

## Introduction

The US 231/SR 46/SR 67 Corridor Planning Study has been undertaken by the Indiana Department of Transportation (INDOT) to assess the safety and efficiency of traffic flow on the state route system in the Town of Spencer, located in Owen County Indiana. Based on an assessment of purpose and need discussed in the Draft US 231/SR 46/SR 67 Statement of Purpose & Need Report (May 2007), study goals include the following:

- *Reducing Congestion*  
Levels-of-service are predicted to remain at acceptable levels for the next two decades. All intersections are predicted to operate at LOS C or better in peak hours through 2030. However, the daily traffic volume of 20,000 vehicles is near the threshold for a three-lane facility. Peak hour truck percentages of up to 12% contribute to occasional vehicle delays.
- *Improving Roadway Efficiency*  
The efficiency of the corridor is affected by numerous closely-spaced access points and traffic queues spanning more than one block, resulting in numerous driveways and side streets being frequently blocked. Inadequate curb radii create difficulties for vehicles, particularly trucks, when turning into local businesses or streets, further reducing efficiency.
- *Improving Safety*  
Over 200 crashes occurred in the study area from 2003-2005. Some of the crash types could be reduced by improved access control.
- *Meeting Current Roadway Geometric Criteria*  
The existing cross-section of the overlap section of US 231/SR 46/SR 67 in Spencer does not meet INDOT's Design Manual criteria for two-way left turn lane width, shoulder width, or curb offset. Poor drainage on Morgan Street frequently results in travel lane blockages.

The existing US 231/SR 46/SR 67 overlap section (Morgan Street) in Spencer is a three-lane roadway that runs in an east-west orientation through the town. A map of the corridor and the study area is shown on **Figure 1**. One through travel lane is provided in each direction with a center two-way left turn lane. Morgan Street serves approximately 20,000 vehicles per day, which is near the capacity of a three-lane facility. Much of the traffic is through traffic following the state route system, either on SR 46 or on US 231/SR 67. Outside the overlap section, SR 46 serves approximately double the traffic served by US 231/SR 67, meaning that there is more demand for east-west connectivity than for north-south movement. The corridor contains numerous closely-spaced driveways and intersections, which contribute to congestion and crashes. The large traffic volume on Morgan Street and its designation as a Principal Arterial both underscore the importance of this corridor for regional mobility and the need to ensure efficient and safe traffic flow in the corridor.

Based on an assessment of the transportation network in the study area and input obtained from INDOT and the Community Advisory Council (CAC), a preliminary set of alternatives has been developed to address the study needs. This document serves to describe the preliminary

alternatives and to screen these alternatives and determine which are reasonable for further study.

## **Description of Preliminary Alternatives**

A series of “build” alternatives have been developed with the goal of reducing roadway congestion, improving efficiency, improving safety, and improving geometrics in the US 231/SR 46/SR 67 (Morgan Street) corridor. The alternatives are as follows:

- Alternative 1: No Action, or do nothing alternative.
- Alternative 2: Traffic operations and intersection improvements, such as turn lane additions or a series of other “spot” improvements.
- Alternative 3: Public transportation treatments that would potentially reduce traffic volumes in the corridor by improving alternative modes of transportation.
- Alternative 4: Implementation of intelligent transportation systems by coordinating the three signals in the study area
- Alternative 5: Access management treatments that would consolidate private access points and standardize the geometry of the private access points.
- Alternative 6: Upgrading the roadway geometrics of Morgan Street, including widening lane widths to meet INDOT standards.
- Alternative 7: Widening Morgan Street between SR 46 West and Fletcher Avenue (US 231/SR 67) to provide additional through lanes. Access management would be performed as part of the street widening.
- Alternative 8: Creation of a one-way pair system for US 231/SR 46/SR 67, with eastbound traffic using Franklin Street (one block south of Morgan Street) and westbound traffic using Morgan Street. In this alternative, the railroad tracks adjacent to Franklin Street would be relocated out of Spencer, allowing for Franklin Street to be widened.
- Alternative 9: Creation of a one-way pair system for US 231/SR 46/SR 67, with eastbound traffic using Franklin Street and westbound traffic using Morgan Street. In this alternative, the railroad tracks adjacent to Franklin Street would remain, meaning that additional lanes could not be added to Franklin Street.
- Alternative 10: Creation of a one-way pair system for US 231/SR 46/SR 67, with eastbound traffic using Morgan Street and westbound traffic using Hillside Avenue (three blocks north of Morgan Street).
- Alternative 11: Construction of a roadway on new alignment that would bypass Spencer to the north.

- Alternative 12: Construction of a roadway on new alignment that would bypass Spencer to the south.
- Alternative 13: A combination of access management (Alternative 5) and upgrading Morgan Street to meet current geometric criteria (Alternative 6).

The following section describes the alternatives in greater detail. It should be noted that on alternatives where new roadways are proposed, the alignments shown are *approximate* corridors. More detailed analysis of a preferred corridor would occur during future environmental assessment, should the alternatives with new alignments advance.

### **Alternative 1 – No Action**

This alternative would involve no changes to the existing roadway network, beyond routine maintenance and previously committed projects, such as the reconstruction of SR 46 west of Morgan Street. This alternative will represent a baseline for which all of the build alternatives can be compared.

