

# 2021 CROSSWALK EVALUATION

South Londonderry Township, Lebanon County, PA

South Londonderry Township, 27 W. Market Street, Palmyra, PA 17078

RETTEW Project No. 082532034

SEPTEMBER 7, 2021



**RETTEW**<sup>SM</sup>

Prepared by  
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## INTRODUCTION

South Londonderry Township, through the 2013 Comprehensive Plan, identified the need to provide a safe integration of travel for motorists, pedestrians, and bicyclist. The plan identified two distinct classifications in the Township between Urban and Rural. In the Urban areas, the Plan called for the Township to retrofit some pedestrian linkage with nearby civic uses, schools, commercial areas, and adjoining neighborhoods. Based upon continued community input, the Board of Supervisors initiated the crosswalk feasibility study for key areas within the Township focused in the Urban area.

## LOCATION

The Township identified 23 locations for evaluation as part of the 2021 Crosswalk Evaluation. The locations are:

Map Pin No.	Intersection	Report Page Number for Corresponding Exhibit
1	Horseshoe Pike (SR 0322)/Larkspur Drive	11
2	Horseshoe Pike (SR 0322)/Schoolhouse Road (SR 3013)	12
3	Horseshoe Pike (SR 0322)/Palmyra Road (SR 3019)	13
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18	Northside Road/Springbrook Drive (West)	24
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21	Northside Drive/Lingle Avenue (SR 3017)	25
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23	Palmyra Road (SR 3019)/Northside Drive	27
24	Horseshoe Pike (SR 0322)/W. Market Street	28
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 Priority Projects

## APPROACH

RETTEW Associates, Inc. has performed a field investigation of the intersections identified for the crosswalk evaluation. Each intersection identified presents unique challenges to all users including motorists, bicyclists, and pedestrians. The following is a partial list of items considered during the field view:

- Roadway classifications, geometry, and function (i.e. volume of traffic, horizontal and vertical alignment)
- Safety concerns (i.e. posted speed limit, available sight distance)
- PennDOT control (i.e. permit requirements)
- Existing pedestrian facilities
- ADA accommodations
- Connectivity (i.e. connection to businesses, neighborhoods, and recreation facilities)

As part of the initial evaluation, RETTEW incorporated the following information:

- South Londonderry Township 2013 Comprehensive Plan
- Campbelltown Community Alliance Recommendations for Pedestrian Road Crossing Study Road Markings and/or Signage, dated September 10, 2019
- Pedestrian Safety at the Crossing of SR 0322 study, dated November 5, 2015, as prepared by LTAP
- Existing PennDOT intersection/signal permits

A summary of findings and observations for each intersection is reported in Appendix A – 2021 Crosswalk Evaluation Field Data Summary. The field investigation revealed that the Township needs to take a holistic approach to the walkability of the community to improve pedestrian safety while addressing other traffic considerations.

## EVALUATION

A meeting was held with Township representatives on June 30, 2021 to review the field view findings per intersection. Consistent with the field view, the Township agreed that pedestrian accommodations should be evaluated in groups to address pedestrian linkage and safety. These groups generally consisted of:

- Route 322 Corridor
- Connection to Commercial Businesses at Rt. 322/Lynmar Avenue
- Connection to Township Park
- Forge Road (SR 0117) South Development Interconnection
- Connection between east/west Hinkle Road
- Northside Drive – East
- Northside Drive - West

### Route 322 Corridor

Route 322 is defined in the Comprehensive Plan as an arterial street, with the defined primary objective to carry large volumes of higher speed traffic. According to PennDOT, Route 322 has an average annual daily traffic of 16,500, with four percent of those vehicular trips being trucks. There are three signalized intersections along this route through the Township located at the following intersections:

- Thistledown Drive
- Palmyra Road
- S. Forge Road (SR 0117)

South Londonderry Township owns and operates these traffic signals in accordance with the traffic signal permit issued by PennDOT. Each of the signals provides pedestrian facilities including ADA curb ramps, crosswalks, and pedestrian pushbuttons/countdown timers. The signals are inspected in accordance with PennDOT's requirements by the Township's signal maintenance contractor.

A mid-block crosswalk is provided along Route 322 at the intersection of W. Market Street. A separate evaluation was conducted in 2015, a copy of the *LTAP Pedestrian Safety at the Crossing of SR 322 Memorandum* is contained in Appendix C. The study identified the need for increased driver awareness to promote a safer pedestrian crossing.

The Route 322 corridor lacks sidewalk connectivity throughout and has several areas of sidewalk in need of replacement. The Comprehensive Plan states: "The municipalities should also attempt to link key public facilities (schools, parks and playgrounds, shopping areas, etc.) with a collector sidewalk system." The plan further expands: "In some cases, these sidewalks will follow state-owned roads and the municipalities will need to seek opportunities for public improvement projects. Local officials should seek to utilize a variety of techniques for this purpose such as developer exactions or donations for deferred road improvements, block grants, growing greener grants, customary transportation grants and even mandatory dedication fees-in-lieu of open space (assuming key sidewalks are identified as part of its linear park system)."

The Township needs to evaluate potential future funding opportunities, partnership with developers, and state agencies to address the pedestrian connectivity throughout the corridor. Due to the roadway classification and function, pedestrian crossings need to be promoted to the existing traffic signals which currently provide pedestrian accommodations.

### Connection to Commercial Business at Route 322/Lynmar Avenue

The businesses located near the intersection of Route 322/Palmyra Road/Lynmar Avenue facilitate the need for safe accommodation of vehicular and pedestrian access. Overflow parking for several of the businesses is provided along Woodlawn Avenue to the south of the intersection. The configuration of the intersection of Lynmar Avenue and Woodlawn Avenue does not accommodate pedestrian access from the overflow parking lot. The traffic control, coupled with the roadway curvature, poses pedestrian and vehicular visibility concerns.

The evaluation of the Lynmar Avenue/Woodlawn Avenue intersection resulted in the following recommendations:

- Address intersection visibility on Woodlawn Avenue with "Stop Ahead" sign prior to intersection of Lynmar Avenue.

- Evaluate need for stop condition on northbound approach of Lynmar Avenue.
- Provide delineated crosswalk from overflow parking lot.
- Restrict other pedestrian crossing movements from overflow parking lot with barrier (fencing, landscaping, etc.).
- Re-construct four ADA curb ramps to current PennDOT standards.
- Add sidewalk to provide connectivity to southern portion of Woodlawn Road; remove existing mid-block crossing.
- Work with the property owner to address lighting.

#### Connection to Township Park

The Township Park is located along Lawn Road (SR 3015) across from the intersection with Lyndell Drive. The park provides recreational facilities including various athletic fields, a centralized parking lot, and internal walking path. There are no pedestrian facilities along Lawn Road or leading into the park. Evaluation of this corridor included three primary intersections:

- Route 322/ Lawn Road – Narrow intersection with limited sight visibility and lack of connectivity of pedestrian facilities.
- Barnwell Lane/Lawn Road – Existing sidewalk along Barnwell Lane terminates at Lawn Road. ADA accommodations need to be provided at termination for potential connection to the Park internal walking trail. A mid-block crossing evaluation and permit is required from PennDOT for the installation of a crosswalk.
- Lyndell Drive/Lawn Road – No pedestrian facilities are located along Lyndell Drive

Consistent with the Route 322 Corridor recommendations from the Comprehensive Plan, the Township needs to identify opportunities to link key destinations with a collector sidewalk system. Future improvements to the park need to consider accessibility of pedestrians and bicycle traffic and connectivity to the surrounding neighborhoods.

#### Forge Road (SR 0117) South Development Interconnection

There are no pedestrian facilities along S. Forge Road (SR 0117). Evaluation of this corridor included the following intersections:

- Forge Road (SR 0117)/Gentry Drive – existing development sidewalk terminates at S. Forge Road
- Forge Road (SR 0117)/Kreider Road – No pedestrian facilities
- Chesterfield Drive/Barnwell Drive – ADA improvements needed to comply with current standards

Consistent with the recommendations from the Comprehensive Plan, the Township needs to identify opportunities to link neighborhoods with a collector sidewalk system. The link includes a state route which will require coordination with the state, funding agencies, and permitting. The link should consider pedestrian connectivity to Route 322.

#### Connection between east/west Hinkle Road

Hinkle Road serves as a collector road serving existing residential development in connection to Route 322 and S. Forge Road (SR 0117). Pedestrian facilities within these neighborhoods include curb, sidewalk,

ADA curb ramps, and walking paths. This network ultimately provides an interconnection from S. Forge Road to Northside Drive. Two key intersections were analyzed as part of the evaluation:

- Hinkle Road/Brookwood Drive – existing ADA curb ramps need re-aligned and constructed to current standards. Recommend installation of pedestrian crosswalk and appropriate signage at the crossing of Hinkle Road.
- Hinkle Road/Old Farm Road - existing ADA curb ramps need re-aligned and constructed to current standards. Recommend installation of pedestrian crosswalk and appropriate signage at the crossing of Hinkle Road.

