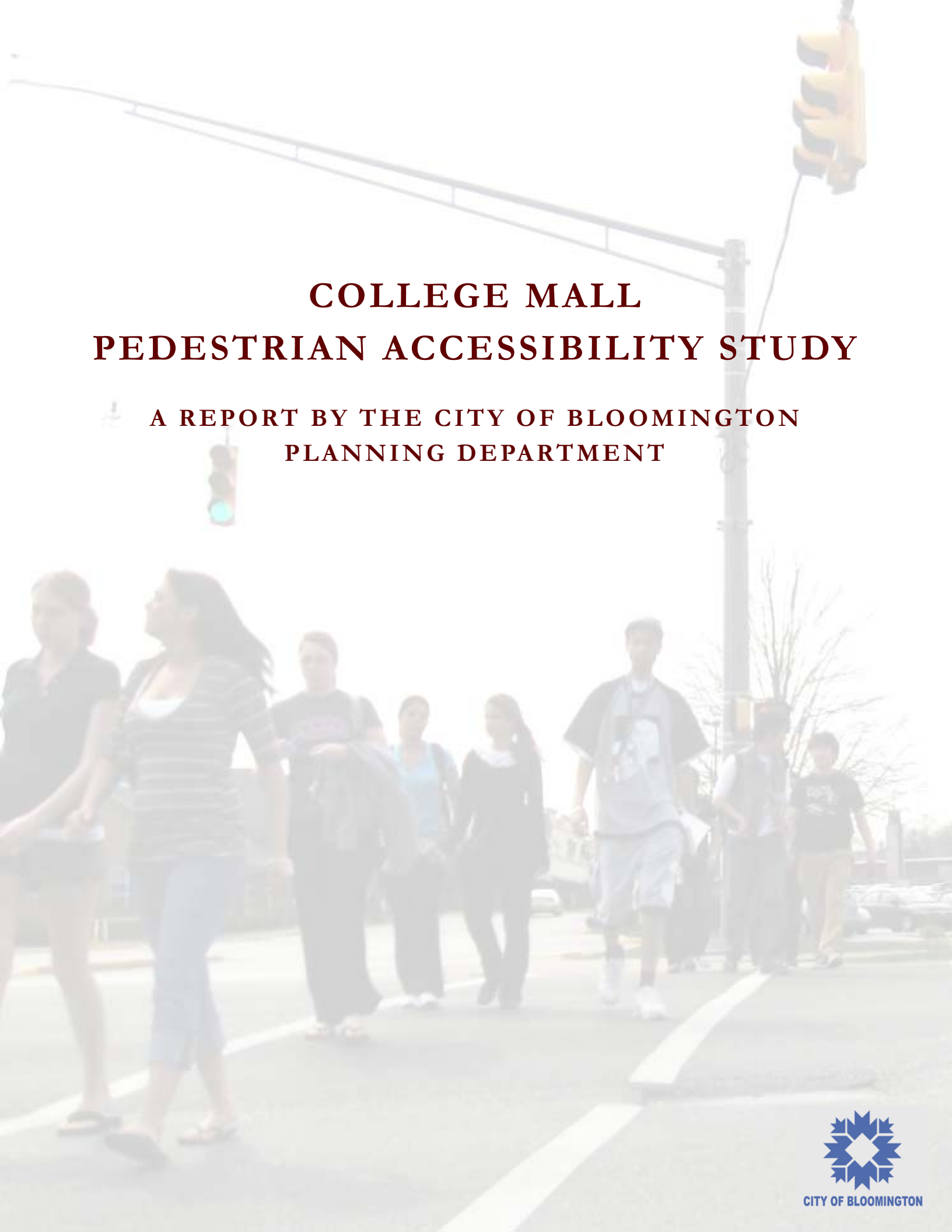

COLLEGE MALL PEDESTRIAN ACCESSIBILITY STUDY

A REPORT BY THE CITY OF BLOOMINGTON PLANNING DEPARTMENT

CITY OF BLOOMINGTON

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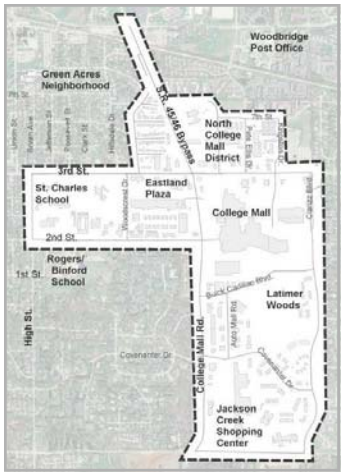
Introduction

The College Mall Pedestrian Accessibility Study identifies the most important barriers and potential solutions to walking in the College Mall area. The report is organized into five sections: Introduction, Land Use/Transportation Context, Existing Pedestrian Infrastructure, Recommendations, and Implementation. The key finding of the report is that there is great potential for walking in the College Mall area, but that current land use patterns and pedestrian infrastructure limit the viability of walking for transportation. Recommendations focus on the public right-of-way, but also include a few suggested improvements for private property.

Land Use/Transportation Context

The College Mall area is one of the most important activity centers in the Bloomington area. A wide variety of uses are located there, including shopping, grocery stores, restaurants, entertainment, and professional services, and a substantial amount of multi-family housing is available in the area.



Study Area overview.

An innovative web-based tool called Walk Score was used to objectively quantify the mix of land uses in the College Mall area. It was found that a significant portion of the study area is "very walkable" or "somewhat walkable", while areas at the periphery are typically deemed to be "car-dependent". These findings point to the potential for walking as a mode of transportation.

To build on this finding, the street network of the College Mall area was compared to downtown Bloomington. It was found that the underlying street network significantly detracts from the area's walkability. Poor connectivity, long blocks, and an overall paucity of public streets and intersections cause vehicles to be concentrated on a small number of streets, which predictably are more difficult for pedestrians to cross than those in a grid system. This problem manifests throughout the study in the form of complicated intersections, unpredictable midblock crossings, and high vehicle speeds. Improving the street network is, therefore, an important underlying recommendation.

One of the other key findings of the study is that public transportation generates a significant amount of pedestrian traffic in the area. In particular, Bloomington Transit's "3" and "9" routes are heavily utilized. Bus stops along these routes are significant nodes of pedestrian travel in the area.

Existing Pedestrian Infrastructure

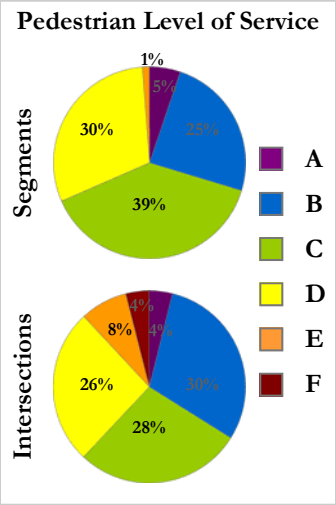
The most substantial part of the study lies in the survey of existing pedestrian infrastructure. A detailed inventory was undertaken, so as to identify the most pressing problems, and recommend potential solutions. Factors such as sidewalks, tree plots, pedestrian signals, driveway crossings, midblock crossings, and curb ramps were evaluated.

A pedestrian crosses 3rd St. at an unmarked crossing.

Most of the public streets in the study area have sidewalks, but they vary in terms of separation from the roadway and whether a tree plot exists. Signalized intersection crossings are more complicated and generally are more problematic for pedestrians in the study area. Several crossings lack pedestrian signals altogether, while others require pedestrians to wait for a significant period of time before having the

opportunity to cross. Unfortunately, excessive pedestrian delay tends to lead to pedestrian signal noncompliance, which may have been a factor in some of the pedestrian crashes noted in the study. Pedestrian push buttons are another part of the pedestrian infrastructure which can cause inconvenience and frustration, depending on their implementation. Like many aspects of the study, the appropriate application of push buttons often comes down to tradeoffs between pedestrian and automobile convenience.

Wide crossings and complicated intersections are another aspect of pedestrian travel in the area. As discussed above, these problems are attributable in part to the street network. Nonetheless, factors such as curb ramp location, curb radius, and signal phasing can be used to mitigate these concerns.

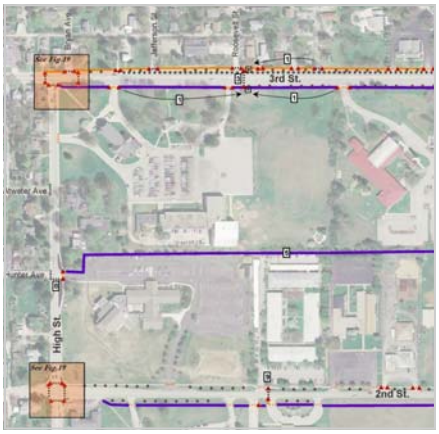


Results from Pedestrian Level of Service analysis.

There are several midblock locations in the study area where pedestrians are prone to cross. A few of these are marked, but several others are not. These midblock crossings are typically associated with the presence of a transit stop or other significant destination on one side of the street or the other. Additionally, the underlying street network, and longer blocks in particular, contribute to the problem.

Curb ramps comprise the final component of the inventory. It was found that most intersections and driveway crossings have basic curb ramps, though some of these might not meet the detailed specifications of the Americans with Disabilities Act. Beyond these, there remain a significant number of crossings that lack basic curb ramps.

To bring together the various components of the inventory, a pedestrian level of service analysis was conducted. This methodology incorporates pedestrian infrastructure, traffic volumes, and speed, providing an overall measure of the comfort and perceived safety of the walking environment. This analysis revealed that more than 30% of the pedestrian environment fall into the "A" and "B" categories, which is comfortable for almost all pedestrians. Unfortunately, an almost equal portion was determined to fall in the "D", "E", and "F" categories, which most pedestrians would find to be uncomfortable, if not a thorough deterrent from walking.



Example recommendations.

Recommended Improvements

Following from the infrastructure inventory, the study recommends a range of pedestrian improvements, including new sidewalks and multi-use paths, driveway crossing improvements, street trees, high-visibility crosswalks, pedestrian signals, curb ramps, intersection improvements, bus stop improvements, landscaping, signage, and bike lanes. The recommendations are conceptual in nature, as further evaluation may be required in many instances prior to implementation.

While the recommendations do not address broader issues such as land use and street connectivity, they present a vision for making the area much more walkable under current conditions. The improvements are broken out into ten sections covering the entire study area. Additionally, the most important signalized intersections are discussed separately and in more detail. Maps for each section are provided.

Implementation

A simple prioritization scheme was developed along two dimensions: location and type of improvement. Locations with greater pedestrian activity are given higher priority, while improvements are generally prioritized according to cost, feasibility, and impact. Accordingly, the highest priority improvements are those in areas with many pedestrians, and having a low cost, high feasibility, and large impact.

Funding for improvements could come from a variety of sources. Federal sources could include Transportation Enhancements, Surface Transportation Program, Highway Safety Improvement Program, and Federal Transit Administration funds, while local sources such as the "Greenways Fund" or the City Council Sidewalk Committee funds could be used. Additionally, improvements can be implemented in conjunction with other City or State projects.

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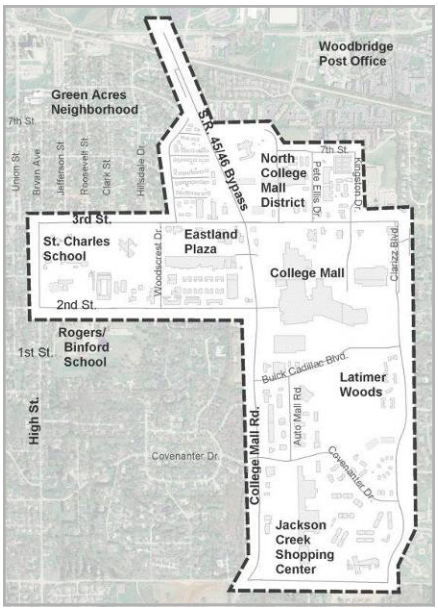
1.0 INTRODUCTION

1.1 Study Purpose

In March of 2007, the Bloomington Bicycle and Pedestrian Safety Commission (BBPSC) developed a recommendation for the City of Bloomington to initiate a planning process for the College Mall area. The members of the BBPSC felt that improvements should be made to make the area more pedestrian-friendly (their specific proposal is included as an appendix). In response, the Planning Department agreed to undertake the current study.

The College Mall Pedestrian Accessibility Study is focused on pedestrian accommodation along existing public streets. The goal is to develop a series of recommendations that, upon implementation, would significantly improve pedestrian accommodation within public rights-of-way in the College Mall area. To accomplish this goal, a detailed inventory of existing conditions was conducted. Several land use and transportation issues are also discussed throughout the study.



Study Area overview.

1.2 Study Area

The study area includes College Mall, Eastland Plaza, Jackson Creek Shopping Center, and other commercial and residential land uses in the vicinity. The following public streets are included in the study area: 3rd St., 2nd St., High St., Woodscrest Dr., College Mall Rd., Covenanter Dr., Moore's Pike, Auto Mall Rd., Buick Cadillac Blvd., Clarizz Blvd., Kingston Dr., Pete Ellis Dr., and Longview Ave. Figure 1 provides an overview of the study area.

1.3 Study Organization

The main components of the Study include: land use/transportation context, existing pedestrian infrastructure, recommended improvements, and implementation. The land use/transportation section outlines the land use and transportation system factors that influence pedestrian travel in the College Mall area. The significance of this section is that it establishes a framework for understanding the opportunities and limitations in terms of creating a walkable College Mall area. The section detailing existing pedestrian infrastructure paints an overall picture of how well pedestrians are currently served in public rights-of-way and forms the basis for infrastructure recommendations which follow. Finally, implementation strategies are discussed briefly.

2.0 LAND USE/TRANSPORTATION CONTEXT

In order to better understand the College Mall pedestrian environment, it is helpful to begin with broader concerns such as the role of the area in a citywide and regional context, the mix of land uses, the street network, and similar factors. These elements have a significant influence on walking as a mode of transportation.

2.1 Function

College Mall and surrounding commercial land uses play an important role in both a citywide and a regional perspective. Along with downtown Bloomington and commercial destinations west of S.R. 37, College Mall serves as one of three regional commercial destinations for residents of Bloomington, Ellettsville, unincorporated Monroe County, and surrounding counties. It is also in close proximity to I.U. campus housing, making it a popular shopping destination for students. Over the past few decades, residential development in the southeastern part of Bloomington has increased local demand for commercial and retail services provided in the College Mall area.

Pedestrians wait to cross College Mall Rd. at Eastland Plaza Dr.

2.2 Land Use

Vibrant, walkable neighborhoods require high density and a mix of land uses. Higher densities can result in a greater feeling of personal security among pedestrians ("eyes on the street" phenomenon), increased efficiency of public transit, more efficient land use patterns, and increased incentive for businesses to cater to pedestrians. A mix of land uses within close proximity allows pedestrians to accomplish a variety of utilitarian trips with a reasonable effort.

In general, the College Mall area can be described as a concentration of commercial and retail land uses surrounded by residential development (Figure 2). There are also several important institutional uses nearby, including St. Charles School, Rogers/Binford School, the Woodbridge Post Office, a few churches, and some government offices. Indiana University is located just west of the study area.

While there is a significant amount of multi-family housing in the area, high density residential development has not always been situated as closely to retail and commercial destinations as needed for a walkable mixed-use community. Where housing is close to commercial uses, poor pedestrian accommodation often makes it uncomfortable to walk. Given that the choice to walk is extremely sensitive to trip distance, the current distribution of retail, commercial, and residential uses suggests that only a small portion of residents in the College Mall area could be expected to routinely accomplish a variety of trips by walking. Conversely, the addition of housing into areas with existing commercial destinations would likely increase the amount of walking in the area, provided that a safe and comfortable walking environment was available.

Under the current land use scenario, walking in the College Mall area may be most appropriately viewed as an intermediate or secondary mode of transportation. In this case, walking can connect internal destinations for those visitors who arrive by public transit, bicycle, or motor vehicle ("park once and walk"). For nearby residents who are not able to routinely accomplish their utilitarian trips on foot, it is

still possible that some trips could be made by walking. For example, residents of Green Acres neighborhood who cannot shop for groceries on foot could occasionally walk to Eastland Plaza for shopping or dining. For these individuals, walking as a secondary mode of transportation could replace car trips when the opportunity is presented.

2.3 Walk Score

The concept of land use mix can be further refined through the use of a web-based tool known as Walk Score (www.walkscore.com). Walk Score uses yellow page data to objectively quantify the potential walkability of a particular location based on its proximity to a mix of land uses. Values range from 0 to 100, with higher scores deemed more "walkable." Walk Score does not account for the safety or comfort of the walking environment, and thus is a measure of the potential for walking, based on distance alone. For this study, the College Mall area was divided into an 8 x 8 grid with ¼ mile x ¼ mile cells, and the Walk Score for the address closest to the center of each cell was retrieved.

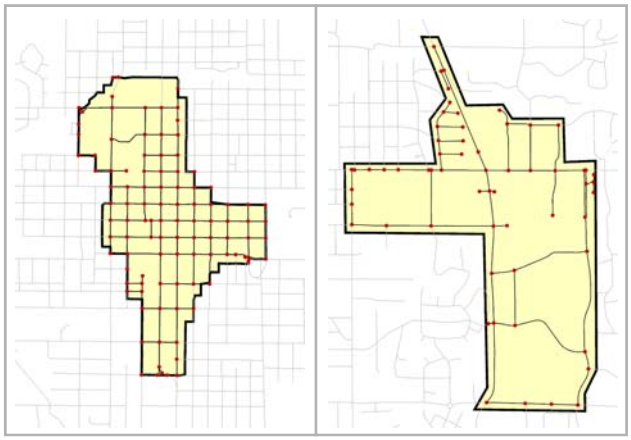
Figure 3 shows that Walk Scores for the College Mall area are generally high. The areas encompassing College Mall itself, Eastland Plaza, 10th & the Bypass, 3rd & Clarizz, and the north College Mall District (northeast of 3rd & the Bypass) are reported to be "very walkable" (the area near Best Buy and Williamsburg Village is deemed a "walker's paradise"). The results reiterate that it would be feasible for residents to live comfortably without a car if adequate pedestrian facilities were provided. Park Ridge, Hoosier Acres, and Green Acres neighborhoods are reported to be "somewhat walkable" to "very walkable", while neighborhoods to the southeast and southwest are generally "car-dependent". By comparison, the average score for Bloomington is 59, which is "somewhat walkable".

2.4 Street Network

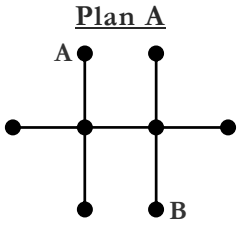
The attributes of the street network are an important underlying factor for pedestrian travel. A highly connected network with short blocks provides more route options, while poorly connected networks force traffic onto fewer streets that tend to be characterized by high traffic volumes and wide road rights-of-way. During off-peak hours, these roads encourage higher speeds as traffic volumes are low compared to street capacity. Poorly connected networks also increase overall trip distance for all road users. In combination, the effects of poor connectivity result in reduced pedestrian safety, comfort, and convenience compared to traditional grid street networks.

