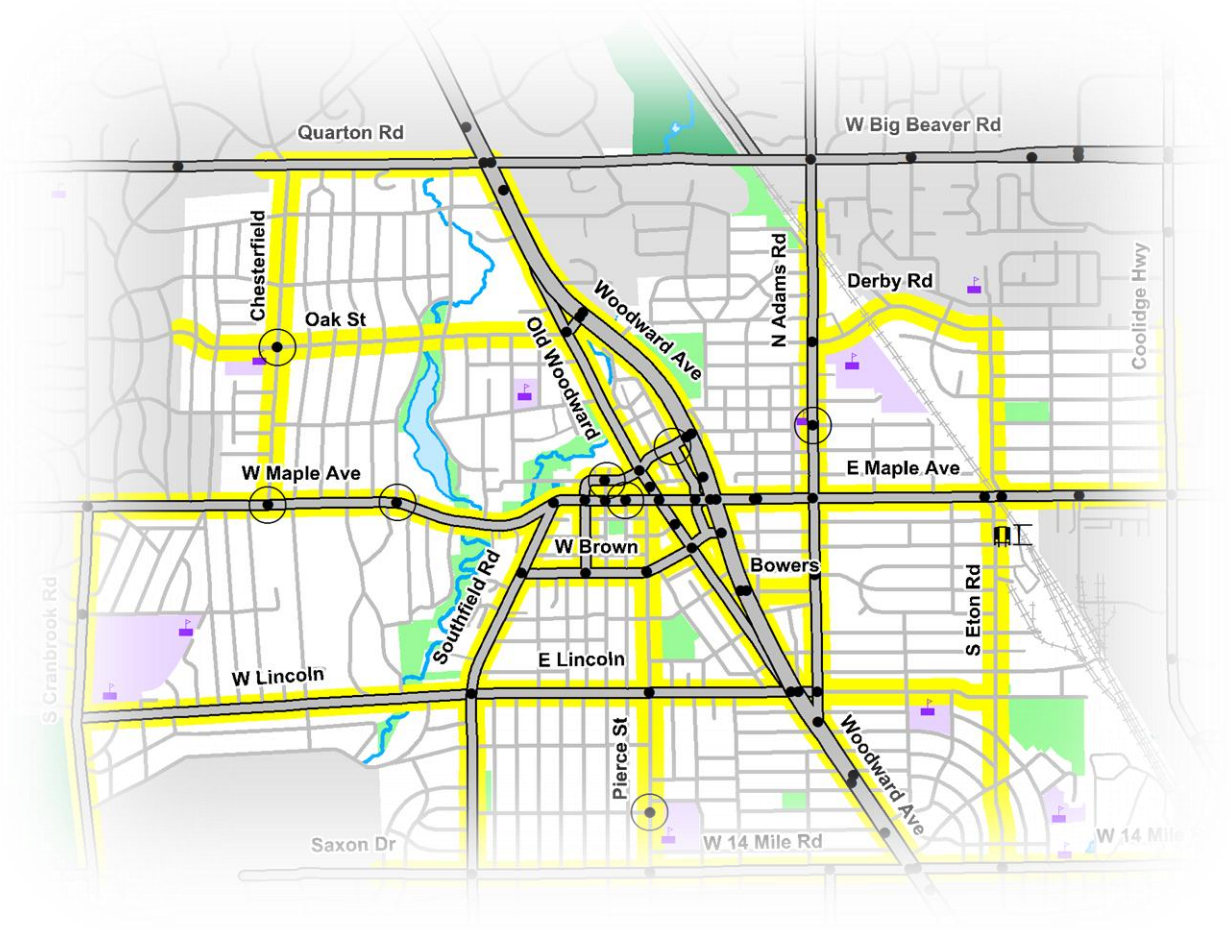
CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

DRAFT INVENTORY & ANALYSIS

January 16, 2013



Prepared for:

City of Birmingham Michigan

submitted by:

The Greenway Collaborative, Inc.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

LIST OF FIGURES

The following maps provide a general summary of the existing conditions in the City of Birmingham.

GENERAL CONDITIONS:

PEDESTRIAN CONDITIONS:

BICYCLE CONDITIONS:

- In-Road Bicycle Quality
- Existing Bicycle Activity
- Potential Bicycle Activity
- Existing Regional Bicycle Activity
- Potential Regional Bicycle Activity
- Potential Bike Lanes through Lane Narrowing
- Potential Bike Lanes through 4 to 3 Lane Conversion
- Potential Bike Lanes through Rearrangement of On-Street Parking
- Potential Bike Lanes By Paving the Shoulder
- Potential for Shared Lane Markings

TRANSIT CONDITIONS:

- Existing and Future Amtrak Service
- SMART Bus Loading and Unloading- Weekdays
- SMART Bus Loading and Unloading- Saturdays
- SMART Bus Loading and Unloading- Sundays
- Existing Bicycle Activity at Transit Locations
- Potential Bicycle Activity at Transit Locations
- Existing Pedestrian Activity at Transit Locations
- Potential Pedestrian Activity at Transit Locations

RELATIVE DEMAND:

- Population Density
- Land Use Diversity
- Activity Generators
- Transit Activity
- Connectivity
- Employment Centers
- Composite Demand Analysis
- Relative Demand Analysis

GENERAL CONDITIONS:

The City of Birmingham, Michigan is located in Oakland County Michigan along Woodward Avenue, between the Cities of Detroit and Pontiac and is approximately 4.8 square miles. The city is centrally located within the region with a vibrant downtown, wide range of house opportunities, strong commercial corridors and high density development well served by public amenities and a dense urban grid.

In general, bicycle and pedestrian travel in the city generally follows the primary road system with a nearly compete sidewalk system. Beyond the Rouge River Trails, which are mainly used for recreational use, there are limited transportation options for bicycles in the City. The artificial barriers of multi-lane arterial roads tend to fragment the community from a non-motorized standpoint, with Woodward Avenue presenting the most challenges for non-motorized travel. Along many of these corridors, opportunities to cross busy roads are limited with poor bicycle and pedestrian connectivity between neighborhoods and destinations that are located on opposite sides of the roadway.

Both SMART and Amtrak provide local and regional transit for the City of Birmingham. The city is very fortunate to have transit options however there is potential to expand their use within the community.

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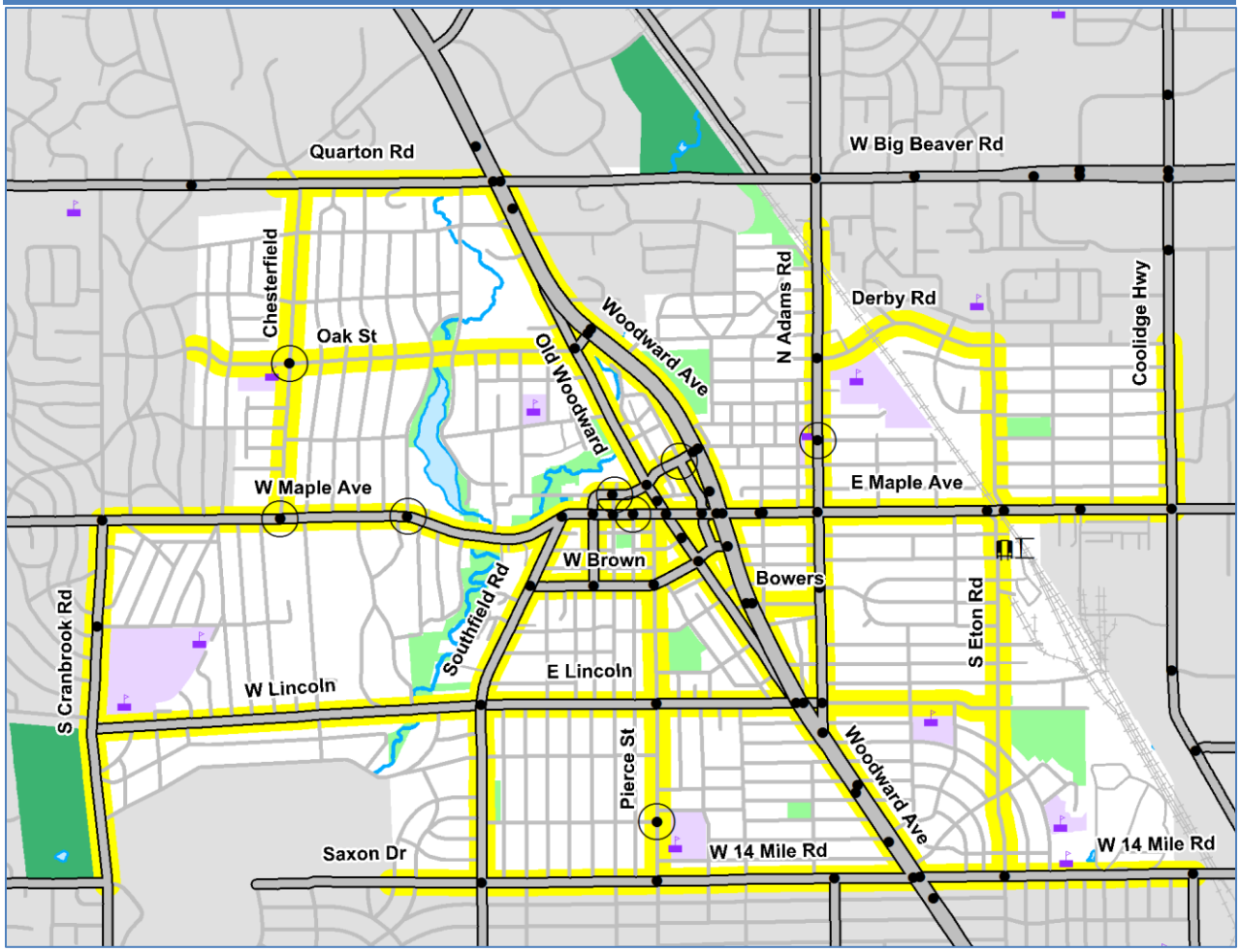
CITY OF BIRMINGHAM PROJECT OVERVIEW



Centrally located between Pontiac and Detroit along Woodward Avenue, the City of Birmingham is recognized as a walkable community with a vibrant downtown.

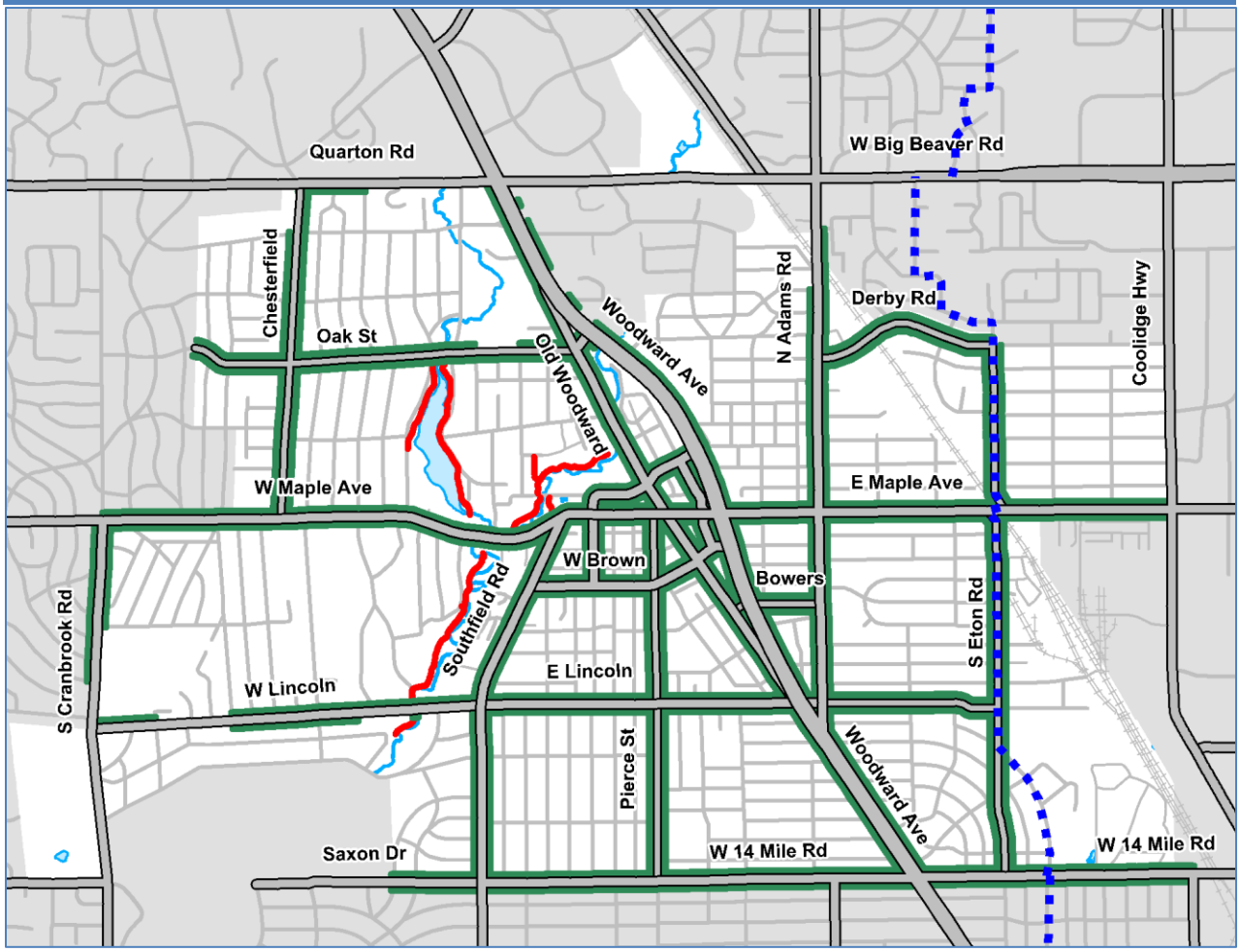
As part of this study specific signals and roads were selected to be prioritized and studied in detail. It should be noted that this is not intended to eliminate the study of other streets and signals, rather to help prioritize those areas that will require greater amount of study.

Legend

- School Building
- Signalized Intersections
- Signal to be Studied
- School Property
- Golf Course
- Parks
- Water
- Major Roads
- Local Roads
- Road to be Studied

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING NON-MOTORIZED FACILITIES



There are approximately 1.5 miles of signed bike routes, 40 miles of sidewalks along primary roads, and 2 miles of existing unpaved trails in the City.

Although there are some existing bicycle and pedestrian facilities, they are not all connected and do not provide a complete network.

Existing Non-motorized Facilities

- Sidewalks along Primary Roads
- Unpaved Trails
- Signed Bike Route

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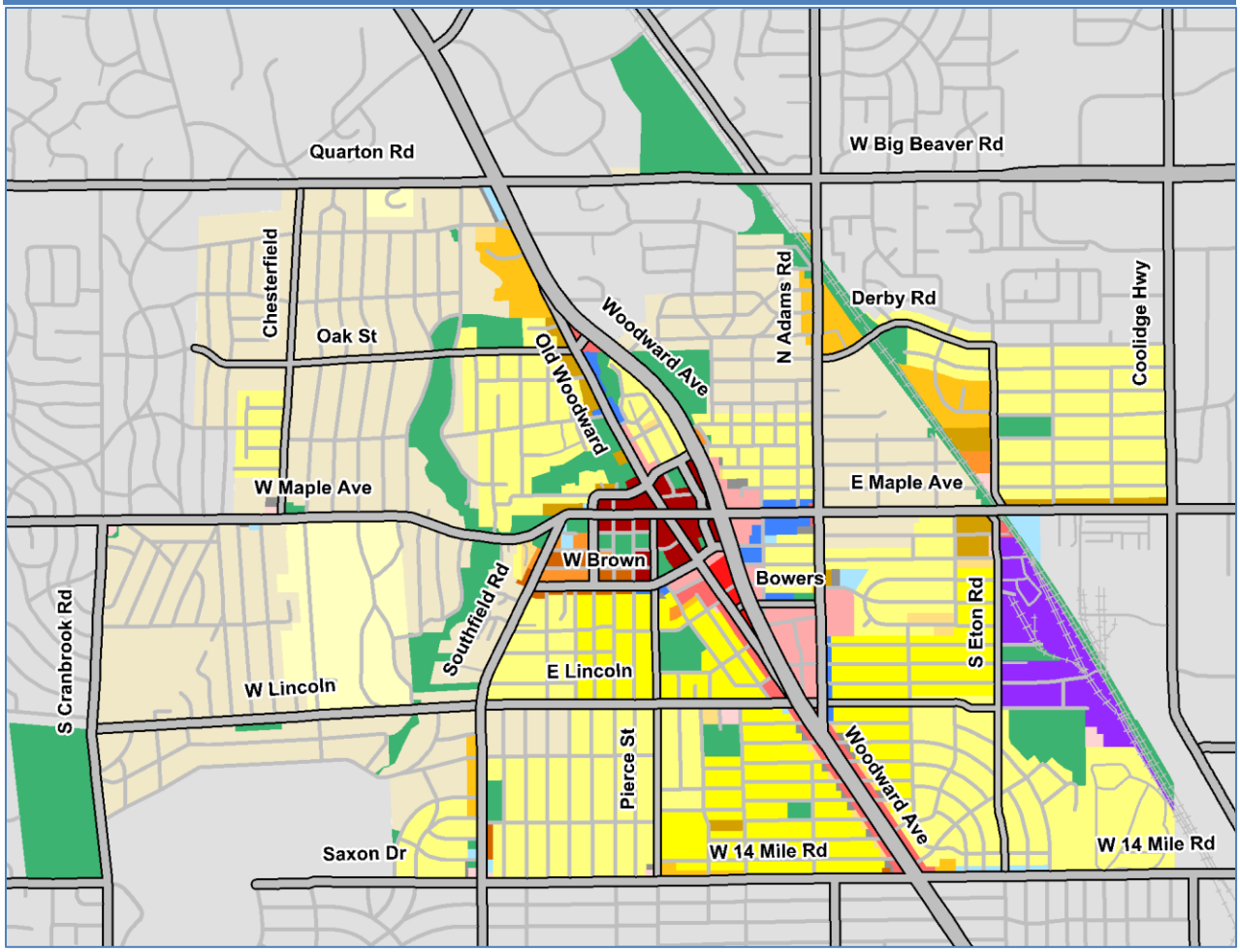
CITY ZONING



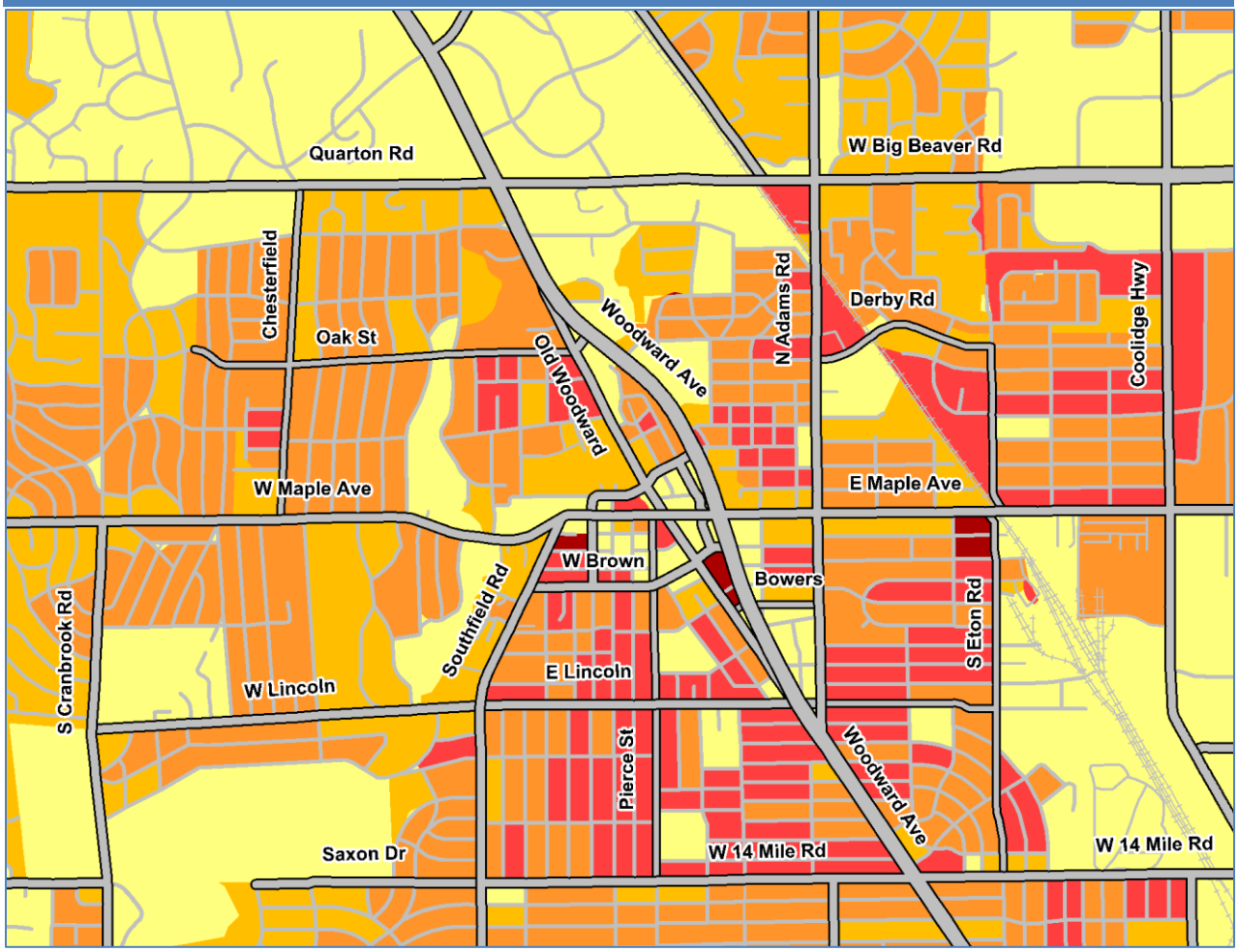
Birmingham is a vibrant community with a unique mix of residential and commercial areas. Different types of non-motorized facilities are appropriate for different types of landscapes.

Zoning Districts

- 0-1 Office
- 0-2 Office Commercial
- B-1 Neighborhood Business
- B-2 General Business
- B-2B General Business
- B-3 Office-Residential
- B-4 Business-Residential
- MX Mixed Use
- P Parking
- PP Public Property
- R1 Single-Family Residential
- R1-A Single-Family Residential
- R2 Single-Family Residential
- R3 Single-Family Residential
- R4 Two-Family Residential
- R5 Multiple-Family Residential
- R6 Muliple-Family Residential
- R7 Multiple-Family Residential
- R8 Multiple-Family Residential

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POPULATION DENSITY



As of the 2010 census, the City of Birmingham population was 20,103. Around 30% of the households have children under the age of 18 and about 27% of households have someone between the age of 25 and 44.

U.S. Census Bureau. 2012. American Fact Finder.
http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

Population Density
(persons per acre)

- 20 and over
- 15 to 20
- 10 to 15
- 5 to 10
- 0 to 5

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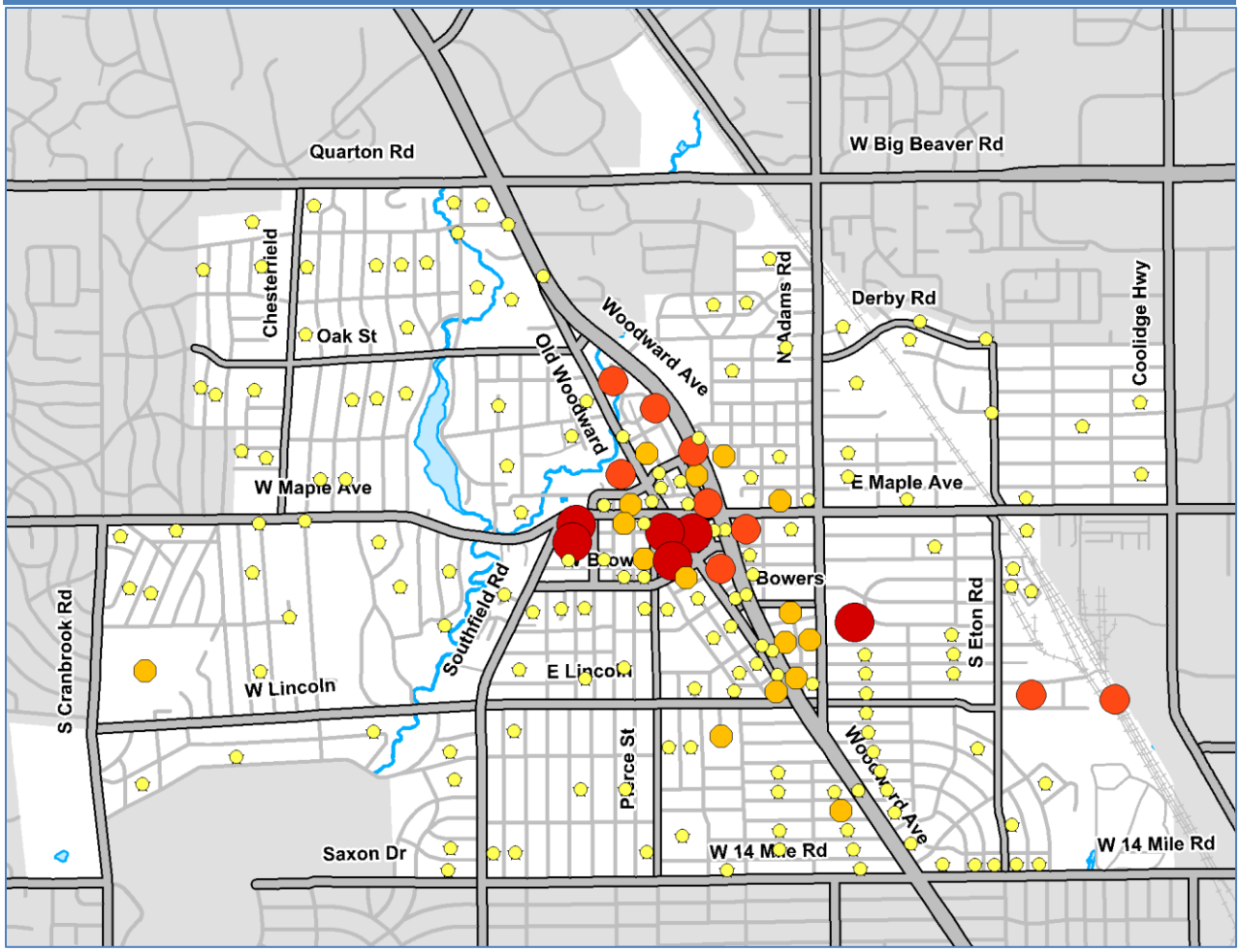
EMPLOYMENT CENTERS



Most of the large employment centers are located in the downtown, with a few in the railroad district.

This data was reported using 2010 Census Blocks from OnTheMap.

