



**DOWNTOWN CORRIDOR MASTER PLAN**

City of West Carrollton, Ohio  
August, 2010



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## > PROJECT OVERVIEW

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### INTRODUCTION

West Carrollton is a Miami Valley community located in southern Montgomery County, Ohio with a population of approximately 13,000 residents. The city is positioned strategically along the Great Miami River and Interstate 75, but is challenged by limited freeway access at the Exit 47 (Dixie Drive/Central Avenue) interchange. In March 2010, improvements to the Interstate 75 interchange at Dixie Drive/Central Avenue were selected as a Tier 1 project for 2011 funding through the Transportation Review Advisory Council (TRAC). Improvements to the Exit 47 interchange will directly impact West Carrollton's downtown corridor of Dixie Drive and Central Avenue.

The city of West Carrollton commissioned LJB Inc. to prepare a master plan for the downtown corridor in anticipation of property redevelopment and increased traffic volumes expected to be triggered by the future interchange improvement project. Final recommendations of this plan will be implemented into the city's new comprehensive plan. Building on the city's desire to invest in downtown revitalization and economic development, the goal of this study is to develop a preferred plan for transforming the physical landscape of the downtown corridor. The proposed plan will establish the framework for improving infrastructure elements, reclaiming the public right-of-way to make it accessible for all users, and creating a stronger sense of place in the West Carrollton community.

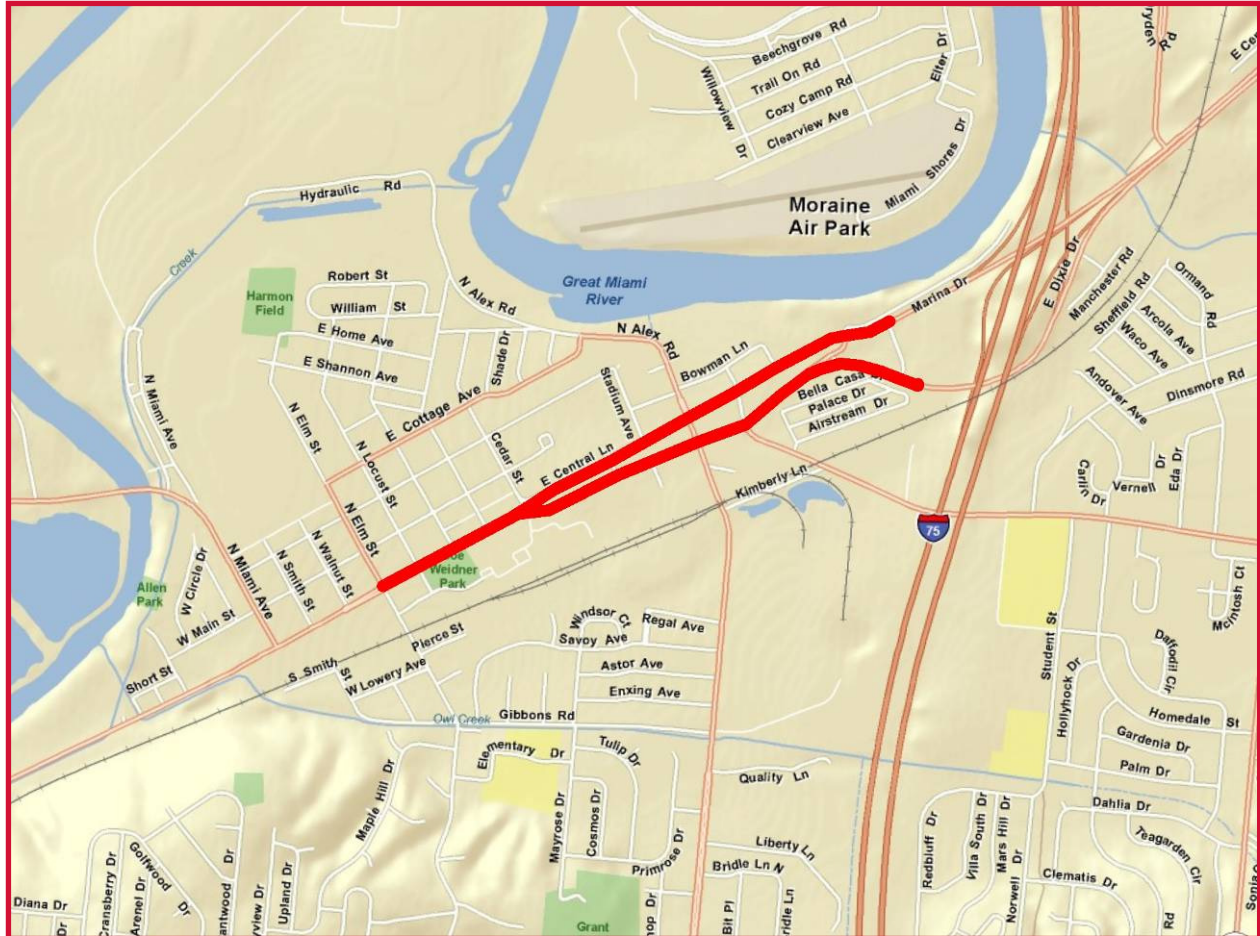
### STUDY OBJECTIVES

The Dixie Drive and Central Avenue downtown corridors have significant potential for beautification and enhancement through infrastructure improvements. Design features that calm and slow traffic coupled with landscape and streetscape opportunities are some of the ingredients needed to spur redevelopment and transform the downtown corridor into a local destination zone. Modifications proposed as part of this master plan will incorporate complete street design principles to provide an enhanced environment for pedestrians, bicyclists, transit users and motorists while maintaining safety and efficiency. The following objectives were identified to meet the goals of this plan:

- > Evaluate modifications to the existing street cross-sections to reclaim excess pavement
- > Maintain safe and efficient intersection operations
- > Evaluate the reduction or consolidation of driveway access points as a long-term strategy when property is redeveloped or has a significant land use change
- > Incorporate on-street parking at key locations as properties redevelop or grant funding is identified, in cooperation with adjacent property owners and in compliance with accepted traffic engineering safety standards
- > Provide bicycle facilities
- > Improve pedestrian facilities
- > Introduce new green space suitable for landscaping
- > Increase connectivity to regional bicycle facilities
- > Recommend a consistent preferred speed limit for the downtown corridor

**STUDY AREA**

This plan focuses primarily on the sections of Dixie Drive and Central Avenue between Interstate 75 and Miami Avenue. The study area addresses the three signalized intersections at Cedar Street, Alex Road and Alex-Bell Road. The Exit 47 interchange transition area forms the east end of the study area limits. A broader study area has been considered with respect to regional bicycle connectivity that extends west to Squire Street and east to Springboro Pike.



