4. Non-motorized Component of Plan

Summary

Thirty years ago, Ann Arbor was considered a national leader in establishing an environment that supported and encouraged walking and bicycling. In the intervening years, the non-motorized program failed to keep pace with research and innovations in non-motorized transportation. Recently, there has been a renewed interest in and support of non-motorized transportation in the City. Many non-motorized facilities have been constructed in the past few years and the new Alternative Transportation Program Management Team and Alternative Transportation Coordinator have been working diligently to improve the non-motorized conditions in the City. The material presented here is intended to help Ann Arbor once again become a national model for quality non-motorized transportation. The goals of the Transportation Citizens Advisory Committee, presented in Section 2.2, clearly point to that objective.

The non-motorized “layer” of the Northeast Area Transportation Plan (NEATP) has been incorporated into the recently developed citywide non-motorized plan. Reference is made to that document for a review of Planning and Design Guidelines and Proposed Policies and Programs to support a successful pedestrian and bicycle network. This report covers two topics specific to the Northeast Area:

- The Existing Environment – assesses the state of the existing condition of pedestrian and bicycle facilities; and,
- Proposed Facilities – covers the specific long and near term improvement recommendations to the transportation system to establish a non-motorized transportation network.

Long-term Solutions

The NEATP long-term pedestrian facility proposals for northeast Ann Arbor are illustrated on Figure 4S-1. The bicycle facility proposals are shown on Figure 4S-2. Crosswalk and median proposals are depicted on Figure 4S-3. These are to be considered for implementation when the roadways to which they relate are reconstructed or widened.

To guide future private development, the following recommendations have been developed:

- Existing subdivision ordinances should be modified to include specific requirements for accommodating pedestrians and bicycles.
- The site plan review process should include criteria that evaluates whether walking is encouraged through the site design and review and modify plans as necessary.
Figure 4S-2
Proposed Bicycle Facilities

Legend
On or Adjacent to Road:
- 10' Shared-use Path
- 4' Bike Lane (5.5' Urban)
- 5' Bike Lane (6.5' Urban)
- Signed Bike Route

Separate From Road:
- 10' Shared-use Path

SOURCE: The Greenway Collaborative, Inc.
Figure 4S-3
Proposed Crosswalks and Medians

Legend

- Proposed New Crosswalk Location
- Proposed Planted Median / Refuge Island

SOURCE: The Greenway Collaborative, Inc.
Developments with small blocks and grid streets should be encouraged through design guidelines.

New residential developments must include pedestrian and bicycle networks that connect to surrounding areas.

Private road standards for sidewalks and buffer zones should be the same as public street standards.

Atypical Long-term Solutions

Not every possibility for each roadway can be adequately addressed at a master plan level. Ultimately, a corridor specific design will determine how to best apply the design guidelines to specific situations. But, even at this level of analysis, several locations can be identified where circumstances make the typical guidelines for accommodating pedestrians and bicycles infeasible or impractical. They include:

- **Washtenaw Avenue**, from Stadium to Geddes Avenue, goes through historic districts where the road and sidewalk width are unlikely to change. The sidewalks are five feet wide and the road is narrow (40 feet wide in some places). Because the road is a Principal Arterial, draft AASHTO Pedestrian Guidelines call for an eight-foot-wide sidewalk. This is unlikely to occur and underscores the need to accommodate bicycles within the roadway as the existing five-foot-wide sidewalks clearly cannot accommodate both adult bicyclists and pedestrians in this high demand corridor.

- **Huron River Drive**, from Huron Parkway to Hogback Road, has adjacent mature woods and steep slopes primarily on the south side of the road. This, in combination with the limited development along the road, makes a sidewalk only on the north side of the road an appropriate solution. There may be areas where the buffer between the sidewalk and the roadway may have to be eliminated to minimize the impact to the natural features.

- **Geddes Road**, from Huron Parkway to Sumac Lane, has steep slopes and woodlots on both sides of the road. Because this road serves as a key linkage connecting Concordia University, three neighborhoods, and the Huron River Pathway system, there is demand for a non-motorized linkage. The most appropriate non-motorized linkage may not be directly adjacent to the roadway but rather away from the roadway utilizing city property and, potentially, easements on private property. By utilizing this approach, the road character may be preserved while still providing the non-motorized link.

- **Geddes Avenue**, from Hill Street to Huron Parkway, goes through patches of woodlots with some mature trees adjacent to the roadway. There is an existing narrow path along portions of the north side of the trail. This path experiences considerable activity. It should be improved and widened, where possible, without significantly impacting the natural features.

Near-term Solutions

Near-term solutions were designed to be implemented with minor changes such as re-striping the existing road surface (Figures 4S-4 and 4S-5). These cost-effective solutions will enhance bicycle...
Figure 4S-4
Near-term Bicycle Facilities

Legend
In or Along Road:
- 3.5' Bike Lane (3.5')
- 4' Bike Lane (4.5')
- 6' Bike Lane
- 8'-10' Shared-use Path
- Bike Route
- Existing 4' Bike Lane

Separate From Road:
- 10' Shared-use Path
- 8' Shared-use Path

SOURCE: The Greenway Collaborative, Inc.
Figure 45-5
Near-term Road Changes
and pedestrian conditions, quickly and easily, until the road is expanded or major reconstruction is undertaken.

Four road corridors in the project area present distinct challenges that are the result of limited space and high volumes of traffic, and/or higher speed limits.

- Plymouth Road
- Washtenaw Avenue
- Fuller Road from Glazier Way to Fuller Court
- Stadium Boulevard from Ferdon Road to Washtenaw Avenue

AASHTO standards provide for flexibility in cases such as these, and certain modifications are described below. Ann Arbor city engineering staff has determined that vehicular lanes on roads with a posted speed limit of 40 mph or greater should not be reduced to less than 11 feet wide.

**Plymouth Road**

Providing minimum-width bicycle lanes on both sides would require that the outside motor vehicle lanes be narrowed to 10.5 feet in some places, the inside motor vehicle lane to 11 feet and the center-turn lane reduced to 10 feet. There is, however, room to provide one designated bicycle lane and maintain the 11-foot desired minimum width of the vehicular lanes.

The cross-section illustrations shown later in this report on Figures 4-24A through 4-24D are based on the number of intersecting driveways and the corresponding need for bike lanes. In several cases, bicyclists would be given the option of bicycling in the roadways or using the sidepath at their discretion. In those situations, and situations where no bike lane is feasible, the visibility of the sidepath needs to be improved at the driveways, and transitions must be provided between the road and sidepath.

**Washtenaw Avenue**

Washtenaw Avenue, a state trunkline, is a high-demand corridor for both automobiles as well as non-motorized traffic. The width of the roadway varies greatly along its length, from 40 feet in the historic neighborhoods closer to campus, to 70 feet nearer U.S. 23.

The bike quality/level of service of the corridor is an E from the intersection of Stadium Boulevard to Huron Parkway due to the large volumes of traffic moving at high speeds and the lack of sidewalks along the north side. Currently, there is a “desire path” worn into the narrow strip of grass along the road at that point, which is virtually impassible during the winter months.

For a near-term solution on this segment, the City should seek MDOT approval to provide a bicycle lane on the north (westbound) and finalize Transportation Enhancement grant approval for a shared use path on the north side.
For the segment from Huron Parkway to U.S. 23, there is sufficient width to provide two bicycle lanes. If improvements recommended in the U.S. 23/Washtenaw Non-motorized Crossing Study are implemented, transitions to sidepaths must be developed.

The near-term proposals along Washtenaw Avenue are shown later in this report on Figures 4-25A through 4-25F.

**Fuller Road**

Fuller Road also varies in width along its length. Portions of the roadway are heavily used by pedestrians and bicyclists moving between North Campus and Central Campus, waiting for buses, or walking from the commuter lots by Mitchell Field. In some portions, the existing sidepaths along both sides of the road can accommodate bicycle use safely due to few intersecting driveways. However, due to heavy pedestrian use, a shared use is problematic for bicycle use. The near-term solution is to accommodate bicyclists in the roadway, where possible, with a narrowing of lanes are shown later in this report on Figures 4-26A through 4-26D.

