



**AGENDA
CITY OF HARRISONVILLE
PUBLIC WORKS COMMITTEE
REGULAR MEETING
CITY HALL
OCTOBER 2, 2014
6:00 PM**

- I. Call to Order**
 - A. Roll Call**
- II. Approval of Minutes**
 - A. Public Works Committee - Regular Meeting - Sep 4, 2014 6:00 PM**
- III. Agenda Items**
 - A. Purchase of walk behind street saw for the Street Department**
 - B. TRAFFIC ENGINEERING ASSISTANCE PROGRAM**
 - C. MASTER PLAN & HYDRAULIC MODEL**
- IV. Stormwater Issues**
- V. Public Works Project Updates**
- VI. Airport Reports**
 - A. SEPTEMBER AIRPORT REPORT**
- VII. General Discussion**
- VIII. Adjourn**

This meeting will be open to the public.

Posted on City Hall Bulletin Board this 25th day of September 2014

Sheryl Stanley, Deputy City Clerk



DRAFT
MINUTES
CITY OF HARRISONVILLE
PUBLIC WORKS COMMITTEE
REGULAR MEETING
CITY HALL
SEPTEMBER 4, 2014
6:00 PM

I. Call to Order

The meeting was called to order at 6:00 PM by Chair Ivan Stull

Attendee Name	Title	Status	Arrived
Kevin Wood	Member	Present	
Doug Meyer	Alternate	Absent	
Morris Coburn	Member	Present	
David Dickerson	Member	Present	
Ivan Stull	Chair	Present	
Bret Brown	Member	Present	

Others present: City Administrator Keith Moody, Finance Director Mike Tholen, Assistant Public Works Director Eric Patterson, Street Superintendent Rodney Jacobs, Systems Administrator Jeremy Smith, Electric Department Director Keith Thomas, and Airport Manager James Green.

II. Approval of Minutes

- A. Public Works Committee - Regular Meeting - Aug 7, 2014 6:00 PM** Accepted
Minutes were approved.

III. Agenda Items

- A. POWER AND WATER BUILDING** Recommended

Mr. Patterson stated staff needed direction on whether to keep the power and water building or demo the building. Mr. Patterson recommended the committee to really look at the possible liability the City could incur if the building was leased or sold. Mr. Patterson introduced Jill Biesma, Environmental Advisors & Engineers who was retained to assist in disposing of the barrels, liquid and possible sludge from the building.

Ms. Biesma reviewed the findings from the Phase I effort and stated it was their recommendation that the City keep the building and demolish it due to the fact that the liability for the City could be large. Ms. Biesma explained that if the City was to sell the building the buyer would likely be required to have a Phase I Environmental Study done. If the study found anything part of if not all of the cost would be the responsibility of the

City. It was also noted that it would cost the City in excess of \$250,000 to bring the building to up to code.

There was a lot of discussion regarding the City leasing the building and having an agreement with the lessee to protect the City from any liability due to containments. It was noted that even having an agreement would not release the City from the liability but it would be discussed with the City's attorney. After a lengthy discussion regarding measurability of the liability, the cost of bringing the building up to code, that the cost to replace the roof would be approximately \$250,000 it was decided that there needed to be an estimate of the cost to dispose of the liquids. The recommendation for staff to bring before the Board an agreement with Environmental Advisors & Engineers of an estimated cost to test the liquids.

Alderman Brown left at 6:35 PM

B. Fiber Optics Update

Director Thomas updated the committee on the fiber optic project and showed on a map how the fiber optic cable could encompass the City facilities. Mr. Thomas reported that he and Systems Administrator Smith met with Springnet a division of the City of Springfield, regarding their fiber optics project. There was discussion regarding the cost and that we won't have hard numbers until it's bid out. There was no action to be taken.

C. Water Tower Use Recommended

Mr. Patterson reported the City has been asked by MOREnet, a company associated with the University of Missouri, for permission to attach equipment to the top of the water tower to provide high speed access internet to rural schools. Dave Olson MOREnet representative explained the service provided to the schools is a cost recovery situation for MOREnet, there is no profit made. Mr. Olson stated if permission is granted this would connect the Harrisonville Public Schools to Cass Midway School and believes it would benefit the Briarwood School and the Harrisonville Cass County Library. Mr. Olson explained there is only one entity that charges them to attach equipment to their water tower and the cost is \$100 monthly, it was noted there that trading a membership for access to the water tower is a possibility. Mr. Olson stated they are a non-for-profit company and have no intention in providing commercial or residential services. It was approved by the committee for staff to continue discussions with MOREnet and the schools to determine what the City can do to assist in coming up with an agreement that everyone is happy with. It was also noted to have the City Attorney review the agreement.

D. SOURCE WATER PROTECTION RCPP GRANT Recommended

Mr. Patterson reported that the Missouri Department of Natural Resources had provided the City a \$10,000 grant to outline a Source Water Protection Plan for Lake Harrisonville and the next phase is the implementation of the changes. Mr. Patterson explained the next step is applying for a Regional Conservation Partnership Program Grant and that the City would need the assistance from Dennis Haag, Burns & McDonnell with the grant application. The cost for Burns & McDonnell's services would approximately be \$8,000. It was discussed that the \$8,000 was not budget for in 2014 but a line item could be reduced to cover the cost. The committee made the recommendation for Board approval with detail of which line item in the budget would need to be reduced to cover the needed cost.

E. SEPTAGE DUMPING PROHIBITED Recommended

Mr. Patterson reported that the City currently allows septic haulers to dump waste at the waste water treatment plant (WWTP) at no cost with the understanding that the septage is coming from residents and/or businesses inside city limits. Mr. Patterson explained there is no code or ordinance to manage the dumping of septage and draft of recommended changes to the code was included in their packets. There was discussion

that septic haulers could be permitted to dump septage for a charge based on the COD level of the septage and permission of the Public Works Director. It was the recommendation of the committee to forward the amendment to the code to the Board for approval.

F. PECULIAR SLUDGE AGREEMENT Recommended

Mr. Patterson reported that the City of Peculiar transports their sludge to Little Blue at a cost of approximately \$70,000 a year which includes the transportation cost and the charges from Little Blue.

The City has been approached by the City of Peculiar asking if we were interested in accepting Peculiar's sludge. After some research it has been determined there is space available in the WWTP capacity, the City would need to purchase equipment costing approximately \$10,000 to allow us to measure the pounds of COD. Based on charging \$0.25/lbs for 80,000 lbs of COD a year it would generate about \$20,000 a year. The second year there would an increase to \$0.29/lbs which would generate about \$23,200 a year. The committee recommended the agreement be forwarded to the Board for approval at a five year agreement instead of two.

IV. Stormwater Issues

No public was present and no concerns were raised.

V. Public Works Project Updates

A. Public Works Update September 2014

Eric asked if there were any questions and there were none.

VI. Airport Reports

A. AIRPORT REPORT

Mr. Green reported he is working with consultants to refigure the airport hangar taxi lane project. Updated the committee on the progress of airport open house, four pilots have committed to being there, local civil air to assist, there will be a pancake breakfast and lunch will be furnished.

VII. General Discussion

Alderman Coburn discussed Franklin Patterson's Eagle Scout Project of stenciling where storm water drains are located in Harrisonville and that the Missouri Department of Natural Resources is providing the stencils. These markings will be loaded into the City's GIS system. Mr. Patterson noted this is one of the requirements for the MS4 Permit.

VIII. Adjourn

Mayor Wood moved to adjourn. Alderman Dickerson seconded the motion and it was approved by a voice vote.

Meeting adjourned at 7:39 PM.

Regular Meeting

Thursday, September 4, 2014

6:00 PM

Kevin Wood, Mayor & Ex-Officio
Chairman of the Board of Aldermen

ATTEST:

Kim Hubbard, City Clerk

Minutes Acceptance: Minutes of Sep 4, 2014 6:00 PM (Approval of Minutes)



TO: Public Works Committee
FROM: Rodney Jacobs, Director
DATE: September 15, 2014
SUBJECT: Purchase of walk behind street saw for the Street Department

Type of Item: *Approval*

Type of Item: *Administrative*

Issue:

Approval to purchase a replacement walk behind street saw for the Street Department.

Summary Recommendation:

The Street Department is requesting approval for the purchase of a Husqvarna FS5000D street saw from United Rentals for \$19,216 to replace an existing unit, a Target Pro35 purchased in 2001.

Options:

Staff has received bids from United Rentals, Hertz Rental and Fastenal for a new replacement street saw. Staff has also reviewed used units from United Rentals with a limited warranty.

The bids are:

United Rentals.....2014 Husqvarna FS5000D with 30 inch blade guard	\$19,216.00	2
year warranty		
Hertz Equipment Rental...2014 Husqvarna FS5000D with 30 inch blade guard	\$19,383.00	2
year warranty		
Fastenal2014 Husqvarna FS5000D with 30 inch blade guard	\$26,629.06	2
year warranty		
Fastenal2014 Norton Clipper C4430SD 30 inch blade guard	\$24,046.70	1
year warranty		
United Rentals.....Used.2010 Husqvarna FS6600D with 30 inch blade guard	\$16,906.00	30
day limited warranty		
United Rentals.....Used 2011 Husqvarna FS6600D with 30 inch blade guard	\$19,714.00	30
day limited warranty		
Diamond Products.....2014 Core-Cut CC3700 with 30 inch blade guard		no response to
inquiry		

Recommendation:

Major considerations in evaluating a street saw were; service, price, and reliability. Brands used in this area for street saws are: Husqvarna, Norton Clipper, and Core-Cut, with Husqvarna being the major brand due to service and training. While Norton Clipper has a tech center in Nixa Missouri, and Core Cut has a representative in Blue Springs they offer only limited service. A used unit was considered, but as saws of this type are prone to vibration and dust issues, the lack of warranty and price considerations made it a questionable investment. It is noticeable that United Rental's price is over seven thousand dollars cheaper than Fastenal's price for the same saw. This is due to United Rentals being partnered with National Joint Powers Alliance (NJPA) which serves as a municipal contracting agency.

It is Staff's recommendation to purchase a 2014 Husqvarna FS 5000D with a 30 inch blade guard from United Rentals in Belton Missouri at the cost of \$19,216 which is within budget.

Thank you,
Rodney Jacobs
Superintendent of Streets

A. Action Item (ID # 1555)

Purchase of walk behind street saw for the Street Department



STAFF REPORT

TO: Public Works Committee
FROM: Jerry Gibbs, Director
DATE: September 16, 2014
SUBJECT: TRAFFIC ENGINEERING ASSISTANCE PROGRAM

Type of Item: Report

BACKGROUND- The city was approved for a project through the MODOT's Traffic Engineering Assistance Program (TEAP). TEAP is 80% funded by MODOT and 20% by local match. Projects are limited in scope and cannot exceed \$8,000. The intersection chosen was South and Commercial Streets. Numerous accidents have occurred in the last five years westbound on South Street as the vehicle enters onto Commercial Street. The traffic study by Transystems reviewed volumes, speed, sight distance and other factors that may be contributing to the accident rate. The final report is attached to the staff report.

ISSUE - The findings showed vehicles were stopping at the STOP sign/STOP bar and proceeding into traffic. This does not provide adequate sight distance to react to an oncoming car heading north on Commercial Street. The recommended solution was to relocate the stop bar closer to Commercial Street. The recommendations also suggest intersection ahead signs to warn northbound traffic.

The Street Department will schedule the changes upon acceptance by the Public Works Committee of the findings. Staff is available to respond to any questions.