**FIGURE 1: STUDY AREA**

## BACKGROUND

West Carrollton’s commitment to the vitality of the Dixie Drive and Central Avenue corridors can be attested to by the number of planning and operational studies that have been undertaken over the past six years. Recent redevelopment projects in the area underscore the need to meld these efforts into a cohesive plan for the corridor that will serve as a guide for future infrastructure decisions. This section highlights three previous studies to provide background and insight on the project goals and objectives.

### 2004 Walkable Communities Workshop

Revitalization and enhancement of the Dixie Drive and Central Avenue corridors for economic development and promotion of the area’s recreational amenities is not a new concept to the West Carrollton community. In 2004, a workshop was held to explore the West Carrollton business district from Interstate 75 to Olde Downtown. The focus of the workshop was to find ways to improve walkability and to generate ideas to increase the attractiveness of the area. The workshop focused on topics including traffic calming, pedestrian accessibility, connections to and promotion of the regional bike trail, and community revitalization.

### 2006 Travel Speed and Signal Progression Study

Vehicular travel speeds on Dixie Drive and Central Avenue have been a topic of concern for many years. Historically, varying speed limits have been posted along the corridor within the West Carrollton city limits. A 30 mile per hour speed limit was posted on Central Avenue west of Cedar Street, transitioning to 25 miles per hour east of Cedar Street. There was a perception that inconsistent speed limits within the city coupled with higher speed limits outside the city created a “speed trap” condition. In 2006, a traffic study was conducted to evaluate travel speed, traffic flow and signal progression along the Dixie Drive and Central Avenue corridors. Based on results of this study, the posted speed limit was increased to 35 miles per hour for the entire Dixie Drive and Central Avenue corridor to coincide with the 85<sup>th</sup> percentile speed and to decrease delay, noise and emissions with improved signal progression.

### 2008 Parking Study

In 2008, a parking study was conducted for the Dixie Drive and Central Avenue corridors to evaluate the impact of converting certain pavement areas to on-street parking. This study identified that 117 on-street parking spaces could be provided at select locations along the corridor, both within the existing right of way and without pavement widening. The majority of the identified parking spaces were along Dixie Drive between the West Carrollton Civic Center and El Meson restaurant. The 2008 study indicated that the primary constraint to on-street parking is the number and location of access driveways along the corridor. Marked parking spaces were strongly recommended to maintain sufficient distance between parked cars and driveways or intersections.

### Recent Property Development

The Dixie Drive and Central Avenue corridors have been the focus of recent development projects that include several fast-food restaurants and an upscale bakery. Select business owners along the corridor have requested designated on-street parking spaces along their property frontage to facilitate efficient access with less reliance on surface parking areas. Improvements recommended in this plan will provide the city with support in evaluation of these requests.

### **Background Summary**

Many of the ideas generated during the community workshop and subsequent studies are reflected in the proposed corridor plan presented in this study, including:

- > Improve connections to and promote the regional bikeway
- > Improve pedestrian connectivity with sidewalk and crosswalk improvements
- > Modify the streetscape by adding bike facilities and landscaping
- > Provide on-street parking on Dixie Drive
- > Implement an access management program to eliminate or restrict access driveways
- > Remove certain access points along Dixie Drive near Cross Street
- > Construct a backage road between Slonaker Drive and Cross Street
- > Increase number of pavement bump-outs
- > Reduce speed limit to 25 miles per hour

## > EXISTING CONDITIONS

The Dixie Drive and Central Avenue corridors are characterized primarily by a mix of retail, industrial and service-oriented businesses with numerous and irregularly spaced driveway access points. Other land uses near the Cedar Street intersection include the West Carrollton Civic Center facility and the West Carrollton Middle School, with residential properties fronting the north side of Central Avenue.

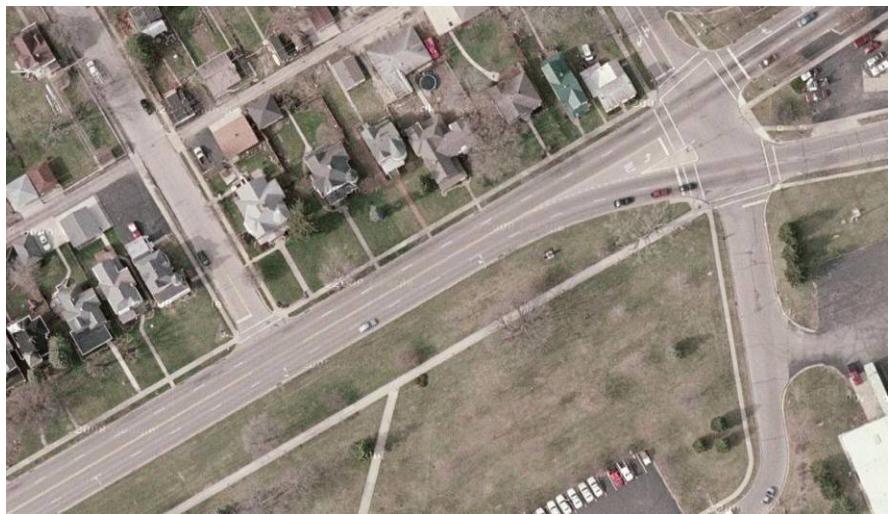
The section of Dixie Drive and Central Avenue between Interstate 75 and Cedar Street functions as a one-way street couplet with a posted speed limit of 35 miles per hour. A couplet consists of two parallel one-way streets that allow travel in opposite directions. Dixie Drive services eastbound traffic with Central Avenue servicing westbound traffic. The corridors converge west of Cedar Street to form a traditional four-lane roadway with a posted speed limit of 35 miles per hour.