The figure to the right illustrates the difference between the street networks of the College Mall area and the more walkable downtown area. Both maps were produced at the same scale, yet the street network in the College Mall area is considerably less extensive.

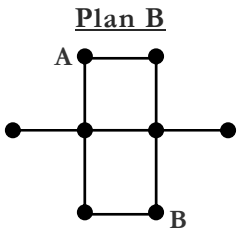
There are several ways of objectively measuring street connectivity. Link-to-node ratio is commonly used and is easy to compute. It is found by dividing the number of links (street segments) in a given area by the number of nodes (intersections). This metric can range from 0.5 to 2.5 or above, with higher values indicating greater connectivity. A perfect grid system would have a link-to-node ratio of 2.5, but in practice, values near 1.5 are typical.



Street network of the College Mall Study Area (right) compared to the Commercial Downtown Zoning District (left).



Link/Node Ratio:
7/8 = 0.88



Link/Node Ratio:
9/8 = 1.13

Values near and below 1.0 indicate poor connectivity. For instance, the link-to-node ratio of a neighborhood having a single entry/exit point and cul-de-sacs branching off from the main street would be 1.0.

The two diagrams to the left illustrate the effect of additional connections on the link-to-node ratio. Under Plan A, there is one possible route between points A and B, while under Plan B, there are four possible routes. Under Plan A, it is likely that the middle link would be congested (or wider than desirable for pedestrians), while under Plan B traffic would be dispersed more evenly across the three horizontal links.

While link-to-node ratio describes connectivity, it does not directly address the density or extent of the street network. A dense street network is necessary for a highly walkable area, as it results in more compact land use patterns and provides more route choices. To measure the density of the network, average block length and intersection density are used. Intersection density is the number of intersections per unit of area, which is a function of block length and street connectivity.

The measures discussed above were computed for the College Mall Study area as well as the Commercial Downtown zoning district for comparison. The findings presented in Table 1 confirm that the street network in the study area limits the walkability of the College Mall area. The link-to-node ratio indicates a lower level of connectivity for the College Mall area, and the average block is about 65% longer than the average block in the downtown. Intersection density in the College Mall area is just over one-third of that in the downtown. These measures suggest that improvements to the underlying street network and land use configuration would help to encourage walking as a mode of transportation.

Table 1. Street Network Metrics

	Area (Square Miles)	Number of Street Segments (Links)	Number of Intersections (Nodes)	Link-to-Node Ratio	Intersections/ Square Mile	Average Block Length (ft.)
College Mall Study Area	0.75	69	60	1.15	80	629
Commercial Downtown Zoning District	0.46	146	103	1.4	224	382

2.5 Bus Routes and Stops

Public transit is an important aspect of pedestrian travel in the College Mall area. In particular, Bloomington Transit's 3 East, 8, and 9 routes serve the area. Additionally, Route 6 crosses the northern edge of the study area. Figure 1 illustrates the coverage of these routes as related to the study.

Bus stops serve as hubs for pedestrian travel and should be well connected to nearby destinations. Sidewalk connections, appropriate crossing treatments, curb

ramps, etc. should be provided, along with safe and comfortable waiting areas. At a minimum, all transit stops should conform to ADA regulations.

There are several designated bus stops within the study area, ranging from accessible shelters with sidewalk connections to shoulders or grassy areas along state highways. Among these, the bus stops in and around Eastland Plaza are the most heavily utilized. In particular, the Route 9 bus stops on College Mall Rd., near Eastland Plaza Dr., generate a significant amount of pedestrian travel, as passengers de-board en route to Eastland Plaza and College Mall. After de-boarding, many pedestrians proceed to cross College Mall Rd. and/or Eastland Plaza Dr., making this one of the most important intersections in the study area. Another important bus stop is on the S.R. 45/46 Bypass, just south of 10th St. In addition to serving a large number of passengers, this stop is noteworthy for its lack of pedestrian accommodations and its contribution to a large number of mid-block crossings.

This Bloomington Transit stop along the Bypass would benefit from better sidewalk connectivity and pedestrian amenities.

2.6 Pedestrian Crashes

Within the study area boundaries, there were 17 reported vehicle-pedestrian crashes from 2003 to 2007. While none of these crashes were fatal, almost all of them resulted in injuries to the pedestrian. In addition to reported crashes, it is likely that there were some unreported crashes involving pedestrians.

Of the 17 reported crashes, eight occurred at intersections, five were in parking lots, and four were at midblock locations. The intersections of 10th St. and the S.R. 45/46 Bypass, and of College Mall Rd. and Eastland Plaza Dr. each had two crashes. The other crashes were distributed throughout the study area, as shown in Figure 4.

It would be presumptuous to generalize about site-specific crash tendencies from such a small number of crashes; however, some crash types were more common than others. The "multiple threat" and "turning vehicle" crash types were each responsible for four crashes, and the "through vehicle at signalized intersection" crash type was responsible for three crashes. In parking lots, the "backing vehicle" crash type was most common, accounting for two of the five crashes reported.

Although it is impossible to exactly determine the factors contributing to each crash, infrastructure shortcomings and field observation point to some likely contributing factors. In the case of intersections, wide crossings, lack of crossing facilities, complex intersections, and unsafe behaviors on the part of motorists and pedestrians are the most likely culprits. For crashes at midblock locations, lack of crossing facilities and other pedestrian infrastructure (especially in conjunction with transit stops) seem to be the most significant problem, along with unsafe behaviors. Crashes in parking lots may be due partly to poor parking lot design. The recommendations contained in this report attempt to account for the circumstances surrounding the various crashes.

Figure 1 -
Study Area and Bus Routes

- Study Area
- BT Route 3
- BT Route 6
- BT Route 8
- BT Route 9
- Bus Stop (signed)
- Bus Stop with Shelter

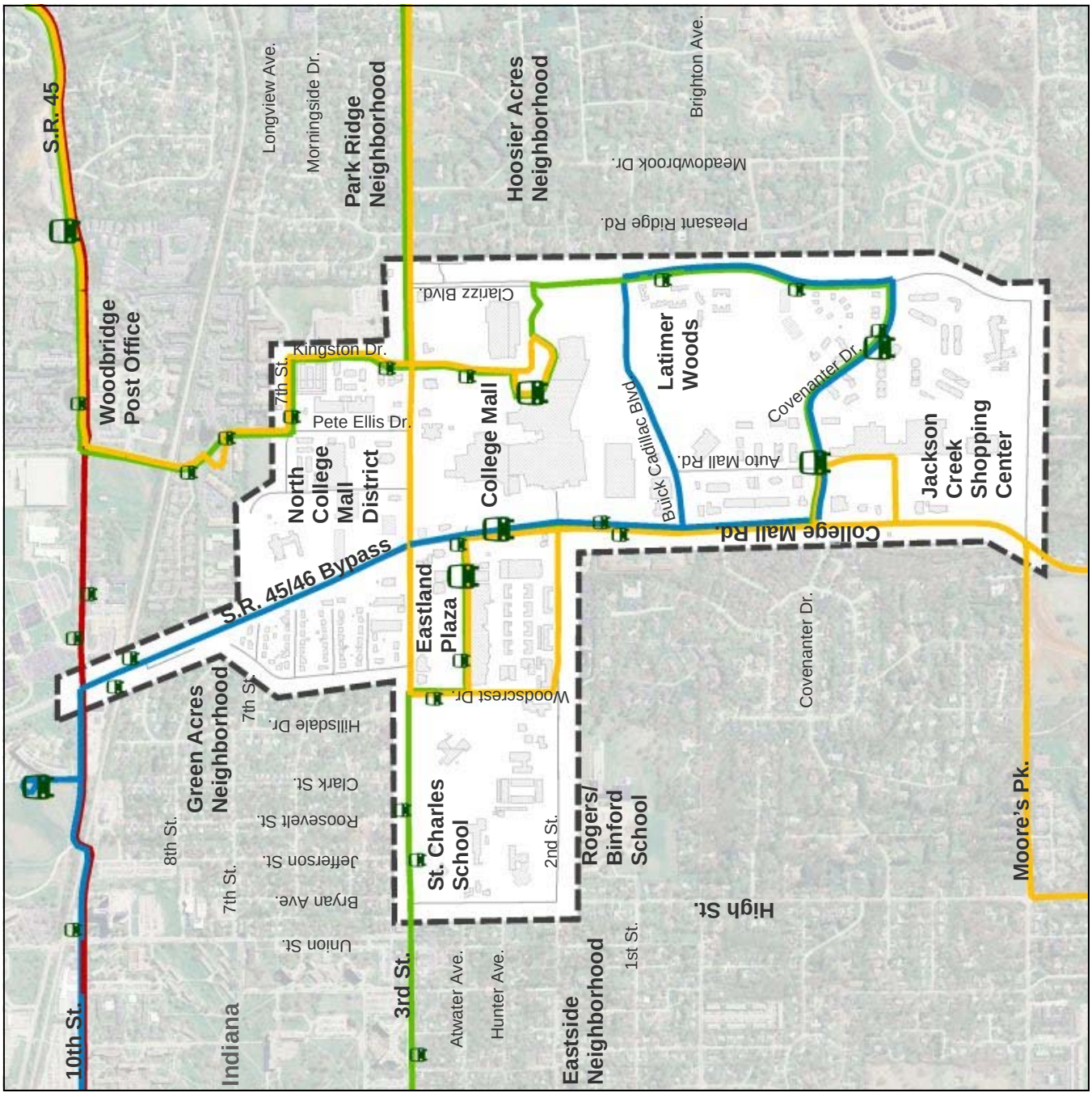
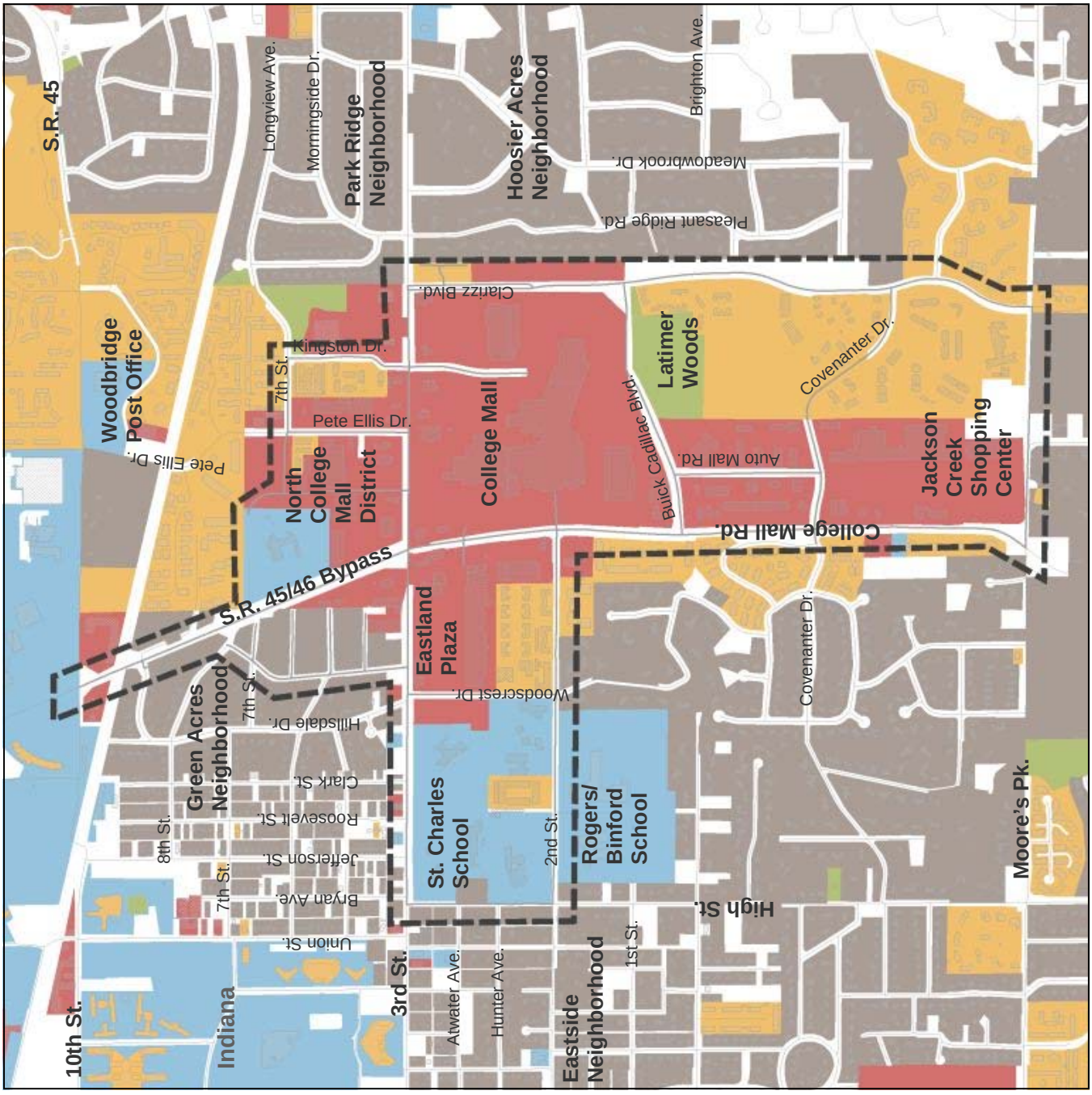


Figure 2 - Land Use

- Study Area
- Single-Family Residential
- Multi-Family Residential
- Institutional
- Retail/Commercial
- Park/Undeveloped Area



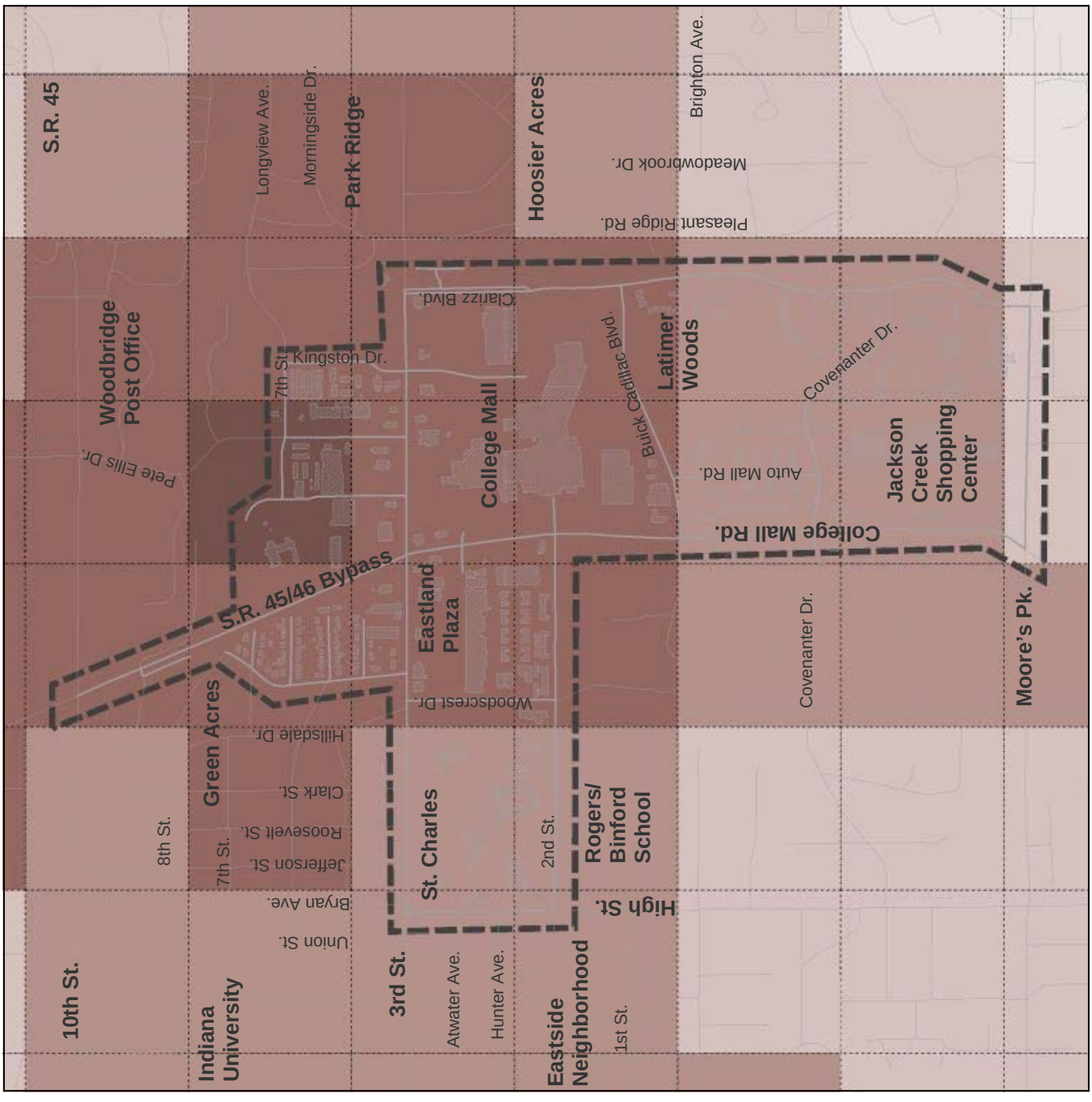
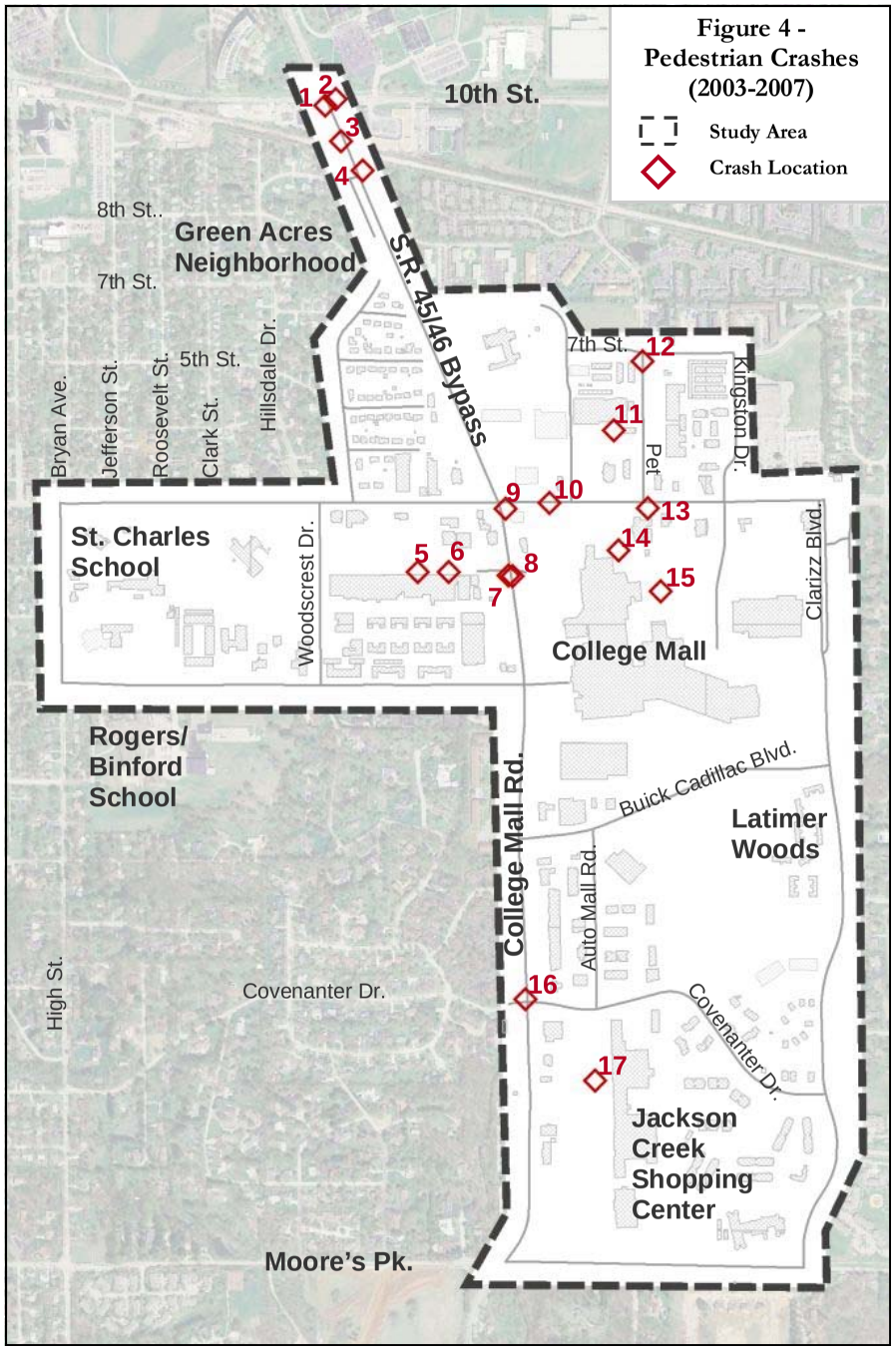


Figure 3 - Walk Score

- **Study Area**
- **1/4 mile x 1/4 mile area**
- **90 - 100: Walker's Paradise**
  Most errands can be accomplished on foot and many people get by without owning a car.
- **70 - 89: Very Walkable**
  It's possible to get by without owning a car.
- **50 - 69: Somewhat Walkable**
  Some stores and amenities are within walking distance, but many everyday trips still require a bike, public transportation, or car.
- **25 - 49: Car-Dependent**
  Only a few destinations are within easy walking range. For most errands, driving or public transportation is a must.
- **0 - 24: Car-Dependent (Driving Only)**
  Virtually no neighborhood destinations within walking range.