**Stadium Boulevard**

Nearly a mile of Stadium Boulevard is included in northeast Ann Arbor. The road in this area is 60 feet wide. Unlike the section of Washtenaw Avenue between Stadium and Huron Parkway, a sidepath is not a viable alternative due to the numerous intersecting driveways and intersections on both sides and the existing conditions of a five-foot sidewalk up against commercial development properties. The near-term proposals for Stadium Boulevard are illustrated later in this report on Figure 4-27.

**Specific Area Recommendations**

The following recommendations for near-term solutions deal with a variety of specific problem areas within the study area:

- Conduct an analysis of pedestrian and bicycle crash data annually to identify problem areas and potential corrective actions.
- Provide crosswalks and pedestrian signals at main entrance to the Arborland Mall.
- Improve the crosswalk where the Huron River Path crosses Wall Street and Maiden Lane.
- Improve the crosswalk at the entrance to Gallup Park from Fuller Road restricting overflow parking as necessary.
- Eliminate all pedestrian activated crosswalk signals in the Lower Town area and integrate the walk phase into standard signal phasing.

**Other Considerations**

Analysis of the “before” and “after” conditions of the traffic effects of the non-motorized proposals on Plymouth Road, between Nixon and Murfin Roads, was performed using the SYNCHRO model. Bike lanes and two new refuge islands were recently constructed on Plymouth Road in this segment.
The SYNCHRO model examined reductions in lane width (12 feet to 11 feet) and average speeds (lower by five mph) on this segment of Plymouth. The results (Table 4S-1) show an increase in delay and travel time. But, with the reduced average vehicular speed on Plymouth, these are considered productive tradeoffs, particularly when understanding these increases in time represent a few seconds per vehicle on Plymouth Road.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Performance Measure</th>
<th>Vehicle Minutes</th>
<th>Average Speed MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay Time</td>
<td>Total Time</td>
<td></td>
</tr>
<tr>
<td>Before Condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murfin to Traverwood</td>
<td>53.0</td>
<td>342.6</td>
<td>34.0</td>
</tr>
<tr>
<td>Traverwood to Nixon</td>
<td>204.0</td>
<td>328.2</td>
<td>15.2</td>
</tr>
<tr>
<td>Nixon to Traverwood</td>
<td>18.6</td>
<td>124.4</td>
<td>34.2</td>
</tr>
<tr>
<td>Traverwood to Murfin</td>
<td>87.8</td>
<td>311.7</td>
<td>28.9</td>
</tr>
<tr>
<td>After Condition (.5 mph)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murfin to Traverwood</td>
<td>62.3</td>
<td>398.1</td>
<td>29.3</td>
</tr>
<tr>
<td>Traverwood to Nixon</td>
<td>254.8</td>
<td>398.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Nixon to Traverwood</td>
<td>19.1</td>
<td>141.1</td>
<td>30.1</td>
</tr>
<tr>
<td>Traverwood to Murfin</td>
<td>119.6</td>
<td>374.1</td>
<td>23.7</td>
</tr>
</tbody>
</table>

Source: The Corradino Group of Michigan, Inc.

The Highway Capacity Software was also applied to determine if the narrower lane width on Plymouth Road, accompanying the non-motorized changes and the increased presence of bicyclists and pedestrians, makes a difference. The results show that the Plymouth Road intersection with Nixon Road will experience no significant reduction in its ability to handle traffic in the peak hour when the lanes on Plymouth are 11 feet rather than 12 feet wide and 10 pedestrian and bicycle interactions affect the flow of eastbound and westbound traffic on Plymouth Road. The reduction in capacity is less than four percent when the bicycle/pedestrian interactions with traffic grow to 25 in the peak hour. So, while, this test is only for one road, the consultant concluded there will be no significant negative effect in vehicle Level of Service due to implementing the non-motorized component of the NEATP. Such changes will have a calming effect on vehicular speeds and improve overall safety of the pedestrians and bicyclists.
4.1 The Existing Environment

Thirty years ago, Ann Arbor was considered a national leader in establishing an environment that supported and encouraged walking and bicycling. In the intervening years, the non-motorized program failed to keep pace with research and innovations in non-motorized transportation. Recently, there has been a renewed interest in and support of non-motorized transportation in the City. Many non-motorized facilities have been constructed in the past few years and the new Alternative Transportation Program Management Team and Alternative Transportation Coordinator have been working diligently to improve the non-motorized conditions in the City. The material presented here is intended to help Ann Arbor once again become a national model for quality non-motorized transportation. The goals of the Transportation Citizens Advisory Committee, presented in Section 2.2, clearly point to that objective.

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- The Existing Environment – assesses the state of the existing condition of pedestrian and bicycle facilities; and,
- Proposed Facilities – covers the specific long and near term improvement recommendations to the transportation system to establish a non-motorized transportation network.

4.1.1 General Conditions

The major influences on non-motorized travel are the physical environment and the social environment. The influence of the physical environment includes the existence of specific facilities, such as bike lanes and sidewalks, and the underlying land uses and buildings. The majority of bicycle and pedestrian trips are for short distances. Even with first-rate facilities, large blocks of homogeneous land uses and spread-out development will inhibit many non-motorized trips.

The social environment affects why people walk and bicycle, including environmental ethics, economics, disabilities, exercise and enjoyment. A community’s acceptance and endorsement of walking and bicycling can promote increased non-motorized travel. Society typically utilizes the automobile for all trips almost without thought. Few people stop to consider the social and economic consequences of their transportation choices. Adult professionals who bicycle or walk to work are still considered “unusual.”

The majority of northeast Ann Arbor is typical of the development patterns that were created post-World War II. The area’s road system and dispersed land uses are largely scaled towards automobile use. Few alternatives exist to the arterial and collector streets for bicyclists and pedestrians. Bicyclists and pedestrians are directed into corridors with the highest concentration of vehicular traffic. The result is a non-motorized environment that is not favorable to walking and bicycling for everyday transportation.
One of the defining characteristics of northeast Ann Arbor is the amount of park and open space. Two golf courses, the parkland along the Huron River and the open space along Huron Parkway are typical of northeast Ann Arbor. While this provides outstanding recreational resources, it also compartmentalizes the existing development. This, in combination with the natural barrier of the Huron River, and the artificial barriers of railroads and four-lane arterials, divides northeast Ann Arbor into distinct subareas.

**Land Use and Future Development**

There are about a dozen locations within the study area with mixed land uses in close proximity to each other. Some have high-density residential areas in close proximity to office, commercial, research, or institutional uses. Others include hotels near restaurants and shopping. In these areas there currently is high potential for a greater percentage of trips to be accomplished by walking or bicycling than would be typical for the northeast area as a whole. The difficulty is that, in many cases, a busy multi-lane primary road separates the trip origin and destination.

The Northeast Area Plan identified 26 areas that are either undeveloped or underutilized (Figure 4-1 and Table 4-1). Many of these areas are located in places of minimal land use diversity. Neighborhood commercial development has been identified for six sites.

**Natural and Cultural Features**

Some roadways in northeast Ann Arbor have significant natural and/or cultural features that are regulated through natural feature or historic district ordinances. The following are some situations where the natural and/or cultural features may influence the proposed design of the roadway and associated non-motorized facilities.

- **Washtenaw Avenue** from Stadium to Geddes Avenue is in an historic district where the road and sidewalk width are unlikely to change. The sidewalks are five feet wide and the road is a narrow (40 feet wide in some places), four-lane facility. Because the road is a Principal Arterial, draft AASHTO Pedestrian Guidelines call for an eight-foot-wide wide sidewalk. This is unlikely to occur and underscores the need to accommodate bicycles within the roadway as the existing five-foot sidewalks clearly cannot accommodate both adult bicyclists and pedestrians.

- **Huron River Drive**, from Huron Parkway to Hogback Road, has adjacent mature woods and steep slopes primarily on the south side of the road. A sidewalk, separated from the roadway, would be difficult to construct without significant impact to the natural features.

