TRAFFIC SAFETY ACTION PLAN

09/08/2022

City of New Albany, Indiana

City of New Albany, Indiana
Traffic Safety Action Plan
September 8th, 2022

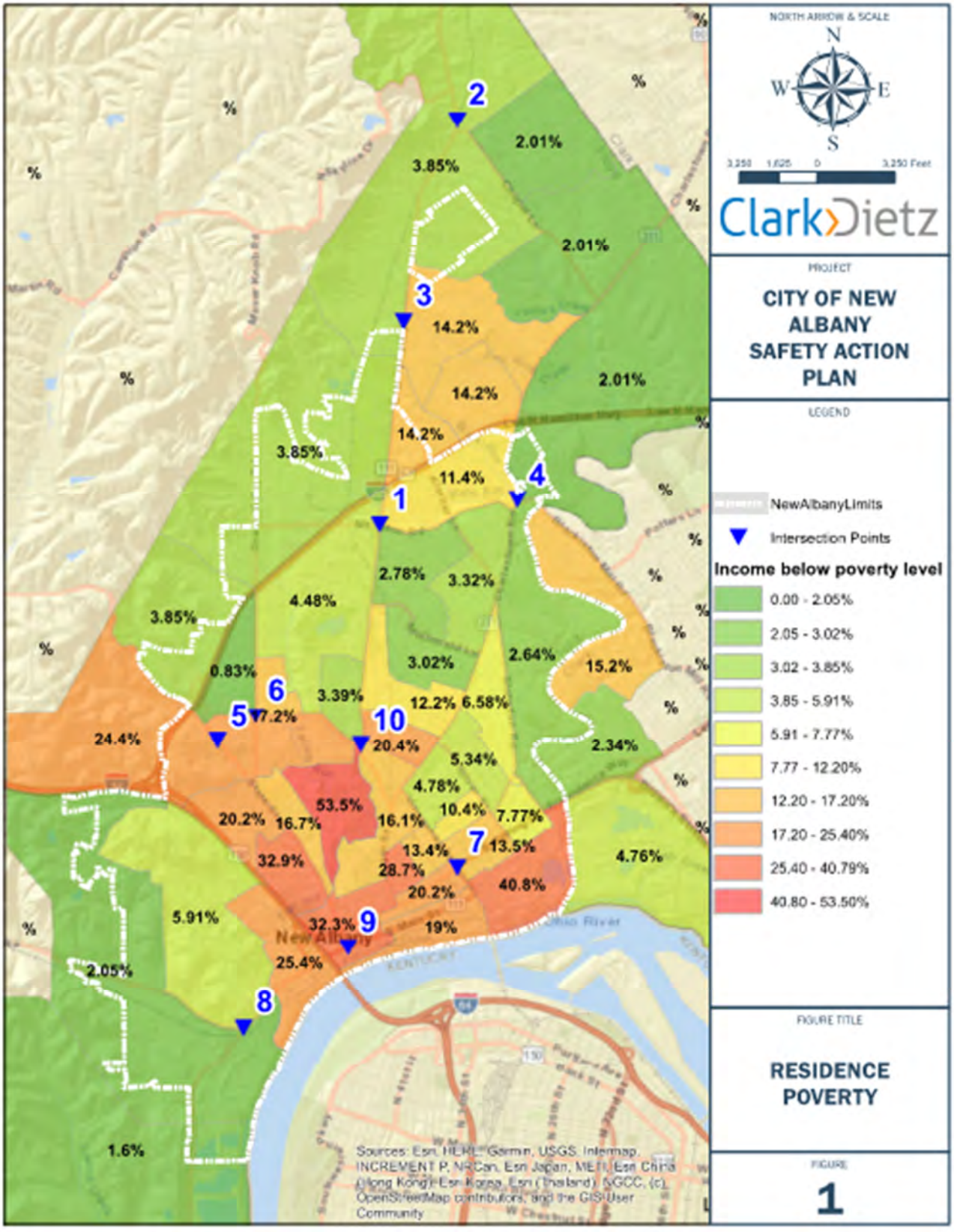
EXECUTIVE SUMMARY

The City of New Albany is seeking to reduce transportation fatalities and serious injuries by implementing a comprehensive, system wide program that crosses all forms and types of transportation. The City took action by drafting and implementing a Transportation Safety Plan that has been adopted. This Plan includes a Road Safety Analysis, Non-Motorized Safety Analysis, Railroad At-Grade Crossing Analysis and an Implementation Plan. The objectives and goals of the Plan are to be met through New Albany's 5E Approach to safety (Education, Emergency Medical Service, Enforcement, Engineering and Evaluation).

On January 27th, 2022, the USDOT Issued the National Roadway Safety Strategy. This new strategy commits the Department to respond to the current crisis in roadway fatalities by taking substantial, comprehensive, action to significantly reduce serious and fatal injuries on the Nation's roadways in pursuit of the goal of achieving zero roadway deaths. This Addendum is being adopted by the City to meet the new requirements issued by the USDOT.

CONSIDERATIONS OF EQUITY

In the City of New Albany, there are Census Tracts with populations that are economically distressed. The Vision Zero Task Force shall take in consideration an equity analysis, in collaboration with appropriate partners, focused on initial equity impact assessments of the proposed projects and strategies, and population characteristics. Figure 1 represents the top ten most dangerous intersections as represented in the TSP along with the equity of the Census Tracts. This map should be used as a guide in project selection.


NORTH ARROW & SCALE
N
W
E
S
3,250 1,625 0 3,250 Feet
ClarkDietz
PROJECT
CITY OF NEW ALBANY SAFETY ACTION PLAN
LEGEND
NewAlbanyLimits
Intersection Points
Income below poverty level
0.00 - 2.05%
2.05 - 3.02%
3.02 - 3.85%
3.85 - 5.91%
5.91 - 7.77%
7.77 - 12.20%
12.20 - 17.20%
17.20 - 25.40%
25.40 - 40.79%
40.80 - 53.50%
FIGURE TITLE
RESIDENCE POVERTY
FIGURE
1
1
2
3
4
5
6
7
8
9
10
2.01%
3.85%
14.2%
11.4%
2.78%
3.32%
4.48%
0.83%
3.02%
2.64%
15.2%
3.39%
12.2%
6.58%
7.2%
20.4%
24.4%
5.34%
2.34%
4.78%
53.5%
20.2%
16.7%
16.1%
10.4%
7.77%
13.4%
13.5%
4.76%
32.9%
28.7%
40.8%
20.2%
5.91%
32.3%
19%
25.4%
2.05%
1.6%
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), GGCC, (c) OpenStreetMap contributors, and the GIS User Community

VISION ZERO PLEDGE

Pledge

We pledge to actively work to reduce fatal and serious-injury crashes on New Albany streets through a coordinated, holistic approach. We recognize that changes to land use patterns and street designs will take time and money, but we are committed to continued investment to make our city safer for all. We will engage in robust data collection, analysis, and sharing to identify needs and priorities, and inform decisions to direct resources where they are most needed. We will continuously evaluate and improve our actions toward our goal of eliminating serious injuries and deaths.

We will prioritize enforcement where it can have the greatest effect in saving lives and preventing serious injuries. We will target law enforcement efforts to locations with high rates of fatal and serious injury crashes and to address the most dangerous behaviors.

Traffic deaths and injuries are preventable; therefore, none are acceptable. We commit the city to continuing the work of the Vision Zero Task Force as we strive to eliminate serious injuries and deaths by 2030.

Mayor, City of New Albany — AUGUST 23, 2022

City Engineer, New Albany — AUGUST 23, 2022

OVERSIGHT

The City of New Albany has brought together the City Engineer, Police Chief and Right-of-Way Coordinator to form the **Vision Zero Task Force**. The Task Force will continue to be an interagency and interdepartmental group and will source representation from key community groups, including advocates for the most vulnerable road users. Representatives from pedestrian, bicycling, and motorcycling groups; minority communities including the African American, Asian American and Spanish-speaking communities; the homeless population and homeless service providers; and advocates for older adults and children, people with disabilities, and social workers who work with at-risk communities will work with government members of the Task Force to ensure their constituents' concerns and needs are addressed.

TRACKING PROGRESS

The Task Force is also responsible to monitor progress of the implemented plan to ensure that the anticipated results are being obtained. The 5 E approach of the Transportation Safety Plan will be the roadmap. The metrics shown displayed in the Vision Zero Actions section of this addendum will be used to measure the success of the actions taken. The Task Force will evaluate if a change in action plan is required to meet the goal of Vision Zero on a periodic basis.

VISION ZERO ACTIONS

	Actions	5E Category	Conceptua	Underway	Complete	Agency(s) Responsible	Notes
1	Hold a billboard campaign to educate the community about the correlation between speed and severity of crashes. Location of billboards should be strategically located in areas of high incident rate.	Education	X			City Police, Vision Zero Task Force	Conduct speed studies before, during and after the campaign is started to measure if there is a reduction in speed. Monitor the ARIES system to see if these actions cause a measurable reduction in severe accidents
2	Engineers work with both New Albany Police and Floyd County Sheriff Department to pin point areas to enforce. Data collection for Average Daily Counts can be set to collect speed data and then the results promptly provided to the agency for consideration for targeted enforcement.	Enforcement	X			Floyd County Sheriff Dept., City Police, Vision Zero Task Force	Conduct speed studies before, during and after the campaign is started to measure if there is a reduction in speed. Monitor the ARIES system to see if these actions cause a measurable reduction in severe accidents
3	Select a project from the list of Top 50 most dangerous intersections and program a project to mitigate crashes in that area	Engineering		X		Mayors Office, City Engineer, Vision Zero Task Force	The City has selected Intersection 10 and developed a high-level concept for reducing crashes in this area. The City pursued funding through a RAISE Grant. In 2022, the City is pursuing funding through SS4A to develop and build infrastructure to reduce trashes at this location
4	Select a project from the list of Top 50 most dangerous intersections and program a project to mitigate crashes in that area	Engineering	X			Mayors Office, City Engineer, Vision Zero Task Force	Select a second item from the list to develop a high-level concept for and pursue funding for development of the project
5	Program an Intersection improvement project at State and Market (Intersection 9)	Engineering	X			INDOT, Mayors Office, City Engineer, Vision Zero Task Force	This is an INDOT controlled intersection
6	Hold a roundtable with EMS to gather their input on Vision Zero	EMS	X			Vision Zero Task Force, EMS	as outreaching and educating the community. They are to be identified as the compassionate early contact with regular face-to-face contacts at community events.
7	Measure the improvement in safety	Evaluation		X		Vision Zero Task Force	Monitor and document outcomes, attitudes and trends through the collection of data before and after corrective measures. Implement solutions to address evolving needs
8	Post the TSP and Addendum online	Education		X		Vision Zero Task Force	

CONCURRENCE

The Vision Zero Task Force shall be consulted if deviation from the Plan is determined to be necessary as monitoring of actions continue. The person or entity initiating the change shall send a memo to the City Engineer. The memo shall include a justification for the change and recommendations for how the change effect the overall goal of Vision Zero. No actions shall be taken by the initiating party on the proposed deviation from the Plan until formally approved by the Vision Zero Task Force.

Document Reviewed by:

Larry Summers, PE — Date: 9/13/22
City Engineer
Recommend: Approval / Disapproval

Document Approved by (Vision Zero Task Force):

Date: 9/13/22

Date: 9-13-22

Date: 09-13-22

New Albany, Indiana

Transportation Safety Plan

March, 2019

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TABLE OF CONTENTS

Executive Summary

The City of New Albany is seeking to reduce transportation fatalities and serious injuries by implementing a comprehensive, system wide program that crosses all forms and types of transportation. The method to achieve a large reduction in risk and injuries is through a comprehensive review of various data sources throughout the city limits and analysis of the data to prioritize decision making on countermeasures. Countermeasures are determined based on proven methods that have been studied and proven on a federal level to be effective in reducing risk. Plans for corrective measures are ranked according to the best cost benefit ratio and include both motorized and non-motorized users.

A Transportation Safety Plan of the public's interaction with roadways, at-grade railroad crossings and pedestrian needs were evaluated. The review method was data driven engaging the Kentuckiana Regional Planning and Development Agency (KIPDA), the State of Indiana's Automated Reporting Information Exchange System (ARIES), FWHA's Truck Routes, the Federal Railroad Administration, updates to the Comprehensive Plan, City's Snow Removal Plan, Multi-use Path Map and several other agencies and documents.

This study has spanned over several years which has permitted ongoing implementation. An effort has been made to note in this study when corrections have been implemented or when they are a part of a continuous process. Decreasing accidents is one of the end goals, but to develop active safety thinking is a better overall focus. Engineering and design factors are addressed in this report. Behavioral issues, such as driver speeding, are enforcement issues where education is needed. There is a portion in the study that makes a correlation between speeding and societal costs. That part of the report takes the actual speeding incidents over the 7 year study period, which provides relevance and points to the importance of enforcement of posted speed limits.

The non-motorized section identifies locations where there are opportunities for completing sidewalks, installing bicycle lanes and natural citizen paths. As with the motorized users, the need for better education of risks is common for pedestrians, bicyclists and all users. The railroad at-grade crossings were reviewed to develop an inventory and recommend safety improvements. Some crossings should be explored further for consideration of closing. Lighting crossings, evaluating traffic control device placement and general educating are the focus points.

Again, educating the public is the common point across all safety items reviewed throughout this study. The bottom line is to achieve an overall reduction in accidents that cause injuries.

Overview and Background

The City of New Albany has made the goal to reduce transportation fatalities and serious injuries through a comprehensive review of multimodal transportation that is data-driven, and proactive across the region. This Transportation Safety Plan (TSP) extends across the area's roadways, pedestrian access points and railroad at-grade crossings and works with the Kentuckiana Regional Planning and Development Agency (KIPDA) and other partners. From 2015 to 2018, VS Engineering reviewed all of New Albany's reported traffic crash reports, pedestrian strikes – or near misses – and at grade railroad crossing incidents. The top 50 intersection and corridor concerns were then ranked and the findings reviewed by City Staff. The safety process has been one of a consistent monitoring, reporting, and evaluation so as to make improvements across the City's entire roadway system.

Over the past three decades, transportation fatality rates have declined in relationship to system usage, due in large part to safer cars, stricter police enforcement and better seat belt use. However, in many manners of collision types, the actual number of crashes has increased because more people are using the transportation network. The analysis has evolved from a targeted corridor to the city-wide review.

