ABSTRACT

SHIFTING GEARS: A BICYCLE AND PEDESTRIAN PLAN FOR OXFORD, OHIO

by Anna Louise Dragovich

Alternative transportation modes have long been on the minds of Oxford residents as evidence in several planning reports previously conducted by both the City of Oxford and Miami University. These reports were used to draw upon public opinion, determine structural barriers and identify opportunities for improvement. Goals for a bicycle and pedestrian plan jointly established by City Council and Planning Commission are as follows. To collaborate planning with Miami University, promote safety and convenience of all modes, analyze existing roadways and research best practices from other town-gown communities. Best practices are based upon the research of peer communities and professional guide manuals. Recommendations came about through extensive collaboration and feedback from the planning commission, city staff, additional Oxford boards and commissions and Miami University staff. The recommendations include a complete streets policy and programs such as: bicycle parking, public education, encouragement, and enforcement to support a physical multi-modal transportation system. The recommendations presented in this plan are meant to serve as broad guidelines with the intent that the planning commission and city staff will continue to determine exact implementation on a case by case basis.
SHIFTING GEARS: A BICYCLE AND PEDESTRIAN PLAN FOR OXFORD, OHIO

A Practicum Report

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I also want to thank my Mom and Dad, though it is impossible for me to adequately thank you.

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Preface

I have learned much more than I had anticipated upon the start of this practicum. I have spent countless hours in front of a computer writing and making maps, but have also spent plenty beautiful days outdoors collecting pictures. I have gotten to know Oxford as if I had grown up here. I have driven, biked, and walked nearly every street many times over, taking images and noting opportunities for improvement. My experience explores a more practical approach to community planning than a typical graduate research report. It is a real plan brought on through the application of real planning processes.

This practicum began following the goals and objectives that were jointly established by Oxford City Council and Planning Commission. Those goals and objectives called to create a plan which addressed bicycle and pedestrian transportation improvements. This plan meets those goals and objectives through specific recommendations, however, there has been and will continue to be much debate and technical review on what exactly will be implemented. But before talking too much about this practicum, I feel compelled to briefly touch on the history of bicycling in Oxford.

Numerous studies and reports beginning as far back as 1973 have been conducted on bicycle planning in Oxford. Only within the past two decades or so has pedestrian safety become a major concern and, even still, only as a result of increased traffic congestion and increased accidents. Anyone who has lived in Oxford for the shortest amount of time hears ‘tales’ of a vague bicycle lane project on Spring Street that went awry and subsequently killed the tiniest glimmer of hope that bicyclists ever had to gaining equality within Oxford’s transportation right of ways. Fast forward to 2012 and Oxford continues to face ever increasing traffic congestion and pedestrian safety concerns. No longer can the City afford to lick the wounds of past bicycle failures and, so, is beginning down a path to create an integrated network.

A major strategy throughout this planning process was the idea of consensus planning. Where the decision making process is based on the concerns of as many stakeholders as possible, rather than individuals competing for their own interests. Which is why I worked to include all parties throughout the process including: Services Department, Community Development and Miami University Physical Facilities. The final work session in July included: the above mentioned departments, as well as, the Environmental Commission, Parking and Transportation Advisory Board, the City Manager, the Police Department and a number of interested members of the public. With this long list of parties, there’s no doubt that there has been an incredible amount of collaboration and interest surrounding this plan.
For Oxford, this practicum is one more attempt to make the case for bicycle and pedestrian planning. For me, it is the result of lessons learned in project management, teamwork, engagement, consensus building and patience. During these lessons, I often found myself wearing many hats. I have been a facilitator, an instructor, a strategist, a promoter, and always a student. Amongst the many lessons, I have learned that plans are often full of idealist visions of “rainbows and ponies” (this one is no exception). But with a lot of ambition, persistence and hard work, we can face the future with humility and knowledge of previous successes and failures to create places that stand alone because of their achievements and opportunities.

In short, my practicum experience has helped to shape my philosophies and perceptions on urban planning issues. I feel that it has been a good bridge from classroom theory to real world practice. It has added a few more tools to my planners’ toolbox and has prepared me for the challenges and rewards that a successful job will bring. It has been my hope throughout this planning process that all the planning efforts before this one not be lost, but put to practice. With a bit of luck, future readers of this practicum report will live in an Oxford where transportation’s inescapable ease of use is taken for granted.
Introduction

Both the City of Oxford and Miami University have produced several planning documents pertaining to alternative transportation modes. It should be noted that each of the subsequent documents have in common the overarching goal to improve the transportation network through the implementation of non-motorized transportation for either commuting or recreation purposes. Though bicycle facilities are most prevalent in each of the documents, efforts to improve facilities for pedestrians can be found throughout.

- Landscape Symposium Oxford Bikeway 1973 (joint with Miami students)
- Master Bike Plan 1997 (joint with City of Oxford)
- Multi-Use Perimeter Path Feasibility Study 1999 (joint with City of Oxford)
- Oxford Transportation Thoroughfare Plan 2006
- Promotion of Bicycling as a Viable Form of Transportation 2006
- City of Oxford Comprehensive Plan 2008
- Campus Transportation Study 2008
- Miami University Circulation Master Plan 2011
- Shaping Our Sustainable Community: An Area Plan for the South Side of Oxford 2011

In addition to previous reports, the Federal Highway Administration (FHWA) website and two engineering manuals were consulted to guide the design and recommendations of bicycle and pedestrian facilities detailed in this report. The American Association of State Highway and Transportation Officials (AASHTO) have published a manual titled *The Guide for the Development of Bicycle Facilities* and *The Guide for the Planning, Design and Operation of Pedestrian Facilities.* These guides are excellent resources for designing on-street and off-street bicycle and pedestrian facilities. *The Manual on Uniform Traffic Control Devices* (MUTCD) published by The U.S. Department of Transportation has also been used as a source of guidance for the proper signing of roadways.

City Profile

The City of Oxford is a traditional college town in that it has a large, transient university population that permeates throughout its economic and social life. At the same time, Oxford has maintained its small town character and size through relatively compact and contiguous development. This type of development has made Oxford a very walkable city and may also be attributed to the large portion of residents that choose to walk.

Street patterns in Oxford are of the traditional gridiron type located within the original Mile Square. While meandering, suburban style streets occur on the outskirts of the town.
Furthermore, City of Oxford streets vary greatly in their width. Some older streets are very narrow and currently provide parking to more cars than they had originally intended, while some newer streets have been constructed to accommodate parking on both sides. Naturally, parking tends to be in higher demand within and around the area adjacent to both Miami University and Uptown. Parking then thins out as one travels from this central core and into the newer parts of the City.

The Planning Process

Previous planning reports and three work sessions helped to determine existing problem areas for both bicycle and pedestrian facilities. Logical bicycle routes, based on local trip generators, were also explored. Additionally, the work sessions yielded questions including:

- What is the current state of the pedestrian network and where are major problem areas?
- What are the ideal routes for alternative transportation?
- How might the current roadway be designed to create a safe integration of non-motorized and motorized transportation?
- How might intersections be designed in order to direct and encourage safe bicyclist and pedestrian behavior?
- How should bicyclists behave when navigating the street?

Figure 1: Routes of Focus. Work sessions yielded routes of focus determined by ideal routes and local trip generators.
The map above is the result of this planning process and is the recommended long range plan for bicycle and pedestrian improvements in Oxford.

