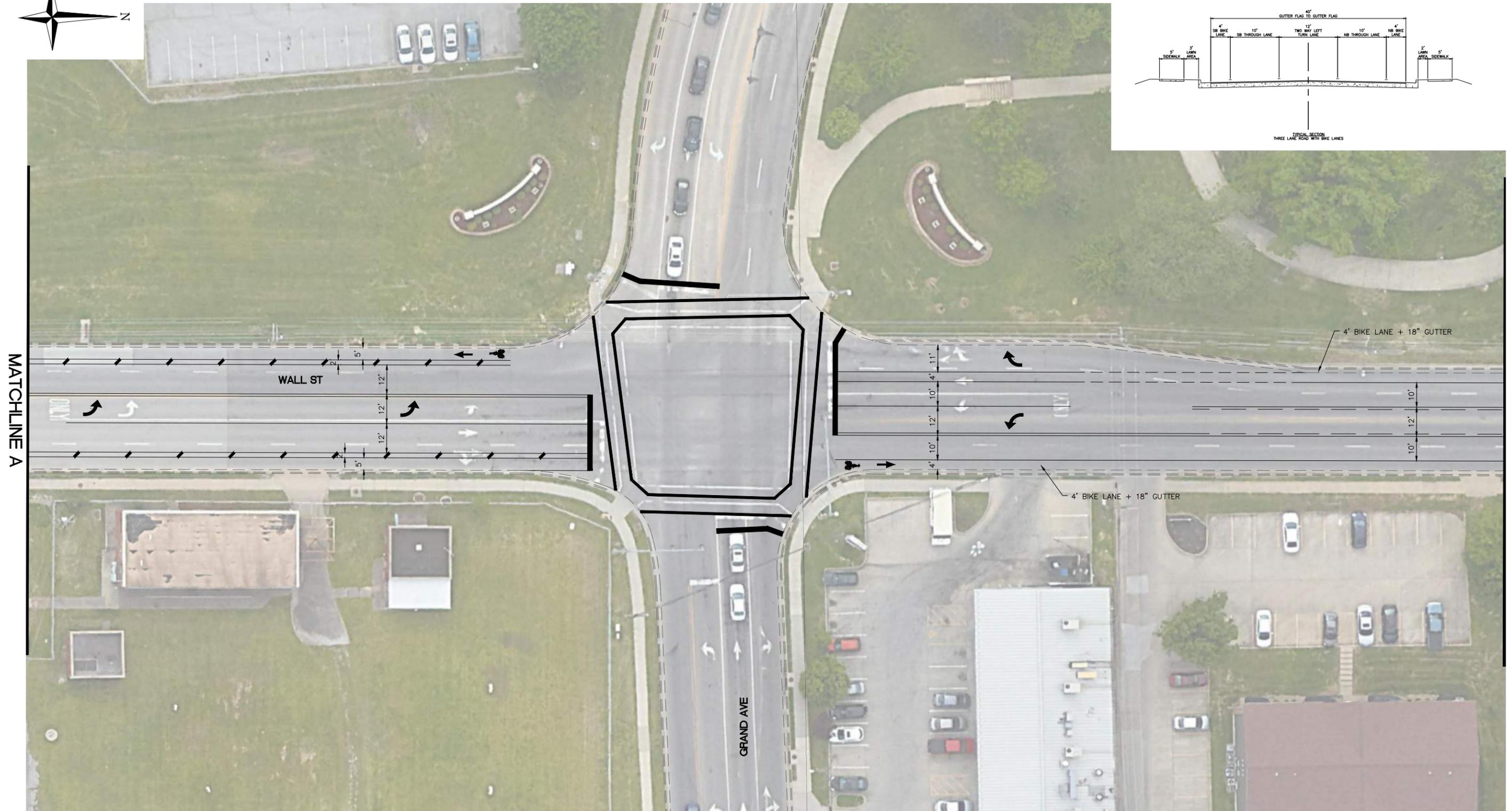


EXHIBIT 2: Wall Street Road Diet and Bike Lanes between Park St and Walnut St

ITEM DESCRIPTION	UNIT	Quantity	Unit Cost	Costs
<b>ROADWAY ITEMS</b>				
SIDEWALK REMOVAL	SQFT	6,120	\$6.00	\$36,720.00
MANHOLE/INLET ADJUSTMENTS	EA	30	\$500.00	\$15,000.00
INLET RELOCATION	EA	6	\$3,000.00	\$18,000.00
INLET GRATE COVER REPLACEMENT	EA	1	\$1,000.00	\$1,000.00
TACK COAT	LBS	18,075	\$2.00	\$36,150.00
BITUMINOUS SURFACE REMOVAL (3 3/4" THICKNESS)	SQ YD	20,083	\$8.00	\$160,664.00
HMA SURFACE MIX (3 3/4" THICKNESS)	TON	4,218	\$130.00	\$548,340.00
PCC SIDEWALK 4"	SQ FT	6,120	\$15.00	\$91,800.00
CURB	LFT	1,800	\$50.00	\$90,000.00
CURB REMOVAL	LFT	1,800	\$15.00	\$27,000.00
DETECTABLE WARNINGS	SQFT	340	\$45.00	\$15,300.00
SEEDING/RESTORATION	LSUM	1	\$40,000.00	\$40,000.00
EROSION CONTROL	LSUM	1	\$10,000.00	\$10,000.00
TRAFFIC CONTROL	LSUM	1	\$130,000.00	\$130,000.00
<b>ROADWAY ITEMS SUB-TOTAL=</b>			<b>\$1,219,974.00</b>	
ITEM DESCRIPTION	UNIT	Quantity	Unit Cost	Costs
<b>MARKING &amp; SIGNING ITEMS</b>				
SOLID YELLOW LINE, 4"	FT	13,408	\$1.50	\$20,111.40
SOLID WHITE LINE, 6"	FT	8,653	\$2.00	\$17,305.08
SOLID WHITE LINE, 12"	FT	715	\$6.00	\$4,288.20
SOLID WHITE LINE, 24"	FT	266	\$9.00	\$2,393.10
SOLID YELLOW LINE, 12"	FT	442	\$6.00	\$2,654.40
SOLID GREEN LINE, 24"	FT	240	\$9.00	\$2,160.00
BIKE AND ARROW	EA	24	\$500.00	\$12,000.00
SHARROW	EA	12	\$500.00	\$6,000.00
WHITE ARROWS	EA	28	\$500.00	\$14,000.00
SIGNING	LSUM	1	\$10,000.00	\$10,000.00
<b>MARKING &amp; SIGNING ITEMS SUB-TOTAL=</b>			<b>\$90,912.18</b>	
<b>ELECTRICAL (adjust signal head locations, push buttons, loop detectors)</b>				
GRAND AVE & WALL ST	LS	1	\$ 50,000.00	\$50,000.00
MILL ST & WALL ST	LS	1	\$ 50,000.00	\$50,000.00
WALNUT ST & WALL ST	LS	1	\$ 50,000.00	\$50,000.00
<b>ELECTRICAL SUB-TOTAL=</b>			<b>\$150,000.00</b>	
<b>MISCELLANEOUS</b>				

# **APPENDIX 4**

## **Previous Studies**

### **4.4 Roundabout - East Grand Avenue and Lewis Lane**



**CARBONDALE**  
All Ways Open

Department of Public Works  
Engineering & Admin.  
200 South Illinois Avenue  
Carbondale, IL 62901  
Phone (618) 457-3270  
Fax (618) 457-3243  
www.explorecarbndale.com

October 02, 2018

**Attn: Jay Kranz P.E.**  
Illinois Department of Transportation  
Division of Highways  
Region 5/District 9  
P.O. Box 100  
Carbondale, IL 62903-0100

**RE: Intersection Design Study (IDS)  
Grand Avenue/Lewis Lane Intersection Improvements**

Jay,

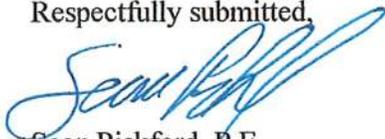
This letter is to address the preliminary comments that were received by our office on August 20, 2018. Attached with this letter is a Project Development Report including an Intersection Design Study revised per these comments and additional design work.

- Comment #1 provided in Preliminary Response Letter: *“Review proposed design vehicle: WB-55 (fig. 34-1G BLRS Manual) based on Grand Avenue as minor arterial (IROADS) and Lewis Lane as a major collector (IROADS)”*
  - The City would like to request a design variance and use an IDOT BUS-40 as the design vehicle in lieu of the WB-55.
    - The reason for this request is that traffic counts performed by the City show truck traffic at < 3%. It is believed that this truck traffic is bus traffic that serves the two schools that are in the vicinity, and local bus routes that are ran in the area.
      - Traffic count data is included in the attached PDR
      - The attached IDS shows turning movements of the IDOT BUS-40
- Comment #2 provided in Preliminary Response Letter: *“Develop all turning movement paths to ensure adequate radii and to verify fastest path movements”*.
  - See attached IDS
- Comment #3 provided in Preliminary Response Letter: *“Review Section 14-3 BDE Manual to ensure all pertinent data is provided”*.
  - Section 14-3 has been reviewed

- Comment #4 provided in Preliminary Response Letter: *"Review approach gradients as outlined in 34-1.02(a) Profiles at intersection (BLRS Manual) and 36-9.04(q)(3) Approach Grades refers to 36-1.06(a) (BDE Manual)"*
  - We were aware of the approach grades from Southbound Leg of Grand Avenue being in excess of 5%. We have added to the Design Variance Request provided in the PDR.
- Comment #5 provided in Preliminary Response Letter: *"Review ADA cross slope issues that could be caused steep approach grades"*.
  - The crossing at the south side of the intersection has been eliminated from the proposed design. The existing crossing at that location directed pedestrian traffic from the southeast corner to the northwest corner.

