



**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C.**

**HIGHWAY FACTORS GROUP CHAIRMAN'S
FACTUAL REPORT**

A. CRASH INFORMATION

Location: 4600 block of North State Route 25 in Rochester, Fulton County, Indiana
Vehicle 1: 2017 Toyota Tacoma pick-up truck
Operator: Private Operator
Pedestrian #1: 6-year-old male
Pedestrian #2: 9-year-old female
Pedestrian #3: 6-year-old male
Pedestrian #4: 11-year-old male
Date: October 30, 2018
Time: Approximately 7:12 a.m. EDT
NTSB #: **HWY19MH003**

B. HIGHWAY FACTORS GROUP

Robert Squire - Accident Investigator, Group Chairman
NTSB Office of Highway Safety
490 L'Enfant Plaza East, S.W., Washington, DC 20594

Indiana Department of Transportation
LaPorte District
315 E. Boyd Boulevard
LaPorte, IN 46350

C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

D. DETAILS OF THE HIGHWAY FACTORS GROUP INVESTIGATION

The Highway Factors Group for this investigation was convened after NTSB Office of Highway Safety investigators initiated an investigation of this crash and determined that certain highway data could provide additional investigative resources. The portion of the investigation undertaken by the Highway Factors Group was limited to analyzing data that was received from the Indiana Department of Transportation (INDOT), Indiana State Police (ISP), Fulton County Sheriff's Office (FCSO) and NTSB investigators.

1. Collision Description and Location

The crash involved a single vehicle, a 2017 Toyota Tacoma pickup truck, that collided with four juvenile pedestrians as they attempted to cross Indiana State Route 25 (SR-25) to board an awaiting school bus. The collision occurred at an entrance to a mobile home court where the pedestrians resided. The investigation revealed that the Toyota, traveling southbound, failed to stop for a northbound school bus that was stationary with its warning lights activated awaiting the children.¹ The four children, who grouped together while crossing the highway, were struck in the southbound lane adjacent the front of the school bus.

The collision occurred October 30, 2018, at approximately 7:12 a.m. EDT, during darkness with dry road surface conditions. The collision area was at the intersection of an access road to the mobile home park, identified by local real estate sources as the Riverview Mobile Home Court, located on the northwest side of SR-25 about 4.6 miles north-northeast of the city of Rochester in Fulton County, Indiana.² **Figure 1** depicts a map illustrating the location of the crash relative to Fulton County.

2. Documentation Review

To assist with the investigation INDOT provided documentation and data for use in this investigation. Specific data included:

- Relevant sections of the highway plans for the “Plan and Profile of Proposed State Highway Project No. 354 Section A, Rochester-Warsaw Road” dated 1936. These sections included the horizontal and vertical alignment of SR-25 some of which are still current.
- Relevant sections of the “Proposed Resurface Plans for State Highway 25 and State Highway 110” dated 2003.
- Annual Average Daily Traffic (AADT) counts for SR-25 for the years of 2014 through 2018 (as estimated).

¹ For this bus, warning lights included alternating, red forward-facing roof mounted lights, driver-side stop-arm with alternating red lights and alternating (wig-wag) high beam headlights.

² Locally, the mobile home court is as known as Meiser's Trailer Park in reference to the previous owners.

- Reported motor vehicle crash data for the years of 2013 through 2018 (current to the date of the crash) that occurred within approximately two miles of the crash site for this investigation. Data was later supplemented with vehicle type information.



Figure 1: Map depicting approximate location of the collision relative to Fulton County (inset) and the state of Indiana. Basic map source - <https://www.acrevalue.com/plat-map/IN/Fulton/?lat=40.013526&lng=-86.960095&zoom=7>

3. Highway Design

SR-25 extends in two segments along a southwest to northeast path across north central Indiana covering a total land distance of 123 miles. **Figure 2** depicts the orientation of SR-25 along its entire length. The highway's southwest terminus is near Waynetown from where it extends northeastward for about 31.9 miles to the city of Lafayette. The highway designated as SR-25 terminates at Lafayette, creating a gap in the highway, but then resumes on the northeast side of the city. The highway continues for about 86.4 miles and terminates at the city of Warsaw. Approximately 19.3 miles of SR-25 extends through Fulton County. While the highway orientation is generally southwest to northeast, it is generally referenced as a north and south highway.

