

EXECUTIVE SUMMARY

This Transportation Planning Report (TPR) – Corridor Study was prepared by the Tennessee Department of Transportation (TDOT) at the request of the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) and Jefferson City, Tennessee. The purpose of this TPR-Corridor Study is to define cost-effective improvements to provide continued safe traffic operations along SR 34 (U.S. 11E) in Jefferson City from SR 92 (Maple Avenue) to Odyssey Road, a distance of approximately 2.11 miles (L.M. 11.730 to L.M. 13.840). See Figures ES-1 and ES-2 on the following pages for maps of the study location.

LAMTPO has received requests for median cuts to provide more direct access to properties adjoining the roadway. LAMTPO is concerned about safety and U-turns along SR 34. Jefferson City has received Congestion Mitigation Air Quality (CMAQ) funding for traffic signal coordination (Transportation Improvement Program ID 45007), and is planning intersection improvements at George Avenue (TIP ID 2044) and Russell Avenue (TIP ID 2044).

SR 34 is classified as an urban arterial and is part of the National Highway System. It has two (2) twelve (12) foot wide lanes in each direction, with two (2) foot wide to ten (10) foot wide shoulders, and a thirty (30) foot wide, depressed grass median. There are seven (7) signalized intersections along the 2.11 mile project length: SR 92, Russell Avenue, George Avenue, Odell Avenue, Hicks Road, Chucky Pike, and Odyssey Road. SR 34 has a 40 mph posted speed limit. The property abutting the corridor is predominantly in commercial use and is zoned Highway Business District (B-3) involving a combination of fast food restaurants, plus major “big box” facilities, such as Wal-Mart and Lowe’s Home Improvement.

The following improvements are recommended:

- Radio-controlled signal interconnect system from SR 92 to Hicks Road;
- Pedestrian signal heads, pushbutton activation, and cross walks for the SR 34 intersections at signalized intersections;
- Left-turn lanes at Pearl Avenue and at Harrington Street;
- Curb ramp upgrades for ADA compliance;
- Tapered offsets for all left-turn lanes;
- Eastbound left-turn lane at the crushed aggregate facility east of Fate Rankin Road;
- Eastbound left-turn lane at the Quick Lube store (Shell Oil parcel) east of Meadow Spring Drive;
- Westbound SR 34 left-turn lane into the Mossy Creek Development;
- Dual left-turn lanes for eastbound SR 34 to northbound Chucky Pike;
- Additional turn lanes on Chucky Pike approaches to SR 34; and
- Restriping of southbound Odyssey Road approach.

The estimated cost for the recommendations listed above is \$1,528,700.

In addition to these recommended improvements, this TPR notes improvements for future consideration. These improvements generally concern access control measures and are not included in the recommended improvements because of the potential that they may damage and/or create possible acquisition of adjacent commercial properties and must be further assessed. Coordination with local officials and adjacent landowners is recommended prior to programming these improvements. Improvements previously considered but eliminated are also discussed.



VICINITY MAP

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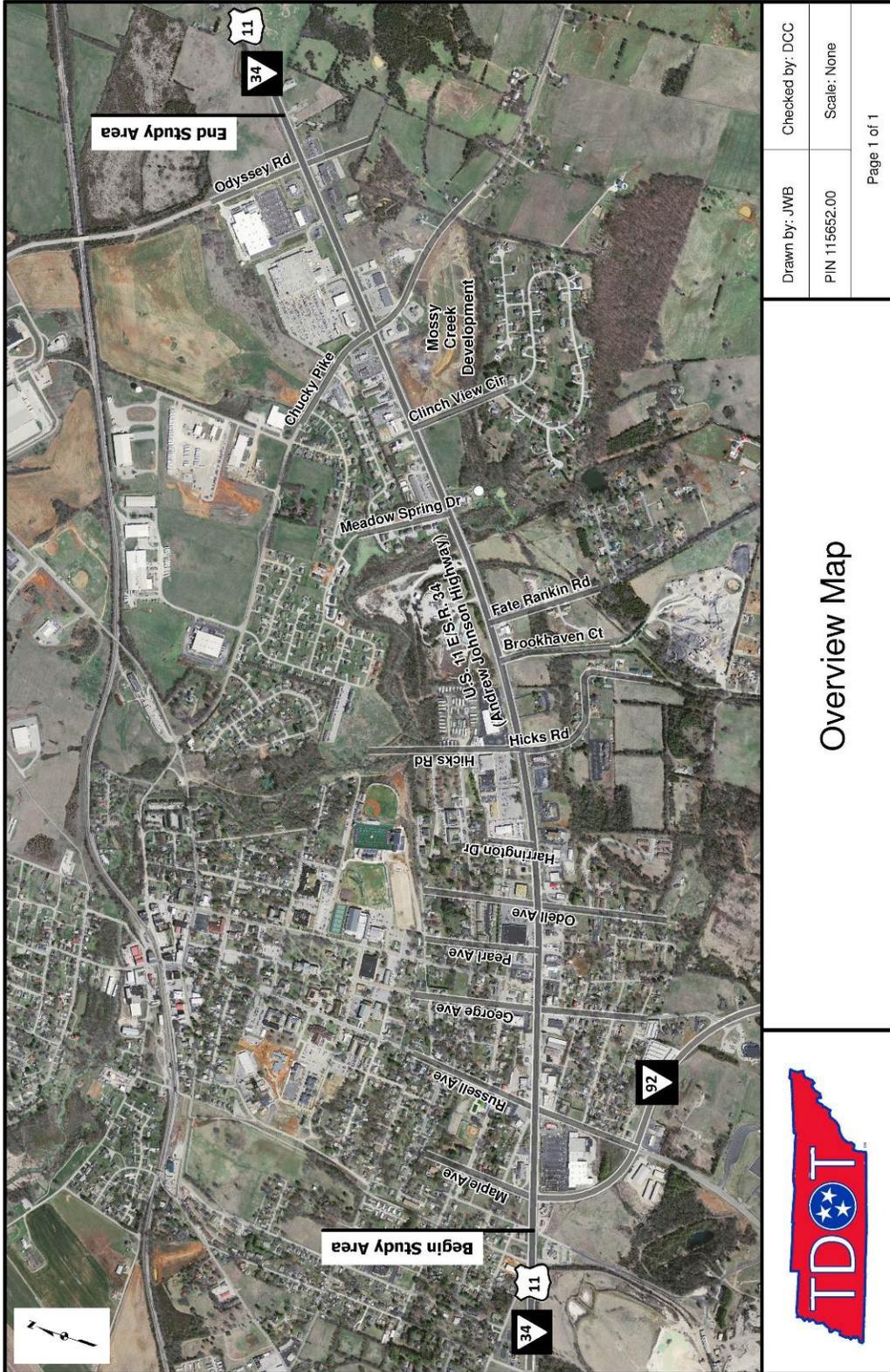
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Figure ES-1
Vicinity Map

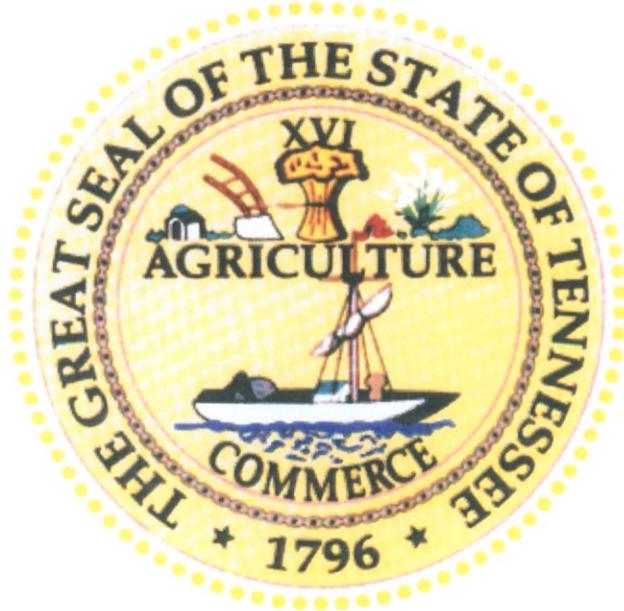


**Figure ES-2
Overview Map**

TRANSPORTATION PLANNING REPORT CORRIDOR STUDY

SR-34 / U.S. 11E (ANDREW JOHNSON HIGHWAY)

**FROM STATE ROUTE 92 TO ODYSSEY ROAD
JEFFERSON CITY, JEFFERSON COUNTY
PIN 115652.00**



Prepared by
THE CORRADINO GROUP, INC.
and the
**TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**
for the
**LAKeway AREA METROPOLITAN TRANSPORTATION
PLANNING ORGANIZATION (LAMTPO)**
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This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.

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1. Study Objectives and Methodology

This Transportation Planning Report (TPR) – Corridor Study was prepared by the Tennessee Department of Transportation (TDOT) at the request of the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) and Jefferson City, Tennessee. The purpose of this TPR-Corridor Study is to define cost-effective improvements to provide continued safe traffic operations along SR 34 (U.S. 11E) in Jefferson City from SR 92 (Maple Avenue) to Odyssey Road, a distance of approximately 2.11 miles (L.M. 11.730 to L.M. 13.840).

2. Introduction and Background Information

This section explains the origin of this TPR – Corridor Study, and provides background information regarding land use, traffic, and environmental conditions.

TPR - Corridor Study Background and Corridor Location

In 2005, Neel-Schaffer prepared the *US 11E Corridor Study – Jefferson and Hamblen Counties* for the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO). The entire project limits of the subject TPR-Corridor Study, from SR 92 (Maple Avenue) to Odyssey Road, are contained within the limits of the Neel-Schaffer study. Analysis and recommendations from the Neel-Schaffer study were reviewed during the preparation of the subject TPR - Corridor Study. Specific recommendations from the Neel-Schaffer study, with commentary regarding applicability to the subject TPR Corridor Study, are referenced later in Section 3.

LAMTPO requested this TPR - Corridor Study of SR 34 in a letter to TDOT dated February 3, 2011, citing existing heavy traffic that will increase with growth from new development, notably: 1) a large new commercial subdivision in the southwest quadrant of SR 34 and Chucky Pike that will have access from both roads; 2) a new publishing business at the southwest corner of Old Andrew Johnson Highway and Odyssey Road intersection (0.6 miles north of SR 34); and, 3) a Norfolk Southern Railroad intermodal facility planned along SR 34 near the town of New Market, approximately three (3) miles west of Jefferson City.

SR 34 is an urban arterial serving traffic between Knoxville and Johnson City, and the intermediate communities of Jefferson City and Morristown (Figure 1). The corridor addressed in this TPR - Corridor Study is located entirely within Jefferson City from SR 92 (L.M. 11.730) to Odyssey Road (L.M. 13.840), a distance of approximately 2.11 miles (Figures 2 and 3).

LAMTPO has received requests for additional median cuts to provide more direct access to properties adjoining the roadway. LAMTPO is concerned about safety and U-turns along SR 34. Jefferson City has received Congestion Mitigation Air Quality (CMAQ) funding for traffic signal coordination (Transportation Improvement Program ID 45007), and is planning intersection improvements at George Avenue (TIP ID 2044) and Russell Avenue (TIP ID 2044). Other planned projects in the LAMTPO Transportation Improvement Program (TIP) include signal improvements at SR 92, Russell Avenue, George Avenue, and Hicks Road. These projects are programmed for implementation. The roadway section being studied here is a subsection of a longer section studied in 2005 that proposed a number of improvements.¹

¹ *US 11E Corridor Study – Jefferson and Hamblen Counties*, for Lakeway Area Metropolitan Transportation Planning Organization by Neel-Schaffer, January 2005.



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Figure 1
Vicinity Map

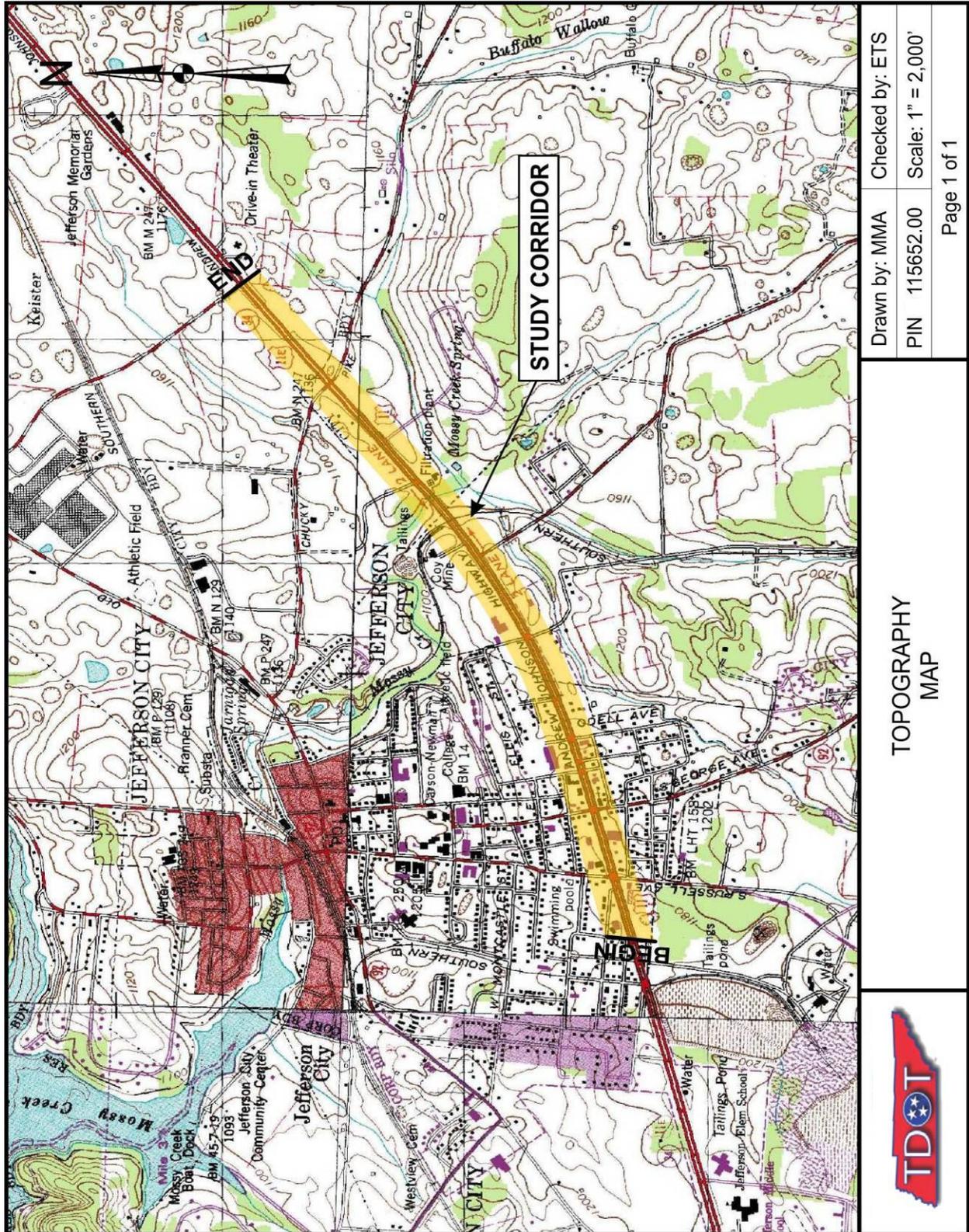
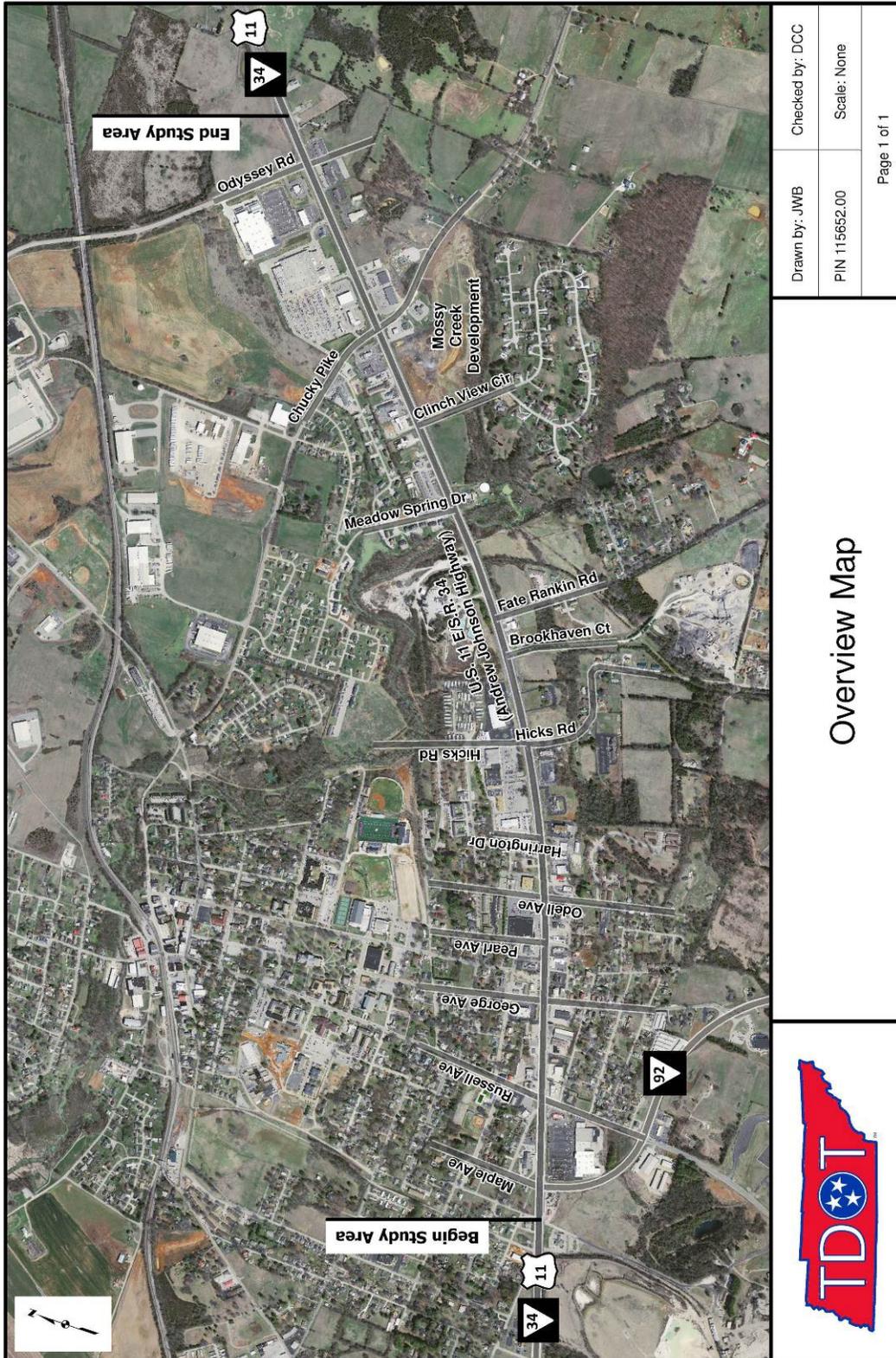


Figure 2
Topography Map



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Figure 3
Overview Map

Land Use and Zoning

The property directly abutting the corridor is predominantly in commercial use. It is zoned Highway Business District (B-3). There are fast food restaurants, plus major “big box” facilities such as Wal-Mart and Lowe’s Home Improvement. The lots to the north of those abutting SR 34 include residential use. Land is developed from the west project limit to Hicks Road, so new trip generation in that section is expected to be limited. Several lots that could be developed are present on both sides of SR 34 east of Hicks Road. The principal area for future development is on the south side of SR 34, from Meadow Spring Drive to Odyssey Road. The following table summarizes the nature of commercial use by section (Table 1).

**Table 1
Existing Land Use and Access**

Section Start	Log Mile	Side of Road	# Parcels	# Drive-ways	Major Entities
SR 92	11.730	N	3	3	County office, bank
		S	2	3	Food Lion Grocery, McDonalds
Russell Ave.	11.900	N	7	9	Pizza Hut, Dominos Pizza, Walgreens
		S	8	10	Shell gas, O’Reilly Auto Parts, CVS Drug Store
George Ave.	12.100	N	4	3	Taco Bell, Burger King, bank
		S	4	6	United Methodist Church, bank, Express Health Clinic, Krystal Burger
Pearl Avenue	12.211	N	2	1	Food City grocery
		S	4	5	Sonic, pawn shop, insurance
Odell Ave.	12.303	N	2	5	Bank, offices, Farris Motor Company (dealership), strip commercial with grocery
		S	9	8	Mexican restaurant, Pizza Hut, Advance Auto Parts, law offices, bank, Nissan dealership, KFC
Hicks Road	12.609	N	1	1	Tarr Chevrolet
		S	4	6	American Legion, strip commercial, auto service center
Fate Rankin Road	12.871	N	2	2	A mineral operation
		S	2	2	Water treatment plant
Meadow Spring Drive	13.088	N	4	7	Shell Rapid Lube, strip development, liquor store, car lot
		S	2	2	Vacant land
Clinch View Circle	13.264	N	8	12	Car wash, Zaxbys, Outdoor Equipment, Auto-Mart, restaurant, Arbys
		S	3	2	Major new development, Mobil gas
Chucky Pike	13.470	N	2	1	Wendys/Exxon, Hibbett Sports
		S	3	3	Strip development
Walmart Drive	13.600	N	4	1	Walmart, Lowe’s, car wash, credit union
End @ Odyssey	13.840	S	5	3	Law and medical offices, and a church

Source: The Corradino Group

There are no parks along the corridor. Several historic sites are near the corridor. These are:

- Branner-Hicks House – north of SR 34 on Chucky Road;
- Fairvue – north of SR 34 on Andrew Johnson Highway;
- Glenmore – north of SR 34 at Chucky Road and Andrew Johnson Highway; and,
- Samuel Isaac Newman House – on Bible Road, which is 0.25 miles south of SR 34, off of SR 92.

None are close enough to be affected by the proposed improvements to SR 34, either directly or indirectly.

Existing Geometric Conditions

SR 34 is classified an urban arterial and is part of the National Highway System. The right-of-way width is one hundred (100) feet between SR 92 and Harrington Drive and, generally, one hundred sixty (160) feet from that point east, with a maximum width of two hundred (200) feet.

SR 34 has two (2) twelve (12) foot wide lanes in each direction, with two (2) foot wide to ten (10) foot wide shoulders, and a thirty (30) foot wide grass median. From SR 92 to Herrington Drive, there is two (2) foot wide curb-and-gutter drainage on both sides of the roadway and the median is flush and/or slightly raised. Ten (10) foot wide shoulders with ditch drainage are present from Herrington Drive to the end of the project. In this area the median is slightly depressed in some locations, with storm water carried under the road to the ditches. The shoulders are used as acceleration and deceleration lanes at several points.

There are no dedicated bicycle lanes or markings on SR 34 within the study corridor. Five (5) foot sidewalks line both sides of SR 34 from SR 92 to Herrington Drive. There are no Americans with Disabilities Act (ADA) compliant ramps at street crossings, no pedestrian crossing signals, and no painted crosswalks present.

There are seven (7) signalized intersections along the 2.11 mile project length: SR 92, Russell Avenue, George Avenue, Odell Avenue, Hicks Road, Chucky Pike, and Odyssey Road. (Refer to Appendix A for Conceptual Plans on aerial photography of each of these intersections.) SR 34 has dedicated left-turn lanes at each of these signalized intersections and dedicated right-turn lanes at SR 92 (eastbound to southbound) and Chucky Pike (eastbound to southbound and westbound to northbound). There are also dedicated left-turn lanes at several unsignalized intersections and at major developments.

Roadway lighting poles are located within the median along the curb-and-gutter section from SR 92 to Harrington Drive and provide continuous lighting. In the project section with shoulders and open-ditch drainage, roadway lighting is limited to intersections.

The topography of the area is rolling. The project start and end point elevations are nearly the same, approximately one thousand, one hundred and sixty-three (1,163) feet above Mean Sea Level (MSL). Between these points, SR 34 rises to approximately one thousand, one hundred and ninety-four (1,194) feet MSL at George Avenue, then drops continuously to a low point (approximately eleven hundred (1,100) feet) MSL, where it crosses Mossy Creek, between Fate Rankin Road and Meadow Spring Drive. This is the only point in the project where guardrail is present. Flood plain associated with Mossy Creek exists on both sides of SR 34 at this point (Figure 4). The elevation then continues to steadily increase to one thousand, one hundred and sixty-three (1,163) feet MSL at Odyssey Road.

Traffic Volumes

Eight-hour turning movement counts were conducted at the seven (7) signalized intersections within the study area, between May 10 and May 13, 2011. The counts covered the hours of 6-9 AM, 11 AM-1 PM, and 3-6 PM. The traffic data for the project is contained in Appendix C, which includes design hourly volumes (DHV) calculations (Appendix C-1), annual average daily traffic (AADT) calculations (Appendix C-2), and expansion factor calculations (Appendix C-3). Traffic data were approved by TDOT on August 23, 2011. Based on the LAMTPO travel demand model, the traffic is expected to grow one and a quarter (1.25) percent per year along the corridor. The 2016 AADT for SR 34 is forecast to range from 15,720 vehicles per day (VPD), east of SR 92, to 23,210 VPD, east of Hicks Road. The 2036 AADT is forecast to range from 19,420 VPD, east of SR 92, to 28,660 VPD, east of Hicks Road. The truck percentage ranges from three (3) percent to five (5) percent of the AADT between SR 92 and Odyssey Road.

Of the seven (7) signalized intersections along SR 34, the one at Chucky Pike is the most congested. It also has the potential for nearby growth from the platted, but not-yet constructed, Mossy Creek Development commercial park in the southwest quadrant, as well as other developable land. At the intersection with Chucky Pike, SR 34 is a four (4) lane divided highway with two (2) twelve (12) foot wide travel lanes in each direction and ten (10) foot wide shoulders. There are designated left-turn lanes and right-turn lanes on each SR 34 approach to the intersection. Chucky Pike has a forty (40) mph posted speed limit and consists of two (2) twelve (12) foot wide travel lanes with three (3) foot wide shoulders north of SR 34 and two (2) eleven (11) foot wide travel lanes with no shoulders south of SR 34. The northbound Chucky Pike approach consists of a single, shared left-through-right lane. The southbound Chucky Pike approach consists of a shared left-through lane and a separate right-turn lane.

The PM peak is the critical period for the intersection. Approximately seventeen hundred (1,700) VPH are forecast for combined eastbound and westbound SR 34 traffic for the 2016 PM peak period. There is a heavy eastbound-SR 34-to-northbound Chucky Pike left-turn volume of two hundred and thirty-one (231) VPH. At one hundred and two (102) VPH and ninety five (95) VPH, the northbound and southbound Chucky Pike-to-SR 34 left-turn volumes represent significant portions of the overall Chucky Pike approach volumes to the intersection. Left-turning volumes tend to have a large impact on the capacity of an intersection. These 2016 traffic volumes will increase by 2036.

A Norfolk Southern Railroad intermodal facility is planned along SR 34 near the town of New Market, approximately three (3) miles west of Jefferson City. The intermodal facility is expected to impact the SR 34 intersection with SR 92, primarily the eastbound SR 34 to southbound SR 92 movement, and the reciprocal northbound SR 92 to westbound SR 34 movement. SR 92 will serve as the connector between the intermodal facility and I-40 to the south. The project data incorporate the projected truck volumes of the future intermodal facility.

Level of Service Analysis

For a four (4) lane divided highway such as SR 34, with signalized intersections spaced approximately a quarter (0.25) mile apart, the level of service is typically determined by the average delay experienced at the signalized intersections, in seconds, per vehicle entering the intersection. LOS “A” describes an ideal, free-flow condition, whereas LOS “F” is characterized by unacceptable congestion resulting in excessive delay. The number of seconds of average delay associated with LOS at signalized intersections is shown in Table 2.

Table 2
Level of Service Index for Intersections

LOS	Traffic Flow Conditions	Delay (seconds) Signalized Intersections
A	Progression is extremely favorable and most vehicles do not stop at all.	0-10
B	Good progression, some delay.	10-20
C	Fair progression, higher delay	20-35
D	Unfavorable progression, congestion becomes apparent.	35-55
E	Poor progression, significant delay.	55-80
F	Poor progression, extreme delay.	>80

Source: *Highway Capacity Manual (HCM)*

Based on the turning movement traffic counts taken in May 2011, all signalized intersections within the project limits are anticipated to operate at Level of Service (LOS) C, or better, in 2016 (Table 3). For 2036, the Chucky Pike intersection is forecast to operate at the high end of the LOS D range, 2.8 seconds from operating at LOS E (Table 4). Likewise, George Avenue is forecast to operate at LOS C, but it is only 0.4 seconds from operating at LOS D. This analysis is based on Synchro computer software, which is based on *Highway Capacity Manual* methodology.

Table 3
2016 Intersection Capacity
No-Build Condition

	AM Peak		PM Peak	
	LOS	Ave. Delay (sec.)	LOS	Ave. Delay (sec.)
SR 92/Maple Avenue	B	18.8	B	17.6
Russell Avenue	B	12.2	C	21.6
George Avenue	B	18.6	C	22.4
Odell Avenue	A	7.6	B	11.2
Hicks Road	B	16.2	C	20.1
Chucky Pike	C	21.2	C	31.1
Odyssey Road	B	18.3	C	20.3

Source: The Corradino Group

Table 4
2036 Intersection Capacity
No-Build Condition

	AM Peak		PM Peak	
	LOS	Ave. Delay (sec.)	LOS	Ave. Delay (sec.)
SR 92/Maple Avenue	C	21.0	C	20.7
Russell Avenue	B	15.0	C	23.4
George Avenue	C	22.1	C	34.6
Odell Avenue	A	7.8	B	15.2
Hicks Road	C	24.9	C	30.0
Chucky Pike	C	24.7	D	52.2
Odyssey Road	C	20.0	C	22.7

Source: The Corradino Group

The capacity analysis summary in Appendix D provides a LOS for each intersection approach and each turning movement within an approach. Three (3) movements at two (2) intersections are forecast to experience LOS E, or worse, in 2036. At the Chucky Pike intersection with SR 34, the eastbound SR 34 to northbound Chucky Pike left-turn movement is forecast to operate at LOS F. The westbound through movement is forecast to operate at LOS E. At the George Avenue intersection with SR 34, the northbound through movement is forecast to operate at LOS E.

Crashes

Crash data for 2007-2009 were provided by TDOT. During this three (3) year period there were three hundred nine (309) crashes. Of these, two hundred forty-seven (247) crashes, representing eighty (80) percent of the total, were property damage only; sixty (60) crashes, representing nineteen (19) percent of the total, involved a non-incapacitating injury; one (1) crash, representing a half (0.5) percent of the total involved an incapacitating injury; and, one (1) crash, representing a half (0.5) percent of the total, involved a pedestrian fatality. The fatality occurred between George Avenue and Pearl Avenue (at L.M. 12.156) (Case No. 10515858). The incapacitating injury incident involved an angle crash at Odyssey Road (Case No. 9914321). A crash data summary for each intersection and crash location mapping are included in Appendix E.

One hundred fifty-five (155) crashes, representing fifty (50) percent of the total, involved rear-end incidents (Table 5). One hundred and fifteen (115) crashes, representing thirty-seven (37) percent of the total, were angle-type incidents; twenty-three (23), seven (7) percent of the total, were sideswipe/same direction crashes; and, seven (7), two (2) percent of the total, were “no collision with vehicle”, where a vehicle departed the roadway. Of the remaining incidents, two (2) crashes, representing one (1) percent of the total, were head-on incidents; two (2), one (1) percent of the total, were sideswipe/opposite direction crashes; and, five (5), two (2) percent of the total, were of unknown crash type.

**Table 5 – Crash Type
(Corridor Segments and Signalized Intersections)**

Type	Frequency	Percentage of Total
Rear-end	155	50%
Angle	115	37%
Sideswipe/Same Direction	23	7%
No Collision With Vehicle	7	2%
Head-on	2	1%
Sideswipe/Opposite Direction	2	1%
Unknown/Other	5	2%
Total	309	100%

Source: Tennessee Department of Transportation

Crash rates for corridor segments only (Table 6) and for signalized intersections (Table 7) were calculated and compared to TDOT’s most recent three (3) year statewide averages (2006-2008) for urban, multi-lane, four (4) lane divided facilities. There were ninety-five (95) corridor segment crashes and two hundred fourteen (214) signalized intersection crashes for a combined total of three hundred nine (309) crashes.

The ninety-five (95) corridor segment crashes result in a calculated corridor crash rate of 2.2088 crashes per million vehicle miles travelled, which exceeds the statewide average of 2.0112 crashes per million vehicles miles travelled. The calculated corridor crash rates for property damage only, non-incapacitating injuries, and fatal crashes also exceed statewide average crash rates. The calculated corridor crash rate for incapacitating injuries is less than the statewide average.

**Table 6 – Crash Rate Comparison to Statewide Average
(Corridor Segments Only – Excludes Signalized Intersections)**

Type	Frequency	Percentage of Total	Calculated Corridor Crash Rate 2007-2009 (per million vehicle miles)	Statewide Average Crash Rate 2006-2008 (per million vehicle miles)
Property Damage Only	74	78%	1.7206	1.4675
Non-Incapacitating Injury	20	21%	0.4650	0.4839
Incapacitating Injury	0	0%	0.0000	0.0491
Fatality	1	1%	0.0233	0.0106
Total Crashes	95	100%	2.2088	2.0112

Source: Tennessee Department of Transportation

The two hundred and fourteen (214) signalized intersection crashes were grouped by individual intersection, and crash rates were calculated and compared to the statewide average. The calculated crash rates for the SR 34 signalized intersections with SR 92, Russell Avenue, George Avenue, Chucky Pike, and Odyssey Road exceed the statewide average crash rate. The signalized intersection of SR 34 and Chucky Pike has a calculated crash rate of 2.252 crashes per million vehicles entering the intersection, which exceeds the statewide average of 1.086 crashes per million vehicle miles entering the intersection, by the greatest margin of any of the seven (7) signalized intersections. The calculated crash rates for the SR 34 signalized intersections at Odell Avenue and Hicks Road are lower than the statewide average crash rate. Further analyses of corridor and intersection crashes are included in Appendix E.

**Table 7 – Crash Rate Comparison to Statewide Average
 (Signalized Intersections Only – Excludes Corridor Segments)**

Intersection	Frequency (total crashes)	Calculated Intersection Crash Rate 2007-2009 (per million entering vehicles)	Statewide Average Crash Rate 2006-2008 (per million entering vehicles)
SR 92	28	1.236	1.086
Russell Avenue	34	1.446	1.086
George Avenue	44	1.697	1.086
Odell Avenue	20	0.826	1.086
Hicks Road	22	0.854	1.086
Chucky Pike	49	2.252	1.086
Odyssey Road	17	1.529	1.086
Total Crashes	214	N/A	1.086

Source: Tennessee Department of Transportation

Access

The number of driveways in each project subsection is listed in Table 1. Commercial development between Russell and Odell Avenues occurred at an earlier date than the rest of the corridor. There are no median cuts in this area, so driveways function as “right-in, right-out.” Nonetheless, there is potential for driveway consolidation, because businesses on the south side of SR 34, between Russell Avenue and Odell Avenue, have rear access to the city streets: East Highland Street between Russell Avenue and George Avenue and East Elmwood Street between George Avenue and Odell Avenue. Near Chucky Pike, a number of fast food restaurants were built with right-in, right-out driveways. SR 34’s ten (10) foot wide shoulders function as a transition to/from mainline traffic and serve as acceleration/deceleration lanes that reduce conflicts. Several of the older businesses have ill-defined driveways.

Air Quality and Other Environmental Considerations

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) pursuant to its role under the Clean Air Act. Periodically, it changes the NAAQS to protect public health and welfare. The project area is currently designated a “maintenance” area for ozone under the NAAQS, as it is part of the ozone air shed of the greater Knoxville area. Being in a maintenance area means that air quality is judged to have improved over its former “non-attainment” status. “Non-attainment” means that certain transportation control measures must go into effect and a plan must be created to demonstrate how the area will meet the NAAQS at a defined point in the future.

In January 2010, EPA proposed a stricter eight (8) hour NAAQS for ozone. EPA’s intent was to select the stricter standard by July 2011, but that date has been missed. If EPA sets the new standard between 65-70 parts per million (ppm), as the January 2010 proposal suggested, it is believed that Jefferson County will return to non-attainment status for ozone. There will be no effect on any recommendations made here, but projects that add significant new capacity will be subject to more review and analysis before gaining environmental acceptance under the National Environmental Policy Act (NEPA).