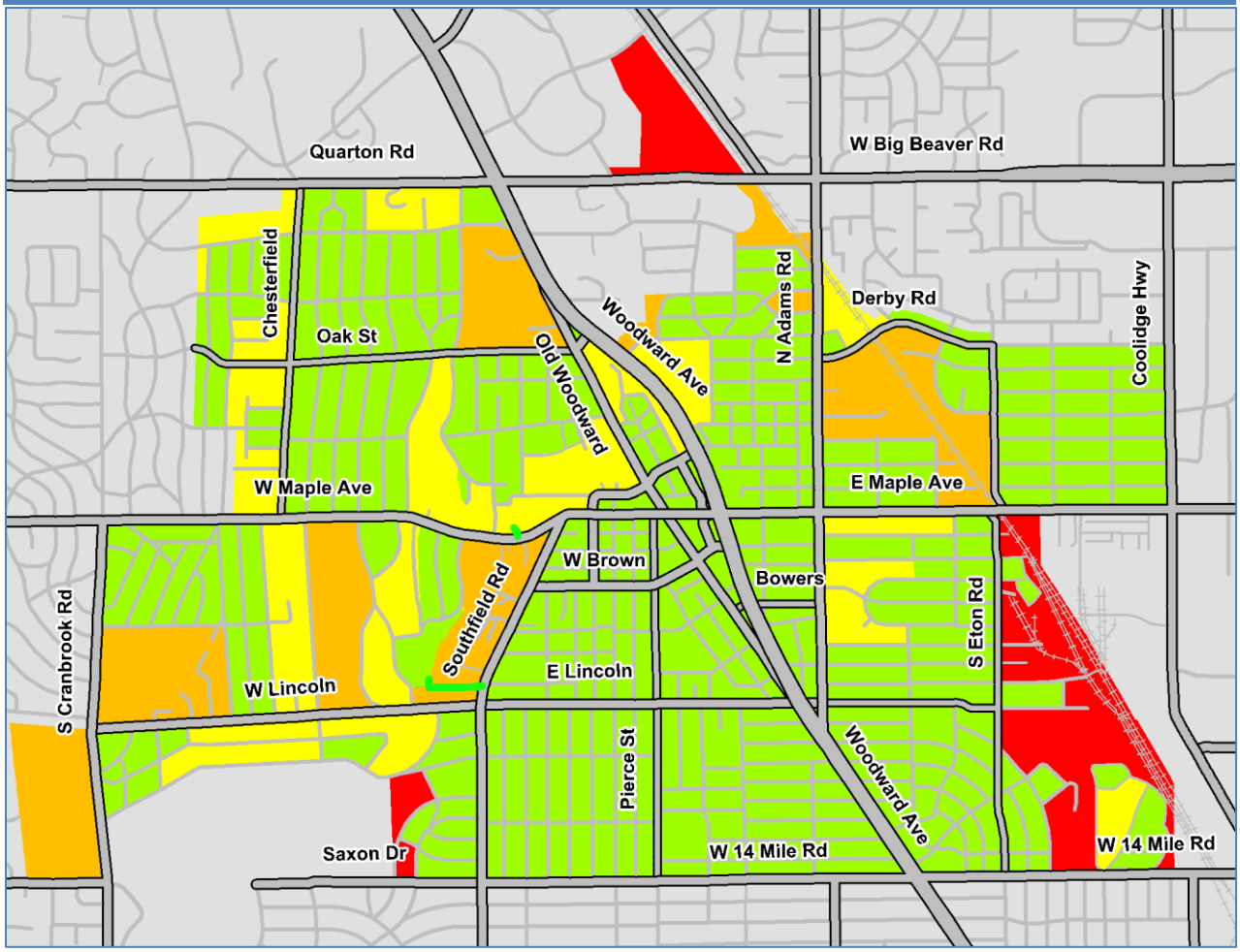
U.S. Census Bureau. 2012. OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/

Jobs

- 400 and over
- 200 to 400
- 100 to 200
- 0 to 100

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

BLOCK SIZE ANALYSIS



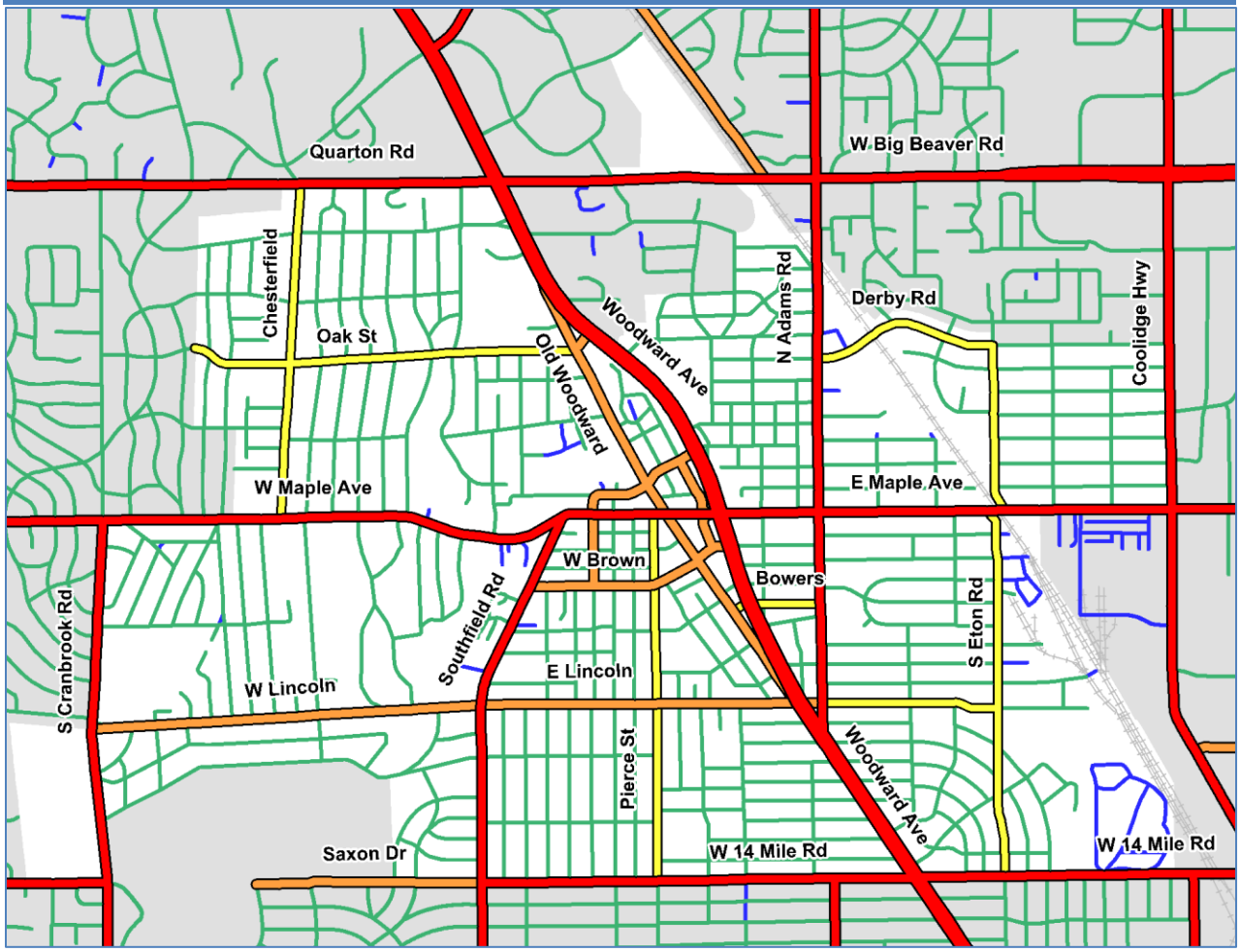
Block size is an excellent measurement of directness of travel and a key indicator in the level of pedestrian activity. A block is defined as an area that a person cannot pass through. These areas usually do not have any sidewalks, roadways or bike paths allowing access between two points. One example is an expressway where you may have to go a mile or more out of your way just to get to the other side.

Block Size
(in acres)
- Over 10
- 5 to 10
- 2 to 5
- 0 to 2

The majority of the City of Birmingham has blocks under 2 acres in size. This means that the city already has the necessary framework that contributes to a bicycle and pedestrian friendly community. Areas with blocks over 2 acres in size presents a challenging landscape for non-motorized transportation. Connections within isolated areas will be important to improving the directness of travel throughout the community.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

FUNCTIONAL CLASSIFICATION OF ROADWAY



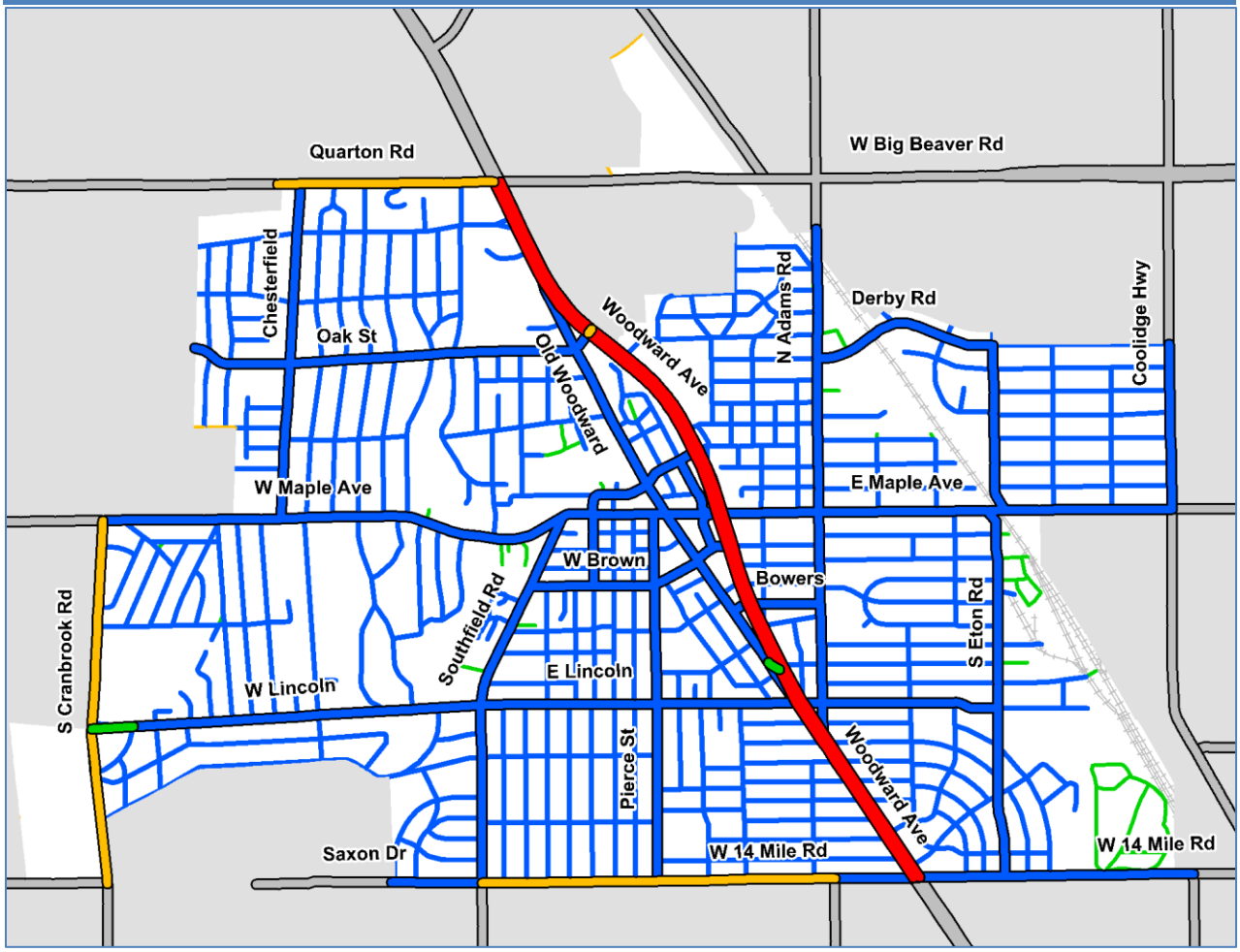
The National Functional Classifications are referenced in AASHTO guidelines and the guidelines in this document. While the National Functional Classification is intended to define a road hierarchy, substantial variation in road characteristics may be found within these classifications. The actual and projected road characteristics should be the determining factor when selecting appropriate sidewalk, buffer and bike lane widths.

Functional Classification of Roadway

- Arterials
- Collectors
- Other Siginificant Roads
- Local Roads
- Private Roads

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

ROADWAY JURISDICTION



A local municipality may not always have jurisdiction over all of the roads within its borders. Roads can be owned by the State, County and City and through Private Ownership.

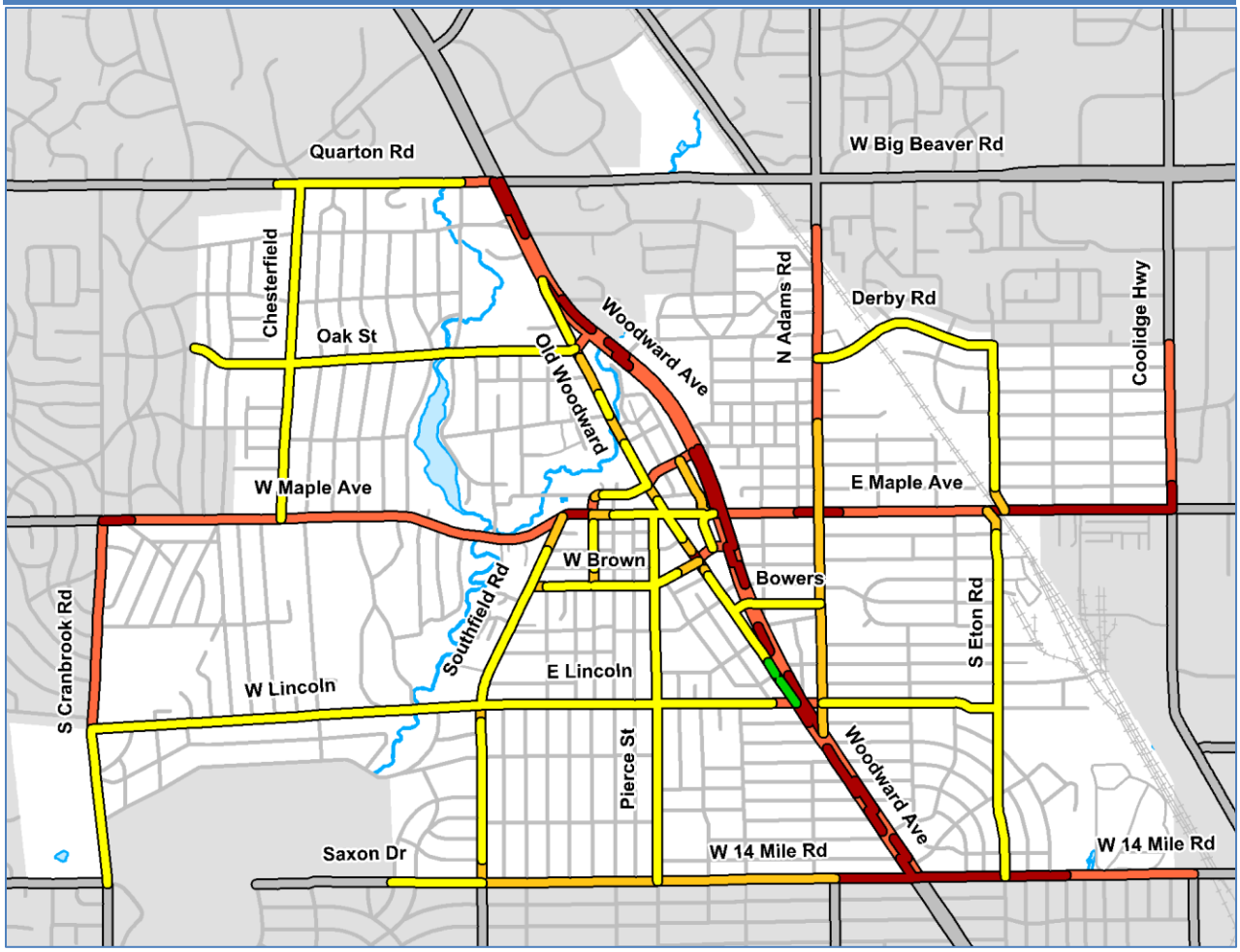
Road Jurisdiction

- MDOT
- Oakland County Road Commission
- City of Birmingham
- Private

It is important to identify the ownership of all roads especially if bike lanes or routes are going to be proposed along a roadway. Any modifications to the roadway must be coordinated with the approved agency that has jurisdiction over the road.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING ROAD CROSS SECTION



The majority of the roads in the area are two lane roads. The widest roads for the most part are major arterials that cut across the city.

Generally, roadways with numerous lanes present challenges when trying to get bicyclists and pedestrians across the roadway, especially where demand between commercial centers and neighborhoods exists on both sides of the road.

Please note that due to the divided nature of Woodward Avenue, the number of lanes in each direction is displayed on this map. This means that in some areas if a pedestrian wanted to cross Woodward Avenue they would have to cross 5 lanes in each direction, totaling 10 lanes of traffic.

Number of Lanes:

- 1 Lane
- 2 Lanes
- 3 Lanes
- 4 Lanes
- 5 Lanes

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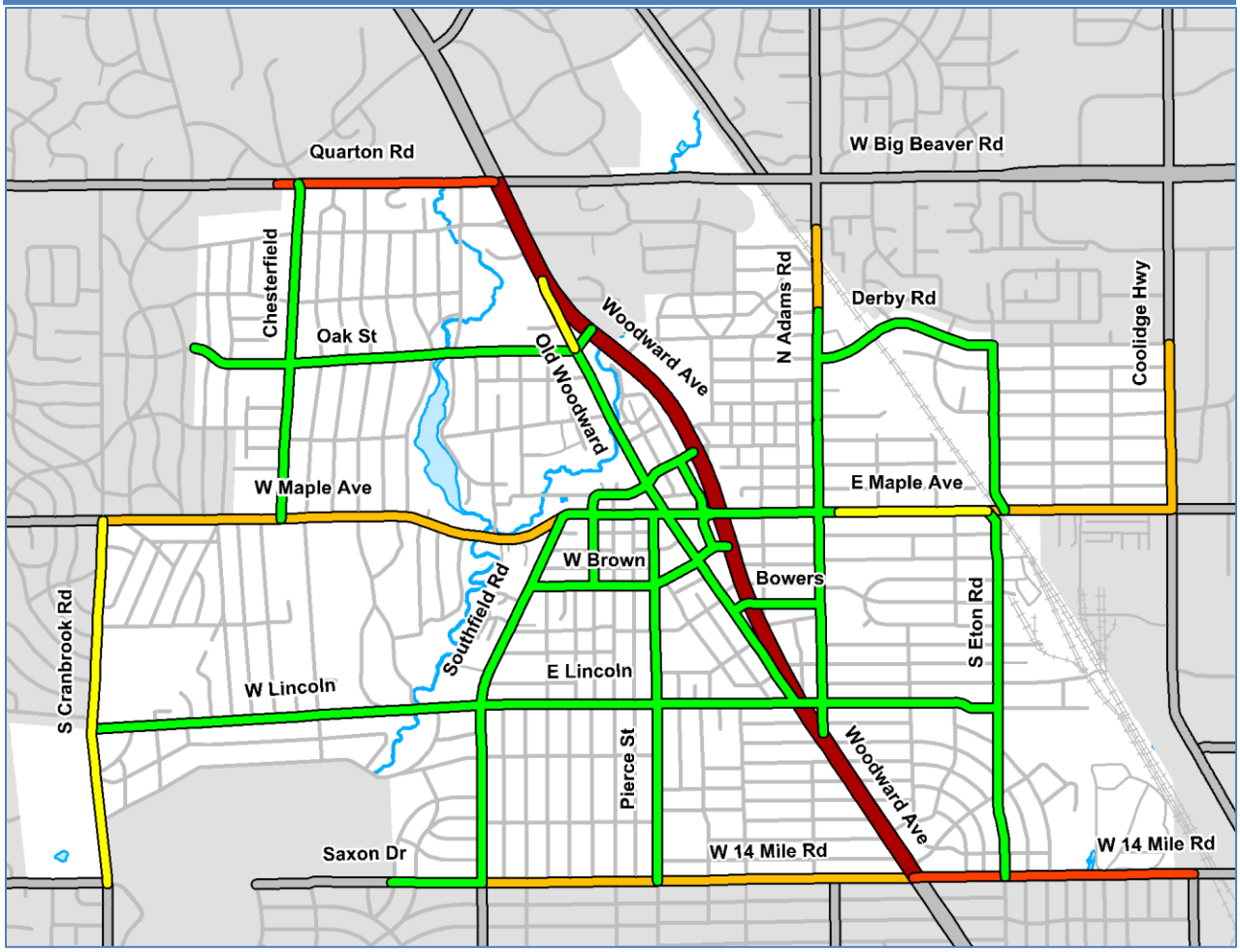
POSTED SPEED LIMIT



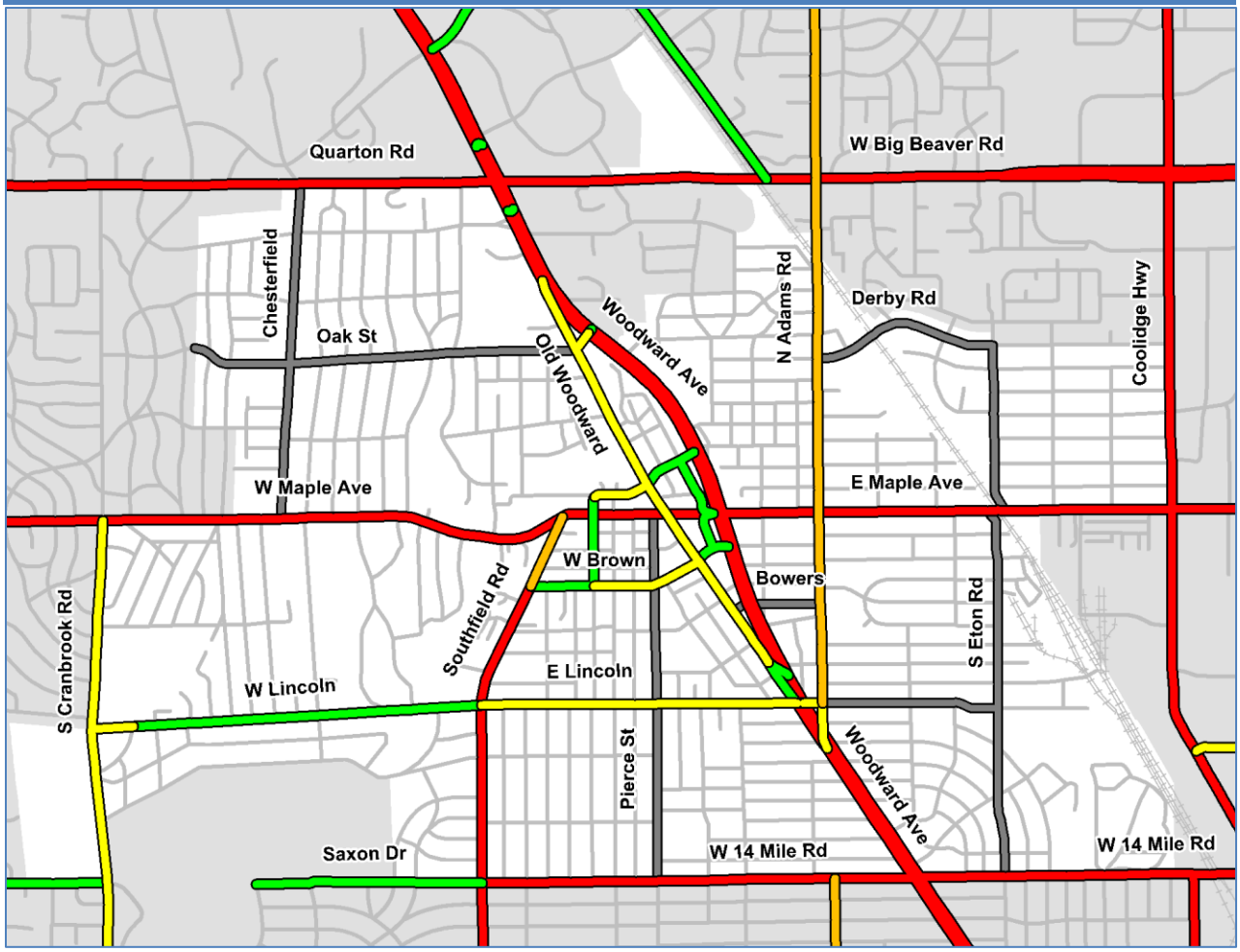
Roadways with high speeds can reduce the comfort level for bicycles and pedestrians traveling along a road corridor, and may even discourage bicycle and pedestrian use all together. Please note that on some roads actual running speeds may be higher.

Posted Speed Limit:

- 25 mph
- 30 mph
- 35 mph
- 40 mph
- 50 mph

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

AVERAGE DAILY TRAFFIC VOLUMES



Annual Average Daily Traffic (AADT) is an estimate of traffic volumes. The volumes are based on total two-way traffic over a 24-hour period and may vary by season or day of the week. The volumes are determined from a combination of actual traffic counts and modeling.

The gradations used generally reflect noticeable changes in the comfort level of bicyclists sharing a roadway with motorists, all other factors being equal.

Vehicle Traffic Volume 2011
(Vehicles per day)

- Heavy (over 15,000)
- Medium (10,000 to 15,000)
- Moderate (5,000 to 10,000)
- Light (0 to 5,000)
- No Data

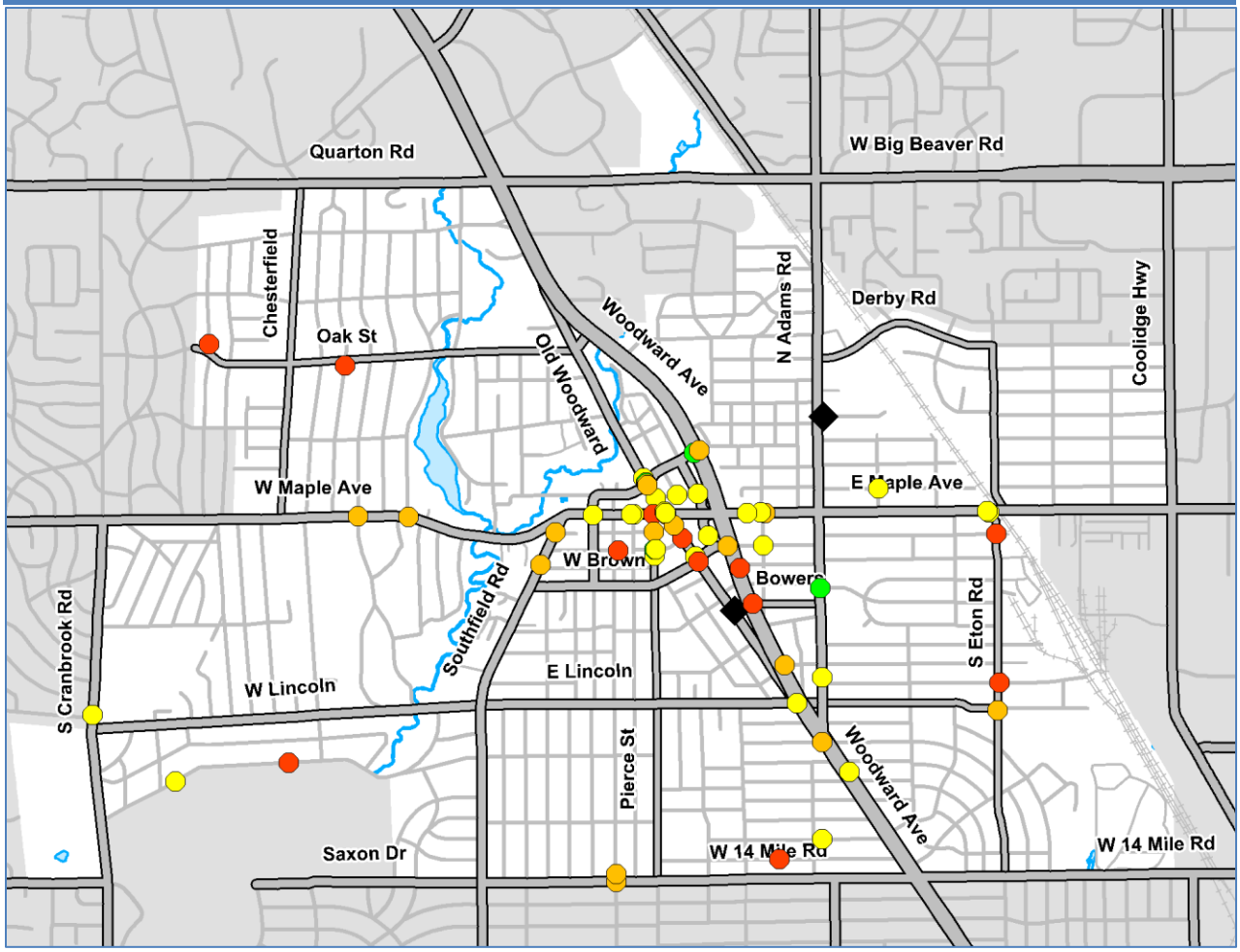
PEDESTRIAN CONDITIONS:

The City of Birmingham has a nearly complete sidewalk system along the major roadways. There are however, still significant gaps along roadways in some of the neighborhoods. The quality of the pedestrian experience on these sidewalks varies greatly throughout the City. Some sidewalks have little if any buffer such as a row of trees or parked cars, between the sidewalk and the roadway. This lack of a barrier has been shown to have a significant adverse impact on the quality of the walking experience.