The functional classification of SR-25 north of Rochester was defined as a rural major collector.^{3,4} Between the cities of Rochester and Warsaw, which included the area of the collision, the highway exhibits two opposing through lanes of travel. While the overall orientation of the highway is southwest to northeast, the heading of various highway segments ranges from north-south to east-west. Turn lanes are provided at a limited number of intersections. Pavement delineation is by painted pavement marking with solid white striping at the right-side lane edges and yellow centerline striping denoting areas where passing is permitted or restricted.

Maintenance oversight for this segment of SR-25 is provided by the Indiana Department of Transportation, LaPorte District.



Figure 2: Route depiction of State Route 25.

³ <https://data.indot.in.gov/data/fcmaps/counties/fultoncounty.pdf>

⁴ <https://indot.maps.arcgis.com/apps/webappviewer/index.html?id=df731decaa704512923b7732ed3ddad2>

3.1. Typical Section – Area of Collision

For the analysis of this collision, highway design and resurfacing plans were reviewed for the segment of SR-25 about 2500 feet north and south of the area of impact.⁵ The highway surface was asphalt. The 2003 resurfacing plan specified two successive overlays – an intermediate and surface overlay - of hot mix asphalt at 19- and 9.5 millimeters respectively atop the existing surface following a one-inch milling.⁶ Documentation of the highway at the collision site indicated that the width of the contiguous paved shoulder areas ranged from two feet adjacent to the travel lane to as much as about seven feet (including the application of aggregate material) along the northbound lane in the area of roadside mail boxes.⁷ INDOT reported that a chip seal treatment was then applied to the roadway in 2013. No additional details regarding the chip seal treatment was provided.

As conveyed by the highway resurfacing plan, typical section dimensions included 12-foot wide travel lanes at a cross slope of 2% and two-foot wide shoulders with an additional two-foot width of aggregate material at a 4% cross slope.⁸ Lane width measurements acquired from scene photographs indicated consistency with the repaving plan near the area of impact where the lane widths measured approximately 12.9 and 11.9 feet for the south- and northbound lanes respectively.⁹

No pavement deficiencies were observed by NTSB on-scene investigators.

3.2. Pavement Marking and Delineation

The highway travel lanes were delineated by pavement striping. Through the area of the collision the north- and southbound travel lanes were delineated by double yellow striping indicating passing was not permitted. Solid white striping delineated the shoulder area from the travel lanes. INDOT reported that the highway had been restriped on October 22, 2018. Scene photographs depicted the retroreflective characteristics of the striping with no observable deficiencies. Although no information regarding the striping widths was provided, measurements extracted from a photographic generated point cloud indicate widths of about six inches. Some offset in the application of the restriping relative to the old striping was visible but was not observed to affect clarity of the striping.

Police photographs depicted what appeared to be the mountings or remnants of raised pavement markers (RPM) along the highway centerline through the area of the collision. The presence of RPMs was not referenced in the reviewed documentation. Likewise, the few nighttime photographs that were available did not depict any retroreflective characteristics along the

⁵ Police investigators provided certain data related to the immediate crash scene that was limited to about 250 feet north and south of the area of impact.

⁶ The surfacing plan specified INDOT standards QC/QA HMA,3,64, indicating the material to be used and participation in a quality control plan.

⁷ The 2003 repaving plan specified a minimum of two feet of paved shoulder using the same HMA criteria as the travel lanes with additional minimum widening of two feet using an application of aggregate material.