The original scope of work first focused on the State Street corridor from the I-265 Ramps to downtown's intersections, due to the concentration of crashes along that corridor. Signal coordination and ADA compliance in that area were then identified. The City coordinated with INDOT and KIPDA to help relieve some scope tasks through data sharing of studies. At that time the City also identified several priorities, including congestion at Daisy Lane and State Street, Green Valley and Spring and pedestrian movement throughout the City. Seven years of crash data within the City was then evaluated and ranked by volume and severity of crashes that resulted in a fatality or injuries. A criteria score was then assigned according to a series of items that included crash rate, severity, frequency and traffic volume. The City made improvements to some of the intersections and Highway Safety Improvement Program (HSIP) funding was secured for federal funds for two applications. Seven Roadway Safety Audits (RSA) were conducted at intersections to identify focus areas for countermeasures. Three of these seven RSAs were in the top ten crash severity intersections. The focus of this report is to identify factors in the top ten intersections where corrections and countermeasures can be expected to reduce injuries. The analysis then explores the non-motorized users and the railroad at-grade crossings.

This review is to reduce the injuries through implementing safety improvements. The document is intended to be a reference point by which to review future needs.

ROAD SAFETY ANALYSIS

The Road Safety Analysis (RSA) started with methodology that mirrored the Kentuckiana Regional Planning and Development Agency (KIPDA) for identifying high crash locations. The method ranks the crash severity, roadway and intersection volumes to arrive at a "Total Criteria Score". This consistency with regional planning will help arrive at agreement on priority locations to target countermeasures. Crash records were then pulled from the State of Indiana's Automated Reporting Information Exchange System (ARIES). The ARIES database is a reliable means to collect all vehicle crash reports when, either New Albany Police, Floyd County Sheriff or Indiana State Police report the incidents. Since the study area overlaps several jurisdictions, a few locations had other entities implement improvements through other projects. For that reason and other changes that evolved, the summary of crash reports were updated several times throughout the seven year study period years 2010 to 2016. Based on criteria ranking scores, the top 50 high crash intersections were then ranked to develop an overall perspective of areas to consider corrections through prioritizing programming. Of the 50 intersections, 11 jurisdictions were not the City of New Albany's jurisdiction (8 were INDOT-Seymour District and 3 were Floyd County). A formal Road Safety Audit (RSA) then reviewed 7 intersections and those findings provided a focus on issues that were identified through the ARIES data analysis and summary. Each of the RSA participants had hard copies of each intersection's summary of Accident Type and Manner of Collision for each of the 7 years reviewed. This background info helped the participants to complete customized comments to open ended prompts in the categories of:

Roadside Conditions

Signing & Pavement Marking Conditions

Pedestrian and Bicycle Accommodations

Intersection Control, Access Management & Sight Distance

Overall Intersection Comments

Appendix A contains the summaries of 50 intersections that were weighted ranked according to vehicle crash severity and frequency for years 2010 to 2016. Of that list, the top ten intersections were then reviewed and summarized according to manner of collisions, surface condition and lighting condition. These categories were found to be common among the intersections that experienced injuries. Appendix B has the summaries of these top ten intersections. These tables separate the Property Damage Only (PDO) from the Fatalities/Injuries (F/I) along various accident types / manner of collisions, road surface condition, and lighting condition. This summary method permits an even evaluation of each intersection across each of the sampled years. The results follow:

1. Grant Line Road / SR 111 at Mount Tabor Road

This intersection has the highest quantity and most injuries of all crashes throughout New Albany. This intersection is controlled by INDOT and carries the second highest volume of vehicles of the top ten intersections. Over three quarters of all the accidents at this intersection are from accident types of Rear-End, Right Angle or Left Turn movements. When Rear-End collisions are limited in injuries, then lower speeds and congestion may be contributing to the issue. At this intersection, about a third of the Rear-End collisions have injuries. The Right Angle and Left Turn manner of collisions are understood to result in injuries due to the angle of the accident. The Road Safety Audit had one participant comment "There was noticeable speeding drivers…" There was also concern about the northbound sight distance where the crest limits visibility and the suggestion was made to add overhead signs to alert drivers when sight is blocked by the hill. Pavement markings were observed to be faded at locations and overhead signs were stated to be "absent or faded" which impairs driver's lane selection. Pedestrian traffic was limited, believed due to lack of crosswalks and a non-compliant PED Ramp located at the southwest corner. A suggestion was made to reduce conflict points through the intersection by installing raised medians at both the north and west approaches. The gas station exiting left turn movements was stated as a problem. The general feeling of the site observation was that the area was "not friendly" to non-motorized users and that this intersection experienced higher than anticipated speeds. "Open speeds" was one comment, meaning that a number of drivers appeared to be speeding.

2. Grant Line Road / SR 111 at Chapel Lane

The main accident type of this intersection was "Ran off Road", which held a high average for each of the seven years. The crash reports showed that more than half of all accidents here occurred when the road surface was wet, snow covered, or standing water. This condition can be attributed to having this intersection rank as the number two intersection with injuries in the City. The number of accidents when the pavement was wet or during snow exceeds the quantity of accidents when the pavement was dry. The lack of lighting was also a contributing factor to the quantity of collisions with injuries. This intersection is under Floyd County's jurisdiction.

3. Grant Line Road / SR 111 at St. Joseph Road

Rear-End and Right Angle accident types are just under 70% of the manner of collision types. When adding those drivers who Ran Off Road, then that covers 85% of this intersection accident types. Similar to the Grant Line at Chapel Lane intersection, this location has a high number of injuries coupled with wet road surface. Ran Off Road manner of collision during Daylight was relatively high at this location. This intersection is under Floyd County's jurisdiction.

4. Charlestown Road / SR 311 at Blackiston Mill and Rainbow Drive

Almost 30% of this intersection's 7 year average accidents were Rear-End manner of collisions. When adding the Right Angle accidents to the Rear-End, then two thirds of the manner of collisions are captured. The next ranking volume of accidents are sideswipes, then Left Turn movements. The sideswipes did not result in many injuries, so less emphasis was given to that category. The Road Safety Audit comments pointed to the pavement condition as a Pavement Surface Evaluation and Rating (PASER) of 7, making it "Fair" condition. Observer's comments suggested overhead signs on Blackiston Mill to help drivers have supplemental confirmation when pavement markings fade. Pavement markings were noted to be presently faded. Motorists exiting the gas station at the northeast corner were witnessed to be at risk and the suggestion was made to review officer narratives on the crash reports to confirm if this is a common hazard. Access management at the gas station is worth consideration.

5. State Street at Coyle Drive

Combining accident types of Rear-End, Right Angle and Left Turns accounts for over 86% of the manner of collisions. The road surface during these accidents was mostly dry and accidents were generally during daylight. Discussion on countermeasures included consideration of "speed tables". This was suggested for Coyle Drive due to these same types of traffic calming measures are on McDonald Lane between Charlestown and Grant Line Road. Rainbow Drive also has a speed table. Speed tables are an option considering the Collector Residential class and volumes of about or under 4,000 vehicles per day.

6. Daisy Lane at Green Valley Road

Over 75% of all manner of collisions were centered in Rear-End and Right Angle accident types. About a third of each of these accident types had injuries that occurred during the day on a dry road surface. When road surface was wet, the injuries were at a higher rate. The Road Safety Audit (RSA) noted that the pavement condition was "Fair" (PASER Rating of 7), with faded pavement markings. The daytime RSA comments included "impatient drivers" and suggested installing overhead signs for enhanced lane selection. This intersection appears to be a good candidate for Emergency Vehicle Preemption to expedite fire and ambulances safely to the nearby hospital. The curb ramps are adequate condition, but aged signal equipment needs the pedestrian indicators modernized. The guardrail located at the northeast was also noted to be damaged and need of repair or replacement.

7. Spring Street at Vincennes Street

This intersection has the accident types evenly distributed between Rear-End, Sideswipe, Right Angle and Left Turn. The Rear-End accidents resulted in a higher injuries. Pavement was mostly dry and accidents were mainly during daylight.

8. Corydon Pike at Main Street and River Road

The accidents with injuries were centered across the Rear-End accidents, followed by Right Angle collisions. Wet roadway surface and accidents in dark conditions were factors in these events, although most accidents were in daylight.

9. State Street at Market Street

Right Angle and Left Turn manner of collisions are 60% of all this intersection's accident types. Injuries were highest in the Right Angle category, compared to the Left Turn accidents. The collisions were mostly on dry surfaces. When accidents were at dusk, the injuries were higher than compared to crashes during daylight. This intersection is under INDOT Seymour District's jurisdiction.

10. Grant Line Road / SR 111 and Beechwood Avenue

Looking at the overall 7 year collection of accidents, the most recent 3 years have had a larger number of accidents. Similar to the higher ranked intersections, this location has almost 60% of the accident types as being Rear-End and Right Angle.

The above list of 10 intersection's primary cause of injuries provides focal points where to consider countermeasures. Reoccurring themes across the signalized intersections are accident types Rear-End and Right Angle with some on wet pavement surface and / or dark with potential insufficient lighting. This type of screening the transportation network to specific manner of collision, combined with targeted Road Safety Audits, provided tailoring countermeasures to reduce the crashes.

Countermeasures and Crash Modification Factor

Countermeasures that are installed have a value that quantifies the expected change in crash frequency. This value is known as a Crash Modification Factor (CMF).The CMFs are used to estimate the expected change in crash frequency associated with various countermeasures and to estimate safety benefits (crash saving) associated with a particular countermeasure. The lower the CMF value, the greater expectation that implementing the countermeasure will decrease crashes. Other factors play into the reliability of this expectation. Crash decreases depend on the evaluation study method used to develop the CMF, the quality of the CMF, and the applicability to the site. In the case of the pattern of accidents with these top ten intersections, Rear-End and Right Angle collision types have several correction options available.

Reviewing the Grant Line Road and Mount Tabor Road intersection, the eastbound and northbound movements may benefit from protected adding a protected left turn signal phase. Other options may be to install a raised median at the north and/or west approaches to reduce accidents. While raised medians eliminate the cause of the turns out of the gas station, the restricted movement will not be popular from the land owner. The gas station presently enjoys full access at two driveway cuts located immediately at where vehicles frequently stack for the traffic signal. Restricting access to Right-In/Right-Out at both of these access points will still permit the option of full access at Northgate Boulevard. The FWHA's National Clearinghouse lists a CMF range of .63 to .82 for installing a countermeasure such as this. Noting that this intersection sits at a low point dip in the road, adding a dynamic speed feedback sign at the approach to the intersection would provide drivers a visual reminder of their speed. This economical countermeasure has a CMF of .95 and could be anticipated to be improved further with a fresh coat of pavement markings, which is another lower priced countermeasure.

Accidents can be anticipated to be reduced through implementing countermeasures, such as these. Similar application of countermeasures at the other nine intersections, can also be anticipated to reduce vehicle crashes. Below are suggested countermeasures for the other intersections based on the crash reports and review of site conditions.

Grant Line Road / SR 111 at Chapel Lane, Issues and Countermeasures

To address the primary issue of drivers running off the road:

Post Delineators: Add from north to south of intersection along the southbound road edge above the side slope.

Chevron Signs: Add at leading edge of blunt faced guardrail located north of intersection.

Signage Enhancement: At the existing Slippery When Wet Sign (W8-5) located south of the intersection, increase the existing sign to a high reflective 36 Inch and add supplemental sign "WHEN WET" (W8-5P). Add this same sign configuration north of the intersection.

Refresh Pavement Markings: Centerline has Raised Pavement Markers, but refreshing the double centerline and the edge lines would better define the pavement in this area.

Intersection Lighting: The intersection lacks lighting. The existing wood power pole at the northeast corner could very economically have a luminaire added and powered. This addition would help offset the 31% dark not lighted documented accident types. Additional lighting should also be considered to help this area.

Further Considerations: Install raised pavement markers. Add guardrail along the southbound drainage ditch area. Consider feasibility of installing High Friction Pavement at this area.

Grant Line Road / SR 111 at St. Joseph Road, Issues and Countermeasures

To address the primary issue of rear-end accident types, followed by right angle and ran off road accidents:

Signage Enhancements: Consider adding Intersection Ahead signs at approaches, Slippery Road Signs (W8-5) at north and south approaches and Chevrons at the guardrail end treatments located at Grant Line School entrance driveway.

School Zone wig-wag lighted signs at both school approaches.

Enhance pavement markings.

Roadway RPM and Delineators: Consider adding delineators along targeted road edges at the South and East Approaches. Add Raised Pavement Markers to help guide drivers.

Charlestown Road / SR 311 at Blackiston Mill and Rainbow Drive, Issues and Countermeasures

To address the primary issues of rear-end and right angle accident types, followed by sideswipes and left turn accidents:

Access Management: At the Shell Station access to Charlestown, consider restricting access where drivers currently exiting are confused during heavy volume peaks.

Signage Enhancement: At the East and West Approaches, install upgraded retroreflective span mounted Left Turn signs (R3-5) to assist motorists in lane selection.

Pavement Improvements: Prioritize surface improvements in light of PASER Rating of 7, and the number of accidents when the surface is wet. Restoration or replacement of the pavement may be beneficial prior to having the pavement markings updated.

Pavement Markings Refresh: Review all approaches for providing clearer lane markings to better direct drivers for lane selection and increase user's awareness of stop bar and sidewalk markings.

Review of Intersection Lighting, Dusk Inspection: The intersection has some lighting, but a night time audit would be helpful to gauge the value of supplemental lighting. A night audit may also provide greater insight into the past issues when some drivers have been reported to drift across the centerline.

State Street and Coyle Drive, Issues and Countermeasures

Address the primary issues of rear-end and right angle accident types, followed by left turn accidents:

Restrict Movements: Coyle Drive westbound left turning traffic may be heavy during the sensitive peaks due to it being used as a cut through alternative route for Daisy Lane westbound left turns. These issues are believed to have been decreased some due to the recent northbound right turn lane added to the I-265 Ramp. Should the Coyle left turn volumes continue to be near the prior volumes after recent improvements, then consider installing a raised median pork chop to enforce no Coyle left turn movements. A right-in-right-out from State to Cole will prevent westbound left turns across four lanes of traffic.

Monitor Travel Speeds: Rear-End manner of collisions may be anticipated to decrease some due to the recent synchronization of traffic signals along the State Street corridor. The number and types of accidents should be monitored to confirm reduction since the State Street corridor has improved coordination between traffic signals.

Monitor Access Points: The Thornton Gas Station's north driveway access to State Street could be closed and the business would still have two full access points. As with all intersection heavy left turn and right angle collision types, access points too close to each other are a major contributor to the problem.

Daisy Lane and Green Valley Road, Issues and Countermeasures

To address the primary issues of rear-end and right angle accident types:

Pavement Surface Review: If this intersection's pavement has not been addressed yet, targeted pavement restoration and pavement marking improvements will better define the intersection.