Because bicycling is a relatively new concept for many Oxford residents, there is vast curiosity and concern for bicyclist safety. It is because of this curiosity and concern that readers of this plan may conclude bicycles to be discussed more than pedestrians. Though this may be the case, they are equally important as witnessed by the intentions and recommendations of this plan.

Nonetheless, this plan is guided by the following goals and objectives, and also draws from existing conditions to discuss Oxfords’ opportunities for improvements so that bicycles and pedestrians can be accommodated in the future.
1. Goals and Objectives
1. Goals and Objectives

The vision of this plan has been guided by objectives that were established during a City Council and Planning Commission joint work session.

Objectives

- Collaborate planning efforts between the City and Miami University
- Promote safety and convenience of all modes of transportation
- Review and analyze existing roadways within the current right of way for future improvements to accommodate pedestrian and bicycle traffic
- Research best practices/benchmarking from other town-gown communities

Strategies outlined in this plan also aim to meet the Thoroughfare Plan and Oxford Comprehensive transportation goals.

Goal:

- “Make the transportation network safer for all modes through better separation of bicycle, pedestrians and motor vehicles”.¹
- “Quality, accessible transportation system with alternative forms of transportation for a diverse population, improved infrastructure, adequate parking, bikeways and efficient traffic management”.²

A closer look in to the goals of the Oxford Comprehensive Plan show that enhancement of the transportation network is supported by other chapters. Land use, urban design, community services and university and community chapters are strongly connected to the transportation chapter.³

Land Use

Goal: Manage growth to ensure small town character, green areas and preserved farmland

Urban Design

Goal: Honor and preserve the historic character and quality of Oxford while embracing high quality which compliments existing development

Community Services

Goal: Excellent schools and community facilities and services including cultural and recreational facilities, safety and social services and programs for all

University and Community

Goal: Partnerships with the university, the city and surrounding jurisdictions.

In short, the goals within the comprehensive plan seek to create a high quality, integrated transportation

system to meet various social, economic and environmental outcomes.

Vision: Integrating the Transportation System

The guiding goals and objectives presented in previous planning reports largely seek to accommodate all roadway users. An emerging concept in transportation planning is the idea of Complete Streets. A Complete Street is a comprehensive approach to transportation planning that aims to integrate all users of the transportation system regardless of mode, age or ability. Complete Streets are not one size fits all, however, and require a variety of accommodations to ensure each user’s needs are met.

For example, the roads in the Mile Square will not be complete in the same sense as streets in rural parts of Oxford. Supplying sidewalks in open rural areas would be unnecessary and may not be the best use of public funds. In this case, a wide shoulder for use by pedestrians, bicycles and farm machinery would suffice. Conversely, wide sidewalks in denser urban areas would most definitely be necessary.

In short, keeping all users in mind improves safety, encourages walking and better health, increases property values, decreases traffic congestion and increases social aspects of the community by allowing those with limited independence a chance to participate in the community.

Oxford has already begun to meet these goals and improve upon the network through several bicycle and pedestrian projects. However, field observations and accident reports reveal that there are opportunities for improvement.

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4 National Complete Streets Coalition. www.completestreets.org
2. Existing Conditions
2. Existing Conditions

Existing conditions were determined through analysis of field observations, previous planning efforts, accident reports from the police department and current roadway dimensions. Identifying areas in need of improvement and the constraints that currently exist provide a basis for the discussion of improvements and recommendations of the transportation network.

Public Opinion and Concerns

Previous planning reports reviewed show that public opinion about alternative transportation in Oxford remains consistent with the following themes pertaining to bicycle initiatives that would likely increase ridership:

- Construct separate bike-only paths
- Better plowed paths in winter
- Provide free community bikes to use
- Provide overnight storage facilities
- Install more bicycle racks

When asked an open-ended question “Do you have additional comments on how to improve or diversify commuting transportation options at Miami University’s Oxford campus?” Major responses included:

- Improve parking
- Promote biking
- Improve and/or expand Miami metro service
- Regional shuttle park and ride
- Promote carpooling

Additionally, there have been concerns over the general safety in navigating the roadway by bicycle, as well as, the loss of on-street motor vehicle parking if bicycle lanes were to be installed.

Motorized and non-motorized trip characteristics

In order to begin to understand the existing transportation network, it is important to look at the modal habits and trip characteristics of Oxford residents. Survey reports show that, overall, motor vehicles have become the primary transportation choice in Oxford followed by walking and then bicycling. These trends vary amongst students and non-students. A large number of students commute to campus and Uptown on foot and then choose to drive when shopping for groceries. The

2 34
majority of Non-students, on the other hand, chose driving as their primary means of transportation. A very small percentage of respondents choose bicycling as their most frequent mode.3

Many faculty and staff of Miami University living outside of Oxford arrive to campus by car. This modal choice also holds true for in-town commuters. On average Miami University employees commute 34 miles per day, amounting to approximately 100,000 vehicle miles.4 Though some live too far to commute by any other means other than a car, many students, and in-town faculty and staff could potentially commute by other modes. The origins of many in-town commuters, both student and non-student, are concentrated in the southwestern corner of Oxford within a 2 mile radius of the center of Uptown.

Though personal vehicles continue to be the number one modal choice, there is an untapped portion of the population that could potentially use their bicycles. A 2006 campus survey of students and non-students indicated that forty percent of respondents own bicycles and sixty-three percent of respondents said bike lanes would likely increase their ridership.5

One factor that is believed to have contributed to the increased traffic congestion is the result of a migration of students from on-campus residence halls to off-campus dwellings. The shift is a result of a change in off campus housing from single family to multi-family dwelling units. It’s believed that this shift has increased the population living in multi-family dwelling units and consequently the numbers students who choose to bring their cars to Oxford. Single family dwellings originally built for one or two cars are now strained to find space for each resident’s car. Residents, in turn, are forced to park their cars on the streets because of lack of space in driveways for multiple cars.6

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Bicycle and Pedestrian Accidents

Bicycle and pedestrian accidents are a real concern for the community. There were 16 reported pedestrian accidents in 2011 alone.\(^7\) Figure 2 indicates that several areas of concern are the Patterson Avenue/Spring/Street/73 intersection, High Street and within the Mile Square due to a clustering of accidents in the area.

\begin{table}
\centering
\begin{tabular}{|l|c|c|}
\hline
Year & Number of Pedestrian Accidents & Number of Bicycle Accidents \\
\hline
2011 & 16 & 1 \\
2010 & 8 & 5 \\
2009 & 10 & 3 \\
2008 & 5 & 2 \\
2007 & 5 & 1 \\
2006 & 5 & 2 \\
\hline
Total & 49 & 14 \\
\hline
\end{tabular}
\caption{Number of bicycle and pedestrian accidents by year.}
\end{table}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{map.png}
\caption{A Map of bicycle and pedestrian accident inventory in Oxford}
\end{figure}

\(^7\) Data courtesy of Oxford Police Department (2012)
Achievements

The City has made progress in the development of a network of facilities that better serves the needs of pedestrians and bicyclists. Recently the City installed a multi-use path running along Route 27 North, updated its subdivision regulations to include connector paths and has successfully reduced the speed limit from 35 MPH to 25 MPH on Patterson Avenue and East High Street. The installation of sidewalks along the north side of Contreras Road is another example of recent achievements. On going efforts include sidewalk repair and the updating of infrastructure to meet Americans with Disabilities Act (ADA) compliance.

Though not as recent as the previously mentioned successes, some efforts have been made in the past to accommodate bicycles. University Avenue and Bishop Street, for example, were converted to one-way streets in order to accommodate bicycle lanes.