Key	Crash Description
1	The pedestrian attempted to cross S.R. 45/46 Bypass from the east side of the Bypass, just south of 10th St., as northbound traffic was stopped at a red light. A stopped semi-truck in the thru lane obscured the pedestrian's view. After crossing in front of the truck, the pedestrian was hit by a vehicle in the left turn lane with a green arrow. The south crossing of the 10th & the Bypass was not equipped with crosswalks or pedestrian signals. Pedestrian suffered serious injuries.
2	The pedestrian was walking northbound across 10th St. at the east crossing of the S.R. 45/46 Bypass. A westbound van in the center lane stopped to allow the pedestrian to cross. Another westbound vehicle passed the van and struck the pedestrian as he was crossing the northernmost lane on 10th St.
3	The pedestrian exited a BT bus on the west shoulder of the S.R. 45/46 Bypass and proceeded to cross the Bypass in front of the bus, before being struck by a southbound vehicle. This location has a pedestrian crossing sign that was obscured by the bus. Additionally, the crossing is not marked on the ground.
4	The pedestrian was crossing the S.R. 45/46 Bypass, westbound, just north of Eastgate Ln. He proceeded past the right lane of traffic, which was stopped, and was struck by a vehicle in the left lane. The driver and pedestrian stated that they did not see each other.
5	The northbound pedestrian was crossing the driveway between stopped cars and was struck by a westbound vehicle.
6	The pedestrian was walking north from Eastland Plaza through the driveway/parking lot. An eastbound vehicle had stopped for the pedestrian, who then looked east to check for westbound traffic. An eastbound truck passed the stopped vehicle and hit the pedestrian. The driver of the truck did see the pedestrian, but claimed the pedestrian walked into the truck.
7	Pedestrian crossed College Mall Rd. against "Don't Walk" phase, was struck by vehicle turning left (southbound) from the Mall. The driver had a left green arrow.
8	The pedestrian was crossing College Mall Rd. at Eastland Plaza Dr., from the southeast to the southwest corner, when she was struck by a northbound vehicle proceeding through a yellow light. The pedestrian was trying to catch the bus at Eastland Plaza.
9	Pedestrian was beginning to cross College Mall Rd, westbound at 3rd St., and was struck by a vehicle turning right on red.
10	The pedestrian was westbound along the north side of 3rd St at Williamsburg Dr. when an eastbound vehicle turned left from 3rd St. onto Williamsburg Dr., hitting the pedestrian. It is no longer possible to turn left from 3rd St. into Williamsburg Dr. due to the installation of "quick curbs" along 3rd St.
11	The pedestrian was loading items into her vehicle when she was struck by another vehicle that was backing out of a parking spot. The driver then pulled forward and backed into the pedestrian a second time.
12	The pedestrian was struck while crossing Pete Ellis Dr., westbound, just south of Longview Ave. The vehicle was southbound.
13	The pedestrian began to cross 3rd St., northbound, on the east side of Pete Ellis Dr., but turned back after realizing that 3rd St. traffic was approaching. When he turned back, he was struck by an eastbound vehicle. The east crossing of 3rd St. at Pete Ellis Dr. does not have a pedestrian crosswalk or signal.
14	The pedestrian was running through parking lot in the rain when she was hit by a truck. Both pedestrian and driver stated that they did not see each other prior to the collision.
15	The pedestrian was walking through the parking lot and was struck by a driver who did not see the pedestrian due to glare.
16	The pedestrian began to cross College Mall Rd. at Covenanter Dr. when the pedestrian signal was flashing "Don't Walk." Shortly thereafter, the north-south light changed to green, and the pedestrian was struck by a southbound vehicle in the outside lane. Another southbound vehicle was parked in the inside lane during the southbound red light, thereby obscuring the view of the pedestrian and the oncoming car.
17	The pedestrian was working for Kroger gathering shopping carts when he was struck by a backing vehicle. The driver of the vehicle fled the scene.

3.0 EXISTING CONDITIONS

This section of the study documents existing pedestrian infrastructure in the College Mall Area. Nearly seven miles of public roads were evaluated, resulting in the analysis of about 12.6 miles of sidewalks or other pedestrian routes in the public right-of-way (Figure 5). Pedestrian routes on private property were also considered, but to a lesser extent.

The pedestrian environment can be conveniently divided into five categories: 1) the roadside pedestrian environment, 2) signalized intersection crossings, 3) driveways and unsignalized intersection crossings, 4) midblock crossings, and 5) curb ramps/transition areas. The roadside environment accommodates the bulk of pedestrian travel, yet driveways, intersections and midblock crossings are typically more problematic due to conflicts with motor vehicles. Curb ramps and transition areas are essential for safe and comfortable passage through the network, especially for individuals with disabilities. Each of these pedestrian features has unique legal, engineering, and environmental constraints that must be considered.

3.1 The Roadside Pedestrian Environment

The defining characteristic of the roadside pedestrian environment is uninterrupted pedestrian travel. Important variables include the presence, width, and condition of the sidewalk; the vertical and horizontal offset of the sidewalk vis-à-vis the roadway; the width of the buffer; and whether the buffer contains a vertical element (trees, bollards, street lights, etc.).

Out of the 12.6 miles of pedestrian network evaluated, about 82% falls into the roadside pedestrian environment category. Table 2 provides a detailed breakdown of these facilities in terms of the presence and width of sidewalks and buffers. The most common roadside pedestrian facility combination in the study area is a sidewalk with a grass plot. Sidewalks with a tree plot are the next most common scenario, followed by monolithic sidewalks and segments with missing sidewalks (Figure 6).

This sidewalk along Kingston Dr. is separated horizontally and vertically from traffic, while street trees establish a buffer and provide shade. Together these design elements create a comfortable walking environment.

The minimum acceptable sidewalk width for new developments, as outlined in the City's Unified Development Ordinance (UDO), is 5 ft. Sidewalks are also required to be separated from the street by at least 5 ft. where feasible. Where this is not possible, sidewalks can be installed adjacent to the road, provided that they are at least 6 ft. in width. In areas with substantial pedestrian traffic, wider sidewalks are desirable. Although these standards cannot be imposed on existing facilities, they provide a useful benchmark.

Slightly more than half of the roadside pedestrian environment meets UDO standards for sidewalks and buffers (Table 2). However, monolithic sidewalks narrower than 6 ft. are prevalent (16% of the roadside network), along with segments without sidewalks (12% of the roadside network). These and other shortcomings will be addressed as redevelopment occurs, if not through public projects.

From a pedestrian improvements standpoint, sidewalks with an existing grass buffer provide an excellent opportunity. Where the buffer is adequately wide, street trees or other landscaping can be installed at a

Table 2. Roadside Pedestrian Environment

	Sidewalk	Buffer	Buffer Width	Length (miles)	% Sidewalk Network	% Roadside Network	% Total Network
Does Not Meet UDO Standards	None	N/A	N/A	1.2	N/A	12%	10%
	Less Than 6 ft.	None	N/A	1.7	19%	16%	14%
	Less Than 5 ft.	Grass	Less Than 5 ft.	0.1	1%	1%	1%
	Less Than 5 ft.	Grass	5 ft. or Greater	0.5	6%	5%	4%
	Less Than 5 ft.	Trees	5 ft. or Greater	0.3	3%	3%	2%
	5 ft. or Greater	Grass	Less Than 5 ft.	0.8	9%	8%	6%
	Total			4.6	37%	45%	37%
Meets UDO Standards	6 ft. or Greater	None	None	0.4	4%	4%	3%
	5 ft. or Greater	Grass	5 ft. or Greater	3.2	35%	31%	25%
	5 ft. or Greater	Trees	5 ft. or Greater	2.2	23%	21%	17%
	Total			5.7	63%	55%	45%

relatively low cost. About 36% of the entire roadside pedestrian network (3.7 miles) falls into this category.

3.2 Signalized Intersection Crossings

Intersections account for a small portion of the overall pedestrian network, but are crucial from the standpoints of safety and connectivity. In poorly connected transportation networks, intersections handle large amounts of vehicular traffic and tend to be extremely complex, involving complicated signal phasing and many opportunities for vehicle and pedestrian crashes. An unsafe or uncomfortable intersection can create a barrier effect, whereby pedestrians are effectively limited to a particular quadrant of the intersection. Such intersections can also encourage midblock crossings as pedestrians are inclined to cross where there are fewer potential conflicts. Factors such as crosswalks, pedestrian signals, pedestrian refuge islands, crossing width, and vehicular turning movements are among the most important elements related to intersections.

Pedestrian signals with countdown timers, as here at 2nd St. & College Mall Rd., provide valuable information for pedestrians and motorists .

Pedestrian Signals

Pedestrian signals vary in the details of their functionality, but should operate in a logical and predictable manner. There are 13 signalized intersections within the study area, resulting in 50 potential crossings (each intersection has four crossings, with the exceptions of 3rd St. & Pete Ellis Dr. and 3rd St. & Clarizz Blvd., both of

which, at the time of writing had three). Figure 7 provides an overview of these crossings in terms of whether a pedestrian phase and countdown are provided.

Of the 50 potential crossings, 32 are controlled by the City of Bloomington and the Indiana Department of Transportation (INDOT) controls the remainder. Of the 32 controlled by the City of Bloomington, 30 have pedestrian signals, and 20 have countdowns. By comparison, of INDOT's 18 crossings, only 10 are equipped with pedestrian signals, and none have countdowns. In most cases, pedestrian signals are accompanied by crosswalks, but in a few locations, the crosswalks are largely worn out.

Pedestrian Delay (seconds)	Likelihood of Non-compliance
< 10	Low
10 to 20	
20 to 30	Moderate
30 to 40	
40 to 60	High
> 60	Very High

Pedestrian Delay

Pedestrian delay refers to the average time that a pedestrian must wait at an intersection before the walk signal is displayed in his/her favor. Pedestrian delay is significant in two ways: 1) longer wait times reduce the convenience and desirability of walking compared to other modes, and 2) longer wait times reduce compliance with the pedestrian signal, which may increase the chance of the pedestrian being involved in a collision. The table at left demonstrates the relationship between pedestrian delay and the likelihood of noncompliance.

Figure 9 shows the distribution of signalized crossings in the study area in terms of pedestrian delay. Thirty-two crossings (64%) have an average pedestrian delay less than 40 seconds. For these crossings, noncompliance rates would be expected to be low to moderate. For the remaining 36% of crossings (including those without pedestrian signals), high noncompliance rates should be expected. Table 3 provides a breakdown of all intersection crossings in the study area with respect to pedestrian delay.

Pedestrian Push Buttons

Pedestrian push buttons are a common feature at signalized intersections in the College Mall area. While push buttons allow for greater flexibility in signal timing, they can contribute to confusion and frustration amongst pedestrians, and the benefits to motorists are negligible in some situations. In particular, push buttons are sometimes installed in such a way as to require their use when the pedestrian signal should automatically follow the traffic signal cycle. WALK signals should be displayed for a given crossing when the parallel street has a green light, unless doing so would cause a significant delay to vehicular traffic.

Twenty-six crossings in the College Mall area require the pedestrian to use the push button to receive a WALK signal, while another six feature the option of using them. Out of the 26 crossings that require the push button, eight are preliminarily judged to be inappropriate in that the WALK signal should come on automatically with a parallel green light (these are minor street crossings). An additional eight may also be inappropriate in light of high pedestrian volumes and/or insignificant benefits resulting from their use. The choice of whether and how to use push buttons should reflect policy tradeoffs related to vehicular traffic flow vis-à-vis pedestrian safety and convenience.

Push buttons at 10th St. & the Bypass

Crossing Distance and Curb Radius

Crossing distance and curb radius play a significant role in determining the degree of pedestrian exposure to vehicles at intersections. Crossing distance is attributable to the number and width of vehicle lanes, the angle of the crosswalk to the road, the configuration of sidewalk approaches, and the curb radii.

Table 3. Pedestrian Delay at Signalized Intersection Crossings

Intersection	Crossing(s)	Pedestrian Delay (seconds)	Likelihood of Noncompliance
10th St. & the S.R. 45/46 Bypass	North, East, West	> 70	Very High
10th St. & the S.R. 45/46 Bypass	South	N/A	Very High
3rd St. & Clarizz Blvd.	East, West	N/A	Very High
3rd St. & College Mall Rd.	All	N/A	Very High
3rd St. & Hillsdale Dr.	North, West	N/A	Very High
3rd St. & Pete Ellis Dr.	East	N/A	Very High
3rd St. & Clarizz Blvd.	South	40 to 60	High
3rd St. & Kingston Dr.	All	40 to 60	High
2nd St. & College Mall Rd.	North, South	20 to 30	Moderate
2nd St. & High St.	All	30 to 40	Moderate
3rd St. & Bryan Ave./High St.	All	30 to 40	Moderate
3rd St. & Hillsdale Dr.	East, South	30 to 40	Moderate
3rd St. & Pete Ellis Dr.	North, West	20 to 30	Moderate
College Mall Rd. & Buick Cadillac Blvd.	All	30 to 40	Moderate
2nd St. & College Mall Rd.	East, West	< 10	Low
College Mall Rd. & Covenanter Dr.	North, South	10 to 20	Low
College Mall Rd. & Covenanter Dr.	East, West	< 10	Low
College Mall Rd. & Eastland Plaza Dr.	All	10 to 20	Low
College Mall Rd. & Moores Pike	All	10 to 20	Low

Aerial photos of 10th and the Bypass (top), compared to Kirkwood and Walnut (bottom) demonstrate longer crossing distances and wider curb radii. These features also contribute to a much larger intersection footprint. The photos are shown at the same scale.

At several locations in the study area, reduced curb radii and installation of perpendicular ramps would result in significantly reduced crossing distance. The average crossing distance is 62 ft., which would take about 18 seconds for a typical pedestrian to cross, while the average corner radius is 21 ft. The longest crossings are at 3rd St. & the Bypass (100 ft.), and the largest curb radius (50 ft.) is at the intersections of 10th St. & the Bypass. In addition to increasing the crossing distance, large curb radii allow vehicles to make turns at faster speeds, which can also increase the crash and severity risk to pedestrians.

Turning Conflicts

Vehicular turning movements are another important aspect of pedestrian exposure at intersections. Both right and left turns can pose problems for pedestrians. The first problem involving right turns occurs when vehicles turn right on green into the path of the pedestrian. In this case, the pedestrian would have the right-of-way, provided that he/she is adhering to the pedestrian signal or traffic light. Another source of conflict involves right turns on red. In this situation, motorists may be looking to the left for oncoming traffic, and in so doing, fail to recognize pedestrians crossing in front of their vehicle. Additionally, right turning vehicles frequently block the crosswalk as motorists attempt to increase their sight distance before turning.

Left turns can also be problematic, especially at complicated intersections. In an effort to improve vehicular flow, signals are often designed to allow "permissive left turns", which enable motorists to turn left whenever parallel traffic has a green light (i.e., left turns are not limited to green arrow signal phases). In these cases, motorists turn into the path of pedestrians who have the right-of-way.

Vehicular turning conflicts are significant in the College Mall study area, due to complicated intersection designs. Every signalized intersection crossing in the study area is subject to the first right turn conflict described above (i.e., vehicle turning into crosswalk) and from the left turn conflict. There are six locations where right turns on red are prohibited.

Potential solutions for turning conflicts include exclusive pedestrian phasing, leading pedestrian interval, "No Right Turn on Red", elimination of permissive left turns, and addition of protected right turns. Exclusive pedestrian phasing is generally appropriate in situations where pedestrian volume is especially high. A leading pedestrian interval (LPI) allows pedestrians to enter the crosswalk three to five seconds before vehicular traffic signals change. This increases the visibility of pedestrians in the crosswalk and reinforces the pedestrian right-of-way at intersection crossings, while having a negligible impact on traffic flow. Elimination of permissive left turns improves safety for both motorists and pedestrians by restricting left turns to the green arrow phase, which eliminates the left turning conflict discussed above. Finally, the addition of a protected right turn phase can help clear the intersection of right-turning vehicles prior to the parallel WALK phase, thereby reducing potential conflicts.

3.3 Driveways and Unsignalized Intersection Crossings

Driveway crossings are common in the College Mall area, accounting for almost 10% of the total pedestrian network, compared to just 2% for unsignalized intersection crossings. Driveways deserve special attention due to their prominence in commercial areas and concerns relating to motor vehicle/pedestrian conflicts. Compared to street intersections, driveways often lack clear right-of-way instructions. Furthermore, motorists often do not notice pedestrians in driveways as their

focus is on entering or exiting the roadway. This is especially true along arterials and other high-speed roads.