There are freshwater forested/shrub wetlands on either side of SR 34 where it crosses Mossy Creek (Figure 5). Water is carried under SR 34 in a culvert. No negative effects are expected from any anticipated project recommendations. Early Environmental Screening (EES) summaries are included in Appendix G.

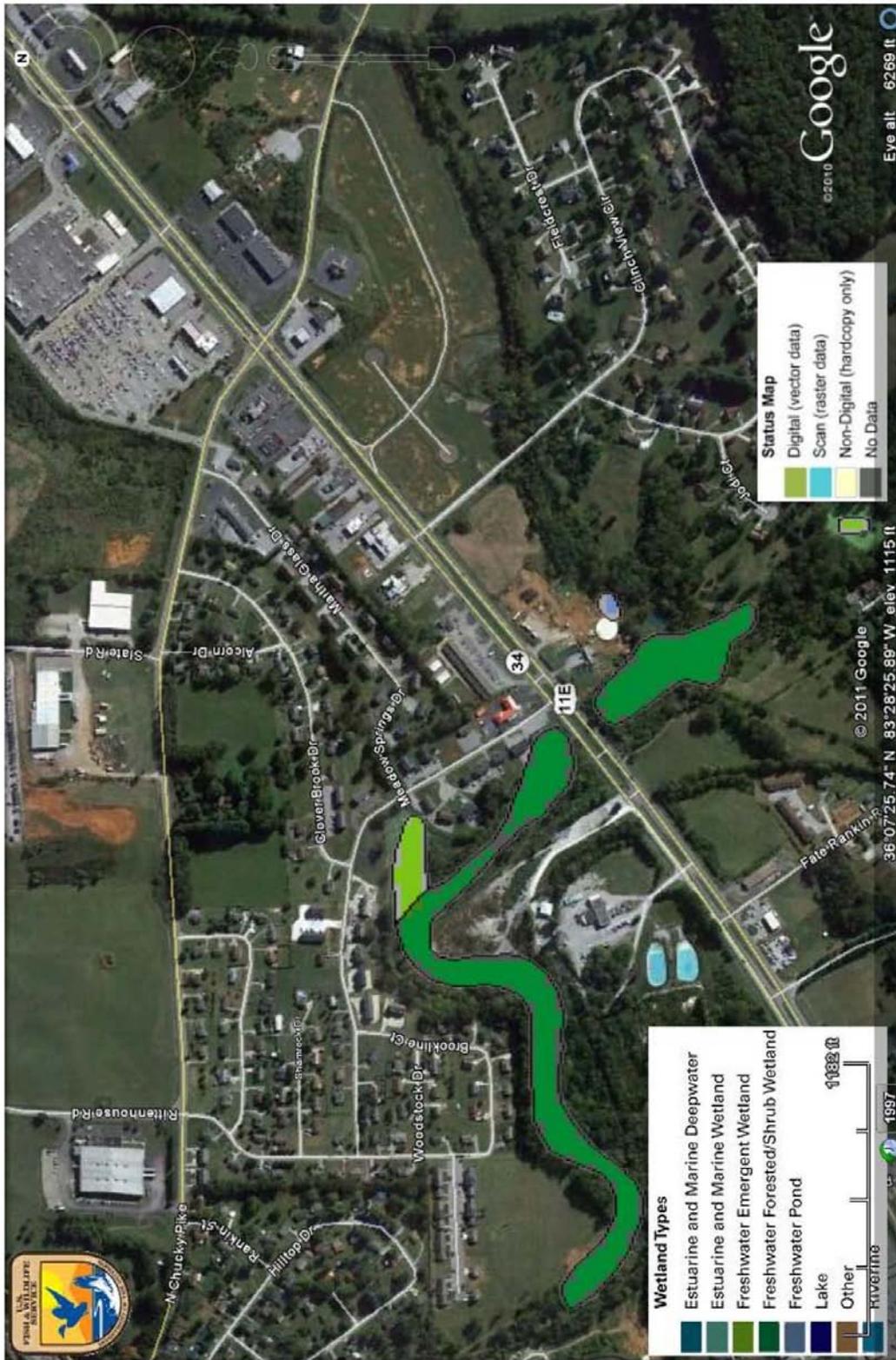


Figure 5
 Wetlands at Mossy Creek

3. Recommendations

The SR 34 corridor within the project limits has two distinct sections. The section from SR 92 to Hicks Road is fully developed with five (5) signalized intersections at quarter-mile (0.25 mi.) spacing. Commercial drive entrances are denser and there are more public road approaches than the section east of Hicks Road. Sidewalks and curb and gutter drainage exist in this section and pedestrian activity is more likely. Roadway lighting poles are present in the median in this section.

The section of SR 34 from east of Hicks Road to Odyssey Road is also considered urban, but it has some suburban characteristics. Median openings and adjacent drive entrances are less frequent. Sidewalks are not present. Growth has recently occurred in this section, and there is developable land available for future growth. The Chucky Pike intersection operates under the poorest LOS of all of the signalized intersections, and future growth is expected to be highest at this location. The Chucky Pike intersection also had the most crashes, from 2007 to 2009, in the project area. Because of the two distinct characteristics of these two sections of the corridor, recommendations will be made separately for each section.

Recommended Improvements

The Neel-Schaffer study completed in January 2005 recommended various improvements along the SR 34 corridor. Multiple improvements are also included in the LAMTPO Transportation Improvement Program (TIP) at various stages of planning and development. This TPR - Corridor Study considers the recommendations of the 2005 Neel-Schaffer study and the projects included in the LAMTPO TIP, as well as additional improvements.

SR-92 to East of Hicks Road

The following are recommended improvements along SR 34 from SR 92 to east of Hicks Road. The Neel-Schaffer study and LAMTPO TIP status are noted where relevant.

1. Install a radio-controlled signal interconnect system for the SR 34 intersections at SR 92, Russell Avenue, George Avenue, Odell Avenue, and Hicks Road and upgrade signal cabinets and phasing plans at each signalized intersection. This improvement was recommended in the 2005 Neel-Schaffer study. The project is funded and included in the LAMTPO TIP (ID 45007). LAMTPO has a contract with TDOT under advertisement for consultant engineering services.

Signal interconnection and phasing improvements are a cost-effective method of improving capacity and vehicular progression through a corridor. With most of the crashes occurring at the signalized intersections, and with a majority of them being rear-end crashes, presumably occurring at the queue of the intersection, improved signal capacity and progression through the signal should reduce crashes and improve safety.

2. Add pedestrian signal heads, pushbutton activation, and cross walks for the SR 34 intersections at: SR 92, Russell Avenue, George Avenue, Odell Avenue, and Hicks Road. This improvement was recommended in the 2005 Neel-Schaffer study. This improvement is not currently in the LAMTPO TIP and is not funded.

3. Add separate left-turn lanes at the unsignalized intersections of SR 34 at Pearl Avenue and at Harrington Street. This improvement was recommended in the 2005 Neel-Schaffer study. This improvement is not currently in the LAMTPO TIP and is not funded.
4. Upgrade existing sidewalk curb ramps to be ADA compliant. This improvement was recommended in the 2005 Neel-Schaffer study. This improvement is not currently in the LAMTPO TIP and is not funded.
5. Reconstruct all opposing left-turn lanes along SR 34 with a tapered offset configuration to prevent a left-turning driver's line of sight toward on-coming traffic from being blocked by an opposing left-turning vehicle.

This improvement is desirable because of the existing median width. The left-turn lanes should be reconstructed to a tapered offset configuration at the SR 34 intersections with SR 92, Russell Avenue, George Avenue, Pearl Avenue, Odell Avenue, Harrington Drive, and Hicks Road. No additional right-of-way is anticipated because the work will be located within the existing median. At signalized intersections, this improvement requires modification of the signal heads to align the turn arrow with the reconstructed turn lane location. The relocation of seven (7) median located light poles will be required with this improvement. Each median located pole has two lights mounted on it, one for each side of the street. It is likely the relocated poles will need to be placed behind the existing sidewalk on both sides of the street. Therefore, fourteen (14) new light poles will be required. This improvement will have the added safety benefit of removing the poles from the median. The impacted light poles are located at the following locations:

- SR 92, two (2) existing poles impacted
- George Avenue, one (1) existing pole impacted
- Pearl Avenue, two (2) existing poles impacted
- Odell Avenue, two (2) existing poles impacted

East of Hicks Road to Odyssey Road

The following are recommended improvements for SR 34 from east of Hicks Road to Odyssey Road. The Neel-Schaffer study and LAMTPO TIP status are noted where relevant.

6. Provide an eastbound SR 34 to northbound left-turn lane at the median cut for the crushed aggregate facility approximately two hundred fifty (250) feet east of Fate Rankin Road. Because there is not an opposing left-turn lane at the location, a tapered offset configuration is not necessary.
7. Provide an eastbound SR 34 to northbound left-turn lane at the median cut for the entrance to the Quick Lube store (Shell Oil parcel) and the strip mall approximately one hundred (100) feet east of Meadow Spring Drive.

The water treatment plant on the south side of SR 34 at this location generates approximately one (1) vehicle per day on average; therefore, it isn't necessary to provide an opposing westbound SR 34 left-turn lane to serve this facility. Because no opposing left-turn lane is recommended, the eastbound SR 34 left-turn lane into the Quick Lube store and strip mall can parallel SR 34, and does not need a tapered offset configuration.

8. Provide a median opening and an exclusive westbound SR 34 left-turn access into the Mossy Creek Development. Due to its proximity to the SR 34 intersection with Chucky Pike, this median opening improvement is incorporated into the SR 34 intersection with the Chucky Pike improvement.
9. At the SR 34 intersection with Chucky Pike, add turn lanes to the Chucky Pike approaches, and add a second (dual) eastbound SR 34 to northbound Chucky Pike left-turn lane. This improvement was recommended in the 2005 Neel-Schaffer study. LAMTPO has requested a contract with TDOT for consultant engineering services. This improvement is funded and included in the LAMTPO TIP (ID 10)

The recommendations involve improving the Chucky Pike approaches, as well as the SR 34 approaches to this intersection. The Chucky Pike left-turn lanes are currently shared with through traffic, which requires the use of a split traffic signal phase for Chucky Pike operations. Split phasing is inefficient because, while it gives green time to one approach to the intersection, the other approaches experience red time. By providing separate left, through, and right-turn lanes on the northbound and southbound Chucky Pike approaches, a single phase allows both approaches to share common green time and permits the opposing left-turns to operate under a "permitted" condition, thereby, avoiding a separate left-turn signal phase with a green arrow. Because the left-turn lanes will oppose each other, sight lines to on-coming through traffic are adequate. This single phase traffic signal operation will significantly reduce the amount of green time required of Chucky Pike traffic operations. This time can then be reallocated to the heavier volume on the SR 34 approaches.

The eastbound SR 34 to northbound Chucky Pike left-turn traffic volume is high. The recommended improvement adds a second (dual) left-turn lane for eastbound SR 34, which requires the addition of a second northbound Chucky Pike receiving lane, which will be carried to the northern-most entrance to Wal-Mart. The dual left-turn lane configuration will carry more vehicles than the single lane configuration; however, there is a drawback involving signal phasing options. A single left-turn lane configuration allows for turns under a permitted phase, but dual left turns require a protected phase. Permitted phases typically provide additional capacity that a protected phase does not. The protected phase is recommended for this left-turn movement for safety reasons, due to the high volume of left-turning and U-turning vehicles.

Tables 8 and 9 compare the 2036 AM Peak and PM Peak capacity of the SR 34 intersection with Chucky Pike for the No-Build condition and the recommended

improvement. For the AM peak, the recommended improvement improves capacity from LOS C to LOS B by reducing average delay from 24.7 seconds to 14.4 seconds.

Table 8
SR 34/Chucky Pike Intersection
2036 AM Peak Intersection Capacity

Intersection	LOS	Ave. Delay (sec.)	Approach	LOS	Ave. Delay (sec.)
No-Build	C	24.7	Eastbound	B	19.6
			Westbound	C	27.4
			Northbound	B	37.0
			Southbound	B	22.7
Recommended Improvement	B	14.4	Eastbound	B	11.0
			Westbound	B	16.7
			Northbound	C	20.3
			Southbound	B	13.3

Source: The Corradino Group

For the PM peak, the recommended improvement improves LOS from D to B by reducing average delay from 52.2 seconds to 19.3 seconds. The recommended improvement also results in LOS C or better for all of the approaches to the intersection. Detailed calculations are included in Appendix F.

Table 9
SR 34/Chucky Pike Intersection
2036 PM Peak Intersection Capacity

Intersection	LOS	Ave. Delay (sec.)	Approach	LOS	Ave. Delay (sec.)
No-Build	D	52.2	Eastbound	D	47.1
			Westbound	E	62.0
			Northbound	D	52.0
			Southbound	D	38.5
Recommended Improvement	B	19.3	Eastbound	B	15.4
			Westbound	C	20.6
			Northbound	C	28.3
			Southbound	C	22.3

Source: The Corradino Group

- Restripe the southbound Odyssey Road approach to SR 34 to provide a separate right-turn lane. LAMTPO has a contract with TDOT for consultant engineering services and the project is currently in the design phase (TIP ID 14).

The existing pavement is wide enough to accommodate the lane. Although the previously discussed capacity analysis at this intersection forecasts a 2036 LOS A for the AM peak period and LOS B for the PM peak period at this intersection, this improvement is recommended. It is a low-cost improvement that will provide

additional capacity at a location surrounded by undeveloped open land. This area could see growth above what is forecast in the traffic data.

Improvements for Future Consideration

Listed below are recommended access control improvements that should improve traffic operations and safety benefits for the corridor. However, they are not included in the "Recommended Improvements" because of the potential that they may damage and/or create possible acquisition of adjacent commercial properties and must be further assessed. Coordination with local officials and adjacent landowners is recommended prior to programming these improvements. The construction costs of these improvements would be minor. It is uncertain what the cost in right-of-way impacts would be. The right-of-way costs may vary dependent upon how favorably the affected landowners viewed the modifications.

1. Close the median between Pearl Avenue and Odell Avenue. This improvement was recommended in the 2005 Neel-Schaffer study. This improvement is not currently in the LAMTPO TIP and is not funded.

The existing median opening and access to the Food City supermarket occurs in the middle of the eastbound SR 34 to northbound Odell Avenue left-turn lane, creating conflicting movements and potential for driver confusion. The Food City supermarket has access to Odell Avenue, which has a traffic signal at SR 34, and access to Pearl Avenue to the rear of the store. It is recommended that the mid-block median opening be considered for elimination and the entrance converted from full access to right-in/right-out only access. The proposed addition of a left-turn lane along SR 34 at Pearl Avenue will mitigate the loss of this full access point. However, eastbound SR 34 traffic will only be able to access Food City by turning onto either Pearl Avenue or Odell Avenue.

2. Close the SR 34 entrance drive from the vacant Burger Queen restaurant (currently owned by Narita Express & Japanese Grill) in the southeast quadrant of the SR 34 intersection with Hicks Road.

The existing entrance is too close to the four (4) legged signalized intersection and could create driver confusion and the potential for conflicts. This parcel has access to Hicks Road to the rear, two hundred (200) feet south of the signalized intersection. Some reconstruction of the drive-thru lane exit would be required. Ingress and egress will only be provided at the rear of the parcel. Therefore, significant potential for right-of-way damages would be expected with this modification.

3. Close the easternmost access of the Liberty Tax parcel at the SR 34 intersection with Harrington Drive and combine with Darby House access to the east.

There are two (2) property access locations within the intersection, which could create motorist confusion. This improvement would require coordination between adjacent property owners outside of the SR 34 right-of-way to eliminate one (1) of the access points. With this modification there is potential for right-of-way damages to both parcels and/or the acquisition of the affected area on the Darby House parcel.

Improvements Considered and Eliminated

The following improvements are included in the LAMTPO TIP and were considered in this TPR-Corridor Study, but were eliminated from further consideration due to minimal predicted improvements in traffic operations, negligible safety benefits, and considerable right-of-way impacts.

1. Add a right-turn lane to each Russell Avenue approach to SR 34. This improvement is included in the LAMTPO TIP as ID 2044, fiscal year 2013. LAMTPO does not currently have a contract with TDOT for this improvement.

Because the existing right-of-way along the Russell Avenue approaches to SR 34 are narrow, and the addition of right-turn lanes would require additional right-of-way from the neighboring commercial properties, this TPR-Corridor Study does not recommend these improvements. The 2036 LOS is forecast to be adequate.

2. Add a right-turn lane to each George Avenue approach to SR 34. This improvement is included in the LAMTPO TIP as ID 2043, fiscal year 2014. LAMTPO does not currently have a contract with TDOT for this improvement.

Because the existing right-of-way along the George Avenue approaches to SR 34 are narrow, and the addition of right-turn lanes would require additional right-of-way from the neighboring commercial properties, this TPR-Corridor Study does not recommend these improvements. The 2036 LOS is forecast to be adequate.

4. Cost Estimate

Cost estimates, in 2011 dollars, were prepared for the recommendations previously discussed in Section 3, "Recommended Improvements" of this TPR - Corridor Study. A summary of the recommended improvements include:

- Radio-controlled signal interconnect system from SR 92 to Hicks Road;
- Pedestrian signal heads, pushbutton activation, and cross walks for the SR 34 intersections at signalized intersections;
- Left-turn lanes at Pearl Avenue and at Harrington Street;
- Curb ramp upgrades for ADA compliance;
- Tapered offsets for all left-turn lanes;
- Eastbound left-turn lane at the crushed aggregate facility east of Fate Rankin Road;
- Eastbound left-turn lane at the Quick Lube store (Shell Oil parcel) east of Meadow Spring Drive;
- Westbound SR 34 left-turn lane into the Mossy Creek Development;
- Dual left-turn lanes for eastbound SR 34 to northbound Chucky Pike;
- Additional turn lanes on Chucky Pike approaches to SR 34; and
- Restriping of southbound Odyssey Road approach.

The estimated cost for the recommendations listed above is \$1,528,700.

APPENDIX A

Recommended Improvements on Aerial Background



Note:
 Traffic signals to be interconnected including at S.R. 92, Russell Ave., George Ave., Odell Ave., and Hicks Rd.
 Additional traffic signals to be interconnected on a separate system including at Chucky Pike and Odyssey Rd.



- LEGEND**
-  Proposed Pavement
 -  Existing Parcel Line
 -  Existing Signalized Intersection

SR-34 / U.S. 11E
 Proposed Improvements
 From Cedar Avenue
 to 300 Feet West of
 Russell Avenue

DRAWN BY: JWB	CHECKED BY: DCC
Sheet 1 of 11	
PIN 115652.00	
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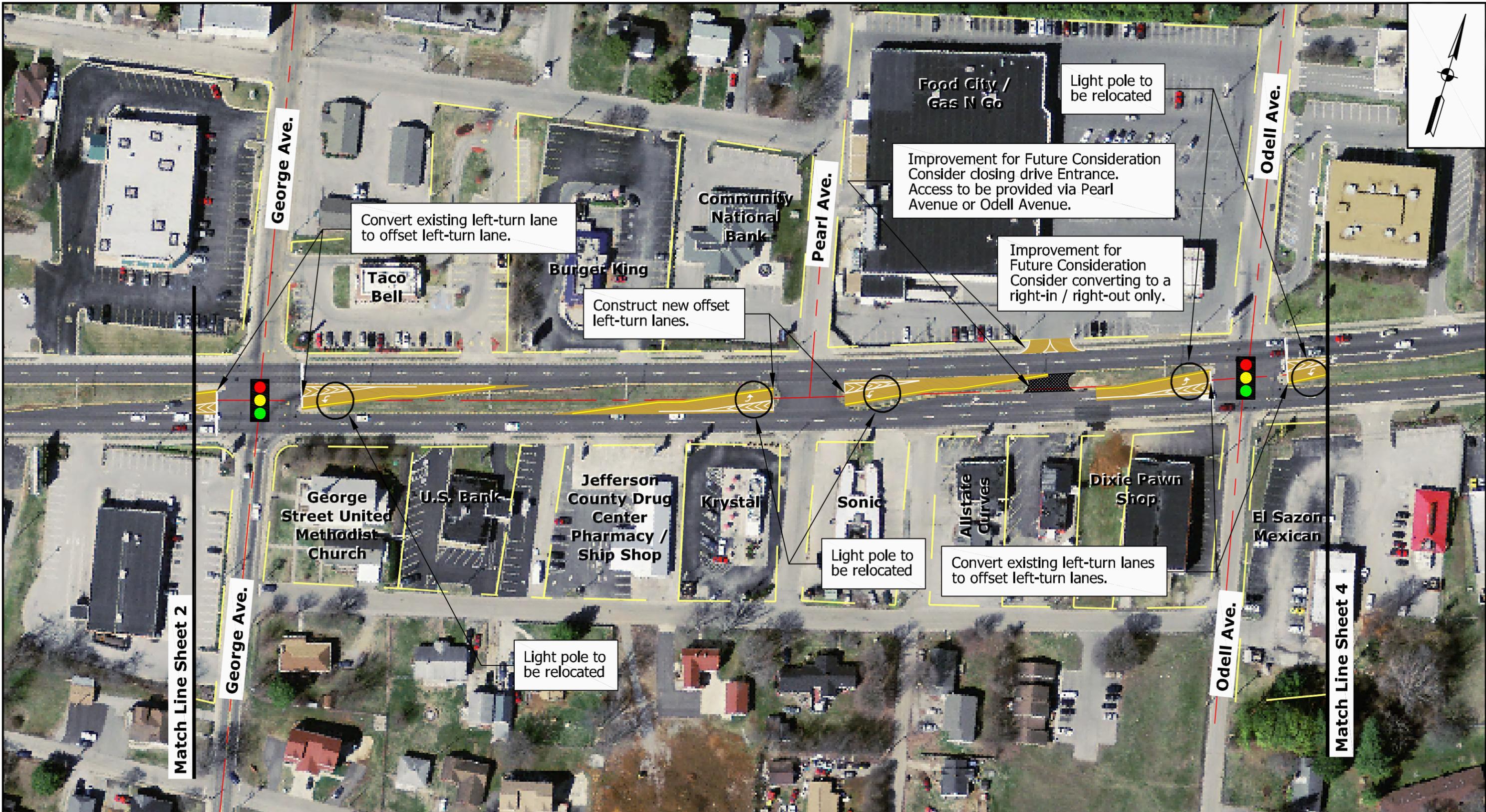


- LEGEND**
-  Proposed Pavement
 -  Existing Parcel Line
 -  Existing Signalized Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From 300 Feet West
 of Russell Avenue
 to George Avenue

DRAWN BY: JWB	CHECKED BY: DCC
Sheet 2 of 11	
PIN 115652.00	
SCALE: 1" = 100'	DATE: 3-7-12



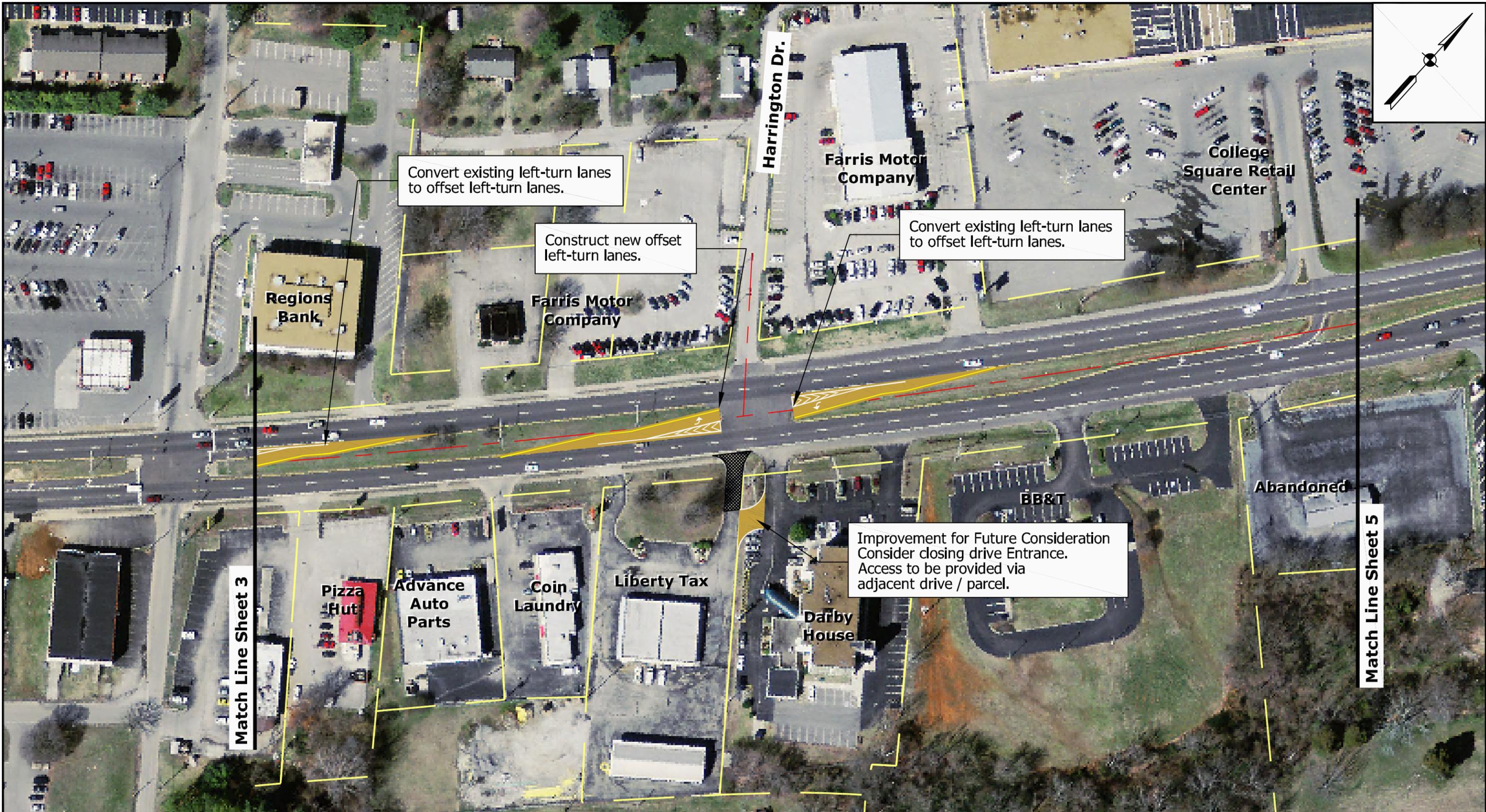
- LEGEND**
- Proposed Pavement
 - Existing Parcel Line
 - Existing Signalized Intersection



SR-34 / U.S. 11E

Proposed Improvements
From George Avenue
to Odell Avenue

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Sheet 3 of 11			
PIN 115652.00			
SCALE:	1" = 100'	DATE:	3-7-12



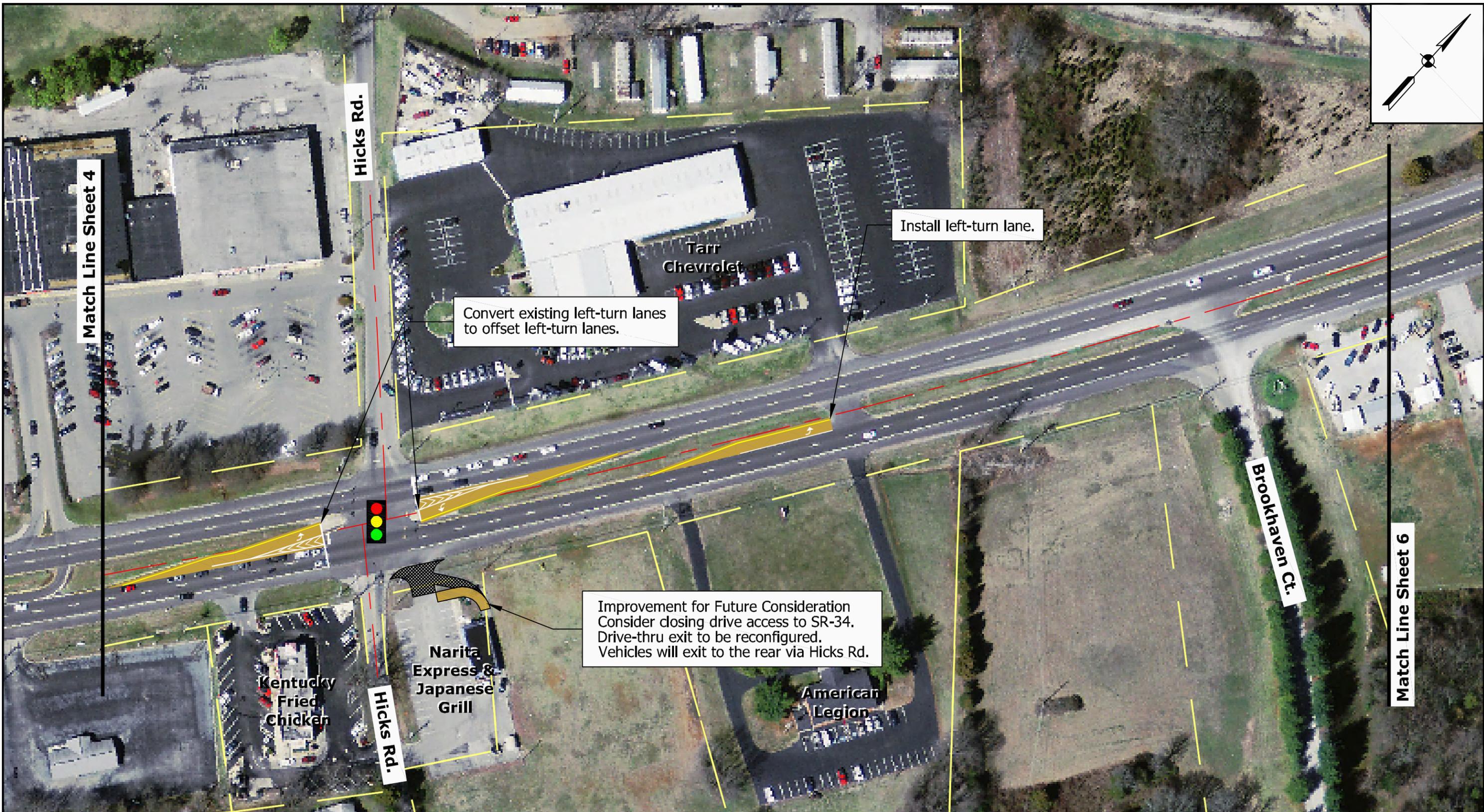
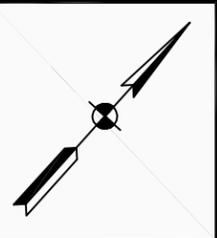
LEGEND

-  Proposed Pavement
-  Existing Parcel Line
-  Existing Signalized Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From Odell Avenue
 to 300 Feet West
 of Hicks Road

<small>DRAWN BY:</small> JWB	<small>CHECKED BY:</small> DCC
Sheet 4 of 11	
PIN 115652.00	
<small>SCALE:</small> 1" = 100'	<small>DATE:</small> 3-7-12



Match Line Sheet 4

Hicks Rd.

Tarr Chevrolet

Install left-turn lane.

Convert existing left-turn lanes to offset left-turn lanes.

Brookhaven Ct.

Match Line Sheet 6



Improvement for Future Consideration
Consider closing drive access to SR-34.
Drive-thru exit to be reconfigured.
Vehicles will exit to the rear via Hicks Rd.

Kentucky Fried Chicken

Hicks Rd.

Narita Express & Japanese Grill

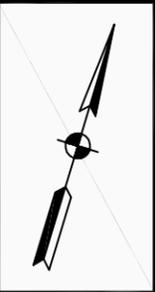
American Legion

- LEGEND**
-  Proposed Pavement
 -  Existing Parcel Line
 -  Existing Signalized Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From 300 Feet West of Hicks
 Road to 200 Feet East of
 Brookhaven Court

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Sheet 5 of 11	
PIN 115652.00	
SCALE: 1" = 100'	DATE: 3-7-12



Match Line Sheet 5

Mossy Creek
Match Line Sheet 7

- LEGEND**
-  Proposed Pavement
 -  Existing Parcel Line
 -  Existing Signalized Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From 200 Feet East
 of Brookhaven Court
 to Bridge Over Mossy Creek

<small>DRAWN BY:</small> JWB	<small>CHECKED BY:</small> DCC
Sheet 6 of 11	
PIN 115652.00	
<small>SCALE:</small> 1" = 100'	<small>DATE:</small> 3-7-12



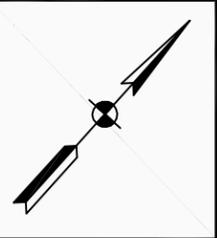
LEGEND

- Proposed Pavement
- Existing Parcel Line
- Existing Signalized Intersection

SR-34 / U.S. 11E
 Proposed Improvements
 From Bridge Over Mossy
 Creek to 100 Feet East of
 Clinch View Circle

<small>DRAWN BY:</small> JWB	<small>CHECKED BY:</small> DCC
Sheet 7 of 11	
PIN 115652.00	
<small>SCALE:</small> 1" = 100'	<small>DATE:</small> 3-7-12

Match Line Sheet 9



Match Line Sheet 7

Match Line Sheet 10

LEGEND

-  Proposed Pavement
-  Existing Parcel Line
-  Existing Signalized Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From 100 Feet East of Clinch
 View Circle to 400 Feet East
 of Chucky Pike

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Sheet 8 of 11	
PIN 115652.00	
SCALE: 1" = 100'	DATE: 3-7-12



Match Line Sheet 8

LEGEND

-  Proposed Pavement
-  Existing Parcel Line
-  Existing Signaled Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 Along North Leg
 of Chucky Pike

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Sheet 9 of 11	
PIN 115652.00	
SCALE: 1" = 100'	DATE: 3-7-12



Andrew Johnson Hwy.

Match Line Sheet 8

Match Line Sheet 11

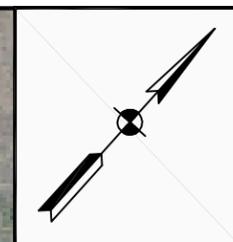
LEGEND

-  Proposed Pavement
-  Existing Parcel Line
-  Existing Signaled Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From 400 Feet East of
 Chucky Pike to 150 Feet
 West of Odyssey Road

<small>DRAWN BY:</small> JWB	<small>CHECKED BY:</small> DCC
Sheet 10 of 11	
PIN 115652.00	
<small>SCALE:</small> 1" = 100'	<small>DATE:</small> 3-7-12



- LEGEND**
-  Proposed Pavement
 -  Existing Parcel Line
 -  Existing Signalized Intersection



SR-34 / U.S. 11E
 Proposed Improvements
 From 100 Feet West of
 Odyssey Road to 525 Feet
 East of Odyssey Road

<small>DRAWN BY:</small> JWB	<small>CHECKED BY:</small> DCC
Sheet 11 of 11	
PIN 115652.00	
<small>SCALE:</small> 1" = 100'	<small>DATE:</small> 3-7-12

APPENDIX B

Cost Estimate

Route:	S.R. 34 / U.S. 11 E (Andrew Johnson Highway)
Description:	From S.R. 92 to Odyssey Road
County:	Jefferson
Length:	2.11 Miles
Date:	March 19, 2012

<u>DESCRIPTION</u>	<u>TOTAL</u>
Right-of-Way	
Clearing and Grubbing	\$ 64,000
Earthwork	\$ 88,900
Railroad Crossing or Separation	
Drainage	\$ 97,400
Utilities	
Structures	
Pavement Removal	\$ 38,600
Paving	\$ 371,600
Roadway and Pavement Appurtenances	\$ 77,400
Retaining Walls	
Topsoil	\$ 9,000
Seeding	\$ 5,000
Sodding	
Rip-Rap or Slope Protection	
Fencing	
Signing	\$ 4,000
Pavement Markings	\$ 34,000
Lighting	\$ 70,000
Signalization	\$ 116,800
Guardrail	
Pay Item Quantity Adjustment (15%) ¹	\$ 146,510
Maintenance of Traffic	\$ 80,000
Mobilization (5%)	\$ 60,160
CONSTRUCTION COST (rounded)	\$ 1,263,370
Engineering and Contingency (10%)	\$ 126,340
TOTAL CONSTRUCTION COST (rounded)	\$ 1,389,710
Preliminary Engineering (10%)	\$ 138,970
PROJECT COST ²(rounded)	\$1,528,700

¹ For estimating purposes pay items are adjusted for fluxuation of cost based on quantity.