One future plan for the City is The Oxford Area Trail System (OATS). This trail is a long term goal of the City to develop a multi-use recreation trail surrounding Oxford. Easements are being set aside as development occurs in order to implement the trail.
Traffic calming measures like this median on Northridge Drive work well to encourage drivers to slow their speed which becomes especially important in residential areas like this one.

Spring Street/ Fairfield Road has been designated for shared use.

An adequate buffer between the roadway and sidewalk is important to the comfort of the pedestrian. Mature trees that provide ample shade also make this segment of College Avenue more pleasant.
Opportunities

As a result of previous projects and efforts the pedestrian and bicycle network has been improved upon. However, more could be done to include other areas of Oxford. The following images identify potential areas for pedestrian improvements.

A sidewalk ends abruptly along Locust Street.

Crossing Locust Street at the Foxfire Drive intersection is often the most convenient route, but frequent traffic on this road often prompts people to dart across the street.

An example of a beaten down “cow path” along Locust Street where sidewalks do not exist, yet there is an obvious desire.
Roots from trees along College Avenue growing in adjacent lawns cause the walkway to buckle.

An example of a vertically displaced sidewalk along Church Street that could cause a pedestrian to trip, or prevent a stroller or wheelchair from passing through.

Bicycle Parking

Often bicycles around Oxford are secured to whatever is close to their destination. Bicycle parking currently depends on private business owners who wish to provide it.

Some independent businesses provide bicycle racks, but many bicyclists are using whatever they can find to secure their bicycles.
Street Widths

Roadway dimensions are important when making improvements to the transportation network, especially when retrofitting bicycle lanes.

Data on Oxford’s roadway dimensions shows that current street pavement widths vary along the network. Street dimensions are defined as the width of the pavement and not curb to curb. Some streets are as narrow as 21 feet on Contreras Road to as wide as 63 feet on High Street in Uptown. Moreover, many streets vary in their width along certain portions of the street. Spring Street, for example, is as narrow as 30 feet between College Avenue and Beech Street and then 37 feet from Main Street to Patterson Avenue.

Table 2: Minimum street width required to accommodate twelve foot car travel lanes, five foot bicycle lanes and eight foot parallel parking lanes.

<table>
<thead>
<tr>
<th>Number of Lanes of Traffic</th>
<th>Number of Parking Lanes</th>
<th>Number of Bicycle Lanes</th>
<th>Minimum Street Width (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Way</td>
<td>0</td>
<td>2</td>
<td>34</td>
</tr>
<tr>
<td>Two-Way</td>
<td>1</td>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>Two-Way</td>
<td>2</td>
<td>2</td>
<td>50</td>
</tr>
</tbody>
</table>

Table 3: Street dimensions ranges by road name

<table>
<thead>
<tr>
<th>Street Name</th>
<th>Width Ranges (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus</td>
<td>25-35</td>
</tr>
<tr>
<td>Chestnut</td>
<td>35-39</td>
</tr>
<tr>
<td>College</td>
<td>26-35</td>
</tr>
<tr>
<td>Contreras</td>
<td>21-36</td>
</tr>
<tr>
<td>Elm</td>
<td>36-37</td>
</tr>
<tr>
<td>Fairfield</td>
<td>22-43</td>
</tr>
<tr>
<td>Foxfire</td>
<td>26</td>
</tr>
<tr>
<td>High</td>
<td>29-63</td>
</tr>
<tr>
<td>Locust</td>
<td>26-41</td>
</tr>
<tr>
<td>McGuffey</td>
<td>35</td>
</tr>
<tr>
<td>Spring</td>
<td>30-37</td>
</tr>
<tr>
<td>Sycamore</td>
<td>33-35</td>
</tr>
<tr>
<td>Wells Mills</td>
<td>35</td>
</tr>
</tbody>
</table>
Motor Vehicle Parking

Many roads in Oxford accommodate on-street parking. However, the use of that parking varies throughout the City. On-street parking tends to be dense where there are major trip destinations such as Miami University and Uptown. The on-street parking becomes less dense beyond the Mile Square where off-street parking is provided and where there is a lower density of residents.

This existing conditions information was used to develop conceptual routes for bicycles and pedestrian improvement areas. Street dimensions and on-street parking utilization were the major barriers discussed for accommodating bicycles and pedestrians. These constraints were presented and discussed, along with best practices from peer communities and AASHTO manuals to discuss policies, programs and procedures that Oxford might adopt.
3. Best Practices and Design
3. Best Practices and Design

This chapter of the Oxford Bicycle and Pedestrian Plan is based on current design documents including AASHTO Guide for Development of Bicycle Facilities (AASHTO, 1999), AASHTO Guide for the Planning Design and Operation of Pedestrian Facilities (AASHTO, 2004) and the Manual of uniform Traffic Control Devices (MUTCD, 2009). Best practices were also reviewed in the peer communities of Athens, Ohio, Bloomington, Indiana and Madison, Wisconsin.

The following pages outline methods that could improve the quality of the transportation network for both pedestrians and bicyclists. The various opportunities for improvement within Oxford are context specific and will require further analysis on a case by case basis. Therefore, the best practices presented here may be most useful when thought of as learning process rather than a fixed set of rules. This approach will foster continued innovative improvements and continued learning.
The Complete Street Ideal

Providing safe walking, biking and public transportation options are equally important when planning for accessible communities. Complete streets are streets which are navigable by everyone regardless of mode or ability. Because each roadway acts differently each road will require a variety of accommodations to ensure each user’s needs are being met. For example, roads in rural areas may be ‘complete’ simply by supplying a wide shoulder for use by pedestrians, bicycles or farm machinery.

An aerial view of how a complete street integrates buses, cars, bicycles and pedestrians.

Complete Streets are not a one size fits all roadways approach and instead aims to include all users when constructing a road.

Complete streets improve access for those who must navigate throughout the community with strollers, wheeled lugged and mobility or vision disabilities.

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1 Introduction to Complete Streets Powerpoint http://www.completestreets.org/complete-streets-fundamentals/resources/
Improving pedestrian comfort, connectivity and safety

The needs and behaviors of a pedestrian are quite different from cars or bicycles. A complete street can accommodate those needs including: visibility to other modes, easy access, and shade.

To walk or not to walk

Distance is the number one factor when a person is deciding to walk or not. Approximately one mile is the limit that people are willing to walk in order to reach their destination before they consider other modes.\textsuperscript{2} Oxfords' relatively high density and close proximity to daily destinations could be one reason a large number of residents choose to walk for the majority of their trips.

Personal safety and security are also factored in to the decision to walk. Walkways can be designed to alleviate some of the safety fears. Narrow sidewalks that are next to loud, high volume roadways and crossings that are confusing or require a long crossing distance are intimidating for pedestrians.\textsuperscript{3} Pedestrian scale lighting and presence of other people increase the sense of safety and ultimately the choice to walk.

Pedestrians are likely to walk where crossing major streets is minimal. Beyond obvious sidewalk, crosswalk and accessibility provisions, the pedestrian network requires detailed features that encourage walking and make it pleasant. Areas where there are high levels of walking generally include:

- A mix of land uses
- Connected and continuous facilities buffered from other modes
- Safe and convenient crossings
- Pedestrian scaled lighting
- A pleasant visual environment through artwork, street benches and architectural designs\textsuperscript{4}

Pedestrian Types

The pedestrian network should accommodate for a variety of pedestrians as each has various needs depending on their age group. Young teenagers tend to have poor traffic sense and a high sense of invulnerability. Conversely, elderly pedestrians tend to have vision and hearing loss and a reduced walking speed when compared to the majority of pedestrians.