### **Alternative 2 - Traffic Operations/Intersection Improvements**

This alternative would involve improvements at selected intersections, perhaps signal improvements or turn lane additions. By analysis of the traffic volumes in the study area, there are no turn lane additions that would provide a notable benefit to traffic operations and reduce peak hour intersection queue lengths. The queuing experienced on Morgan Street is due to the through traffic volumes; therefore, turn lane additions would have very little effect on queuing. All high-volume turning movements in on Morgan Street currently have turn lanes to serve them. The signals in the study area operate quite efficiently today for the current traffic volumes and have optimal signal timing and phasing. It is possible that altering the signals to protected-only left turn phasing might reduce crash rates, but such an action would increase delays, congestion, and queuing. There is no potential signal equipment upgrade that could provide a measurable benefit. Intersection improvements would not address the existing geometric deficiencies or the overabundance of access points on Morgan Street. Therefore, this alternative is considered to be unreasonable for further study.

### **Alternative 3 – Public Transportation Treatments**

This alternative would improve the existing public transportation system in the study area with the goal of reducing single-occupant vehicular traffic. Currently, Rural Transit operates weekday bus service from Spencer to other locations in Owen County and in the surrounding region. Under this alternative, bus service routes and/or frequency could be increased to optimally serve local demand, and/or increasing ridesharing/carpooling efforts. While these measures may provide a benefit to the community, they are not likely to notably reduce vehicular traffic in the study area. These measures would do nothing to address the safety issues and roadway deficiencies in the study area, and would entail costs for infrastructure, vehicles and/or employees. Therefore, the public transportation alternative is considered unreasonable for further study.

#### **Alternative 4 – Intelligent Transportation Systems (ITS)/Signal Improvements**

This alternative would primarily involve the coordination of the three signals on Morgan Street in Spencer. Signal timing could be updated to provide signal timing patterns for various times of the day. Vehicle detection could also be upgraded to allow for more demand-based timing of the signals. However, the signals on Morgan Street already operate efficiently for the volume of traffic served. The signal spacing in the corridor, particularly between SR 46 West and Main Street, is large enough that signal coordination would have minimal impact on Morgan Street traffic operations. These improvements would only slightly improve the traffic flow on Morgan Street and would not address the deficient roadway geometrics, safety concerns, or the abundance of driveways on Morgan Street. Therefore, the ITS/signal improvements alternative is considered unreasonable for further study.

#### **Alternative 5 – Access Management**

This alternative would involve a variety of access management techniques on the Morgan Street corridor. The corridor currently features an abundance of private access points, many of which may contribute to vehicle delays, queuing, and crashes. This alternative would examine all existing driveways along Morgan Street to determine any access points that should be consolidated, eliminated, or redesigned. Medians would not be used in this alternative because the existing street width could not accommodate even the narrowest median. Nearly all of the properties in the corridor have access to side streets and could be adequately served without direct access to Morgan Street. It may also be desirable for certain cross streets, particularly on the western side of the town, to be either realigned or partially closed to eliminate offset intersections, closely-spaced intersections, or five-legged intersections. **Figure 2** shows the portion of the study area where access management improvements would be made.

#### **Alternative 6 – Upgrade Morgan Street Roadway Geometrics**

This alternative would upgrade the existing Morgan Street corridor to meet current roadway geometric standards and improve drainage. **Figure 3** shows the location where these improvements would take place. Morgan Street would be widened to provide a 2-foot curb offset on each of the travel lanes and a 14-foot two-way left-turn lane. These measures would widen Morgan Street by at least 4 feet. Morgan Street would be reconstructed to ensure that proper drainage exists and that travel lanes are not blocked by high water. Where possible, curb radii at intersections could be increased to provide for improved turning paths for both cars and trucks, which would create a more efficient road network. All of the measures listed in this alternative would help to reduce crashes on Morgan Street.

#### **Alternative 7 – Widen Morgan Street for Additional Travel Lanes**

This alternative would widen Morgan Street to provide additional travel lanes in the US 231/SR 46/SR 67 overlap section. **Figure 4** illustrates the location of Alternative 7. The additional lanes would increase capacity and reduce vehicle queues. All lanes on Morgan Street would be designed to meet current INDOT roadway standards. Additional turn lanes or other

improvements at the west and east ends of the corridor may also be included to maximize capacity.

### **Alternative 8 – Morgan-Franklin One-Way Pair with Railroad Relocation**

This alternative would create two one-way roadways that would carry the state route traffic through Spencer and would relocate the Indiana Southern Railroad (ISRR) to allow for Franklin Street to be widened. Morgan Street would be converted into a route for westbound traffic only. This would allow for two through westbound lanes for US 231/SR 46/SR 67 traffic through the overlap section, thus increasing capacity over the existing one westbound through lane. Eastbound traffic that uses Morgan Street today would be diverted onto Franklin Street, which would be converted to one-way operation. The ISRR tracks that run adjacent to Franklin Street would be relocated. **Figure 5** depicts the configuration of Alternative 8. A potential relocated railroad corridor has been drawn taking into account the minimum radius allowable for railroad tracks. Franklin Street would then be reconstructed and widened into the existing ISRR right-of-way to accommodate the large increase in traffic load that would occur. The widened Franklin Street would have two through eastbound lanes. The western end of Franklin Street would be realigned to connect to the state route system as the fourth leg of the Morgan Street/SR 46 West signal. Thus, eastbound SR 46 drivers would go straight through that intersection in order to continue on SR 46. The eastern terminus of the one-way Franklin Street operation could either be at Fletcher Avenue or be at Morgan Street just west of the White River bridge via an extension of Franklin Street. Further analysis would have to be performed in order to determine the optimal configuration for allowing eastbound state route traffic to access US 231/SR 67 northbound and SR 46 eastbound heading out of Spencer.