- **Geddes Road**, from Huron Parkway to Sumac Lane, has steep slopes and woodlots on both sides of the road. Because this road serves as a key linkage between Concordia University, three neighborhoods, and the Huron River Pathway system, there is demand for a non-motorized linkage. The most appropriate non-motorized linkage may not be directly adjacent to the roadway but rather away from the roadway utilizing city property and potentially easements on private property. By utilizing this approach, the road character may be preserved while still providing the non-motorized link.
Figure 4-1
Land Use and Future Development Areas

Legend
- Residential
- Lodging
- Office
- Commercial
- Industrial/Research
- Institutional
- Recreation
- NE Area Plan Vacant or Underutilized Sites
- Existing Mixed-use Concentrations
- NE Area Plan Proposed Neighborhood Retail

SOURCE: The Greenway Collaborative, Inc.
## Table 4-1

Northeast Area Plan Summary of Draft Site Specific Land Use Recommendations

<table>
<thead>
<tr>
<th>Site</th>
<th>Acres</th>
<th>Proposed Residential</th>
<th>Proposed Retail</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>63</td>
<td>7-10 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian connection to stub street on Skydale Drive.</td>
</tr>
<tr>
<td>2</td>
<td>67</td>
<td>7-10 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian connection to Foxfire. Provide a pathway along the creek between Foxfire East Park to Nixon Road.</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>7-10 DU/Ac</td>
<td>&lt; = 3 AC neighborhood retail</td>
<td>Provided a paved path to Logan School and the Placid Way stub street. Provided sidewalks along Dhu Varren and Nixon Roads.</td>
</tr>
<tr>
<td>4</td>
<td>54</td>
<td>4-10 DU/Ac</td>
<td>None</td>
<td>Provide path linking Nixon Road to Oakwood Nature area and around the large wetland. Provide sidewalk along Nixon Road.</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
<td>7-10 DU/Ac</td>
<td>None</td>
<td>Provide access from Pontiac Trail to Leslie Park. Provide a path to link Northeast Area Park and Leslie Park. Provide sidewalk along Pontiac Trail and Dhu Varren Roads.</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>10-15 DU/Ac</td>
<td>&lt;2,000 SF neighborhood retail</td>
<td>Provide a sidewalk along Dhu Varren Road. Provide a path to connect Northeast Area Park to Leslie Park.</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>7-25 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian linkage along Traverwood Boulevard to Leslie Woods.</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
<td>Mixed Use</td>
<td>Restaurant</td>
<td>Mixed use with research, office, education and residential.</td>
</tr>
<tr>
<td>9</td>
<td>160</td>
<td>7-10 DU/Ac</td>
<td>Potential</td>
<td>Provide pedestrian access along the Huron River and sidewalks along both sides of Geddes and Earhart Roads.</td>
</tr>
<tr>
<td>10</td>
<td>47</td>
<td>7-10 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian access to natural features on north side of site, and paved pathways to rear of Arborland Mall.</td>
</tr>
<tr>
<td>11</td>
<td>5.4</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Maximum of two access points from Dhu Varren Rd.</td>
</tr>
<tr>
<td>12</td>
<td>3.8</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Access from Traver Road.</td>
</tr>
<tr>
<td>13</td>
<td>2.1</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Access from Traver Road.</td>
</tr>
<tr>
<td>14</td>
<td>5.9</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian access to Hilldale Road via Cloverdale Road right-of-way.</td>
</tr>
<tr>
<td>15</td>
<td>6.0</td>
<td>6-8 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian access to private stub street off of Tibbits Court.</td>
</tr>
<tr>
<td>16</td>
<td>2.7</td>
<td>7-10 DU/Ac</td>
<td>None</td>
<td>Single access point from Traver Road.</td>
</tr>
<tr>
<td>17</td>
<td>1.7</td>
<td>None</td>
<td>Potential</td>
<td>Office or neighborhood commercial use.</td>
</tr>
<tr>
<td>18</td>
<td>6.3</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Access from Broadway.</td>
</tr>
<tr>
<td>19</td>
<td>3</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Provide pedestrian access to Baits Drive.</td>
</tr>
<tr>
<td>20</td>
<td>5.7</td>
<td>High Density</td>
<td>None</td>
<td>Existing private dormitory proposal.</td>
</tr>
<tr>
<td>21</td>
<td>3.8</td>
<td>Mixed Use</td>
<td>Yes</td>
<td>Mix of office, retail, and residential. Locate retail adjacent to Plymouth Road sidewalk.</td>
</tr>
<tr>
<td>22</td>
<td>8.3</td>
<td>Single Family</td>
<td>None</td>
<td>Limited development potential due to natural features.</td>
</tr>
<tr>
<td>23</td>
<td>4.6</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Access from Wolverhampton Lane.</td>
</tr>
<tr>
<td>24</td>
<td>11.7</td>
<td>4-6 DU/Ac</td>
<td>None</td>
<td>Access from Glazier Way.</td>
</tr>
<tr>
<td>25</td>
<td>8.8</td>
<td>3-4 DU/Ac</td>
<td>None</td>
<td>Access from Lakehave Drive and Shagbark Court.</td>
</tr>
<tr>
<td>26</td>
<td>20.8</td>
<td>2 DU/Ac</td>
<td>None</td>
<td>Access from Sumac Lane to the south and existing private stub street to the west. Extremely sensitive natural area.</td>
</tr>
<tr>
<td>27</td>
<td>150</td>
<td>150 Units</td>
<td>Mixed Use</td>
<td>Current development proposal calls for a significant increase in population density.</td>
</tr>
</tbody>
</table>

Source: Northeast Area Plan, 2006
Geddes Avenue, from Hill Street to Huron Parkway, goes through patches of woodlots with some mature trees adjacent to the roadway. There is an existing narrow path along portions of the north side of the trail. This path experiences considerable activity, but is constrained by a narrow right-of-way.

4.1.2 Neighborhood Accessibility

The key issues determining neighborhood accessibility are population density, diversity of land uses, and the design of the physical environment. Kevin J. Krizek of the University of Minnesota has published a series of papers documenting a measurement system for neighborhood accessibility. Using Portland, Ore., as a test case, Krizek developed a “neighborhood accessibility index” based on generally available data. Key inputs to the model are measurements of population density, urban form, and land use diversity. The model also uses smaller analysis zones than traditional transportation models. An independent panel verified the model by ranking the accessibility of 70 neighborhoods using numerous criteria. A high correlation was found between the panel’s results and the results of the model.

Krizek’s model was adapted and refined for this project. All of Washtenaw County was modeled to provide a context for the results in northeast Ann Arbor. While Krizek validated his model with comparative research conducted by a separate panel, a similar detailed validation has not been completed for this model. However, there is also a strong correlation between the areas of high neighborhood accessibility and the number of bicycle and pedestrian crashes. While this may seem counterintuitive, in general, the number of crashes does reflect the degree of activity in an area. There is also a strong correlation with bus stop location reflecting AATA’s assessment of the years of potential pedestrian activity.

Regional Neighborhood Accessibility Context

In comparison with the rest of Ann Arbor, the northeast area has a great percentage of the project area that is at a low level of neighborhood accessibility (Figure 4-2). This can be attributed to the two golf courses in the area, the open space along the Huron River, and the sparse development along Huron Parkway. The majority of northeast Ann Arbor has a neighborhood accessibility rating similar to many of the surrounding rural areas.

Northeast Ann Arbor Neighborhood Accessibility

Based on the neighborhood accessibility index for the northeast area, four corridors have a significant potential for daily bicycle and pedestrian trips. Washtenaw Avenue, Plymouth Road, Nixon Road and Stadium Boulevard. Another pattern that is apparent is the exceptionally low ratings of the Huron River corridor and the Huron Parkway corridor. While the pathway that runs along the Huron River receives considerable recreational activity in the evenings and weekends, it does not act as a primary transportation corridor for work, school, or personal business trips. The limited residential development and large block size along Huron Parkway contribute to its low index.
Figure 4-2
Neighborhood Accessibility Index

Legend
Neighborhood Accessibility Index

<table>
<thead>
<tr>
<th>Color</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: The Greenway Collaborative, Inc.
Other Key Pedestrian Activity Centers

While the neighborhood accessibility index provides a view of the underlying potential for daily non-motorized activity, there are a number of trip types that are not directly captured by this model:

- Work trips
- Hotel-to-Commercial trips
- Recreational trips
- School trips

Non-motorized home-to-work trips are exceptionally difficult to model given the relatively short commuting distances. Other than for the downtown area, there are no data indicating that Ann Arbor residents live within a distance short enough to walk or bicycle to their workplace.

Trips between hotels and restaurants are other types of movements that are challenging to capture in a model. However, analysis of northeast Ann Arbor shows there is one location near the junction of Plymouth Road and Green Road where the potential to increase walking trips from hotels to restaurants and businesses exists with the addition of crosswalks and other pedestrian facilities.