Another major issue lies with cross-roadway accommodations. There are significant stretches of the major thoroughfares that provide no means to cross the roadway safely. There are also places where logical crossings are not accommodated. Even where there are marked crosswalks, they are often inadequate. Many times the existing crossings are missing key safety features, making them difficult to cross, especially on high speed multi-lane roadways.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

PEDESTRIAN CRASH LOCATIONS



There were 67 pedestrian crashes during the 8 year period (2004 – 2011) for the City of Birmingham.

During this period there were 2 fatalities and 13 crashes that resulted in serious injuries. Both fatalities took place under very unusual circumstances for which there are no countermeasures available.

The Michigan Traffic Crash Facts website was the source of the data and charts.

Michigan Traffic Crash Facts. 2012. MTCF Data Query Tool. http://www.michigantrafficcrashfacts.org/datatool/build

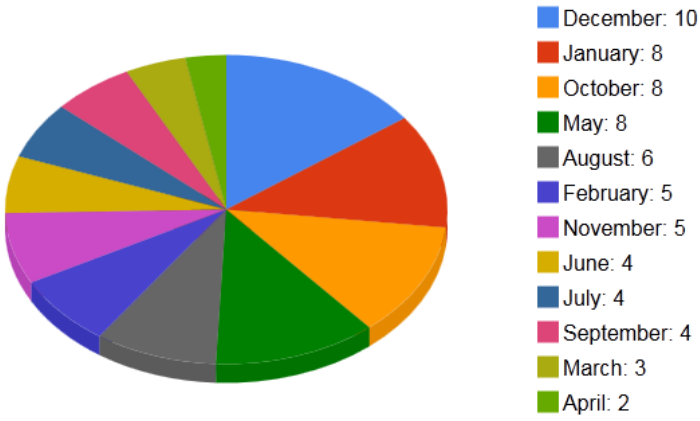
Pedestrian Crashes
(worst injury in accident)

- Fatal
- A - Incapacitating Injury
- B - Nonincapacitating Injury
- C - Possible Injury
- No Injurty

PEDESTRIAN CRASH DATA

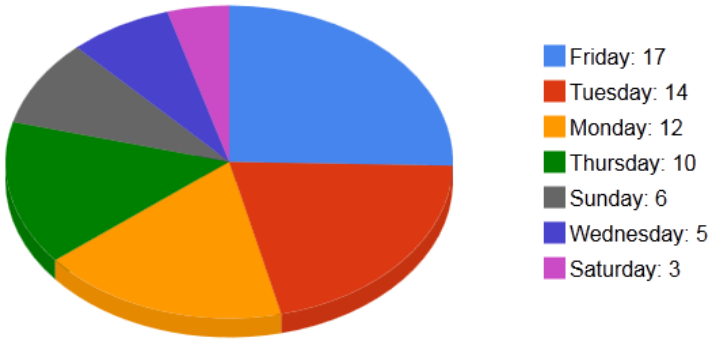
MONTH OF CRASH

The winter months had the highest number of crashes.



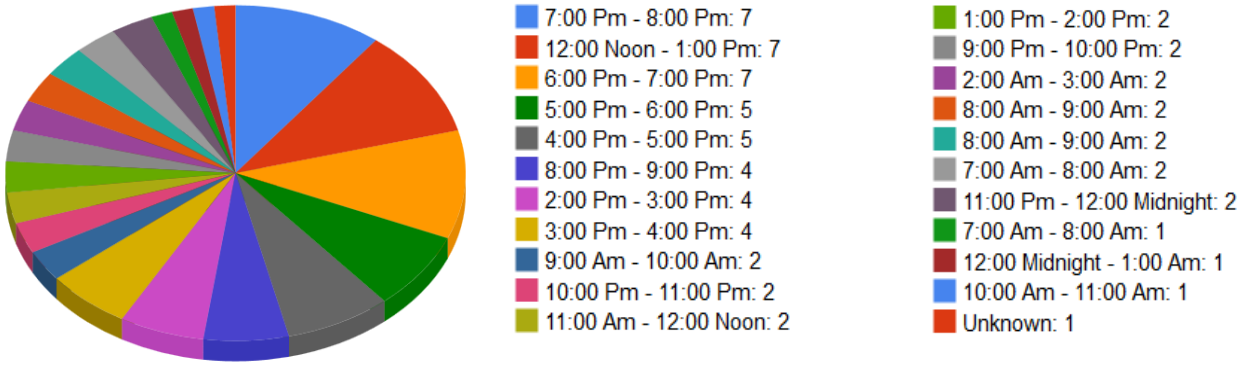
DAY OF WEEK

Crashes took place on every day of the week with the most occurring on a Friday.



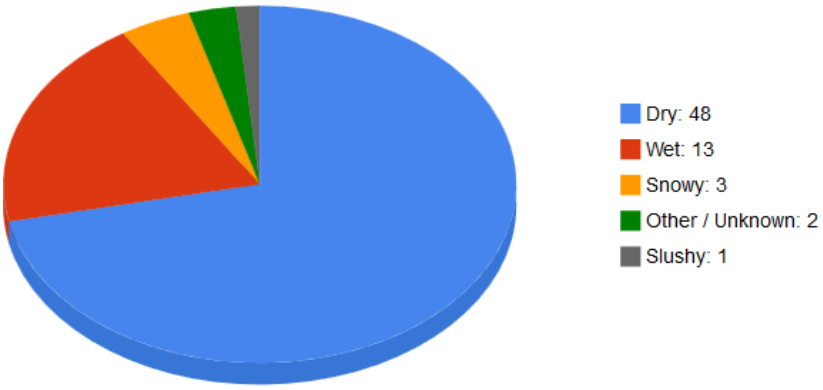
TIME OF DAY

Crashes took place all hours of the day. 66% of the crashes took place during daylight, 4% took place during dusk, and 29% took place in the dark (1% were not coded).



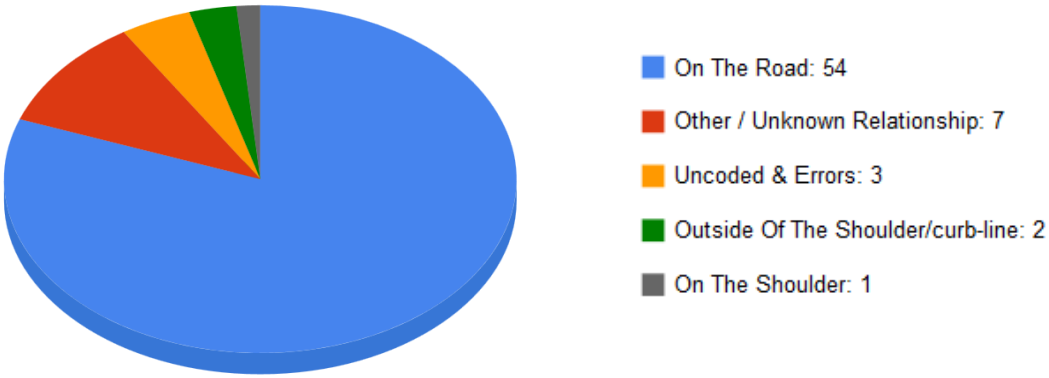
ROAD CONDITIONS

Wet, snowy or icy roads were a factor in 10% of the crashes.



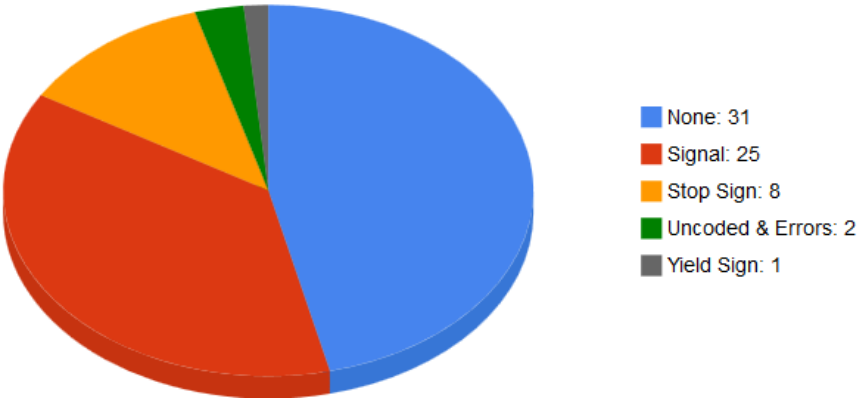
RELATION TO ROADWAY

80% of the crashes took place on the roadway.



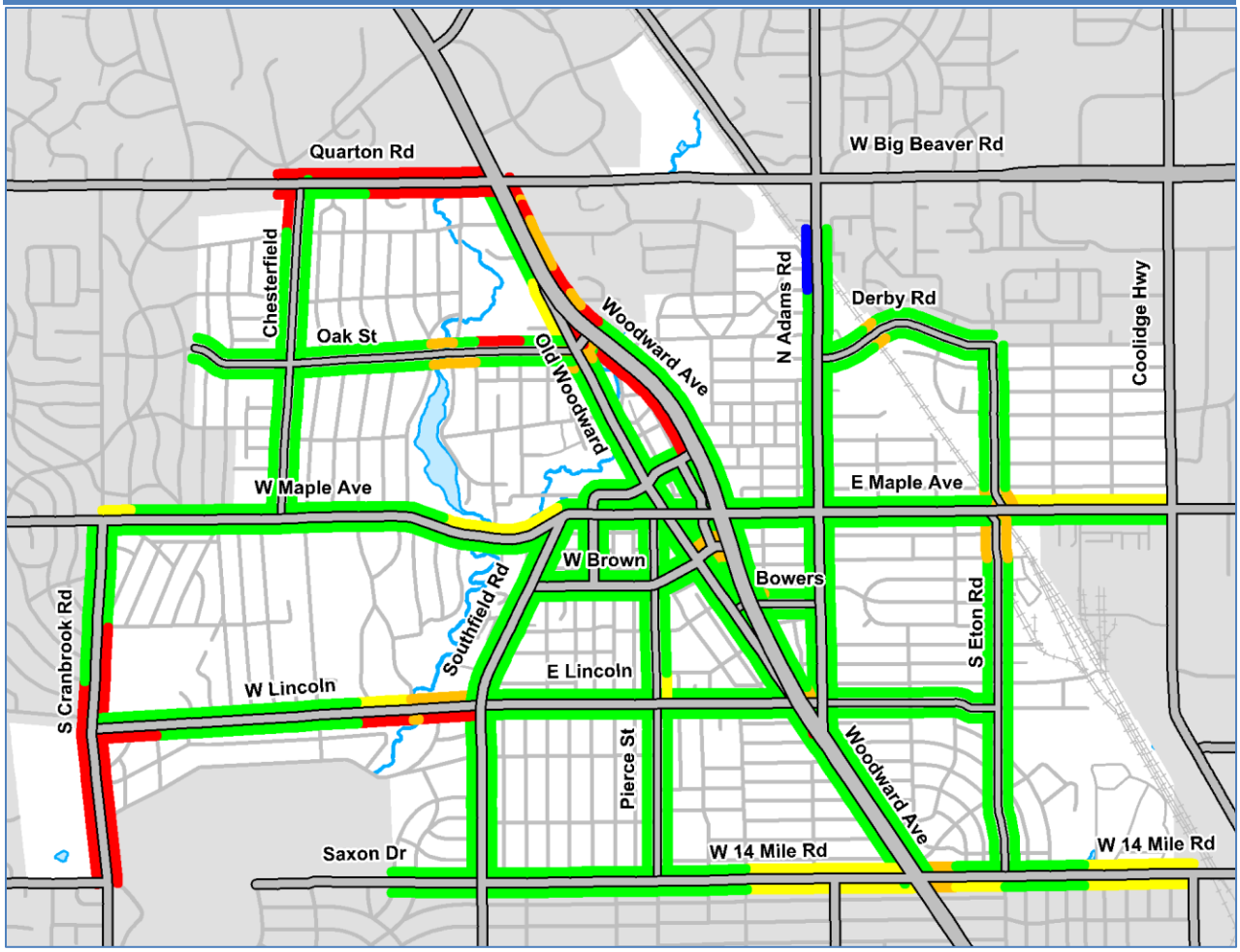
TRAFFIC CONTROL

37% of the crashes occurred where a signal was present, 11% occurred where a stop sign was present and 1% occurred where a yield sign was present



CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING SIDEWALK LEVEL OF SERVICE



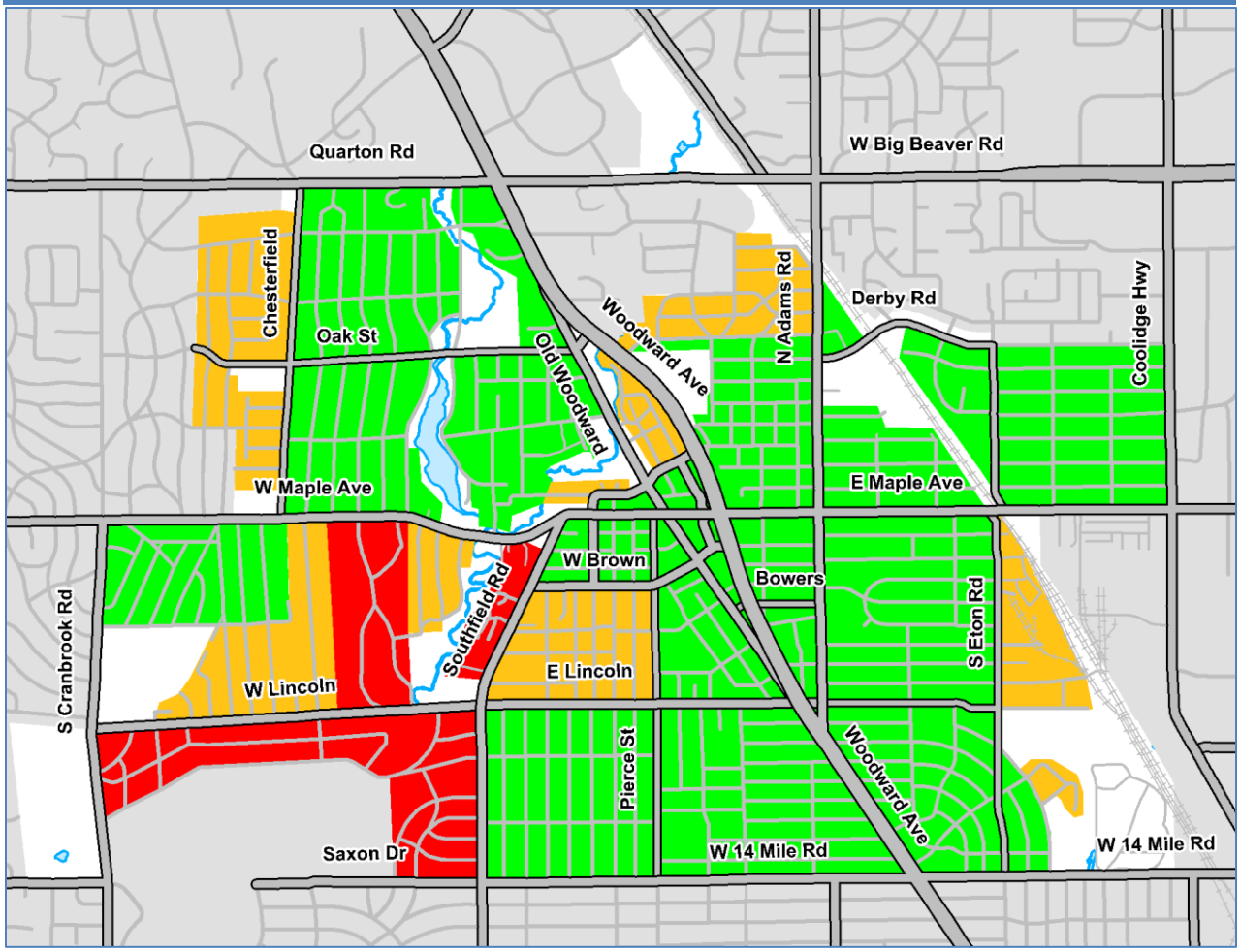
There are approximately 40 miles of existing sidewalks in the City of Birmingham. The degree of separation from the roadway is a key factor in a pedestrian's comfort on a sidewalk. Buffer (lawn extensions) and vertical elements such as trees and parked cars increase the pedestrians comfort level.

Sidewalk Rating

- A - Facility with Vertical Buffer
- B - Facility with Buffer
- C - Facility along Curb
- D - No Facility/Passable
- E - No Facility/Not Passable

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

NEIGHBORHOOD SIDEWALK COVERAGE



Most of the neighborhoods in the City of Birmingham have a complete sidewalk system. A few neighborhoods to the southwest have no sidewalks.

Neighborhood Sidewalks

- Complete
- Partially Complete
- Incomplete

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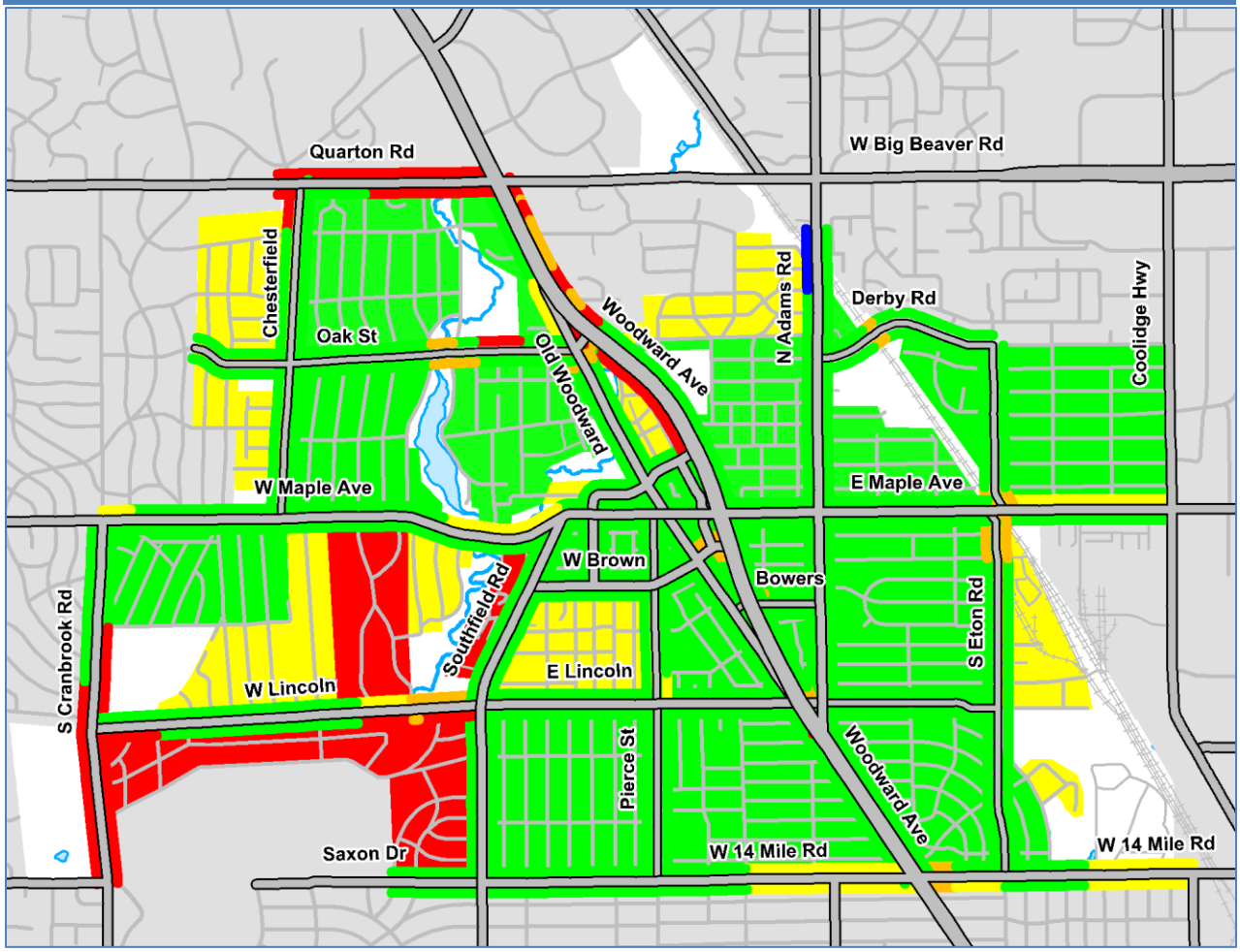
SIDEWALK CONNECTIVITY



This map gives an overview of the pedestrian mobility around town. In some cases, there may be sidewalks within a neighborhood but there are gaps in the primary road system inhibiting a pedestrian ability to travel to destinations outside of their neighborhood.

Sidewalk Rating

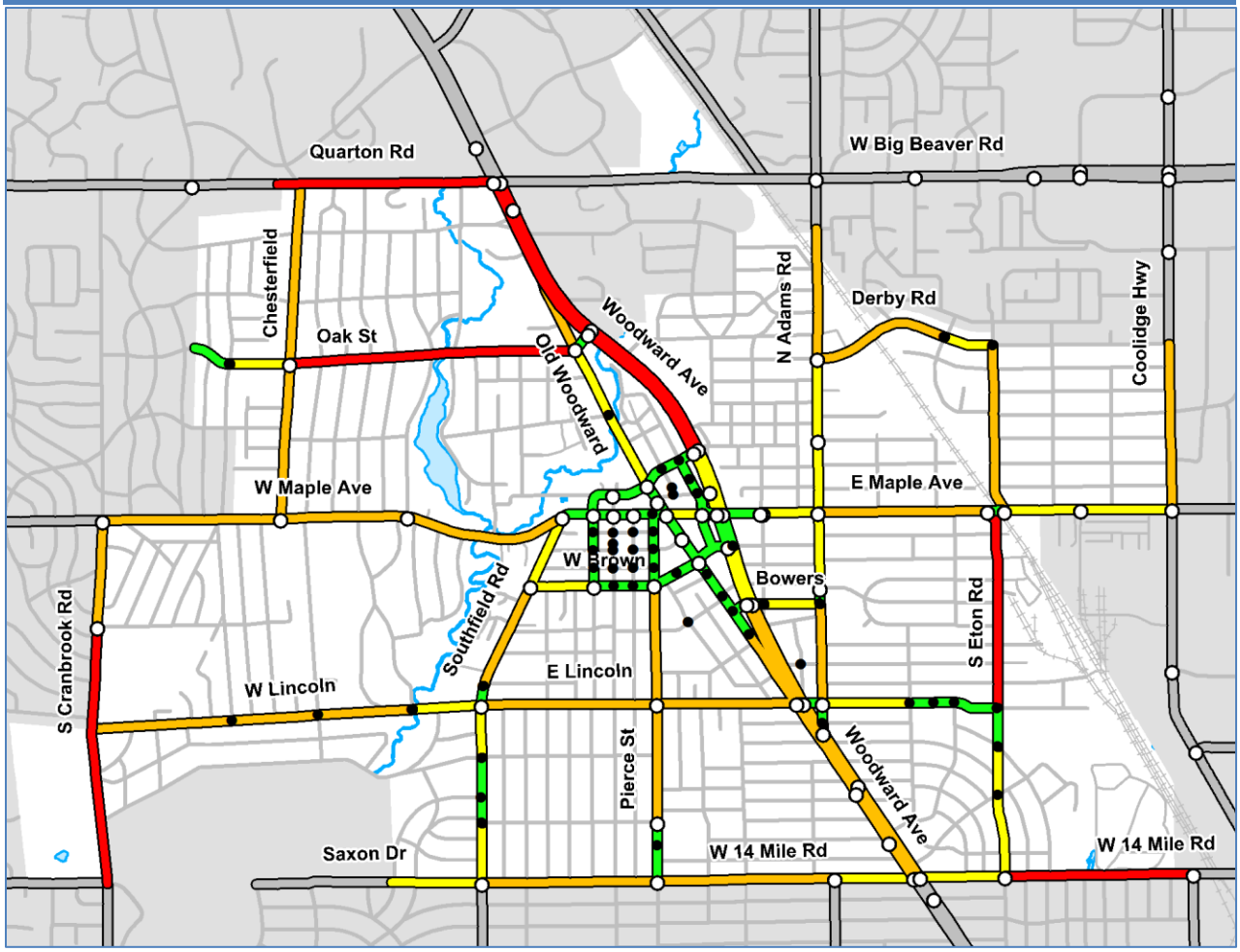
- A - Facility with Buffer (e.g. trees, parked cars)
- B - Facility with Buffer (e.g. lawn extension)
- C - Facility along curb
- D - No Facility/Passable
- E - No Facility/Not Passable

Neighborhood Sidewalks

- Complete
- Partially Complete
- Incomplete

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

CROSSWALK SPACING



Crosswalk spacing is a key factor in directness of travel. Most pedestrian trips for personal business (like walking to the store) are about ½ mile long. Where there is demand to cross the road and crosswalk spacing is over 1/8 of a mile apart, midblock crossings are likely to occur.

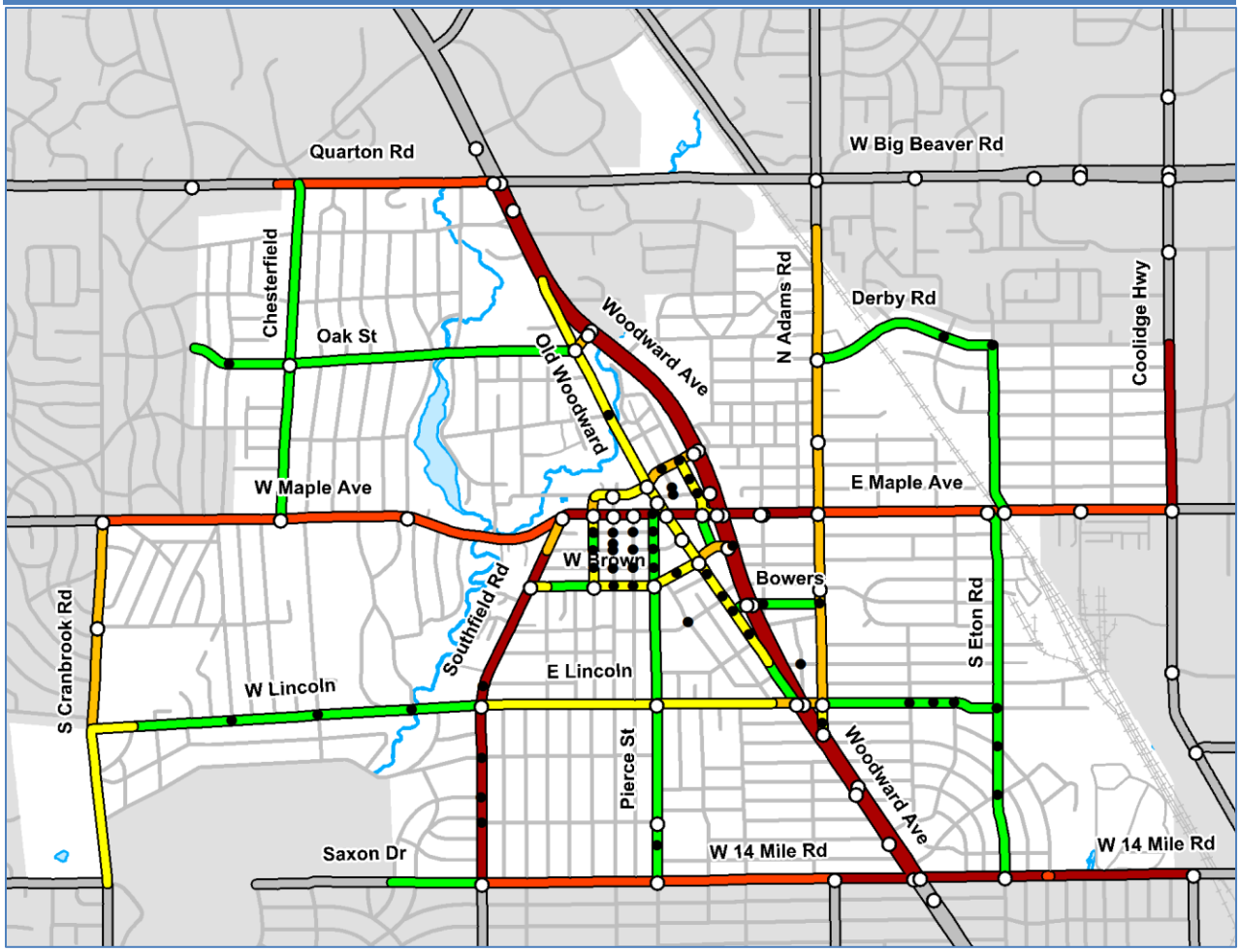
It is important to note that although there may be an existing pedestrian crossing or signalized intersection, they do not always provide an easy and safe way to get across the street. Many times additional improvements are need at those locations to make them accessible to everyone.