\textsuperscript{3} Ibid, 9
\textsuperscript{4} Ibid, 9
Pedestrian Facilities

Sidewalks

Sidewalks create the backbone of any pedestrian network. When designed well sidewalks provide an easy, safe and convenient way for pedestrians to travel along the right of way.

A minimum width of 5 feet is required of any sidewalk to create enough space for a wheel chair. Any width that is less than this does not comply with ADA requirements. Sidewalks can and often are for more than just travel. Walking, as a social activity with two people abreast, often takes up at least 5 feet. This social interaction creates a desire for more sidewalk space than what is required. Areas that experience higher volumes, such as schools and sporting complexes, require a minimum of 8 feet. Even more space than this can create room for street furniture, landscaping and ample space to socialize. A spatial bubble does well to depict the preferred space to allow efficient pedestrian movement.

A spatial bubble demarcates the available space for different scenarios that may decrease the space available to each pedestrian.

Wide sidewalks provide ample room for large crowds to walk comfortably, places for pedestrians to sit and trees for shade.

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Crosswalks

A crosswalk is the portion of the roadway that is designed for use by pedestrians in order to cross the street. As stated in the Ohio Revised Code, crosswalks are implied at all intersections and whether marked or not, pedestrians are given the priority. Markings are often provided to alert drivers of the crosswalk location and possible pedestrian presence. The MUTCD provides options for crosswalk markings, however, the continental design has shown to be the most visible to drivers and cheapest to maintain.7

Pavement Markings

Pavement markings such as LOOK BOTH WAYS has been used as an attempt to encourage pedestrians to look for traffic prior to entering the roadway.8

Calming Traffic

Traffic calming measures refer to any physical features that intend to improve the roadway for non-motorized modes by altering driver behavior and reducing the negative effects of motor vehicles in general. Examples include: curb extensions, raised crosswalks, and medians. The potential of such roadway alterations are explained in the following paragraphs.

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Curb extensions

Eliminating parking up to the crosswalk is a good first step to improving pedestrian visibility to traffic in the travel lanes. Visibility can be taken one step further by extending the curb out in to the intersection. Curb extensions reduce crossing distance and improve sight lines of drivers at intersections in order for motorists to notice a pedestrian approaching car road space. This also helps for those that may be in a wheelchair and at lower heights than drivers anticipate.9

Crossing Times

A pedestrian's pace when crossing an intersection can depend on a number of factors. For example, older pedestrians may need more time to cross because of a slower pace than the “average” pedestrian. The MUTCD recognizes an average walking speed of 3.5 ft./s.10 However, a crossing time that accommodates for walking speed less than that may be better suited for crosswalks frequented by older adults, and citizen with disabilities. Additionally, high pedestrian volumes may require longer crossing times.


Raised Crosswalks

Raised crosswalks are crosswalks that are flush with the curb. Creating a ‘hump’ in the road, they bring pedestrians to a higher, more visible level for drivers, and encourage drivers to slow their speed when driving over the crosswalk. Raised crosswalks work well for those who have difficulty stepping down from the curb and in to the road. Detectable warnings should be installed for those with visual impairments.¹¹

Pedestrian Refuge Islands

Raised medians or pedestrian refuge islands provide a safe haven for pedestrians crossing a busy roadway. They also serve to slow traffic by narrowing the roadway and increasing visibility to drivers by allowing pedestrians to cross in phases.

Bicycle Facilities

Recently, planners have realized that the needs of pedestrians and bicycles are different from other modes. A Complete Street accounts for those needs and seeks to create a roadway that integrates bicycle facilities into the transportation network. On high volume roadways, bicycle lanes should be used to increase bicyclist confidence and comfort. AASHTO standards require a 5' bicycle lane when a curb and gutter are present and a 4' bicycle lane can be installed when no curb and gutter are present. Where parking is permitted, but is not utilized the shared area should be a minimum of 11 feet.

Some roadways may adequately accommodate bicycles via a shared use roadway. Also called sharrows, these paths can provide full bicycle accommodation on high volume roads.

The skill and confidence levels of bicyclists vary dramatically. Some are comfortable riding anywhere they are legally allowed. While others, like most adult riders, are less confident and seek space where motor vehicles cannot go, such as a bicycle lane or a sharrow. Children, though sometimes confident riders, have not yet developed the traffic sense to navigate the roadway. Bicycle facilities are often planned for the average adult who likes to use their bicycle for travel, but is not yet confident to share the same space with faster motor vehicles.

Bicyclists are very diverse in their age, ability, and comfort level.

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**Off-Street Bike Lanes**

Off street bicycle paths are completely separated from car traffic often by a barrier such as a curb lawn. This type of path can include both pedestrians and bicycle or it can be widened further to separate both users. This type works well where roadway space is not available for bicycle lanes, yet there are several trip generators along the path.

**Sharrows**

Shared use roadways or *sharrows* are roads that are not used by cars often enough to need a designated bike lane or where right of way is constrained making bike lanes not feasible. Sharrow pavement markings notify drivers that bikes may be present and that they need to share the road. On-street parallel parking can be preserved through the use of sharrows as bicycle and motor vehicles share the same space.
Bicycle Lanes at Intersections

Bicycle facilities and their movement through intersections is a very important consideration. By nature, intersections pose a higher risk of conflicts between motor vehicles, let alone bicycles and pedestrians too. Bike lane striping should always give pedestrians priority and never pass over pedestrian crosswalks or continue through intersections. Dotted guidelines are acceptable through particularly complex intersections in order to properly guide bicyclists through intersections.自行车道不应该突然结束或未通知，适当的标志通知自行车手路边设施的变化。每一个道路是独特的，需要合格的工程师的判断。MUTCD有大量类似标牌，供道路设计师用于指导自行车。详情请参阅手册获取完整的标牌列表。

Bicycles may use full lane’ sign may be used in places where it is necessary to inform motorists that bicycles may occupy the travel lane.自行车道应该从左到右，使用“移交自行车”标志，告知车辆允许自行车使用整个车道。

Where motor vehicles must enter an exclusive right turn lane and also cross bicycle traffic travelling in bicycle lanes, the sign to the left will be used to inform both users of the weaving maneuver.


On-street Bicycle Lanes

A bicycle lane creates space exclusively for bicyclists and in turn makes them more visible to drivers. By designating space, even the most novice bicyclists can feel more comfortable and confident on the road.

On-Street Parking

When on-street parking is located adjacent to bicycle lanes, there is the potential for conflict between bicyclists and opening car doors, vehicles existing parking spaces and lengthy car mirrors. Sound local discretion should when designing the facilities and educating the public of this potential conflict.

(Figueiredo, Kielaszek, O’Malley Knight, & Porter, 2006) An example of a bicycle lane
Bike Boxes

Bike boxes have reached fame from their recent use in major bicycle friendly cities such as Portland, Oregon. A bike box is a roadway marking that gives bicyclists an opportunity to move in front of stopped traffic when making left hand turns. Doing this puts bicyclists in view of drivers allowing them to safely proceed through traffic. Any community in Ohio can put in a bike box, however, they are considered experimental at this time. When something is experimental, the FHWA is close to putting them in the MUTCD, but more studies are occurring to show how they are performing.\textsuperscript{15}

As an alternative to bike boxes, bicyclists can maneuver a left hand turn through an intersection in one of two ways. A bicyclist may choose a one-step “vehicular style” left turn where they would move in to the motor vehicle lane and turn left just as a motor vehicle would. The bicyclist may also choose a two-step “pedestrian style” turn where they can remain on the right side of the road to travel through the intersection and wait at the opposite corner as a pedestrian would. At the green light, the bicyclists could then proceed through the next intersection.