Important parameters concerning driveways and street crossings include width, geometric characteristics, vehicular and pedestrian traffic volume, relation to the nearest intersection, and visual cues regarding right-of-way. Figure 8 illustrates the distribution of driveway and unsignalized intersection crossing widths in the College Mall study area. Almost half of all driveways fall within the 34 ft. maximum width provided by the Unified Development Ordinance (UDO) and the vast majority are 50 ft. or less. As redevelopment occurs in the College Mall area, driveways exceeding UDO width standards will come into compliance or be eliminated.

For arterial and collector streets, the UDO also prohibits driveways within 150 ft. of the nearest intersection and limits a given property to two driveways per street frontage. Although an exhaustive inventory was not undertaken, it is evident that a significant number of parcels in the area would not meet these requirements. As in the case of driveway width, these driveways would need to be relocated and/or consolidated as redevelopment occurs.

This series of driveway crossings along Kingston Dr. exhibits poor design. In particular, the sidewalk should continue through the crossings to indicate that the pedestrian has the right-of-way.

3.4 Midblock Crossings

Midblock crossings occur where pedestrians cross a street at a location other than an intersection. They are sometimes confused with uncontrolled intersection crossings, where a pedestrian crosses a street that is not controlled by a traffic signal or stop sign, but that is an intersection nonetheless (e.g., crossing 3rd St. at Jefferson Ave.). Though similar in some respects, midblock crossings and uncontrolled intersection crossings differ in that it is legal for pedestrians to cross at uncontrolled intersections regardless of whether a crosswalk has been striped. By contrast, crossing at midblock locations is illegal, unless a crosswalk has been marked or certain other conditions apply.

There are two marked midblock crossings in the College Mall area. They are located along 2nd St. in front of Binford/Rogers school, and on Covenanter Dr., in front of Covenanter Hill. There are also several bus stops where pedestrians frequently cross midblock., such as the stops on the S.R. 45/46 Bypass south of 10th St., on College Mall Rd. between Eastland Plaza Dr. and 2nd St., and on College Mall Rd. between 2nd St. and Buick Cadillac Blvd. (see Figure 1 for bus stop locations). Midblock crossings are also common on 3rd St. in front of Eastland Plaza and at Williamsburg Dr. These locations would be good candidates for formalized midblock crossings. Alternatively, in some situations it may be advisable to relocate bus stops to encourage pedestrians to cross at intersections.

3.5 Curb Ramps and Transition Areas

Curb ramps provide a seamless transition between pedestrian facilities of differing types. They are most important for pedestrians with disabilities, many of whom rely on the curb ramp and associated features for navigational cues. In addition to establishing guidelines for curb ramps, the Americans with Disabilities Act (ADA) establishes infrastructure requirements at transition areas, addressing such factors as detectable warnings for visually impaired pedestrians and space requirements for wheelchair users.

Curb ramps are needed at this driveway crossing along E. 3rd St.

These examples range from Pedestrian Level of Service A (top) to Level of Service E (bottom).

The scope of the current study would not allow for a thorough documentation of each transition area in the College Mall area; however, a basic inventory was conducted, and the presence or absence of a curb ramp was noted. In total, 411 transition areas were documented, of which curb ramps were present at 339 (82%), leaving 72 locations (18%) where a curb ramp is lacking. Many other locations with curb ramps would need to be reconstructed in order to meet ADA requirements and improve pedestrian safety. The most significant of these are included in the recommendations below. The Public Works Dept. recently completed a comprehensive inventory of sidewalks throughout the City. This inventory provides a more detailed analysis of existing curb ramp/transition area conditions, as well as sidewalk conditions.

3.6 Pedestrian Level of Service

The safety and comfort of the pedestrian environment are reflected in a measurement called Pedestrian Level of Service (PLOS). PLOS has been used throughout the country and was developed by leading transportation researchers. It accounts for many of the features that contribute to pedestrian safety and comfort, including: presence and width of sidewalk; presence, type, and width of buffer (e.g., grass plot, tree plot, etc.); vehicular traffic features (speed and volume), presence of on-street parking, intersection crossing width/number of travel lanes crossed, presence and type of crosswalk, curb radius, presence and width of pedestrian refuge, signalization parameters, and vehicular turning patterns.

Figures 11 and 12 provide an overview of the pedestrian network in terms of PLOS. About 30% of the roadside network (segments) and 34% of intersection crossings fall into the "A" & "B" categories. Most people would consider these locations to be safe and comfortable pedestrian routes, as they typically feature separated sidewalks with tree plots and appropriate consideration for pedestrians at intersection crossings.

Facilities in the "C" category account for 39% of segment miles and 28% of intersection crossings. For segments, facilities consisting of sidewalks with a grass plot, or sidewalks adjacent to the roadway are likely to fall into this category, while intersection crossings in this category are typically wide or lacking in basic pedestrian accommodations. These facilities may be adequate for many pedestrians, but are likely to discourage those who are more sensitive to the quality of the walking environment, such as the elderly or families with children.

The "D" category accounts for 30% of segments and 26% of intersections. Streets with high traffic volumes and monolithic sidewalks (or no sidewalks at all) commonly fall into this category, along with moderate to wide intersections lacking in pedestrian accommodation. In many cases, these facilities provide a basic level of accommodation, but they are generally uncomfortable for pedestrians. Facilities in this category are unlikely to encourage walking as a mode of transportation if convenient alternatives are available.

Categories "E" and "F" are reserved for the least hospitable pedestrian environments. High-volume, high-speed roadways without sidewalks, and wide intersection crossings with little to no pedestrian accommodations are typical of these categories. While only one segment in the study area is rated as an "E", four intersection crossings received the rating, and two crossings received the "F" rating. Each of these "E" and "F" ratings are for facilities under the jurisdiction of the Indiana Department of Transportation. Needless to say, these facilities serve as a deterrent to pedestrian travel.

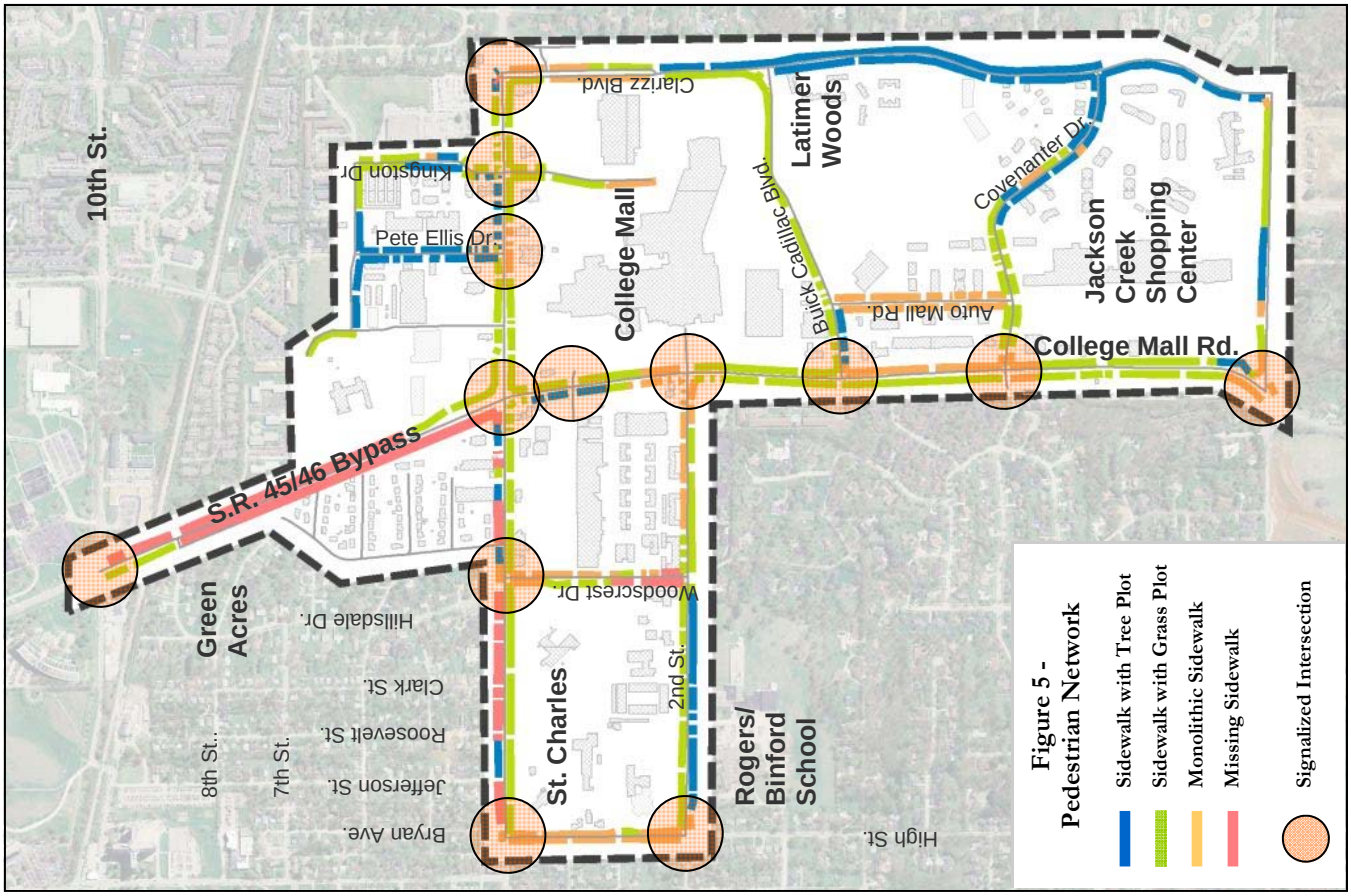


Figure 5 - Pedestrian Network
Sidewalk with Tree Plot
Sidewalk with Grass Plot
Monolithic Sidewalk
Missing Sidewalk
Signalized Intersection
10th St.
S.R. 45/46 Bypass
Green Acres
St. Charles
Rogers/ Binford School
College Mall
Latimer Woods
Jackson Creek Shopping Center
College Mall Rd.
Auto Mall Rd.
Buick Cadillac Blvd.
Covenanter Dr.
Clarizz Blvd.
Kingston Dr.
Pete Ellis Dr.
Woodscrest Dr.
2nd St.
Hillsdale Dr.
Clark St.
Roosevelt St.
Jefferson St.
Bryan Ave.
8th St.
7th St.
High St.

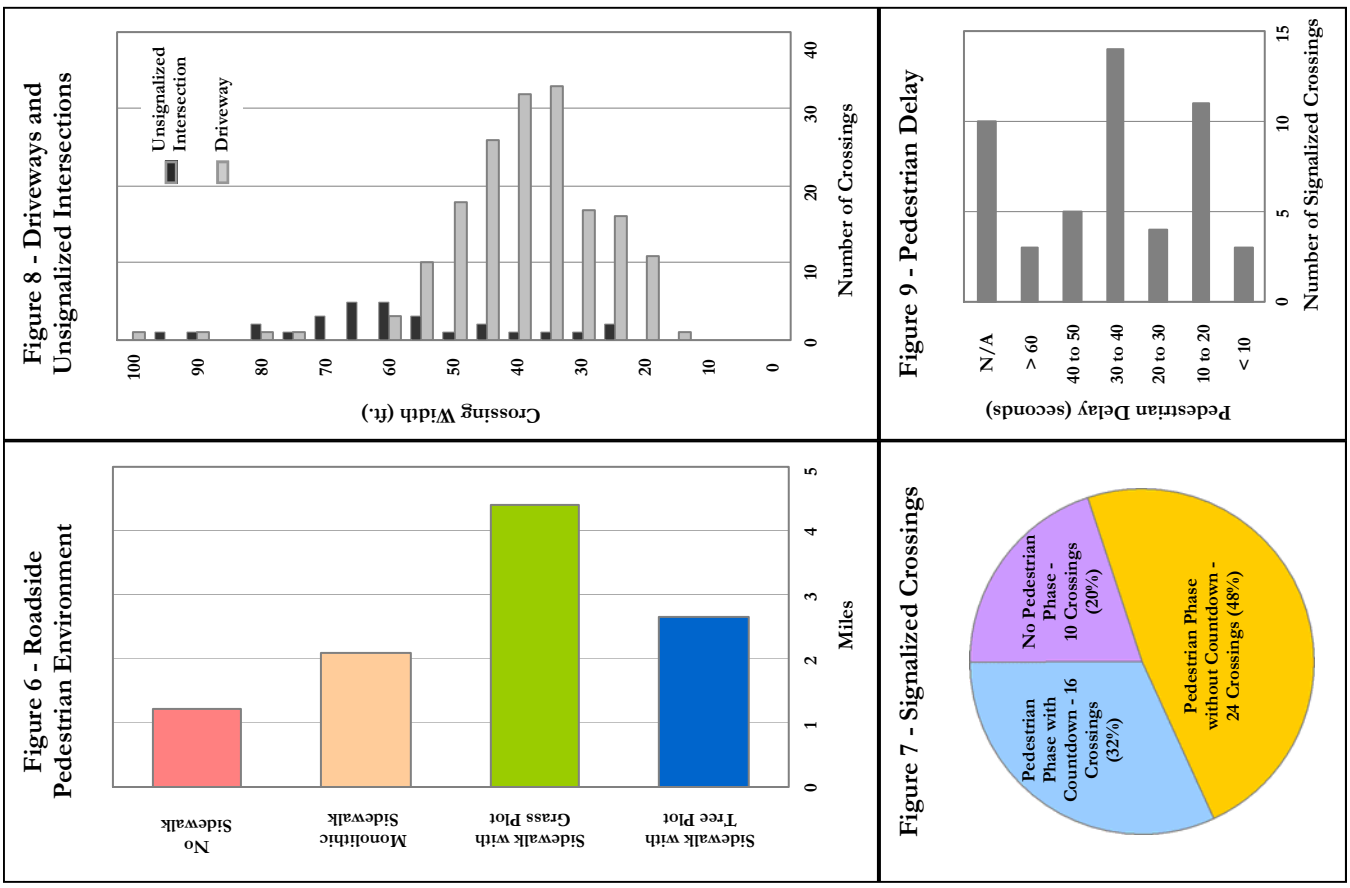


Figure 6 - Roadside Pedestrian Environment
Sidewalk with Tree Plot
Sidewalk with Grass Plot
Monolithic Sidewalk
No Sidewalk
Miles
Figure 7 - Signalized Crossings
No Pedestrian Phase - 10 Crossings (20%)
Pedestrian Phase without Countdown - 24 Crossings (48%)
Pedestrian Phase with Countdown - 16 Crossings (32%)
Figure 8 - Driveways and Unsignalized Intersections
Unsignalized Intersection
Driveway
Crossing Width (ft.)
Number of Crossings
Figure 9 - Pedestrian Delay
Pedestrian Delay (seconds)
N/A
> 60
40 to 50
30 to 40
20 to 30
10 to 20
< 10
Number of Signalized Crossings

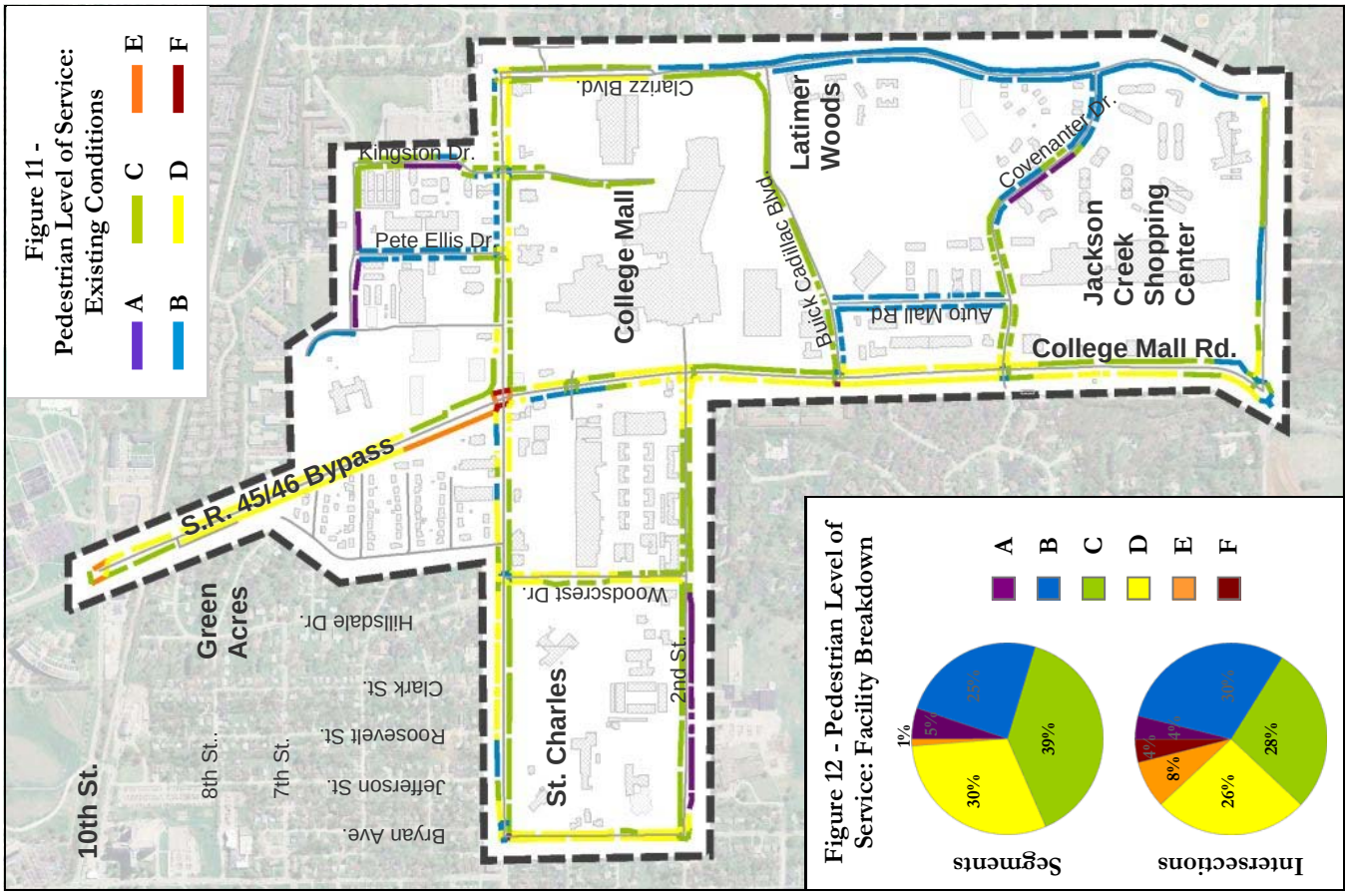


Figure 11 -
Pedestrian Level of Service:
Existing Conditions
A
B
C
D
E
F
S.R. 45/46 Bypass
10th St.
8th St.
7th St.
Green Acres
Hillsdale Dr.
Clark St.
Roosevelt St.
Jefferson St.
Bryan Ave.
St. Charles
Woodscrest Dr.
2nd St.
College Mall
Kingston Dr.
Pete Ellis Dr.
Clarizz Blvd.
Latimer Woods
Buick Cadillac Blvd
Auto Mall Rd
Covenanter Dr.
Jackson Creek Shopping Center
College Mall Rd.
Figure 12 - Pedestrian Level of Service: Facility Breakdown
A
B
C
D
E
F
Segments
1%
5%
25%
39%
30%
Intersections
1%
4%
8%
26%
28%
33%