### **Alternative 9 – Morgan-Franklin One-Way Pair without Railroad Relocation**

This alternative would create two one-way roadways that would carry the state route traffic through Spencer but would not involve relocating the ISRR tracks. Morgan Street would be converted into a route for westbound traffic only, allowing for two through westbound lanes for US 231/SR 46/SR 67 traffic through the overlap section, thus increasing capacity over the current one westbound through lane. Eastbound traffic that uses Morgan Street today would be diverted onto Franklin Street, which would be converted to one-way operation. **Figure 6** shows the configuration of Alternative 9. Franklin Street varies in width, with some portions only 16 feet wide. The ISRR tracks that run adjacent to Franklin Street would prevent any widening to the south side of the road. The close proximity of buildings in many locations along the north side of the road may make widening undesirable in that direction. This alternative therefore assumes that only one through eastbound lane would exist on Franklin Street. As with Alternative 8, the western end of Franklin Street would be realigned as the fourth leg of the Morgan Street/SR 46 West signal. The eastern end of Franklin Street could either be at Fletcher Avenue or be at Morgan Street just west of the White River bridge via an extension of Franklin Street.

### **Alternative 10 – Morgan-Hillside One-Way Pair**

This alternative would involve the creation of a one-way pair using Morgan Street and Hillside Avenue. This one-way pair alternative is illustrated on **Figure 7**. Morgan Street would be

converted into an eastbound-only facility with two through lanes, an increase over the existing one eastbound through lane. Hillside Avenue is wide enough to carry two westbound lanes through much of the town; however, the portion between East Street and Fletcher Avenue is likely only wide enough for one westbound lane. Traffic currently using westbound Morgan Street would be diverted onto Hillside Avenue. Westbound traffic coming from east of the White River on SR 46 would be directed to proceed north on Fletcher Avenue and then west onto Hillside Avenue. At the western terminus of Hillside Avenue, traffic wanting to go west on SR 46 would then turn right, while traffic headed for US 231/SR 67 southbound would turn left onto SR 46 and then right onto US 231/SR 67 at Morgan Street. Improvements to the intersections at the east and west ends of Hillside Avenue would likely be needed for successful implementation of this alternative.

### **Alternative 11 – Northern Bypass**

This alternative would construct a roadway on new alignment that would serve to divert through state route traffic away from Morgan Street onto a new facility to be located north of the Town of Spencer. **Figure 8** depicts the general location of this corridor. The eastern terminus of the bypass would be located just west of the White River bridge on SR 46. The alignment would run north from that point and then turn west to intersect with US 231/SR 67. The bypass would continue westward until meeting with SR 46 on the west side of Spencer. This bypass could then be extended south to US 231/SR 67 southwest of the Town. The configuration of Morgan Street through Spencer would remain unchanged by this alternative.

### **Alternative 12 – Southern Bypass**

This alternative would construct a roadway on new alignment that would serve to divert through state route traffic away from Morgan Street onto a new facility to be located south of the Town of Spencer. **Figure 9** depicts the general location of this corridor. The western terminus of the bypass would be located on SR 46 on the west side of Spencer, possibly near the Owen Valley High School. The bypass corridor would extend southward and intersect US 231/SR 67 and then cross the White River. The corridor would remain on the southern and eastern side of the river and terminate at SR 46. If desired, a potential bypass extension could be constructed between SR 46 and US 231/SR 67 northeast of Spencer.

### **Alternative 13 – Access Management & Upgrade Roadway Geometrics (Alternative 5 + Alternative 6)**

Alternative 5 and Alternative 6 both would improve the existing Morgan Street corridor without the addition of new travel lanes. Both of these alternatives would help to address the safety and efficiency of the US 231/SR 46/SR 67 overlap. Because of the similarity of these two alternatives, an alternative that combines Alternative 5 and Alternative 6 will be analyzed. Alternative 13, as shown in **Figure 10**, would consolidate or eliminate driveways while also reconstructing the roadway to current INDOT standards. Because this alternative would involve widening of Morgan Street, medians could be constructed as part of this alternative. Medians may result in better driver compliance with the access management restrictions by providing a physical barrier that would prevent left turning movements from being made at certain locations.

Signs (i.e. “No Left Turn”), splitter islands, or other measures of controlling turning movements are sometimes ignored by drivers.

## Screening

In order to identify the most reasonable of the alternatives for detailed analysis and eliminate alternatives which are not reasonable to address the concerns outlined in the Purpose and Need document, the preliminary alternatives have been screened using a set of evaluation criteria. These criteria have been selected based on the findings of the Purpose and Need document and comments received from the Community Advisory Council (CAC).