If there are any questions or more information that is needed please feel free to contact me.

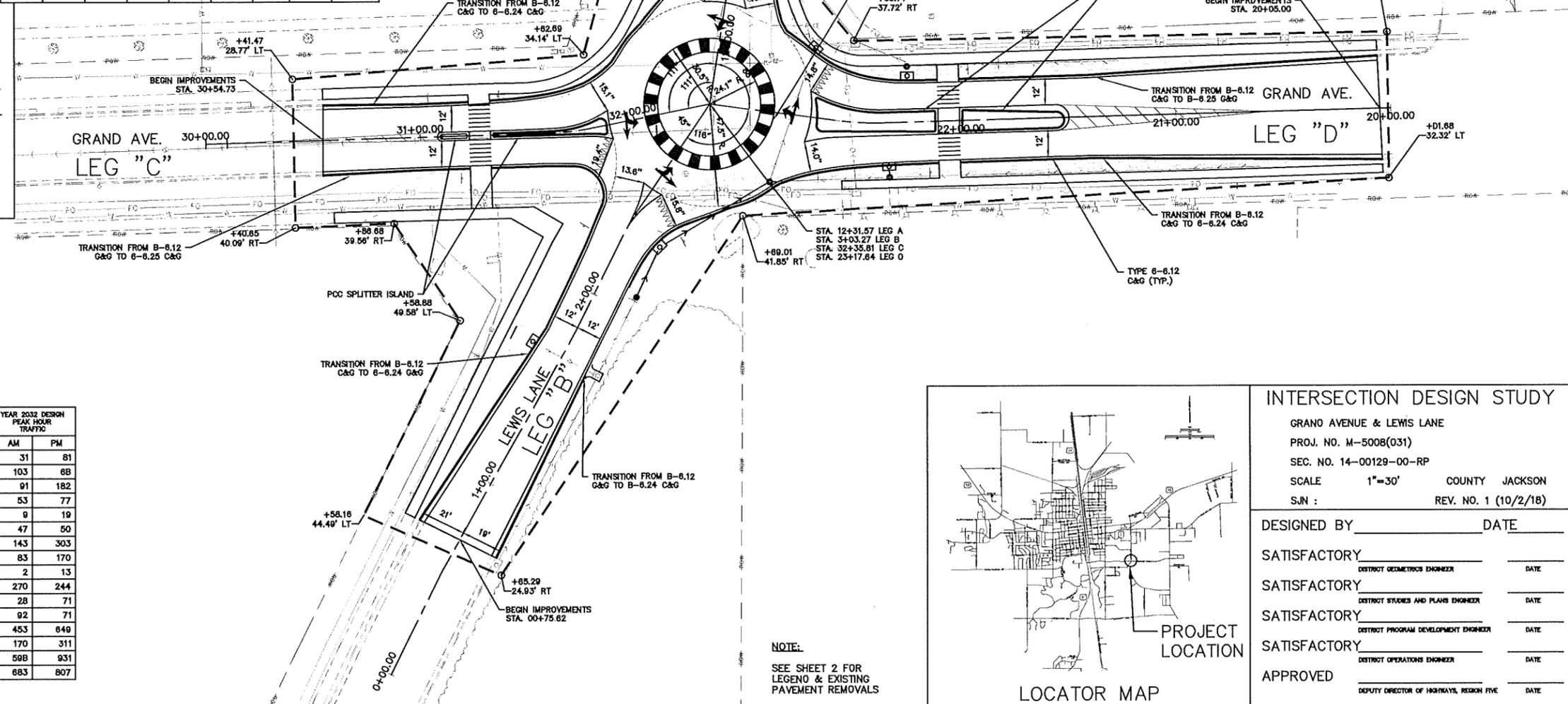
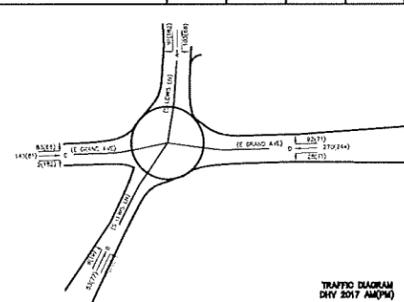
Respectfully submitted,



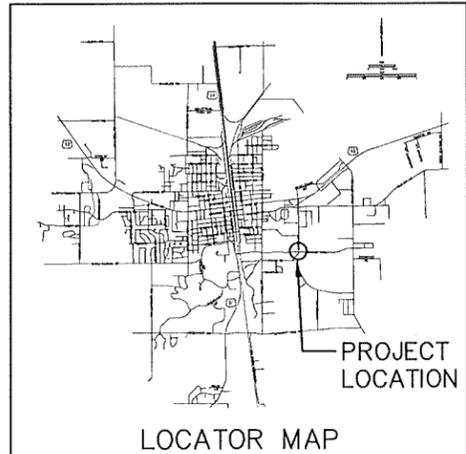
Sean Pickford, P.E.

Cc:

ROUNDBOUT CAPACITY ANALYSIS													
PROGRAM USED:		McTRANS HCS 2010_ VERSION: 6.70				PEAK HOUR FACTOR:		0.92					
AVERAGE INTERSECTION DELAY:		NON - CBD A.M. 8.18 SEC P.M. 12.19 SEC				INTERSECTION LEVEL:		A.M. A P.M. B					
INSCRIBED DIAMETER, OI (ft)		90											
CENTRAL ISLAND DIAMETER, O <sub>c</sub> (ft)		61.00											
APPROACH		EB GRANO AVE (C)			WB GRANO AVE (O)			NB LEWIS LANE (B)			SB LEWIS LANE (A)		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
OHV	AM	83	143	02	28	270	92	09	53	47	103	31	91
	PM	228			390			109			225		
PEDESTRIANS	AM	11			02			28			21		
	PM	19			00			29			36		
LANE GROUP		LTR			LTR			LTR			LTR		
LANE WIDTHS		12			12			12			12		
ENTRY FLOW RATE v <sub>e</sub> (vph)	AM	248			424			118			245		
	PM	528			419			158			360		
LANE CAPACITY c <sub>l</sub> (vph)	AM	0.27			0.46			0.16			0.32		
	PM	0.62			0.52			0.27			0.48		
x <sub>i</sub> (v <sub>e</sub> /c <sub>l</sub> ratio)	AM	.27			.48			.16			.32		
	PM	.62			.52			.27			.48		
STORAGE QUEUE LENGTH (VEHICLES)	AM	1.1			2.5			0.6			1.4		
	PM	4.4			3.0			1.1			2.6		
LANE DELAY (SECONDS)	AM	6.8			9.4			6.5			8.4		
	PM	13.9			11.6			9.6			11.6		
LANE LEVEL OF SERVICE	AM	A			A			A			A		
	PM	B			B			B			B		
APPROACH CONTROL DELAY (SEC)	AM	6.76			9.36			6.46			8.41		
	PM	13.85			11.60			9.58			11.58		
APPROACH LEVEL OF SERVICE	AM	A			A			A			A		
	PM	B			B			B			B		



MOVEMENT	YEAR 2017 PEAK HOUR TRAFFIC		% TRUCK TRAFFIC IN PEAK HOUR		ESTIMATED PERCENT INCREASE BY 2032		YEAR 2032 DESIGN PEAK HOUR TRAFFIC	
	AM	PM	AM	PM	AM	PM	AM	PM
AB (T)	31	81	3.2	3.7	0	0	31	81
AD (L)	103	88	2.9	2.9	0	0	103	88
AC (R)	91	182	1.1	.55	0	0	91	182
6A (T)	53	77	3.8	2.6	0	0	53	77
BC (L)	9	19	0	0	0	0	9	19
6D (R)	47	50	2.1	0	0	0	47	50
CD (T)	143	303	5.8	1.0	0	0	143	303
CA (L)	83	170	2.4	0	0	0	83	170
CB (R)	2	13	0	0	0	0	2	13
DC (T)	270	244	2.2	1.8	0	0	270	244
DB (L)	28	71	0	1.4	0	0	28	71
OA (R)	92	71	0	4.2	0	0	92	71
TOTAL A	453	849	-	-	0	0	453	849
TOTAL B	170	311	-	-	0	0	170	311
TOTAL C	596	931	-	-	0	0	596	931
TOTAL D	683	807	-	-	0	0	683	807



- ### ELEMENTS CONTROLLING DESIGN
- NIGHWAY DESIGN CLASSIFICATION: GRAND AVENUE (FAU 9711) LOCAL ROAD
  - NIGHWAY DESIGN CLASSIFICATION: LEWIS LANE (FAU 9726) LOCAL ROAD
  - TRAFFIC CONTROL TO BE POSTED YIELD SIGNS POSTED APPROXIMATELY 400' IN ADVANCE OF THE ROUNDABOUT.
  - ANTICIPATED YEAR OF CONSTRUCTION IS 2019
  - EXISTING TRAFFIC CONTROL IS ALL WAY STOP
  - PROPOSED TRAFFIC CONTROL IS A ROUNDABOUT
  - IMPROVEMENT TYPE IS RECONSTRUCTION
  - DESIGN VEHICLE IS 100T 6US-40
  - EXISTING & PROPOSED DESIGN SPEED 30MPH
  - DIMENSIONS SHOWN ARE EDGE TO EDGE OF TRAVELED WAY
- ### GENERAL NOTES
- ROUNDABOUT DESIGN DOES NOT UTILIZE ANY MECHANICAL OR ELECTRICAL TRAFFIC CONTROL DEVICES. VEHICLES APPROACHING THE INTERSECTION YIELD TO TRAFFIC CIRCLING WITHIN THE ROUNDABOUT.
  - TYPE B-6.12 C&G TO BE USED ON OUTER EDGES OF THE ROUNDABOUT AND ON ALL APPROACHES.
  - TYPE B-6.12 C&G TO BE USED ON THE SPLITTER ISLAND.
  - TYPE M-2.12 C&G TO BE USED ON THE OUTER CIRCUMFERENCE OF THE TRUCK APRON.
  - EXISTING RIGHT-OF-WAY IS SHOWN. NO ADDITIONAL RIGHT-OF-WAY IS ANTICIPATED. PROFILES ARE PROVIDED ON SHEET 5.
- ### DESIGN EXCEPTIONS
- INSCRIBED CIRCULAR DIAMETER IS 90'. SECTION 38-9.02(d) OF THE BDE MANUAL STATES THAT MINIMUM DIAMETER FOR A SINGLE-LANE IS 105'.
  - EXISTING TRAFFIC COUNTS INDICATE A DECLINE IN TRAFFIC. FUTURE ADT IS PROJECTED 0% INCREASE.
  - APPROACH GRADIENT AT THE SOUTHBOUND LEG (LEWIS LANE) IS IN EXCESS OF 5%. ACCESSIBILITY IS NOT AN ISSUE DUE TO SIDEWALK NOT BEING INSTALLED AT THIS LOCATION.