Advance Notice of Intersection Signage: The approaches have guardrail, drainage ditches or buildings to give the driver a tunnel feeling at the approaches. Where existing advance traffic control signs exist, enhance them with flashing beacons. The rear end collisions have a number of injuries with officer's noting the typical cause of "following too close". Human

behavior items of "distractive driving" may not be offset with engineering improvements, but improved marking and signage of the intersection will help.

Signal Modernization, Lighting and Overhead Signs: Traffic signal equipment and pedestrian indicators need improvement. Emergency Vehicle Preemption should be included in modernization due to the difficulty of emergency vehicles to pass through this heavily traveled area. This intersection would benefit from intersection lighting. Overhead signs are recommended so as to better command the driver's attention for turn lane selection and awareness of the intersection.

Spring Street at Vincennes Street, Issues and Countermeasures

To address the evenly balanced collisions between rear-end, right angle, left turns and side swipe accident types:

Monitor Signal Timings and Non-motorized Users: The intersection has received upgraded signals and pavement markings define the lanes. These improvements should help alleviate the sideswipes that may be attributed to drivers feeling closed-in during through movements. The peak hours should be monitored over a period of time to determine if opportunities exist to borrow time from one cycle to more efficiently move traffic. During this review, pedestrian and bicycle users should also be noted as to their "feeling of safety" as they use this intersection.

Advance Intersection Signage: Due to side street parking and the bicycle lane, the offset of the grass buffer may not make traditional post mounted signage visible. For this reason, consider advance signal signage with supplemental flashers.

Consider offsetting the through/right turn movement stop bar for the eastbound and northbound so as to provide improved sight distance for right turning drivers.

Corydon Pike and Main Street at River Road, Issues and Countermeasures

To address the primary issues of rear-end and right angle accident types:

Better Define the Intersection: This angled juncture of roadways would benefit from increasing sign size of the advance intersection notice. Freshen-up the pavement markings so as to better direct drivers through the road curve. The rear-end collisions with injuries have mixed reasons from "view obstructed" to "improper lane use" to "following too close". Helping drivers to "see" this angled intersection is the primary countermeasure focus.

Add Intersection Corridor Lighting: The accident reports note a number of collisions with injuries when dark, yet this intersection has some lighting. The existing lighting is very limited and would benefit from expanding to all corners and to the roads leading to the intersection.

Consider adding a northbound left protected signal phase to eliminate the yield sign which is located in sensitive driving area. If this phase was added, then the westbound right could be provided a protected arrow.

Maintenance of Brush Clearing: The northwest corner has brush that extends toward the sidewalk to possibly restrict sight distance at times. Clearing the trees or consistent maintenance would be beneficial.

Pedestrian Safety – Buffer: This intersection has pedestrian traffic to the service station and the sidewalk is to the back of curb with no green space buffer. Considering that the area is where the speed limit changes and the close proximity of pedestrians to traffic, offsetting the pedestrians at the northwest area should be a safety enhancement.

State Street and Market Street, Issues and Countermeasures

To address the primary issues of right angle and left turn angle accident types:

Monitor Effectiveness of Signal Upgrades and Markings: The upgraded traffic signals at this downtown location should be site checked periodically during peak hours to assure efficiency. The past reasons for rear-end collisions were “disregarded signal” and “improper lane use” (possible lane jumping). The recent modernized traffic signal and the upgraded pedestrian pavement markings can be anticipated to generally make the intersection safer. Pedestrian safety is currently enhanced with the decorative PED crossing markings. The pedestrian cycle could be checked to confirm that the timings are sufficient. Pavement markings appear to be currently well defined, so no improvements are believed warranted to the markings.

Grant Line Road / SR 111 and Beechwood Avenue, Issues and Countermeasures

To address the primary issues of rear-end and right angle accident types:

Traffic Signal Modernization and Coordination: The traffic signal is in need of a upgrade and modernizing the pedestrian indicators. Presently this signal is coordinated with the nearby Daisy Lane signal. The coordination between these two intersections should be reviewed and timings checked for several peak hours.

Access Management: The gas station at the north east end, and the business at the south east end both have accesses too close to the intersection, and should be considered for restricting movements. The restriction could start with signage and move to other measures if that is not effective. The left turn accident narratives at the gas station state “improper turn” and failure to yield” as the primary causes for that type of collision. Rear-End collisions at the intersection’s north approach may also benefit from restricting movements. The majority of

the right angle collisions are failure to yield, which may also improve with decreasing access points.

Implementing these improvements will provide enhancements that will help all users to benefit from ease of movement with reduced conflicts. The above bullet points have a number of overlapping issues across the 10 intersections. Addressing systemic issues other than these top ten will reduce risk where rate of crashes may not have yet risen to urgency. Common factors such as lighting and surface condition can be mitigated through design. Behavioral items, such as speeding, will require a delicate balance of scare resources of police enforcement. Traffic Calming items can be implemented in some of the instances. To consider the impact of speed on the fatalities and injuries, speed related crashes were reviewed and a summary is listed in a table below.

Data on roadway crashes was gathered for the years of 2010 to 2016 for the city. The data was then reduced such that only speed related crashes were counted. Data was then split into Property Damage Only and Fatal/Injury crashes. Analysis of the data showed that the percent of speed related crashes were approximately 3% of the total crashes and that 23.4% of these crashes were fatal and/or caused injury.

To determine the societal costs of these crashes during the study period, FHWA's societal costs for planning and project prioritization were consulted. The suggested price in 2009 USD for PDO crashes was found to be $7,400 and $ 158,200 for fatal and injury Crashes. These were then multiplied by 1.1178 to account for inflation between 2009 and 2016 as per US Inflation Calculator. The total cost throughout the study period was found to be $17,336,000, which averages to be approximately $2,500,000 per year. It is therefore recommended that traffic calming measures be considered and that a Traffic Calming Policy be adopted by the City. These findings are summarized in Table 1 below.

TABLE 1 – ACCIDENTS RELATED TO SPEED

YEAR	TOTAL ACCIDENTS			ACCIDENT TOTALS				Societal Costs (2016 $) (Crashes*Cost*Inflation)		
				PROPERTY DAMAGE		FATALITY / INJURY				
	Total	Speed Related	%Speed Related	Total	Speed Related	Total	Speed Related	PDO	F/I	Total
2010	1738	53	3.05%	1372	42	366	11	$348,000	$1,946,000	$2,294,000
2011	1740	50	2.87%	1407	33	333	17	$273,000	$3,007,000	$3,280,000
2012	1728	43	2.49%	1390	33	338	10	$273,000	$1,769,000	$2,042,000
2013	1653	47	2.84%	1355	34	298	13	$282,000	$2,299,000	$2,581,000
2014	1845	43	2.33%	1522	35	323	8	$290,000	$1,415,000	$1,705,000
2015	1832	59	3.22%	1526	46	306	13	$381,000	$2,299,000	$2,680,000
2016	1986	68	3.42%	1708	55	278	13	$455,000	$2,299,000	$2,754,000
Total	12522	363	2.90%	10280	278	2242	85	$2,302,000	$15,034,000	$17,336,000

Non-Motorized Safety Analysis

A primary goal during the review of pedestrian access was to reduce barriers to non-motorized forms of transportation. Physical barriers are Silver Creek, Mill Creek, I-265, I-64 and railroad crossings. Priority is given to connections to the 11 schools, College of Technology at New Albany (Purdue University), 12 parks, Ohio River Greenway, Indiana's Historic Pathways Scenic Byway, Ohio River Scenic Byway and over a dozen Historic Districts or structures. In discussions with various members of the Ohio River Greenway Commission, Parks and Health The primary item that is important to non-motorist safety was education. Education in the form of informing all users of what is safe and what Indiana law requires concerning treatment of pedestrians and cyclists. Education is needed on a regional level to engage New Albany, Jeffersonville, Clarksville and Louisville communities. This regional approach will capture the fact of how citizens travel the area.

The Downtown area and the more mature area east of downtown recorded 16 of 24 pedestrian crashes between 2009 to 2011 per the draft KIPDA Transportation Analysis District 20001 Report dated February 3, 2014. Each of these incidents was at unique locations (not reoccurring).

Pedestrian Fatalities

The pedestrian fatalities were unique circumstances that did not appear to follow a pattern. The specifics follow from the officer narrative in the crash reports. Two fatalities were in front of Slate Run elementary School. On December 28, 2010, two pedestrians were crossing State Run Road at dusk from the school parking lot and hit by a vehicle at 7:17PM (Master Record # 901562405). Adding intersection lighting and well delineated pavement markings is prudent due to the school location. At Grant Line Road / SR 111 at Jollissaint Avenue two vehicles were involved in a head on collision where a pedestrian was killed (Master Record # 901752039**).** On December 29, 2011 a body was reported "in the road" just north of Old Ford Road / Klerner Lane on Charlestown Road / SR 311 at 1:20 PM with no reported reason for the incident (Master Record # 901755676).

Prior to this report public comments concerning non-motorized routes or access included:

Blackiston Mill Road
Blackiston Mill Road has a lack of bike/pedestrian access.

Klerner Lane
Klerner Lane needs sidewalks for the whole length.
Klerner Lane needs sidewalks along between Castlewood Drive and Cliffwood Drive.

McDonald Lane
McDonald Lane needs sidewalks whole length. The City is currently programming corrections to this issue.

Mount Tabor Road
Mount Tabor Road needs sidewalks whole length. This area is also ranked as a priority to the City so as to avoid payment out of the TIF fund.

Scribner Street
The pedestrian button on the pole crossing Scribner Street from the parking lot to the library only allows 15 seconds to get across.

Scribner Street at New Albany- Floyd County Library
Traffic coming off I- 64 and onto Scribner Street is terrible. It is very difficult to cross the street at Spring Street because of the drivers turning right onto Spring Street. Maybe a skywalk would do well here.

Slate Run Road
Slate Run Road needs sidewalks whole length. The City has this area in current programming plans.

Spring Street
Bike lanes end abruptly on Spring Street and there are many trucks.

Vincennes Street and Spring Street Intersection Area
Frontages that form commercial driveways that don't define pedestrian right-of-way

State Street from Green Valley Road to I-265
From Coyle Drive to Daisy Lane, there are sidewalks on the west side of State Street, but not the east. From Daisy Lane to I- 265, there are no sidewalks on either side and no separate bicycle facilities.

Grantline Road corridor from McDonald Lane north to Mount Tabor Road
There are a few sidewalks on the west side of Mount Tabor Road, but none on the east side, nor are there sidewalks on Pillsbury Lane. There are sidewalks on the south side of Rolling Creek Drive, but the sidewalk does not continue to meet the sidewalk on Grantline Road. Similar conditions exist on McDonald Lane and Academy Drive.

Considering the above comments and the proximity to natural pedestrian magnets (shopping, schools, public libraries, entertainment venues and parks), sidewalks, multi-use paths and other connecting nodes should be considered. The city's desire is to install bike lanes and balancing the natural paths of citizens should be included in the decision making process. Grant writing and plan review with pedestrian awareness would be a good start on addressing the pedestrian needs.

Railroad At-Grade Crossing Analysis

Indiana "has one of the greatest number of public grade crossings (more than 5800) of any state in the nation and sadly, among the highest number of collisions, injuries and deaths at grade crossings annually"(Indiana Highway-Rail Grade Crossing Safety Action Plan, adopted 6/1/2012, Page 4). The report goes on to state that the safest grade crossing is one that is not there and that Indiana has the fifth highest density of public grade crossings of any state in the nation.

New Albany's at-grade crossings were reviewed for the purpose of developing an inventory and recommend safety improvements. Some recommendations considered closing the crossings due to seldom use or redundant grade crossings. The TSP reached out to roadway users, railroad companies, local law enforcement, INDOT, Federal Highway Administration (FHWA) and other stakeholders for this analysis. Across the state, about half of all public at-grade crossings have train activated warning devices (ibid). In the US DOT Inspector General's 2004 report to congress, analysis of data nationwide revealed that risky driver behavior or poor judgment accounted for 94 percent of public grade crossing collisions. The goal of this portion of the TSP is to ensure safe crossing of railroad at-grade crossings throughout the city for all users, and thus eliminating traffic collision deaths and incapacitating injuries. Grade crossing collisions are a tiny fraction of the state's overall motor vehicle collision problem, but potential for a train derailment adds the risk of injuries, deaths of train crew, passengers and New Albany residents as well as property damage. Fire, explosion, or hazardous material release is a risk from an at-grade collision.

The FWHA Indiana division reviewed nearly 1000 Indiana police reports on collisions at grade crossings from January 1, 2003 through April 5, 2012 and found that the primary factor for grade crossing collisions was driver decision making. Risky driver behavior or poor judgment accounted for 94 percent of public grade crossing collisions, which was consistent with the US DOT Inspector General's 2004 report to congress. New Albany has 2 of the state's 42 railroads operating, to carry freight. There are no passenger trains currently or planned to travel through New Albany. New Albany has 46 public at grade crossings and 59 private grade crossings which lead to factories or onto farm fields and they operate under agreements between individual landowners and railroad companies.

An engineering study was conducted to determine the amount of vehicle crashes related to the local railroad crossings around New Albany Indiana from the time of January 1st of 2007 to December 31st of 2016 using data provided by the City. This study found that there were 8 crashes related to railroad crossings during the study period, as summarized in Tables 2 and 3. All of these crashes were property damage only (PDO). Six of these crashes took place on Corydon Road, two at the eastern most crossing (724966S), four at the western most crossing (724971N).

Judging from pictures taken from Google Earth on February 10th, 2017, Crossing 724971N has its eastbound traffic control measures on the left side of the road. This layout is unintuitive for the driving public and can easily become blocked by the local foliage.