## Congestion & Efficiency

**Table 1** offers an assessment of how the alternatives would impact congestion and efficiency. The alternatives were evaluated according to the following criteria:

*Level-of-Service (LOS)* - If no improvements are constructed, all Morgan Street intersections are predicted to remain operating at LOS C or better during all 2030 peak hours, which is an acceptable LOS for this type of facility. The Purpose & Need document did not identify a need for improvements to LOS in the study area. Alternatives 5, 6, and 13 would not substantially affect the Morgan Street LOS or average vehicle delays. Alternatives 9 and 10 would create an additional through lane on Morgan Street in the westbound and eastbound directions, respectively. The extra lanes would reduce vehicle delays for these directions of travel. However, preliminary capacity analyses show that the new one-way pair streets (Franklin Street in Alternative 9 and Hillside Avenue in Alternative 10) may actually experience greater delays than the No Action alternative. This would be due to increased intersection turning movements and side street traffic generated by the one-way pair scenarios. Intersections on Franklin Street are predicted to operate at LOS D, with some movements operating at LOS E. Alternative 8 is the only one-way pair scenario that would decrease delays in both travel directions because two through lanes could be provided on both Morgan Street and Franklin Street. Alternatives 11 and 12 would improve LOS and delays by allowing for through traffic to bypass Spencer. Because the northern bypass alignment (Alternative 11) would connect major employment centers such as Boston Scientific, Cook Urological, and Owen Valley High School and also appears to be the most direct bypass route for SR 46 traffic, Alternative 11 would likely divert the most volume away from Morgan Street. Thus, Alternative 11 would likely have a greater positive effect on LOS and delays on Morgan Street than Alternative 12.

*Queuing* - Because queuing is a function of LOS and vehicle delays, the impacts on queue lengths for each alternative mirror those stated above for LOS impacts. However, the alternatives involving access management (Alternative 5 and Alternative 13) would reduce the number of driveways and conflict points in areas that experience queuing from nearby signals. Even though Morgan Street queue lengths would not be affected by these alternatives, the access management would result in fewer instances of driveways being blocked.

*Efficiency* – Currently traffic can struggle to make turning movements along Morgan Street due to the inadequate curb radii that exist today at many of intersections and driveways. The intersections with minor, local streets can be difficult for trucks and larger vehicles to perform turning movements. (The east and west intersections of US 231/SR 67 with SR 46 both have much larger radii that allow for easier turning for traffic staying on the state route network.) The high percentage of truck traffic also contributes to the efficiency of Morgan Street. Alternatives 6, 7, and 13 could improve curb radii at many intersections, but Alternative 13 would also require vehicles, including trucks, to use minor streets to access Morgan Street businesses because many direct private driveways to Morgan Street would be eliminated. The one-way pair alternatives would force trucks to make more turning movements in Spencer, as access to and from local properties would be more circuitous. Alternatives 11 and 12 would do nothing to improve turning radii for local traffic, but would allow for through trucks to bypass Spencer, thus likely improving travel times for freight traffic.

## **Roadway Geometrics**

**Table 2** offers an assessment on how the alternatives would provide a roadway that conforms to the standards in the INDOT Design Manual. The alternatives were evaluated according to the following criteria:

*Two-Way Left-Turn Lane Width* - The existing 12-foot two-way left turn lane (TWLTL) does not meet INDOT design criteria, which state that a TWLTL should be a minimum of 14 feet in width. Alternatives 6, 7, and 13 would provide the minimum TWLTL width. The one-way pair alternatives (8, 9, 10) would result in one-way traffic flow on Morgan Street, thus negating the need for a TWLTL. Alternatives 5, 11, and 12 would not correct the TWLTL width deficiency on Morgan Street.

*Curb Offset* - The existing travel lanes on Morgan Street do not provide a 2-foot offset from the curb, as directed in the INDOT Design Manual. Alternative 5 would only involve work on driveways and would not change the width of Morgan Street. Alternatives 6, 7, and 13 would provide the standard curb offsets by widening of Morgan Street. Alternatives 8, 9, and 10 would result in acceptable curb offsets because only two travel lanes (with no TWLTL) would be needed on the existing 36-foot roadway. The bypass alternatives (11, 12) would do nothing to correct the existing deficient curb offsets.

*Drainage* - Local residents have noted that poor drainage on Morgan Street causes ponding of water and occasional lane blockages during heavier rain events. Alternatives 6, 7, and 13 would involve reconstruction of Morgan Street, which would include a drainage design that meets current standards. Under all other alternatives, the existing Morgan Street roadway would remain unchanged. While many of the other alternatives would divert some traffic away from Morgan Street, the occasional water ponding would still persist.

*Other issues* - Only Alternatives 6, 7, and 13 would make Morgan Street compliant with all current INDOT roadway design standards. It should be noted that Alternative 9 would move all eastbound state route traffic onto Franklin Street, which has deficient vertical profile at all

intersections with north-south streets that cross the railroad tracks. The railroad tracks are 1-4 feet higher than the adjacent Franklin Street and the cross streets create humps up to two feet high on Franklin Street. These vertical design issues could not be remedied without raising the elevation of Franklin Street by 1-3 feet, which would cause problems interfacing with roads and driveways to the north. With Alternative 8, it is assumed that railroad bed would be removed, eliminating the vertical issues along the north-south streets intersecting Franklin Street.