Crosswalk Spacing
(distance between marked crosswalks)

- Over 1/2 Mile
- 1/4 to 1/2 Mile
- 1/8 to 1/4 Mile
- 0 to 1/8 Mile
- Signalized Intersection
- Unsignalized Road Crossing

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

ROAD CROSSING DIFFICULTY



Road crossing difficulty is a measurement of how difficult a person would typically find it to cross a road at an unmarked crosswalk. It is based on the number lanes, speed and average daily traffic. Overall, it is generally difficult to cross many of the primary roads in the city with ADT being the most restrictive factor.

Please refer to the chart below to see how ratings were established.

Rating	Lanes	Posted Speed	ADT
A	2	25	0 - 5,000
B	3	30	5,000 – 10,000
C	4	35	10,000 – 15,000
D	5	40	15,000 – 20,000
E	6+	45+	20,000+

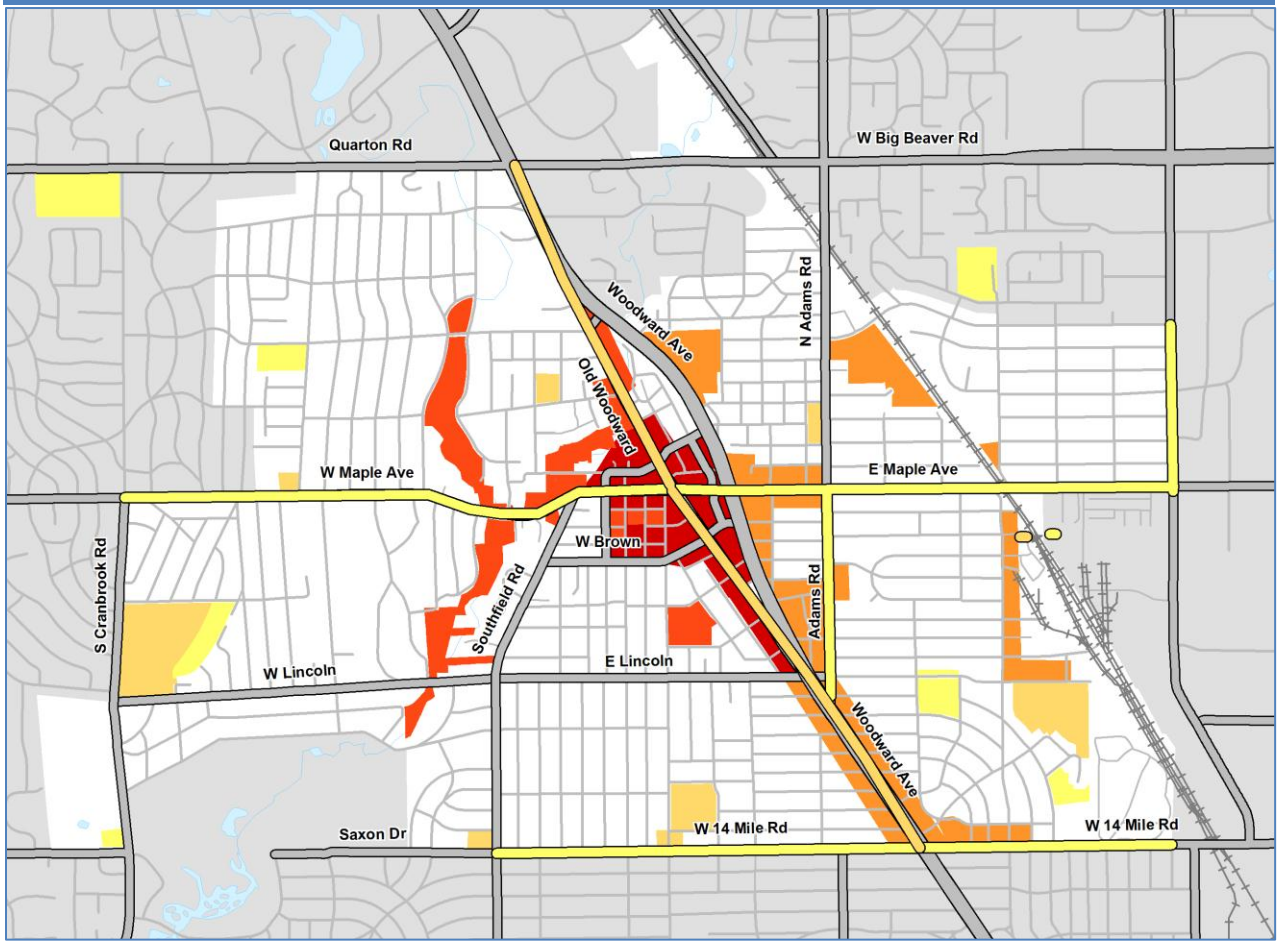
Road Crossing Difficulty
(Speed, No. Lanes & ADT)

- A - Excellent
- B - Good
- C - Fair
- D - Poor
- E - Very Poor
- Signalized Intersection
- Unsignalized Road Crossing

Due to availability of data, the posted speed limit was use. Please note that actual running speeds may be higher.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING PEDESTRIAN ACTIVITY SURVEY



According the web survey, the Downtown generates most of the current pedestrian activity. The Rouge Trails, Barnum Park, Booth Park, Shain Park, Baldwin Public Library, City Hall, the Community House and North Old Woodward District also generate a large amount of pedestrian activity.

Survey Results

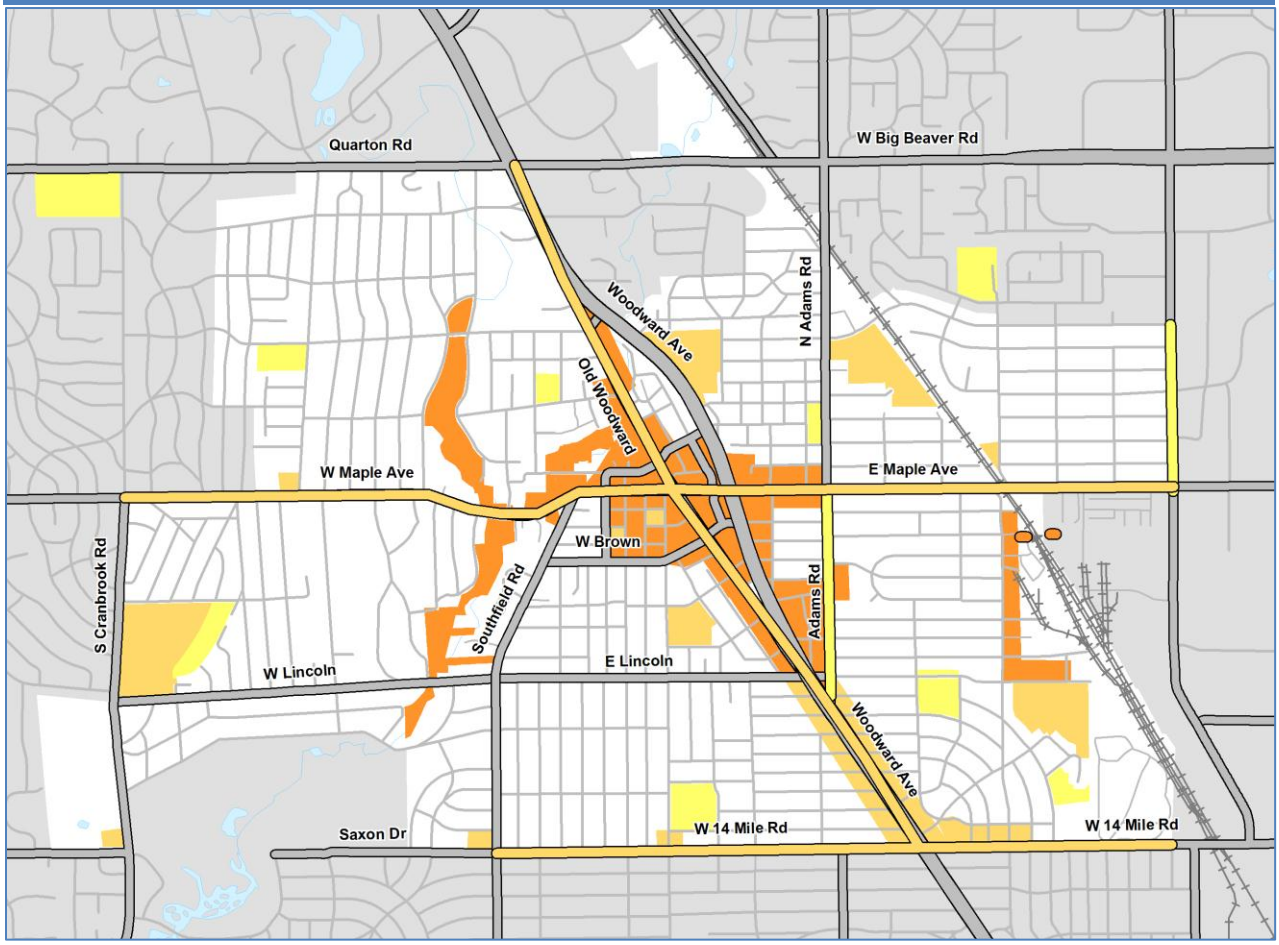
(# of survey participants who currently walk)

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

*colored roadways indicate bus routes and colored dots indicate transit stations

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL PEDESTRIAN ACTIVITY SURVEY



According the web survey, if a complete and safe non-motorized network was established Downtown Birmingham, Future Amtrak Station, Rouge Park Trails, Baldwin Public Library, Rail District, Triangle District, North Old Woodward Commercial Areas and Booth Park would see growth by non-motorized users based on feedback from the online survey.

Areas of high pedestrian activity are listed above. The relative low demand shown on the map may reflect the high number of people already walking.

Survey Results

(# of survey participants who would like to walk

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

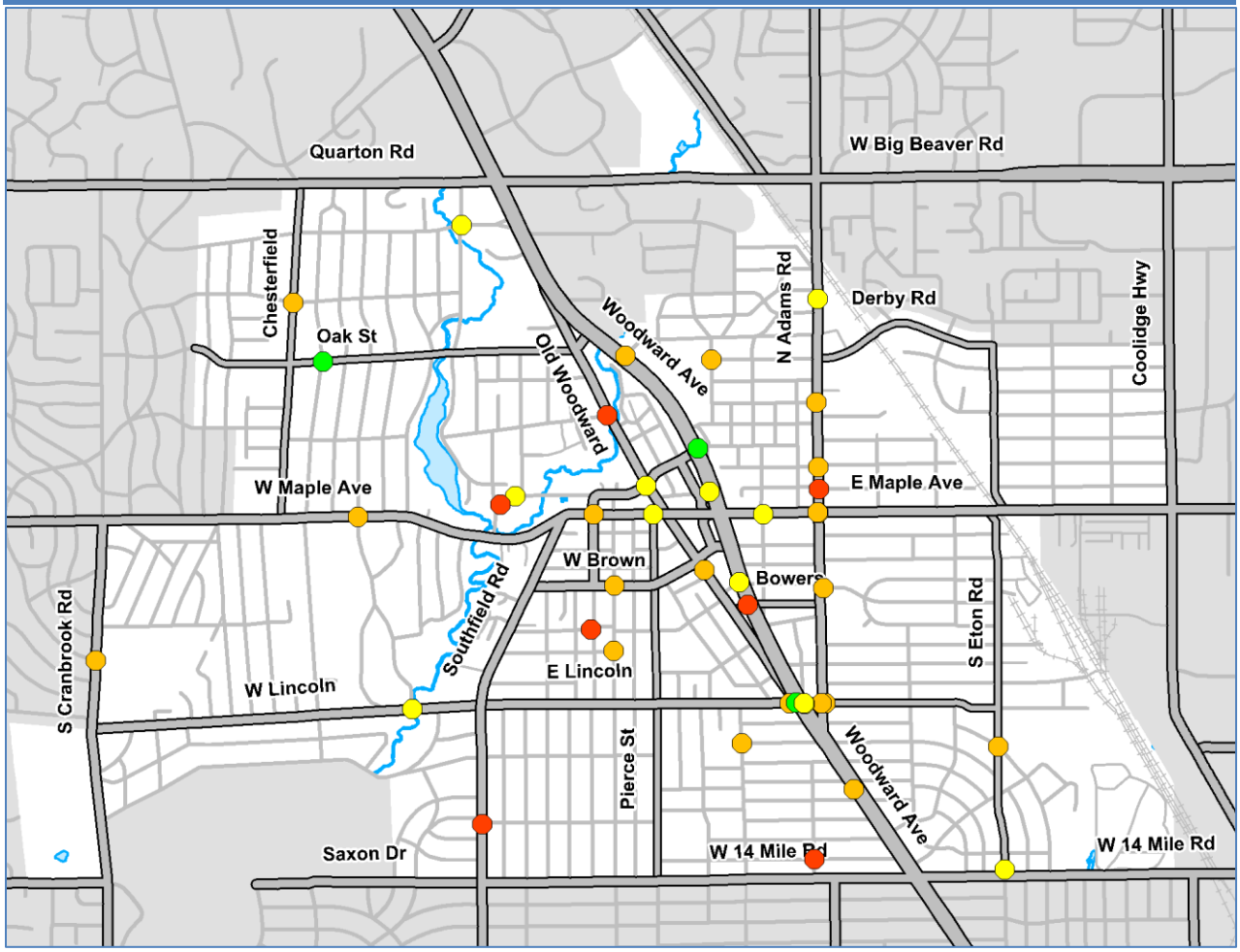
*colored roadways indicate bus routes and colored dots indicate transit stations

BICYCLE CONDITIONS:

The approach to handling bicycles in the City of Birmingham is inconsistent and incomplete. With the exception of the Rouge Park Trails, there are very few opportunities for bicycle travel in the City.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

BICYCLE CRASH LOCATIONS



There were 44 bicycle crashes during the 8 year period (2004 – 2011) for the City of Birmingham. No fatalities were reported and 7 crashes resulted in serious injury.

The Michigan Traffic Crash Facts website was the source of the data and charts.

Michigan Traffic Crash Facts. 2012. MTCF Data Query Tool. http://www.michigantrafficcrashfacts.org/datatool/build

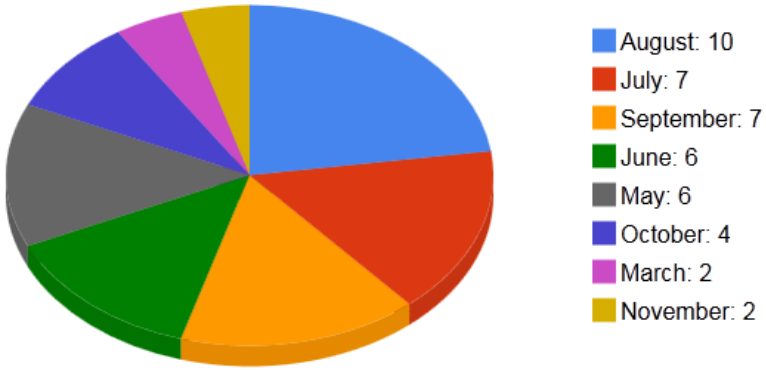
Bicycle Crashes
(worst injury in accident)

- Fatal
- A - Incapacitating Injury
- B - Nonincapacitating Injury
- C - Possible Injury
- No Injurty

BICYCLE CRASH DATA

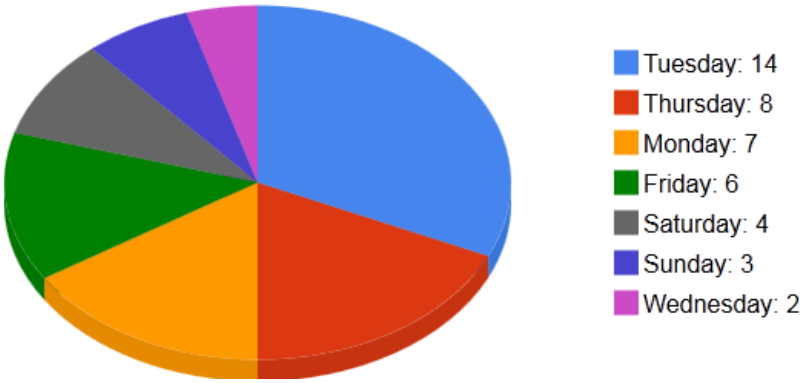
MONTH OF CRASH

The summer months had the highest number of crashes.



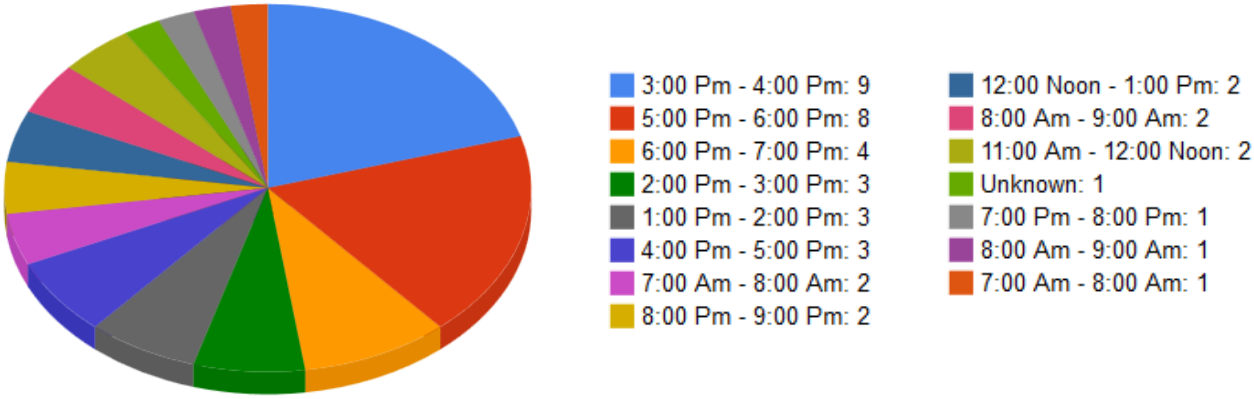
DAY OF WEEK

Crashes occurred every day of the week with the highest number of crashes occurring on Tuesday.



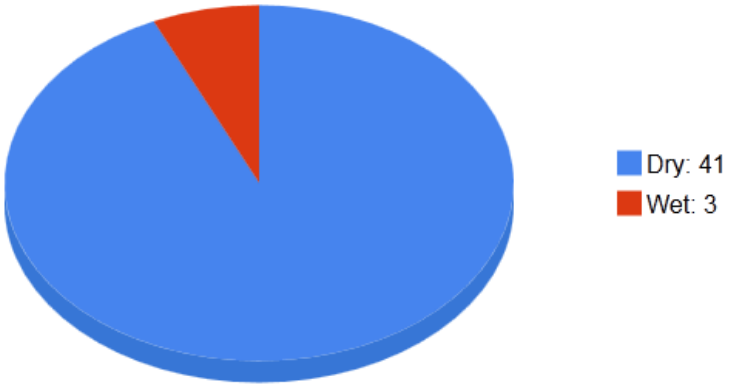
TIME OF DAY

Crashes took place between 7 a.m. and 9 p.m. 93% of the crashes took place in daylight, 2% at dusk and 4% when it was dark.



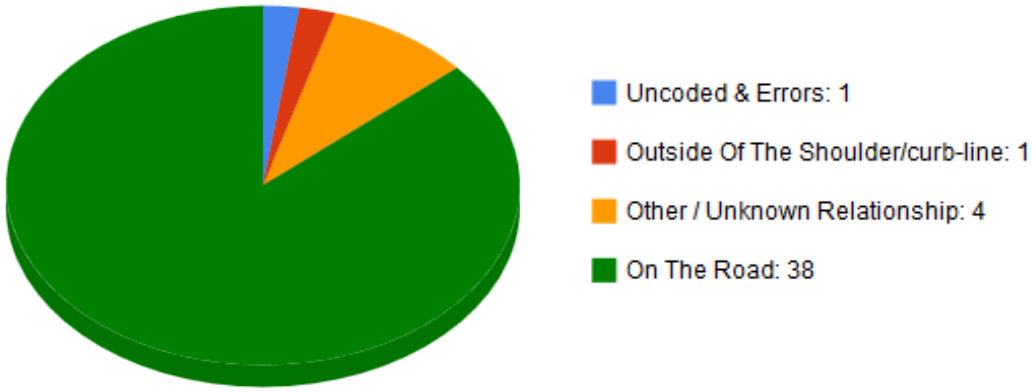
ROAD CONDITIONS

The road was dry for 93% of the crashes.



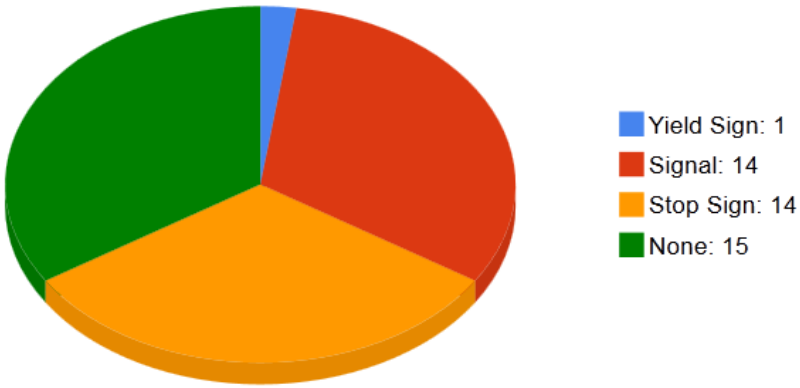
RELATION TO ROADWAY

86% of the crashes took place in the roadway.



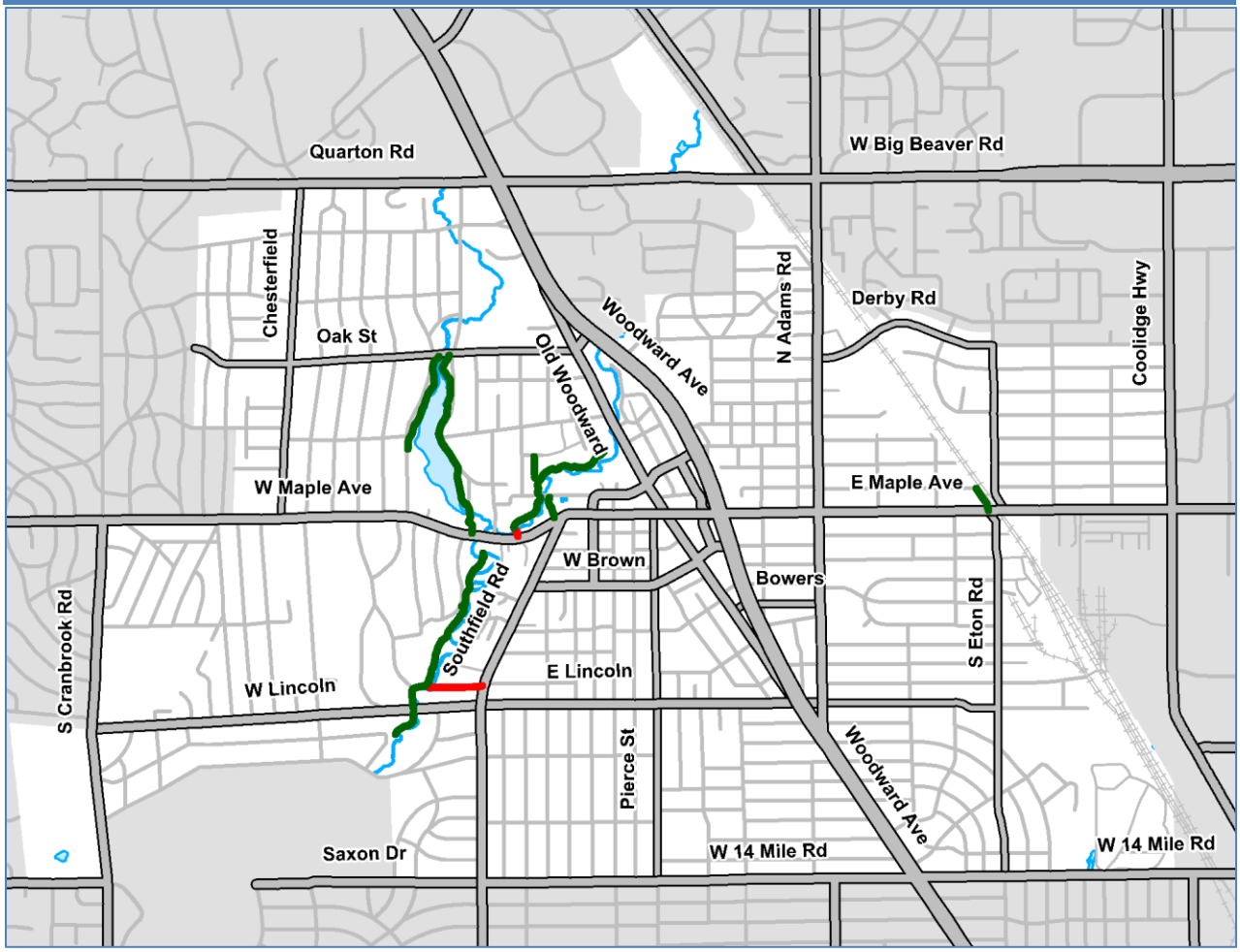
TRAFFIC CONTROL

31% of the crashes occurred where a signal was present, 31% occurred where a stop sign was present and 2% occurred where a yield sign was present.



CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING OFF-ROAD TRAILS AND PATHWAYS



There are approximately 2 miles of existing unpaved trails in the City of Birmingham and 0.2 miles of proposed trails.