Long term plans should evaluate the connection of pedestrian facilities with the Route 322 corridor.

#### Northside Drive – East

Northside Drive serves as a collector road serving existing residential and commercial development connecting from S. Forge Road (SR 0117) to Lingle Avenue (SR 3017). The eastern portion primarily provides the link from the Hinkle Road area to Palmyra Road, primarily serving the surrounding residential areas. Pedestrian facilities within these neighborhoods include curb, sidewalk, ADA curb ramps, and walking paths. Three key intersections were analyzed as part of the evaluation:

- Northside Drive/Palmyra Road (SR 3019) – Existing signalized intersection with ADA curb ramps, crosswalks, and pedestrian pushbuttons/countdown timers. The crosswalks need to be maintained per the traffic signal permit. A portion of sidewalk needs to be constructed at the southeast corner to provide connectivity.
- Northside Drive/Springbrook Drive (West) - existing ADA curb ramps need re-aligned and constructed to current standards. Recommend installation of pedestrian crosswalk and appropriate signage at the crossing of Northside Drive.
- Northside Drive/Springbrook Drive (East) - Windermere Phase II currently under construction; proposed pedestrian facilities to be coordinated with existing walking path. Recommend installation of pedestrian crosswalk and appropriate signage at the crossing of Northside Drive.

#### Northside Drive - West

The western portion of Northside Drive primarily serves existing commercial uses. Pedestrian traffic is accommodated through existing sidewalk and walking paths. Existing tracts of land remain for development and will be required to install pedestrian facilities at the time of development. Improvements in this area should be deferred and coordinated with the proposed development.



## CONCLUSION AND RECOMMENDATION

Five priority pedestrian improvement areas were identified, these areas are identified below:

- Lynmar Avenue/Woodlawn Avenue Pedestrian Improvements
- Northside Drive – East Pedestrian Improvements
- SR 322/W. Market Street Street Crosswalk Improvements
- Hinkle Road/Brookwood Drive Pedestrian Improvements
- Hinkle Road/Old Farm Road Pedestrian Improvements

A description of the recommended improvements is provided in the Evaluations section above, and the conceptual schematic for the pedestrian improvements is identified on Appendix A - 2021 Crosswalk Evaluation Field Data Summary. Budgetary opinions of probable cost were developed for the identified priority areas, see Appendix B. The associated overall pedestrian improvement costs are summarized below:

Description	Budgetary Estimate
Lynmar Avenue/Woodlawn Avenue Pedestrian Improvements	\$ 56,000.00
Northside Drive - East Pedestrian Improvements	\$ 41,000.00
SR 322/W. Market Street Crosswalk Improvements	\$ 78,000.00
Hinkle Road/Brookwood Drive Pedestrian Improvements	\$ 30,000.00
Hinkle Road/Old Farm Road Pedestrian Improvements	\$ 46,000.00
	<b>\$ 251,000.00</b>

One recommended traffic calming improvement on Woodlawn Avenue was identified during the study, the projected costs are summarized below. For budgetary purposes, the estimate considers traffic lane delineation and installation of two chicanes to promote lower speeds. Other calming measures, including the removal of the “no-parking” restriction, should be considered by the Township. Several other traffic calming measures are identified in Appendix D - ITE Traffic Calming Measures Summary Sheets for the Township’s consideration.

Description	Budgetary Estimate
Woodlawn Avenue Traffic Calming	\$ 91,000.00

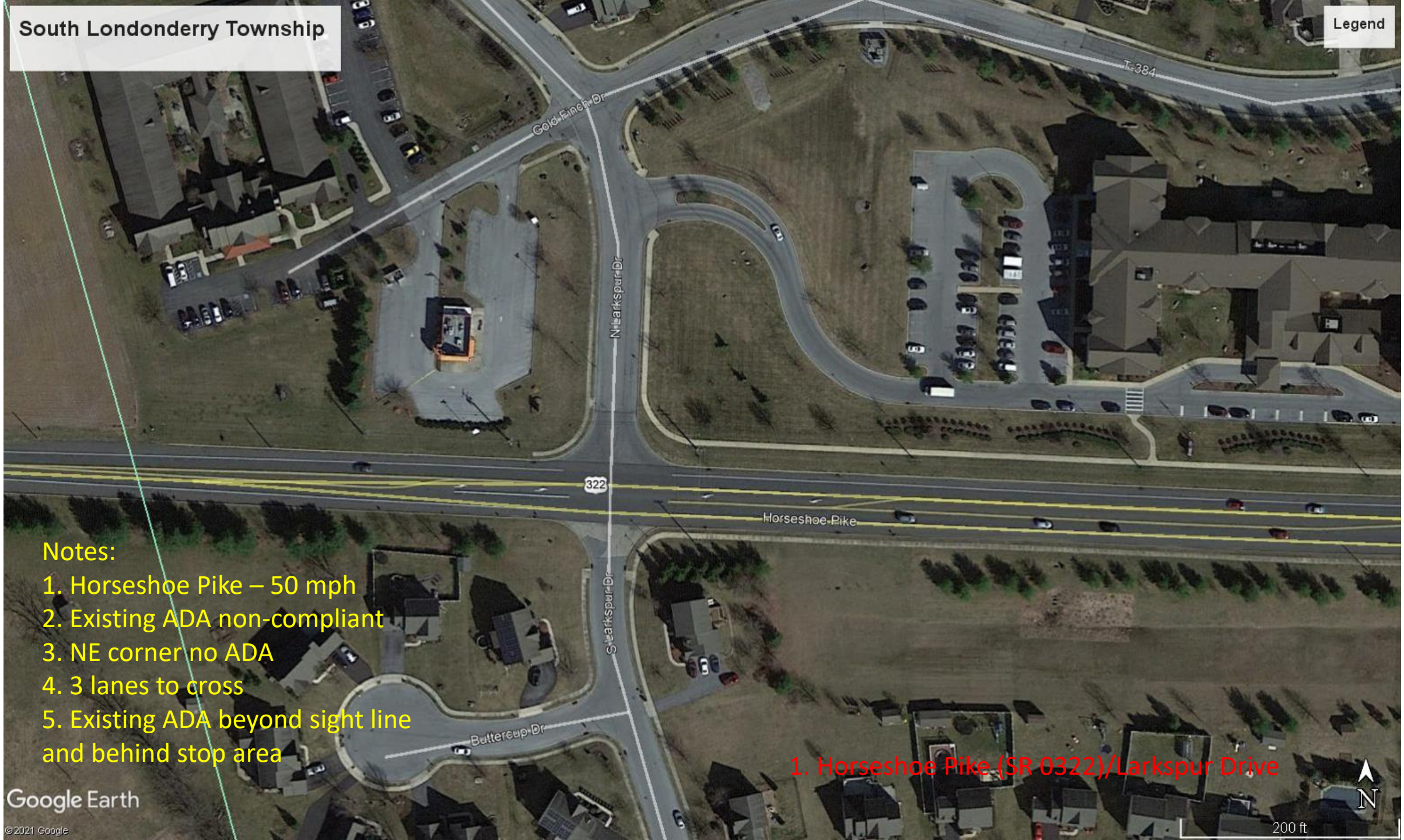
**Appendix A**  
**2021 Crosswalk Evaluation Field Data Summary**

# South Londonderry Township

## **2021 Crosswalk Evaluation Field Data Summary**

**August 2021**





Notes:


- 1. Horseshoe Pike – 50 mph
- 2. Existing ADA non-compliant
- 3. NE corner no ADA
- 4. 3 lanes to cross
- 5. Existing ADA beyond sight line and behind stop area

1. Horseshoe Pike (SR 0322)/Larkspur Drive



# South Londonderry Twp.

## Legend

 Hershey Church of the Nazarene



## Notes:

1. Horseshoe Pike – 35 mph
2. Schoolhouse Road – 30 mph
3. Existing ADA non-compliant
4. North side no ADA, sidewalk below curb elevation
5. 3 lanes to cross
6. Narrow, poor sight distance
7. Sidewalk connectivity
8. Considered mid-block crossing


2. Horseshoe Pike (SR 0322)/Schoolhouse Road (SR 3013)

Google Earth

© 2021 Google

# South Londonderry Twp.

## Legend

 Hershey Church of the Nazarene

### Notes:

1. Horseshoe Pike – 35 mph
2. Palmyra Road – 35 mph
3. Verify operating per signal permit
4. Pavement marking maintenance
5. No ped signs
6. Lacks sidewalk connectivity