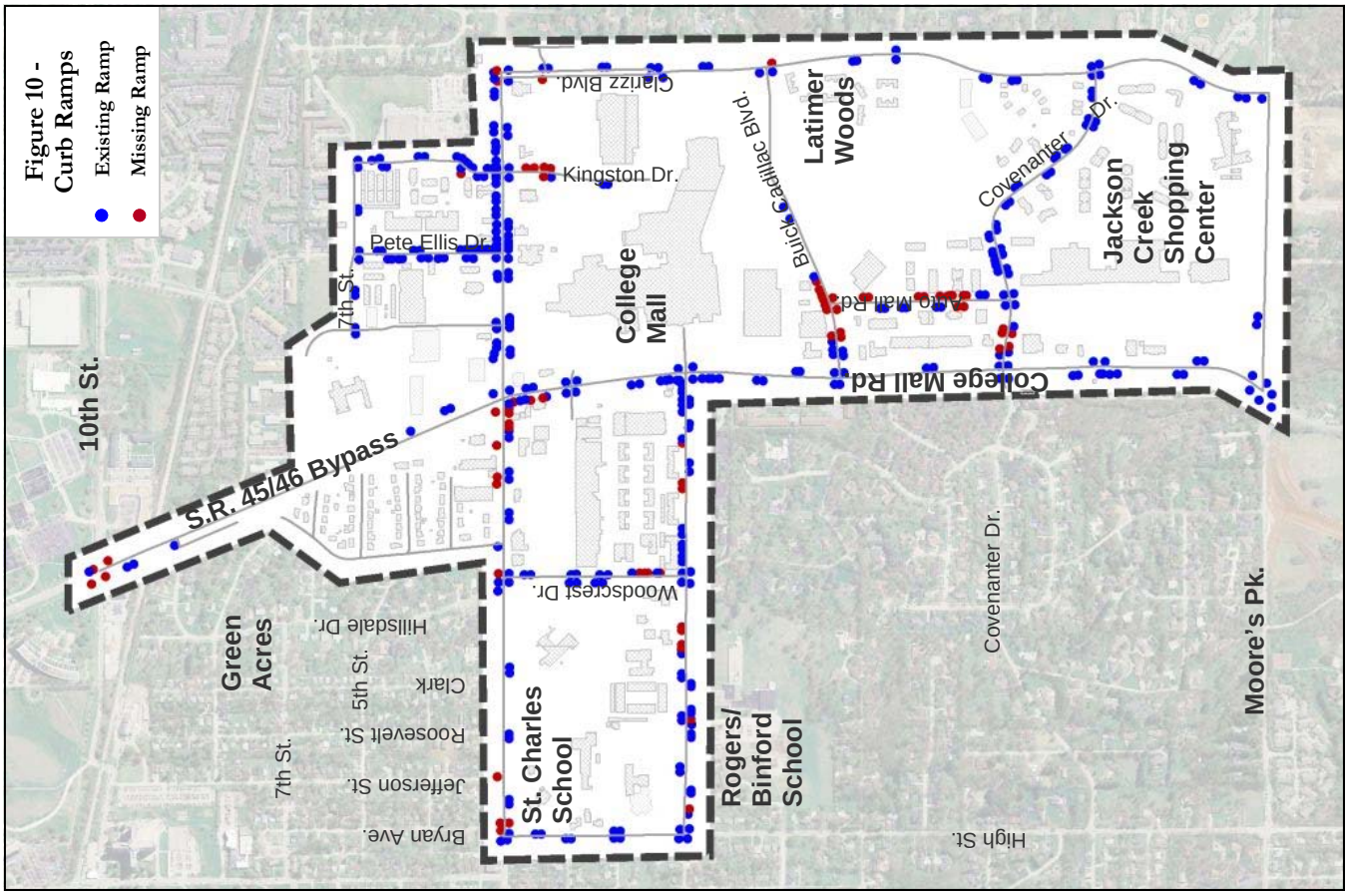


Figure 10 -
Curb Ramps
Existing Ramp
Missing Ramp
S.R. 45/46 Bypass
10th St.
7th St.
Green Acres
Hillsdale Dr.
Clark
5th St.
Roosevelt St.
Jefferson St.
Bryan Ave.
St. Charles School
Woodscrest Dr.
College Mall
Kingston Dr.
Pete Ellis Dr.
Clarizz Blvd.
Latimer Woods
Buick Cadillac Blvd.
Auto Mall Rd.
Covenanter Dr.
Jackson Creek Shopping Center
College Mall Rd.
Rogers/ Binford School
Covenanter Dr.
High St.
Moore's Pk.

4.0 RECOMMENDED IMPROVEMENTS

Conceptual recommendations for pedestrian infrastructure improvements are illustrated in Figures 13-23. The recommendations include a variety of treatment possibilities, ranging from simple to complex, low-cost to high-cost, and from short-term to long-term. The recommendations are not final engineering solutions; rather, they are potential solutions, creating the vision and impetus for more specific engineering plans to follow. Some of the recommended improvements would require public/private partnerships or cross-jurisdiction coordination in order to be implemented.

4.1 Recommendation Themes

There are several common themes throughout the study recommendations. These include: new sidewalk and multi-use path construction; sidewalk widening; driveway crossings and access management; street tree and tree plot installation; high-visibility intersection crosswalks; pedestrian signal installation and upgrades; curb ramp installation and reconstruction; improvements to pedestrian waiting areas, installation of roadway narrowing, and reduction of pedestrian crossing distance; new midblock and uncontrolled crossings; addition, relocation, and improvement of bus stops and shelters; landscaping; pedestrian access through parking lots and private property; and bicycle facility opportunities. These themes are discussed below, and Table 4 summarizes each treatment option in terms of cost, feasibility, and prioritization.

New Sidewalk and Multi-use Path Construction

With a few notable exceptions, most of the public streets in the study area are currently equipped with sidewalks or multi-use paths. Where such facilities do not currently exist, new sidewalks are needed. In some scenarios, wide multi-use paths are recommended in lieu of sidewalks, so that pedestrians and bicyclists can be accommodated comfortably on the same facility. Multi-use paths and sidewalks are also recommended where pedestrian and bicycle access is desirable independent of nearby roadways. The latter condition arises due to the prevalence of long blocks and poor street connectivity in the study area.

This sidewalk along 2nd St. was completed in 2008.

Construction of sidewalks and multi-use paths is relatively expensive compared to other pedestrian improvements, as these projects often involve land acquisition and stormwater infrastructure. Additionally, sidewalks should be buffered from the roadway with a tree plot, which further increases the cost and impact of the project. Nonetheless, sidewalk and multi-use path construction is necessary to fill in gaps in the existing network.

Sidewalk Widening

In some instances, widening of existing sidewalks can be an effective way to improve the pedestrian environment. In particular, this strategy should be pursued when existing sidewalks are adjacent to high speed and/or high volume traffic, when pedestrian volumes are significant, or when ADA standards are not met due to obstacles in the sidewalk. The cost of this treatment varies depending on property ownership and environmental conditions.

Driveway Crossing Improvements and Access Management

Driveway crossing improvements and vehicular access management are recommended as part of an overall strategy to improve pedestrian safety and comfort. Infrastructure cues at driveway crossings should clearly indicate that pedestrians

This sidewalk and driveway crossing are well-designed: the pedestrian clearly has the right-of-way, as the sidewalk is uninterrupted across the driveway.

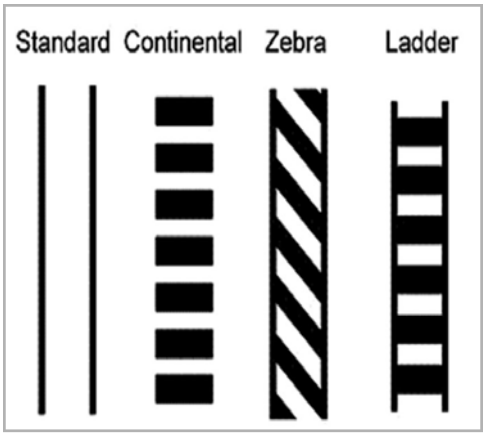
have the right-of-way through the crossing, and the number of driveways should be limited to a reasonable number, as outlined in the U.D.O.

Providing the preferred cue to motorists and pedestrians is most easily accomplished by extending the sidewalk or an ADA-compliant textured path (e.g., decorative pavers, stamped concrete, etc.) through the driveway. Reduced crossing distance and curb radii are also effective, and stop or yield signs may be installed at particularly busy conflict points.

The most cost-effective opportunity to improve or eliminate driveway crossings occurs in conjunction with new development and other larger projects. Isolated driveway crossing improvements would be a relatively expensive treatment option, given the number of driveways in the study areas. Additionally, any driveway closures or modifications would require coordination with affected businesses or residences.

Street Tree and Tree Plot Installation

As noted above, street trees provide a buffer and shade for pedestrians, while also improving aesthetics. Fortunately, there are many locations throughout the study area where a grass buffer currently exists and where trees may be installed at low cost. In isolated circumstances, new tree plots could be installed. This option would be most feasible where travel lanes or excess lane width can be converted to a tree plot. Applicability of these treatment options is limited by sight line obstruction, conflicts with utilities, available right-of-way, and cost.



There are a variety of crosswalk types that are more visible to motorists than the "standard" crosswalk used at most intersections.

High-visibility Intersection Crosswalks

High-visibility crosswalks (e.g., ladder, continental, or zebra style) are perhaps the cheapest and easiest available improvement to the pedestrian environment. They are particularly appropriate at complicated signalized intersections such as those in the study area. By comparison, standard crosswalk markings are easily overlooked at complex intersections and tend to fade quickly. High-visibility markings are recommended at all signalized intersection crossings in the study area, as well as midblock and uncontrolled crossings. However, consideration must be given to long-term maintenance obligations associated with high-visibility markings.

Pedestrian Signal Installation and Upgrades

Most of the signalized intersections in the study area are equipped with pedestrian signals. However, as detailed above, they vary in terms of their functionality for pedestrians. As with many of the recommendations, further evaluation by the Engineering and/or Traffic Divisions of Public Works is needed to implement signal improvements.

The goals for pedestrian signals in the study area include: 1) provide pedestrian signals at all signalized intersection crossings; 2) ensure that all pedestrian signals meet or exceed ADA and MUTCD requirements; 3) reduce pedestrian delay, particularly at crossings with high concentrations of pedestrians; and 4) increase the convenience of pedestrian travel by modifying pedestrian signal operations where possible. Modifications could include the elimination or relocation of push buttons, addition of audible pedestrian signals, implementation of leading pedestrian interval at specified locations, and improved pedestrian signal timing.

Curb Ramp Installation and Reconstruction

There are more than a hundred locations in the study area where new or reconstructed curb ramps are recommended. Additionally, other improvements such as sidewalk construction, driveway reconfiguration, and corner modifications would require new or reconstructed curb ramps. Upgrading curb ramps in the public right-of-way to ADA standards is not only a good idea, but is required by federal law.

Curb ramp reconstruction at 3rd St. & Clarizz Blvd.

The first priority in implementing curb ramp improvements is to provide ramps where currently none exist. Within this category, ramps near transit stops, pedestrian-oriented businesses, and other important destinations are the most important, along with those along heavily traveled sidewalks. Secondarily, older ramps should be upgraded to be brought into compliance with ADA standards. Typically, this process requires reconstructing the ramp. Finally, as other public and private improvements are planned, curb ramps should be incorporated into the designs. Curb ramp construction requires consideration of stormwater drainage; however, ramp construction can be relatively inexpensive if there are not utility conflicts or other significant design challenges that need to be addressed.

Corner Improvements and Reduction of Crossing Distance

Throughout the study area, there are many locations where the addition of a curbed concrete or landscaped area would improve the pedestrian environment with little to no impact on vehicular travel. Intersections and wide driveways are the most common opportunities. Such improvements can result in lower traffic speeds and reduced pedestrian crossing distance, which minimizes pedestrian exposure to vehicles and may improve signal timing in some situations (less time is required for the pedestrian signal).

Corner improvements and similar changes to the road profile require consideration of the number and size of vehicles using the intersection, existing and desirable speeds, and stormwater flows, among other factors. Proposed improvements are likely to have a negligible impact on other users. The cost of modifications to the curb line can vary significantly.

New Midblock and Uncontrolled Crossings

Formalized midblock and uncontrolled crossings are recommended near transit stops and along stretches of roadway with few controlled pedestrian crossing opportunities (i.e., stop signs or signals). Such crossings can increase the predictability of pedestrian crossing behavior, provide a safer crossing environment, and encourage pedestrian travel.

This crosswalk in Boulder, CO illustrates best practices for markings and signage at mid-block crosswalks.

Potential midblock crossing locations should be carefully evaluated prior to implementation. Sight lines, the potential for vehicle-pedestrian and vehicle-vehicle crashes, impacts to traffic flow, and impacts on emergency responders should be considered.

The cost of installing a midblock crossing can vary significantly depending on the treatment. It is generally unadvisable to install a midblock crossing without additional safety enhancements. This is especially true on busier and wider streets such as E. 3rd St. and College Mall Rd., where a crosswalk alone would not be advisable. Appropriate complementary treatments

Bus shelters, such as this one on College Mall Rd. encourage transit usage.

include pedestrian refuge islands, curb extensions, advance yield lines, and pedestrian signals. Thus, costs for well-designed midblock and uncontrolled crossings vary, but can be quite significant.

Bus Stops and Shelters

As discussed above, a significant amount of pedestrian travel in the study area originates or ends with a transit trip. As a result, the locations and amenities of transit stops play an important role in pedestrian safety and accommodation. For instance, the location of a transit stop may encourage a pedestrian to cross the street at an unsafe location or require him or her to walk in the roadway or grass to access their destination. Additionally, transit stops that lack amenities or shelter may discourage transit use and related pedestrian travel.

Transit stop improvements can vary significantly in cost, but appreciable improvements can be made at relatively low cost compared to other measures. Priorities for transit stop improvements are based on safety concerns, volume of users, and feasibility of improvements. Making transit stops accessible to disabled users is a high priority.

This sidewalk provides convenient pedestrian access through the parking lot at 6th & Dunn.

Landscaping

Landscaping and other aesthetic improvements can improve the pedestrian experience by providing visual interest, shade, and a buffer from vehicular travel. Landscaping is particularly effective at softening the visual impact of parking lots and wide streets. In several cases throughout the recommendations, landscaping is recommended on private property. It is envisioned that the City would initiate discussions with property owners to determine whether there is a mutual interest in landscaping improvements. Significant landscaping improvements are not inexpensive, but may be a cost-effective measure in locations that are unlikely to redevelop in the near future.

Pedestrian Access through Parking Lots and Private Property

In the College Mall area, significant blocks of land remain under private control, limiting formalized pedestrian routes to and from destinations. Pedestrians can be seen walking through parking lots, grassy areas, and other substandard facilities with some regularity. Although the recommendations in this report are generally targeted to the public right-of-way, in some cases, recommendations are made to provide pedestrian access through parking lots and private property. As with landscaping, these recommendations would be subject to discussion with private property owners. Costs for such improvements depend entirely on the nature of the treatment chosen.

There are a variety of signs that can be used to improve interactions between motorists and pedestrians.

Bike Lanes

While pedestrian travel is the focus of this study, a few recommendations for bike lanes have been included. Bike lanes benefit both bicyclists and pedestrians, as they provide a buffer between sidewalks and vehicular travel lanes. Where adequate width exists, bike lanes are a relatively inexpensive treatment option. Further evaluation is needed to determine whether proposed bike lanes are feasible.

Signage

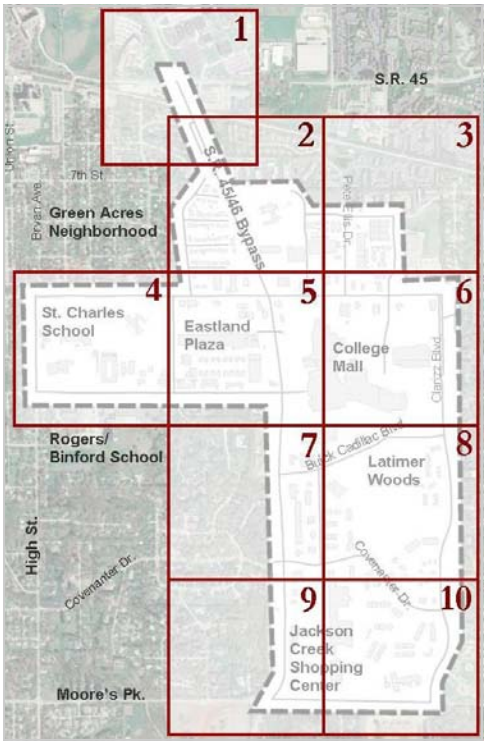
Strategically placed signs can reinforce safe interactions between motorists and pedestrians and notify users of existing laws. Signs should not be used, indiscriminately, however, as overuse may cause them to be ignored. Examples of relevant MUTCD-compliant signs are shown at right. The recommendations below include signage in a few cases, but many more opportunities exist for effective signage to be installed.

Table 4. Treatment Options

Priority	Treatment	Cost	Prioritization Considerations	Feasibility Considerations
High	High-visibility Intersection Crosswalks	Low	Pedestrian volume	Maintenance
	Street Tree Installation	Low	Pedestrian volume, vehicle traffic volume and speed	Utilities, sight lines
	Addition, Relocation, and Improvement of Bus Stops	Low to Medium	Transit ridership volume, ADA requirements	Nature of improvements, maintenance
	Midblock Crossing	Low to Medium	Pedestrian volume, traffic volume and speed, relationship to transit, nearest crossing opportunity, pedestrian and motorist safety	Signage, ramps, signalization, stormwater, utilities
	Pedestrian Signal Installation and Upgrade	Low to High	Pedestrian volume, intersection complexity	Nature of improvements, existing signal system
	Curb Ramp Installation and Reconstruction	Low to Medium	Pedestrian volume, condition of existing ramp, ADA requirements	Stormwater, utilities, ramp type
Medium	Signage	Low	Pedestrian volume	Sight lines, location
	Corner Improvements, Roadway Narrowing, and Reduction of Crossing Distance	Medium to High	Pedestrian volume, existing crossing width, ADA requirements, impacts to motorists	Stormwater, utilities
	New Sidewalk and Multi-Use Path Construction	High	Predicted usage, vehicular traffic volume and speed, relationship to network	Property ownership, stormwater, tree plot, terrain
	Bike Lanes	Low	Bicycle usage, benefit to pedestrians, significance to network	Available width
	Pedestrian Access through Parking Lots and Private Property	Medium	Pedestrian volume, impacts to motorists, impacts to businesses	Property ownership, stormwater
Low	New Tree Plot Installation	High	Pedestrian volume, vehicle traffic volume and speed	Property ownership, stormwater, tree plot
	Landscaping	Low to Medium	Aesthetic effect	Property ownership, stormwater
	Driveway Crossing Improvement and Vehicular Access Management	Medium to High	Pedestrian volume, vehicular traffic volume, ramp conditions, safety	Impacts to business, stormwater
	Sidewalk Widening	Medium to High	Pedestrian volume, vehicular traffic volume and speed, ADA requirements	Property ownership, terrain

4.2 Recommendations

The recommendation maps below (Figures 13-23) provide a conceptual plan for improved pedestrian safety and connectivity in the study area. The following text describes these recommendations in greater detail. Implementation of some recommendations may not be feasible due to constraints such as terrain, available right-of-way, and utility conflicts, as well as cost. Additionally, specific modifications to pedestrian and vehicular signal phasing, turn restrictions, etc. are not proposed. Such improvements are important, but would need to be considered on a case-by-case basis.