MODOT provided the following announcement: *Applications for funding are now available from 9/17/2014 through 11/14/2014. The Missouri Department of Transportation is seeking projects that could be funded with Traffic Engineering Assistance Program (TEAP) funds. The Traffic Engineering Assistance Program (TEAP) allows local public agencies (LPA) to receive engineering assistance for studying traffic engineering problems. LPAs facing a traffic safety or operational problem can utilize the LPA On-Call Consultant List to perform a traffic study. Typical traffic engineering related projects include: corridor safety and/or operational analysis, intersection(s) safety and/or operational analysis, speed limit review, sign inventory, pedestrian/bike route analysis, parking issues, and other traffic studies, etc.*

Local public agencies are reimbursed for eligible project costs at a rate of 80 percent with the local agency providing a 20-percent match. Funds administered by MoDOT will provide 80 percent of the TEAP project costs, up to \$8,000 per project. If the total cost is greater than \$10,000, the local agency can pay more than 20 percent to complete the

TEAP project, if desired. Eligible projects must be able to be completed by fall of 2015.

Applications are due November 14, 2014 to [MoDOT](#) with selected projects to be announced in January 2015.

B. Discussion Item (ID # 1558)

TRAFFIC ENGINEERING ASSISTANCE PROGRAM

Attachments:

Harrisonville TEAP Final Report 9-14 (PDF)

MISSOURI TRAFFIC ENGINEERING ASSISTANCE PROGRAM

INTERSECTION ANALYSIS Commercial Street and South Street

Prepared for
CITY OF HARRISONVILLE

By



August 2014

**TranSystems**

2400 Pershing Road
Suite 400
Kansas City, MO 64108
Tel 816 329 8600
Fax 816 329 8601

www.transystems.com

August 15, 2014

Mr. Jerry Gibbs
Director of Public Works
300 E. Pearl Street
Harrisonville, MO 64701

**Re: Intersection Analysis
Commercial Street and South Street**

Dear Mr. Gibbs:

In accordance with your request, TranSystems Corporation has prepared the following analysis for the intersection of Commercial Street and South Street in Harrisonville, Missouri. In general, the focus of the analysis was to review the existing conditions at this location and determine the need for safety improvements. Our data collection efforts, results, and recommendations are summarized in the attached report. We trust that this study has adequately addressed the concerns of the city.

We have appreciated this opportunity to be of service to the Missouri Department of Transportation and the City of Harrisonville. We will be available to review this study with you at your convenience.

Sincerely,

TranSystems

By: Michael Hare
Michael Hare, EI

By: Jeffrey J. Wilke
Jeffrey J. Wilke, PE, PTOE

JJW:MTH:mth:P101140070

Attachment: Harrisonville TEAP Final Report 9-14 (1558 : TRAFFIC ENGINEERING ASSISTANCE PROGRAM)

Introduction

TranSystems has prepared the following analysis for the intersection of Commercial Street and South Street in Harrisonville, Missouri. A map showing the location of the study intersection and surrounding area is included on Figure 1. This study was requested by Mr. Jerry Gibbs, P.E., Director of Public Works, under the Traffic Engineering Assistance Program (TEAP), administered by the Missouri Department of Transportation (MoDOT).

Study Purpose

The study intersection is comprised of Commercial Street, a primary north/south arterial route in the city which provides access to I-49, and South Street, an east/west roadway. The intersection currently operates under stop control on South Street with uninterrupted flow allowed on Commercial Street. The city is concerned about safety at this two-way stop controlled intersection as a number of crashes have occurred and sight distance for westbound traffic is somewhat limited due to the skewed intersection geometry. Given these concerns, the city would like to review the existing intersection conditions in order to determine potential safety enhancements to address observed deficiencies. Improvement options could include modifications to the existing intersection control (e.g. multi-way stop or traffic signal control); modifications to the existing signing and pavement markings; parking restrictions; or, the use of other traffic control devices such as flashing beacons. Geometric modifications may also be considered, provided impacts on adjacent properties are minimized.

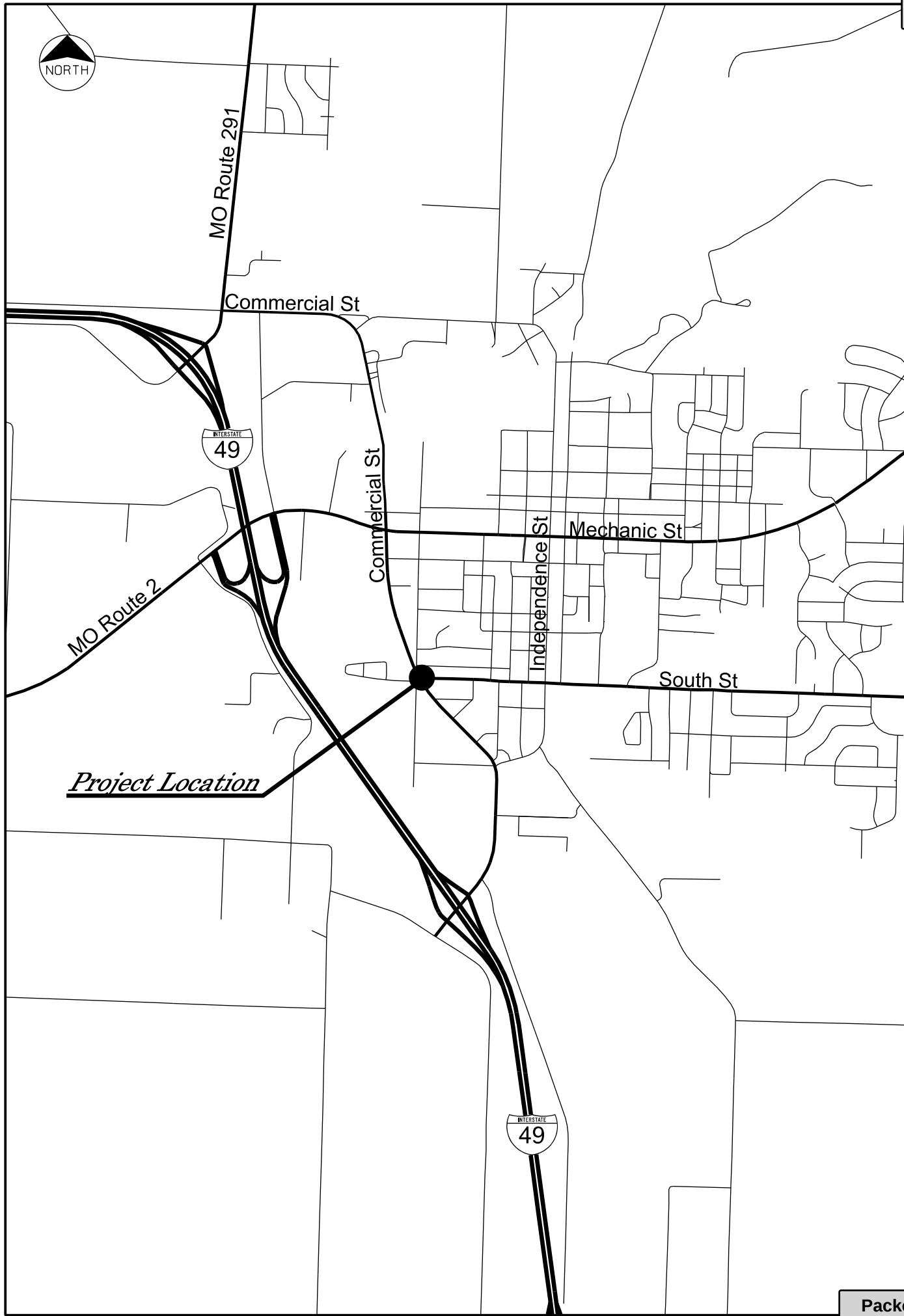
Scope of Study

The following program was developed to complete the analysis:

1. Conduct 24-hour machine traffic volume counts for all approaches to the study intersection.
2. Conduct manual traffic and pedestrian volume counts at the study intersection during a typical morning and afternoon peak period. The count times will encompass typical school peak periods as well.
3. Obtain vehicle speeds along each Commercial Street approach to the study intersection.
4. Review existing intersection sight distances for drivers on the South Street approaches looking along the uncontrolled Commercial Street approaches. The evaluation will be based on criteria in *A Policy on Geometric Design of Highways and Streets* (2011 Edition, also referred to as the AASHTO Green Book) published by the American Association of State Highway and Transportation Officials (AASHTO).
5. Review recent crash experience for the study intersection and evaluate the existing safety conditions using procedures in the *Highway Safety Manual* (HSM) published by the American Association of State Highway and Transportation Officials (AASHTO).
6. Analyze the data that were collected to address identified deficiencies at the study intersection. Items to consider could include modifications to the existing intersection control (e.g. multi-way stop or traffic signal control); modifications to the existing signing and pavement markings; parking restrictions; or, the use of other traffic control devices such as flashing beacons. Geometric modifications may also be considered, provided impacts on adjacent properties are minimized.
7. Prepare a report documenting our data collection, analysis, and recommendations.

Data Collection

Data collection for this study and the methods used in its collection conform to current *Manual on Uniform Traffic Control Devices* (MUTCD) guidelines and recognized traffic engineering data collection procedures of the Institute of Transportation Engineers (ITE). The MUTCD is the Federal Highway Administration (FHWA) reference adopted as the standard governing the use of traffic control devices in the State of Missouri.



Intersection Characteristics

A sketch of the study intersection on an aerial photo which includes the existing signing and pavement markings along each roadway is included in the Appendix (Figure A-1). Some pertinent characteristics of the intersection recorded at the time of the site investigation are listed below:

- Commercial Street is a two-lane arterial roadway with a center two-way left-turn lane and raised curbs. South Street is a two-lane local roadway with raised curbs. The eastbound and westbound South Street intersection approaches are slightly offset at Commercial Street; therefore, drivers must cross Commercial Street at a slight angle. Typical section widths measured between the edges of travelway are shown on Figure A-1 in the Appendix.
- The vertical alignments of both streets approaching the intersection can generally be characterized as level. South Street intersects Commercial Street on a horizontal curve, and the west leg of South Street curves slightly prior to intersecting Commercial Street at approximately 90 degrees. The east leg of South Street intersects Commercial Street at approximately 60 degrees.
- The existing pavement markings are shown on Figure A-1 and were found to be rather worn and faded along Commercial Street and in fair condition along South Street. Centerline and edge line markings are in place along the Commercial Street intersection approaches. Centerline, lane line, and stop line markings are in place along the westbound South Street intersection approach. The stop lines are staggered which allow right-turning vehicles to pull up farther to see around vehicles in the adjacent lane. Due to the skew of the intersection, the stop line locations are fairly far back from Commercial Street (25 feet back from the edge of traveled way for the right-turn stop line and 33 feet back from the edge of traveled way for the through/left-turn stop line). The placement of the through/left-turn stop line conflicts with guidance in the MUTCD that states stop lines should not be placed more than 30 feet or less than four (4) feet from the nearest edge of the intersecting traveled way. At the time of our site visit (April 2014), no pavement markings were visible along the eastbound South Street intersection approach.
- Signage in the vicinity of the intersection is shown on Figure A-1 in the Appendix, and in general was found to be in good condition. Stop signs are in place on both South Street intersection approaches. On South Street, there is a speed limit sign posted roughly 275 feet east of the intersection indicating a 25 m.p.h. speed limit for eastbound traffic. There are no speed limit signs posted along Commercial Street in the immediate vicinity of the intersection, but speed limit signs are present at other locations along Commercial Street indicating a 35 m.p.h. speed limit for northbound and southbound traffic.
- Land use in the vicinity of the intersection is mostly commercial, and Harrisonville Christian School is located in the northwest quadrant of the intersection.