3. Horseshoe Pike (SR 0322)/Palmyra Road (SR 3019)

Google Earth

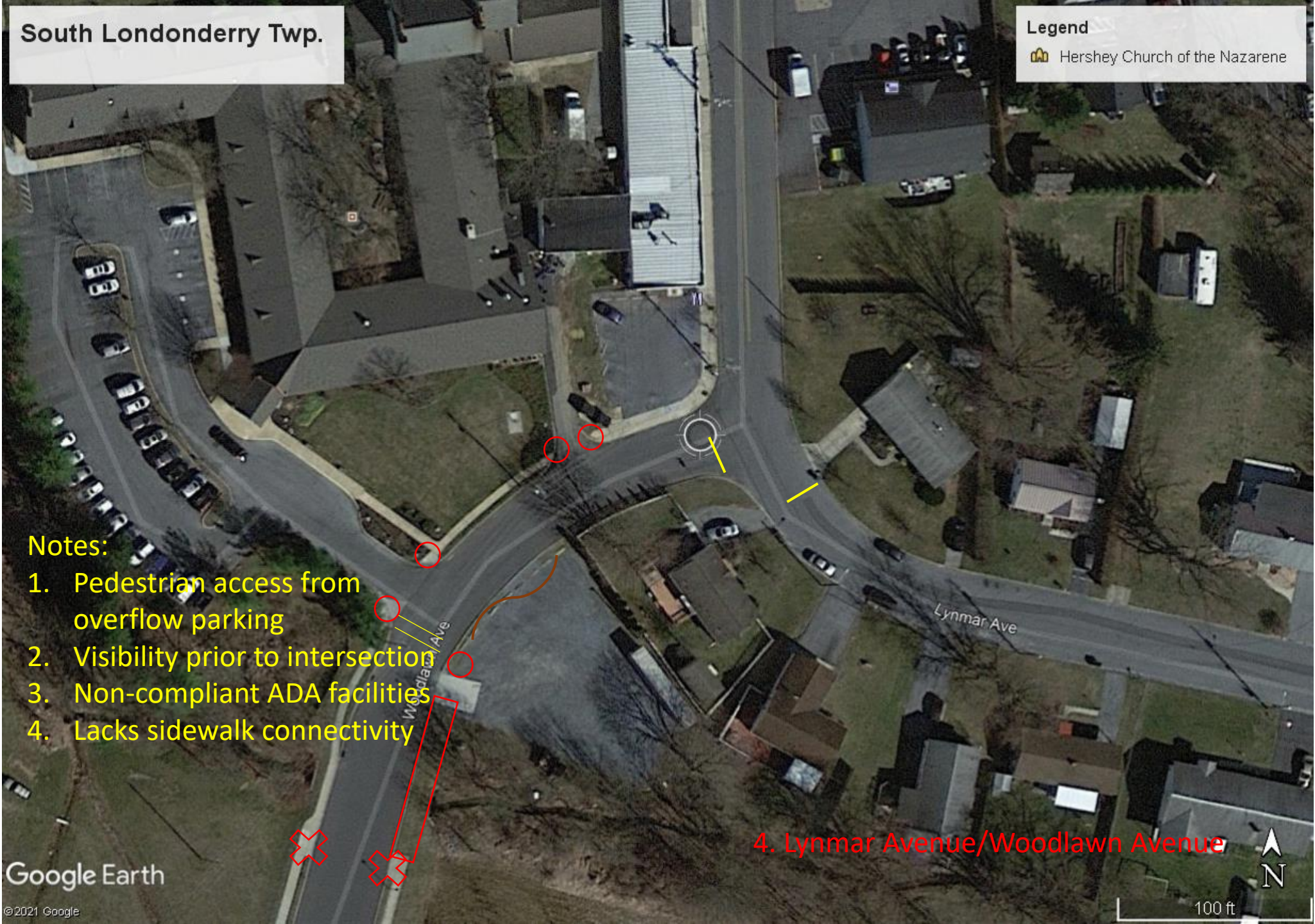
© 2021 Google

200 ft

N

# South Londonderry Twp.

**Legend**  
🏛️ Hershey Church of the Nazarene



## Notes:

- 1. Pedestrian access from overflow parking
- 2. Visibility prior to intersection
- 3. Non-compliant ADA facilities
- 4. Lacks sidewalk connectivity

4. Lynmar Avenue/Woodlawn Avenue

Google Earth

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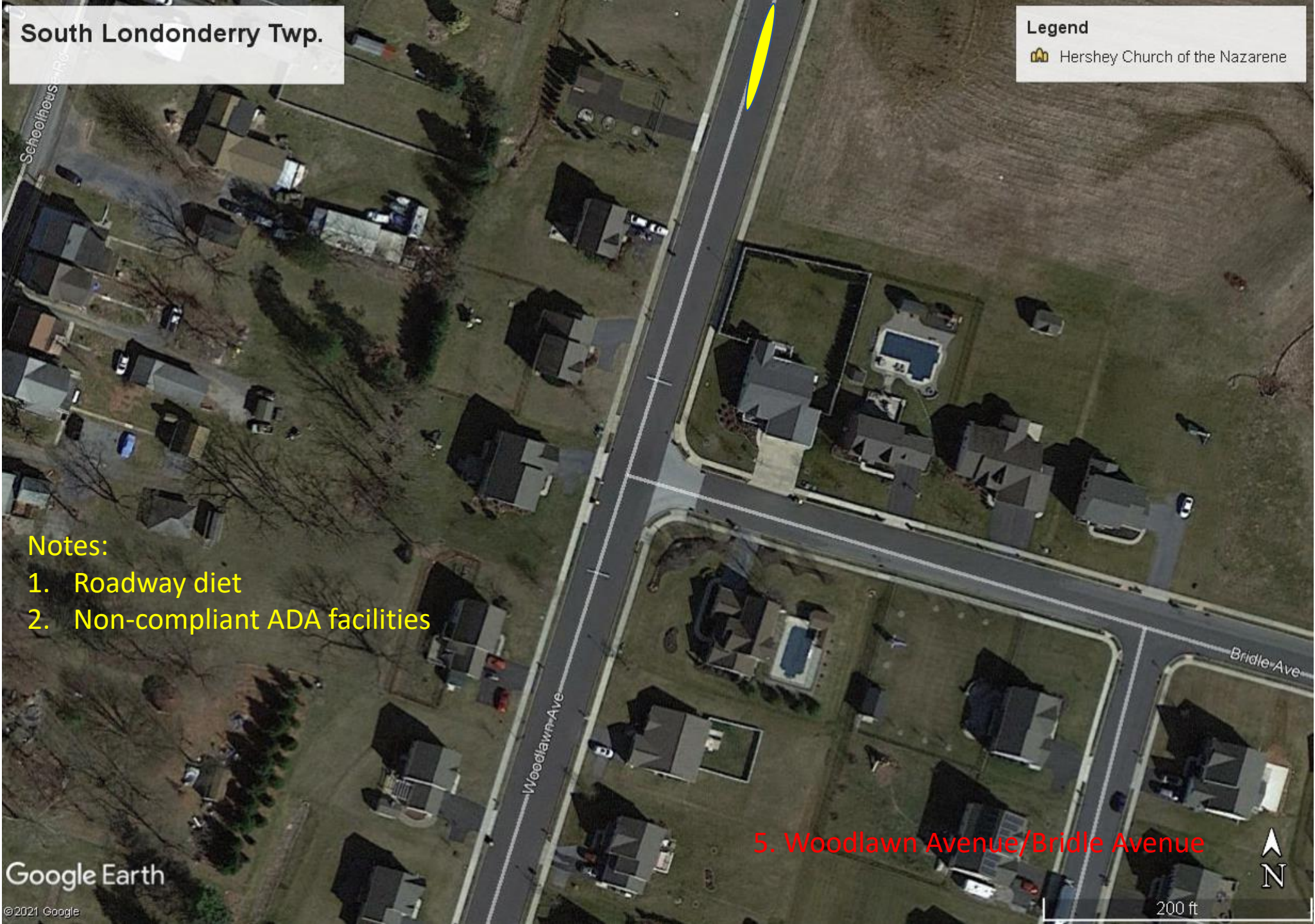
100 ft





# South Londonderry Twp.

**Legend**  
🏛️ Hershey Church of the Nazarene



## Notes:

- 1. Roadway diet
- 2. Non-compliant ADA facilities

5. Woodlawn Avenue/Bridle Avenue

# South Londonderry Twp.

**Legend**  
🏰 Hershey Church of the Nazarene



## Notes:

- 1. Narrow intersection
- 2. Poor sight distance
- 3. Sidewalk connectivity
- 4. Considered mid-block crossing