Since a bike boxes are currently not recognized by MUTCD, a bicyclist navigating an intersection can either choose a one-step “vehicular-style” left turn or a two-step “pedestrian-style” left turn.

\textsuperscript{15} Heather Bowden personal communication, April 17, 2012
Bicycle Lanes at Turn Lanes

Bicyclists traveling through an intersection and motorists turning right must cross paths. Appropriate signing and pavement markings that encourage motorists and bicyclists to merge are preferred. The diagram below, taken from the MUTCD, is an example of such a configuration. As with motor vehicles, bike lanes should be designed with appropriate signing along the roadway and at intersections.

Bicycle Lanes at Bus Stops

Buses and bicycles can coexist given bus drivers act professionally and bicycles maneuver in a vehicular manner. Proper interaction calls for both users to operate defensively and courteously.

The diagram below, taken from The MUTCD, shows a typical T-intersection design for bicycles. Dotted lines communicate a need for caution and that buses and bicycles may potentially occupy the same space.
Shifting Gears  

Best Practices and Design

Drainage grates

Inadequate drainage grates create potentially dangerous obstacles for bicyclists to maneuver around. Moreover, bicycle wheels can get stuck in drainage slots that follow the direction the bicycle is travelling.

Bicycle friendly drainage grates should be installed in new roadway projects. Where it is not practical to eliminate a drainage grate or other roadway obstruction, the follow roadway markings can be applied to notify bicyclists of potential conflict.16

Following discussions of existing conditions and best practices, a number of recommendations were presented, discussed and incorporated in to final revisions. These revisions were discussed further during work sessions where planning commissioners were asked to provide feedback. It was also discussed that determining specific improvements on each roadway may need further future analysis by staff on a case by case basis. Appendix I contains suggestions for phased implementation and is presented only as a guide given that specific improvements will be determined at a later date.

4. Recommended Long Range Plan
4. Recommended Long Range Plan

Meeting the challenge of future transportation activity is complicated by the necessity to strike a balance amongst the various modes. Ease and accessibility to all users, convenient and abundant parking, and an understanding of the rights and responsibilities of each mode are just a few of the challenges facing Oxford transportation today. The long range vision attempts to address those challenges over the next few decades, while anticipating current and future demands of the transportation system. The recommended policies and programs are designed to support the unique needs of a physical multimodal network and coincide with community goals through complete streets.

Ultimately, the long range plan proposes the enactment of several ambitious, optimistic and harmonious projects into an ideal vision of the City of Oxford where transportation’s inescapable ease of use can be taken for granted.

Figure 3: Recommended long range bicycle and pedestrian improvement locations
Complete Streets Policy

Making it a policy to include all modes into new and retrofit projects will only enhance the transportation network by increasing capacity and utilizing the entire right of way. A complete streets policy will cover the transportation goal of the Oxford Comprehensive Plan which is to “create a quality, accessible transportation system with alternative forms of transportation for a diverse population, improved infrastructure, adequate parking, bikeways and efficient traffic management”. Of the peer cities researched, Bloomington, Indiana, was the only one to adopt a complete streets policy while Madison, Wisconsin has adopted a resolution.¹

Why Have a Complete Streets Policy?

Having a Complete Streets policy will allow the visions of the community to be planned for at the very beginning; at the concept stage. Defining the vision at the first development stage asks the transportation network to consider the context of adjacent land use and strives to ensure work done along the right of way will accomplish this overall vision. This consideration enables gradual creation of complete networks and allows the City to apply the best possible planning the first time which saves funding on expensive retrofits later.²

Since Complete Streets are an integrated approach to transportation planning and many agencies use and control our streets, design teams will have the freedom to include a broader range of individuals connected to the project including but not limited to planners, engineers, adjacent land owners, urban designers, fire, police, the community and elected officials.


Safe Routes to Schools

The current rate and causes leading to overweight children are generally known. Approximately 17% of children aged 2—19 years are obese. According to the Center for Disease Control (CDC) from 1969 to 2001, the number of trips walked to school by children living within 1 mile of their school declined from 87% to 36%. Convenience, safety and access are some of the challenges to getting more children to walk or ride their bikes to school. Often parents choose to drive their children to school because of the convenience on their way to work or because of perceived safety issues. Additionally, many students may live too far away from school, making it not feasible to walk or bike.

The National Center for Safe Routes to Schools program is aimed at children grades kindergarten through eighth grade that walk or bike to school. Sustained by local, state and federal funding efforts, the Center addresses safety concerns by exploring ways to create safer routes to school. The program also promotes walking and bicycling as a way for the community to reduce pollution and increase the health of children. Projects eligible for funding include: education, planning, sidewalks, pedestrian and bike paths, crosswalks, traffic calming and bike racks.

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Bicycle Parking

As bicycle routes are constructed and ridership grows, the need for bicycle parking will increase. Safe, secure bicycle parking is an important component to a successful bicycle plan. Experience from Davis, California has shown that many small amounts of parking are preferred to a couple high capacity parking areas. Unless parking is close to the destination, bicyclists will avoid parking.

A fear of theft is a major turn off for bicyclists when good bike parking is not provided. The quantity of parking should consider the land use type and its' proximity to major destinations. Bicycle racks should be designed so that they:

- Are visible and as close to the main entrance as possible, or at least as convenient as motor vehicle parking
- Are covered, if possible
- Do not bend wheels or damage the bicycle
- Accommodate high security U-shaped bike locks
- Do not inhibit pedestrian traffic

To prevent damage to bicycles, the inverted U type works best to support the weight of the bicycle. Ribbon style racks are not the best type of racks to use as these lock only the front tire and bicycles tend to fall over. The anticipated turnover rate for parking is

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On-street bike parking can come in the form of moveable racks that reside in the street and in a parking space typically used for motor vehicle parking. Advantages to using these racks are that they can be removed during the winter months and replaced as demand increases during other parts of the year.

It is recommended that bicycle parking be implemented in the Uptown area particularly in the Uptown Park, the parking garage, and additional locations as necessary.

Incentives could be provided to apartment complexes and commercial businesses that choose to install high quality and secure parking facilities. An incentive could come in the form of a reduction in required vehicular parking space for large commercial developments or a density bonus. The City code currently has no requirements for bicycle parking and should be revised to update and address bicycle parking requirements for new developments.

**Public Education**

There are a number of issues that are generally misunderstood when it comes to bicycle and pedestrian laws. A public campaign awareness and education campaign should be undertaken to inform the public of safe and respectful roadway travel.

Efforts for Oxford should be geared towards each modes rights and responsibilities, and promote actions of civil courtesy.