The Huron River Corridor, while currently of little significance to work and personal business trips, is a major destination in the city for recreational bicycling, walking, running and inline skating. While some people access the park via their automobile, many people bicycle or walk from their home to the river pathway system via the connecting city streets. As the Huron River path system is expanded towards Ypsilanti and northwest, through the Border-to-Border Trail Initiative, the draw and use of this recreational corridor will increase. The Huron River corridor has been identified as regionally significant and is part of the key “Greenway Framework” in A Vision for Southeast Michigan Greenways.

Another type of movement not captured in this model is the home-to-school trip. The number of students walking or bicycling to school has dropped dramatically over recent years. Through a combination of educational efforts, events such as Walk-to-School Day and minor facility improvements, like crosswalks or streetlights, many more home-to-school trips could be encouraged.

Centers of existing and potential pedestrian activity are shown in Figure 4-3.

4.1.3 The Pedestrian Environment

A nearly complete sidewalk system exists along the roadways throughout northeast Ann Arbor with a few notable exceptions. These include key transportation corridors such as portions of Washtenaw Avenue, Geddes Avenue, Geddes Road, Pontiac Trail, and the area at the intersection of Nixon Road and Dhu Varren Road where new neighborhoods continue to grow. Many of the sidewalks in the study area have little, if any, buffer, such as a row of trees or parked cars, between the sidewalk and the roadway. The lack of a barrier has been shown to have a significant impact on the quality of the walking experience.
Another major issue lies with cross-roadway accommodation. There are significant stretches of the major thoroughfares in northeast Ann Arbor that provide no means to safely cross the vehicular traffic. There are also places where logical crossings are not accommodated. Even where there are marked crosswalks, a general disregard by motorists of a pedestrian’s right-of-way in a crosswalk has been observed. This may be attributed to a lack of understanding of the applicable laws and/or lack of enforcement.

**Existing Pedestrian Facilities**

Figure 4-4 shows both adjacent-to-road facilities (i.e., sidewalks) along major streets and pedestrian facilities away from the road corridor (i.e., trails and paths). In addition, most neighborhoods, with the exception of those in the Geddes/Arlington/Washtenaw area, are served by internal sidewalk networks. While the city has an extensive network of existing facilities, the areas mentioned above, where gaps remain, are indicated by a dashed line.

**AATA Bus Stops and Service Area**

A ¼ mile buffer around each bus stop is considered the primary service area; this corresponds to a five-minute walk. Figure 4-5 indicates the areas within a five-minute walk to a bus stop.

**Distance Between Crosswalks**

This factor measures the distance between official crosswalks across arterial and collector roadways. One-eighth of a mile (660 feet) is considered the maximum spacing between crosswalks in high demand areas. While city code allows a pedestrian to cross at any point along a road, as long as they do not interfere with motor vehicle traffic, widely-spaced or non-existent crosswalks provide a clear physical message that discourages cross-corridor travel by pedestrians. Most of the road corridors in northeast Ann Arbor do not meet the 1/8-mile standard (Figure 4-6).

**Pedestrian/Car Crash Locations**

Crashes involving pedestrians/bicycles and autos are underreported. Nevertheless, clear patterns and problem intersections emerge in looking at the crashes reported from 1997-1999 in the northeast Ann Arbor area (Figure 4-7). While most of the crashes are centered in and around the downtown area, the Plymouth Road corridor stands out as a site of relatively large numbers of pedestrian crashes. This is a very high-density, mixed-use area with minimal crosswalks.

The intersection of Washtenaw and Huron Parkway is another area with a high level of pedestrian crashes. The intersection has multiple turning movements and high volumes of cars moving through the intersection at any given time in this high-density area. At the time this analysis was conducted, there was a gap in the sidewalk facilities along that stretch of road which may have contributed to the dangerous nature of the intersection for pedestrians.

These preliminary findings are instructive but require further study of contributing factors before final conclusions are reached.
Figure 4-5
AATA Bus Stops and Service Area

Legend
AATA Coverage
- AATA Bus Stop
1/4 Mile Buffer of Bus Stops (approx. a 5 minute walk)

Source: The Greenway Collaborative, Inc.
Figure 4-6
Distance Between Crosswalks

Legend
Distance Between Crosswalks
- > 1/2 mile
- 1/4 to 1/2 mile
- 1/8 to 1/4 mile
- <1/8 mile

SOURCE: The Greenway Collaborative, Inc.
Figure 4-7
Reported Pedestrian/Car Crash Locations

Legend
1997 to 1999 Ped Crashes

- 4 (1)
- 3 (8)
- 2 (17)
- 1 (102)

High Activity Areas Divided by Primary Roads with Minimal Cross Walks

High Density Mixed-Use Areas

High Density Mixed-Use Area and High Traffic Volume Intersection

SOURCE: The Greenway Collaborative, Inc.
Existing Quality/Level of Service Analysis

The quality/level of service rating is a measurement of the perceived safety and comfort of pedestrians. The technique used in this analysis is Sprinkle Engineering’s Pedestrian and Bicycle Level of Service. Key factors affecting the rating include presence of a sidewalk, separation between pedestrians and motorists, presence of buffers, automotive vehicle volume and speed.

Parts of Washtenaw, Fuller, Geddes and Huron River Dr. receive a rating of E, the lowest possible grade, because of their absence of sidewalks, lack of separation between the road and sidewalk, high volumes and speed, or a combination of factors (Figure 4-8). Adding a sidewalk in critical portions of these corridors would mean a substantial increase in the level of service. For corridors with a rating of D or C, increasing the amount of lateral separation between the road and the sidewalk with the addition of a bike lane will improve the perceived safety/comfort of pedestrians. Likewise, adding amenities like buffer strips and tree plantings will help make the experience for pedestrians a more pleasant one.

4.1.4 The Bicycling Environment

The existing bicycle facilities in northeast Ann Arbor tend to be primarily off-road side-path facilities. Very few accommodations, whether formally demarcated or not, exist in the roadway. Transfers between on-road and off-road facilities are not logical or convenient. In short, a functioning non-motorized transportation system does not exist on-road, off-road, or a combination thereof. Of special concern are key transportation corridors such as portions of Washtenaw Avenue, Geddes Avenue, Geddes Road, Pontiac Trail, and Nixon Road that are inhospitable to bicycle travel.

Existing Off-Road Facilities

The existing off-road facilities have numerous gaps and do not constitute a system (Figure 4-9). Without exception, these facilities are all constructed to older design guidelines.

Existing On-Road Facilities

The limited on-road facilities consist mainly of low-volume roadways and roads with wide curb lanes (Figure 4-10). Even though the on-road bike system is very limited right now, progress continues to be made to improve biking conditions in northeast Ann Arbor. Portions of Dhu Varren, Pontiac Trail, Huron River Drive, and Nixon Road all received bike lanes or paved shoulders in the summer of 2003. In 2004, bicycle lanes were added on Plymouth between Murfin and Traverwood in coordination with pedestrian refuge islands throughout this segment.

Reported Bike/Car Crashes

Similar to pedestrians, the reporting of crashes involving bicyclists is often incomplete or not recorded. Examination of the available data does, however, call attention to several intersections, in particular the intersection of Plymouth Road, Pontiac Trail and Maiden Lane (Figure 4-11). The lack of on-road facilities in this area makes bicyclists riding on the sidewalk particularly vulnerable to turning movements in this complicated intersection. This area has the highest number of reported bicycle/car crashes in the city for the three-year analysis period (1997-1999). This information on crash experience needs to be supplemented and further study undertaken of contributing factors before final conclusions are reached.
Figure 4-8
Existing Pedestrian Level of Service

Legend
- Quality/Level of Service A
- Quality/Level of Service B
- Quality/Level of Service C
- Quality/Level of Service D
- Quality/Level of Service E

SOURCE: The Greenway Collaborative, Inc.
Figure 4-11
Reported Bike/Car Crash Locations

Legend
1997 to 1999 Crashes:

- 1
- 3
- 5
- 7

SOURCE: The Greenway Collaborative, Inc.
Bicycle Quality/Level of Service Analysis (Q/LOS)

Factors affecting the Bike Q/LOS include the presence of a bicycle lane or paved shoulder, proximity of bicyclists to motorized vehicles, motor vehicle volume, speed and type, pavement conditions and presence of on-street parking. The Q/LOS analysis (using Sprinkle Engineering’s Pedestrian and Bicycle Level of Service technique) shows that the northeast Ann Arbor area is currently an inhospitable environment for bicycling (Figure 4-12). The majority of roads within the Northeast area received a grade of D or E because of the lack of on-road facilities and the heavy volumes of automotive traffic moving at high speeds.