² For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
-	Right-of-Way	LS	LS	\$ -	\$ -
RIGHT-OF-WAY TOTAL (ROUNDED)					\$ -
201-01	Clearing and Grubbing	LS	1	\$ 48,000.00	\$ 48,000.00
202-01	Removal of Structures and Obstructions	LS	1	\$ 16,000.00	\$ 16,000.00
CLEAR AND GRUBBING TOTAL (ROUNDED)					\$ 64,000
203-01	Road and Drainage Exc. (Uncl.)	CY	1500	\$ 4.00	\$ 6,000
203-03	Borrow Exc. (Uncl.)	CY	1600	\$ 15.00	\$ 24,000
203-05	Undercutting	CY	1250	\$ 7.50	\$ 9,375
207-01.01	Subgrade Const & Prep	STA	40	\$ 1,000.00	\$ 40,000
209-99.91	Erosion Control	LS	1	\$ 9,500.00	\$ 9,500
EARTHWORK TOTAL (ROUNDED)					\$ 88,900
415-01.02	Cold Planning Bit. Pavement	SY	15,430	\$ 2.50	\$ 38,575
PAVEMENT REMOVAL TOTAL (ROUNDED)					\$ 38,600
607-03.02	18" Conc. Pipe Culvert (Class III)	LF	1600	\$ 42.00	\$ 67,200
611-07.01	Class A Concrete (Pipe Endwalls)	CY	5.88	\$ 650.00	\$ 3,822
611-07.02	Steel Bar Reinforcement (Pipe Endwalls)	LBS	772	\$ 1.50	\$ 1,158
611-12.02	Catch Basins, Type 12 >4'-8' Depth	EA	14	\$ 1,800.00	\$ 25,200
					\$ -
DRAINAGE TOTAL (ROUNDED)					\$ 97,400
					\$ -
UTILITIES TOTAL (ROUNDED)					\$ -
					\$ -
STRUCTURES TOTAL (ROUNDED)					\$ -
					\$ -
RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)					\$ -
303-01	Mineral Aggregate, TY A Base, Grading D	TON	1800	\$ 21.00	\$ 37,800
307-01.06	Asphalt Conc. Mix (PG64-22) (BPMB-HM) Grading B	TON	2200	\$ 75.00	\$ 165,000
403-01	Bituminous Material for Tack Coat	TON	6.5	\$ 490.00	\$ 3,176
411-01.10	ACS Mix (PG64-22) Grading D	TON	1800	\$ 92.00	\$ 165,600
PAVING TOTAL (ROUNDED)					\$ 371,600
702-03	Curb & Gutter	CY	360.00	\$ 215.00	\$ 77,400
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)					\$ 77,400

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
RETAINING WALLS TOTAL (ROUNDED)					\$ -
712-01	Traffic Control	LS	1	80000	\$ 80,000
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)					\$ 80,000
203-07	Furnishing & Spreading Topsoil	CY	900	\$ 10.00	\$ 9,000
TOPSOIL TOTAL (ROUNDED)					\$ 9,000
801-01	Seeding (With Mulch)	UNIT	125	\$ 40.00	\$ 5,000
SEEDING TOTAL (ROUNDED)					\$ 5,000
SODDING TOTAL (ROUNDED)					\$ -
713-99.91	Signs	SF	100.00	40	\$ 4,000
SIGNING TOTAL (ROUNDED)					\$ 4,000
716-99.91	Pavement Markings	LM	1.7	20000	\$ 34,000
PAVEMENT MARKINGS TOTAL (ROUNDED)					\$ 34,000
714-01.38	Light Pole Relocation	EA	12.00	\$ 5,000.00	\$ 60,000
LIGHTING TOTAL (ROUNDED)					\$ 60,000
730-01	Traffic Signals	LS	1	\$ 60,000.00	\$ 60,000
730-02.41	Signal Head Mod.	EA	12	\$ 1,000.00	\$ 12,000
730-08.32	Interconnect Cable	LF	4700	\$ 2.00	\$ 9,400
730-12.02	Conduit 2" Dia. PVC	LF	4700	\$ 6.00	\$ 28,200
730-13.08	Vehicle Detector	EA	12	\$ 600.00	\$ 7,200
SIGNALIZATION TOTAL (ROUNDED)					\$ 116,800
FENCE TOTAL (ROUNDED)					\$ -
GUARDRAIL TOTAL (ROUNDED)					\$ -
RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)					\$ -

Jefferson City,
Jefferson County

S.R. 34 / U.S. 11 E
Andrew Johnson Highway

Quantity Breakdown

Right-of-Way		Lump Sum							
		\$0.00	\$ -						
		sub-total = \$ -							
Clear and Grubbing		Lump Sum							
201-01	Clearing and Grubbing	\$48,000.00	\$ 48,000.00						
202-01	Removal of Structures and Obstructions	\$ 16,000.00	\$ 16,000.00						
		sub-total = \$ 64,000							
Earthwork	Lgth. (ft.)	Width (ft.)	Avg. Fill (ft.)	Factor	C.Y.	Stations	Cost/c.y./Sta.	Lump Sum	
203-01	Road and Drainage Exc. (Uncl.)				1500		\$4.00	\$6,000.00	
203-03	Borrow Exc. (Uncl.)				1600		\$15.00	\$24,000.00	
203-05	Undercutting				1250		\$7.50	\$9,375.00	
207-01.01	Subgrade Const & Prep					40	\$1,000.00	\$40,000.00	
209-99.91	Erosion Control							\$9,500.00	
								sub-total = \$ 88,900	
Pavement Removal		Area(sq.ft.)	Factor	S.Y.	Cost/s.y.				
415-01.02	Cold Planning Bit. Pavement	138870	9	15,430	\$2.50			\$ 38,575	
								sub-total = \$ 38,600	
Drainage		Lin. Ft.	Cost/L.F.	Each	Cost/ea.	CY or LBS	Cost/CY-LBS		
607-03.02	18" Conc. Pipe Culvert (Class III)	1600	\$42.00					\$ 67,200	
611-07.01	Class A Concrete (Pipe Endwalls)					5.88	\$650.00	\$ 3,822	
611-07.02	Steel Bar Reinforcement (Pipe Endwalls)					772	\$1.50	\$ 1,158	
611-12.02	Catch Basins, Type 12 >4'-8' Depth			14	\$1,800.00			\$ 25,200	
								sub-total = \$ 97,400	
Utilities		Lin. Ft.	Cost/L.F.	Each	Cost/ea.				
								sub-total = \$ -	
Structures		Lump Sum							
		sub-total = \$ -							
Railroad Crossing or Separation		Lump Sum							
		sub-total = \$ -							
Paving	Area(s.f.)	Thk. (ft.)	Factor	S.Y.	C.Y.	Factor	lb/ton	Tons	\$/Ton or S.Y.
303-01	Agg. Typ A Base							1800	\$21.00
307-01.06	Asp. Mix B							2200	\$75.00
403-01	Tack Coat	269534	9	29948		0.05	231	6.5	\$490.00
411-01.10	Asp. Surface							1800.0	\$92.00
									\$ 37,800
									\$ 165,000
									\$ 3,176
									\$ 165,600

										\$ 371,576	
										sub-total = \$ 371,600	
Scoring Flex. Pvm't.					Lgth.(ft.)	Lgth. (mi.)					\$/Lin. Mi.
										sub-total = \$ -	
Roadway and Pavement Appurtenances		Width (ft.)	Lgth.(ft.)	\$/l.f.	S.F. or S.Y.	\$/s.f. or \$/s.y.	C.Y.	\$/c.y.	No.	\$/each	
702-03	Curb & Gutter						360.00	\$215.00		\$ 77,400	
										sub-total = \$ 77,400	
Retaining Walls					Lgth.(ft.)	Avg. Ht. (ft.)			Sq.Ft.	\$/s.f.	
										sub-total = \$ -	
Maintenance of Traffic							Lump Sum				
712-01	Traffic Control							\$80,000.00		\$80,000.00	
										sub-total = \$ 80,000	
Topsoil		L.F.	Width (ft.)	S.F.	Depth (ft.)	Factor	C.y.			\$/c.y.	
203-07	Topsoil						900	\$ 10.00		\$ 9,000	
										sub-total = \$ 9,000	
Seeding		L.F.	Width (ft.)	S.F.	S.F./Unit	Factor	Unit	\$/unit	MG	\$/MG	
801-01	Seeding (Mulch)	0	0	100000	1000	1.25	125.00	\$ 40.00		\$ 5,000	
										sub-total = \$ 5,000	
Sodding		L.F.	Width (ft.)	S.F.	S.F./Unit	Factor	Unit			\$/unit	
803-01	Sod	0	0	0	1000	1.25	0.00	\$ 4.00		\$ -	
										sub-total = \$ -	
Signing					S.F.	\$/sf			No.	\$/ea.	Total
713-99.91	Signs				100.00	\$40.00	[Cost incl. Posts]			\$ 4,000	

sub-total = \$ 4,000

Pavement Markings / Markers	Lin. Mi.	Cost/L.M.	S.Y.	Cost/S.Y.	Lgth.(ft.)	Cost/l.f.	Lump Sum	\$/ea.
716-99.91 Pavement Markings	1.7	\$20,000.00						\$34,000.00

sub-total = \$ 34,000

Lighting	Lump Sum	Each	\$/ea.
714-01.38 Light Pole Relocation		14	\$5,000.00

sub-total = \$ 70,000

Traffic Signals	Lin. Ft.	Cost/L.F.	Lump Sum	Each	\$/ea
730-01 Traffic Signals			\$60,000.00		\$ 60,000
730-02.41 Signal Head Mod.				12	\$1,000.00
730-08.32 Interconnect Cable	4700	\$2.00			\$ 9,400
730-12.02 Conduit 2" Dia. PVC	4700	\$6.00			\$ 28,200
730-13.08 Vehicle Detector				12	\$600.00

sub-total = \$ 116,800

Fence	Lin. Ft.	Cost/L.F.
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sub-total = \$ -

Guardrail	Lin. Ft.	Cost/L.F.	Each	Cost/ea.
-----------	----------	-----------	------	----------

sub-total = \$ -

Rip-Rap/Slope Protection	L.F.	Width (ft.)	S.F.	Factor	C.y.	Factor	Tons	\$/ton
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sub-total = \$ -

APPENDIX C

Approved Traffic Data



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION
SUITE 1000, JAMES K. POLK BUILDING
505 Deaderick Street
NASHVILLE, TENNESSEE 37243-0344

John Schroer
Commissioner

Bill Haslam
Governor

August 23, 2011

Ms. Sarah Hoch
The Corradino Group
200 South Fifth St. Suite 300N
Louisville KY 40202

Subject : S.R. 34 Corridor Study Traffic Data
Jefferson City, Jefferson County

Dear Sarah :

We have reviewed the revised traffic schematics for the 7 intersections you submitted on August 23, 2011 for the subject project.

These figures have our approval for use in the study. If I can be of further assistance, please advise.

Sincerely,

A handwritten signature in red ink that reads "Tony Armstrong".

Tony Armstrong
Transportation Manager I

CC : file
Chris Armstrong

**TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**

PROJECT NO.: _____ ROUTE: U.S. 11E/S.R. 34
 COUNTY: Jefferson CITY: Jefferson City
 PROJECT PIN NUMBER: 115652.00
 PROJECT DESCRIPTION: U.S. 11E/S.R. 34 (Andrew Johnson Highway) Traffic Study from S.R. 92 (Maple Avenue) to Odyssey Road

DIVISION REQUESTING:

MAINTENANCE PAVEMENT DESIGN
 PLANNING STRUCTURES
 PROG. DEVELOPMENT & ADM. SURVEY & DESIGN
 PUBLIC TRANS. & AERO. TRAFFIC SIGNAL DESIGN
 OTHER
 YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: _____
 PROJECTED LETTING DATE: _____

TRAFFIC ASSIGNMENT:

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
17,530	2011	22,970	2,060	9	2036	53-47	4	5		

REQUESTED BY: NAME _____ DATE 7/25/11
 DIVISION _____
 ADDRESS _____

REVIEWED BY: TONY ARMSTRONG _____ DATE _____
 TRANSPORTATION MANAGER 1
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: BILL HART _____ DATE _____
 TRANSPORTATION MANAGER 2
 SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

Please review the traffic data prepared by the Corradino Group.

This traffic is based on 2011 manual turning movement counts taken in May 2011 at the seven signalized intersections within the study area. Counts were taken for an 8-hour period (6:00am to 9:00am, 11:00am to 1:00pm, and 3:00pm to 6:00pm). The future traffic is based on the average growth rate within the study area, as estimated by TDOT from the LAMPTO computer assignment model.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR AADT's OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.

SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.

(REV. 9/20/07)

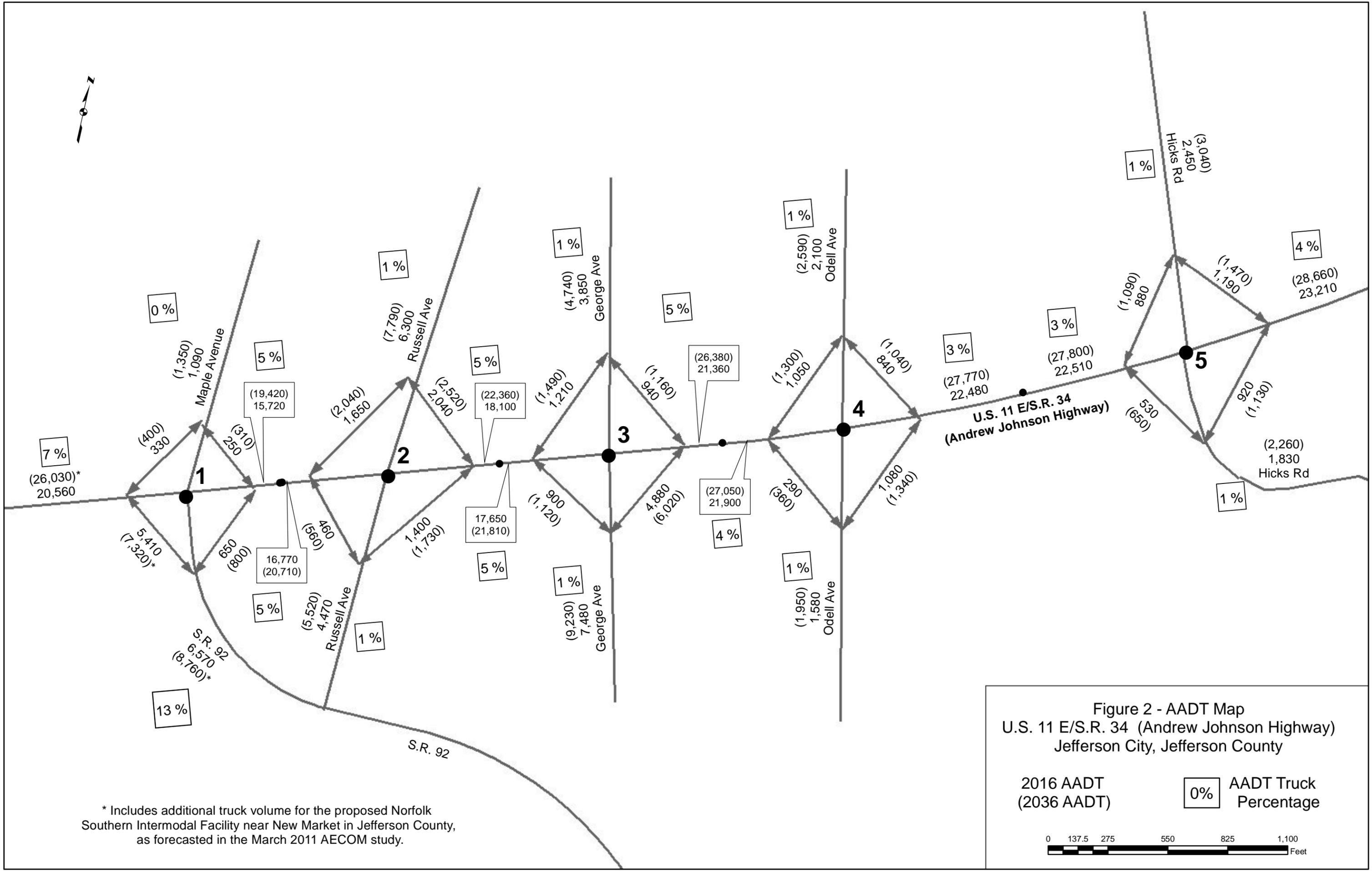


Figure 3

Design Hourly Volume (DHV)

Intersection # 1

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ S.R. 92 (Maple Avenue)

Jefferson City, Jefferson County

Date: July 25, 2011

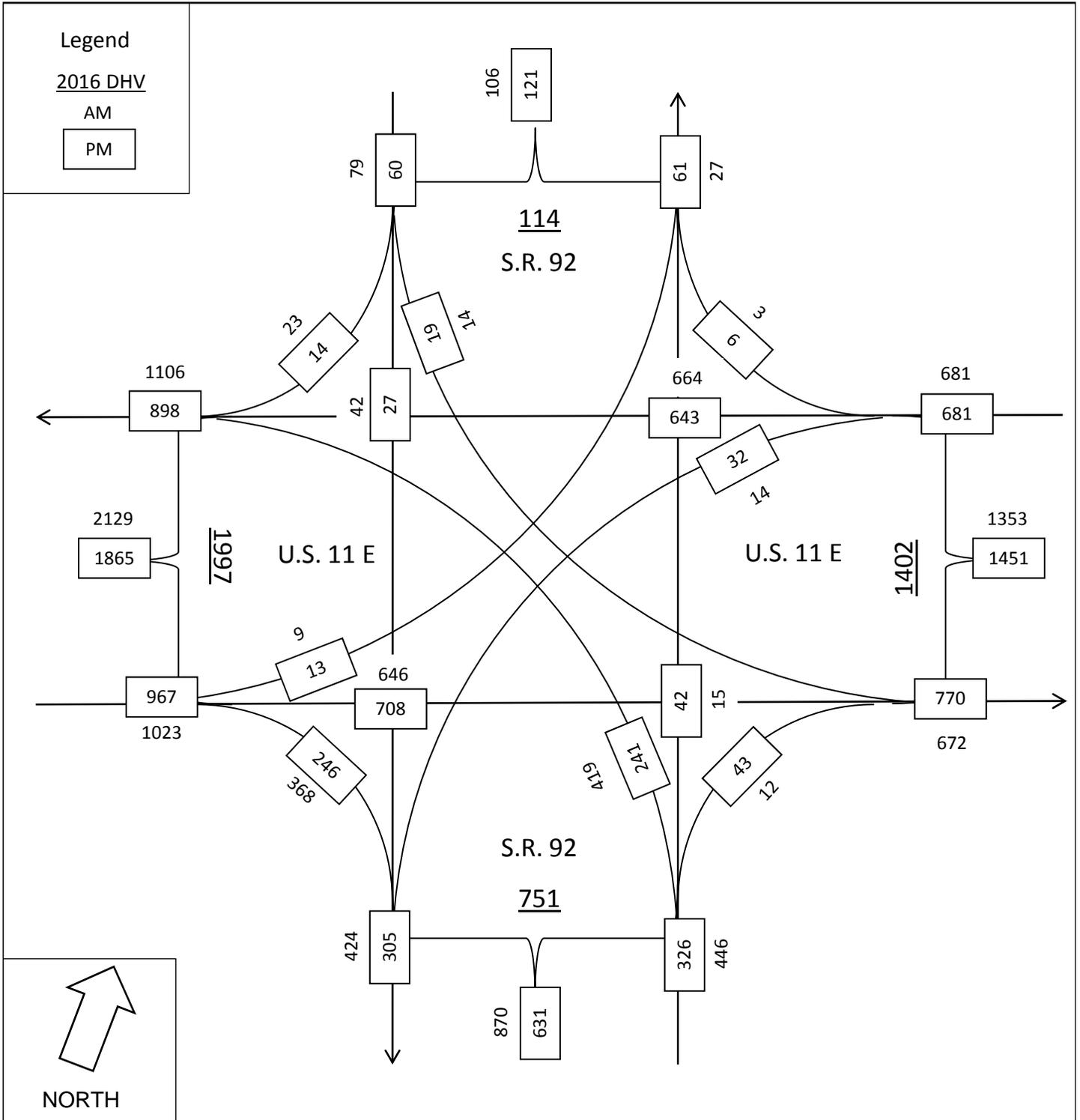


Figure 4

Design Hourly Volume (DHV)

Intersection # 1

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ S.R. 92 (Maple Avenue)

Jefferson City, Jefferson County

Date: July 25, 2011

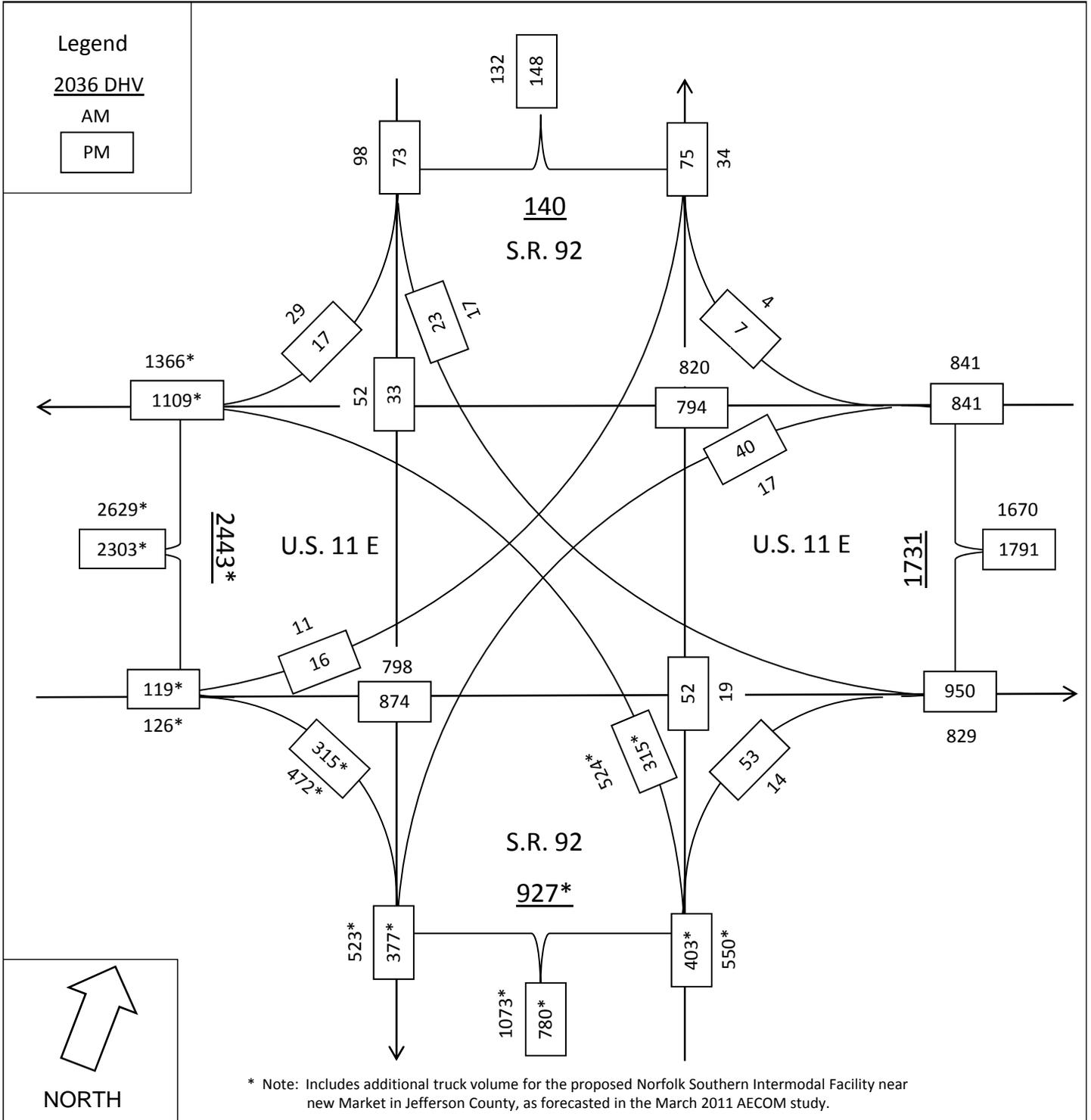


Figure 5

Design Hourly Volume (DHV)

Intersection # 2

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Russell Avenue

Jefferson City, Jefferson County

Date: July 25, 2011

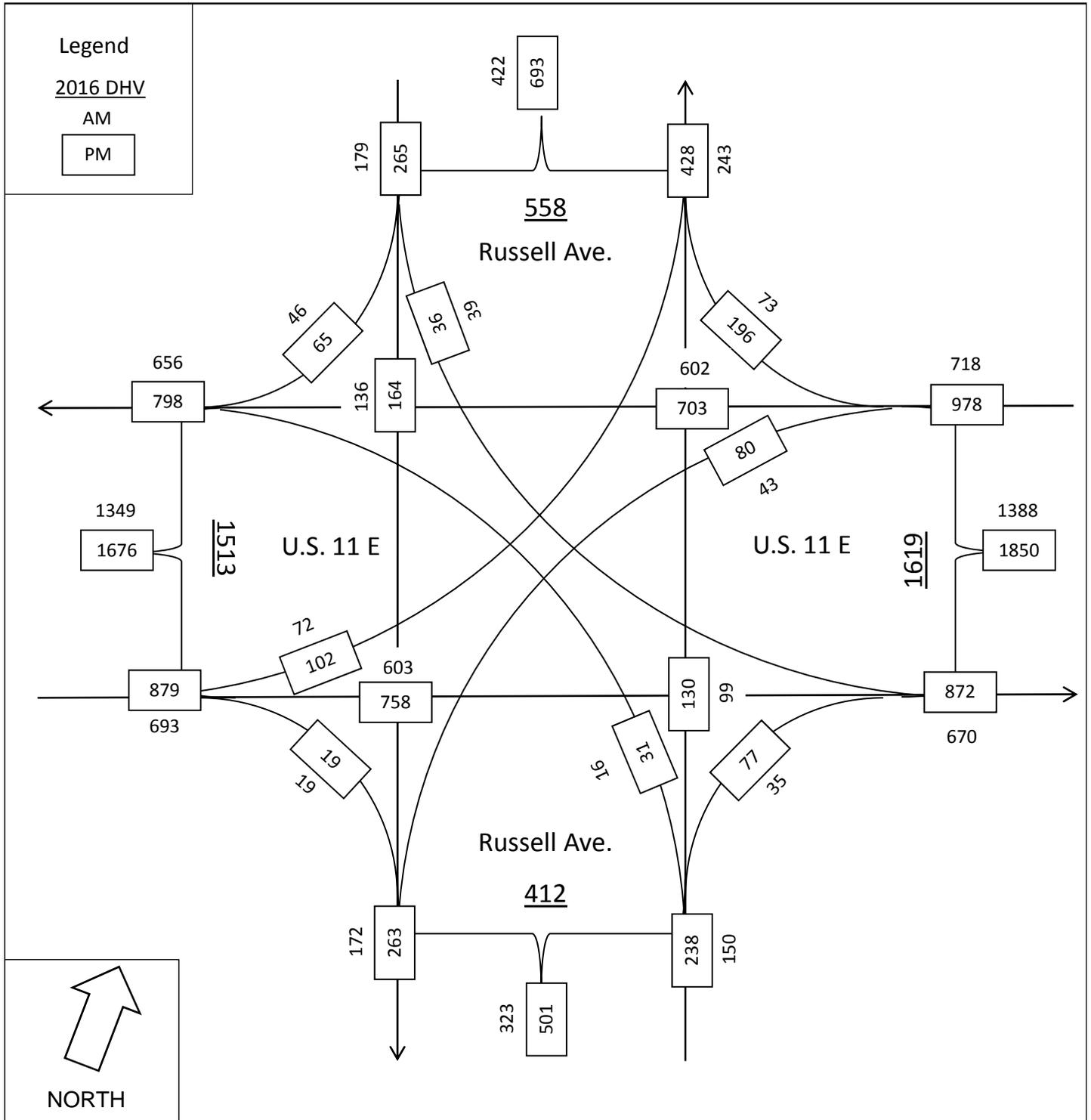


Figure 6

Design Hourly Volume (DHV)

Intersection # 2

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Russell Avenue

Jefferson City, Jefferson County

Date: July 25, 2011

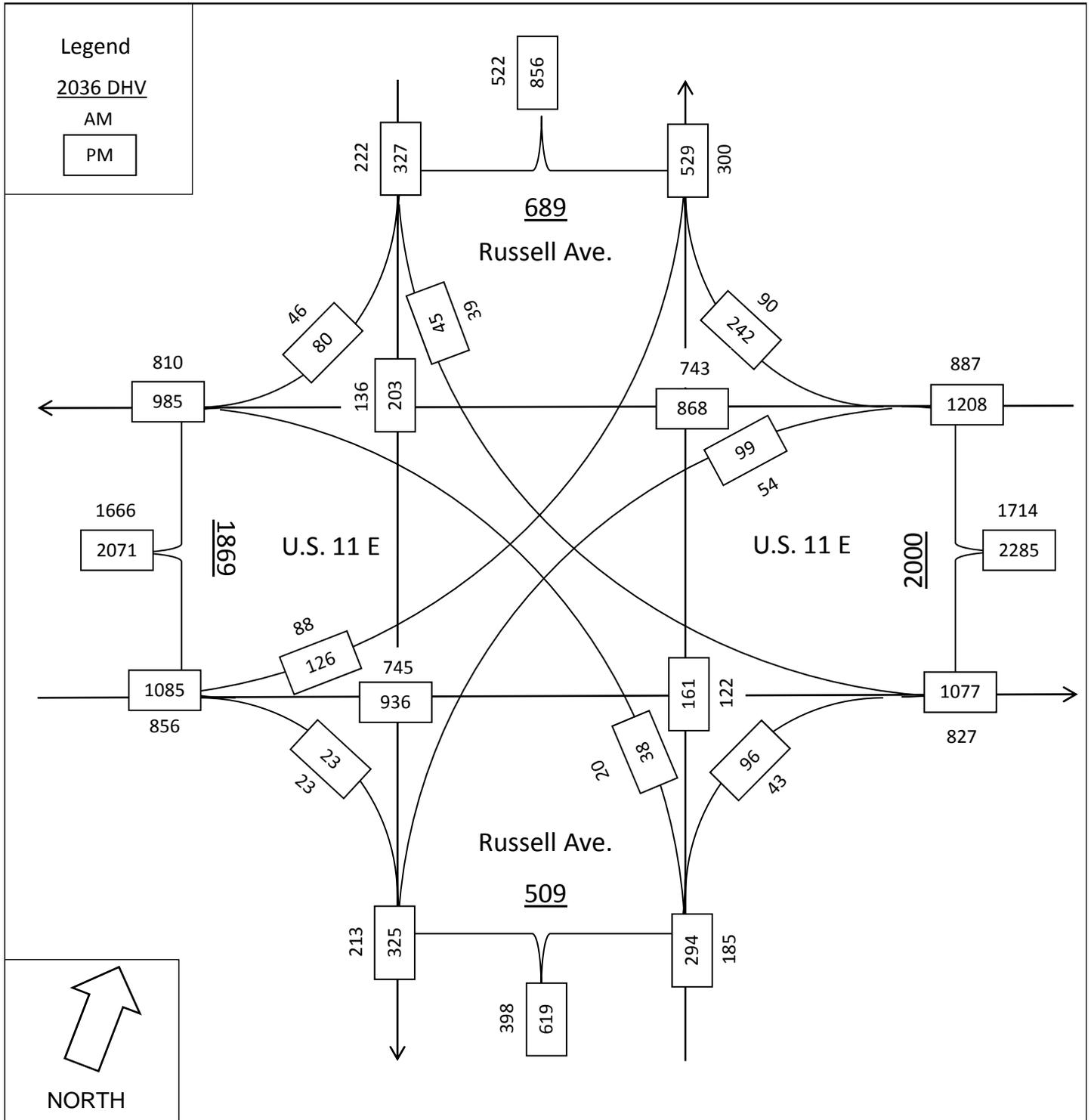


Figure 7

Design Hourly Volume (DHV)

Intersection # 3

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ George Avenue

Jefferson City, Jefferson County

Date: July 25, 2011

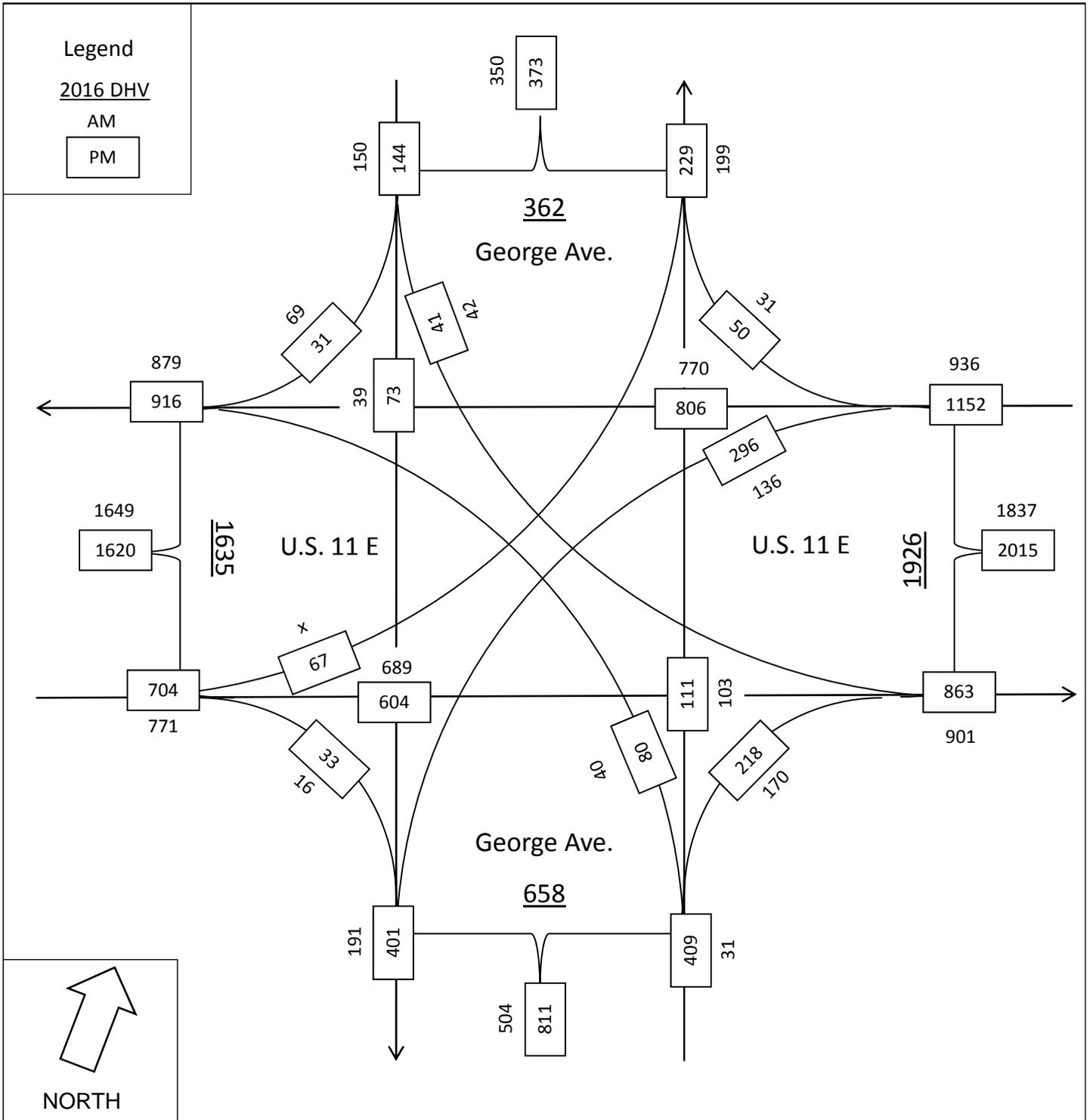


Figure 8

Design Hourly Volume (DHV)