**Pedestrian Responsibilities**

Chapter 4511 of the Ohio Revised Code explains that pedestrians have certain rights and responsibilities in traffic. For example, pedestrians must obey the instructions of traffic control devices, signs and signals. When not crossing at a crosswalk, the pedestrian is the one who must yield to all other traffic. The Ohio Department of Transportation has put out an interpretation of all applicable pedestrian laws on its website and can be found at [http://www.dot.state.oh.us/districts/D10/safety/Documents/Pedestrian_Laws.pdf](http://www.dot.state.oh.us/districts/D10/safety/Documents/Pedestrian_Laws.pdf)

**Bicycle Responsibilities**

A campaign towards bicyclists should include clarification that their rights and responsibilities are the same as a motor vehicle. This means yielding to pedestrians in crosswalks, and having required lights and gear when riding at night and using hand turn signals.
Motorist Responsibilities
Pedestrians and bicyclists are more vulnerable than a motor vehicle. Drivers might think they only have to yield to pedestrians in crosswalks. Whether this is lawfully true or not, each mode has a responsibility for the safety of the entire transportation network. Because of this, a campaign aimed at motorists should focus on sharing roadway space with bicyclists, stopping at stop bars ahead of the crosswalk, and yielding to pedestrians.

Missoula, Montana, a city that experienced chronic accidents because of drivers not yielding to pedestrians, used grant dollars to fund a community wide pedestrian safety campaign.9 The catchphrase “You Have the Power: Stop for Pedestrians” was used on television, radio and in newspapers to catch the attention of residents. Additionally, posters were hung around town and were geared towards both motorists and pedestrians.

Oxford will want to brand a slogan of its own that is both informative and memorable. “Wheels and Feet Sharing the Street” is just one example that could be used to raise public safety awareness.

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Public Encouragement

Promotional items are very important to the success of any pedestrian and bicycle plan. Encouraging residents to leave their cars behind by taking to the road or sidewalk will create an atmosphere that is fun, safe and inspiring. Encouragement can take the form of community bike rides, bike maps, commuter incentive programs and bike/walk to work weeks. Bicycle maps are a good example for a way to communicate bicycle safety to the community, especially incoming students. The encouragement possibilities are only limited by a communities’ imagination.

Public Enforcement

Enforcing current and future laws jointly with Miami University will show a commitment to establishing a safe transportation network. Education and enforcement should go hand-in-hand and should include not only the education of residents, but of local law enforcement as well. Enforcement strategies in the City of Athens Non-Motorized Transportation Plan include:

- An optional bicycle education class in lieu of a fine.
- A coupon for bicycle lights to those who were pulled over after daylight hours and did not have lights.¹⁰


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An example of Athens, Ohio bicycle map that includes the locations of: public water fountains, designated bicycles lanes, sharrows and public parking lots.

http://www.athenscyclepath.com/AthensCommuterMap.pdf
Recommended Bicycle Facilities

Oxford currently has only a few existing bicycle facilities, therefore nearly all recommended bicycle improvements are new facilities. Incorporating bicycles into the existing network is a balancing act amongst the various modes. As mentioned before, roads in Oxford vary in the width available to provide bicycle lanes and also maintain a safe travel lane for cars. With that in mind, the recommendations work to integrate bicycles where the current infrastructure is sufficient and also works to preserve on-street parking as much as possible. Miami University plans for off-street bicycle paths are also included in the following recommendations. Phased implementation for Short-term, Mid-term and long-term are presented in the Implementation section. Where width permits, a separate five foot bike lane should be placed to the right of motor vehicle lanes. Where adequate width does not exist, bicycle and motor vehicles should be encouraged to merge, and the use of sharrows should be installed.
On Street Bicycle Lanes

A diagram of a typical cross-section for on-street bicycle lanes

The MUTCD offers a choice for bicycle lane roadway markings
Shared Lane Roadways or “Sharrows”

Using the MUTCD as a guide, sharrow pavement markings will be placed eleven feet from the face of the curb where on-street parallel parking exists and four feet from the face of the curb on streets without on-street parallel parking.
Bicycle Way Finding

Oxford is relatively small in size, making it easy to find area destinations. However, because of a large transient population and potential visitors from other communities and Hueston Woods, way finding signs will help to get bicyclists to where they need to go. Signs to direct bicyclists to natural areas and more distant places like Wal-Mart and Hueston Woods make navigating the area easy and bicycle friendly.

Way finding signs help visitors navigate through Oxford.
Recommended Pedestrian Improvement Areas

The following map illustrates recommended pedestrian improvement areas. Pedestrian improvements areas were identified through pedestrian and bicycle accident location data and feedback from the planning commission, city staff and other Oxford board and commissions.

This map is intended to serve as long term guidance where Oxford will continue to determine exact structural improvements on a case by case basis. Pedestrian improvements should take the form of various traffic calming elements and coordinate with public education, encouragement and enforcement programs.
Figure 4: Recommended Pedestrian Improvement Areas

Legend
- Pedestrian Improvement

Recommended Long Range Plan
Crosswalks

Continuation of the use of continental style crosswalks is recommended as these types are most visible to drivers and easiest to maintain.

Traffic Calming

Patterson Avenue is a federal route and major access road to Oxford and campus. As such many cars are seen travelling on this road and not necessarily at the posted speed limit. Oxford’s success at reducing the posted speed limit to 25 MPH is a big first step. The next step is to get pedestrians safely across the roadway with a short distance to cover while doing little to hinder motor vehicle access. Pedestrian refuge islands on Patterson Avenue and at the Locust Street/Foxfire Drive intersection will serve to slow traffic speeds closer to posted speeds and increase visibility of crossing pedestrians.

The width of the crossing island should be 6 feet or more to provide space for a wheelchair and several pedestrians waiting to cross. Angling the crossings through the median allow distracted pedestrians to be more aware of traffic on the roadway before they cross.11

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A city gateway at the Patterson Avenue/27 intersection will double as a traffic calming device for motorists entering the City and communicate with visitors that they have reached Oxford. A gateway for this location is also recommended in the Miami University Circulation Master Plan.

**An example of a community gateway**

**Raised Crosswalk**

A raised crosswalk on Spring Street at the Maple Street intersection will signal to drivers that they are entering a different district. Installing a raised crosswalk with distinctive pavement encourages drivers to slow their speed and will bring pedestrians to a higher, more visible level.

**An example of a raised crosswalk**
Curb Extensions

Curb extensions are recommended at the Locust Street/Spring Street intersection and mid-block curb extensions on College Corner Pike. There currently exists limited pedestrian access for crossing College Corner Pike without forcing pedestrians to cross the street out of their way to distant crosswalks.

Recommendations were discussed and incorporated into additional revisions of bicycles routes and pedestrian improvements. Those recommendations were discussed during work sessions where planning commissioners were asked to provide feedback. It was also discussed that determining specific improvements on each roadway will need further future analysis by staff on a case by case basis. Appendix I explains suggested phased implementation and is presented only as a guide, given that specific improvements will be determined at a later date.
5. Maintenance
5. Maintenance

Once projects are built, maintenance will need to be a commitment and projects will need to be woven in to existing maintenance schedules.

Sidewalk Maintenance

Maintenance is an important component to the success of a non-motorized transportation network. Inadequate maintenance of sidewalks can complicate travel and be dangerous for pedestrians. The City of Oxford Code requires that adjacent property owners maintain the sidewalk. The City relies on a complaint-based process to identify sidewalks in need of repair. If the land owner does not repair the sidewalks themselves, the City makes repairs and assesses the property for the cost. Repair and maintenance of sidewalks should be continued. A complete inventory of majorly defective sidewalks should be conducted and repaired.

Snow Removal

Ohio winters have been known to produce an abundance of snow. Those relying on bicycling and walking as their mode of transportation are often at the mercy of winter weather. Snow removal on sidewalks is the responsibility of the adjacent land owner. Crossing islands are not the responsibility of the adjacent land owner and will require the maintenance by City staff.