Overview of recommendation sections.

Section One

Section One (Fig. 13) includes improvements planned in INDOT's S.R. 45/46 Bypass project, along with some additional recommendations. Sidepaths are planned for both sides of the Bypass, and the City is working with INDOT to have a landscaped median installed with the project.

There are four significant transit stops in the area, each of which would benefit from accessible shelters. The stop along the east side of the Bypass is proposed to be relocated to Eastgate Ln., along with an uncontrolled intersection crossing. Additional pedestrian crossing elements, such as a high-intensity activated crosswalk (HAWK) signal would be appropriate at that location due to high traffic volumes.

Modifications shown at 10th & the Bypass include: improved sidewalk connectivity, a pedestrian refuge island at the northwest corner, new pedestrian signals, and crosswalks on all crossings. Although not depicted here, pedestrian crossing distances will increase as a result of the project, due to the addition of travel lanes and larger curb radii.

Section Two

Section Two (Fig. 14) includes a continuation of the sidepaths from the north and a bicycle/pedestrian underpass at 7th St.., as per INDOT's Bypass plans. Additionally, Section Two includes connector paths to allow residents of Cambridge Square and Park Doral Apartments to access the underpass and the North College Mall area. Implementation of these connector paths would be contingent upon the support and interest of these apartment complex owners.

Section Three

Relatively few improvements are proposed in Section Three (Fig. 15). Sidewalk and driveway crossing improvements on the north side of Longview Ave. are proposed, along with high-visibility crosswalks at the intersection of Pete Ellis Dr. and Longview Ave. Upon connection of 7th St. to the Bypass, traffic at this intersection will likely increase, possibly warranting a multi-way stop.

Section Four

Section Four (Fig. 16) represents an important transition between the older neighborhoods and the I.U. campus to the west, and the study area to the east. At the 3rd St. & High St. intersection (Fig. 18), several modifications are proposed to increase pedestrian capacity and make better use of existing right-of-way. Curb extensions at each corner would provide a more comfortable waiting area and better transitions for wheelchair users. The southeast curb extension would also provide a significant buffer from traffic, reduce the crossing distance of the east cross-

ing, and provide a logical transition for eastbound vehicles. The sidewalk widening proposed on the north side of 3rd St., west of Bryan Ave. is necessary to meet ADA regulations, and to more comfortably accommodate pedestrians. The 3rd & High intersection is a good candidate for countdown timers and implementation of leading pedestrian interval. Several signs may also be appropriate, including: "Turning Traffic Must Yield To Pedestrians" for traffic turning right from 3rd St. onto southbound High St.; "Stop Here on Red" for the north and south crossings, and "Push Button for Crosswalk" for the east and west crossings.

Recommendations for the 3rd St. corridor from High St. to Woodscrest Dr. include the installation of a sidewalk, tree plot, and bike lane on the north side, upgrade of the existing sidewalk on the south side to a sidepath, and tree installation on the south side. Installation of transit shelters and an uncontrolled intersection crossing are proposed at Roosevelt St. As with other multi-lane uncontrolled crossings, pedestrian amenities such as refuge islands and signalization are desirable here for safety purposes.

The proposed bike lane configuration for E. 3rd St. (one-way westbound) reflects the bicyclist's greater need for designated space on uphill segments. Eastbound cyclists could use the sidepath or ride on-street mixed with traffic. Because eastbound 3rd St. is downhill in this section, cyclists are in a better position to share space with motor vehicles than are westbound cyclists.

Proposed improvements along 2nd St. include installation of street trees, upgrading the existing south sidewalk to a sidepath, and enhancing the existing midblock crossing. Along Woodscrest Dr., installation and upgrade of sidewalk is proposed north of 2nd St., along with street trees where feasible. Landscaping and a median are also suggested to improve the aesthetics of the Woodscrest corridor.

An east-west multi-use path connection is proposed to connect Hunter Ave. with Woodscrest Dr. Hunter Ave. is currently a designated bike route that could provide a higher level of connectivity if extended east. Implementation of this extension is contingent on the interest of adjacent property owners.

At the 2nd & High intersection (Fig. 18), corner improvements and crosswalk realignment are proposed to reduce the crossing distance and improve the transition/waiting areas. Additionally, the WALK intervals for the north and west crossings should be extended to concur with the appropriate solid green phases.

Section Five

The area represented in Section Five (Fig. 17) has perhaps the largest concentration of pedestrians in the study area. At the intersection of 3rd St. & Woodscrest Dr. (Fig. 17), an additional crossing is proposed on the north side of 3rd St., and the north-south crossing that currently bisects the intersection would be moved to the west side of the intersection (the current configuration creates a conflict between pedestrians and straight or left-turning traffic). Along with these crossing improvements, pedestrian signals would be needed. Additionally, improvements are proposed at the northwest corner of the intersection to reduce the crossing distance. A "Turning Traffic Must Yield to Pedestrians" sign may be appropriate at the southwest corner for vehicles turning south from 3rd St. onto Woodscrest Dr., along with push-button activated leading pedestrian intervals for all crossings.

The intersection of 3rd & the Bypass/College Mall Rd. (Fig. 18) is included in INDOT's S.R. 45/46 Bypass project plans. The proposed improvements shown in

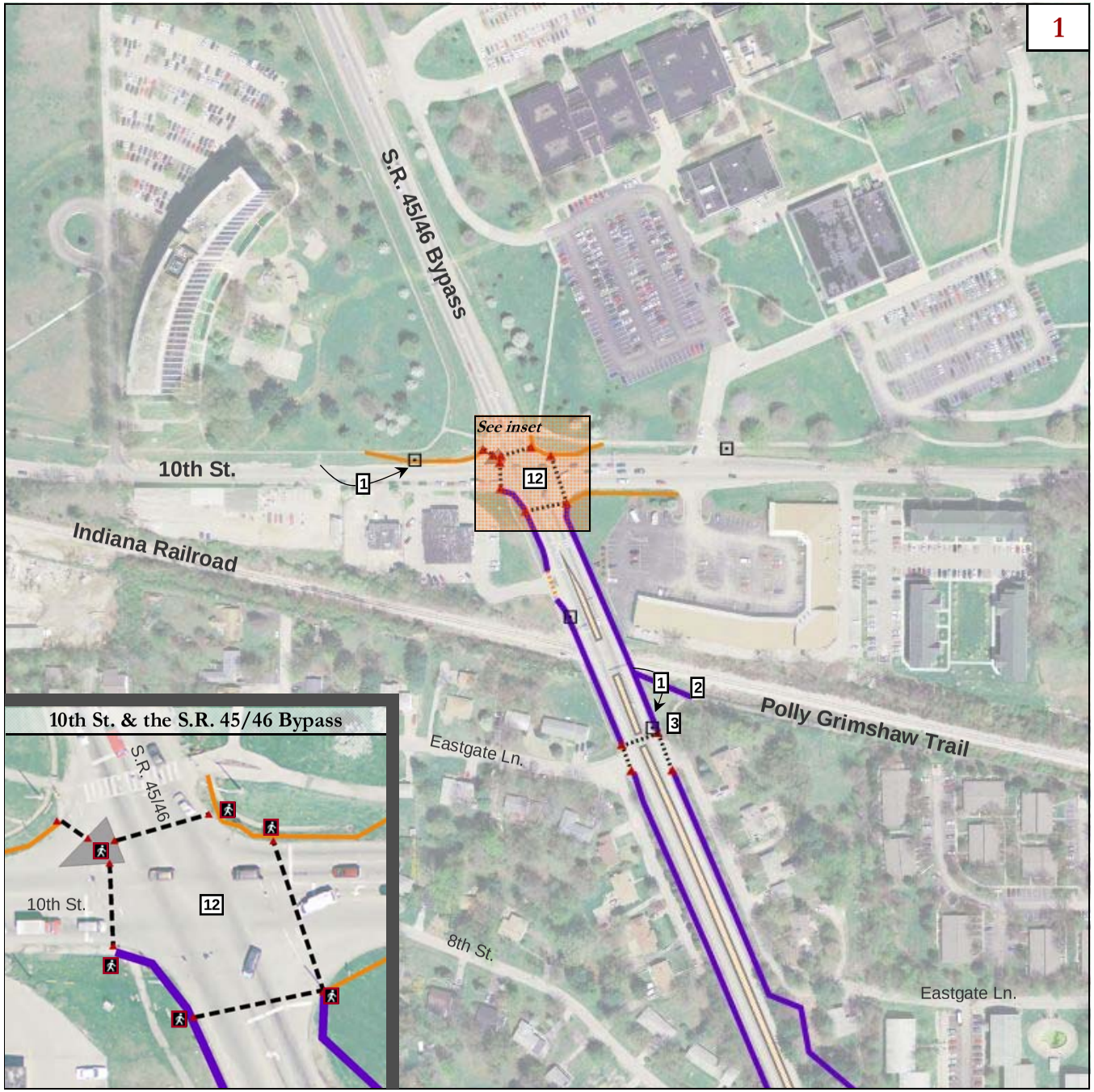


Figure 13 - Planned INDOT Improvements (Section 1)

- Sidewalk
- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Landscaping
- Curb Extension/Refuge
- Curb Ramp
- Bus Shelter
- New Pedestrian Signal

Notes

1	Relocate existing transit stop*
2	Multi-use path connection*
3	New uncontrolled crossing*
12	Intersection controlled by the Indiana Department of Transportation

**not included in S.R. 45/46 Bypass plans*

Figure 14 - Planned INDOT Improvements (Section 2)

- Sidewalk
- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Landscaping
- Curb Ramp
- Bus Shelter

Notes

3	New uncontrolled crossing*
4	Bicycle/pedestrian tunnel
5	Public/Private Partnership

not included in S.R. 45/46 Bypass plans

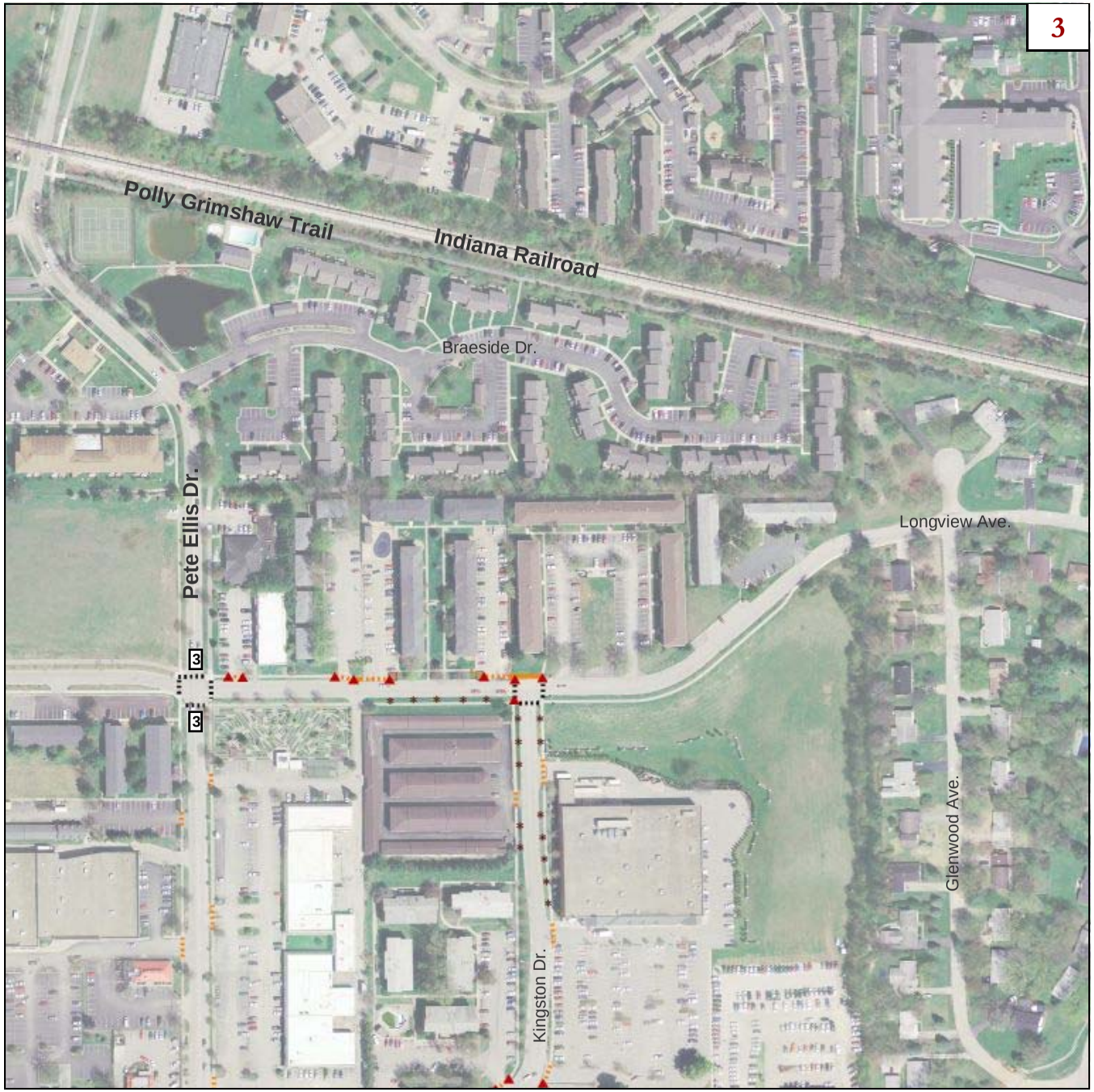


Figure 15 - Conceptual Recommendations (Section 3)

- Sidewalk
- Driveway Crossing
- High-visibility Crosswalk
- Trees
- Curb Ramp

Notes

3 | New uncontrolled crossing

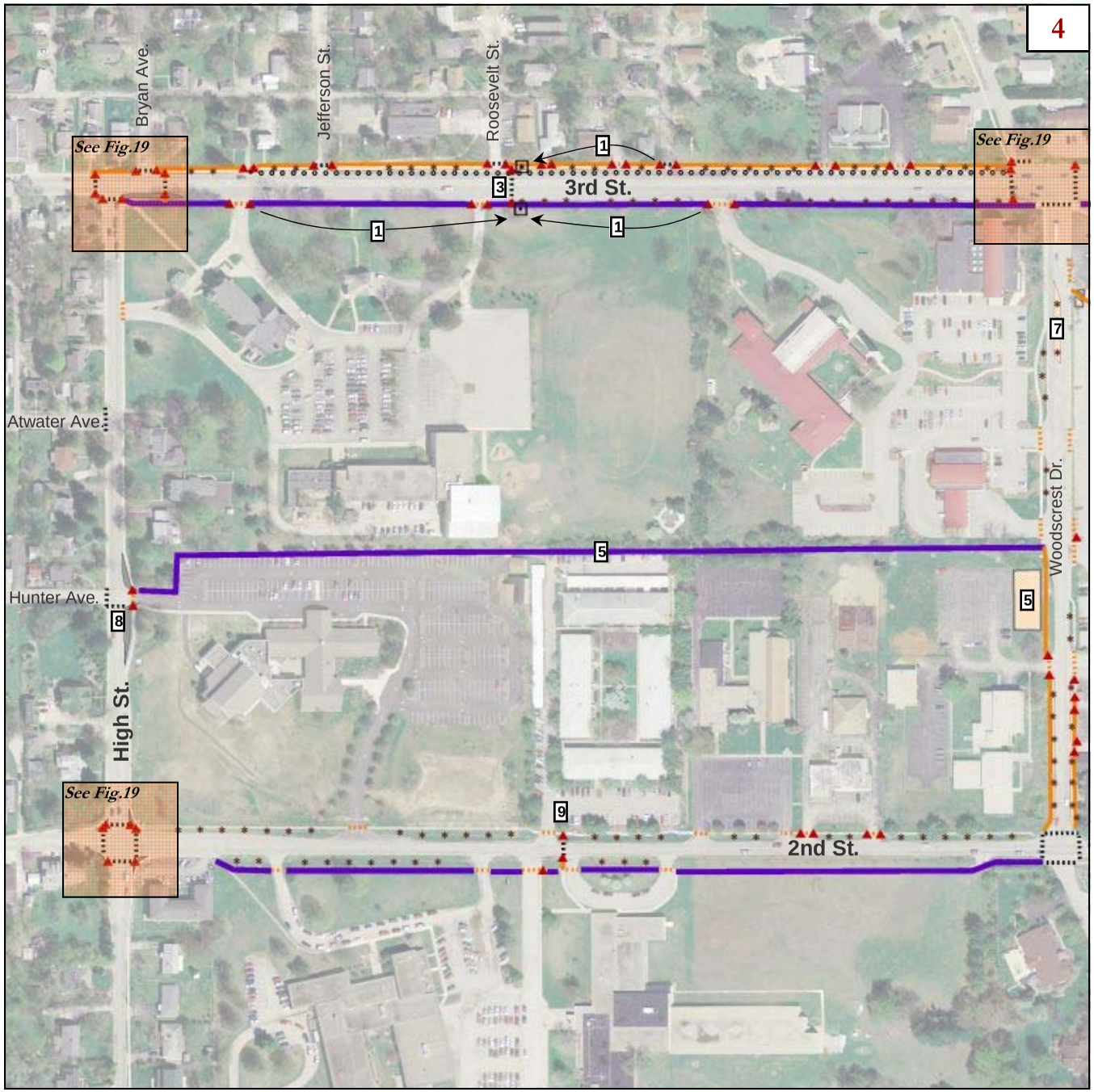


Figure 16 - Conceptual Recommendations (Section 4)

- Sidewalk
- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Bike Lane
- Landscaping
- Curb Extension/Refuge
- Trees
- Curb Ramp
- Bus Shelter

Notes

1	Relocate existing transit stop
3	New uncontrolled crossing
5	Public/private partnership
7	Median opportunity
8	Enhance existing uncontrolled crossing
9	Enhance existing midblock crossing

