

## CHICAGO AVENUE CORRIDOR STUDY

### EXECUTIVE SUMMARY

The Chicago Avenue and Mt. Clinton Pike corridors are located within the northwestern part of the City of Harrisonburg. The study area, illustrated in **Figure 1**, encompasses a primarily residential area, with some commercial and industrial uses as well as some significant institutions including Waterman Elementary School, the locally-owned Red Front Supermarket, Eastern Mennonite University (EMU), Eastern Mennonite High School (EMHS), and the Gemeinschaft House halfway home located just beyond the City line in Rockingham County. Both roads are busy two-lane roadways; Chicago Avenue is classified as an urban collector while Mt. Clinton Pike is classified as an urban minor arterial within City limits, transitioning to a collector road when it enters the County.

The corridors have several issues, including:

#### Chicago Avenue:

- Significant levels of pedestrian and bicycle traffic, with insufficient infrastructure to accommodate them.
- Chicago Avenue cuts at a skew across the City's grid system, creating several highly skewed intersections.
- Numerous utility poles and other fixed objects located within the road's clear zone with no curbing or guide rail protection.
- Very flat topography with minimal or no roadway crowning, which contributes to drainage and flooding issues along the corridor.
- The confusing configuration of the offset-T intersection of Mt. Clinton Pike, Chicago Avenue, & Park Road.
- Numerous businesses with excessive, poorly defined, or unusually wide entrances.

#### Mt. Clinton Pike:

- Except for the portion of road near the Chicago Avenue/Park Road offset-T intersection, this road has just two 11-foot lanes with no shoulder.
- There is significant topography west of Park Road, including a sharp crest curve right at the City/County line that has poor stopping sight distance.
- Some levels of pedestrian and bicycle traffic despite the lack of shoulders, sidewalks, or bicycle lanes.
- A significant history of crashes at the Mt. Clinton Pike & Virginia Avenue (VA Route 42) signalized intersection.

The study area also includes portions of Park Road and Parkwood Drive within the EMU/EMHS campus. The EMU Campus in particular has very high numbers of pedestrians, as there are campus buildings on both sides of Park Road. There is sidewalk on the east side of Park Road and some marked midblock pedestrian crossings.

The purpose of the study is to analyze existing conditions and develop short-term and long-term improvements to accomplish the following goals:

- Improve the bicycle/pedestrian infrastructure, to more safely accommodate the pedestrians and bicyclists already using the corridor and in conjunction with the City's larger goal of encouraging bicyclists and pedestrians throughout the City.
- Accommodate the sidewalk and bicycle lane recommendations in the 2009 *Virginia School Travel Plan* for Waterman Elementary School.
- Address existing safety and geometric deficiency issues throughout the study area.
- Address access management concerns along Chicago Avenue.
- Develop mainline improvements which reduce traffic congestion and improve safety along the corridor.
- Develop intersection improvements that improve safety and accommodate projected future traffic volumes.

## I. INTRODUCTION

The Chicago Avenue and Mt. Clinton Pike corridors are in the northwestern part of the City of Harrisonburg. The corridors are generally set in older urban areas with a mixture of residential, commercial, institutional, and industrial land uses. There are several important community institutions within the corridor, including Waterman Elementary School (WES), Eastern Mennonite University (EMU), Eastern Mennonite High School (EMHS), the Red Front Supermarket, and the Gemeinschaft House halfway home.

The study area includes the following roads:

- Chicago Avenue from West Gay Street to Mt. Clinton Pike
- Mt. Clinton Pike from Lincolnshire Drive to Virginia Avenue (VA Route 42)
- Park Road from Mt. Clinton Pike to Parkwood Drive
- Parkwood Drive from Park Road to Virginia Avenue

The following intersections were studied in detail as a part of this study:

- Chicago Avenue & Waterman Drive
- Chicago Avenue & Mt. Clinton Pike & Park Road (existing offset-T intersection)
- Mt. Clinton Pike & Virginia Avenue
- Park Road & Parkwood Drive

The purpose of this study is to analyze the existing deficiencies along these corridors and develop recommended short-term and long-term improvements for the study area. The identified existing deficiencies include:

- Pedestrian/bicycle accommodations – there are a significant number of both pedestrians and bicyclists that can be observed using these corridors. However, there is a lack of adequate infrastructure to accommodate these nonmotorized travelers. Much of Chicago Avenue and Mt. Clinton Pike has no sidewalks, shared use paths, or bicycle lanes, forcing bicyclists into the street and pedestrians into the street or onto the grass. What pedestrian accommodations that do exist are generally not ADA-compliant.
- Safety/Speeding – there were numerous crashes within the study area from January 2007 to June 2010, as documented further below. In addition, the wide, straight sections of Chicago Avenue and Waterman Drive contribute to average speeds of 34 mph, and 35 mph, respectively – as compared to 25 mph posted speed limits.
- Traffic Volumes – both Chicago Avenue and Mt. Clinton Pike are high-volume Collector roads, with volumes ranging from 3800-5500 Average Daily Traffic (ADT) on Chicago Avenue and 5200-7400 ADT on Mt. Clinton Pike. There is also a relatively high amount of heavy truck traffic, particularly truck traffic coming to/from the quarry on Waterman Avenue and utilizing Chicago Avenue to get to Mt. Clinton Pike and Virginia Avenue.

- Intersection Capacity – The Chicago Avenue/Waterman Drive and Chicago Avenue/Mt. Clinton Pike/Park Road intersections currently operate near capacity. They are expected to both operate over capacity, with lengthy delays, in the year 2035 under both low-growth and high-growth scenarios.
- Geometric Deficiencies – Chicago Avenue is relatively straight and has gentle or rolling topography, however there are dozens of fixed objects, including high-tension power lines as close as 3.5 feet from the edge of road. Most of those fixed objects lack curbing or other protection. Chicago Avenue also cuts across the City grid at a skew, creating multiple intersections with awkward geometry.

Mt. Clinton Pike is much narrower, with just two 11-foot lanes and no shoulder on the north side and varied shoulder width on the south side. (The City completed a shoulder widening project on a portion of Mt. Clinton Pike in 2012 to provide some temporary refuge for pedestrians until a more substantial road improvement project can be done.) Moreover, it has significant topography, with grades as high as 9.6% and a hillcrest with significantly deficient stopping sight distance at the City/County line. There is also noticeably substandard intersection sight distance at the intersection of Mt. Clinton Pike and Lincolnshire Drive, in Rockingham County just beyond the City line.

- Access Management – Many of the commercial establishments along Chicago Avenue, especially Red Front Supermarket, have wide, poorly defined, closely spaced, and/or excessive numbers of entrances. This has a detrimental effect on both vehicular safety and pedestrian/bicyclist safety.
- Drainage – Chicago Avenue residents, particularly at the north end of the corridor, have often reported drainage problems. At 4<sup>th</sup> Street the road transitions from a curb & gutter section to an open shoulder section with no ditches or ditches that appear to be undersized. (The curb & gutter section will be extended north to Rockingham Drive on the west side once the Waterman Elementary School Safe Routes to School project is completed.) Moreover, the road is almost completely flat transversely, with little or no crowning.

In response to these concerns, the City tasked McCormick Taylor with doing a comprehensive study of these corridors and developing a series of short-term and long-term recommendations for improvements within the study area. This report details the results of that study. In particular, McCormick Taylor studied the following:

- The existing bicycle/pedestrian environment
- Harrisonburg Police Department accident records
- Existing geometric and design deficiencies
- Existing traffic volumes and capacity
- Existing drainage issues
- An environmental overview of notable natural and historic resources

- Other planning initiatives and current/anticipated land use
- Projected traffic volumes and capacity
- Existing public transit service and opportunities to enhance public transit service within the study area
- Potential short-term and long-term improvements, the potential benefits of those improvements, and the potential impacts of those improvements (environmental impacts, ROW impacts, utility impacts)

This study effort also included a Citizens Information Meeting on 4/19/11, where the public was given opportunity to provide input on the existing issues and potential improvements to the corridor. In addition, City staff have held meetings with the City's Transportation Safety & Advisory Committee and special stakeholder meetings with the Parkview Mennonite Agencies Council (which is comprised of representatives from EMU, EMHS, and the Virginia Mennonite Retirement Community), and Waterman Elementary School.

## II. EXISTING CONDITIONS

### Project Setting

The Chicago Avenue and Mt. Clinton Pike corridors are in the northwestern part of the City of Harrisonburg. The corridors are generally set in older urban areas with a mixture of residential, commercial, institutional, and industrial land uses.

The southernmost portion of Chicago Avenue is dominated by Waterman Elementary School, an older school building with distinctive stone architecture. In the blocks immediately north of the school, there is a wide cartway (36 feet of pavement plus curb and gutter on both sides) and a narrow sidewalk on the west side of Chicago Avenue.

The corridor changes character at Second Street, where the road has a sharp curve. North of Second Street, the sidewalk disappears and the dominant characteristic of the road is the Red Front Supermarket. Red Front Supermarket is an independent, local, family-owned supermarket that has been in existence since 1905 and in its current location since 1958. The Red Front Supermarket parcel is characterized by a "sea of asphalt" effect – the parking lot has no grass islands and the asphalt runs all the way to the road, with no buffer strip separating the parking lot from the road. Thick red pylons with chains are used to delineate the edge of the parking lot. The parking lot also has an unusually high number of entrances – three on Chicago Avenue and one on Third Street – with some of the entrances as close as 70 feet apart. There are also some other, smaller commercial establishments on both sides of Chicago Avenue.

North of Fourth Street, the curb and gutter ends and the road narrows slightly to a 30-foot width (two eleven-foot lanes and two four-foot shoulders). There is also a short stretch of Chicago Avenue between Rockingham Drive and Greystone Street that has an eight foot wide shared use path. This section is defined by its narrow

roadway, undulating pavement, and existing high tension utility poles on the eastern side of the roadway. These existing poles are within the minimum clear zone for a roadway with shoulder design, and present a major hazard to traffic.

Mount Clinton Pike serves the area by carrying more traffic than the other segments of the corridor. The existing section consists of two lanes of varying width from the County Line to the intersection with Virginia Avenue. Mount Clinton Pike also contains varying degrees of zoning, ranging from residential to commercial institutions. Mount Clinton Pike serves all properties in the corridor, and is commonly used to access EMU, Chicago Avenue, or as a causeway into Rockingham County.

Park Road is a wide two-lane facility with bike lanes which cuts through the campus of Eastern Mennonite University. This road sees a high degree of pedestrian traffic from students and faculty, as well as other area residents. Near the campus center, Park Road forms a T-intersection with Parkwood Drive, which exists as a two lane road connecting the campus to Virginia Avenue. Parkwood Drive also connects the campus to the existing athletic and recreation fields.

### Bicycle/Pedestrian Environment

The design team personally observed numerous citizens walking or biking along the existing corridor, with very few of these instances occurring on any pedestrian or bicycle facilities. Most pedestrian travel was done along the roadway and conflicted with the existing automobile traffic. While sidewalk exists along portions of Chicago Avenue, and along Park Road and Parkwood Drive, the network is incomplete and insufficient for the amount of existing pedestrian activity. This study will address the needs for pedestrian facilities and will propose these improvements with the developed alternatives.

### Public Transit Service

Currently, the corridor is serviced by "Route 5" by the Harrisonburg Department of Public Transportation (HDPT). This bus route routinely serves as a transport throughout the corridor, as well as a spur to the downtown area. With 11 stops throughout the study corridor, (eight along Chicago Avenue, two along Park Road, and one along Mount Clinton Pike), the residents have access to and from other points in the corridor, as well as the downtown district. These buses run from



7:09 AM to 6:56 PM Monday through Friday, and 9:09 AM through 5:56 PM on Saturday. Service is not offered on Sunday.