Public Works - Engineering

Sheet Title: COVER SHEET

Project Title: INTERSECTION DESIGN STUDY  
INTERSECTION IMPROVEMENTS  
GRAND AVENUE AND LEWIS LANE

200 South Illinois Avenue  
Carbondale, IL 62901  
(618) 457-3270

**Carbondale**  
ILLINOIS

INTERSECTION DESIGN STUDY

GRAND AVENUE & LEWIS LANE  
PROJ. NO. M-5008(031)  
SEC. NO. 14-00129-00-RP  
SCALE 1"=30' COUNTY JACKSON  
S.J.N. : REV. NO. 1 (10/2/18)

DESIGNED BY \_\_\_\_\_ DATE \_\_\_\_\_

SATISFACTORY \_\_\_\_\_ DATE \_\_\_\_\_  
DISTRICT GEOMETRIC ENGINEER

SATISFACTORY \_\_\_\_\_ DATE \_\_\_\_\_  
DISTRICT STUDIES AND PLANS ENGINEER

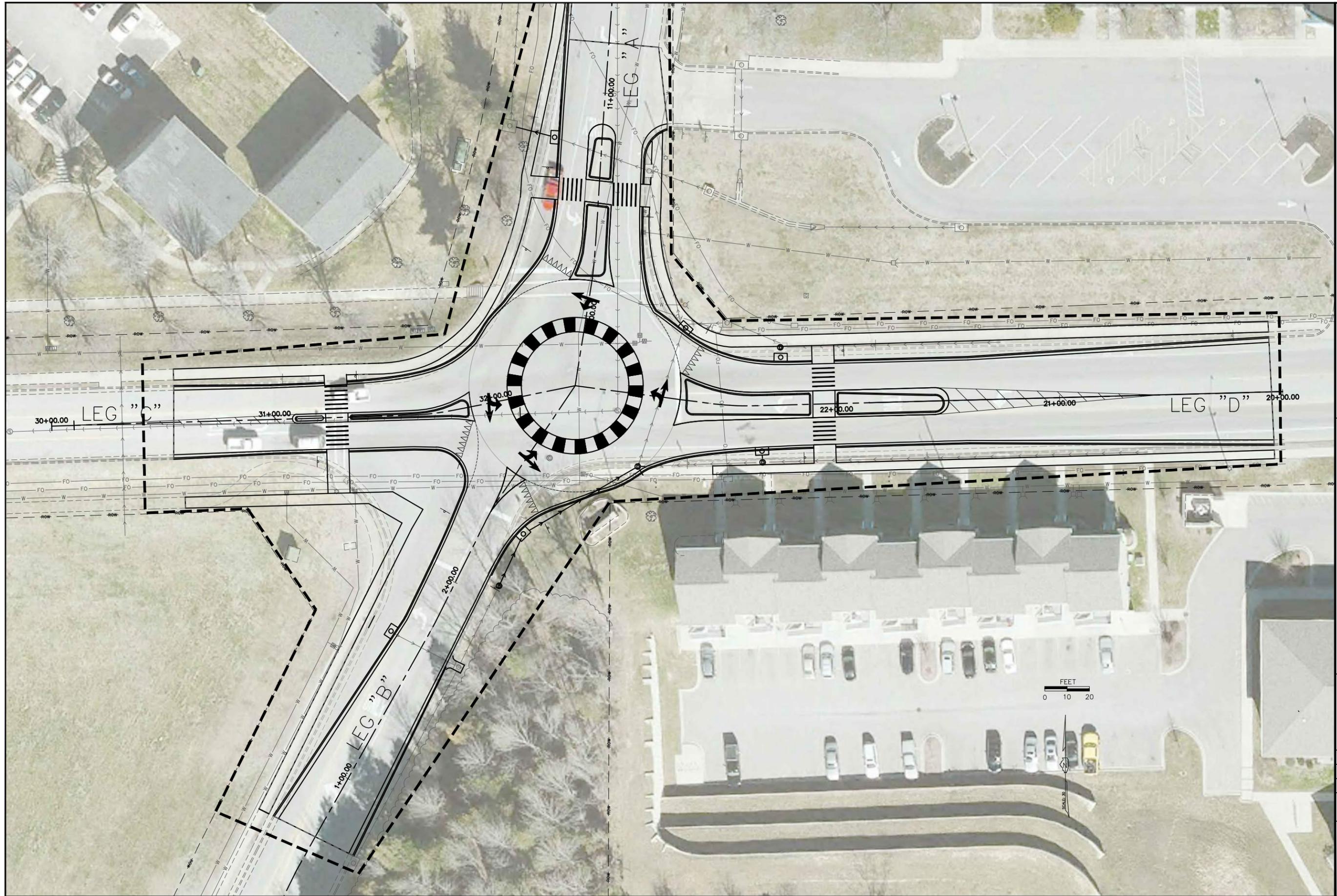
SATISFACTORY \_\_\_\_\_ DATE \_\_\_\_\_  
DISTRICT PROGRAM DEVELOPMENT ENGINEER

SATISFACTORY \_\_\_\_\_ DATE \_\_\_\_\_  
DISTRICT OPERATIONS ENGINEER

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
DEPUTY DIRECTOR OF HIGHWAYS, REGION FIVE

JOB NO: ST0903  
DRAWN BY: SDP  
DATE: 07/24/2018  
REVISIONS:

1  
OF 6 SHEETS



Sheet Title: GEOMETRICS

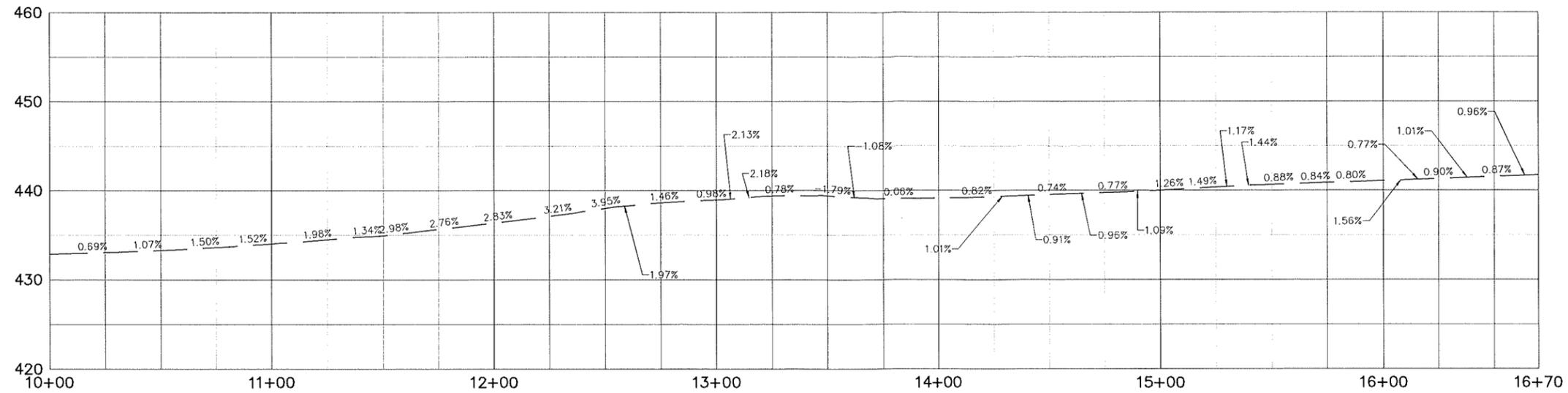
Project Title: INTERSECTION DESIGN STUDY  
 INTERSECTION IMPROVEMENTS  
 GRAND AVENUE AND LEWIS LANE

Public Works - Engineering

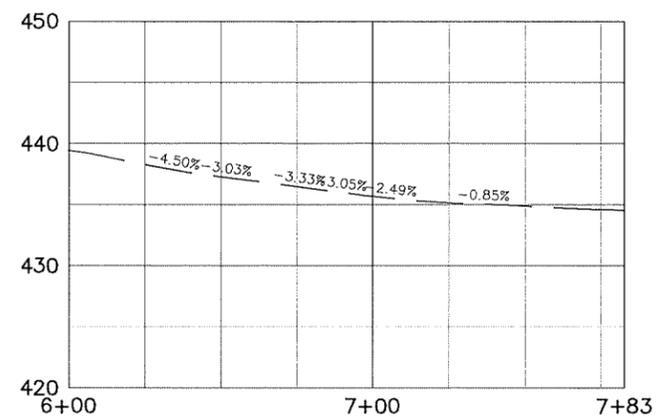
200 South Illinois Avenue  
 Carbondale, IL 62901  
 (618) 457-3270