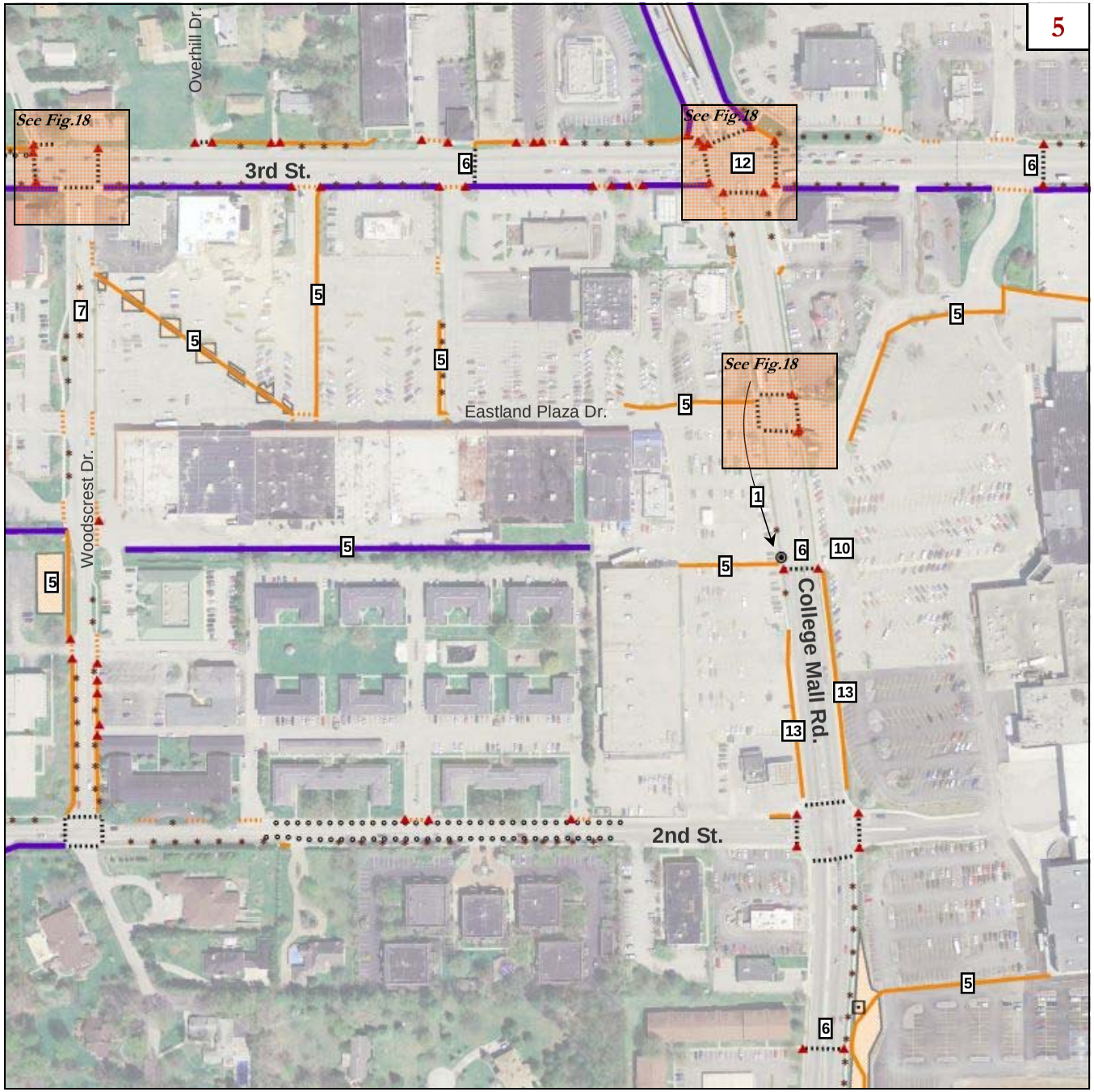
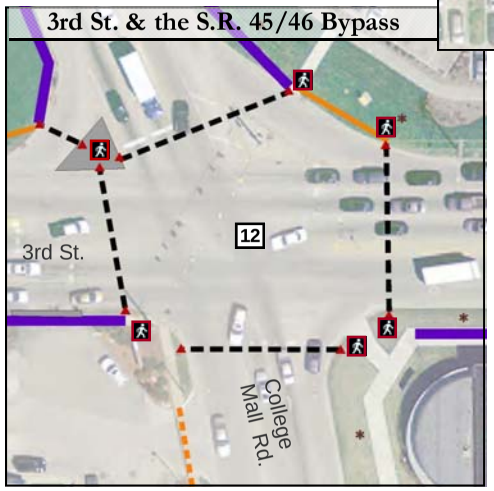


Figure 17 - Conceptual Recommendations (Section 5)

- Sidewalk
- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Bike Lane
- Landscaping
- Trees
- Curb Ramp
- Bus Stop (Signed)
- Bus Shelter

Notes

1	Relocate existing transit stop
5	Public/private partnership
6	New midblock crossing
7	Median opportunity
10	Transit stop improvements
13	Widen existing sidewalk



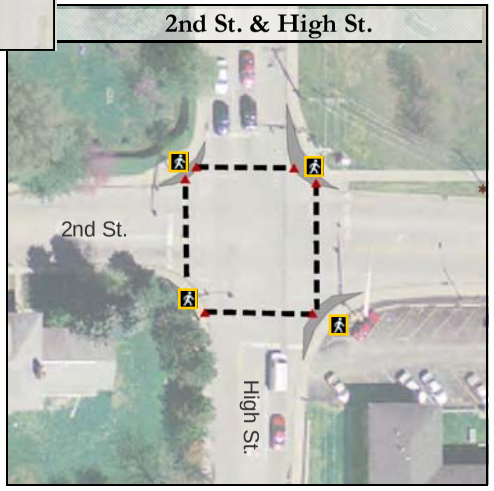


Figure 18 - Intersection Details (Sections 4-5)

- Sidewalk
- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Bike Lane
- Landscaping
- Curb Extension/Refuge
- Trees
- Curb Ramp
- Bus Stop (Signed)
- Bus Shelter
- Existing Pedestrian Signal
- New Pedestrian Signal

Notes

2	Multi-use path connection
12	Intersection controlled by the Indiana Department of Transportation
13	Widen existing sidewalk
14	Relocate existing crosswalk

Pedestrians walk through the College Mall and Eastland Plaza parking lots after de-boarding at College Mall Rd. and Eastland Plaza Dr.

Figure 18 reflect the latest available version of those plans (not accounting for the addition of travel and turn lanes). The project will add pedestrian signals and crosswalks and a pedestrian refuge island at the northwest corner. The downside to the project for pedestrians is that crossing distances would be increased as a result of additional travel and turn lanes.

Existing facilities at College Mall Rd. & Eastland Plaza Dr. (Fig. 18) provide reasonable accommodation for pedestrians, but improvements could be made to increase safety, comfort, and convenience. Relocation of the existing bus stop on College Mall Rd. from the north to the south side of the intersection would be the most important change at the intersection. This would increase the predictability of pedestrian movements from the bus stop to College Mall and Eastland Plaza. Corner improvements are proposed at the southeast and northeast corners, along with a sidewalk on the north side of Eastland Plaza Dr. Due to high volumes of pedestrians, consideration should be given to eliminating push buttons (especially for the east and west crossings) and adding a leading pedestrian interval into the signal cycle. "Turning Traffic Must Yield to Pedestrians" and "Stop Here on Red" signs are also recommended.

In addition to the improvements proposed at intersections, several sidewalk connections are proposed in Section Five (Fig. 17). These connections would facilitate pedestrian access to commercial destinations, such as Eastland Plaza, College Mall, and Omalia's grocery store. Most of the pedestrian connections proposed in Section Five are on private property and thus would require the interest and support of the relevant property owners in order to be viable.

Section Five also includes four midblock crossings – two on E. 3rd St., and two on College Mall Rd. As noted above, the longer blocks characteristic of the study area encourage pedestrians to cross between intersections. Designated midblock crossings would help to make these crossings safer and more predictable. The proposed crossings would connect commercial destinations and, in the case of College Mall Rd., facilitate safe access to and from transit stops.

Incomplete sidewalk network along Woodscrest Dr.

Other improvements recommended in Section Five include: installation of curb ramps and street trees, sidepath construction along the south side of 3rd St., connector path construction south of Eastland Plaza, bike lane installation on 2nd St., and landscaping or other aesthetic improvements on College Mall Rd., south of 2nd St.

Section Six

Section Six (Fig. 19) marks the eastern boundary of the study area and includes a large portion of College Mall itself. Similar to Eastland Plaza, the Mall could benefit from improved pedestrian access from surrounding streets. North-south connections are proposed to provide pedestrian access to Target and Kmart from 3rd St., and to the southern mall entrance from Buick Cadillac Blvd. East-west connections are proposed to connect residents and workers along Clarizz Blvd. to the mall. Additional improvements proposed in Section Six include: sidewalk along Kingston Dr., sidepath along 3rd St., street tree installation, an uncontrolled crossing on Clarizz Blvd., bike lanes along Kingston Dr., curb ramps, and landscaping improvements.

The three signalized intersections in Section Six are controlled by the Indiana Dept. of Transportation. Additional crosswalks and curb ramps, along with signal improvements would be beneficial at these locations.

Section Seven

In Section Seven (Fig. 20), proposed improvements focus on improving the comfort and enjoyment of the walking experience. Most of the streets in Section Seven already have sidewalks; however, they tend to be adjacent to traffic and street trees are often lacking. Along College Mall Rd., north of Covenanter Dr., an additional sidewalk or path is proposed on the east side of the exposed portion of Jackson Creek. The rationale for this proposal is that the existing sidewalk is uncomfortable for pedestrians, due to its proximity to high vehicular speeds and volumes along College Mall Rd. A new sidewalk east of the creek would provide a much more pleasurable walking experience and would also enhance the amenity value of the restored creek. Towards Buick Cadillac Blvd., a small pedestrian bridge is proposed to bring pedestrians back to College Mall Rd. so they can cross at the intersection. North of Buick Cadillac Blvd., landscaping or other aesthetic improvements are proposed to take advantage of unused space. Curb ramp installation is another significant aspect of proposed improvements in Section Seven. Several driveway crossings in the area currently lack curb ramps.

This curb ramp at 3rd & Pete Ellis was recently reconstructed, but the utility pole was not relocated.

The two signalized intersections in Section Seven are relatively comfortable for pedestrians. Possible improvements could include relocation of crosswalks, improved signage, and bicycle detection at Covenanter Dr.

Section Eight

Improvements in Section Eight (Fig. 21) build upon and extend those mentioned above. Sidewalk connections are proposed to allow convenient access to the south side of College Mall, and landscaping is proposed to improve aesthetics along Clarizz and Buick Cadillac Blvds. A new midblock crossing is also proposed along Clarizz, where a paved connection to the Hoosier Acres neighborhood has been established.

Section Nine

The southwest corner of the study area is represented in Section Nine (Fig. 22). With the recent addition of hundreds of housing units and several commercial properties nearby, pedestrian traffic will likely increase in this area over the next few years. A midblock crossing is proposed at the entrance to the Jackson Creek Shopping Center to encourage residents of nearby condominiums to cross College Mall Rd. at a predictable location. Street trees are also proposed along College Mall Rd. In association with the Renwick development, improvements were recently made to the intersection of Moore's Pike and Sare Rd. An additional curb extension is proposed at the southeast corner to provide a buffer for pedestrians as they attempt to cross the intersection.

Section Ten

Relatively few improvements are proposed in Section Ten (Fig. 23). A path connection from Campus Corner apartments to Showplace theater and adjacent shopping could reduce vehicle trips for some residents. At Clarizz Blvd. and Covenanter Dr., markings to enhance the existing uncontrolled crossing are proposed. South of Covenanter on Clarizz, a short section of street trees is proposed where a bus pull-off was previously located. Street trees are also proposed along Moore's Pike.

Figure 19 - Conceptual Recommendations (Section 6)

- Sidewalk
- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Bike Lane
- Landscaping
- Trees
- Curb Ramp

Notes

3	New uncontrolled crossing
5	Public/private partnership
12	Intersection controlled by the Indiana Department of Transportation

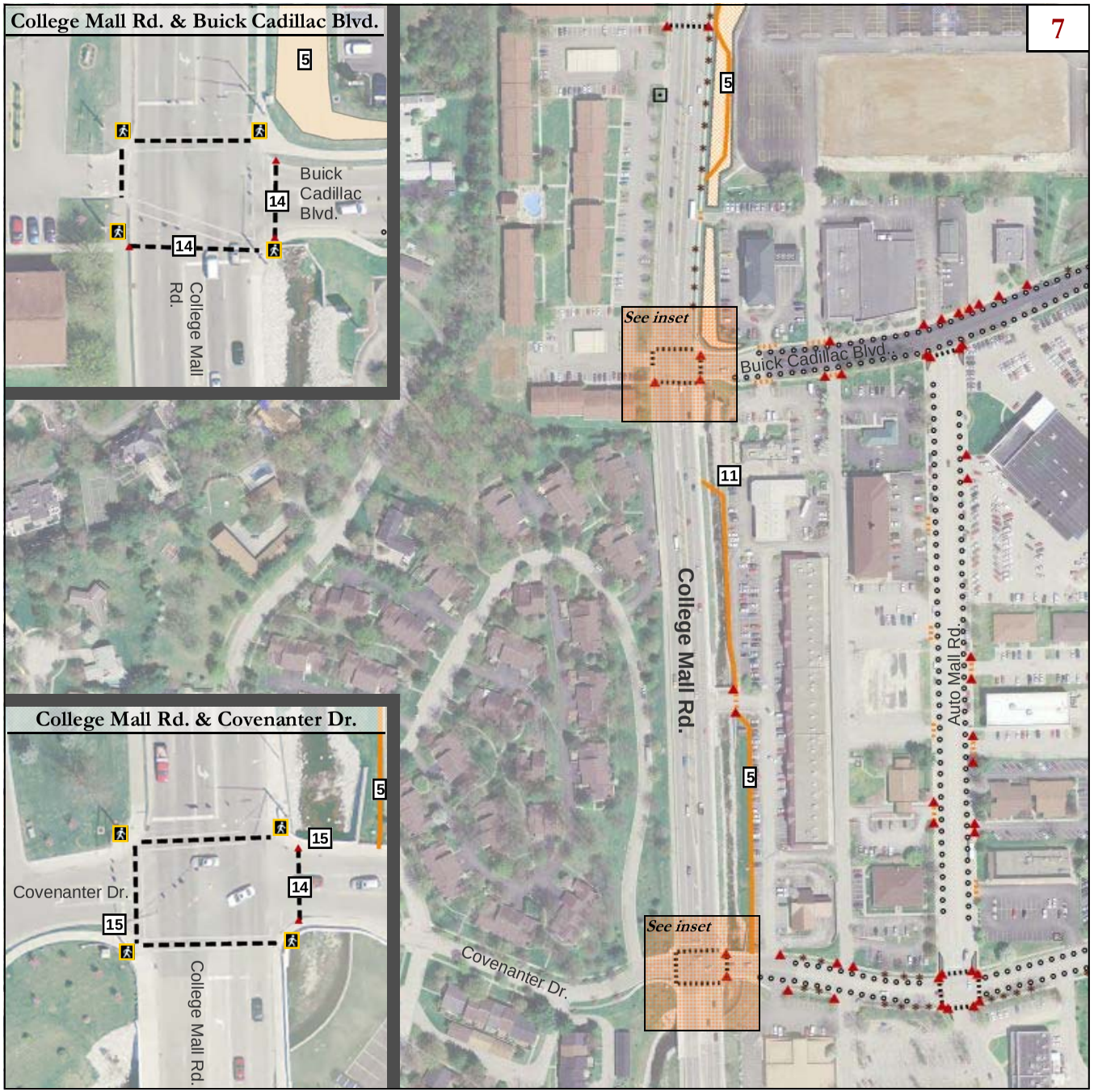


Figure 20 - Conceptual Recommendations (Section 7)

- Sidewalk
- Driveway Crossing
- High-visibility Crosswalk
- Bike Lane
- Landscaping
- Curb Extension/Refuge
- Trees
- Curb Ramp
- Bus Shelter
- Existing Pedestrian Signal

Notes

5	Public/private partnership
11	Pedestrian bridge
14	Relocate existing crosswalk
15	Add detection for bicyclists

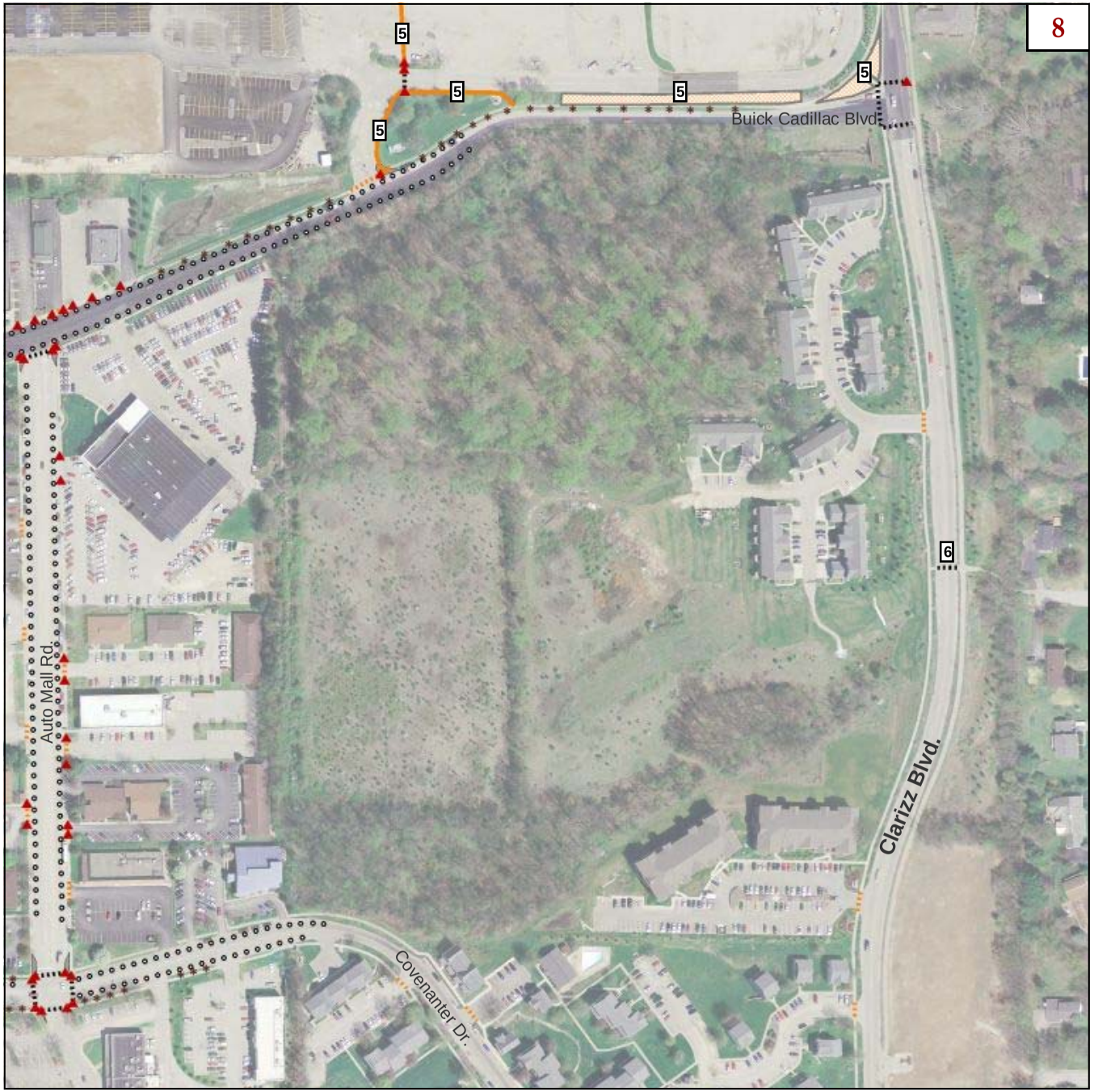


Figure 21 - Conceptual Recommendations (Section 8)