Machine Traffic Volume Counts

Machine traffic volume counters were placed on all approaches to the study intersection to measure the traffic volume entering the intersection on a typical weekday. These data were collected for a representative 24-hour period between Monday, April 21, 2014, and Tuesday, April 22, 2014. The counts were tabulated in 15-minute intervals and are included in the Appendix (Pages A-2 and A-3). The 24-hour approach volumes recorded for the study intersection are summarized in Table 1.

Table 1
24-Hour Approach Volumes

Intersection Approach	Total Volume
Northbound on Commercial Street	2,997
Southbound on Commercial Street	5,378
Eastbound on South Street	768
Westbound on South Street	2,268
TOTAL	11,411

Manual Traffic Volume Counts

TranSystems conducted manual traffic volume counts at the study intersection during typical weekday morning and afternoon peak periods. The data was collected on Monday, April 21, 2014, from 2:30 to 6:00 p.m., and on Tuesday, April 22, 2014, from 7:00 to 9:00 a.m. The counts indicated the current turning movement patterns at the intersection as well as the peak hours. The intersection peak hours occurred between 7:15 and 8:15 a.m., and 4:30 and 5:30 p.m. The turning movement volumes recorded during each of the intersection peak hours are shown in the Appendix (Figure A-4). Pertinent observations recorded at the time of our counts are summarized below:

- In general, most westbound drivers stopped beyond the marked stop lines in order to see oncoming northbound traffic along Commercial Street. Furthermore, if a vehicle was present in the through/left-turn lane, most vehicles in the right turn lane would inch forward to see around the adjacent vehicle.
- During the school dismissal period, we observed a longer and more sustained vehicle queue on the eastbound approach to the intersection. This queue continued back through the White Oak Street and Oakland Street intersection and into the school parking lot.
- One pedestrian crossed Commercial Street just north of the study intersection during school dismissal time.

Spot Speed Studies

A spot speed study is a typical method used to determine vehicle speed characteristics along a particular roadway segment. One of the more important statistics obtained from a spot speed study is the 85th percentile speed. This statistic represents the speed at which 85 percent of the observed vehicles are traveling at or below and is generally regarded as the speed considered reasonable and appropriate by most drivers. For the uncontrolled Commercial Street approaches, spot speed studies were conducted using a hand-held radar gun. The results of the studies for data collected on Tuesday, April 22, 2014, are summarized below in Table 2. Relative frequency distributions for these data have also been prepared and are included in the Appendix (Pages A-5 and A-6).

Table 2
Spot Speed Study Results

Intersection Approach	Number of Observations	85th Percentile Speed, m.p.h.
Northbound	103	33.5
Southbound	108	35.2

The results in Table 2 indicate good motorist compliance with the existing 35 m.p.h. posted speed limit for the northbound and southbound Commercial Street intersection approaches. These findings suggest that analysis of the intersection conditions as well as improvement measures for the study location should be evaluated based on the existing posted speed limit.

Intersection Sight Distance

Intersection sight distance is provided at intersections to allow the drivers of stopped vehicles to depart from their approach and enter or cross the major road. Intersection sight distances along Commercial Street for the South Street approaches were measured in accordance with AASHTO Green Book criteria. The intersection sight distances measured for each approach are shown on the next page in Table 3.

The data in Table 3 indicates that the measured intersection sight distances are above the recommended AASHTO values (reference: Chapter 9 of the AASHTO Green Book) for eastbound South Street motorists when looking north and south along Commercial Street and westbound South Street motorists when looking north along Commercial Street. However, the measured sight distance when looking south along Commercial Street from the westbound South Street approach is less than AASHTO's recommended minimum values. At the time of our site visit, there were numerous parked vehicles in the used car

lot located in the southeast quadrant of the intersection. These parked vehicles along with the horizontal curvature of Commercial Street restrict the sight distance for westbound drivers at the study intersection.

Table 3
Intersection Sight Distances

	Approach	Direction Looking Along Commercial Street	Approximate Sight Distance (feet)	
			Measured	Recommended *
South Street	Eastbound	North	>1,000	365 – 415
		South	>1,000	365 – 415
	Westbound	North	490	365 – 415
		South	300	365 – 415

* Sight distance based on AASHTO criteria for an approach speed of 35 m.p.h. along Commercial Street (lower value is the sight distance for a right-turn or crossing maneuver while the upper limit is the sight distance for a left-turn maneuver).

It is important to note that the sight distances shown in Table 3 were measured from a position where the driver is located 14.5 feet from the edge of traveled way along Commercial Street in accordance with AASHTO criteria. For the westbound approach, this results in a driver location that is beyond the existing stop lines, 7 feet for right-turn vehicles and 21 feet for through/left-turn vehicles. If drivers stop farther from Commercial Street, such as at the existing stop lines, sight distances will be less than those identified in Table 3.

These findings indicate the importance of the location where westbound motorists stop at this intersection, particularly since this affects the time required for a vehicle to enter or cross Commercial Street. At any stop-controlled intersection, motorists approaching the STOP sign generally look for visual clues regarding the appropriate stopping point. Drivers typically pull forward as close to the uncontrolled road as possible without encroaching on the intersection. AASHTO notes that field observations of vehicle stopping positions found that, where necessary, drivers will stop with the front of their vehicle 6.5 feet or less from the edge of the major-road traveled way. At skewed intersections, drivers may not stop this close to the intersecting road given the larger corner radii and the STOP sign location which is correctly located further back from the intersection in order to be adequately visible for approaching traffic. For locations such as this, placement of stop lines beyond the STOP sign is permissible in the MUTCD, and it would be beneficial in identifying the appropriate stopping point for drivers. In reviewing the current stop line locations, they are farther back than locations based on AASHTO criteria; however, stop lines must be located to avoid the potential for conflicts between a vehicle stopped on South Street and left-turn movements off Commercial Street. In considering all factors, it appears that the location of both stop lines could be moved closer to the edge of travelway on Commercial Street without encroaching on the left-turn vehicle path.

Crash Experience

Crash records for the Commercial Street and South Street intersection were requested from the city for the time period between January 1, 2009, and April 1, 2014. Using the crash reports that were provided, a collision diagram was prepared for the study intersection to identify any crash patterns or tendencies that might exist. The diagram has been included in the Appendix (Figure A-7). Some general statistics and/or patterns identified from the diagram or crash records are summarized below:

- As shown on Figure A-7, 13 intersection-related crashes were reported at this location during the 63-month analysis period. This crash total corresponds to a frequency of 2.5 crashes per year.
- The intersection crash types included 11 angle crashes, one (1) left-turn crash, and one (1) sideswipe crash. Some form of personal injury occurred in three (3) of the crashes, all of which were angle collisions. No fatalities occurred during the analysis period.
- There is a pattern of angle crashes at this intersection and most (8 of 11) involved a southbound driver on Commercial Street. All of the reports indicated that the drivers on South Street initially stopped at the intersection before attempting to enter or cross Commercial Street. Unfortunately, all the reports, except for two, offer little information that might explain

why drivers failed to yield to traffic on Commercial Street. One report indicated that a westbound driver did not see the vehicle traveling southbound on Commercial Street due to a truck on the opposite side of the road making a left-turn movement onto Commercial Street. Another report indicated that an eastbound driver did not see the northbound vehicle due to another eastbound vehicle that was to the right. This is not an uncommon situation on a wide-throat intersection approach to a stop controlled intersection given the potential for side-by-side traffic.

- Most of the 13 crashes occurred during daylight hours with no apparent pattern by day of week. Seven (7) of the crashes occurred during the afternoon between the hours of 12:00 p.m. and 5:00 p.m. Adverse weather conditions, driving under the influence of alcohol or drugs, vehicle malfunction, or other such factors were not identified as contributing circumstances in any of these crashes. Somewhat notable is that ten (10) of the 13 crashes involved either a younger driver or older driver (less than age 25 and above age 60); drivers who may have difficulty judging an adequate gap in the Commercial Street traffic stream due to the skew of the intersection.

The above information indicates that the Commercial Street and South Street intersection has a moderate crash frequency. Of primary concern is that angle collisions are the predominant crash type at this location, which tend to be more severe than other crash types (11 of the 13 crashes were angle collisions). These findings indicate that some intersection modifications may be appropriate to mitigate this crash pattern.

Analysis

Highway Safety Manual Analysis

To further evaluate the existing safety characteristics of the Commercial Street and South Street intersection, TranSystems used procedures outlined in the HSM to determine the predicted average crash frequency (crashes per year) for this location. Results from the HSM analysis for the study intersection have been included in the Appendix (Page A-8), and they indicate a predicted average crash frequency of 1.0 crash per year for an urban or suburban intersection with similar characteristics. Based on these findings, the Commercial Street and South Street intersection is of concern since the actual crash frequency of 2.5 crashes per year is higher than the HSM predicted crash frequency of 1.0 crashes per year.

To address the existing safety and operational deficiencies documented for the Commercial Street and South Street intersection, we would recommend that the city implement some improvements to enhance operations and safety at the study intersection. The following sections analyze various improvement considerations.

Traffic Signal Control

The use of traffic signal control can be an effective means of assigning right-of-way to various movements at an intersection, thereby providing for the orderly movement of traffic. These devices can increase the traffic-handling capacity of an intersection while also reducing the frequency and severity of certain types of crashes, especially angle collisions. However, installing a traffic signal without proper justification can result in disadvantages as well, such as higher overall intersection delay, higher vehicle emissions, noncompliance of control, increased use of other routes to avoid the signal, and an increase in the frequency of other types of crashes, particularly rear-end collisions.

The most current version of the MUTCD outlines nine warrants that justify the need for a traffic signal. It also states that the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal. The nine warrants are:

- | | |
|--|--|
| • Warrant 1: Eight-Hour Vehicular Volume | • Warrant 6: Coordinated Signal System |
| • Warrant 2: Four-Hour Vehicular Volume | • Warrant 7: Crash Experience |
| • Warrant 3: Peak Hour | • Warrant 8: Roadway Network |
| • Warrant 4: Pedestrian Volume | • Warrant 9: Intersection Near an At-Grade Rail Crossing |
| • Warrant 5: School Crossing | |

In evaluating each of these MUTCD warrants, the results indicate that the study intersection does not fully satisfy the requirements of any warrant at this time. Completed worksheets for the traffic signal volume warrants (Warrants 1, 2, and 3)

have been included in the Appendix (Pages A-9 and A-10). None of the eight hours with the highest traffic volume totals meet the traffic volume thresholds of Warrant 1. To meet the criteria, traffic volumes along South Street would need to increase by roughly 10 – 20 percent, which is unlikely in the near future given the mature development of the area surrounding the intersection. Likewise, the highest peak hour traffic volume totals do not meet the thresholds for Warrants 2 and 3. No pedestrians were observed crossing the intersection during the manual traffic volume counts, indicating that Warrants 4 and 5 do not apply at this location. Warrants 6, 8, and 9 also do not apply at this intersection. Warrant 7 applies, but the crash frequency at this intersection does not satisfy the minimum threshold identified in the MUTCD (five or more reported crashes in a 12-month period that are susceptible to correction by a traffic control signal).

Multi-way Stop Control

Since traffic signal control is not warranted, we also considered whether multi-way stop control should be installed. This form of control can be useful as a safety measure at intersections where certain conditions exist, particularly where the volume of traffic on the intersecting roads is approximately equal. However, a multi-way stop is the most restrictive form of intersection control since all vehicles at the intersection are required to stop, regardless of the situation, which has an adverse impact on efficiency and fuel consumption. This form of control would likely be beneficial in addressing the existing angle crash pattern at this location, but an important consideration is the current traffic volumes along Commercial Street and South Street, which are highly imbalanced at present. The traffic volumes on Commercial Street are more than double those on South Street (roughly 70 percent of the total intersection traffic is on Commercial Street). Given this imbalance, we would not recommend installation of multi-way stop control at this intersection at this time.