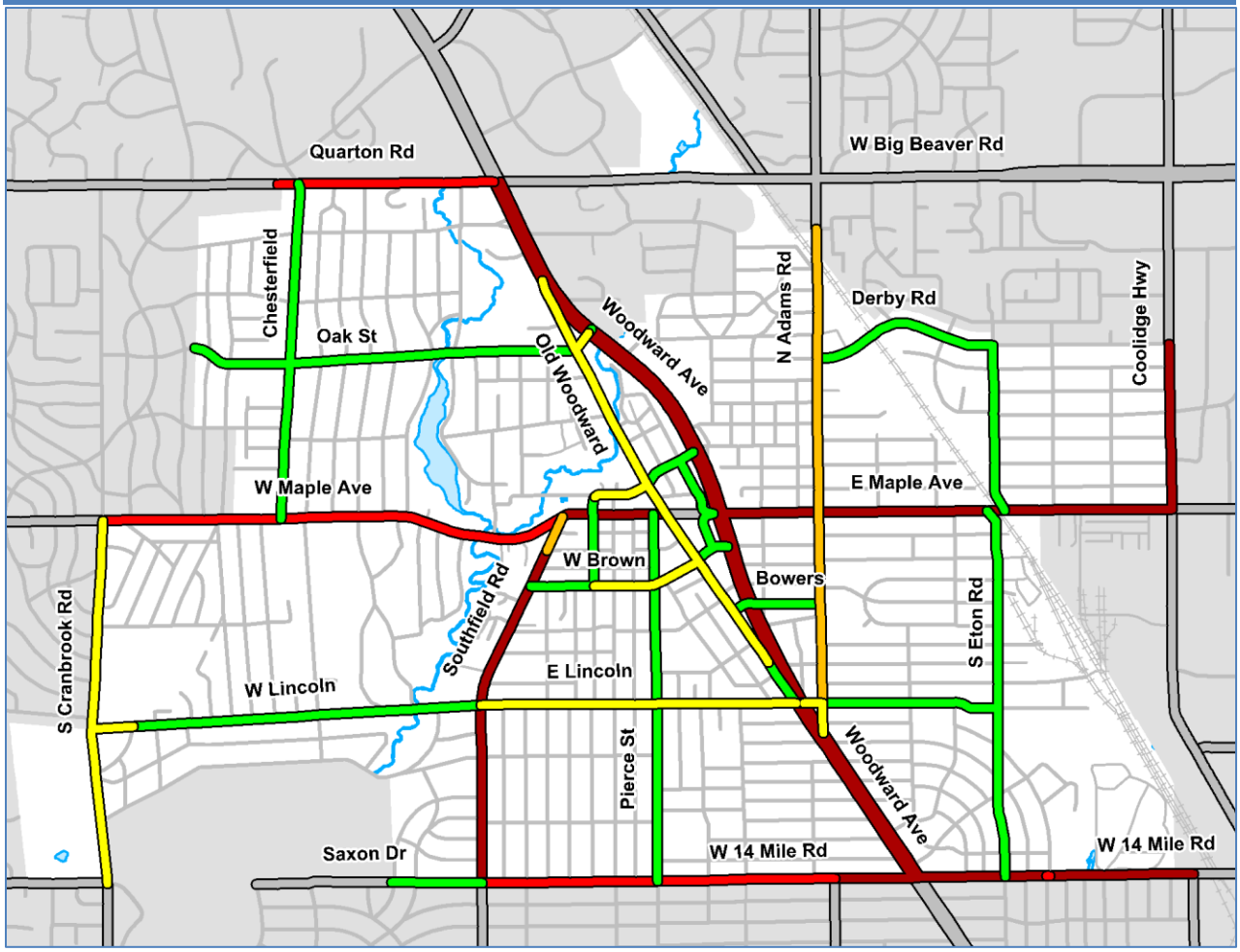
Existing Off-Road Trails and Pathways

- Existing Unpaved Trails
- Proposed Trails

The existing Rouge Park Trails are important because they provide pathways between neighborhoods are help to improve the connectivity of the non-motorized network.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

IN-ROAD BICYCLE QUALITY



In-road bicycle facilities improve the quality of the bicycling experience on busy roads. Quality of the in-road bike facilities is based on speed limit and daily traffic volumes. A road with an existing bike lane has a higher quality; however, there currently are no bicycle lanes in the city.

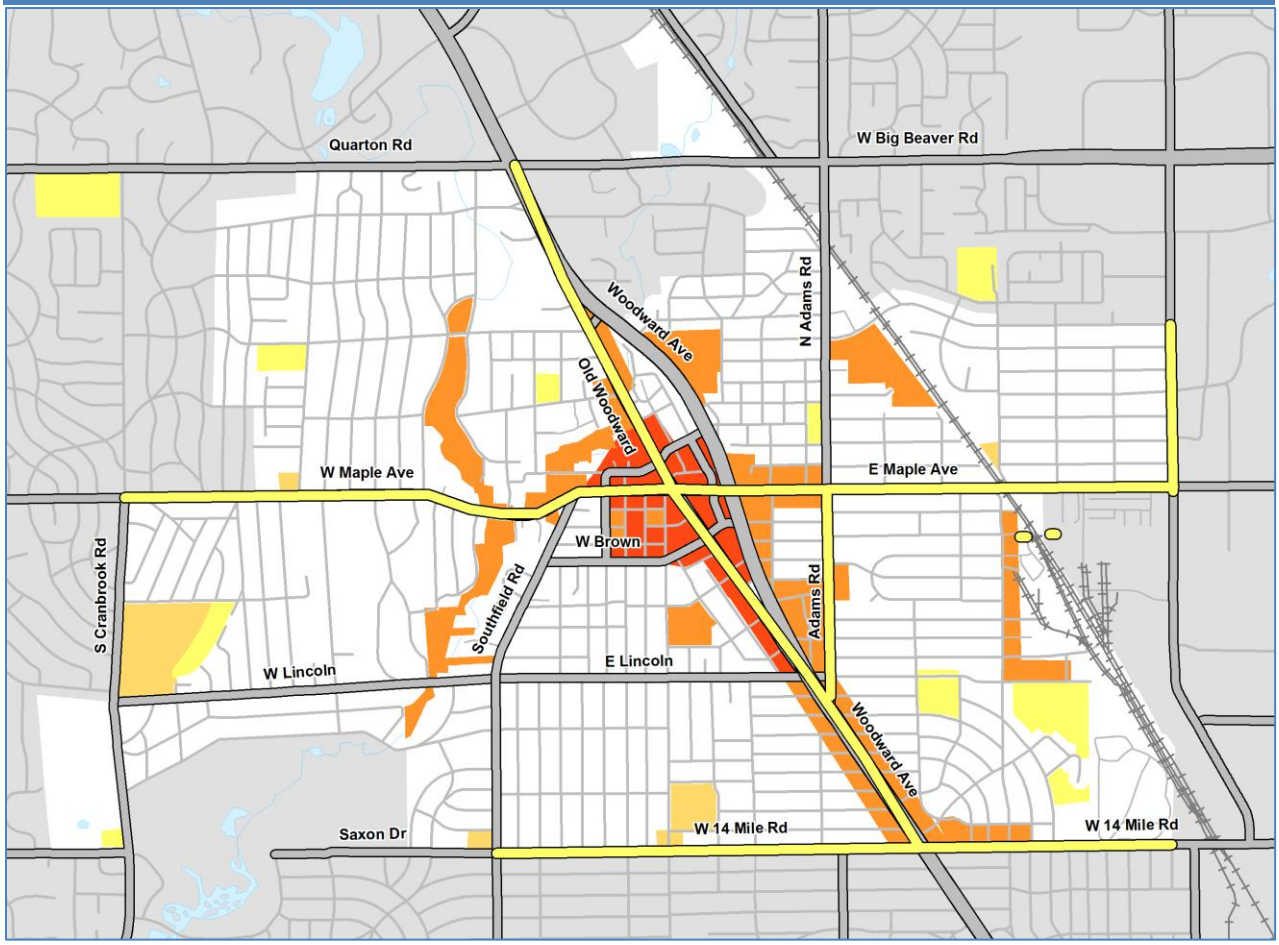
Road Crossing Difficulty
(Posted Speed, No. Lanes & ADT)

Rating (Without Bike Lane)	Rating (With Bike Lane)	Speed	ADT
A	A	25	0 - 5,000
B	A	30	5,000 – 10,000
C	B	35	10,000 – 15,000
D	C	40	15,000 – 20,000
E	C	45	20,000 – 25,000
	D	50+	25,000 +

Due to availability of data, the posted speed limit was use. Please note that actual running speeds may be higher.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING BICYCLE ACTIVITY SURVEY



According the web survey, Downtown Birmingham and Shain Park generate most of the current bicycle activity.

Survey Results

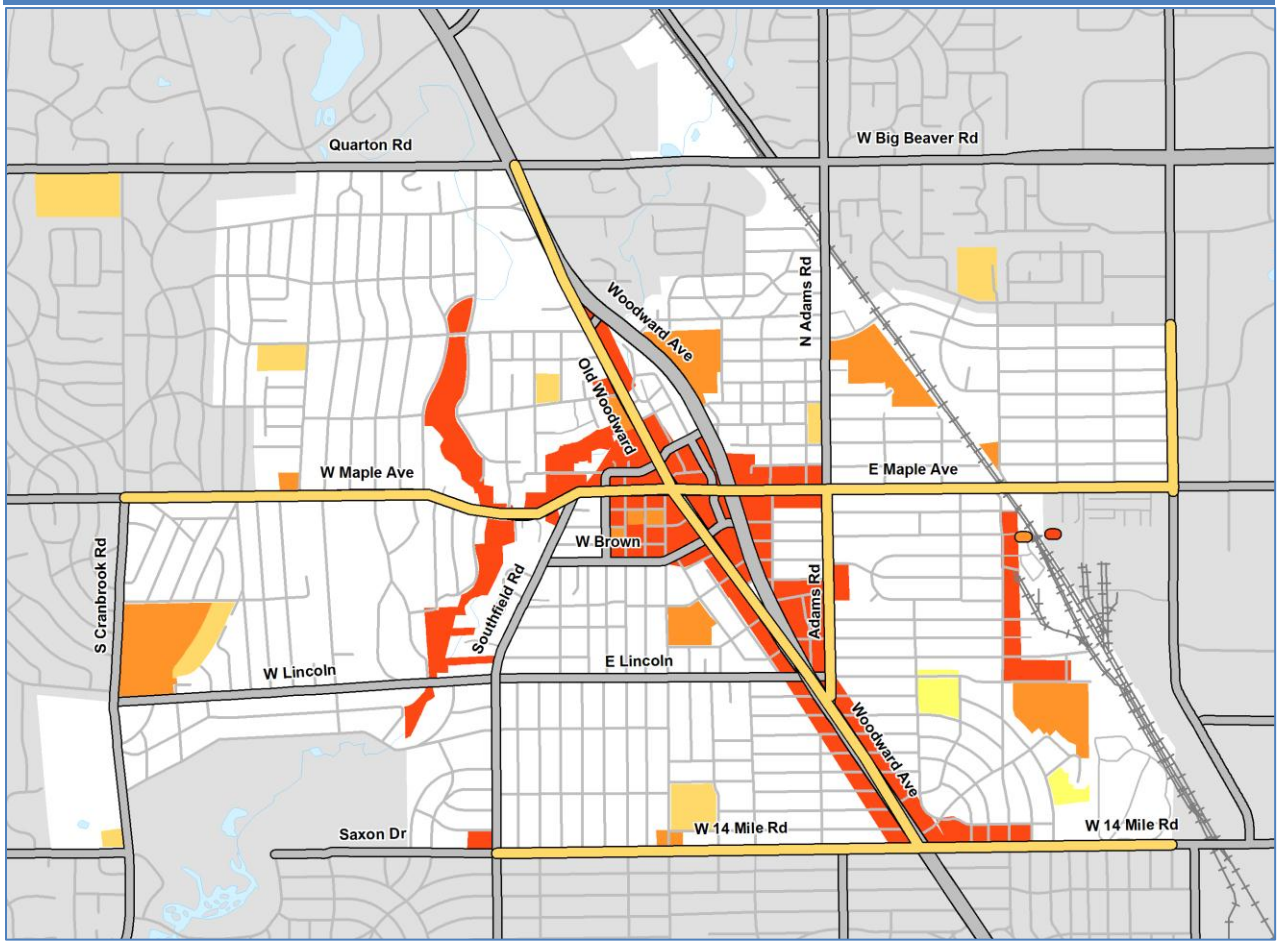
(# of survey participants who currently bike)

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

*colored roadways indicate bus routes and colored dots indicate transit stations

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL BICYCLE ACTIVITY SURVEY



According the web survey, if a complete and safe non-motorized network was established the Rail District, North Old Woodward Commercial Areas, Rouge Park Trails, Triangle District, Baldwin Public Library, Woodward Commercial South of Lincoln and the Future Amtrak Station would see the most growth by non-motorized users based on feedback from the online survey. The current area of high pedestrian activity, including the Downtown and Shain Park would still be major generators as well.

Survey Results

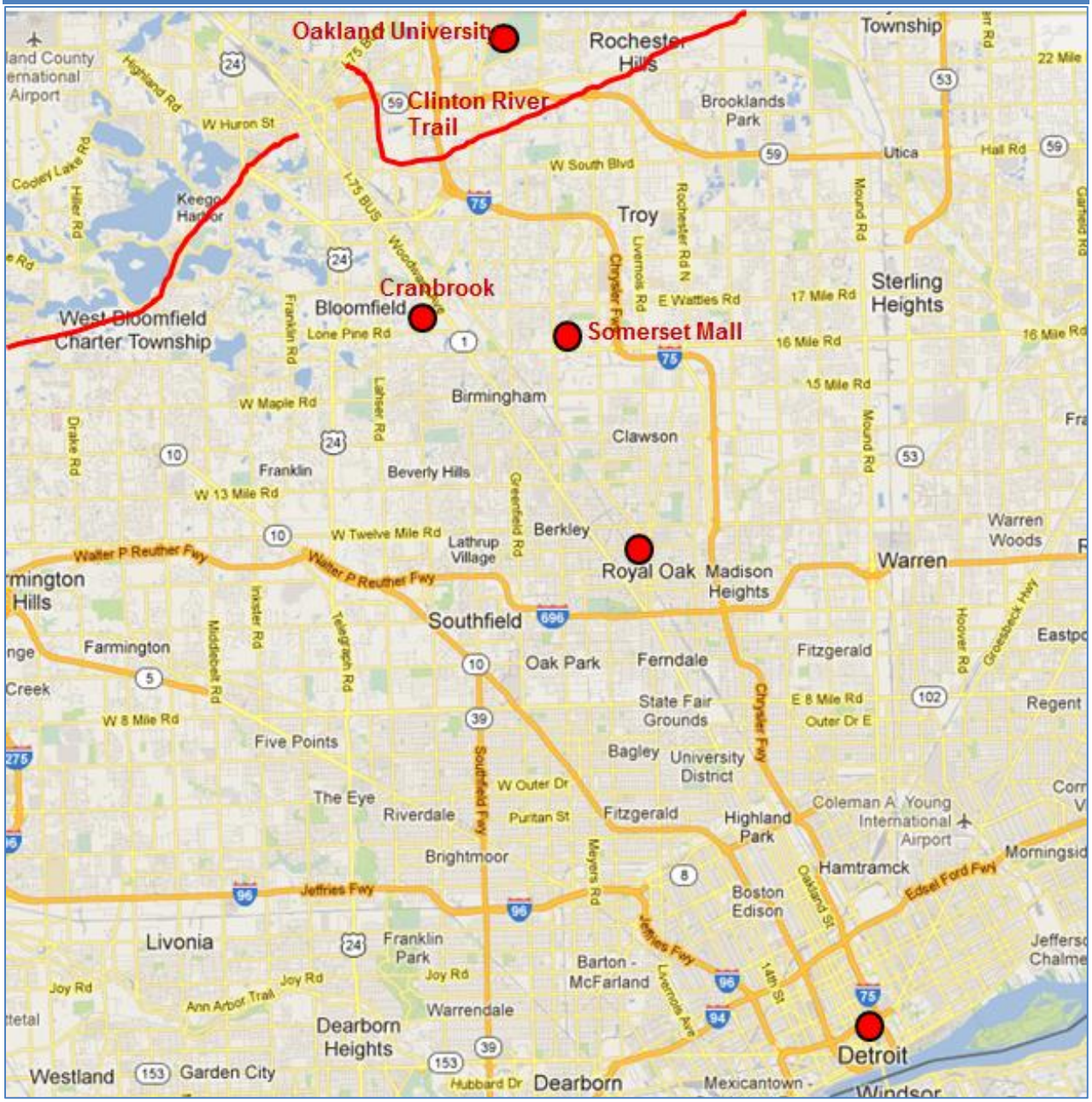
(# of survey participants who would like to bike

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

*colored roadways indicate bus routes and colored dots indicate transit stations

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

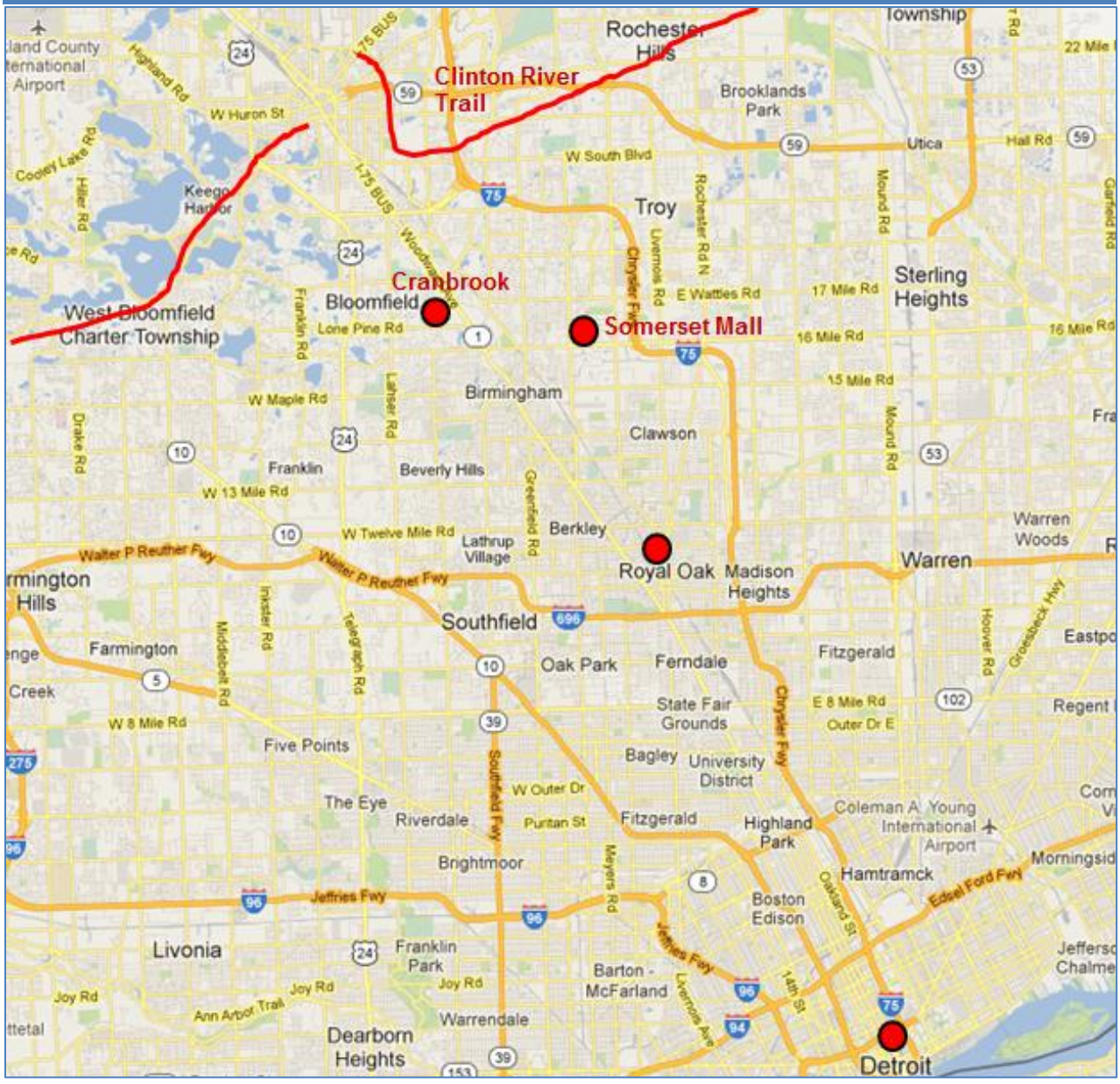
EXISTING REGIONAL BICYCLE ACTIVITY SURVEY



According the web survey Royal Oak, Bloomfield/West Bloomfield, Cranbrook, Clinton River Trail, Oakland University, Auburn Hills, Detroit and Somerset Mall generate most of the current regional bicycle activity.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

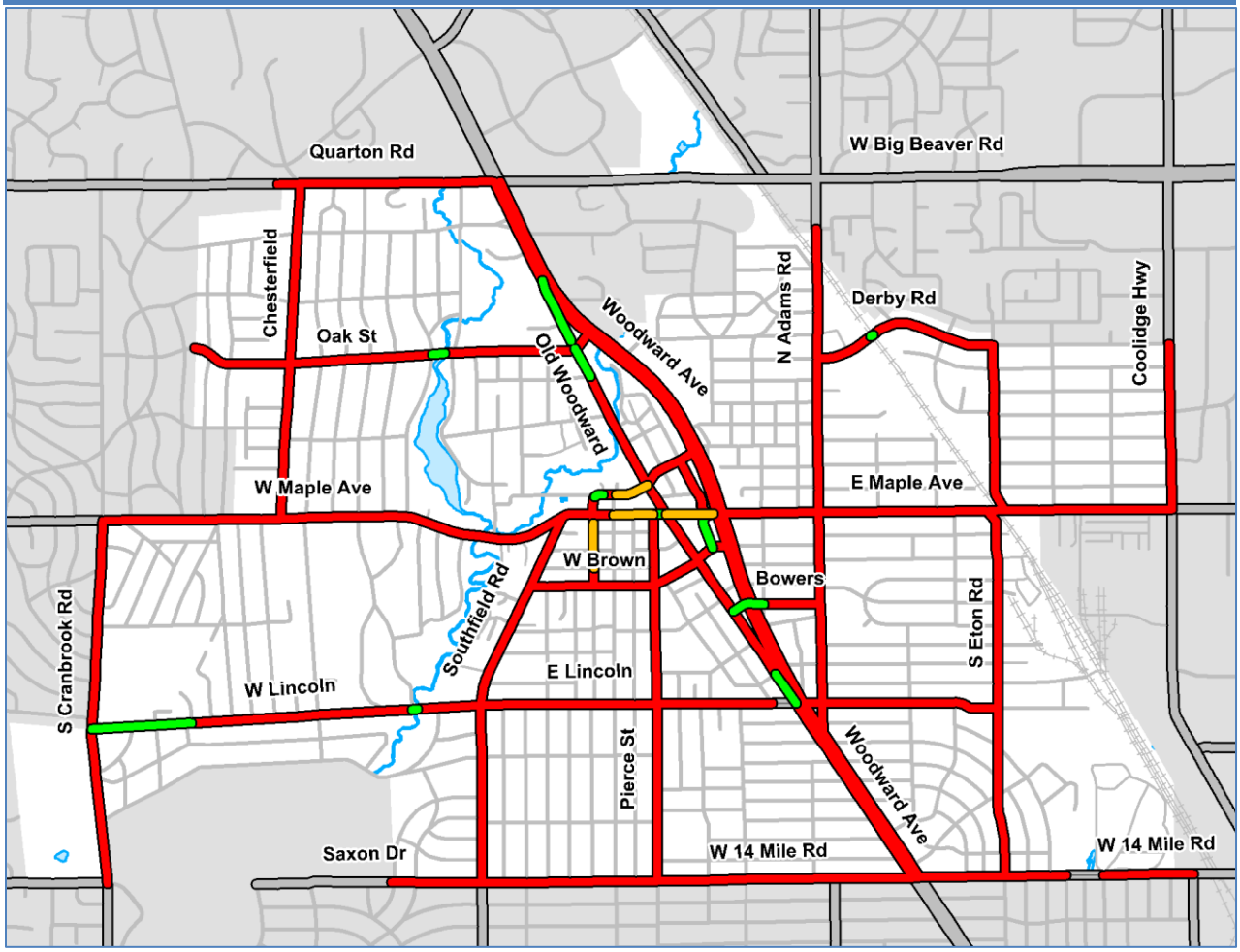
POTENTIAL REGIONAL BICYCLE ACTIVITY SURVEY



According the web survey, if a complete and safe non-motorized network was established there Royal Oak, Detroit, Cranbrook, Somerset Mall, Bloomfield/West Bloomfield and the Clinton River Trail would see the most growth by non-motorized users based on feedback from the online survey.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL BIKE LANES THROUGH LANE NARROWING



There are very limited opportunities to add bike lanes via narrowing existing motor vehicle lanes. Other methods, such as removing a travel lane or parking may be necessary in order to add bike lanes to the primary roads in the City of Birmingham.

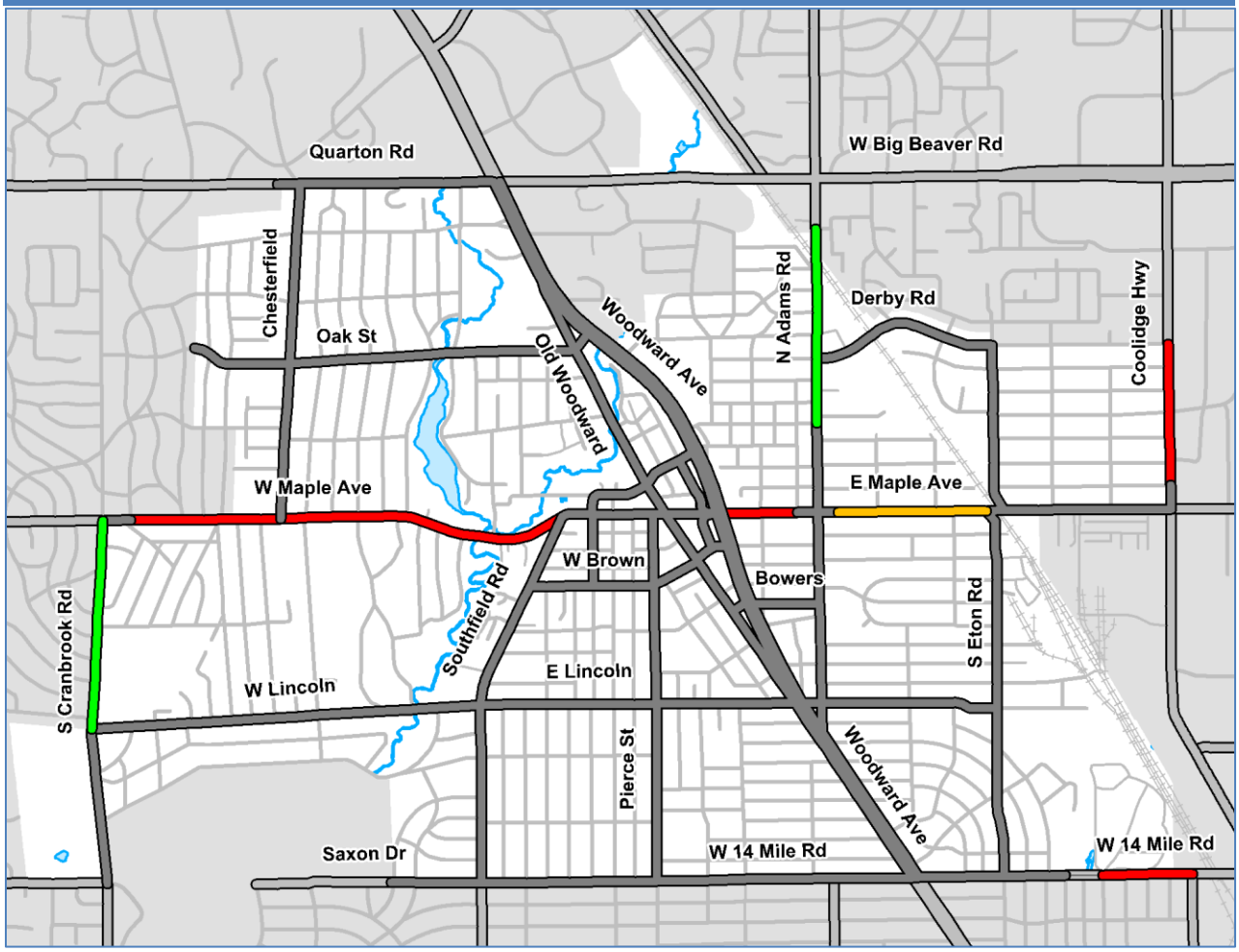
Bike Lane Potential through Lane Narrowing

- High Potential (11' travel lanes)
- Moderate Potential (10.5' travel lanes)
- Marginal Potential (10' travel lanes)
- Low Potential (less then 10' travel lanes)

Please note that traffic lanes are generally acceptable with an 11’ width. An engineering judgment is needed when determining if lanes can be narrowed.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL BIKE LANES THROUGH 4 TO 3 LANE CONVERSION



There is potential to add bike lanes to a few of the primary roads in the near term through 4 to 3 lane conversions.