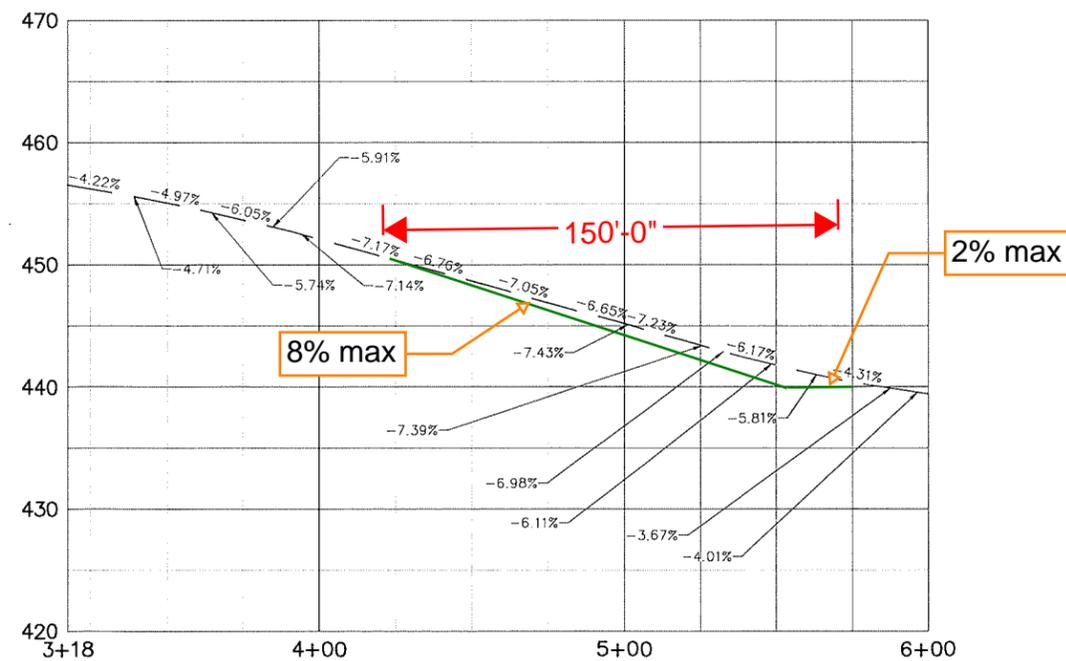
JOB NO: ST0903  
 DRAWN BY: SDP  
 DATE: 07/24/18  
 REVISIONS:



EXISTING PROFILE: EAST GRAND AVENUE



EXISTING PROFILE: LEWIS LANE, NORTH LEG



EXISTING PROFILE: LEWIS LANE, SOUTH LEG

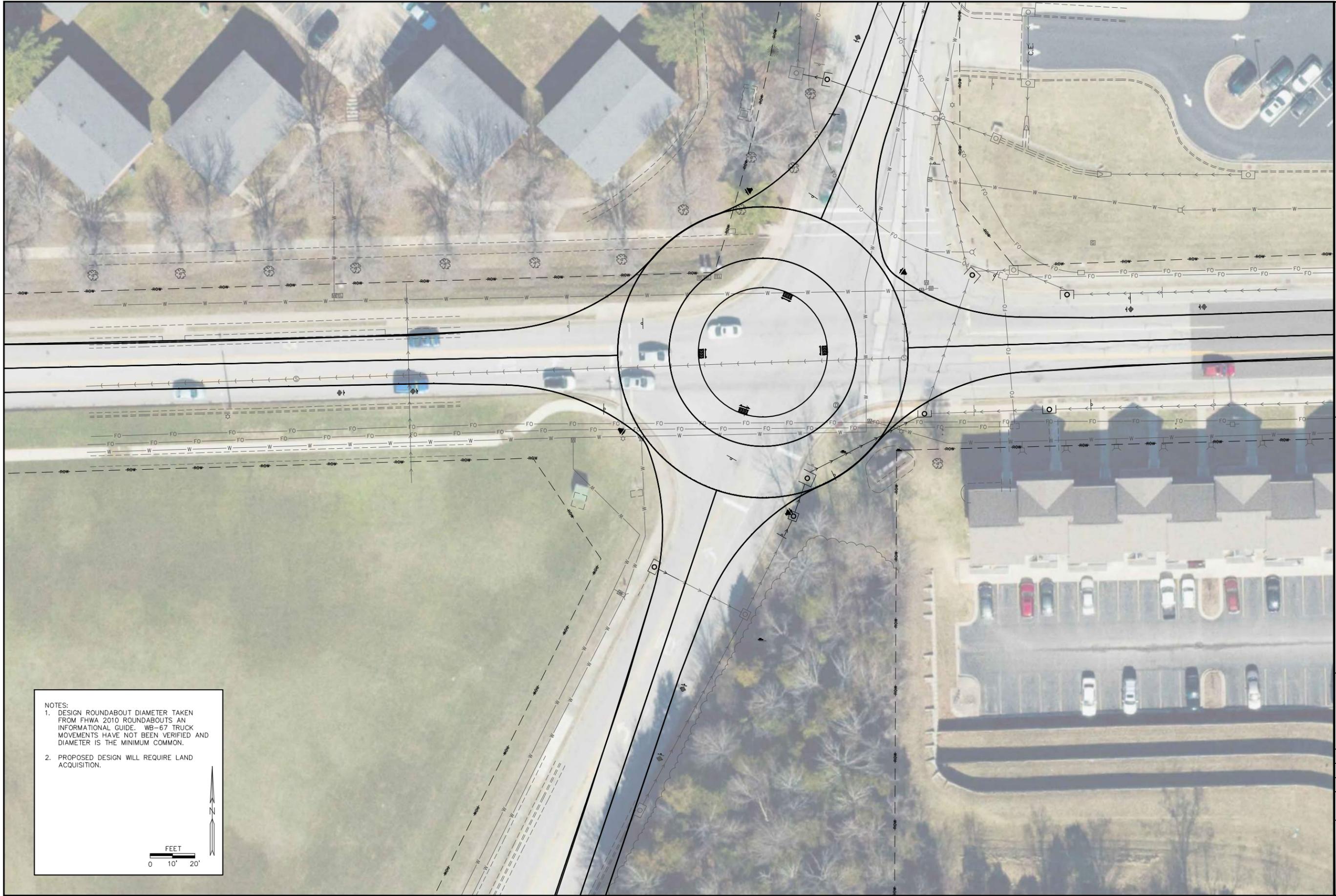
Sheet Title: EXISTING - PROFILES  
 Project Title: GRAND AVE AND LEWIS LANE ROUNDABOUT  
 STATION M2+00 TO XXX

Public Works - Engineering  
 200 South Illinois Avenue  
 Carbondale, IL 62901  
 (618) 457-3270



JOB NO: ST0903  
 DRAWN BY: SDP  
 DATE: 10/2017  
 REVISIONS: 10/02/18

EX. 7.A  
 OF \_ SHEETS



NOTES:  
 1. DESIGN ROUNDABOUT DIAMETER TAKEN FROM FHWA 2010 ROUNDABOUTS AN INFORMATIONAL GUIDE. WB-67 TRUCK MOVEMENTS HAVE NOT BEEN VERIFIED AND DIAMETER IS THE MINIMUM COMMON.  
 2. PROPOSED DESIGN WILL REQUIRE LAND ACQUISITION.

	Public Works - Engineering 200 South Illinois Avenue Carbondale, IL 62901 (618) 457-3270	<b>Sheet Title:</b> INFORMATIONAL PLAN SKETCH <b>Project Title:</b> GRAND AVE AND LEWIS LANE ROUNDABOUT
JOB NO: ST0903 DRAWN BY: SDP DATE: 01/07/19 REVISIONS:		<b>1</b> OF 1 SHEETS

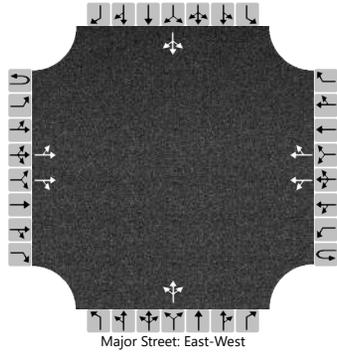
## **APPENDIX 5**

### **Road Diet Analysis on the Intersection of E. Grand and State St.**

# HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	MI	Intersection	Grand Ave and State St				
Agency/Co.	Oates Associates	Jurisdiction	IDOT				
Date Performed	1/16/2023	East/West Street	Grand Ave				
Analysis Year	2022	North/South Street	State St				
Time Analyzed	PM Peak	Peak Hour Factor	0.91				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	Grand Ave and State St						

## Intersection of State and Grand - Existing Condition



Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	1	0		0	1	0
Configuration		LT		TR		LT		TR			LTR				LTR	
Volume (veh/h)		51	415	5		10	342	46		5	0	9		42	1	41
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked		0.000				0.000				0.000	0.000	0.000		0.000	0.000	0.000
Percent Grade (%)									2				2			
Right Turn Channelized																
Median Type   Storage	Undivided															

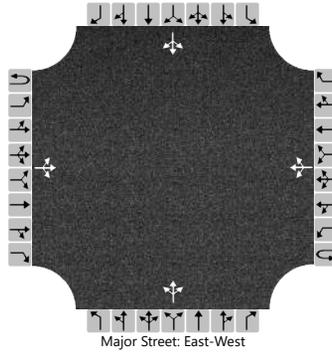
Critical and Follow-up Headways																
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.96	6.96	7.16		7.96	6.96	7.16
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service																		
Flow Rate, v (veh/h)		56				11					15					92		
Capacity, c (veh/h)		1122				1089					408					365		
v/c Ratio		0.05				0.01					0.04					0.25		
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0					0.1					1.0		
Control Delay (s/veh)		8.4	0.4			8.3	0.1				14.2					18.2		
Level of Service (LOS)		A	A			A	A				B					C		
Approach Delay (s/veh)		1.2				0.3					14.2				18.2			
Approach LOS		A				A					B				C			

# HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	MI			Intersection	Grand Ave and State St		
Agency/Co.	Oates Associates			Jurisdiction	IDOT		
Date Performed	1/16/2023			East/West Street	Grand Ave		
Analysis Year	2022			North/South Street	State St		
Time Analyzed	PM Peak			Peak Hour Factor	0.91		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Grand Ave and State St						

## Intersection of State and Grand - Road Diet Condition



### Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		51	415	5		10	342	46		5	0	9		42	1	41
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked		0.000				0.000				0.000	0.000	0.000		0.000	0.000	0.000
Percent Grade (%)									2				2			
Right Turn Channelized																
Median Type   Storage	Undivided															

### Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.53	6.93	6.43		7.53	6.93	6.43
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

### Delay, Queue Length, and Level of Service

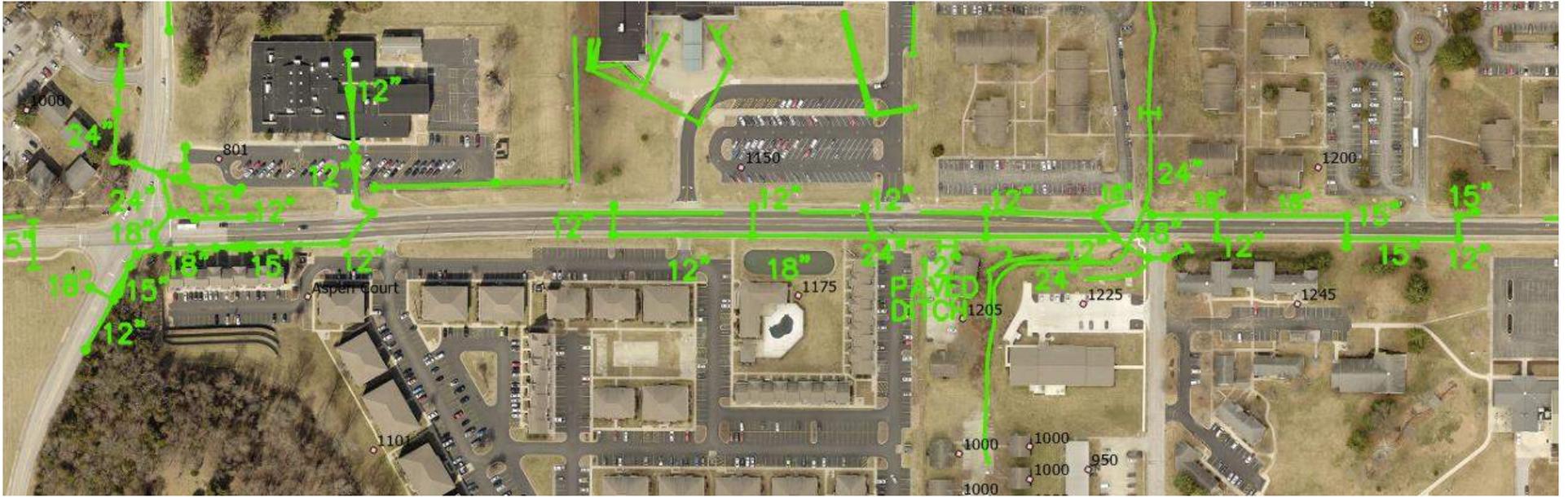
Flow Rate, v (veh/h)		56				11					15					92
Capacity, c (veh/h)		1128				1094					318					276
v/c Ratio		0.05				0.01					0.05					0.33
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0					0.2					1.4
Control Delay (s/veh)		8.4	0.6	0.6		8.3	0.1	0.1			16.9					24.4
Level of Service (LOS)		A	A	A		A	A	A			C					C
Approach Delay (s/veh)		1.4				0.3				16.9				24.4		
Approach LOS		A				A				C				C		

## **APPENDIX 6**

### **Existing Stormwater System Exhibit**



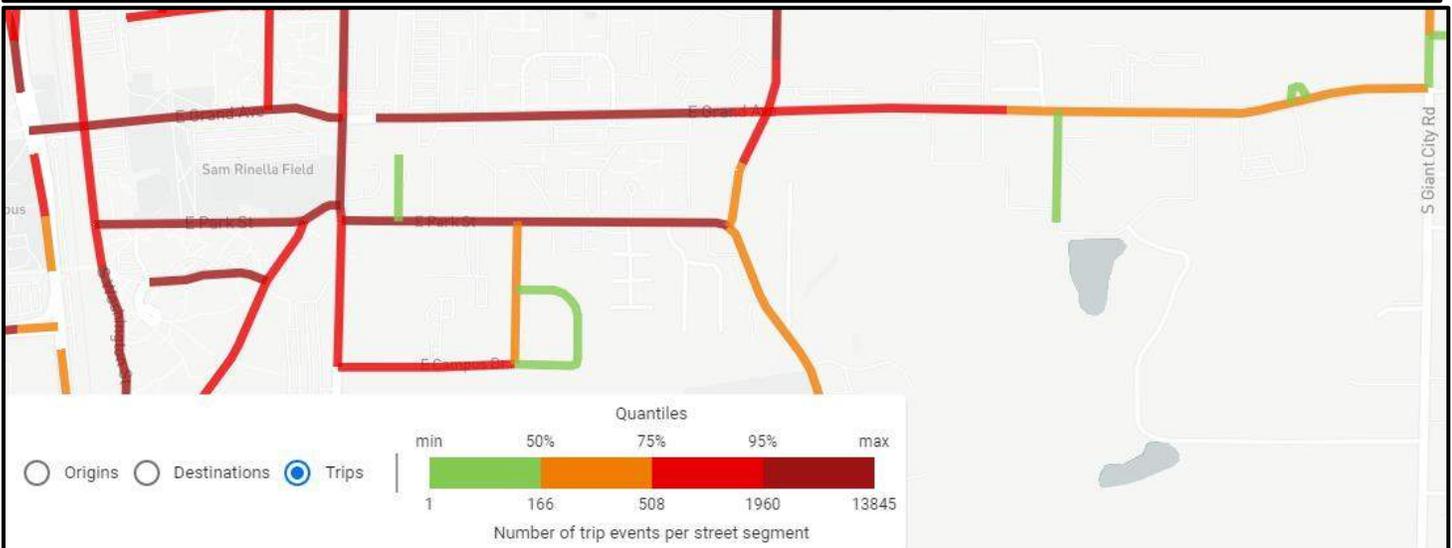
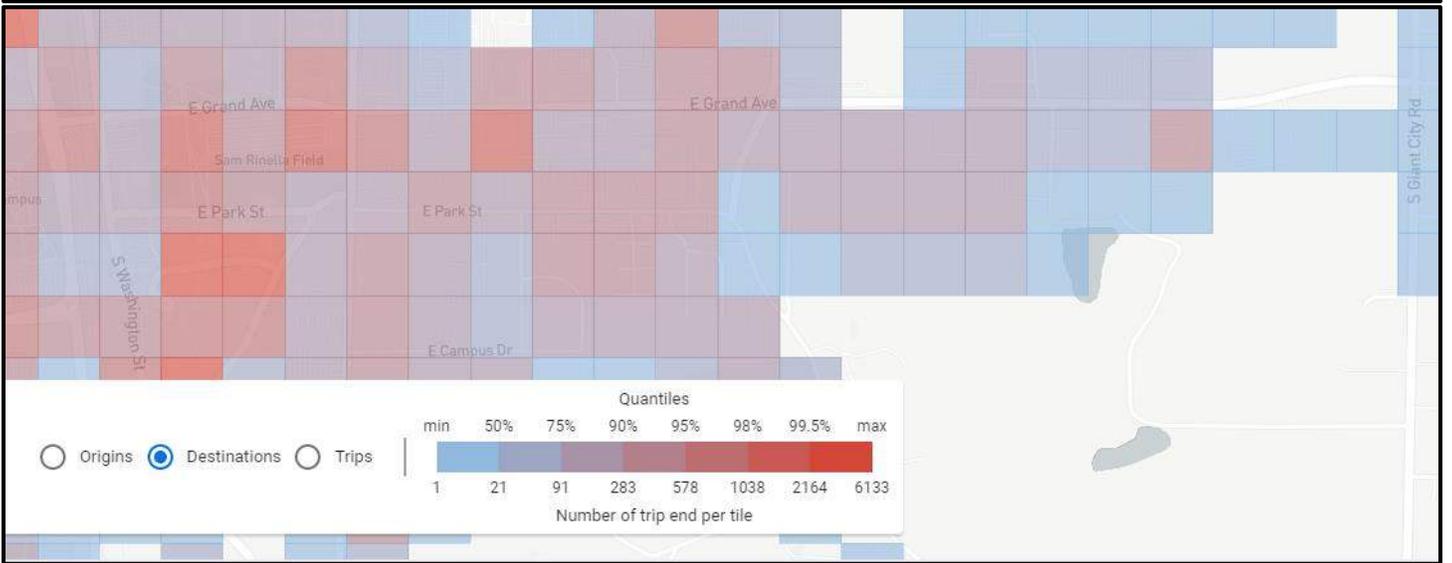
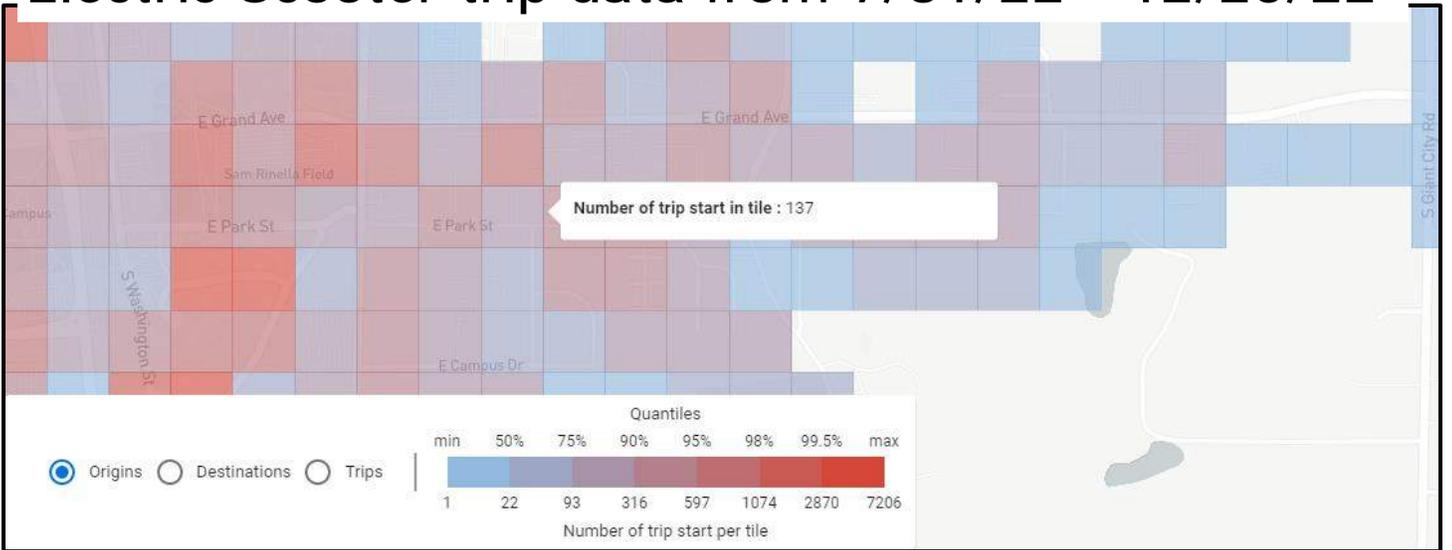