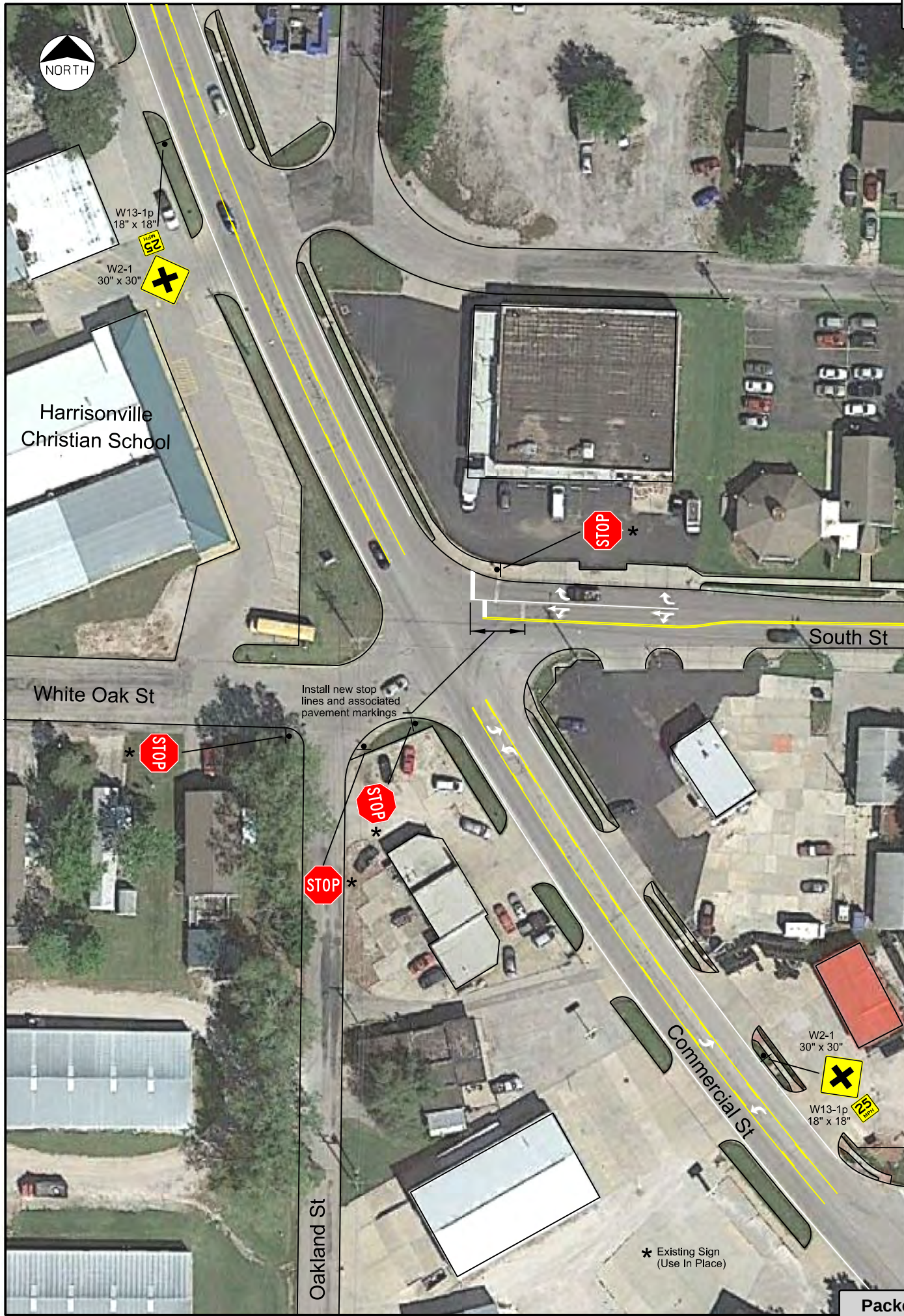
Other Recommendations

The use of traffic signal control or multi-way stop control has not been recommended for the study intersection at this time; therefore, the existing two-way stop control should remain in place. To address the observed sight distance deficiency and in an effort to help reduce the number of crashes occurring at the intersection, some modifications to the existing pavement markings are recommended. These modifications have been shown on Figure 2 and are summarized below:

- Remove the existing stop lines on the westbound South Street approach, and install new 24-inch wide stop lines on this intersection approach at the appropriate stopping point. The new stop line locations were established in accordance with AASHTO criteria, and they are based on the typical stopping location of a vehicle. For each approach lane, the stop lines should be installed a distance of 10 feet back from the extended edge of travel on Commercial Street measured down the middle of each westbound lane. These locations are closer to Commercial Street than the existing STOP sign, which is permissible in the MUTCD and not uncommon at skewed intersections with large corner radii. The new stop line location for the through/left-turn lane will not encroach on the turning paths for left-turn movements from Commercial Street. Once the new stop lines have been placed, the existing centerline and lane line markings should be extended to the new stop line locations.

Use of the new stop line locations should improve sight lines for westbound South Street motorists when looking both north and south along Commercial Street by identifying a more appropriate stopping location. However, as described previously in the intersection sight distance section, sight lines looking to the south will still be less than AASHTO's recommended minimum values for the existing 35 m.p.h. speed limit. Therefore, some additional signing would be appropriate along Commercial Street in advance of the intersection to alert drivers of the South Street intersection. This additional signing has also been shown on Figure 2 and is described below:

- Install Cross Road warning signs (MUTCD No. W2-1, 30"x30") along with 25 m.p.h. advisory speed plaques (W13-1p, size 18"x18") approximately 300 feet in advance of the intersection on the northbound and southbound approaches. The Cross Road warning sign indicates to drivers the presence of an intersection and the possibility of turning or entering traffic. The 25 m.p.h. advisory speed plaques are recommended to supplement the warning sign and to identify the appropriate advisory speed for this intersection based on the available intersection sight distance when a driver is located 14.5 feet from the edge of the traveled way along Commercial Street.



INTERSECTION IMPROVEMENTS
COMMERCIAL STREET AND SOUTH STREET

Attachment: Harrisonville TEAP Final Report 9-14 (1558 : TRAFFIC ENGINEERING ASSISTANCE PROGRAM)

Conclusion

The above study has focused on the need for safety improvements at the intersection of Commercial Street and South Street in Harrisonville, Missouri. The general procedures and analysis for this study were based on criteria set forth in the AASHTO Green Book as well as the *Manual on Uniform Traffic Control Devices* (MUTCD), the Federal Highway Administration (FHWA) reference adopted as the standard governing the use of traffic control devices in the State of Missouri.

Based on the data that were collected, including our observations of existing vehicular patterns at or near the intersection, the following deficiencies were identified for the intersection of Commercial Street and South Street:

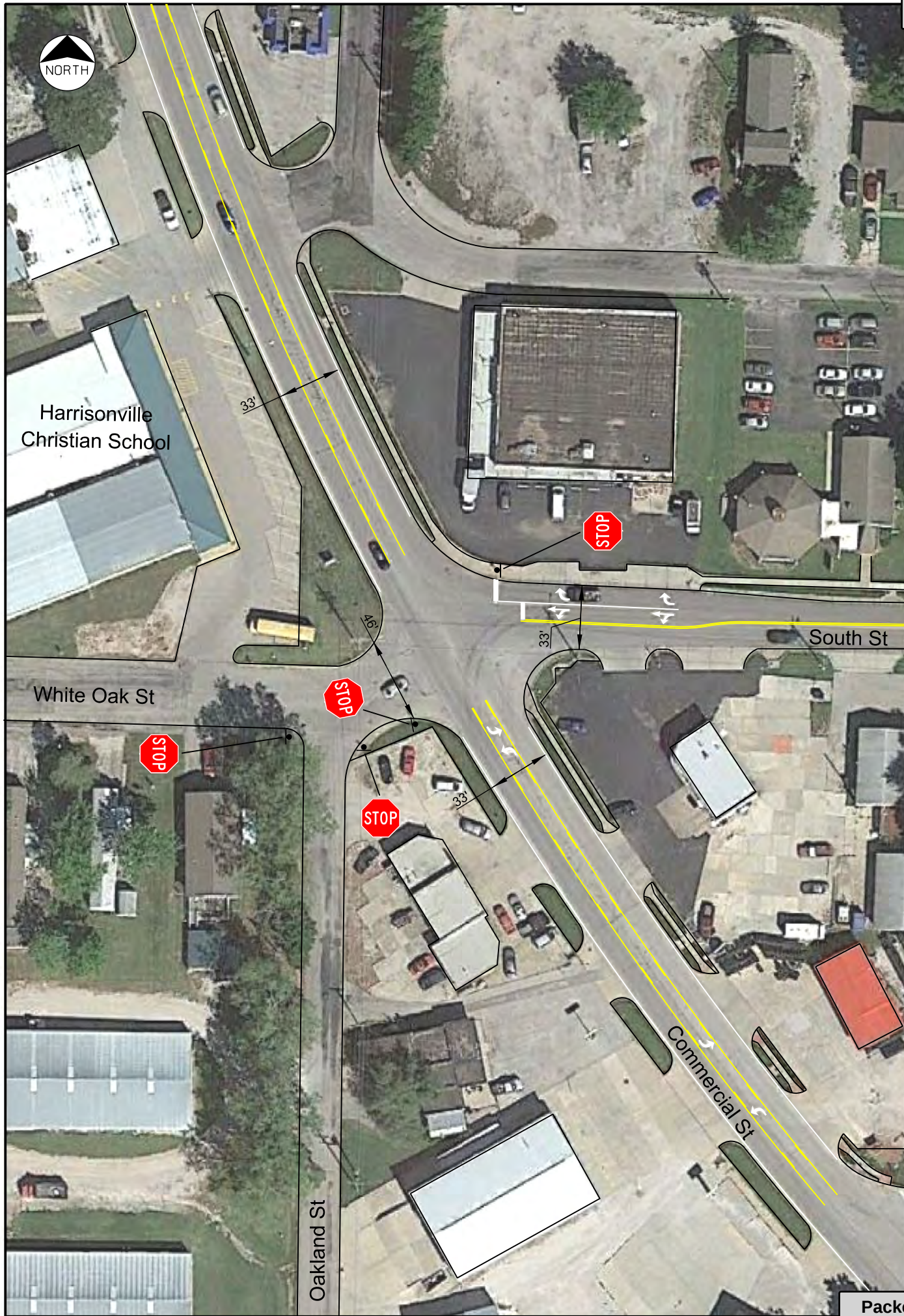
- The measured intersection sight distance when looking south along Commercial Street from the westbound South Street approach is 300 feet. This value does not meet AASHTO's recommended minimum values of 365 feet for a right-turn or crossing maneuver and 415 feet for a left-turn maneuver.
- There is a crash frequency of 2.5 crashes per year at the study intersection. This frequency is above the predicted average crash frequency of 1.0 crash per year for an urban or suburban intersection with similar characteristics.
- There is a pattern of angle collisions at the study intersection, and three of these resulted in some type of personal injury. Angle collisions are of concern since these tend to be more severe than other crash types.

The above conditions indicate that some safety enhancements would be appropriate at the study intersection. Traffic volumes at the study intersection do not satisfy any of the traffic signal warrants or multi-way stop control warrants; therefore, the intersection should remain under two-way stop control. However, based on our analyses, it would be appropriate to install new stop lines on the westbound South Street intersection approach. The new stop line locations will be closer to the edge of traveled way along Commercial Street, which should improve sight lines for westbound South Street motorists by identifying a more appropriate stopping location. Another recommended safety enhancement is to install Cross Road warning signs (MUTCD No. W2-1, 30"x30") along with 25 m.p.h. advisory speed plaques (W13-1p, size 18"x18") for the northbound and southbound Commercial Street intersection approaches. These warning sign assemblies alert approaching drivers along Commercial Street of the presence of the South Street intersection and the possibility of turning or entering traffic. The advisory speed plaque supplements the warning sign and indicates the appropriate advisory speed for the condition.