### III. OTHER PLANNING INITIATIVES

There are several completed or ongoing planning initiatives within the study area that have relevance to this study. These include the following:

- Comprehensive Plan – Harrisonburg’s current Comprehensive Plan was updated in 2011. The Comprehensive Plan has several recommended transportation elements, including the following:
  - A “Northwest Connector” limited access roadway that would run, roughly, from West Market Street just west of the city, around the west and north of the City, to the I-81/US Route 11 interchange north of the City (Exit 251).
  - Widening Mt. Clinton Pike from the Northwest Connector to Virginia Avenue, including the entire section of Mt. Clinton Pike within this study area.
  - Intersection improvements at the Mt. Clinton Pike, Chicago Avenue, & Park Road intersection, perhaps including a roundabout.
  - Building a connector road east of Virginia Avenue from Mt. Clinton Pike to Acorn Drive.
  - Connecting Acorn Drive to Friendship Drive.
  - Intersection improvements at Virginia Avenue and Acorn Drive, as well as Liberty Street and Acorn Drive.
  - Reconstructing Parkwood Drive as a three-lane road with median.
  - Connecting Summit Avenue to West Market Street; includes connecting Hillside Avenue to College Avenue.
  - Widening Chicago Avenue to provide a center turn lane between West Gay Street and Mt. Clinton Pike, along with bicycle/pedestrian improvements.
  - Constructing a roundabout or other intersection improvement at the Chicago Avenue & Waterman Drive intersection.
  - Widening Virginia Avenue from West Gay Street to Fifth Street.
  - Improving the intersection of Virginia Avenue / High Street and West Gay Street.
  - Reconstructing North Liberty Street from Edom Road to the North City Limits.
  - Improving West Washington Street from North Main Street to Liberty Street.

In addition, the Comprehensive Plan offers some general recommendations for public transit improvements, including expanding service beyond the City boundaries into the County and upgrading the amenities at higher volume bus stops to include items such as bus shelters, benches, and solar-powered lighting. The Comprehensive Plan also recommends relocating the Norfolk

Southern Lines (which currently intersect with Mt. Clinton Pike immediately east of Virginia Avenue) to the west of the City to reduce the frequent disruptions that occur at the at-grade railroad crossings, including the Mt. Clinton Pike at-grade railroad crossing.

- Bicycle & Pedestrian Plan – In 2010, The City completed its *Bicycle & Pedestrian Plan*, an update to the earlier 2005 *Pedestrian Plan* and the 1994 *Bicycle Plan* (updated in 2005). The plan has several general citywide recommendations for how to design future road improvements with bicyclists and pedestrians in mind. In addition, there are several recommendations that specifically apply to this study area, including:
  - Park Road – remove existing on-street parking and paint bicycle lanes. The plan notes that EMU supports this change. These changes have already been implemented.
  - WES Safe Routes to School (SRTS) Improvements – several improvements identified in the WES 2009 *Virginia Travel Plan*, as discussed further below. This was identified as a project in the five-year plan and is currently in final design.
  - Northend Greenway – construct a 10-ft wide shared use path from EMU and EMHS area to Mt. Clinton Pike where the path will follow Blacks Run into Downtown Harrisonburg.
  - Mt. Clinton Pike – reconstruct Mt. Clinton Pike and provide bicycle lanes from the west City limits to Virginia Avenue. This is identified as a high-priority improvement.
  - Chicago Avenue – reconstruct Chicago Avenue to provide bicycle lanes and sidewalks from Gay Street to Mt. Clinton Pike. The portion from Gay Street to the Rockingham Drive Trail is included in the five-year plan and the portion from the Rockingham Drive Trail to Mt. Clinton Pike is identified as a high-priority improvement.
  - Virginia Avenue – reconstruct Virginia Avenue to provide bicycle lanes from West Market Street to the north City limits. This is identified as a medium-priority improvement.
  - Waterman Drive – widen Waterman Drive from West Market Street to Chicago Avenue to accommodate bicycle lanes. This is identified as a low-priority improvement.
  - The Bicycle & Pedestrian Plan also supports the recommendations in the Comprehensive Plan for intersection improvements at the Chicago Avenue/Waterman Drive and Mt. Clinton Pike/Chicago Avenue/Park Road intersections.
- Waterman Elementary School Virginia School Travel Plan – In 2009, Harrisonburg City Public Schools and the Department of Public Works completed a School Travel Plan for WES to apply for infrastructure funding from the federal Safe Routes to School (SRTS) program. This plan identifies the current number of students who walk or bike to school and identifies a variety of methods (physical infrastructure improvements, safety campaigns, outreach to students and parents, etc.) to encourage more students to walk or bike to school. Following the completion of the plan, the City of Harrisonburg applied for SRTS

funding to implement many of the physical infrastructure identified in the plan. The City was awarded SRTS funding in 2010 and this project is currently in final design.

Specific to this study corridor, the School Travel Plan recommends the following improvements:

- 5' concrete sidewalk and curb and gutter along the western side of Chicago Avenue, from the intersection of Second Street to the intersection of Rockingham Drive.
- 5' concrete sidewalk and curb and gutter along the eastern side of Chicago Avenue, from the intersection of Second Street to the intersection of Stuart Street. This short section will connect to a proposed network in the neighborhood east of Chicago Avenue.

#### IV. CRASH ANALYSIS AND SAFETY STUDY

City of Harrisonburg Police Department crash records were analyzed for the period from January 2007 to June 2010. The results of this analysis are summarized below. Note that this total only includes crashes to which the police responded. Minor “fender bender” crashes in which the driver(s) chose not to report the crash to the police are not included in this study.

There were a total of 68 crashes within the project area. These crashes resulted in approximately \$240,000 worth of damage to vehicles. A diagram of where all the crashes occurred is shown in **Figure 2**.

The crashes break down by severity<sup>1</sup> as follows:

Severity	Number of Crashes	Percent
Fatal	0	0%
Major Injury	4	6%
Minor Injury	7	15%
No Injury (Property Damage Only)	57	79%
<b>Total</b>	<b>68</b>	<b>100%</b>

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<sup>1</sup> Severity is based on the police officer’s estimation of injury at the scene, not an evaluation by a medical professional. Injuries that are not immediately apparent to an untrained eye (e.g. concussions or internal bleeding) may not be accounted for in these statistics.

The crashes at the project area intersections are shown below:

Location	Total Crashes	Injury Crashes	Crashes involving peds
Mt. Clinton & Virginia	21	3	1
Chicago & Waterman	6	2	0
Mt. Clinton & Chicago	2	1	0
Chicago & Shenandoah	2	0	0
Chicago & 3 <sup>rd</sup>	2	0	0
Chicago & 2 <sup>nd</sup>	2	0	0
Parkwood & Virginia	1	1	0
Chicago & Greystone	1	0	0

By far the most significant number of crashes occurred at the Mt. Clinton Pike & Virginia Avenue intersection. A diagram of these crashes is shown in **Figure 3**. Of the 21 crashes at that intersection, the most prevalent types were angle crashes (13) and rear-end crashes (6).

One important thing to note is that many of those crashes occurred not at the intersection itself, but instead at the BB&T Bank entrance on Mt. Clinton Pike immediately to the west of the traffic signal. There were four angle crashes involving drivers entering or exiting that driveway, and another 2 rear-end crashes that appeared to involve drivers stopped in the through lane, trying to turn left into BB&T Bank or into Park View Plaza.

Some potential countermeasures that could alleviate that safety situation include widening Mt. Clinton Pike to provide a Two-Way Left Turn Lane (TWLTL) area so that drivers could turn left into BB&T Bank or Park View Plaza without blocking westbound through traffic on Mt. Clinton Pike. In addition, it is recommended that the City work with those property owners to develop a shared entrance for the two properties.

## V. EXISTING TRAFFIC CONDITIONS

City staff conducted Automatic Traffic Recorder (ATR) and manual turning movement counts on the key roads and intersections within the project area in October 2010. The counts were done on weekdays when City public schools and EMU/EMHS were in session. Based on that, McCormick Taylor synthesized the data to identify the peak hour volumes (shown in **Figure 4**) on the study roads and the following intersections:

1. Chicago Avenue & Waterman Drive
2. Chicago Avenue/Park Road & Mt. Clinton Pike (which was treated as one intersection for the purposes of traffic data collection and analysis)
3. Park Road & Parkwood Drive
4. Mt. Clinton Pike & Virginia Avenue

These counts included pedestrian and bicyclist counts as well as vehicular counts. The table below shows the number of pedestrians and bicyclists counted at each location during the peak hour.

Intersection	# of Pedestrians	# of Bicyclists
Chicago Avenue & Waterman Dr	7	29
Chicago Avenue/Park Road & Mt. Clinton Pike	17	19
Park Road & Parkwood Drive	187	24
Mt. Clinton Pike & Virginia Avenue	0	0

By far the most significant pedestrian volumes are at the Park Road & Parkwood Drive intersection, which is located in the heart of EMU's campus. However, more bicyclists were observed on Chicago Avenue near Waterman Drive. This is consistent with Chicago Avenue's function as an important bicycling corridor for the northwestern part of the City, and likely also reflects the value the community places in the current existing bicycle facilities, even with their current limitations.

The ATR data was also used to capture data on existing vehicle speeds. In general, Chicago Avenue's average speeds ranged from 29 to 34 mph, with the percent of vehicles traveling more than 10 mph over the speed limit ranging from 4%-12%. The highest-speed segments were at the north end of the corridor, closest to Mt. Clinton Pike.

Mt. Clinton Pike also showed signs of speeding, particularly in the westbound direction for drivers going past Park Road and heading into Rockingham County. This may reflect the fact that Mt. Clinton Pike transitions from 35 to 25 to 45 as you travel westbound from Virginia Avenue to Park Road to into the County.

**CHICAGO AVE CORRIDOR STUDY - SPEED DATA SUMMARY**

Road	Location	Direction	posted speed limit (mph)	Speed Percentages From One Week of Counts													average speed (mph)	85th %ile speed	% exceed speed limit	% exceed SL + 10	
				0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69					70-74
Chicago Ave	1st St -> 2nd St	NB	25	0.1%	0.7%	2.3%	17.8%	43.9%	25.8%	5.7%	1.8%	0.9%	0.5%	0.3%	0.2%	0.0%	0.0%	29	33.9	35.2%	3.7%
		SB	25	0.1%	0.6%	1.9%	12.0%	36.7%	33.6%	10.8%	2.5%	0.8%	0.6%	0.3%	0.3%	0.0%	0.0%	30	35.1	48.8%	4.5%
Chicago Ave	4th St -> Rockingham Dr	NB	25	0.0%	0.2%	0.9%	4.3%	24.0%	41.9%	21.0%	5.5%	1.3%	0.2%	0.4%	0.1%	0.1%	0.0%	33	38.2	70.5%	7.5%
		SB	25	0.1%	0.4%	1.0%	2.4%	16.4%	39.5%	26.8%	9.1%	2.4%	0.8%	0.5%	0.3%	0.2%	0.0%	34	39.7	79.7%	13.4%
Chicago Ave	Waterman Dr -> Mt Clinton Pk	NB	25	0.1%	0.3%	1.4%	6.1%	16.5%	35.4%	28.6%	9.3%	1.9%	0.4%	0.1%	0.1%	0.0%	0.0%	34	39.4	75.7%	11.7%
		SB	25	0.1%	0.5%	1.4%	5.4%	13.8%	36.9%	30.8%	9.2%	1.5%	0.3%	0.1%	0.0%	0.0%	0.0%	34	39.4	78.8%	11.1%
Mt Clinton Pk	Rockingham Cnty -> Park Rd	EB	25**	0.1%	0.6%	2.1%	13.7%	41.9%	31.4%	8.5%	1.3%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	29	34.2	41.6%	1.8%
		WB	25**	0.1%	0.8%	2.2%	12.4%	37.4%	33.0%	10.4%	2.1%	0.8%	0.4%	0.2%	0.2%	0.0%	0.0%	30	34.9	47.0%	14.0%
Mt Clinton Pk	Chicago Ave -> Virginia Ave	EB	35***	0.0%	0.1%	0.4%	2.2%	16.7%	44.7%	27.5%	6.1%	1.3%	0.5%	0.2%	0.1%	0.1%	0.0%	34	38.8	8.3%	0.8%
		WB	35***	0.0%	0.1%	0.3%	1.3%	8.3%	31.7%	38.9%	15.4%	3.0%	0.6%	0.2%	0.1%	0.1%	0.0%	36	41.4	19.4%	1.1%
Waterman Dr	West of Chicago Ave	EB	25	0.3%	1.7%	2.3%	4.2%	13.1%	32.7%	29.3%	11.2%	2.8%	1.1%	0.6%	0.4%	0.3%	0.0%	34	40.6	78.3%	16.3%
		WB	25	0.0%	0.3%	0.8%	2.2%	8.2%	31.1%	39.4%	15.1%	2.2%	0.4%	0.1%	0.1%	0.1%	0.0%	36	41.0	88.5%	18.0%
Park Road	Mt Clinton Pk -> Parkwood Dr	NB	25	0.1%	0.6%	3.1%	14.7%	38.6%	32.9%	7.9%	1.1%	0.4%	0.2%	0.2%	0.1%	0.0%	0.0%	29	34.2	42.8%	2.0%
		SB	25	0.1%	0.7%	3.2%	13.0%	33.2%	33.6%	11.0%	2.8%	1.2%	0.6%	0.3%	0.3%	0.1%	0.0%	30	35.6	49.8%	5.2%
Parkwood Dr	Park Rd -> Virginia Ave	EB	25	0.1%	0.8%	7.0%	19.3%	27.2%	26.0%	15.6%	3.2%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%	29	35.5	45.7%	4.1%
		WB	25	0.4%	1.0%	8.0%	20.5%	31.6%	25.1%	10.8%	2.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	28	34.7	38.4%	2.4%

\*\* Speed limit increases to 45 mph just west of Lincolnshire Drive in the County  
 \*\*\* Speed limit is 35 where the ATR tubes were placed, however the limit is reduced to 25 just west of the tubes (just east of Chicago Ave)

The capacity analysis was done using Synchro version 7, which in turn uses the methodology of the 2000 *Highway Capacity Manual*. For the purposes of this planning study the analysis focused solely on the PM peak hour period, which was considered the period with the most significant traffic volumes.