# **APPENDIX 7**

## **Electronic Scooter Data**

# Electric Scooter trip data from 7/31/22 - 12/20/22



# **APPENDIX 8**

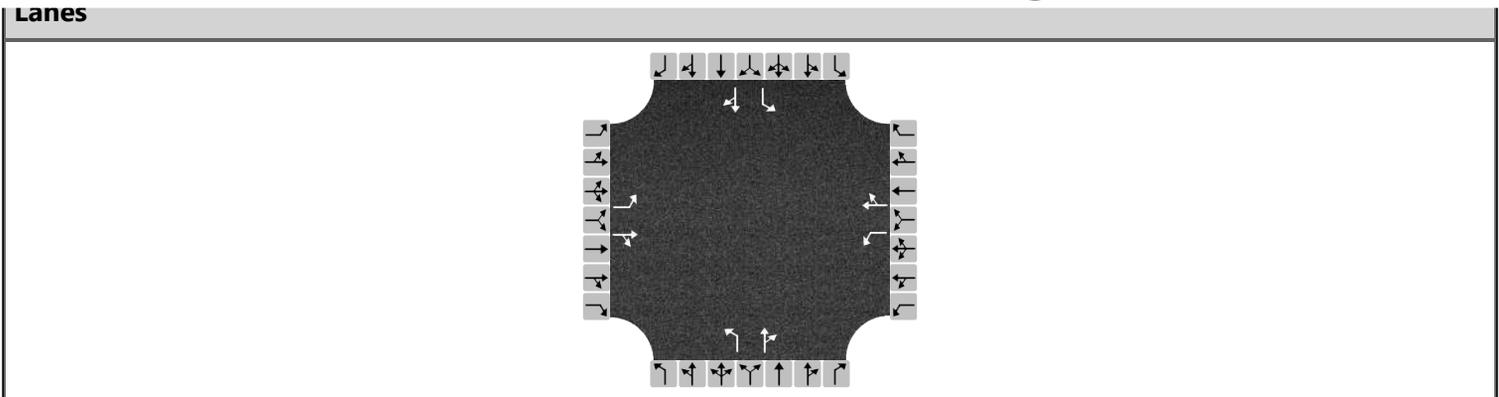
## **Level of Service Analysis**

### **Intersection of E. Grand and State St.**

# HCS All-Way Stop Control Report

General Information		Site Information	
Analyst	Mohiuddin Imran	Intersection	Grand Avenue and Lewis Ln
Agency/Co.	Oates Associates	Jurisdiction	IDOT
Date Performed	1/16/2023	East/West Street	Grand Avenue
Analysis Year	2015	North/South Street	Lewis Ln
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.76
Time Analyzed	6:30-7:30 AM (2017)		

## Lewis and Grand Intersection - Existing Conditions (am)



Vehicle Volume and Adjustments												
Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	83	143	2	28	270	92	9	53	47	103	31	91
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		L	TR		L	TR		L	TR	
Flow Rate, v (veh/h)	109	191		37	476		12	132		136	161	
Percent Heavy Vehicles	3	6		0	2		0	6		3	4	

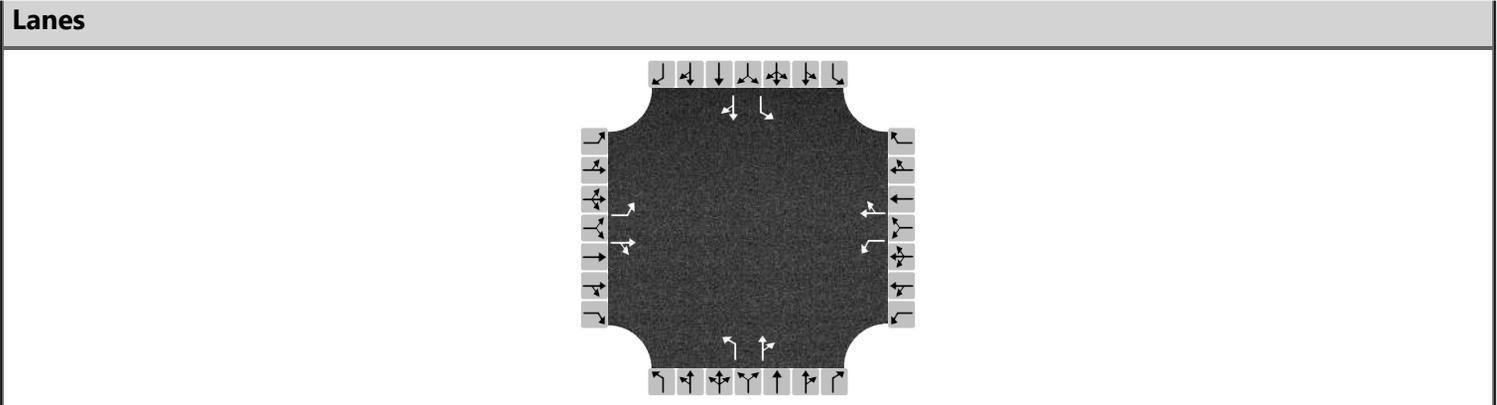
Departure Headway and Service Time												
Initial Departure Headway, hd (s)	3.20	3.20		3.20	3.20		3.20	3.20		3.20	3.20	
Initial Degree of Utilization, x	0.097	0.170		0.033	0.423		0.011	0.117		0.120	0.143	
Final Departure Headway, hd (s)	7.22	6.76		6.87	6.23		7.84	7.12		7.60	6.59	
Final Degree of Utilization, x	0.219	0.358		0.070	0.824		0.026	0.260		0.286	0.294	
Move-Up Time, m (s)	2.3	2.3		2.3	2.3		2.3	2.3		2.3	2.3	
Service Time, ts (s)	4.92	4.46		4.57	3.93		5.54	4.82		5.30	4.29	

Capacity, Delay and Level of Service												
Flow Rate, v (veh/h)	109	191		37	476		12	132		136	161	
Capacity	499	532		524	578		459	506		474	546	
95% Queue Length, Q <sub>95</sub> (veh)	0.8	1.6		0.2	8.4		0.1	1.0		1.2	1.2	
Control Delay (s/veh)	11.9	13.2		10.1	31.6		10.8	12.3		13.3	12.0	
Level of Service, LOS	B	B		B	D		B	B		B	B	
Approach Delay (s/veh)	12.7			30.1			12.2			12.6		
Approach LOS	B			D			B			B		
Intersection Delay, s/veh   LOS	19.7						C					

# HCS All-Way Stop Control Report

General Information		Site Information	
Analyst	Mohiuddin Imran	Intersection	Grand Avenue and Lewis Ln
Agency/Co.	Oates Associates	Jurisdiction	IDOT
Date Performed	1/16/2023	East/West Street	Grand Avenue
Analysis Year	2015	North/South Street	Lewis Ln
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.91
Time Analyzed	3:15-4:15 PM (2017)		

## Lewis and Grand Intersection - Existing Conditions (pm)



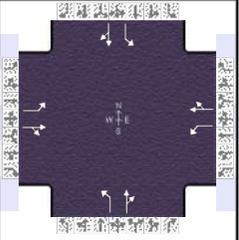
Approach	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Movement												
Volume	170	303	13	71	244	71	19	77	50	68	81	182
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		L	TR		L	TR		L	TR	
Flow Rate, v (veh/h)	187	347		78	346		21	140		75	289	
Percent Heavy Vehicles	0	1		2	6		0	3		3	5	