Once the modifications outlined in the report have been implemented, we would recommend that the city closely monitor the crash experience at this location to see if additional safety enhancements are needed. If a pattern of angle collisions continues to occur, more extensive geometric modifications should be considered.

Appendix

Study Area	Figure A-1
Machine Traffic Volume Counts.....	A-2 and A-3
Turning Movement Counts	Figure A-4
Spot Speed Study Results	A-5 and A-6
Collision Diagram	A-7
Highway Safety Manual Analysis	A-8
Traffic Signal Volume Warrant Worksheets	A-9 and A-10



Traffic Volume Counts

Missouri Traffic Engineering Assistance Program

Harrisonville, Missouri

Location: **Commercial St & South St**

Period Start	Approach to Intersection						TOTAL
	Commercial St		South St		NB	EB	
	NB	SB	EB	WB	+SB	+WB	
0:00	2	3	0	2	5	2	7
0:15	1	9	2	0	10	2	12
0:30	4	7	2	1	11	3	14
0:45	3	2	0	0	5	0	5
1:00	2	2	1	1	4	2	6
1:15	3	4	1	0	7	1	8
1:30	1	4	1	1	5	2	7
1:45	1	6	4	1	7	5	12
2:00	1	6	2	1	7	3	10
2:15	1	1	0	0	2	0	2
2:30	0	0	0	0	0	0	0
2:45	2	0	0	1	2	1	3
3:00	0	2	0	0	2	0	2
3:15	2	2	1	2	4	3	7
3:30	1	3	3	5	4	8	12
3:45	4	2	0	2	6	2	8
4:00	3	3	1	1	6	2	8
4:15	4	2	0	0	6	0	6
4:30	10	4	1	3	14	4	18
4:45	3	8	4	4	11	8	19
5:00	7	5	1	8	12	9	21
5:15	13	8	3	18	21	21	42
5:30	9	7	3	18	16	21	37
5:45	10	11	5	30	21	35	56
6:00	18	12	4	29	30	33	63
6:15	19	23	7	30	42	37	79
6:30	27	20	11	39	47	50	97
6:45	40	32	12	36	72	48	120
7:00	31	52	13	39	83	52	135
7:15	35	42	12	54	77	66	143
7:30	47	51	31	63	98	94	192
7:45	53	65	33	73	118	106	224
8:00	41	41	12	53	82	65	147
8:15	50	45	13	38	95	51	146
8:30	34	60	14	49	94	63	157
8:45	43	54	14	56	97	70	167
9:00	40	70	6	27	110	33	143
9:15	49	62	16	27	111	43	154
9:30	49	60	8	30	109	38	147
9:45	44	63	14	26	107	40	147
10:00	53	63	7	26	116	33	149
10:15	40	72	11	25	112	36	148
10:30	50	91	14	28	141	42	183
10:45	53	80	8	28	133	36	169
11:00	60	84	6	34	144	40	184
11:15	60	89	11	33	149	44	193
11:30	54	92	13	35	146	48	194
11:45	52	105	7	32	157	39	196

Period Start	Approach to Intersection						TOTAL
	Commercial St		South St		NB	EB	
	NB	SB	EB	WB	+SB	+WB	
12:00	70	99	8	35	169	43	212
12:15	49	114	12	36	163	48	211
12:30	65	123	13	36	188	49	237
12:45	71	97	9	34	168	43	211
13:00	60	106	7	29	166	36	202
13:15	62	76	6	31	138	37	175
13:30	68	82	8	35	150	43	193
13:45	65	109	5	36	174	41	215
14:00	73	108	18	23	181	41	222
14:15	66	104	14	41	170	55	225
14:30	60	101	13	30	161	43	204
14:45	37	80	6	44	117	50	167
15:00	63	109	41	57	172	98	270
15:15	56	129	22	41	185	63	248
15:30	60	115	13	41	175	54	229
15:45	56	119	13	45	175	58	233
16:00	63	143	8	50	206	58	264
16:15	56	114	16	42	170	58	228
16:30	56	121	4	48	177	52	229
16:45	61	150	10	47	211	57	268
17:00	73	159	12	30	232	42	274
17:15	52	147	24	27	199	51	250
17:30	59	119	8	37	178	45	223
17:45	60	119	13	31	179	44	223
18:00	44	116	7	39	160	46	206
18:15	59	113	16	27	172	43	215
18:30	35	87	12	29	122	41	163
18:45	33	75	6	37	108	43	151
19:00	19	77	2	21	96	23	119
19:15	22	82	12	20	104	32	136
19:30	25	62	7	15	87	22	109
19:45	22	61	4	19	83	23	106
20:00	21	63	4	18	84	22	106
20:15	21	58	9	17	79	26	105
20:30	17	47	8	19	64	27	91
20:45	11	38	7	13	49	20	69
21:00	10	37	3	14	47	17	64
21:15	10	32	5	14	42	19	61
21:30	10	26	6	9	36	15	51
21:45	9	28	2	8	37	10	47
22:00	5	11	4	7	16	11	27
22:15	10	25	6	6	35	12	47
22:30	4	11	4	5	15	9	24
22:45	4	15	2	2	19	4	23
23:00	5	8	2	2	13	4	17
23:15	3	10	0	7	13	7	20
23:30	6	16	4	4	22	8	30
23:45	2	8	1	1	10	2	12

Approach	Start:	Day	Date	Time	Totals	Ref. #	Approaches	Totals
Northbound		Mon	4/21/2014	11:00	2,997	1	NB+SB	8,375
Southbound		Mon	4/21/2014	11:00	5,378	2	EB+WB	3,036
Eastbound		Mon	4/21/2014	11:00	768	3		
Westbound		Mon	4/21/2014	11:00	2,268	4	Intersection	11,411