Intersection # 3

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ George Avenue

Jefferson City, Jefferson County

Date: July 25, 2011

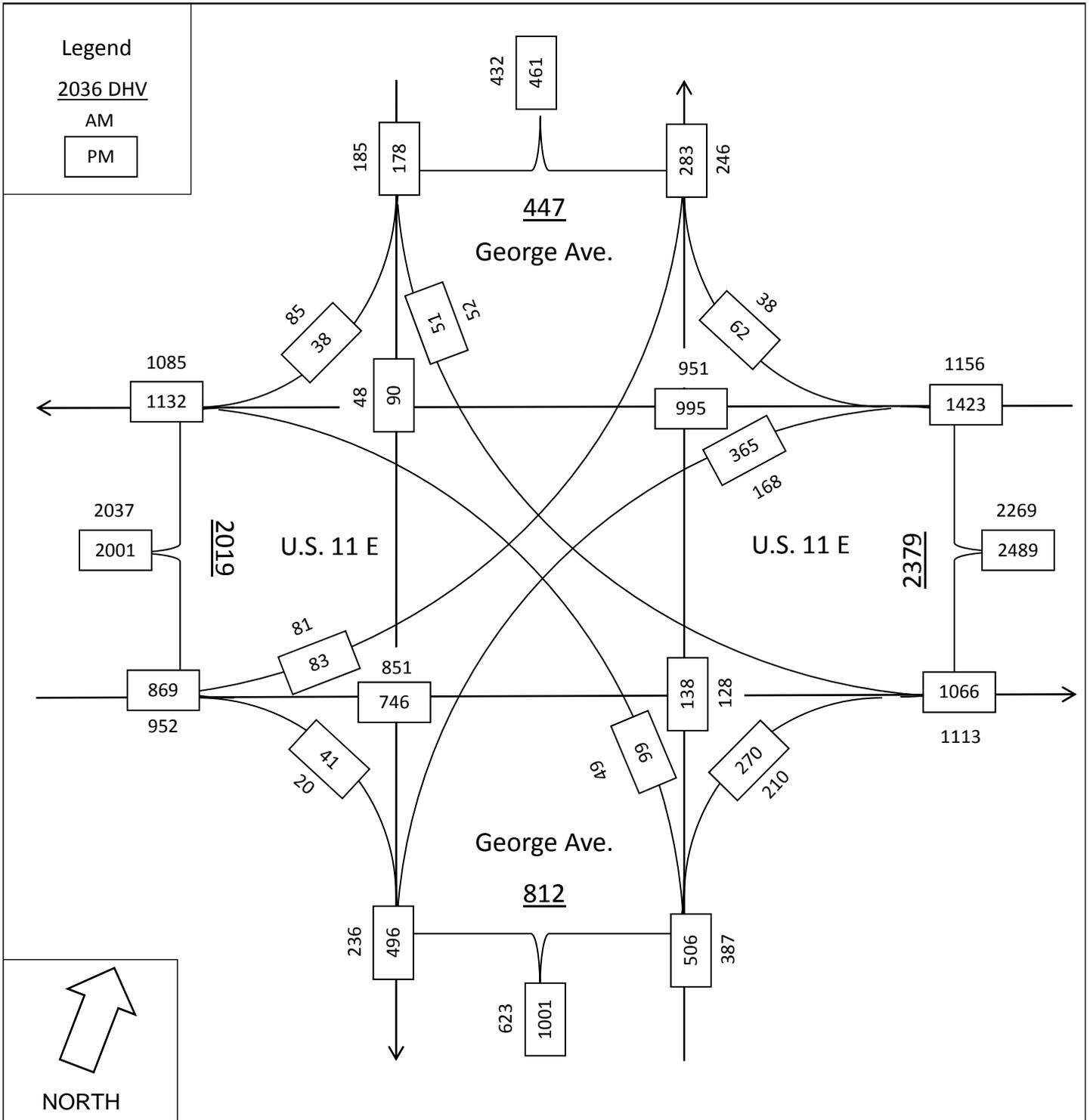


Figure 9

Design Hourly Volume (DHV)

Intersection # 4

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odell Avenue

Jefferson City, Jefferson County

Date: July 25, 2011

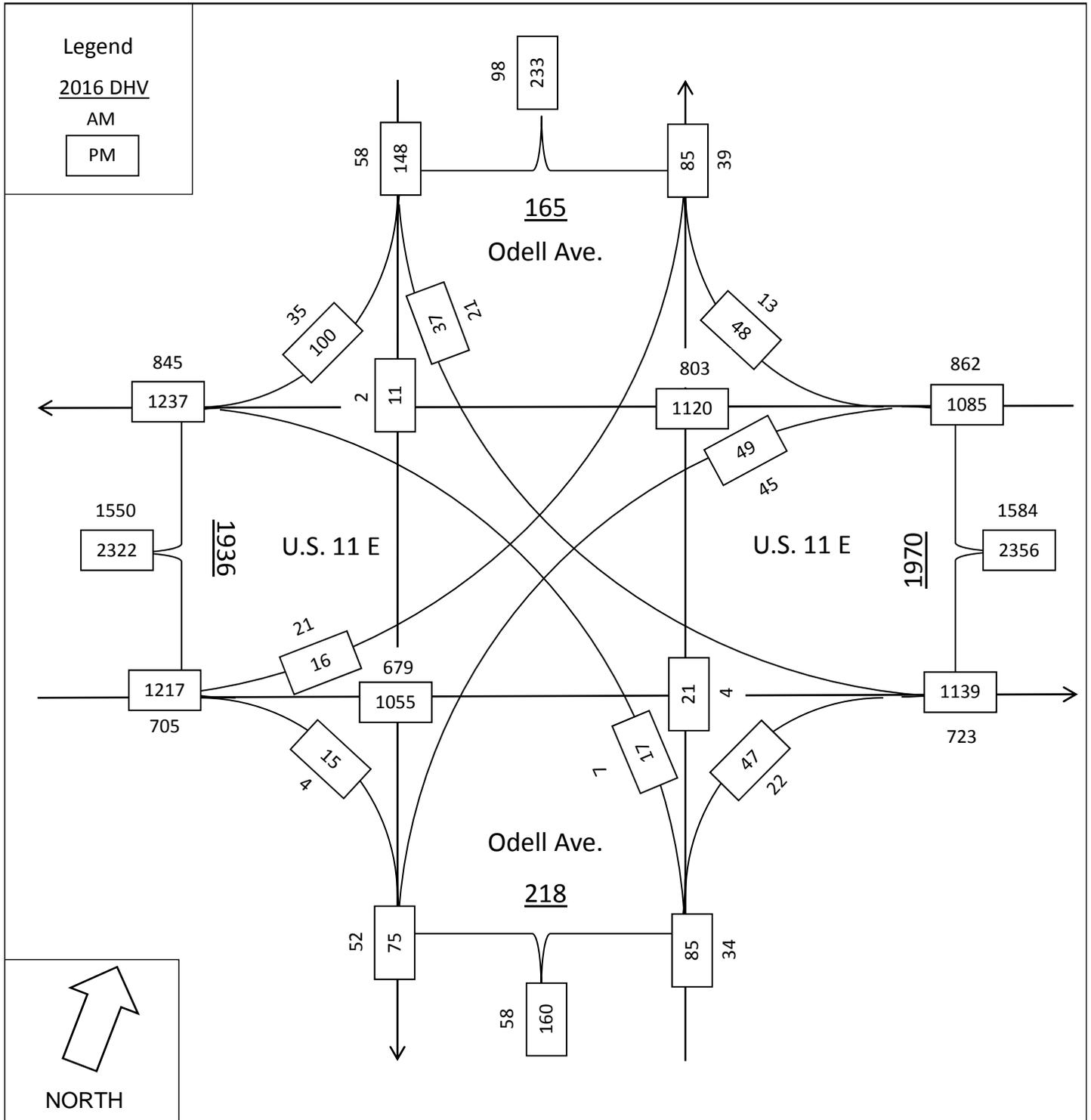


Figure 10
Design Hourly Volume (DHV)
 Intersection # 4
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odell Avenue
 Jefferson City, Jefferson County
 Date: July 25, 2011

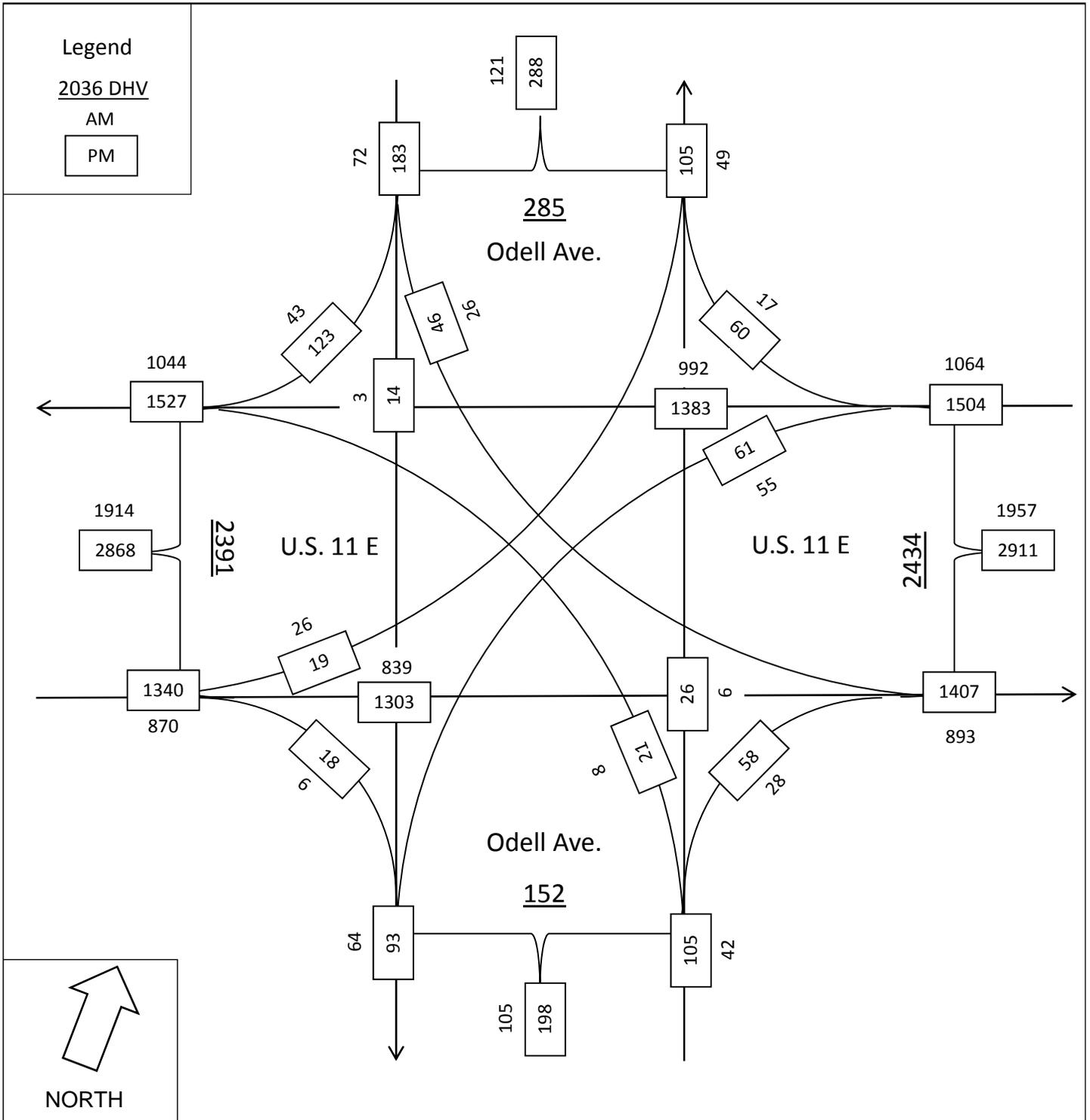


Figure 11
Design Hourly Volume (DHV)
 Intersection # 5
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Hicks Road
 Jefferson City, Jefferson County
 Date: July 25, 2011

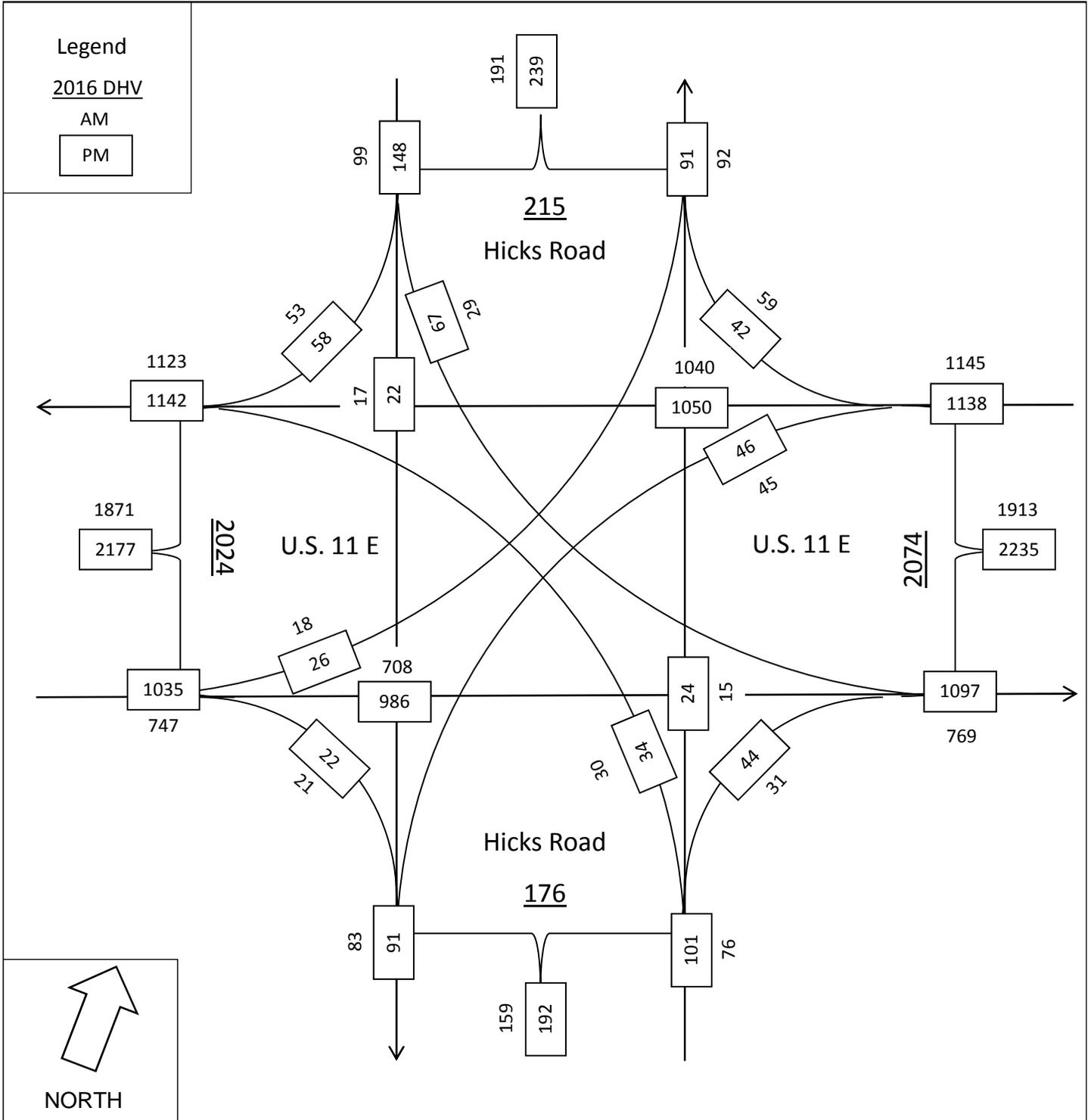


Figure 12
Design Hourly Volume (DHV)
 Intersection # 5
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Hicks Road
 Jefferson City, Jefferson County
 Date: July 25, 2011

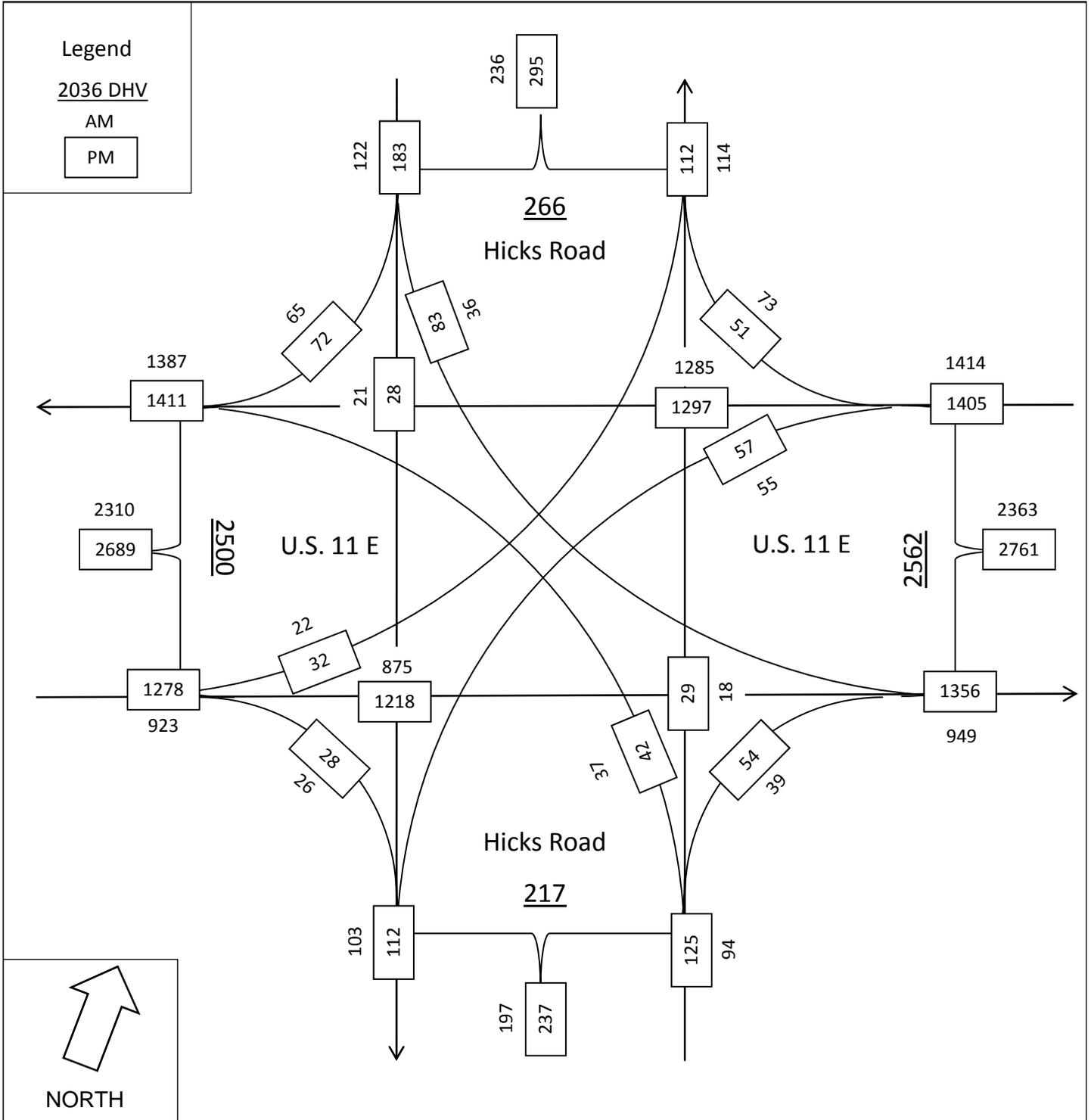


Figure 13
Design Hourly Volume (DHV)
 Intersection # 6
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Chucky Pike
 Jefferson City, Jefferson County
 Date: July 25, 2011

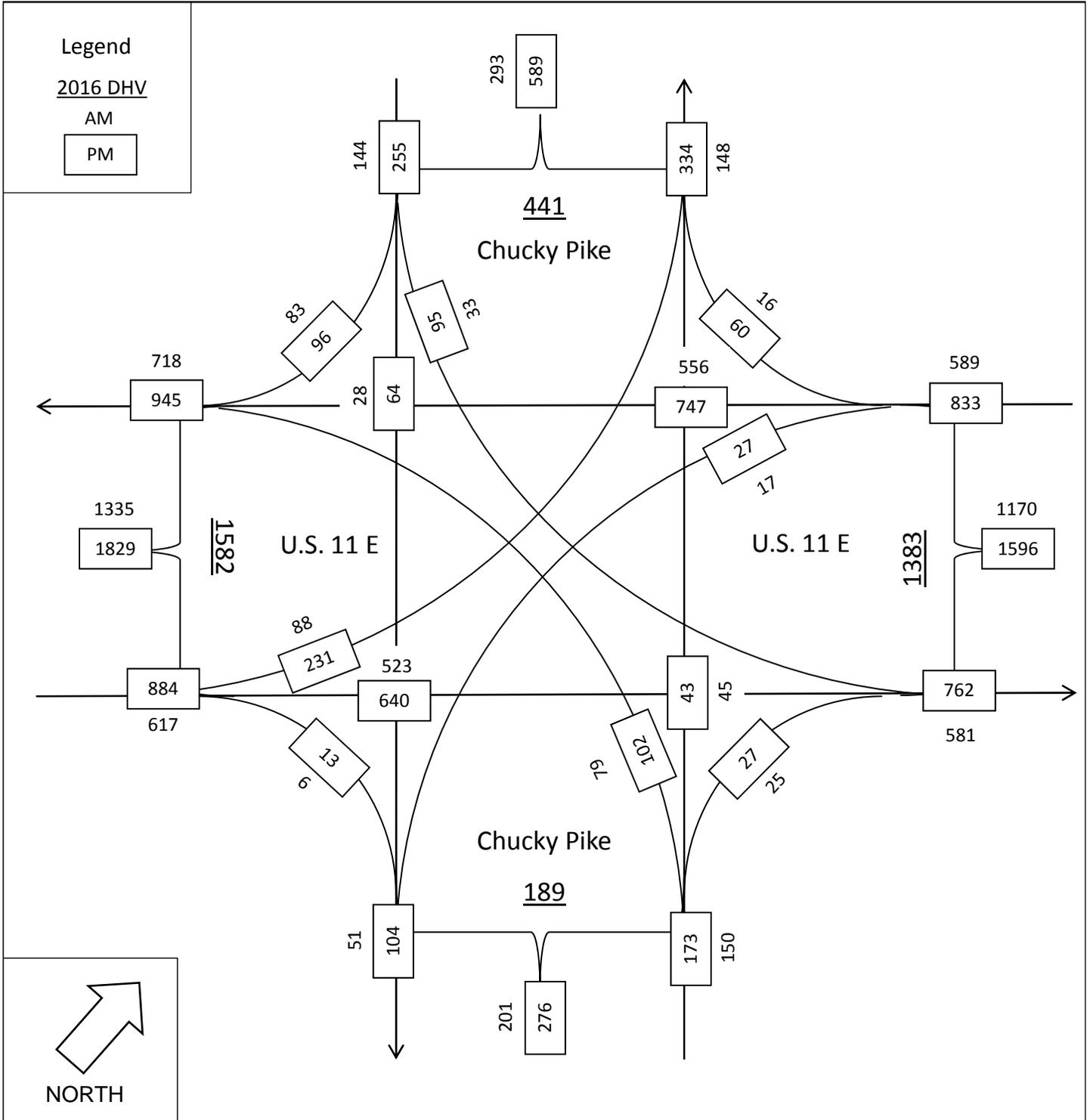


Figure 14
Design Hourly Volume (DHV)
 Intersection # 6
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Chucky Pike
 Jefferson City, Jefferson County
 Date: July 25, 2011

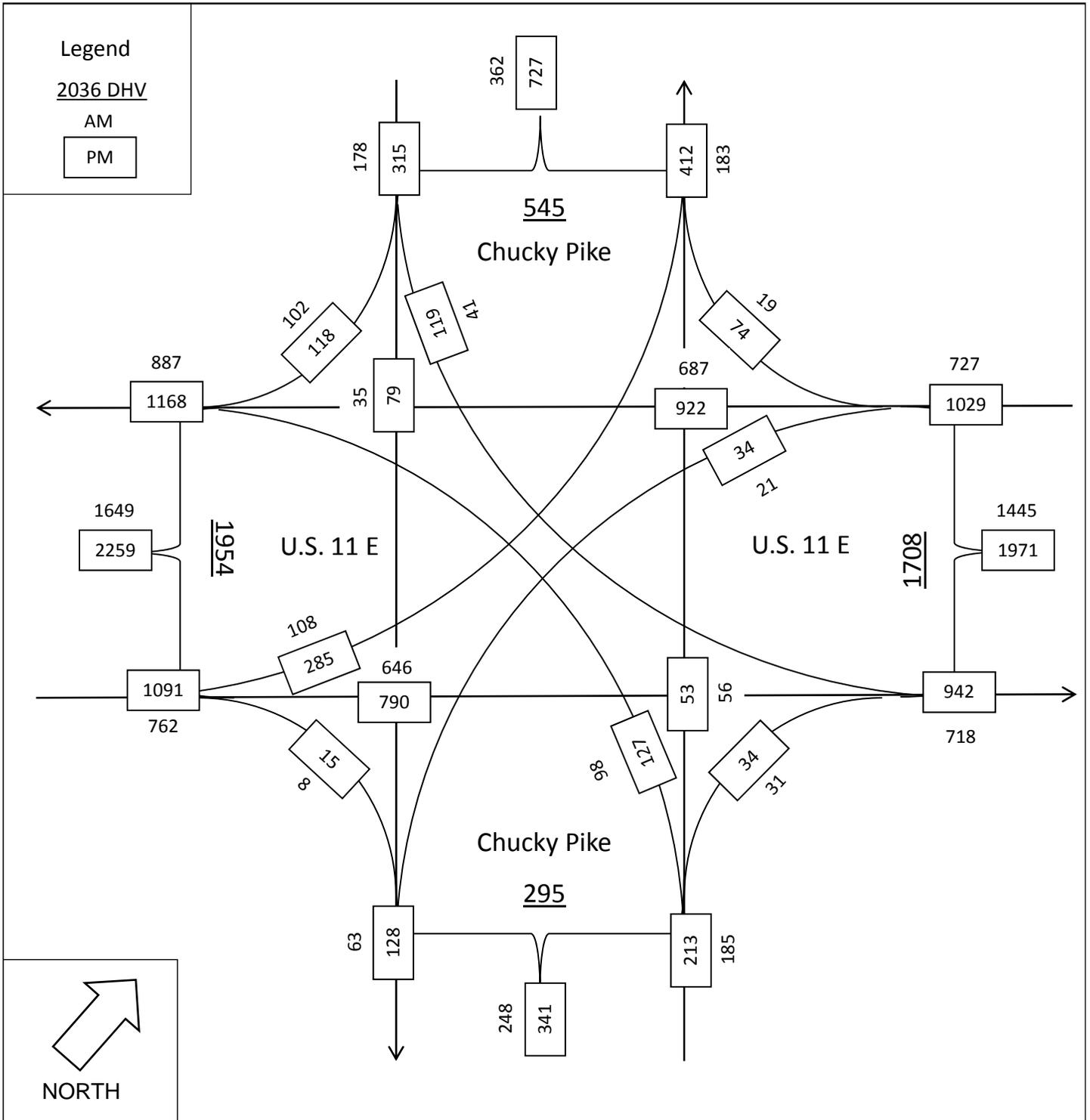


Figure 15
Design Hourly Volume (DHV)
 Intersection # 7
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odyssey Road
 Jefferson City, Jefferson County
 Date: July 25, 2011

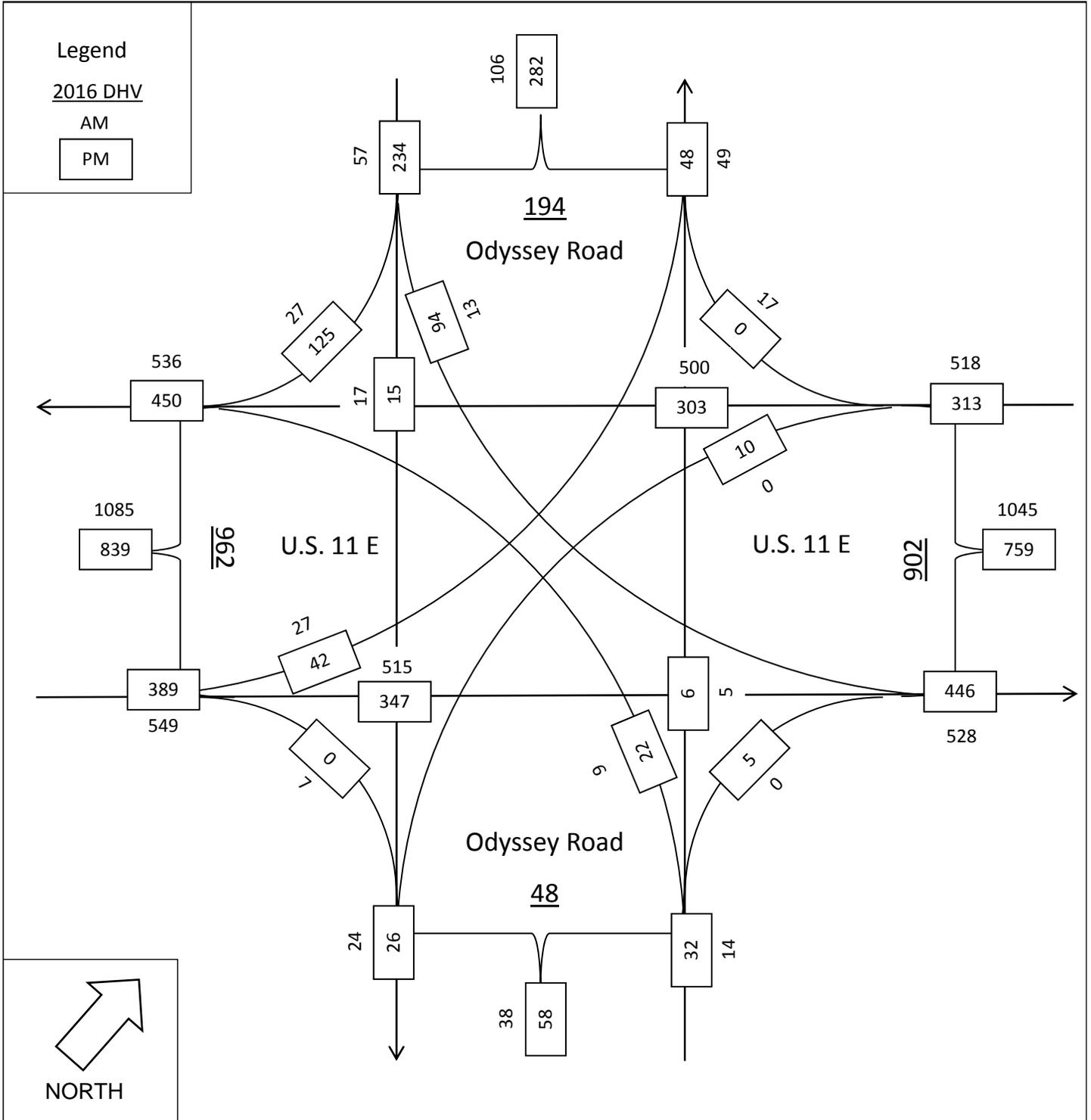
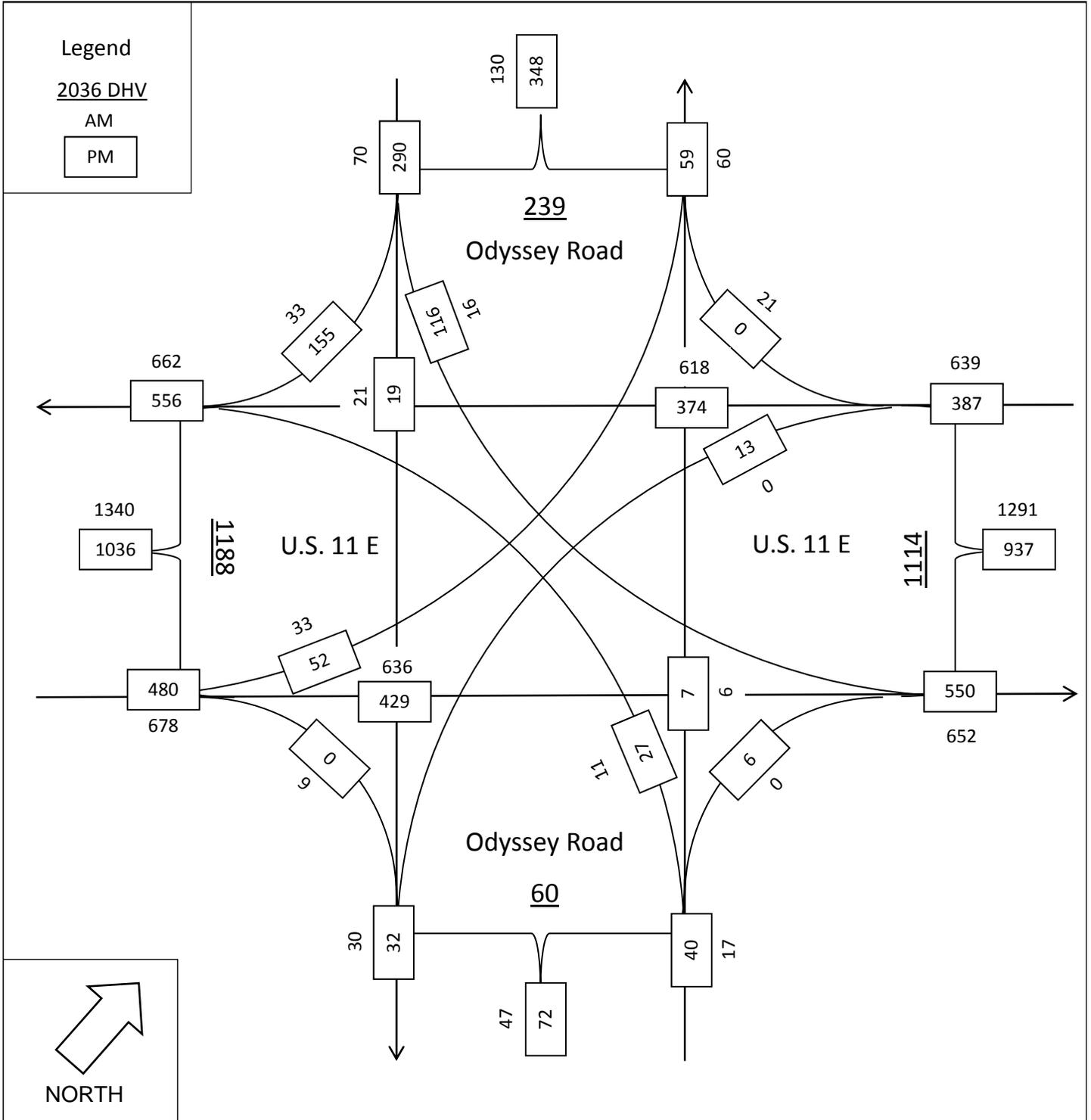


Figure 16
Design Hourly Volume (DHV)
 Intersection # 7
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odyssey Road
 Jefferson City, Jefferson County
 Date: July 25, 2011



APPENDIX C-1

Peak Hourly Traffic Counts and Design Hourly
Volumes (DHV) Calculations

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 1

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ S.R. 92 (Maple Avenue)

Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/11/2012	600	1	29	0	2	0	1	1	0	52	14	0	52	1	
	5/11/2011	615	1	22	0	1	0	1	2	0	36	16	1	69	1	
	5/11/2011	630	1	41	0	6	0	3	2	0	61	20	0	71	2	
	5/11/2011	645	1	38	0	3	2	4	3	0	74	24	1	96	2	
	5/11/2011	700	1	51	4	4	1	5	1	3	106	50	1	195	4	
	5/11/2011	715	1	68	1	0	2	4	3	0	95	50	5	133	0	
	5/11/2011	730	1	93	2	4	3	7	4	1	135	81	0	145	3	
	5/11/2011	745	1	124	6	0	3	14	7	4	187	88	2	187	0	
	5/11/2011	800	1	76	4	6	4	11	6	3	140	98	5	107	0	
	5/11/2011	815	1	59	6	0	3	1	1	4	94	58	5	119	0	
	5/11/2011	830	1	45	3	9	5	4	5	3	109	36	1	111	0	
	5/11/2011	845	1	42	5	3	2	3	4	1	98	39	4	94	1	
	Peak Hour Volume				361	13	10	12	36	20	8	557	317	12	572	3
	Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Variation Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
2011 DHV				394	14	11	13	39	22	9	608	346	13	625	3	
2016 DHV @ 1.25% growth *				419	15	12	14	42	23	9	646	368	14	664	3	
2036 DHV @ 1.25% growth **				***524	19	14	17	52	29	11	798	***472	17	820	4	

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/11/2011	1500	1	32	4	4	3	6	1	7	141	48	7	112	0	
	5/11/2011	1515	1	53	7	9	5	6	2	6	186	50	10	160	1	
	5/11/2011	1530	1	62	12	15	5	6	3	4	160	57	7	121	3	
	5/11/2011	1545	1	43	7	6	2	4	3	0	149	43	8	131	0	
	5/11/2011	1600	1	50	10	7	4	7	4	1	115	62	3	142	1	
	5/11/2011	1615	1	45	4	6	3	7	2	2	98	43	12	148	2	
	5/11/2011	1630	1	32	3	7	5	7	4	1	154	59	6	121	1	
	5/11/2011	1645	1	32	6	4	5	4	3	2	127	44	6	128	2	
	5/11/2011	1700	1	35	5	9	1	5	2	3	131	53	5	147	2	
	5/11/2011	1715	1	23	4	5	2	2	2	3	126	54	8	129	1	
	5/11/2011	1730	1	42	7	6	7	1	4	3	179	59	5	157	1	
	5/11/2011	1745	1	37	6	2	3	4	8	2	157	44	1	125	1	
	Peak Hour Volume				208	36	37	16	23	12	11	610	212	28	554	5
	Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Variation Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
2011 DHV				227	39	40	17	25	13	12	666	232	31	605	5	
2016 DHV @ 1.25% growth *				241	42	43	19	27	14	13	708	246	32	643	6	
2036 DHV @ 1.25% growth **				***315	52	53	23	33	17	16	874	***315	40	794	7	

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

*** Includes additional truck volume for the proposed Norfolk Southern Intermodal Facility near New Market in Jefferson County, as forecasted in the March 2011 AECOM study.