4.1.5 Existing Plans

Extensive research at the national level has occurred since the Ann Arbor Bicycle Master Plan was developed in 1992. While the Bicycle Master Plan does have some outdated recommendations, mainly having to do with sidepath travel, the majority of the bicycle recommendations and guidelines proposed in the plan still hold true today. The recommendations of the Bicycle Master Plan for increased enforcement, new educational programs, and updated bicycle facilities have not been fully implemented. The recommendations in this plan and the Citywide Non-motorized Plan, now under development, will replace the Bicycle Master Plan with an updated framework based on the wealth of new research in this area.

Recommendations for pedestrian facilities are found in the 1990 Transportation Plan Update and the City’s Americans with Disabilities Act Transition Plan.

4.1.6 Existing Non-motorized Trip Characteristics

To understand Ann Arbor’s potential to increase the number of people walking and bicycling, it is helpful to examine how Ann Arbor’s current bicycling and walking compares to other areas. Then it is possible to gauge approximately how many more people may be enticed into walking and bicycling. The issues to address are:

- The number of people who express an interest in bicycling or walking
- Existing non-motorized mode share
- Types of walking and bicycling trips by purpose
- Average distances of those trips

Mode-split is the proportion of trips made by a particular mode of travel. Ann Arbor currently has well over twice the national average of the percentage of trips taking place by walking and bicycling (Table 4-2). Personal/Family Business and Social Recreation Trips are the two most predominant types of non-motorized trips. The Ann Arbor “Get Downtown” Program survey indicated that the average walking trip for downtown workers is 1.25 miles and the average bicycling trip is two miles.

Based on survey data and trip distance/time equivalents, an approximation of the existing trips by purpose is illustrated on Table 4-3. Studies indicate that the trip length varies by the trip purpose with the “Earning-the-Living Trip” being the longest.
Figure 4-12
Existing In-Road Bicycle Quality/Level of Service
Table 4-2
Walking and Bicycling Trips

<table>
<thead>
<tr>
<th>Area</th>
<th>Share of Total Trips</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>7.20%</td>
<td>National Personal Transportation Survey, 1995</td>
</tr>
<tr>
<td>Region</td>
<td>6.42%</td>
<td>SEMCOG 1994 Household-based Travel Survey</td>
</tr>
<tr>
<td>Washtenaw</td>
<td>10.20%</td>
<td>SEMCOG 1994 Household-based Travel Survey</td>
</tr>
<tr>
<td>Ann Arbor</td>
<td>16.52%</td>
<td>Bikes at Work, Inc., Based on 2000 Census</td>
</tr>
</tbody>
</table>

Table 4-3
Trips by Purpose

<table>
<thead>
<tr>
<th></th>
<th>Earning-A-Living</th>
<th>School/Church/Civic</th>
<th>Personal/Family Business</th>
<th>Social/Recreational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>10%</td>
<td>15%</td>
<td>45%</td>
<td>30%</td>
</tr>
<tr>
<td>4 MPH Avg. Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Trip</td>
<td>1 Mile</td>
<td>1 Mile</td>
<td>.5 Mile</td>
<td>1 Mile</td>
</tr>
<tr>
<td></td>
<td>(15 min.)</td>
<td>(15 min.)</td>
<td>(8 min.)</td>
<td>(15 min.)</td>
</tr>
<tr>
<td>95% of Trips</td>
<td>2 Miles</td>
<td>2 Miles</td>
<td>NA</td>
<td>2 Miles</td>
</tr>
<tr>
<td>Under</td>
<td>(30 min.)</td>
<td>(30 min.)</td>
<td>NA</td>
<td>(30 min.)</td>
</tr>
<tr>
<td>Bicycling</td>
<td>10%</td>
<td>15%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>8 MPH Avg. Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Trip</td>
<td>2 Miles</td>
<td>2 Miles</td>
<td>1 Mile</td>
<td>6 Miles</td>
</tr>
<tr>
<td></td>
<td>(15 min.)</td>
<td>(8 min.)</td>
<td>(45 min.)</td>
<td></td>
</tr>
<tr>
<td>95% of Trips</td>
<td>4 Miles</td>
<td>4 Miles</td>
<td>2 Miles</td>
<td>10 Miles</td>
</tr>
<tr>
<td>Under</td>
<td>(30 min.)</td>
<td>(30 min.)</td>
<td>(15 min.)</td>
<td>(1.25 hrs.)</td>
</tr>
</tbody>
</table>

Potential Increases in Non-motorized Mode Share

Given that Ann Arbor’s non-motorized mode share is relatively high already (Table 4-2), improvements to the physical environment will likely see modest increases in the overall mode share. Nevertheless, such improvements would likely result in lower crash rates and greater integration of all modes of transportation, providing increased opportunities and access for Ann Arbor residents.
The biggest changes are likely to be seen with bicycle mode share. The existing bicycle system is relatively incomplete. Areas with comparable demographic and physical characteristics, but with a more complete bicycle network, have a higher bicycle mode share. Based on a combination of professional judgment, analysis of existing facilities, and data from other similar cities, reasonable targets for non-motorized mode share in the city would be:

- Walking trips to comprise 15 to 20 percent of all trips.
- Bicycling trips to comprise at least one percent of all trips.

### 4.2 Proposed Facilities

The following facilities are proposed based on the research and analysis presented in the previous sections, and current best practices for accommodating bikes and pedestrians and AASHTO design guidelines. These facilities will enhance the walking and biking conditions in the northeast Ann Arbor area.

#### 4.2.1 Long-term Solutions

The NEATP long-term pedestrian facilities for northeast Ann Arbor are illustrated on Figure 4-13. The bicycle facility proposals are shown on Figure 4-14. Crosswalk and median proposals are depicted on Figure 4-15. These are to be considered for implementation when the roadways to which they relate are reconstructed or widened.

To guide future private development, the following recommendations have been developed:

- Existing subdivision ordinances should be modified to include specific requirements for accommodating pedestrians and bicycles.
- The site plan review process should include criteria that evaluates whether walking is encouraged through the site design and review and modify plans as necessary.
- Developments with small blocks and grid streets should be encouraged through design guidelines.
- New residential developments must include pedestrian, bicycle and street networks that connect to surrounding areas.
- Private road standards for sidewalks and buffer zones should be the same as public street standards.

#### 4.2.2 Other Long-term Solutions

This section includes guidelines for designing typical road sections for collector and arterial streets throughout northeast Ann Arbor, as well as maps where each roadway type occurs in the study area and summary maps that show the entire system. They are to be considered for implementation when the roadways to which they relate are reconstructed or widened. It should be noted that City of Ann Arbor standards set a minimum travel lane width at 11 feet. This minimum is assumed on the roadway cross-sections, but may be reduced in certain situations where speed limits are 35 mph or less.
Figure 4-13
Proposed Pedestrian Facilities

Legend
Adjacent to Road:
- 10' Shared-use Path
- 5'-8' Sidewalk
- 6' Sidewalk
- 8' Sidewalk

Separate From Road:
- 10' Shared-use Path

SOURCE: The Greenway Collaborative, Inc.
Figure 4-14
Proposed Bicycle Facilities

Legend
On or Adjacent to Road:
- 10' Shared-use Path
- 4' Bike Lane (3.5' Urban)
- 5' Bike Lane (6.5' Urban)
- Signed Bike Route

Separate From Road:
- 10' Shared-use Path

SOURCE: The Greenway Collaborative, Inc.
Figure 4-15
Proposed Crosswalks and Medians

Legend
- Proposed New Crosswalk Location
- Proposed Planted Median / Refuge Island

SOURCE: The Greenway Collaborative, Inc.
Two-lane Roads

On two-lane roads with speed limits of 35 mph or less, bicycle lanes may be reduced to the 3.5-foot minimum (five-foot total from face of curb). In rural cross sections the paved shoulder should be a minimum of four feet wide.