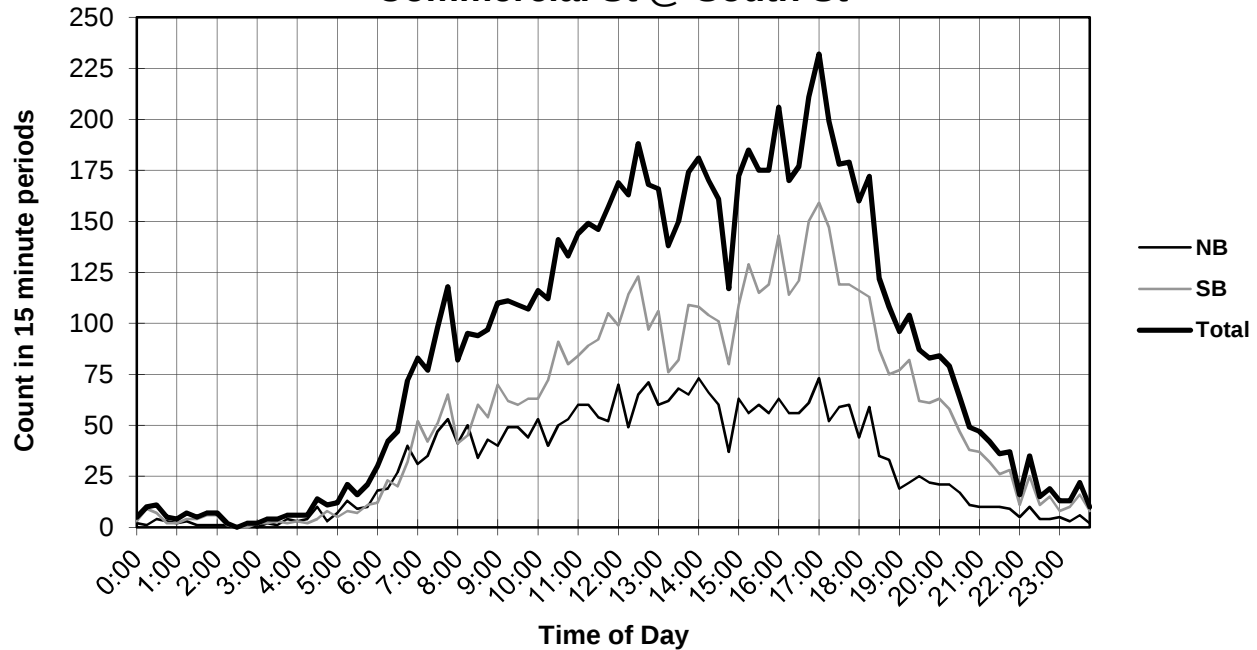
Traffic Volume Counts

Missouri Traffic Engineering Assistance Program

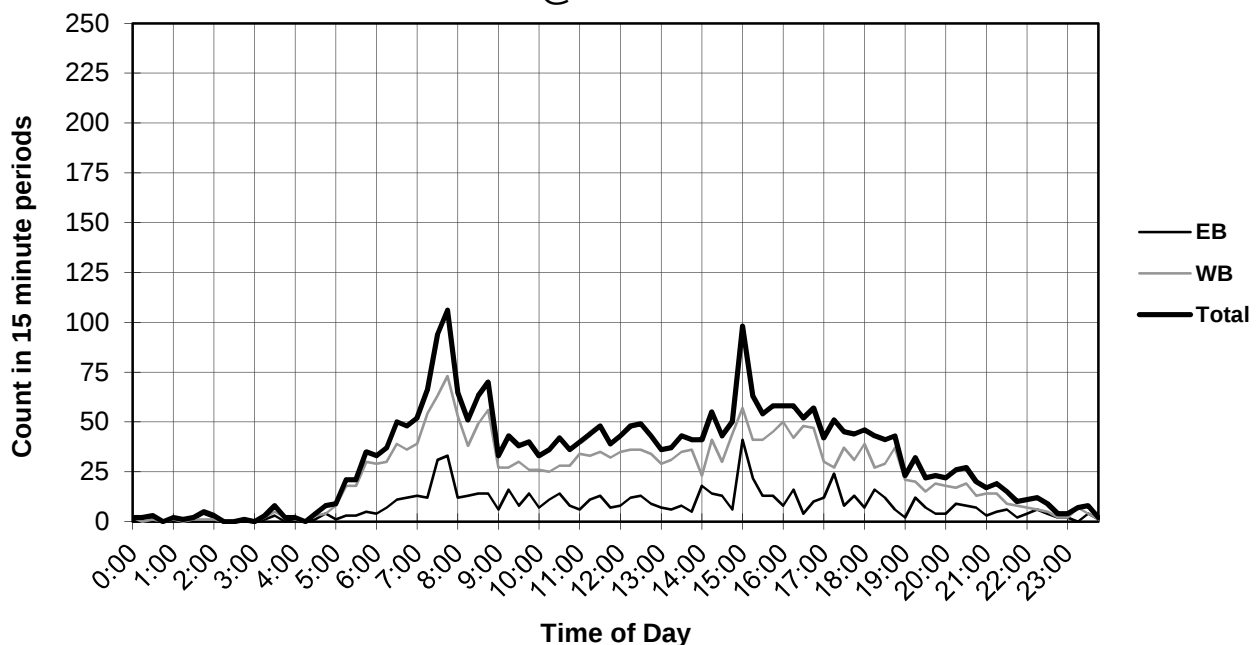
Harrisonville, Missouri

Location: **Commercial St & South St**

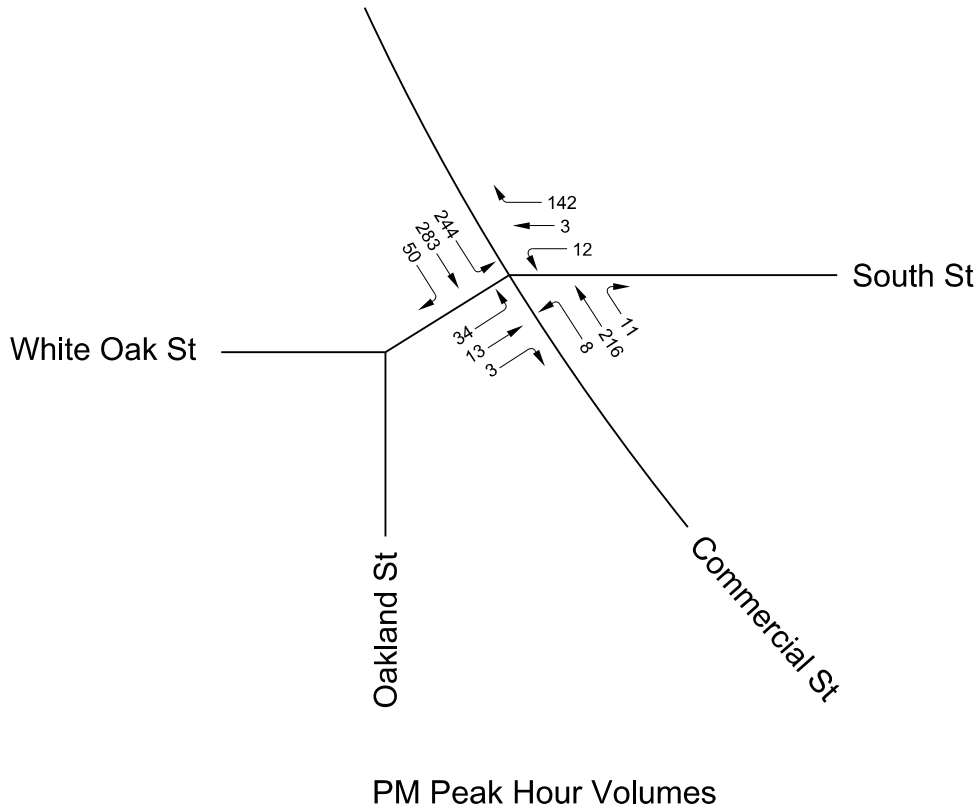
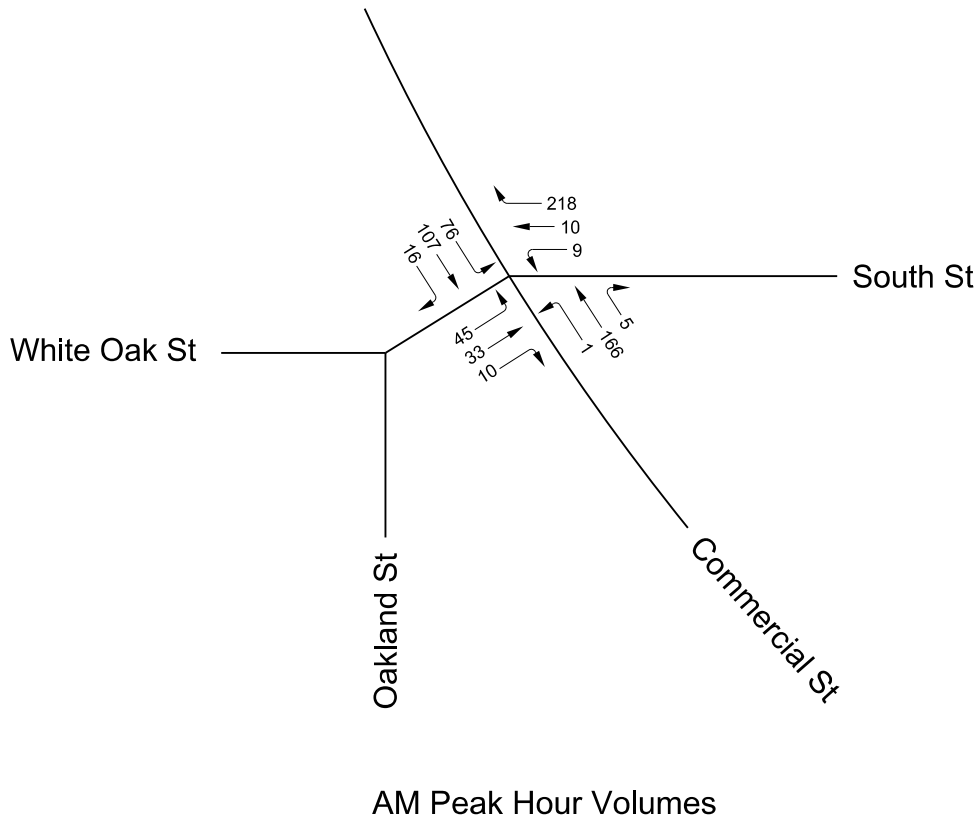
WEEKDAY TRAFFIC VOLUMES
Commercial St @ South St



WEEKDAY TRAFFIC VOLUMES
South St @ Commercial St



Attachment: Harrisonville TEAP Final Report 9-14 (1558 : TRAFFIC ENGINEERING ASSISTANCE PROGRAM)

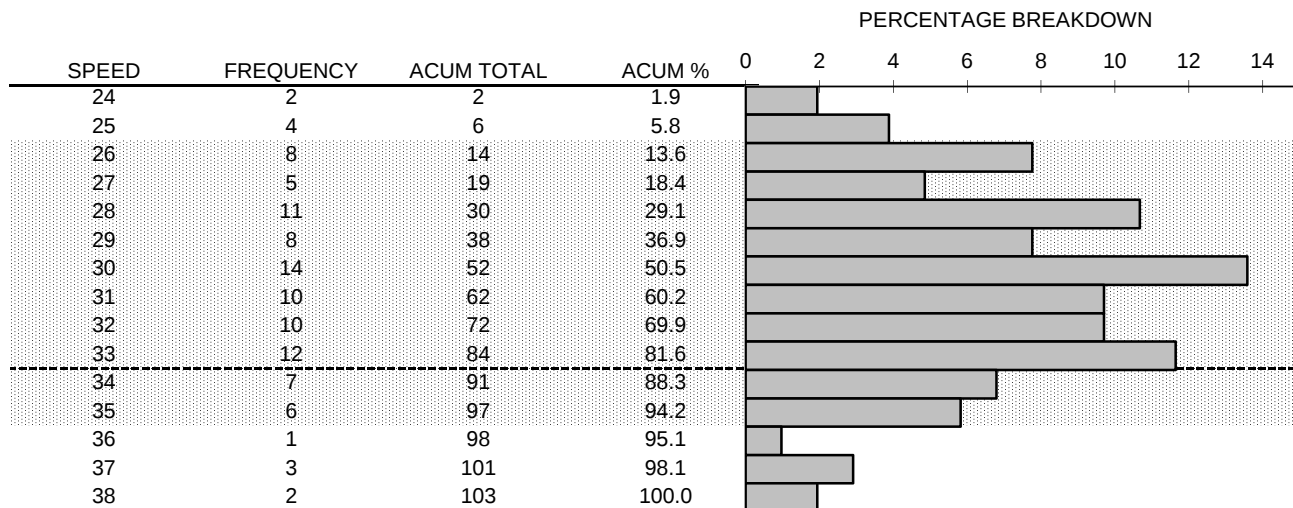


SPOT SPEED STUDY RESULTS RELATIVE FREQUENCY DISTRIBUTION

CITY: Harrisonville, MO
OBSERVER: MTH
DATE: 4/22/2014

COUNTY: Cass
SPEED LIMIT: 35
DIRECTION: NB

LOCATION: Commercial Street near South Street
TIME START: 9:00 AM
TIME END: 10:00 AM



AVERAGE SPEED = 30.6
50th PERCENTILE = 30.
85th PERCENTILE = 33.5
90th PERCENTILE = 34.3
95th PERCENTILE = 35.9

PACE = 26 - 35
VEHICLES IN PACE = 91
% IN PACE = 88.3
% BELOW PACE = 5.8
% ABOVE PACE = 5.8

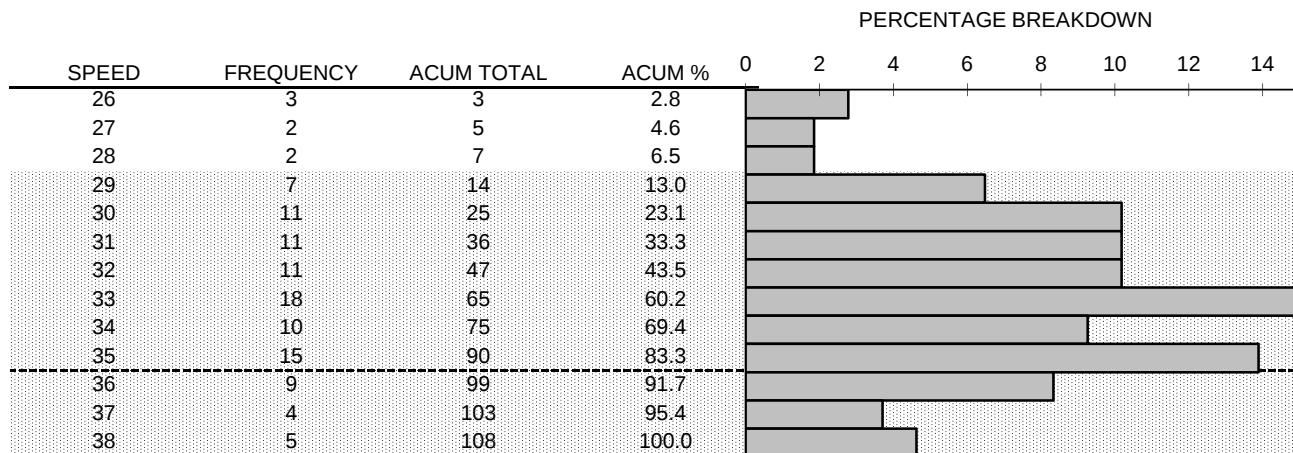
SAMPLE VARIANCE = 10.7386255
STANDARD DEVIATION = 3.2769842
RANGE 1*S = 67.96116
RANGE 2*S = 98.05825
RANGE 3*S = 100.