The table below summarizes the Level of Service<sup>2</sup> (LOS) results for 2010 PM Existing conditions.

Intersection	2010 PM LOS	2010 PM Delay (sec/veh)
Chicago Avenue & Waterman Dr	D	25
Chicago Avenue/Park Road & Mt. Clinton Pike	C	20
Park Road & Parkwood Drive	B	15
Mt. Clinton Pike & Virginia Ave	D	40

**Figure 5** summarizes the Level of Service (LOS) results for 2010 Existing PM peak conditions.

## VI. TRAFFIC VOLUME PROJECTIONS

As a start, McCormick Taylor examined potential future growth areas within the City and Rockingham County by reviewing the following:

- The City’s latest Comprehensive Plan
- The County’s latest Comprehensive Plan
- Potential future developable areas, as identified by the latest available aerial imagery

This information was discussed with the City at a status meeting on 12/7/10. The potential future growth areas are identified in **Figures 6 and 7**. Note that the City has informed us that much of the land available in area “G” may have already been developed since the aerial image was taken.

In general, this is a mature area without tremendous growth anticipated. Within the City, most of the land remains fully developed, with the exception of some small commercial parcels on Virginia Avenue and some Low Density Residential areas surrounding the quarry. The City has also indicated that the quarry is very active and they do not see the quarry being redeveloped for other, more traffic-generating land uses anytime in the foreseeable future.

West of the City, the County is almost completely undeveloped, with large amounts of available farmland. However, most of this area does not have sewer connections

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<sup>2</sup> Level of Service (LOS) is a scale from “A” to “F” used by traffic engineers to grade operating conditions at an intersection. LOS A represents the best operating conditions (completely unimpeded operations) and LOS F represents the worst operating conditions (volumes exceed the capacity of the intersection, with severe queuing resulting). For intersections, a LOS of D or better is typically considered acceptable. For unsignalized intersections, the LOS letter grade is based on the average delay to vehicles on the minor street (stop-signed) approach trying to cross or turn onto the major street. For signalized intersections, the LOS letter grade is based on the average delay to all vehicles that are entering the intersection.

and the County's Comprehensive Plan identifies most of this area as remaining agricultural land use. The one exception is a large 115-acre area west of the quarry, and near the areas also identified by the City as future residential areas.

The City has also indicated that it is anticipated that College Avenue may eventually be extended down to Market Street to service these City and County future growth areas. That linkage is an identified transportation improvement in the City's Comprehensive Plan.

If those areas do develop, it is expected that they would result in increased traffic on Waterman Drive, Chicago Avenue north of Waterman Drive, and Mt. Clinton Pike.

The City also discussed other potential future roadway extensions and widenings listed on the City's Comprehensive Plan. The Comprehensive Plan does identify a need for a future "Northwest Connector" that would encircle the northwestern part of the City, using in part Mt. Clinton Pike. This would include widening Mt. Clinton Pike through the study area, and extending/widening it east of Virginia Avenue. The City indicated that the full Northwest Connector is not likely to be constructed within the timeframe of this Corridor Study; however portions of it may be constructed. Therefore, it is reasonable to assume that through traffic on Mt. Clinton Pike may increase in future years.

### Travel Demand Model

McCormick Taylor next examined the latest available files for the Harrisonburg/Rockingham MPO. The model was last updated in 2009 when The Corradino Group converted the old TP+ model to a new Cube Voyager format. It is based on 2000 census data and uses a base year of 2007 and a projection year of 2035.

The model is divided into Traffic Analysis Zones (TAZ's), as shown in **Figure 8**. **Figure 9** shows the population, dwelling unit, and employment data for the TAZ's surrounding the study area. The majority of TAZ's show a fairly minimal 1%<sup>3</sup> per year growth in these metrics, and overall the study area is projected to have 1.0-1.2% per year growth. However, certain areas are projected to have greater levels of growth.

Next, the actual volumes for the links within the study area were examined, as shown in **Figure 10**. It is important to note that a travel demand model is a "macro"-level model and should NOT be used to directly derive future year projections. This travel demand model, like all TDM models, does not include all links, only certain primary links, and certain real-world constraints such as intersection capacity is not well modeled. However, it is useful to use the model to compare existing and projected volumes and compare the growth rate between the two scenarios.

---

<sup>3</sup> All growth rates reported in this memo refer to compounded growth rates. So, for example, a 1%/year compounded growth rate from 2010 to 2035 = 128.24% straight growth.

## Recommended Projections

McCormick Taylor was tasked with developing two scenarios, a “low-growth” and a “high-growth” scenario. For the Low-Growth scenario, it is assumed that traffic will grow by a uniform 1%/year growth rate throughout the study period to a design year of 2035. This represents a fairly modest level of growth and is consistent with the expected population, employment, and dwelling unit growth in future years.

For the high-growth scenario, a higher growth rate was used for certain links. A growth rate of 2% was used for Waterman Drive and Chicago Avenue north of Waterman Drive. This is used to represent the higher growth that could occur if some of the available lands within the City near the quarry are redeveloped. This also meets or exceeds the projected growth rates for those links in the Travel Demand Model.

A growth rate of 2.5% was used for the through movements on Mt. Clinton Pike. This is intended to account for the highest-growth scenario if all of the following things happen:

- Mt. Clinton Pike is improved east of Virginia Avenue, making it a more attractive road overall
- The remaining developable portions of the City and County are developed
- College Avenue is extended to Market Street, which would presumably increase traffic on Mt. Clinton Pike between College Avenue and Virginia Avenue.

This growth rate is higher than the growth rates projected by the Travel Demand Model. Typically, only fast-growing areas (for example, Henrico County and Prince William County) see such a high growth rate in the long term.

The resulting low-growth and high-growth volume peak-hour and ADT projections are shown in **Figures 11-A through 12-B**.

## **VII. ENVIRONMENTAL CONCERNS**

The study team performed a preliminary cursory review of existing environmental concerns throughout the corridor. Areas that were researched include wetlands, stream & floodplains, threatened & endangered species, and cultural & historic resources. The purpose of the environmental research was to determine if there were any existing environmental concerns which might impact the final corridor recommendations or conflict with future plans.

The results of the study conclude that there are no wetlands, streams, or floodplains along the study area which would be adversely impacted by corridor improvements.

No threatened or endangered species were identified within a two mile radius of the project corridor.

According to the review of the VDHR Data Sharing System (DSS) database conducted on September 11, 2010, there are no previously identified cultural and/or historic resources within the project area. Note that the Eastern Mennonite College Administration Building (DHR# 115-0026) located north of the project has been recommended 'Eligible' for listing in the National Register of Historic Places (NRHP).

Based on this research, there are no resources located within the project boundary that would prevent the development / improvement for bicycle / pedestrian access or modifications to intersections. It should be noted that formal coordination with the appropriate environmental agencies has not been conducted. As the corridor enters the engineering phase in the future, additional coordination with the agencies may be necessary, depending on the project funding mechanism.

### **VIII. DRAINAGE IMPROVEMENTS**

For improved drainage, an adequate cross slope must be addressed within the roadway cross section. This combined with added curb & gutter improvements, as well as a closed storm sewer system, will eliminate local pockets of inadequate drainage and move stormwater downstream to its discharge point. This will likely require some upgrades to the existing storm sewer system, particularly along the south side of Mt. Clinton Pike as this appears to be sized for minimal drainage. The area crossing Virginia Avenue (Rt. 42) will also require additional analysis to ensure its adequacy to its eventual outfall at Blacks Run.

There are three practical potential sites for stormwater management basins that will likely be needed to temper additional runoff and to improve water quality. The first is on the north side of Mt. Clinton Pike, just east of Park Road. This site is situated at a point where it will be able to receive flow traveling eastward along Mt. Clinton Pike and then discharge along Mt. Clinton Pike to the outfall at Rt. 42. The second is just south of Mt. Clinton Pike, and east of Chicago Avenue. Similar to the first site, this site will be able to receive flow along Mt. Clinton Pike as well as any additional pavement generated by the roadway and intersection improvements. This location will likely require enhancements to the outfall storm sewer as the stormwater flow makes its way to Blacks Run. The third location is at the north east corner of the Park View Shops owned by the City on Chicago Avenue, just south of Greystone Street. This site is located near the sag in the roadway so it can accept flow from several directions, but has a slightly less clear outfall path. Water exits the site to the south west but eventually makes it way back to a roadside ditch along Waterman Drive. This ditch will require further analysis and possible upgrades.

## IX. ALTERNATIVES DEVELOPMENT AND ANALYSIS

Once the existing conditions and long term plans for the corridor were reviewed, the study team sought out several potential alternatives which focused on addressing the needs for the area. Several alternatives were developed for each portion of the corridor, as well as numerous intersection alternatives. Each of the following alternatives would include the necessary drainage, traffic, right of way, and utility improvements which are inherent to projects of this nature.

- MAINLINE ALTERNATIVES (See **Figures 13 and 14**)
  - **Chicago Avenue** – Alternatives were developed for a 2-lane and 3-lane section. Both alternatives would include bicycle lanes and sidewalks on both sides of the roadway. Either of these alternatives would result in minimal impact to the existing properties and utilities along the corridor, with a higher degree of impact concentrated at each intersection and varying based on the level of improvement.
  - **Mount Clinton Pike** – Alternative developed consists of a 2-lane median divided section (median eliminated as it approaches the City / County border) with turning lanes based on traffic patterns and projections. This alternative includes bicycle lanes and sidewalks on both sides of the roadway. Note, however, that with the development of the Northend Greenway, a shared use path on the north side of Mt. Clinton Pike may be included in lieu of bike lanes and sidewalks on the north side. With either scenario, this full alternative would result in minimal impacts to the existing properties and utilities along the majority of the corridor, with a high degree of impact at the intersection of Chicago Avenue / Mount Clinton Pike / Park Road, depending on the intersection alternative selected.
  - **Park Road** – Alternative developed consisting of 2-lane section to match existing roadway. This alternative includes bicycle lanes and sidewalks on either side of the roadway. Property and utility impacts would be minimal.
  - **Parkwood Drive** – Alternative developed will widen the existing 2-lane section to a 3-lane section to include a flush median / turning lane. Property and utility impacts would be moderate depending on the method of widening selected (i.e. which side of the road is widened).
- INTERSECTION ALTERNATIVES (See **Figures 15 and 16**)
  - **Chicago Avenue / Waterman Drive** – Key intersection along the corridor which currently exists as a skewed free flow intersection with stop control along Waterman Drive.
    - A roundabout concept is the most functional, but would result in the maximum property impact to the intersection. It should be noted that the property at the western quadrant of the intersection is currently owned by City Public Works, so the intersection improvements were focused on that location under the assumption that it would provide the least amount of public resistance. This alternative would produce a Level of Service "A" for the intersection.