<table>
<thead>
<tr>
<th></th>
<th>Sidewalk Min. Width</th>
<th>Buffer Min. Width</th>
<th>Bike Lane Min. Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collectors</td>
<td>6'</td>
<td>6'</td>
<td>4'</td>
</tr>
<tr>
<td>Minor Arterials</td>
<td>8'</td>
<td>9'</td>
<td>5'</td>
</tr>
</tbody>
</table>

Source: The Greenway Collaborative, Inc.
Figure 4-16C
Two-lane Roadway Locations

Legend
- Typical road section guidelines
- Atypical situation

Proximity of river limits room for sidewalk on south side

Facility may be implemented on city property away from roadway due to natural features

Improve existing path on North side

Place sidewalk on north side of road to avoid natural features

SOURCE: The Greenway Collaborative, Inc.
Two-lane Boulevards

When designing two-lane boulevards, care should be taken to provide adequate room for emergency vehicles to pass vehicles pulled to the side.

**Figure 4-17A**

Two-lane Boulevard Typical Cross Section

![Image of two-lane boulevard cross section]

**General Two-lane Boulevard Design Guidelines**

<table>
<thead>
<tr>
<th></th>
<th>Sidewalk Min. Width</th>
<th>Buffer Min. Width</th>
<th>Bike Lane Min. Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collectors</td>
<td>6’</td>
<td>6’</td>
<td>4’</td>
</tr>
<tr>
<td>Minor Arterials</td>
<td>8’</td>
<td>9’</td>
<td>5’</td>
</tr>
</tbody>
</table>

Source: The Greenway Collaborative, Inc.

**Figure 4-17B**

Two-lane Boulevard Typical Plan View

![Image of two-lane boulevard plan view]

Source: The Greenway Collaborative, Inc.
Figure 4-17C
Two-lane Boulevard Locations

Legend
- Typical road section guidelines
- Atypical situation

SOURCE: The Greenway Collaborative, Inc.
Three-lane Roads

A planted median should be incorporated into all three-lane roads whenever the there is no need for a turn lane. The planted median improves the aesthetics of the roadway, reduced the impervious surfaces, can act as a refuge island for mid-block crossings, and has been shown to be less expensive in the long run than paving. The refuge island may also be constructed in a manner to mitigate storm water run-off.

### General Three-lane Road Design Guidelines

<table>
<thead>
<tr>
<th>Type</th>
<th>Sidewalk Min. Width</th>
<th>Buffer Min. Width</th>
<th>Bike Lane Min. Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collectors</td>
<td>6'</td>
<td>6'</td>
<td>4'</td>
</tr>
<tr>
<td>Minor Arterials</td>
<td>8'</td>
<td>9'</td>
<td>5'</td>
</tr>
<tr>
<td>Principal Arterials</td>
<td>8'</td>
<td>9'</td>
<td>5'</td>
</tr>
</tbody>
</table>

Source: The Greenway Collaborative, Inc.
Figure 4-18C
Three-lane Roadway Locations

Legend
- Typical road section guidelines
- Atypical situation

Historic districts where road corridor and sidewalk widths are unlikely to change

Sidewalk may not be appropriate on west side of road due to natural features

SOURCE: The Greenway Collaborative, Inc.
Four-lane Parkways

The cross-section proposed for parkway-type conditions is where the roadway has few, if any, intersecting roads and/or driveways. The shared-use path is typically set further back from the roadway than in most situations. Care should be taken not to meander the path excessively as even in a parkway situation as few bicyclists will travel far out of their way unless there is a compelling reason.

Figure 4-19A
Four-lane Parkway Typical Cross Section

<table>
<thead>
<tr>
<th>General Four-lane Parkway Design Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathway</td>
</tr>
<tr>
<td>Collectors</td>
</tr>
<tr>
<td>Minor Arterials</td>
</tr>
<tr>
<td>Principal Arterials</td>
</tr>
</tbody>
</table>

Source: The Greenway Collaborative, Inc.

Figure 4-19B
Four-lane Parkway Typical Plan View

Source: The Greenway Collaborative, Inc.
Figure 4-19C
Four-lane Roadway Locations

Legend

- Typical road section guidelines
- Atypical situation

Source: The Greenway Collaborative, Inc.
Five-lane Roads

A planted median should be incorporated into a five-lane road design wherever there is no need for a turn lane. The planted median improves the aesthetics of the roadway, reduces the impervious surface, can act as a refuge island for mid-block crossings, and has been shown to be less expensive in the long run than paving. The refuge island may also be constructed in a manner to mitigate storm water run-off.

General Five-lane Road Design Guidelines

<table>
<thead>
<tr>
<th></th>
<th>Shared-use Pathway Min. Width</th>
<th>Buffer Min. Width</th>
<th>Bike Lane Min. Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collectors</td>
<td>6'</td>
<td>6'</td>
<td>4'</td>
</tr>
<tr>
<td>Minor Arterials</td>
<td>8'</td>
<td>9'</td>
<td>5'</td>
</tr>
<tr>
<td>Principal Arterials</td>
<td>8'</td>
<td>9'</td>
<td>5'</td>
</tr>
</tbody>
</table>

Source: The Greenway Collaborative, Inc.

State Street, south of Eisenhower Boulevard, is similar to the proposed five-lane configuration except the sidewalk should be slightly wider and medians should be included.
Figure 4-20C
Five-lane Roadway Locations

Legend
- Red: Typical road section guidelines
- Blue: Atypical situation

SOURCE: The Greenway Collaborative, Inc.
4.2.3 Atypical Long-term Solutions

Not every possibility for each roadway can be adequately addressed at a master plan level. Ultimately, a corridor specific design will determine how to best apply the design guidelines to specific situations. But, even at this level of analysis, several locations can be identified where circumstances make the typical guidelines for accommodating pedestrians and bicycles infeasible or impractical. These are shown in blue on Figures 4-22 and 4-23. They include:

- **Washtenaw Avenue**, from Stadium to Geddes Avenue, goes through historic districts where the road and sidewalk width are unlikely to change. The sidewalks are five feet wide and the road is narrow (40 feet wide in some places). Because the road is a Principal Arterial, draft AASHTO Pedestrian Guidelines call for an eight-foot-wide sidewalk. This is unlikely to occur and underscores the need to accommodate bicycles within the roadway as the existing five-foot-wide sidewalks clearly cannot accommodate both adult bicyclists and pedestrians in this high demand corridor.

- **Huron River Drive**, from Huron Parkway to Hogback Road, has adjacent mature woods and steep slopes primarily on the south side of the road. This, in combination with the limited development along the road, makes a sidewalk only on the north side of the road an appropriate solution. There may be areas where the buffer between the sidewalk and the roadway may have to be eliminated to minimize the impact to the natural features.

- **Geddes Road**, from Huron Parkway to Sumac Lane, has steep slopes and woodlots on both sides of the road. Because this road serves as a key linkage connecting Concordia University, three neighborhoods, and the Huron River Pathway system, there is demand for a non-motorized linkage. The most appropriate non-motorized linkage may not be directly adjacent to the roadway but rather away from the roadway utilizing city property and, potentially, easements on private property. By utilizing this approach, the road character may be preserved while still providing the non-motorized link.

- **Geddes Avenue**, from Hill Street to Huron Parkway, goes through patches of woodlots with some mature trees adjacent to the roadway. There is an existing narrow path along portions of the north side of the trail. This path experiences considerable activity. It should be improved and widened, where possible, without significantly impacting the natural features.

4.2.4 Near-term Solutions

Near-term solutions were designed to be implemented with minor changes such as re-striping the existing road surface (Figures 4-21 and 4-22). These cost-effective solutions will enhance bicycle and pedestrian conditions, quickly and easily, until the road is expanded or major reconstruction is undertaken. In doing so, coordination is essential with the implementation of changes in the transit and roadway components of the Northeast Area’s transportation system.
Figure 4-21
Near-term Bicycle Facilities

Legend
In or Along Road:
- 3.5' Bike Lane (5')
- 4 Bike Lane (5.5')
- 5 Bike Lane
- 8-10' Shared-use Path
- Bike Route
- Existing 4' Bike Lane

Separate From Road:
- 10' Shared-use Path
- 8 Shared-use Path

SOURCE: The Greenway Collaborative, Inc.
Four road corridors in the project area present distinct challenges that are the result of limited space and high volumes of traffic and/or higher speed limits.