## Safety

**Table 3** offers an assessment of how the alternatives would impact safety. The section of Morgan Street in the study area was documented as having an above average crash rate according to the Purpose & Need. Many of the crashes on Morgan Street involve vehicles turning into or out of driveways and unsignalized intersections in the corridor. Alternatives 5 and 13 would likely reduce angle crashes on Morgan Street by reducing the number of access points. Rear-end crashes may also be reduced by these alternatives because fewer places will exist for drivers to make unexpected stops and turns into driveways if access management is undertaken. Alternative 6 would provide for standard lane widths and curb offsets. However, few of the crashes on Morgan Street were of the type (e.g. sideswipes) that would be caused by insufficient lane widths. Alternatives 7, 8, 9, 10, 11, and 12 could reduce rear-end crashes on Morgan Street by either increasing the capacity or lowering the volume of the street. However, these alternatives would increase traffic on other streets, thus raising the crash potential elsewhere. Alternative 8 would remove the 17 at-grade railroad crossings within Spencer by moving the tracks outside the town. Alternative 9 would create an increased safety hazard by moving all eastbound state route traffic adjacent to the ISRR tracks along Franklin Street. This would create high-volume intersections directly adjacent to the railroad and would increase the likelihood of queued northbound vehicles stopping on the tracks. Alternatives 8 and 9 would also substantially increase traffic on the residential portions of Franklin Street and through the pedestrian-friendly downtown area. Alternative 10 would substantially increase traffic on Hillside Avenue, which is predominantly residential and contains an elementary school. The western terminus of the one-way pair operation in Alternative 10 would be located at the SR 46/Hillside Avenue intersection, an intersection that currently has a high skew angle, which can be a safety concern.

## Community Impacts

**Table 4** offers an assessment of how the alternatives would impact the community. The three types of impacts that are shown in this table are as follows:

*Right-of-way* - This shows the amount of new right-of-way required for the alternative. These impacts could either be along Morgan Street or elsewhere in the study area. Alternative 7 would require major right-of-way acquisition along the existing Morgan Street corridor. Alternatives 8, 11, and 12 would require major right-of-way acquisition to accommodate either future bypass road alignments or railroad realignments. Alternatives 5, 6, and 13 are expected to have very little, if any, right-of-way needs.

*Economic Impact* - This shows the impacts each alternative could have on local businesses and the local economy. These impacts include loss of parking spaces, loss of business (building take), or loss of traffic adjacent to a business. Alternatives 5, 6, and 13 would have the fewest impacts to existing businesses. Alternatives 5 and 13 would not result in the loss of any parking spaces or businesses. If Alternative 6 required additional right-of-way, it would potentially result in minor loss of parking from adjacent Morgan Street properties, or no impact at all. Alternative 7 would require a large amount of right-of-way acquisition and numerous structures along Morgan Street would have to be acquired to make room for the widened roadway. Nearly every business on the street would lose some or all of its parking spaces. This alternative would likely have the most severe negative impact on local businesses and Morgan Street property owners. Alternatives 8, 9, 10, 11, and 12 would divert some or all of the through state route traffic away from the businesses on Morgan Street. Given that many of the Morgan Street businesses are gas stations, fast-food restaurants, and other highway-oriented uses, the loss of traffic could be very detrimental. Drivers on the new one-way pair streets (either Franklin Street or Hillside Avenue) would not be able to see these businesses as they drove through Spencer. Alternatives 11 and 12 would create a new bypass around the periphery of the town, which could make land near the bypass corridor more attractive and accessible for future development.

*Circulation/Connectivity* - This category illustrates how traffic flow within the town would change with each alternative. Alternatives 6 and 7 would have little or no impact on traffic circulation to properties on Morgan Street. Alternatives 5 and 13 would close many existing access points on Morgan Street, but all properties would be provided access to Morgan Street either via direct access or access to a side street. While this could help to improve traffic safety and efficiency, it could also make accessing businesses more confusing. The one-way pair scenarios (Alternatives 8, 9, 10) would make things even more complex for drivers trying to get to and from properties along Morgan Street. It may be difficult for drivers on the new one-way pair streets (either Franklin Street or Hillside) to know where to turn in order to access a certain business on Morgan Street. Traffic on the north-south streets in between the one-way streets would increase. Travel times in the town would increase, as drivers would frequently have to “backtrack” with the one-way street systems. Alternative 8 would help to improve connectivity to the southern part of the town by removing the railroad tracks south of Franklin Street. The bypass scenarios (Alternatives 11, 12) would not affect the traffic circulation patterns within the central part of the town. These alternatives might provide improved access to the major local employment centers (Cook Urological, Boston Scientific, high school).

## **Environmental Issues**

**Table 5**, **Table 6**, and **Table 7** offer assessments on impacts to natural resources, recreational and historic resources, and hazardous material sites. Table 5 shows that the bypass alternatives (Alternatives 11 and 12) would have the greatest impact to environmental features, such as floodplains and waterways. Alternative 12 is the only alternative to have a potential impact on a recreational resource, a boat launch on the White River, as documented in Table 6. Because Morgan Street passes through the Hillside Historic District, the non-bypass alternatives would involve varying degrees of work in the historic district. Alternatives 8 and 9 would also entail

work in the Spencer Courthouse Square Historic District, with Alternative 9 funneling all eastbound state route traffic through the historic district. Table 7 indicates that Alternative 8 would have the most potential hazardous material sites impacted. This is primarily because Alternative 8 would involve removal of the railroad tracks through the Town, and construction of a roadway on the railroad alignment. Overall, Alternatives 5, 6, and 13 would require the least amount of environmental-related disturbances of any of the build alternatives.