- A realignment concept was developed which would make Waterman Avenue the “through” movement, and Chicago Avenue would connect to Waterman Avenue with a stop sign-controlled approach. Similar to the roundabout concept, impacts were directed toward the western quadrant of the intersection. This alternative would produce a LOS B for the intersection.
- An alternative was developed to maintain the existing configuration, but improve the intersection with turning lanes, slip ramp lanes, and stop control features. This alternative is the least desirable from a traffic standpoint, but results in the least amount of property impact. This alternative would produce a LOS C for the intersection.
- **Mount Clinton Pike / Chicago Avenue / Park Road** – Critical intersection which currently exists as an “offset-T” intersection with stop control on Chicago Avenue and Park Road.
  - A roundabout concept was developed which considered all modes of transportation (truck traffic turning movements, etc.) This concept provided the maximum property impact to the intersection. Numerous relocations would be required, and the existing gasoline / service station at the corner of Chicago Avenue and Mount Clinton Pike would most likely be adversely impacted, as well as some existing residential structures. This alternative would produce a LOS A for the intersection.
  - A realignment concept was developed to eliminate the existing offset configuration. It would align Park Road and Chicago Avenue to create a more traditional signal controlled intersection. This alternative would result in property impacts similar to the roundabout concept. This alternative would produce a LOS B for the intersection.
  - An alternative was developed to maintain the existing configuration, but improve the intersection with turning lanes, medians, and stop control features. This alternative is the least desirable from a traffic standpoint, but results in the least amount of property impact. This alternative would produce a LOS C for the intersection.
- **Mount Clinton Pike / Virginia Avenue (Route 42)** – Existing signalized intersection.
  - One alternative was developed which would connect the proposed improvements to Mount Clinton Pike into Virginia Avenue. It includes the additional turning lanes needed. This alternative would produce a LOS C for the intersection.
  - Not shown in Figures 15 and 16 are concepts for how the Northend Greenway will navigate through this intersection. Intersection concepts will be developed with the Northend Greenway project.
- **Park Road / Parkwood Drive** – Existing T-intersection with stop control on Parkwood Drive.
  - One roundabout alternative was developed for this intersection in the center of the EMU campus. Focus was given to pedestrian

accessibility and traffic requirements. This alternative would produce a LOS A for the intersection.

○ **Miscellaneous Intersections**

- The existing alignment of Chicago Avenue creates many skewed intersections along the corridor. As shown on Boards 5A and 5B, there are numerous ways to reconfigure these intersections in order to improve safety. Improvement can be performed for the majority of the intersections without excessive property impacts via realignment and the additions of slip-lanes and stop control features.

## **X. CITIZENS INFORMATION MEETING**

A Citizens Information Meeting (CIM) was held on April 19, 2011 at Park View Mennonite Church. Presented materials included traffic and crash data, mainline alternatives, and intersection alternatives in order to obtain public input.

108 citizens attended the meeting and provided comments based on the material presented. Citizens were encouraged to review the information and provide feedback via the distributed comment sheets. The citizens were asked to rank several of the existing corridor features, and the results are detailed in the attached Public Meeting Comment Summary. Results of the meeting are as follows:

- Overwhelmingly, citizens ranked the lack of pedestrian / bicycle facilities as the most serious issue currently along the corridor. When coupled with the amount of pedestrian / bicycle traffic observed along the corridor, as well as the proximity of the college campus and other institutions, this conclusion seems more than reasonable.
- Safety is a serious consideration for the citizens. In addition to the need for additional traffic control, this concern can likely be attributed to the lack of existing pedestrian facilities.
- Speeding is another serious consideration for the citizens. The alternatives presented would reduce the amount of speeding along the corridor. Numerous citizens also voiced a preference to reduce the speed limit along Chicago Avenue.
- Traffic congestion is a moderate concern. The alternatives presented would relieve a great deal of the traffic congestion.
- The lack of public transit is another moderate concern. Additional public transit features such as buses will be considered by the City.
- Stormwater drainage is a concern to the citizens, especially near the intersection of Chicago Avenue and Mount Clinton Pike. All of the alternatives presented would alleviate these problems with curb and gutter and improved stormwater management techniques.
- Some of the lower concern issues addressed include aesthetics, environmental concerns, property impacts, taxpayer cost, street lighting, and zoning revisions. While all of these issues can be improved, the majority of

the citizen concern was centered on pedestrian facilities, corridor safety, traffic congestion, and public transit.

The citizens were also asked whether they would prefer a roundabout or conventional intersection at the intersection of Chicago Avenue / Mount Clinton Pike / Park Road. The majority of commenter's who responded (72 out of 91) prefer a roundabout at this location and feel that it would best serve the needs of the intersection.

## XI. RECOMMENDATIONS

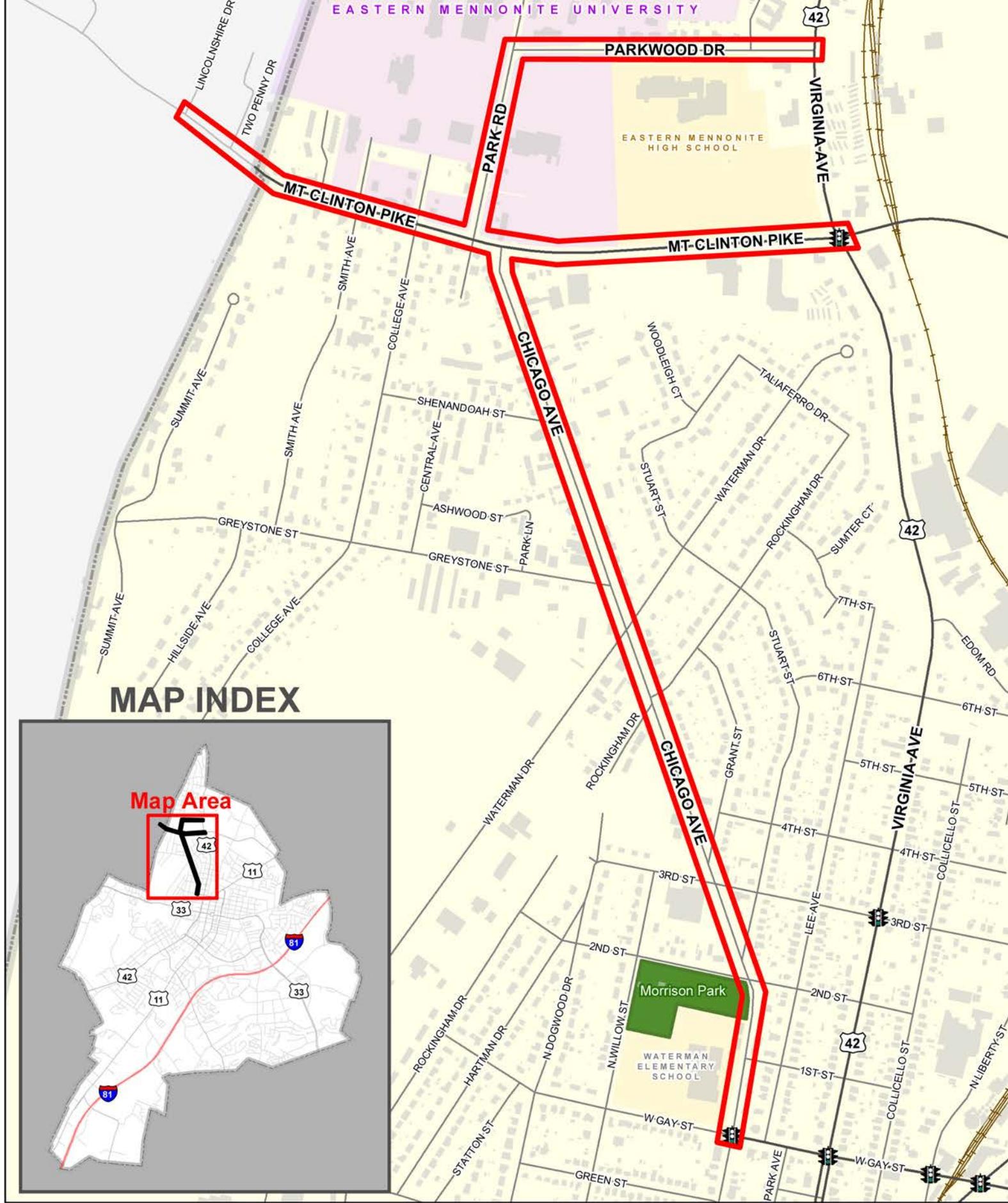
After the Citizens Information Meeting in April 2011, the design team compiled and analyzed the data in order to determine short-term and long-term recommendations for the corridor.

### SHORT-TERM SOLUTIONS

- **Intersection Roundabout:** As previously stated, the citizens have a great deal of concern with the lack of pedestrian facilities and traffic congestion along the corridor, specifically at the Chicago Avenue / Waterman Drive and Chicago Avenue / Mount Clinton Pike / Park Road intersections. We recommend that the City investigate the potential for a roundabout at these locations. These alternatives, if warranted based on traffic projections, would create the needed pedestrian facilities in order to safely traverse the intersections, improve intersection safety for pedestrians and drivers alike, improve the traffic congestion by improving traffic control, and provide an opportunity for quality aesthetic and street lighting features.
- **Access Management:** Perform access management improvements along the corridor, specifically along Chicago Avenue near the Red Front Supermarket and on Mt. Clinton Pike just west of Virginia Avenue (by consolidating the BB&T Bank and Park View Plaza entrances). The consolidation and elimination of many of the entrances, as well as revising the entrance locations and spacing will create a safer and more efficient corridor for pedestrians, bicyclists, and drivers.
- **Obstruction Shielding:** Install barrier curb and gutter and / or concrete barrier in the proximity of the existing high tension power lines along Chicago Avenue as it approaches the intersection with Mount Clinton Pike. The existing poles are well within the required clear zone distance for fixed objects based on the 2006 AASHTO Roadside Design Guide. These present a dangerous collision hazard, specifically at night or during inclement weather.
- **Mass Transit:** The current bus system can be improved if funding permits and the need is dictated. Options for improving this include expanding service into the evening hours, and on Sundays; increasing the frequency of trips around the various institutions, specifically EMU; adding a bus to the route which would double the frequency of pickup; and/or creating an additional transfer station just north of the downtown area in order to increase bus frequency along the corridor.

LONG-TERM SOLUTIONS

- ***Pursuing Alternatives:*** In order to achieve the goals set forth for the corridor, the City will need to pursue several of the alternatives presented to the public. General improvements in each segment of the corridor, including the addition of pedestrian facilities, roadway widening where needed, improved intersection configurations, and improved stormwater management techniques must be included in the long-term plan. Once implemented, the citizens along the corridor should enjoy an improved standard of living in a safer, cleaner, and more-aesthetic corridor.