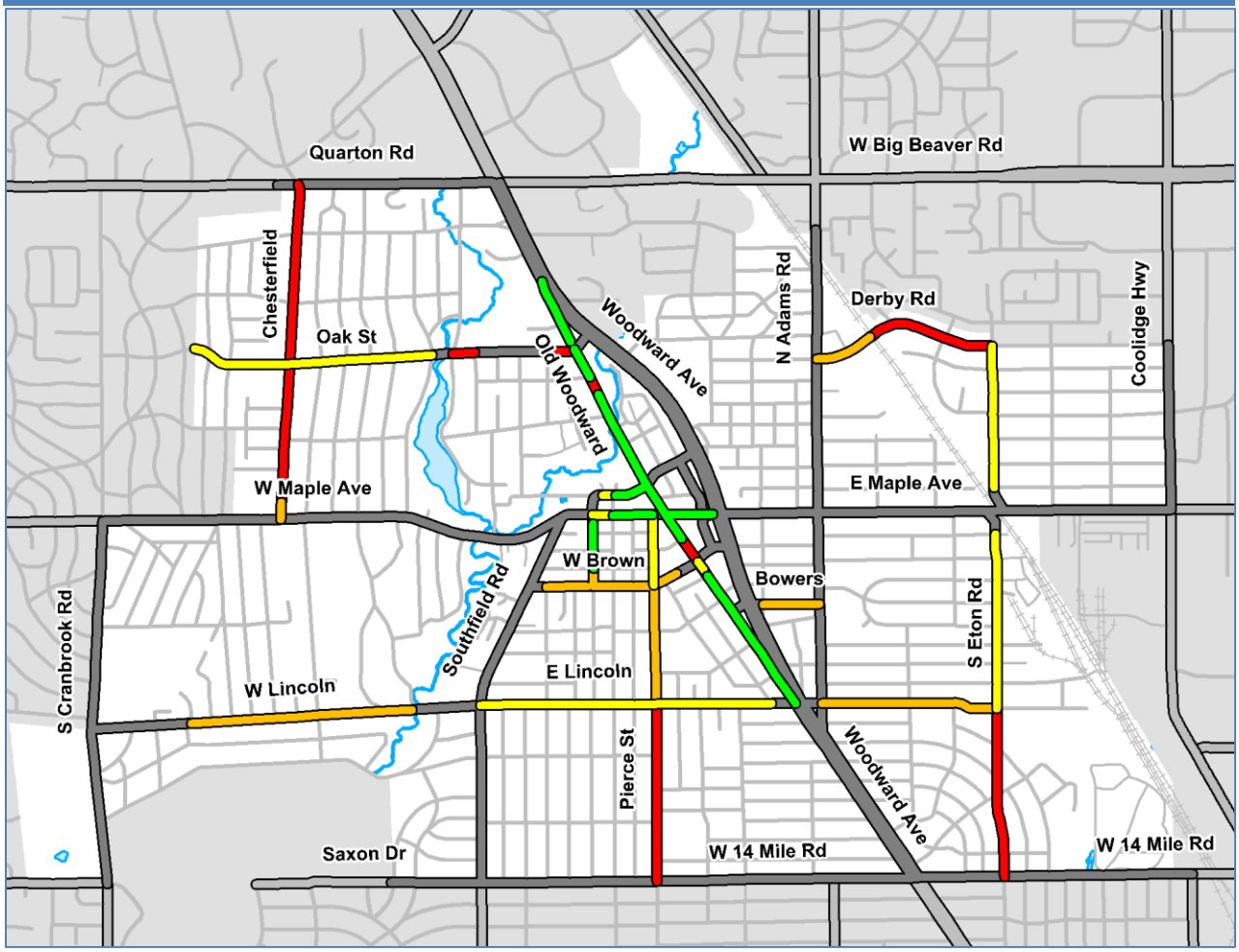
When minimal traffic volumes are present, four lane roads may be converted into three lanes roads with bike lanes. The suitability of the conversion depends on the traffic volume and delay at signalized intersections.

Bike Lane Potential through 4 to 3 Lane Conversion

- High Potential (Less than 15,000 ADT)
- Moderate Potential (15,000 to 17,500 ADT)
- Marginal Potential (17,500 to 20,000 ADT)
- Low Potential (Greater than 20,000 ADT)
- Not Applicable

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL BIKE LANES THROUGH REARRANGEMENT OF ON-STREET PARKING



Bike Lane Potential thorugh Rearrangment of On-Street Parking

- High Potential (No loss of parking spaces)
- Moderate Potential (Loss of 50% of Parking Spaces)
- Marginal Potential (Loss of 100% of Parking Spaces)
- Low Potential (Too Narrow)
- Not Applicable

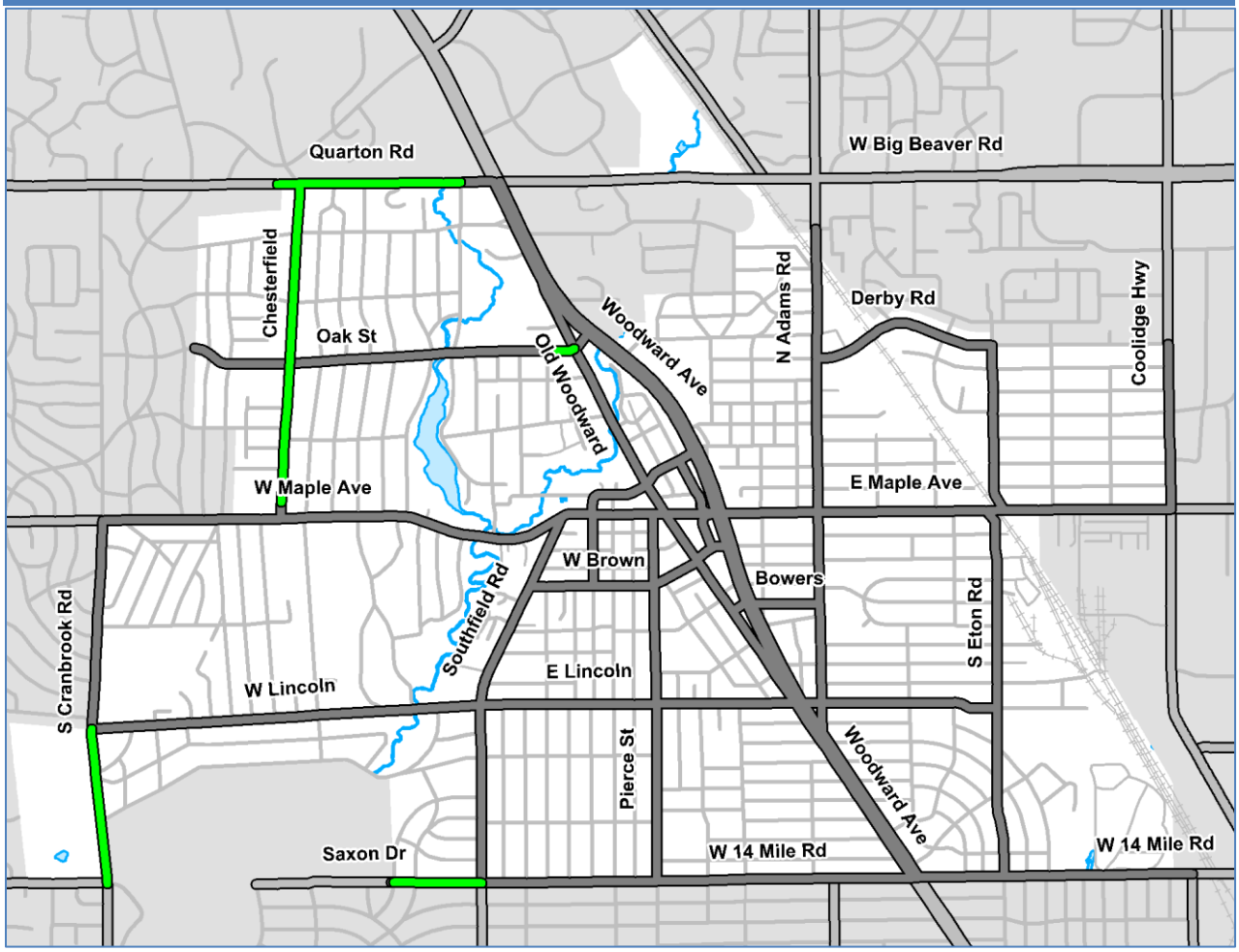
There are opportunities on many of the roadways to provide bike lanes by rearranging and/or removing on-street parking.

Removing on-street parking may diminish the pedestrian level service as on-street parking provides a barrier between the sidewalk and the roadway.

Please note that in order to add bike lanes with no loss of parking along Old Woodward Avenue head-in angled parking would need to be converted to back-in angled parking.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL BIKE LANES BY PAVING THE SHOULDER



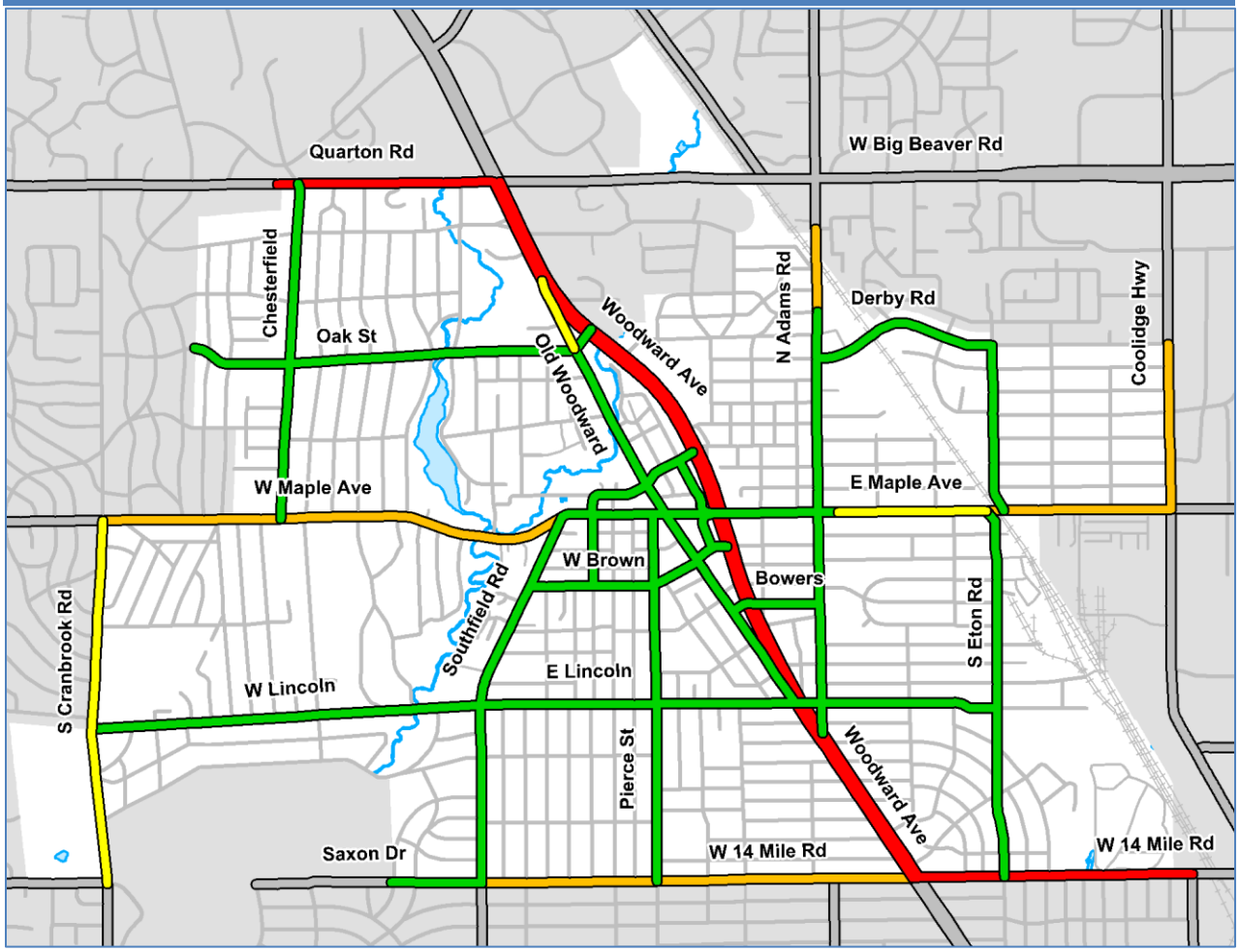
There is potential to add bike lanes to a few of the roadways by paving the shoulder.

Bike Lane Potential by Paving the Shoulder

- Potential
- Not Applicable

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL FOR SHARED LANE MARKINGS



Due to the relatively low posted speed limit (35 mph and below), the majority of the primary roads have potential for Shared Lane Markings. Shared-Lane Markings work especially well in downtown areas where there is not enough room for a bike lane and there is on-street parking.

Shared Lane Markings

- 25 mph
- 30 mph
- 35 mph
- Greater than 35 mph

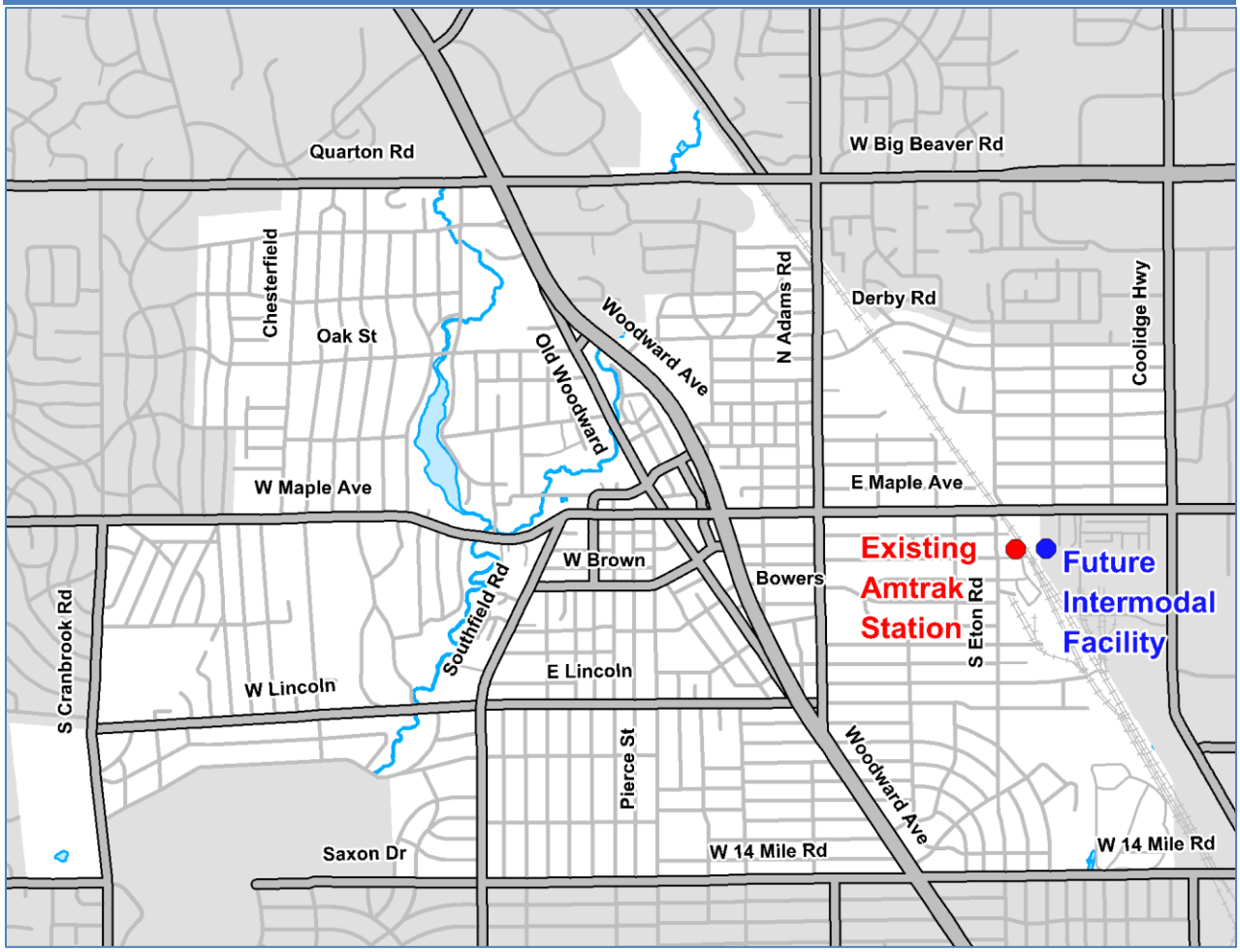
TRANSIT CONDITIONS:

The Suburban Mobility Authority for Regional Transportation (SMART) and Amtrak provide service to the City of Birmingham.

Only a small percentage of Birmingham residents currently use the transit in the City of Birmingham. The existing Amtrak station is located in the Rail District and the train passes through town six times a day, three northbound and three southbound. There are plans for the existing Amtrak service to be replaced by a new Intermodal Facility in Troy. SMART currently provides bus service along the primary arterials in the City with limited service on the weekends.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING AND FUTURE AMTRAK SERVICE



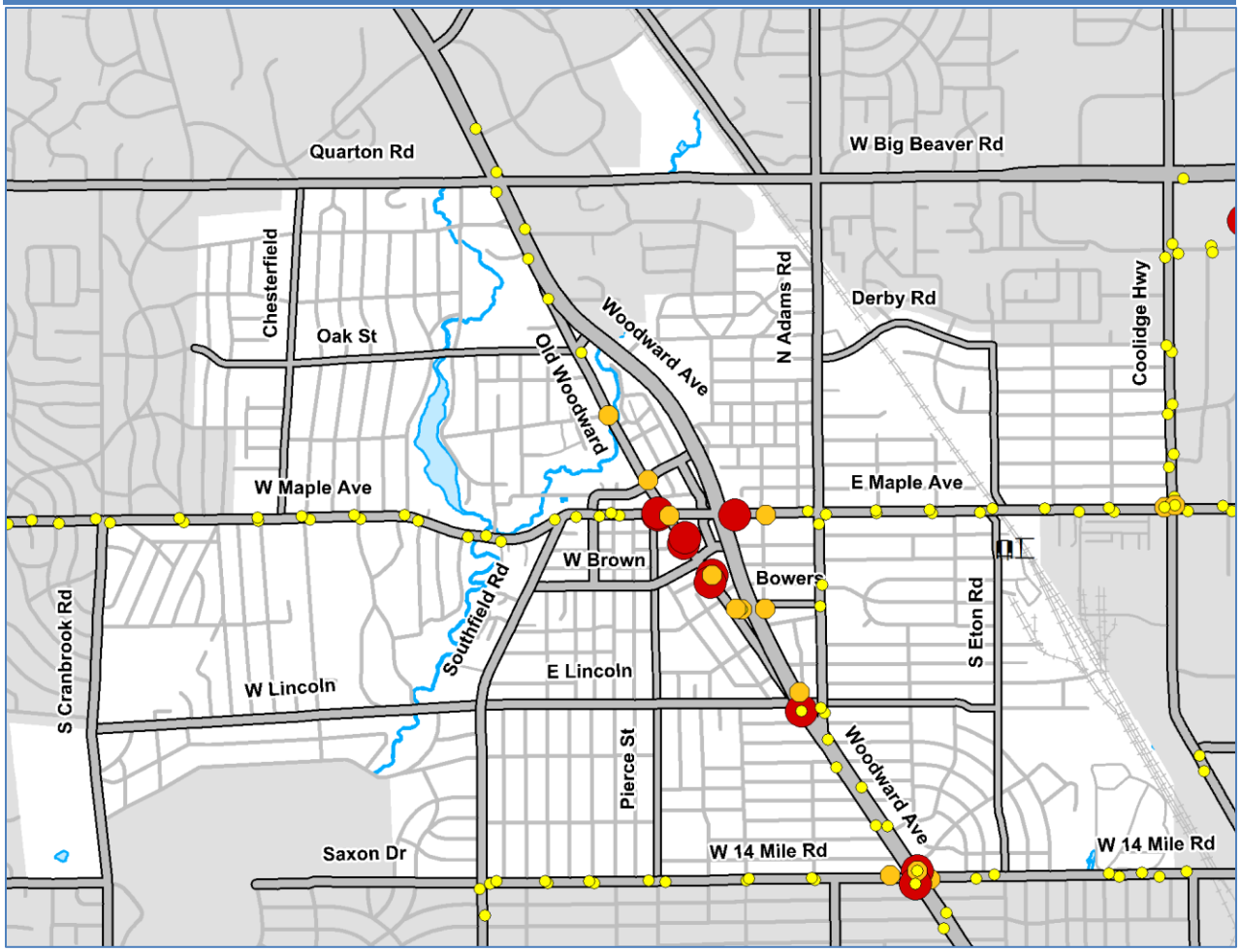
The existing Amtrak service to Birmingham consists of six trains daily, three southbound and three northbound, between Detroit and Pontiac. In 2012, the annual ridership for the existing Birmingham station was 22,193 passengers.

There are plans for the existing Amtrak service to be replaced by a new intermodal facility in Troy. Based on a Traffic Impact Study completed in 2008 for the new intermodal facility, it was projected that in 2027 the ridership average daily boarding's and alightings would increase to 257 passengers daily (annual ridership of 51,485 passengers).

MDOT. 2012. Rail & Public Transit, Monthly Corridor Station Activity Summary. http://mdotcf.state.mi.us/public/railstats/

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

SMART BUS LOADING AND UNLOADING- WEEKDAYS



Overall, the weekdays see the most bus use. SMART Bus Stops that receive the most use are located in the Downtown (especially along Old Woodward), at Woodward Avenue and 14 Miles Road, at Woodward Avenue and Bowers, at Woodward Avenue and Lincoln and at Maple Avenue and Coolidge Highway.

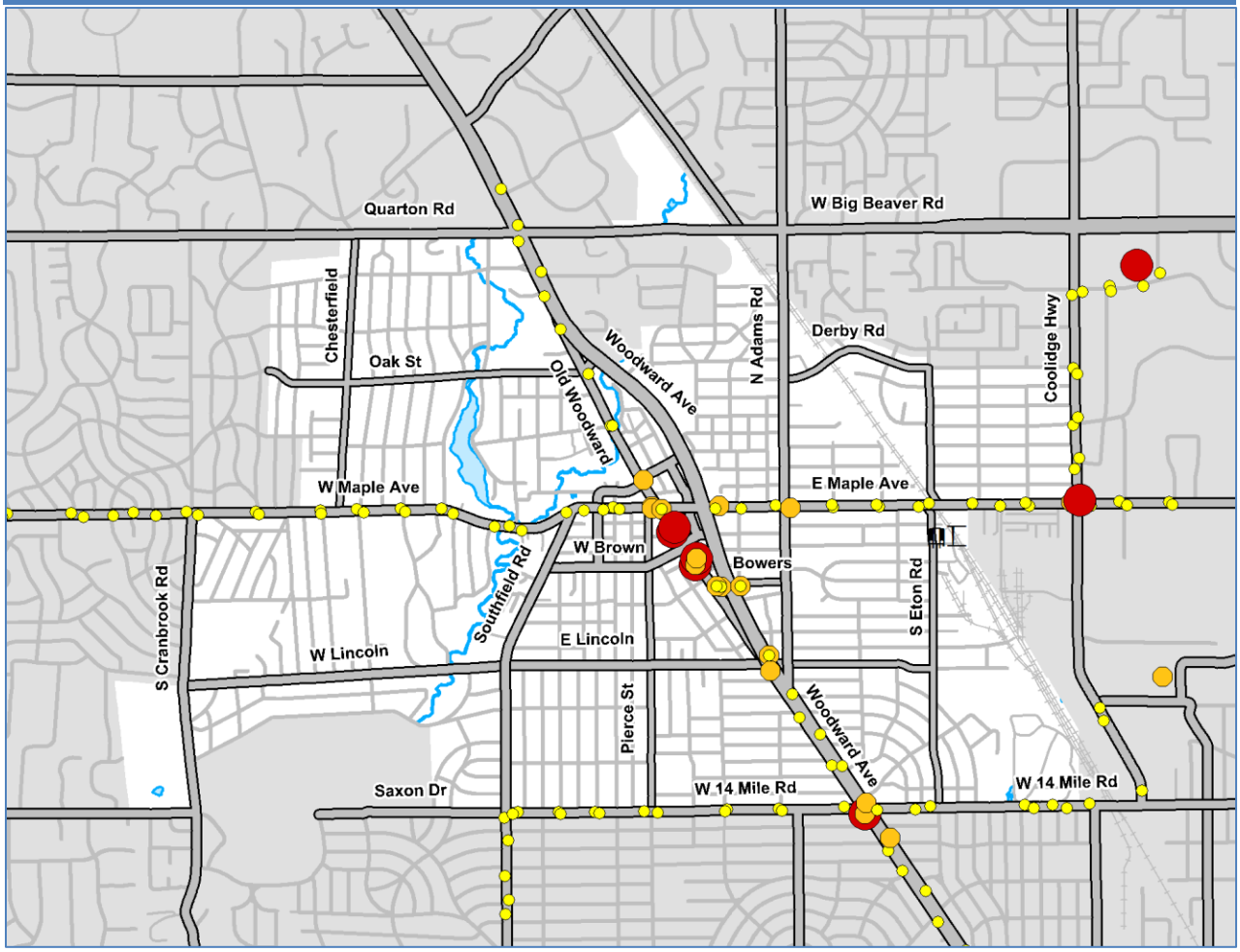
SMART Bus Stops - Weekday
(total on and off at each stop)

- Over 20
- 10 to 20
- 0 to 10

SMART 2011.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

SMART BUS LOADING AND UNLOADING- SATURDAYS



On Saturdays, SMART Bus Stops that receive the most use are located in the Downtown (especially along Old Woodward and Maple), at Woodward Avenue and 14 Miles Road, at Woodward Avenue and Bowers, at Woodward Avenue and Lincoln, at Maple Avenue and Adams Rd and at Maple Avenue and Coolidge Highway

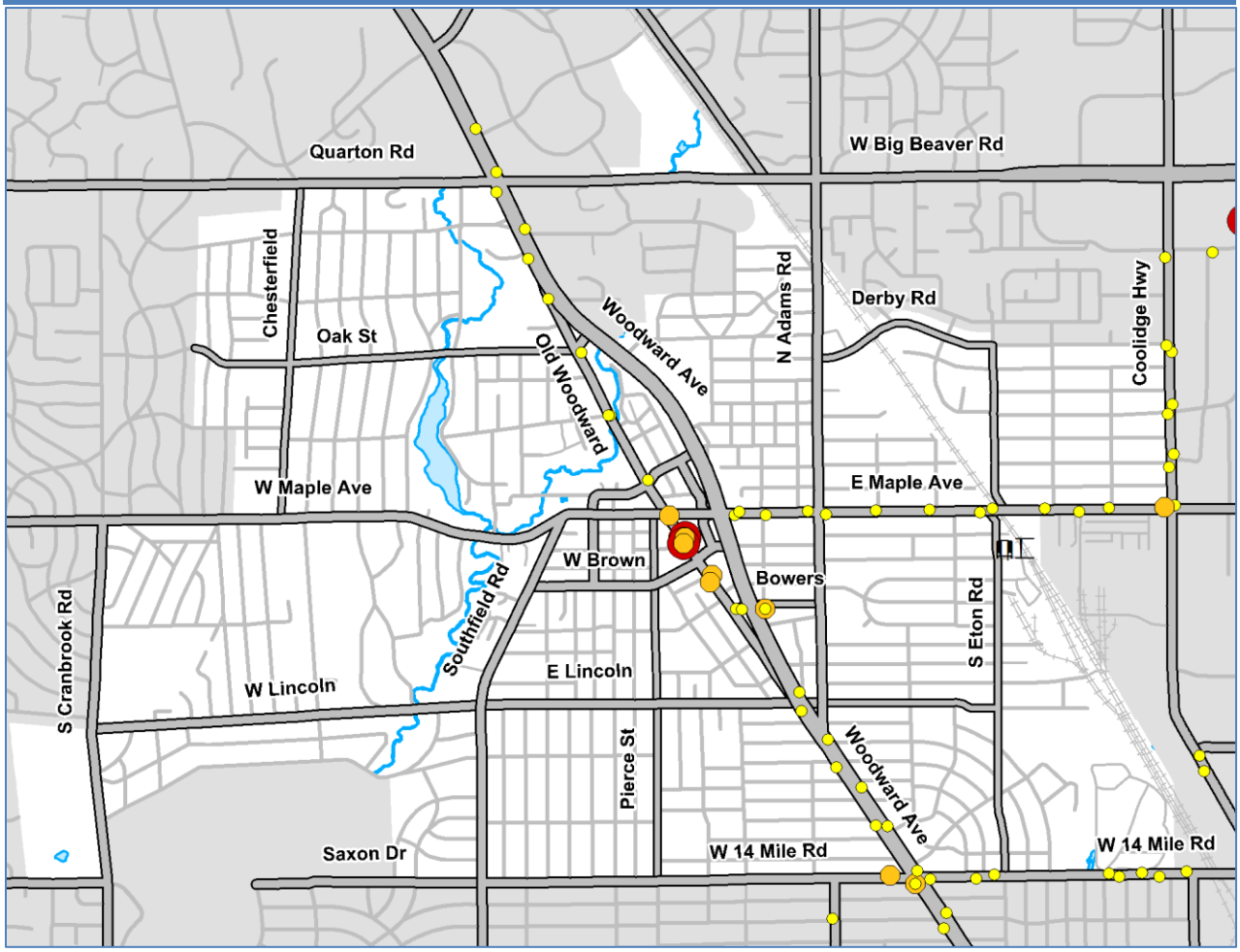
SMART Bus Stops - Saturday
(total on and off at each stop)

- Over 20
- 10 to 20
- 0 to 10

SMART 2011.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

SMART BUS LOADING AND UNLOADING- SUNDAYS



Sunday has the lowest number of SMART bus riders with less routes available. SMART Bus Stops that receive the most use are located in the Downtown, at Woodward Avenue and 14 Miles Road, at Woodward Avenue and Bowers and at Maple Avenue and Coolidge Highway.