Both Dixie Drive and Central Avenue are plagued by numerous and irregularly-spaced access driveways. Most properties have a minimum of two access driveways from each roadway, with few shared driveways.

### ELM STREET TO CEDAR STREET

Central Avenue is a four-lane roadway between Elm Street and Cedar Street comprised of two through travel lanes in each direction. Exclusive left-turn lanes are provided at the Elm Street intersection with left turns made from the through travel lane at other intersections and driveways. Four-foot sidewalks line both sides Central Avenue, separated from the traveled way by grass strips of varying widths.

The Cedar Street intersection forms the terminus of the one-way street couplet and operates under traffic signal control with unusual geometric conditions. The traffic signal functions with two-phase operation, without protected left-turn phases. A short turn bay is provided for eastbound left-turning vehicles. Westbound left turns are executed from the inside through lane on



Central Avenue. In the absence of a dedicated turn lane, left-turning vehicles queue within the central intersection area and are often positioned outside the view of the traffic signal heads. Additionally, the expansive central intersection area causes concerns with right-of-way assignment for traffic exiting the Civic Center facility from the south and Cedar Street from the north.

### **CEDAR STREET TO ALEX ROAD**

The section of Dixie Drive between Cedar Street and Alex Road consists of a 45-foot pavement cross section comprised of two through travel lanes with nearly continuous left and right turn lanes. Pavement bump-outs near Handle Street and Cross Street prevent the turn lanes from being used as through travel lanes. Four-foot sidewalks line both sides of this section of Dixie Drive, separated from the traveled way by five-foot grass strips.

The section of Central Avenue between Cedar Street and Alex Road is comprised of a 23-foot pavement cross-section with two through travel lanes. Short left-turn storage areas are provided at only two locations within this section. Four-foot sidewalks line both sides of this section of Central Avenue, separated from

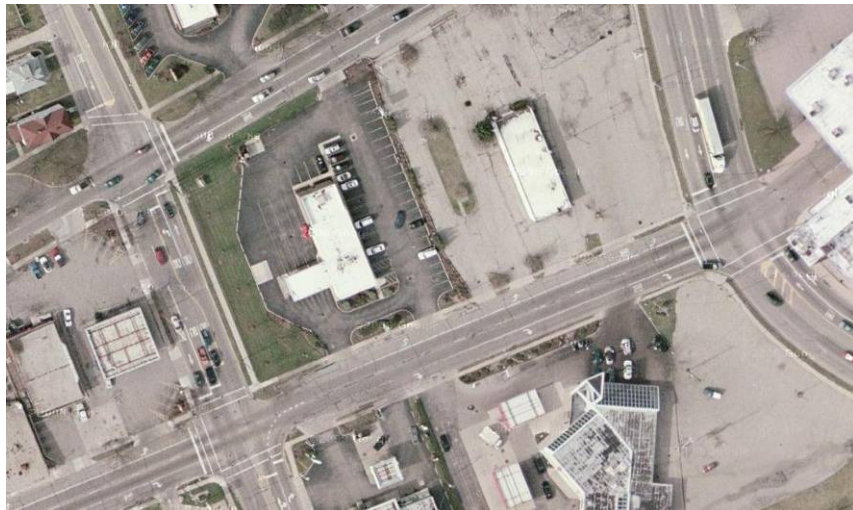


the traveled way by 12 to 14-foot grass strips. Large street trees on the north and south sides form a mature canopy over Central Avenue.

### **ALEX ROAD TO INTERSTATE 75**

The section of Dixie Drive between Alex Road and Interstate 75 is comprised of a 47-foot pavement section with two through travel lanes and turn lanes. Four-foot sidewalks line both sides of this section of Dixie Drive, separated from the traveled way by narrow grass strips. Left- and right-turn lanes are provided at the signalized intersections at Alex Road and Alex –Bell Road. Crosswalks are present on three of the four legs at both intersections.

The section of Central Avenue between Alex Road and Interstate 75 is comprised of a pavement section varying between 35 and 45 feet in width, with two through travel lanes and turn lanes. Four-foot sidewalks line the north side of Central Avenue, separated from the traveled way by grass strips of varying widths. A four-foot sidewalk presently terminates at the Sonic restaurant east property line. Left and right-turn lanes are provided at the signalized intersections at Alex Road and Alex-Bell Road. Crosswalks are present on three of the four legs at both intersections.





## > METHODOLOGY

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### DESIGN PARAMETERS

The following design parameters were assessed and evaluated to develop solutions for the Dixie Drive and Central Avenue corridors.

- > Travel lanes
- > Intersection geometrics
- > Intersection capacity
- > On-street parking
- > Pedestrian facilities
- > Bicycle facilities
- > Regional bicycle connectivity
- > Landscaping
- > Access management
- > Travel speeds

The recommended corridor and bikeway plans presented in this study are a conglomeration of design solutions aimed at reaching the project objectives with specific attention given to feedback received from residents, business owners and community leaders. Design parameters listed above were a result of goals and ideas generated as part of prior planning exercises as well as ongoing discussions with city staff. The methodology used to evaluate the various design parameters is described in greater detail in the Analysis section of this report.