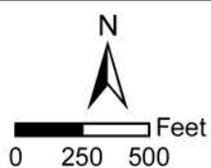


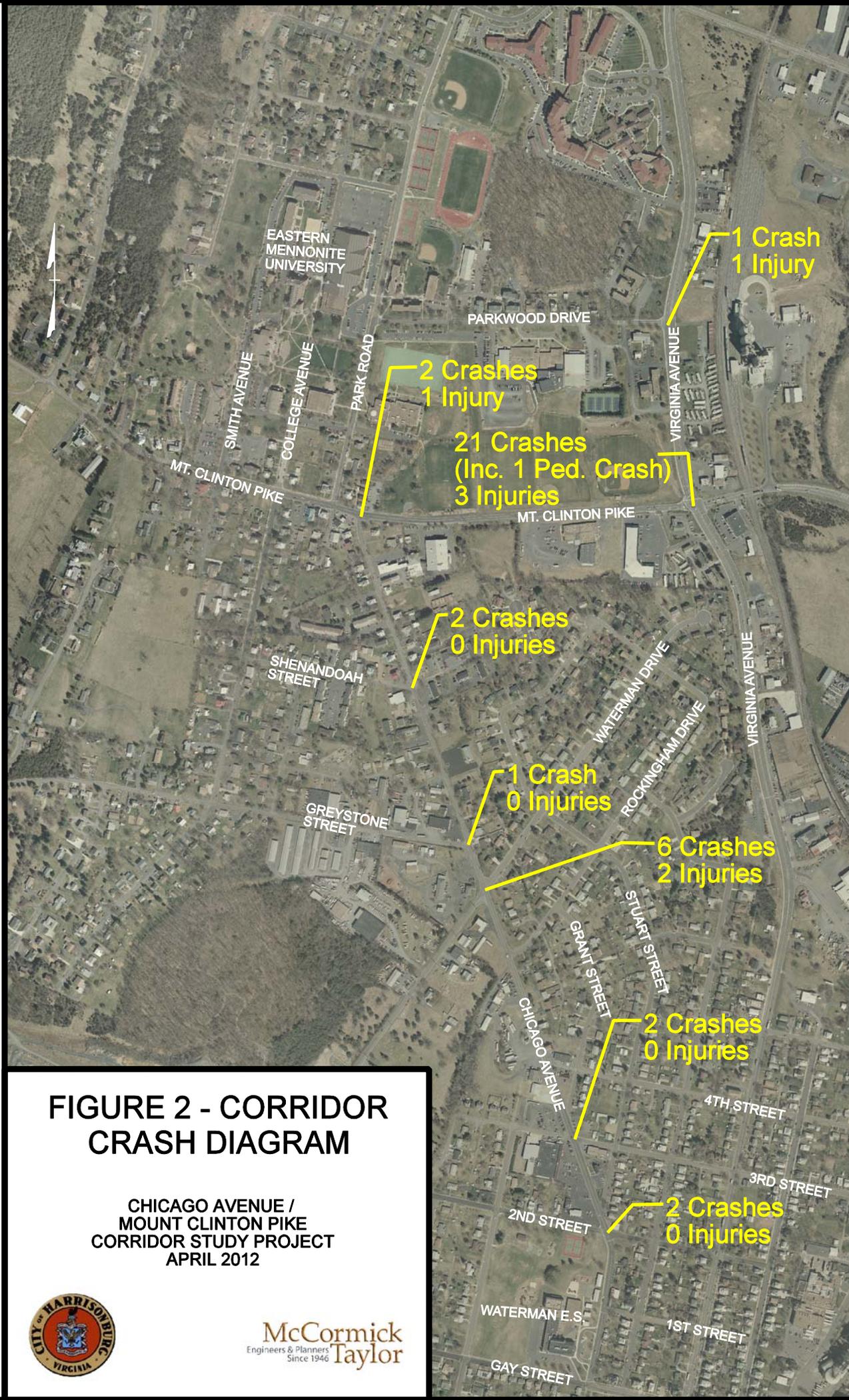
**MAP INDEX**



**Legend**  
 Study Area

**Chicago Ave Corridor Study**  
**Figure 1 - Project Overview**



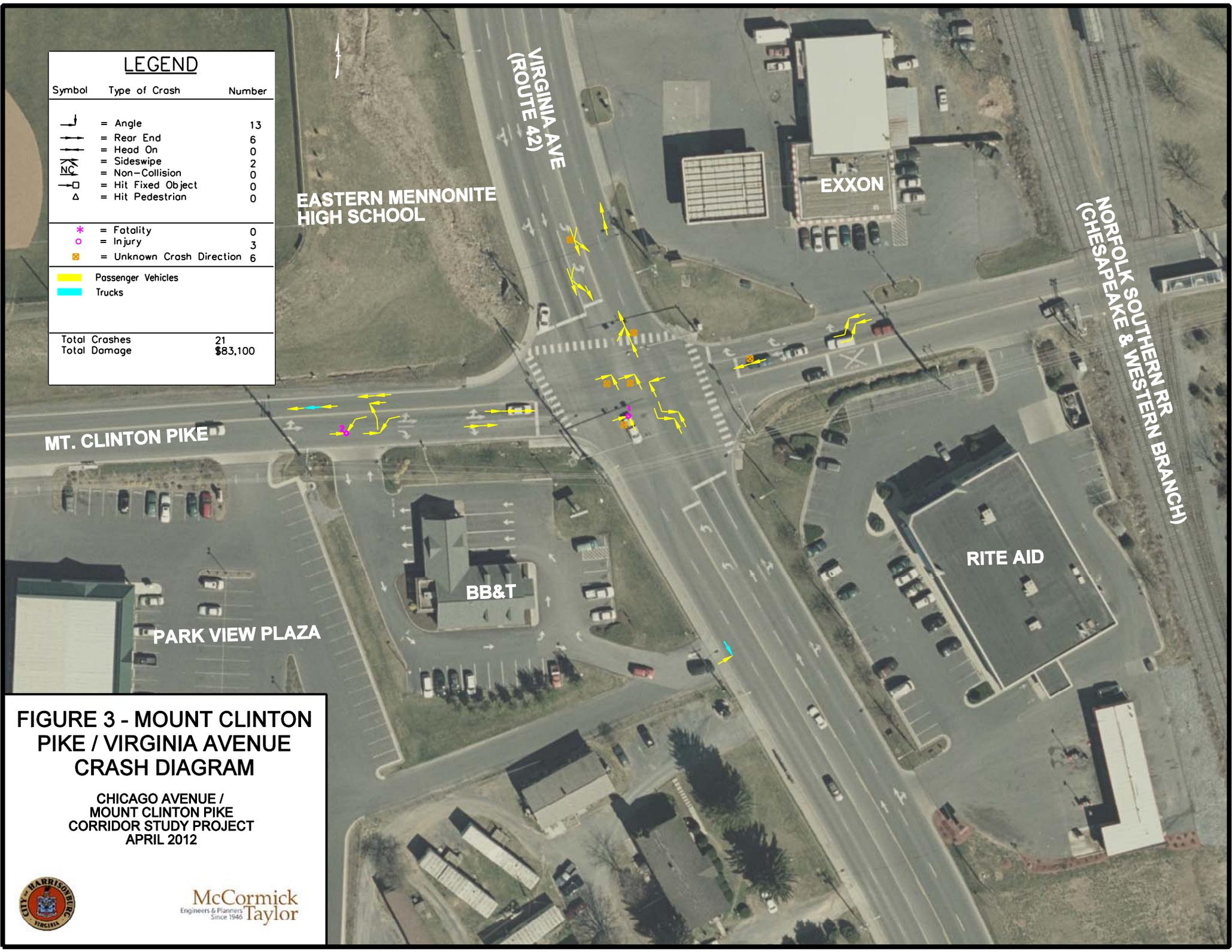


## FIGURE 2 - CORRIDOR CRASH DIAGRAM

CHICAGO AVENUE /  
MOUNT CLINTON PIKE  
CORRIDOR STUDY PROJECT  
APRIL 2012



LEGEND		
Symbol	Type of Crash	Number
	= Angle	13
	= Rear End	6
	= Head On	0
	= Sideswipe	2
	= Non-Collision	0
	= Hit Fixed Object	0
	= Hit Pedestrian	0
<hr/>		
	= Fatality	0
	= Injury	3
	= Unknown Crash Direction	6
<hr/>		
	Passenger Vehicles	
	Trucks	
<hr/>		
Total Crashes		21
Total Damage		\$83,100



EASTERN MENNONITE HIGH SCHOOL

EXXON

NORFOLK SOUTHERN RR (CHESAPEAKE & WESTERN BRANCH)

RITE AID

BB&T

PARK VIEW PLAZA

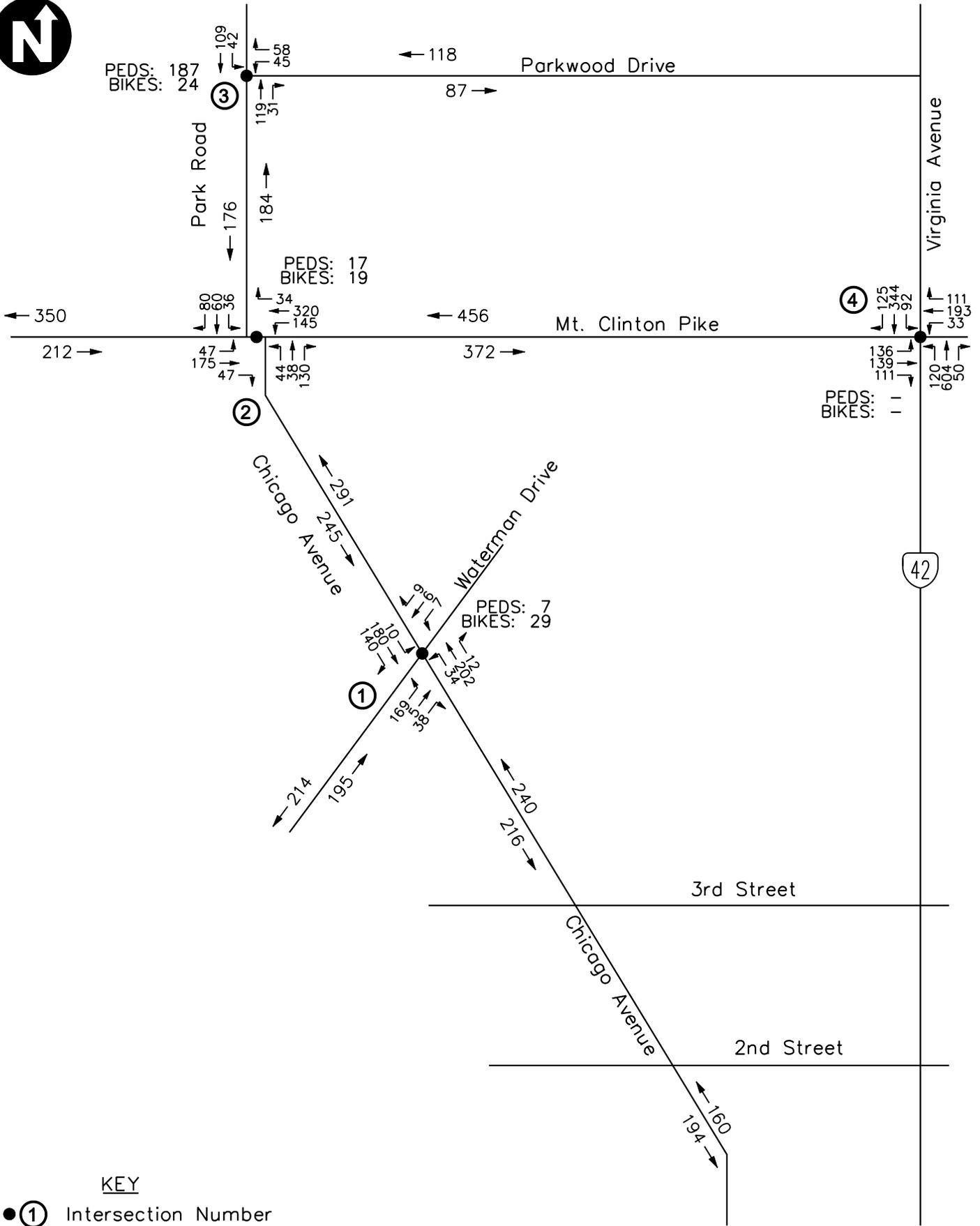
VIRGINIA AVE (ROUTE 42)