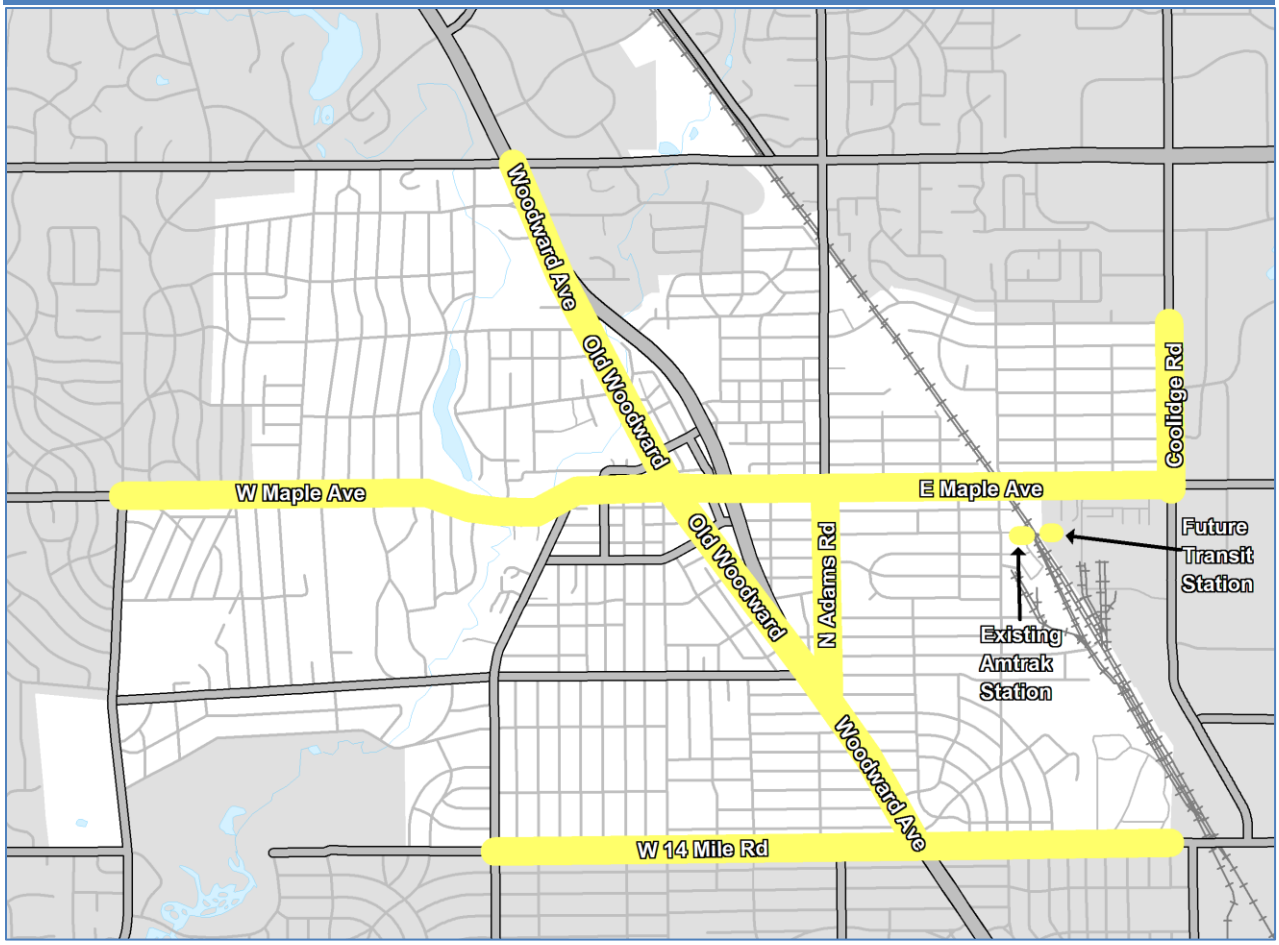
SMART 2011.

SMART Bus Stops - Sunday
(total on and off at each stop)

- Over 20
- 10 to 20
- 0 to 10

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING BICYCLE ACTIVITY AT TRANSIT LOCATIONS



According to the web survey, only 11.4% of the respondents have ridden the bus. Of the people who do ride the bus only a few use their bicycle as their primary mode of transportation to get to and from the bus stop.

Transit Destinations

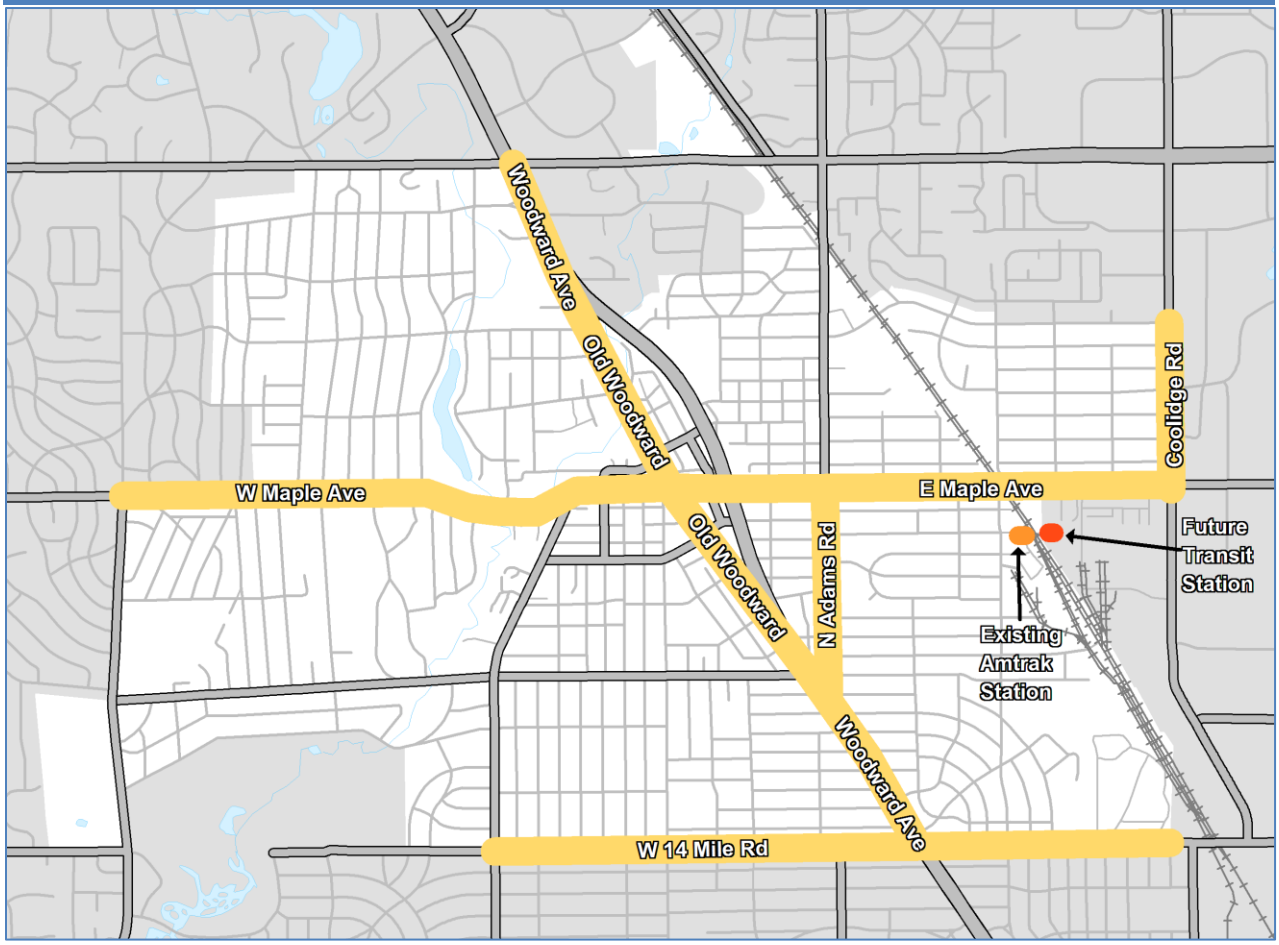
(# of survey participants who currently bike)

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

*colored roadways indicate bus routes and colored dots indicate transit stations

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL BICYCLE ACTIVITY AT TRANSIT LOCATIONS



According to the web survey, if a complete and safe non-motorized network was established all of the routes would have potential for growth and the Future Transit Station would see the most growth by non-motorized users based on feedback from the online survey.

Transit Destinations

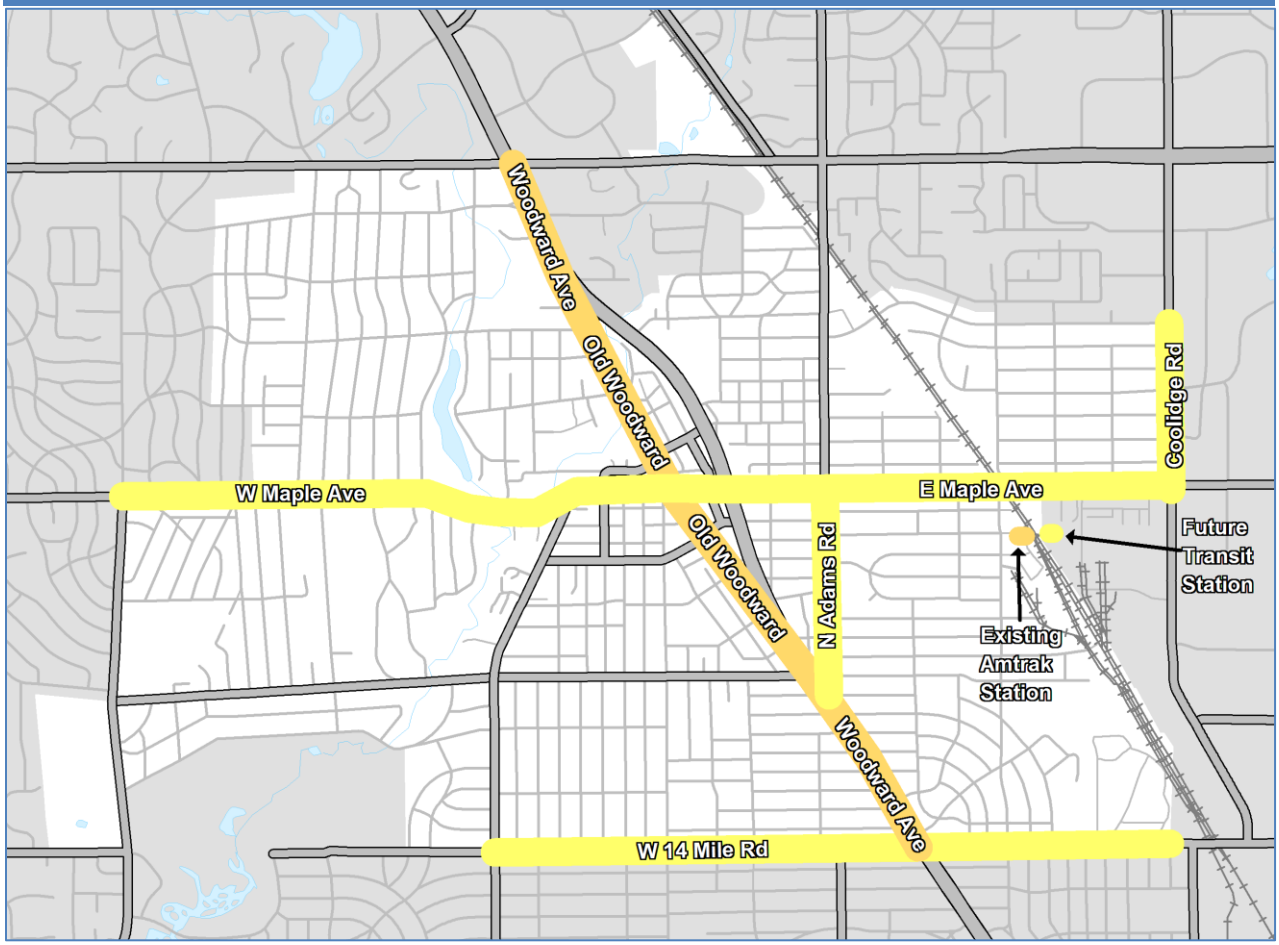
(# of survey participants who would like to bike

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

*colored roadways indicate bus routes and colored dots indicate transit stations

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EXISTING PEDESTRIAN ACTIVITY AT TRANSIT LOCATIONS



According to the web survey Old Woodward Ave and the Existing Amtrak Station generate the most pedestrian activity compared to other transit locations in the city.

Of the 11.4% of survey respondents that ride the bus a large majority (over 80%) walk as their primary mode of transportation to get to and from the bus stop.

Transit Destinations

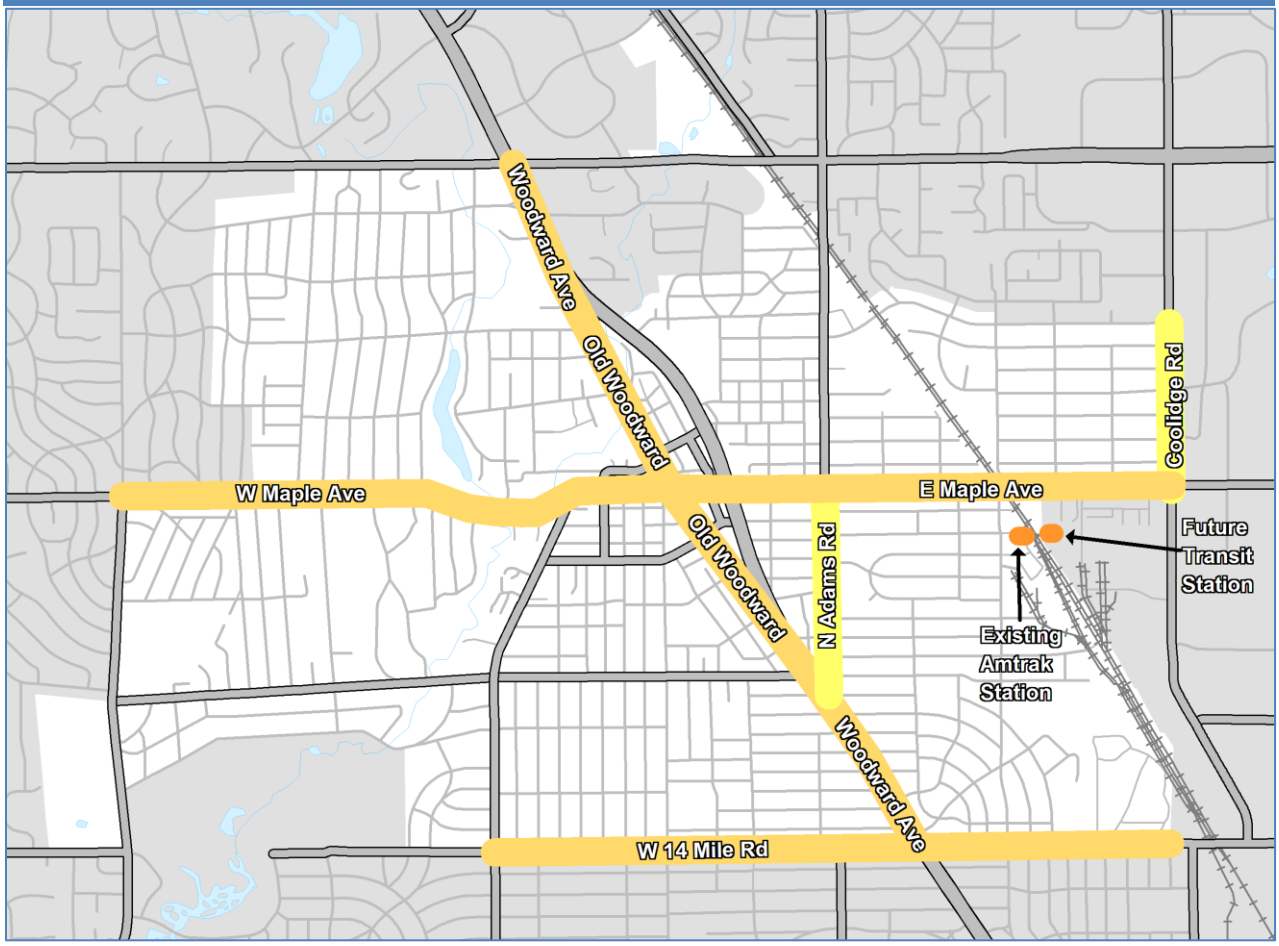
(# of survey participants who currently walk)

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

*colored roadways indicate bus routes and colored dots indicate transit stations

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POTENTIAL PEDESTRIAN ACTIVITY AT TRANSIT LOCATIONS



According to the web survey, if a complete and safe non-motorized network was established most of the routes would have potential for growth and the Existing and Future Transit Stations would see the most growth by non-motorized users based on feedback from the online survey.

Transit Destinations

(# of survey participants who would like to walk

- Over 200
- 100 to 200
- 50 to 100
- 25 to 50
- Less than 25

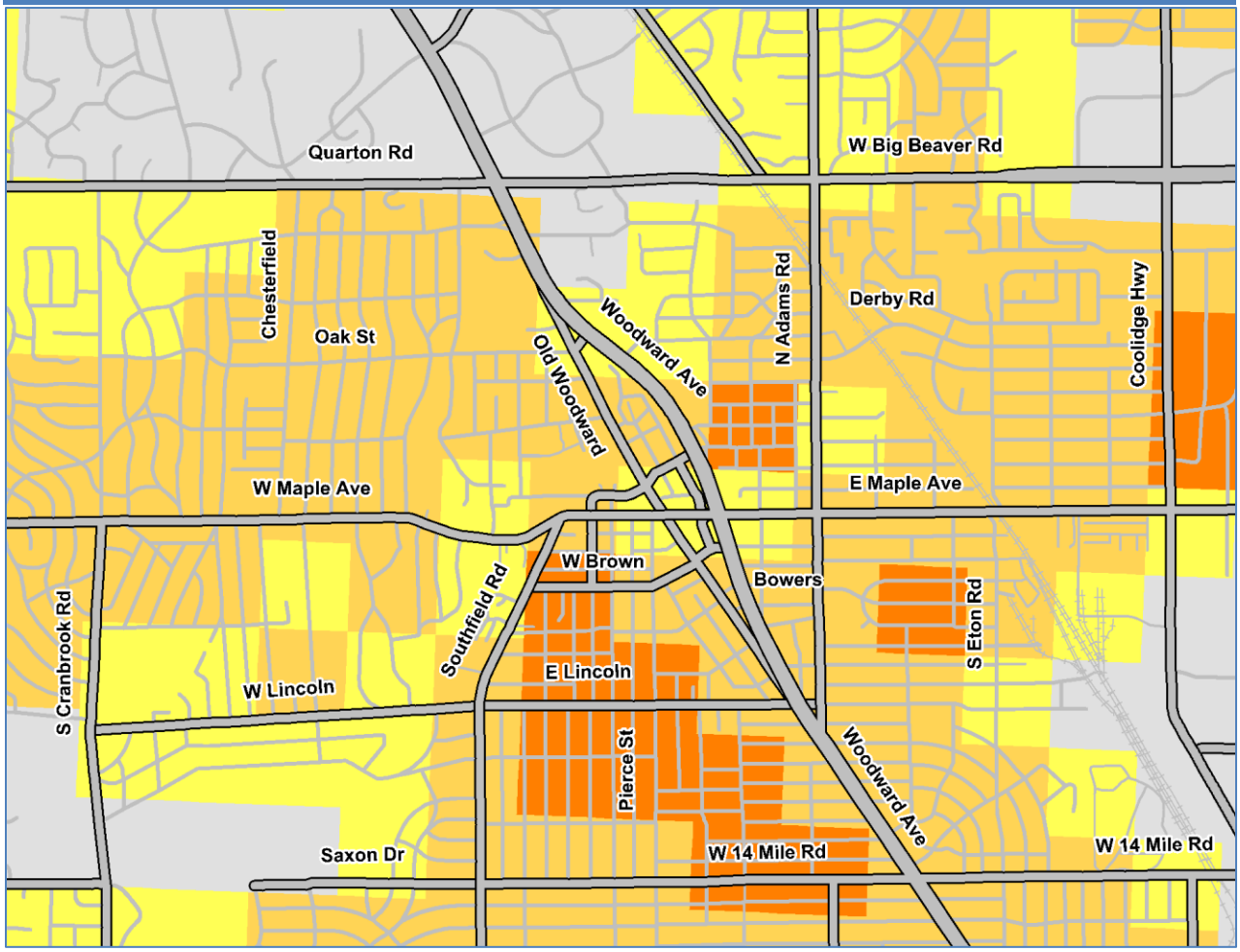
*colored roadways indicate bus routes and colored dots indicate transit stations

RELATIVE DEMAND ANALYSIS:

The Relative Demand Analysis is a parcel based grid analysis that evaluates population density, diversity of land uses, adjacency to activity generators and the design of the physical environment. This analysis is used to help prioritize improvements.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

POPULATION DENSITY



In general, the population density in the City of Birmingham is relatively high.

Population density is an important factor from two standpoints. First, even if the percentage of people who walk does not change, more people will be walking in areas with higher population density. Second, increased population density generally brings with it more destinations for people to walk to such as stores, schools, bus stops, etc.

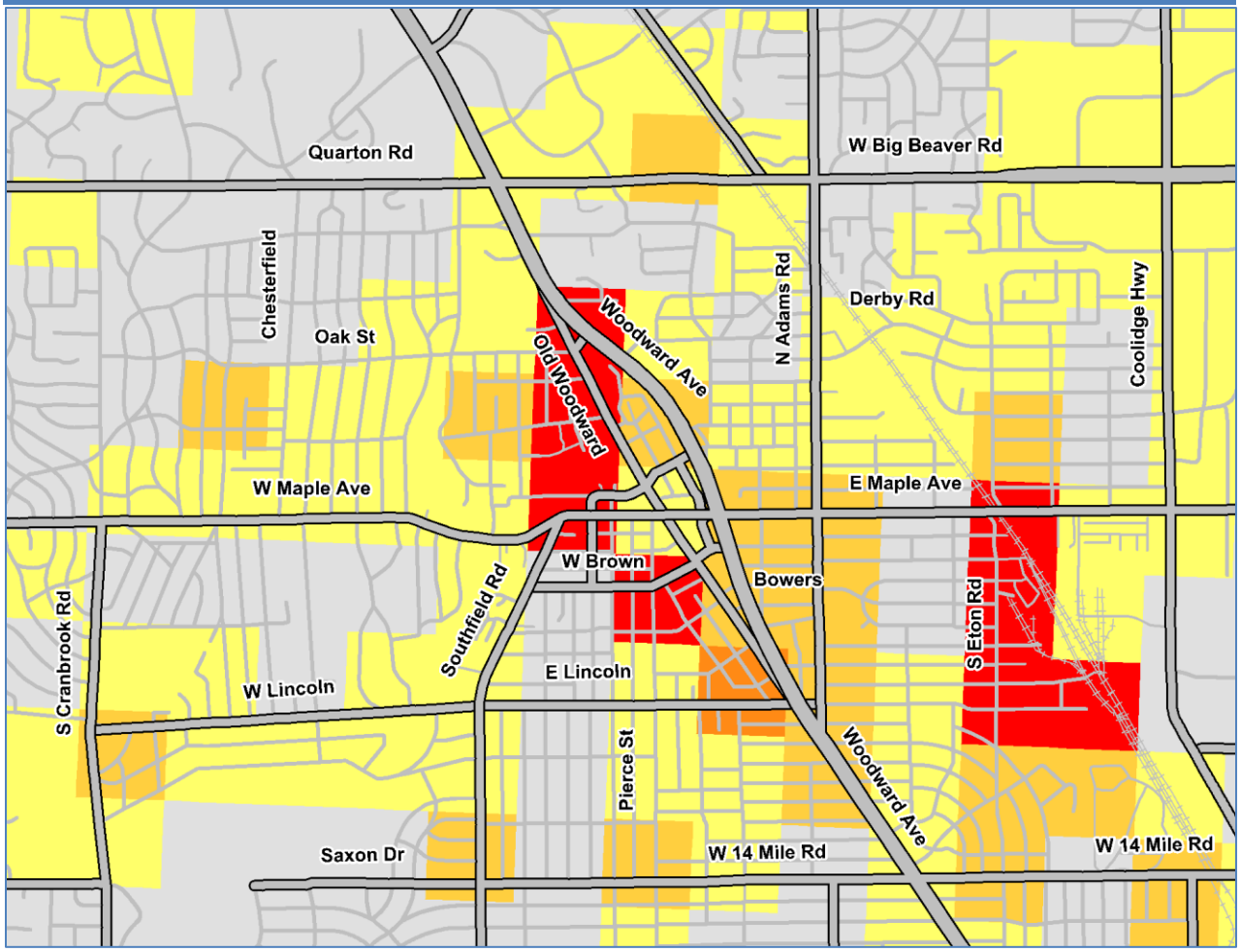
Population Density
(proportional average of people per acre)

- 20 and over
- 10 to 20
- 5 to 10
- 2 to 5
- 0 to 2

For this analysis a ¼ mile grid was superimposed over the project area. The population density score was based on the number of people per acre. Where a cell spanned multiple census blocks, a proportional average of the intersection census block was used to determine the cells average population density.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

LAND USE DIVERSITY



Generally an area with many different land uses within close proximity of each other is beneficial to non-motorized users because they do not have to travel great distances to get from one place to another. Land use diversity is important because the greater number of nearby land uses means there is a greater number of potential walking or bicycling trips.