⁸ Cross slopes (superelevation) on highway curves was specified as great as 8.6%.

⁹ A series of photographs taken by sUAS vehicle were rendered into a 3D point cloud for analysis.

centerline consistent with RPMs. During a follow-up inquiry months after the crash INDOT confirmed that the mountings were present, but the condition of the retroreflectors was unavailable.

In the southbound direction passing is restricted beginning about 3,593 feet north of collision area.

A W-beam guardrail is installed along the west side of highway continuous with the southbound shoulder. White retroreflective flexible delineator posts are positioned at 50-foot intervals along the guardrail.

3.3. Highway Alignment

The collision occurred along a 960-foot tangent segment of highway that exhibited a west-southwest to east-northeast heading of 80/260°. The area of impact between the Toyota and the pedestrians was identified as near the center of the southbound travel lane adjacent to the middle of three paved access roadways for the mobile home court, or about 890 feet from the northern end of the tangent segment. The three access roadways intersected SR-25 from the west (north side relative to the highway heading at this location) at right angles. INDOT data indicated that the access roadways measured about 14, 17 and 18 feet in width for the southern, middle and northern-most roadways respectively. The overall widths of these pavements where they intersected SR-25 measured 55, 70 and 70 feet respectively. The distances between the southern and northern access roadways relative to the middle access roadway were approximately 412 and 252 feet respectively. The access roadways to the mobile home court are private roadways.

The highway exhibits curves at the northern and southern approaches to the tangent segment. Northward from the tangent segment, the first curve was approximately 890 feet from the collision site and began a transition of the highway toward a more north-south heading. This would be a rightward curve for the Toyota traveling southbound toward the collision site. This curve exhibits a radius of approximately 1,910 feet over a distance of about 544 feet with a heading change of 16.3°. ¹⁰ Following this curve northward is a tangent segment approximately 730 feet in length.

Beginning about 2,164 feet northward of the collision area a second curve begins. This curve continues the highway transition to a more north-south heading, making it also a rightward curve for the southbound Toyota. This curve exhibits a radius of approximately 1,432 feet over a distance of about 710 feet with a heading change of 28.4°. A lengthy tangent segment follows this curve with the highway exhibiting a northeast-southwest heading of about 35/215°.

About 70 feet southward of the collision area, a curve transitioning the highway to a more southerly heading begins. Refining data from the original highway design plans and resurfacing survey indicate this curve has a radius of approximately 1,520 feet over a distance of 703 feet with

¹⁰ The central angle of a curve defines the degree of curvature and is the angle between the ends of an arc or a chord of agreed length. It also describes the change in forward direction as that portion of the curve is traveled. The length of curve is the distance from the Point of Curvature to the Point of Tangent measured along the curve.

a heading change of 26.4° . In the southbound direction of travel, this would be a leftward curve. Following this curve southward is a tangent segment approximately 673 feet in length.¹¹

Beginning about 1,146 feet southward of the collision area a second curve initiates. This curve continues the highway transition to a more north-south heading, making it also a leftward curve for the southbound direction. This curve exhibits a radius of approximately 900-1100 feet over a distance of about 300 feet with a heading change of $18-20^{\circ}$. A lengthy tangent segment follows this curve southward with the highway exhibiting a northeast-southwest heading of about $31/211^{\circ}$.

Through the tangent segment where the collision occurred the highway appears relatively level. Design plans note a slight ascending vertical grade of 0.2 to 0.3% in the southbound direction of travel.

¹¹ Minor differences in stationing locations were identified between the original highway design plans and repaving plan survey requiring some recalculation of curve and tangent measurements south of the collision location.

3.4. Highway Signage

INDOT provided sign location data for the southbound direction of travel beginning about two miles north of the collision area. The majority of signage was related to the horizontal alignment of the highway along with two school bus related warning signs. **Table 1** provides distances between the referenced signs and the collision area as reported by INDOT.¹²

Table 1: Highway signage in southbound direction beginning about two miles from area of collision.