MT. CLINTON PIKE

**FIGURE 3 - MOUNT CLINTON PIKE / VIRGINIA AVENUE CRASH DIAGRAM**

CHICAGO AVENUE / MOUNT CLINTON PIKE CORRIDOR STUDY PROJECT  
APRIL 2012





**KEY**

● ① Intersection Number



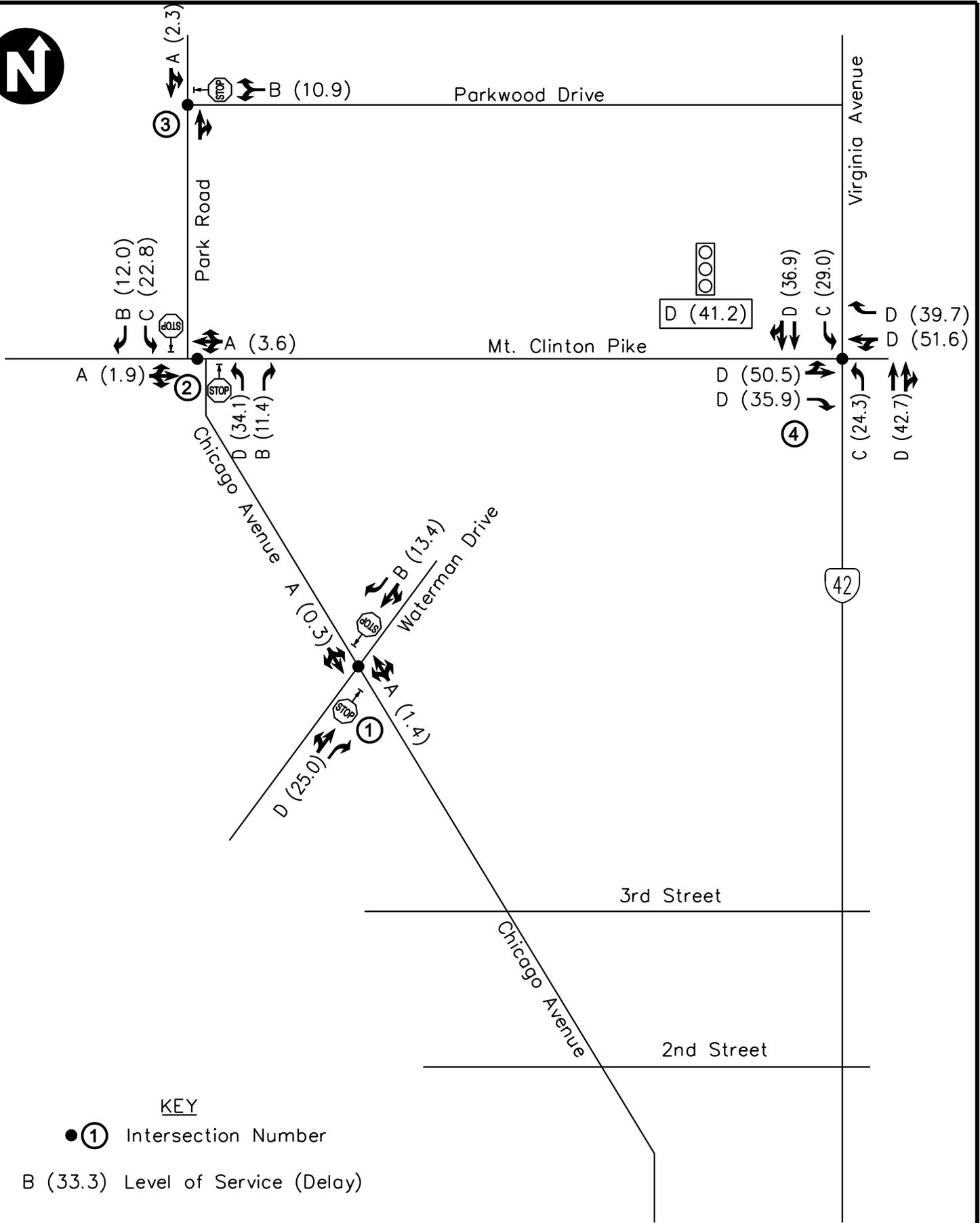
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 Since 1946

**CHICAGO AVENUE/  
 MT. CLINTON PIKE  
 CORRIDOR STUDY**

**CITY OF HARRISONBURG, VA**

**FIGURE 4**

**2010 EXISTING  
 PM PEAK HOUR  
 TRAFFIC VOLUMES**



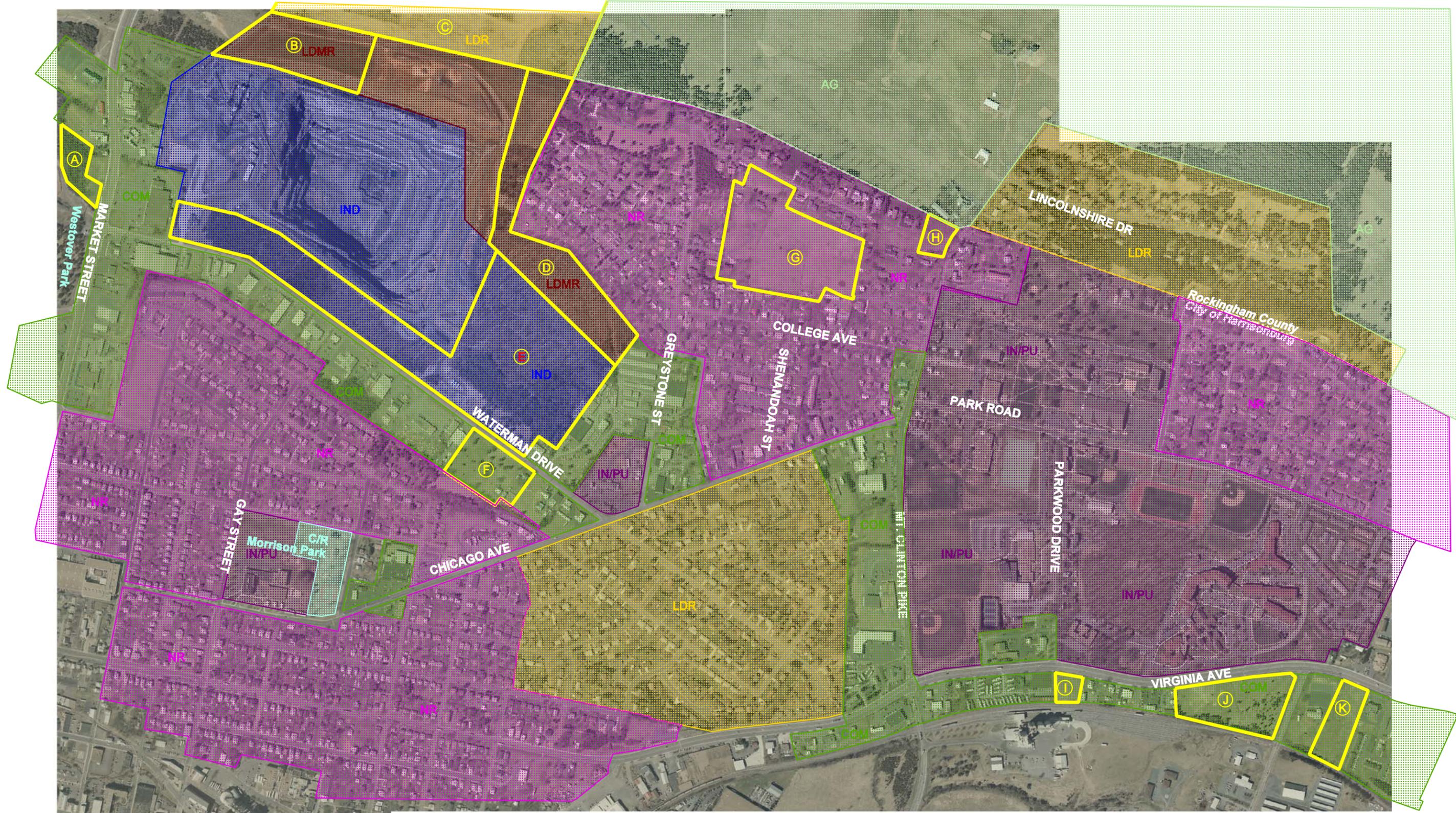
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 CORRIDOR STUDY**

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**FIGURE 5**

**2010 EXISTING  
 PM PEAK HOUR  
 LEVEL OF SERVICE**



**LEGEND**

- |                               |                         |              |
|-------------------------------|-------------------------|--------------|
| Low Density Residential       | Commercial/Professional | Agricultural |
| Low Density Mixed Residential | General Industrial      |              |
| Neighborhood Residential      | Conservation/Recreation |              |
| Institutional/Public          | Developable Parcels     |              |

CHICAGO AVENUE/  
MT. CLINTON PIKE  
CORRIDOR STUDY  
CITY OF HARRISONBURG, VA



FIGURE 6  
PLANNED LAND USE  
AND AREAS OF FUTURE GROWTH



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## FIGURE 7 - POTENTIAL FUTURE GROWTH AREAS

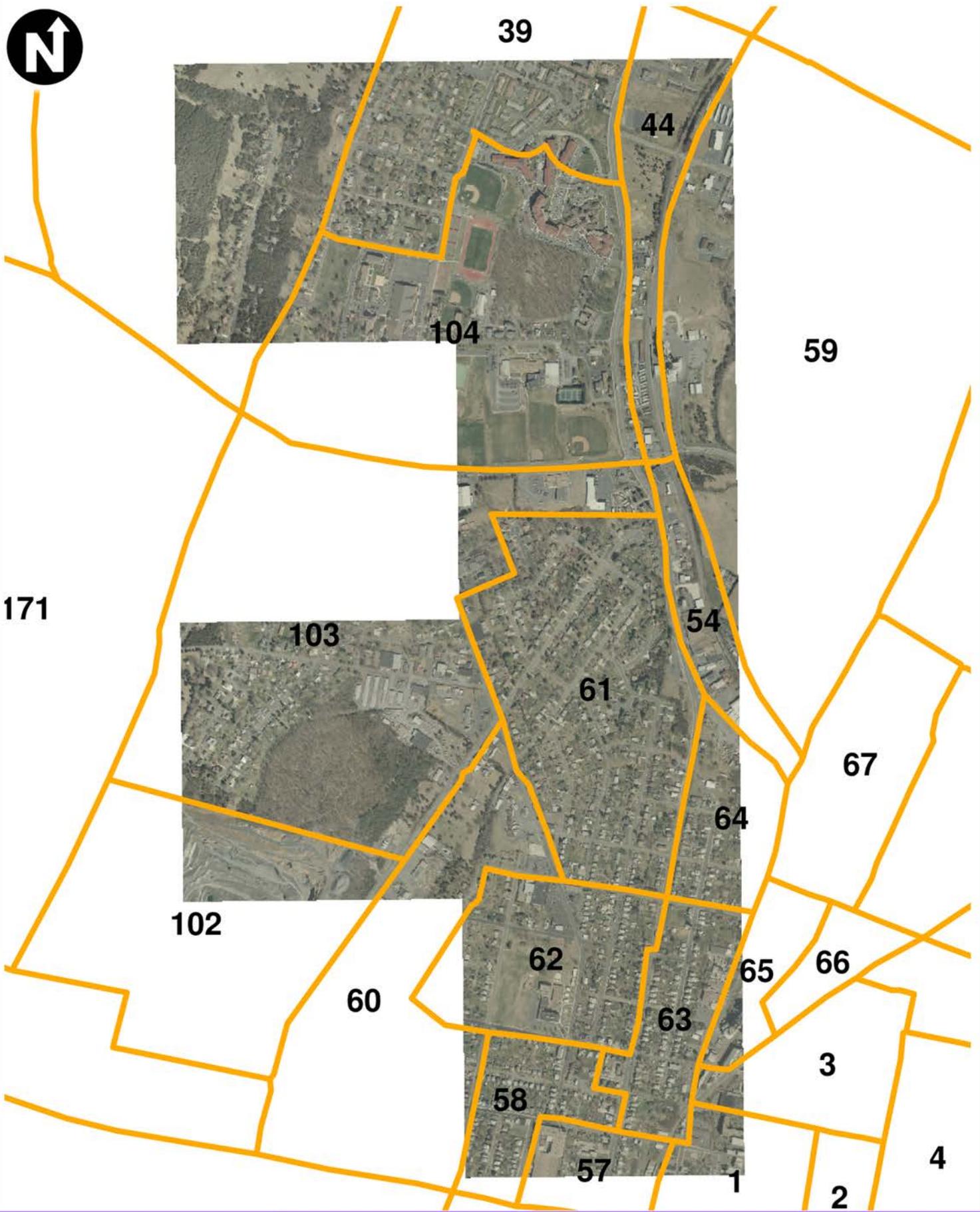
Parcel	Size	Locality	Current Use	Comprehensive Plan
A	2.2 acres	Harrisonburg	mostly wooded	Commercial
B	9.3 acres	Harrisonburg	edge of quarry	Low-Density Mixed Res
C	115 acres	Rockingham	agricultural	Low-Density Residential
D		Harrisonburg	mostly wooded	Low-Density Mixed Res
E	40 acres	Harrisonburg	mostly wooded	Industrial
F	4.8 acres	Harrisonburg	open space	Commercial
G	15.8 acres	Harrisonburg	open space	Neighborhood Residential
H	1.3 acres	Harrisonburg	open space	Neighborhood Residential
I	.9 acres	Harrisonburg	open space	Commercial
J	6.7 acres	Harrisonburg	open space	Commercial
K	3.2 acres	Harrisonburg	open space	Commercial



CHICAGO AVENUE /  
MOUNT CLINTON PIKE  
CORRIDOR STUDY

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**FIGURE 9 - POPULATION AND EMPLOYMENT BY TAZ**