Departure Headway and Service Time												
Initial Departure Headway, hd (s)	3.20	3.20		3.20	3.20		3.20	3.20		3.20	3.20	
Initial Degree of Utilization, x	0.166	0.309		0.069	0.308		0.019	0.124		0.066	0.257	
Final Departure Headway, hd (s)	7.52	7.01		7.70	7.11		8.45	7.72		8.05	7.10	
Final Degree of Utilization, x	0.390	0.676		0.167	0.683		0.049	0.299		0.167	0.570	
Move-Up Time, m (s)	2.3	2.3		2.3	2.3		2.3	2.3		2.3	2.3	
Service Time, ts (s)	5.22	4.71		5.40	4.81		6.15	5.42		5.75	4.80	

Capacity, Delay and Level of Service												
Flow Rate, v (veh/h)	187	347		78	346		21	140		75	289	
Capacity	479	514		468	506		426	466		447	507	
95% Queue Length, Q <sub>95</sub> (veh)	1.8	5.0		0.6	5.2		0.2	1.2		0.6	3.5	
Control Delay (s/veh)	15.0	23.1		11.9	23.8		11.6	13.7		12.4	18.8	
Level of Service, LOS	B	C		B	C		B	B		B	C	
Approach Delay (s/veh)	20.3			21.6			13.4			17.5		
Approach LOS	C			C			B			C		
Intersection Delay, s/veh   LOS	19.2						C					

# Lewis and Grand Intersection - Signalized Conditions (am)

General Information				Intersection Information			
Agency	Oates Associates			Duration, h	0.250		
Analyst	MI	Analysis Date	Jan 16, 2023	Area Type	Other		
Jurisdiction	IDOT	Time Period	AM Peak	PHF	0.76		
Urban Street	Grand Avenue	Analysis Year	2015	Analysis Period	1 > 7:00		
Intersection	Grand Avenue and Lewi...	File Name	Signal_AM Peak (2017).xus				
Project Description	AM Peak (2017)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	83	143	2	28	270	92	9	53	47	103	31	91

Signal Information				Phase Diagrams								
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	10.0	30.0	10.0	20.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	1.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	15.0	35.0	15.0	35.0	15.0	25.0	15.0	25.0
Change Period, ( Y+R <sub>c</sub> ), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway ( MAH ), s	3.2	3.1	3.2	3.1	3.2	3.3	3.2	3.3
Queue Clearance Time ( g <sub>s</sub> ), s	5.3	9.2	3.1	26.7	2.4	7.8	7.1	9.1
Green Extension Time ( g <sub>e</sub> ), s	0.1	1.3	0.0	0.6	0.0	0.5	0.1	0.4
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.15	0.00	0.00	0.91	0.00	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( v ), veh/h	109	191		37	464		12	126		136	149	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1745	1783		1787	1595		1787	1654		1745	1607	
Queue Service Time ( g <sub>s</sub> ), s	3.3	7.2		1.1	24.7		0.4	5.8		5.1	7.1	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	3.3	7.2		1.1	24.7		0.4	5.8		5.1	7.1	
Green Ratio ( g/C )	0.44	0.33		0.44	0.33		0.33	0.22		0.33	0.22	
Capacity ( c ), veh/h	308	594		555	532		429	368		442	357	
Volume-to-Capacity Ratio ( X )	0.355	0.321		0.066	0.874		0.028	0.344		0.307	0.416	
Back of Queue ( Q ), ft/ln ( 95 th percentile)												
Back of Queue ( Q ), veh/ln ( 95 th percentile)	2.8	5.7		0.8	17.3		0.3	4.5		4.0	5.5	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.57	0.00		0.18	0.00		0.07	0.00		0.82	0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh	19.3	22.4		14.7	28.2		20.6	29.5		22.1	30.0	
Incremental Delay ( d <sub>2</sub> ), s/veh	3.2	1.4		0.2	17.8		0.1	2.5		1.8	3.5	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	22.5	23.8		14.9	46.1		20.7	32.0		23.9	33.5	
Level of Service ( LOS )	C	C		B	D		C	C		C	C	
Approach Delay, s/veh / LOS	23.3	C		43.8	D		31.0	C		28.9	C	
Intersection Delay, s/veh / LOS	33.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.93	B	1.94	B	1.93	B
Bicycle LOS Score / LOS	0.98	A	1.31	A	0.72	A	0.96	A

# Lewis and Grand Intersection - Roundabout (am)

General Information					Site Information				
Analyst	MI				Intersection	Grand Avenue and Lewis Lane			
Agency or Co.	Oates Associates				E/W Street Name	Grand Avenue			
Date Performed	1/16/2023				N/S Street Name	Lewis Lane			
Analysis Year	2015				Analysis Time Period (hrs)	0.25			
Time Analyzed	6:30-7:30 AM (2017)				Peak Hour Factor	0.76			
Project Description	Grand Avenue and Lewis Lane				Jurisdiction	IDOT			

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	83	143	2	0	28	270	92	0	9	53	47	0	103	31	91
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v <sub>pce</sub> ), pc/h	0	112	194	3	0	38	366	125	0	12	72	64	0	140	42	123
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	19				2				57				57			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass										
Critical Headway (s)		5.1929			5.1929			5.1929			5.1929		
Follow-Up Headway (s)		3.1858			3.1858			3.1858			3.1858		

Flow Computations, Capacity and v/c Ratios													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass										
Entry Flow (v <sub>e</sub> ), pc/h		309			529			148			305		
Entry Volume veh/h		300			514			144			296		
Circulating Flow (v <sub>c</sub> ), pc/h	220			196			446			416			
Exiting Flow (v <sub>ex</sub> ), pc/h	398			501			309			83			
Capacity (c <sub>pce</sub> ), pc/h		907			929			723			745		
Capacity (c), veh/h		878			902			697			718		
v/c Ratio (x)		0.34			0.57			0.21			0.41		

Delay and Level of Service													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass										
Lane Control Delay (d), s/veh		7.9			12.0			7.5			10.5		
Lane LOS		A			B			A			B		
95% Queue, veh		1.5			3.7			0.8			2.0		
Approach Delay, s/veh	7.9			12.0			7.5			10.5			
Approach LOS	A			B			A			B			
Intersection Delay, s/veh   LOS	10.2						B						

# Lewis and Grand Intersection - Roundabout (pm)

General Information					Site Information							
Analyst	MI				Intersection				Grand Avenue and Lewis Lane			
Agency or Co.	Oates Associates				E/W Street Name				Grand Avenue			
Date Performed	1/16/2023				N/S Street Name				Lewis Lane			
Analysis Year	2015				Analysis Time Period (hrs)				0.25			
Time Analyzed	3:15-4:15 PM (2017)				Peak Hour Factor				0.91			
Project Description	Grand Avenue and Lewis Lane				Jurisdiction				IDOT			

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	170	303	13	0	71	244	71	0	19	77	50	0	68	81	182
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v <sub>pce</sub> ), pc/h	0	192	343	15	0	80	276	80	0	22	87	57	0	77	92	206
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	19				2				57				57			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass										
Critical Headway (s)		5.1929			5.1929			5.1929			5.1929		
Follow-Up Headway (s)		3.1858			3.1858			3.1858			3.1858		

Flow Computations, Capacity and v/c Ratios													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass										
Entry Flow (v <sub>e</sub> ), pc/h		550			436			166			375		
Entry Volume veh/h		534			423			161			364		
Circulating Flow (v <sub>c</sub> ), pc/h	249			301			612			378			
Exiting Flow (v <sub>ex</sub> ), pc/h	477			504			359			187			
Capacity (c <sub>pce</sub> ), pc/h		881			836			613			774		
Capacity (c), veh/h		853			812			590			746		
v/c Ratio (x)		0.63			0.52			0.27			0.49		

Delay and Level of Service													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass										
Lane Control Delay (d), s/veh		14.1			11.8			9.7			11.8		
Lane LOS		B			B			A			B		
95% Queue, veh		4.5			3.1			1.1			2.7		
Approach Delay, s/veh	14.1			11.8			9.7			11.8			
Approach LOS	B			B			A			B			
Intersection Delay, s/veh   LOS	12.4						B						