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 2

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Russell Avenue
Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/10/2011	600	2	2	2	3	2	12	3	2	40	3	3	46	9
	5/10/2011	615	2	1	6	5	3	8	4	5	60	2	8	107	7
	5/10/2011	630	2	4	5	5	3	19	5	5	74	0	4	89	25
	5/10/2011	645	2	4	6	5	2	11	3	6	56	4	3	112	13
	5/10/2011	700	2	0	5	7	1	9	1	4	81	2	1	115	12
	5/10/2011	715	2	1	11	6	4	25	5	6	87	2	7	129	9
	5/10/2011	730	2	2	17	7	4	21	7	15	136	3	10	128	17
	5/10/2011	745	2	7	27	6	13	27	4	23	129	3	12	166	19
	5/10/2011	800	2	2	20	10	3	25	10	18	133	2	6	102	12
	5/10/2011	815	2	3	20	7	7	21	11	5	116	8	9	117	14
	5/10/2011	830	2	2	10	4	1	29	7	11	95	0	7	75	12
	5/10/2011	845	2	6	19	8	2	14	9	17	84	1	9	63	18
	Peak Hour Volume				14	84	30	27	94	32	61	514	16	37	513
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
2011 DHV				15	93	33	30	104	35	67	567	18	41	566	68
2016 DHV @ 1.25% growth *				16	99	35	32	110	38	72	603	19	43	602	73
2036 DHV @ 1.25% growth **				20	122	43	39	136	46	88	745	23	54	743	90

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/10/2011	1500	2	6	21	9	11	24	16	18	136	2	7	115	31
	5/10/2011	1515	2	3	21	15	9	28	16	25	157	5	15	182	28
	5/10/2011	1530	2	7	14	13	5	26	21	33	150	1	16	110	30
	5/10/2011	1545	2	5	31	13	3	37	14	36	188	7	25	145	50
	5/10/2011	1600	2	4	27	11	8	31	10	17	135	0	10	114	30
	5/10/2011	1615	2	9	31	19	8	36	18	14	159	6	16	179	50
	5/10/2011	1630	2	8	22	23	12	36	13	20	164	3	17	161	37
	5/10/2011	1645	2	5	12	7	8	29	15	13	124	0	11	111	23
	5/10/2011	1700	2	6	22	19	8	36	11	11	184	4	17	162	58
	5/10/2011	1715	2	3	23	11	7	34	11	9	124	1	13	98	36
	5/10/2011	1730	2	6	17	17	4	39	25	18	177	2	19	142	37
	5/10/2011	1745	2	8	29	13	4	31	19	24	179	2	15	137	49
	Peak Hour Volume				26	111	66	31	140	55	87	646	16	68	599
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
2011 DHV				29	123	73	34	155	61	96	713	18	75	661	184
2016 DHV @ 1.25% growth *				31	130	77	36	164	65	102	758	19	80	703	196
2036 DHV @ 1.25% growth **				38	161	96	45	203	80	126	936	23	99	868	242

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 3

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ George Avenue
Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/10/2011	600	3	2	1	15	1	2	3	1	49	1	4	64	4
	5/10/2011	615	3	1	10	15	4	1	5	3	65	1	16	95	4
	5/10/2011	630	3	6	2	47	2	3	6	2	86	0	10	102	11
	5/10/2011	645	3	6	2	25	4	3	8	3	83	1	7	129	8
	5/10/2011	700	3	2	11	36	1	3	3	8	97	2	10	153	14
	5/10/2011	715	3	7	18	23	9	5	8	23	147	3	37	164	3
	5/10/2011	730	3	10	17	55	10	9	11	11	141	4	23	164	19
	5/10/2011	745	3	8	24	10	8	11	17	11	164	3	29	177	2
	5/10/2011	800	3	9	29	57	9	8	23	11	135	4	27	151	2
	5/10/2011	815	3	6	21	24	11	14	11	22	125	4	37	154	5
	5/10/2011	830	3	3	18	53	7	5	15	21	123	2	13	105	4
	5/10/2011	845	3	8	33	40	7	3	12	16	77	1	31	104	10
	Peak Hour Volume				34	88	145	36	33	59	56	587	14	116	656
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
2011 DHV				38	97	160	40	36	65	62	648	15	128	724	29
2016 DHV @ 1.25% growth *				40	103	170	42	39	69	66	689	16	136	770	31
2036 DHV @ 1.25% growth **				49	128	210	52	48	85	81	851	20	168	951	38

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/10/2011	1500	3	13	11	38	8	9	4	19	104	8	47	120	4
	5/10/2011	1515	3	16	19	43	10	16	6	20	141	8	70	203	8
	5/10/2011	1530	3	19	30	54	9	11	7	20	126	5	58	155	14
	5/10/2011	1545	3	10	15	37	4	13	7	8	142	9	68	152	7
	5/10/2011	1600	3	16	27	40	9	19	7	15	108	4	54	151	9
	5/10/2011	1615	3	21	15	39	9	15	7	10	135	7	58	184	11
	5/10/2011	1630	3	13	40	52	9	6	6	18	135	5	55	204	11
	5/10/2011	1645	3	15	18	41	6	9	6	4	120	10	53	129	9
	5/10/2011	1700	3	19	22	54	11	32	7	25	125	6	86	170	12
	5/10/2011	1715	3	7	12	23	7	11	5	9	110	7	63	137	10
	5/10/2011	1730	3	14	13	40	8	9	9	13	140	5	56	179	10
	5/10/2011	1745	3	12	15	23	7	10	10	11	123	5	56	145	9
	Peak Hour Volume				68	95	186	35	62	26	57	515	28	252	687
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
2011 DHV				75	105	205	39	68	29	63	569	31	278	758	47
2016 DHV @ 1.25% growth *				80	111	218	41	73	31	67	604	33	296	806	50
2036 DHV @ 1.25% growth **				99	138	270	51	90	38	83	746	41	365	995	62

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 4

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odell Avenue
Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/12/2011	600	4	0	0	0	0	0	0	0	0	48	0	1	80	0
	5/12/2011	615	4	0	1	1	4	0	1	1	92	0	5	75	0	
	5/12/2011	630	4	1	0	4	1	0	2	0	113	0	6	120	2	
	5/12/2011	645	4	1	0	1	2	0	5	1	111	0	1	147	0	
	5/12/2011	700	4	0	0	2	0	0	2	0	88	1	6	95	1	
	5/12/2011	715	4	0	1	5	2	0	9	2	160	1	5	193	3	
	5/12/2011	730	4	2	0	4	6	0	9	2	151	1	9	189	2	
	5/12/2011	745	4	1	2	7	5	0	11	4	189	0	11	218	3	
	5/12/2011	800	4	2	2	4	1	0	6	2	118	2	8	116	3	
	5/12/2011	815	4	1	0	5	7	2	5	11	147	1	12	193	4	
	5/12/2011	830	4	0	1	1	3	0	8	10	150	1	3	101	3	
	5/12/2011	845	4	1	2	5	7	0	4	8	32	0	9	136	6	
	Peak Hour Volume				6	4	20	19	2	31	19	605	4	40	716	12
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Variation Factor				0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
2011 DHV				6	4	21	20	2	33	20	639	4	42	756	13	
2016 DHV @ 1.25% growth *				7	4	22	21	2	35	21	679	4	45	803	13	
2036 DHV @ 1.25% growth **				8	6	28	26	3	43	26	839	6	55	992	17	

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/12/2011	1500	4	3	1	15	5	0	6	2	148	6	9	137	3
	5/12/2011	1515	4	5	4	9	9	3	20	3	248	4	11	303	10
	5/12/2011	1530	4	4	9	11	11	1	18	4	217	3	9	281	11
	5/12/2011	1545	4	1	0	10	3	2	23	0	264	4	7	193	10
	5/12/2011	1600	4	5	6	12	10	4	28	7	211	2	17	221	12
	5/12/2011	1615	4	4	3	15	8	1	18	12	250	4	17	273	13
	5/12/2011	1630	4	1	4	15	5	1	27	10	222	4	7	237	14
	5/12/2011	1645	4	3	0	13	10	2	7	7	251	3	9	241	10
	5/12/2011	1700	4	2	2	7	7	3	22	5	184	3	8	250	10
	5/12/2011	1715	4	1	1	3	7	2	16	1	222	6	12	207	13
	5/12/2011	1730	4	3	1	9	5	1	24	3	226	2	9	269	13
	5/12/2011	1745	4	1	1	5	9	1	17	2	161	2	18	184	6
	Peak Hour Volume				15	19	42	33	10	89	14	940	13	44	998
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
2011 DHV				16	20	44	35	11	94	15	993	14	46	1054	45
2016 DHV @ 1.25% growth *				17	21	47	37	11	100	16	1055	15	49	1120	48
2036 DHV @ 1.25% growth **				21	26	58	46	14	123	19	1303	18	61	1383	60

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 5

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Hicks Road
Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/12/2011	600	5	2	0	3	1	1	2	0	53	2	1	90	8
	5/12/2011	615	5	1	1	3	3	1	4	1	70	1	6	134	8
	5/12/2011	630	5	5	0	9	1	1	5	0	93	0	4	144	21
	5/12/2011	645	5	5	0	5	3	1	6	1	89	2	3	183	15
	5/12/2011	700	5	1	2	7	1	1	2	2	104	4	4	216	28
	5/12/2011	715	5	6	3	4	7	2	7	7	158	4	13	232	7
	5/12/2011	730	5	8	2	11	7	4	8	3	151	5	8	232	38
	5/12/2011	745	5	6	4	2	5	5	14	3	177	5	10	250	4
	5/12/2011	800	5	7	4	11	7	4	18	3	145	5	9	213	4
	5/12/2011	815	5	5	3	5	8	6	9	7	134	6	13	218	10
	5/12/2011	830	5	2	3	10	5	2	11	6	132	2	5	149	8
	5/12/2011	845	5	6	5	8	5	1	10	5	83	1	11	147	19
	Peak Hour Volume				27	13	28	26	15	47	16	631	19	40	927
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
2011 DHV				29	14	30	27	16	50	17	666	20	42	979	56
2016 DHV @ 1.25% growth *				30	15	31	29	17	53	18	708	21	45	1040	59
2036 DHV @ 1.25% growth **				37	18	39	36	21	65	22	875	26	55	1285	73

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
	5/12/2011	1500	5	6	2	8	14	3	8	8	177	6	8	164	3
	5/12/2011	1515	5	7	4	9	18	5	12	8	240	6	11	277	7
	5/12/2011	1530	5	8	7	11	16	3	14	8	214	4	9	211	13
	5/12/2011	1545	5	9	3	8	16	5	15	4	231	5	9	250	9
	5/12/2011	1600	5	6	9	11	15	2	11	7	231	4	9	278	10
	5/12/2011	1615	5	7	4	9	10	3	12	2	204	7	9	176	8
	5/12/2011	1630	5	8	5	11	19	10	14	10	213	4	14	232	10
	5/12/2011	1645	5	5	2	7	17	4	10	6	197	3	8	203	10
	5/12/2011	1700	5	5	3	9	11	5	11	6	206	5	8	243	12
	5/12/2011	1715	5	3	3	5	11	3	9	3	188	5	10	187	9
	5/12/2011	1730	5	6	3	8	14	3	18	5	239	4	9	244	9
	5/12/2011	1745	5	6	3	5	12	3	21	5	209	3	9	197	8
	Peak Hour Volume				30	21	39	60	20	52	23	879	20	41	936
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
2011 DHV				32	22	41	63	21	55	24	928	21	43	988	39
2016 DHV @ 1.25% growth *				34	24	44	67	22	58	26	986	22	46	1050	42
2036 DHV @ 1.25% growth **				42	29	54	83	28	72	32	1218	28	57	1297	51

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 6

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Chucky Pike
Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/13/2011	600	6	6	0	2	1	1	4	1	42	0	1	52	2	
	5/13/2011	615	6	3	5	3	3	1	7	4	56	0	2	77	2	
	5/13/2011	630	6	14	1	8	2	2	8	2	74	0	1	82	6	
	5/13/2011	645	6	14	1	4	4	2	11	4	71	1	1	105	4	
	5/13/2011	700	6	17	9	4	8	4	11	34	125	1	5	133	2	
	5/13/2011	715	6	22	8	9	9	7	14	17	120	2	3	133	11	
	5/13/2011	730	6	17	12	2	7	9	23	17	140	1	4	144	1	
	5/13/2011	745	6	20	14	9	8	7	31	16	115	2	4	122	1	
	5/13/2011	800	6	17	15	9	5	5	21	22	118	2	4	97	2	
	5/13/2011	815	6	14	10	4	9	11	15	33	106	2	5	125	3	
	5/13/2011	830	6	7	9	9	7	4	19	30	105	1	2	85	2	
	5/13/2011	845	6	18	16	7	6	2	16	23	66	0	5	85	6	
	Peak Hour Volume				76	43	24	32	27	79	84	500	6	16	532	15
	Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	
2011 DHV				75	42	24	31	27	78	83	492	6	16	523	15	
2016 DHV @ 1.25% growth *				79	45	25	33	28	83	88	523	6	17	556	16	
2036 DHV @ 1.25% growth **				98	56	31	41	35	102	108	646	8	21	687	19	

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/13/2011	1500	6	19	5	5	21	9	14	73	123	3	5	125	5	
	5/13/2011	1515	6	23	8	6	27	15	21	77	167	3	7	211	11	
	5/13/2011	1530	6	27	13	7	24	11	26	76	149	2	6	161	20	
	5/13/2011	1545	6	15	6	5	9	13	24	30	168	4	7	158	10	
	5/13/2011	1600	6	24	11	6	25	19	26	58	128	2	6	157	13	
	5/13/2011	1615	6	27	7	7	21	13	22	88	139	4	9	198	19	
	5/13/2011	1630	6	17	7	8	26	13	27	76	153	3	5	171	14	
	5/13/2011	1645	6	18	4	5	26	12	19	61	137	2	5	155	15	
	5/13/2011	1700	6	30	7	5	25	15	26	40	161	3	6	191	14	
	5/13/2011	1715	6	19	17	7	23	5	20	69	161	2	6	212	15	
	5/13/2011	1730	6	22	8	6	15	9	21	15	142	4	5	134	12	
	5/13/2011	1745	6	27	9	8	28	32	25	97	148	3	9	177	16	
	Peak Hour Volume				98	41	26	91	61	92	221	612	12	26	714	57
	Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82		
2011 DHV				96	40	26	90	60	91	217	602	12	26	703	56	
2016 DHV @ 1.25% growth *				102	43	27	95	64	96	231	640	13	27	747	60	
2036 DHV @ 1.25% growth **				127	53	34	118	79	119	285	790	15	34	922	74	

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

Peak Hour Traffic Counts and Design Hourly Volume (DHV) Calculations

Intersection # 7

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odyssey Road
Jefferson City, Jefferson County

Date: July 25, 2011

AM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/11/2011	600	7	1	0	0	0	0	1	1	0	37	0	0	42	2
	5/11/2011	615	7	0	0	0	1	1	2	1	49	0	0	62	2	
	5/11/2011	630	7	2	0	0	1	1	3	1	65	0	0	67	6	
	5/11/2011	645	7	1	0	0	1	1	3	1	63	1	0	85	4	
	5/11/2011	700	7	0	0	0	0	1	1	3	73	1	0	100	8	
	5/11/2011	715	7	2	1	0	3	2	3	9	111	1	0	108	2	
	5/11/2011	730	7	2	1	0	3	4	4	5	107	2	0	108	11	
	5/11/2011	745	7	2	1	0	2	5	7	5	124	1	0	116	1	
	5/11/2011	800	7	2	1	0	3	4	9	4	102	2	0	99	1	
	5/11/2011	815	7	1	1	0	3	6	4	9	94	2	0	101	3	
	5/11/2011	830	7	1	1	0	2	2	6	8	93	1	0	69	2	
	5/11/2011	845	7	2	1	0	2	1	5	6	58	0	0	68	6	
	Peak Hour Volume				8	4	0	11	15	23	23	444	6	0	431	15
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
2011 DHV				9	4	0	12	16	25	25	485	7	0	471	16	
2016 DHV @ 1.25% growth *				9	5	0	13	17	27	27	515	7	0	500	17	
2036 DHV @ 1.25% growth **				11	6	0	16	21	33	33	636	9	0	618	21	

PM PEAK PERIOD	DATE	TIME	INT.	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
	5/11/2011	1500	7	4	1	1	19	2	16	12	60	0	2	46	0	
	5/11/2011	1515	7	4	1	1	24	4	25	13	82	0	2	77	0	
	5/11/2011	1530	7	5	2	1	22	3	30	12	73	0	2	59	0	
	5/11/2011	1545	7	3	1	1	8	3	27	5	82	0	2	58	0	
	5/11/2011	1600	7	6	1	1	22	3	30	6	79	0	2	70	0	
	5/11/2011	1615	7	4	2	1	20	1	24	11	79	0	2	77	0	
	5/11/2011	1630	7	4	1	1	14	2	25	3	69	0	2	49	0	
	5/11/2011	1645	7	5	1	1	25	7	29	16	72	0	3	65	0	
	5/11/2011	1700	7	3	1	1	14	4	22	9	70	0	2	68	0	
	5/11/2011	1715	7	2	1	0	15	2	20	5	64	0	2	52	0	
	5/11/2011	1730	7	4	1	1	19	2	38	8	81	0	2	68	0	
	5/11/2011	1745	7	3	1	0	16	2	43	7	71	0	2	55	0	
	Peak Hour Volume				19	5	4	81	13	108	36	299	0	9	261	0
Factor				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Variation Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
2011 DHV				21	5	4	88	14	118	39	327	0	10	285	0	
2016 DHV @ 1.25% growth *				22	6	5	94	15	125	42	347	0	10	303	0	
2036 DHV @ 1.25% growth **				27	7	6	116	19	155	52	429	0	13	374	0	

Note: Shading indicates peak hour.

* Straight-line growth of 1.25% for the 5-year period from 2011 to 2016 is calculated via a multiplication factor of 1.0626.

** Straight-line growth of 1.25% for the 25-year period from 2011 to 2036 is calculated via a multiplication factor of 1.3125.

APPENDIX C-2

AADT Calculations

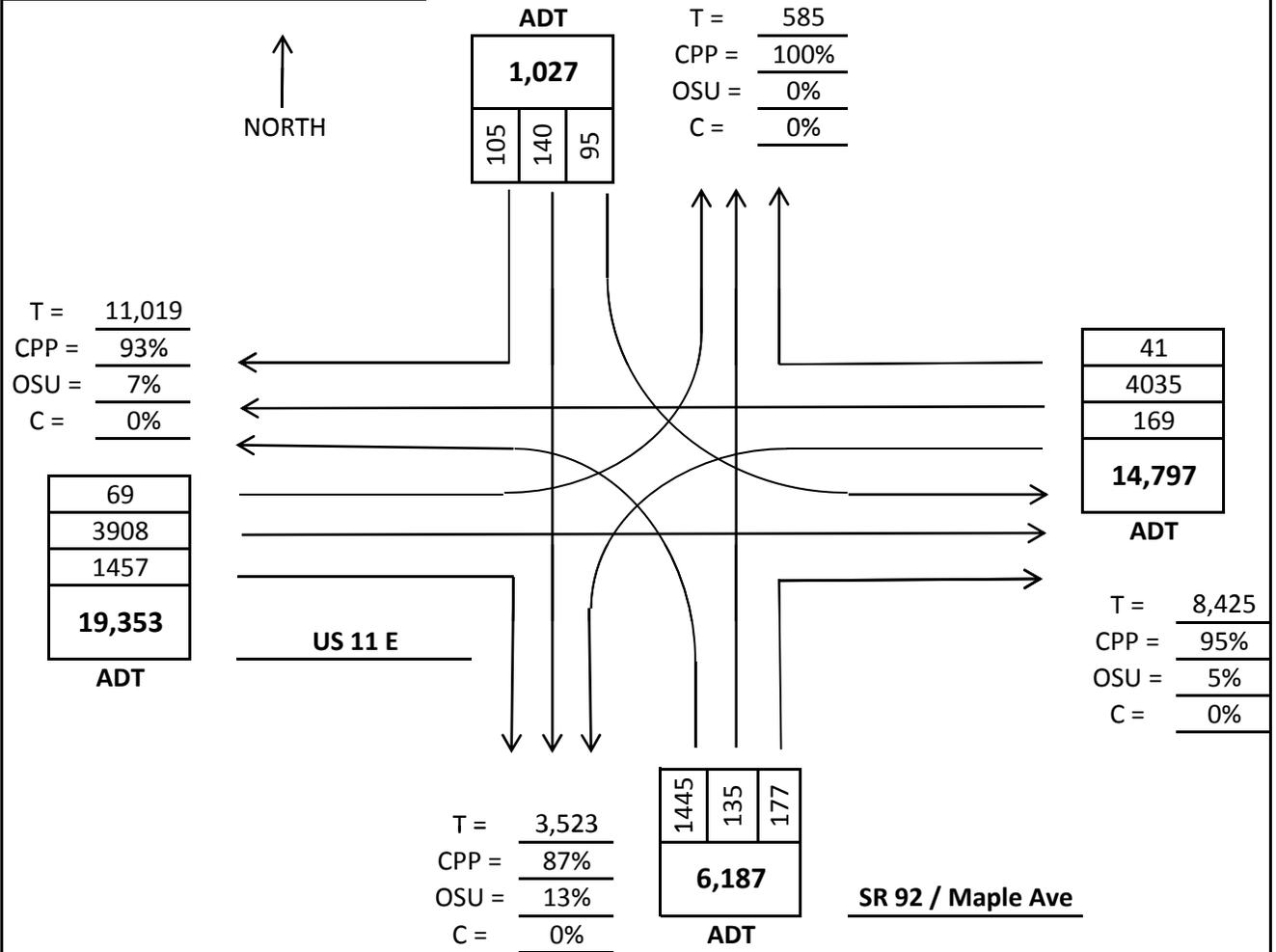
AADT Calculations

Intersection # 1
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ S.R. 92 (Maple Avenue)
 Jefferson City, Jefferson County
 Date: July 25, 2011

Project: US 11 E from SR 92 to Odyssey Rd

LEGEND
 T = TOTAL TRAFFIC PER APPROACH
 (BOTH DIRECTIONS)
 CPP = CARS, PICK-UPS & PANELS
 OSU = OTHER SINGLE UNITS
 C = COMBINATIONS

2011 ADT
1.93 FACTOR USED TO INCREASE A COUNT TO A
 24 - HOUR VALUE



This count was performed on **5/11/2011**
 The corresponding Variation Factor is **0.91**

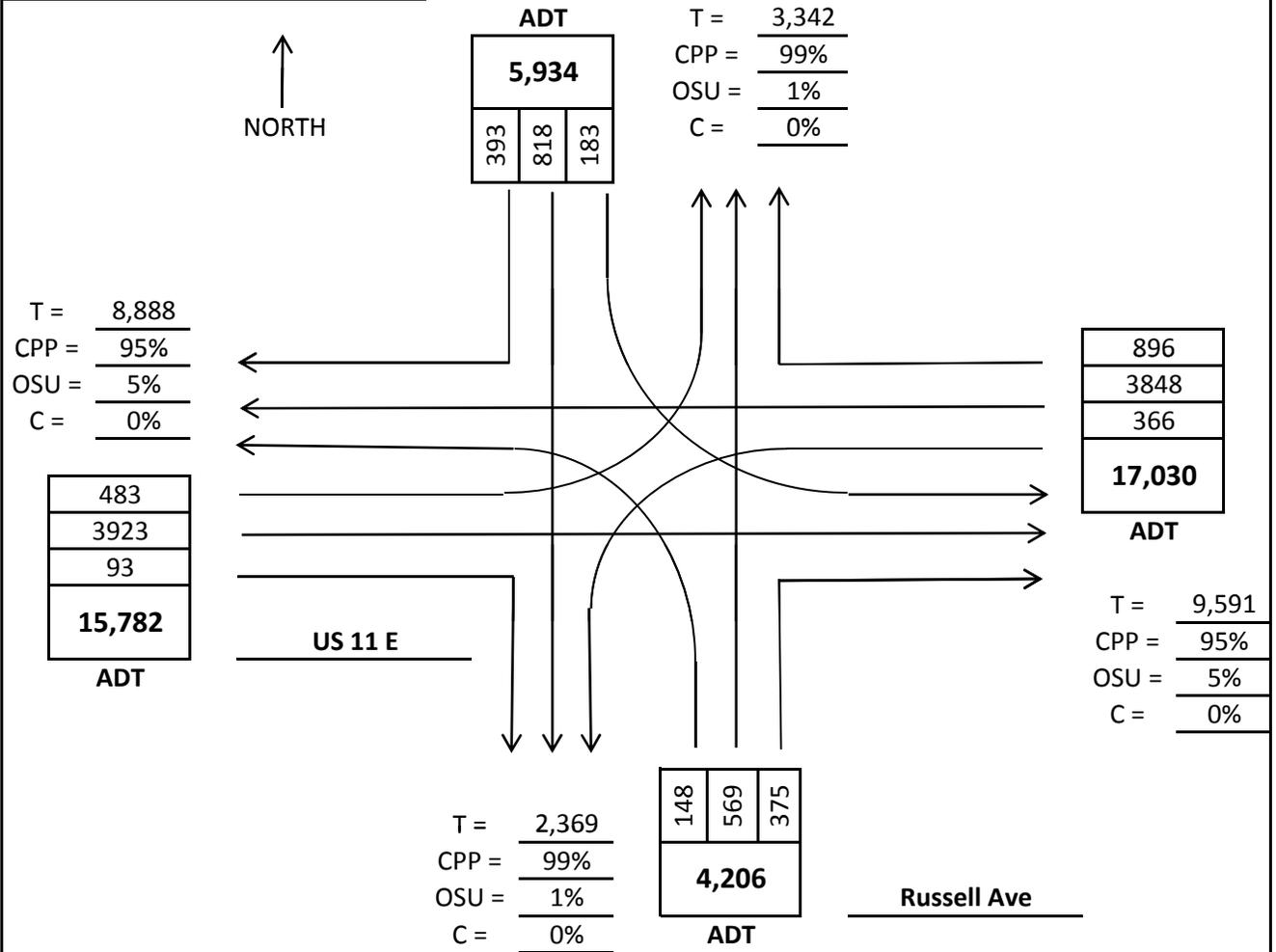
AADT Calculations

Intersection # 2
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Russell Avenue
 Jefferson City, Jefferson County
 Date: July 25, 2011

Project: US 11 E from SR 92 to Odyssey Rd

LEGEND
 T = TOTAL TRAFFIC PER APPROACH
 (BOTH DIRECTIONS)
 CPP = CARS, PICK-UPS & PANELS
 OSU = OTHER SINGLE UNITS
 C = COMBINATIONS

2011 ADT
1.93 FACTOR USED TO INCREASE A COUNT TO A
 24 - HOUR VALUE



This count was performed on **5/10/2011**
 The corresponding Variation Factor is **0.92**

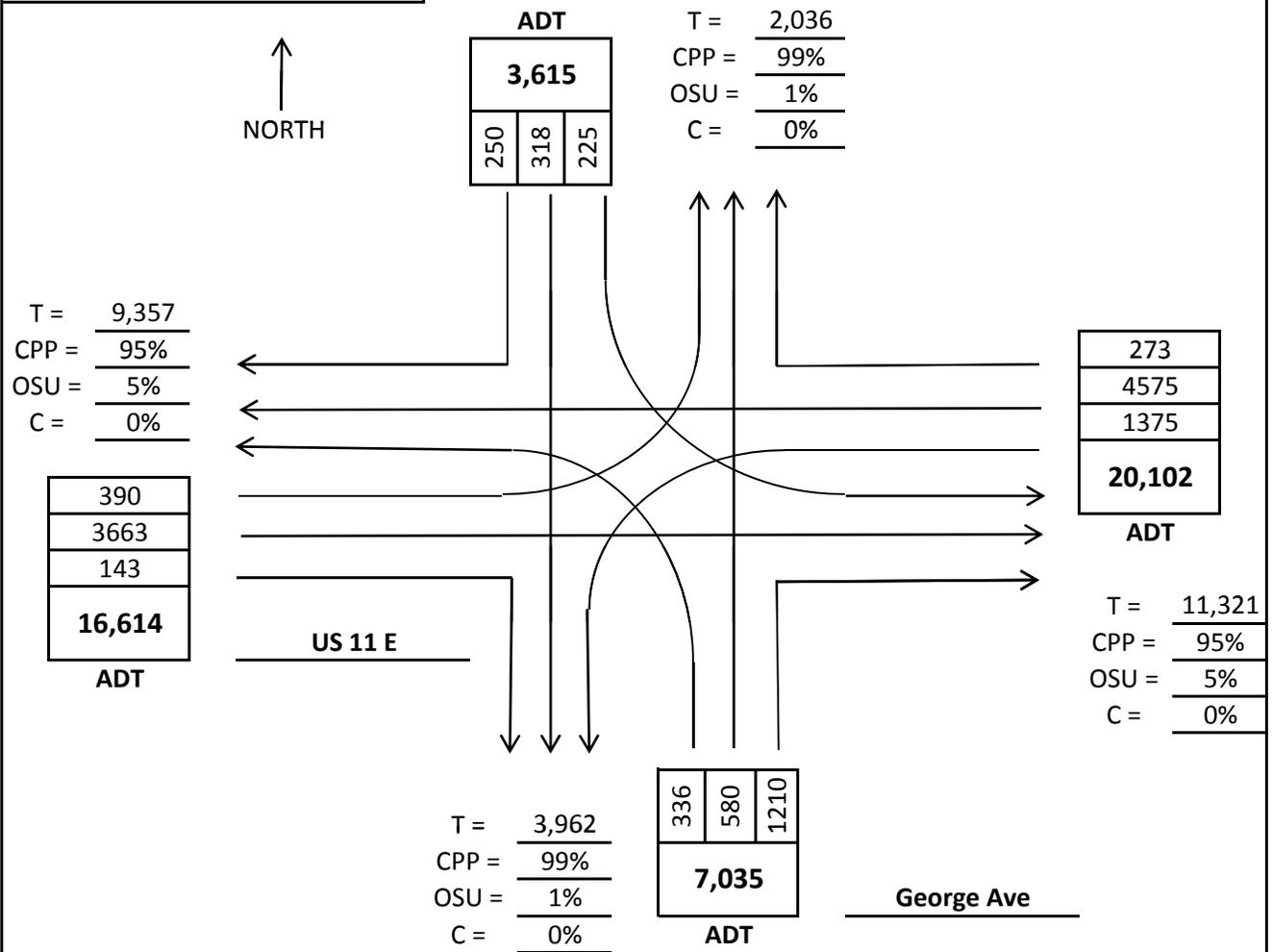
AADT Calculations

Intersection # 3
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ George Avenue
 Jefferson City, Jefferson County
 Date: July 25, 2011

Project: US 11 E from SR 92 to Odyssey Rd

LEGEND
 T = TOTAL TRAFFIC PER APPROACH
 (BOTH DIRECTIONS)
 CPP = CARS, PICK-UPS & PANELS
 OSU = OTHER SINGLE UNITS
 C = COMBINATIONS

2011 ADT
1.93 FACTOR USED TO INCREASE A COUNT TO A
 24 - HOUR VALUE



This count was performed on **5/10/2011**
 The corresponding Variation Factor is **0.92**

AADT Calculations

Intersection # 4

U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odell Avenue

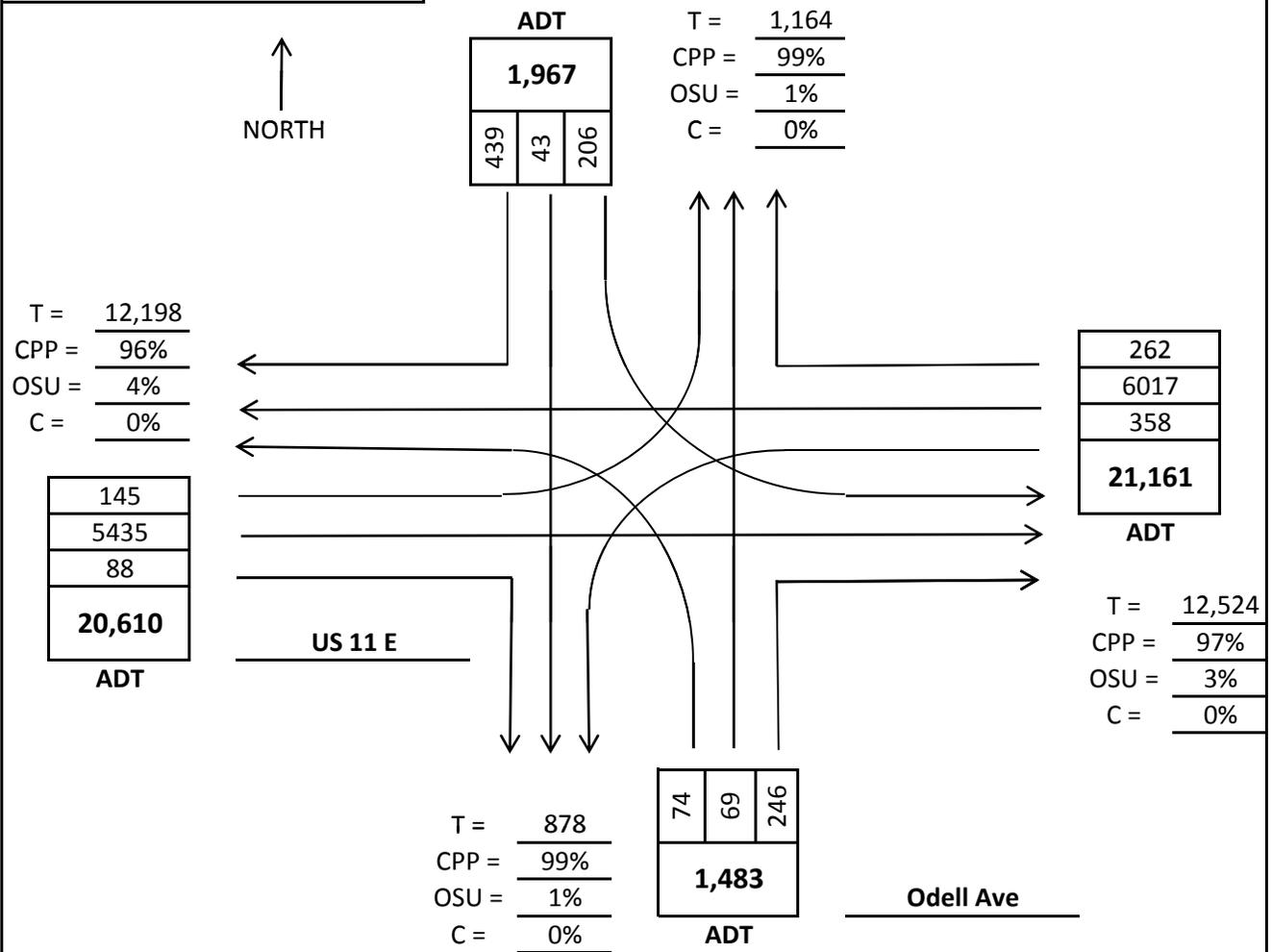
Jefferson City, Jefferson County

Date: July 25, 2011

Project: US 11 E from SR 92 to Odyssey Rd

LEGEND
 T = TOTAL TRAFFIC PER APPROACH
 (BOTH DIRECTIONS)
 CPP = CARS, PICK-UPS & PANELS
 OSU = OTHER SINGLE UNITS
 C = COMBINATIONS