SPOT SPEED STUDY RESULTS RELATIVE FREQUENCY DISTRIBUTION

CITY: Harrisonville, MO
OBSERVER: MTH
DATE: 4/22/2014

COUNTY: Cass
SPEED LIMIT: 35
DIRECTION: SB

LOCATION: Commercial Street near South Street
TIME START: 10:00 AM
TIME END: 10:45 AM



AVERAGE SPEED = 32.7
50th PERCENTILE = 32.4
85th PERCENTILE = 35.2
90th PERCENTILE = 35.8
95th PERCENTILE = 36.9

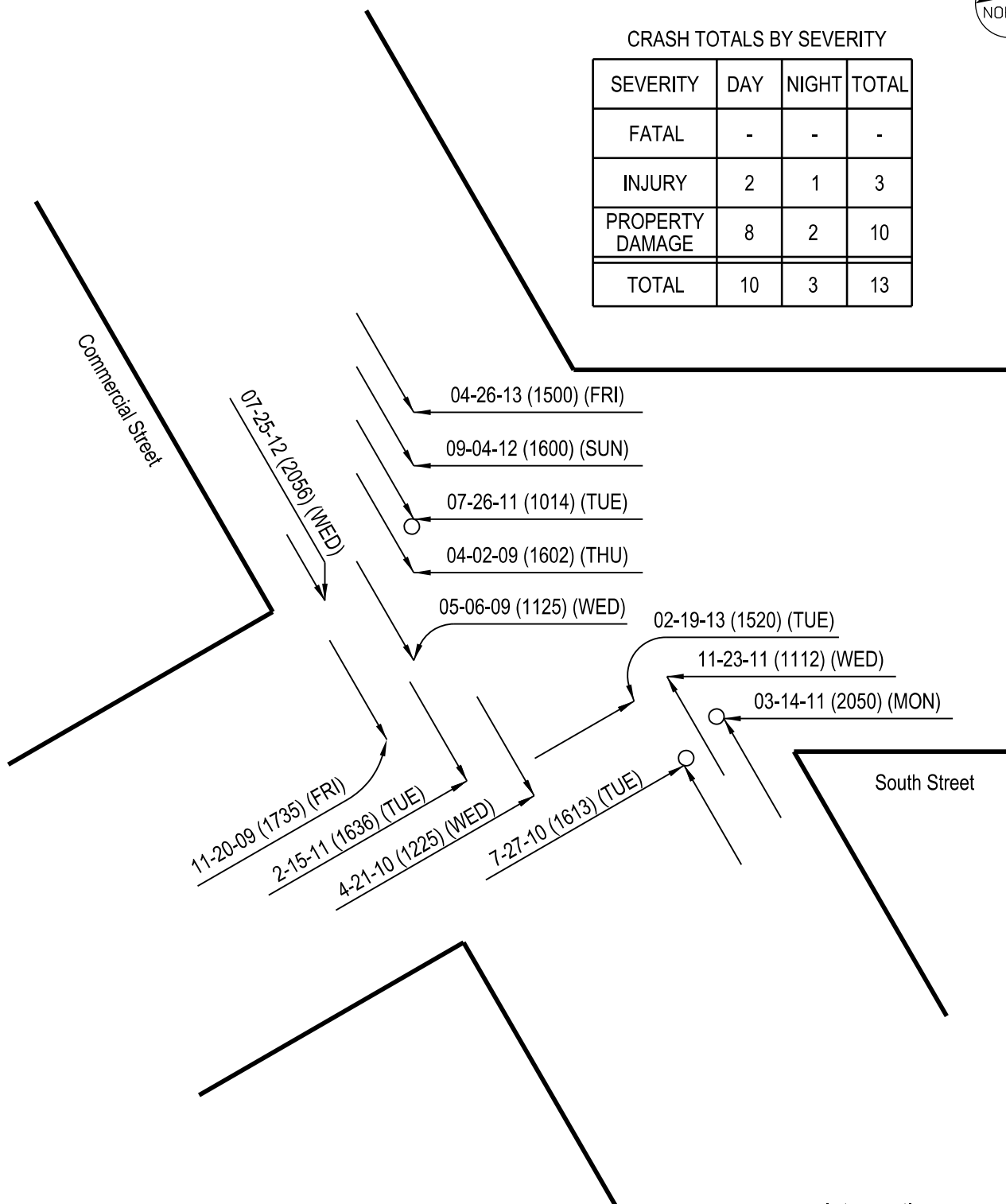
PACE = 29 - 38
VEHICLES IN PACE = 101
% IN PACE = 93.5
% BELOW PACE = 6.5
% ABOVE PACE = .

SAMPLE VARIANCE = 8.104794
STANDARD DEVIATION = 2.846892
RANGE 1*S = 70.37037
RANGE 2*S = 97.22222
RANGE 3*S = 100.



CRASH TOTALS BY SEVERITY

SEVERITY	DAY	NIGHT	TOTAL
FATAL	-	-	-
INJURY	2	1	3
PROPERTY DAMAGE	8	2	10
TOTAL	10	3	13



LEGEND

- | | | | |
|-----|----------------------|-----|-----------------------|
| ● | FATALITY | →→→ | MOTOR VEHICLE BACKING |
| ○ | PERSONAL INJURY | → | UNINVOLVED VEHICLE |
| ←+→ | REAR END COLLISION | ←P | PEDESTRIAN |
| ←/→ | SIDE SWIPE COLLISION | ←B | BICYCLE |
| ←○ | OUT OF CONTROL | □ | FIXED OBJECT |

Intersection:
Commercial Street &
South Street

City / State:
Harrisonville, Missouri

Time Period:
From: 1-1-09
To: 4-30-14

3.B.a

Figure A-

August 2014

No Scale

Intersection Analysis
Harrisonville, Mo

COLLISION DIAGRAM
COMMERCIAL STREET AND SOUTH STREET

Attachment: Harrisonville TEAP Final Report 9-14 (1558 : TRAFFIC ENGINEERING ASSISTANCE PROGRAM)

Tran Systems

Highway Safety Manual Analysis Roadway Intersections

$$[(N_{\text{spf int}} \times \text{CMF}_1 \times \text{CMF}_2 \times \dots \times \text{CMF}_n) + N_{\text{pedi}} + N_{\text{bikei}}] \times C_r = N_{\text{predicted int}}$$

Where:

$N_{\text{spf int}}$ = predicted total average crash frequency of intersection-related crashes for base conditions (excluding vehicle-pedestrian and vehicle-bicycle collisions)

$\text{CMF}_1 \dots \text{CMF}_n$ = crash modification factors for intersections

N_{pedi} = predicted average crash frequency of vehicle-pedestrian collisions

N_{bikei} = predicted average crash frequency of vehicle-bicycle collisions

C_r = calibration factor for intersections developed for use for a particular geographic area

$N_{\text{predicted int}}$ = predicted average crash frequency of intersection for a selected year

	$N_{\text{spf int}}$	CMF					N_{ped}	N_{biker}	C_r^1	$N_{\text{predicted int}}$
		Left-Turn Lanes	Left-Turn Phasing	Right-Turn Lanes	Right-Turn on Red	Lighting				
Commercial St. and South St.	1.92	0.53	1.00	1.00	1.00	0.91	0.020	0.017	1.00	1.00
TOTAL										1.00

¹ There is currently a project underway to develop calibration factors for the State of Missouri, but these will not be published until sometime in the year 2014.

Traffic Signal Warrant Analysis
Missouri Traffic Engineering Assistance Program
Harrisonville, Missouri

Location: **Commercial St & South St**

Period		Approach to Intersection				NB		EB		TOTAL
		Commercial St		South St						
From	To	NB	SB	EB	WB	+SB	+WB			
0:00	1:00	10	21	4	3	31	7		38	
1:00	2:00	7	16	7	3	23	10		33	
2:00	3:00	4	7	2	2	11	4		15	
3:00	4:00	7	9	4	9	16	13		29	
4:00	5:00	20	17	6	8	37	14		51	
5:00	6:00	39	31	12	74	70	86		156	
6:00	7:00	104	87	34	134	191	168		359	
7:00	8:00	166	210	89	229	376	318		694	
8:00	9:00	168	200	53	196	368	249		617	
9:00	10:00	182	255	44	110	437	154		591	
10:00	11:00	196	306	40	107	502	147		649	
11:00	12:00	226	370	37	134	596	171		767	
12:00	13:00	255	433	42	141	688	183		871	
13:00	14:00	255	373	26	131	628	157		785	
14:00	15:00	236	393	51	138	629	189		818	
15:00	16:00	235	472	89	184	707	273		980	
16:00	17:00	236	528	38	187	764	225		989	
17:00	18:00	244	544	57	125	788	182		970	
18:00	19:00	171	391	41	132	562	173		735	
19:00	20:00	88	282	25	75	370	100		470	
20:00	21:00	70	206	28	67	276	95		371	
21:00	22:00	39	123	16	45	162	61		223	
22:00	23:00	23	62	16	20	85	36		121	
23:00	0:00	16	42	7	14	58	21		79	

Peak Hour Totals:

A.M.

Period Start	10:45	10:45	7:00	7:15	10:45	7:15	10:45
Hour Volume	227	345	89	243	572	331	740

Noon

Period Start	13:30	11:45	13:45	12:00	12:00	12:00	12:00
Hour Volume	272	441	50	141	688	183	871

P.M.

Period Start	16:15	16:30	15:00	16:00	16:45	15:00	16:30
Hour Volume	246	577	89	187	820	273	1,021

Evening

Period Start	20:00	20:00	20:00	20:00	20:00	20:00	20:00
Hour Volume	70	206	28	67	276	95	371

Daily

Period Start	13:30	16:30	7:00	7:15	16:45	7:15	16:30
Hour Volume	272	577	89	243	820	331	1,021

Approach	Start:	Day	Date	Time	Totals	Ref. #	Approaches	Totals
Northbound		Mon	4/21/2014	11:00	2,997	1	NB+SB	8,375
Southbound		Mon	4/21/2014	11:00	5,378	2	EB+WB	3,036
Eastbound		Mon	4/21/2014	11:00	768	3		
Westbound		Mon	4/21/2014	11:00	2,268	4	Intersection	11,411

EIGHT-HOUR VEHICULAR VOLUME WARRANT

Condition A			Condition B		
NB+ SB>	EB or WB>		NB+ SB>	EB or WB>	
500	150	Both	750	75	Both
	X			X	
	X			X	
				X	
X				X	
X				X	
X				X	
X				X	
X	X	X		X	
X	X	X	X	X	X
X			X	X	X
X				X	
9	4	2	2	13	2
Condition A NOT Met			Condition B NOT Met		

Values used to set warrant thresholds:

Lanes on major st.	1
Lanes on minor st.	1
Population<10,000 or Speed>40 mph?	FALSE
(if TRUE reduce thresholds to 70%)	

Condition A

Lanes		Total Volume	Higher Volume
Major	Minor	Major St.	Minor Street
1	1	500	150
2+	1	600	150
2+	2+	600	200
1	2+	500	200

Condition B

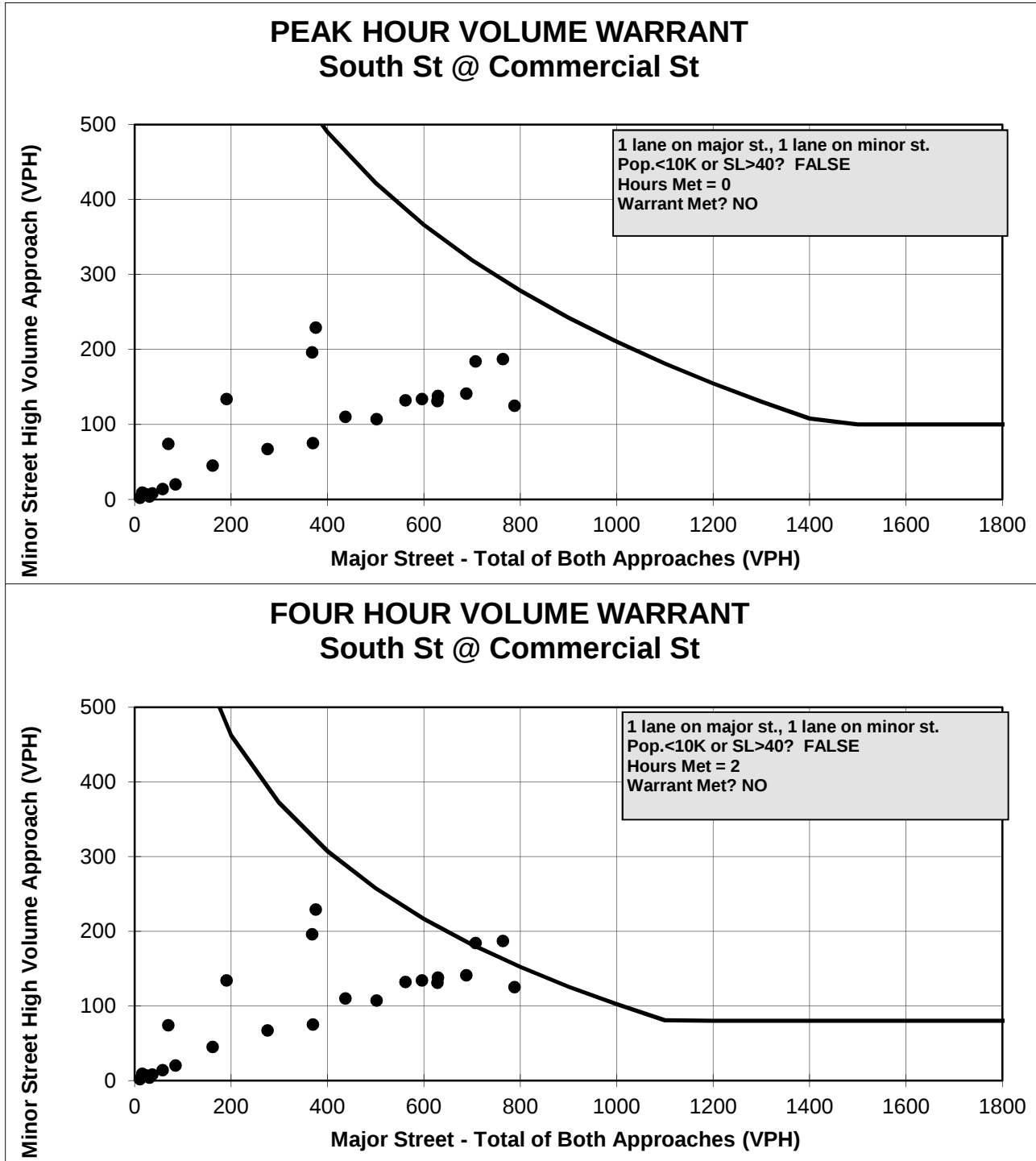
Lanes		Total Volume	Higher Volume
Major	Minor	Major St.	Minor Street
1	1	750	75
2+	1	900	75
2+	2+	900	100
1	2+	750	100