## **Cost Estimates**

Conceptual cost estimates have been developed for the preliminary alternatives in order to better analyze their feasibility. **Table 8** compares the estimated costs of each alternative. The estimated costs were developed using the INDOT Project Costing Tool. These cost estimates include construction, engineering/design, and right-of-way costs. Table 8 shows that three of the alternatives (Alternatives 8, 11, and 12) are expected to cost much more than the other alternatives. Alternative 8 is estimated as having the highest cost at nearly \$50 million. Alternatives 11 and 12 are estimated between \$20-\$40 million (depending on how much of the bypasses would be constructed). Given that this corridor is expected to operate at an acceptable level-of-service through 2030 in the No Action alternative, these higher cost alternatives are out-of-scale for the needs of this study. Table 7 shows that Alternatives 5, 6, 7, 9, 10, and 13 all have costs of less than \$5 million; however, the listed estimate for Alternative 7 does not include the possibly large costs of purchasing buildings necessary to be removed for the widening project. Alternative 5, with an estimated cost of \$300,000, would be the least expensive build option.

## **Summary of Alternatives Analysis**

Earlier in the report, it was determined that Alternatives 2, 3, and 4 should be considered unreasonable for further study. The remaining alternatives were screened in the previous section and conclusions can be reached as to which alternatives would effectively address the study goals with few negative impacts. The alternatives that performed well in the screening will be advanced as reasonable alternatives. The following summarizes how each alternative fared in the screening analysis and conclusions have been provided regarding each alternative. These conclusions are offered to INDOT and the Community Advisory Council (CAC) for concurrence and verification. After receiving input and concurrence from INDOT and the CAC, more detailed analysis of the reasonable alternatives will be conducted and a preferred alternative can be recommended.

### **Alternative 1 – No Action**

The No Action alternative would not address any of the project goals outlined in the Purpose and Need document, but would entail no additional costs except for routine maintenance and previously committed projects. The No Action alternative will be used as a baseline to compare to the build alternatives.

### **Alternative 5 – Access Management**

This alternative would provide a safety benefit by reducing conflict points and eliminating many movements with higher crash frequencies. Through consolidation and standardization of private driveway openings, the safety and efficiency of the corridor would be improved. This alternative is the least expensive, with an estimated cost of \$300,000. Minimal or no environmental impacts are expected with this alternative. However, access management would not address or improve the substandard lane widths or the roadway drainage. An alternative that would leave a geometrically deficient state route roadway should not be recommended. Therefore, it is recommended that Alternative 5 should be considered unreasonable for further study.

### **Alternative 6 – Upgrade Morgan Street Roadway Geometrics**

This alternative would improve roadway geometrics and drainage on Morgan Street. This alternative would do very little to address the high crash rates occurring in this corridor. Additionally, Alternative 6 would have little or no impact in reducing congestion or vehicle queues. The alternative would cause little disruption to the community and have minimal environmental impact. But, the \$1.7 million cost would provide very limited benefit to the corridor, especially compared to the much greater safety benefits that can be achieved with the estimated \$300,000 in additional funding required for Alternative 13. Therefore, it is recommended that Alternative 6 be considered unreasonable for further study.

### **Alternative 7 – Widen Morgan Street for Additional Travel Lanes**

This alternative would improve roadway geometrics and drainage, while potentially providing some safety benefit. This alternative would also provide additional through lanes in each direction to reduce queuing, while not diverting traffic away from businesses on Morgan Street. However, the widening would have major impacts to properties adjacent to Morgan Street. Alternative 7 would cause encroachment into numerous parking lots and would require the removal of several buildings. While not included in the preliminary cost estimate (Table 7), the cost of building takes would add great cost to the alternative. Some of the affected buildings and properties lie in the Hillside Historic District, which would make the impact even more severe. The disruption to the community would likely be unacceptable, especially considering that Morgan Street is predicted to operate an acceptable level-of-service if no action is taken. The capacity additions of this alternative would be very costly and do little to address the needs of this study. Therefore, it is recommended that Alternative 7 be considered unreasonable for further study.

### **Alternative 8 – Morgan-Franklin One-Way Pair with Railroad Relocation**

This alternative would result in improved roadway geometrics, improved safety on Morgan Street, and would reduce queuing in Spencer. However, Alternative 8 would not improve the drainage or reduce the number of access points on Morgan Street. Crashes are likely to increase on Franklin Street with the introduction of higher traffic volumes. Existing businesses on Morgan Street, such as gas stations and restaurants, could be hurt by the diversion of eastbound traffic onto Franklin Street. This alternative would result in severe disruption within the Spencer

Courthouse Square Historic District. The relocation of the ISRR tracks would require two new bridges over the White River and acquisition of new right-of-way. The estimated cost, nearly \$50 million, is the highest of all alternatives. The cost is also out-of-scale based on the project needs. Much of the benefit of this alternative is increased capacity, but the level-of-service is predicted to be acceptable through 2030 if no action is taken. It is therefore recommended that Alternative 8 be considered unreasonable for further study.

#### **Alternative 9 – Morgan-Franklin One-Way Pair without Railroad Relocation**

This alternative would result in improved roadway geometrics and traffic flow for westbound motorists only. Eastbound state route traffic would be directed to use Franklin Street, which does not have sufficient width to allow for more than one travel lane. The diversion of state route traffic to Franklin Street, which has parallel railroad tracks within 10 feet of the pavement edge, would present a safety issue. Franklin Street would not meet design standards for vertical profile, due to the proximity of the railroad causing humps at each cross street. This alternative would add circuitry and complexity for motorists attempting to access properties in the corridor. This alternative would also introduce large traffic volumes into the Spencer Courthouse Square Historic District. Because this alternative has very limited benefit and creates numerous undesirable consequences, Alternative 9 should be considered as unreasonable for further study.