TABLE 2 – AT-GRADE RAILROAD ACCIDENTS DURING STUDY PERIOD

Year	RR Incident #	Crossing Number	Occupants	Position*	Visibility	Weather	F/I/PDO
2016	121092	724966S	NO	1	DARK	CLEAR	PDO
2016	119348	724960B	YES	3	DAY	CLEAR	PDO
2014	110560	724971N	YES	1	DARK	CLOUDY	PDO
2013	105396	724971N	YES	2	DARK	RAIN	PDO
2013	104470	724971N	YES	2	DARK	CLEAR	PDO
2010	39870	724971N	YES	4	DARK	CLEAR	PDO
2010	39256	724966S	YES	2	DARK	CLEAR	PDO
2007	36095	352422P	YES	3	DAY	CLEAR	PDO

*Causes for crashes on at-grade crossings were determined to be:

1) Stalled or Stuck on Crossing
2) Stopped on Crossing
3) Moving Over Crossing
4) Trapped on Crossing by Traffic
5) Blocked on Crossing by Gates

The crash summary follows:

TABLE 3 – AT-GRADE RAILROAD ACCIDENT SUMMARY

Crossing	Road	Crashes
724966S	Corydon	2
724960B	SR111	1
724971N	Corydon	4
352422P	Vincennes	1
352435R	Ekin Ave	1

An audit of New Albany's 59 public at-grade railroad crossings was completed and the review considered enhancements to both passive and active protection. The existing inventory of warning devices at crossings (cross-bucks and/or stop signs, W10-1 Advance Warning Signs, W10-5 Hump Crossing signs, Pavement Markings and active protection is in the form of Four Quad Gates, flashing lights and gates, flashing lights and bells. The most common kind of mitigation strategy would be to install lighting for the crossings, as all of the crashes take place at night. A more specific mitigation strategy would be to reinstall all existing traffic control devices such that the devices are always on the driver's right hand side. This is more intuitive for drivers. Table 4 summaries the countermeasures.

TABLE 4 – AT-GRADE RAILROAD COUNTERMEASURES

Crossing	Road	Existing Mitigations
724966S	Corydon	W10-5, I-13, Flashing Lights, Bells
724960B	SR111	W10-1, Stop Line, RR Xing Symbol, I-13, Arms, Flashing Lights, Bells
724971N	Corydon	W10-1, I-13, Flashing Lights, Bells
352422P	Vincennes	W10-1, Stop Line, RR Xing Symbol, I-13, Arms, Flashing Lights, Bells
352435R	Ekin Ave	W10-5, I-13, Flashing Lights, Bells

Implementation of Transportation Safety Plan

New Albany's leadership to embrace safety is essential to the ongoing success of the TSP. Transparency, clear mission, vision and goals are the foundation for receiving the greatest benefit though this effort.

One of the goals is to identify where to invest funds for improvements. A basic principle for developing an effective safety strategy is to reach effective results with the least cost through using a benefit to cost ratio (B/C) for each safety concern (location, types of users, or manner of collision). The ranking of the B/C ratio for safety issues across the City is how intersections and roadway corridors are determined to be addressed. The ratios are determined through review of crash reports and ranking the severe manner of collisions.

Stakeholders engaged in the process included INDOT, KIPDA, City Engineering & Planning, Floyd County Engineering & Planning, Emergency Medical Responders, New Albany Police, Floyd County Sheriff, TARC and River Greenways. A variety of safety analysis tools have been applied to assist implementing action. These include: the Highway Safety Manual, Crash Modification Factors Clearinghouse, computer based spreadsheets and geo-locating model systems for spatial analysis and mapping, and, a number of technical assistance materials on websites.

Goals and Objectives

The City's primary goal for transportation safety is to reduce the number of fatalities and serious injuries within the city limits by one-half in the next ten years. New Albany's objectives for safety are:

- ✓ Reduce fatalities and serious injuries caused by vehicle crashes. Monitor and make changes to move toward eliminating preventable injuries.
- ✓ Provide a planning tool to ensure that funding is applied to projects that will result in maximum functional and economical benefit.
- ✓ Identification of intersection and roadway improvements that will maintain existing assets while improving the overall road network.

To expand upon these goals and objectives from the local to the national level, a combination of infrastructure and non-infrastructure programs and projects were considered.

New Albany's 5E Approach to Safety

Motor vehicle collisions happen due to a variety of factors: driver error, roadway geometry or conditions, or the vehicle. The City's goal to reduce accidents involves engaging all of the community partners in a process that is commonly known in traffic engineering as The 5Es.

1. **Education** -Emphasis on education reduces vehicle crashes
    A. Educating drivers to be safety conscious and preventative thinking. This is accomplished among entry level drivers through Driver Education and then continuing through citizens' advocacy groups and educators. Public communication is further available through social marketing, billboards and other media efforts.
    B. Aimed at transforming attitudes and modifying thinking. Understanding defensive driving techniques and sensitivity to fines and penalties. Directly address the emotional factors that result in distractive driving, unsafe behavior, unsafe speed and driver inattention. Focus on positive corrections, such as time management (to get to work on time), leaving early on trips, and planning ahead for potential delays.

2. **Emergency Medical Services (EMS)** – First responders are said to provide the last opportunity to positive health outcomes.

    A. EMS image in the community is to be noted as outreaching and educating the community. They are to be identified as the compassionate early contact with regular face-to-face contacts at community events.
    B. Expertise in service and a commanding presence in the community helps EMS to be recognized as having deep respect for preventing injuries and fatalities.

3. **Enforcement** – Law enforcement has a direct impact on behavior changes to both motorists and non-motorists.

    A. Prioritization
        1) Enforcement, education and incarceration. Ensure laws are obeyed.
        2) Identify problem areas and explore funding sources to patrol problem areas.
        3) Engineers work with both New Albany Police and Floyd County Sheriff Department to pin point areas to enforce. Data collection for Average Daily Counts can be set to collect speed data and then the results promptly provided to the agency for consideration for targeted enforcement.

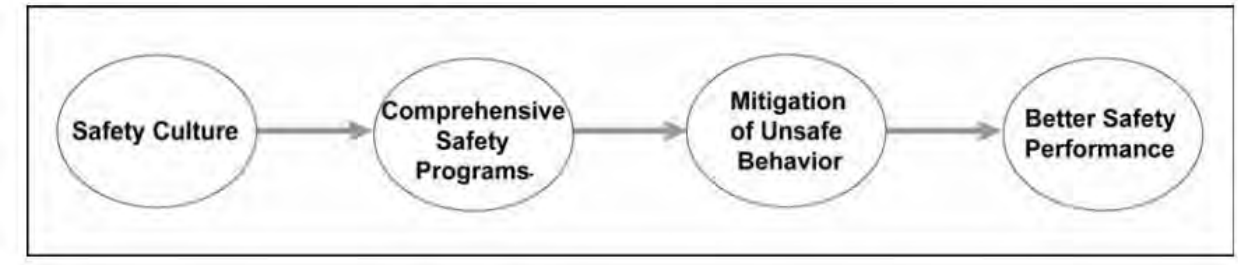
4. **Engineering** – Design, construction, operations, maintenance and planning transportation.
    A. Identify existing processes that build a safe environment (does City receive reports from police on enforcement areas?)
    B. Seeking to reduce speeds and potential conflicts

5. **Evaluation** – Measures the improvement in safety

    A. Monitor and document outcomes, attitudes and trends through the collection of data before and after corrective measures.
    B. Implement solutions to address evolving needs

Current Safety Culture

Safety Culture / Safety Performance Relationship



One definition of Safety Culture is *Shared values (what is important) and beliefs (how things work) that interact with New Albany's structures and control systems to produce safe behavior.*

Keeping this definition in mind, three questions to apply to New Albany's safety:

Who develops, defines, and communicates shared values regarding safety in transportation?

What are the internal policies and procedures (i.e., beliefs) that create a culture of safety?

How do the values and beliefs regarding safety interact with other organizational values and beliefs?

The City's engineering and public works departments develop, define and communicate the message of safety regarding transportation issues. The policies and procedures to communicate safety are currently in some of the City policy documents, organizational relationships and data management. The existing planning documents, policies and engineering standards were reviewed with respect to their responsiveness to safety.

Plans and Policy Documents

Several documents reviewed included the Comprehensive Plan, 2007 Grid System, New Albany Multi-Use Path and Sidewalk Plan, 2014 Speck and Associates Study, Transit Authority of River City (TARC). TARC is based out of Louisville and reports over 600 employees, 230 busses and trolleys, 89 paratransit vehicles that run 41 routes in five counties in Kentucky and southern Indiana. The transit averaged approximately 47,000 riders daily during fiscal year 2013. TARC plans for additional routes now that the Ohio River Bridges Project is complete. Plans are also to improve headway, adjustments to bus stops (ADA enhancements or safety changes).

Safety Data

Safety data includes not just crash reports, but also roadway inventory data, traffic data, and history of safety improvement projects. Land use items related to safety are also noted. These may include pedestrian corridors and natural pedestrian magnets (parks, schools, convenience and liquor stores, etc.). New Albany's safety plan is data driven so as to provide metrics for measurement of improvements. The periodic updating of data is anticipated to also help in the application for grants to reduce problem areas.

The focus on the manner of collisions that caused the greatest potential for injuries was a primary sort of the total data. Right angle and left turn collisions have historically been the types that result in the most severe injuries, compared to the more prevalent rear end manner of collisions. The overall quantity of collisions by intersection were then ranked, followed by review of main corridors that were known as heavier volume through review of KIPDA and INDOT historical records. Areas where there were a relatively high number of collisions, but not a high quantity of injuries, those areas were ranked by the greatest the damage estimate loss. The greater damage estimate loss is generally associated with more severe manner of collisions as compared to lower damage estimates. Some reports also revealed telling signs of where minor improvements in the form of signage might be of benefit (officer entries of many "failure to yield" or "disregarded signal"). These items were also categorized and ranked in order to develop a complete and through view of the causes and consideration of counter measures.

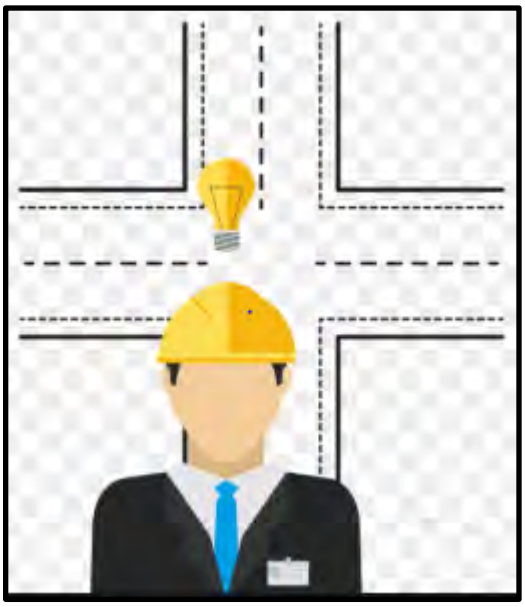
Environmental Conditions

Darkness without streetlight was the most significant environmental crash factor on all types of roadways. Appendix B includes a chart that lists each intersection light condition during the accidents. Crashes occurring on weekends were more likely to be severe than weekdays on all types of routes. Yet, weekends were only a significant crash factor for rural two-lane and non-two-lane routes. The most noticeable weather condition related to severe injuries on rural two-lane and non-two-lane routes was fog, smoke or dust. However, no weather conditions were significantly-related to severe crashes on any type of route.

Counter Measures

Appendix E provides a helpful tool box approach to selecting countermeasures at both signalized and un-signalized intersections. The thinking process starts with identifying the suspected issue, then engineering review of the applicable crash types. Effective and relevant countermeasures can be discerned through review of issues and mitigation methods. The selection of methods to counteract the accidents with severe injuries is focused on the factors associated with the severe crashes identified in the above section. The factors associated with severe crashes are:

1. Curve
2. Run-off-road
    a. Utility Pole
    b. Tree
3. Head-on
4. Pedestrian
5. Bicycle
6. Motorcycle
7. Alcohol
8. Darkness



Recommended Treatments

Countermeasures are selected to reduce crash frequency and severity at specific sites. To customize methods for particular locations, the roadway type, documented crash patterns, and specific safety concerns are considered. Several countermeasures may be considered for recommended treatments based on an economic appraisal and priority-ranking weight of the options. Three cost methods to evaluate corrective action are:

1. Cost Effectiveness: The countermeasure cost per crash reduced
2. Benefit-Cost Ratio: Ratio of monetary benefits to countermeasure costs
3. Net Benefits: Monetary benefits minus countermeasure costs

Of these three, the Benefit-Cost Ratio, along with the service life of the proposed improvement were used in this analysis to meet the requirements of the Federal Highway Safety Improvement Program (HSIP) so the analysis results will be consistent with FWHA Federal fund requests.

There are four basic strategies for accident reduction through the use of countermeasures. These are:

- Single site: The treatment of specific types of accident at a single location;
- Mass action plans: The application of a known remedy to locations with a common accident problem (a pattern with accident density);
- Route action plans: The application of known remedies along a route with a high accident rate;
- Area coverage: The applications of various treatments over a wide area of town/city, i.e. including traffic management and traffic calming (speed reducing devices).

Application of countermeasures is according to the most severe injuries and the higher risk areas. Locations where accidents are grouped together are examined to seek common treads between accident types. Accidents that occur at intersections, rather than between intersections, are common based on a number of conflict points. Officer narratives are valuable in determining causes that lead to the crash. Sometimes accident reduction is feasible through low-cost engineering measures (such as road signs and pavement markings) at problem locations.