6. Horseshoe Pike (SR 0322)/Lawn Road (SR 3015)

Google Earth

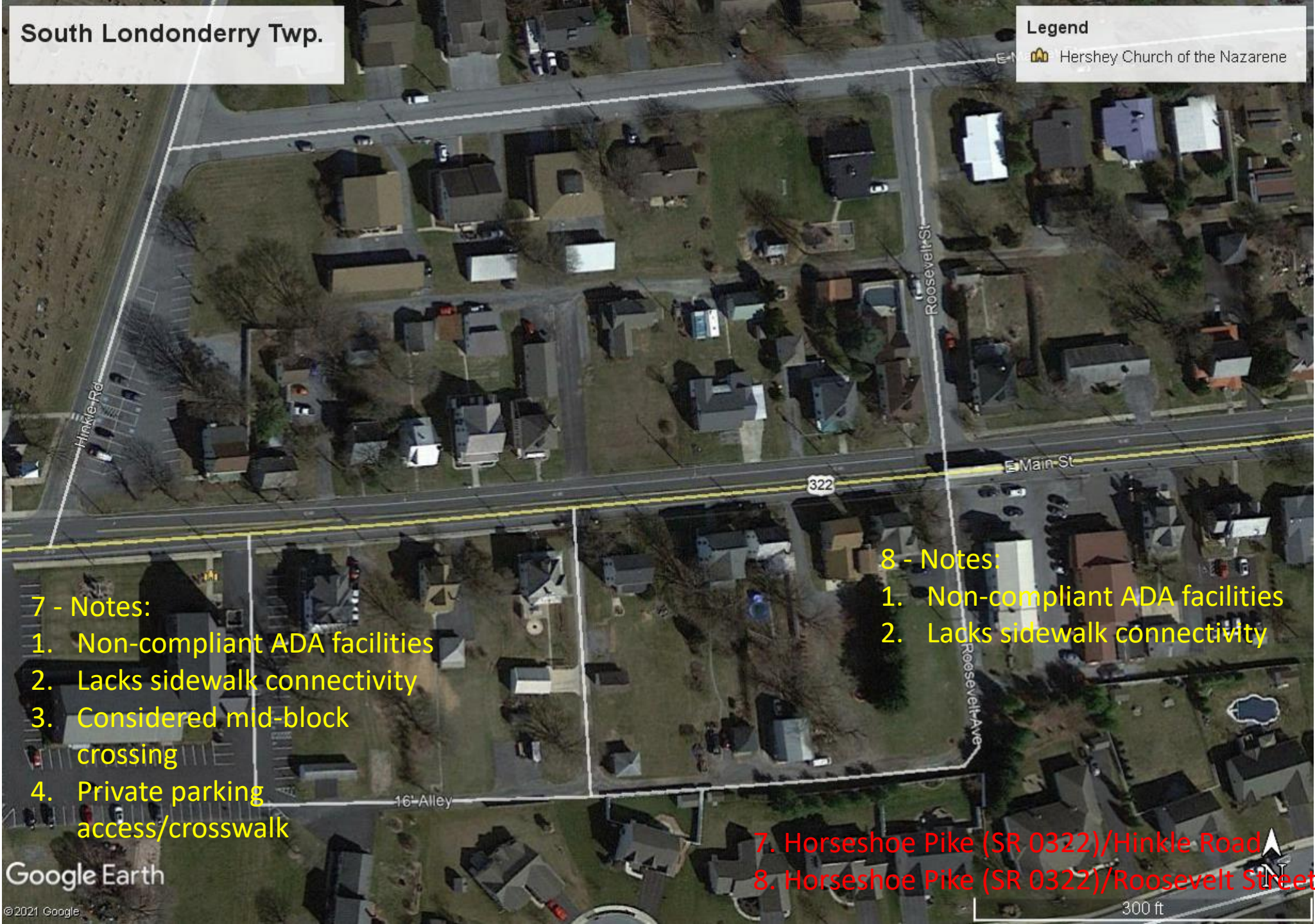
©2021 Google

300 ft



# South Londonderry Twp.

**Legend**  
🏰 Hershey Church of the Nazarene



## 7 - Notes:

- 1. Non-compliant ADA facilities
- 2. Lacks sidewalk connectivity
- 3. Considered mid-block crossing
- 4. Private parking access/crosswalk

## 8 - Notes:

- 1. Non-compliant ADA facilities
- 2. Lacks sidewalk connectivity

- 7. Horseshoe Pike (SR 0322)/Hinkle Road
- 8. Horseshoe Pike (SR 0322)/Roosevelt Street

Google Earth

# South Londonderry Twp.

**Legend**  
🏛️ Hershey Church of the Nazarene



## Notes:

- 1. Verify operating per signal permit
- 2. Pedestrian restriction SE corner
- 3. Pavement marking maintenance
- 4. No ped signs
- 5. Lacks sidewalk connectivity
- 6. Horseshoe Pike westbound approach poor sight distance for right turn on red

9. Horseshoe Pike (SR 0322)/S. Forge Road (SR 0117)

Google Earth

# South Londonderry Twp.

**Legend**  
🏰 Hershey Church of the Nazarene



### 11 - Notes:

- 1. No pedestrian facilities or ADA
- 2. Lacks sidewalk connectivity

### 10 - Notes:

- 1. Existing ADA non-compliant
- 2. Lacks sidewalk connectivity
- 3. Existing ADA beyond sight line and behind stop area
- 4. Considered mid-block crossing

10 - S. Forge Road (SR 0117)/Gentry Drive  
11 - S. Forge Road (SR 0117)/Bradford Drive

Google Earth

©2021 Google

200 ft

Notes:

- 1. Existing ADA non-compliant
- 2. Lacks sidewalk connectivity
- 3. Curb trip hazard SE corner
- 4. Sight distance obstructed by plantings NE corner

12. Chesterfield Drive/Kreider Road



13 - Notes:

- 1. Northern walking path connectivity
- 2. No ADA facilities
- 3. Considered mid-block crossing
- 4. Existing ADA beyond sight line and behind stop area

14 - Notes:

- 1. No pedestrian facilities
- 2. Lacks connectivity to recreation

13. Lawn Road (SR 3015)/Barnwell Drive

14. Lawn Road (SR 3015)/Lyndell Drive



400 ft

# South Londonderry Twp.

**Legend**  
🏛️ Hershey Church of the Nazarene



## Notes:

- 1. Non-compliant ADA facilities
- 2. Existing ADA beyond sight line and behind stop area
- 3. Tree sight distance obstruction northwest corner

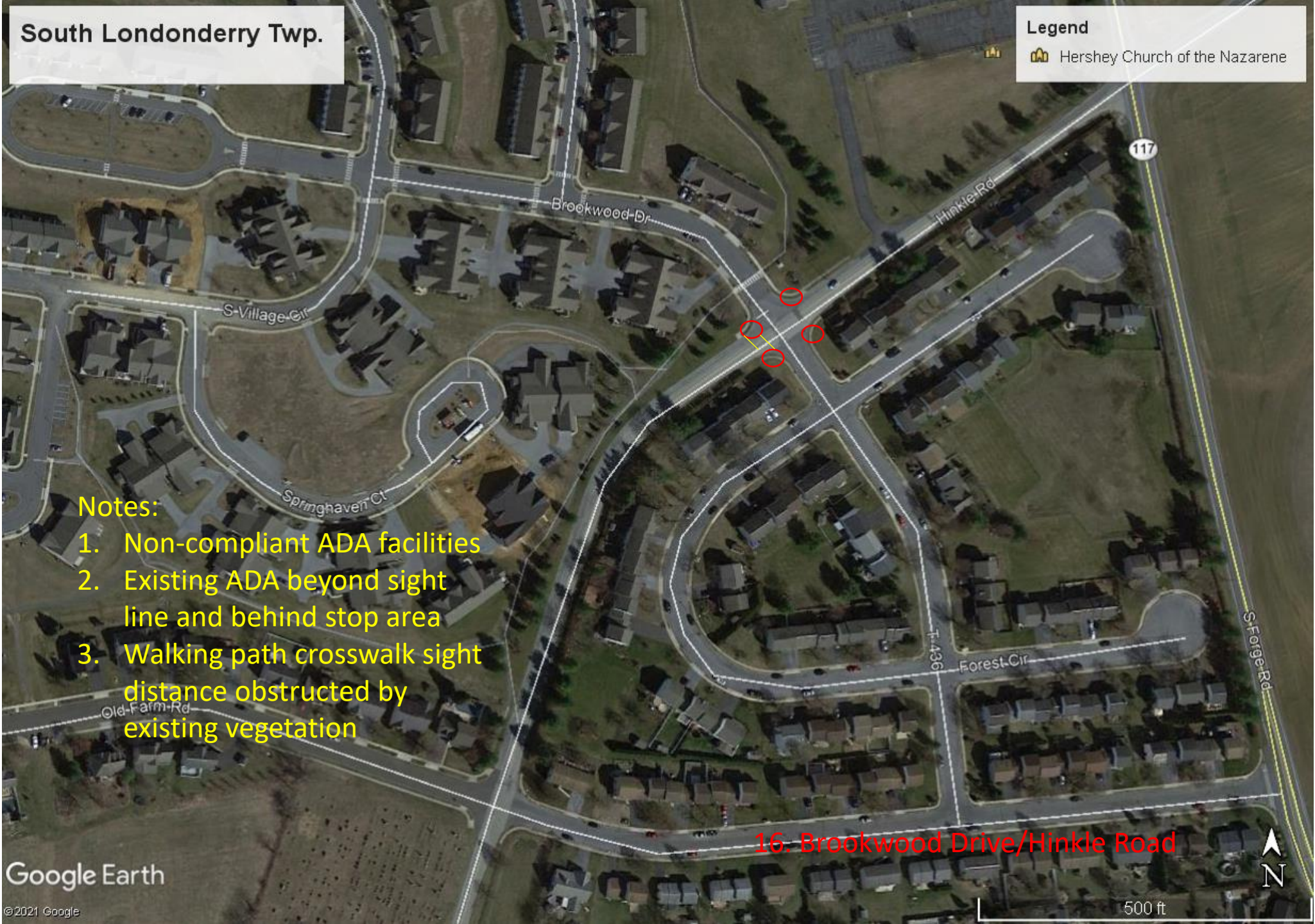
15. Hinkle Road/Old Farm Road





# South Londonderry Twp.

**Legend**  
🏰 Hershey Church of the Nazarene




## Notes:

- 1. Non-compliant ADA facilities
- 2. Existing ADA beyond sight line and behind stop area
- 3. Walking path crosswalk sight distance obstructed by existing vegetation