2011 ADT
1.92 FACTOR USED TO INCREASE A COUNT TO A
 24 - HOUR VALUE



This count was performed on **5/12/2011**
 The corresponding Variation Factor is **0.88**

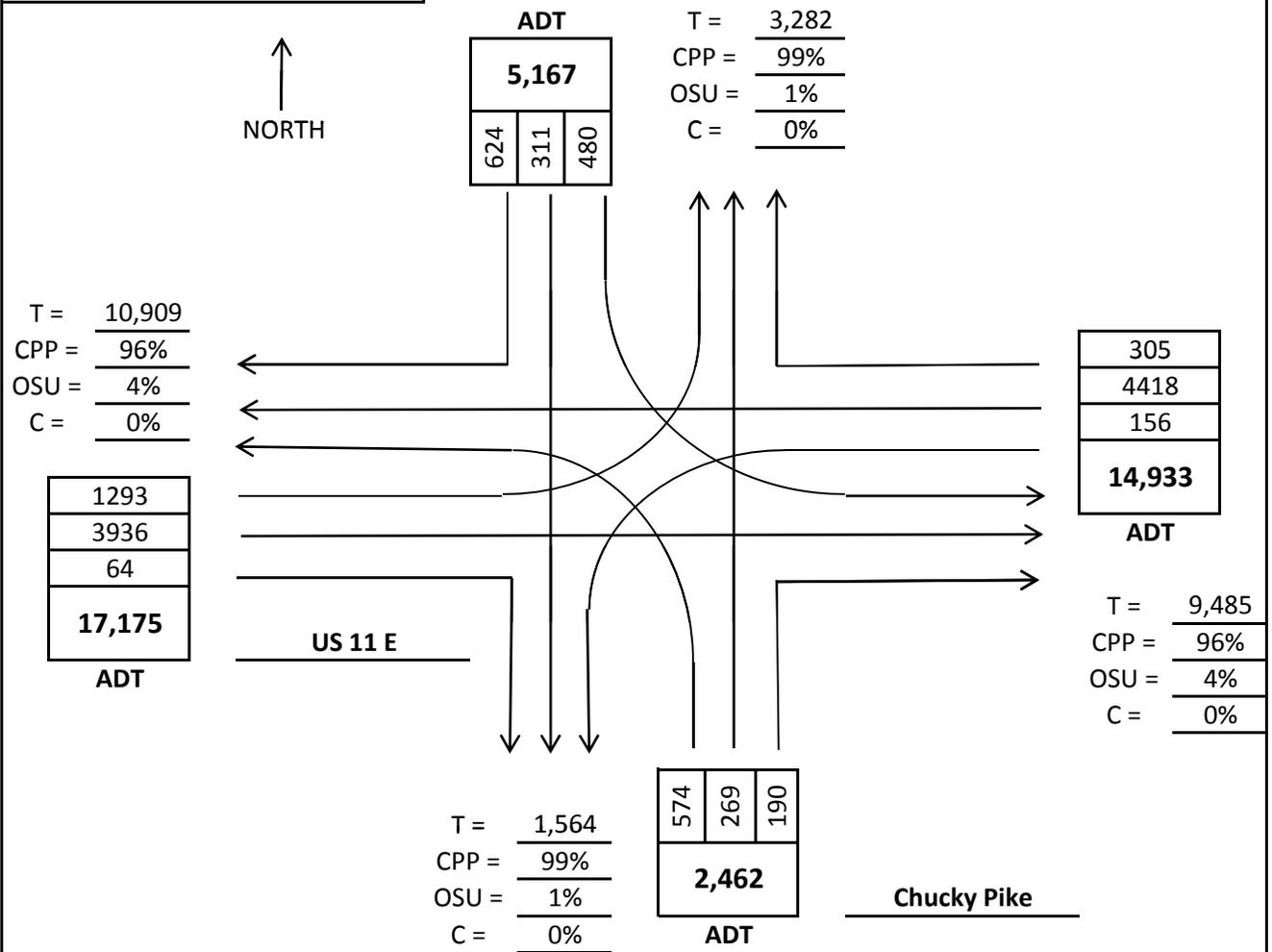
AADT Calculations

Intersection # 6
 U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Chucky Pike
 Jefferson City, Jefferson County
 Date: July 25, 2011

Project: US 11 E from SR 92 to Odyssey Rd

LEGEND
 T = TOTAL TRAFFIC PER APPROACH
 (BOTH DIRECTIONS)
 CPP = CARS, PICK-UPS & PANELS
 OSU = OTHER SINGLE UNITS
 C = COMBINATIONS

2011 ADT
1.92 FACTOR USED TO INCREASE A COUNT TO A
 24 - HOUR VALUE



This count was performed on **5/13/2011**
 The corresponding Variation Factor is **0.82**

AADT Calculations

Intersection # 7

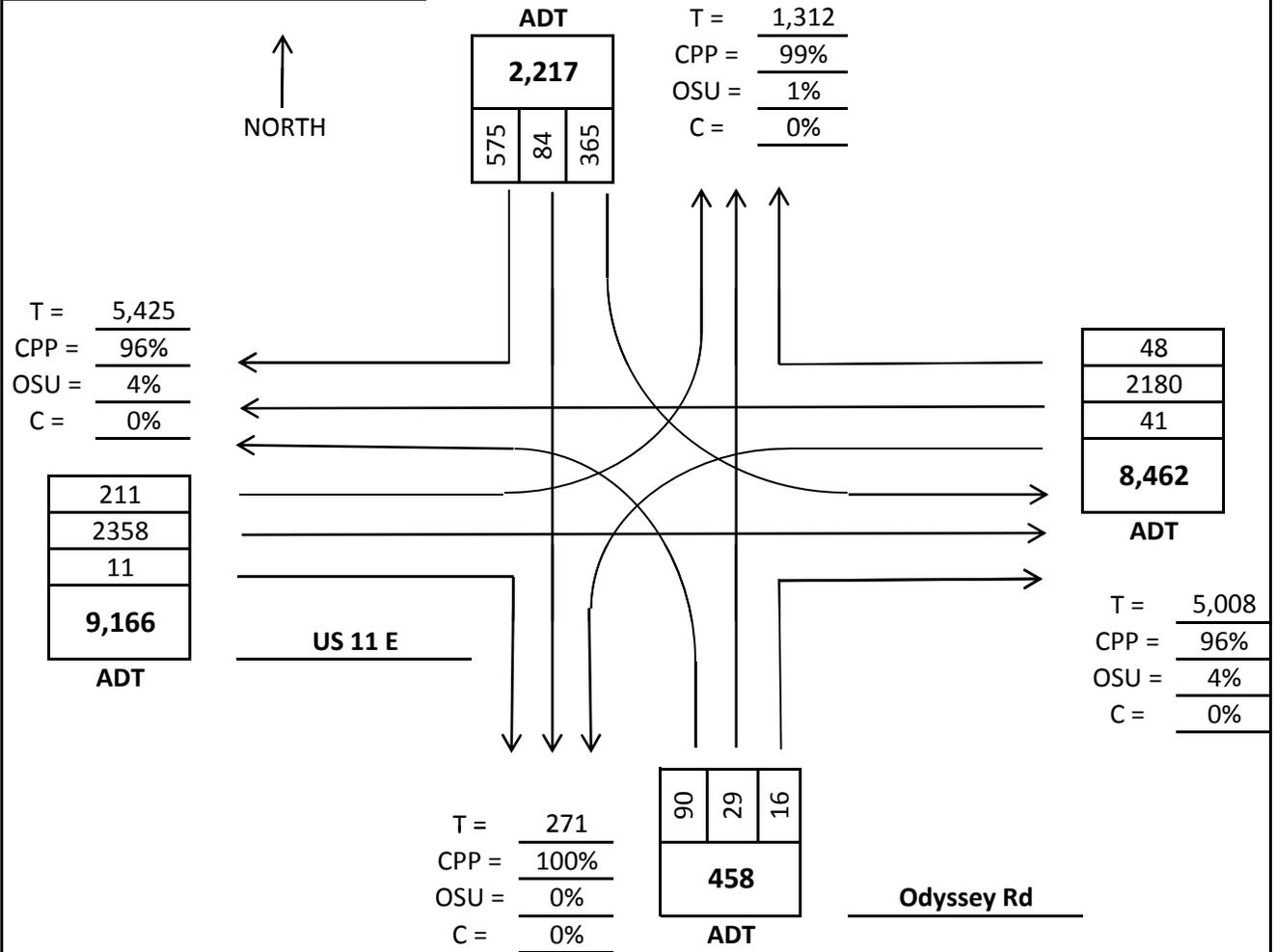
U.S. 11E/S.R. 34 (Andrew Johnson Highway) @ Odyssey Road
Jefferson City, Jefferson County

Date: July 25, 2011

Project: US 11 E from SR 92 to Odyssey Rd

LEGEND
 T = TOTAL TRAFFIC PER APPROACH
 (BOTH DIRECTIONS)
 CPP = CARS, PICK-UPS & PANELS
 OSU = OTHER SINGLE UNITS
 C = COMBINATIONS

2011 ADT
1.92 FACTOR USED TO INCREASE A COUNT TO A
 24 - HOUR VALUE



This count was performed on **5/11/2011**
 The corresponding Variation Factor is **0.88**

APPENDIX C-3

Expansion Factor Calculations

Expansion Factor Calculations

Stations 85 and 86

U.S. 11E/S.R. 34 (Andrew Johnson Highway)
from S.R. 92 (Maple Avenue) to Odyssey Road

Jefferson City, Jefferson County

Date: July 25, 2011

Formula:

$$\text{Expansion Factor} = \frac{\text{24-hour total from coverage count}}{\text{Respective 8-hour total from coverage count}}$$

STATION 85:

$$\frac{20468}{696 + 1256 + 1100 + 1299 + 1478 + 1621 + 1641 + 1648} = 1.92$$

STATION 86:

$$\frac{29192}{955 + 1622 + 1552 + 2132 + 1916 + 2203 + 2469 + 2257} = 1.93$$

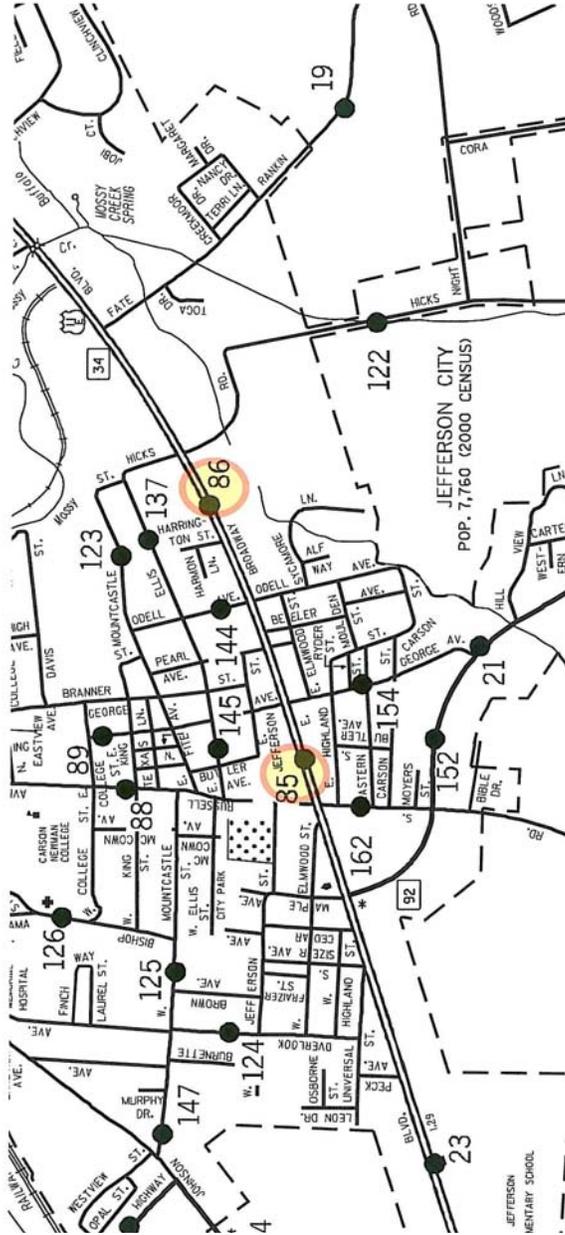
Source: TDOT

Traffic Counting Station Location Map

U.S. 11E/S.R. 34 (Andrew Johnson Highway)
from S.R. 92 (Maple Avenue) to Odyssey Road

Jefferson City, Jefferson County

Date: July 25, 2011



Source: TDOT

Coverage Count Data for Station 85

U.S. 11E/S.R. 34 (Andrew Johnson Highway)
from S.R. 92 (Maple Avenue) to Odyssey Road

Jefferson City, Jefferson County

Date: July 25, 2011

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number: 000085 County: 45 Jefferson
 Start Date: 04 / 14 / 2011 End Date: 04 / 15 / 2011
 Start Time: 12 : 00 End Time: 12 : 00
 Direction: 6 (Coverage)

Time	
12:00 - 13:00	1,478
13:00 - 14:00	1,345
14:00 - 15:00	1,428
15:00 - 16:00	1,621
16:00 - 17:00	1,641
17:00 - 18:00	1,648
18:00 - 19:00	1,155
19:00 - 20:00	968
20:00 - 21:00	768
21:00 - 22:00	579
22:00 - 23:00	361
23:00 - 24:00	214
24:00 - 01:00	141
01:00 - 02:00	89
02:00 - 03:00	73
03:00 - 04:00	78
04:00 - 05:00	97
05:00 - 06:00	251
06:00 - 07:00	696
07:00 - 08:00	1,256
08:00 - 09:00	1,100
09:00 - 10:00	1,097
10:00 - 11:00	1,155
11:00 - 12:00	1,229

Total: 20,468 x Variation Factor: 0.90 = 18,421 x Truck Factor: 0.99 = AADT: 18,236.9

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
11:45 - 12:45	1420	0.88	16:15 - 17:15	1721	0.93

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
7	56	8	53	8	53

Source: TDOT

Coverage Count Data for Station

U.S. 11E/S.R. 34 (Andrew Johnson Highway)
from S.R. 92 (Maple Avenue) to Odyssey Road

Jefferson City, Jefferson County

Date: July 25, 2011

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number: 000086 County: 45 Jefferson
 Start Date: 03 / 31 / 2011 End Date: 04 / 01 / 2011
 Start Time: 12 : 00 End Time: 12 : 00
 Direction: 6 (Coverage)

Time

12:00 - 13:00	1,916
13:00 - 14:00	1,974
14:00 - 15:00	1,979
15:00 - 16:00	2,203
16:00 - 17:00	2,469
17:00 - 18:00	2,257
18:00 - 19:00	1,888
19:00 - 20:00	1,359
20:00 - 21:00	973
21:00 - 22:00	718
22:00 - 23:00	436
23:00 - 24:00	301
24:00 - 01:00	144
01:00 - 02:00	132
02:00 - 03:00	119
03:00 - 04:00	108
04:00 - 05:00	136
05:00 - 06:00	349
06:00 - 07:00	955
07:00 - 08:00	1,622
08:00 - 09:00	1,552
09:00 - 10:00	1,656
10:00 - 11:00	1,814
11:00 - 12:00	2,132

Total: 29,192 x Variation Factor: 0.87 = 25,397 x Truck Factor: 0.99 = AADT: 25,143.0

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
11:00 - 12:00	2132	0.96	16:00 - 17:00	2469	0.94

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
7	52	8	51	8	51

Source: TDOT

APPENDIX D

Summary of 2016 and 2036 Capacity Analysis for Signalized Intersections

2016 EXISTING CONDITIONS

INTERSECTION					APPROACH				MOVEMENT							
	AM		PM			AM		PM			AM			PM		
	LOS	SIGNAL DELAY	LOS	SIGNAL DELAY		APPROACH LOS	APPROACH DELAY	APPROACH LOS	APPROACH DELAY		DELAY	V/C RATIO	LOS	DELAY	V/C RATIO	LOS
SR 92/Maple Avenue	B	18.8	B	17.6	EB	B	14.5	B	15.9	LT	15.7	0.03	B	12.3	0.04	B
						TH	22.0	0.60	C	21.0	0.62	C				
						RT	1.3	0.29	A	1.3	0.21	A				
					WB	C	22.1	B	15.9	LT	15.9	0.05	B	12.8	0.12	B
						TH	22.3	0.62	C	16.1	0.49	B				
						RT	--	--	--	--	--	--				
					NB	C	22.0	C	23.7	LT	22.4	0.46	C	26.1	0.36	C
						TH	15.8	0.06	B	17.1	0.23	B				
						RT	--	--	--	--	--	--				
					SB	C	27.7	C	30.0	LT	--	--	--	--	--	--
						TH	27.7	0.30	C	30.0	0.27	C				
						RT	--	--	--	--	--	--				
Russell Avenue	B	12.2	C	21.6	EB	B	12.3	B	17.5	LT	7.6	0.16	A	10.9	0.34	B
						TH	12.9	0.42	B	18.3	0.60	B				
						RT	--	--	--	--	--	--				
					WB	B	16.1	C	21.3	LT	7.6	0.10	A	10.3	0.26	B
						TH	16.6	0.55	B	22.3	0.75	C				
						RT	--	--	--	--	--	--				
					NB	B	18.8	C	27.5	LT	--	--	--	--	--	--
						TH	18.8	0.34	B	27.5	0.59	C				
						RT	--	--	--	--	--	--				
					SB	C	22.4	C	31	LT	--	--	--	--	--	--
						TH	22.4	0.52	C	31.0	0.66	C				
						RT	--	--	--	--	--	--				
George Avenue	B	18.6	C	22.4	EB	B	19.7	C	27	LT	9.3	0.18	A	11.9	0.23	B
						TH	20.7	0.61	C	28.6	0.73	C				
						RT	--	--	--	--	--	--				
					WB	B	16.4	B	18.2	LT	10.2	0.33	B	17.2	0.67	B
						TH	17.5	0.58	B	18.5	0.62	B				
						RT	--	--	--	--	--	--				
					NB	C	23.3	C	25.9	LT	--	--	--	--	--	--
						TH	23.3	0.65	C	25.9	0.75	C				
						RT	--	--	--	--	--	--				
					SB	B	16.8	C	26.4	LT	--	--	--	--	--	--
						TH	16.8	0.37	B	26.4	0.48	C				
						RT	--	--	--	--	--	--				
Odell Avenue	A	7.6	B	11.2	EB	A	8.2	B	12.3	LT	4.4	0.04	A	4.9	0.06	A
						TH	8.3	0.29	A	12.4	0.62	B				
						RT	--	--	--	--	--	--				
					WB	A	6.4	A	8.9	LT	4.3	0.07	A	5.4	0.17	A
						TH	6.5	0.32	A	9.1	0.60	A				
						RT	--	--	--	--	--	--				
					NB	B	13.2	B	18.6	LT	--	--	--	--	--	--
						TH	13.2	0.12	B	18.6	0.35	B				
						RT	--	--	--	--	--	--				
					SB	B	13.5	B	18	LT	--	--	--	--	--	--
						TH	13.5	0.21	B	18.0	0.52	B				
						RT	--	--	--	--	--	--				
Hicks Road	B	16.2	C	20.1	EB	B	17.3	C	21.1	LT	7.9	0.07	A	10.0	0.16	A
						TH	17.5	0.55	B	21.4	0.74	C				
						RT	--	--	--	--	--	--				
					WB	B	16.0	B	19.5	LT	8.3	0.13	A	10.7	0.23	B
						TH	16.3	0.69	B	19.8	0.74	B				
						RT	--	--	--	--	--	--				
					NB	B	14.7	B	17.3	LT	--	--	--	--	--	--
						TH	14.7	0.15	B	17.3	0.22	B				
						RT	--	--	--	--	--	--				
					SB	B	12.7	C	20.6	LT	--	--	--	--	--	--
						TH	12.7	0.18	B	20.6	0.33	C				
						RT	--	--	--	--	--	--				
Chucky Pike	C	21.2	C	31.1	EB	B	15.3	C	20.9	LT	13.3	0.24	B	26.9	0.69	C
						TH	15.7	0.38	B	18.9	0.45	B				
						RT	11.8	0.01	B	12.6	0.02	B				
					WB	C	25.1	D	35.2	LT	12.6	0.05	B	13.5	0.11	B
						TH	25.9	0.64	C	38.2	0.84	D				
						RT	10.8	0.04	B	7.4	0.14	A				
					NB	C	31.1	D	43.4	LT	--	--	--	--	--	--
						TH	31.1	0.48	C	43.4	0.66	D				
						RT	--	--	--	--	--	--				
					SB	C	20.6	D	44.5	LT	31.7	0.16	C	48.6	0.55	D
						TH	17.3	0.41	B	42.1	0.73	D				
						RT	--	--	--	--	--	--				
Odyssey Road	B	18.3	C	20.3	EB	B	18.4	C	22.1	LT	9.8	0.07	A	12.3	0.11	B
						TH	18.9	0.56	B	23.3	0.47	C				
						RT	--	--	--	--	--	--				
					WB	B	17.8	B	19	LT	18.2	0.53	B	11.3	0.03	B
						TH	8.5	0.04	A	19.3	0.33	B				
						RT	--	--	--	--	--	--				
					NB	C	24.7	C	25.2	LT	--	--	--	--	--	--
						TH	24.7	0.06	C	25.2	0.15	C				
						RT	--	--	--	--	--	--				
					SB	B	19.0	B	18.3	LT	--	--	--	--	--	--
						TH	24.3	0.12	C	27.3	0.37	C				
						RT	13.1	0.12	B	10.4	0.42	B				

2036 EXISTING CONDITIONS

INTERSECTION					APPROACH				MOVEMENT							
	AM		PM			AM		PM			AM			PM		
	LOS	SIGNAL DELAY	LOS	SIGNAL DELAY		APPROACH LOS	APPROACH DELAY	APPROACH LOS	APPROACH DELAY		DELAY	V/C RATIO	LOS	DELAY	V/C RATIO	LOS
SR 92/Maple Avenue	C	21	C	20.7	EB	B	14.6	B	19.5	LT	17.6	0.06	B	18.8	0.08	B
						TH	21.4	0.6	C	25.8	0.74	C				
						RT	1.2	0.31	A	1.3	0.27	A				
					WB	C	25.4	B	19.4	LT	16.7	0.04	B	18	0.15	B
						TH	25.5	0.77	C	19.5	0.59	B				
						RT	--	--	--	--	--	--				
					NB	C	25.9	C	25.4	LT	26.4	0.52	C	27.9	0.36	C
						TH	18.2	0.06	B	18.1	0.23	B				
						RT	--	--	--	--	--	--				
					SB	C	29.5	C	31.6	LT	--	--	--	--	--	--
						TH	29.5	0.35	C	31.6	0.33	C				
						RT	--	--	--	--	--	--				
Russell Avenue	B	15	C	23.4	EB	B	13.7	C	20.6	LT	13.8	0.22	B	20.7	0.48	C
						TH	13.7	0.44	B	20.6	0.74	C				
						RT	--	--	--	--	--	--				
					WB	B	14.5	C	24	LT	14.9	0.12	B	19.6	0.31	B
						TH	14.5	0.49	B	24.4	0.85	C				
						RT	--	--	--	--	--	--				
					NB	B	18.1	C	24.2	LT	--	--	--	--	--	--
						TH	18.1	0.39	B	24.2	0.66	C				
						RT	--	--	--	--	--	--				
					SB	B	19.7	C	29.5	LT	--	--	--	--	--	--
						TH	19.7	0.46	B	29.5	0.74	C				
						RT	--	--	--	--	--	--				
George Avenue	C	22.1	C	34.6	EB	C	24.2	C	31.5	LT	19.1	0.31	B	21.5	0.35	C
						TH	24.7	0.78	C	32.5	0.86	C				
						RT	--	--	--	--	--	--				
					WB	C	21.1	C	29.2	LT	22.2	0.44	C	47.3	0.88	D
						TH	20.9	0.74	C	22.8	0.78	C				
						RT	--	--	--	--	--	--				
					NB	C	23.2	E	60.1	LT	--	--	--	--	--	--
						TH	23.2	0.75	C	60.1	0.99	E				
						RT	--	--	--	--	--	--				
					SB	B	14.6	C	21	LT	--	--	--	--	--	--
						TH	14.6	0.46	B	20.1	0.49	C				
						RT	--	--	--	--	--	--				
Odell Avenue	A	7.8	B	15.2	EB	A	8.3	B	17.3	LT	8.6	0.04	A	10.8	0.07	B
						TH	8.3	0.38	A	17.4	0.71	B				
						RT	--	--	--	--	--	--				
					WB	A	7.1	B	13.6	LT	7.2	0.09	A	12.3	0.19	B
						TH	7.1	0.42	A	13.7	0.68	B				
						RT	--	--	--	--	--	--				
					NB	B	11.6	B	13.4	LT	--	--	--	--	--	--
						TH	11.6	0.11	B	13.4	0.34	B				
						RT	--	--	--	--	--	--				
					SB	B	10.6	B	13.1	LT	--	--	--	--	--	--
						TH	10.6	0.19	B	13.1	0.51	B				
						RT	--	--	--	--	--	--				
Hicks Road	C	24.9	C	30	EB	B	17.7	C	33.8	LT	13.1	0.1	B	13.5	0.14	B
						TH	17.8	0.68	B	34.3	0.95	C				
						RT	--	--	--	--	--	--				
					WB	C	31.6	C	29.9	LT	14.3	0.18	B	16.8	0.22	B
						TH	32.3	0.94	C	30.4	0.93	C				
						RT	--	--	--	--	--	--				
					NB	B	12.6	B	12.7	LT	--	--	--	--	--	--
						TH	12.6	0.22	B	12.7	0.28	B				
						RT	--	--	--	--	--	--				
					SB	B	11.1	B	16.3	LT	--	--	--	--	--	--
						TH	11.1	0.26	B	16.3	0.43	B				
						RT	--	--	--	--	--	--				
Chucky Pike	C	24.7	D	52.2	EB	B	19.6	D	47.1	LT	17.2	0.41	B	111	1.11	F
						TH	20	0.53	C	24.9	0.63	C				
						RT	14.8	0.01	B	16.1	0.03	B				
					WB	C	27.4	E	62	LT	13.6	0.09	B	16.6	0.17	B
						TH	28.4	0.73	C	67.8	1.03	E				
						RT	9.6	0.04	A	10.2	0.17	B				
					NB	D	37	D	52	LT	--	--	--	--	--	--
						TH	37	0.62	D	52	0.78	D				
						RT	--	--	--	--	--	--				
					SB	C	22.7	D	38.5	LT	35.3	0.23	D	41	0.51	D
						TH	18.8	0.52	B	37	0.72	D				
						RT	--	--	--	--	--	--				
Odyssey Road	A	9.4	B	18.8	EB	A	9.3	B	15	LT	20.3	0.1	C	25.9	0.22	C
						TH	8.7	0.25	A	13.7	0.31	B				
						RT	--	--	--	--	--	--				
					WB	A	8.6	B	13.8	LT	22	0	C	24.4	0.06	C
						TH	8.6	0.24	A	13.4	0.27	B				
						RT	6.8	0.02	A	12	0	B				
					NB	B	20	C	23.5	LT	--	--	--	--	--	--
						TH	20	0.05	B	23.5	0.16	C				
						RT	--	--	--	--	--	--				
					SB	B	15.5	C	31.2	LT	--	--	--	--	--	--
						TH	20.2	0.1	C	54.7	0.74	D				
						RT	10.8	0.1	B	10.4	0.46	B				

APPENDIX E

Crash Summary and Mapping

S.R. 34 / U.S. 11 E Crash Data Summary
From S.R. 92 (L.M. 11.730) to Odyssey Rd. (L.M. 13.840)

Intersection	Log Mile	Angle		Head On		No Veh		Rear End		Same Dir SS		Opp Dir SS		Unknown/Other		Total Crashes
SR 92	L.M. 11.730	17	61%					10	35%	1	4%					28
L.M. 11.730 to 11.900		2	67%					1	33%							3
Russell Avenue	L.M. 11.900	16	47%	1	3%	2	6%	12	35%	2	6%			1	3%	34
L.M. 11.900 to 12.100								8	89%	1	11%					9
George Avenue	L.M. 12.100	17	39%					25	57%	1	2%			1	2%	44
L.M. 12.100 to 12.211								1	34%	1	33%			1	33%	3
Pearl Avenue	L.M. 12.211	8	80%					2	20%							10
L.M. 12.211 to 12.303								1	50%	1	50%					2
Odell Avenue	L.M. 12.303	11	55%					7	35%	2	10%					20
L.M. 12.303 to 12.609		1	33%					2	67%							3
Hicks Road	L.M. 12.609	7	32%			1	5%	12	54%	2	9%					22
L.M. 12.609 to 12.871								4	100%							4
Fate Rankin Road	L.M. 12.871	3	43%	1	14%			1	14%	2	29%					7
L.M. 12.871 to 13.088								3	100%							3
Mossy Creek Bridge	L.M. 13.06									1	100%					1
Meadow Spring Drive	L.M. 13.088	1	14%					5	72%					1	14%	7
L.M. 13.088 to 13.264		2	24%			1	13%	5	63%							8
Clinchview Circle	L.M. 13.264	1	50%					1	50%							2
L.M. 13.264 to 13.470		2	33%			1	17%	2	33%	1	17%					6
N Chucky Drive	L.M. 13.470	12	25%			1	2%	31	63%	2	4%	2	4%	1	2%	49
L.M. 13.470 to 13.600	j	4	40%					5	50%	1	10%					10
Walmart Super Center	L.M. 13.600	2	67%			1	33%									3
L.M. 13.600 to 13.840	k	4	57%					1	14%	2	29%					7
Odyssey Road	L.M. 13.840	5	20%					16	67%	3	13%					24
		115	37%	2	1%	7	2%	155	50%	23	7%	2	1%	5	2%	309

Study Area Crash Rates Compared to Statewide Averages for Intersections and Segments

	Property Damage Only		Non-Incapacitating Injury		Incapacitating Injury		Fatality		Total Crashes	
	Frequency	Calculated Rate	Frequency	Calculated Rate	Frequency	Calculated Rate	Frequency	Calculated Rate	Frequency	Calculated Rate
SR-92	22	0.971	6	0.265	0	-	0	-	28	1.236
Russell Avenue	26	1.106	8	0.340	0	-	0	-	34	1.446
George Avenue	33	1.273	11	0.424	0	-	0	-	44	1.697
Odell Avenue	18	0.744	2	0.083	0	-	0	-	20	0.826
Hicks Road	18	0.699	4	0.155	0	-	0	-	22	0.854
Chucky Pike	41	1.884	8	0.368	0	-	0	-	49	2.252
Odyssey Raod	15	1.349	1	0.090	1	0.090	0	-	17	1.529
Intersection Average*	-	0.822	-	0.244	-	0.018	-	0.002	-	1.086
SR-92 to Odyssey Road**	74	1.7206	20	0.4650	0	0.0000	1	0.0233	95	2.2088
Segment Average***	-	1.4675	-	0.0491	-	0.0491	-	0.0106	-	2.0112

*Intersection Average Crash Rates (2006-2008)
 Signalized Urban Multi-Lane Divided
 Tennessee Department of Transportation

** SR-92 to Odyssey Road excludes crashes within 300 feet of signalized intersections.

***Statewide Average Rates for Spots and Sections (2006-2008)
 Urban State Route 4-Lane Divided
 Tennessee Department of Transportation

Statewide Average Rates for Sections and Spots (2006-2008)

Route Type	Rural/ Urban	Location Type	Highway Type	Fatal Rate	Incap. Rate	Other Inj. Rate	Pd. Rate	Total Rate	Severe Crash Rate	Total Veh. Miles (million)
Interstate and State Routes										
IS & SR	Rural	Section	2-Ln	0.0299	0.0938	0.4818	1.0509	1.6565	0.1237	26,181
IS & SR	Rural	Section	2-Ln/TL	0.0120	0.0710	0.4561	1.4404	1.9794	0.0830	831
IS & SR	Rural	Section	4+LN Undiv.	0.0153	0.0920	0.4108	1.1173	1.6354	0.1073	652
IS & SR	Rural	Section	4+LN Div.	0.0129	0.0447	0.2173	0.5234	0.7984	0.0576	8,202
IS & SR	Rural	Section	4+LN TL	0.0114	0.0518	0.2355	0.6634	0.9622	0.0632	2,895
IS & SR	Rural	Section	Freeway	0.0070	0.0161	0.1092	0.3030	0.4352	0.0231	27,724
IS & SR	Rural	Spot	2-Ln	0.0082	0.0256	0.1320	0.2889	0.4548	0.0338	97,253
IS & SR	Rural	Spot	2-Ln/TL	0.0020	0.0124	0.0809	0.2496	0.3448	0.0144	5,020
IS & SR	Rural	Spot	4+LN Undiv.	0.0027	0.0162	0.0749	0.2029	0.2966	0.0189	3,766
IS & SR	Rural	Spot	4+LN Div.	0.0032	0.0108	0.0529	0.1287	0.1955	0.0140	33,932
IS & SR	Rural	Spot	4+LN TL	0.0026	0.0114	0.0534	0.1519	0.2193	0.0140	13,388
IS & SR	Rural	Spot	Freeway	0.0011	0.0026	0.0178	0.0493	0.0708	0.0037	170,930
IS & SR	Urban	Section	2-Ln	0.0126	0.0801	0.6248	1.7013	2.4188	0.0927	8,179
IS & SR	Urban	Section	2-Ln/TL	0.0080	0.0581	0.6165	1.7044	2.3870	0.0661	1,635
IS & SR	Urban	Section	4+LN Undiv.	0.0133	0.0804	0.8480	2.4502	3.3920	0.0937	2,847
IS & SR	Urban	Section	4+LN Div.	0.0106	0.0491	0.4839	1.4675	2.0112	0.0597	13,756
IS & SR	Urban	Section	4+LN TL	0.0105	0.0587	0.6555	1.9271	2.6518	0.0692	12,432
IS & SR	Urban	Section	Freeway	0.0055	0.0203	0.2391	0.7475	1.0125	0.0258	40,699
IS & SR	Urban	Spot	2-Ln	0.0020	0.0127	0.1007	0.2777	0.3931	0.0147	55,100
IS & SR	Urban	Spot	2-Ln/TL	0.0010	0.0075	0.0854	0.2383	0.3322	0.0085	12,428
IS & SR	Urban	Spot	4+LN Undiv.	0.0013	0.0084	0.0934	0.2830	0.3862	0.0097	31,182
IS & SR	Urban	Spot	4+LN Div.	0.0014	0.0065	0.0671	0.2071	0.2822	0.0079	106,836
IS & SR	Urban	Spot	4+LN TL	0.0013	0.0069	0.0783	0.2310	0.3175	0.0082	108,462
IS & SR	Urban	Spot	Freeway	0.0007	0.0024	0.0288	0.0901	0.1220	0.0031	339,120

Note: Section rates are crashes per million vehicle miles.

Note: Spot rates are crashes per million vehicles. Spots are sections of roadway less than or equal to 0.10 mile.

Note: Severe crash rates are the sum of rates for fatal and incapacitating injury crashes.