APPENDIX A: TOP 50 INTERSECTION STUDY

Weighted Rank	Intersection				2010-2016 Total Crashes	2010-2016 Total Injuries	Crash Severity			Severity Index	Crash Rate	ADT Entering Intersection	Criteria Rankings			Total Criteria Score
	Major Roadway		Minor Roadway				With Fatalities	With Reported Injury(ies)	With No Reported Injuries or Fatalities				Frequency	Severity Index	Crash Rate	
1	GRANT LINE ROAD / SR 111	22380	MOUNT TABOR ROAD	8950	229	82	1	56	172	1.54	2.9	31330	1	15	4	20
2	GRANT LINE ROAD / SR 111	8715	CHAPEL LANE	1425	86	49	1	29	56	1.80	3.3	10140	19	3	1	23
3	GRANT LINE ROAD / SR 111	12180	ST JOSEPH ROAD	975	101	53	0	29	72	1.57	3.0	13155	10	13	3	26
4	CHARLESTOWN ROAD / SR 311	15800	BLACKISTON MILL & RAINBOW DRIVE	6240	177	58	0	37	140	1.42	3.1	22040	3	39	2	44
5	STATE STREET	27190	COYLE DRIVE	2500	180	53	0	36	144	1.40	2.4	29690	2	40	6	48
6	DAISY LANE	9500	GREEN VALLEY ROAD	9000	86	27	0	21	65	1.49	1.8	18500	19	24	15	58
7	SPRING STREET	18300	VINCENNES STREET	9360	89	29	1	22	66	1.62	1.3	27660	17	9	33	59
8	MAIN STREET & RIVER ROAD	12215	CORYDON PIKE	1660	56	21	1	14	41	1.70	1.6	13700	35	4	21	60
9	STATE STREET	6165	MARKET STREET	5000	60	20	0	15	45	1.50	2.1	11165	32	21	8	61
10	GRANT LINE ROAD / SR 111	11170	BEECHWOOD AVENUE	4615	83	22	0	19	64	1.46	2.1	15785	23	31	9	63
11	SPRING STREET	19150	SILVER STREET	6300	121	32	0	24	97	1.40	1.9	25450	7	43	13	63
12	STATE STREET	11560	OAK STREET	1030	55	26	0	17	38	1.62	1.7	12590	37	8	18	63
13	GRANT LINE ROAD / SR 111	18600	HAUSFELDT LANE	4820	138	37	0	24	114	1.35	2.3	23420	5	52	7	64
14	CHARLESTOWN ROAD / SR 311	19650	INNOVATION BLVD. & ST. JOE STREET	4000	121	43	0	22	99	1.36	2.0	23650	7	48	10	65
15	STATE STREET	27195	DAISY LANE	6250	161	33	0	29	131	1.35	1.9	33445	4	51	11	66
16	STATE STREET	17900	CAPTAIN FRANK ROAD	4500	92	32	0	21	71	1.46	1.6	22400	14	32	20	66
17	I-265 WEST RAMP	21670	GRANT LINE ROAD / SR 111	10700	113	31	1	21	91	1.47	1.4	32370	9	29	29	67
18	STATE STREET	11560	ELM STREET	3685	73	21	0	17	56	1.47	1.9	15245	26	30	12	68
19	CHARLESTOWN ROAD / SR 311	15800	KLERNER LANE	6500	84	20	1	16	67	1.51	1.5	22300	22	20	26	68
20	GRANT LINE ROAD / SR 111	15420	ROLLING CREEK DRIVE	3000	85	20	0	18	67	1.42	1.8	18420	21	38	16	75
21	VINCENNES STREET	7310	OAK STREET	1030	39	16	0	12	27	1.62	1.8	8340	52	10	14	76
22	I-265 EAST RAMP	24870	CHARLESTOWN ROAD / SR 311	10010	101	39	0	25	76	1.50	1.1	34880	10	22	44	76
23	GRANT LINE ROAD / SR 111	10935	ACADEMY DR. & MCDONALD LANE	2300	93	20	0	13	80	1.28	2.8	13235	13	59	5	77
24	BLACKISTON MILL ROAD	13600	SILVERWOOD COURT	75	45	39	0	22	23	1.98	1.3	13675	46	1	32	79
25	SPRING STREET	10400	STATE STREET	10000	90	23	0	16	74	1.36	1.7	20400	16	50	17	83
26	I-265 EAST RAMP	24985	GRANT LINE ROAD / SR 111	10730	138	33	0	23	115	1.33	1.5	35715	5	53	25	83
27	CHARLESTOWN ROAD / SR 311	18770	CHAPEL LANE	2800	64	17	1	13	50	1.58	1.2	21570	29	12	42	83
28	STATE STREET	17900	NEW ALBANY PLAZA	4500	88	24	0	17	71	1.39	1.5	22400	18	46	23	87
29	I-265 WEST RAMP	24870	CHARLESTOWN ROAD / SR 311	6000	92	26	0	21	71	1.46	1.2	30870	14	32	41	87
30	CHARLESTOWN ROAD / SR 311	30090	CHARLESTOWN CROSSING	2500	101	26	0	20	81	1.40	1.2	32590	10	44	34	88
31	CHARLESTOWN ROAD / SR 311	15800	SLATE RUN ROAD	2810	56	23	0	15	41	1.54	1.2	18610	35	16	40	91
32	CHARLESTOWN ROAD / SR 311	10925	BEECHWOOD AVENUE	3870	49	19	0	12	37	1.49	1.3	14795	42	23	31	96
33	I-265 WEST RAMP	13865	PAOLI PIKE	8735	83	23	0	16	67	1.39	1.4	22600	23	47	27	97
34	CHARLESTOWN ROAD / SR 311	30090	KAMER MILLER ROAD	5020	80	18	1	15	64	1.51	0.9	35110	25	19	53	97

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	Major Roadway		Minor Roadway				With Fatalities	With Reported Injury(ies)	With No Reported Injuries or Fatalities				Frequency	Severity Index	Crash Rate	
35	CHARLESTOWN ROAD / SR 311	30090	MOUNT TABOR ROAD	6000	57	34	0	18	39	1.63	0.6	36090	33	7	57	97
36	CHARLESTOWN ROAD / SR 311	13565	SILVER STREET	7655	57	23	0	15	42	1.53	1.1	21220	33	17	48	98
37	STATE STREET	11560	CHERRY STREET	5100	44	29	0	18	26	1.82	1.0	16660	47	2	49	98
38	GRANT LINE ROAD / SR 111	19870	UNIVERSITY WOODS DRIVE	3000	70	20	0	14	56	1.40	1.2	22870	27	40	38	105
39	SPRING STREET	10400	PEARL STREET	1775	37	15	0	11	26	1.59	1.2	12175	55	11	39	105
40	ELM STREET	9700	SILVER STREET	1890	50	14	0	9	41	1.36	1.7	11590	39	49	19	107
41	PAOLI PIKE	13860	BUFFALO TRAIL	100	50	12	0	10	40	1.40	1.4	13960	39	40	28	107
42	U.S. 150	16285	PAOLI PIKE	2770	43	12	1	9	33	1.67	0.9	19055	48	5	54	107
43	VINCENNES STREET	7310	ELM STREET	4160	38	17	0	9	29	1.47	1.3	11470	53	26	30	109
44	MOUNT TABOR ROAD	6750	KLERNER LANE	6495	54	9	0	9	45	1.33	1.6	13245	38	53	22	113
45	U.S. 150	26000	OLD VINCENNES ROAD	1000	70	26	0	15	55	1.43	1.0	27000	27	35	51	113
46	CHARLESTOWN ROAD / SR 311	7900	VINCENNES STREET	6950	46	15	0	10	36	1.43	1.2	14850	45	34	35	114
47	MAIN STREET	6165	STATE STREET	5900	33	11	0	9	24	1.55	1.1	12065	57	14	46	117
48	GREEN VALLEY ROAD	9000	BONO ROAD	2050	34	9	0	8	26	1.47	1.2	11050	56	28	36	120
49	STATE STREET	14850	GREEN VALLEY ROAD	9000	33	13	0	11	22	1.67	0.5	23850	57	6	60	123
50	MARKET STREET	7500	5th STREET	5000	49	9	0	7	42	1.29	1.5	12500	42	58	24	124

APPENDIX B: ROADWAY SAFETY AUDITS

TABLE 1				GRANT LINE ROAD / SR 111 AT MOUNT TABOR ROAD																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	34	26	8	16	5	5	1	2	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	0
2011	43	32	11	10	4	5	3	3	0	7	3	0	0	2	0	1	0	2	1	0	0	0	0	2	0
2012	37	27	10	13	5	7	3	3	1	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2013	21	15	6	4	3	6	0	2	0	0	1	0	0	0	0	0	2	3	0	0	0	0	0	0	0
2014	37	27	10	9	4	12	3	2	1	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
2015	24	19	5	6	1	2	3	1	0	6	0	1	0	1	0	1	0	0	1	0	0	0	0	1	0
2016	32	25	7	13	1	5	3	2	0	2	0	0	1	1	0	0	1	1	1	0	0	0	0	1	0
Accident Totals				71	23	42	16	15	2	21	5	2	1	4	0	2	3	6	5	3	0	0	0	5	2
Average / Year				10.1	3.3	6.0	2.3	2.1	0.3	3.0	0.7	0.3	0.1	0.6	0.0	0.3	0.4	0.9	0.7	0.4	0.0	0.0	0.0	0.7	0.3
% Total Accidents				41.2%		25.4%		7.5%		11.4%		1.3%		1.8%		2.2%		4.8%		1.3%		0.0%		3.1%	
Average of Total PDO Accidents per Year = 24.4										Average of Total F/I Accidents per Year = 8.1															

TABLE 1A				GRANT LINE ROAD / SR 111 AT MOUNT TABOR ROAD													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	34	26	8	21	8	1	0	0	0	0	0	0	0	0	0	4	0
2011	43	32	11	27	10	1	0	0	0	0	0	0	0	0	0	4	1
2012	37	27	10	25	8	0	0	0	0	0	0	0	0	0	0	2	2
2013	21	15	6	11	6	0	0	0	0	0	0	0	0	0	0	4	0
2014	37	27	10	22	8	0	0	0	0	0	0	1	1	0	0	4	1
2015	25	20	5	15	4	0	0	0	0	0	0	1	0	0	0	4	1
2016	32	25	7	21	5	0	0	0	0	0	0	0	0	0	0	4	2
Accident Totals				142	49	2	0	0	0	0	0	2	1	0	0	26	7
Average / Year				20.3	7.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	3.7	1.0
% Total Accidents				83.4%		0.9%		0.0%		0.0%		1.3%		0.0%		14.4%	
Average of Total PDO Accidents per Year = 24.6										Average of Total F/I Accidents per Year = 8.1							

TABLE 1B				GRANT LINE ROAD / SR 111 AT MOUNT TABOR ROAD									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	34	26	8	0	0	1	0	2	0	23	8	0	0
2011	43	32	11	4	1	0	0	4	1	24	9	0	0
2012	37	27	10	3	0	1	0	2	0	21	10	0	0
2013	21	15	6	1	0	1	1	1	0	11	5	1	0
2014	37	27	10	5	3	1	0	2	0	19	7	0	0
2015	25	20	5	3	1	3	0	1	0	13	4	0	0
2016	32	25	7	3	2	2	0	0	0	20	5	0	0
Accident Totals				19	7	9	1	12	1	131	48	1	0
Average / Year				2.7	1.0	1.3	0.1	1.7	0.1	18.7	6.9	0.1	0.0
% Total Accidents				11.4%		4.4%		5.7%		78.2%		0.4%	
Average of Total PDO Accidents per Year = 24.6								Average of Total F/I Accidents per Year = 8.1					

Notes:

There were noticeable speeding drivers during the audit. Concern was expressed on the northbound sight distance where the crest limits visibility and adding overhead signage should be considered. Pavement markings are faded at locations and there are overhead signs are absent or faded, which impairs driver's lane selection. Pedestrian traffic limited due to lack of crosswalks and non-compliant ramp at southwest corner. Suggest raised medians at north and west approaches for access control. The Gas station exiting left turn is a problem. Advance signage before the hill should warn of the traffic signal. High volume and speed at this intersection. Area has general feeling of "not friendly" to non-motorized users. Open speeds, high traffic volume and the hill crest are the noted issues.

TABLE 2	GRANT LINE ROAD / SR 111 AT CHAPEL LANE																							
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																				
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	10	5	5	2	1	0	0	1	0	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0
2011	9	7	2	1	0	0	0	0	1	0	0	0	0	0	0	3	0	1	1	0	0	0	0	2	0
2012	17	11	6	1	1	0	0	1	1	0	0	0	0	0	0	8	3	0	1	0	0	0	0	1	0
2013	17	12	5	0	0	0	0	4	1	0	0	0	0	0	0	6	2	2	2	0	0	0	0	0	0
2014	11	7	4	2	1	0	0	3	0	0	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0
2015	13	7	6	1	0	1	2	1	0	0	0	0	0	0	0	4	2	0	2	0	0	0	0	0	0
2016	9	7	2	0	0	0	2	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0
Accident Totals				7	3	1	4	10	3	0	0	0	0	0	0	32	11	3	9	0	0	0	0	3	0
Average / Year				1.0	0.4	0.1	0.6	1.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	4.6	1.6	0.4	1.3	0.0	0.0	0.0	0.0	0.4	0.0
% Total Accidents				11.6%		5.8%		15.1%		0.0%		0.0%		0.0%		50.0%		14.0%		0.0%		0.0%		3.5%	
Average of Total PDO Accidents per Year = 8.0																									
Average of Total F/I Accidents per Year = 4.3																									

TABLE 2A	GRANT LINE ROAD / SR 111 AT CHAPEL LANE															
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION												
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	10	5	5	4	3	0	0	0	0	0	0	0	0	0	0	1	2
2011	9	7	2	2	0	0	0	0	0	0	0	1	1	1	0	3	1
2012	17	11	6	4	3	0	0	0	0	0	0	0	0	0	1	7	2
2013	17	12	5	1	3	1	0	0	0	0	0	2	0	0	0	8	2
2014	11	7	4	3	3	0	0	0	0	0	0	0	0	1	0	3	1
2015	13	7	6	3	5	0	0	0	0	0	0	0	0	0	0	4	1
2016	9	7	2	4	1	0	0	0	0	0	0	0	0	0	0	3	1
Accident Totals				21	18	1	0	0	0	0	0	3	1	2	1	29	10
Average / Year				3.0	2.6	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.3	0.1	4.1	1.4
% Total Accidents				45.3%		1.2%		0.0%		0.0%		4.7%		3.5%		45.3%	
Average of Total PDO Accidents per Year = 8.0																	
Average of Total F/I Accidents per Year = 4.3																	

TABLE 2B	GRANT LINE ROAD / SR 111 AT CHAPEL LANE										
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION							
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	10	5	5	0	0	1	3	1	0	3	2	0	0
2011	9	7	2	0	0	4	1	0	0	3	1	0	0
2012	17	11	6	0	1	6	0	0	1	5	4	0	0
2013	17	12	5	0	0	3	2	1	0	8	3	0	0
2014	11	7	4	0	0	1	1	1	0	5	3	0	0
2015	13	7	6	0	0	2	3	0	0	5	3	0	0
2016	9	7	2	0	0	0	0	0	1	7	1	0	0
Accident Totals				0	1	17	10	3	2	36	17	0	0
Average / Year				0.0	0.1	2.4	1.4	0.4	0.3	5.1	2.4	0.0	0.0
% Total Accidents				1.2%		31.4%		5.8%		61.6%		0.0%	
Average of Total PDO Accidents per Year = 8.0													
Average of Total F/I Accidents per Year = 4.3													

APPENDIX B: ROADWAY SAFETY AUDITS

TABLE 3				GRANT LINE ROAD / SR 111 AT ST JOSEPH ROAD																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	17	13	4	6	2	2	2	2	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2011	13	8	5	4	3	3	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
2012	8	6	2	3	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
2013	14	11	3	5	0	3	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1
2014	13	9	4	2	2	1	0	1	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0	0	2
2015	18	12	6	11	1	1	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
2016	18	13	5	10	2	1	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accident Totals				41	12	11	6	4	0	3	0	0	0	0	0	9	7	2	1	1	0	0	0	1	3
Average / Year				5.9	1.7	1.6	0.9	0.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.3	1.0	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.4
% Total Accidents				52.5%		16.8%		4.0%		3.0%		0.0%		0.0%		15.8%		3.0%		1.0%		0.0%		4.0%	
Average of Total PDO Accidents per Year = 10.3																									
Average of Total F/I Accidents per Year = 4.1																									