### PUBLIC INVOLVEMENT

A draft version of the proposed corridor modification plan and bikeway plan was presented during a public meeting on Wednesday, December 2, 2009. The purpose of this meeting was to provide a forum for the public to express opinions regarding improvements proposed for the Dixie Drive and Central Avenue corridors. The meeting was held in an open house format with project information and draft plan exhibits available for viewing. The following exhibits were presented at the meeting for viewing.

- > **Short-term concept exhibits** – detailing improvements intended for short-term implementation including driveway consolidation and on-street parking
- > **Long-term concept exhibits** – detailing improvements intended for long-term implementation including reduction in through travel lanes between Elm Street and Alex Road, center median on Central Avenue between Elm Street and Cedar Street, on-street parking on the south side of Central Avenue and Dixie Drive, shared use bike path on the north side of Dixie Drive separated from the travel lanes.
- > **Bikeway exhibit** – detailing connectivity with surrounding regional bikeway facilities
- > **On-street bike lane exhibits** – detailing concepts for providing on-street bike lanes in lieu of shared use paths as depicted in the long-term concept exhibits

Attendees were encouraged to provide feedback on the proposed plan by completing a provided comment form. The comment form presented four questions focused on gauging the level of public support for the primary project goals including streetscape improvements, reduction in the number of through travel lanes on Dixie Drive and Central Avenue, bicycle accommodations and access drive consolidation. Public comments have been summarized in Table 1 below.

TABLE 1 – SUMMARY OF PUBLIC COMMENTS

Comment Form Question	Responses				Total Responses
	Yes	No	Maybe/Not Sure	No Comment	
Support for streetscape improvements	8 38%	11 52%	2 10%	0 0%	21 100%
Support for a reduction in number of travel lanes	3 14%	16 76%	1 5%	1 5%	21 100%
Support for bike facilities	15 71%	6 29%	0 0%	0 0%	21 100%
Support for access drive consolidation	8 38%	10 48%	1 5%	2 10%	21 100%

Space was provided for additional comments on the draft plan. The most commonly expressed comments were focused in four general areas as summarized below.

- > **Property access** – one of the most commonly expressed perceptions/concerns was that driveway consolidation and/or elimination will negatively impact business viability, parking availability and delivery circulation
- > **Travel lane reduction** – many responders expressed concern that reducing the number of travel lanes on Dixie Drive and Central Avenue will increase congestion and restrict traffic flow into the business district. Most responders were not in favor of on-street parking at the expense of a travel lane.
- > **Central Avenue between Elm and Cedar** – general concerns were expressed with regard to reducing the number of travel lanes and limiting access to accommodate a raised center median on Central Avenue west of Cedar. The general perception is that this change will increase congestion, impact truck traffic, and hinder emergency vehicle access.
- > **Bicycle accommodations** – most responders were supportive of providing bicycle accommodations and preferred bike paths separated from vehicle traffic.

Greater than 75-percent of the survey responders did not support a reduction in the number of through travel lanes along the corridor. Concerns about vehicle congestion coupled with increasing heavy vehicle traffic were the primary factors contributing to the lack of support for this change. Survey responses for bike facilities, streetscape improvements and access management were more favorable, with the majority of responders supportive of or neutral to these changes.

Feedback solicited during the public workshop was used to amend the draft plan to better meet the needs and expectations of the West Carrollton community. The preferred corridor and bikeway plans presented in this study represents a balanced design approach aimed at reaching the project objectives with solutions that address feedback received from residents, business owners and community leaders. A more detailed summary of the public workshop, including the public survey sheet has been included in **Appendix A**.

## > ANALYSIS

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This section presents the evaluation process considered for each design parameter including a detailed summary of public feedback and explanation of how each parameter was incorporated into the final recommended plan. Included in this report are the following exhibits detailing the recommended long-range plans for the Dixie Drive and Central Avenue corridors.

- > **Exhibits A through D** – proposed corridor modification plans from Elm Street to Interstate 75
- > **Exhibit E** – proposed typical street sections
- > **Exhibit F** – proposed bikeway plan featuring connection points to the regional bike path and other future bike facilities

### TRAVEL LANES

Evaluation of the number of through travel lanes was a critical component in the development of the proposed typical street section for Dixie Drive and Central Avenue. Reclamation of excess pavement on Dixie Drive for bicycle facilities and on-street parking is a primary objective of the plan to create a multi-modal environment. The following objectives were identified with respect to the evaluation of through travel lanes:

- > Evaluate a reduction in through travel lanes from two-lanes to one-lane in each direction
- > Eliminate the continuous left and right turn lanes on Dixie Drive
- > Maintain turn lanes at key intersections with sufficient vehicle storage

The draft corridor plan presented for public input included a reduction in through travel lanes on Dixie Drive and Central Avenue east of Cedar Street, from two lanes to one lane in each direction. Additionally, the existing four-lane section of Central Avenue, west of Cedar Street was proposed as a three-lane section comprised of one travel lane in each direction separated by a raised center median. Although capacity analyses supported a reduction in through travel lanes west of Alex Road, there was significant public concern that reducing the number of travel lanes on Dixie Drive and Central Avenue would increase congestion and restrict traffic flow into the business district.

The final corridor plan presented in this study maintains two travel lanes in each direction on Dixie Drive and Central Avenue and proposes only minimal changes to the street typical section west of Cedar Street. The decision to maintain two travel lanes in each direction for the entire study area corridor provides the opportunity for only minimal changes to the typical street section on Central Avenue. The two-way section of Central Avenue (west of Cedar Street) remains in its current condition. The 23-foot pavement section on Central Avenue between Cedar Street and Alex Road will remain in its existing condition as it is only wide enough to accommodate two through lanes without additional features such as on-street parking. Some modifications are proposed for the section of Central Avenue east of Alex Road, as discussed in subsequent sections.