TAZ	2000			2030			% Change		
	Population	Dwelling Units	Employment	Population	Dwelling Units	Employment	Population	DU	Employment
1	307	209	2,472	462	273	2,617	1.4%	0.9%	0.2%
3	79	36	231	195	84	376	3.1%	2.9%	1.6%
39	938	501	108	1,092	565	253	0.5%	0.4%	2.9%
43	255	117	56	641	278	201	3.1%	2.9%	4.4%
44	147	66	512	301	130	657	2.4%	2.3%	0.8%
54	10	3	97	10	3	242	0.0%	0.0%	3.1%
57	211	86	496	211	86	641	0.0%	0.0%	0.9%
58	397	155	24	397	155	24	0.0%	0.0%	0.0%
59	38	12	449	38	12	850	0.0%	0.0%	2.2%
60	529	264	356	529	264	456	0.0%	0.0%	0.8%
61	842	341	271	842	341	271	0.0%	0.0%	0.0%
62	306	146	139	422	194	179	1.1%	1.0%	0.8%
63	348	155	182	348	155	327	0.0%	0.0%	2.0%
64	252	110	55	406	174	200	1.6%	1.5%	4.4%
102	0	0	20	0	0	64	--	--	4.0%
103	1,068	523	200	1,223	587	345	0.5%	0.4%	1.8%
104	1,861	504	294	2,788	890	696	1.4%	1.9%	2.9%
105	380	160	14	457	196	14	0.6%	0.7%	0.0%
170	167	65	0	244	101	0	1.3%	1.5%	--
171	231	84	15	664	286	38	3.6%	4.2%	3.1%
172	222	77	0	299	113	0	1.0%	1.3%	--
	<b>8,588</b>	<b>3,614</b>	<b>5,991</b>	<b>11,569</b>	<b>4,887</b>	<b>8,451</b>	<b>1.0%</b>	<b>1.0%</b>	<b>1.2%</b>



CHICAGO AVENUE /  
MOUNT CLINTON PIKE  
CORRIDOR STUDY

CITY OF HARRISONBURG, VA

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**FIGURE 10 - SELECT LINKS  
FROM HRMPO TRAVEL DEMAND MODEL**

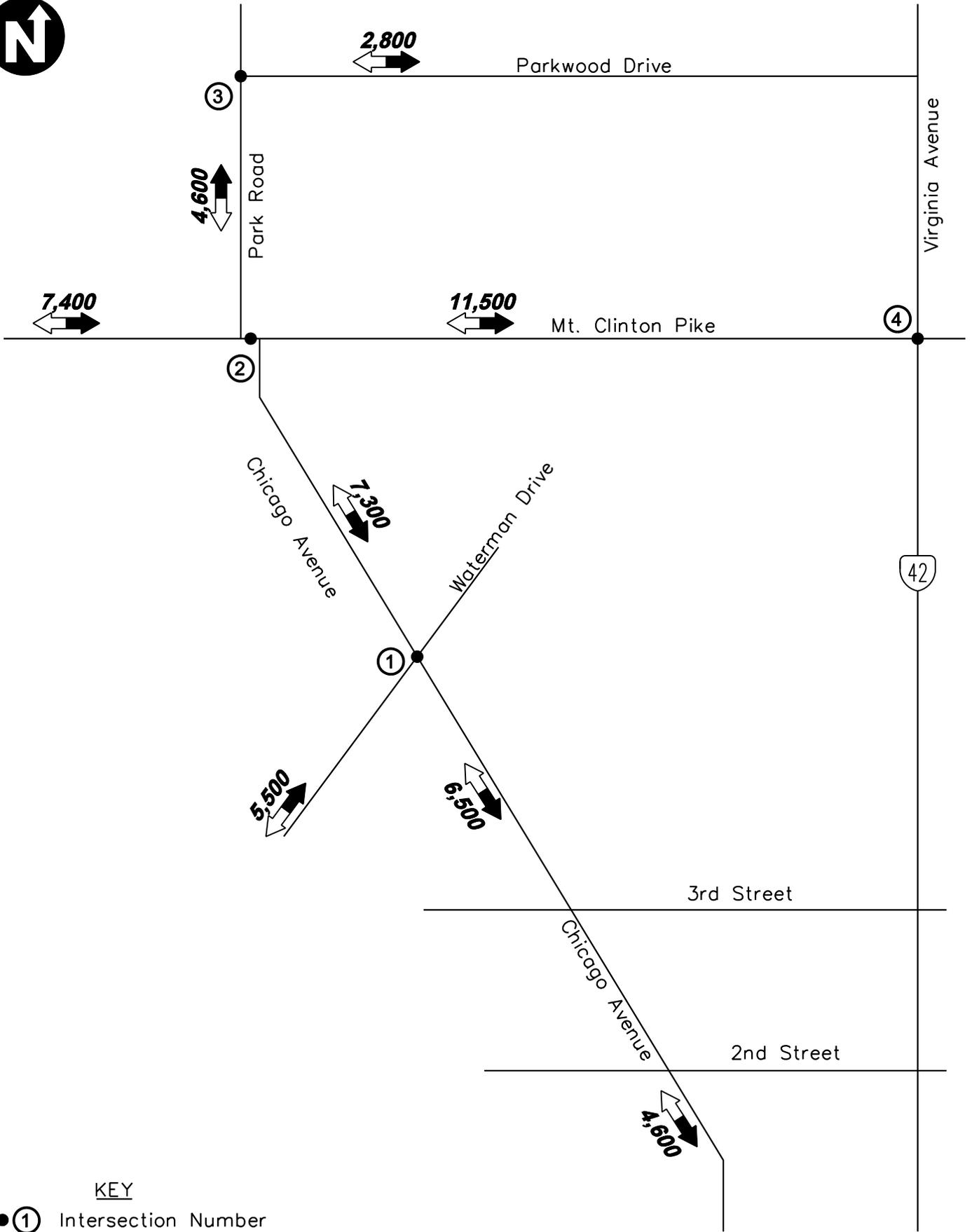
Road	Location	2007 ADT	2035 ADT	Growth Rate
Chicago Ave	south of Waterman	7414	9638	0.9%
Chicago Ave	north of Waterman	8700	12305	1.2%
Chicago Ave	south of Mt Clinton	5662	8647	1.5%
Mt Clinton Pike	west of the City	5587	10624	2.3%
Mt Clinton Pike	College - Park	6311	11968	2.3%
Mt Clinton Pike	Chicago - Virginia Ave	7541	13702	2.2%
Waterman Dr	west of Chicago	1819	3203	2.0%
Park Road	north of Mt Clinton	7734	13134	1.9%
Virginia Ave	south of Mt Clinton	13140	17009	0.9%
Virginia Ave	north of Mt Clinton	12976	17299	1.0%



CHICAGO AVENUE /  
MOUNT CLINTON PIKE  
CORRIDOR STUDY

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**KEY**

● ① Intersection Number



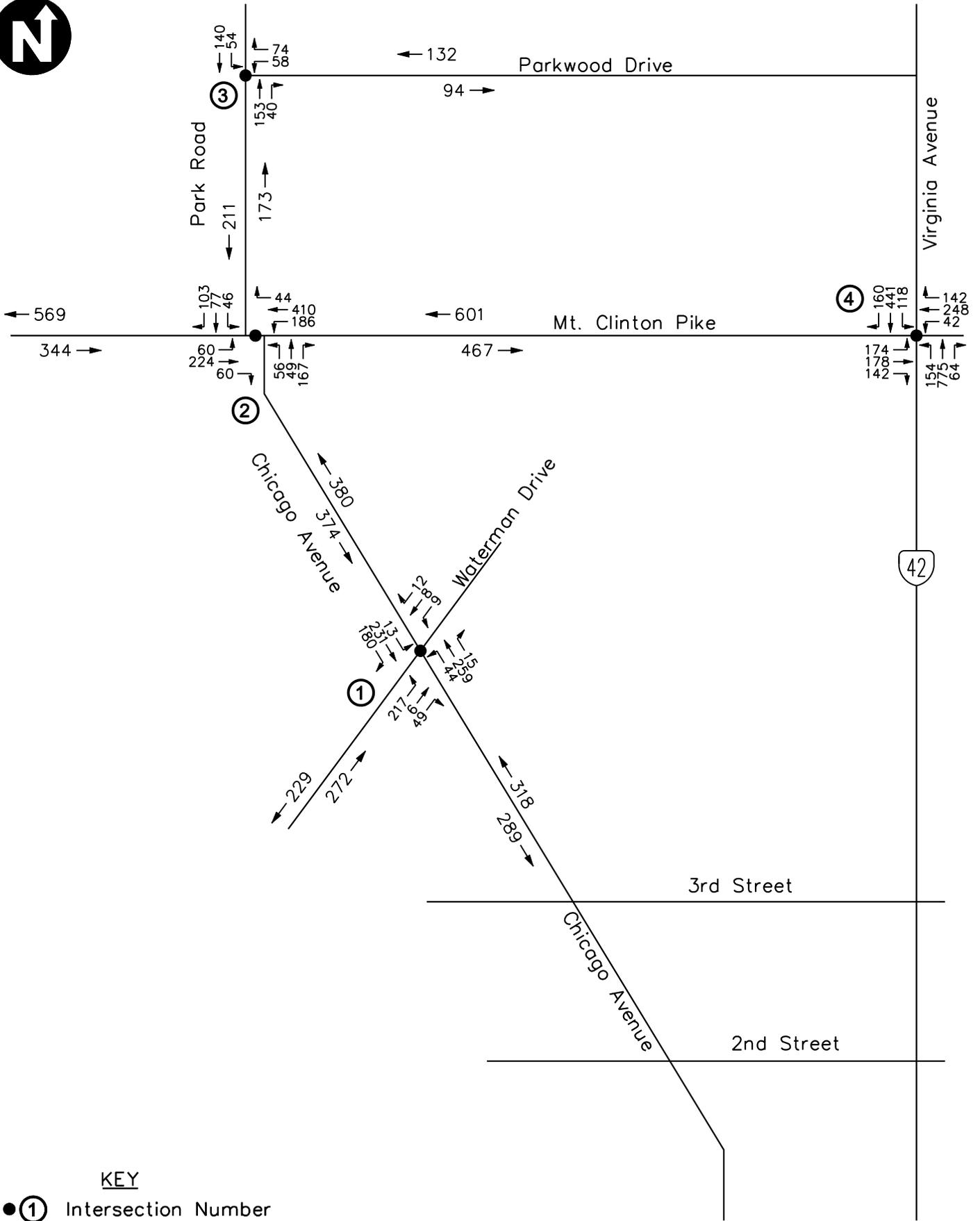
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MT. CLINTON PIKE  
CORRIDOR STUDY**