TABLE 3A				GRANT LINE ROAD / SR 111 AT ST JOSEPH ROAD													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	17	13	4	8	2	0	0	0	0	0	0	0	0	0	0	5	2
2011	13	8	5	6	3	0	0	0	0	0	0	0	0	0	0	2	2
2012	8	6	2	4	2	0	0	0	0	0	0	0	0	0	0	2	0
2013	14	11	3	7	2	0	0	0	0	0	0	0	0	0	0	4	1
2014	13	9	4	7	2	1	1	0	0	0	0	0	0	0	0	1	1
2015	18	12	6	6	4	0	0	0	0	0	0	0	0	0	0	6	2
2016	18	13	5	7	2	0	0	0	0	0	0	0	0	0	0	6	3
Accident Totals				45	17	1	1	0	0	0	0	0	0	0	0	26	11
Average / Year				6.4	2.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	1.6
% Total Accidents				61.4%		2.0%		0.0%		0.0%		0.0%		0.0%		36.6%	
Average of Total PDO Accidents per Year = 10.3																	
Average of Total F/I Accidents per Year = 4.1																	

TABLE 3B				GRANT LINE ROAD / SR 111 AT ST JOSEPH ROAD									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	17	13	4	0	0	1	0	2	0	10	4	0	0
2011	13	8	5	0	0	1	0	0	0	7	5	0	0
2012	8	6	2	0	0	1	0	0	0	5	2	0	0
2013	14	11	3	0	0	0	0	1	0	9	3	1	0
2014	13	9	4	1	0	2	1	1	0	5	3	0	0
2015	18	12	6	0	0	0	0	1	0	11	6	0	0
2016	18	13	5	0	0	2	0	0	0	11	5	0	0
Accident Totals				1	0	7	1	5	0	58	28	1	0
Average / Year				0.1	0.0	1.0	0.1	0.7	0.0	8.3	4.0	0.1	0.0
% Total Accidents				1.0%		7.9%		5.0%		85.1%		1.0%	
Average of Total PDO Accidents per Year = 10.3													
Average of Total F/I Accidents per Year = 4.1													

APPENDIX B: ROADWAY SAFETY AUDITS

TABLE 4	CHARLESTOWN ROAD / SR 311 AT BLACKISTON MILL & RAINBOW DRIVE																							
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																				
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	29	22	7	5	2	8	3	6	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0
2011	20	15	5	7	0	3	2	1	0	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	1
2012	20	14	6	8	1	1	4	1	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0
2013	30	22	8	7	0	8	5	2	0	3	2	0	0	2	0	0	0	0	1	0	0	0	0	0	0
2014	21	19	2	5	1	5	1	5	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2015	24	19	5	3	1	8	3	2	0	4	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0
2016	32	28	4	10	2	6	1	4	0	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1
Accident Totals				45	7	39	19	21	1	19	2	6	1	2	0	1	0	3	5	1	0	0	0	2	2
Average / Year				6.4	1.0	5.6	2.7	3.0	0.1	2.7	0.3	0.9	0.1	0.3	0.0	0.1	0.0	0.4	0.7	0.1	0.0	0.0	0.0	0.3	0.3
% Total Accidents				29.5%		33.0%		12.5%		11.9%		4.0%		1.1%		0.6%		4.5%		0.6%		0.0%		2.3%	
Average of Total PDO Accidents per Year = 19.9				Average of Total F/I Accidents per Year = 5.3																					

TABLE 4A	CHARLESTOWN ROAD / SR 311 AT BLACKISTON MILL & RAINBOW DRIVE																	
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION														
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET		
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	
2010	29	22	7	17	7	0	0	0	0	0	0	0	0	0	0	5	0	
2011	20	15	5	12	2	0	0	0	0	0	0	0	1	0	0	3	2	
2012	20	14	6	12	6	0	0	0	0	0	0	0	0	0	0	2	0	
2013	31	23	8	20	8	0	0	0	0	0	0	0	0	0	0	3	0	
2014	21	19	2	18	2	0	0	0	0	0	0	0	0	0	0	1	0	
2015	24	19	5	14	4	0	0	0	0	0	0	0	0	0	0	5	1	
2016	32	28	4	23	3	0	0	0	0	0	0	0	0	1	0	4	1	
Accident Totals				116	32	0	0	0	0	0	0	0	1	1	0	23	4	
Average / Year				16.6	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	3.3	0.6	
% Total Accidents				83.6%		0.0%		0.0%		0.0%		0.6%		0.6%		15.3%		
Average of Total PDO Accidents per Year = 20.0				Average of Total F/I Accidents per Year = 5.3														

TABLE 4B	CHARLESTOWN ROAD / SR 311 AT BLACKISTON MILL & RAINBOW DRIVE											
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION								
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	29	22	7	5	0	1	0	0	0	16	7	0	0
2011	20	15	5	3	0	0	2	0	1	12	2	0	0
2012	20	14	6	1	1	0	0	2	0	11	5	0	0
2013	31	23	8	7	2	1	0	0	0	15	6	0	0
2014	21	19	2	1	0	1	0	0	0	17	2	0	0
2015	24	19	5	2	1	1	0	0	0	16	4	0	0
2016	32	28	4	6	1	1	0	0	0	20	3	1	0
Accident Totals				25	5	5	2	2	1	107	29	1	0
Average / Year				3.6	0.7	0.7	0.3	0.3	0.1	15.3	4.1	0.1	0.0
% Total Accidents				16.9%		4.0%		1.7%		76.8%		0.6%	
Average of Total PDO Accidents per Year = 20.0				Average of Total F/I Accidents per Year = 5.3									

Notes:

Roadway pavement condition is "Fair" with an estimated Paser rating of 7. Blackiston Mill needs overhead signs to help drivers have supplemental confirmation when pavement markings fade. Present faded pavement markings. Some of the curb ramps are not ADA compliant and consideration should be ranked for these upgrades to meet all users needs. Need for sidewalks on Blackiston Mill and PED ramp slope compliance. Access management concern was stated of the northeast corner gas station where sight distance is a problem for drivers. The drivers exiting the gas station were witnessed to be at risk and officer crash report narratives should be reviewed to see if this apparent hazard is common. Overall this intersection experiences high volumes to cause need to step-up counter measure considerations to reduce risk.

TABLE 5				STATE STREET AT COYLE DRIVE																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	23	18	5	5	1	7	3	2	0	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2011	24	21	3	7	1	9	2	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	21	16	5	7	4	5	1	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
2013	33	23	10	7	1	9	8	3	0	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2014	28	24	4	9	1	9	2	2	0	2	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
2015	26	21	5	8	2	7	2	1	0	4	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
2016	24	21	3	8	1	9	2	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Accident Totals				51	11	55	20	13	0	16	2	3	0	2	0	2	0	0	2	2	0	0	0	0	0
Average / Year				7.3	1.6	7.9	2.9	1.9	0.0	2.3	0.3	0.4	0.0	0.3	0.0	0.3	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0
% Total Accidents				34.6%		41.9%		7.3%		10.1%		1.7%		1.1%		1.1%		1.1%		1.1%		0.0%		0.0%	
Average of Total PDO Accidents per Year = 20.6										Average of Total F/I Accidents per Year = 5.0															

TABLE 5A				STATE STREET AT COYLE DRIVE													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	24	18	6	17	5	0	0	0	0	0	0	0	0	0	0	1	1
2011	24	21	3	16	3	0	0	0	0	0	0	0	0	0	0	5	0
2012	21	16	5	14	3	0	0	0	0	0	0	0	0	0	0	2	2
2013	33	23	10	18	10	0	0	0	0	0	0	0	0	0	0	5	0
2014	28	24	4	17	3	1	0	0	0	0	0	0	0	1	0	5	1
2015	26	21	5	21	2	0	0	0	0	0	0	0	0	0	0	0	3
2016	24	21	3	15	1	0	0	0	0	0	0	1	0	0	0	5	2
Accident Totals				118	27	1	0	0	0	0	0	1	0	1	0	23	9
Average / Year				16.9	3.9	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	3.3	1.3
% Total Accidents				80.6%		0.6%		0.0%		0.0%		0.6%		0.6%		17.8%	
Average of Total PDO Accidents per Year = 20.6								Average of Total F/I Accidents per Year = 5.1									

TABLE 5B				STATE STREET AT COYLE DRIVE									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	24	18	6	0	1	2	0	0	0	16	5	0	0
2011	24	21	3	0	0	0	0	0	0	20	3	1	0
2012	21	16	5	1	0	0	0	0	1	15	4	0	0
2013	33	23	10	4	1	1	0	0	0	18	9	0	0
2014	28	24	4	2	0	1	0	1	0	20	4	0	0
2015	26	21	5	1	2	0	0	0	0	20	3	0	0
2016	24	21	3	1	0	3	0	1	0	16	3	0	0
Accident Totals				9	4	7	0	2	1	125	31	1	0
Average / Year				1.3	0.6	1.0	0.0	0.3	0.1	17.9	4.4	0.1	0.0
% Total Accidents				7.2%		3.9%		1.7%		86.7%		0.6%	
Average of Total PDO Accidents per Year = 20.6								Average of Total F/I Accidents per Year = 5.1					

TABLE 6				DAISY LANE AT GREEN VALLEY ROAD																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	16	8	8	4	6	4	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2011	10	10	0	6	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	10	7	3	5	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2013	10	5	5	3	3	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	17	15	2	8	1	2	1	1	0	1	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0
2015	9	8	1	6	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	13	11	2	6	1	1	1	1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Accident Totals				38	13	11	3	6	0	5	3	0	0	0	0	2	0	1	1	0	0	1	0	0	1
Average / Year				5.4	1.9	1.6	0.4	0.9	0.0	0.7	0.4	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
% Total Accidents				60.0%		16.5%		7.1%		9.4%		0.0%		0.0%		2.4%		2.4%		0.0%		1.2%		1.2%	
Average of Total PDO Accidents per Year = 9.1																									
Average of Total F/I Accidents per Year = 3.0																									

TABLE 6A				DAISY LANE AT GREEN VALLEY ROAD													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	16	8	8	7	6	0	0	0	0	0	0	0	0	0	0	1	2
2011	10	10	0	7	0	0	0	0	0	0	0	1	0	0	0	2	0
2012	10	7	3	6	3	0	0	0	0	0	0	0	0	0	0	1	0
2013	10	5	5	3	4	0	0	0	0	0	0	0	0	0	0	2	1
2014	17	15	2	11	1	0	0	0	0	0	0	2	0	0	0	2	1
2015	10	9	1	7	1	0	0	0	0	0	0	0	0	0	0	2	0
2016	13	11	2	11	2	0	0	0	0	0	0	0	0	0	0	0	0
Accident Totals				52	17	0	0	0	0	0	0	3	0	0	0	10	4
Average / Year				7.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.4	0.6
% Total Accidents				80.2%		0.0%		0.0%		0.0%		3.5%		0.0%		16.3%	
Average of Total PDO Accidents per Year = 9.3																	
Average of Total F/I Accidents per Year = 3.0																	

TABLE 6B				DAISY LANE AT GREEN VALLEY ROAD									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	16	8	8	2	2	0	0	0	0	6	6	0	0
2011	10	10	0	1	0	1	0	0	0	8	0	0	0
2012	10	7	3	1	0	0	0	0	0	6	3	0	0
2013	10	5	5	0	1	0	0	0	0	5	4	0	0
2014	17	15	2	2	0	1	0	1	0	11	2	0	0
2015	10	9	1	1	0	1	0	0	0	7	1	0	0
2016	13	11	2	1	1	2	0	0	0	8	1	0	0
Accident Totals				8	4	5	0	1	0	51	17	0	0
Average / Year				1.1	0.6	0.7	0.0	0.1	0.0	7.3	2.4	0.0	0.0
% Total Accidents				14.0%		5.8%		1.2%		79.1%		0.0%	
Average of Total PDO Accidents per Year = 9.3													
Average of Total F/I Accidents per Year = 3.0													

Notes:

Pavement condition is "Fair" with an estimated PASER rating of 7. Pavement markings are functional, but noticeably fading and would benefit from being renewed. Adding overhead signs for lanes is needed. This intersection appears to be a good candidate for emergency vehicle preemption to smooth ambulance and fire movement. Curb ramps are adequate condition, but aged signal equipment needs PED indicator upgrade. Guardrail is damaged at the northeast side. One RSA participant noted this intersection has the feeling of impatient drivers and notable high traffic volume.

TABLE 7				SPRING STREET AT VINCENESS STREET																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	14	10	4	3	2	1	1	3	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0
2011	13	9	4	1	3	2	1	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	5	4	1	1	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	11	8	3	3	3	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	12	8	4	3	2	1	1	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
2015	13	10	3	2	2	3	0	2	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
2016	21	17	4	5	0	3	1	6	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Accident Totals				18	12	13	5	19	0	10	2	1	0	1	0	0	0	3	1	1	0	0	1	0	2
Average / Year				2.6	1.7	1.9	0.7	2.7	0.0	1.4	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.1	0.0	0.3
% Total Accidents				33.7%		20.2%		21.3%		13.5%		1.1%		1.1%		0.0%		4.5%		1.1%		1.1%		2.2%	
Average of Total PDO Accidents per Year = 9.4																									
Average of Total F/I Accidents per Year = 3.3																									

TABLE 7A				SPRING STREET AT VINCENESS STREET													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	14	10	4	6	3	1	0	0	0	0	0	1	0	0	0	2	1
2011	13	9	4	9	4	0	0	0	0	0	0	0	0	0	0	0	0
2012	5	4	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0
2013	11	8	3	6	2	0	0	0	0	0	0	0	0	1	1	1	0
2014	12	8	4	5	4	0	0	0	0	0	0	1	0	0	0	2	0
2015	13	10	3	9	3	0	0	0	0	0	0	0	0	0	0	1	0
2016	21	17	4	14	4	0	0	0	0	0	0	0	0	0	0	3	0
Accident Totals				53	21	1	0	0	0	0	0	2	0	1	1	9	1
Average / Year				7.6	3.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	1.3	0.1
% Total Accidents				83.1%		1.1%		0.0%		0.0%		2.2%		2.2%		11.2%	
Average of Total PDO Accidents per Year = 9.4																	
Average of Total F/I Accidents per Year = 3.3																	