The decision to maintain two travel lanes on Dixie Drive still provides the opportunity to eliminate the continuous left and right turn lanes between Cedar Street and Alex-Bell Road while providing properly sized turn lanes at the signalized intersections. The existing typical section of Dixie Drive provides the most flexibility for accommodating on-street parking, bicycle facilities and landscaping while maintaining two through travel lanes.

## INTERSECTION GEOMETRICS

The study objective to maintain safe and efficient intersection operation triggered the evaluation of geometric and operational parameters at the Central Avenue/Cedar Street intersection. This intersection has unusual geometric features as it forms the connection between the one-way street couplet and the traditional four-lane street section. The primary concerns with this intersection are the operation of left turn movements on Central Avenue as well as the assignment of right-of-way for traffic exiting the side streets. In the absence of a dedicated turn lane, westbound left turning vehicles queue within the central intersection area and become positioned outside the view of the traffic signal heads. Additionally, the wide central intersection area causes concerns with right-of-way assignment for traffic exiting the Civic Center facility from the south and Cedar Street from the north.

The following modifications to intersection geometrics and traffic signal phasing are recommended for the Cedar Street intersection in conjunction with the proposed corridor plan. Geometric changes are reflected in **Figure 2** below.

- > Realignment of the eastbound through lanes on Central Avenue to provide a 150-foot eastbound left-turn lane
- > Retain permissive operation for the eastbound left-turn movement
- > Widening on the south side of Central Avenue to create a dedicated westbound left-turn lane, offset from the eastbound left-turn lane to improve sight distance. This improvement will require property acquisition.
- > Implement a protected-only phase for the westbound left-turn movement to minimize vehicle queuing within the central intersection area
- > Implement split phases for northbound and southbound movements to minimize conflicts through the intersection

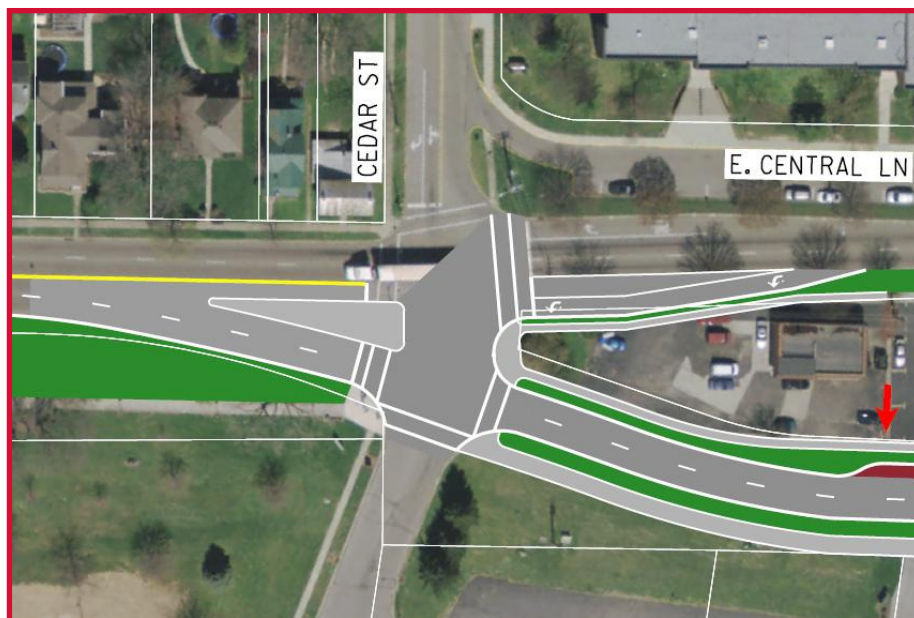


Figure 2: Cedar Street Intersection Improvements

## INTERSECTION CAPACITY

Intersection capacity and operation parameters were evaluated at the Cedar Street, Alex Road and Alex-Bell Road intersections with the assistance of Synchro (Version 7) traffic signal software. Intersection capacity was evaluated in preparation of the draft corridor improvement plan to determine if acceptable operations could be anticipated with a reduction in through travel lanes on Dixie Drive and Central Avenue. Although through lane reductions are not proposed in the final corridor plan, capacity information has been included in this report to document the findings. Additionally, operational characteristics of the Cedar Street intersection were evaluated to determine the effects of the geometric and signal phasing changes proposed at that intersection

Intersections are graded using a level of service (LOS) designation expressed in terms of letter grades. Level of service is a quality measure describing operational conditions with a traffic stream with LOS A representing the highest quality traffic flow and minimal delay, and LOS F representing poor traffic operations, significant delay, and substantial queuing. Level of service is defined in terms of vehicle delay, as published in the Highway Capacity Manual (Transportation Research Board, 2000). Levels of service thresholds for signalized intersections have been summarized in **Table 2**.

**TABLE 2 – LEVELS OF SERVICE THRESHOLDS FOR SIGNALIZED INTERSECTIONS**

LEVEL OF SERVICE	CONTROL DELAY (SECONDS PER VEHICLE)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Capacity analyses were prepared using 2006 evening peak hour traffic count data (highest volume period of an average day) for the following three scenarios based on a 30-mile-per-hour posted speed limit:

- > Existing conditions – with optimized signal timing
- > Two-lane conditions – with two travel lanes in each direction and adjacent parking lane, modifications to the Cedar Street intersection and optimized signal timing
- > One-lane conditions – with one travel lane in each direction and adjacent parking lane, modifications to the Cedar Street intersection and optimized signal timing based on

Capacity analysis results have been summarized in **Table 3** with detailed reports included in **Appendix B**. Analysis results suggest that acceptable levels of service will be maintained at all study area intersections with the proposed corridor modifications with two through travel lanes in each direction. Results also indicate that a reduction in through travel lanes is feasible on Dixie Drive and Central Avenue between Cedar Street and Alex Road based on intersection capacity. A sensitivity analysis was also conducted for the one-lane condition assuming a 25 percent growth in traffic volumes. Results of the sensitivity analysis suggest that a significant increase in traffic volumes on the Dixie Drive and Central Avenue corridors, which is possible due to the interchange modifications, would significantly impact the future feasibility of reducing the number of through travel lanes.