Sign description, MUTCD designation and installation year	Distance and direction from collision area	Sign depiction	Size
Curve Warning – Left (W1-2L) 2009	667 feet North		750mm X 750mm (30in X 30in)
WATCH FOR SCHOOL BUS (S3-Y2) 2010	868 feet North		900mm X 900mm (36in X 36in)
Curve Warning – Right (W1-2R) 2010	1,747 feet North	Reverse of W1-2L	Same
Curve Warning – Right (W1-2R) 2009	3,355 feet North	Reverse of W1-2L	Same
NO PASSING ZONE (W14-3) 2008	3,593 feet North (left side of highway)		750mm X 1000mm X 1000mm (30in X 40in X 40in)
Intersection – Left (W2-2L) 2009	3,800 feet North		750mm X 750mm (30in X 30in)
SCHOOL BUS STOP AHEAD (S3-Y1) 2010	9,706 feet North		750mm X 750mm (30in X 30in)
Curve Warning – Right (W1-2R) 2009	10,356 feet North	Reverse of W1-2L	Same

Figure 3 depicts the relative locations of the signage provided for southbound motorists on approach to the crash location.

¹² Measurements provided by INDOT were consistent with Google Earth satellite imagery.



Figure 3: Modified Google Earth image depicting the relative location of signage along the southbound approach to collision site.

By statute, Indiana Code §9-21-2-1 through §9-21-2-4, INDOT adopts the Indiana Manual on Uniform Traffic Control Devices for Streets and Highways (IMUTCD) with concurrence from the Federal Highway Administration. The IMUTCD conforms substantially with the federal MUTCD prepared by the Federal Highway Administration.¹³ At the time the signage noted above was installed, INDOT was using the 2008 IMUTCD and supplements that had been developed from the adopted version of the 2003 national MUTCD. The 2008 IMUTCD was in effect between July 1, 2008 through November 20, 2011. In 2011 IMUTCD was adopted to conform with 2009 national MUTCD.

¹³ The Manual on Uniform Traffic Control Devices (MUTCD) is approved by the Federal Highway Administrator as the National Standard in accordance with Title 23 U.S. Code, Sections 109(d), 114(a), 217, 315, and 402(a), 23 CFR 655, and 49 CFR 1.48(b)(8), 1.48(b)(33), and 1.48(c)(2).

3.4.1. Speed Limit

SR-25 through the collision area has a posted speed limit of 55 miles per hour. In the southbound direction the nearest speed limit sign was located about 2.46 miles before the collision site. This location was just south of a small township identified as Talma through which the highway speed limit is reduced. No required or recommended speed reduction was posted through the highway curves leading to the collision area along the southbound route.

3.4.2. Horizontal Alignment Signage

Highway users are advised of changes in the horizontal alignment of the highway (curves) by curve warning signs (MUTCD W1-2) indicating the change in direction in advance of each curve. No additional advisories were posted with the curve warning signs until further south of the collision area.

No additional requirements or recommendations related to the horizontal alignment was specified by the IMUTCD.

3.4.3. School Bus Warning Signage – WATCH FOR SCHOOL BUS and SCHOOL BUS STOP AHEAD

Two warning signs related to school bus stop were erected along the southbound lane in advance of the bus stop where the collision occurred. One each of the WATCH FOR SCHOOL BUS and SCHOOL BUS STOP AHEAD signs were in place. The WATCH FOR SCHOOL BUS warning sign (MUTCD S3-2) was installed along the tangent segment about 868 feet before the collision area as referenced in Table 1. The sign was located adjacent the right shoulder just south of the tangent segment onset. INDOT reported that the installed sign was “oversized”, which increased the typical dimension by six inches along each side. As referenced in the 2008 IMUTCD when installed, the diamond-shaped sign featured black lettering on a yellow background.