16. Brookwood Drive/Hinkle Road

# South Londonderry Twp.

## Legend

 Hershey Church of the Nazarene

### 17 - Notes:

1. Northside Drive – 35 mph
2. Pavement marking evaluation
3. Lacks walking trail connectivity
4. Relocate stop sign

### 18 - Notes:

1. Northside Drive – 35 mph
2. Springwood Drive – 25 mph
3. Existing ADA non-compliant
4. Pavement marking evaluation
5. Lacks sidewalk connectivity
6. Relocate stop sign SE corner


17. Northside Drive/Road Under Construction  
18. Northside Drive/Springbrook Drive

Google Earth

©2021 Google

500 ft

**Legend**

 Hershey Church of the Nazarene

20 - Notes:

- 1. Existing ADA generally compliant
- 2. Lacks sidewalk connectivity

19 - Notes:

- 1. Existing ADA non-compliant
- 2. Over-vertical on Northside Dr. limits sight distance
- 3. Lacks sidewalk connectivity

21 - Notes:

- 1. Existing ADA needs relocated to intersection
- 2. ADA facilities need provided SE corner
- 3. Coordination PennDOT project
- 4. Existing vegetation impedes sight distance
- 5. Relocate stop sign SE corner

- 19. Northside Drive/Stonebrook Drive
- 20. Northside Drive/Northside Commons
- 21. Northside Drive/Ingle Avenue (SR 3017)

- 1. No pedestrian facilities
- 2. Vertical grade issues
- 3. Intersection alignment
- 4. Coordinate with PennDOT project

22. Lingle Avenue (SR 3017)/Palmyra Road (SR3019)



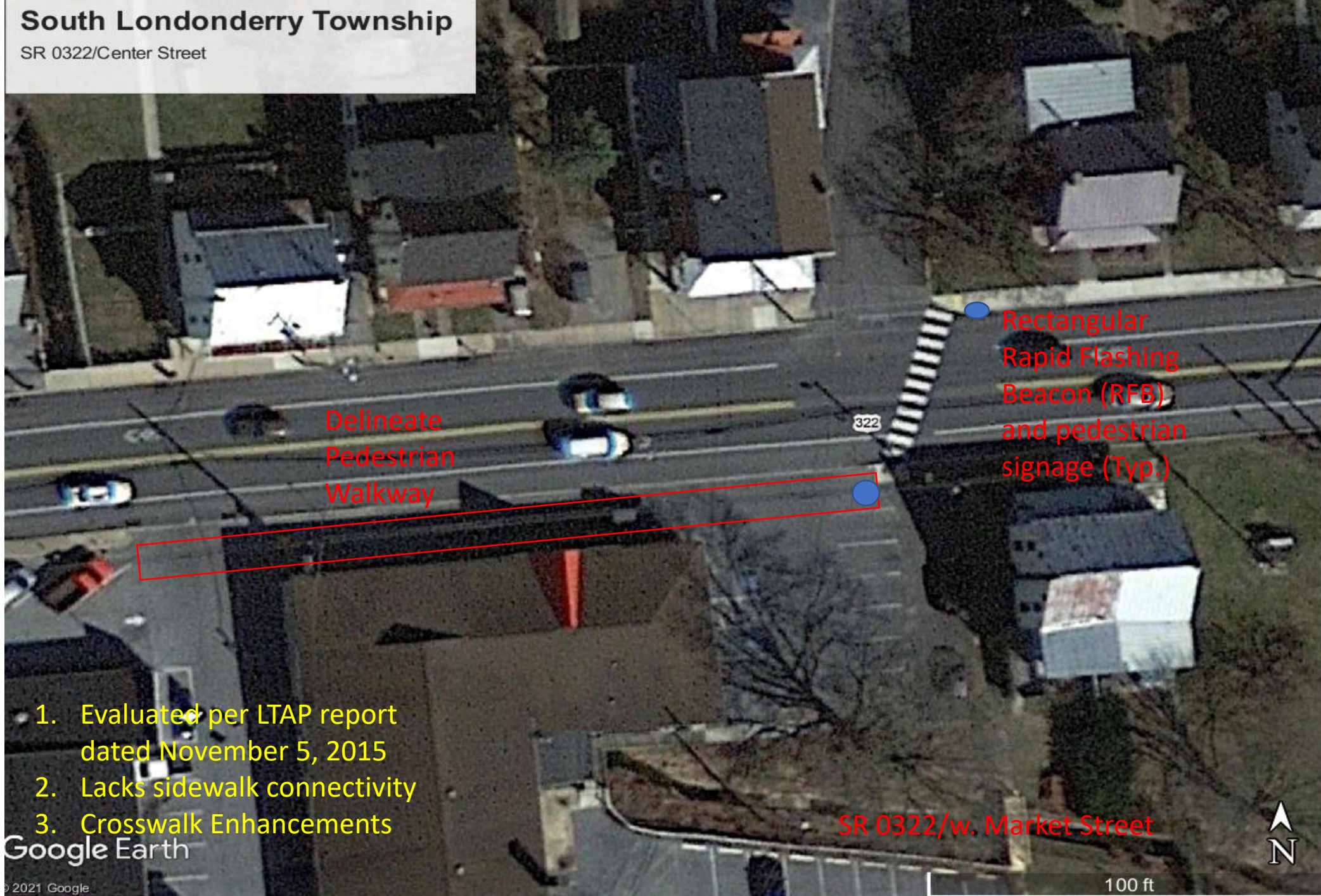
1. Verify per signal permit
2. Pavement marking maintenance
3. Stop bar location promotes encroachment into crosswalk for right turn on red.
4. Lacks sidewalk connectivity

23. Palmyra Road (SR 3019)/Northside Drive



# South Londonderry Township

SR 0322/Center Street



Delineate  
Pedestrian  
Walkway

Rectangular  
Rapid Flashing  
Beacon (RFB)  
and pedestrian  
signage (Typ.)

1. Evaluated per LTAP report dated November 5, 2015
2. Lacks sidewalk connectivity
3. Crosswalk Enhancements

Google Earth

© 2021 Google

SR 0322/w. Market Street



100 ft

# South Londonderry Township

1. Traffic Calming Measures needed from Lynmar Ave. to Schoolhouse Rd.
2. Removal of parking restrictions
3. Pavement markings to reduce road width appearance
4. Traffic calming measures - chicane

Chicane (Typ.)

Woodlawn Road Traffic Calming

Google Earth

© 2021 Google

1000 ft



**Appendix B**  
**Planning Opinion of Probable Cost Estimates**





**PROBABLE CONSTRUCTION COST OPINION  
SOUTH LONDONDERRY TOWNSHIP**

**Project No. 082532034**

**August 26, 2021**

COMPUTED BY: MRK

CHECKED BY: JDS

**RETTEW ASSOCIATES, INC.**

MECHANICSBURG, PA

**Lynmar Avenue/Woodlawn Avenue Pedestrian Improvements**

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization and demobilization	LS	1	\$ 3,200.00	\$ 3,200.00
2	Traffic Control	LS	1	\$ 2,300.00	\$ 2,300.00
3	ADA Curb Ramp - Concrete Curb	LF	134	\$ 90.00	\$ 12,060.00
4	ADA Curb Ramp - Concrete Sidewalk	SF	811	\$ 25.00	\$ 20,275.00
5	ADA Curb Ramp - Detectable Warning Surface	SF	52	\$ 40.00	\$ 2,080.00
6	ADA Curb Ramp - topsoil, seed and mulch	SY	51	\$ 30.00	\$ 1,530.00
7	ADA Curb Ramp - Remove Existing Concrete, topsoil, seed and mulch	SY	15	\$ 35.00	\$ 525.00
8	ADA Curb Ramp - Pavement restoration	SY	28	\$ 85.00	\$ 2,380.00
9	White Thermoplastic Crosswalk Line - 6" Line width	LF	60	\$ 6.00	\$ 360.00
10	White Thermoplastic Stop Bar - 24" line width	LF	32	\$ 30.00	\$ 960.00
11	Split Rail Fence	LF	95	\$ 20.00	\$ 1,900.00
12	Excavate, topsoil and seed	SY	55	\$ 35.00	\$ 1,925.00
13	Stop Sign	Ea	1	\$ 250.00	\$ 250.00
14	Stop Ahead Sign	Ea	1	\$ 250.00	\$ 250.00
15	Pedestrian Crossing Signs W11-2	Ea	2	\$ 250.00	\$ 500.00