- Plymouth Road
- Washtenaw Avenue
- Fuller Road from Glazier Way to Fuller Court
- Stadium Boulevard from Ferdon Road to Washtenaw Avenue

AASHTO standards provide for flexibility in cases such as these, and certain modifications are described below. Ann Arbor city engineering staff has determined that vehicular lanes on roads with a posted speed limit of 40 mph or greater should not be reduced to less than 11 feet wide.

**Plymouth Road**

Providing minimum-width bicycle lanes on both sides would require that the outside motor vehicle lanes be narrowed to 10.5 feet in some places, the inside motor vehicle lane to 11 feet and the center-turn lane reduced to 10 feet. There is, however, room to provide one designated bicycle lane and maintain the 11-foot desired minimum width of the vehicular lanes.

Figure 4-23 illustrates the numerous road crossings and driveway intersections along the length of Plymouth Road. Between Parc Pointe Apartments and Beal Avenue there are numerous intersecting roads and driveways on both sides of Plymouth Road. For safety reasons, bicycle lanes are highly recommended on both sides of the road even though this would require that the outside travel lane adjacent to the bicycle lane to be 10.5’ in some places.

The cross-section illustrations of Figures 4-24A through 4-24D are based on the number of intersecting driveways and the corresponding need for bike lanes. In several cases, bicyclists would be given the option of bicycling in the roadways or using the sidepath at their discretion. In those situations, and situations where no bike lane is feasible, the visibility of the sidepath needs to be improved at the driveways, and transitions must be provided between the road and sidepath.
Figure 4-23
Intersections and Driveways Along Plymouth Road

Legend
- Red Circle: Road or Major Driveway Intersection
- Blue Circle: Driveway Intersection

SOURCE: The Greenway Collaborative, Inc.
Figure 4-24A
Plymouth Road – Lowertown to Barton Drive (Near-term)

In this section, the roadway is only 48’ in width, which does not allow for bike lanes on both sides. The north side of the roadway does not have an existing sidewalk. The south side has an existing 8’ sidewalk with several entering driveways and intersections.

Source: The Greenway Collaborative, Inc.

Figure 4-24B
Plymouth Road – Barton Drive to Parc Pointe Apartments (Near-term)

This section varies from 48’-60’ and has no entering driveways or intersections until Parc Pointe apartments.

Source: The Greenway Collaborative, Inc.
Installing bike lanes in this stretch by going to a sub-11’ lane for brief sections is a safe and reasonable option to address the large number of intersections and entering driveways in this area. The roadway varies from 60’-61’ so in some places bike lanes could be installed while maintaining an outer lane of 11’.

**Figure 4-24C**
Plymouth Road – Parc Pointe Apartments to Huron Parkway (Near-term)

Due to higher posted speeds in this segment (40-45 mph), narrowing of the outer travel lane is not desired for the near term. Adequate room exits to provide a wide bicycle lane on the north (westbound), which is characterized by more driveways. Modifications to the sidepaths on both sides should be made to improve visibility at driveways and intersections.

**Bike lane on north side, shared-use path on south side**
Comprehensive Transportation Plan for the Northeast Area of the City of Ann Arbor

Final Report

Washtenaw Avenue

Washtenaw Avenue, a state trunkline, is a high-demand corridor for both automobiles as well as non-motorized traffic. The width of the roadway varies greatly along its length, from 40 feet in the historic neighborhoods closer to campus, to 70 feet nearer U.S. 23.

The bike quality/level of service of the corridor is an E from the intersection of Stadium Boulevard to Huron Parkway due to the large volumes of traffic moving at high speeds and the lack of sidewalks along the north side. Currently, there is a “desire path” worn into the narrow strip of grass along the road at that point, which is virtually impassible during the winter months.

For a near-term solution on this segment, the City should seek MDOT approval to provide a bicycle lane on the north (westbound) and finalize Transportation Enhancement grant approval for a shared use path on the north side.

For the segment from Huron Parkway to U.S. 23, there is sufficient width to provide two bicycle lanes. If improvements recommended in the U.S. 23/Washtenaw Non-motorized Crossing Study are implemented, transitions to the sidepaths must be developed.

The near-term proposals along Washtenaw Avenue are shown in Figures 4-25A through 4-25F.

![Diagram of Washtenaw Avenue from Hill Street to 1/8th Mile East of Toumy Road (Near-term)](img)

Source: The Greenway Collaborative, Inc.
Figure 4-25B
Washtenaw Avenue from 1/8th Mile East of Toumy Road to Tappan Crosswalk (Near-term)

Here the roadway widens to 50’ allowing for two 6’ bike lanes when the road is converted from four-lane to three-lane. Although this is somewhat wide for a three-lane, the advantage is that people using the crosswalk at Tappan School will only have to cross one lane of fast-moving traffic in each direction.

Source: The Greenway Collaborative, Inc.

Figure 4-25C
Washtenaw Avenue from Tappan Crosswalk to Stadium Boulevard (Near-term)

Because a 50’ road width is large for a three lane with bike lanes, the road east of the Tappan crosswalk should be converted to a four lane with bike lanes. Numerous commercial driveways are on the south side of the road. Two eastbound lanes allow cars to use the outside lane as a turning lane into the businesses.

Source: The Greenway Collaborative, Inc.
Figure 4-25D
Washtenaw Avenue from Stadium Road to Platt Road (Near-term)

The roadway in this section is 60’ wide. In the near term, provide a bike lane on the North side of the road and utilize the existing shared-use path on the south.

Bike lane on north side, shared-use path on south side

Source: The Greenway Collaborative, Inc.

Figure 4-25E
Washtenaw Avenue from Platt Road to Huron Parkway (Near-term)

This area has numerous driveway crossings on both sides, however, there is a high volume of traffic. In the near term, a bike lane is recommended on the north side, with a wide outer curb lane on the south. New development on the north should provide for the additional street width to accommodate a full bike lane.

Source: The Greenway Collaborative, Inc.
The roadway in this section is 70’ wide. This allows room for two 6’ bike lanes by simply narrowing the current travel lanes. 8’ sidewalks are proposed on either side of the roadway. Transitions will be necessary at the east end to connect to the facilities recommended in the U.S. 23/Washtenaw Non-motorized Crossing Study.

Source: The Greenway Collaborative, Inc.
Fuller Road

Fuller Road also varies in width along its length. Portions of the roadway are heavily used by pedestrians and bicyclists moving between North Campus and Central Campus, waiting for buses, or walking from the commuter lots by Mitchell Field. In some portions, the existing sidepaths along both sides of the road can accommodate bicycle use safely due to few intersecting driveways. However, due to heavy pedestrian use, a shared use is problematic for bicycle use. The near-term solution is to accommodate bicyclists in the roadway, where possible, with a narrowing of lanes as shown on Figures 4-26A through 4-26D.

Figure 4-26A
Fuller Road from Maiden Lane to Bonisteel (Near-term)

The road width here is too narrow to accommodate bike lanes in the roadway. They are accommodated on the existing shared-use paths on either side.

Source: The Greenway Collaborative, Inc.

Figure 4-26B
Fuller Road from Bonisteel to Glazier Way (Near-term)

The shared use pathways in this section are very crowded with pedestrians. There are numerous heavily used driveways and many intersections. Accommodating bike lanes in the roadway by narrowing the outer lanes to sub-11’ is the most appropriate solution for the safety and convenience of both bicyclists and pedestrians.

Source: The Greenway Collaborative, Inc.
With the current road width of 27’, there is room for a 4’ bike lane on the south side of the road. The presence of the bike lane will narrow the lanes from 13.5’ to 11.5’ which may reduce the incident of speeding on this road.

The current sidewalk, directly adjacent to the roadway, is 14’ wide. Because there are no intersecting driveways between Glazier Way to Fuller Court on the north side of the road, a “raised bikeway” may be added on the outside edge of the shared-use path, leaving a 4.5’ minimum buffer for utility posts and signs. The bikeway portion of the path should be marked with a shared-use arrow to indicate position of the bikes.

Source: The Greenway Collaborative, Inc.
Figure 4-26D
Fuller Road from Fuller Court to Huron Parkway (Near-term)

Paving the shoulders and narrowing travel lanes will facilitate bikes in the roadway along this portion.