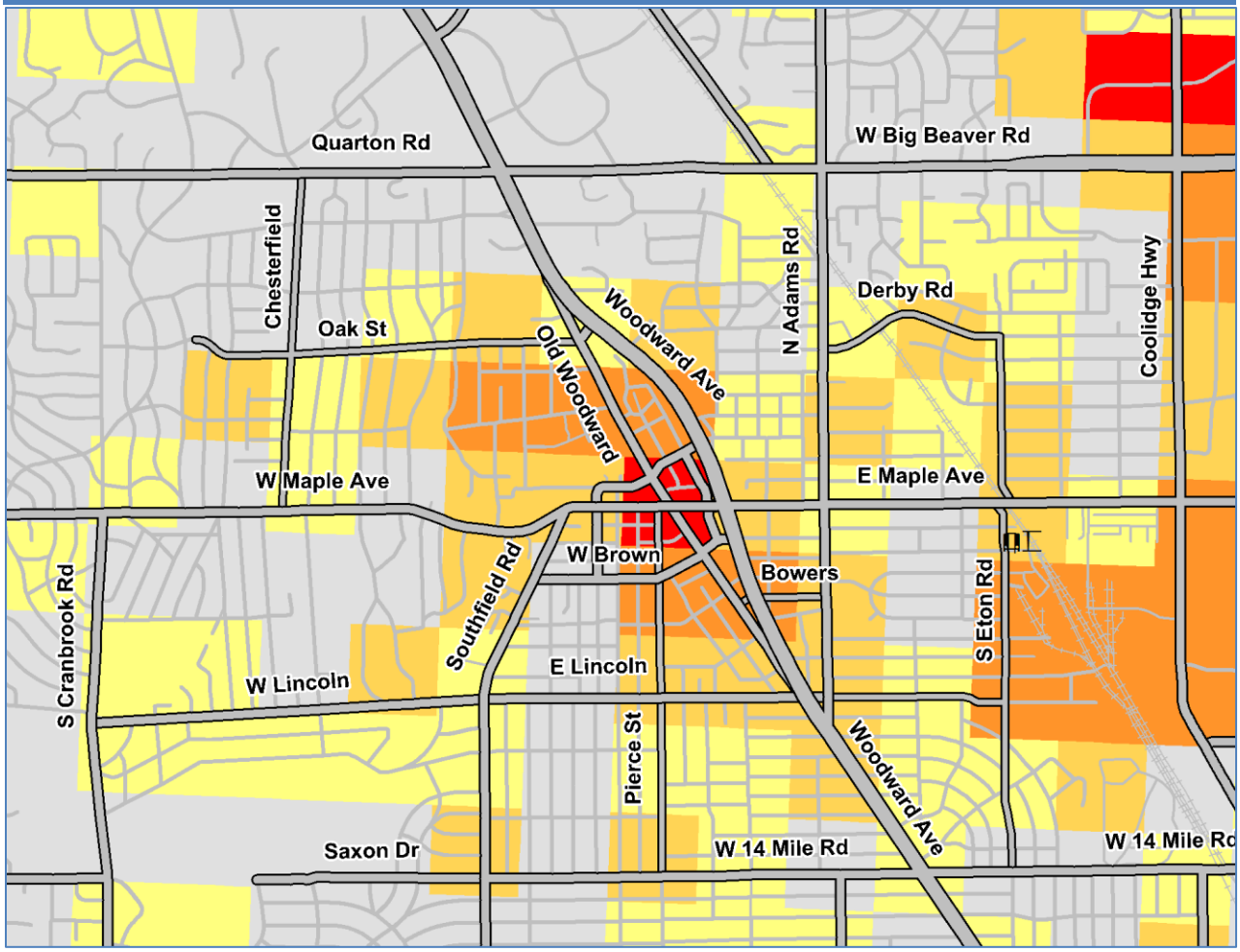
Land use diversity was measured by the number of the land uses within a cell. The following land uses were considered, commercial/retail, office, residential, school, park, or mixed-use. This data is a measurement of trip potential.

Land Use Diversity
(unique types per cell)

- 5 or greater
- 4
- 3
- 2
- 1 or fewer

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

ACTIVITY GENERATORS



Some land uses are even more likely to generate travel than others. For this analysis activity generators included primary destinations for bicyclists, pedestrian and transit user groups such as schools, parks, trails, recreation centers and regional shopping centers.

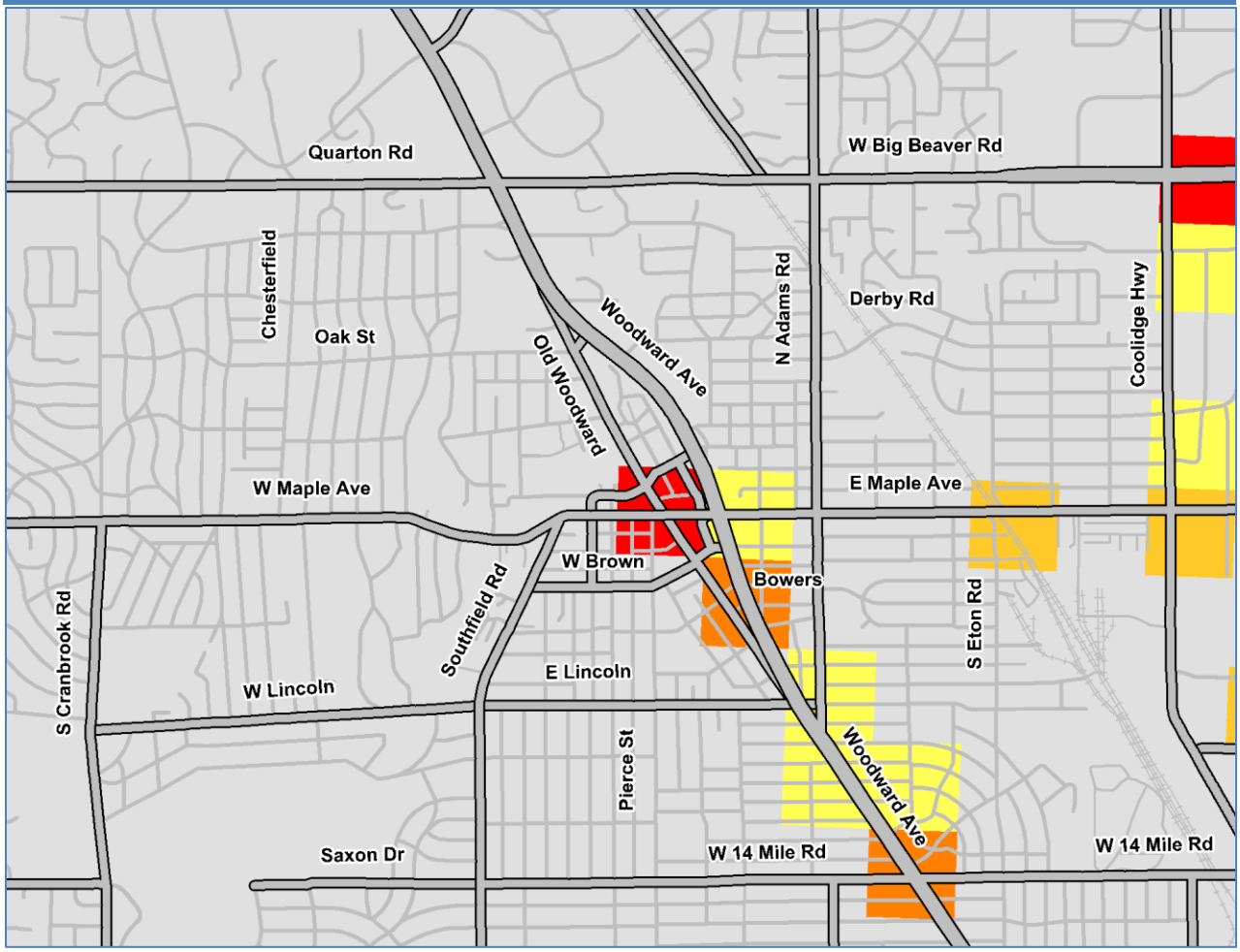
Each cell was given a score from 0 to 4 based on the number of concentration of special activity generators. One point was given for containing a school or park. An activity zone with a park received an additional two points. Colleges, downtowns and regional shopping centers received 1 to 4 points based on the percentage of coverage within the cell.

Activity Generators
(unique types per cell)

- 4
- 3
- 2
- 1
- 0

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

TRANSIT ACTIVITY



Transit generates pedestrian and bicycle travel. People who use public transit generally walk or ride a bicycle to get to the transit stop or station. It is important to provide safe and convenient facilities, especially road crossings where there is a lot of transit oriented activity.

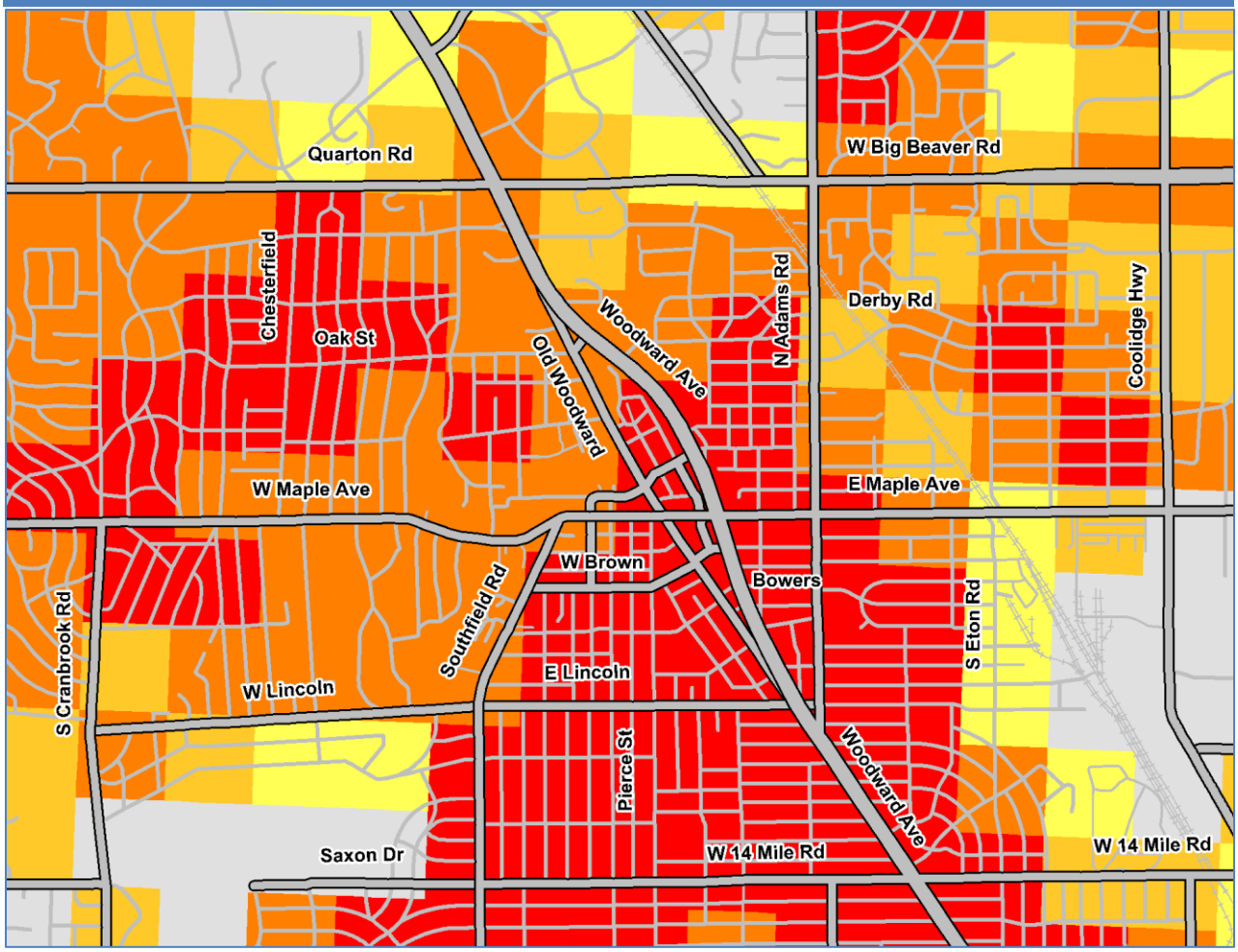
For this analysis each cell was assigned a value of 0 to 4 based on the number of a weekday's total boardings and alightings at all locations within the cell. Due to limited data, the existing Amtrak Station was calculated based on an average of yearly boardings and alightings.

Transit Activity
(total daily on and off per cell)

- 200 and over
- 100 to 200
- 50 to 100
- 20 to 50
- 0 to 20

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

CONNECTIVITY



The connectivity in the City of Birmingham is relatively high.

This analysis determines how much bicycle and pedestrian connectivity is within a designated area. Areas with high connectivity (0 to 15 acre blocks) are generally easy for a bicyclist or pedestrian to travel through, allowing for a relatively direct route. Areas with low connectivity (over 150 acre blocks) are generally difficult for a bicyclist or pedestrian to travel through, causing them to travel out of their way.

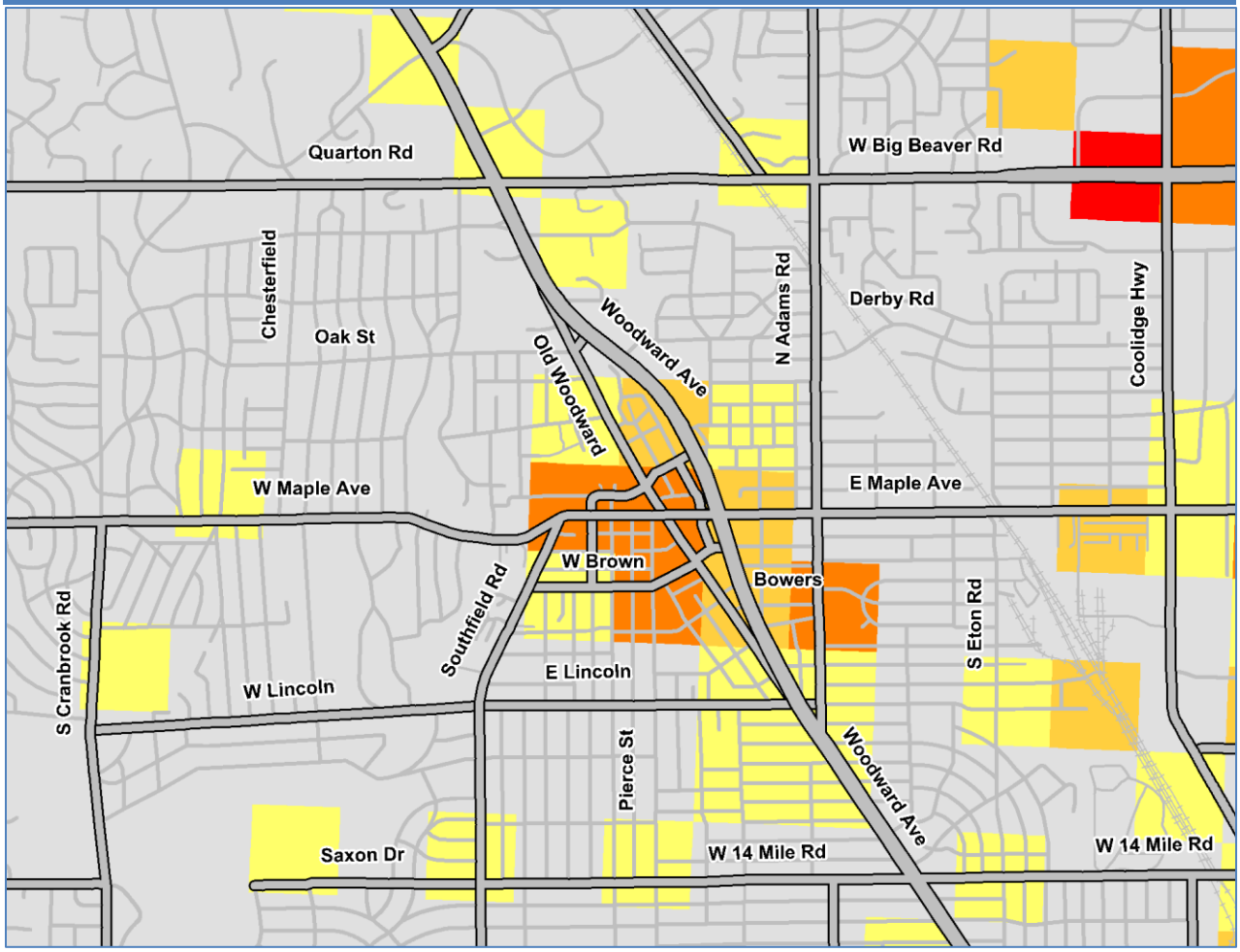
Connectivity
(proportional average block size)

- 0 to 15
- 15 to 50
- 50 to 100
- 100 to 150
- 150 and 0ver

This analysis is based on the Block Size Analysis. Block size has been shown to have a close correlation with the amount of pedestrian travel in an area. For this analysis each cell was assigned a value of 0 to 4 based on the proportional average of the block sizes within the cell.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

EMPLOYMENT CENTERS



Some trips are more likely to be undertaken via walking, bicycling and transit than others. Many work commute trips do not require carrying substantial amounts of materials or supplies making them ideal for alternative transportation.

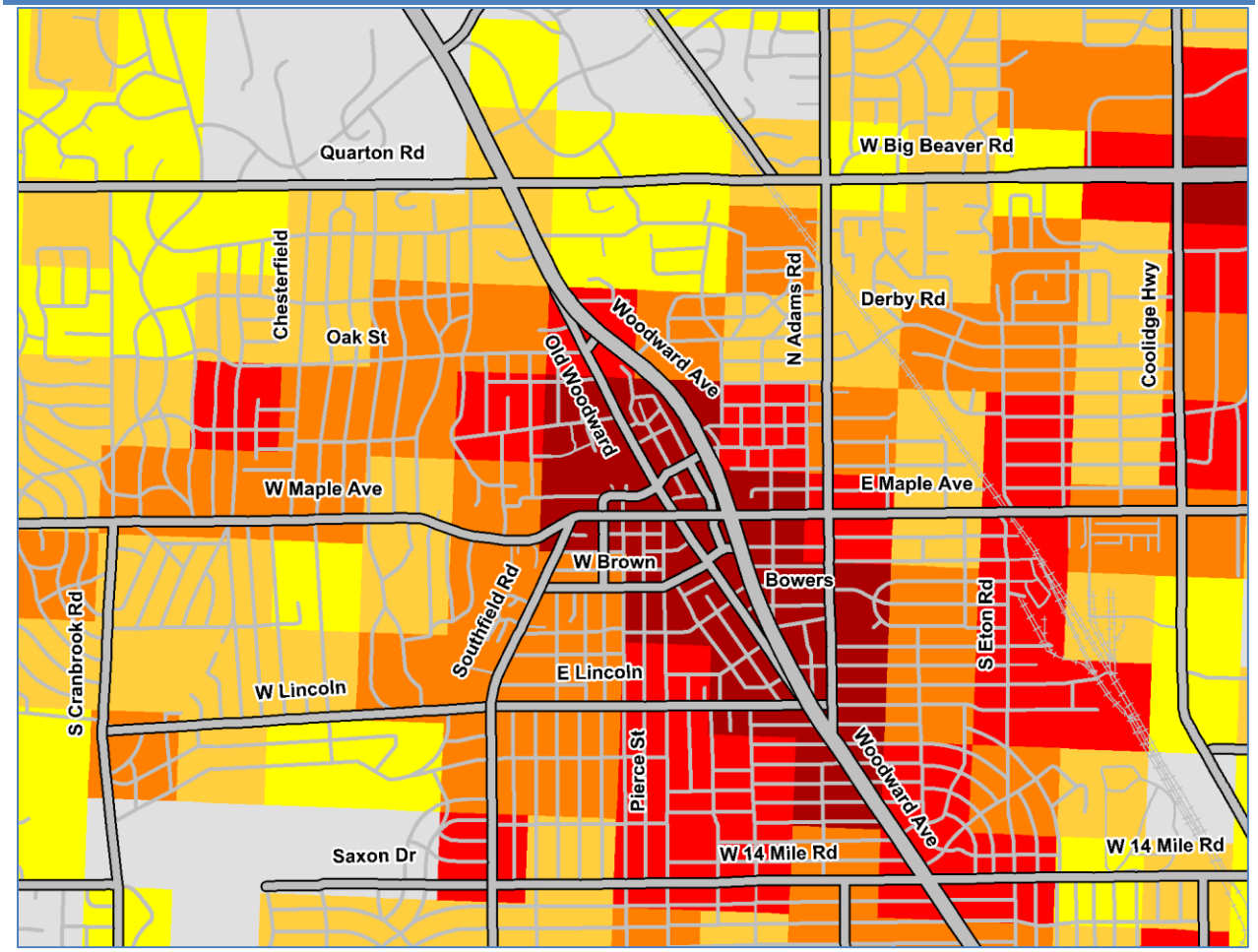
For this analysis, the concentration of employment centers was measured by the number of the jobs within a cell.

Employment Centers
(total number of jobs per cell)

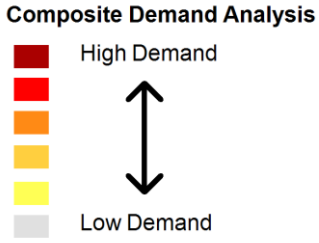
- 5000 and over
- 1000 to 5000
- 500 to 1000
- 100 to 500
- 0 to 100

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

COMPOSITE DEMAND ANALYSIS



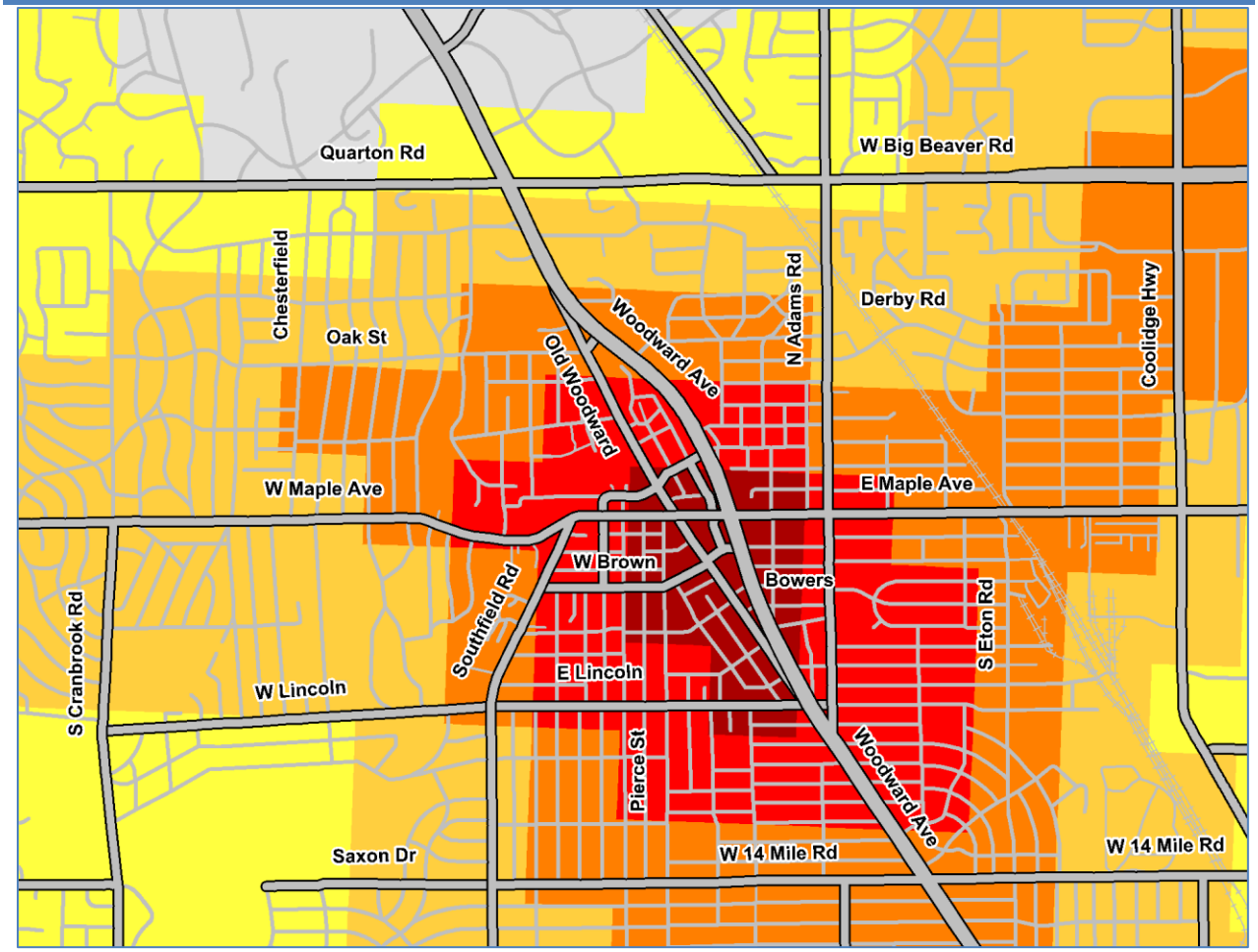
This assessment combines population density, land use diversity, activity generators, transit activity, connectivity, and employment centers creating a composite score for each cell in the grid. Areas with the highest composite score tend to have the highest potential for bicycle and pedestrian activity.



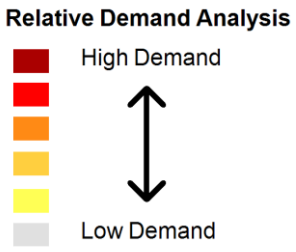
For this analysis, a ¼ mile grid was superimposed over the project area. For each cell in the grid, various factors associated with bicycle an pedestrian travel were rated and scored from 0 (no positive association) to 4 (very positive association). The demand is determined by adding up the score of the six demand analysis components. Each cell may range from 0 to 24.

CITY OF BIRMINGHAM MULTIMODAL TRANSPORTATION PLAN

RELATIVE DEMAND ANALYSIS



This assessment is a parcel based grid analysis that evaluates population density, land use diversity, activity generators, transit activity, connectivity, and employment centers. This analysis has been adjusted to highlight the areas where there is potential for the most bicycle and pedestrian activity. For Birmingham, these are generally areas where there are combinations of high population density, , commercial activity, employment opportunities, a mix of land uses and high connectivity.



The composite rating reflects an approximation of the latent demand for non-motorized travel in an area. Other factors may promote or inhibit actual non-motorized travel levels. The composite analysis is a useful tool to contrast with facility deficiencies, potential facilities and to prioritize improvements. This analysis is used to help prioritize improvements.

The demand is determined by adding up the six demand analysis components, then an inverse distance weighting calculation is performed where the value of all cells within 1.5 miles is used.