Bicycle Lane Striping and Sweeping

Debris tends to get swept in to bicycle lanes by motor vehicles. Built up debris should be swept up so as not to hamper bicycle access and overall perception of the bicycle network. Bicycle lane sweeping can be incorporated in to routine street sweep schedules. Bicycle pavement marking repainting should be taken on a case by case basis and assessed as often as motor vehicle pavement repainting. Maintaining the visibility and reflectivity of bicycle pavement markings are important for bicycling after dark.

Public Participation in Maintenance

Getting the community in on identifying non-motorized infrastructure problems and maintenance can save City staff resources. Madison, Wisconsin has a separate section on their city website for bicycle information. Here residents can report a maintenance problem or concern. Oxford could have a similar program for both pedestrian and bicycle facilities. Posting a sign with maintenance contact information in the form of the web address or a phone number could allow instant access and reporting.
6. Funding Sources
Shifting Gears

Potential funding courses for pedestrian and bicycle projects can be found in the tables below. Oxford and Miami staff should continue to collaborate to secure and maximize funding potential.

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Local Match Minimum</th>
<th>Eligible Projects</th>
<th>Deadline</th>
<th>Eligible Applicants</th>
</tr>
</thead>
</table>
| Transportation Enhancements             | 20%                 | • Bicycle Lanes for transportation  
• Bicycle parking  
• Bicycle Storage  
• Sidewalks, new or retrofit  
• Crosswalks, new or retrofit  
• Shared use path construction | Varies                    | County, City, Village, Township and Park Districts |
| Safe Routes to Schools                   | 10-20%              | Improvements limited to chosen radius around K-8 schools  
• Bicycle lanes  
• Signed bike route  
• Bicycle parking  
• Sidewalks  
• Crosswalks  
• Signal improvement  
• Traffic calming  
• Environment and safety education programs | Twice per year          | Local governments             |
| [http://www.saferoutesinfo.org/funding-portal](http://www.saferoutesinfo.org/funding-portal) |                     |                                                                                  |                           |                                          |
| Safety Program                          | 10%-20%             | • Bicycle and pedestrian facilities in high crash areas  
• Environmental and safety education programs | April 30 and September 30 of each year | State and local government |
<p>| <a href="http://www.dot.state.oh.us/Divisions/Planning/SPPM/SystemsPlanning/Pages/FundingGuidelines.aspx">http://www.dot.state.oh.us/Divisions/Planning/SPPM/SystemsPlanning/Pages/FundingGuidelines.aspx</a> |                     |                                                                                  |                           |                                          |</p>
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<tr>
<th>Funding Source</th>
<th>Local Match Minimum</th>
<th>Eligible Projects</th>
<th>Deadline</th>
<th>Eligible Applicants</th>
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</thead>
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<td>Congestion Mitigation Air Quality</td>
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<td>• Bicycle lanes</td>
<td>Varies</td>
<td>Political subdivisions with MPO</td>
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<td>• Signed bike route</td>
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<td>• Shared use path/trail</td>
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<td>• Crosswalks, new or retrofit</td>
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<td>• Signal improvements</td>
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<td></td>
<td>• Curb cuts and ramps</td>
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<tr>
<td>Section 402 Federal, State and Community Highway</td>
<td>0%</td>
<td>• Maps</td>
<td>July of each year</td>
<td>County, city, township, village, law enforcement agency, board of education, health</td>
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<tr>
<td>Safety Funds</td>
<td></td>
<td>• Police patrol</td>
<td></td>
<td>department, metropolitan planning organization, etc.); state agency; or non-profit</td>
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<tr>
<td></td>
<td></td>
<td>• Helmet promotion</td>
<td></td>
<td>organization, church, hospital, educational service center, college or university</td>
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<td></td>
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<td>• Safety brochure/book</td>
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<tr>
<td></td>
<td></td>
<td>• Training</td>
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</table>

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/cmaqfunds.cfm

http://safety.fhwa.dot.gov/policy/section402/
**Conclusion**

In Conclusion, the major underlying principles of the proposed bicycle and pedestrian plan is that it is directly tied to the goals and recommendations of the 2008 Oxford Comprehensive Plan, The Thoroughfare Plan, and the 2011 Miami University Circulation Master Plan. Furthermore, it stands on top of previous planning efforts and, so has been the product of extensive study and consultation.

The policies, programs and best practices presented in this plan satisfy the goals of creating an efficient, sustainable and integrated transportation network.

Survey results, accident data, and observation data show that the desire for modal options is present in the community. Constructing Complete Streets can offer residents more choices while managing transportation demand for short distance trips and providing easy access for all. Geographically, Oxford is well suited for bicycling which may be one reason why walking is the second most used mode within the City behind the car. But the vision defined by the community is not for one mode or the other, rather a context sensitive approach to each segment of each roadway.

Although this plan has an ambitious and costly implementation schedule, long term economic, social and environmental benefits, will significantly move Oxford towards an even more efficient, livable, and charming community for all residents.
Appendix I

Possible Strategies for Implementation
Appendix 1: Possible Strategies for Implementation

The following sections outline a suggested phased implementation for projects beginning short term through long term that would result in a complete network that coincides with the 2011 Miami University Circulation Master Plan 2008 City of Oxford Comprehensive Plan, the and the 2007 Transportation Thoroughfare Plan as they apply to non-motorized transportation. Accommodating all motor vehicles, bicycles, pedestrians, and on-street parking is a balancing act. Where possible, this plan seeks to provide facilities for all modes.

On Street Parking

On-street parking loss is a concern for residents and this report seeks to preserve available parking where possible. As previously stated, some streets have parallel parking that is generally underutilized while streets closer to major destinations have high use parking.

Short-term implementation calls for the removal of parallel parking on Spring Street. Parking adjacent to Miami University will be relocated to Oak Street per Miami’s Circulation Master Plan. This leaves approximately 50 parking spaces west of Campus Avenue to be removed in order to make room for bicycle lanes. Other short-term bicycle lanes are proposed for streets where very few cars currently park, making loss of on-street parking minimal.

Mid-term implementation calls for bicycle lanes on Chestnut Street from Patterson Avenue to Oxford-Reilly Road. This will require the removal of approximately 330 spaces. Elm Street is also recommended for bicycle lanes and will require the removal of approximately 170 spaces.

Long-term implementation calls for bicycle lanes on Main Street and will require the removal of approximately 400 parallel parking spaces.¹

¹ Available parking spaces did not include driveways or yellow-striped curbs. Each street was converted into the number of available spaces by assuming an average length of 22 feet per space. Banks, B., Coon, M., Ice, C., & Jaycox, K. (May 1997). Master Bike Route Plan for the City of Oxford.
Short Term (0-2 years)

Throughout all phases, the following ongoing steps should be taken:

Ongoing

- Inventory, repair and maintenance of sidewalks and crosswalks
- Drainage grate improvements
- ADA improvements
- Education, encouragement and enforcement

Miami University

Off Street Bicycle Lanes

Discussion with Miami University staff indicated a desire to construct off street bicycle lanes within the next 2 years along Patterson Avenue. University staff would also like to stripe bicycle lanes on Spring Street after the removal of university parking spaces.