Statewide Average Rates for Sections and Spots (2006-2008)

Route Type	Rural/ Urban	Location Type	Highway Type	Fatal Rate	Incap. Rate	Other Inj. Rate	Pd. Rate	Total Rate	Severe Crash Rate	Total Veh. Miles (million)
Functionally Classified Local Roads										
FUNCT.	Rural	Section	2-Ln	0.0334	0.1272	0.7050	1.6516	2.5172	0.1606	8,233
FUNCT.	Rural	Spot	2-Ln	0.0151	0.0578	0.3194	0.7496	1.1418	0.0729	18,196
FUNCT.	Urban	Section	2-Ln	0.0117	0.0802	0.7647	2.2862	3.1428	0.0919	12,744
FUNCT.	Urban	Section	2-Ln/TL	0.0049	0.0567	0.6314	1.9386	2.6317	0.0616	1,216
FUNCT.	Urban	Section	4+LN Undiv.	0.0155	0.0709	0.9198	2.7266	3.7328	0.0864	2,707
FUNCT.	Urban	Section	4+LN Div.	0.0092	0.0501	0.5454	1.6583	2.2631	0.0593	3,135
FUNCT.	Urban	Section	4+LN TL	0.0085	0.0623	0.6633	2.0117	2.7458	0.0708	4,013
FUNCT.	Urban	Section	Freeway	0.0051	0.0278	0.4075	1.3264	1.7668	0.0329	395
FUNCT.	Urban	Spot	2-Ln	0.0022	0.0148	0.1419	0.4302	0.5891	0.0170	70,567
FUNCT.	Urban	Spot	2-Ln/TL	0.0006	0.0088	0.1018	0.3040	0.4151	0.0094	8,222
FUNCT.	Urban	Spot	4+LN Undiv.	0.0019	0.0089	0.1190	0.3673	0.4970	0.0108	23,023
FUNCT.	Urban	Spot	4+LN Div.	0.0012	0.0071	0.0785	0.2505	0.3374	0.0083	24,101
FUNCT.	Urban	Spot	4+LN TL	0.0011	0.0079	0.0860	0.2650	0.3599	0.0090	31,994
FUNCT.	Urban	Spot	Freeway	0.0005	0.0043	0.0621	0.2029	0.2698	0.0048	3,736

Statewide Average Rates for Sections and Spots (2006-2008)

Route Type	Rural/ Urban	Location Type	Highway Type	Fatal Rate	Incap. Rate	Other Inj. Rate	Pd. Rate	Total Rate	Severe Crash Rate	Total Veh. Miles (million)
High Risk Rural Road Routes										
MAJOR COL.	Rural	Section	2-Ln	0.0348	0.1237	0.6113	1.3188	2.0887	0.1585	9,154
MAJOR COL.	Rural	Section	2-Ln/TL	0.0057	0.0456	0.5362	1.7969	2.3844	0.0513	175
MAJOR COL.	Rural	Section	4+LN Undiv.	0.0727	0.2907	1.1630	2.1806	3.7070	0.3634	28
MAJOR COL.	Rural	Section	4+LN Div.	0.0296	0.1478	0.7390	1.8327	2.7490	0.1774	68
MAJOR COL.	Rural	Section	4+LN TL	0.0096	0.0675	0.2602	0.9639	1.3012	0.0771	104
MAJOR COL.	Rural	Spot	2-Ln	0.0108	0.0383	0.1895	0.4105	0.6491	0.0491	29,773
MAJOR COL.	Rural	Spot	2-Ln/TL	0.0009	0.0082	0.0915	0.2865	0.3871	0.0091	1,093
MAJOR COL.	Rural	Spot	4+LN Undiv.	0.0127	0.0569	0.2088	0.4050	0.6834	0.0696	158
MAJOR COL.	Rural	Spot	4+LN Div.	0.0045	0.0246	0.1340	0.3173	0.4803	0.0291	448
MAJOR COL.	Rural	Spot	4+LN TL	0.0014	0.0099	0.0440	0.1676	0.2230	0.0113	704
MINOR COL.	Rural	Section	2-Ln	0.0336	0.1275	0.7036	1.6479	2.5127	0.1611	8,194
MINOR COL.	Rural	Spot	2-Ln	0.0152	0.0582	0.3200	0.7509	1.1444	0.0734	18,036

Tennessee Department of Transportation

Intersection Average Crash Rates (2006 - 2008)

Intersection Type	Crash Type	Rural					Urban				
		Multi-Lane					Multi-Lane				
		2-Lane	2-In W/ Turn Ln	Undivided	Divided	Turn Lane	2-Lane	2-In W/ Turn Ln	Undivided	Divided	Turn Lane
Signalized											
	NonInjury	0.543	0.561	0.614	0.542	0.525	0.684	0.585	0.788	0.822	0.741
	Injury	0.156	0.126	0.176	0.208	0.154	0.188	0.186	0.234	0.244	0.232
	Incap. Inj.	0.018	0.006	0.008	0.020	0.023	0.016	0.017	0.014	0.018	0.016
	Fatal	0.002	0.001	0.001	0.008	0.003	0.001	0.001	0.001	0.002	0.002
	Total	0.719	0.693	0.797	0.778	0.705	0.889	0.789	1.037	1.086	0.991
Full Stop											
	NonInjury	0.435	0.451	0.396	0.191	0.535	0.384	0.652	0.555	0.530	0.513
	Injury	0.117	0.193	0.155	0.064	0.040	0.096	0.163	0.185	0.242	0.023
	Incap. Inj.	0.018	0.064	0.020	0.021	0.010	0.008	0.033	0.092	0.015	0.000
	Fatal	0.005	0.001	0.001	0.007	0.001	0.001	0.001	0.001	0.001	0.001
	Total	0.575	0.709	0.572	0.283	0.586	0.489	0.849	0.833	0.778	0.537
Other											
	NonInjury	0.122	0.133	0.119	0.084	0.067	0.155	0.127	0.186	0.140	0.116
	Injury	0.053	0.039	0.048	0.041	0.025	0.055	0.045	0.064	0.048	0.040
	Incap. Inj.	0.009	0.007	0.006	0.008	0.005	0.006	0.004	0.005	0.005	0.004
	Fatal	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001
	Total	0.186	0.180	0.175	0.135	0.098	0.217	0.177	0.256	0.194	0.161

Intersection Rates: Crashes / Million Entering Vehicles

Date: 05/ 12/ 2010



CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
 From S.R. 92 (L.M. 11.730) to
 Odyssey Road (L.M. 13.840)
 Jefferson County



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Figure 1 of 7



CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
 From S.R. 92 (L.M. 11.730) to
 Odyssey Road (L.M. 13.840)
 Jefferson County



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Figure 2 of 7



CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
 From S.R. 92 (L.M. 11.730) to
 Odyssey Road (L.M. 13.840)
 Jefferson County



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Figure 3 of 7



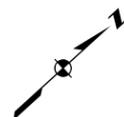
CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
From S.R. 92 (L.M. 11.730) to
Odyssey Road (L.M. 13.840)
Jefferson County



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

Figure 4 of 7



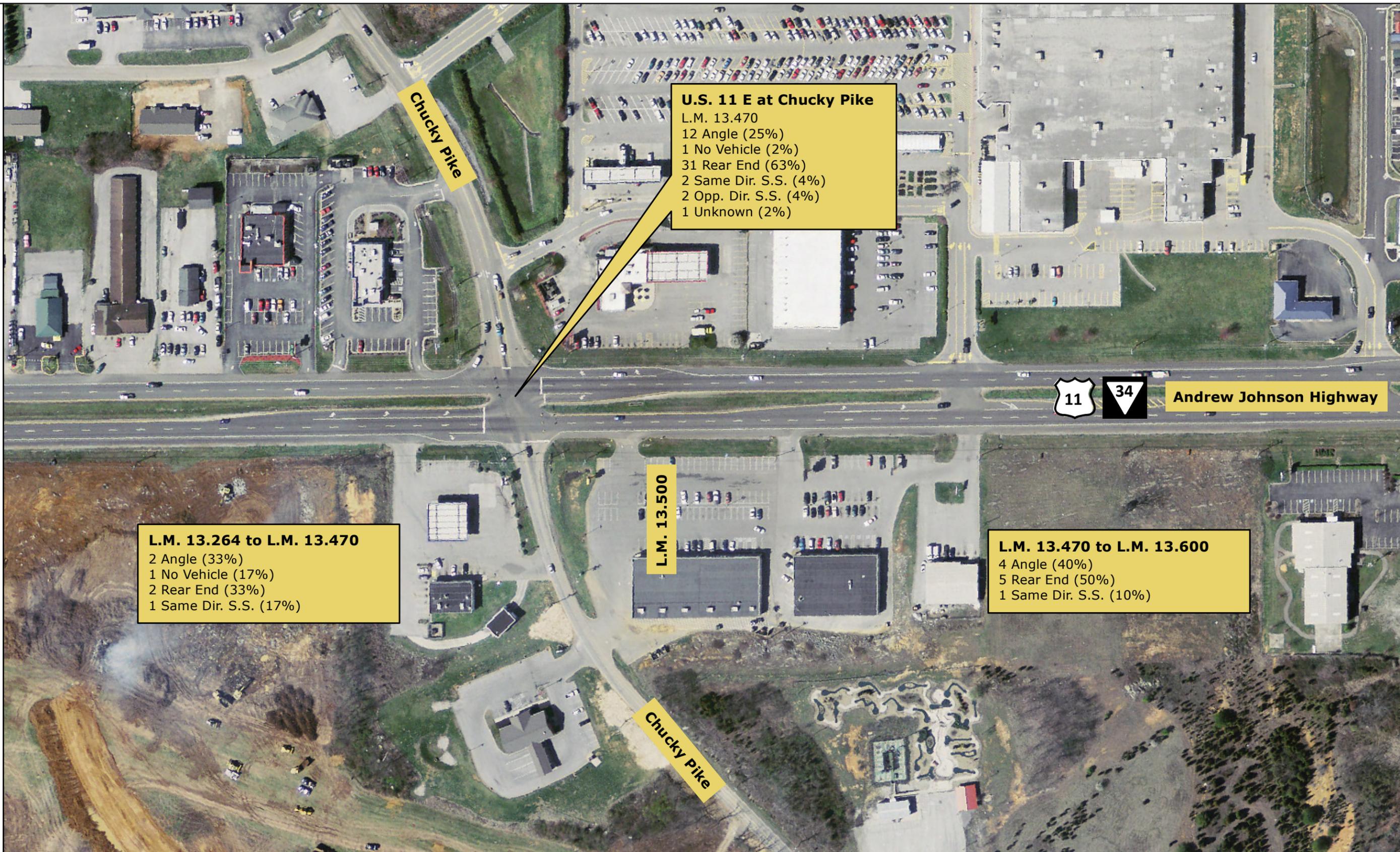
CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
 From S.R. 92 (L.M. 11.730) to
 Odyssey Road (L.M. 13.840)
 Jefferson County



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Figure 5 of 7



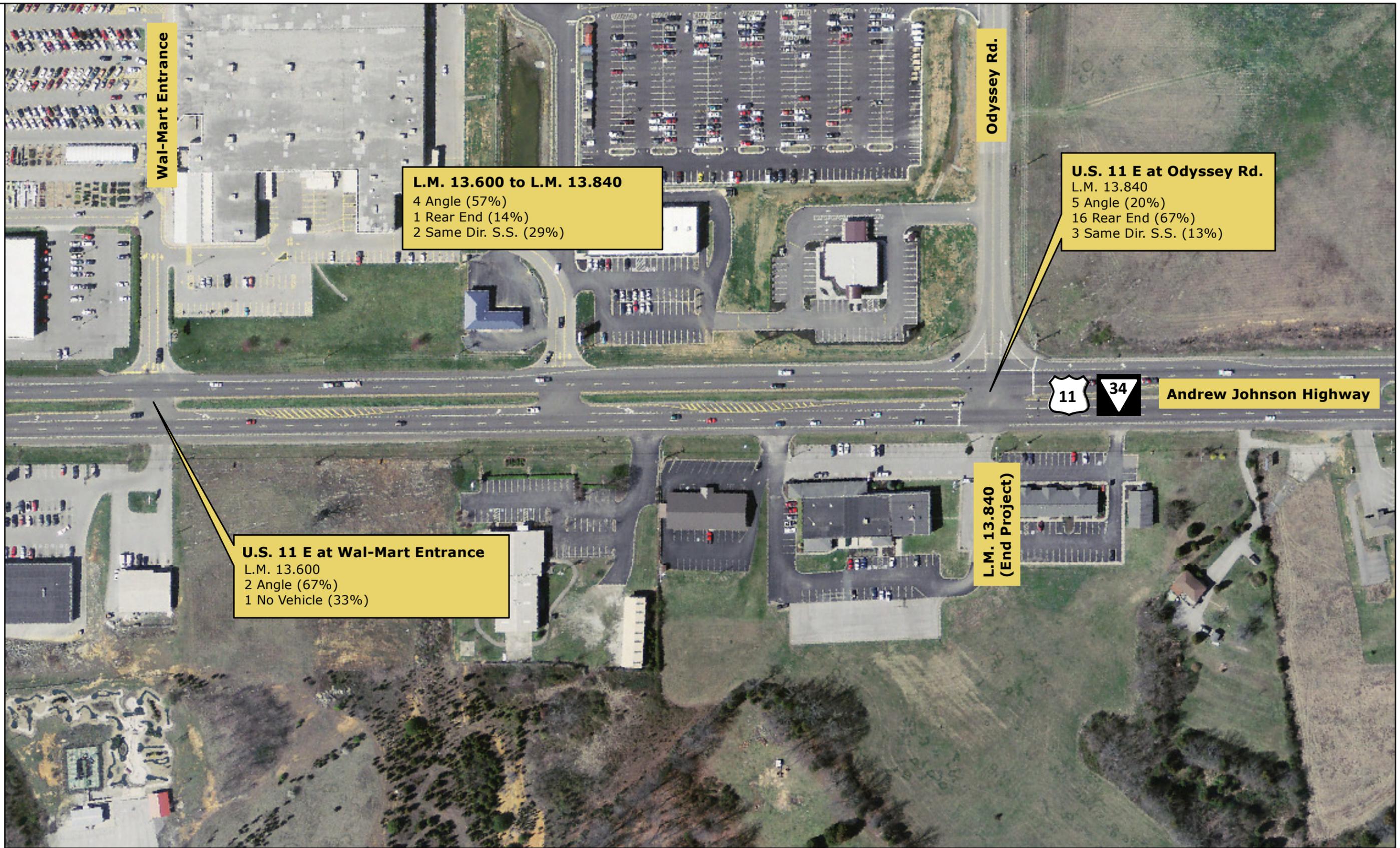
CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
 From S.R. 92 (L.M. 11.730) to
 Odyssey Road (L.M. 13.840)
 Jefferson County



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Figure 6 of 7



Wal-Mart Entrance

L.M. 13.600 to L.M. 13.840
 4 Angle (57%)
 1 Rear End (14%)
 2 Same Dir. S.S. (29%)

Odyssey Rd.

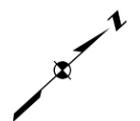
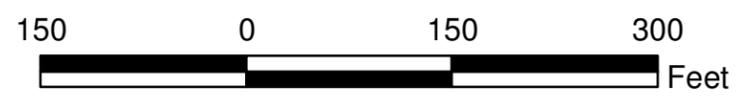
U.S. 11 E at Odyssey Rd.
 L.M. 13.840
 5 Angle (20%)
 16 Rear End (67%)
 3 Same Dir. S.S. (13%)

Andrew Johnson Highway



**L.M. 13.840
(End Project)**

U.S. 11 E at Wal-Mart Entrance
 L.M. 13.600
 2 Angle (67%)
 1 No Vehicle (33%)



CRASH DATA SUMMARY

US 11 E - Andrew Johnson Highway
 From S.R. 92 (L.M. 11.730) to
 Odyssey Road (L.M. 13.840)
 Jefferson County



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Figure 7 of 7

APPENDIX F

Synchro Reports for 2016 and 2036 Capacity Analysis

AM Peak 2016 - Existing Lanes, Volumes, Timings

1: Andrew Johnson Highway & SR 92

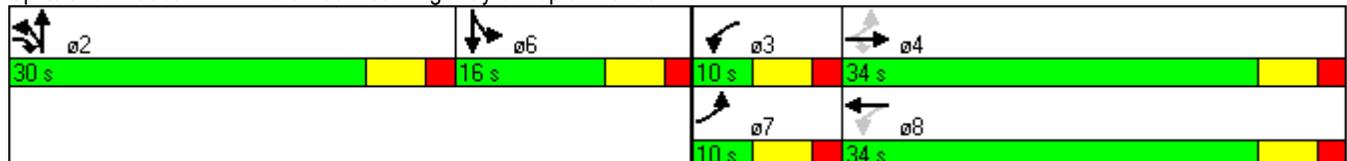


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Volume (vph)	9	646	368	14	664	419	15	42
Turn Type	pm+pt		pm+ov	pm+pt		Split		
Protected Phases	7	4	2	3	8	2	2	6
Permitted Phases	4		4	8				
Detector Phase	7	4	2	3	8	2	2	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0	22.0	22.0	10.0
Total Split (s)	10.0	34.0	30.0	10.0	34.0	30.0	30.0	16.0
Total Split (%)	11.1%	37.8%	33.3%	11.1%	37.8%	33.3%	33.3%	17.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			
Recall Mode	None	Min	Min	None	Min	Min	Min	None
Act Effct Green (s)	18.6	18.1	43.1	18.6	18.1	15.7	15.7	8.2
Actuated g/C Ratio	0.31	0.31	0.73	0.31	0.31	0.27	0.27	0.14
v/c Ratio	0.03	0.60	0.29	0.05	0.62	0.46	0.06	0.30
Control Delay	15.7	22.0	1.3	15.9	22.3	22.4	15.8	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	22.0	1.3	15.9	22.3	22.4	15.8	27.7
LOS	B	C	A	B	C	C	B	C
Approach Delay		14.5			22.1		22.0	27.7
Approach LOS		B			C		C	C

Intersection Summary

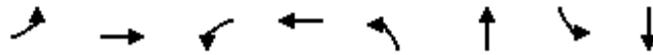
Cycle Length: 90	
Actuated Cycle Length: 59.2	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 47.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Andrew Johnson Highway & Maple Avenue



AM Peak 2016 - Existing Lanes, Volumes, Timings

2: Andrew Johnson Highway & Russell Avenue

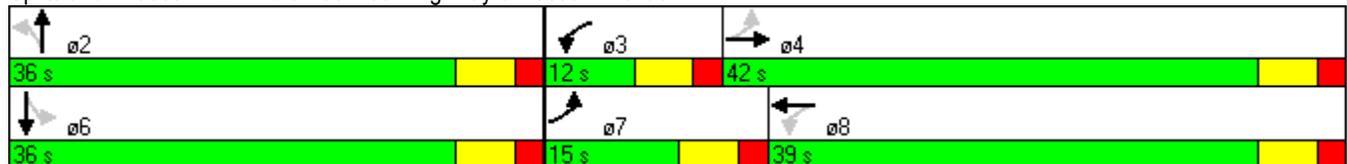


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕		↕		↕
Volume (vph)	72	603	43	602	16	99	39	136
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	15.0	42.0	12.0	39.0	36.0	36.0	36.0	36.0
Total Split (%)	16.7%	46.7%	13.3%	43.3%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes			Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	23.5	21.0	20.7	17.7		12.6		12.6
Actuated g/C Ratio	0.47	0.42	0.41	0.35		0.25		0.25
v/c Ratio	0.16	0.42	0.10	0.55		0.34		0.52
Control Delay	7.6	12.9	7.6	16.6		18.8		22.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.6	12.9	7.6	16.6		18.8		22.4
LOS	A	B	A	B		B		C
Approach Delay		12.3		16.1		18.8		22.4
Approach LOS		B		B		B		C

Intersection Summary

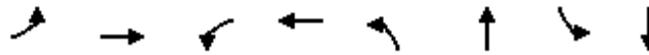
Cycle Length: 90
 Actuated Cycle Length: 50.4
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 15.6
 Intersection LOS: B
 Intersection Capacity Utilization 57.2%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: Andrew Johnson Highway & Russell Avenue



AM Peak 2016 - Existing Lanes, Volumes, Timings

3: Andrew Johnson Highway & George



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕		↕		↕
Volume (vph)	66	689	136	770	40	103	42	39
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	10.0	10.0	10.0	10.0
Total Split (s)	13.0	36.0	17.0	40.0	37.0	37.0	37.0	37.0
Total Split (%)	14.4%	40.0%	18.9%	44.4%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	24.0	19.1	27.6	23.0		15.4		15.4
Actuated g/C Ratio	0.41	0.33	0.47	0.39		0.26		0.26
v/c Ratio	0.18	0.61	0.33	0.58		0.65		0.37
Control Delay	9.3	20.7	10.2	17.5		23.3		16.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	9.3	20.7	10.2	17.5		23.3		16.8
LOS	A	C	B	B		C		B
Approach Delay		19.7		16.4		23.3		16.8
Approach LOS		B		B		C		B

Intersection Summary

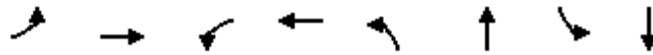
Cycle Length: 90	
Actuated Cycle Length: 58.4	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 18.6	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Andrew Johnson Highway & George Avenue



AM Peak 2016 - Existing Lanes, Volumes, Timings

4: Andrew Johnson Highway & Odell



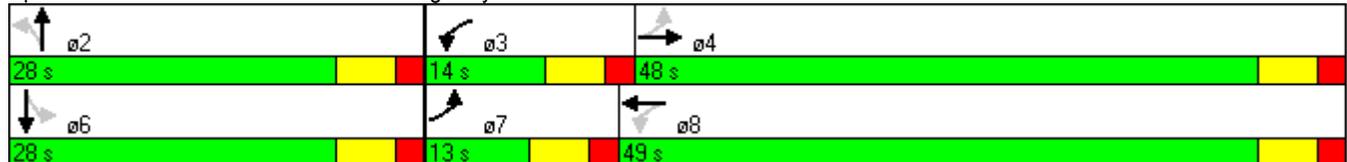
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↶↷	↶	↶↷		↷		↷
Volume (vph)	21	679	45	803	7	4	21	2
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	13.0	48.0	14.0	49.0	28.0	28.0	28.0	28.0
Total Split (%)	14.4%	53.3%	15.6%	54.4%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	25.5	26.9	26.6	29.0		6.7		6.7
Actuated g/C Ratio	0.63	0.66	0.65	0.71		0.16		0.16
v/c Ratio	0.04	0.29	0.07	0.32		0.12		0.21
Control Delay	4.4	8.3	4.3	6.5		13.2		13.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	4.4	8.3	4.3	6.5		13.2		13.5
LOS	A	A	A	A		B		B
Approach Delay		8.2		6.4		13.2		13.5
Approach LOS		A		A		B		B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 40.7
 Natural Cycle: 55
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.32
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 46.7%
 Analysis Period (min) 15

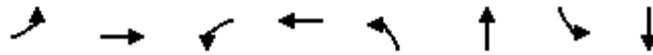
Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 4: Andrew Johnson Highway & Odell Avenue



AM Peak 2016 - Existing Lanes, Volumes, Timings

5: Andrew Johnson Highway & Hicks



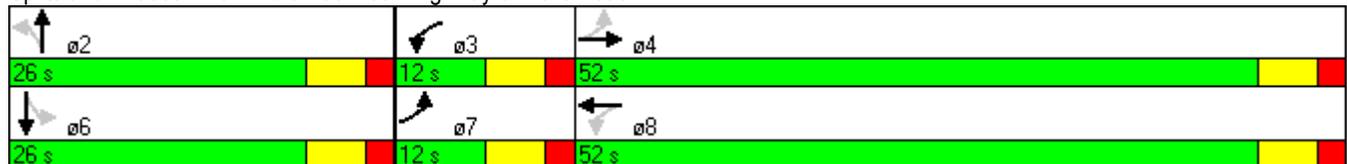
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕		↕		↕
Volume (vph)	18	708	45	1040	30	15	29	17
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	12.0	52.0	12.0	52.0	26.0	26.0	26.0	26.0
Total Split (%)	13.3%	57.8%	13.3%	57.8%	28.9%	28.9%	28.9%	28.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	Max	Max	Max	Max
Act Effct Green (s)	27.2	24.0	29.6	28.7		20.7		20.7
Actuated g/C Ratio	0.43	0.38	0.47	0.45		0.33		0.33
v/c Ratio	0.07	0.55	0.13	0.69		0.15		0.18
Control Delay	7.9	17.5	8.3	16.3		14.7		12.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.9	17.5	8.3	16.3		14.7		12.7
LOS	A	B	A	B		B		B
Approach Delay		17.3		16.0		14.7		12.7
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 63.6
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 16.2
 Intersection Capacity Utilization 54.2%
 Analysis Period (min) 15

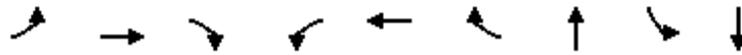
Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 5: Andrew Johnson Highway & Hicks Road



AM Peak 2016 - Existing Lanes, Volumes, Timings

6: Andrew Johnson Highway & Chucky Pike



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Configurations	↶	↷	↷	↶	↷	↷	↷	↶	↷
Volume (vph)	88	523	6	17	556	16	45	33	28
Turn Type	pm+pt		Perm	pm+pt		Perm		Split	
Protected Phases	7	4		3	8		2	6	6
Permitted Phases	4		4	8		8			
Detector Phase	7	4	4	3	8	8	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0	22.0	10.0	10.0	10.0
Total Split (s)	14.0	35.0	35.0	10.0	31.0	31.0	28.0	17.0	17.0
Total Split (%)	15.6%	38.9%	38.9%	11.1%	34.4%	34.4%	31.1%	18.9%	18.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			
Recall Mode	None	Min	Min	None	Min	Min	Min	Min	Min
Act Effct Green (s)	25.9	24.7	24.7	19.0	16.0	16.0	10.8	7.5	7.5
Actuated g/C Ratio	0.41	0.39	0.39	0.30	0.25	0.25	0.17	0.12	0.12
v/c Ratio	0.24	0.38	0.01	0.05	0.63	0.04	0.48	0.16	0.41
Control Delay	13.3	15.7	11.8	12.6	25.9	10.8	31.1	31.7	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	15.7	11.8	12.6	25.9	10.8	31.1	31.7	17.3
LOS	B	B	B	B	C	B	C	C	B
Approach Delay		15.3			25.1		31.1		20.6
Approach LOS		B			C		C		C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 63.7

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 21.2

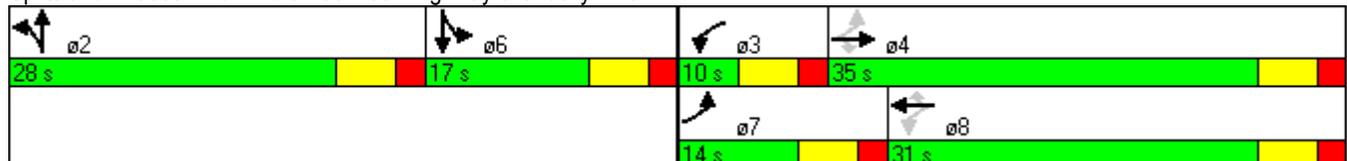
Intersection LOS: C

Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



AM Peak 2016 - Existing
Lanes, Volumes, Timings

7: Andrew Johnson Highway & Odyssey Road



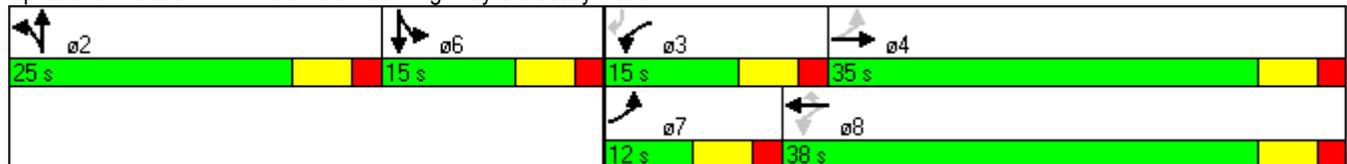
Lane Group	EBL	EBT	WBT	WBR	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	27	515	500	17	5	17	27
Turn Type	pm+pt			Perm			custom
Protected Phases	7	4	8		2	6	
Permitted Phases	4			8			3
Detector Phase	7	4	8	8	2	6	3
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	22.0	22.0	10.0	10.0
Total Split (s)	12.0	35.0	38.0	38.0	25.0	15.0	15.0
Total Split (%)	13.3%	38.9%	42.2%	42.2%	27.8%	16.7%	16.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	Min	Min	Min	Min	None
Act Effct Green (s)	14.7	12.9	13.1	13.1	6.2	6.7	6.2
Actuated g/C Ratio	0.30	0.26	0.27	0.27	0.13	0.14	0.13
v/c Ratio	0.07	0.56	0.53	0.04	0.06	0.12	0.12
Control Delay	9.8	18.9	18.2	8.5	24.7	24.3	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	18.9	18.2	8.5	24.7	24.3	13.1
LOS	A	B	B	A	C	C	B
Approach Delay		18.4	17.8		24.7	19.0	
Approach LOS		B	B		C	B	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 48.7
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 18.3
 Intersection Capacity Utilization 39.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 7: Andrew Johnson Highway & Odyssey Road



PM Peak 2016 - Existing
Lanes, Volumes, Timings

1: Andrew Johnson Highway & Maple Avenue



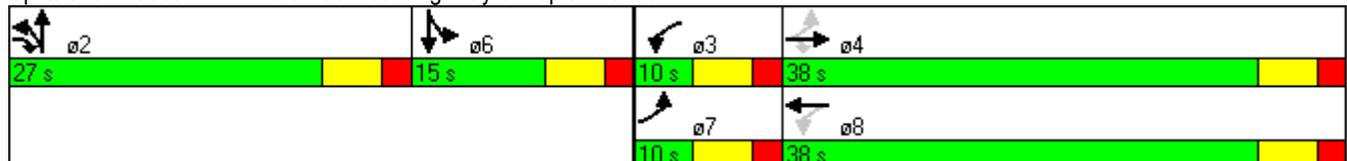
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Volume (vph)	13	708	246	32	643	241	42	27
Turn Type	pm+pt		pm+ov	pm+pt		custom		
Protected Phases	7	4	2	3	8	2	2	6
Permitted Phases	4		4	8		2		
Detector Phase	7	4	2	3	8	2	2	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0	22.0	22.0	10.0
Total Split (s)	10.0	38.0	27.0	10.0	38.0	27.0	27.0	15.0
Total Split (%)	11.1%	42.2%	30.0%	11.1%	42.2%	30.0%	30.0%	16.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			
Recall Mode	None	Min	Min	None	Min	Min	Min	None
Act Effct Green (s)	23.7	21.8	46.6	25.7	25.1	13.2	13.2	8.2
Actuated g/C Ratio	0.39	0.36	0.77	0.42	0.41	0.22	0.22	0.13
v/c Ratio	0.04	0.62	0.21	0.12	0.49	0.36	0.23	0.27
Control Delay	12.3	21.0	1.3	12.8	16.1	26.1	17.1	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	21.0	1.3	12.8	16.1	26.1	17.1	30.0
LOS	B	C	A	B	B	C	B	C
Approach Delay		15.9			15.9		23.7	30.0
Approach LOS		B			B		C	C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 60.8
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 17.6
 Intersection Capacity Utilization 50.1%
 Analysis Period (min) 15

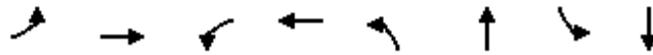
Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Andrew Johnson Highway & Maple Avenue



PM Peak 2016 - Existing
Lanes, Volumes, Timings

2: Andrew Johnson Highway & Russell Avenue



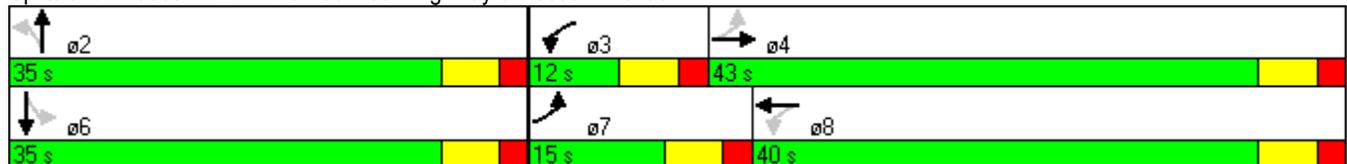
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕		↕		↕
Volume (vph)	102	758	80	703	31	130	36	164
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	15.0	43.0	12.0	40.0	35.0	35.0	35.0	35.0
Total Split (%)	16.7%	47.8%	13.3%	44.4%	38.9%	38.9%	38.9%	38.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes			Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	33.1	27.1	29.9	25.5		17.3		17.3
Actuated g/C Ratio	0.50	0.41	0.45	0.38		0.26		0.26
v/c Ratio	0.34	0.60	0.26	0.75		0.59		0.66
Control Delay	10.9	18.3	10.3	22.3		27.5		31.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	10.9	18.3	10.3	22.3		27.5		31.0
LOS	B	B	B	C		C		C
Approach Delay		17.5		21.3		27.5		31.0
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 66.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 21.6
 Intersection Capacity Utilization 66.0%
 Analysis Period (min) 15

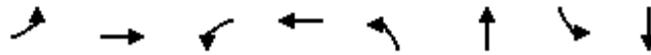
Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 2: Andrew Johnson Highway & Russell Avenue



PM Peak 2016 - Existing
Lanes, Volumes, Timings

3: Andrew Johnson Highway & George Avenue

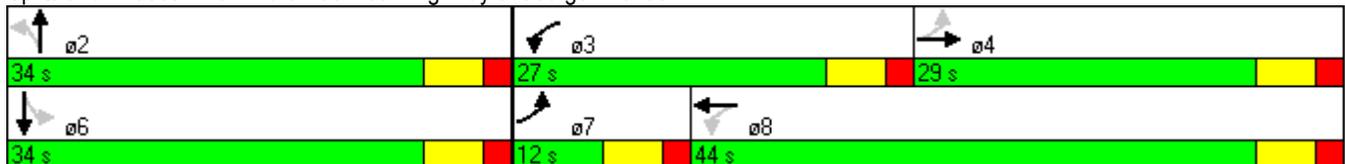


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕		↕		↕
Volume (vph)	67	604	296	806	80	11	41	73
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	10.0	10.0	10.0	10.0
Total Split (s)	12.0	29.0	27.0	44.0	34.0	34.0	34.0	34.0
Total Split (%)	13.3%	32.2%	30.0%	48.9%	37.8%	37.8%	37.8%	37.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	24.9	18.6	38.1	29.4		16.0		16.0
Actuated g/C Ratio	0.37	0.28	0.57	0.44		0.24		0.24
v/c Ratio	0.23	0.73	0.67	0.62		0.75		0.48
Control Delay	11.9	28.6	17.2	18.5		25.9		26.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	11.9	28.6	17.2	18.5		25.9		26.4
LOS	B	C	B	B		C		C
Approach Delay		27.0		18.2		25.9		26.4
Approach LOS		C		B		C		C

Intersection Summary

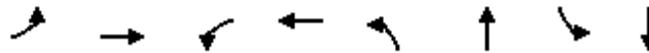
Cycle Length: 90	
Actuated Cycle Length: 67.3	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 72.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Andrew Johnson Highway & George Avenue



PM Peak 2016 - Existing
Lanes, Volumes, Timings

4: Andrew Johnson Highway & Odell Avenue



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕		↕		↕
Volume (vph)	16	1055	49	1120	17	21	37	11
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	10.0	53.0	11.0	54.0	26.0	26.0	26.0	26.0
Total Split (%)	11.1%	58.9%	12.2%	60.0%	28.9%	28.9%	28.9%	28.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	34.4	32.3	37.4	36.7		8.7		8.7
Actuated g/C Ratio	0.58	0.54	0.63	0.62		0.15		0.15
v/c Ratio	0.06	0.62	0.17	0.60		0.35		0.52
Control Delay	4.9	12.4	5.4	9.1		18.6		18.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	4.9	12.4	5.4	9.1		18.6		18.0
LOS	A	B	A	A		B		B
Approach Delay		12.3		8.9		18.6		18.0
Approach LOS		B		A		B		B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 59.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 63.5%
 Analysis Period (min) 15

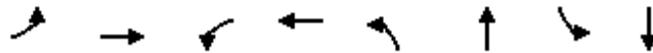
Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 4: Andrew Johnson Highway & Odell Avenue



PM Peak 2016 - Existing
Lanes, Volumes, Timings

5: Andrew Johnson Highway & Hicks Road

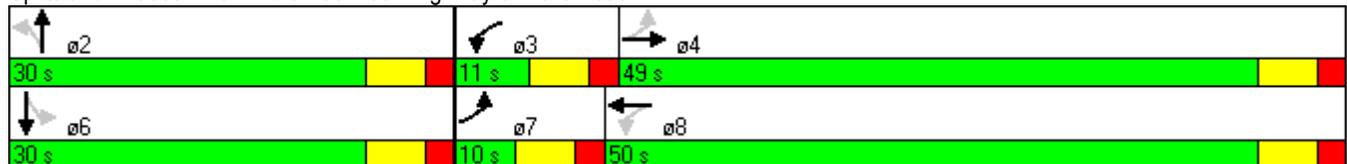


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↶↷	↶	↶↷		↷		↷
Volume (vph)	26	986	46	1050	34	24	67	22
Turn Type	pm+pt		pm+pt		Perm		Perm	
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	10.0	49.0	11.0	50.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	54.4%	12.2%	55.6%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	Max	Max	Max	Max
Act Effct Green (s)	34.6	32.5	36.6	34.9		24.7		24.7
Actuated g/C Ratio	0.46	0.43	0.49	0.46		0.33		0.33
v/c Ratio	0.16	0.74	0.23	0.74		0.22		0.33
Control Delay	10.0	21.4	10.7	19.8		17.3		20.6
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	10.0	21.4	10.7	19.8		17.3		20.6
LOS	A	C	B	B		B		C
Approach Delay		21.1		19.5		17.3		20.6
Approach LOS		C		B		B		C