**TABLE 3 – CAPACITY ANALYSIS RESULTS**

Condition	EB Approach	WB Approach	NB Approach	SB Approach	Intersection Total
<b>Central Avenue @ Cedar Street</b>					
Existing Condition	A/1.4	A/4.8	B/10.8	C/22.7	A/4.4
2-Lane Condition PROPOSED (2-lanes EB/WB + phasing changes)	C/24.4	B/17.8	B/17.4	D/38.3	C/20.7
1-Lane Condition (1-lane EB/WB + no phasing changes)	B/10.5	C/21.8	B/13.7	C/29.8	B/17.9
<b>Central Avenue @ Alex Road</b>					
Existing Condition	-	A/6.4	B/18.4	B/19.4	A/8.3
2-Lane Condition PROPOSED (2 EB/WB through lanes)	-	A/5.0	B/17.2	C/20.2	A/7.1
1-Lane Condition (1 EB/WB through lane)	-	D/37.8	D/37.0	C/29.4	D/37.1
<b>Central Avenue @ Alex-Bell Road</b>					
Existing Condition	-	B/11.9	B/18.3	D/36.7	B/14.0
2-Lane Condition PROPOSED (2 EB/WB through lanes)	-	B/12.7	B/14.2	D/36.7	B/13.6
1-Lane Condition (1 EB/WB through lane)		F/144.8	A/9.0	D/36.7	F/109.8
<b>Dixie Avenue @ Alex Bell Road</b>					
Existing Condition	A/7.0	-	B/18.4	B/11.2	B/10.6
2-Lane Condition PROPOSED (2 EB/WB through lanes)	A/6.1	-	B/19.2	B/12.6	B/10.5
1-Lane Condition (1 EB/WB through lane)	A/6.9	-	C/29.5	C/21.1	B/15.0
<b>Dixie Avenue @ Alex Road</b>					
Existing Condition	A/8.2	-	B/10.8	B/10.9	A/9.9
2-Lane Condition PROPOSED (2 EB/WB through lanes)	B/13.8	-	B/11.2	B/12.8	B/12.7
1-Lane Condition (1 EB/WB through lane)	B/14.5	-	B/16.4	C/25.5	B/18.6

Letter/Number = Level of Service / Approach Delay

### ON-STREET PARKING

One of the catalysts for this corridor plan was a request to provide on-street parking along Dixie Drive near the Ele' Cake Company located at 810 East Dixie Drive. Other businesses along the corridor have been identified as likely users of on-street parking, including Holly's Home Cooking, Dayton Home Improvement, and El Meson. On-street parking has been shown to have a calming effect on traffic resulting in slower travel speeds which supports many of the study objectives.

The primary objectives with respect to on-street parking are as follows:

- > Identify on-street parking locations on Dixie Drive
- > Identify on-street parking locations on Central Avenue

The draft corridor plan originally reflected on-street, parallel parking at various locations along both Dixie Drive and Central Avenue, made possible by eliminating one of the two through travel lanes on each roadway. As previously stated, the majority of public responses were against a reduction in through travel lanes and therefore the plan was modified to retain two through travel lanes in each direction. This decision significantly impacted the number of locations available for on-street parking due to limited pavement width.

The 2008 parking study (referenced in the background section of this report) identified the potential to provide 117 on-street parking spaces at select locations along the downtown corridor and concluded that on-street parking spaces “will have a minor impact on through-traffic in the corridor”. The majority of the identified spaces were along Dixie Drive between the West Carrollton Civic Center and El Meson restaurant. Other areas were not recommended to incorporate on-street parking due to operational concerns. The recommended parking spaces are in proximity to existing businesses with high parking turnover rates which may result in reduced travel speeds along the corridor. A reduction in average travel speed may justify a reduced speed limit along the corridor. Recommendations of the downtown corridor plan are substantially consistent with the recommendations of the 2008 study, except that on-street parking is only recommended on one side (not both sides) of Dixie Drive from Cedar Street to S. Alex Rd. It should be noted that the following recommendations are to be implemented only as properties redevelop or grant funding is identified, in cooperation with adjacent property owners and in compliance with accepted traffic engineering safety standards.”

The proposed corridor plan includes on-street, parallel parking at the following locations:

- > 650 feet on the south side of Central Avenue west of Cedar Street in proximity to the Civic (This area of parking will necessitate relocation of the existing curb line on the south side of Central Avenue within the existing grass area. Sufficient buffer will be maintained between the parking and the existing shared use path.)
- > 950 feet on the north side of Dixie Drive between Cedar Street and Alex Road
- > 400 feet on the north and south sides of Dixie Drive east of Alex-Bell Road
- > 170 feet on the north side of Central Avenue west of Omad
- > 350 feet on the north side of Central Avenue between Alex Road and Alex-Bell Road

The total number of on-street parking spaces provided in these areas will ultimately depend on the number and location of access driveways. The long-range plan exhibits reflect potential parking areas but do not account for spaces that will be lost as a result of driveways. The following guidelines are recommended with respect to on-street parking locations:

- > Parking should not be provided within intersection influence areas in order to maintain turn lanes with sufficient vehicle storage
- > Parking should begin a minimum of 50-feet downstream of signalized intersections

## PEDESTRIAN FACILITIES

The primary goal of the plan with respect to pedestrian travel is to enhance the existing pedestrian features present along the corridor. Crosswalks are marked on three of the four legs of the Dixie Drive and Central Avenue intersections with Alex Road and Alex-Bell Road. This plan proposes the addition of marked crosswalks on all four legs of the signalized intersections to enhance pedestrian accessibility. These changes should be reflected in the city’s upcoming signal system project and evaluated to ensure appropriate signal phasing and clearance times are implemented.