<b>TOTAL:</b>	<b>\$ 50,495.00</b>
Contingency (+/-10%)	\$ 5,505.00
<b>Grand Total</b>	<b>\$ 56,000.00</b>

RETTEW Associates, Inc. is not a construction contractor and therefore probable construction cost opinions are made on the basis of RETTEW's experience and qualifications as an engineer and represent RETTEW's best judgment as an experienced and qualified design professional generally familiar with the industry. This requires RETTEW to make a number of assumptions as to actual conditions which will be encountered on the site; the specific decisions of other design professionals engaged; the means and methods of construction the contractor will employ; contractors' techniques in determining prices and market conditions at the time, and other factors over which RETTEW has no control. Given these assumptions which must be made, RETTEW states that the above probable construction cost opinion is a fair and reasonable estimate for construction costs but cannot and does not guarantee that actual construction cost will not vary from the Probable Construction Cost Opinion prepared by RETTEW.

file,new,Civil,Construction Cost Est.

Rev. 05/03/11

**Notes:**

1. Improvements to overflow parking lot to facilitate pedestrian movement
2. Improvement to 4 existing ADA curb ramps for compliance
3. Removal of existing mid-block ADA and sidewalk connectivity
4. "Stop Ahead" sign
5. Evaluate stop control at the intersection of Woodlawn Ave./Lynmar Ave.





**PROBABLE CONSTRUCTION COST OPINION  
SOUTH LONDONDERRY TOWNSHIP**

**Project No. 082532034**

**August 26, 2021**

COMPUTED BY: MRK

CHECKED BY: JDS

**RETTEW ASSOCIATES, INC.**

MECHANICSBURG, PA

**SR 322/W. Market Street Crosswalk Improvements**

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization and demobilization	LS	1	\$ 6,000.00	\$ 6,000.00
2	Traffic Control	LS	1	\$ 4,500.00	\$ 4,500.00
3	Rectangular Rapid Flashing Beacon (RFB)	Ea	2	\$ 18,500.00	\$ 37,000.00
4	ADA Curb Ramp - Concrete Sidewalk	SF	85	\$ 25.00	\$ 2,125.00
5	ADA Curb Ramp - topsoil, seed and mulch	SY	4.5	\$ 30.00	\$ 135.00
6	White Thermoplastic Crosswalk Line - 6" Line width	LF	270	\$ 6.00	\$ 1,620.00
7	Inlaid Thermoplastic Pavement Marking - Walking Path	SY	90	\$ 175.00	\$ 15,750.00
8	White Thermoplastic Crosswalk Marking - 24" line width	LF	88	\$ 30.00	\$ 2,640.00
9	Pedestrian Crossing Signs W11-2	Ea	2	\$ 250.00	\$ 500.00

TOTAL:	<b>\$ 70,270.00</b>
Contingency (+/-10%)	\$ 7,730.00
Grand Total	<b>\$ 78,000.00</b>

RETTEW Associates, Inc. is not a construction contractor and therefore probable construction cost opinions are made on the basis of RETTEW's experience and qualifications as an engineer and represent RETTEW's best judgment as an experienced and qualified design professional generally familiar with the industry. This requires RETTEW to make a number of assumptions as to actual conditions which will be encountered on the site; the specific decisions of other design professionals engaged; the means and methods of construction the contractor will employ; contractors' techniques in determining prices and market conditions at the time, and other factors over which RETTEW has no control. Given these assumptions which must be made, RETTEW states that the above probable construction cost opinion is a fair and reasonable estimate for construction costs but cannot and does not guarantee that actual construction cost will not vary from the Probable Construction Cost Opinion prepared by RETTEW.

**Notes:**

1. Crosswalk warning device
2. Improvement of 2 existing ADA curb ramps
3. Pedestrian connectivity to be made through pavement delineation







**Appendix C**  
**LTAP Pedestrian Safety at the Crossing of SR 322**  
**Memorandum**

# Memorandum

To: Shawn Arbaugh, South Londonderry Township

From: Andrew Robison & Patrick Wright, LTAP

Date: November 5, 2015

Subject: Pedestrian Safety at the Crossing of SR 0322

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## BACKGROUND

In response to a technical assistance request by South Londonderry Township, we met on October 16, 2015 to examine the pedestrian crossing across E Main Street (SR 0322) located at the intersection with Center Street. While on site, we walked and drove the area. The Township is concerned about the safety of pedestrians crossing E Main Street. The crosswalk serves as the only connection for pedestrians between the north side of town and the south side, east of the traffic signal at Palmyra Road (SR 3019). A large park is located directly to the south of the crossing.



Figure 1: E Main Street (SR 0322) Crosswalk



According to PennDOT ITMS data, SR 0322 is classified as an urban other principal arterial with approximately 17,400 vehicles per day, and 4% truck traffic. SR 0322 is two-lane, two-way, with a double yellow center line, white edge lines, and a posted speed limit of 35 mph. The roadway width at the location of the crosswalk is 40 feet.

The crossing is marked by a type C crosswalk, however, it was hardly noticeable. There are also non-standard Pedestrian Crossing Warning Signs on each approach. We also observed low driver compliance yielding to pedestrians waiting to cross. There were no sight distance issues.



**Figure 3: Faded Pavement Markings**



**Figure 2: Pedestrian Warning Sign**

Before discussing a concept for the pedestrian crossing, note that field observations, discussions with municipal personnel, highway safety research, and traffic engineering experience are largely responsible for the content and findings of this memo. In addition, specific references that were consulted include:

- Current edition of the 2009 Manual on Uniform Traffic Control Devices
- PennDOT Publications 46, 111,212, 236, and 383
- Pedestrian road Safety Audit Guidelines and Prompt Lists, FHWA SA-07-007, July 2007
- Improving Pedestrian Safety at Unsignalized Crossings, NCHRP Report 562, 2006
- Pedbikeinfo.org (FHWA)

Pennsylvania LTAP is willing to clarify and provide additional information relating to any of the potential solutions listed.

## CROSSWALK DISCUSSION

Since Center Street is a low volume roadway and forms a tee intersection with E. Main Street (SR 0322), the crosswalk functions, and will be evaluated as, a midblock crossing. Pedbikeinfo.org states “crosswalk markings alone are unlikely to benefit pedestrian safety. Ideally, crosswalks should be used in conjunction with other measures, such as curb extensions, to improve the safety of a pedestrian crossing, particularly on multi-lane roads with average daily traffic (ADT) above 10,000.” While E. Main Street is only a two-lane road, the overall roadway width creates similar concerns. Additionally, there are no designated pedestrian facilities on the south side of E. Main Street. Therefore until the surrounding facilities can be upgraded, it is recommended that the crosswalk should not be marked until other measures can be installed.

### *Upgraded Pedestrian Facilities*

Once pedestrians cross over to the south side of E. Main Street, they must walk on the shoulder to their destination. If they are going the community park to the south they must walk east on E. Main Street to the fire house driveway. Before a crosswalk should be marked, proper pedestrian facilities including sidewalks and curb ramps should be installed. Bump outs should also be considered to narrow the roadway at the crossing providing a safe refuge for pedestrians to wait as well as effectively narrowing the crossing distance and creating a choke point in the roadway, potentially slowing vehicles.



Figure 4: Sidewalk Bump Outs

**Pedestrian Safety Countermeasures**

The MUTCD and pedestrian safety research identifies basic signing and marking components and other treatments for crosswalks, and these include:

- Install pedestrian warning signs (W11-2) at the crosswalk and in advance of the crosswalk with the appropriate plaques
- Restrict parking near the crosswalks to improve sight distance at the crosswalks
- Install crosswalk markings
- Install “Yield to Pedestrians” sign (R1-6) at the crosswalks
- Increase enforcement to regulate speed of traffic and compliance with yielding to pedestrians



Other treatments that can improve pedestrian safety in mid-term or longer term efforts include (examples of some of these treatments are shown in Figure 5):

- Activated pedestrian signs with flashing beacons or rectangular rapid flashing beacons
- Activated pedestrian in-street lights
- Additional street lighting

Sources for the above recommendations include:

- Pedestrian Safety at Intersections, Issue Brief 9, FHWA, April 2004.
- Toolbox of Pedestrian Countermeasures, FHWA-SA-014, FHWA, September, 2007.
- Manual on Uniform Traffic Control Devices, FHWA 2009 Edition.
- PennDOT Publications 383, Traffic Calming Handbook, and 46, Traffic Engineering Manual.