TABLE 7B				SPRING STREET AT VINCENESS STREET									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	14	10	4	2	1	0	0	0	1	8	2	0	0
2011	13	9	4	3	0	0	0	0	0	6	4	0	0
2012	5	4	1	1	0	0	0	0	0	3	1	0	0
2013	11	8	3	1	2	0	0	1	0	6	1	0	0
2014	12	8	4	0	0	1	0	0	0	7	4	0	0
2015	13	10	3	2	0	0	0	1	1	7	2	0	0
2016	21	17	4	3	0	1	0	0	0	13	4	0	0
Accident Totals				12	3	2	0	2	2	50	18	0	0
Average / Year				1.7	0.4	0.3	0.0	0.3	0.3	7.1	2.6	0.0	0.0
% Total Accidents				16.9%		2.2%		4.5%		76.4%		0.0%	
Average of Total PDO Accidents per Year = 9.4													
Average of Total F/I Accidents per Year = 3.3													

TABLE 8				CORYDON PIKE AT MAIN STREET & RIVER ROAD																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	8	4	4	2	1	0	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
2011	8	4	4	2	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2012	11	7	4	3	0	1	1	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0	1	0	0
2013	8	7	1	3	0	1	0	2	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2014	9	8	1	4	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
2015	4	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2016	8	8	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Accident Totals				16	5	3	4	8	1	5	1	0	0	0	0	1	1	0	2	5	0	0	1	3	0
Average / Year				2.3	0.7	0.4	0.6	1.1	0.1	0.7	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.7	0.0	0.0	0.1	0.4	0.0
% Total Accidents				37.5%		12.5%		16.1%		10.7%		0.0%		0.0%		3.6%		3.6%		8.9%		1.8%		5.4%	
Average of Total PDO Accidents per Year = 5.9																									
Average of Total F/I Accidents per Year = 2.1																									

TABLE 8A				CORYDON PIKE AT MAIN STREET & RIVER ROAD													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	8	4	4	4	2	0	0	0	0	0	0	0	0	0	0	0	2
2011	8	4	4	3	4	0	0	0	0	0	0	0	0	0	0	1	0
2012	11	7	4	7	4	0	0	0	0	0	0	0	0	0	0	0	0
2013	8	7	1	5	1	0	0	0	0	0	0	0	0	1	0	1	0
2014	9	8	1	7	1	0	0	0	0	0	0	0	0	0	0	1	0
2015	4	3	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0
2016	8	8	0	3	0	0	0	0	0	0	0	0	0	0	0	5	0
Accident Totals				32	13	0	0	0	0	0	0	0	0	1	0	8	2
Average / Year				4.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.1	0.3
% Total Accidents				80.4%		0.0%		0.0%		0.0%		0.0%		1.8%		17.9%	
Average of Total PDO Accidents per Year = 5.9																	
Average of Total F/I Accidents per Year = 2.1																	

TABLE 8B				CORYDON PIKE AT MAIN STREET & RIVER ROAD									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	8	4	4	3	2	0	0	0	0	1	2	0	0
2011	8	4	4	1	0	2	0	0	0	1	4	0	0
2012	11	7	4	1	1	0	1	0	0	6	2	0	0
2013	8	7	1	1	1	0	0	0	0	6	0	0	0
2014	9	8	1	3	0	0	0	1	0	4	1	0	0
2015	4	3	1	0	0	0	0	0	0	3	1	0	0
2016	8	8	0	2	0	1	0	1	0	4	0	0	0
Accident Totals				11	4	3	1	2	0	25	10	0	0
Average / Year				1.6	0.6	0.4	0.1	0.3	0.0	3.6	1.4	0.0	0.0
% Total Accidents				26.8%		7.1%		3.6%		62.5%		0.0%	
Average of Total PDO Accidents per Year = 5.9													
Average of Total F/I Accidents per Year = 2.1													

TABLE 9				STATE STREET AT MARKET STREET																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	2	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2011	6	5	1	0	0	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2012	14	11	3	0	0	3	2	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0
2013	9	8	1	1	0	1	0	1	1	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2014	7	5	2	1	0	1	1	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2015	8	6	2	1	1	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2016	14	10	4	0	1	7	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Accident Totals				3	2	14	7	8	1	14	1	0	0	0	0	0	1	0	0	3	0	0	1	3	2
Average / Year				0.4	0.3	2.0	1.0	1.1	0.1	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.0	0.0	0.1	0.4	0.3
% Total Accidents				8.3%		35.0%		15.0%		25.0%		0.0%		0.0%		1.7%		0.0%		5.0%		1.7%		8.3%	
Average of Total PDO Accidents per Year = 6.4																									
Average of Total F/I Accidents per Year = 2.1																									

TABLE 9A				STATE STREET AT MARKET STREET													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0
2011	6	5	1	4	1	0	0	0	0	0	0	0	0	0	0	1	0
2012	14	11	3	11	1	0	0	0	0	0	0	0	0	0	0	0	2
2013	9	8	1	6	1	0	0	0	0	0	0	0	0	0	0	2	0
2014	7	5	2	4	2	0	0	0	0	0	0	0	0	0	0	1	0
2015	8	6	2	3	2	0	0	0	0	0	0	0	0	0	0	3	0
2016	14	10	4	8	4	0	0	0	0	0	0	0	0	0	0	2	0
Accident Totals				36	13	0	0	0	0	0	0	0	0	0	0	9	2
Average / Year				5.1	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.3
% Total Accidents				81.7%		0.0%		0.0%		0.0%		0.0%		0.0%		18.3%	
Average of Total PDO Accidents per Year = 6.4																	
Average of Total F/I Accidents per Year = 2.1																	

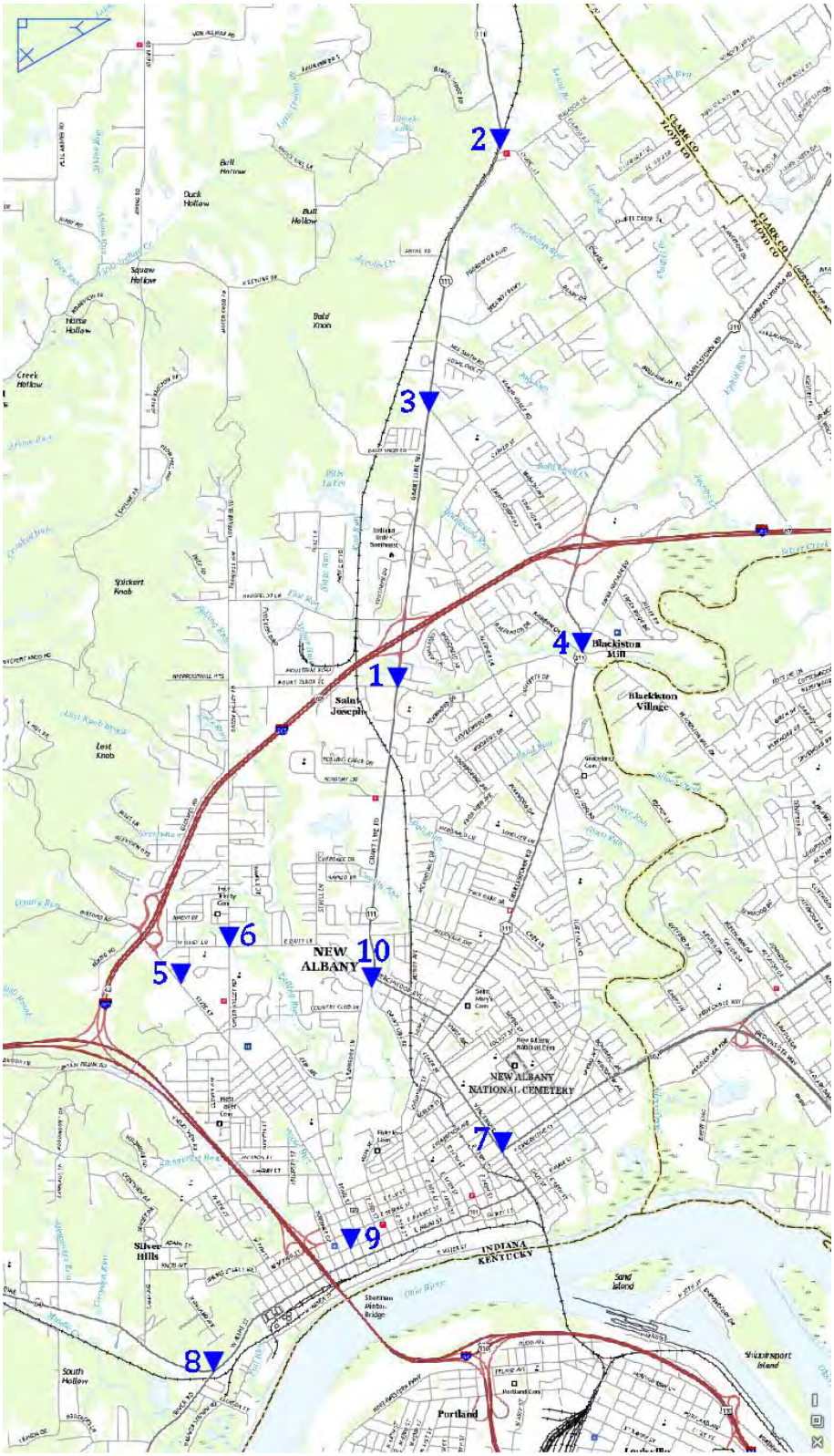
TABLE 9B				STATE STREET AT MARKET STREET									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	2	0	2	0	0	0	0	0	0	0	2	0	0
2011	6	5	1	0	0	0	0	1	0	4	1	0	0
2012	14	11	3	1	3	0	0	0	0	10	0	0	0
2013	9	8	1	3	1	0	0	0	0	5	0	0	0
2014	7	5	2	1	0	0	0	1	0	3	2	0	0
2015	8	6	2	1	0	0	0	0	0	5	2	0	0
2016	14	10	4	2	0	0	0	0	0	8	4	0	0
Accident Totals				8	4	0	0	2	0	35	11	0	0
Average / Year				1.1	0.6	0.0	0.0	0.3	0.0	5.0	1.6	0.0	0.0
% Total Accidents				20.0%		0.0%		3.3%		76.7%		0.0%	
Average of Total PDO Accidents per Year = 6.4													
Average of Total F/I Accidents per Year = 2.1													

TABLE 10				GRANT LINE ROAD / SR 111 AT BEECHWOOD AVENUE																			
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / MANNER OF COLLISION																			
				REAR-END		RIGHT ANGLE		SAME/OPPOSITE DIRECTION		LEFT TURN		LEFT/RIGHT TURN		RIGHT TURN		RAN OFF ROAD		HEAD-ON		BACKING CRASH		NON-COLLISION		OTHER - EXPLAIN IN NARRATIVE	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	8	5	3	3	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2011	6	4	2	2	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2012	7	5	2	2	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
2013	10	7	3	2	2	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0
2014	18	16	2	6	1	4	0	4	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
2015	17	13	4	4	2	2	1	4	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2016	17	14	3	4	3	4	0	2	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Accident Totals				23	9	13	3	13	0	9	2	0	1	2	0	1	1	0	2	3	0	0	1	0	0
Average / Year				3.3	1.3	1.9	0.4	1.9	0.0	1.3	0.3	0.0	0.1	0.3	0.0	0.1	0.1	0.0	0.3	0.4	0.0	0.0	0.1	0.0	0.0
% Total Accidents				38.6%		19.3%		15.7%		13.3%		1.2%		2.4%		2.4%		2.4%		3.6%		1.2%		0.0%	
Average of Total PDO Accidents per Year = 9.1																									
Average of Total F/I Accidents per Year = 2.7																									

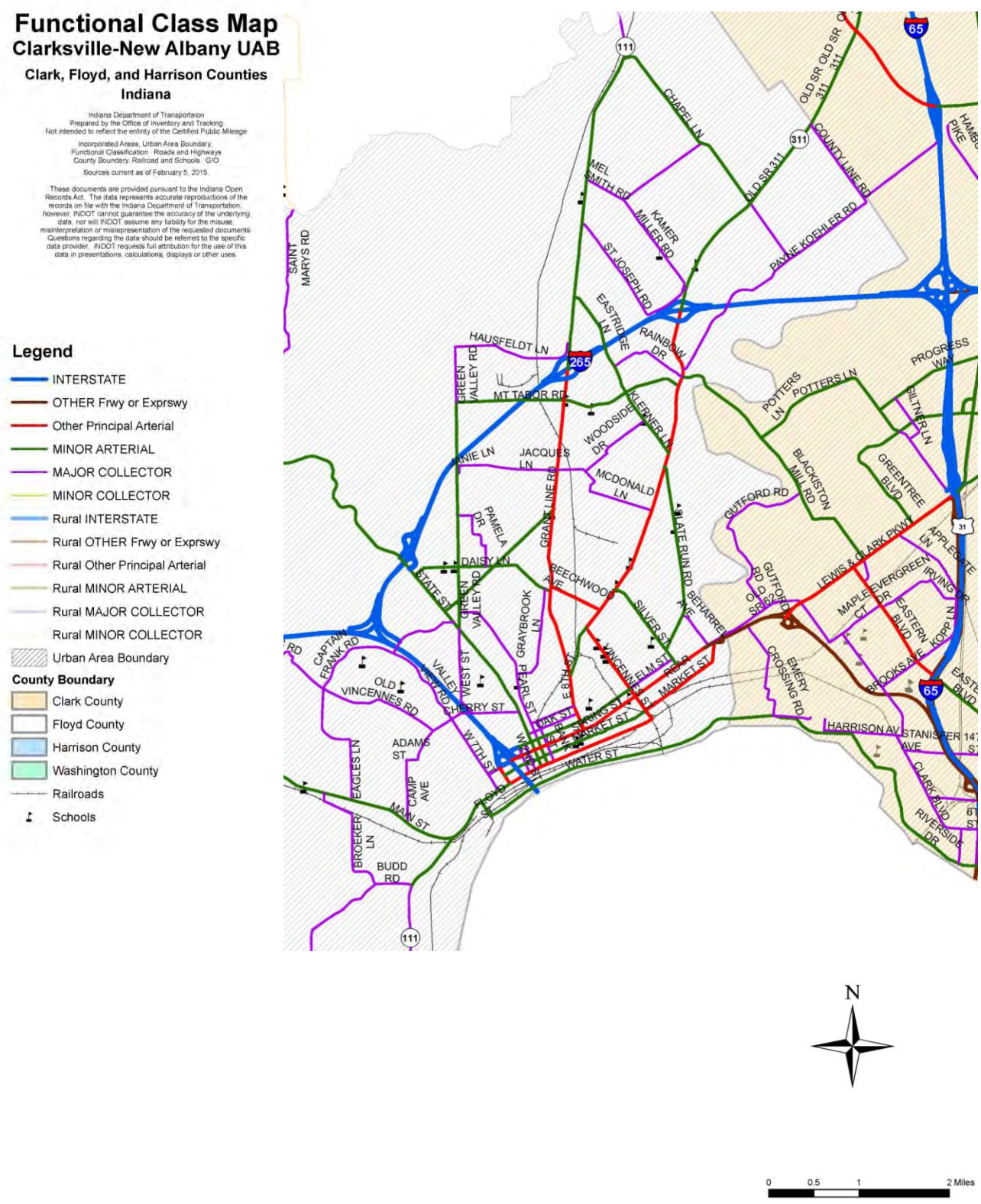
TABLE 10A				GRANT LINE ROAD / SR 111 AT BEECHWOOD AVENUE													
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / SURFACE CONDITION													
				DRY		ICE		LOOSE MATERIAL		MUDDY		SNOW / SLUSH		WATER (STANDING		WET	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	8	5	3	4	3	0	0	0	0	0	0	1	0	0	0	0	0
2011	6	4	2	2	2	0	0	0	0	0	0	0	0	0	0	2	0
2012	7	5	2	5	2	0	0	0	0	0	0	0	0	0	0	0	0
2013	10	7	3	7	3	0	0	0	0	0	0	0	0	0	0	0	0
2014	18	16	2	16	1	0	0	0	0	0	0	0	0	0	0	0	1
2015	17	13	4	11	4	0	0	0	0	0	0	1	0	0	0	1	0
2016	17	14	3	11	3	1	0	0	0	0	0	0	0	0	0	2	0
Accident Totals				56	18	1	0	0	0	0	0	2	0	0	0	5	1
Average / Year				8.0	2.6	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.7	0.1
% Total Accidents				89.2%		1.2%		0.0%		0.0%		2.4%		0.0%		7.2%	
Average of Total PDO Accidents per Year = 9.1																	
Average of Total F/I Accidents per Year = 2.7																	