Intersection Summary

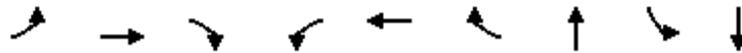
Cycle Length: 90	
Actuated Cycle Length: 75.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 20.1	Intersection LOS: C
Intersection Capacity Utilization 60.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Andrew Johnson Highway & Hicks Road



PM Peak 2016 - Existing
Lanes, Volumes, Timings

6: Andrew Johnson Highway & Chucky Pike

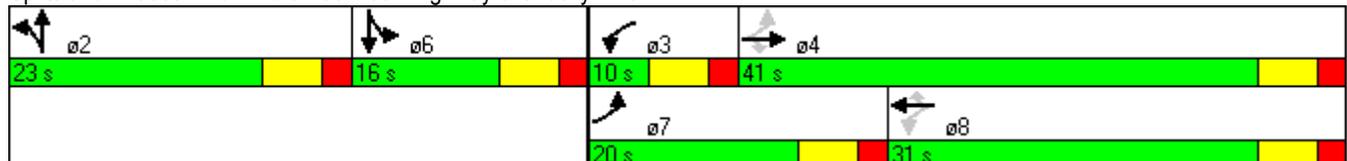


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	231	640	13	27	747	60	43	95	64
Turn Type	pm+pt		Perm	pm+pt		Perm		Split	
Protected Phases	7	4		3	8		2	6	6
Permitted Phases	4		4	8		8			
Detector Phase	7	4	4	3	8	8	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0	22.0	10.0	10.0	10.0
Total Split (s)	20.0	41.0	41.0	10.0	31.0	31.0	23.0	16.0	16.0
Total Split (%)	22.2%	45.6%	45.6%	11.1%	34.4%	34.4%	25.6%	17.8%	17.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes			
Recall Mode	None	Min	Min	None	Min	Min	Min	Min	Min
Act Effct Green (s)	42.4	36.8	36.8	27.1	23.1	23.1	13.2	9.0	9.0
Actuated g/C Ratio	0.51	0.44	0.44	0.33	0.28	0.28	0.16	0.11	0.11
v/c Ratio	0.69	0.45	0.02	0.11	0.84	0.14	0.66	0.55	0.73
Control Delay	26.9	18.9	12.6	13.5	38.2	7.4	43.4	48.6	42.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	18.9	12.6	13.5	38.2	7.4	43.4	48.6	42.1
LOS	C	B	B	B	D	A	D	D	D
Approach Delay		20.9			35.2		43.4		44.5
Approach LOS		C			D		D		D

Intersection Summary

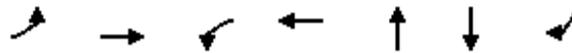
Cycle Length: 90
 Actuated Cycle Length: 82.9
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 31.1
 Intersection Capacity Utilization 72.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



PM Peak 2016 - Existing
Lanes, Volumes, Timings

7: Andrew Johnson Highway & Odyssey Road

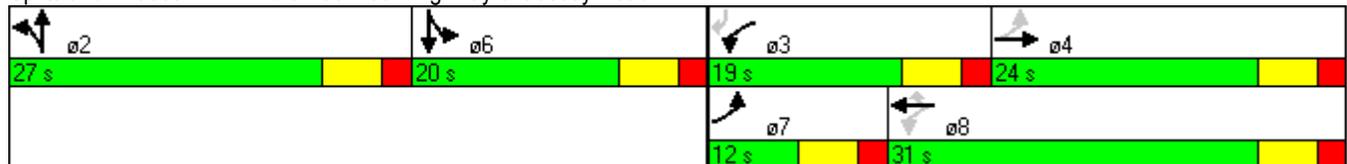


Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	42	347	10	303	6	15	125
Turn Type	pm+pt		pm+pt				custom
Protected Phases	7	4	3	8	2	6	
Permitted Phases	4		8				3
Detector Phase	7	4	3	8	2	6	3
Switch Phase							
Minimum Initial (s)	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	22.0	10.0	22.0	22.0	10.0	10.0
Total Split (s)	12.0	24.0	19.0	31.0	27.0	20.0	19.0
Total Split (%)	13.3%	26.7%	21.1%	34.4%	30.0%	22.2%	21.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	Min	None	None
Act Effct Green (s)	17.0	12.7	19.7	15.8	7.3	10.1	7.3
Actuated g/C Ratio	0.31	0.23	0.36	0.29	0.13	0.18	0.13
v/c Ratio	0.11	0.47	0.03	0.33	0.15	0.37	0.42
Control Delay	12.3	23.3	11.3	19.3	25.2	27.3	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	23.3	11.3	19.3	25.2	27.3	10.4
LOS	B	C	B	B	C	C	B
Approach Delay		22.1		19.0	25.2	18.3	
Approach LOS		C		B	C	B	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 54.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 36.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Andrew Johnson Highway & Odyssey Road



AM Peak 2036 - Existing
Lanes, Volumes, Timings

1: Andrew Johnson Highway & Maple Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	523	269	8	660	7	336	13	8	9	30	15
Satd. Flow (prot)	1770	3539	1583	1770	3532	0	3433	1755	0	0	1778	0
Flt Permitted	0.172			0.264			0.950				0.992	
Satd. Flow (perm)	320	3539	1583	492	3532	0	3433	1755	0	0	1778	0
Satd. Flow (RTOR)			392		1			12			18	
Lane Group Flow (vph)	12	761	392	12	971	0	489	31	0	0	79	0
Turn Type	pm+pt		pm+ov	pm+pt			custom				Split	
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases	4		4	8			2					
Total Split (s)	13.0	40.0	17.0	13.0	40.0	0.0	17.0	17.0	0.0	20.0	20.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	24.2	23.3	43.8	24.2	23.3		11.9	11.9			8.2	
Actuated g/C Ratio	0.40	0.38	0.72	0.40	0.38		0.20	0.20			0.13	
v/c Ratio	0.04	0.56	0.31	0.04	0.72		0.73	0.09			0.31	
Control Delay	10.8	17.5	1.6	10.8	20.4		35.5	21.8			26.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	10.8	17.5	1.6	10.8	20.4		35.5	21.8			26.9	
LOS	B	B	A	B	C		D	C			C	
Approach Delay		12.0			20.2			34.7			26.9	
Approach LOS		B			C			C			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 60.8
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 19.7
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Andrew Johnson Highway & Maple Avenue



AM Peak 2036 - Existing
Lanes, Volumes, Timings

2: Andrew Johnson Highway & Russell Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	514	16	37	513	62	14	84	30	27	94	32
Satd. Flow (prot)	1770	3525	0	1770	3483	0	0	1794	0	0	1794	0
Flt Permitted	0.248			0.314				0.951			0.919	
Satd. Flow (perm)	462	3525	0	585	3483	0	0	1715	0	0	1664	0
Satd. Flow (RTOR)		6			24			15			13	
Lane Group Flow (vph)	89	771	0	54	837	0	0	186	0	0	223	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	24.2	22.1		23.0	20.0			12.8			12.8	
Actuated g/C Ratio	0.46	0.42		0.43	0.38			0.24			0.24	
v/c Ratio	0.28	0.52		0.15	0.63			0.44			0.54	
Control Delay	9.1	14.1		7.7	16.2			21.3			23.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.1	14.1		7.7	16.2			21.3			23.9	
LOS	A	B		A	B			C			C	
Approach Delay		13.5			15.7			21.3			23.9	
Approach LOS		B			B			C			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 52.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 16.2
 Intersection LOS: B
 Intersection Capacity Utilization 57.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: Andrew Johnson Highway & Russell Avenue



AM Peak 2036 - Existing
Lanes, Volumes, Timings

3: Andrew Johnson Highway & George Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	587	13	116	656	26	33	89	146	36	33	60
Satd. Flow (prot)	1770	3529	0	1770	3518	0	0	1715	0	0	1721	0
Flt Permitted	0.190			0.223				0.940			0.709	
Satd. Flow (perm)	354	3529	0	415	3518	0	0	1621	0	0	1237	0
Satd. Flow (RTOR)		4			7			59			43	
Lane Group Flow (vph)	83	873	0	169	993	0	0	391	0	0	187	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	28.3	24.2		29.7	26.6			17.2			17.2	
Actuated g/C Ratio	0.44	0.38		0.47	0.42			0.27			0.27	
v/c Ratio	0.34	0.65		0.60	0.67			0.81			0.51	
Control Delay	10.7	18.2		18.2	18.0			36.4			22.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	10.7	18.2		18.2	18.0			36.4			22.6	
LOS	B	B		B	B			D			C	
Approach Delay		17.5			18.0			36.4			22.6	
Approach LOS		B			B			D			C	

Intersection Summary

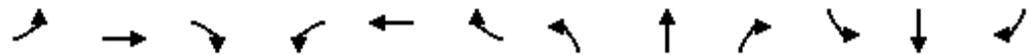
Cycle Length: 90
 Actuated Cycle Length: 63.6
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 20.8
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 3: Andrew Johnson Highway & George Avenue



AM Peak 2036 - Existing Lanes, Volumes, Timings

4: Andrew Johnson Highway & Odell Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	10	618	4	33	716	11	5	5	20	14	0	35
Satd. Flow (prot)	1770	3536	0	1770	3532	0	0	1680	0	0	1659	0
Flt Permitted	0.239			0.282				0.927			0.890	
Satd. Flow (perm)	445	3536	0	525	3532	0	0	1570	0	0	1497	0
Satd. Flow (RTOR)		1			3			29			51	
Lane Group Flow (vph)	15	906	0	48	1058	0	0	43	0	0	71	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	29.1	31.0		30.2	32.8			6.8			6.8	
Actuated g/C Ratio	0.65	0.70		0.68	0.74			0.15			0.15	
v/c Ratio	0.04	0.37		0.10	0.41			0.16			0.26	
Control Delay	4.2	7.4		4.3	6.2			13.9			13.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.2	7.4		4.3	6.2			13.9			13.2	
LOS	A	A		A	A			B			B	
Approach Delay		7.4			6.1			13.9			13.2	
Approach LOS		A			A			B			B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 44.5

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 51.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Andrew Johnson Highway & Odell Avenue



AM Peak 2036 - Existing
Lanes, Volumes, Timings

5: Andrew Johnson Highway & Hicks Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	631	20	41	927	52	27	13	28	26	15	47
Satd. Flow (prot)	1770	3522	0	1770	3511	0	0	1725	0	0	1703	0
Flt Permitted	0.113			0.223				0.841			0.884	
Satd. Flow (perm)	210	3522	0	415	3511	0	0	1479	0	0	1528	0
Satd. Flow (RTOR)		6			10			35			56	
Lane Group Flow (vph)	25	947	0	60	1425	0	0	99	0	0	128	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	36.2	34.0		37.5	36.2			17.8			17.8	
Actuated g/C Ratio	0.52	0.49		0.54	0.52			0.26			0.26	
v/c Ratio	0.12	0.55		0.20	0.78			0.25			0.30	
Control Delay	6.9	13.7		7.3	16.9			20.8			18.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.9	13.7		7.3	16.9			20.8			18.9	
LOS	A	B		A	B			C			B	
Approach Delay		13.5			16.5			20.8			18.9	
Approach LOS		B			B			C			B	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 69.7
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 15.7
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 5: Andrew Johnson Highway & Hicks Road



AM Peak 2036 - Existing
Lanes, Volumes, Timings

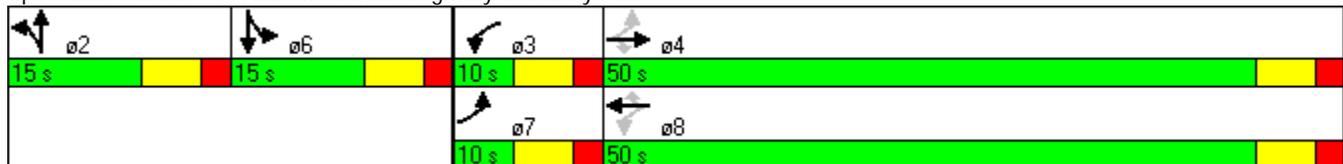
6: Andrew Johnson Highway & Chucky Pike

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	501	6	17	532	15	76	43	24	32	26	79
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1773	0	1770	1652	0
Flt Permitted	0.236			0.313				0.974		0.950		
Satd. Flow (perm)	440	3539	1583	583	3539	1583	0	1773	0	1770	1652	0
Satd. Flow (RTOR)			6			22		9			115	
Lane Group Flow (vph)	122	729	9	25	774	22	0	209	0	47	153	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8						
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	15.0	15.0	0.0	15.0	15.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	25.8	24.3	24.3	23.3	20.3	20.3		9.2		7.3	7.3	
Actuated g/C Ratio	0.41	0.39	0.39	0.37	0.32	0.32		0.15		0.12	0.12	
v/c Ratio	0.46	0.53	0.01	0.09	0.68	0.04		0.78		0.23	0.52	
Control Delay	16.4	17.2	10.5	10.1	22.1	7.1		51.0		30.8	17.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	16.4	17.2	10.5	10.1	22.1	7.1		51.0		30.8	17.5	
LOS	B	B	B	B	C	A		D		C	B	
Approach Delay		17.0			21.4			51.0			20.6	
Approach LOS		B			C			D			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 62.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 22.5
 Intersection LOS: C
 Intersection Capacity Utilization 63.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



PM Peak 2036 - Existing
Lanes, Volumes, Timings

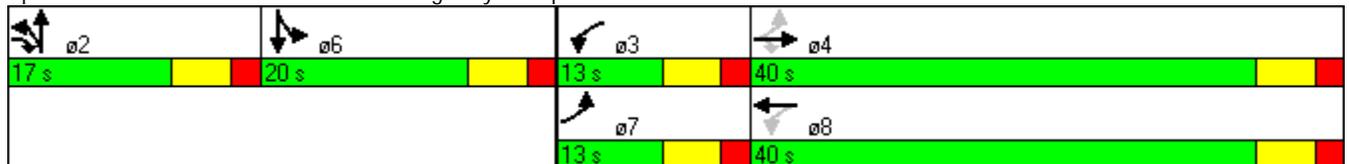
1: Andrew Johnson Highway & Maple Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	610	212	28	554	5	208	36	37	16	23	12
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.924			0.969	
Flt Protected	0.950			0.950			0.950				0.984	
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	3433	1721	0	0	1776	0
Flt Permitted	0.280			0.184			0.950				0.984	
Satd. Flow (perm)	522	3539	1583	343	3536	0	3433	1721	0	0	1776	0
Satd. Flow (RTOR)			309		1			47			14	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%
Mid-Block Traffic (%)		20%			20%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	888	309	41	813	0	303	106	0	0	73	0
Turn Type	pm+pt		pm+ov	pm+pt			custom			Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases	4		4	8			2					
Total Split (s)	13.0	40.0	17.0	13.0	40.0	0.0	17.0	17.0	0.0	20.0	20.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	26.7	23.7	44.2	29.1	28.1		11.0	11.0			8.5	
Actuated g/C Ratio	0.41	0.36	0.68	0.44	0.43		0.17	0.17			0.13	
v/c Ratio	0.05	0.69	0.26	0.13	0.54		0.52	0.32			0.30	
Control Delay	10.0	22.6	1.7	10.8	16.1		33.8	22.9			30.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	10.0	22.6	1.7	10.8	16.1		33.8	22.9			30.7	
LOS	A	C	A	B	B		C	C			C	
Approach Delay		17.1			15.8			31.0			30.7	
Approach LOS		B			B			C			C	

Intersection Summary

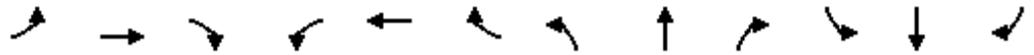
Cycle Length: 90	
Actuated Cycle Length: 65.4	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 19.3	Intersection LOS: B
Intersection Capacity Utilization 54.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Andrew Johnson Highway & Maple Avenue



PM Peak 2036 - Existing
Lanes, Volumes, Timings

2: Andrew Johnson Highway & Russell Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	87	646	16	68	599	167	26	111	66	31	140	55
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.967			0.956			0.967	
Flt Protected	0.950			0.950				0.994			0.993	
Satd. Flow (prot)	1770	3525	0	1770	3422	0	0	1770	0	0	1789	0
Flt Permitted	0.143			0.203				0.894			0.893	
Satd. Flow (perm)	266	3525	0	378	3422	0	0	1592	0	0	1609	0
Satd. Flow (RTOR)		4			65			24			16	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%
Mid-Block Traffic (%)		20%			20%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	963	0	99	1115	0	0	296	0	0	329	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	31.5	28.5		31.5	28.5			17.4			17.4	
Actuated g/C Ratio	0.48	0.43		0.48	0.43			0.26			0.26	
v/c Ratio	0.57	0.63		0.37	0.73			0.67			0.75	
Control Delay	18.3	16.6		10.7	17.9			32.4			37.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	18.3	16.6		10.7	17.9			32.4			37.3	
LOS	B	B		B	B			C			D	
Approach Delay		16.8			17.3			32.4			37.3	
Approach LOS		B			B			C			D	

Intersection Summary

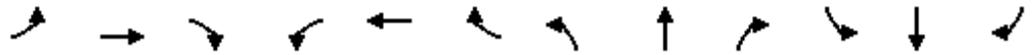
Cycle Length: 90	
Actuated Cycle Length: 65.7	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 72.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Andrew Johnson Highway & Russell Avenue



PM Peak 2036 - Existing
Lanes, Volumes, Timings

3: Andrew Johnson Highway & George Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	57	521	28	252	680	42	67	96	187	35	62	26
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.991			0.928			0.971	
Flt Protected	0.950			0.950				0.990			0.986	
Satd. Flow (prot)	1770	3511	0	1770	3507	0	0	1711	0	0	1783	0
Flt Permitted	0.171			0.262				0.896			0.630	
Satd. Flow (perm)	319	3511	0	488	3507	0	0	1549	0	0	1139	0
Satd. Flow (RTOR)		10			11			56			13	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%
Mid-Block Traffic (%)		20%			20%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	799	0	367	1051	0	0	510	0	0	179	0
Turn Type	pm+pt			pm+pt			Perm		Perm			
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	29.5	25.4		30.9	27.9			17.2			17.2	
Actuated g/C Ratio	0.45	0.39		0.48	0.43			0.27			0.27	
v/c Ratio	0.35	0.58		1.17	0.70			1.13			0.58	
Control Delay	11.0	16.6		125.7	18.1			108.4			30.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.0	16.6		125.7	18.1			108.4			30.8	
LOS	B	B		F	B			F			C	
Approach Delay		16.1			45.9			108.4			30.8	
Approach LOS		B			D			F			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 64.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 46.9
 Intersection LOS: D
 Intersection Capacity Utilization 84.8%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 3: Andrew Johnson Highway & George Avenue



PM Peak 2036 - Existing
Lanes, Volumes, Timings

4: Andrew Johnson Highway & Odell Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	940	13	44	998	43	15	19	42	33	10	89
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.994			0.926			0.909	
Flt Protected	0.950			0.950				0.990			0.988	
Satd. Flow (prot)	1770	3532	0	1770	3518	0	0	1708	0	0	1673	0
Flt Permitted	0.100			0.121				0.849			0.906	
Satd. Flow (perm)	186	3532	0	225	3518	0	0	1464	0	0	1534	0
Satd. Flow (RTOR)		2			8			60			102	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%
Mid-Block Traffic (%)		20%			20%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	1387	0	64	1516	0	0	111	0	0	193	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	41.2	39.2		42.5	41.2			10.3			10.3	
Actuated g/C Ratio	0.61	0.58		0.63	0.61			0.15			0.15	
v/c Ratio	0.09	0.68		0.27	0.70			0.40			0.60	
Control Delay	5.5	13.0		7.4	12.5			20.9			23.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.5	13.0		7.4	12.5			20.9			23.9	
LOS	A	B		A	B			C			C	
Approach Delay		12.9			12.3			20.9			23.9	
Approach LOS		B			B			C			C	

Intersection Summary

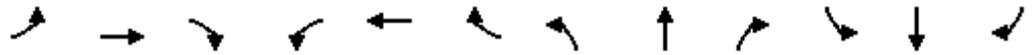
Cycle Length: 90
 Actuated Cycle Length: 67.5
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 13.5
 Intersection LOS: B
 Intersection Capacity Utilization 71.3%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 4: Andrew Johnson Highway & Odell Avenue



PM Peak 2036 - Existing
Lanes, Volumes, Timings

5: Andrew Johnson Highway & Hicks Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Volume (vph)	23	887	21	41	927	37	30	21	39	60	19	52
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.994			0.942			0.946	
Flt Protected	0.950			0.950				0.984			0.978	
Satd. Flow (prot)	1770	3525	0	1770	3518	0	0	1727	0	0	1723	0
Flt Permitted	0.104			0.109				0.849			0.813	
Satd. Flow (perm)	194	3525	0	203	3518	0	0	1490	0	0	1433	0
Satd. Flow (RTOR)		4			7			37			33	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%
Mid-Block Traffic (%)		20%			20%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1322	0	60	1403	0	0	132	0	0	191	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	57.0	0.0	10.0	57.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	39.2	37.1		40.4	39.1			17.7			17.7	
Actuated g/C Ratio	0.54	0.51		0.56	0.54			0.24			0.24	
v/c Ratio	0.17	0.73		0.30	0.74			0.34			0.51	
Control Delay	7.4	16.6		9.4	15.6			23.8			29.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.4	16.6		9.4	15.6			23.8			29.4	
LOS	A	B		A	B			C			C	
Approach Delay		16.4			15.4			23.8			29.4	
Approach LOS		B			B			C			C	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 72.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 68.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Andrew Johnson Highway & Hicks Road



PM Peak 2036 - Existing
Lanes, Volumes, Timings

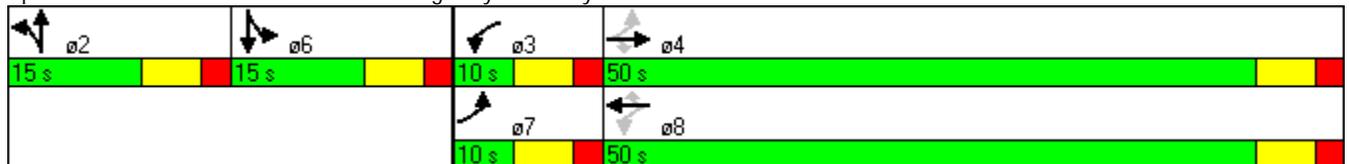
6: Andrew Johnson Highway & Chucky Pike

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	221	618	12	26	707	57	98	41	26	91	61	93
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.979			0.910	
Flt Protected	0.950			0.950				0.971		0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1771	0	1770	1695	0
Flt Permitted	0.150			0.236				0.971		0.950		
Satd. Flow (perm)	279	3539	1583	440	3539	1583	0	1771	0	1770	1695	0
Satd. Flow (RTOR)			8			83		8			67	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%	131%
Mid-Block Traffic (%)		20%			20%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	322	900	17	38	1029	83	0	241	0	132	224	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8						
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	15.0	15.0	0.0	15.0	15.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effect Green (s)	36.2	33.9	33.9	33.6	29.5	29.5		9.1		9.1	9.1	
Actuated g/C Ratio	0.48	0.45	0.45	0.44	0.39	0.39		0.12		0.12	0.12	
v/c Ratio	1.52	0.57	0.02	0.14	0.75	0.12		1.10		0.62	0.85	
Control Delay	274.6	17.8	9.8	9.7	23.4	3.9		125.9		48.7	55.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	274.6	17.8	9.8	9.7	23.4	3.9		125.9		48.7	55.3	
LOS	F	B	A	A	C	A		F		D	E	
Approach Delay		84.5			21.6			125.9			52.9	
Approach LOS		F			C			F			D	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 75.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.52
 Intersection Signal Delay: 59.8
 Intersection LOS: E
 Intersection Capacity Utilization 85.3%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



AM Peak 2016 - Option 4
Lanes, Volumes, Timings

6: Andrew Johnson Highway & Chucky Pike



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗	↖	↖	↗↗	↖	↖	↖		↖	↗	↖
Volume (vph)	88	523	6	17	556	16	79	45	25	33	28	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		50	75		175	100		0	125		250
Storage Lanes	2		1	1		1	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.946				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1762	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.739			0.711		
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1377	1762	0	1324	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			5			16			25			83
Link Speed (mph)		45			45			30				30
Link Distance (ft)		4599			1859			1324				902
Travel Time (s)		69.7			28.2			30.1				20.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mid-Block Traffic (%)		10%			10%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	523	6	17	556	16	79	70	0	33	28	83
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases			4			8	2			6		6
Total Split (s)	15.0	46.0	46.0	12.0	43.0	43.0	32.0	32.0	0.0	32.0	32.0	32.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Act Effect Green (s)	7.2	18.2	18.2	6.3	13.4	13.4	8.6	8.6		8.6	8.6	8.6
Actuated g/C Ratio	0.17	0.44	0.44	0.15	0.32	0.32	0.21	0.21		0.21	0.21	0.21
v/c Ratio	0.15	0.34	0.01	0.06	0.49	0.03	0.28	0.18		0.12	0.07	0.21
Control Delay	19.6	8.9	6.7	21.9	14.5	7.2	20.4	14.1		18.7	17.9	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	19.6	8.9	6.7	21.9	14.5	7.2	20.4	14.1		18.7	17.9	7.1
LOS	B	A	A	C	B	A	C	B		B	B	A
Approach Delay		10.4			14.5			17.4				11.9
Approach LOS		B			B			B				B

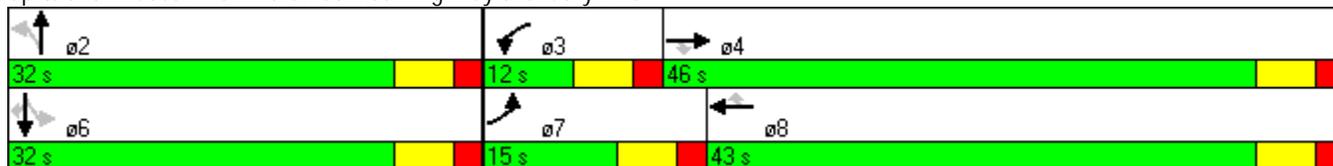
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	41.8
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	12.9
Intersection LOS:	B
Intersection Capacity Utilization:	44.7%
ICU Level of Service:	A
Analysis Period (min):	15

AM Peak 2016 - Option 4
Lanes, Volumes, Timings

6: Andrew Johnson Highway & Chucky Pike

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



PM Peak 2016 - Option 4
Lanes, Volumes, Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	231	640	13	27	747	60	102	43	27	95	64	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		50	75		175	100		0	125		250
Storage Lanes	2		1	1		1	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.942				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1755	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.715			0.711		
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1332	1755	0	1324	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			9			60		27				96
Link Speed (mph)		45			45			30				30
Link Distance (ft)		4599			1859			1324				902
Travel Time (s)		69.7			28.2			30.1				20.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mid-Block Traffic (%)		10%			10%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	640	13	27	747	60	102	70	0	95	64	96
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases			4			8	2			6		6
Total Split (s)	19.0	49.0	49.0	11.0	41.0	41.0	30.0	30.0	0.0	30.0	30.0	30.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Act Effect Green (s)	9.6	31.2	31.2	5.2	19.0	19.0	10.3	10.3		10.3	10.3	10.3
Actuated g/C Ratio	0.17	0.54	0.54	0.09	0.33	0.33	0.18	0.18		0.18	0.18	0.18
v/c Ratio	0.40	0.33	0.02	0.17	0.64	0.11	0.43	0.21		0.40	0.19	0.27
Control Delay	25.9	9.5	6.7	32.3	19.5	5.2	29.3	17.2		28.6	23.8	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	25.9	9.5	6.7	32.3	19.5	5.2	29.3	17.2		28.6	23.8	8.2
LOS	C	A	A	C	B	A	C	B		C	C	A
Approach Delay		13.7			18.9			24.4				19.7
Approach LOS		B			B			C				B

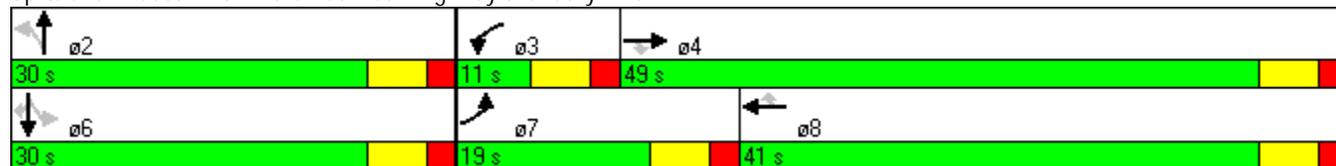
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	57.6
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	17.3
Intersection LOS:	B
Intersection Capacity Utilization	54.6%
ICU Level of Service	A
Analysis Period (min)	15

PM Peak 2016 - Option 4

Lanes, Volumes, Timings

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



AM Peak 2036 - Option 4

Lanes, Volumes, Timings



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↗	↕	↖	↖	↖		↖	↕	↖
Volume (vph)	108	646	8	21	687	19	98	56	31	41	35	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		50	75		175	100		0	125		250
Storage Lanes	2		1	1		1	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.947				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1764	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.734			0.701		
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1367	1764	0	1306	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			5			19			31			102
Link Speed (mph)		45			45			30				30
Link Distance (ft)		4599			1859			1324				902
Travel Time (s)		69.7			28.2			30.1				20.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mid-Block Traffic (%)		10%			10%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	646	8	21	687	19	98	87	0	41	35	102
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases			4			8	2			6		6
Total Split (s)	15.0	46.0	46.0	13.0	44.0	44.0	31.0	31.0	0.0	31.0	31.0	31.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Act Effect Green (s)	7.6	24.0	24.0	6.6	16.1	16.1	9.5	9.5		9.5	9.5	9.5
Actuated g/C Ratio	0.16	0.49	0.49	0.14	0.33	0.33	0.20	0.20		0.20	0.20	0.20
v/c Ratio	0.20	0.37	0.01	0.09	0.59	0.04	0.37	0.23		0.16	0.10	0.26
Control Delay	23.0	9.1	7.0	24.8	16.7	6.8	24.4	15.7		21.1	19.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	23.0	9.1	7.0	24.8	16.7	6.8	24.4	15.7		21.1	19.9	7.3
LOS	C	A	A	C	B	A	C	B		C	B	A
Approach Delay		11.0			16.7			20.3				13.0
Approach LOS		B			B			C				B

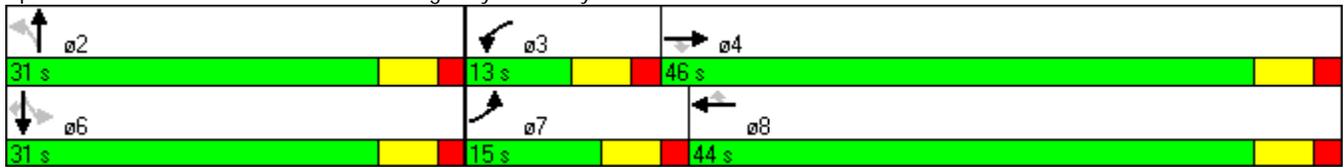
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	48.7
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	14.4
Intersection LOS:	B
Intersection Capacity Utilization:	49.4%
ICU Level of Service:	A
Analysis Period (min):	15

AM Peak 2036 - Option 4

Lanes, Volumes, Timings

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



PM Peak 2036 - Option 4
Lanes, Volumes, Timings

6: Andrew Johnson Highway & Chucky Pike

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	790	15	34	922	74	127	53	34	118	79	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		50	75		175	100		0	125		250
Storage Lanes	2		1	1		1	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.941				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1753	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.706			0.701		
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1315	1753	0	1306	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			8			74		34				119
Link Speed (mph)		45			45			30				30
Link Distance (ft)		4599			1859			1324				902
Travel Time (s)		69.7			28.2			30.1				20.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mid-Block Traffic (%)		10%			10%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	285	790	15	34	922	74	127	87	0	118	79	119
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases			4			8	2			6		6
Total Split (s)	18.0	50.0	50.0	10.0	42.0	42.0	30.0	30.0	0.0	30.0	30.0	30.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Act Effect Green (s)	10.5	37.9	37.9	4.2	24.5	24.5	12.1	12.1		12.1	12.1	12.1
Actuated g/C Ratio	0.16	0.58	0.58	0.06	0.37	0.37	0.18	0.18		0.18	0.18	0.18
v/c Ratio	0.52	0.39	0.02	0.30	0.70	0.12	0.52	0.25		0.49	0.23	0.31
Control Delay	31.6	9.7	6.9	42.5	21.1	4.6	34.8	18.9		33.8	26.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	31.6	9.7	6.9	42.5	21.1	4.6	34.8	18.9		33.8	26.7	8.2
LOS	C	A	A	D	C	A	C	B		C	C	A
Approach Delay		15.4			20.6			28.3				22.3
Approach LOS		B			C			C				C

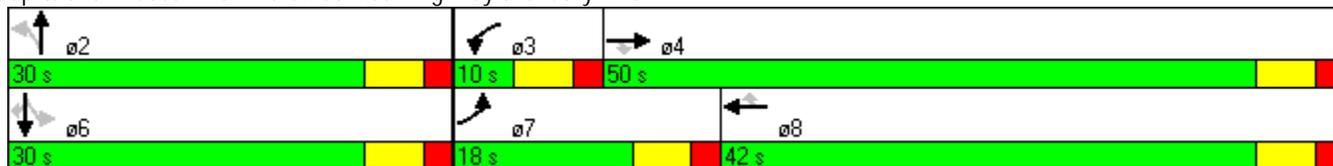
Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	65.8
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	19.3
Intersection LOS:	B
Intersection Capacity Utilization:	62.3%
ICU Level of Service:	B
Analysis Period (min):	15

PM Peak 2036 - Option 4
 Lanes, Volumes, Timings

6: Andrew Johnson Highway & Chucky Pike

Splits and Phases: 6: Andrew Johnson Highway & Chucky Pike



APPENDIX G

Early Environmental Screening (EES)

EES Report

PIN 115652.00
1,000 Foot Corridor

Option: 115652_4501V01
Version Date: February 28, 2012
Created by: JONATHAN ROGERS

Cemetery Sites & Cemetery Properties

Cemeteries	None were found
Cemetery Property	None were found

Institutions & Sensitive Community Populations

Institutions	None were found
--------------	-----------------

Populations:

No population present	Present
65 & older populations	None were found
Disability populations	None were found
Households without a vehicle	None were found
Minority populations 24%	None were found
Linguistically isolated populations	Present
Populations below poverty-State average-13%	Present
Populations below poverty-State average-27%	Present

Bat

Myotis grisescens

Total= USESA SPROT

Railroads

Present

EES Report

PIN 115652.00
2,000 Foot Corridor

Option: 115652_4501V01
Version Date: February 28, 2012
Created by: JONATHAN ROGERS

National Register Sites		None were found
Superfund Sites		None were found
Pyritic Rock	Classification	<u>Total</u> =
Pyritic Rock		None were found
TWRA Lakes & Other Public Lands		
TWRA Lakes		None were found
Other Public Lands		None were found

EES Report

PIN 115652.00
4,000 Foot Corridor

Option: 115652_4501V01
Version Date: February 28, 2012
Created by: JONATHAN ROGERS

Terrestrial Species None were found

TDEC Conservation Sites & TDEC Scenic Waterways

TDEC Conservation Sites None were found

TDEC Scenic Waterways None were found

Large Wetland Impacts

Total Acreage= 18.01

PEM1C	0.90	acres
PEM1F	0.18	acres
PFO1C	3.88	acres
PFO1C	11.45	acres
PUBHh	0.16	acres
PUBHh	1.09	acres
PUBHh	0.33	acres

Tennessee Natural Areas Program None were found

Wildlife Management Areas None were found

EES Report

PIN 115652.00

Option: 115652_4501V01

10,000 Foot Corridor

Version Date: February 28, 2012

Created by: JONATHAN ROGERS

Aquatic Species

None were found

Caves

None were found