#### **Alternative 10 – Morgan-Hillside One-Way Pair**

This alternative would result in improved roadway geometrics and traffic flow for eastbound traffic only. Westbound traffic operations on Hillside Avenue would not improve over current conditions because Hillside Avenue is only wide enough for one travel lane in some locations. This alternative would divert all westbound state route traffic through the residential neighborhoods along Hillside Avenue, creating safety issues for pedestrian and school traffic in the area. This alternative would also increase circuitry and complexity for motorists trying to access properties in the corridor and divert traffic away from Morgan Street businesses. Because of the three-block spacing between Morgan Street and Hillside Avenue, cut-through traffic on other residential streets would be a concern. While this alternative would have a lower cost (\$3.9 million) than some other alternatives, it would create numerous detrimental effects in the community, particularly within the Hillside Historic District. Therefore, Alternative 10 should be considered as unreasonable for further study.

#### **Alternative 11 – Northern Bypass**

The Northern Bypass alternative has the potential to divert large traffic volumes away from Morgan Street, and thus reduce congestion. This bypass alignment would connect the three highest volume roadways in the Spencer area and would serve major traffic generators such as Cook Urological, Boston Scientific, and Owen Valley High School. However, Alternative 11 would have sizeable environmental impacts and would have a cost (over \$20 million) that is out-of-scale with the project needs. Additionally, the alternative would divert through traffic away from the Morgan Street businesses and would do nothing to improve the existing deficient roadway geometrics on Morgan Street. Therefore, Alternative 11 should be considered as unreasonable for further study.

## **Alternative 12 – Southern Bypass**

The Southern Bypass would likely divert less traffic and would cost more than the Northern Bypass alternative. It would also likely have the greatest environmental impact of any alternative, with multiple waterway crossings and much of the potential alignment being in floodplain. While the southern bypass may reduce some congestion on Morgan Street, the environmental and economic costs of the alternative are too severe. Alternative 12 should be considered as unreasonable for further study.

## **Alternative 13 – Combined Access Management & Upgrade Roadway Geometrics (Alternative 5 + Alternative 6)**

Alternative 13 would offer the combined benefits of Alternatives 5 and 6. This alternative would provide INDOT standard lane widths, standard curb offsets, and improved drainage features. This alternative would also improve roadway safety by reducing the number of driveway accesses and vehicle conflict points in the corridor. This alternative would allow for the construction of a median in any locations where such a barrier would benefit the access management. Alternative 13 may entail some minor right-of-way acquisition to widen the lanes to current standards. This alternative would have minimal detrimental impacts to environmental or historic resources. The cost of Alternative 13 is slightly less than the combined costs of Alternative 5 and Alternative 6. However, due to rounding within the INDOT Project Costing spreadsheet program, the rounded cost estimate (\$2.0 million) is equal to the sum of the estimates for Alternative 5 (\$300,000) and Alternative 6 (\$1.7 million). This is the only alternative that would correct the roadway deficiencies and crash problems, while having limited costs, limited environmental impacts, and limited impact to the area businesses. Therefore, it is recommended that Alternative 13 should be advanced as a reasonable alternative.

## **Further Analysis of Reasonable Alternative**

Based on its ability to address the project needs in a cost-effective manner, while limiting the amount of undesirable impacts on nearby property owners, environmental resources, and historic resources, Alternative 13 has been deemed the only reasonable alternative for the US 231/SR 46/SR 67 Corridor Planning Study. A preliminary access management plan was developed and is shown on **Figure 11**, **Figure 12**, and **Figure 13**. The access management plan focused on reconfiguring, consolidating, or eliminating access points along Morgan Street in order to promote safer and more efficient travel in the corridor. Alternative 13 would also involve widening Morgan Street by a total of 4 feet. In order to make the access management plan more legible, the proposed new curb lines are not shown on Figures 11-13. Further study will be needed to determine the best means of widening the street (e.g. widen 4 feet from the north edge of pavement, widen 2 feet on both sides, etc...)

The first step in developing the access management plan was to address any public streets or public street intersections that showed a need for improvements. Figure 11 shows the realignment of Franklin Street to intersect Morgan Street directly across from SR 46 West. For

the purposes of this study, this realignment is assumed to be part of a committed INDOT SR 46 improvement project. One location where improvements to public streets were deemed to be appropriate is the intersection of Morgan Street (US 231/SR 67) with Fifth Avenue and Franklin Street on the western edge of Spencer. This intersection has an unusual five-leg design and has the highest crash rate and number of crashes of any unsignalized intersection in the study area. Even after Franklin Street is relocated to align with SR 46 West, this intersection would still have a “K-intersection” design, with both minor street legs on the same side of the major street. Additionally, the horizontal curvature of US 231/SR 67 and the vertical alignment of the minor streets make left turn movements from the minor streets difficult. It is therefore recommended that Fifth Avenue be realigned to connect with the driveway that runs on the west side of the Wendy’s restaurant. A short connector roadway would be constructed between US 231/SR 67 and Fifth Avenue, as shown on Figure 11. Traffic on Fifth Avenue and the Wendy’s driveway would stop for traffic on the connector road. It is recommended that the connector roadway have only right-in/right-out (RIRO) access onto US 231/SR 67. Vehicles that currently make left turns at this intersection could utilize SR 46 and the Wendy’s driveway as an alternate route.