**Figure 5: Sample Pedestrian Improvements**



For the crossings on E. Main Street, LTAP suggests the following short term pavement markings and signs as minimum treatments:

- Install W11-2 Pedestrian Crossing signs at each crosswalk. Supplement the signs with the W16-7p Downward Diagonal Arrow plaque.
- Install R1-6 In-Street Pedestrian Crossing signs in advance of the crosswalks on both approaches. Continue to have staff place the signs in the street during high pedestrian activity periods.
- Install Type C “block” pavement markings. Minimize the spacing between the block markings to improve visibility of the crosswalk.
- Install W11-2 Pedestrian Crossing signs in advance of each crosswalk with the Ahead W16-9p plaque. The signs should be placed in advance of the crosswalks according to MUTCD Table 2C-4, based on the speed of traffic. For a posted speed limit of 35 mph, the distance is a minimum of 100 feet.

If the Township wants to further emphasize the crossing in the short term, consider adding supplemental signs on the left side of each approach (“doubling up” signs is a proven FHWA safety measure).



**Figure 6: Example of "doubled up" Pedestrian Warning Signs with Rectangular Rapid Flashing Beacons**

Another option the Township could consider is adding Rectangular Rapid Flashing Beacons to the pedestrian signs at the crossing. These beacons are pedestrian activated, and flash in pattern that attracts the attention of motorists. Lastly, at the location of the advance pedestrian crossing signs, the Township could consider installing “Ped Xing” pavement markings on E. Main Street.

### ***Sign Installation and Maintenance***

For all signing and pavement markings purchases and installation, make sure to follow PennDOT guidelines. PennDOT Publication 111 provides details on the post installation, sign placement (height and lateral offset), and pavement marking installation

details. Where in urban areas where pedestrian activity is present, install signs so that the bottom of the sign is 7 feet above the top of the curb in accordance with Section 2A.18 of the 2009 MUTCD. The Township should also continually restripe faded pavement markings, such as stop bars, centerlines, and crosswalk markings, and replace faded and/or damaged/defaced signs. The Township can consider using thermoplastic pavement markings for the crosswalk to increase visibility and decrease maintenance. Establish a schedule for inspecting, cleaning, and replacing these traffic control devices. In accordance with Section 2A.08 of the 2009 MUTCD, implement an assessment or management method that is designed to maintain sign retroreflectivity at or above the required minimum levels. A sign management tool can be found on LTAP's website free of charge. On the website, click on "LTAP News / Events" under "News" to find information related to the free sign inventory and management tool. If Township officials have questions about the tool, please contact LTAP.

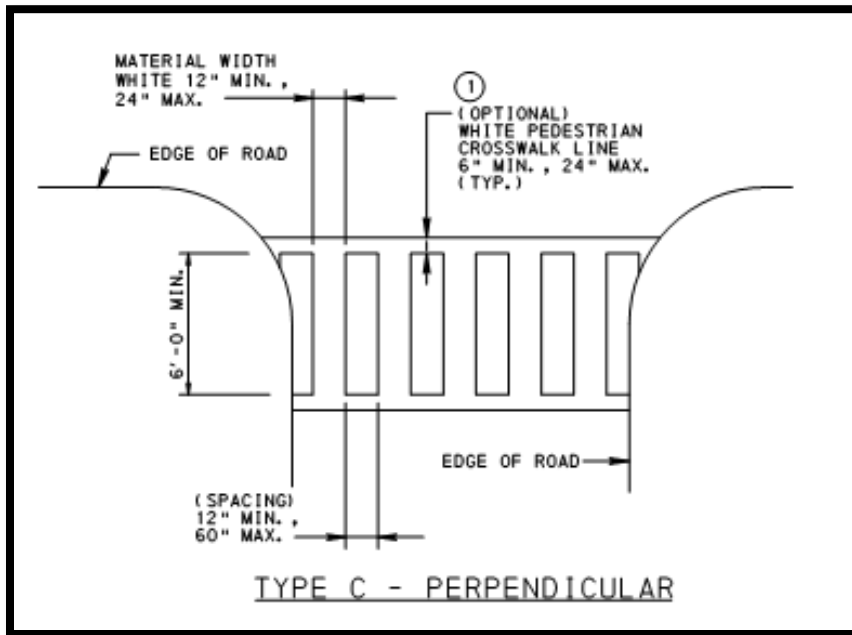


Figure 7: Sample Crosswalk Detail from PennDOT Pub 111

**ADA**

Also be aware that the American with Disabilities Act (ADA) of 1990 will apply to any new pedestrian facilities that are constructed, or existing facilities that are altered (such as repair to existing sidewalks or marking a new crosswalk). PennDOT Publication 13M, Chapter 6, contains standards and requirements for pedestrian facilities and the ADA. LTAP instructs a class on ADA for Municipal Transportation Facilities that provides good information on the issue and how to develop a plan.

## SUMMARY

Based on a field view of E. Main Street (SR 0322) and application of safety research and traffic control device standards, the Township should upgrade and install pedestrian facilities before striping the crosswalk on E. Main Street at Center Street. Once the new pedestrian facilities are installed, the Township can add signs and pavement markings to enhance motorist awareness of the crosswalk.

**Appendix D**  
**ITE Traffic Calming Measures Summary Sheets**

# Traffic Calming Fact Sheets

May 2018 Update

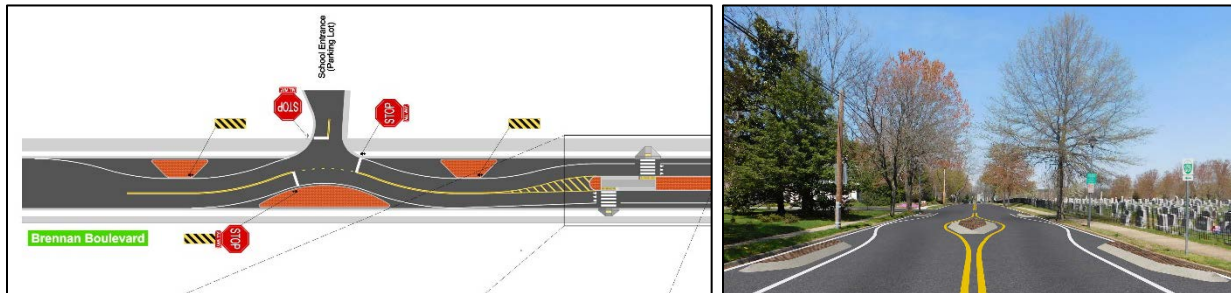
## Chicane

### Description:

- A series of alternating curves or lane shifts that force a motorist to steer back and forth instead of traveling a straight path
- Also called deviations, serpentines, reversing curves, or twists

### Applications:

- Appropriate for mid-block locations but can be an entire block if it is relatively short
- Most effective with equivalent low volumes on both approaches
- Appropriate speed limit is typically 35 mph or less
- Typically, a series of at least three landscaped curb extensions
- Can use alternating on-street parking from one side of a street to the other
- Applicable on one-lane one-way and two-lane two-way roadways
- Can be used with either open or closed (i.e. curb and gutter) cross-section
- Can be used with or without a bicycle facility



(Source: Delaware Department of Transportation)

**ITE/FHWA Traffic Calming EPrimer:** [https://safety.fhwa.dot.gov/speedmgt/traffic\\_calm.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)

### Design/Installation Issues:

- Chicanes may still permit speeding by drivers cutting straight paths across the center line
- Minimize relocation of drainage features
- May force bicyclists to share travel lanes with motor vehicles
- Maintain sufficient width for ease of emergency vehicles and truck throughput

### Potential Impacts:

- No effect on access, although heavy trucks may experience challenges when negotiating
- Limited data available on impacts to speed and crash risk
- Street sweeping may need to be done manually
- Minimal anticipated volume diversion from street
- May require removal of some on-street parking
- Provides opportunity for landscaping
- Unlikely to require utility relocation
- Not a preferred crosswalk location
- Bus passengers may experience discomfort due to quick successive lateral movements

### Emergency Response Issues:

- Appropriate along primary emergency vehicle routes

### Typical Cost (2017 dollars):

- Reported costs range between \$8,000 and \$25,000



## Choker

### Description:

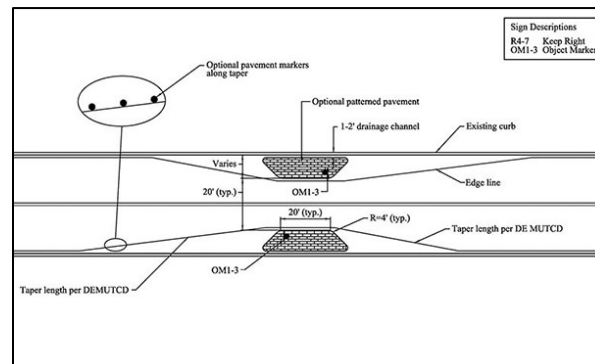
- Curb extension is a lateral horizontal extension of the sidewalk into the street, resulting in a narrower roadway section
- If located at an intersection, it is called a corner extension or a bulb-out
- If located midblock, it is referred to as a choker
- Narrowing of a roadway through the use of curb extensions or roadside islands