The IMUTCD does not provide for a specific application of this sign but states that this sign may be installed if the school bus stops at individual residences to pick up or discharge passengers, rather than at a single location where numerous passengers are picked up or discharged. The IMUTCD further provides that this sign need not be used everywhere a school bus stops to pick up or discharge passengers but for use where terrain and roadway features limit the approach sight distance and where there is no opportunity to relocate the stop to another location with adequate visibility. The need for this sign should be determined by a field investigation and engineering judgment.

The SCHOOL BUS STOP AHEAD warning sign (MUTCD S3-1) was installed about 9,706 feet north of the collision area. When installed, the design of this sign was likewise referenced by the 2008 IMUTCD, which specified the diamond-shaped sign to have black lettering on a yellow background.

As conveyed in the IMUTCD at the time of installation, this sign should be installed in advance of locations where a school bus, when stopped to pick up or discharge passengers, is not visible to road users for a distance of approximately 150 m (500 ft) in advance and where there is no opportunity to relocate the bus stop to provide approximately 150 m (500 ft) of visibility.

As conveyed by the IMUTCD this sign is not intended to be used everywhere a school bus stops to pick up or discharge passengers but where terrain and roadway features limit the approach sight distance and the bus stop cannot be moved to another location with adequate visibility. Installation of either sign was not required but can be recommended based on motorist visibility and engineering judgment.

While current revisions of the IMUTCD and national MUTCD specify a fluorescent yellow-green background for school signs and a pictogram to replace text in addition to removing the reference to a specific visibility distance, the IMUTCD provides that any change to the Indiana manual need not be implemented immediately unless specifically called for by regulation. The governmental agencies involved are tasked with determining the reasonableness in time in making any changes or additions as required by regulations. The manual provides that changing existing installations to conform to the IMUTCD should typically occur at the end of normal service life or during “Phase-in Compliance Periods” as may be directed by the FHWA. As new or reconstructed devices are installed, they shall be in compliance with the newest edition or revision.

3.5. Highway Lighting

The collision occurred during darkness, about 61 minutes before sunrise and 29 minutes before civil twilight. The highway approach to and through the collision area had no street lighting or other sources of supplemental roadway lighting.

4. Highway Traffic Volume

INDOT provided Annual Average Daily Traffic (AADT) counts for SR-25 through the area of the collision. INDOT reported that some of the AADT figures are projections interpolated from ground counts conducted in June 2014 and April 2017. Neither the ground count site locations nor specific directions of travel were reported with the data. **Table 2** provides the total AADT counts by year as reported by INDOT.

Table 2: AATD Counts for Years 2014 Through 2018.

Year				
2014	2015	2016	2017	2018
2,847	2,864	2,878	2,953	2,953

While the INDOT data did not include a complete vehicle classification study, the agency did provide a daily count of buses on SR-25. The counts were taken over a two-day period in April 2017 from a location approximately 1000 feet south of CR-350E, or about 2540 feet south of the collision area.¹⁴ The April 24, 2017 count identified a total of 34 buses with 21 traveling northbound (62%) and 13 southbound (38%).¹⁵ The April 25, 2017 count identified a similar distribution with a total of 31 buses wherein 19 were traveling northbound (61%) and 12 southbound (39%).

¹⁴ The data did not specify the hours during which the counts were taken.

¹⁵ INDOT reiterated that this figure represented a total count of vehicles classified as a “bus”, could include the repetitive route of a single bus, and were not all school buses.

INDOT conveyed that the data was insufficient to isolate school buses from total bus count. School bus data would rest with the school districts and the routes they established.

5. Highway Crash History

INDOT provided motor vehicle crash data for the years of 2013 (January 1) through October 2018, that occurred within approximately two miles of the collision site. The data provided by INDOT included: geographic coordinates for each reported crash; severity of the crash; collision type; a “primary factor”; roadway identifier and cross street; and location conditions to include weather, roadway surface, and lighting. Neither vehicle type nor classification were reported with the initial data.