Traffic Signal Warrant Analysis

Missouri Traffic Engineering Assistance Program

Harrisonville, Missouri

Location: **Commercial St & South St**



Attachment: Harrisonville TEAP Final Report 9-14 (1558 : TRAFFIC ENGINEERING ASSISTANCE PROGRAM)



STAFF REPORT

TO: Public Works Committee
FROM: Jerry Gibbs, Director
DATE: September 24, 2014
SUBJECT: MASTER PLAN & HYDRAULIC MODEL

Type of Item: *Report*

BACKGROUND: Qualifications were requested from an engineering firm with experience in sewer and water master planning and water system hydraulic modeling. Two engineering firms submitted proposals and made a presentation to the selection committee of Alderman Brown, Coburn and Dickerson, Eric Patterson and me. The scope of services for the master planning and water modeling are:

Master Plan

- A. Background - The Southwest Planning Area includes the area west of I49/71 to the east and north, Brush College Road to the west and 283rd/287th to the south. The master plan will take current/future zoning and density to calculate demand and flows. Different scenarios will be evaluated and conceptual costs identified. Sewer and water service is limited in the area. The area south of 267th is served by Public Water District #4. Wastewater services are provided to a limited number of residents/businesses. A WWTP/package plant serves the Walmart Distribution Center.
- B. Purpose - The purpose of the Water and Sewer Master Plan is to evaluate the water & sewer needs and existing infrastructure, assess alternatives and develop costs and a capital improvement plan for water and sewers. The Water and Sewer Master Plan(s) will be used as a guiding document for future capital investments.
- C. Water Master Plan - The Water Master Plan will be broken down into tasks. These generally constitute the following:
 - Compiling background information regarding the system, its operation, and condition to develop the basis for the planning framework. Developing water demand projections through build out of the area based on allowable zoning
 - A portion of the planning area is served by PWD #4. Review PWD#4's capability to serve and identify possible barriers/solutions to resolve.
 - Evaluate the required system improvements the City and PWD #4 will need to complete to meet future demands.
 - Development of a capital improvement plan based on a demand base over 20 years and associated costs
 - Summarize finds in a water master plan report (digital format)

D. Sewer Master Plan

- Document the existing sewer system
- Review and incorporate the findings of Bartlett and West for the intersection of HWY& and Brookhart
- Assess existing and future wastewater flows
- Evaluate sewer capacity and projected capacity needs
- Evaluate pump station capacity and condition
- Evaluate replacing the existing package plant with a newer/higher capacity package plant or replacing with a pump station
- Recommend improvements and prepare a capital improvement plan on a demand base over 20 years and associated costs

General Scope of Services Water Modeling

A. Water Hydraulic Model - The consultant will review and evaluate the Utility's existing hydraulic model and create an accurate model of the current distribution system including flow testing and calibration. The modeling shall include the evaluation of alternate operating scenarios both steady state and continuous simulations.

B. Recommended Distribution System Improvements and Including Storage

Identify and recommend improvements to the distribution system to improve capacity, reliability, and acceptable pressure with an emphasis on water quality. Special consideration:

- Water storage on the west side of I-49.
- Crossing under I-49/HWY 71
- Emergency Water Connection(s)

C. Demand Based Phasing of Improvements

Develop a matrix of improvements to accomplish the improvement goals in anticipation of the growth projected. The improvements shall be demand based over a 20-year period. The consultant shall establish cost estimates for each improvement and shall attempt to equalize the annual financial commitment considering inflation in future years.

D. Model Maintenance

The consultant shall recommend, through written procedures, a program to maintain the hydraulic model, including additional testing and importing new main segments.

E. Final Report

The consultant shall prepare a final report and executive summary detailing the results of the master plan update, including discussion on the existing conditions, assumptions made, demands forecasted, alternative demands considered, improvements, cost rational,

alternate improvements, recommended improvements and phasing of improvements.

General Scope of Services

Sewer and Water Master Planning

- A. Background - The Southwest Planning Area includes the area west of I49/71 to the east and north, Brush College Road to the west and 283rd/287th to the south. The master plan will take current/future zoning and density to calculate demand and flows. Different scenarios will be evaluated and conceptual costs identified. Sewer and water service is limited in the area. The area south of 267th is served by Public Water District #4. Wastewater services are provided to a limited number of residents/businesses. A WWTP/package plant serves the Walmart Distribution Center.
- B. Purpose - The purpose of the Water and Sewer Master Plan is to evaluate the water & sewer needs and existing infrastructure, assess alternatives and develop costs and a capital improvement plan for water and sewers. The Water and Sewer Master Plan(s) will be used as a guiding document for future capital investments.
- C. Water Master Plan - The Water Master Plan will be broken down into tasks. These generally constitute the following:
 - Compiling background information regarding the system, its operation, and condition to develop the basis for the planning framework. Developing water demand projections through build out of the area based on allowable zoning
 - A portion of the planning area is served by PWD #4. Review PWD#4's capability to serve and identify possible barriers/solutions to resolve.
 - Evaluate the required system improvements the City and PWD #4 will need to complete to meet future demands.
 - Development of a capital improvement plan based on a demand base over 20 years and associated costs
 - Summarize finds in a water master plan report (digital format)
- D. Sewer Master Plan
 - Document the existing sewer system
 - Review and incorporate the findings of Bartlett and West for the intersection of HWY& and Brookhart
 - Assess existing and future wastewater flows
 - Evaluate sewer capacity and projected capacity needs
 - Evaluate pump station capacity and condition
 - Evaluate replacing the existing package plant with a newer/higher capacity package plant or replacing with a pump station
 - Recommend improvements and prepare a capital improvement plan on a demand

base over 20 years and associated costs

E. Summarize finds in a water master plan report (digital format)

Two firms submitted a response to our request for qualifications, Burns and McDonnell and Bartlett and West. Both firms had experience and are qualified to perform water modeling and sewer and water master planning services.

ISSUES - Ranking the two firms based on their interview and experience, Burns and McDonnell was the preferred choice. If the Public Works Committee concurs, staff will request a fee proposal for the water hydraulic model and master plan from Burns and McDonnell. Staff would like the committee to consider Bartlett and West for the sewer master plan. Bartlett and West was used by staff to develop a plan to provide sewer service to the Walmart Distribution/Highway 7 area. The sewer master plan would expand upon the work already completed. The advantage would be less time to become familiar with the geography of the area. Staff will be prepared to discuss in more detail at the meeting.

C. **Discussion Item (ID # 1580)**

MASTER PLAN & HYDRAULIC MODEL



STAFF REPORT

TO: Public Works Committee
FROM: Jerry Gibbs, Director
DATE: September 24, 2014
SUBJECT: SEPTEMBER AIRPORT REPORT

Type of Item: *Report*

Airport Monthly Report

By

James Green

Hangar and Tie Down Space:

- All Hangars are Full, 16 people on the waiting list
- 5 Outside tie down spots available

Fuel:

- Potential jet fuel sales - approx. 150 gallons
- 100LL - our current price is \$5.46 per gallon
- Fuel prices in our service area:

Lee's Summit	\$5.22 per gal.
Butler	\$5.60 per gal.
Gardner	\$5.45 per gal.
Johnson County	\$6.40 per gal.
Grain Valley	\$5.49 per gal.

AVGAS Sales: (Aug. 28th to Sept. 24th)

Price \$5.46 per gallon
 Gallons Sold 1,055.52 gallons
 Revenue \$5,763.15
 Profit \$717.75

Highway Truss Sign:

The highway truss sign proposed by MoDOT to be located near the end of the runway on Hwy 7 has been reviewed by the FAA and has been given a conditional "no hazard to air navigation" clearance provided that the sign have a red obstruction light on it. The sign penetrates a departure clear zone for runway 35

by 10 ft but does not penetrate any approach surfaces for runway 17, as the airport sits now, but may pose a risk in future development.

The city has until the end of October to protest the decision.

Haying Contract:

After advertising for proposals, there were no individuals that submitted proposals. One individual expressed interest in a long term arrangement but wanted to wait until next year to enter into an agreement so he could hay the airport this fall and assess his interest from there. Since the early onset of temperatures and moisture this fall he decided to pass on the haying this year since he already had enough for the season.

I am still talking with a few individuals and the airport may still be hayed yet this year. I have mowed the areas near the hangar for the open house on September 27th but have left the rest for hay at a later time.

Airport Open House:

The Airport Open House is scheduled for Saturday, September 27th. I will have a supplemental report to hand out at the Public Works Committee Meeting.

A. Discussion Item (ID # 1581)

SEPTEMBER AIRPORT REPORT

Attachments:

Potential Jet Fuel Sales August 2014 (XLS)

POTENTIAL JET FUEL SALES

(in gallons)

													ANNUAL
	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	<u>TOTAL</u>
2003	?	?	1,700	2,300	2,300	2,500	2,000	2,500	1,800	1,500	1,200	1,400	19,200
2004	1,800	2,500	3,500	2,500	1,500	1,500	3,000	2,800	2,000	2,000	3,200	3,400	29,700
2005	2,100	1,400	1,200	2,200	2,400	2,000	1,500	1,000	2,000	1,500	1,000	1,300	19,600
2006	1,000	1,500	1,800	1,800	1,000	1,300	1,000	1,200	1,500	1,000	1,100	800	15,000
2007	500	1,000	1,000	1,200	1,000	1,200	1,000	500	600	500	300	200	9,000
2008	200	200	200	100	100	200	300	400	200	250	150	100	2,400
2009	150	100	100	150	200	250	150	250	150	150	100	100	1,850
2010	250	350	250	150	150	100	100	150	100	0	200	250	2,050
2011	350	300	250	200	250	200	250	350	200	200	250	200	3,000
2012	150	250	150	200	400	300	200	200	300	200	350	100	2,800
2013	350	250	150	200	250	300	450	250	200	350	550	350	3,650
2014	1,800	500	200	200	300	350	300	200	150				4,000