### Applications:

- Can be created by a pair of curb extensions, often landscaped
- Encourages lower travel speeds by reducing motorist margin of error
- One-lane choker forces two-way traffic to take turns going through the pinch point
- If the pinch point is angled relative to the roadway, it is called an angled choker
- Can be located at any spacing desired
- May be suitable for a mid-block crosswalk
- Appropriate for arterials, collectors, or local streets



(Source: City of An Arbor, Michigan)



(Source: Delaware DOT)

ITE/FHWA Traffic Calming EPrimer: [https://safety.fhwa.dot.gov/speedmgt/traffic\\_caln.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_caln.cfm)

### Design/Installation Issues:

- Only applicable for mid-block locations
- Can be used on a one-lane one-way and two-lane two-way street
- Most easily installed on a closed-section road (i.e. curb and gutter)
- Applicable with or without dedicated bicycle facilities
- Applicable on streets with, and can protect, on-street parking
- Appropriate for any speed limit
- Appropriate along bus routes
- Typical width of 6 to 8 feet; offset from through traffic by approximately 1.5 feet
- Locations near streetlights are preferable
- Length of choker island should be at least 20 feet

### Potential Impacts:

- Encourages lower speeds by funneling it through the pinch point
- Can result in shorter pedestrian crossing distances if a mid-block crossing is provided
- May force bicyclists and motor vehicles to share the travel lane
- May require some parking removal
- May require relocation of drainage features and utilities

### Emergency Response Issues:

- Retains sufficient width for ease of use for emergency vehicles

### Typical Cost (2017 dollars):

- Between \$1,500 and \$20,000, depending on length and width of barriers

## Corner Extension/Bulb-Out

### Description:

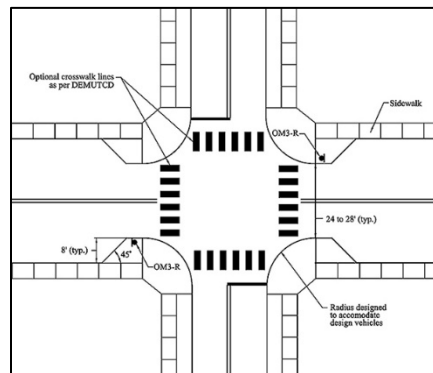
- Horizontal extension of the sidewalk into the street, resulting in a narrower roadway section
- If located at a mid-block location, it is typically called a choker

### Applications:

- When combined with on-street parking, a corner extension can create protected parking bays
- Effective method for narrowing pedestrian crossing distances and increase pedestrian visibility
- Appropriate for arterials, collectors, or local streets
- Can be used on one-way and two-way streets
- Installed only on closed-section roads (i.e. curb and gutter)
- Appropriate for any speed, provided an adequate shy distance is provided between the extension and the travel lane
- Adequate turning radii must be provided to use on bus routes



(Source: James Barrera, Horrocks, New Mexico)



(Source: Delaware DOT)

**ITE/FHWA Traffic Calming EPrimer:** [https://safety.fhwa.dot.gov/speedmgt/traffic\\_calm.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)

### Design/Installation Issues:

- Effects on vehicle speeds are limited due to lack of deflection
- Must check drainage due to possible gutter realignment
- Major utility relocation may be required, especially drainage inlets
- Typical width between 6 and 8 feet
- Typical offset from travel lane at least 1.5 feet
- Should not extend into bicycle lanes

### Potential Impacts:

- Effects on vehicle speeds are limited due to lack of deflection
- Can achieve greater speed reduction if combined with vertical deflection
- Smaller curb radii can slow turning vehicles
- Shorter pedestrian crossing distances can improve pedestrian safety
- More pedestrian waiting areas may become available
- May require some parking removal adjacent to intersections

### Emergency Response Issues:

- Retains sufficient width for ease of emergency-vehicle access
- Shortened curb radii may require large turning vehicles to cross centerlines

### Typical Cost (2017 dollars):

- Cost between \$1,500 and \$20,000, depending on length and width of barriers

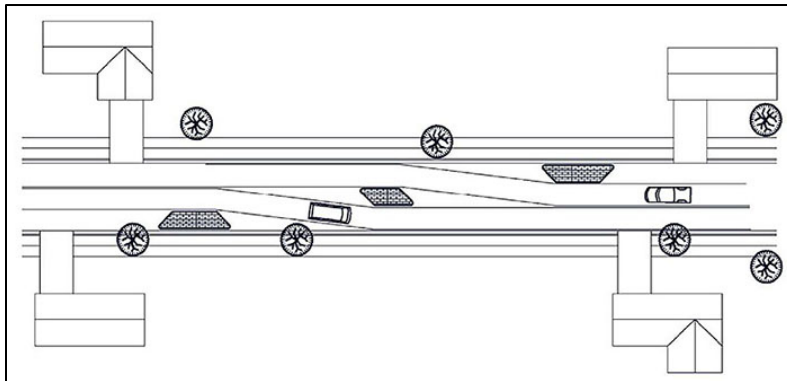
## Lateral Shift

### Description:

- Realignment of an otherwise straight street that causes travel lanes to shift in at least one direction
- A chicane is a variation of a lateral shift that shifts alignments more than once

### Applications:

- Appropriate for local, collector, or arterial roadways
- Appropriate for one-lane one-way and two-lane two-way streets
- Appropriate on roads with or without dedicated bicycle facilities
- Maximum appropriate speed limit is typically 35 mph
- Appropriate along bus transit routes



(Source: Delaware Department of Transportation)



(Source: Google Street View)

**ITE/FHWA Traffic Calming EPrimer:** [https://safety.fhwa.dot.gov/speedmgt/traffic\\_calm.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)

### Design/Installation Issues:

- Typically separates opposing traffic through the shift with the aid of a raised median
- Applicable only to mid-block locations
- Can be installed on either open- or closed-section (i.e. curb and gutter) roads
- Location near streetlights preferred
- May require drainage feature relocation
- Should not require utility relocation

### Potential Impacts:

- Without islands, motorists could cross the centerline to drive the straightest path possible
- No impact on access
- May require removal of some on-street parking
- Limited data available on impacts on speed, volume diversions, and crash risk
- Provides opportunities for landscaping
- Can provide locations for pedestrian crosswalks

### Emergency Response Issues:

- Appropriate along primary emergency vehicle routes or on streets with access to hospitals/emergency medical services, provided vehicles can straddle the street centerline

### Typical Cost (2017 dollars):

- Reported costs range between \$8,000 and \$25,000

## On-Street Parking

### Description:

- Allocation of paved space to parking
- Narrows road travel lanes and increases side friction to traffic flow
- Can apply on one or both sides of roadway
- Can be either parallel or angled, but parallel is generally preferred for maximized speed reduction

### Applications:

- High likelihood of acceptability for nearly all roadway functional classifications and street functions
- More appropriate in urban or suburban settings
- Can be combined with other traffic calming measures
- Can apply alternating sides of street for chicane effect
- Can combine with curb extensions for protected parking, including landscaping for beautification
- Can apply using time-of-day restrictions to maximize throughput during peak periods
- Can be used on one-way or two-way streets
- Preferable to have a closed-section road (i.e. curb and gutter)
- Appropriate along bus transit routes



(Source: PennDOT Local Technical Assistance Program)



(Source: Google Earth, Fort Collins, CO)

**ITE/FHWA Traffic Calming EPrimer:** [https://safety.fhwa.dot.gov/speedmgt/traffic\\_calm.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)

### Design/Installation Issues:

- Appropriate distance needed between travel lane and parking lane
- Impact is directly affected by demand; must have parked vehicles present to be effective
- If used for chicane effect, must verify parking demand to ensure that majority of spaces are occupied when effect is desired most during the day; can use parallel, angled, or combination
- Should not be considered near traffic circles nor roundabouts
- Should not be applied along median island curbs
- For lower-demand locations, can counteract negligible impact with curb extensions or other road-narrowing features

### Potential Impacts:

- Can be blocked in by snow during plowing operations; required vehicle removal
- May limit road user visibility and sight distance at driveways/alleys/intersections
- Can put bicyclists at risk of colliding with car doors
- May be impacted if other traffic calming measures are considered or implemented
- Provides buffer between moving vehicles and pedestrian facilities

### Emergency Response Issues:

- Preferred by emergency responders to most other traffic calming measures
- Requires consideration of design of parking lanes near hydrants and other emergency features

# Traffic Calming Fact Sheets

May 2018 Update



## **Typical Cost (2017 dollars):**

- Approximately \$6000 or less (factor of design specifics and length of application); can be much higher