As summarized in **Table 3**, a total of 53 crashes were reported over the approximate four miles of SR-25 covered by the data (including this investigation). When evaluated by severity, the overall total represented two (2) fatal crashes, one of which includes this investigation, five (5) injury crashes and 46 property damage-only crashes. Other than this investigation, only one crash (single vehicle) was reported in the area of the mobile home court between the northern and southern access roadways.

Table 3: Total Reported Crashes on SR-25 within Two Miles of the Collision Site by Year of Occurrence and Severity.

	Crash Severity			
Year	Fatal	Injury	Property Damage	Total by Year
2013		1	10	11
2014		0	9	9
2015		1	7	8
2016		0	7	7
2017		2	9	11
2018 (partial year)	2	1	4	7
Total by Severity	2 4%	5 9%	46 87%	53

As depicted in Table 3, the majority of crashes were classified as property damage. One of the two fatal crashes included this investigation. The other fatal crash was classified as a “run off the road” collision that occurred during daylight hours with a dry road surface under clear weather conditions.

The INDOT data indicated eight (8) crash types. While the term “pedestrian” did not appear as a type, the data as presented did not indicate the occurrence of any pedestrian-related collisions. INDOT supplemental data corroborated that none of the previous crashes involved a pedestrian. **Table 4** depicts total counts for the specified crash types and the severity of those crashes.

Table 4: Crash Type and Count for the Reported Crashes (2013-2018) and Crash Severity.

Crash Type and Count			Injury Severity			
Type	Total Crashes		Property Damage	Incapacitating Injury	Possible Injury	Fatal
Head On	6	11%	5	0	1	0
Ran off road	20	38%	15	4	0	1
Same direction sideswipe	2	4%	2	0	0	0
Opposite direction sideswipe	2	4%	2	0	0	0
Rear end	2	4%	2	0	0	0
Right angle	5	9%	5	0	0	0
Other	2	4%	2	0	0	0
Unknown	13	25%	13	0	0	0
Current crash	1	2%	0	0	0	1

As depicted in Table 4, the majority of crash types involved a “run off the road” scenario. While “unknown” was identified as the second most prevalent type, the criteria for this entry was not defined but did appear when the primary factor involved an animal or object in the roadway strike. The Indiana Officer’s Standard Crash Report from which these data are acquired provides for 12 predefined types, including “other” and “non-collision”.

Table 5 presents data that identified the primary “factor” for each of the reported collisions and the total count for the indicated factor. Also included is the collision severity count for each factor.

Table 5: Primary Factor and Aggregate Count for each Reported Crash Including Crash Severity Counts.

Crash Primary Factor and Count			Collision Injury Severity			
Primary Factor	Count		Fatal	Incapacitating Injury	Possible Injury	Property Damage
Animal/Object in Roadway	21	40%	0	0	0	21
Ran Off Road	16	30%	1	3	0	12
Speed too fast for weather conditions	5	9%	0	0	0	5
Driver distracted	3	6%	0	0	0	3
Left of center	2	4%	0	0	0	2
Brake failure or defective	1	2%	0	0	0	1
Driver illness	1	2%	0	0	1	0
Following too closely	1	2%	0	0	0	1
Unsafe speed	1	2%	0	1	0	0
Fail to yield right of way	1	2%	0	0	0	1
Unknown (Current)	1	2%	1	0	0	0

The data indicate that about 70% of all reported crashes involved the striking of an animal or object in the roadway or a run-off-the-road scenario. The Indiana Officer’s Standard Crash Report requests the entry of one “primary cause for the crash”. The primary cause is then divided into driver, vehicle, or environmental elements. As noted in Table 5, the primary cause for all reported crashes, with one exception, were driver related.

Table 6 depicts data representing environmental conditions for the reported crashes, excluding this investigation. As previously noted, the other fatal crash in the data set occurred during daylight hours with dry conditions. Otherwise, four of the five injury crashes occurred during clear or cloudy weather with two crashes each occurring during hours of daylight and darkness. The final injury crash occurred during rain (with wet road surface) and daylight hours.