# **APPENDIX 9**

**U.S. Department of Transportation**

**Federal Highway Administration, FHWA-SA-20-015**

**The Safe System Approach**

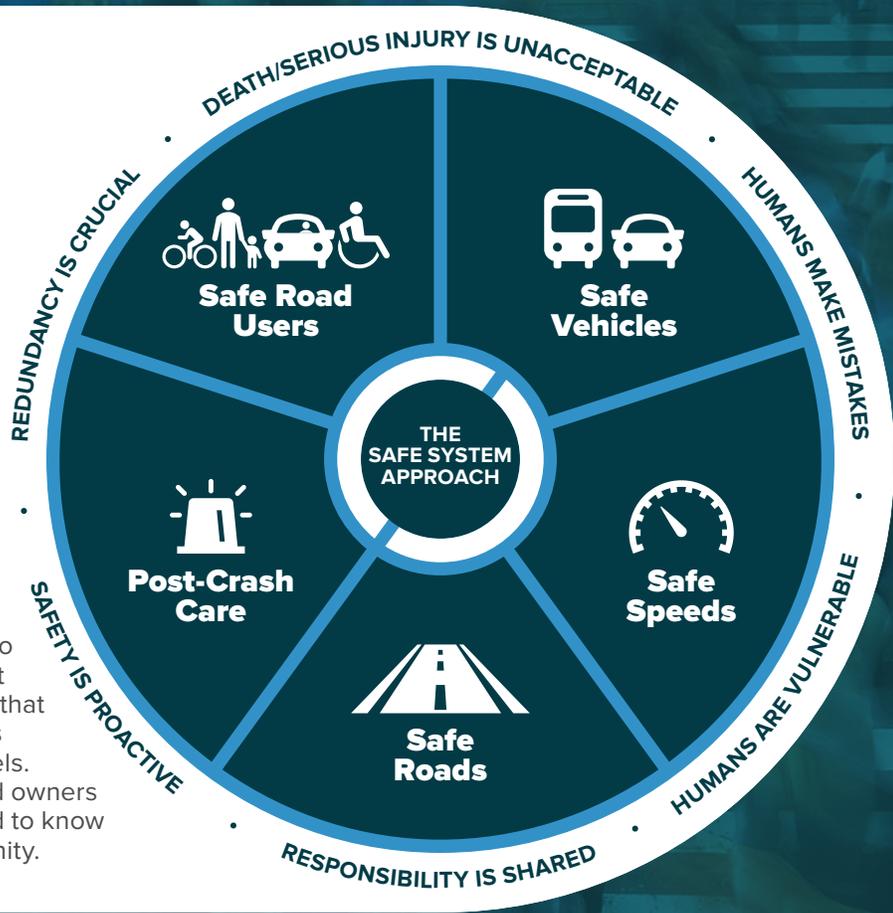


# SAFE SYSTEM

## APPROACH

**Zero is our goal. A Safe System is how we will get there.**

**Imagine a world where nobody has to die from vehicle crashes.** The Safe System approach aims to eliminate fatal & serious injuries for all road users. It does so through a holistic view of the road system that first anticipates human mistakes and second keeps impact energy on the human body at tolerable levels. Safety is an ethical imperative of the designers and owners of the transportation system. Here's what you need to know to bring the Safe System approach to your community.



## SAFE SYSTEM PRINCIPLES



### Death/Serious Injury is Unacceptable

While no crashes are desirable, the Safe System approach prioritizes crashes that result in death and serious injuries, since no one should experience either when using the transportation system.



### Humans Make Mistakes

People will inevitably make mistakes that can lead to crashes, but the transportation system can be designed and operated to accommodate human mistakes and injury tolerances and avoid death and serious injuries.



### Humans Are Vulnerable

People have limits for tolerating crash forces before death and serious injury occurs; therefore, it is critical to design and operate a transportation system that is human-centric and accommodates human vulnerabilities.



### Responsibility is Shared

All stakeholders (transportation system users and managers, vehicle manufacturers, etc.) must ensure that crashes don't lead to fatal or serious injuries.



### Safety is Proactive

Proactive tools should be used to identify and mitigate latent risks in the transportation system, rather than waiting for crashes to occur and reacting afterwards.



### Redundancy is Crucial

Reducing risks requires that all parts of the transportation system are strengthened, so that if one part fails, the other parts still protect people.



U.S. Department of Transportation  
**Federal Highway Administration**

FHWA-SA-20-015



**Safe Roads for a Safer Future**  
*Investment in roadway safety saves lives*

## SAFE SYSTEM ELEMENTS

**Making a commitment to zero deaths means addressing every aspect of crash risks through the five elements of a Safe System, shown below.** These layers of protection and shared responsibility promote a holistic approach to safety across the entire transportation system. The key focus of the Safe System approach is to reduce death and serious injuries through design that accommodates human mistakes and injury tolerances.



### Safe Road Users

The Safe System approach addresses the safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes.



### Safe Vehicles

Vehicles are designed and regulated to minimize the occurrence and severity of collisions using safety measures that incorporate the latest technology.



### Safe Speeds

Humans are unlikely to survive high-speed crashes. Reducing speeds can accommodate human injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.



### Safe Roads

Designing to accommodate human mistakes and injury tolerances can greatly reduce the severity of crashes that do occur. Examples include physically separating people traveling at different speeds, providing dedicated times for different users to move through a space, and alerting users to hazards and other road users.



### Post-Crash Care

When a person is injured in a collision, they rely on emergency first responders to quickly locate them, stabilize their injury, and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

## THE SAFE SYSTEM APPROACH VS. TRADITIONAL ROAD SAFETY PRACTICES

### Traditional

- Prevent crashes → Prevent deaths and serious injuries
- Improve human behavior → Design for human mistakes/limitations
- Control speeding → Reduce system kinetic energy
- Individuals are responsible → Share responsibility
- React based on crash history → Proactively identify and address risks

### Safe System

Whereas traditional road safety strives to modify human behavior and prevent all crashes, the Safe System approach also refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

WHERE ARE  
**YOU** ON THE  
SAFE SYSTEM  
JOURNEY?

Implementing the Safe System approach is our shared responsibility, and we all have a role. It requires shifting how we think about transportation safety and how we prioritize our transportation investments. Consider applying a Safe System lens to upcoming projects and plans in your community: put safety at the forefront and design to accommodate human mistakes and injury tolerances. Visit [safety.fhwa.dot.gov/zerodeaths](https://safety.fhwa.dot.gov/zerodeaths) to learn more.

## **APPENDIX 10**

**City of Carbondale, Resolution No. 2015 – R – 12**

**Resolution Adopting A Complete Streets Policy**

**RESOLUTION NO. 2015 - R - 12**

**RESOLUTION ADOPTING A COMPLETE STREETS POLICY**

**WHEREAS**, transportation, quality of life, and economic development are all connected through well planned, well designed and context sensitive transportation solutions; and

**WHEREAS**, Complete Streets are defined as streets that are designed and operated to enable safe and convenient access for all users of the roadway including pedestrians, bicyclists, transit users, and vehicular traffic; and

**WHEREAS**, the City of Carbondale, Illinois, views all transportation improvements as opportunities to connect neighborhoods, calm traffic and improve safety, provide greater access and mobility of users of the public way, and recognize bicycle, pedestrian, and transit modes as integral elements of the transportation system; and

**WHEREAS**, the City of Carbondale Comprehensive Plan promotes a transportation principal that Carbondale residents should be able to drive, walk, or bike safely and conveniently through the City for daily needs and activities; and

**WHEREAS**, numerous jurisdictions in the United States have adopted Complete Streets policies, including the State of Illinois and the Illinois Department of Transportation (IDOT).

**NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF CARBONDALE, ILLINOIS, AS FOLLOWS:**

1. Complete Streets can be achieved through network level improvements, through integration into single location projects, or incrementally through a series of small improvements or maintenance activities. Decisions regarding the public right-of-way shall promote use by pedestrians, bicyclists, public transit and motor vehicles, in a safe and effective manner taking into account the surrounding community context and land uses. The City shall strive to create a comprehensive, integrated and connected network of transportation options for all modes of

conveyance, designed and operated to enable appropriate and safe access for all users.

2. The Complete Streets policy shall be applied to all projects involving roadway improvements and the movement of people when feasible. It is understood that there may be circumstances in which it may not be practical or feasible to apply the Policy. Such circumstances include the following:

- a. The scope of the relevant project is limited to maintenance activities intended to keep the roadway in serviceable condition.
- b. There is sufficient documentation that there is no feasible way to accommodate improvements for non-vehicular traffic with a project's scope and/or budget.
- c. There is no documented current or anticipated need for accommodations of non-motorized roadway users or the road is not a current or planned transit route.
- d. The cost for a particular Complete Street design recommendation would be excessively disproportionate to the need of that particular improvement, with due consideration given to future users, latent demand, and the social and economic value of providing a safer and more convenient transportation system for all users.
- e. Documented environmental constraints or unsafe transportation issues.

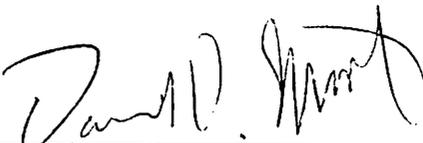
3. Complete Streets improvements create a connected network of facilities accommodating each mode of travel that is consistent with and supportive of the local community, recognizing that all streets are different and that the needs of various users will need to be balanced in a flexible manner. The City will generally follow accepted or adopted best practice design standards when implementing improvements intended to fulfill this Complete Streets Policy, but will also consider innovative or non-traditional design options to fit within the context of the community, provide the needed flexibility based on the characteristics of the corridor, and provide a comparable level of safety and connectivity.

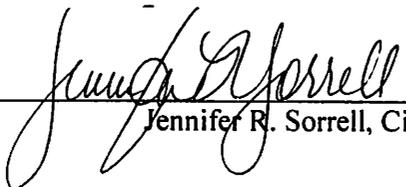
4. The City shall incorporate Complete Streets into budgeting processes, work plans, and staffing projections and consider Complete Streets as one of the priorities in roadway

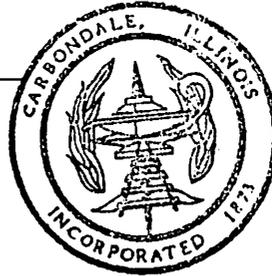
planning and funding decisions. Staff shall prioritize the safe movement of pedestrians, bicycle and public transportation traffic in decisions regarding the use of limited public right-of-way, with consideration given to roadway context and land use. Staff will review and revise as necessary plans, manuals, policies, processes and programs to encourage the implementation of Complete Streets.

5. That this Resolution be spread at length upon the minute records of the City Council of the City of Carbondale, Illinois.

This Resolution adopted at a regular meeting of the City Council of the City of Carbondale on the 14<sup>th</sup> day of April 2015.

APPROVED:   
Donald D. Monty, Acting Mayor

ATTEST:   
Jennifer R. Sorrell, City Clerk



APPROVED AS TO LEGALITY AND FORM:

  
P. Michael Kimmel, City Attorney

FOR: Jack, Adams, Fronabarger,  
McDaniel, Bradshaw, Harvey, Monty  
AGAINST: None  
PASSED: April 14, 2015  
APPROVED: April 14, 2015  
RECORDED: April 15, 2015  
PUBLISHED: April 15, 2015