Another location involving changes to the public street network is at the intersection of Morgan Street with Lincoln Street and Vandalia Avenue. This is another five-legged intersection, with one of the cross streets (Vandalia Avenue) intersecting Morgan Street at a 45-degree angle. While this intersection did not rank as having a high crash rate, the current design is substandard and should be corrected as part of an access management plan. Figure 11 shows the proposed changes to the intersection, which includes realigning approximately 150 feet of Vandalia Street to intersect Lincoln Street north of Morgan Street. This would reduce the number of legs at the major intersection to four, and would eliminate one of the 45-degree intersection legs. Access to the Speedway property (600 W. Morgan Street) would be provided via Vandalia Avenue. Due to the configuration of adjacent properties on the south side of Morgan Street, no cost-effective way exists to realign Vandalia Street so as to intersect Morgan Street at a 90-degree angle. Therefore, it is proposed that the south leg of Vandalia Street remains in its existing configuration. However, Figure 11 indicates that the excessively wide driveway openings that surround Vandalia Street be consolidated or eliminated. If the properties on the south side of Morgan Street were to ever be redeveloped, the south leg of Vandalia Street should either be closed or realigned to a 90-degree intersection in conjunction with the site reconfiguration.

The remaining part of the access management plan focused on individual driveways and access points to properties on Morgan Street. There is currently an overabundance of driveways on Morgan Street within Spencer. Because of the close spacing of the north-south public streets (most blocks are about 300 feet long), the majority of properties on Morgan Street have the ability to be accessed via side streets. Alleys also exist behind many properties, which allow for additional connectivity. Therefore, many of the existing driveways can be consolidated, eliminated, or converted to right-in/right-out while still allowing full access into and out of properties. Every property along Morgan Street was individually examined to determine the appropriate means of access control that should be permitted. The access management plan shown in Figures 11-13 allows for full, not necessarily direct, access into and out of every property in the corridor.

Some criteria used in the recommended treatment of driveways include:

- Proximity to adjacent intersections
- Proximity to signalized intersections/queued traffic
- Crash history, including crash types (left turns in, right turns out, etc...)
- Ability for vehicles/trucks to access property
- Ability for vehicles to use adjacent driveways

Direct access to Morgan Street was permitted at locations where no reasonable alternative exists. Burger King (873 W. Morgan Street) is one notable exception of a property that does not connect to any adjacent alleys or side streets. The only access to the property is via Morgan Street. Therefore, one full access point to the property (the driveway furthest from the signalized intersection) is recommended to remain in the access management plan.

Implementation of this access management plan will involve cooperation between INDOT and the Town of Spencer. One important element is to ensure that alleys providing access to the rear and sides of parcels along Morgan Street are maintained to allow for vehicular travel. In many locations, side streets and alleys will be the quickest or best method for vehicles to make certain movements on and off of Morgan Street. Another priority is to incorporate access management on side streets in the immediate vicinity of Morgan Street. It is particularly important to do this on Main Street near the signal. In order for the signal to operate as efficiently as possible, the existing driveways on Main Street that are closest to the signal should be eliminated. On other side streets, excessively wide curb cuts in close proximity to Morgan Street should be rebuilt to standard driveway widths in order to provide the safest conditions for drivers in the area. Overly wide driveways can lead to vehicles entering and exiting the roadway at unexpected locations.

Because Alternative 13 would involve minor widening of Morgan Street, medians could be provided at selected locations in the corridor. Medians may be helpful in the implementation of the access management plan, by providing a physical barrier that would prevent drivers from making prohibited turning movements. The medians may also add an aesthetic enhancement to the corridor. However, care should be taken that any future medians are designed to allow for vehicles, particularly trucks, to perform legal turning movements and not track over the medians. If medians are desired, further study can be conducted to determine the optimal placement for medians in the corridor.

## **Conclusion/Next Steps**

Based on its ability to address the project needs in a cost-effective manner, while limiting the amount of undesirable impacts on nearby property owners, environmental resources, and historic resources, Alternative 13 has been deemed the only reasonable alternative for this study. Other preliminary alternatives that were studied either failed to adequately address the existing safety problems in the corridor, or had prohibitively high costs. While Alternatives 5 and 6 had relatively low costs and would each provide some benefit, neither of these two alternatives would fully address the project needs. Alternative 5 (Access Management), by itself, would effectively reduce crashes, but would leave Morgan Street in a substandard geometric condition. Alternative 6 (Upgrade Roadway Geometrics), while providing standard two-way left turn lane

widths and curb offset, would not address most of the correctable crash problems in the corridor. Much greater safety and efficiency benefits can be realized by implementation of an access management plan concurrently with improvement of the roadway geometry (Alternative 13).

Alternative 13, Combined Access Management & Upgrade Roadway Geometrics, should therefore be advanced further in the US 231/SR 46/SR 67 Corridor Planning Study. Upon concurrence from INDOT and the Citizens Advisory Council (CAC), the reasonable alternative can be more fully developed and/or refined.

This project would require the preparation of a Categorical Exclusion (CE) document. In order to complete the CE document, several technical studies will need to be performed. Because of the proximity of historic districts to the project work area, a cultural resources study will be necessary. Ecological studies should be performed to confirm that streams and waterways in the area will not be impacted by the recommended alternative. To ensure that contaminated sites are not impacted by the alternative, a hazardous materials study should also be conducted. Prior to completion of the CE document, a public meeting should be held to detail the findings of the environmental studies.