Pedestrian

- Install multi-use path signs on College Corner Pike multi-use path
- Spring Street
  - Complete crosswalks at intersections where they do not exist in order to highlight pedestrian presence along bicycle corridors
  - Installation of three way stop at Spring Street Maple Street intersection
- Locust Street
  - Crosswalk construction at Foxfire Drive intersection

- Wells Mills
  - Three way crosswalks at intersection of McGuffey and Wells Mills
  - Construction of sidewalks and repair where necessary

- Main Street/ Walnut Street intersection
  - Installation of 4-way stop

- Walnut Street
  - Crosswalk installation along bicycle corridor

On Street Bicycle Lanes

- Spring Street/ Fairfield Road from Patterson Avenue to Hidden Creek Drive
- Wells Mills
- McGuffey Avenue

Shared Use Roadways

- Contreras Road from Knollwood Drive to Elm Street
- Spring Street from Main Street to Beech Street
- Campus Avenue, Maple Street, Oak Street, Central Avenue, Foxfire Drive, Western Drive, Walnut Street, Vine Street
- College Avenue from Foxfire Drive to Central Avenue
- Locust Street from Wells Mills Drive to Foxfire
The short term map illustrates bicycle facilities that could be implemented within the next two years. A combination of bicycle lanes (blue) and sharrows (orange) are included. Roads in dark purple indicate where Miami University plans to construct off street bicycle lanes in the short term. The light purple roads are future off street bicycle lanes that Miami University plans to construct and are presented here for reference only. It should be the intention of future Oxford bicycle facilities to line up with these off street construction plans.
Medium Term  
(3-10 years)

Miami University  
Off Street Bicycle Lanes

Mid-term goals anticipated by Miami include: continued construction of off street bicycle lanes with priority areas being High Street, Talawanda Road and the campus core.

Pedestrian

- Fieldcrest Drive
  - Installation of crosswalk at Fairfield Road and Fieldcrest Drive intersection
- Locust Street and Foxfire Drive
  - Upgrade of pedestrian crosswalk to a pedestrian refuge island
- Completion of sidewalk network along
  - Locust Street
  - Wells Mills
  - Contreras Road
- Extension of the curb and signal countdown timers at Spring/ Locust intersection to slow traffic and reduce pedestrian crossing distance
- Spring Street installation of crossing island between Oak and Maple Streets
- Install pedestrian refuge island on Patterson Avenue just north of Chestnut Street.

On Street Bicycle Lanes

- Chestnut Street from Patterson Avenue to Oxford-Reilly Road
- Lynn Avenue
- Fieldcrest Drive
- Oxford-Trenton Road (SR 73 East) from Patterson to OATS
- Oxford-Reilly Road from Chestnut Street to Talawanda Middle School
- Millville-Oxford Road (US 27 South)

Shared Use Roadways

- Church Street
- Brookville Road from Oxford-Reilly to community park
- Fairfield Road from Hidden Creek Drive to community park
- Connection of Vine Street to College Corner Pike (US 27 North) will require obtaining private property to connect
- Tollgate Drive
- Erickson Drive
- Emerald Woods Drive
- Brookview Court from Erin Drive to Locust Street
- Brown Road from Sycamore Street to North Ridge Drive
- North Ridge Drive to Hester Road to College Corner Pike (include utilization of existing multi-use connector)
- Access to the Southeast portion of Oxford via South Locust Street to Sandra Drive to Glenview Drive to Dana Drive to Oxford-Reilly Road
The Mid-term map illustrates bicycle facilities that could be implemented within 3-10 years following short term implementation. Additional bicycle lanes and sharrows are suggested while Miami continues to construct off-street bicycle lanes within the campus core. Light purple roads, again, indicate future Miami off street bicycle lanes. Bicycle lanes (blue) on Chestnut and 27 south are suggested and could be in conjunction with the closing of the old Talawanda High School and the opening of the new High School.
Long Term (10-20 years)

Miami University
Off Street Bicycle Lanes

Long term goals include: completion of off street bicycle lanes with the construction of south campus, western campus and College Avenue from Chestnut Avenue to High Street.

Pedestrian

- Installation of pedestrian refuge islands, curb bulb outs, and other innovative techniques in order to encourage the slowing of traffic to posted speed limits
- Address reconfiguring of intersection at College Corner Pike/ Locust Street intersection
- Mid-block curb extensions and crosswalks to access both sides of College Corner Pike

Bicycle

- Brown Road upgrade from shared use roadway to on street bicycle lane.
  - Consider similar upgrades
- Main Street
  - On street bicycle lanes
- College Corner Pike
  - On street bicycle lane from Locust Street to OATS
- Connection of Collins Run Road to OATS to allow access to Talawanda High School
- Complete non-motorized access at railroad/ OATS crossing
This complete network map illustrates what the bicycle system could look like within the next 20-30 years following the phased short-term and mid-term implementations. Lining up with the Oxford Area Trail System (OATS), this map also includes pedestrian improvement areas to be considered (red dots). Dark purple roads indicate fully constructed Miami off street bicycle lanes.
Appendix II

Hypothetical Cross-sections
The following diagrams illustrate several hypothetical scenarios that could be implemented within two current street widths examples. Options provide the consolidation of parking to one side of the road, the use of 4’ bike lanes, and the possible reduction of parking lane widths. It should be noted that incorporating bicycles into the roadway can sometimes be made possible through the reduction of travel lanes, or parking lanes by one foot of space.

The first hypothetical cross-section group is for a 36 foot wide road. For reference, some segments of the following the follow roads are 36 feet wide: Campus, Chestnut, College, Elm, Locust, Main, Tollgate, Walnut.
This suggestion for a sharrow and bike lane road has been seen in the Athens, Ohio Bicycle and Pedestrian Plan. It was suggested that a bicycle lane be painted on the uphill direction and a sharrow on the downhill direction. The reasoning behind this is that bicyclist would be exerting more energy and be more vulnerable travelling uphill. A bike lane would allow them the room to make it up the hill.
For reference, the following group of cross-sections represent some segments of the following roads that are 35 feet wide: Campus, Chestnut, College, Fairfield, Locust, Main, McGuffey, Spring, Sycamore, and Tollgate.

<table>
<thead>
<tr>
<th>17.5'</th>
<th>17.5'</th>
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</thead>
<tbody>
<tr>
<td>Travel Lane</td>
<td>Travel Lane</td>
</tr>
<tr>
<td><strong>35' Wide</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8'</th>
<th>9.5'</th>
<th>9.5'</th>
<th>8'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lane</td>
<td>Travel Lane</td>
<td>Travel Lane</td>
<td>Parking Lane</td>
</tr>
<tr>
<td><strong>35' Wide</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>5'</th>
<th>12.5'</th>
<th>12.5'</th>
<th>5'</th>
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</thead>
<tbody>
<tr>
<td>Bike Lane</td>
<td>Travel Lane</td>
<td>Travel Lane</td>
<td>Bike Lane</td>
</tr>
<tr>
<td><strong>35' Wide</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Shifting Gears

Appendix II

<table>
<thead>
<tr>
<th>7'</th>
<th>4'</th>
<th>10'</th>
<th>10'</th>
<th>4'</th>
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</thead>
<tbody>
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<td>Parking Lane</td>
<td>Bike Lane</td>
<td>Travel Lane</td>
<td>Travel Lane</td>
<td>Bike Lane</td>
</tr>
</tbody>
</table>

35' Wide

<table>
<thead>
<tr>
<th>8'</th>
<th>5'</th>
<th>11'</th>
<th>11'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lane</td>
<td>Bike Lane</td>
<td>Travel Lane</td>
<td>Travel Lane with Sharrow</td>
</tr>
</tbody>
</table>

35' Wide
Resources


Institute of Transportation Engineers. (2006). Context Sensitive Solutions in Designing Major Urban
Thoroughfares for Walkable Communities.
http://www.ite.org/css/