Most of the study area corridor features four-foot sidewalks on both sides of the roadway, with the exception of an 800-foot section on the south side of Central Avenue between Sonic and El Meson. New sidewalk is proposed in this area as part of this plan. No changes are proposed to the existing sidewalk on the north side of Central Avenue or on the south side of Central Avenue between Cedar Street and Alex Road. This plan proposes replacement of the existing sidewalk on the north side of Dixie Drive with a

five-foot walk separated from the traveled way by a five-foot grass strip. Existing sidewalk on the south side of Dixie Drive will be replaced with the 10-foot shared use path.

## BICYCLE FACILITIES

Bicycle facilities are fundamental to complete street design principles and are a primary component of a street's typical section. The primary objectives of the plan with regard to bicycle facilities include:

- > Provide connection to the existing shared use path in front of the Civic Center building
- > Provide connections to the Great Miami River Recreational Trail
- > Provide connection to the south on Alex Road

The type and location of bike facilities to be included in this plan were the topic of significant discussion during the project planning process. On-street bikeways are identified in the MVRPC Bicycle Friendly Communities Action Plan for most of the major roadways in the West Carrollton area, including Central Avenue, portions of Dixie Drive, Alex Road and Alex-Bell Road. Although on-street bike lanes provide distinct advantages to the non-recreational cyclist, they must provide for directional travel and are often perceived as suitable for only advanced users. Bike facilities such as shared-use paths adjacent to the traveled way are perceived as a more viable option for recreational users and children, but are typically located outside the roadway area within a separate right-of-way or in areas with a limited number of access points.

The following two concepts for accommodating bicycle travel were presented at the public workshop to gauge support from the community.

- > **Concept 1:** 10-foot shared-use path traversing the north side of Dixie Drive to the east side of Alex Road and continuing on the north side of Central Avenue to Marina Drive.
- > **Concept 2:** On-street bike lanes on both Dixie Drive and Central Avenue (Figure 3)



FIGURE 3: ON-STREET BIKE LANE EXHIBIT



Based on public feedback, the decision was made to maintain two through travel lanes in each direction throughout the project corridor. This decision precluded directional bike lanes on Central Avenue between Cedar Street and Elm Street due to limited pavement width. Additionally, the majority of public responders were supportive of providing bicycle accommodations along the corridor but preferred bike paths separated from vehicle traffic. Based on public feedback and physical constraints, it was concluded that a shared-use path adjacent to the traveled way would best accommodate the needs of the West Carrollton community.

After revisions based on public comment and staff feedback, the proposed corridor plan includes a 10-foot shared-use path on the south side of Dixie Drive between Cedar Street and Alex Road, which continues north along the east side of Alex Road to the Central Avenue intersection. The shared-use path is separated from the traveled way by a 10-foot grass buffer. The shared-use path connects to the existing path on Central Avenue near the Civic Center facility.

The decision to provide a shared-use path in lieu of on-street bike lanes underscores the importance of implementing and enforcing an access management policy for Dixie Drive and Central Avenue as property redevelops along the corridors. Each driveway or intersecting street creates a potential conflict point between vehicles and pedestrians/bicyclists. Reducing the number of curb cuts will reduce the number of conflict points for bicyclists. The set-back condition of the shared-use path coupled with bicyclists traveling at higher speeds relative to pedestrians has the potential to create unexpected conditions for vehicles exiting the driveways. It is anticipated that advanced cyclists and bike commuters will choose to travel within the roadway, leaving the shared-use path for recreational users traveling at lower speeds. Provisions for two, 12-foot travel lanes on each street will not preclude on-street bicycle travel, even in the absence of marked bike lanes.

### REGIONAL BICYCLE CONNECTIVITY

An overall bikeway plan has been included as **Exhibit F** that details the proposed shared-use path and its connections to future bikeway projects and the Great Miami River Recreational Trail. The shared-use path proposed in the corridor plan meets the objective of creating a connection to the existing shared use path near the Civic Center facility and sets the framework for continuation of the path to the west and north to form connections with the Great Miami Recreational Trail.

The shared-use path proposed in this corridor plan terminates on the west end of the study area at the Slonaker Drive intersection with Central Avenue. Unless the Central Avenue typical section is modified west of Elm Street, continuation of the shared-use path to the west adjacent to the roadway is unlikely due to right-of-way constraints. However, the city's recent purchase of the Fraser property on the south side of Central Avenue between Elm Street and Miami Street sets the framework for a westerly connection to the Great Miami River Recreational Trail. The bikeway plan routes cyclists onto Slonaker Drive, across Elm Street with continuation on a future bike path parallel to the railroad to Miami Street within the recently purchased property. A signed bike route will continue north on Miami Avenue, and west on Main Street, with connection to the regional bikeway from Squire Street.

The shared-use path proposed in this corridor plan terminates on the east end of the study area at the Alex Road intersection with Central Avenue. Since the Great Miami River Recreational Trail provides the primary east/west corridor for bicycle travel, it was determined that the West Carrollton area bikeway plan would focus on north/south bicycle connectivity via Alex Road and providing three points of connection to the regional trail. The city of West Carrollton is planning a 10-foot shared-use path on the east side of Alex Road, south of Dixie Drive which will be extended north to the regional trail. The future

Alex Road path and the Dixie Drive path proposed in this plan will converge in the heart of the study area.

Bicycle facilities were not included in the proposed corridor plan between Alex Road and Marina Drive primarily because the regional trail already provides east/west connectivity in close proximity to this section. The bikeway plan does reflect a preferred bikeway path through the Exit 47 interchange, connecting Springboro Pike and the regional trail via Crossover Street.

### LANDSCAPING

Modification to the street typical sections provides new green space areas suitable for landscape or streetscape features such as street trees and pedestrian-scale lighting. The recommended plan does not include disturbing the mature tree line on Central Avenue between Cedar Street and Alex Road. Other mature trees that are in good health should be preserved to the maximum extent possible. Street trees should be included as part of property redevelopment plans within the 300 block of Central Avenue, west of Elm Street.