- Sidewalk
- Driveway Crossing
- High-visibility Crosswalk
- Bike Lane
- Landscaping
- Curb Extension/Refuge
- Trees
- Curb Ramp

Notes

5	Public/private partnership
6	New midblock crossing

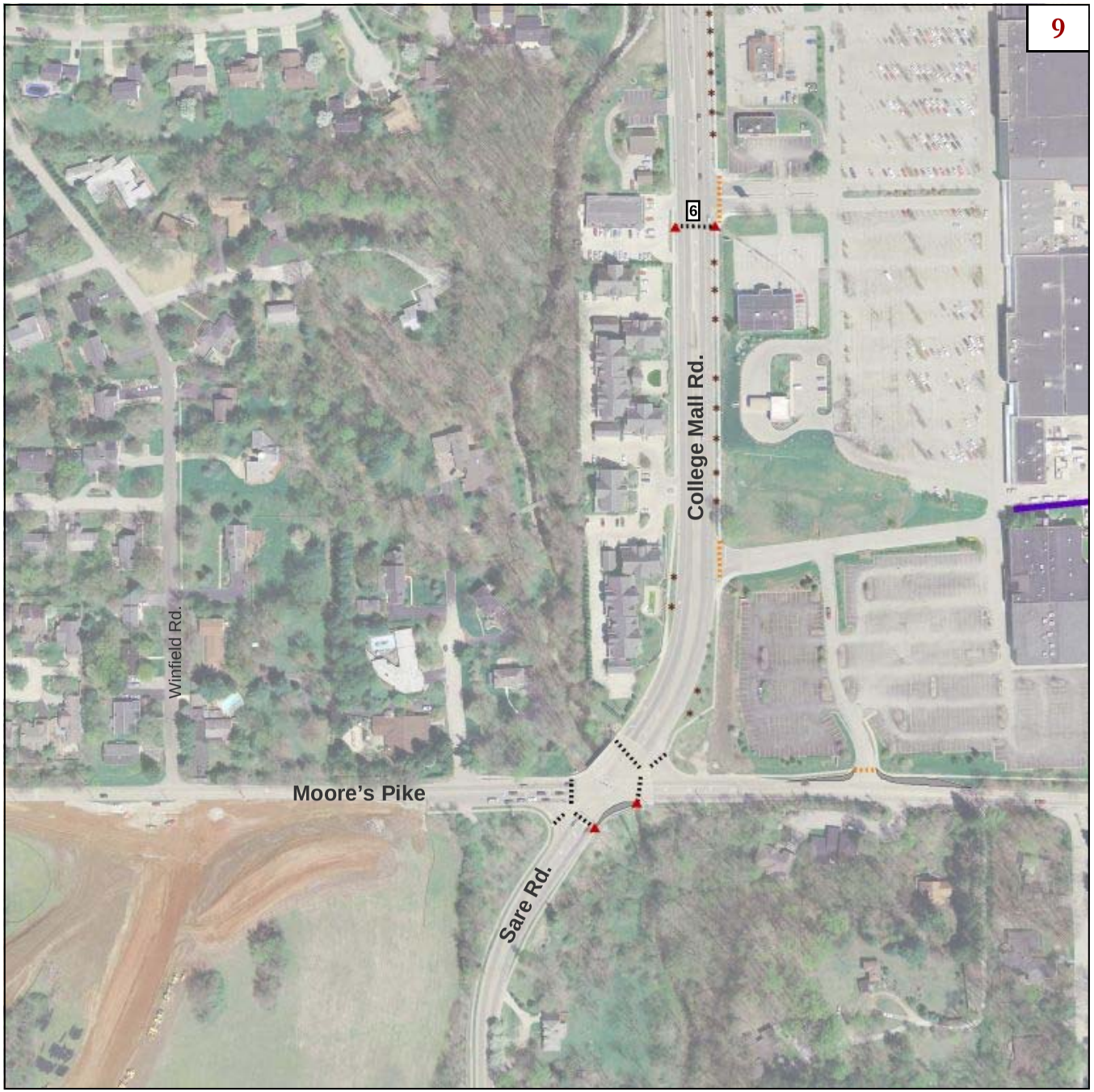


Figure 22 - Conceptual Recommendations (Section 9)

- Driveway Crossing
- High-visibility Crosswalk
- Curb Extension/Refuge
- Trees
- Curb Ramp

Notes

6 | New midblock crossing

Figure 23 - Conceptual Recommendations (Section 10)

- Driveway Crossing
- Multi-use Path
- High-visibility Crosswalk
- Landscaping
- Curb Extension/Refuge
- Trees
- Curb Ramp

Notes

5	Public/private partnership
8	Enhance existing uncontrolled crossing

5.0 IMPLEMENTATION

5.1 Prioritization

Priorities for implementation can be established based on two criteria: location and improvement type. Table 4 organizes the various types of improvements based on their effectiveness. Figure 24, on the other hand, shows the spatial priorities for sections and intersections, based on existing and potential pedestrian volume. Table 5 combines these two schemes to establish five priority groupings: Low, Low-Medium, Medium, Medium-High, and High. For instance, midblock crossings on College Mall Rd. are established as a medium-high priority, whereas on 3rd St., from High St. to the S.R. 45/46 Bypass, they are viewed as a high priority. Similarly, corner improvements at 2nd St. & High St. are viewed as a low-medium priority, but such improvements at 3rd St. & High St. are a medium-high priority.

5.2 Funding

There are many potential funding sources that could be utilized to implement the proposed improvements. These include federal, state, and local funds. At the federal level, the most likely sources are: Transportation Enhancements, Surface Transportation Program, Highway Safety Improvement Program, and Federal Transit Administration Urban Formula Funds. Although these are federal sources, local entities exercise control over these funds, through the planning process of the Metropolitan Planning Organization. Federal sources could also be used to engage in further study or design of proposed improvements.

State funding of proposed improvements would most likely be in conjunction with other larger projects. For instance, in 2008, INDOT upgraded several curb ramps along E. 3rd St. (S.R. 46) in conjunction with repaving that stretch of road. Additionally, some improvements will be implemented with the S.R. 45/46 Bypass project. Other projects along state roads would, at the very least, require the approval of the state, but could also utilize state funding.

Local sources are another potential source of funding. Within this category, the "Greenways Fund" is one possible source. This funding source is allocated for improvements identified in the Bicycle and Pedestrian Transportation & Greenways System Plan, and for other high priority bicycle and pedestrian projects, as identified by staff. Another potential local source is the City Council Sidewalk Fund (aka the "Alternative Transportation Fund"). Staff provides input to the Committee, but funding decisions are made by the City Council.

Figure 24 - Priority Locations

- Study Area
- High Priority Section
- Medium Priority Section
- High Priority Intersection
- Medium Priority Intersection
- Low Priority Intersection

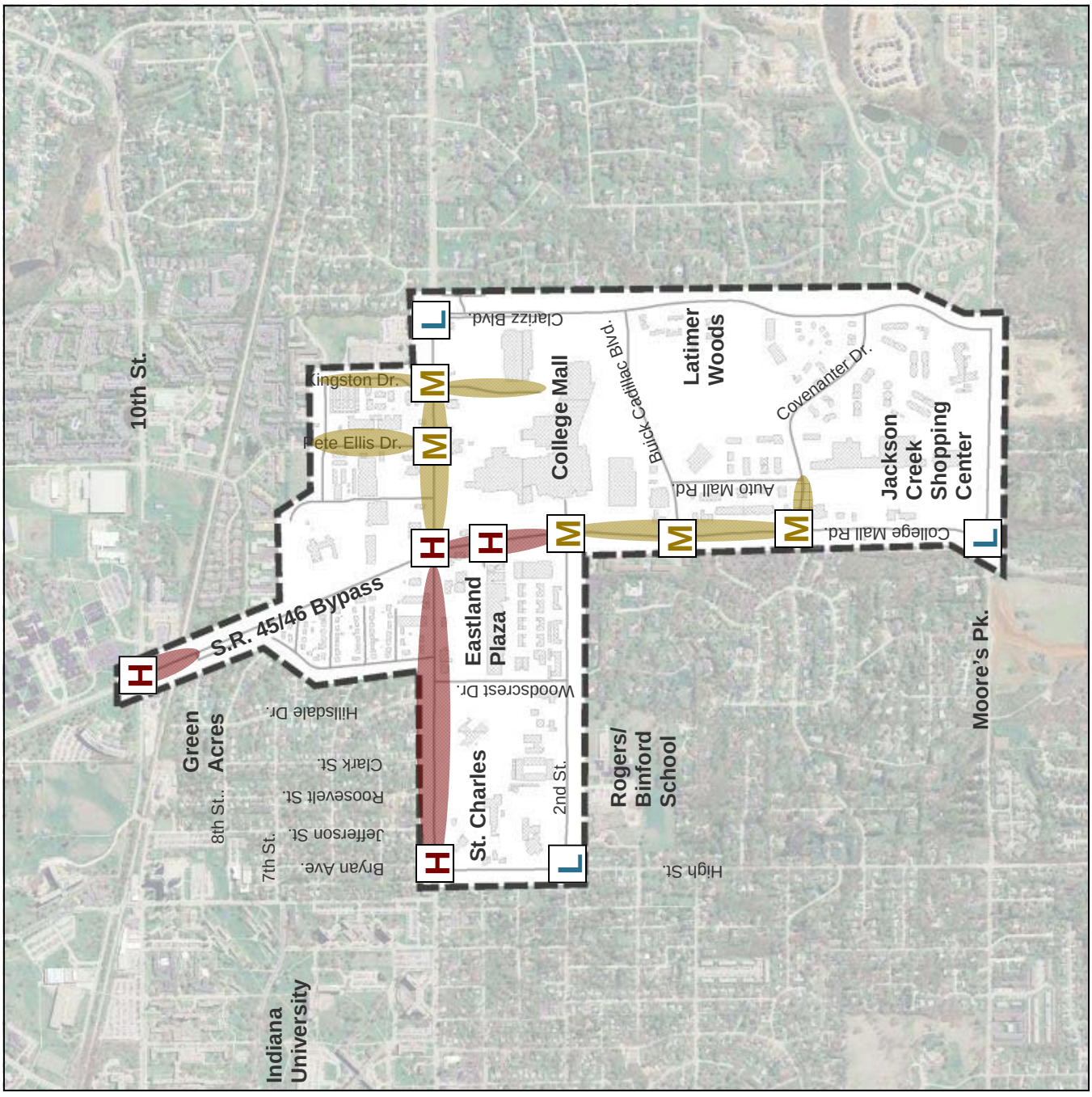


Table 5. Priorities by Location and Improvement Type

	Intersections →	3rd St. & Clarizz Blvd.; 2nd St. & High St.; Moore's Pike & Sare Rd.	3rd St. & Woodscrest Dr.; 3rd St. & Pete Ellis Dr.; 3rd St. & Kingston Dr.; College Mall Rd. & 2nd St.; College Mall Rd. & Buick Cadillac Blvd.; College Mall Rd. & Covenanter Dr.	10th St. & the S.R. 45/46 Bypass; 3rd & High St.; 3rd & the S.R. 45/46 Bypass; College Mall Rd. & Eastland Plaza Dr.
	Sections →	Other Remaining Sections	College Mall Rd., from 2nd St. to Covenanter Dr.; 3rd St., from the S.R. 45/46 Bypass to Kingston Dr.; Pete Ellis Dr.; Kingston Dr.	S.R. 45/46 Bypass, from 10th St. to Eastgate Ln.; 3rd St., from High St. to the S.R. 45/46 Bypass; College Mall Rd., from 3rd St. to 2nd St.
Improvements ↓	**Priority** ↓ →	**Low**	**Medium**	**High**
Street Tree Installation; High-visibility Intersection Crosswalks; Addition, Relocation, and Improvement of Bus Stops; Midblock Crossing; Pedestrian Signal Installation and Upgrade; Curb Ramp Installation and Reconstruction	**High**	**Medium**	**Medium-High**	**High**
Signage; Corner Improvements, Roadway Narrowing, and Reduction of Crossing Distance; New Sidewalk and Multi-Use Path Construction; Bike Lanes	**Medium**	**Low-Medium**	**Medium**	**Medium-High**
Pedestrian Access through Parking Lots and Private Property; Tree Plot Installation; Landscaping; Driveway Crossing Improvement and Vehicular Access Management; Sidewalk Widening	**Low**	**Low**	**Low-Medium**	**Medium**

REFERENCES

- Charlotte, NC Department of Transportation. 2007. Urban Street Design Guidelines. Appendix B: Pedestrian & Bicycle Level of Service Methodology for Crossings at Signalized Intersections. http://www.charmeck.org/Departments/Transportation/Urban+Street+Design+Guidelines.htm
- City of Bloomington, IN. Unified Development Ordinance. 20.05.010 (b) (3).
- Dill, Jennifer. 2004. Measuring Network Connectivity for Bicycling and Walking. TRB 2004 Annual Meeting CD-ROM.
- Federal Highway Administration. 2002. Pedestrian Facilities User Guide – Providing Safety and Mobility. http://drusilla.hsrc.unc.edu/cms/downloads/PedFacility_UserGuide2002.pdf
- Federal Highway Administration. 2004. PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. http://www.walkinginfo.org/pedsafe/
- Federal Highway Administration. 2004. Signalized Intersections: Informational Guide. http://www.tfhrc.gov/safety/pubs/04091/07.htm#chp716
- Federal Highway Administration. 2006. Traffic Detector Handbook. Third Edition—Volume I. http://www.tfhrc.gov/its/pubs/06108/06108.pdf
- Federal Highway Administration. 2007. Manual on Uniform Traffic Control Devices. http://mutcd.fhwa.dot.gov/pdfs/2003r1r2/pdf_index.htm
- Landis, et al. 2001. Modeling the Roadside Walking Environment: A Pedestrian Level of Service. http://www.sprinkleconsulting.com/PDFs/Modeling%20the%20Roadside%20Environment_A%20Pedestrian%20Level%20of%20Service.pdf
- Moeur, Richard C. Manual of Traffic Signs. http://www.trafficsign.us/
- Surface Transportation Policy Partnership. 2006. From the Margins to the Mainstream: A Guide to Transportation Opportunities in Your Community. http://www.transact.org/PDFs/margins2006/STPP_guidebook_margins.pdf
- Walk Score. http://www.walkscore.com
- Zegeer, Charlie, et al. 2005. Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. http://www.tfhrc.gov/safety/pubs/04100/

APPENDIX

The following pages include the March 2007 proposal from the Bloomington Bicycle and Pedestrian Safety Commission that ultimately lead to this study.

PLANNING FOR THE COLLEGE MALL NEIGHBORHOOD

A PROPOSAL FROM THE BICYCLE AND PEDESTRIAN SAFETY COMMISSION

March 11, 2007

The College Mall neighborhood offers a tight proximity of a wide variety of retail, employment, services, and residential uses. Though destinations are within easy walking distance, this car dominated form of development strongly inhibits safe walking. The current situation could be seen as a large opportunity, but with a looming INDOT 45/46 Highway Bypass widening project, that opportunity will be lost without strong local leadership.

The Alien Pedestrian

Some effort has been made to improve the pedestrian and bicycle infrastructure in the area. Sidewalks/sidepaths have been extended along East Third and College Mall Road. These efforts, and some others like them, are a step in the right direction, but they hardly begin to address the overall problems of an environment where pedestrians are an alien species.

Sidewalks, where they do exist, aren't buffered by tree plots or on-street parking. Vehicular speeds are high. Frequent drive cuts create many conflict points. Multi-lane crossings (without pedestrian refuges) are exacerbated by large turning radii, allowing vehicles to turn faster, and increasing pedestrian crossing exposure.

With buildings set back far from sidewalks, the pedestrian experience is split between killer traffic at one elbow, and boring parking lots on the other. To reach a building from a sidewalk, the large parking lots and access drives (not designed to accommodate pedestrians)

must be navigated.

Apart from the obvious hazards of walking, the environmental cues say "pedestrians don't belong." So even if a clerk at Smith's Shoes would like to walk to Eastland Plaza for lunch, and is willing to risk crossing College Mall Road, she will also need to overcome that feeling of being a social outcast to make the trip on foot. The environment says that walking is for those who don't have other options. It demeans walking.

These same environmental cues tell drivers that they own the roads. At best, alert drivers make space for 'unexpected' pedestrians. Many drivers are dangerously oblivious to pedestrians at intersections and drives, where walking requires constant surveillance on the front, back, and both sides.

Evolving Forms of Retail & Mixed-Use Development

The out-dated, retail format of stand-alone, big boxes, and an enclosed mall fails to create the enticing urban-style shopping experience that is proving very popular across the country. The trend is driven by customers who love to walk and sit in sidewalk cafes. In other cities, some suburban style developments have begun to urbanize, creating outdoor, storefront streets with residential uses on upper floors. This transformation includes buildings pulled up to wide sidewalks, on-street parking, and a grid of streets. While supporting pedestrians, the urban style format gives retailers more street presence and direct customer egress. Evidence of this trend can be seen at College Mall as some retailers have developed their own storefronts. To create a truly vital, urbanized environment, a coordinated planning effort is necessary to change the character of the area.

Recommendation

The Bicycle and Pedestrian Safety Commission urges the City of Bloomington to undertake a plan to make the College Mall neighborhood pedestrian friendly and guide its evolution as a lively, mixed-use urban center.

Proposed Plan Activities

Increase walk-ability within and to the neighborhood to reduce traffic, enliven shopping areas, and enhance sustainability.

- Work with INDOT's 45/46 bypass project to create safe and comfortable pedestrian connections along and across major thoroughfares.
- Consider new internal connector streets and paths to improve flow.
- Support a 'park once and walk' environment.
- Create a density node for efficient mass transit.
- Directly connect existing, stand alone uses and parking lots, possibly with new, boulevard-style, pedestrian-friendly, frontage streets.

Develop a more appealing, more diverse, and more valuable urban neighborhood.

- Determine our community's preferred form for the area.
- Survey national commercial development trends.
- Guide development so that individual elements work together to form a greater whole, rather than the current, stand alone approach.
- Encourage small, locally owned businesses.
- Identify transition strategies for evolving the neighborhood.

Encourage new residential development where walking residents can help create a more interesting, 24-7, urban atmosphere, and live with less car dependence.

- Study structured parking incentives.
- Analyze other incentives such as zoning, public infrastructure improvements, & marketing surveys, to encourage desired forms of development.