Table 6: Aggregate Count of Reported Crashes (2013-2018) Under Prevailing Conditions of Lighting, Weather and Road Surface Condition.

		Aggregate Count	
Lighting	Daylight	21	40%
	Dark (not lighted)	29	56%
	Dawn/Dusk	2	4%
Weather Prevailing	Clear	27	52%
	Cloudy	12	23%
	Rain	8	15%
	Sleet/Hail/Freezing Rain	1	2%
	Blowing Sand/Soil/Snow	1	2%
	Snow	3	6%
Road Surface	Dry	35	67%
	Wet	10	19%
	Snow Slush	4	8%
	Ice	3	6%

As illustrated in the data, a slight majority of crashes occurred during hours of darkness. Overall, three-quarters of the crashes occurred during good weather conditions that are defined as clear or cloudy, although a small number of those still encountered other than a dry road surface.

The data identified each crash as an individual occurrence. The data did not convey which crashes may have involved multiple vehicles or injuries. Only the greatest severity level was reported for the purpose of classifying each crash. While the vehicle direction of travel was not specified, 30 crashes (57%) denoted SR-25N (north) as the primary road. For the remaining 23 crashes, the primary road was denoted at SR-25.

INDOT subsequently updated the crash data to include vehicle type and number of vehicles involved in each of the previously reported crashes. That data conveyed that seven (7) of the reported 53 crashes were multiple vehicle crashes that involved no more than two vehicles. All of the multiple vehicle crashes were reported as property damage and all, with one exception, involved light duty vehicles. Three of the seven crashes exhibited sufficient information to conclude they were intersection or intersection-related crashes.

The remaining 87% of the crashes involved a single vehicle. All of the injury crashes (fatal, incapacitating injury and possible injury) were single vehicle collisions. Nineteen of the 21 single vehicle crashes having a primary factor of animal or object in the roadway involved a collision with a deer.

Using INDOT supplemental data, vehicle type involved in each crash could be identified and summarized. A substantial majority, 89% (n=47), involved only light duty vehicles (passenger vehicle, SUV or truck with GVWR <10,000 lbs.). The data conveyed one (1) crash each, all single vehicle, that involved a motorcycle, a medium duty truck (delivery vehicle), and a heavy vehicle (tractor-semi trailer combination).

The remaining three crashes involved a school bus or were related to a school bus operation. Two of the crashes involved contact with the school bus with one having been a deer strike (10/2018), while the second involved a stopped bus that was struck in the rear by a light duty vehicle (05/2015). The third crash was school bus related and is the crash being investigated here. **Figure 4** depicts the reported locations of the three school bus related crashes.



Figure 4 depicts the relative location of all reported crashes based on the geographic coordinates included with the data. The maximum distances between the current crash location for this investigation and previous reported crashes is about 1.49 and 1.69 miles south and north respectively.



Figure 4: Google Earth image modified to depict the relative locations of the reported crashes between 2013 and 2018.

E. REFERENCES

- A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 2011
- Manual on Uniform Traffic Control devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, 2003
- Indiana Manual on Uniform Traffic Control devices for Streets and Highways, Indiana Department of Transportation, 2008

F. DOCKET MATERIAL

The following attachments and photographs are included in the docket for this investigation:

LIST OF ATTACHMENTS

- Relevant plans sections titled “Plan and Profile of Proposed State Highway Project No. 354 Section A, Rochester-Warsaw Road” dated 1936.
- Relevant sections titled “Proposed Resurface Plans for State Highway 25 and State Highway 110” dated 2003.
- Reported motor vehicle crash data for the years of 2013 through 2018 that occurred within approximately two miles of the crash site.

LIST OF PHOTOGRAPHS

None

END OF REPORT

Robert Squire
Highway Accident Investigator