### ACCESS MANAGEMENT

Dixie Drive and Central Avenue are plagued by numerous and irregularly spaced access driveways throughout the entire project corridor. Most properties have a minimum of two access driveways, with only a few driveways shared by multiple properties. Those properties that front both Dixie Drive and Central Avenue often have multiple points of access from each roadway. Closely spaced access points are undesirable as they can interfere with each other, restrict egress capacity and increase conflict points for vehicles, pedestrians and bicyclists.

Access management is defined in the Access Management Manual (Transportation Research Board, 2003) as “the systematic control of the location, spacing, design and operation of driveways, median openings, interchanges, and street connections to a roadway”. A vital component of access management is the location and spacing of access connections which includes private driveways and intersecting streets or roads. The primary purpose of the access management plan identified in the conceptual street improvement plans (Exhibits A through D) is to create a consistent corridor that meets driver expectations with fewer conflict points to improve safety for all users.

Proposed property access modifications were based on the following objectives:

- > Limit the number of conflict points and separate conflict areas
- > Reduce the total number of access driveways
  - Position driveways along property lines to encourage shared access between adjacent properties
- > Eliminate multiple and redundant points of access to individual properties
  - Maintain one point of access for properties on the north side of Central Avenue
  - Maintain one point of access for properties on south side of Dixie Drive
  - Maintain one point of access to Dixie Drive and one point of access to Central Avenue for those properties located between the two corridors
  - Provide secondary property access on adjacent side streets, where applicable

Proposed access modifications were reflected in the draft corridor plan for both short- and long-term conditions. Access modifications were met with public concern, primarily from business owners. One of the most commonly expressed concerns was that the elimination or consolidation of driveways will negatively impact business viability, parking availability and delivery circulation. In response to public comments, the short-term access management recommendations were excluded from the final plan. It was however determined that access management is a critical component to the successful implementation of the corridor improvements and remains a component of the recommended long-range plan.

Red arrows have been used in **Exhibits A through D** to illustrate the preferred locations for access driveways along the corridor. The proposed access plan includes a backage road positioned south of Dixie Drive from Alex Road to the PODS access driveway, approximately 875 feet to the west. The backage road incorporates the underutilized Cross Street and eliminates direct access to Dixie Drive for most properties. Access to the Taco Bell parcel may require direct access to Dixie Drive if a cross-access easement is not obtained.

Access locations illustrated in the conceptual plan exhibits are approximate and represent a general location to encourage shared access between adjacent properties. These changes should be evaluated as a long-term strategy when property is redeveloped or has a significant land use change. Access consolidation will not be required in the short-term for existing uses without the owner's consent. Requests to deviate from these recommendations may require detailed study or evaluation as required by the city of West Carrollton, depending on the degree of deviation requested.

Strict adherence to access management recommendations is often difficult in urban retrofit environments such as the Dixie Drive and Central Avenue corridors. The following guidelines are offered to support requests for changes to the recommended plan:

- > Minimum of 200 feet of spacing between driveways is recommended to provide stopping sight distance based on 30-mile-per-hour conditions. In some cases, this minimum may not be feasible due to small lot sizes and physical constraints.
- > Access points should be located along property lines with shared access agreements between property owners
- > Access points should align with connections on the opposite side of the roadway
- > Access points should not be located within the functional area of an intersection, which extends upstream and downstream from the physical intersection and includes limits of the auxiliary turn lanes

**TRAVEL SPEED**

Vehicle travel speeds were collected as part of this study to reassess conditions along the corridor. Mechanical volume and speed measurement devices were placed on Dixie Drive and Central Avenue, west of Alex Road, on June 25, 2009. Traffic volume and speed results have been summarized in **Table 4**.

**TABLE 4 – TRAFFIC VOLUME AND VEHICLE SPEED SUMMARY**

ROADWAY SEGMENT	VEHICLES PER DAY	85 <sup>TH</sup> PERCENTILE SPEED
Central Avenue (west of Alex Rd)	10,500	32 MPH
Dixie Drive (west of Alex Rd)	9,300	30 MPH

The current 35-mile-per-hour speed limit was set in 2006 based on findings of the 2006 speed and signal progression study. At that time, the city was focused on providing the most efficient movement of vehicles and trucks along the corridor, which was best achieved at 35 miles per hour. Results of the 2009 data collection program indicate that the 85<sup>th</sup> percentile speed is between 30 and 32 miles per hour; up to five miles per hour below the posted limit. Certain modifications now being proposed such as reduced capacity on Dixie Drive (with elimination of the continuous turn lanes), on-street parking and shared-use paths will further encourage slower travel speeds along the corridor. In light of the proposed street modifications and the city's desire to provide both an efficient and multi-modal environment for all users, a posted speed limit of 30 miles per hour is recommended. This recommendation is supported by the current 85<sup>th</sup> percentile speeds.

## > RECOMMENDED PLAN

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The recommended improvement plan for the Dixie Drive and Central Avenue corridors has been graphically illustrated in **Exhibits A through D** with typical street sections in **Exhibit E**. The proposed plan maintains two through travel lanes in each direction and features a shared-use bicycle path and on-street parking in select locations. Sidewalk is maintained, replaced or added with crosswalks provided on all legs of the signalized intersections.

Additional recommendations of the plan include:

- > Reduce the posted speed limit to 30 miles per hour for the entire corridor
- > Implement and enforce access management recommendations as property redevelops
- > Provide regional bicycle connectivity as illustrated in the bikeway plan graphically detailed in **Exhibit F**
- > Improve the Cedar Street intersection with left-turn lanes and signal phasing changes
- > Provide landscaping and/or streetscape elements within newly formed green space areas
- > Preserve existing trees that are mature and in good health to the maximum extent possible
- > Incorporate street trees into property redevelopment projects on Central Avenue