**CITY OF HARRISONBURG, VA**

**FIGURE 11-A**

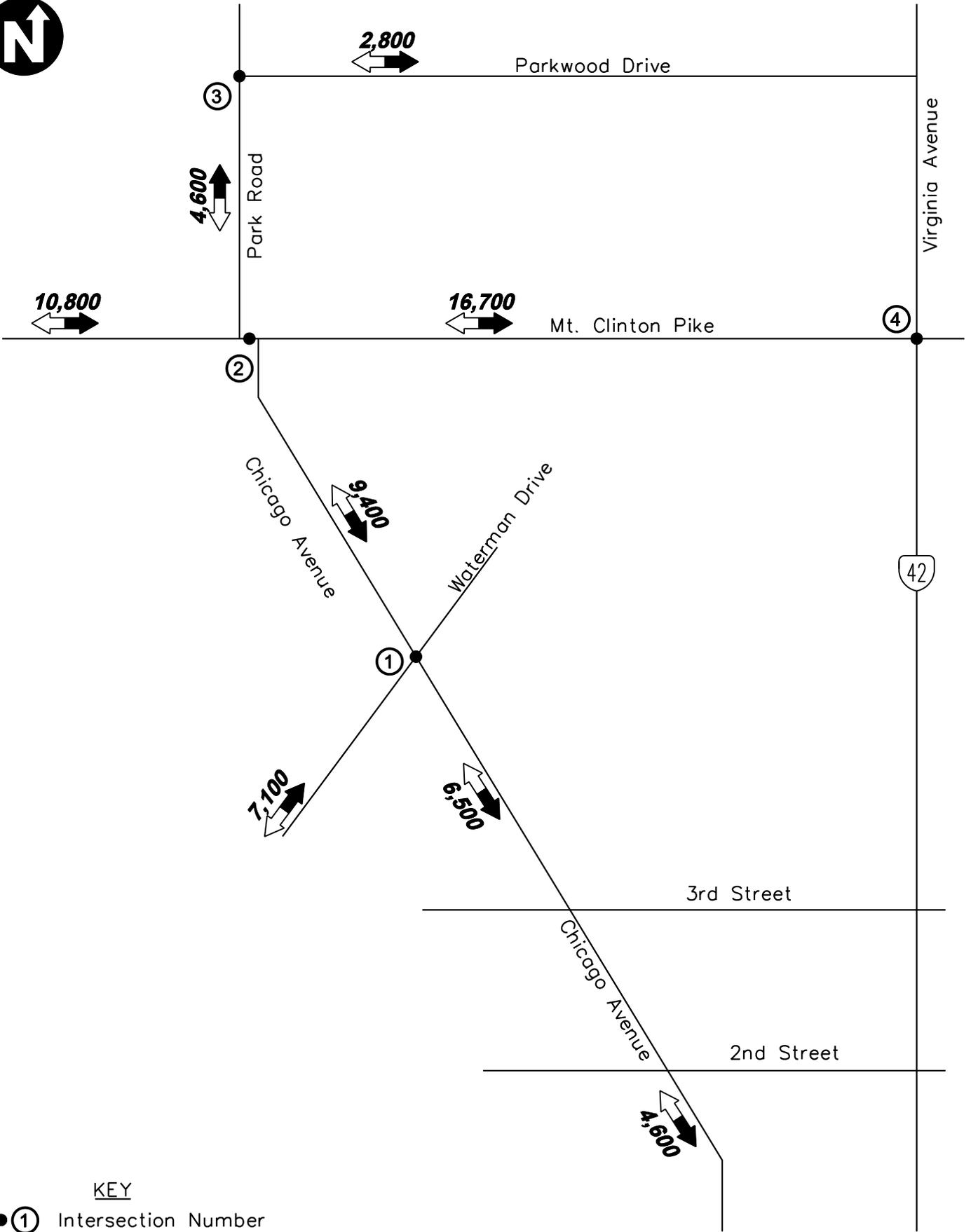
**2035 LOW GROWTH  
ADT TRAFFIC VOLUMES**



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**CHICAGO AVENUE/  
 MT. CLINTON PIKE  
 CORRIDOR STUDY**  
 CITY OF HARRISONBURG, VA

**FIGURE 11-B**  
 2035 PROJECTED  
 "LOW GROWTH"  
 PM PEAK HOUR VOLUMES



**KEY**

● ① Intersection Number



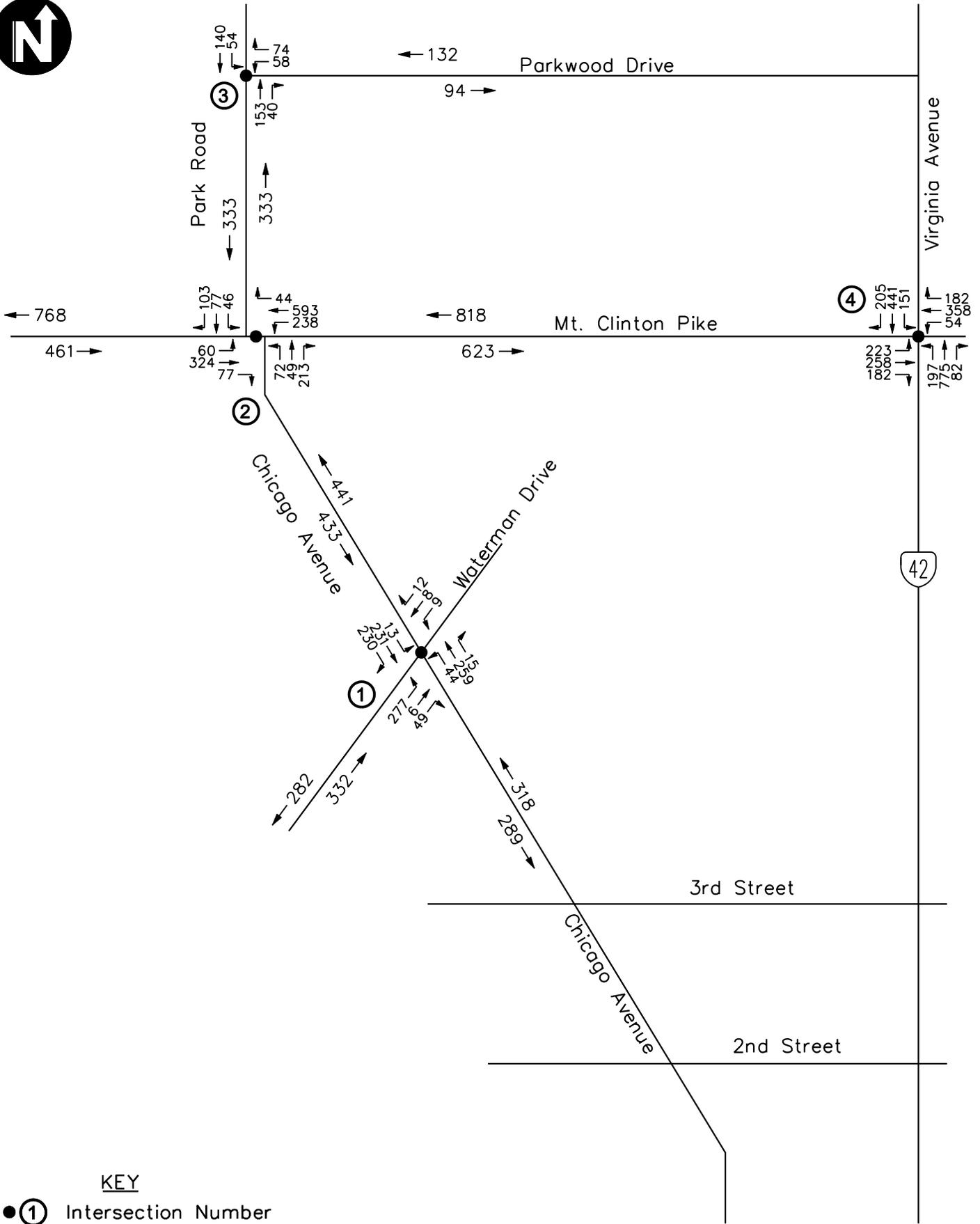
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MT. CLINTON PIKE  
CORRIDOR STUDY**

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**FIGURE 12-A**

**2035 HIGH GROWTH  
ADT TRAFFIC VOLUMES**



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 MT. CLINTON PIKE  
 CORRIDOR STUDY**

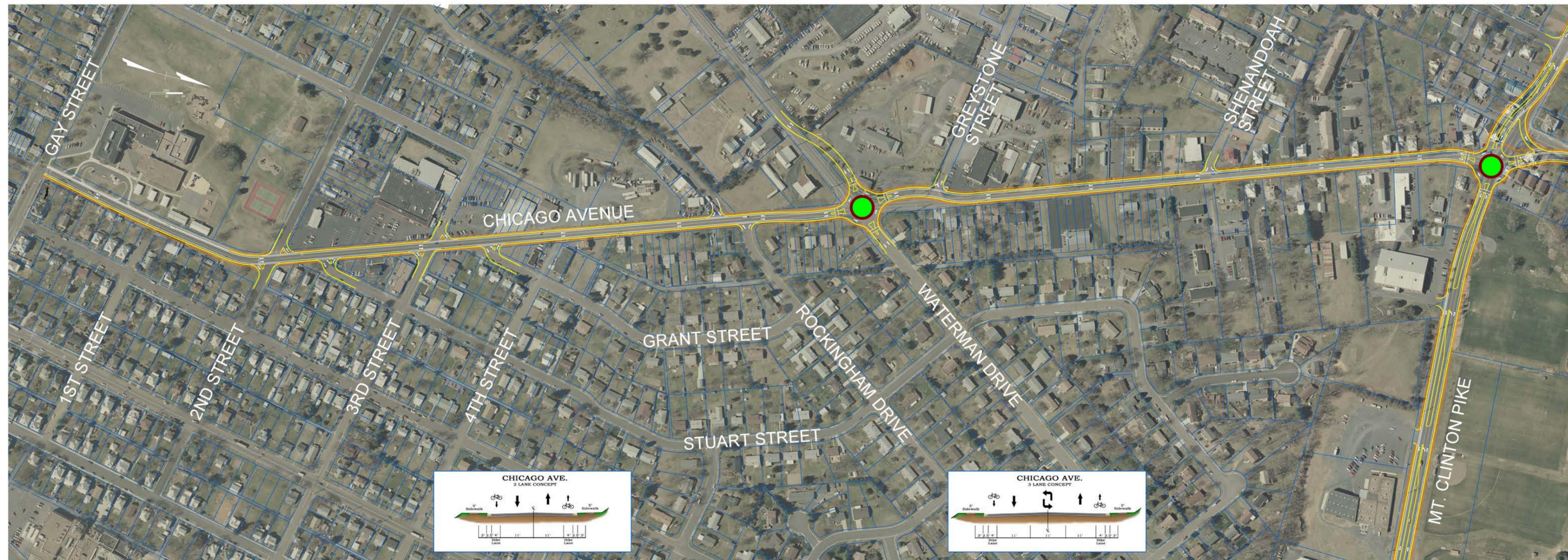
**CITY OF HARRISONBURG, VA**

**FIGURE 12-B**

**2035 PROJECTED  
 "HIGH GROWTH"  
 PM PEAK HOUR VOLUMES**

# MAINLINE ALTERNATIVES

## FIGURE 13

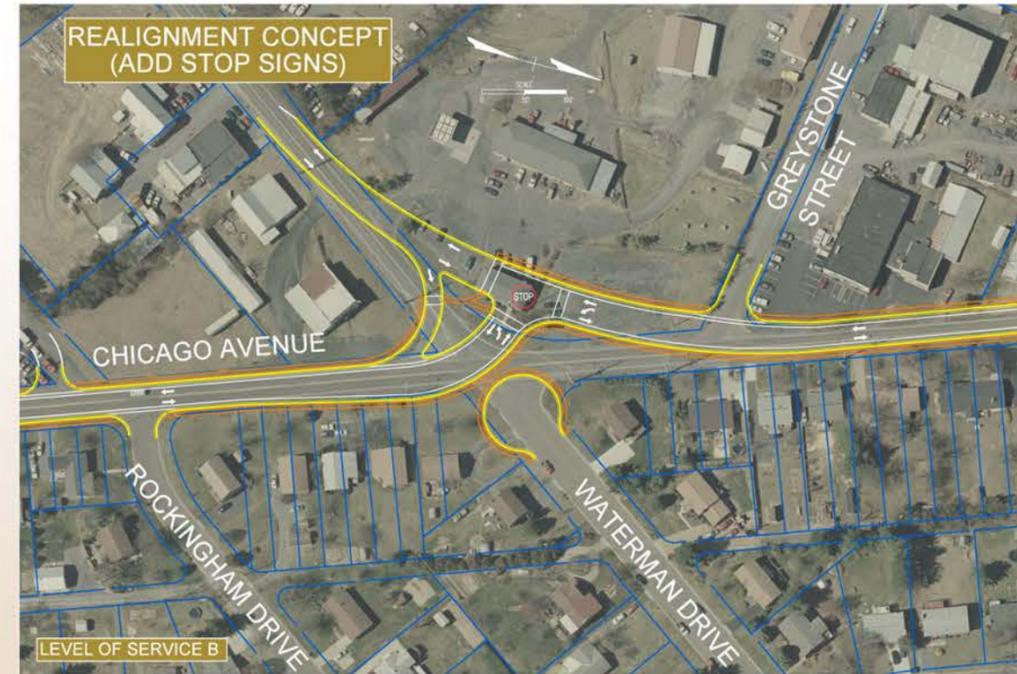




# INTERSECTION ALTERNATIVES

FIGURE 15

CHICAGO AVENUE /  
WATERMAN DRIVE



MOUNT CLINTON PIKE /  
CHICAGO AVENUE /  
PARK ROAD



# INTERSECTION ALTERNATIVES

FIGURE 16

## MOUNT CLINTON PIKE/ VIRGINIA AVENUE



## PARK ROAD / PARKWOOD DRIVE