TABLE 10B				GRANT LINE ROAD / SR 111 AT BEECHWOOD AVENUE									
YEAR	TOTAL ACCIDENTS	ACCIDENT TOTALS		ACCIDENT TYPE / LIGHTING CONDITION									
				DARK (LIGHTED)		DARK (NO LIGHT)		DAWN / DUSK		DAYLIGHT		UNKNOWN	
		PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I	PDO	F/I
2010	8	5	3	0	0	1	0	0	1	4	2	0	0
2011	6	4	2	0	0	0	0	0	0	4	2	0	0
2012	7	5	2	2	1	0	0	0	0	3	1	0	0
2013	10	7	3	1	0	0	1	0	0	6	2	0	0
2014	18	16	2	1	1	0	0	0	0	15	1	0	0
2015	17	13	4	1	0	1	0	0	0	11	4	0	0
2016	17	14	3	0	0	1	0	1	0	12	3	0	0
Accident Totals				5	2	3	1	1	1	55	15	0	0
Average / Year				0.7	0.3	0.4	0.1	0.1	0.1	7.9	2.1	0.0	0.0
% Total Accidents				8.4%		4.8%		2.4%		84.3%		0.0%	
Average of Total PDO Accidents per Year = 9.1													
Average of Total F/I Accidents per Year = 2.7													

APPENDIX C: LOCATION MAP



APPENDIX D: FUNCTIONAL CLASSIFICATION MAP



APPENDIX E: COUNTERMEASURES SUMMARY

Summary of Signalized Intersections				
Suspected Issue	*Applicable Engr Studies*	*Counter Measure*	*Applicable Crashes*	*Notes*
Slippery Surface	Skid Resistance Study Weather-related Study Traffic Conflict Study	Grooved Pavement	Wet Pavement	Results vary
		10% Speed Reduction	Injury	Refer to http://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/
			Fatality	
			PDO	
Large Volume	Volume Study Roadway Inventory Traffic Conflict Study Delay Study	Prohibit LT w/s signs	All	Consider Turning Volumes
		Add Protected LT phase	Angle	
		Flashing Yellow Arrow	Fatal and Injury	
		Increase Clearance Interval to be greater than ITE reccomended	Rear End	
			Angle	
		Install roundabout	Injury	
			All	
Poor Visibility	Roadway Inventory Study Traffic control Device Study Traffic Conflict Study Dilemma Zone Study Sight Distance Study	Advanced Warning Signs	PDO	
			Angle	
		12 inch di. Signal Heads	Angle	Industry Standard
		Confirm All-red Time	All	Industry Standard
		Lighting	Night	Improve Existing Lighting
			Fatal and Injury	Add Lighting to Unlite Intersection
			PDO	Add Lighting to Unlite Intersection
Unwarranted Signal	Signal Warrant Study	Remove Signal	All	

Summary of Unsignalized Intersections				
Suspected Issue	*Applicable Engr Studies*	*Counter Measure*	*Applicable Crashes*	*Notes*
Slippery Surface	Skid Resistance Study Weather-related Study Traffic Conflict Study	Grooved Pavement	Wet Pavement	Results vary
		10% Speed Reduction	Injury	Refer to http://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/
			Fatality	
			PDO	
Large Volume	Volume Study Roadway Inventory Traffic Conflict Study Delay Study Signal Warrant Study	Prohibit LT w/ signs	All	Consider Turning Volumes
		Add Protected LT phase	Angle	
		Flashing Yellow Arrow	Fatal and Injury	
		Install Single-Lane RAB	All	All Way Stop control
			Injury	All Way Stop control
		Install Modern RAB	All	Two Way Stop Control
			Injury	Two Way Stop control
		Install Multi-Lane RAB	All	All Way Stop control
		Install Signal	Fatal and Injury	
			Angle	
		Install Left Turn Lane	All	3-Leg Stop Control
			Fatal/Injury	3-Leg Stop Control
			All	4 Leg Stop Control
			Fatal/Injury	4 Leg Stop Control
Poor Visibility	Roadway Inventory Study Traffic control Device Study Traffic Conflict Study Sight Distance Study	Advanced Warning Signs	PDO	
			Angle	
		Lighting	Night	Improve Existing Lighting
			Fatal and Injury	Add Lighting to Unlite Intersection
			PDO	Add Lighting to Unlite Intersection
		Install Larger Signs	All	Results vary

APPENDIX E: COUNTERMEASURES SUMMARY

Summary of Segments				
Suspected Issue	*Applicable Engr Studies*	*Counter Measure*	*Applicable Crashes*	*Notes*
Slippery Surface	Skid Resistance Study Weather-related Study Traffic Conflict Study	Grooved Pavement	Wet Pavement	Results vary
		10% Speed Reduction	Injury	Refer to http://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/
			Fatality	
			PDO	
Large Volume	Volume Study Roadway Inventory Traffic Conflict Study	Add TWLTL	All	High Varience
			F/I	High Varience
		Road Diet	All	
Poor Visibility	Roadway Inventory Study Traffic control Device Study Traffic Conflict Study	Lighting	Fatal and Injury	4-6 Lane
			PDO	4-6 Lane
		Widen Lane Lines	F/I	

Sources: Garbel & Hoel (2002), CMF Clearing House

APPENDIX F: RAILROAD MAP

Indiana Railroads and Abbreviations

AMTK	Amtrak RR
BFH	Big Four Terminal Railroad
BLRR	Bee Line RR
CAPA	City of Auburn Port Authority
CLIW	Central Indiana & Western RR
CERA	Central Railroad Company of
CHER	Chicago, Ft. Wayne & Eastern RR
CIND	Central Railroad Company of Indiana
CKIN	Chesapeake & Indiana Railroad
CMPA	City of Madison Port Authority RR
CN	Canadian National RR
CNC	C & NC RR
CSSB	Chicago, Southshore, & South Bend RR
CSX	CSX RR
DCR	Dubois County RR
EVWR	Evansville Western Railroad
FWR	Elkhart & Western Railway
GDLK	Grand Elk Railroad
GRW	Gary Railway
HHPA	Hoosier Heritage Port Authority
HOS	Hoosier Southern RR
IERR	Indiana Eastern Railroad
IHDR	Indiana Harbor Del.
IN	Indiana Northeastern RR
INCR	Indian Creek RR
INDI	Indiana & Ohio RR
INRD	Indiana Rail Road Company
IRRM	Indiana Railroad Museum RR
ISRR	Indiana Southern RR
ISW	Indiana Southwestern Railway
KUS	Kankakee, Beaverville, & Southern RR
KR	Kokomo Rail
KTR	Kendallville Terminal RR
LIRC	Louisville & Indiana RR
LORL	Lucas Rail Lines dba LNA&C
MGR	MG Railroad
MSO	Michigan Southern Railroad
NS	Norfolk Southern RR
OVR	Ohio Valley Railroad
SIND	Southern Indiana Railway
TPW	Toledo, Peoria, & Western Railway
VVR	Vermilion Valley Railroad
WC	Wabash Central RR
WSR	Winamac Southern RR
WVRR	Whitewater Valley RR

Source:

STATE OF INDIANA
2017
RAIL SYSTEM MAP

DEPARTMENT OF TRANSPORTATION

6/09/2017

APPENDIX G: PHOTO LOG

Photo 1: State at Cherry PED Xing illustrates the value of upgrading PED Islands. Here pavement markings have been enhanced to provide better definition of the pathway.

Photo 2: Traffic signal indicators and overhead signs need review at each of the City's intersections. As programming permits, modernizing signals will pay back in safety improvements.

APPENDIX G: PHOTO LOG

Photo 3: Road Safety Audit comments provided specific on-site comments which helped pin-point causes of accident prone intersections. Here RSA participants review notes on their individual perceptions.

APPENDIX G: PHOTO LOG

Photo 4: Intersections with access points at the intersection and with Pedestrian activity were considered.

Photo 5: A variety of crosswalk markings have been used.

APPENDIX G: PHOTO LOG

Photo 6: Several downtown intersections have received signal upgrades.

Photo 7: Decorative Pedestrian crossing markings stand out during this rain day review of intersection conditions.

Photo 8: Here crosswalk and stop bar pavement markings stand out during this cloudy day.

Photo 9: Upgrades to Pedestrian Crossing ramp slopes and turning spaces need to be partnered with providing close access to Pedestrian buttons.

Photo 10: Clean crossing pavement markings are very helpful to non-motorized users

Photo 11: A view of a recent ramp improvement.

APPENDIX G: PHOTO LOG

Photo 12: New pavement markings and prominent Pedestrian Crossing sign define the intersection for all users.

Photo 13: RSA audit of an intersection where crosswalk markings are still needed at one approach.

Photo 14: Several poles on a corner are a reminder to consolidate projections when possible.

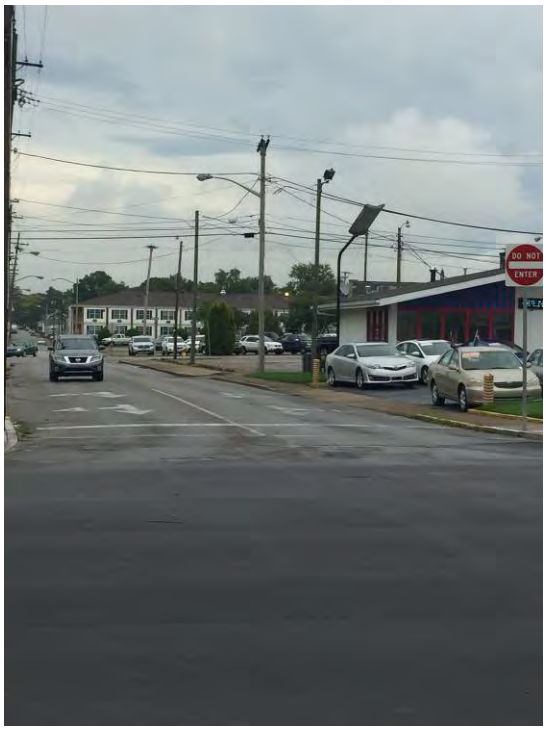


Photo 15: One Way streets had a few recorded accidents where drivers entered the wrong direction. Signage enhancements are a possible countermeasure to consider offsetting that event.

Photo 16: Another view of a one way street approach.

Photo 17: Pavement surface is smooth through the mainline, but the transition to worn pavement on a minor volume street can be seen here.

Photo 18: Notice the smooth transition around this manhole lid that is in the driver's wheel path.

Photo 19: This is an example of where directional pavement markings without overhead signs, can lead to driver confusion.

Photo 20: Clutter of overhead powerlines and several poles within a few feet of active travel.

Photo 21: Aged Pedestrian Indicators, if they work, do not demand pedestrian's attention.

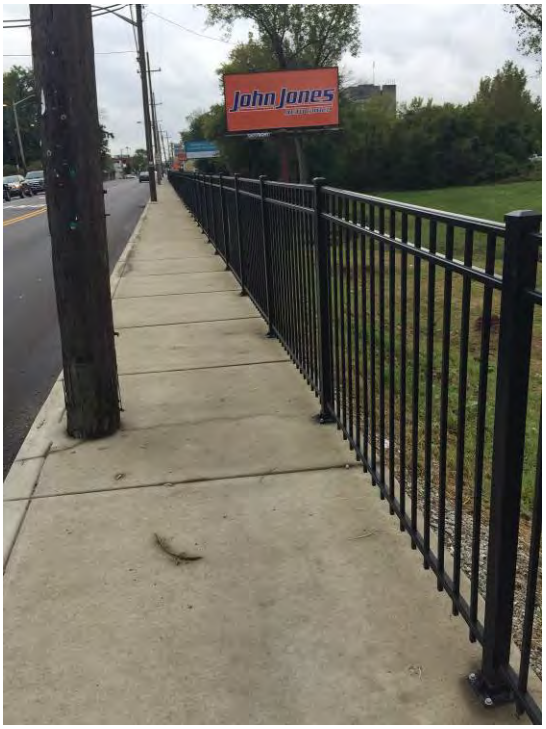


Photo 22: State Street safety improvement of rail greatly helps, yet non-moveable power pole creates a pinch point for a wheelchair user. Consideration of a sidewalk bump-out would be helpful.

Photo 23: Grade changes can surprise drivers to intersections. Enhanced lighted advance intersection signs can help motorists better anticipate intersections such as these.

Photo 24: Consideration of the length of the Pedestrian phase is needed at long crosswalk locations.

Photo 25: Intersections that are fairly spread out and have high peak hour volumes can be discouraging to Pedestrian use.

Photo 26: Vehicles following too close was a regular theme for the primary cause of rear-end type of collisions. Changing driver behavior should be an education goal.

Photo 27: Improvements to the road surface condition is beneficial on many levels.

Photo 28: Pedestrian ramps have shown their age and outlets to roadways present obstacles for some users.

Photo 29: Pedestrian push buttons need to have sidewalk extensions and/or relocation to align with the Pedestrian Indicators to ease crossing.