Source: The Greenway Collaborative, Inc.
Stadium Boulevard

Nearly a mile of Stadium Boulevard is included in northeast Ann Arbor. The road in this area is 60 feet wide. Unlike the section of Washtenaw Avenue between Stadium and Huron Parkway, a sidepath is not a viable alternative due to the numerous intersecting driveways and intersections on both sides and the existing conditions of a five-foot sidewalk up against commercial development properties. The proposals for Stadium Boulevard are illustrated on Figure 4-27.

Figure 4-27
Stadium Boulevard from Ferdon Road to Washtenaw Avenue (Near-term)

The 60’ wide roadway allows for two bike lanes by narrowing the outside travel lane to sub-11’.

Source: The Greenway Collaborative, Inc.

4.2.5 Specific Area Recommendations

The following recommendations deal with a variety of specific problem areas within the study area:

- Conduct an analysis of pedestrian and bicycle crash data annually to identify problem areas and potential corrective actions.
- Provide crosswalks and pedestrian signals at main entrance to the Arborland Mall.
- Improve the crosswalk where the Huron River Path crosses Wall Street and Maiden Lane.
- Improve the crosswalk at the entrance to Gallup Park from Fuller Road restricting overflow parking as necessary.
- Eliminate all pedestrian activated crosswalk signals in the Lower Town area and integrate the walk phase into standard signal phasing.
- Cooperate with MDOT to implement the improvements recommended by the U.S. 23/Washtenaw Interchange Crossing Study.
4.3 Goals and Evaluation Factors

The non-motorized component meets the goals of the Northeast Ann Arbor Transportation Plan by providing appropriate access and mobility for all people, with minimal impacts (Tables 4-4 and 4-5). The increased emphasis on the non-motorized mode will protect and enhance the natural and human/built environment by providing people an alternative to auto use thereby lessening air pollution. The ability to connect communities by avoiding, to an increased extent, modifying roads by pouring more concrete, is also enhanced by balancing the investment in infrastructure while promoting a safe and secure transportation system. And, an increased emphasis on non-motorized transportation by the City of Ann Arbor and its surrounding communities, as well as the University of Michigan, will allow the focus on this mode to promote cooperation among all these jurisdictions.

<table>
<thead>
<tr>
<th>Table 4-4</th>
<th>Northeast Ann Arbor Transportation Plan</th>
<th>Proposed Non-motorized Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Recommendations</td>
<td></td>
</tr>
<tr>
<td>Provide appropriate access and mobility with minimal negative impacts for all people and goods</td>
<td>Meet Goal</td>
<td></td>
</tr>
<tr>
<td>Protect and enhance the natural environment and the human and built environment</td>
<td>Meet Goal</td>
<td></td>
</tr>
<tr>
<td>Promote a safe and secure transportation system</td>
<td>Meet Goal</td>
<td></td>
</tr>
<tr>
<td>Invest in transportation infrastructure in a manner consistent with other goals</td>
<td>Meet Goal</td>
<td></td>
</tr>
<tr>
<td>Promote cooperation among the city of Ann Arbor and other governmental entities, particularly the surrounding townships and municipalities and the University of Michigan in a manner consistent with other goals</td>
<td>Meet Goal</td>
<td></td>
</tr>
<tr>
<td>Meaningful public input and involvement will be required of any transportation project in the Northeast Area</td>
<td>Meet Goal</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4-5</th>
<th>Northeast Ann Arbor Transportation Plan</th>
<th>Proposed Non-motorized Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation Factor</td>
<td>Recommendations</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>Positive Effect</td>
<td></td>
</tr>
<tr>
<td>Community Cohesion</td>
<td>Positive Effect</td>
<td></td>
</tr>
<tr>
<td>Land Acquisition</td>
<td>No Effect</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>No Effect</td>
<td></td>
</tr>
<tr>
<td>Mode Choice</td>
<td>Positive Effect</td>
<td></td>
</tr>
<tr>
<td>Level of Service</td>
<td>No Effect</td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>No Effect</td>
<td></td>
</tr>
<tr>
<td>Wetlands</td>
<td>No Effect</td>
<td></td>
</tr>
<tr>
<td>Open Space</td>
<td>No Effect</td>
<td></td>
</tr>
<tr>
<td>Environmental Justice</td>
<td>No Disproportionate Negative Effect</td>
<td></td>
</tr>
</tbody>
</table>
Development of the non-motorized transportation component of the NEATP will have little or no effect on land acquisition or noise. Likewise, it will not affect the area’s water quality, wetlands or open space. And, there will be no disproportionate negative effects on low-income or minority populations.

Analysis of the “before” and “after” conditions of the traffic effects of the non-motorized proposals on Plymouth Road, between Nixon and Murfin Roads, was performed using the SYNCHRO model. Bike lanes and two new refuge islands were recently constructed on Plymouth Road in this segment. The SYNCHRO model examined reductions in lane width (12 feet to 11 feet) and average speeds (lower by five mph) on this segment of Plymouth. The results (Table 4-6) show an increase in delay and travel time. But, with the reduced average vehicular speed on Plymouth, these are considered productive tradeoffs, particularly when understanding these increases in time represent a few seconds per vehicle on Plymouth Road.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Performance Measure</th>
<th>Vehicle Minutes</th>
<th>Average Speed MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Delay Time</td>
<td>Total time</td>
</tr>
<tr>
<td>Before Condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murfin to Traverwood</td>
<td></td>
<td>53.0</td>
<td>342.6</td>
</tr>
<tr>
<td>Traverwood to Nixon</td>
<td></td>
<td>204.0</td>
<td>328.2</td>
</tr>
<tr>
<td>Nixon to Traverwood</td>
<td></td>
<td>18.6</td>
<td>124.4</td>
</tr>
<tr>
<td>Traverwood to Murfin</td>
<td></td>
<td>87.8</td>
<td>311.7</td>
</tr>
<tr>
<td>After Condition (.5 mph)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murfin to Traverwood</td>
<td></td>
<td>62.3</td>
<td>398.1</td>
</tr>
<tr>
<td>Traverwood to Nixon</td>
<td></td>
<td>254.8</td>
<td>398.1</td>
</tr>
<tr>
<td>Nixon to Traverwood</td>
<td></td>
<td>19.1</td>
<td>141.1</td>
</tr>
<tr>
<td>Traverwood to Murfin</td>
<td></td>
<td>119.6</td>
<td>374.1</td>
</tr>
</tbody>
</table>

Source: The Corradino Group of Michigan, Inc.

The Highway Capacity Software was also applied to determine if the narrower lane width on Plymouth Road, accompanying the non-motorized changes and the increased presence of bicyclists and pedestrians, makes a difference in vehicle throughput. The results (Table 4-7) show that the Plymouth Road intersection with Nixon Road will experience no significant reduction in its ability to handle traffic in the peak hour when the lanes on Plymouth are 11 feet rather than 12 feet wide and 10 pedestrian and bicycle interactions affect the flow of eastbound and westbound traffic on Plymouth Road. The reduction in capacity is less than four percent when the bicycle/pedestrian interactions with traffic grow to 25 in the peak hour. So, while, this test is only for one road, the consultant concluded there will be no significant negative effect in vehicle Level of Service due to implementing the non-motorized component of the NEATP. Such changes will have a calming effect on vehicular speeds and improve overall safety of the pedestrians and bicyclists.
<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Existing Conditions</th>
<th>New Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12' Lanes</td>
<td>12' Lanes</td>
</tr>
<tr>
<td></td>
<td>0 conflicting pedestrians and bikes per hour each approach</td>
<td>10 conflicting pedestrians and bikes per hour each approach</td>
</tr>
<tr>
<td>All Values Saturated Flow Rates (vph)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound Left</td>
<td>1770</td>
<td>1770</td>
</tr>
<tr>
<td>Eastbound Thru and Right</td>
<td>3533</td>
<td>3531</td>
</tr>
<tr>
<td>Westbound Left</td>
<td>1770</td>
<td>1770</td>
</tr>
<tr>
<td>Westbound Thru and Right</td>
<td>3456</td>
<td>3448</td>
</tr>
<tr>
<td>Difference with 12' Lanes and 0 Conflicts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound Left</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Eastbound Thru and Right</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>Westbound Left</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Westbound Thru and Right</td>
<td>0</td>
<td>-8</td>
</tr>
<tr>
<td>Percent Difference</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>-0.06%</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>-0.23%</td>
</tr>
</tbody>
</table>

Source: The Corradino Group of Michigan, Inc.